

Building Domestic Capacity: Localization Strategies for South Africa's Renewable Energy Sector

Phemelo Tamasiga and Lebogang Mateane

South Africa's energy transition unfolds within a complex landscape of urgent decarbonization needs, persistent energy insecurity and global competition over renewable value chains. Thus, the central question we ask in this policy brief is: which localization measures could strengthen equity considerations in the energy transition? Based on interviews conducted with stakeholders in South Africa's energy and industrial policy sectors, and augmented by current academic literature and policy documents, this policy brief finds that policy and incentive gaps undermine domestic manufacturing, job creation and community ownership in the renewable energy sector. Without a stronger localization strategy, the Just Energy Transition Partnership could fail to deliver on its equity promises. Key recommendations include reforming public procurement to reward local content and social impact, leveraging concessional finance to attract private investment in domestic renewable energy industries, establishing bilateral partnerships for technology transfer, facilitating industrial upgrading and promoting community and worker-owned renewable energy initiatives.

South Africa is at a critical crossroads because of a proposed large-scale shift from coal to renewable energy sources. This shift will not only determine the pace of decarbonization in the South African economy but also determine who benefits from the transition of value chains from carbon-based sources to renewables. A crucial question is whether South Africa will rely on imported renewable energy technologies or use this opportunity to develop domestic industries, create substantial employment and promote community empowerment, thereby supporting transformative and equitable income (and eventual wealth) distribution.¹ These questions lie at the centre of South Africa's most contentious socio-economic and political debates.² In this policy brief, localization denotes a strategic industrial policy approach to shift demand from imports towards domestic production through

¹ Luís Fernández Intriago et al., "Overcoming Five Key Challenges to Make the Energy Transition a Just Labor Transition," *Nature Communications* 16, no. 1 (2025): 7541.

² Nicholas van Doesburgh and Harald Winkler, "Challenges and Pathways to Inclusive Low-Carbon Development in South Africa: A Political Settlements Analysis," *New Political Economy* 30, no. 4 (2025): 590–606.

tools such as local content requirements, preferential procurement and targeted support for local firms.³

Supporters of rapid renewable energy deployment prioritize expediency and cost-effectiveness in power generation, but this overlooks the fact that a transformative energy transition based on localization is likely to be gradual rather than rapid. Conversely, organized labour and domestic enterprises advocate for substantial localization and equitable integration. This tension over differing views on the pace of adjustment in the energy transition underscores the need for policy frameworks that explicitly reconcile the imperatives of rapid decarbonization, green industrialization and social equity, and that require innovative mechanisms to foster domestic manufacturing capabilities and ensure broad-based participation.⁴ This transition presents an unprecedented opportunity to redefine South Africa's industrial trajectory – moving beyond a history of mineral extraction towards green industrialization and a green economy anchored in localized innovation and sustainable practices.⁵ Accordingly, this policy brief explores how South Africa can balance rapid clean energy deployment with industrial development. It examines the energy transition, localization debates, semi-structured interviews from Johannesburg on industrial policy, and literature on procurement, finance, technology partnerships and community ownership.

South Africa's push for renewable energy is intertwined with the objectives of economic transformation and inclusive industrialization. The South African Renewable Energy Masterplan (SAREM) serves as the country's industrialization roadmap for the renewable energy sector.⁶ The plan outlines localization as a deliberate strategy to expand domestic industrial activity across renewable energy value chains to increase local content, stimulate manufacturing and create sustainable employment. It includes local content targets for 2030 of 45 per cent for solar components, 47 per cent for wind and 20 per cent for storage and aims to build local technological and innovation capabilities through investment in research, design and skills development. The SAREM also seeks to broaden the participation of small, medium and Black-owned enterprises (with 50 per cent or more shareholding and management control) in renewable energy supply chains. Launched in 2011, the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) has played a key role in turning these goals into action. It has contributed to building a domestic renewable energy industry while promoting localization and economic empowerment.⁷ Failure to pursue deliberate localization in South Africa's energy transition could result in mostly temporary construction jobs and disproportionate benefits for foreign firms, leaving local communities with too few long-term gains and without the development of local industrial capacity. Such a trajectory will not ensure community ownership, and risks South Africa's energy transition falling short of its "just" ambitions.⁸

The South African economy is characterized by deeply entrenched inequalities, a dual economy divided between a small high-skill, high-productivity segment and a large low-skill, low-productivity segment, an infrastructure deficit and the spatial and economic lega-

³ Neva Makgetla, *Localisation and Industrial Policy: Scopes, Debates and Instruments* (TIPS, 14 August 2023).

⁴ Iain Todd and Darren McCauley, "An Inter-disciplinary Approach to the Energy Transition in South Africa," *Discover Sustainability* 2, no. 1 (2021): 1–12.

⁵ Ayodele A. Adebisi and Katleho Moloi, "Renewable Energy Source Utilization Progress in South Africa: A Review," *Energies* 17, no. 14 (2024): 1–21.

⁶ *South African Renewable Energy Masterplan (SAREM): An Inclusive Industrial Development Plan for the Renewable Energy and Storage Value Chains by 2030* (Government of South Africa, 2 April 2025).

⁷ NDC Partnership Good Practice Database, South Africa's Renewable Energy Independent Power Producer Procurement Programme (NDC Partnership, accessed 4 February 2025).

⁸ Iain Todd and Darren McCauley, "Assessing Policy Barriers to the Energy Transition in South Africa," *Energy Policy* 158 (2021): 112529.

cies of apartheid that created segregated urban geographies and uneven access to economic opportunity.⁹ These features necessitate a critical examination of how current policy frameworks and implementation strategies address the imperative of fostering domestic industrial growth, creating equitable employment opportunities and empowering local communities in the burgeoning renewable energy sector.¹⁰ Conversely, the absence of robust local content requirements and skills development programmes could exacerbate existing socio-economic disparities, transforming the transition into a replication of colonial resource extraction models rather than a genuine pathway to sustainable development.¹¹

Political debates in South Africa over localization have grown increasingly heated. This is evident in the desire, expressed in particular by the ruling political party, the African National Congress (ANC) and in South Africa's government structures, to achieve economic stability while ensuring energy security, albeit currently mainly based on non-renewables.¹² One camp – including the Department of Trade, Industry and Competition – emphasizes local content and job creation, even if it means a slower rollout. For example, in April 2025, the South African government floated proposals to raise tariffs on imported solar, wind and battery components, with increases ranging from 5 to 30 per cent.¹³ This move reflects a clear shift in industrial policy towards localization, aiming to recalibrate the supply chain in favour of South African firms, while creating meaningful employment opportunities in the local renewable energy sector. However, renewable energy industry groups swiftly warned that such tariffs could raise costs and slow solar and wind deployment, as domestic suppliers cannot currently meet demand. At the same time, political actors who are resistant to abrupt changes in energy sources have seized on these fears. For example, the South African Electricity and Energy Minister, Kgosientsho Ramokgopa, and then Electricity Minister, Gwede Mantashe, have openly cast doubt on an externally driven energy transition and have argued and warned that international partners are using South Africa as a “guinea pig” for the purposes of examining the transition from carbon to renewable energy sources.¹⁴

Why does this localization issue matter to external partners of South Africa? Germany and the EU have committed substantial financing to support South Africa's energy reforms and decarbonization efforts.¹⁵ For Berlin and Brussels, South Africa may serve as a solid foundation for the energy transition, especially on the African continent. As Africa's most industrialized economy, it exports electricity generated mainly from carbon-intensive sources to neighbouring countries. In 2023, South Africa remained the largest emitter in Africa, accounting for approximately 28 per cent of the continent's total fossil-fuel CO₂ emissions.¹⁶ In addition, South Africa has advanced banking and financial systems, along with a high

⁹ Sophie Plagerson, Leila Patel, Tessa Hochfeld, and Marianne S. Ulriksen, “Social Policy in South Africa: Navigating the Route to Social Development,” *World Development* 113 (2019): 1–9.

¹⁰ Nqobile Xaba, “Whose Just Energy Transition? A South African Perspective,” *Wiley Interdisciplinary Reviews: Energy and Environment* 12, no. 5 (2023): 1–5.

¹¹ Pegah Mirzania, Joel A. Gordon, Nazmiye Balta-Ozkan, Ramazan C. Sayan, and Lochner Marais, “Barriers to Powering Past Coal: Implications for a Just Energy Transition in South Africa,” *Energy Research & Social Science* 101 (2023): 103122.

¹² Phemelo Tamasiga, *Workforce Transition in South Africa's Just Energy Transition*, Policy Brief 39 (Megatrends Afrika, 2025).

¹³ “SA Proposes New Tariffs on Renewable Energy Components,” *Freight News*, 30 April 2025.

¹⁴ Thabo Makwakwa, “Trump's Energy Stunt Dilemma for SA,” *Sunday Independent (Independent Online)*, 17 November 2024.

¹⁵ “Project information: Just Energy Transition Partnership with South Africa” (KfW Entwicklungsbank, 2025).

¹⁶ Alize le Roux and Jakkie Cilliers, *Climate. Thematic Futures*, African Futures & Foresight Programme, Theme 14, (Institute for Security Studies (ISS), 2025).

degree of capital account openness and financial integration in global markets.¹⁷ Furthermore, South Africa has strong (and established) trade linkages with the rest of the world (more than any other African economy), and other African economies are highly dependent on its economy, especially its neighbours in the Southern African region.¹⁸

If South Africa can replace carbon sources (especially coal) with renewables and develop local supply chains, skills and enterprises, this will validate the approach of the Just Energy Transition (JET) and may deliver insights into possible transitional adjustments other African economies could make. Conversely, if the transition is perceived to benefit only foreign contractors or to impose social costs on South Africa's workforce, it could undermine domestic buy-in and tarnish the JET's credibility. This challenge of ensuring domestic value capture and social legitimacy aligns with the European Union (EU)'s broader strategic initiatives. Specifically, the EU's Global Gateway explicitly aims to "maximize the benefits of a job-rich green transition", and this is reinforced by its significant investment in Africa's infrastructure.

Challenges: Why South Africa Struggles to Localize Renewable Energy Value Chains

South Africa's energy transition does not occur on a blank slate. It is constrained by deep-seated structural barriers that explain why South Africa has struggled to establish a resilient domestic renewable manufacturing base. Several structural and policy-related challenges (Sections 2.1 to 2.3) emerged from semi-structured interviews with stakeholders in South Africa's energy and industrial policy sectors. In total, 17 interviews were conducted between July and August 2025, capturing the perspectives of energy consultant, labour union representatives, policy makers, academics, coal mine workers and experts from development finance institutes.

Structural and Market Barriers to Localization

The structure of South Africa's economy has been shaped by a minerals–energy complex (MEC) characterized by large-scale mining and fossil fuel interests. This legacy has crowded out investment in other sectors, such as manufacturing, and has hindered diversification.¹⁹ The MEC is widely understood as a barrier to balanced development, as past industrial policies prioritized mining, basic metals and heavy industries over high-tech manufacturing. Over time, South Africa experienced premature deindustrialization – its manufacturing share began to decline before the economy had matured in industrial complexity.²⁰ The combination of MEC dominance and liberalization pressures exposed weak industrial sectors to global competition too early, resulting in industrial decline rather than transfor-

¹⁷ Lebogang Mateane, "Risk Preferences, Global Market Conditions and Foreign Debt: Is there any Role for the Currency Composition of FX Reserves?" *Research in Economics* 77(3), 402–418.

¹⁸ Lebogang Mateane and Christian R. Proaño, "Does Monetary Policy React Asymmetrically to Exchange Rate Misalignments? Evidence for South Africa," *Empirical Economics* 58, no. 4 (2020): 1639–1658.

¹⁹ Harald Winkler and Anthony Black, "Creating Employment and Reducing Emissions: Options for South Africa," *Development Southern Africa* 41, no. 6 (2024): 1078–1097.

²⁰ Haroon Borat, Kezia Lilenstein, Morné Oosthuizen, Amy Thornton, "Structural Transformation, Inequality and Inclusive Growth in South Africa," UNU-WIDER Working Paper 2020/50 (Helsinki: UNU-WIDER, 2020).

mation.²¹ As a result, by the time renewable energy technologies emerged globally, South Africa lacked a foundation in electronics, precision engineering and other capabilities needed to manufacture solar panels and wind turbine components at scale. Without addressing this structural deficit, domestic producers cannot compete in components such as solar cells or turbine parts.

South Africa's domestic market for renewable components has remained too small and unpredictable to sustain local manufacturing. Manufacturers rely on stable, sizable demand to justify investments in production facilities.²² While the early rounds of the REIPPPP procured about 6,328 MW across 92 projects between 2011 and 2014, subsequent delays and cancellations disrupted market certainty and created long gaps between auctions.²³ By 2022, the country had installed around 6.2 GW of solar photovoltaics (PV), onshore wind, and concentrated solar power (CSP), accounting for roughly 7.3 per cent of the energy mix.²⁴ Yet, procurement remained uneven, making local manufacturing a risky undertaking. Moreover, late entry into global markets has exposed local firms to stiff competition from cheap imports. Foreign producers – especially in China and Europe – benefit from economies of scale and state support, exporting panels, towers and batteries at prices South African firms cannot match. Historically, even duty-free import policies meant local startups were undercut. These market barriers (limited domestic market and foreign competition) reinforce each other: without a guaranteed local market (demand-side) or protection (policy-side), manufacturing jobs will gravitate elsewhere.

Policy Incoherence and Uncertainty

Another key obstacle is the fragmented policy framework faced by renewable manufacturers. A consistent and aligned policy is required for industrial development. Energy planning and industrial policy were not closely coordinated in the past. For example, the Just Energy Transition (JET) is managed by the Presidency and the Department of Mineral Resources and Energy. In contrast, industrial policy is overseen by the Department of Trade, Industry and Competition (DTIC).

Although the government convenes multi-stakeholder forums for the JET (including labour and business), coordination across these institutions has historically been limited, with only recent attempts at joint planning. As a result, industry development has often been shaped by periods of initial progress followed by delays, reversals and policy pauses before initiatives resume. This inconsistency disrupts investment confidence, local manufacturing capacity and skills development, all of which require steady demand and long-term certainty. One interviewee argued that, in practice, discussions of the just transition often remain abstract and disconnected from implementation realities. The interviewee noted that, despite frequent high-level rhetoric about equity and industrial development,

²¹ Antonio Andreoni and Fiona Tregenna, "The Middle-Income Trap and Premature Deindustrialization in South Africa," in *Structural Transformation in South Africa: The Challenges of Inclusive Industrial Development in a Middle-Income Country*, ed. Antonio Andreoni et al. (Oxford Academic, 2021).

²² Ulrich Terblanche, Nyawasedza Magoda, Sithobile Khoza, Jack Radmore, Cilnette Pienaar, Lauren Basson, Bruce Raw, and Nicholas Fordyce. "Large-Scale Renewable Energy: Market Intelligence Report 2025." Cape Town: GreenCape, 2025.

²³ Anton Eberhard and Raine Naudé, "The South African Renewable Energy Independent Power Producer Procurement Programme: A Review and Lessons Learned," *Journal of Energy in Southern Africa* 27, no. 4 (2016): 1-14.

²⁴ "CSIR Releases Statistics on Power Generation in South Africa – 2022," CSIR, 22 February 2023, <https://www.csir.co.za/csir-releases-statistics-on-power-generation-south-africa-2022>

the alignment between those ideals and actual mechanisms, such as procurement and localization criteria, remains weak.

The Integrated Resource Plan (IRP) initially did not prioritize local content requirements, thereby limiting domestic manufacturers' participation in renewable energy projects.²⁵ At the same time, industrial incentives were not fully aligned with the rapid expansion of solar and wind energy, leaving local industries unprepared to supply the necessary components. The result was policy whiplash, with missed or delayed opportunities for localization in renewables procurement (notably a three-year freeze on Independent Power Producer (IPP) contracts in 2015–2018). This led to the closure of nascent component factories and eroded investor confidence.²⁶ Frequent changes to rules regarding local content, and uneven enforcement, created further uncertainty for manufacturers. In short, inconsistent and fragmented policies, as well as overlapping mandates between energy and trade, have been a significant root cause of weak industrialization in the renewables sector.

Skills, Innovation and Technology Gaps

Gaps in skills, technology and innovation undermine localization. Renewable manufacturing is a knowledge-intensive field, but South Africa faces a shortage of specialized engineers and technicians.²⁷ A practitioner in energy transition noted that “technical colleges and universities have only begun to adapt curricula for the green economy and most training programs are piecemeal”.²⁸ This means manufacturers struggle to find workers trained in solar module assembly or power electronics.

Similarly, South Africa's investment in renewable energy research and development (R&D) is minimal, and foreign equipment suppliers rarely transfer core knowledge. Thus, local firms often receive only basic technology transfers, which keeps them at the lower end of the value chain. Moreover, South Africa has no significant patents or proprietary designs for photovoltaic (PV) modules, wind turbines, or batteries, meaning it must import designs or technology. Often, technology is transferred in a limited manner (through turnkey projects or basic training) that provides local firms with only the knowledge to operate systems, not the comprehensive expertise to innovate independently. This dynamic keeps the local industry dependent and low on the value chain.

The challenges outlined above demonstrate that South Africa's renewable energy sector cannot thrive solely on market forces. These constraints suggest a clear conclusion: without deliberate and coordinated state intervention, the energy transition will default to imported technologies and yield only temporary gains. Therefore, localization matters as an economic aspiration and as a practical policy response that can transform systemic weaknesses into drivers of industrial upgrading, job creation and community participation. Section 3 examines how industrial policy instruments, ranging from stable procurement pipelines and local content requirements to financing mechanisms and technology partnerships, can operationalize this approach.

²⁵ *Integrated Resource Plan 2019 (IRP2019)* (Department of Mineral Resources & Energy (DMRE), October 2019).

²⁶ Manufacturers and local content Working Group – SAWEA, *Position Paper on Manufacturing and Local Content in the REIPPPP* (South African Wind Energy Association (SAWEA), 25 March 2019).

²⁷ Phemelo Tamasiga, *Challenges and Opportunities for Just Energy Transition Partnerships in Africa*, Policy Brief 30 (Megatrends Afrika, 2024).

²⁸ Author's interview with policy expert on just energy transition, Johannesburg, South Africa, July 2025.

Community ownership and governance gaps

Communities in South Africa remain largely outside the centres of control and value capture across renewable-energy value chains.²⁹ Community trusts typically hold small, non-controlling stakes without veto or reserved matters rights over operations, refinancing, contract changes or asset sales. The result is a persistent sense of formal ownership without real agency. In the early years of operating a community trust, most revenue is used to service project debt, resulting in modest, delayed dividends to communities. What arrives is often further reduced by fees, interest and layered company structures.

Governance and capacity gaps compound these limits. Trustees often lack the financial and legal expertise to interpret complex project documents, while sponsors and lenders control most of the information, thereby entrenching asymmetries and weakening oversight. Where rules are weak, elite capture can occur. A narrow group dominates board seats, decision-making becomes opaque, and rents accrue to a few rather than being broadly shared. In practice, these dynamics can reduce community trust to a compliance checkbox, redistributing some cash without shifting decision rights or influence.

Solutions: Embedding Localization Pathways in Renewable Energy Value Chains

Anchoring renewable investment in domestic industries, localization creates demand for local suppliers, builds skills and technology capabilities and reduces dependence on imported equipment. For instance, local content requirements tied to procurement can counteract the historical neglect of manufacturing. At the same time, community- and worker-ownership schemes address inequality and ensure that benefits reach those most affected by the transition. Localization, in this sense, is not an isolated policy choice but a leverage point that connects industrial policy, skills development and community empowerment with the rollout of renewable energy.

Strengthening Local Supply Chains and Policy Certainty

Manufacturing investment hinges on a predictable domestic market. A factory for wind towers or PV modules will only be viable if developers can expect a steady pipeline of projects. In this regard, South Africa's policy track record sends mixed signals. The last-minute delay in 2018 to independent power producer (IPP) contracts halted growth, shuttered plants and led to job losses.³⁰ This was a clear indication of how policy volatility undermines industrialization. For example, solar module plants in Gauteng and wind tower facilities in the Western Cape closed during this period. When procurement resumed, much of the high-value technology continued to be imported. The Integrated Resource Plan must therefore be tightly aligned with industrial policy to ensure that procurement functions as a driver of industrial development. Multi-year auction schedules, timely contract awards, and transparent targets are essential to give suppliers confidence to invest in production facilities, skills and supply networks. Brazil, for example, used multi-year procurement schedules and

²⁹ Lucy Baker and Holle Linnea Wlokas, *South Africa's Renewable Energy Procurement: A New Frontier?* (Energy Research Centre, University of Cape Town, 2015).

³⁰ "South Africa: One More Delay for the REIPPP," *African Energy Newsletter* (15 March 2018), accessed 17 Oct. 2025.

strong local-content requirements to grow its wind and solar industries.³¹ South Africa could adapt similar measures by ensuring that renewable procurement is sequenced and scaled in a way that promotes cumulative growth rather than isolated projects.

REIPPPP has steadily increased the local-content thresholds, reaching 54 per cent for solar PV, 54 per cent for concentrated solar power (CSP) and 47 per cent for onshore wind projects by Round 3.³² Enforcement mechanisms and monitoring of outcomes will be critical. In past REIPPPP rounds, ambiguous definitions of what counted as “local” allowed developers to overstate local contributions. To avoid this, localization policies must include transparent auditing systems and consequences for non-compliance, such as financial penalties or disqualification from future rounds. Conversely, firms that exceed targets could be rewarded with preferential treatment in subsequent bids. Beyond compliance, the government should invest in capacity-building programmes for suppliers to ensure that small and medium enterprises can access opportunities within renewable value chains.

Localization policies must also harness South Africa's mineral endowments to strengthen supply chains. As Africa's largest steel producer, South Africa is well placed to supply structural metals for wind towers, solar mounting frames and other critical components. Similarly, the high-grade vanadium reserves could be leveraged to produce vanadium electrolytes and assemble flow batteries domestically.³³ By integrating mining, refining and component production, South Africa can capture more value domestically rather than exporting raw materials.

Financing and Incentives for Local Participation

Targeted incentives and financing mechanisms are central to unlocking localization. Special Economic Zones (SEZs), such as Atlantis in the Western Cape, show how clustering manufacturers with logistics and customs advantages can attract investment. Incentives must be precise and time-bound, including tax credits, concessional loans and export rebates targeted at factories producing core renewable components. Tariff reforms also need careful calibration. It is counterproductive if finished imports enter duty-free while parts for local assembly face duties. A comprehensive audit of the renewables value chain – from raw inputs to final products – would help identify where tariffs should be adjusted to promote local production.

Financing remains a decisive factor for participation in local value chains. Large-scale projects are capital-intensive and have been mainly financed by foreign developers and major banks, leaving smaller South African firms and community groups at a disadvantage. Expanding the Small Projects REIPPPP, with simplified requirements, could lower barriers to entry. Public finance institutions could also provide grants or interest-free loans to community trusts, allowing them to benefit from project revenues immediately rather than waiting until debt is repaid. Government-backed credit guarantees and partnerships with international climate funds could encourage lending to smaller manufacturers and contractors. Meanwhile, blended finance models combining public, private and philanthropic resources could help reduce borrowing costs. Linking financial instruments to localization

³¹ Morgan Brazilian, Victoria Cuming and Thomas Kenyon. “Local-content rules for renewables projects don’t always work,” *Energy Strategy Review* 32 (2020): 100569.

³² Gaylor Montmasson-Clair and Georgina Ryan. “Lessons from South Africa’s Renewable Energy Regulatory and Procurement Experience,” *Journal of Economic and Financial Sciences* 7(S) (2014): 507–526.

³³ Lesego Moshikaro and Lebogang Pheto. *Localising Vanadium Battery Production for South Africa’s Energy Security*. Pretoria: Trade & Industrial Policy Strategies (TIPS), 2023.

milestones such as the production of PV modules or battery components would ensure that financing translates into durable industrial and employment gains.

Technology Transfer, Skills and International Partnerships

Effective localization requires more than hardware production – it requires investment in skills and knowledge transfer, complemented by international partnerships that strengthen technological capabilities and workforce readiness. South Africa's historical lack of proprietary technology in solar PV, wind turbine systems and advanced battery designs means that collaboration with firms and countries possessing advanced capabilities is essential. But such partnerships must be structured to develop local skills and technology ownership over time, rather than perpetuating dependency. Stakeholders warned that technology cooperation should be bidirectional. Partners must help South Africa become less dependent over time. As one interviewee noted, South Africa and its partners “have much to gain by exchanging knowledge and jointly innovating in clean energy, but this requires developing local skills and ownership of technology over time, rather than perpetuating dependency”.³⁴

One pathway of technology transfer is the formation of joint ventures between local firms and foreign original equipment manufacturers (OEMs). A local partner gains access to designs, processes and quality control systems, while the OEM benefits from local market knowledge and cost advantages.³⁵ For example, in battery storage, partnerships between international OEMs and South African companies to manufacture cell stacks for flow batteries promote skills development, reduce reliance on imported labour and spread investment risk.

Technical and Vocational Education and Training (TVET) and university programmes must equip students with hands-on, industry-relevant skills aligned with renewable manufacturing. One expert noted that “TVETs providing those hands-on skills and the curriculum needs to be aligned with the skills required for a just energy transition”.³⁶ Embedding skills development and R&D support into the localization agenda would enable South Africa to develop the expertise needed to turn its industries from assembly to innovation.³⁷ South Africa should aim to increase its enrolment in vocational education, with an emphasis on the energy and digital sectors, as this may enable comprehensive localization of renewable value chains. Accordingly, lessons and positive network externalities can be derived from the experience of Denmark, where vocational students are filling Europe's skills gap in the green transition.³⁸ International partners can support this through training, secondments and “twinning” arrangements, drawing on experiences such as Germany's *Energiewende* programmes or Danish wind energy expertise. Finally, climate finance and development cooperation can tie funding to technology transfer. An energy transition policy analyst put it plainly: “the German–South Africa green hydrogen partnership should combine pilot

³⁴ Author's interview with policy expert on just energy transition, Johannesburg, South Africa, July 2025.

³⁵ *Concentrated Solar Power: A Strategic Industrial Development Opportunity for South Africa* (WWF-South Africa, 2015).

³⁶ Author's interview with policy expert on just energy transition, Johannesburg, South Africa, December 2024.

³⁷ Nicholas van Doesburgh and Harald Winkler, “Challenges and Pathways to Inclusive Low-Carbon Development in South Africa: A Political Settlements Analysis”, *New Political Economy* 30(4): 590–606.

³⁸ Bryan Carter, “Meet the Danish Students Training in Skilled Trades to Power Europe's Green Transition,” (Euronews, 24 September 2025).

production with skills development, local research, and eventual domestic manufacturing, so South Africa builds its own hydrogen industry rather than just importing electrolyzers”.³⁹

Community Participation and Equity Models

Renewable energy projects, often located in rural areas, have a direct impact on local communities. Ensuring genuine participation, fair ownership and equitable distribution of revenues is critical for long-term success. South Africa's REIPPPP has sought to address this by requiring each independent power producer (IPP) to create a community trust that holds at least 2.5 per cent of project equity.⁴⁰ When well-managed, community trusts funnel renewable revenue into tangible community improvements, building goodwill and local buy-in for the project.⁴¹

Another model is worker cooperatives and community-owned renewable projects, in which a community or a cooperative of workers initiates and owns a project, typically with external technical assistance. In Europe, especially Denmark and Germany, citizens pool funds to build turbines, benefiting from feed-in tariffs. In South Africa, this model has been nascent but is gaining attention. As one representative of the Congress of South African Trade Unions explained, “social ownership must place workers at the centre of emerging green enterprises. For example, a factory union could use funding to install solar panels on its premises and then lease them to the employer, creating a stream of communal worker income”.⁴² These kinds of localized generation initiatives – worker cooperatives or municipally-led projects – could embody social ownership more fully than small equity stakes in big IPPs.

Community participation cannot be treated as a purely technical design challenge because it is inherently political and shaped by unequal power relations.⁴³ The central issue is not only how much equity is allocated to communities, but also who represents them, whose voices are prioritized and what competing interests are at play. In practice, industrial developers often prioritize project efficiency and investor confidence, while local actors seek long-term social and economic benefits. Balancing these objectives requires governance arrangements that acknowledge these trade-offs rather than obscuring them through technical procedures. Therefore, achieving a “just” transition means taking into account industrial imperatives, local development needs and the urgency of decarbonization, rather than assuming that a single policy design can satisfy all three.

Conclusion and Recommendations

South Africa's energy transition presents an opportunity to reduce carbon emissions, eliminate load-shedding, and build an inclusive economy. However, without coordinated policy reform, the transition risks reproducing extractivist development patterns—import dependence, temporary construction jobs and unequal community benefits. Policy must therefore treat the renewable rollout not just as an energy programme, but as an industrial and social

³⁹ Author's interview with policy expert on just energy transition, Johannesburg, South Africa, July 2025.

⁴⁰ *State of Renewable Energy in South Africa*, (Department of Energy, 2015).

⁴¹ Author's interview with labour union representative, Johannesburg, South Africa, July 2025.

⁴² Author's interview with a representative of COSATU, Johannesburg, South Africa, July 2025

⁴³ Lena Gutheil and David Muthi Muthama, *Localizing Development to the Grassroots: Potentials and Limits of Engaging with Community Groups*, Policy Brief 40 (Megatrends Afrika, 2025).

development agenda. Drawing together interview evidence and the insights discussed above, this policy brief concludes with key policy recommendations:

1. An integration of renewable procurement and industrial policy is needed to address the structural legacy of the minerals–energy complex and premature de-industrialization. Procurement schedules must be stable and scaled to create predictable demand, enabling investment in factories for wind towers, PV modules and storage systems. Localization must leverage South Africa's mineral and steel base, linking renewable energy manufacturing to the Steel Masterplan and mineral beneficiation.
2. Sequenced local content rules are needed to overcome market barriers of foreign competition and small, volatile domestic demand. These should prioritize higher-value components, backed by supplier development programmes and transparent auditing to prevent box-ticking compliance. Penalties for underperformance and rewards for exceeding targets can build investor confidence while nurturing competitive domestic firms.
3. Institutional alignment will solve policy incoherence and uncertainty. The Integrated Resource Plan should embed DTIC's localization objectives, and the Renewable Energy Masterplan must serve as the coordinating framework linking energy planning, trade policy and industrial finance. Predictability and cross-departmental coordination are prerequisites for attracting long-term investment.
4. Targeted investment in TVET colleges, university curricula and R&D partnerships is needed to close skills and technology gaps. Technology transfer agreements should be structured to build domestic know-how rather than perpetuate dependency, while joint ventures and licensing arrangements can accelerate capability upgrading.
5. The Department of Mineral Resources and Energy and the Independent Power Producer Office should mandate minimum governance rights for community entities, audited reporting, and public disclosure by community trusts. Municipalities and recognized community bodies should convene an independent oversight forum to monitor compliance and address disputes, preventing elite capture and ensuring communities gain real influence.

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Megatrends Afrika

is a joint project of SWP, IDOS and IfW.

The views expressed in this publication are those of the author(s).

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ISSN 2747-4119

DOI 10.18449/2025MTA-PB43

Funded by:



Federal Foreign Office



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of Defence



Federal Ministry
for Economic Cooperation
and Development