electricity & energy

Department:
Electricity and Energy
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF ELECTRICITY AND ENERGY

ENERGY IS ECONOMIC POWER | SOUTH AFRICA'S STRATEGIC TRANSFORMATION

Eskom necsa NRWDI National Nuclear Regulator nersa sanedi

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SEIFSA Energy Conference
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GLOBAL, REGIONAL AND DOMESTIC DEVELOPMENTS SHAPING ELECTRICITY & ENERGY SECTOR

Navigating Global Disruptions in the Energy Landscape

- Geopolitical tensions (Russia-Ukraine, Middle East, US-Iran) disrupting oil, gas, and clean tech supply chains.
- Rising resource nationalism restricting critical mineral exports.
- Global trend toward industrial self-sufficiency and clean energy policies (e.g., US IRA, EU Green Deal).

Building a Resilient, Self-Sufficient Energy Economy

- Global leaders localising clean energy production.
- SA must industrialise clean energy tech to stay competitive.
- Incentives and localisation targets critical to capture value chain.

The Role of Nuclear in Industrial Growth and Energy Security

- Nuclear provides stable baseload and industrial innovation.
- SA's Nuclear Fuel Cycle strategy supports energy sovereignty.
- SMRs offer scalable, fast-deploy solutions aligned with COP28 goals.

Global Risks Amplifying the Need for Energy Resilience

- Climate risks threaten power infrastructure.
- Debt stress limits energy investment in emerging markets.
- Digitalisation introduces cybersecurity threats.

Global Growth in Renewables and Nuclear Energy

Renewable capacity projected to grow 2.7x by 2030.
• Nuclear capacity projected to grow 2.5x by 2050, with rising SMR interest.
• COP28 Global Stocktake includes nuclear for first time.

Strategic Leverage for SA as a key Regional Player

- SA's critical mineral wealth aligns with global clean tech demand.
- Policy support available for beneficiation and clean tech manufacturing (e.g. SAREM).
- Advance regional energy integration and cross-border power trade across the SADC.
- Active participation in SADC energy projects, green hydrogen, and LNG infrastructure development will be crucial to ensure regional leadership in the clean energy transition

Positioning South Africa in the Global Clean Energy Transition

- Grid expansion critical for renewable integration.
- Localise clean energy tech to boost industrial value.
- Incorporate nuclear into Just Energy Transition framework.

- Prioritise grid resilience, disaster recovery and digital security.
- Develop a National Energy Cybersecurity Framework.
- Use blended finance and PPPs for investment in infrastructure.

GLOBAL AND DOMESTIC ENERGY COMPLEX IN CONTEXT

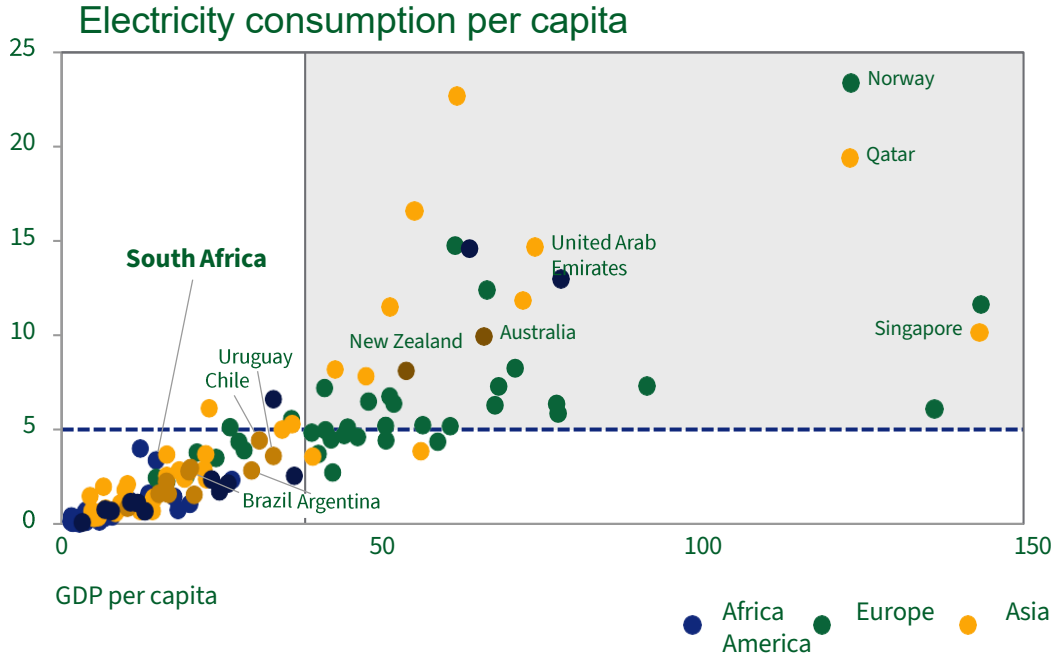
Energy security challenges over past 15 years have prevented us from realising this ambition, and moving towards a high growth trajectory





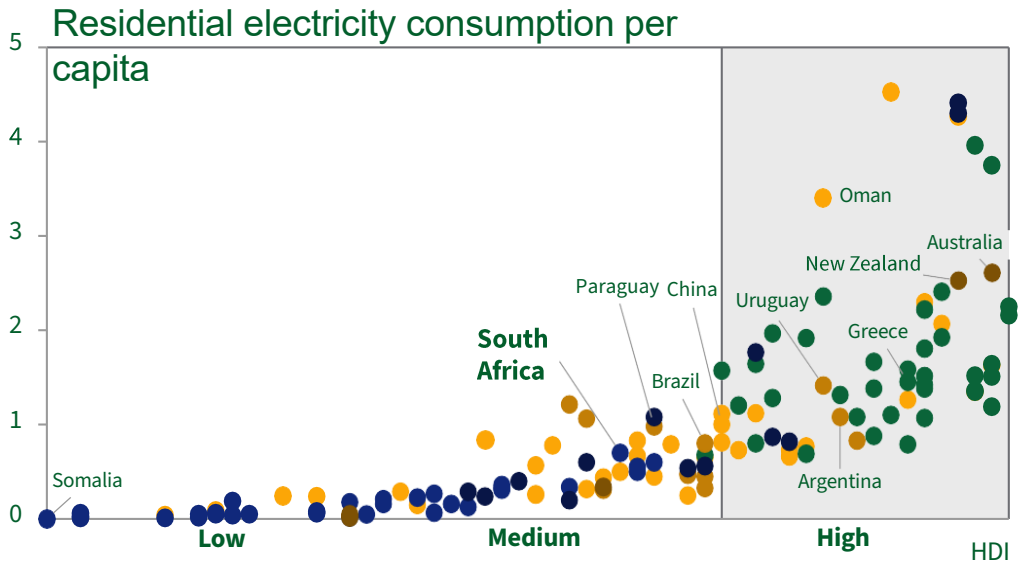

A reliable power system underpins economic growth

GDP per capita (USD PPP, thousands) **vs electricity consumption per capita** (MWh)



High electricity consumption is correlated with high quality of life

Human Development Index (HDI) vs residential electricity consumption per capita
(MWh)



CURRENT POWER CONSUMPTION DEMAND

South Africa remains a Continental Powerhouse

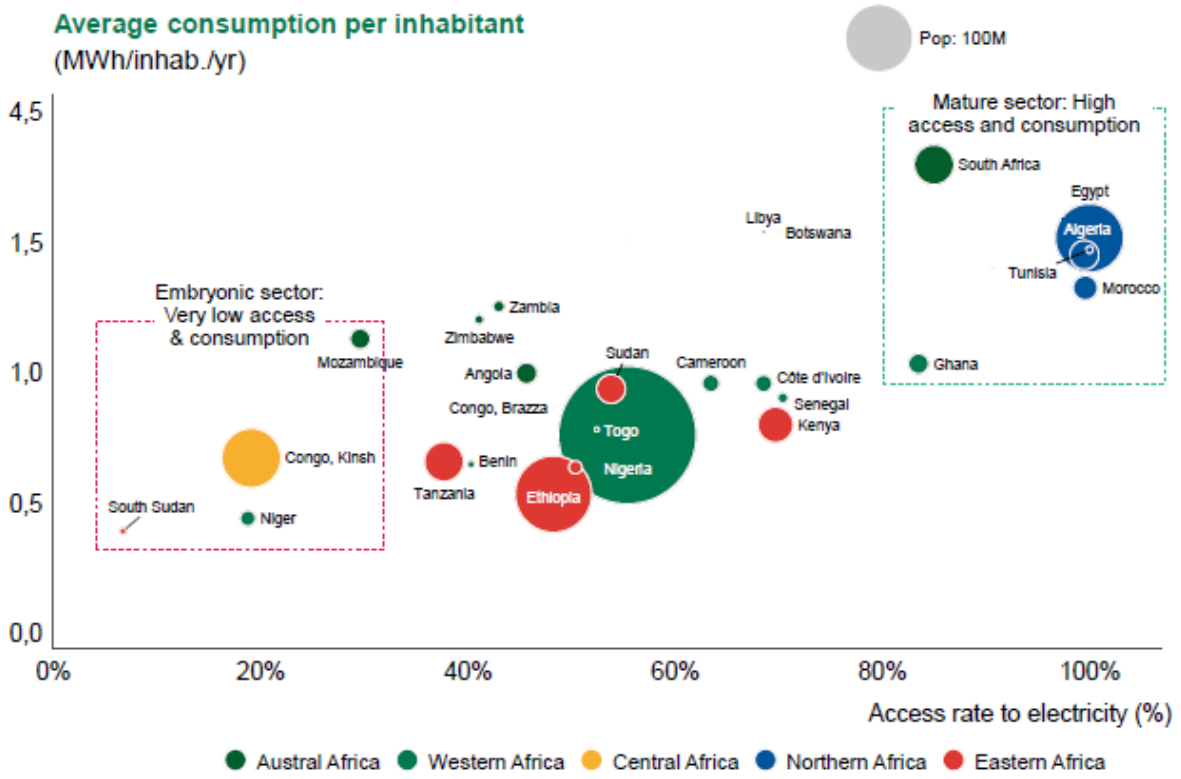





South Africa has the largest power consumption per capita and demand on the continent

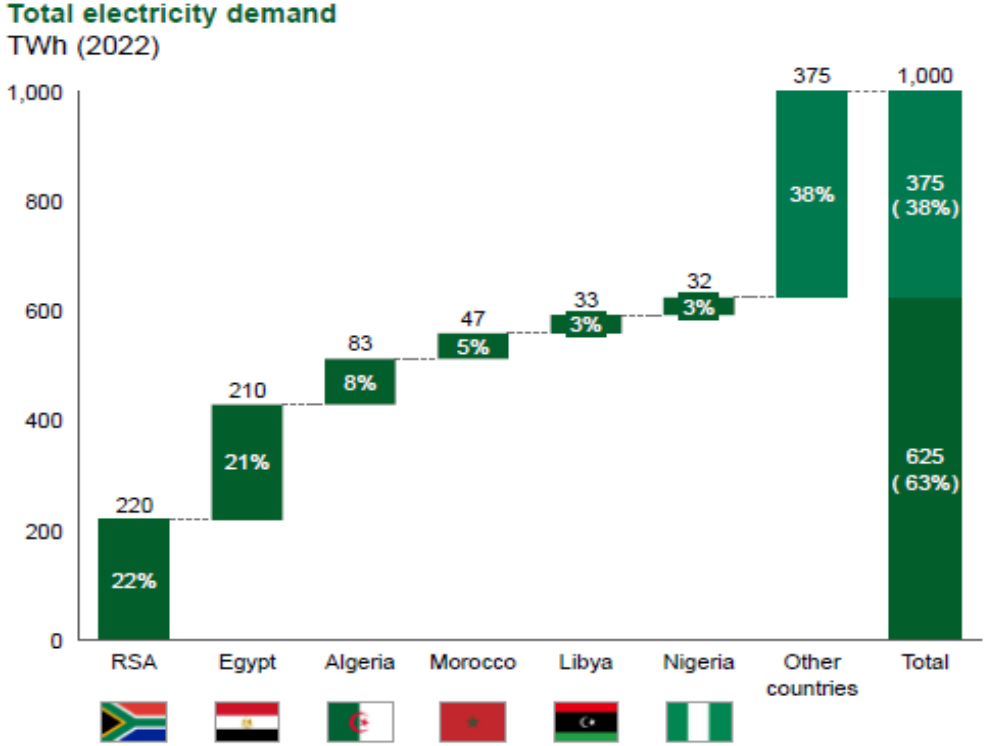
Power consumption and access rates in Africa

South Africa has the largest power consumption per capita on the continent …



Total electricity demand per country in Africa

… and accounts for >20% of total electricity demand



1. Others include Angola, Tunisia, Sudan, Ghana, Ethiopia, Kenya, Mozambique, Zambia, DRC, Tanzania, Côte d'Ivoire, and 43 other countries and islands
Source: BP Statistical Review 2023, The World Bank data portal (2023)

QUANTIFIED SYSTEM PRESSURES & GROWTH OPPORTUNITIES






KEY FIGURES

DIGITAL DEMAND

1.3 GW

Projected national data-centre capacity by 2034, adding roughly 4 TWh of annual load.

ACCESS REQUIREMENT

400k

Approximate annual on-grid and off-grid connections needed to reach universal access by 2030.

RENEWABLE PIPELINE

30 GW

Additional renewable generation potential by 2034, supported by 12-14 GW of storage.

TRANSMISSION NEED

14,500 km

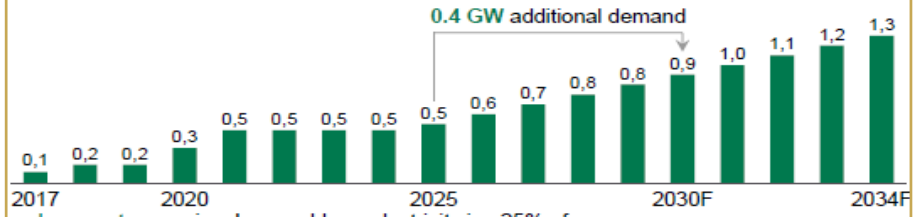
New lines plus 133 GVA of transformer capacity identified in TDP 2025-2034.

Analytical implication

Demand recovery, final-mile access and decarbonisation all converge on the same execution challenge: grid readiness, permitting speed and investment mobilisation. The Department is therefore prioritising corridor delivery, market transformation and stronger implementation discipline.

SA can capture 0.4 GW of globally growing data centre growth, becoming the gateway to Africa

Cumulative power demand of data centres in SA
(GW)

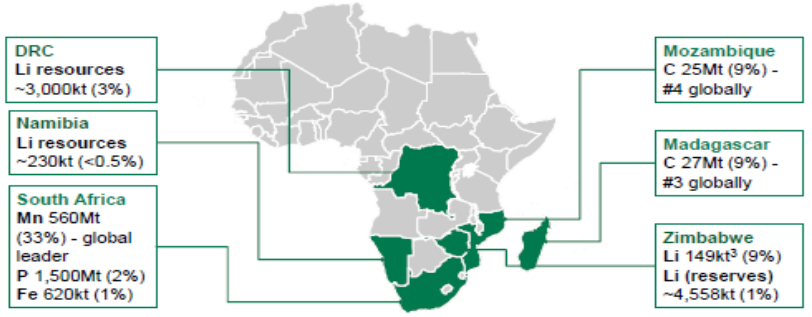


- Low-cost power is a key enabler – electricity is ~25% of opex
- Strong fibre connectivity is needed – SA's inland connectivity needs expansion
- South Africa is the only region with every cloud operator in Africa present, making it the gateway to Africa's data centre growth

+4 TWh p.a. **+0.1% GDP[1]** **+6k jobs[2]**

30% of global CM reserves are found in Southern Africa providing opportunity for South Africa to act as a hub

SA has a well-developed mining industry, producing +40 minerals - with access to L(M)FP battery minerals locally and within SADC



+ZAR 20-30 Bn GDP contribution by ~2035 potentially unlocked through end-to-end value chain integration for the LFP battery value chain

1. Assume no growth in 2024 GDP levels 2. Assume once off hiring to ramp up production and direct jobs
3. LCE (Lithium Carbonate Equivalent)
Source: USGS MCS 2024, Africa's Key Data Centre Markets, Business Tech, JLL Data Centres market outlook

CURRENT AND FUTURE SUPPLY

Policy Certainty





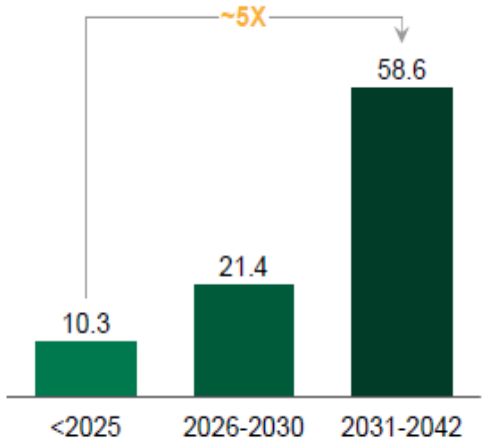

Investment and committed capital for generation infrastructure exceeded ~$30Bn in the last 10 years and investment is expected to grow substantially into the future

17 GW of additional, generation capacity on-track to be added since 2013 with ~$30B in public & private investments mobilised

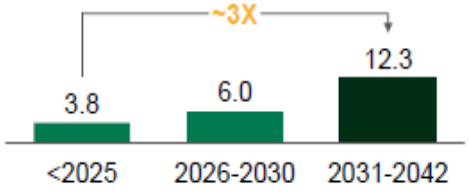
- **>6 GW** — Operational utility–scale REIPPP projects as of Q4 2025
- **>7 GW** — Est. installed embedded generation capacity as of Q4 2025
- **>4 GW** — Private PPAs connected/ in process of connection as of Q4 2025
- **~$20+ Bn** — Private sector REIPPPP and RMIPPPP total project investment
- **~$10+ Bn** — Committed JET-IP funding by International Partner Group (IPG)

South Africa will invest at an unprecedented level in generation expansion to ensure its energy security & economic growth

Utility Scale RE[1] installation rate
(GW)



GtP installation rate
(GW)



1. Includes solar PV, wind, BESS and energy storage 2. Full IRP build (~R2.2 Trn) excluding TDP investments (~R430 Bn)
Source: IRP 2025, NTCSA TDP 2024, World Bank

SCALE OF THE ENERGY INFRASTRUCTURE INVESTMENT PIPELINE






South Africa GDP (2004)

R7.6 trillion

Pipeline as % of GDP

≈ 29%

Energy Infrastructure Pipeline

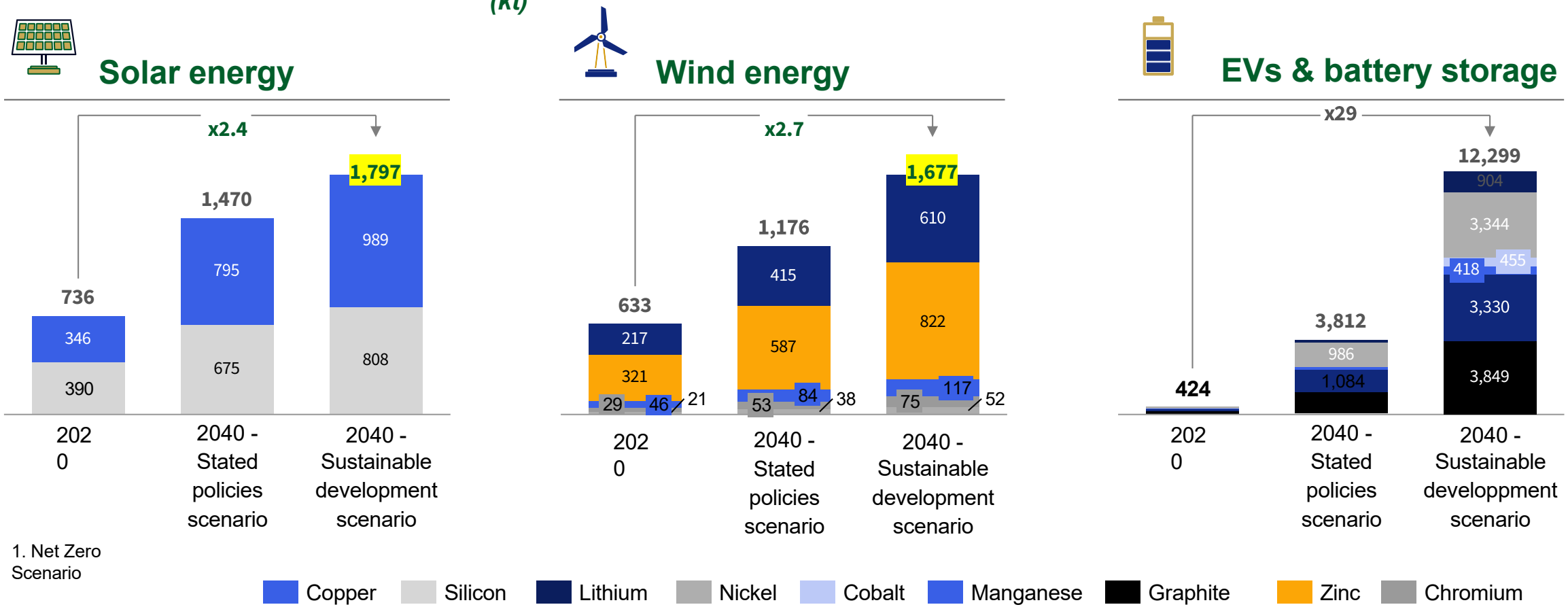
R2.2 trillion

This is a **system scale investment** programme anchored in IRP 2025 and the Transmission Development Plan, positioning **infrastructure as a driver of economic growth and industrialisation**, with execution as the key constraint

CRITICAL MINERALS

Definition & List of Critical Minerals and Metals | South Africa

Example of total mineral demand for selected energy transition sectors, 2020-2040 (kt)



1. Net Zero Scenario

Source: BSG. (2025). Power as catalyst for growth [PowerPoint slides]. International Energy Agency (IEA)

SOUTH AFRICA'S RENEWABLE ENERGY POTENTIAL

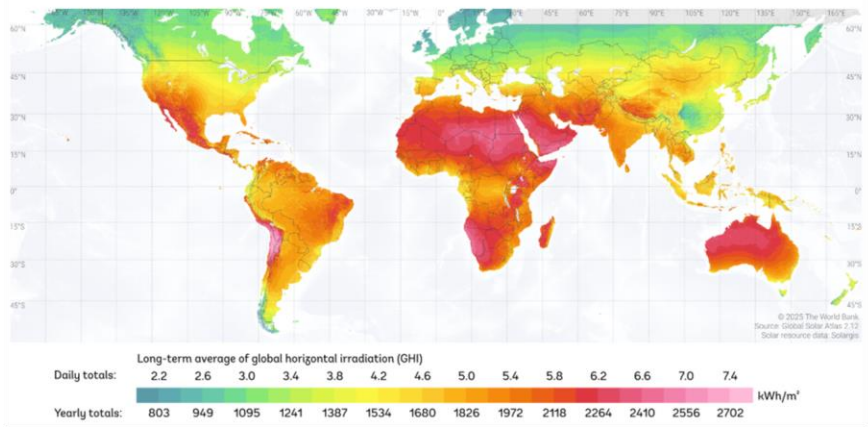
Enables low-cost generation at scale






South Africa possesses amongst the highest-quality renewable energy resources globally, enabling low-cost generation at scale

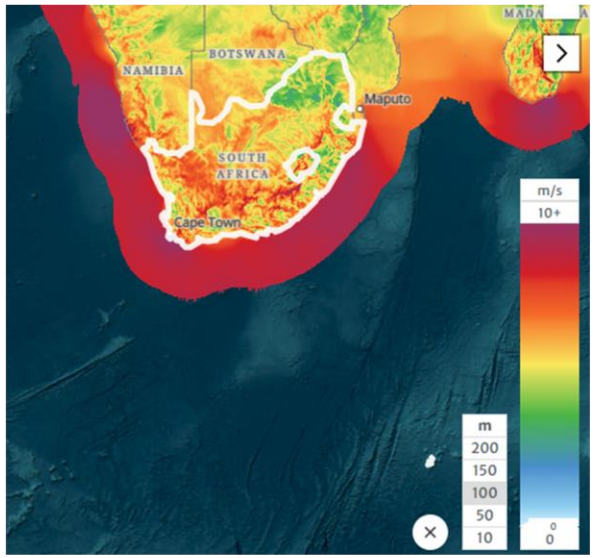
Solar



South Africa has some of the highest solar irradiation levels globally, with the strongest resource concentrated in the Northern Cape and central interior.

This enables high energy yields and highly competitive solar generation, positioning the country as a leading destination for utility-scale solar investment.

Wind



South Africa benefits from strong and consistent wind speeds along the Western, Eastern and Northern Cape coastlines, creating prime conditions for large-scale wind deployment.

These coastal corridors support high capacity factors and reliable generation profiles.

CURRENT & FUTURE GRID: ACCELERATING GRID EXPANSION TO SUPPORT INVESTMENT & GROWTH

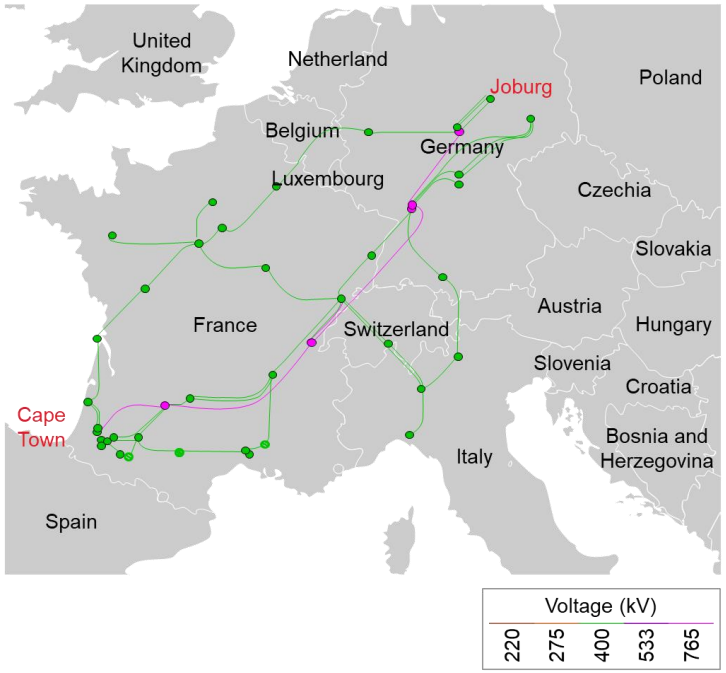
South Africa's grid is one of the largest in the world and can be a catalyst for energy growth in the region



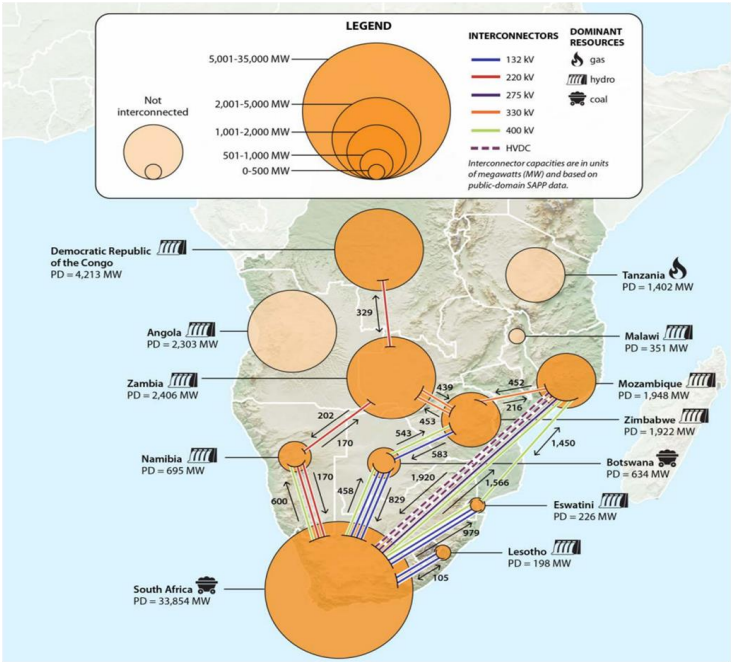



Eskom transmission network overlayed on Europe

South Africa has one of the largest grid networks in the world with 765kv lines being built in the 1980s



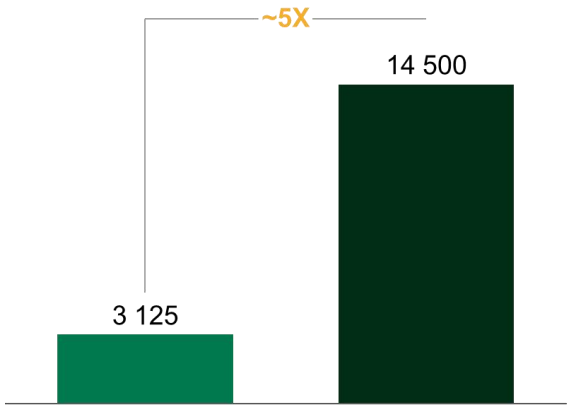
Grid regional interconnection via SAPP



Grid investment requirements

5x investment needed in the next 10 years to ensure the grid can support SA's energy needs

Transmission line installation rate
(km)



~ZAR 430 Bn
Capital investment required[1]

SMELTERS: STRATEGIC CASE FOR INTERVENTION

Value Chain Integration	Electricity Dependency	Economic Contribution	Employment Stability
Critical flow from chrome mining and smelting to manufacturing, exports, and **fiscal revenue.**	High operational reliance with 35-45% of production costs linked to power and a 15 TWh baseload demand.	Generating over **R76bn in annual export e**arnings for the national economy.	Supporting **12,143 direct jobs and over 33,000 indirect roles** vulnerable to industry disruption.

The cost of inaction impacts mining productivity, employment security, and Eskom revenue.

ECONOMIC TRADE-OFF: INTERVENTION VS. COLLAPSE

Comparing the impacts of proactive intervention against reactive industrial failure

No Intervention (Reactive)

- Industrial Contraction: Widespread smelter closures and furnace shutdowns
- Loss of Beneficiation: Erosion of value-added processing capabilities
- Macro Impact: Total job losses and systemic economic decline
- Infrastructure Strain: Reduced electricity demand leading to further grid instability

Intervention Strategy (Proactive)

- Temporary Pricing Support: Stabilizes operational costs during volatility
- Capacity Preservation: Maintains critical industrial infrastructure
- Job Protection: Safeguards employment across the value chain
- Export Stability: Ensures continued foreign currency inflows
- Fiscal Context: Addresses the R9.6bn Eskom revenue shortfall

PATHWAY FORWARD: FROM CRISIS MANAGEMENT TO COMPETITIVENESS

A strategic roadmap to industrial sustainability






Phase 1
Stabilisation

MoU concluded, NERSA tariff relief approved, and retrenchments averted.

Phase 2
Recovery

Framework toward 62 c/kWh, NERSA application, and focus on international competitiveness.

Phase 3
Long-Term

Dedicated energy generation, operational modernisation, and efficiency partnerships.

2027
Future Projection

49 smelters operational, 74% capacity restored, and 11,000+ direct jobs secured.

A targeted industrial competitiveness intervention, not an open-ended subsidy.

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THANK YOU