TRADE & INDUSTRIAL POLICY STRATEGIES

POLICY BRIEF: 8/2024

A policy primer for green industrialisation in South Africa

INTRODUCTION

A global transition to low-carbon development pathways, enabled by rapid technological evolution is underway. This transition was initially fostered by policy and the urgency of climate action, primarily to mitigate greenhouse gas (GHG) emissions. The transition is increasingly driven by market forces, as greentech becomes more and more competitive (IEA 2023). Global dynamics require that South Africa adapts and responds to the transition, while proactively seeking opportunities in the transition. On the one hand, South Africa ought to protect domestic interests, particularly to ensure a just transition for local vulnerable stakeholders, and enhance the resilience of its economy and population to (climate) shocks. On the other hand, the country must secure its role in the global economy by materially increasing its green competitiveness (Montmasson-Clair and Chigumira 2020; Montmasson-Clair 2016). This requires thinking differently about industrial policy to progressively shift to green industrial policy and ensure a just transition. This needs a great balancing act to: a) maximise the benefits of the transition, b) minimise the transition risks, and c) manage short-term trade-offs and threats in line with domestic capabilities. A number of policy instruments and interventions are available to support this transition.

CONTEXT FOR THE TRANSITION

The transition to a low-carbon economy is not unfolding without challenges. The rapid nature of the shift has generated considerable resistance and contestation from countries, firms and individuals threatened by the transition, particularly those linked to the fossil fuel industry. Countries, firms and individuals primarily responsible for climate change are not shifting rapidly enough. The United States, the European Union and China have collectively accounted for 60% of historical emissions, against 3% for Africa (Our World in Data), while the richest 1% of humanity is responsible for more GHG emissions than the poorest 66% (Khalfan et al. 2023). Such tensions are furthermore set to increase as the transition accelerates to catch up with the levels of decarbonisation required by science to avoid catastrophic climate change (GEC 2024).

Climate impacts are set to exacerbate poverty in the Global South, especially in Africa. While the continent is only responsible for a marginal share of GHG emissions, it faces the brunt of direct climate impacts, from rising temperatures to extreme weather events. Extremely low levels of resilience, compounded by the inadequacy of support from the Global North, put large numbers of people and economic activities in jeopardy. At the local level, vulnerable communities and businesses, unlike high-income households and large corporations, are similarly unable to withstand and/or adapt to external (climate) shocks (IPCC 2018).

The low-carbon transition is on track to increase inequality, on global and local scales. Offensive-defensive policy by global powers, especially in the Global North, is closing the space for African economies to tap into green transition opportunities. The combination of green industrial policy (such as the United States Inflation Reduction Act and the European Union Green Deal Industrial Plan), a scramble to lock in intellectual property (through patents) and secure access to critical minerals, and green protectionism (through the Carbon Border Adjustment Mechanism (CBAM), among others) is reshaping geopolitics and global value chains (UNCTAD 2023; Brenton and Chemutai 2021). At the same time, transition impacts linked to shifts in policy, trade patterns, and technology are leading to many economic activities radically transforming or declining. This is putting substantial pressure on people, businesses and communities relying on such activities, many of whom have low levels of resilience to shocks (IPCC 2023).

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These dynamics have led to calls for a just transition, within national economies as well as between countries, to support vulnerable stakeholders (people, firms, countries) to transition (ILO 2015; UNCTAD 2022). The United Nations Framework Convention on Climate Change (UNFCCC) initiated a Just Transition Work Programme at COP27 in 2022. A group of Global North nations has struck Just Energy Transition Partnerships (JETPs) with a number of low- and middle-income countries, including South Africa, to direct financial support to just transition activities. Many countries, like South Africa, have put significant emphasis domestically on the imperative of a just transition, particularly in the coal value chain.

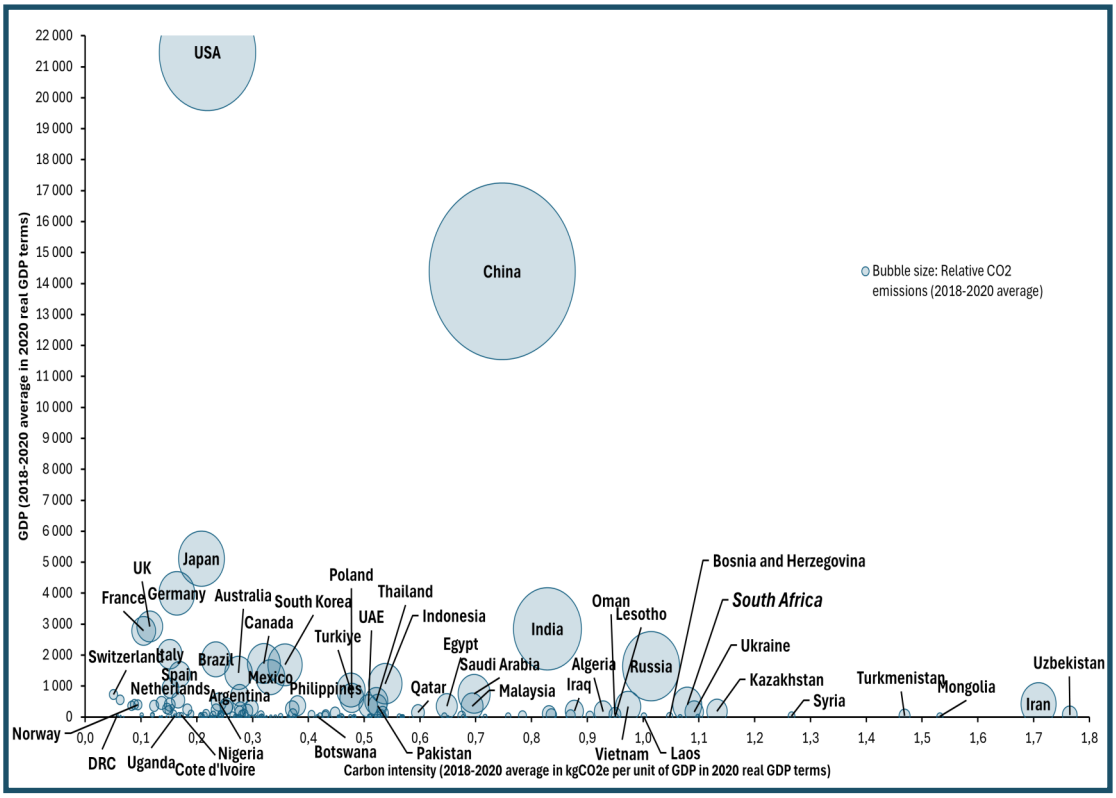
South Africa is highly integrated into the global political economy. With 194 other countries, it has committed to achieving the Paris Agreement and decarbonising its economy to keep the rise in global surface temperature to well below 2°C above pre-industrial levels. The country is also facing significant biophysical and transition impacts, from increased droughts, flooding and temperatures to the phase-out of the use of coal or internal combustion engines (Makgetla et al. 2019).

THE CURRENT DOMESTIC SITUATION

Combining heightened social challenges and deep-seated carbon dependencies, South Africa faces unique transition challenges. An entrenched Minerals-Energy Complex historically supported by cheap, but highly polluting, coal-based electricity and energy-intensive industries has shaped South Africa's modern economy (Fine and Rustomjee 1996), while a legacy of historically-skewed economic participation has entrenched high levels of poverty, inequality and unemployment (Makgetla 2020).

South Africa is one of the most carbon-intensive economies (Montmasson-Clair 2020), as illustrated by Figure 1. Coal forms the backbone of the country's energy systems. Despite the recent rise in renewable energy generation, the bulk of South Africa's electricity still originates from coal-fired power plants (see Figure 4 on page 6). Coal also feeds the production of liquid fuels and petrochemicals through Sasol's Coal-to-Liquid process, and steelmaking and cement production. In addition, many industries, such as aluminium smelting, have developed on the back of historically low-cost, coal-based electricity supply (Makgetla and Patel 2021). Although rapid electricity price increases over the past two decades have led to material changes in energy efficiency, the economy remains highly energy intensive, as illustrated by the low numbers of ISO 50001 (energy management) certifications in the country (Montmasson-Clair and Chigumira 2020).

Figure 1: Carbon intensity of South Africa and other world economies



Source: Montmasson-Clair, 2024, based on data downloaded from the World Bank.

Despite the existence of sizeable freight rail capacity, South Africa's transport system is furthermore primarily road-based. The degradation of the country's rail infrastructure over the past decade has further entrenched that trend, imposing costs and degrading road infrastructure nationally. In addition, tourism, which heavily relies on high-income foreign tourists, depends on carbon-intensive long-haul aviation.

The majority of South Africa's GHG emissions are concentrated in a small number of upstream firms, which underpins the entire economy's carbon dependency. Eskom (39% of national GHG emissions) and Sasol (14%) overwhelmingly dominate the emissions landscape, followed by companies in mining, cement, metals and forestry (ArcelorMittal ranks third with less than 3%) (CER n.d.). This has created a notable carbon-intensive path dependency in the economy, as most firms are reliant on such core companies for their energy and other key inputs.

In light of the global low-carbon transition, South Africa's high carbon-intensity translates into an elevated degree of economic risk. South Africa is one of the leading exporters of embedded carbon globally. As global markets increasingly shift away from carbon-intensive goods and jurisdictions, South Africa's exports, which are among the most carbon-intensive globally, face declining demand (Montmasson-Clair 2020). For instance, the EU CBAM, in pilot phase since October 2023, will have dramatic impacts on South Africa's exports of iron, steel and aluminium products (Maimele 2023). Correspondingly, the pathways to "green steel" and "green aluminium" in South Africa remain unclear, due to the high capital cost required, lack of access to technology and the absence of domestic demand (Monaisa and Montmasson-Clair, 2022). The broader shift to greentech will also impact numerous other industries, such as the automotive and liquid fuel value chains (with the shift to electric vehicles (EVs) or agricultural value chains (with the phase-out of fossil fuel-based chemical fertilisers).

Domestically, industries set to experience disruptive transitions or face decline employ a large proportion of the population. The coal value chain directly supports over 150 000 people in mining, power generation, petrochemicals, transport, capital equipment and services, especially in Mpumalanga's coalfields (Patel et al. 2020). About 250 000 mechanics, a third of whom are informally or self-employed, will require retraining and upskilling to service EVs. Petrol stations across the country, with some 140 000 workers, face a slow but almost certain decline in the coming decades (Maseko et al. 2020). The platinum value chain, which directly employs more than 180 000 people, especially in the North West, is also at risk from the rise of EVs and the decline of catalytic converters (Montmasson-Clair et al. 2020). The agricultural value chain, which employs 785 000 people in industrial agriculture, 300 000 in food processing and 80 000 in the production of wine and other alcoholic beverages, will face significant climate impacts (Makgetla et al. 2020a).

Despite a wide range of labour market policies providing a degree of protection and support for workers, both at the workplace and between jobs, and strong unionisation in some sectors (such as mining), most workers display low resilience levels (Makgetla et al. 2020b; Montmasson-Clair 2021). Standards and eligibility are too low to ensure the promotion of decent work, notably in new economic activities, or constitute a robust safety net for workers who would lose their employment in the transition. Numerous workers, especially in the informal sector, do not receive a living wage, materially reducing their ability to mitigate or adapt to climate-related impacts. In addition, the existing employment-related safety net, the Unemployment Insurance Fund (UIF), covers workers imperfectly. Only 60% of employed people made contributions to the UIF in 2018 (Stats SA 2020) and many workers, especially self-employed people, are simply ineligible.

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Moreover, the UIF only provides a partial cover for previous earnings. Similarly, while South Africa's social grant system has done a great deal to reduce poverty and protect people against destitution, it is not sufficient to adequately ensure the climate resilience of vulnerable communities (and more broadly secure the right to social security). Social assistance benefit levels are too low to ensure an adequate standard of living (Montmasson-Clair 2021).

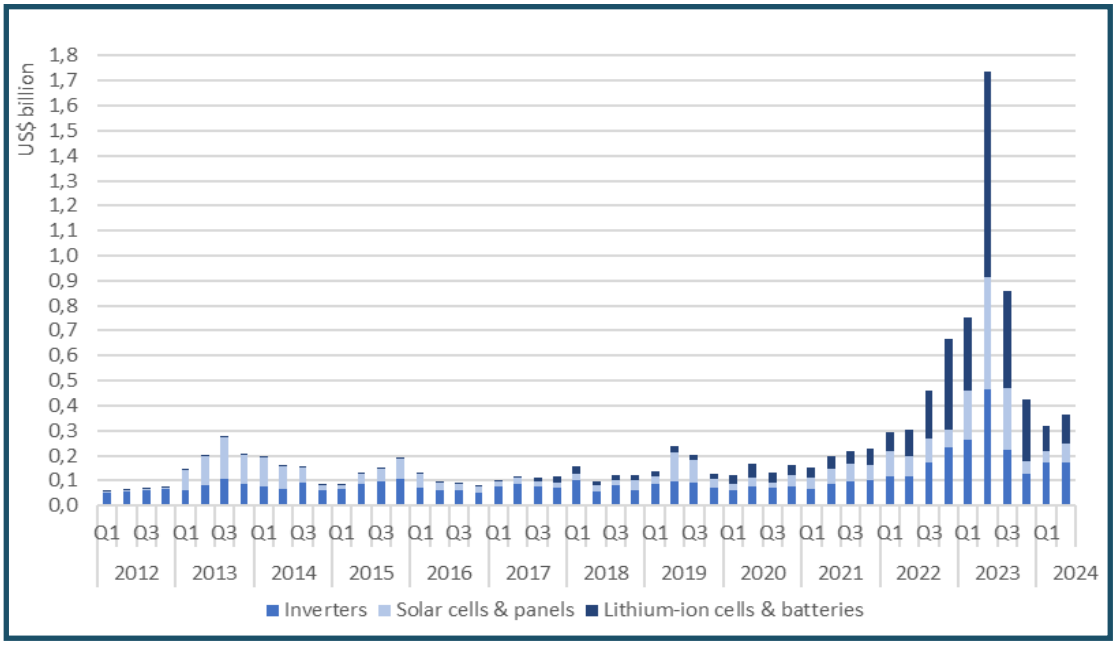
Importantly, the transition to a green economy does not, in and of itself, lead to inclusive development, better work conditions or quality of employment. While it provides an opportunity for decent jobs and a more inclusive economy, dedicated interventions are required to materialise this potential (Montmasson-Clair 2018).

Overall, maintaining (if not improving) the competitiveness of the South African economy in a climate-compatible market is contingent on addressing both supply- and demand-side constraints (Montmasson-Clair and Chigumira 2020). Access to green innovations and production processes, new forward-looking skills, and finance, especially grant and affordable, patient capital, are central determinants of the green industrial transition. It also relies on securing markets, notably by fostering domestic demand and value chain linkages, but also through trade agreements, such as the African Continental Free Trade Area (AfCFTA).

Beyond the necessity of greening existing industries, there is potential to develop new green industries. South Africa displays globally competitive potential for the development of several emerging green value chains, such as renewable energy, battery storage, green hydrogen (GH_2), sustainable aviation fuel and next generation sanitation (see, for instance, Mudombi 2018; Montmasson-Clair 2024; Patel 2020; Chireshe, Bole-Rentel, and Reeler 2022).

Yet, to date, South Africa's transition has been heavily fuelled by imports, as illustrated in Figure 2 with the case of key solar energy components. The country is also rich in several critical minerals, such as platinum group metals (PGMs), manganese, chromite, titanium, vanadium, and zinc, which are forecast to experience increased demand in the future given their importance to clean energy and other low-carbon technologies. Coupled with South Africa's industrial capabilities, this opens the door for mineral beneficiation and value creation.

Figure 2: South Africa's imports of solar panels, lithium-ion batteries and inverters



Source: Montmasson-Clair, 2024, based on South African Revenue Service (SARS) data

Overall though, in many cases, a combination of public investment and support, local private sector investment and partnership with foreign lead firms at the technological frontier, would be required to be successful (for example, see Montmasson-Clair, Moshikaro, and Monaisa (2020) and Moshikaro (2023) on lithium-ion and vanadium-based battery value chains).

Green industrialisation is also a cornerstone of South Africa's just transition agenda, as highlighted in the country's Just Transition Framework and the Just Energy Transition Partnerships Implementation Plan.

GREEN SHOOTS: FOSTERING GREEN INDUSTRIALISATION

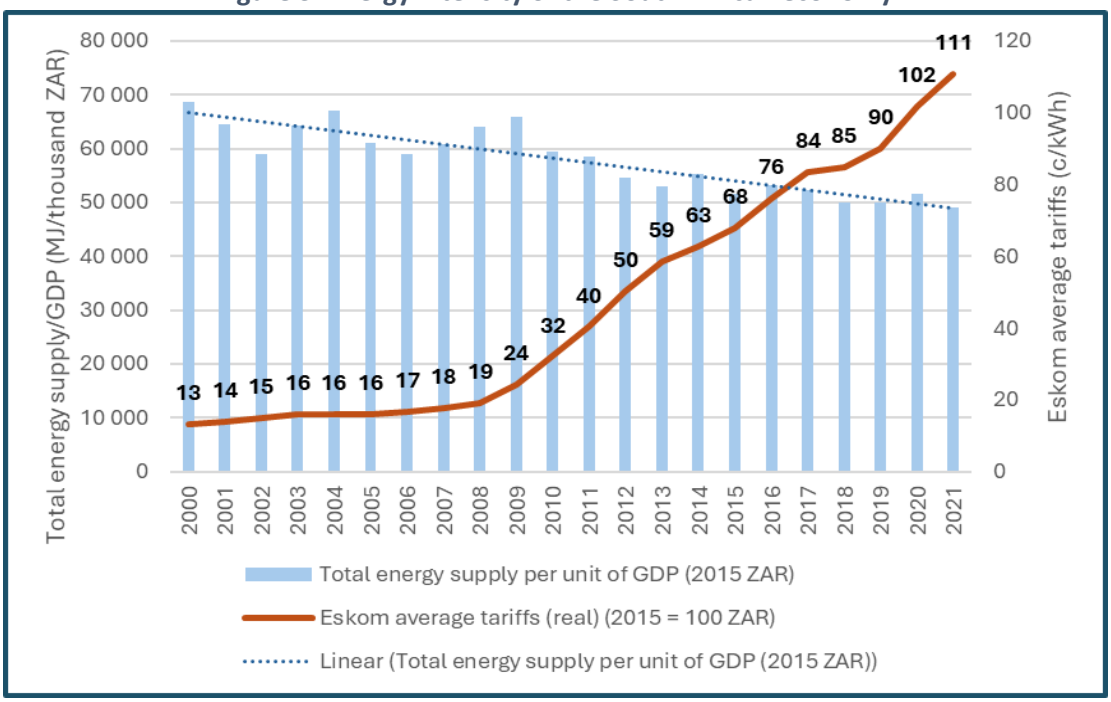
To address the deep-seated carbon dependency, South Africa has initiated a transition towards green industrial development, starting with measures to foster the shift to low-carbon production systems. Securing competitiveness in key greentech and green value chains has also received increased attention.

Green industrialisation was first introduced in the South Africa policy landscape through the Industrial Policy Action Plan (IPAP) process, in 2010. The IPAP 2018/19-2020/21, for example, focused strongly on renewable energy development and reducing the carbon intensity in the energy system (the dtic 2018a). The development of green industries was also a key pillar of the New Growth Path and the National Development Plan. More recently, green industrialisation features in various industrial development masterplans, albeit to various degrees. Green industrialisation is also a cornerstone of South Africa's just transition agenda, as highlighted in the country's Just Transition Framework and the JETP Implementation Plan (Presidency 2022; PCC 2022).

The initial entry point for green industrialisation in South Africa has been through a performance lens, with the aim of improving the sustainability of existing value chains, through a mix of taxes, subsidies and regulatory approaches.

The first port of call to improve "green performance" is generally energy efficiency. While the South African economy remains relatively energy-intensive by global standards, its energy efficiency (in MJ/unit of GDP) has markedly improved over the past two decades, as depicted by Figure 3. Fast-rising electricity prices, increasing by about 700% in nominal terms over the 2000-2021 period, along with energy security concerns, have arguably been the main driver of this improvement. South Africa's Energy Efficiency Strategy, underpinned by the 12l tax incentive for energy efficiency investments, has also positively contributed to the decrease in intensity (DMRE 2005; DoE 2016). Efficiency standards, appliance labelling, certification and accreditation, research and development (R&D) funding, demand side management programmes and education, and information and awareness campaigns have supported this trend.

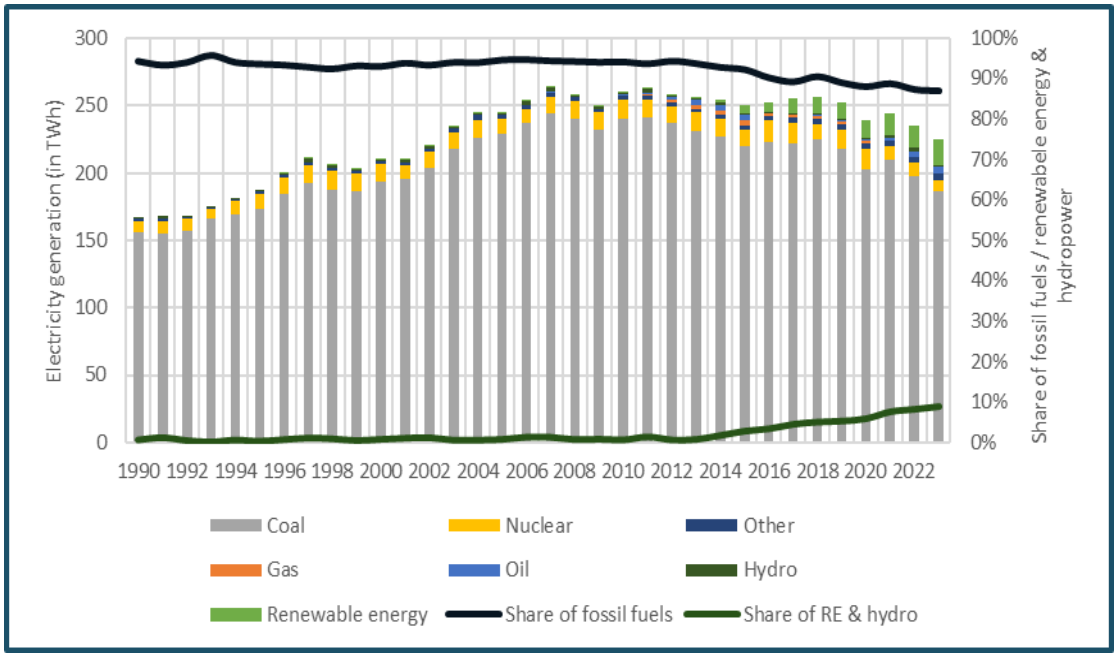
Figure 3: Energy intensity of the South African economy



Source: Patel, 2024, based on data from (IEA 2021) and Eskom Integrated Annual Reports (2000 – 2021) .*Notes:* Blue bars indicate total energy supply per gdp (left axis). Orange line refers to Eskom average tariffs (right axis).

Complementing improvement in energy efficiency, South Africa has initiated the rollout of renewable energy (and battery storage) to decarbonise the country's electricity supply

Figure 4: South Africa's electricity generation per source



Source: Montmasson-Clair, 2024, based on data from BP and the Energy Institute.

Complementing improvement in energy efficiency, South Africa has initiated the rollout of renewable energy (and battery storage) to decarbonise the country's electricity supply. Since 2011, state-led utility-scale programmes have procured 11 590MW of renewable energy technologies and about 800MW of battery storage capacity. The procurement has, however, been undermined by a series of problems, leading to a stop-start pattern. The programme was stalled between 2015 and 2019 due to institutional issues, and the implementation of procurement rounds has been haphazard since then. The procurement of solar PV projects under Bid Window 5 was hamstrung by the implementation of local content rules. Grid constraints undermined the procurement of wind energy under Bid Window 6 and render future procurement uncertain. Numerous delays and changes to the procurement framework have also created policy uncertainty.

Since 2021, regulatory reforms have materially opened up the market, by significantly loosening (in August 2021) and then removing (in December 2022) the licensing requirements for independent power production. Along with a limited – but increasing – number of enabling Small-Scale Embedded Generation (SSEG) frameworks at municipal level, these policy changes have triggered a massive development of renewable energy projects by the private sector, households and the public sector (government departments and state-owned enterprises). For instance, from January 2022 to June 2024, the private sector registered with the regulator over 7.5GW of generation capacity for development (NERSA data).

In 2023, National Treasury announced a tax incentive for households to invest in solar systems and enhanced the existing incentive for businesses in place since 2015. Yet, access to renewable energy and storage technologies in South Africa (and globally) remains the prospect of a minority. The vast majority of South African households do not have the means to invest in such technologies. Furthermore, the tax incentive does not include any local content provisions and is, as a result, largely fuelling imports.

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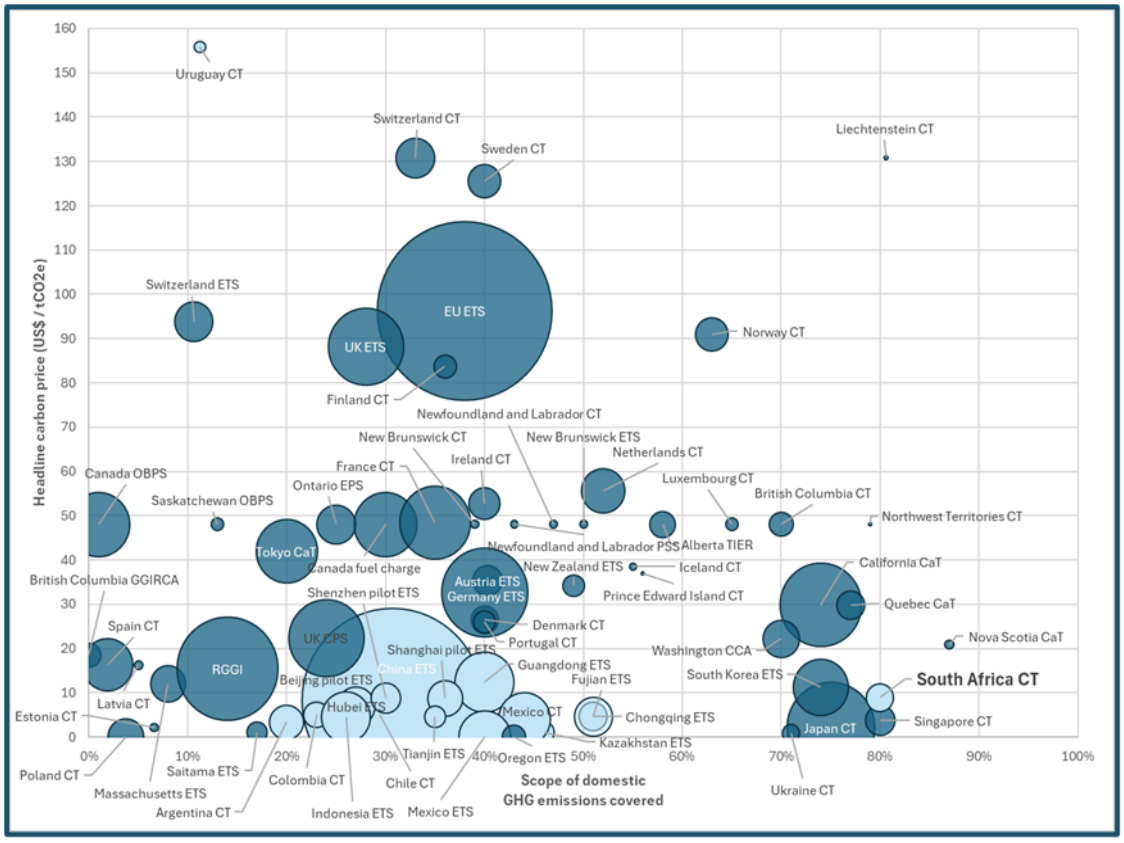
Regulatory risk for Sasol is significant as both petrol prices and natural gas prices are heavily regulated. It has had difficulties with the National Energy Regulator of South Africa's price regulation.

To further drive efficiency and decarbonisation across sectors of the economy, South Africa introduced a carbon tax in 2019 at a rate of R120 per tonne of carbon dioxide equivalent (tCO_2e). The carbon tax was subsequently increased from R159 to R190 per tCO_2e from 1 January 2022 (National Treasury 2024). As shown in Figure 5, while South Africa's carbon tax covers a large share of the country's emissions (80%), which is significantly more than carbon pricing schemes in other countries, its effective rate is low by global standards. This is due to generous tax-free allowances, a focus on direct emissions, and exemptions granted to Eskom (the highest emitter in the country). The effective carbon tax ranged between R6 to R48 per tCO2e (US$0.30 to US$2.60) in 2022, compared to a global average of US$6 (SARB 2023). Furthermore, National Treasury targets US$30 per tCO_2e by 2030, which is below the International Monetary Fund (IMF) target of US$50 per tCO_2e for emerging markets (SARB 2023; Gaspar and Parry 2021). The absence of ring-fencing of funds raised through the carbon tax (towards decarbonisation activities) has also raised criticism.

In addition, the recently passed Climate Change Act No. 22 of 2024 makes provisions for the implementation of carbon budgets, through sectoral emissions targets for key GHG-emitting sectors in the country, aligned with a determined national GHG emissions trajectory (Presidency 2024).

Figure 5: Main carbon pricing mechanisms globally according to their price and scope in 2023



Source: Montmasson-Clair, 2024, based on data from the World Bank.

South Africa has also made some inroads fostering green industrialisation opportunities linked to circular value chains. Extended Producer Responsibility (EPR) regulations, under the National Environmental Management Waste Act No. 59 of 2008, are the main instrument driving sustainable end-of-life management. Packaging, electrical and electronic equipment, batteries, oil, paint, lighting, as well as tyres are notably covered by EPR schemes (DFFE 2021). Regulations include a ban on landfill on tyres and certain plastics. While a positive step, the impact of the EPR scheme is hampered by constraining legislation (for waste reuse), a restricted sectoral coverage, the limited end-of-life management infrastructure and the lack of inclusion of informal waste pickers.

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Environmental levies complement the EPR. While levies on plastic bags and incandescent lightbulbs have successfully supported some shift in consumption patterns, the tax on carbon emissions from motor vehicles remains much too low to have any impact. Then, a number of levies are financing the end-of-life management of various goods, such as waste tyres. Industrial symbiosis programmes, which facilitate the exchange of unused or residual resources (e.g. materials, energy, water, services) of one company by another have been established by the National Cleaner Production Centre of South Africa (NCPC-SA) and GreenCape.

In addition to the drive to improve the sustainability performance of the economy, a more offensive angle, aimed at securing South Africa's green competitiveness, has emerged in recent years. The development of new green value chains is paramount to diversify the structure of the South African economy, especially to achieve a just transition in areas facing economic decline (such as the Mpumalanga coalfields).

Although a set of cross-cutting industrial policy measures provides a degree of support to existing and prospective manufacturers in the country (industrial finance, concessional loans, cost-sharing incentives), no dedicated policy support for greentech manufacturing value chains exists, unlike in peer/competitor countries. A number of Special Economic Zones (SEZs), such as Atlantis, Coega or East London, have actively pursed green strategies both to provide a low-carbon business environment and attract manufacturers of green goods, and the NCPC-SA is supporting the development of eco-industrial parks. But their efforts are hindered by the difficulty in accessing existing incentives, and the broader energy and transport ecosystems.

In contrast, large fossil fuels subsidies remain in place. Geddes and Schmidt (2024) estimate that fossil fuel subsidies between 2018 and 2023 tripled from R39 billion (US$2.9 billion) to R118 billion (US$7.5 billion). The IMF, which adopts a different definition, estimated explicit fossil fuel subsidies at about 1.2% of GDP in 2022.

Demand-side support for local green products and services is limited. The tax incentive for solar systems is not linked to localisation. Government does not have a green public procurement policy in place either. A few products that are part of green value chains have nevertheless been designated for local procurement by public entities, such as solar panels, frames and mounting structures, inverters, electrical cables, transformers, buses, solar water heaters, electric and water meters (the dtic 2018b). The utility-scale procurement of renewable energy generation capacity has also included localisation requirements, delivering R63.3 billion of local content over the 2011-2021 period (IPPO 2022).

Driving local R&D as well as the rapid adoption of global innovation is a key pillar of green competitiveness and the economic diversification required to support a just transition in the country. In most greentech fields, South African firms are positioned as fast followers. This requires technological readiness, both in terms of systems and human capital. However, R&D expenditure in the country remains under the target of 1.5% of GDP, at 0.6% in 2020/2021, despite a long-standing tax incentive (Section 11D of the Income Tax Act). A "valley of death", fuelled notably by a lack of venture capital, additionally hinders the innovation journey of local entrepreneurs and small businesses, despite some support programmes (Technological Innovation Agency, Industrial Development Corporation (IDC), the dtic, private sector). The development of "green skills" on the local labour market is still nascent, hampered by a mismatch between the limited supply and rising demand of skills in the industry. In addition, firms face significant challenges to retain existing skills, due to global competition (GreenCape 2022; AELC and REAL 2023). Several plans, however, aim to bolster skills development to mitigate reliance on imported skills and develop local labour supply.

The development of new green value chains is paramount to diversify the structure of the South African economy, especially to achieve a just transition in areas facing economic decline (such as the Mpumalanga coalfields).

The South African Renewable Masterplan aims to reverse the flood of imports in products such as solar panels, mounting structures, wind towers, inverters, batteries, cables and key inputs such as steel and aluminium.

For example, the Hydrogen Society Roadmap raises the necessary development of skills, emphasising new technical and vocational roles and the preparation required by educational and training institutions – such as the Technical Vocational Education and Training (TVET) colleges and the Sector Education and Training Authorities (SETAs).

Targeted sector-specific strategies could unlock significant industrial development opportunities in the country, with the appropriate demand- and supply-side frameworks. Possible opportunities abound, from critical mineral beneficiation, to renewable energy and battery value chains, to EVs, to GH_2 and derivates, to water and sanitation industrial value chains, to biofuels and biomaterials.

In line with the 2023 Electrical Vehicle White Paper, some initial supply-side support for automotive value chains to transition has been introduced through the Automotive Production Development Programme. More decisive interventions, both on the supply and demand sides, are required to meaningfully drive the EV transition in the country (Barnes et al. 2021; 2022). No battery electric vehicles (BEVs) are currently manufactured in South Africa, and EVs, including soft hybrids, accounted for less than 3% of new vehicles sales in 2023. The absence of a targeted EV policy programme threatens the long-term viability of the automotive value chain in the country.

South Africa has an ambitious vision for the development of renewable energy value chains. The South African Renewable Energy Masterplan (SAREM) has been developed to foster the growth of the renewable energy and battery value chains in the country. Yet to be launched, the Masterplan aims to foster the growth of an already vibrant – but fragile – value chain and reverse the flood of imports in products such as solar panels, mounting structures, wind towers, inverters, batteries, cables, fasteners and key inputs such as steel and aluminium.

Building on the country's exceptional renewable energy potential, strong industrial capability (including access to the Fischer-Tropsch technology) and mineral endowment (PGMs), South Africa is well positioned to develop GH_2 value chains. The 2021 Hydrogen Society Roadmap and the 2023 Green Hydrogen Commercialisation Strategy aim to position South Africa as a leading producer of GH_2 for domestic and export purposes. Beyond driving the renewable energy (as per SAREM) and GH_2 value chains (e.g. electrolysers), the technology can position South Africa favourably to supply green iron and steel, green ammonia and chemicals, and sustainable aviation and maritime fuels. Several projects seek to demonstrate the commercial viability of GH_2 production processes in the country. These include consortium projects by Sasol (sustainable aviation fuel, Boegoebaai Port), Anglo American (hydrogen valley, heavy duty trucks), Hive (ammonia), ArcelorMittal (Saldanha green steel), and Toyota and BMW (fuel cell electric vehicles), among others.

LOOKING AHEAD: POLICY INTERVENTIONS

A deep structural change and reorientation of the South African economy towards a low-carbon and inclusive state may take decades. Yet, building on the progress that South Africa has made thus far, a number of strategic policy interventions are achievable in a relatively short period of time (two to five years), and can serve as a catalyst for future sustainable development. These interventions represent near-term opportunities that the South African government, supported by social partners, can embark on. As detailed in Table 1, these interventions span across a wide array of areas, namely: strategy, industrial finance, procurement, industrial spaces, carbon pricing, standards and certification, trade policy, energy policy, tourism policy, mineral development policy, agricultural policy, waste management policy, R&D, human capital development, small business development and the just transition agenda.

A deep structural change and reorientation of the South African economy towards a low-carbon and inclusive state may take decades. Yet, building on the progress made thus far, a number of strategic policy interventions are achievable in a relatively short period of time (two-to-five years), and can serve as a catalyst for future sustainable development.

Table 1: Recommended interventions towards green industrialisation in South Africa

POLICY AREA	KEY ISSUE	SHORT-TERM INTERVENTION
Strategy	Most masterplans do not cover sustainable industrialisation and just transition adequately.	Review of all existing masterplans (e.g. Iron and Steel, R-CF, and Leather for these parameters/themes. Ensure that updated/ new masterplans retain this emphasis.
Strategy	Planning and implementation of aggressive green manufacturing plans is lacking.	Fast-track implementing existing plans (e.g. SAREM, EV White Paper, GH_2 commercialisation strategy) and complete additional ones (e.g. Water and Sanitation Industry Master Plan, Critical Minerals Masterplan) in coordination with relevant departments.
Industrial finance	Significant fossil fuel subsidies remain in place while green transition support is limited.	Phase out fossil fuel subsidies and redirect funding to green industrial policy tools (e.g. renewable energy rollout tax incentive or low-interest loans for EVs).
Industrial Finance	Levies and taxes from climate policy are pooled into the fiscus, diverting funds from green industrialisation.	Consider ring-fencing revenues from taxes and levies (e.g. plastic bag levy, carbon tax) for green industrialisation activities.
Industrial finance	Most support programmes/public financing do not have any green conditionality and no dedicated support for green manufacturing exists.	Introduce green conditionality in existing support programmes (towards green or greening activities). Consider a dedicated green manufacturing incentive (e.g. by repurposing the 12i tax incentive for greentech manufacturing).
Industrial finance	Public support does not always include localisation objectives.	Include localisation conditions in line with the Preferential Procurement Act (e.g. for any support – grant, loan, guarantee – towards renewable energy rollout).
Industrial finance	Start-ups and small businesses in the sustainable space face challenges in raising finance.	Increase capacity in funding institutions around sustainable development business models (e.g. IDC, DBSA).
Industrial finance	No support for inclusive rollout of greentech	Consider public support design targeting inclusive demand patterns.
Procurement	No green public procurement policy or strategy in place.	Draft green procurement policy and initiate trial period (e.g. support for transition to e-buses and e-minibuses, EV government fleets, sustainable textile for uniforms).
Procurement	Public procurement of greentech does not always include local content objectives.	Include localisation conditions in line with the Preferential Procurement Act (e.g. renewable energy rollout).
Procurement	Lack of awareness about green products and services.	Launch consumer awareness campaigns (through Proudly South Africa) targeting corporate and individual markets.
Industrial spaces	Effort to develop green industrial spaces are insufficient to enable low-carbon production and export.	Bolster the existing eco-industrial park programme and fast-track energy policy reforms.
Industrial spaces	Access to existing incentives by SEZs is impractical and cumbersome.	Streamline process to improve SEZ value proposition.
Carbon pricing	Carbon tax is too low to incentivise rapid change.	Progressive increase in carbon pricing in line with global norms and decarbonisation imperatives Consider offset against decarbonisation investments.
Carbon pricing	Carbon tax is too low to protect from CBAMs or other green protectionist measures.	Consider flexible designs that would retain proceeds in South Africa.

Standards and certification	Mandatory quality standards are needed to prevent the import/use of sub-standard products.	The National Regulator for Compulsory Specifications to introduce mandatory standards and increase capacity of SARS to police and enforce them (e.g. cables, batteries, inverters).
Standards and certification	Standards are not implemented and/or regulatory framework is not in place to support transition.	Finalise regulations and implementation frameworks (e.g. biofuels, cleaner fuels).
Standards and certification	Voluntary performance certification is low domestically. Existing support to encourage certification (e.g. NCPC-SA) is insufficient.	Bolster support for certification (e.g. ISO 14001 and 50001). Consider conditionality (mandatory certification) for certain category of public support.
Standards and certification	Local testing and certification capabilities for numerous green products are insufficient or non-existent.	Establish testing and certification centres, in partnership with the private sector (e.g. batteries, solar panels, inverters, transformers, cables and fasteners).
Standards and certification	No support exists to help local firms comply with national and international sustainability reporting requirements.	Establish a one-stop-shop to support local firms, especially small, medium and micro enterprises, with monitoring, reporting and verification of sustainability requirements – such as environment, social and governance and CBAM.
Trade policy	Tariff structure does not support increased demand and localisation (no or weak protection of nascent industries and tariffs on certain key imported inputs/products). Tariff amendment process not nimble.	Conclude ongoing International Trade Administration Commission investigation into renewable energy and battery value chains. Initiate new investigation as necessary (e.g. BEVs). Streamline process for tariff application and review.
Trade policy	Regional and continental agreements hold untapped potential to drive sustainable trade and domestic sustainable production.	Engage secretariats such as AfCFTA and others to understand global demand for sustainable goods and services and use these platforms to advocate for intra-African trade and international support.
Energy policy	Decarbonisation of the grid is too slow to enable economy-wide low-carbon development.	Fast track public procurement of renewable energy and battery storage along with the transmission rollout, curtailment framework and the market infrastructure (e.g. trading and wheeling).
Energy policy	Lack of consistent, nationwide SSEG framework to enable firms' decarbonisation.	Design and implement a standard, nationwide SSEG framework at the municipal/Eskom level.
Transport policy	Domestic freight logistics is heavily and increasingly dominated by road transport.	Fast-track implementation of the Roadmap for the Freight Logistics System in South Africa, especially in terms of road-to-rail modal shift.
Tourism policy	Long-distance tourism is at risk from decarbonisation imperatives Tourism activities can support industrial development in protected and conserved areas.	Foster the development of sustainable aviation fuel and electric ground transport Explore industrial development linkages with tourism around biodiversity and nature-based activities (e.g. essential oils).
Mineral development policy	No clear critical mineral policy is in place.	Finalise Critical Minerals Masterplan, focus on ambitious but feasible downstream development (e.g. battery value chain).
Agricultural policy	Resource efficiency in agricultural value chains can be materially improved.	Support the rollout of local regenerative, resource-efficient and climate-smart technologies and practices in agricultural value chains.
Agricultural policy	Foster the development of sustainable inputs into agricultural value chains linkages (e.g. GH_2 to produce ammonia for fertilisers).	Incentivise the development of linkages between projects that seek to produce sustainable agricultural inputs, e.g. green fertiliser and the agricultural sector.

	KEY ISSUE	SHORT-TERM INTERVENTION
Agricultural/ Research & Development policy	Lack of smart farming technologies developed and implemented domestically.	Assess emerging smart farming practices and technologies and their applicability to the local market, with a focus on increasing support for local innovators and manufacturers.
Agricultural/ Trade policy	Agricultural and agro-processing exports need to meet increasingly stringent sustainability standards in key export markets (e.g. EU Farm-to-Fork strategy).	Assess the extent to which sustainability standards (GHG emissions, water, fertiliser use) in key export destinations threaten key agricultural and agro-processing exports, and implement remedial actions.
Waste management policy	Waste regulations sometimes obstruct circularity initiatives (e.g. waste classification as hazardous or controlled prevents recycling or repurposing).	Review waste material classifications for sustainable materials that face barriers and/or are incorrectly classified.
Waste management policy	EPR regulations only apply to specific categories of waste.	Enforce regulations and consider major categories of waste beyond packaging, electrical and electronic waste and lighting (e.g. textiles, automotives, construction). Streamline administrative burden to ensure compliance.
Waste management policy	Regulatory hurdles around licensing and permitting raise the barriers to entry in recycling (and other circular activities).	Streamline licensing and permitting to reduce time and other costs, encouraging investment.
Research & Development	Expenditure on R&D, and green R&D especially, is insufficient.	Progressively increase R&D expenditure to achieve 1.5% of GDP, with increased focus on green R&D.
Research & Development	Technology commercialisation is hampered by risk aversion and unsupportive procurement systems.	Establish platform to derisk the cost of assessing and trialling local innovations in both the public and private sectors.
Research & Development	Technical incubation and capacity building support for innovators is limited.	Recapitalise the mothballed Manufacturing Technology Centre and establish new centres across the country.
Human capital development	Mismatch between demand and supply of green skills.	Bolster the ongoing mapping of green skills to inform their inclusion in existing qualifications and the development of dedicated demand-led qualifications.
Small business development	Lack of structured platform for the development of many supply chains.	Expand support for supplier development and Original Equipment Manufacturer-led industrial clusters in green value chains (e.g. renewable energy and battery value chains).
Small business development	Public procurement system does not encourage innovation.	Experiment with procurement of novel products (in conjunction with derisking platform proposed above).
Small business development	Lack of support for technology commercialisation.	Increase technology development and commercialisation finance.
Just transition	Worker and community support in transition value chains and areas is insufficient.	Development of a dedicated policy support package for workers in transition (e.g. coal value chain).
Just transition	Lack of dedicated support (direct public investment, incentive) for economic diversification in just transition hotspots.	Develop value proposition for diversified investment in just transition hotspots, including dedicated incentive framework.
Just transition	No decent work policy in place.	Develop a decent work framework linked to public procurement and state support.

CONCLUSION

The transition towards a low-carbon economy presents both challenges and opportunities for South Africa. As highlighted, the country's economic structure, heavily reliant on carbon-intensive industries, faces significant risks amid global decarbonisation efforts and increased green competitiveness. And the country's road to green industrialisation is not without obstacles. While South Africa is integrated into the global economy and committed to international climate agreements, achieving a balance between mitigating climate impacts and ensuring a just transition for vulnerable communities is critical. The interplay between green industrial policy, global trade dynamics, and domestic socio-economic realities requires a strategic, inclusive, and forward-looking approach.

South Africa's dependency on fossil fuels, particularly coal, has contributed to economic development but at great social and environmental costs. By contrast, the path towards green industrialisation should focus on protecting and improving livelihoods. Efforts to diversify economic activities and invest in emerging green industries, such as renewable energy, battery storage, and hydrogen value chains, are steps in the right direction. However, dedicated policy measures, such as public procurement, R&D investments, green financing, and technological partnerships, among other interventions, are vital to fully realise the potential of these new opportunities and transform all economic activities.

In the short term, targeted policy interventions can act as catalysts for driving this transition. Phasing out fossil fuel subsidies, implementing green manufacturing incentives, developing supportive procurement policies, and enhancing skills development are essential measures that can accelerate progress towards an inclusive green economy. Moreover, securing South Africa's competitiveness requires fostering domestic demand for green products and services, enhancing mutually reinforcing value chain linkages, and leveraging opportunities within continental and international trade frameworks.

Ultimately, the success of South Africa's low-carbon transition depends on coordinated efforts across government, industry, and civil society to create a resilient, sustainable, and inclusive economy. By strategically and actively aligning policy frameworks, building institutional capacities, and driving socio-economic investments, South Africa can lead the way in realising a just, green industrial future.

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