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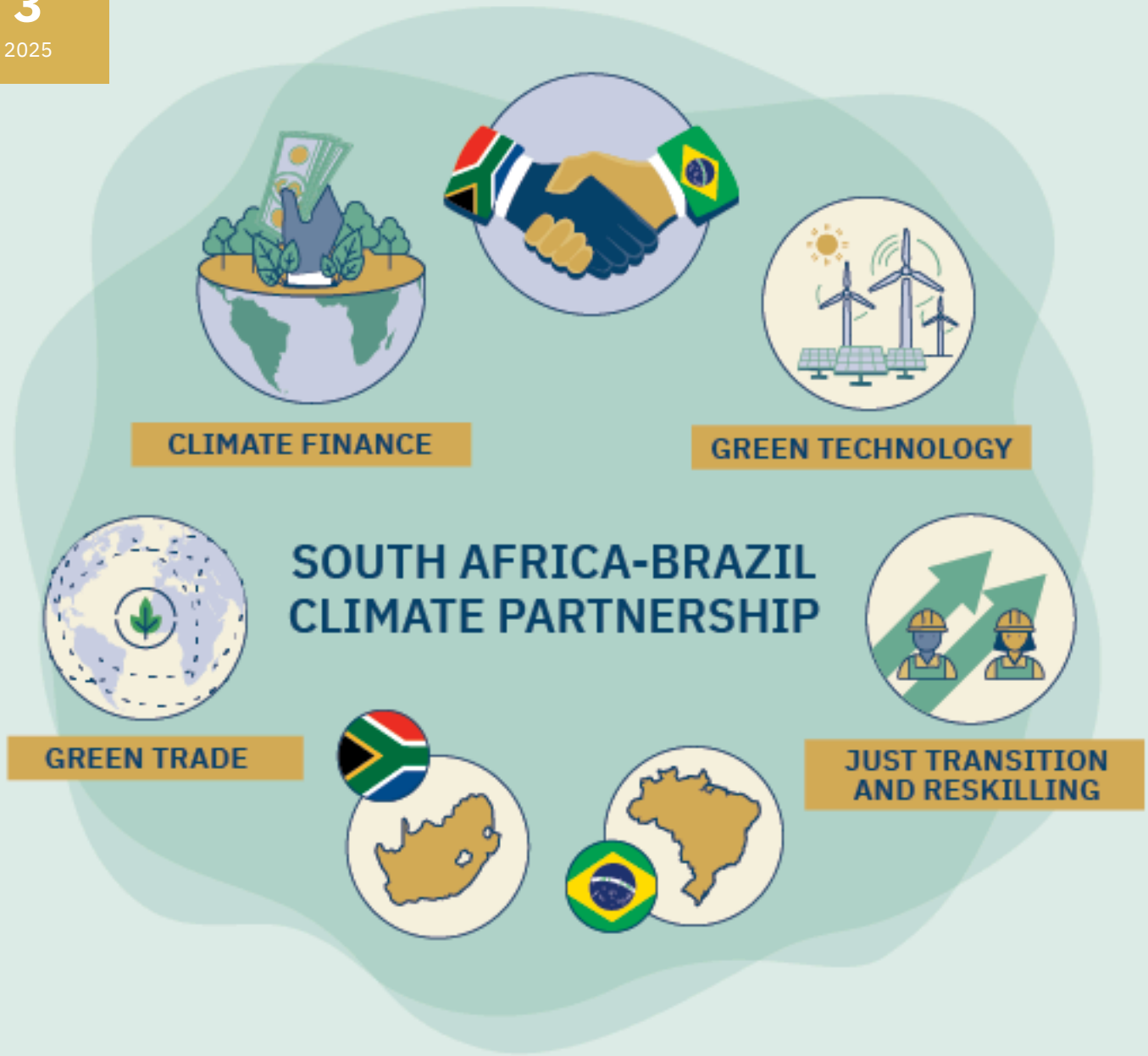

Managing a Just Transition: Reskilling of Affected Communities in Fossil Fuel Intensive Sectors

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About this project

In partnership with the South African BRICS Think Tank and the National Institute for the Humanities and Social Sciences, the South African Institute of International Affairs (SAIIA) has initiated a research project entitled 'BRICS Shaping Economic Cooperation for Green Growth, Development and the Just Transition: Partnership between Brazil and South Africa'.

The objective of the project is to contribute towards shaping a Global South economic cooperation agenda that supports green growth, development and a just transition in targeted countries and in global economic governance forums. This will be achieved through research, policy dialogues, network development and capacity-building activities centred on Brazil's and South Africa's approaches to the just transition.

A study of Brazil and South Africa can provide important shared learnings regarding the interconnectedness of climate change responses with other instruments relating to trade, technology, social protection and financing. Such learnings are relevant for how BRICS members and other developing countries shape their own transitions to a new economic and social paradigm, as well as how they engage and help shape transforming the global climate and economic governance architecture.

The project focuses on four key themes:

- strengthening the multilateral trade system for green growth and development;
- climate finance for green growth and development;
- reskilling of affected communities in the fossil fuel-intensive sector; and
- technology for green growth and industrialisation.

Among the project outputs will be the following:

- a Brazil–South Africa climate and just transition dialogue platform to contribute towards a community of practice focused on the green growth, economic cooperation and development concerns of the Global South;
- a series of working papers on each of the project themes;
- an edited volume; and
- a foresight workshop exploring the trajectory for the development of a Global South-friendly climate governance architecture through enhanced BRICS economic cooperation.

The project will support the appointment of a South African research fellow, who will complete the fellowship at SAIIA and the project's Brazilian partner institute, the Institute of Applied Economic Research/Instituto de Pesquisa Econômica Aplicada (IPEA).

Introduction

The global ambition to transition to lower-carbon economies is driven not only by the rising urgency to lower greenhouse gas (GHG) emissions to curb climate change but also by the real social and economic development opportunities associated with greening the economy. A 'just transition' should ensure that no one is left behind. For the energy transition, this is most important for the shift away from fossil fuels towards renewable energies and the resultant impact on the most vulnerable people and sectors. In developing countries, the just transition attempts to reconcile development concerns and climate action.

Energy remains a driving force of development. In fact, per-capita energy consumption is strongly related to many development indicators, including life expectancy, health, nutrition and education.[1] However, as the climate crisis worsens, the impacts of slow- and sudden-onset climate disasters are set to harm the poorest and most vulnerable communities disproportionately. This increases the urgency to decarbonise energy production to lower GHG emissions and preserve livelihoods. The question of energy decarbonisation is no longer whether the world needs to decarbonise, but rather how this can best be achieved and over what time frame. The justice question is how to accomplish a rapid transition in a manner that protects the most vulnerable populations.

Two policy imperatives have accelerated policymaking for the energy transition in South Africa and Brazil, the case countries in this working paper. The first imperative relates to opportunities to boost economic development and spur job creation through new and green industries 'greening' the economy. The second is the urgent need to address poverty and inequality (and not allow these to deepen from climate disasters) through inclusive, resilient and sustainable growth. Especially for South Africa and Brazil, two countries ranked consistently as the most unequal in the world,[2] crafting transition policies that 'leave no one behind' is essential.

The BRICS (Brazil, Russia, India, China and South Africa, and recently incorporating Indonesia, Iran, Egypt, Ethiopia and the United Arab Emirates)[3] grouping continues to play an important geopolitical role, bringing attention to Southern perspectives on global issues such as the energy transition. By virtue of its profile as a grouping of leading emerging economies and because of the controversy surrounding its members, notably China and Russia, BRICS's summits and communiqués continue to garner widespread attention. On climate change, the grouping has made somewhat less ambitious statements, albeit including climate change in each communiqué since the bloc's inception in 2009 as BRIC. Instead, BRICS countries choose to reserve their key climate commitment-making for more traditional multilateral forums such as the UN Framework Convention on Climate Change (UNFCCC) Convention of the Parties (COP) process.

For South Africa and Brazil, the climate agenda (to mitigate and adapt to the causes of climate change) is a pressing economic, social and developmental priority. Both recognised and recommitted to ambitious climate action in the 2024 BASIC ministerial statement where, with

[1] Philip J. Lloyd, "The role of energy in development," *Journal of Energy in Southern Africa* 28, no. 1 (2017): 54.
[2] World Bank, "World Development Indicators," accessed July 7, 2025.
[3] At the Johannesburg XV BRICS Summit in 2023, the BRICS invited new members to the grouping: Argentina, Egypt, Ethiopia, Iran, Saudi Arabia and the United Arab Emirates. Following national elections, Argentina withdrew interest to join BRICS while Saudi Arabia continues to observe BRICS proceedings and has not joined as a full member. Indonesia joined the BRICS as a member from January 2025.

China and India, they made the call to scale up climate finance commitments from developed countries to trillions rather than previous goals of billions.[4]

This working paper investigates the extent to which these two nations can act as role models for the skills development and transitions needed in the Global South for transitioning fossil fuel sectors and affected communities to low-carbon futures. Both countries have expressed political commitment at all levels to addressing climate change and advancing an inclusive and green economy. Thus, the ability to protect vulnerable workers and local communities from the negative impacts[5] of the green transition is imperative to achieving their national developmental agendas. Strategic areas upon which to build a partnership between the two countries to advance sustainability, clean and affordable energy and a just and inclusive green economic transition are also identified. An understanding of Brazil and South Africa's broader economic and social contexts and dynamics is vital to understand the domestic challenges the countries currently face on the journey towards socially inclusive decarbonisation.

The social dimensions of the energy transition: Country contexts

Coal and electricity in South Africa

Despite being the third largest economy in Africa, South Africa continues to struggle with the triple challenge of growing poverty, unemployment and inequality. South Africa ranks at the top of international inequality indices. Approximately 30% of its population lives below the national upper-bound poverty line and around 18% is classified as living in extreme poverty (below $1.90 per day), underscoring the structural nature of socio-economic exclusion in the post-apartheid era. Nonetheless, a World Bank report from 2022, analysing the impact of COVID-19 on the global economy, stated that South Africa and Brazil, both of which had substantial pandemic support largest declines in poverty.[6] In addition, South Africa's unemployment rate is 32.9% and its youth unemployment rate is potentially as high as 62.1%.[7] In 2023/24, approximately 19.5–20 million individuals in South Africa – representing roughly one-third of the total population – received at least one form of social assistance through the national grant system. This figure adjusts for overlapping beneficiaries who receive multiple grant types, such as a caregiver receiving both a child support grant and an old-age pension. While the total number of individual grant payments exceeds 27 million, the number of distinct recipients reflects the structural depth of income vulnerability in the country.[8] Evidence consistently shows that social grants in South Africa play a vital role in reducing extreme poverty and mitigating hunger, yet most recipients still struggle to

[4] Government of China, Ministry of Ecology and Environment, "BASIC Ministerial Joint Statement on Climate Change," Wuhan, July 21, 2024.
[5] These negative impacts are typically localised and short term. They can, however, be acute and have extensive socio-political implications. For instance, job losses in the coal sector – in a country characterised by high levels of formal unemployment – constitute serious socio-economic problems and thus have political implications that in turn impact policymaking at a national level.
[6] World Bank, Poverty and Inequality Platform (version 20220602_2017_01_02_INT). World Bank Group, 2022 quoted in D Gerzon Mahler, Nishant Yonzan, and Christoph Lakner, "The Impact of Covid-19 on Global Inequality and Poverty," Policy Research Working Paper, 2022.
[7] Trading Economics, "South Africa Unemployment Rate," accessed July 7, 2025.
[8] National Treasury, *Budget Review 2024: Social Protection Chapter & Annexure W1* (Pretoria: Republic of South Africa, 2024). See also South African Social Security Agency (SASSA), *Annual Report 2022/23* (Pretoria: South African Social Security Agency, 2023).

meet even basic nutritional and household needs, as grant values often fall below the cost of living and food poverty lines.[9]

In this context, it is critical that South Africa does not compromise its aspirations for broad-based development. However, these aspirations are tightly linked to continued reliance on coal-powered electricity, which makes South Africa the 14th largest emitter of GHG in the world.[10] Coal is also an important generator of export revenue and South Africa is the fifth largest coal exporter globally, with most coal imported by fellow BRICS member India in 2024–25, to the value of ZAR[11] 52.9 billion (about $2.94 billion).[12]

Coal accounted for approximately 80–83% of electricity generation in 2024. Eskom, the state-owned utility, produces around 95% of the country's electricity, drawing heavily on its 39.8 gigawatts (GW) of coal-fired capacity, which forms the backbone of a total national installed generation capacity of approximately 54.7GW. Despite recent growth in renewable generation, the carbon intensity of the power sector remains among the highest globally. The draft Integrated Resource Plan (IRP) anticipates a phased decommissioning of aging coal plants, with 5.4GW set to retire by 2030 and 12GW by 2035, presenting both decarbonisation opportunities and transition risks.[13]

The country's renewable energy capacity, while growing, remains far below its technical potential. By 2024, wind and solar collectively contributed only 13% to electricity generation, with installed capacity comprising roughly 5.2GW of solar photovoltaic (PV) and 3.3GW of wind. Yet, according to estimates by the Council for Scientific and Industrial Research (CSIR), South Africa has the technical potential to deploy over 250GW of solar and wind energy, particularly in resource-rich provinces such as the Northern Cape. The challenge is not the availability of renewable resources but rather infrastructural and institutional bottlenecks. Many shovel-ready projects remain grid-constrained due to a transmission system designed around historical coal corridors and lacking geographic reach into high-resource regions.[14]

Eskom's Transmission Development Plan (2023–2032) estimates that more than ZAR 210 billion (approximately $11 billion) will be required over the next decade to expand and modernise the transmission grid. These investments are essential to integrate new renewable capacity into the national grid, ensure reliable supply and facilitate the transition away from coal. Without these upgrades, South Africa risks locking in energy insecurity and failing to capitalise on its vast renewable endowment. Additionally, underdeveloped grid infrastructure would increase the country's exposure to climate-linked trade instruments such as the EU's Carbon Border Adjustment Mechanism (CBAM), further constraining industrial competitiveness.[15]

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[9] Talent Zwane, Mduduzi Biyase, and September Rooderick, "Assessing the Impact of Social Grants on Household Welfare Using Propensity Score Matching Approach," *International Journal of Development Issues* 24, no. 1 (2022): 1.
[10] Climate Watch, "Historical GHG Emissions."
[11] Currency code for the South African rand.
[12] International Energy Agency (IEA), "Coal Information: Exports."; The Observatory of Economic Complexity (OEC), "Coal Briquettes, South Africa," accessed July 7, 2025.
[13] Department of Mineral Resources and Energy (DMRE), *Integrated Resource Plan 2019* (Pretoria: Government of South Africa, 2019); Draft Integrated Resource Plan 2023 (unpublished as of June 2025).
[14] Jarrad Wright and Joanne Calitz, "Systems Analysis to Support Increasingly Ambitious CO 2 Emissions Scenarios in the South African Electricity System," Tech. Rep., vol. 27, 2020.
[15] Eskom, *Transmission Development Plan 2023–2032* (Eskom, 2023); National Treasury, *Budget Review 2024* (Pretoria: Republic of South Africa, 2024).

South Africa has made an ambitious commitment to reduce its GHG emissions by 2030 to between 398 and 440 megatons of CO_2 equivalent in its revised Nationally Determined Contribution of 2021.[16] However, this diversification is not happening at a fast enough pace to fill the current energy generation deficit.

A significant constraint to the country's economic growth (currently, GDP growth is slower than 1% per year) is its energy generation deficit. As a result of decades of mismanagement of Eskom and underinvestment in the country's energy generation and transmission infrastructure, South Africa suffered from rolling blackouts, commonly known as 'load shedding', for up to 10 hours a day at their peak (in 2023). While 2023 marked South Africa's worst year on record for electricity supply interruptions – with over 325 days of load shedding and estimated economic losses exceeding ZAR 450 billion (approximately $24 billion) – conditions improved in 2024. Load shedding was reduced by roughly 50–60% due to improved fleet performance, elevated diesel use and increased distributed solar generation. On this basis, total revenue losses from load shedding in 2024 were estimated at ZAR200–220 billion (approximately $10.8–11.9 billion), still representing a substantial drag on output and productivity. These figures, however, reflect only the immediate, quantifiable economic costs of unserved energy. They do not capture the more diffuse opportunity costs associated with investor hesitancy and deindustrialisation in energy-intensive sectors, or the reputational risks of maintaining a power system that remains both unreliable and carbon-intensive. Without a credible and accelerated transition toward a secure, low-carbon energy infrastructure – including grid reform, regulatory certainty and decarbonised baseload options – South Africa's broader growth and reindustrialisation prospects will remain constrained.

Energy affordability also remains a pressing issue across the country. Minister for Energy and Electricity Kgosientsho Ramokgopa had to defend proposed electricity tariff hikes for 2025 as Eskom sought critical financing to hold off load shedding.[17] Despite the country's high rate of electrification (86%),[18] household energy poverty is widespread and 43% of households are unable to meet basic energy needs.[19] Access does not translate into sufficient availability at appropriate amperages to reliably run a small business, for instance. In this context of chronic energy insecurity and wider poverty, inequality and unemployment crises, studies on the just transition in South Africa must include broader discussions on vital employment creation and social policies to protect vulnerable peoples and promote economic prosperity.

South Africa does have plans in place to diversify its energy mix, with the potential to create new jobs in new industries, encourage entrepreneurship and provide affordable and renewable energy for the country. The latest IRP aims for an energy mix of 44% coal power (a 5% revision down from the 2019 IRP), 28% gas, 22% renewables and 6% nuclear by 2030, although the country is not on track to realise these goals. Despite acknowledging the urgency of decarbonisation and energy security, South Africa's most recent IRP (not yet gazetted) has been criticised for underestimating the pace and scale of renewable energy deployment needed to meet climate and economic objectives. Researchers argue that the IRP remains tethered to outdated planning assumptions and fails to fully leverage cost declines in solar and wind technology. It also does not sufficiently integrate transmission infrastructure planning into its expansion scenarios, resulting in a

[16] Government of South Africa, "First Nationally Determined Contribution under the Paris Agreement, Updated September 2021."
[17] SABC News, "Govt needs to protect poor from electricity price hikes: Ramokgopa," September 20, 2024.
[18] International Renewable Energy Agency (IRENA), *Renewable Energy Prospects: South Africa* (Abu Dhabi: IRENA, June 2020).
[19] Blessings Masuku, "Rethinking South Africa's Household Energy Poverty through the Lens of off-Grid Energy Transition," *Development Southern Africa* 41, no. 3 (2024): 467.

mismatch between policy ambition and implementation feasibility. For instance, Kiss-Dobronyi et al. contend that the IRP lacks coherence with South Africa's recovery and decarbonisation strategies,[20] while Schmid and Lumsden show that gaps in capacity allocations and policy inertia impede the scaling of renewables.[21]

Additionally, the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) has as its core objective the ambition to diversify and expand South Africa's energy generation capacity. Through open bids, the plan encourages independent power producers to contribute to the country's renewable energy generation, although constrained local financing and limited available skills have hampered the scale of the REIPPPP's success.

The REIPPPP was initially hailed as a model of market-based clean energy procurement, attracting over ZAR 200 billion (approximately $11 billion) in private investment and delivering competitively priced renewable energy at unprecedented speed. As Eberhard et al. note, the programme's early success lay in its transparent bidding processes, credible institutional arrangements and clear procurement targets.[22] However, its momentum stalled after 2015 due to political interference, particularly during the height of state capture, when vested interests within Eskom and government circles delayed the signing of power purchase agreements. This institutional regression aligns with Acemoglu and Robinson's thesis that dominant elites may deliberately block growth-enhancing innovations to preserve their rents, even at the cost of national welfare.[23] Moreover, the localisation components of the REIPPPP, while well-intentioned, often failed to deliver durable technological or skills transfer. Critics argue that South Africa continues to import key renewable energy components – such as solar PV panels and wind turbine systems – often manufactured using raw materials exported from South Africa itself.[24] This underscores the need for a green industrial strategy that goes beyond procurement and actively fosters domestic capability, manufacturing depth and value-chain integration.[25]

In a case study review of wind power generation for the REIPPPP, Chetty et al. found that two wind farms in the renewables-strategic site of the Northern Cape were unable to address the shrinking coal-based work opportunities of the transition. Nor did the wind farms supply much long-term employment after the initial phase of job creation during construction.[26] Skills development programmes struggled to respond to the scale of the farms' demand while surrounding communities were somewhat protected from negative effects through the establishment of community trusts and the provision of select social services.[27]

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[20] Bence Kiss-Dobronyi et al., "Interactions between Recovery and Energy Policy in South Africa," *Energy Strategy Reviews* 50 (2023): 101187.
[21] Nicolas Schmid and Christina Lumsden, "Sowing the Seeds of Change: Policy Feedback and Ratcheting up in South African Energy Policy," *Energy Policy* 178 (2023): 113597.
[22] James Leigland and Anton Eberhard, "Localisation Barriers to Trade: The Case of South Africa's Renewable Energy Independent Power Program," *Development Southern Africa* 35, no. 4 (2018): 569.
[23] Daron Acemoglu and James A Robinson, "Economic Backwardness in Political Perspective," *American Political Science Review* 100, no. 1 (2006): 115.
[24] Mike Morris et al., "Energy and Industrial Policy Failure in the South African Wind Renewable Energy Global Value Chain: The Political Economy Dynamics Driving a Stuttering Localisation Process," Policy Research on International Services and Manufacturing (APA, 2020).
[25] Ross Harvey, Stuart Morrison, and Pranish Desai, "Is South Africa Afflicted by the Resource Curse?," *Extractive Industries and Society* 23 (2025): 101678.
[26] Krish Chetty et al., "Fostering a just energy transition: Lessons from South Africa's Renewable Energy Independent Power Producer Procurement Programme," *South African Journal of International Affairs* 30, no. 2 (2023): 225.
[27] Chetty et al., "Fostering a just energy transition," 225.

This case is emblematic of the wider challenge facing South Africa's just transition: the approximately 90 000 current direct coal sector jobs cannot be smoothly or swiftly substituted by employment in the renewable energy sector, particularly when grid constraints prevent many projects from reaching financial closure or scaling deployment. As Chetty et al. caution, without systemic alignment between industrial policy, spatial development and grid investment, renewable energy deployment risks reinforcing existing regional disparities rather than alleviating them.[28] To address this justice gap, experts advocate for an integrated strategy that includes targeted reskilling and labour mobility programmes, long-term community equity participation in renewable projects and state-led investment in expanding transmission infrastructure into coal-dependent regions.[29] Without such deliberate coordination, South Africa's transition risks deepening rather than resolving its socio-economic fault lines.

The energy mix of Brazil

Despite Brazil's relatively clean energy mix, reliant mostly on renewable hydroelectric[30] and wind power, the country is ranked among the top 10 biggest GHG emitters, with agriculture and deforestation major sources of its carbon emissions.[31] Brazil is the largest economy in South America but continues to struggle with inequality and poverty. The country entered a deep recession in 2015–2016, with GDP contracting by 3.5% in 2015 and again by 3.3% in 2016, followed by a slow and uneven recovery. This was further undermined by the economic fallout from the COVID-19 pandemic in 2020, when GDP fell by 3.9%.[32] Following the pandemic, Brazil's economy grew by 2.9% in 2022 and was estimated to have expanded by 3.1% in 2023, reflecting a modest recovery supported by strong agricultural output and resilient consumption.[33] Despite these gains, Brazil remains one of the most unequal societies in the world: the top 5% of the population earns as much as the bottom 95%, a stark reflection of structural income concentration.[34] President Luiz Inácio Lula da Silva's administration faces the dual challenge of promoting environmentally sustainable growth while addressing persistent inequality and poverty. The government has reintroduced and expanded social protection programmes in response to rising fuel and food prices, even as public and private debt levels remain elevated and fiscal constraints tighten.[35]

Despite Brazil's clean energy mix and the widespread availability of energy in the country (electricity is available in 99% of Brazilian households), energy poverty remains a pervasive policy

[28] Chetty et al., "Fostering a just energy transition," 225.
[29] Franziska Müller and Simone Claar, "Auctioning a 'Just Energy Transition'? South Africa's Renewable Energy Procurement Programme and Its Implications for Transition Strategies," *Review of African Political Economy* 48, no. 169 (2021): 333.
[30] There is considerable controversy over whether traditional hydropower is truly 'renewable' in that the dams built to produce the power typically have severe downstream ecological and livelihood effects. The production of power at the expense of food security, for instance, is not exactly a sustainable intervention. Thus, while the power produced is free from emissions, the ecological footprint of dam building and its subsequent irreversible effects may render the technology effectively 'unclean'.
[31] United States Agency for International Development (USAID), "Brazil Climate Change Country Profile," November 29, 2023.
[32] C. Feijó, E. Mantoan, and V. Centeno, "Why has the Brazilian economy stagnated in the 2010s? A Minskyan analysis of the behavior of non-financial companies in a financialized economy," *Brazilian Journal of Political Economy* 41, no. 3 (2021): 455.
[33] International Monetary Fund (IMF), *Brazil: 2023 Article IV Consultation – Press Release; Staff Report* (IMF Country Report No. 23/356, 2023).
[34] A. Ayoub, A. Sultan, and T. A. Wani, "External Debt Crisis & Socio-Economic Fallout: Evidence from the BRICS Nations," *Regional Science Policy & Practice*, 2024.
[35] Christopher Sabatini and Lilia Caiado Couto, "Brazil's new president inherits huge economic challenges," Chatham House, October 31, 2022..

issue. Deep socio-economic inequalities, as in the case of South Africa, leave marginalised communities with limited access to affordable energy. Moreover, the reliability of the national electricity system has raised significant concerns over the past few years, as has the sustainability of Brazil's clean energy mix. The country is heavily reliant on hydroelectric power, but droughts have led it to seek alternative energy sources.[36] Brazil's agricultural sector is responsible for the majority of the country's carbon emissions, rendering it the highest emitter in South America, despite its relatively clean energy mix and investments in wind and solar energy sources.

Brazil's agricultural sector remains an economic linchpin, contributing approximately 6.8% to GDP and wielding considerable political influence, particularly due to the dominance of large-scale agro-industrial interests in soy, beef and sugarcane. However, this sector is also a primary driver of GHG emissions, not only through livestock and fertiliser use but also through deforestation linked to agricultural expansion, especially in the Amazon and Cerrado biomes. The political economy of Brazilian agriculture has fostered resistance to zero-deforestation measures, as documented in recent studies highlighting industry pushback against environmental regulation due to perceived threats to profitability and land-use autonomy.[37] At the same time, Brazil's manufacturing sector – intertwined with agribusiness through food processing, biofuels and agricultural machinery – employs around 20% of the population and remains vulnerable to decarbonisation shifts.[38] The green transition could disrupt these integrated value chains if not matched by a just and coordinated industrial strategy. Projections suggest that green employment expansion – particularly in bioeconomy and renewable energy – will not easily compensate for potential losses unless substantial investment is made in skills development, regional planning and technological localisation.[39] Accordingly, from an ecological economics perspective, Brazil should consider recalibrating its development model to prioritise regenerative agriculture, spatially inclusive reindustrialisation and transparent governance of ecological limits, aligning emission reduction with social resilience.

Brazil has the potential to lead in sustainable energy development. However, the unequal distribution of affordable energy resources continues to undermine progress made in other aspects of development (such as through Brazil's extensive social programmes)[40] and thus the government's ability to engineer a just and inclusive transition.

[36] Gustavo Ribeiro, "The underexplored risks of hydroelectric power," *The Brazilian Report*, July 9, 2021. This speaks to the earlier footnote raising caution over categorising hydropower as 'renewable' or 'clean'; its sustainability is unclear at best.
[37] B. de Andrade Aragão et al., "'Greenlash' and Reactionary Stakeholders in Environmental Governance: An Analysis of Soy Farmers against Zero Deforestation in Brazil," *Forest Policy and Economics*, 2024.
[38] R. D. Garrett et al., "Should Payments for Environmental Services Be Used to Implement Zero-Deforestation Supply Chain Policies? The Case of Soy in the Brazilian Cerrado," *World Development* 158 (2022): 105959.
[39] M. G. Bastos Lima, "Just Transition Towards a Bioeconomy: Four Dimensions in Brazil, India and Indonesia," *Forest Policy and Economics*, 2022.
[40] There are a number of social programmes that guarantee access to modern cooking fuels and electricity in Brazil for low-income families. These include Luz Para Todos (aims to universalize electricity), Auxilio Gas (to assist low-income families to purchase gas through a bimonthly voucher), Tarifa Social (a discount on electricity bills for low income registered families) and Bolsa Familia (a cash transfer program targeting poverty and vulnerability). See Paula Bezerra et al., "The multidimensionality of energy poverty in Brazil: A historical analysis," *Energy Policy* 171 (2022): 113268.

Transition policy in Brazil and South Africa

The Just Energy Transition Plan

In 2020, President Cyril Ramaphosa established an independent and multi-stakeholder body in the form of the Presidential Climate Commission (PCC) to 'oversee and facilitate' the low-carbon transition process.[41] The formation of the PCC preceded South Africa's entering into the first North–South international financing plan to transition away from coal-fired power: the Just Energy Transition Plan. The Just Energy Transition Partnership (JETP) was launched with South Africa at COP26 in November 2021, followed by Indonesia in November 2022, Vietnam in December 2022 and Senegal in June 2023, making all current JETP recipients exclusively from the Global South. These partnerships represent a new model of climate finance diplomacy aimed at supporting coal phase-out and clean energy transitions in emerging economies.[42]

The complexities of achieving a just, inclusive and equitable energy transition in the developing world requires navigation to safeguard the vulnerable communities that are likely to be most impacted by decarbonisation initiatives. South Africa has to balance the expectations of its Northern partners with regard to the pace and implementation of the just transition while facing increasing pressure to address developmental issues nationally, which will be exacerbated by the transition itself. To this end, the PCC adopted the Just Transition Framework, also approved by cabinet in 2022, to serve as a unifying national policy framework for the just transition. The framework aligns to the National Development Plan and South Africa's other international climate commitments. It is supported by the Just Transition Investment Plan and an Implementation Plan, both of which have delineated objectives for tackling the skills development and social investment aspects of the just transition.

The Just Transition Framework recognises the critical role of human resource skills development to the success of South Africa's transition. Its vision for transitioning the formal labour sector away from coal is consistent with the International Labour Organization's (ILO) suggestions for decarbonising the economy. These highlight the need to 'invest in existing and new technical and vocational training systems, retrain workers, anticipate needs and provide upskilling measures, offer on-the-job training and apprenticeships' or adopt new economic models for sustainable development, such as investing in a low-carbon digital or care economy.[43] It identifies 1) reskilling and upskilling adult workers, 2) realigning the skills development system with anticipated labour needs for a green economy and 3) the importance of foundational skills setting throughout the education system to create an adaptive future workforce.[44] To support these efforts, the framework proposes additional goals around economic diversification and innovation for industrial development as job creators.

The Just Transition Framework, together with its investment and implementation plans, recognises how vital skills development will be to the success of the transition and 'leaving no one behind'. Absorbing and reskilling workers from affected industries for new sectors in the low-carbon

[41] Presidential Climate Commission (PCC), "About Us."
[42] NP Simpson, M Jacobs, and A Gilmour, *Taking Stock of Just Energy Transition Partnerships* (ODI Policy Brief, November 2023); H Brown and A Seiler, *The JETPs of South Africa and Indonesia: A Blueprint to Move Away from Coal?* (Center for Global Development, 2023).
[43] International Labour Organisation (ILO), "Employment and just transition to sustainability in the BRICS countries," Working paper for the 1st BRICS Employment Working Group, 2022, 5.
[44] The Presidential Climate Commission, "A Framework for a Just Transition in South Africa," 2022.

economy will go hand in hand with several social interventions designed to protect South Africa's workforce and encourage the sustainable development of new contributors to the country's economy. The just transition policy framework has thus evolved to accommodate the complex socio-economic realities associated with coal dependency. Recognising the uneven spatial distribution of transition risks, the government developed a dedicated Just Transition Framework for Mpumalanga – the province where approximately 85% of the country's coal-related employment is concentrated. In parallel, targeted frameworks addressing skills development and municipal resilience were introduced to guide capacity building and institutional support at local levels, ensuring that the transition addresses labour market vulnerabilities and service delivery challenges in affected regions. However, based on recent peer-reviewed evaluations, the implementation of South Africa's Just Transition Framework – particularly its localised roll-out in Mpumalanga – has been uneven. While the creation of province-specific initiatives reflects a deliberate move to contextualise national objectives, outcomes have been hindered by institutional fragmentation, limited funding flows and a lack of coordination between municipalities, provincial government and national departments. Studies by Chidzungu[45] and Nel & Marais[46] find that while local governments have engaged in initial strategic planning, execution remains slow due to skills deficits, administrative capacity constraints and unclear mandates for interdepartmental collaboration. Community-level participation has also been patchy, with trust deficits and procedural exclusion hampering legitimacy. Going forward, success will hinge on aligning national and provincial strategies with targeted technical assistance, devolved budgetary allocations and dedicated capacity building for municipal authorities in areas like energy planning, land use and socio-economic impact assessments.

Skills in South Africa's just energy transition

South Africa's historical inequalities, coupled with sustained high levels of unemployment, pose a major challenge to ensuring the transition takes place fairly and inclusively. The level of investment necessary to realise the three human resource development objectives of the Just Transition Framework are explained in the JET Investment Plan. The plan estimates that ZAR 1.4 trillion (approximately $81 billion) is needed to implement the just transition between 2023 and 2027. Of this, ZAR 2.7 billion (approximately $157 million) has been allocated to skills development.[47] The JET Implementation Plan argues that the country lacks a coherent national coordination mechanism to plan and develop sustainability skills and that the large number of smaller green jobs in planning and analysis are not incorporated into the overarching national economic strategy.[48] Appropriate skills identification and planning requires national support (to build policy coherence and ensure alignment with national development goals and JET objectives) and can benefit from international lesson-sharing in order to leapfrog planning and implementation hurdles. It is also clear that South Africa is starting off a weak base in respect of a labour force that largely does not possess the initial knowledge sets associated with jobs in green tech.

[45] Thandiwe Chidzungu, "The Role of Social Impact Assessments in Skill Development and Sustainable Communities in South Africa's Just Energy Transition from Coal: A Study of Carolina and Kriel Mining Communities in South Africa" (Johannesburg, 2023).
[46] Etienne Nel and Lochner Marais, "South Africa's Sustainability Transition: The Case of the Mpumalanga Province and its Coal-Dependent Communities," in *Rescaling Sustainability Transitions*, ed. Moritz Albrecht, Maija Halonen, and Irene Kuhmonen (Switzerland: Palgrave Macmillan, 2024), 247.
[47] Government of South Africa, *The Just Transition Implementation Plan: 2023-2027*.
[48] Government of South Africa, *Just Transition Implementation Plan*.

The energy transition is expected to generate structural shifts across the economy, as employment gains are unlikely to be spatially or sectorally aligned with job losses. While new jobs will emerge – particularly in renewable energy, electrification and related services – many of these positions will not be created in the same industries or geographic areas where fossil fuel-related employment is being phased out. Simultaneously, the ongoing diffusion of artificial intelligence, robotics and machine-learning technologies is expected to fundamentally alter job tasks across sectors, displacing some categories of labour while complementing others. As Daron Acemoglu has shown, the labour market impact of technological change depends critically on whether innovations are 'automation' or 'augmentation' focused. Automation often reduces demand for middle-skill work and increases inequality in the absence of complementary investments in education and labour market adjustment mechanisms.[49] The coal industry is the most vulnerable to job losses through the energy transition. South Africa's coal value chain currently employs close to 90 000 people and is largely concentrated in Mpumalanga.[50] Some of the job losses in the coal value chain may be offset by job creation in the renewable energy sector. However, this is dependent on ensuring the renewable energy sector develops the capacity to employ local people as well as source resources and materials locally.

Another sector at risk is the South African automotive industry, which has been one of the successes of the Department of Trade, Industry and Competition. A failure to respond quickly to the shift to replace internal combustion engine (ICE) vehicles with electric vehicles (EV) would put an estimated 100 000 jobs at risk in one of the most vulnerable provinces in South Africa, the Eastern Cape, which posts the country's highest provincial expanded unemployment rate of 47.1%.[51] It would also put an additional half a million jobs at risk in associated fields, such as taxi drivers, auto mechanics and petrol attendants. Thus, it is essential that South Africa's automotive industry prepares for a potentially swift change in demand by investing in innovative technologies and reskilling the workforce.

South Africa's automotive manufacturing sector is a key contributor to industrial output and exports, yet it remains primarily oriented toward the production of ICE vehicles. Despite the government's release of the Electric Vehicles White Paper in December 2023, which outlines ambitions to localise EV production and incentivise investment, capacity for EV assembly remains limited.[52] The domestic EV market is small, with cost, infrastructure and energy insecurity posing major barriers to uptake.

While South African vehicle exports, especially to the EU, face mounting pressure due to decarbonisation mandates and emerging regulatory instruments like the CBAM, the potential imposition of broad US tariffs would further strain the sector. Recent news reports confirms that the Trump administration will impose a formal 30% tariff on all exports. This will jeopardise automotive exports to the US, which accounted for approximately 15.1% of South Africa's vehicle export value in 2023 alone, to the value of $1.17 billion.[53] The transition to EV manufacturing must therefore be accelerated to safeguard competitiveness, supported by targeted industrial policy, battery value chain development and export diversification.

[49] Daron Acemoglu and Pascual Restrepo, "The Wrong Kind of AI? Artificial Intelligence and the Future of Labour Demand," *Cambridge Journal of Regions, Economy and Society* 13, no. 1 (2020): 25.
[50] Statista, "Number of people employed by South Africa's coal mining industry from 2011-2022."
[51] Statistics South Africa, "Stats Biz, February," February 2023.
[52] Republic of South Africa, Department of Trade, Industry and Competition, *White Paper on Electric Vehicles in South Africa* (Pretoria: Government of South Africa, 2023).
[53] The Observatory of Economic Complexity (OEC), "HS4 data," accessed July 8, 2025.

In South Africa's case, planning for a just transition from coal involves timelines dependent on factors such as the required financing, access to relevant green technology and potential derailment by global crises. Uncertainty necessitates the development of responsive processes and peer learning between South Africa and Brazil, which can help both countries avoid costly misjudgements.

The coal and petrochemical value chains will be most affected in South Africa, with equal impact on surrounding communities oriented around these value chains as well. Ensuring that affected communities have the social, human and financial capability to adapt to a low-carbon economy is essential. It is important if we understand the deep ties coal has to the community. For instance, the name of Emalahleni municipality in Mpumalanga derives from the isiXhosa word *amalahle*, which means coal, translating literally to 'the place "in coal"' – what then becomes of this area once coal is obsolete? The PCC argues for clean energy sources for grid capacity to be prioritised before the task of decommissioning Eskom coal plants, to ease the transition.[54] In this way, communities are afforded the necessary time and opportunity to pivot to green or other industries by reskilling and upskilling those employed in the value chain. Consideration should also be given to the fact that renewable energy jobs will not have the same geographic concentration in the Mpumalanga area as coal has had, which will have an impact on those communities.[55]

The mechanics behind the allocation of ZAR 2.7 billion (approximately $157 million) to skills development mentioned above were not transparent, leaving little funding to support impacted workers and communities to adapt to a low-carbon future. Moreover, details on how the funding will be spent remain vague. This lack of clarity undermines the necessary partnership that should exist between the state and its most vulnerable people. As compared to the scale of funding directed at renewable energy initiatives, the limited investment in skills development risks jeopardising the ability of coal-dependent workers and communities to adapt a changing energy landscape.

Brazil's transition plan frameworks

There are several policies in place to realise a just and inclusive energy transition in Brazil, despite the regressive actions of the previous Bolsonaro administration. Lula has recentred sustainable economic growth and climate action in his administration's policymaking.

The Multi-Year Plan 2024–2027 is a central policy instrument, agreed to through a highly public and participatory process in Brazil. It establishes a roadmap for realising a future Brazil that is democratic, fair and environmentally sustainable and developed, and that has a substantial focus on energy. The plan provides key objectives for securing an efficient energy supply in Brazil through a sustainable and clean energy mix. Several objectives bear relevance to a just transition, including 1) increasing the share of renewable energy to contribute to mitigation, 2) improving energy efficiency to reduce energy consumption and waste and 3) promoting industrial growth and development to attract much-needed investment in energy-intensive sectors needing to decarbonise.

The Ecological Transition Plan is an initiative of the Ministry of Economy and contains six pillars for addressing pressing environmental concerns in Brazil. These pillars are sustainable finance, technology, bioeconomy, the energy transition, the circular economy and adaptation. The

[54] Presidential Climate Commission (PCC), *The Just Transition Framework*, 16.
[55] Jesse Burton et al., "Socio-economic considerations for a Paris Agreement-compatible coal transition in South Africa" (report, Climate Transparency, July 2019).

energy transition pillar is focused on urban bus electrification and the expansion of the wind, solar, green diesel and low-carbon hydrogen sectors, as well as sustainable aviation fuels and emission targets for light vehicles.[56]

Further to this, in August 2024 Lula launched the National Energy Transition Plan with the National Energy Policy Council and the Ministry of Mines and Energy.[57] The plan will serve as the main coordinating policy for the energy transition to create new synergies between various climate and energy governance frameworks. It is expected to attract over $300 billion in investments over the next 10 years and aims to bridge the transportation, electrical, mineral, oil and gas sectors and create regulatory frameworks to combat energy poverty and inequalities more broadly. A national energy forum will also be established to promote dialogue between public and private sector stakeholders.

Green jobs in Brazil's transition

Brazil has seen a steady increase in the number of 'green jobs'.[58] Over 2 million workers have green jobs, of which nearly 1.5 million are in the renewable energy sector.[59] The country's success in creating green jobs in the formal sector provides key policy lessons for South Africa's skills transition. Brazil's abundant natural resources have enabled this labour transition, as job creation took place in the forestry, sanitation and transport sectors, besides renewable energy generation and distribution. At the same time, a number of national policies, such as the National Policy on Climate Change, encourage the creation of green jobs in the renewable energy and sustainable agriculture sectors, providing critical legal frameworks for this.

A number of issues remain with Brazil's labour transition, despite these achievements. The country's labour market is characterised by high levels of informality and wage discrepancies, especially in informal, new and digital sectors that still lack sufficient regulation. There is a need, much like in South Africa, to engender sustainability in the population's skillset throughout formal education, especially for young school-leavers. For instance, waste recyclers in the informal economy, despite having tangible positive impacts on the environment, earn on average around $230 monthly, below Brazil's minimum wage of $250.[60] A key recommendation from Brazil's green jobs experience would be to include all the formal, informal and emerging sectors of the labour economy into the green jobs matrix, allowing for these issues of informality and inequality to be addressed in just transition policy.

Social safety nets for the just transition in Brazil and South Africa

Social protection programmes are an instrumental element of just transitions, as they provide necessary income support for vulnerable workers and communities. Because the energy transition will result in both anticipated and unintended negative impacts on workers and communities, social protection programmes are especially useful for their ability to safeguard livelihoods, incomes and job prospects through reskilling. Despite this utility, many people still lack access to

[56] Government of Brazil, Ministry of Economy, *Ecological Transformation Plan* (2023).
[57] Government of Brazil, "President Lula launches National Energy Transition Policy, expected to bring BRL 2 trillion in investment," August 27, 2024.
[58] Climate Transparency, "Brazilian Policy Paper En."
[59] CAGED, International Labour Organisation (ILO), and International Renewable Energy Agency (IRENA), "On the rise, green jobs face challenges."
[60] CAGED, ILO, and IRENA, "On the rise."

social protection. In Latin America and the Caribbean, around 56% of the population had access to a social protection measure in 2020 compared to only 17% of Africa's population. The ILO links social protection to at least 12 of the 17 SDGs and argues that the failure to strengthen and expand social protection directly undermines climate action and the achievement of a just transition.[61] A stark economic challenge, however, is generating sufficient tax revenue to fund social protection in the context of high unemployment in a fossil fuel-driven economy.

Through various social protection and economic policies, the government of Brazil has lifted 28 million people out of poverty over the past 15 years and reduced the population living in poverty to 10%. To realise the objective of addressing inequality through green, inclusive growth, Brazil has to combat its persisting poverty problem with a redoubled effort to encourage its population to engage in the sustainable economy.[62]

The Bolsa Verde social protection programme is one such effort that Brazil has implemented and from which South Africa can take important lessons in merging development, income security and sustainability. The programme provides a top-up to the Bolsa Familia cash transfer as more sustainable use practices are employed by Bolsa Familia beneficiaries. Many beneficiaries are from rural, extremely poor households that are dissuaded from making negative environmental choices through the financial reward from Bolsa Verde. Bolsa Verde incentivises the gathering of fruits, artisanal fishing and craftmaking from natural resources. Efforts are measured by tracking satellite images and radar hotspots to detect deforestation.[63] The resultant preservation of ecologically intact forest has extensive carbon sequestration value. This will play an increasingly important role in selling carbon credits or debt-for-nature swaps and similar kinds of innovative policy instruments to mitigate climate change.[64]

South Africa has also seen progress in reducing poverty and raising living standards through social protection measures. Cash transfers are the main social protection benefit, reaching 18 million beneficiaries monthly. Since the COVID-19 pandemic, the universal basic income grant debate has gained more momentum after its first formal appearance in South Africa's policy decisions in the Taylor Commission of 2002. The growing call for a basic income grant in South Africa reflects the state's persistent struggle with intersecting unemployment, poverty and inequality challenges. Civil society actors, policy researchers and organised labour increasingly advocate for the institutionalisation of a basic income for unemployed of working age, not only as a response to structural joblessness but also as a social buffer against the projected employment losses associated with the country's just transition. As decarbonisation accelerates in high-emission sectors such as mining, manufacturing and electricity, the urgency of establishing an inclusive social protection floor has intensified, linking income security to the broader pursuit of a just and equitable climate transition.

Expanding social protection coverage is critical for developing countries, as common policy response measures (such as employee guarantee schemes) to the projected negative losses of the just transition are not applicable in developing country contexts.[65] Additionally, skilling, upskilling and reskilling the workforce presuppose that skills development in transitioning countries

[61] International Labour Organisation (ILO), *World Social Protection Report 2024-26: Universal social protection for climate action and a just transition*.
[62] James Canonge, "Social Protection and Climate Change," International Labour Organisation (ILO) Geneva.
[63] Canonge, "Social Protection and Climate Change, 4.
[64] See, for example, A. Mukpo, "African Parks earns over $7 million from carbon credit sales in Benin and CAR," *Mongabay*, July 3, 2025.
[65] International Labour Organisation (ILO), *Skills Development for a Just Transition*.

is both well-resourced and well developed. This is not the case, even for middle-income countries such as Brazil and South Africa. Especially in South Africa, the renewable energy industry is just emerging and thus strategic investment in training programmes and educational courses is still necessary. The same is true for Brazil's informal economy, where combinations of social protection programmes are necessary to achieve positive impacts on poverty, skills and income security.

Defining the 'just transition' in Brazil and South Africa

For Brazil and South Africa, the just transition is not only about decarbonising the economy to help mitigate the harsh impacts of climate change. The energy transition is an opportunity for the two countries to fight poverty, create jobs and boost economic and social development. The core objectives of both nations are strategically aligned – to secure their electricity supply against uncertainty (from loadshedding and droughts) to actively contribute to addressing climate change (as their regions' highest emitters) and to promote and encourage economic development (to solve poverty, unemployment and inequality). This makes it even more important for their governments to share knowledge and lessons as the transition unfolds.

The two countries experience the just transition differently, given their very different energy mixes, GHG emission profiles and history with renewable energies, green jobs and skills development. However, as two influential Global South countries and BRICS members, Brazil and South Africa have the capabilities to contribute thought leadership and technical expertise towards a 'Southern' or developing conception of a just transition. Such a conception needs to take into account the very real developmental challenges that impede their skills transitions.

Local communities and the just transition

Mining remains a cornerstone of South Africa's economy, accounting for around 6% of GDP and providing employment for around 475 000 people in 2024.[66] Although the mining industry has shrunk in recent years, the importance of platinum group metals (PMGs) – as well as chrome, manganese and titanium – for green technology and the low-carbon economy in South Africa and abroad means that mining and its place in the country's economy and transition will only grow. The mining sector is geographically concentrated in three provinces: Mpumalanga (coal), Limpopo (PMGs and diamonds) and the North West (PMGs). For example, coal mining in Mpumalanga supports 92 000 jobs directly and approximately 170 000 jobs indirectly. The energy sector continues to be dominated by coal, with Eskom operating 14 coal-fired power stations that collectively generate most of the country's electricity. These stations are heavily reliant on domestic thermal coal mines, which directly employ approximately 12 000 workers.[67] While coal's role in domestic energy production is significant, its export value – although substantial – has been overtaken by other commodities. In 2024, coal briquettes accounted for approximately $9.67 billion in exports, ranking third after platinum and gold, and comprising around 10% of South

[66] Mineral Council, "Fact and Figures Pocket Book 2024," accessed July 9, 2025.
[67] Megan Cole, Mzila Mthenjane, and Andrew van Zyl, "The Just Transition and the Coal Mining Sector in South Africa," *Journal of the Southern African Institute of Mining and Metallurgy* 122, no. 11 (2022).

Africa's total export revenue.[68] Although the strategic value of coal remains high for energy security and employment, its long-term viability is increasingly constrained by global decarbonisation trends and domestic just transition imperatives. According to the South African Coal Roadmap and recent CSIR analysis, approximately 70–75% of South Africa's coal production is consumed domestically, primarily for electricity generation. Of this, around 55–60% is used by Eskom to fuel its coal-fired power stations, while the petrochemical industry (notably Sasol) consumes roughly 30–35% and the metallurgical sector accounts for approximately 5–10%. The remaining 25–30% of total coal production is exported, mainly to markets in Asia and Europe.[69]

While Brazil's energy mix remains relatively clean by global standards – largely due to its reliance on hydropower and biofuels – concerns persist about its continued reliance on coal in certain regions. Contrary to earlier reports that framed the 'Just Transition' Law as extending national coal use until 2040, the 2025 Implementation Check confirms that Brazil's national climate policy has instead shifted decisively towards an emissions trading system (SBCE), with a clear legislative framework now in place and aligned with Brazil's updated Nationally Determined Contributions. Importantly, the SBCE currently excludes the power sector in Santa Catarina from its initial scope, where coal is still subsidised under state-level legislation.[70] These local subsidies prolong the life of a small number of coal-fired power plants, but they are increasingly out of step with the federal government's broader decarbonisation strategy. A May 2025 Climate Transparency report[71] emphasises the importance of ensuring the SBCE does not operate in isolation, calling for its alignment with Brazil's industrial and energy transition plans. Integrating these efforts will be crucial to phasing out coal use entirely, including the legacy subsidies embedded at the subnational level, and to demonstrating high-integrity climate governance ahead of COP30.

Key considerations from these debates on transitioning justly from fossil fuel power to renewable energy involve questions on how to balance the expansion of renewable energy with the land rights of local communities. In Brazil, the desire to harness wind power off the north-eastern coastline, for instance, is met with the challenge of fishing communities that have now lost their means of subsistence.[72] Essentially, buy-in from local communities is crucial for the success of just transition processes.

Pilot initiatives – such as Sasol's green hydrogen project in Mpumalanga – have been identified by South Africa's PCC as critical testing grounds for demonstrating the feasibility of low-carbon industrial transitions that also deliver local development benefits.[73] These pilots aim to build public trust, attract investment and provide visible co-benefits for communities historically excluded from industrial development. However, their effectiveness hinges on inclusive design and equitable benefit-sharing. In Brazil, for example, green hydrogen development is largely geared toward international export markets, raising concerns about distributive justice as low-income

[68] The Observatory of Economic Complexity (OEC), "South Africa: Economic Profile and Export Data (2023)," accessed July 9, 2025.
[69] *South African Coal Roadmap, Overview of Coal in the South African Economy* (Johannesburg: Department of Energy and Fossil Fuel Foundation, 2022); Also see Jesse Burton, Tara Caetano, and Bryce McCall, "Coal Transitions in South Africa: Understanding the Implications of a 2°C-Compatible Coal Phase-Out Plan for South Africa" (report, IDDRI and UCT Energy Research Centre, 2018).
[70] Fabio Teixeira, "Brazil extends coal use to 2040 under new 'just transition' law," *Reuters*, January 6, 2022.
[71] William Wills, *Brazil's Roadmap for a High-Integrity Emissions-Trading System: An Implementation Assessment* (Rio de Janeiro: Climate Transparency and Centro Brasil no Clima, 2025).
[72] Isadora Cardoso Vasconcelos, "Just Transitions: Mapping Plural Perspectives from civil society in Brazil and Germany" (Institute for Advanced Sustainability Studies Potsdam, December 2022).
[73] Presidential Climate Commission (PCC), *Just Transition Framework* (Pretoria: Republic of South Africa, 2022).

communities continue to struggle with access to reliable and affordable electricity.[74] While Brazil's national grid coverage is relatively high, affordability and quality of access remain uneven, particularly in rural and peri-urban areas.

Similarly, in South Africa, electricity access – while formally widespread – is shaped by the spatial legacies of apartheid, with many Black working-class communities still experiencing inferior grid infrastructure, unreliable supply and disproportionately high costs relative to income.[75] At present, renewable energy technologies remain financially inaccessible to most low-income households, reinforcing energy inequality. The PCC's pilot project framework therefore presents a valuable model not only for South Africa but also for Brazil. It embeds community participation, formalises civil society inputs into just transition planning and enhances public understanding of climate policy choices through locally grounded, demonstrable interventions. Ensuring the meaningful representation of historically marginalised groups is key to aligning decarbonisation with social legitimacy and durable political support.

Conclusion

This working paper has examined the evolving contours of just energy transitions in South Africa and Brazil, with particular emphasis on the central role of skills development and social equity. In both contexts, decarbonisation is not simply a technical imperative but also a political and economic challenge that intersects with long-standing structural inequalities and regional disparities.

South Africa's dependence on coal-fired power, historically a pillar of both its electricity generation and employment in provinces such as Mpumalanga, has placed acute pressure on the state to reconcile its climate obligations with the livelihoods of nearly 90 000 coal mine workers, in addition, another 12 000 are employed in Eskom coal-fired power stations. Despite policy frameworks like the Just Transition Framework and the Renewable Energy Masterplan, the pace of green industrialisation has been uneven, and skills pipelines remain poorly aligned with emerging opportunities in renewable energy manufacturing, grid infrastructure and hydrogen technologies. This mismatch poses a serious risk to both the credibility and feasibility of the just transition at a time when capital increasingly favours automation over augmentation.

Brazil, while starting from a lower-carbon electricity mix, faces similarly complex challenges. Green hydrogen and wind power investments, often export-oriented and capital-intensive, risk bypassing local benefits if not embedded within strategies for skills upgrading and inclusive development. Moreover, rural and Indigenous communities affected by renewable infrastructure buildouts have frequently been excluded from planning processes. Without deliberate efforts to democratise access to clean energy jobs and training, the risk of reproducing exclusion is high.

In both countries, ensuring a just transition will require the expansion of targeted skills development programmes, stronger labour market coordination and investment in community-driven transition planning. Future research should examine not only the specific occupational transformations required in each national context but also the governance architectures necessary to embed

[74] William Wills, Brazil's Roadmap for a High-Integrity Emissions-Trading System: An Implementation Assessment (Rio de Janeiro: Climate Transparency and Centro Brasil no Clima, 2025), https://www.climate-transparency.org/wp-content/uploads/2025/05/Implementation-Check-Brazil_Carbon_Market_2025.pdf.
[75] Anton Eberhard et al., *Power Sector Reform in South Africa: Building an Inclusive and Sustainable Electricity Future* (Cape Town: Power Futures Lab, University of Cape Town, 2022).

justice in transition outcomes. These architectures range from education and reskilling to procurement and ownership models. Only by addressing the socio-economic fault lines of the energy transition can South Africa and Brazil realise its promise as a catalyst for decarbonisation and inclusive development.

Policy recommendations

Establish national green skills coordination mechanisms

Create dedicated national coordination bodies to align skills development with green economy needs, addressing the current lack of coherent planning in both countries.

Scale up targeted reskilling programmes for coal-dependent communities

Expand funding and the scope of reskilling programmes for workers in coal-value chains, emphasising spatial interventions.

Integrate informal economy works into the green jobs framework

Develop comprehensive policies to formalise and support informal economy workers in their transition to green jobs, drawing on Brazil's experience in addressing wage and social protection gaps.

Develop an automotive sector transition strategy

Create comprehensive transition plans for the automotive manufacturing sector in both countries to prevent job losses from the shift to EVs.

Strengthen community participation in renewable energy projects

Mandate meaningful community participation and benefit sharing in renewable energy projects to ensure local employment and skills development.

Expand social protection for energy transition impacts

Work to establish comprehensive social protection systems specifically designed to support workers and communities affected by energy transition, building on Brazil's Bolsa Verde model.

Enhance international cooperation on green skills development

Formalise Brazil–South Africa cooperation on green skills development and just transition implementation through a research partnership and the BRICS grouping.

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