Guide to Investing in Transmission Infrastructure – Market Opportunities for Investors to Unlock Resilience and Growth in the Western Cape

February 2026

V&A Waterfront, Cape Town

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Powerlines in South Africa

1 Executive Summary

Policy reforms and deregulation have accelerated the liberalisation of South Africa's energy market – the relaxation of generation licensing by the National Energy Regulator for South Africa (NERSA) has spurred private participation and growth in renewable energy. However, grid constraints in the Northern Cape, Western Cape and Eastern Cape limit new connections. Eskom's Transmission Development Plan commits ZAR440 billion to expansion through to 2030, after which public–private partnerships will be critical. This document highlights the key challenges which the South African grid faces and the opportunities for investors in its reform over the next decade. In addition, the document will cover key considerations for investors who participate in developing the transmission infrastructure. The document is aimed at investors seeking a deeper understanding of the transmission value chain in South Africa and the Western Cape.

2 Key Takeaways

a. South Africa has seen immense growth in renewable energy generation. In 2020, renewable energy accounted for roughly 10% of all generation. By January 2025, this figure had increased to 16%.

b. The Transmission Development Plan (TDP) and the Integrated Resource Plan (IRP) anticipate 134 GW and 100 GW of new capacity by 2034 respectively. The mix will largely be constituted from renewable wind and solar projects in the Cape provinces.

c. Investments as per the IRP are expected to reach over ZAR 2 trillion to finance not only generation but also upgrades to the grid as a whole.

d. Such investments will emerge from public–private partnership mechanisms to supplement shortfalls in the fiscus and help the utility meet its generation, transmission, and distribution requirements.

e. The deregulation of the energy market resulted in the unbundling of the national utility into generation, transmission, and soon distribution, to address challenges in the energy market.

f. Transmission now remains the key challenge for evacuating wholesale electricity. The challenge is more pronounced as generation capabilities are shifting from the coal belt to the provinces in the Cape where there is high potential for renewable energy.

g. These areas are currently grid-constrained with limited to zero additional grid connection capacity. For investors in the energy market, connection capacity at the substation level provides new investment opportunities. These opportunities exist in renewable energy generation, grid modernisation, and maintenance and operations.

h. Build of transmission infrastructure is currently underway through the piloted independent transmission programme which should draw on lessons learned from the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP).

i. The ownership and operation models for transmission infrastructure will be contingent on the models developed by the procuring entity and further deregulation of the transmission services sector.

j. Eskom has identified over 14,000km of ultra-high-voltage lines by 2034; however, the utility is capable of financing the required build only until 2029. This represents approximately a third of the required build. The private sector will therefore have to mitigate the remainder of the cost.

k. There are various financing, procuring, and ownership models that can be explored to ensure private-sector participation and investment. With this in mind, the private sector will have to understand the requirements for environmental and social approvals, and take into account the due diligence that is required on land tenure.

l. Unlocking the grid creates opportunities for unlocking further economic activities, building resilience and ensuring that the region is competitive as an investment destination and is able to serve social needs.

Contents

1 Executive Summary 3
2 Key Takeaways 3
3 Introduction 6
4 Overview of the Roadmap to Transmission Sustainability in South Africa 8
4.1. Effects of market liberalisation on the grid 9
4.2. Energy imbalances in the grid are changing areas of supply and demand 10
5 Developing a Robust Grid – Adapting to the Density of New Technologies 13
5.1. Opportunities for localisation of high-voltage power lines in South Africa 14
5.2. Transmission service agreements: requirements and roadmaps for private-sector participation 16
6 Understanding the Western Cape's Transmission Requirements and Opportunities 20
7 Strategic Opportunities That Can Be unlocked from Transmission Infrastructure 24
8 References 26

Powerlines with Lions Head, Cape Town in the Background

3 Introduction

Deregulation and effective policy reform have charted a path for the liberalisation of the energy market in South Africa. By and large this has been through the lifting of license requirements by NERSA for utility-scale energy generation to mitigate the national utility's constrained generation. As such, an energy market that is much more liberalised has been evident in the past five years. Procurement programmes have accelerated the pipeline of renewable energy projects particularly in regions that have high renewable energy resources. This has further catalysed private-sector participation and increased renewable energy generation. To date, the pipeline has seen 134 GW of new energy projects that are anticipated to become live by 2035 (Vulindlela, 2025). Parallel to this, the recently published IRP seeks to add an additional 105 GW of new energy to the grid by 2034 (DMRE, 2025).

Public-sector procurement alone has added 5,200 MW to the national generation profile. However, by bid window six, grid constraints made it possible to evacuate only 1,000 MW through our transmission infrastructure (Cliffe Dekker Hofmeyr, 2025). The published Generation Connection Capacity Assessment (GCCA) highlights that constraints exist largely in the provinces of the Northern Cape, Western Cape and Eastern Cape – the Cape provinces (Eskom, 2025). In all three provinces, grid capacity is currently at full capacity, with generators unable to connect to substations.

Eskom publishes its TDP annually which lays out the utility's ambition to strengthen and expand the transmission infrastructure. The Eskom TADP, notes that the utility is capable of carrying out strengthening and expansion only up until 2030. Beyond that, the utility will depend on public–private partnerships for investing in transmission infrastructure. The purpose of this document is to delve deeper into the mechanisms that are currently being deployed to address the constrained grid as policy reform shapes the energy market structure.

The TDP anticipates investing ZAR440 billion in transmission infrastructure by 2030. However, the utility's financial position makes it challenging for the utility to invest in further expansion of the grid after 2030 (Eskom, 2022). In the recently published IRP 2025, it is noted that an investment of ZAR2.2 trillion is required to transform the energy sector completely by 2030. This in itself accounts for 30% of the current gross domestic product (GDP). Therefore, as the energy market liberalises further to increase private-sector participation, more recently in transmission infrastructure, an opportunity exists for project developers to participate in infrastructure expansion (DMRE, 2025). The Western Cape is primed for this investment, and while the region has experienced a full saturation of the grid, curtailment can unlock 2,680 MW of grid access. It also allows for a phased approach to investing in the regional grid and the opportunity to unlock new generation (Eskom, 2025).

This document also highlights procurement developments by the national government and considerations for investments in transmission, which cover environmental and financing issues. In addition, it provides an assessment of infrastructure requirements.

Wind Farm, Cape Overberg

4 Overview of the Roadmap to Transmission Sustainability in South Africa

The Eskom financial strategy for 2025 to 2035 is a core tenet for energy reform in South Africa and aims to ensure that appropriate investment instruments are implemented to meet our energy system's changing market structure (Eskom, 2025). Electricity generation led by Eskom has declined significantly due to difficulties in operational costs across the generation fleet, loss of revenue from non-payment by clients, and loss of revenue from declining sales. This is shown in Figure 1. The loss of revenue has made it largely unsustainable for the utility to extend its investments beyond the expansion of its core businesses. Before the National Treasury's debt relief mechanism in 2022, the utility had exceptionally high debt-servicing costs with a negative credit outlook and was thus not capable of financing maintenance and operations from its cashflows (FitchRatings, 2021).

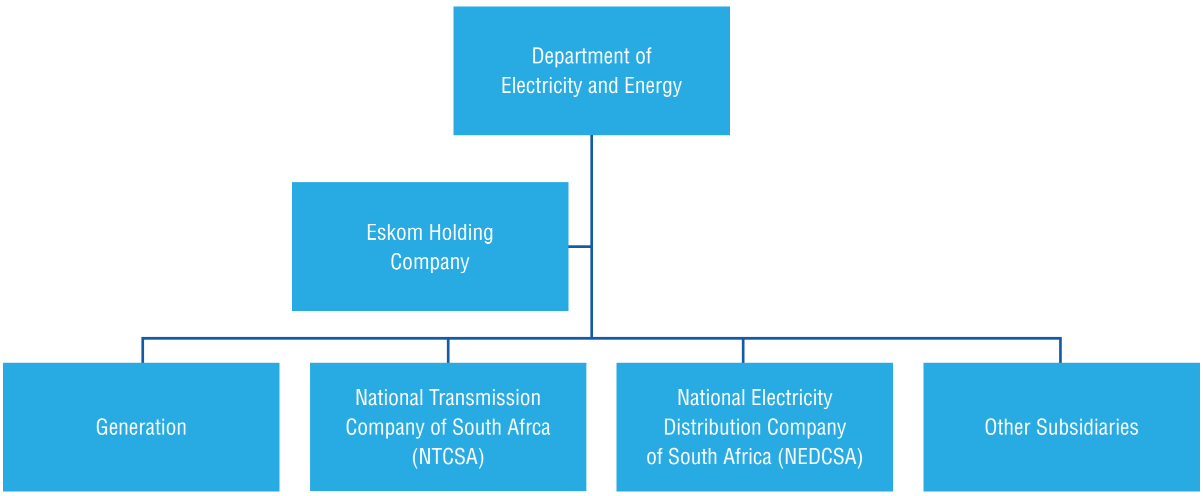
The debt relief mechanism provided by the National Treasury offered Eskom ZAR254 billion in advances between 2023 and 2026 to settle its full debt and to free up cash flows for the utility to run its core business. Nonetheless, Treasury's approach to Eskom's debt has placed a strain on the country's already high debt-to-GDP ratio of 75.1% for the year 2024/2025 (Parliament of South Africa, 2022). The consequences of the high debt-to-GDP ratio will in effect be felt on public–private partnerships where service providers may perceive the high sovereign risk and thus place stricter ring-fenced project revenue streams on built infrastructure.

However, up until now this has not been an inhibitor to public procurement particularly in the REIPPPP. On the contrary, the liberalisation of the generation market has resulted in an increase in installed capacity in renewable energy due to private-sector participation, and is now expected to represent 28% of the energy mix by 2035 in comparison to the 7% in 2022 (Council for Scientific and Industrial Research, 2022). The IRP has also noted that ZAR2.2 trillion will be required to transform the energy market comprehensively (DMRE, 2025).

Between 2023 and 2024, Eskom's overall maintenance of transmission infrastructure declined by 3%, while capital expenditure (capex) requirements increased by 20% in the same period. In the decade 2025–2035, the TDP 2025 expects an average investment of ZAR34 billion in capex per annum in expanding the grid. This allocation is required to expand transformer capacity by 97% (or 133,550 MVA) through 210 newly built transformers. In addition, a 46% expansion (or 14,500 km) in transmission lines will be facilitated (Eskom, 2024). While it is anticipated that most of the funding will be mitigated by the private sector, in the midterm 2025–2030, the National Transmission Company of South Africa (NTCSA) plans to spend ZAR112 billion on transmission infrastructure (National Transmission Company of South Africa, 2024) which will unlock 11,000 MW of new connections.

In order to finance new projects, a combination of on-balance sheet funding and partnerships with parties that are focused on external development will be an imperative. This will reduce dependence on Eskom which currently is striding towards financial sustainability. Its equity position shows a strained position due to constraints in the national fiscus. Significant strides have been made towards reforming the South African energy market structure which should unlock both the state's capacity in continuing maintenance of the grid, and private-sector participation that will catalyse the required expanded capex investment.

Figure 1: Eskom unbundled structure

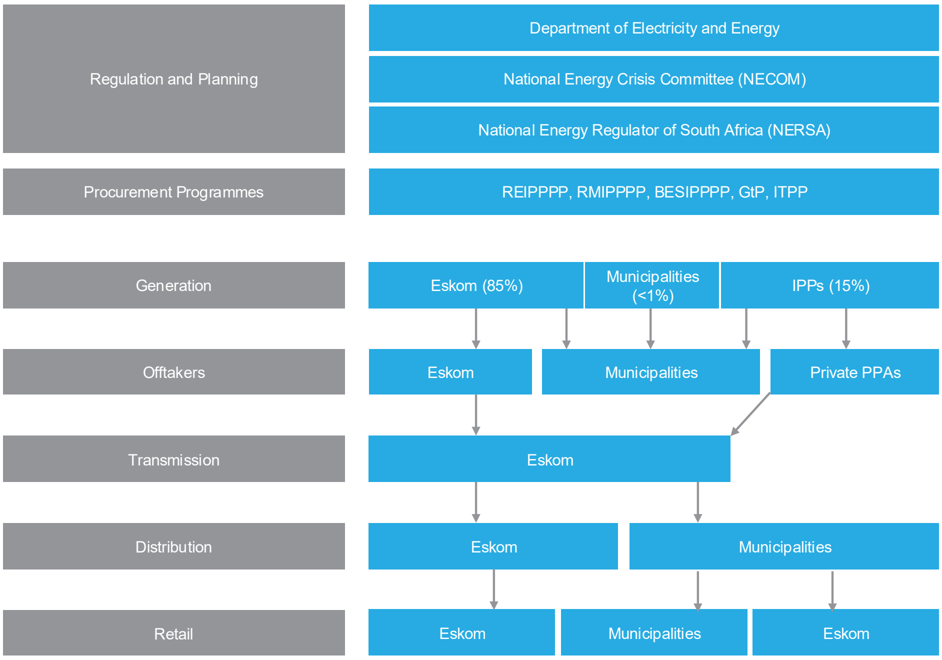


Source: Eskom, 2024

4.1. Effects of market liberalisation on the grid

Increased private-sector participation in the energy sector is crucial. This has been identified in Operation Vulindlela which noted that through market reform, over ZAR400 billion has been unlocked in renewable energy investments across utility-scale generation, distributed generation, and small-scale embedded generation (SSEG) from 2021 to 2024 (Vulindlela, 2025). Such market liberalisation has mitigated the shortfall of funding and the generation has closed the gap between demand and generation, even more so given Eskom's liquidity, but has not done much for stabilisation. These investments have added over 9,500 MW of capacity to the grid since the increase in the licensing threshold in 2021. A pipeline of 134 GW of renewable energy has been built into the energy market in which 44.7% of these projects have undergone environmental and regulatory approvals (Vulindlela, 2025).

Figure 2: Market structure reform



Source (Leitich, 2025)

Operation Vulindlela has prioritised the complete restructuring of the national utility, as depicted in Figure 2, to include a transmission systems operator – the NTCSA – which is now fully licensed and is mandated to strengthen and expand the national transmission network (Vulindlela, 2025). This unbundling has proved to be vital in reforming the energy market and has charted the way for increased private-sector participation. The NTCSA has noted its plans to invest ZAR112 billion between 2025 and 2030 which will unlock 11,000 MW of new connections.

The mandate of the NTCSA is to be informed about the nature of the changing electricity value chain. The strengthening and expansion of the transmission infrastructure are related to the change in energy flows. The north-eastern part of the country has long been an area of high energy use along the coal belt, and consequently the northern interior is an area of high energy use as well. In the past, electricity flows have therefore been from the northern parts of the country – areas of high electricity generation and use – to the south-western areas of low-energy use and traditionally little energy generation.

This has, however, changed in the past decade. The Cape provinces (i.e. the Northern Cape, Western Cape, and Eastern Cape) find themselves in a unique position of being able to deliver on renewable energy generation to meet South Africa's Nationally Determined Contributions for emissions reduction. However, this means energy flows will reverse in the long term when the Cape provinces, which are characterised by high concentrations of wind and solar energy, will be net exporters of energy to the northern interior parts – areas of high energy use. This creates an energy imbalance, as depicted in Figure 3 – high energy users will depend on renewable energy production from the Cape provinces. Thus, the current and planned infrastructure will have to account for changing energy flows, i.e. from north-south to south-north.

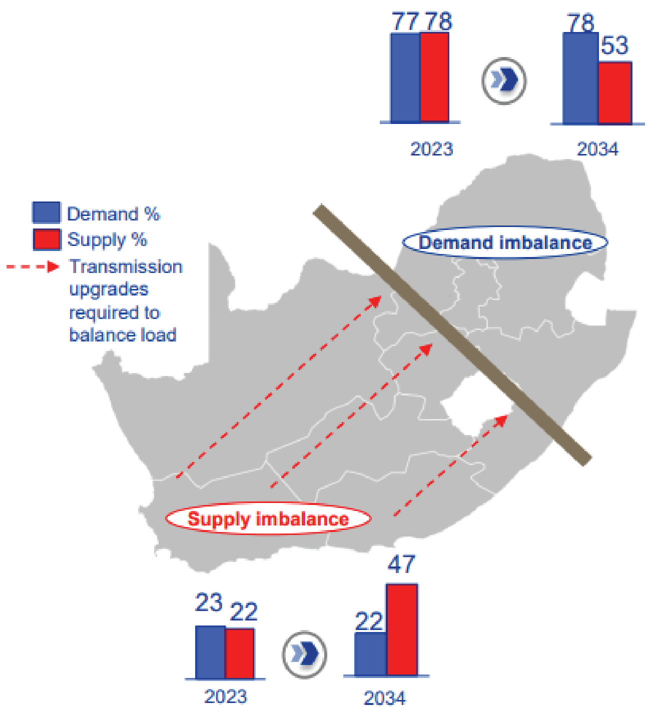
In December 2024, Cabinet endorsed the establishment of the Independent Transmission Projects (ITP) programme which provides a mechanism for mobilising private-sector investments in the grid. While the mechanism for public–private partnerships (PPPs) is being defined by Treasury, the REIPPPP and the Risk Mitigation Independent Power Producer Procurement Programme (RMIPPPP) have set up a viable template showing that they are capable of attracting the necessary private-sector investments for meeting Eskom's generation constraints.

Under the Electricity Regulation Act which gave effect to the unbundling of Eskom to form the NTCSA, the Minister has set determinations for the requirement of 1,164km of 400kV transmission power lines in its initial bid (pilot phase) of the ITP programme. While this has been received largely as the first bid window, it will be preceded with several more calls for proposals and bid windows (National Treasury, 2025).

4.2. Energy imbalances in the grid are changing areas of supply and demand

The NTCSA as the procuring entity will engage in transmission services agreements with the private sector through the ITP programme. Participating provinces as per the determinations are the Northern Cape, Free State, and Gauteng – noting that changes to the network have up- and down-stream effects. The intention is to unlock 3,222 MW of new generation in these regions by 2029. This stems from the gridlock that was encountered by independent power producers (IPPs) during the REIPPPP bid window 6, when only 1,000 MW of the awarded 5,200 MW were accessible (Cliffe Dekker Hofmeyr, 2025).

Figure 3: Demand and supply imbalance: transmission upgrades are necessary



Source (Eskom, 2025)

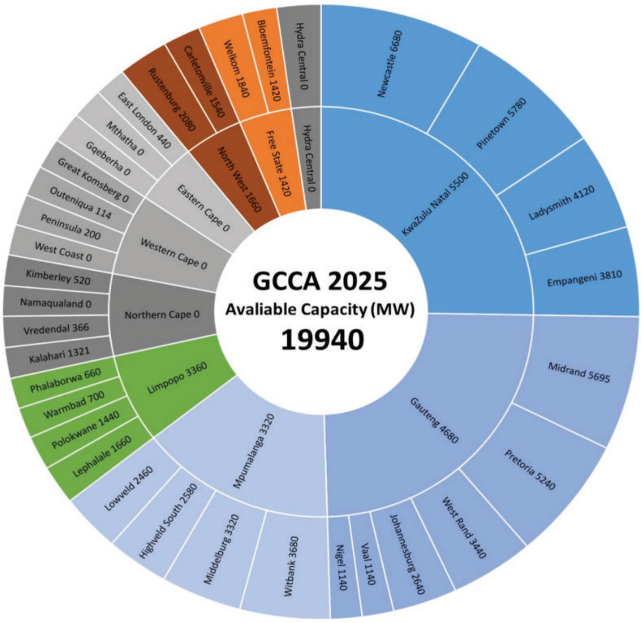
As evidenced in Figure 4 and Figure 5, the larger issue is the capability for evacuating energy into the grid in regions of high renewable energy generation, and the prevalent saturation of the grid in those regions. It is anticipated that renewable energy will account for 56GW in new generation by 2034 (Cliffe Dekker Hofmeyr, 2025). To achieve this, ZAR440 billion in investments will be required in transmission infrastructure during the decade. While reform in transmission is underway, to date over 20GW of renewable energy, which has undergone construction, still remains untapped (Leitich, 2025).

Large transmission constraints are evident in the Cape provinces where there is no grid connection capacity (illustrated in Figure 4). To meet the requirement of 14,000km of powerlines as per the TDP2024 by 2029, 5,043km of powerlines need to be constructed. However, by the end of 2025, only 286km of powerlines are likely to be possible from the Eskom balance sheet (Mkoko, 2025).

Published annually, the GCCA details the amount of grid connection capacity that is available at the supply level to the substation level. As a response to bid window seven of the REIPPP programme, which saw almost no projects awarded in the Cape provinces, there is a need to identify substations where capacity can be unlocked parallel to the expansion of the grid in areas of constraint. Thus, for developers, it has become more relevant to engage in developments closer to areas where there is still connection capacity.

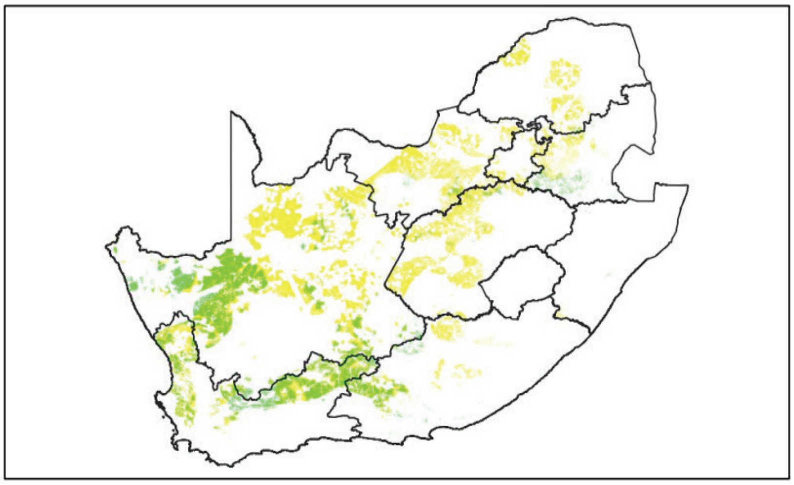
The latest version of the GCCA 2025, published in 2024, builds on the 2023 and 2022 editions with several key updates. It highlights improved grid capacity in certain regions resulting from ongoing transmission upgrades, while also confirming that significant constraints persist in high-demand renewable energy zones such as the Northern Cape and Western Cape.

Figure 4: Grid connection capacity in provinces



Source (Eskom, 2025)

Figure 5: Areas suitable for wind (green) and solar (yellow) energy



Source (National Transmission Company South Africa, 2025)

Simultaneously, the NTCSA acknowledges its balance sheet can fund only the required first five years of the expansion of the grid, and that alternative funding mechanisms will have to be explored (National Transmission Company of South Africa, 2024). In this, the operator will lean on the Minister of Electricity and Energy, and on the National Treasury, for funding models necessary to catalyse the expansion of the grid. Cognisant of procurement as a mechanism, a credit guarantee vehicle is expected to be established with the World Bank via the previously mentioned ministerial determination. The facility will underwrite infrastructure, particularly transmission infrastructure that expands into rail and water. This will increase the investments made by the Just Energy Transition Partnership (JETP) with a focus on infrastructure financing through leveraging private capital. The JETP has established a project office where projects can apply for funding to meet the targets of the JETP.


Engineers Standing at Electricity Station

5 Developing a Robust Grid – Adapting to the Density of New Technologies

In addition to powerlines, a consideration of various aspects of the grid is necessary for ensuring a stable, functioning, and sustainable grid. Renewable energy in itself not only shifts the physicality of more grid connection capacity towards areas of generation but also adds new stresses to the traditional grid which would have retained stability from synchronous generators (i.e. thermal power stations). Thus, grid expansion will have to account for modernisation as technology changes. Table 1 shows the various components required in both the expansion and modernisation of the grid.

Transformers are another fundamental component of the transmission system. They step voltage levels up or down, which is critical for efficient long-distance power transmission. High-voltage transmission reduces losses over long distances, while lower voltage levels are needed for safe distribution to consumers. Transformers also provide electrical isolation between different parts of the grid. They enable maintenance, protect against faults and support the integration of various generation sources, including renewable energy plants, into the network.

Renewable energy technologies do not typically have the heavy rotating masses of traditional synchronous generators which help to stabilise the grid by naturally supporting frequency, fault levels and reactive power. Instead, renewables rely on inverters to match grid phase and voltage, which is the ease of the outflow of electrons into the grid. As renewable energy use grows, fewer synchronous generators are connected to the grid, and this reduces natural stability. Inverter-based systems can introduce new control and stability challenges, making grid management more complex (National Transmission Company of South Africa, 2024).

Thus, the grid has to consider alternatives above and beyond transformers such as synchronous condensers. Synchronous condensers deliver inertia, voltage regulation, and system strength in one package, making them a key solution for replacing lost inertia when synchronous generators are displaced by high levels of renewable energy. When paired with advanced grid-forming inverters and battery energy storage, they combine physical inertia, fast-acting synthetic inertia and frequency response to maintain grid stability, support voltage, and flatten out renewable variability. This will become a more important consideration for developers as batteries will form a key role in stabilising not only transmission infrastructure but also distribution.

Reactors are used to manage reactive power and to control current under specific conditions. There are two main types of reactors: series reactors, which are connected in series with a transmission line; and shunt reactors, which are connected in parallel at a busbar or along a line. Series reactors that are connected in series with transmission lines limit short-circuit currents, protecting critical equipment such as transformers and circuit breakers from excessive fault currents. Shunt reactors, on the other hand, are connected in parallel at busbars or along transmission lines to absorb reactive power. They mitigate over-voltages that can occur on lightly loaded high-voltage lines, particularly at 400–765 kV. By regulating reactive power, reactors play a key role in maintaining voltage stability and prevent fluctuations that could lead to equipment trips or even localised blackouts, allowing the grid to operate safely and reliably.

Capacitors complement reactors and transformers by supplying reactive power to the grid. Shunt capacitors are typically installed at substations or along transmission lines to boost voltage levels, improve power factor and reduce losses in the system. By carefully balancing the contribution of reactive power from capacitors and the absorption by reactors, transmission operators can optimise voltage profiles across the network, enhance system stability and ensure the efficient and reliable delivery of electricity to consumers. Together, reactors, transformers and capacitors form the backbone of a robust and resilient high-voltage transmission grid.

Table 1: Asset requirements for national grid expansion 2025–2034

Infrastructure requirements	2025–2029	2030–2034	Totals
Power Lines (km)			
765 kV	767	6,190	6,957
400 kV	4,251	3,226	7,477
275 kV	26	34	60
Total	5,044	9,450	14,494
Transformers			
Number of Units	87	123	210
Total Capacity (MVA)	41,325	91,325	132,650

Infrastructure requirements	2025–2029	2030–2034	Totals
Capacitors			
Number of Units	15	25	40
Total Capacity (MVar)	1,032	1,660	2,692
Reactors			
Number of Units	14	45	50
Total Capacity (MVar)	3,260	13,000	16,260
Synchronous Condensers			
Number of Units	7	1	8
Total Capacity (MVar)	5,850	900	6,750

Source (National Transmission Company South Africa, 2025)

5.1. Opportunities for localisation of high-voltage power lines in South Africa

The ITP has pre-qualified seven internationally led consortia for the first phase of delivery which has unlocked a USD1 billion transmission investment package covering 1,164 km of high-voltage power lines and 2,630 MVA of transformer capacity. As with the REIPPP programme, localisation requirements form a core component of the ITP, with thresholds set by the Department of Trade, Industry and Competition (DTIC). This creates a material opportunity to crowd in local investment, deepen existing supply chains and expand the domestic industrial basket for grid-related components, particularly transformers, cables, switchgear, and steel-intensive structures (GreenCape, 2026). The details are shown in Tables 2 and 3. According to GreenCape, this scale of transmission build-out represents one of the most significant near-term anchors for industrial localisation in the power sector.

However, realising this opportunity requires confronting the structural constraints identified by Trade & Industrial Policy Strategies (TIPS). While South Africa has achieved substantial renewable energy deployment, localisation outcomes remain fragmented and vulnerable to policy discontinuity and system bottlenecks. TIPS highlights that localisation is inseparable from the performance of the electricity system itself. Transmission capacity, in particular, shapes project timelines, connection certainty and the credibility of procurement pipelines. Where grid expansion lags behind generation ambition, demand signals for locally manufactured components weaken and undermine the investment case for domestic production of high-value grid equipment (Trade & Industrial Policy Strategies, 2024).

The spatial mismatch between renewable energy resources and electricity demand further elevates transmission as a binding constraint. Wind and solar generation is concentrated in regions distant from major load centres, requiring accelerated investment in transmission corridors, substations and grid reinforcement. Delays in this infrastructure increase connection backlogs and project risk, eroding investor confidence not only in generation but also across the manufacturing value chain. This uncertainty compounds the effects of historically inconsistent procurement volumes, making it difficult for firms to commit capital, scale operations, or invest in workforce development. As a result, localisation remains shallow, with domestic firms largely confined to low-value segments and unable to achieve the scale required for competitiveness (Trade & Industrial Policy Strategies, 2024).

Table 2: Summary of local content requirements

Components	Local content requirement
Power Lines	100%
Electrical Cables	90%
Transformers & Shunt Reactors	45 – 90%

Source: (GreenCape, 2026)

Logistics and infrastructure readiness further shape localisation outcomes under the ITP. High-voltage equipment, particularly 400 kV transformers and associated components, can exceed 200 tonnes per unit, placing significant demands on port capacity, heavy-haul logistics and inland transport corridors. Concentration of imports through major ports heightens the importance of coordinated planning between transmission delivery, port authorities and industrial zones. In this context, Special Economic Zones (SEZs) can play a catalytic role by clustering manufacturers near logistics hubs, leveraging fiscal incentives and reducing cost barriers to entry for domestic and international firms seeking to localise production (GreenCape, 2026).

Beyond scale and infrastructure, the analysis underscores that localisation cannot be reduced to procurement volumes alone. Despite more than 6 GW of wind and solar capacity being delivered, domestic firms continue to capture only a limited share of total project value. Localisation to date has been dominated by assembly, construction and low-complexity manufacturing, while critical technologies such as PV cells, advanced inverters, wind nacelles and blades, grid control systems, and battery technologies remain imported. This reflects an energy transition that has expanded installed capacity faster than it has transferred productive knowledge (Megatrends Afrika, 2025).

The persistence of shallow localisation is closely linked to weak mechanisms relating to technology transfer. Although localisation and community participation requirements are embedded in procurement frameworks, they are rarely matched with binding obligations for licensing, joint ventures, co-development, or structured skills transfer. This limits domestic exposure to proprietary designs, advanced manufacturing processes and system integration expertise, locking firms out of the highest-value segments that account for the majority of capital expenditure and learning spillovers. Reframing localisation policy around measurable technology transfer outcomes, aligned procurement sequencing and targeted industrial finance, is therefore essential. Without this, the energy transition risks entrenching long-term import dependence; with it, transmission-led investment can become a platform for sustained industrial upgrading, skills formation and competitive participation in global clean energy value chains (Megatrends Afrika, 2025).

Table 3: Break down of local content requirements as determined by the DTIC

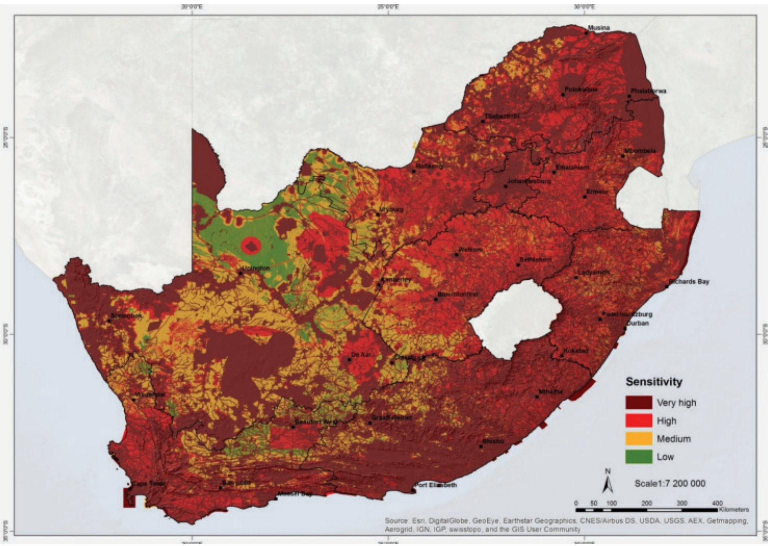
Components	Local competence	Local content requirement
Conductors and Overhead Line Materials		
Bare Overhead Conductors	Low	Local capability with no production, Opportunity for local investment
Optical Ground Wire	Low	Local manufacturing can also unlock growth in telecommunication
Ground Wires / Earth Wire	Moderate	N/A
Transmission Towers		
Lattice Steel Towers / Monopoles	High	100% local sourcing, opportunity to strengthen steel industry
Foundations (Concrete + Rebar)	High	100%
Insulators		
Composite Insulator (HV)	Moderate	N/A
Porcelain/Glass Insulators	Low	N/A
Hardware Fittings	High	90%
Transformers		
Power Transformers	High	45% - 90%
Distribution Transformers	Moderate	45% - 90%
Instrument Transformers	Moderate	45% - 90%
Ehv Transformers (>400kv)	Low	10%
Switchgears & Protection		
High-Voltage Circuit Breakers	Low	N/A
Disconnectors, Surge Arresters	Moderate	N/A
Gis/Ais Switchgear	Moderate	N/A
Protection Relays & Scada	Low	N/A
Line Hardware & Accessories		
Clamps, Connectors Compression Joints	Moderate	N/A
Transmission Line Tools	Moderate	N/A
Insulator Fittings, Line Hardware	Low	N/A
Cables And Conductors (Inputs)		
Transformer Conductor	Moderate	N/A
Power Cable	High	N/A

Source (GreenCape, 2026)

5.2. Transmission service agreements: requirements and roadmaps for private-sector participation

Under the Electricity Regulation Act, participants in the ITP programme may be required to obtain a transmission licence. The license will give participating companies the opportunity to connect with IPPs and offer grid access to projects and high energy users. In the main, applications should meet the necessary requirements of technical capability, financial and operational capacity, regulatory compliance and alignment with grid codes, and standards relating to security of supply.

Figure 6: Wall-to-wall environmental constraints map



Source (Council for Scientific and Industrial Research, 2019)

Given that transmission lines in the main cover 10s, 100s or 1,000s of kilometres, Environmental Impact Assessments (EIAs) need to consider strategic considerations as identified in Table 4. It should also be noted that under the EIA provisions required by the Department of Environment, Forestry and Fisheries, Strategic Transmission Corridors (STCs) have been identified which set out basic assessment requirements for projects in these corridors. Those projects that fall outside of the transmission corridor will have to complete a more comprehensive Scoping and Environmental Impact (SRI) report. Figure 6 (above) shows the environmental sensitivity areas for EIAs across South Africa. The STC broadly excludes social and economic impact reporting that is required and thus creates an expedited approvals process.

Table 4: EIA approval considerations for developer

EIA factor	Scope	Risk assessment
Biodiversity	Flora and fauna Long-term effects on ecosystem services Causeway through protected areas including heritage areas	High
Agricultural Practices	Impact on food security Causeway through farmlands Soil erosion impact	Medium to high
Water Resources	Considerations regarding groundwater, rivers, and estuaries	Medium to high
Air Quality and Noise	Impact on bird life Radiation levels	Low

EIA factor	Scope	Risk assessment
Development Planning	Impact on property values Airports and military areas Considerations regarding protected areas Community health and safety Causeway through settlements, railways, roads and aviation Long-term socio-economic impact	Low to medium

Source (Envirolution Consulting, 2017)

An emerging and more common constraint for large energy producers regarding the obtaining of a license has been land access and associated rights. These challenges have been driven by:

1. Unclear or communal land tenure: Project developers may think they are dealing with an individual landowner, but customary councils, families, or government entities may have overlapping authority on key parcels of land resulting in disputes and uncertainty (Legal Resources Centre, 2024).
2. Community resistance, lack of Free, Prior and Informed Consent (FPIC): Projects that inadequately consult affected communities often trigger protests, litigation, or political blowback more especially where livelihoods (agriculture) or sacred sites are affected. Community opposition can stop projects or force expensive redesigns, compensation, or timelines extending (UCT News, 2025).
3. Servitudes, wayleaves, and transmission-route access: Even if a site is secured, securing servitudes for lines/roads/substations requires separate legal agreements. Disputes over fair compensation, access, or route selection are frequent and can delay grid connection. The roll-out of national transmission corridors has highlighted these frictions (Cliffe Dekker Hofmeyr, 2025).
4. Complex legal and policy environment, expropriation risk, and procedural hurdles: New rules and political pressure (e.g., government signalling possible use of expropriation to speed transmission builds) create both opportunity and uncertainty. Developers must understand compensation rules, “public purpose” vs “public interest” distinctions, and procedural requirements to avoid being caught out (Cliffe Dekker Hofmeyr, 2025).
5. Environmental, heritage and land-use constraints: Protected areas, biodiversity hotspots, watercourses and sites with cultural or archaeological value impose strict assessment, permitting and mitigation obligations. Overlooked ecological/heritage values lead to regulatory stop-orders or litigation (UCT News, 2025).

For transmission projects, the key steps in mitigating issues around land access and rights will be driven by extensive FPIC processes with communities and stakeholders. A thorough mapping of stakeholders and effects of the projects on the stakeholders is an exercise which developers will have to undertake. Nonetheless this is not to say that the FPIC processes are bullet proof and non-void to contestations. Pressures can arise not only from communities, but also from regulators and public authorities.

Lastly, several investment models have been developed by the Development Bank of Southern Africa and the World Economic Forum. While the determination by the Minister envisages the NTCSA as the procurer, unlocking investments through a scalable PPP model will realise the required investments. Table 5 summaries this with the premise that the public entity will be the NTCSA. The ITP draws largely on the various mechanisms as per the table, and on the lessons learned from the REIPPP programme. In addition, funding from the JETP mechanism as well as the credit guarantee from the World Bank provide the necessary concessions to get projects ready for construction.

Table 5: ITP's options for financing

Driving factors	Options
Tender Scope	Early: preliminary work is managed by private developers Late: public entity manages preliminary work (i.e. identifying servitudes)
Revenue Model	Merchant: revenues from disposal of assets Regulated: revenues through tariff structures
Tender Process	Competitive bidding: open process for soliciting from potential investors Direct negotiation: regulator approaches investors
Risk Allocation	Concession: private operator builds and operates while collecting fees Build, own, operate: private entity builds, owns, and operates transmission infrastructure Build, transfer: developer builds and transfers to public entity at operations date Build, transfer, operate: developer builds, operates and transfers, with public entity retaining ownership Build, own, operate, transfer: developer retains ownership until a determined period
Credit Enhancement	Collateralisation: asset to be securitised to reduce risk Blended finance: concessional funding pooled with commercial funding Guarantees: NTCSA guaranteeing payment Political risk insurance: covers losses due to political causes Procurement and project preparation facility: grants for technical preparation/feasibility

Source (World Economic Forum, 2024)

In a sounding exercise regarding the global market by the of Electricity and Energy, it was established that 44% of the domestic role-players that intended to participate in the ITP programme would require international partnerships. Local content in the REIPPP programme was necessary to meet procurement requirements. However, local supply chains, particularly in value-added goods such as solar modules, are not sufficiently robust. A similar challenge exists in transmission where international supply chains will have to be utilised, particularly for transformers (National Treasury, 2025). Key markets for imports to be considered by South African companies will be South Korea, Japan, China, India, Germany, Switzerland and Sweden. These countries are generally net exporters for transmission equipment and South Africa has stable trade relations with them. The United States is a significant manufacturer by volume. However, due to its economic size and demand, it is overall the largest manufacturer; yet it is also a net importer for transformers.

Solar Panel Roofs, Cape Town

6 Understanding the Western Cape's Transmission Requirements and Opportunities

The TDP forecasts that the provincial load peak for the Western Cape is set to increase from 3,500MW in 2023 to 5,000MW by 2034. The Koeberg power station in the main provides the base load of generation for the region, and four additional peaking plants provide energy during outages.

As shown in Table 6, the City of Cape Town is also the owner of three additional peaking plants which manage the demand for power in the metropole. An additional 1,643MW has been added to the provincial grid through the REIPPP programme and the RMIPPPP. No IPPs were awarded in the province from bid window six (National Transmission Company of South Africa, 2024). In addition, 764MW of SSEG was added to the grid in the Western Cape (The Outlier, 2025). This reflects only SSEG that has been registered and does not account for non-registered SSEG. Thus, this is a very conservative view of installed SSEG that does not have grid access. A further 2,127MW of IPP wheeling projects were also commissioned and approved by 2024.

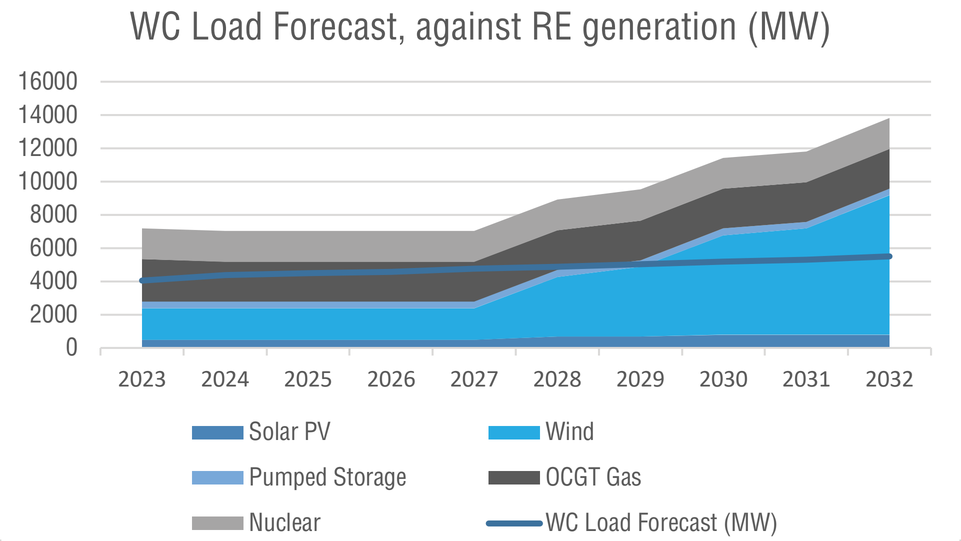
Table 6: Current Western Cape installed capacity

Owned	Generation plants	Technology	Capacity (MW)
Eskom	Koeberg	Nuclear	1,940
	Palmiet	Pumped storage	400
	Ankerlig	OCGT	1,350
	Gourikwa	OCGT	750
	Acacia	Gas turbine station	171
City of Cape Town	Steenbras	Pumped storage	180
	Athlone (decommissioned)	Gas turbine	36
	Roggebaai	Gas turbine	42

Source (NTCSA, 2025)

Figure 7 breaks down the energy profile of new generation. It is anticipated that by 2032, combined generation will exceed 13,000MW and by 2034, the province will have an excess of 17,000MW of energy. This will position the Western Cape as a net exporter of electricity to the northern parts of the country. As such, it will be important for the region to invest in unlocking the necessary transmission capacity required for this growth in renewable energy generation.

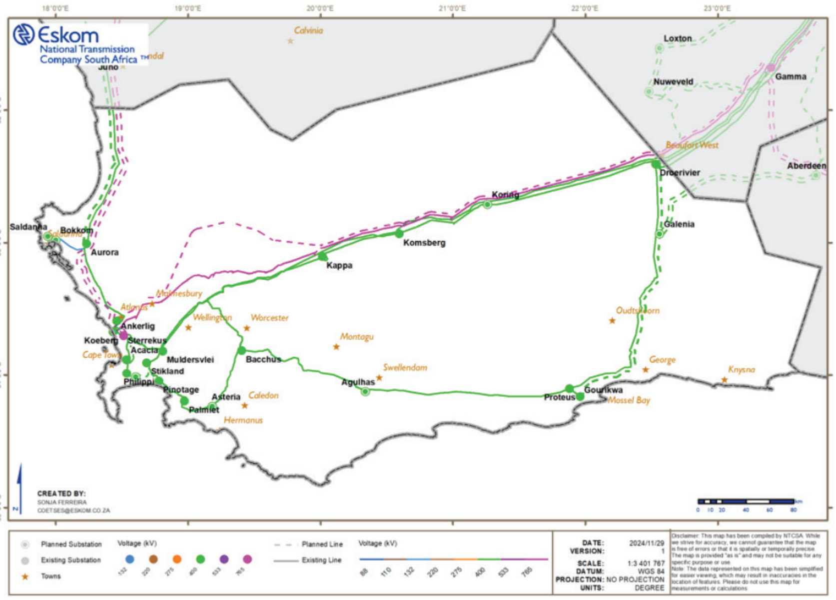
Figure 7: Western Cape's renewable energy generation forecast



Source (Eskom, 2022)

The NTCSA thus anticipates that 24 new transformers will be installed in the Western Cape and, in addition, 1,287km of transmission lines. The objective is to localise substations to evacuate electricity from the Renewable Energy Development Zones towards areas of high energy use including the Cape Peninsula, Saldanha Bay and Mossel Bay – the location for the gas industry. Moreover, the transmission lines that are being planned will serve to evacuate electricity via Kappa substation, as shown in Figure 8, into the northern parts of the country, and through Juno substation into the western parts of the country. The planned western corridor will expand into Namibia and will play a pivotal role in the Southern African Power Pool. Figure 8 illustrates the current state of transmission upgrades and future expansion in the Western Cape.

Figure 8: Current and planned grid upgrades for the Western Cape



Source (NTCSA, 2025)

Plans for Eskom's expansion of the Western Cape transmission infrastructure across various components are detailed in Tables 7, 8, 9 and 10.

Table 7: Planned transformers for the Western Cape

Transformer type	2025–2029		2030–2034	
	Quantity	Total capacity (MVA)	Quantity	Total capacity (MVA)
< 100 MVA	2	30	5	260
< 300 MVA	-	-	1	160
< 500 MVA	1	315	-	-
500 MVA	20	10,000	15	7,500
2000 MVA	-	-	4	8,000
Totals	23	10,345	25	15,920

Source (NTCSA, 2024)

Table 8: Planned overhead high voltage powerlines in the Western Cape

Line voltage	2025–2029	2030–2034
	Total length (km)	Total length (km)
400kV	216	287
765kV	50	1,000
Totals	266	1,287

Source (NTCSA, 2025)

Table 9: Planned capacitor banks in the Western Cape

Capacitor Type	2025–2029		2030–2034	
	Quantity	Total Capacity (Mvar)	Quantity	Total Capacity (Mvar)
72 Mvar 132kV	-	-	4	288
Totals	-	-	4	288

Source (NTCSA, 2025)

Table 10: Planned reactors in the Western Cape

Reactor Type	2025–2029		2030–2034	
	Quantity	Total Capacity (Mvar)	Quantity	Total Capacity (Mvar)
100 Mvar 400kV	1	100	-	-
400 Mvar 765kV	1	400	4	1,600
Totals	2	500	4	1,600

Source (NTCSA, 2025)

While overall electricity consumption in the Western Cape is lower than that in Gauteng and Kwa-Zulu Natal, increasing the province's energy usage through greater numbers of high energy users (such as data centres) can in the interim open generator connection capacity in constrained substations. This capacity can allow more renewable energy projects to be installed. However, this remains a short-term solution.

This, in part, can be attributed to the limited capacity for grid connection that is available at the local area level. A key enabler has been the introduction of curtailment mechanisms which have effectively unlocked additional connection capacity at the substation level. Although the Western Cape overall had zero available capacity for grid connection under the base case, certain substations in the Peninsula and Outeniqua supply regions may still benefit from new generation connections under the curtailment framework that was introduced in the GCCA 2025 Addendum (Eskom, 2025).

The Addendum noted that allowing up to 10% curtailment across the national grid could unlock approximately 3,470MW of additional generation capacity including 2,680MW in the Western Cape and 790MW in the Eastern Cape almost immediately. This places developers and generation projects in the Western Cape at an advantage, enabling faster grid connection without waiting for new transmission infrastructure to be completed (Eskom, 2025). Strategic considerations for developers will have to account for losses in their financials against the recommended 10% generation reduction and possibly consider hybrid projects that could include battery and energy storage. In addition to this, developers will have to structure their power purchase agreements carefully to factor in generation reduction.

The Atlantis SEZ, located just 40km from Cape Town, offers a compelling competitive advantage for renewable energy localisation. With ready bulk infrastructure, proximity to major road networks and ports, and targeted fiscal incentives, Atlantis has attracted over R2.25 billion in green technology investments. The SEZ is developing a specialised renewable manufacturing hub that combines local skills development with export orientation, creating a focal point for assembling, fabricating, and testing renewable energy components.

Freeport Saldanha and the Port of Cape Town complement Atlantis by providing critical logistics and deep-water access for heavy and bulk renewable equipment. Freeport Saldanha is uniquely positioned within a deep-water port (23m+ draught) with direct rail and road connectivity. This enables efficient importation of large transformers, turbines and wind tower components, while supporting emerging green hydrogen value chains. The Port of Cape Town serves as the region's primary gateway for containerised and break-bulk shipments, strengthening supply chains for both imported renewable components and domestically manufactured products. It also ensures the integration of local production into national and international markets.

Electricity Transmission and Tower Check, South Africa

7 Strategic Opportunities That Can Be Unlocked from Transmission Infrastructure

While there is a fundamental need to develop transmission infrastructure, grid resilience has the ability to unlock potential economic growth by opening new markets and strengthening existing markets. The Western Cape has positioned itself as a key player in energy transition relating to new generation and new technologies. Opportunities that can be unlocked include:

1. Green hydrogen manufacturing in which the regional strategy identifies the need for 15GW of renewable energy largely for use in electrolysers by 2032.
2. Exports of steel from Saldanha Bay due to increased and secure energy supply. This can reopen the mothballed steel production facility. The facility is also considering the production of green steel from reducing iron ore with green hydrogen and will thus require an additional supply of stable energy or green hydrogen.
3. The increased requirement for data centres, with the International Energy Agency forecasting an annual increase of 15% in energy requirements for data centres.
4. Wheeling and virtual wheeling which has seen various municipalities participate in the development of wheeling frameworks that account for tariffed vehicles for transmission projects.
5. The Southern African Power Pool which provides a strategic opportunity for the country with the national utility participating as an exporter of energy to parts of the southern African region.
6. Transmission infrastructure that will form the backbone of a wholesale market, driving up electricity trading and supporting increased generation while the South African Wholesale Electricity Market code is being cemented.
7. The increase in electric mobility across South Africa with a projected compounded annual growth rate of up to 36.6% by 2030 for electric vehicles.
8. The competitive global advantage offered by port infrastructure in the renewable energy supply chain which will allow for energy products to flow through them as Transnet undergoes reform (in relation to the Port of Cape Town and the Port of Saldanha).

There is an impending need for the development of transmission infrastructure, and Eskom and the public fiscus will require increased participation from the private sector to finance the bulk of the upgrades which are to be completed from 2030 to 2034. Outside of this, while the playbook for private-sector participation is being developed through the Independent Transmission Procurement Programme, project developers can participate in the development of transmission infrastructure to supply key areas of high energy requirements. These can fall within the STCs which are ear-marked for eased environmental approvals or those of which will involve more rigorous environmental and social considerations and the necessary licences.

Financing from agencies and private-sector balance sheets will drive transmission developments. However, capex and operational expenditure costs will have to be determined at tender prices.

V&A Waterfront, Cape Town

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