

Large-scale Renewable Energy

MARKET
INTELLIGENCE REPORT

2024



GreenCape

LARGE-SCALE RENEWABLE ENERGY

GreenCape

GreenCape is a non-profit organisation that works at the interface of business, government, and academia to identify and remove barriers to economically viable green economy infrastructure solutions. Working in developing countries, GreenCape catalyses the replication and large-scale uptake of these solutions to enable each country and its citizens to prosper.

Partnering for Accelerated Climate Transitions

This publication has been made possible with the financial support of United Kingdom Partnering for Accelerated Climate Transitions (UK PACT). UK PACT is jointly governed and funded by the United Kingdom's (UK) Government's Foreign, Commonwealth and Development Office, and the Department for Business, Energy, and Industrial Strategy through the UK's International Climate Finance. It works in partnership with countries with high emissions reduction potential to support them in implementing and increasing their ambitions for tackling climate change. The contents of this publication are the sole responsibility of GreenCape and do not necessarily reflect the views of the funders.

AUTHORS

Ulrich Terblanche,
Christoff Botha,
Christina Louw, and
Jack Radmore.

EDITORIAL AND REVIEW

Cilnette Pienaar,
Lauren Basson,
Bruce Raw, and
Nicholas Fordyce.

IMAGES

GreenCape

LAYOUT AND DESIGN

The Ethical Agency

DISCLAIMER

While every attempt has been made to ensure that the information published in this report is accurate, no responsibility is accepted for any loss or damage to any person or entity relying on any of the information contained in this report.

Copyright © GreenCape 2024

This document may be downloaded at no charge from
www.greencape.co.za. All rights reserved.

Cover image courtesy of Freepik.

Subscribe to receive e-mail alerts or GreenCape news, events, and publications by registering as a member on our website:
www.greencape.co.za

2nd floor, North Wharf, 42 Hans Strijdom Avenue, Foreshore, Cape Town

CONTENTS

6	Executive summary
13	What's new?
16	1 Introduction and purpose
18	2 Emerging opportunities
19	2.1 Private procurement of renewable energy
19	2.1.1 Investment opportunity
21	2.1.2 Drivers
21	2.1.2.1 Improved cost competitiveness of renewable energy
22	2.1.2.2 Energy security
22	2.1.2.3 Carbon emissions reduction for large power users
23	2.1.2.4 Eskom transformation
24	2.1.3 Barriers
24	2.1.3.1 Grid capacity constraints
25	2.1.3.2 Low carbon tax
25	2.1.3.3 Skills shortage
26	2.2 Public procurement of renewable energy
26	2.2.1 Investment opportunity
27	2.2.2 Drivers
27	2.2.2.1 National level independent power producer procurement programmes
27	2.2.2.2 Municipal tenders
28	2.2.2.3 Relieving grid capacity through battery energy storage programmes
28	2.2.3 Barriers
28	2.2.3.1 Extended project development timelines and costs due to municipal procurement requirements
29	2.2.3.2 Policy uncertainty
29	2.2.3.3 South Africa's global rankings for investment
30	2.3 Local manufacturing
30	2.3.1 Investment opportunity
31	2.3.2 Drivers
32	2.3.2.1 Local content requirements
32	2.3.2.2 Beneficial international agreements
34	2.3.3 Barriers
34	2.3.3.1 Market uncertainty
34	2.3.3.2 Local competitiveness
35	2.3.3.3 Restrictive international trade instruments
36	3 References

List of abbreviations and acronyms

AfCFTA	African Continental Free Trade Agreement	MW	Megawatt
AGOA	African Growth and Opportunity Act	MWh	Megawatt Hour
B-BBEE	Broad-Based Black Economic Empowerment	NDC	Nationally Determined Contribution
BESIPPPP	Battery Energy Storage Independent Power Producers Procurement Programme	NECOM	National Energy Crisis Committee
BESS	Battery Storage System	NERSA	National Energy Regulatory of South Africa
BW	Bid Window	NTCSA	National Transmission Company of South Africa
CBAM	Carbon Border Adjustment Mechanism	PACT	Partnering for Accelerated Climate Transitions
CCT	City of Cape Town	PPA	Power Purchase Agreement
COP	Conference of the Parties	PV	Photovoltaic
DMRE	Department of Mineral Resources and Energy	REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
dti	Department of Trade and Industry (until 2019)	RMIPPPP	Risk Mitigation Independent Power Producer Procurement Programme
dtic	Department of Trade, Industry and Competition (since 2019)	PPA	Power Purchase Agreement
EAP	Energy Action Plan	PPPFA	Preferential Procurement Policy Framework Act of 2000
ERA	Electricity Regulations Act of 2006	SACU	Southern African Customs Union
ESA	Electricity Supply Agreement	SAREM	South African Renewable Energy Masterplan
ESG	Environment, Social, and Governance	SARS	South African Revenue Service
EU	European Union	SADC	Southern African Development Community
FATF	Financial Action Task Force	TDCA	Trade, Development Cooperation Agreement
FTA	Free Trade Area	TDP	Transmission Development Plan
GW	Gigawatt	UNFCCC	United Nations Framework Convention on Climate Change
IPG	International Partners Group	UK	United Kingdom
IPP	Independent Power Producer	USA	United States of America
IPPO	Independent Power Producer Office	USD	United States Dollar
IRA	Inflation Reduction Act	ZAR	South African Rand
IRP	Integrated Resource Plan		
IRP2023	The Draft Integrated Resource Plan published for comments in 2024		
JET-IP	Just Energy Transition Investment Plan		
JETP	Just Energy Transition Partnership		
JSE	Johannesburg Stock Exchange		
LCOE	Levelised Cost of Energy		
MFMA	Municipal Finance Management Act		
MIR	Market Intelligence Report		

Exchange rate used: 1 USD = 18.40 ZAR

List of figures

Figure 1: Market growth potential matrix of the large-scale renewable energy opportunities	7
Figure 2: Annual number of registered private renewable energy projects indicating growth of the sector since 2021	19
Figure 3: Renewable energy LCOE compared to Eskom average mining electricity price (lowest industrial price)	21
Figure 4: Loadshedding statistics	22
Figure 5: Traditional wheeling compared to virtual wheeling payment structure	23
Figure 6: Eskom supply area grid capacity	24
Figure 7: Import and export statistics of major solar PV and wind project components	34

List of tables

Table 1: Summary of opportunities within the large-scale renewable energy market	8
Table 2: South Africa's credit rating from the three major credit rating agencies	30
Table 3: List of South Africa's top 10 global renewable energy component export destinations and trade agreements on the African continent	33





EXECUTIVE SUMMARY

This market intelligence report (MIR) is written for foreign and local investors looking to invest directly in the South African renewable energy market. It highlights opportunities in the public and private large-scale renewable energy¹ market in South Africa. South Africa's large-scale renewable energy sector is historically driven by the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), a government programme managed through the Independent Power Producers Office (IPPO). In 2023, private offtaker agreements have grown at a rapid pace and are expected to be a large driver of future renewable energy projects.

Key developments influencing the market in 2023:

- Eskom's² unbundling into distribution, transmission, and generation entities is close to realisation through the approval of necessary permits by the National Energy Regulator of South Africa (NERSA).
- Further amendments to the Electricity Regulations Act of 2006 (ERA) have removed the need for an electricity generation licence for large electricity generation projects. The amendments are still awaiting approval, but once approved, will open the market for the development of large-scale privately owned renewable energy plants.
- The Department of Mineral Resources and Energy (DMRE) launched Bid Window (BW) 7 of the REIPPPP in December 2023, calling for 5 000 Megawatts (MW) of new renewable energy builds.
- A draft update to the Integrated Resource Plan (IRP), South Africa's formal electricity plan, was published for public comment and includes more capacity allocation for distributed generation and allocation for solar photovoltaic (PV) and wind projects to accommodate BW7.

The emerging investment opportunities in the sector are private and public procurement of large-scale renewable energy and component manufacturing, as illustrated in [Figure 1](#) and summarised in [Table 1](#).

Public procurement of renewable energy is currently still guided by the IRP2019. However, the IRP2019 is under review and, as indicated, a draft new IRP, the IRP2023, was published for public comment in January 2024. The draft IRP has potential to grow the renewable energy industry through the REIPPPP procurement framework. Two new BWs were mentioned during the Budget Vote Speech in May 2023, BW7 and BW8 amounting to an additional 10 Gigawatts (GW) of projects. As indicated, BW7 was launched by the DMRE in December 2023, leaving another 5 000 MW to be procured if BW8 were to be launched. However, challenges experienced with closing BW5 and the inability to procure wind projects in BW6, combined with inconsistent implementation of the bidding process and rules, resulted in the loss of credibility in the REIPPPP. Another avenue of public procurement of renewable energy is through municipal procurement. A limited number of municipal projects are being developed.

Many developers are focussing on the private sector where higher returns can be achieved through power purchase agreements (PPAs) with private offtakers, either through on-site installations or using wheeling. The opportunity in private sector procurement of new generation capacity is driven by a number of factors including the removal of the capacity limitations on generation licensing exemptions in February 2023, increasing demand for energy security, and environmental considerations of large energy users.

Local manufacturing of components for large-scale renewable energy is an opportunity that is enabled through the growth in private sector procurement, continued implementation of REIPPPP BWs, and the various incentives and requirements placed upon the industry from both private and government offtakers.

In order to leverage the rising demand in renewable energy and storage technology, the DMRE began development of the South African Renewable Energy Masterplan (SAREM). The aim of SAREM is to foster the industrial and inclusive development of renewable energy value chains in South Africa. Stakeholder engagements for SAREM concluded in 2023, with final ministerial approval expected in 2024.

The large-scale renewable energy industry has seen rapid growth in 2023. The rate of growth is expected to increase. This increase is expected to be realised through private procurement of renewable energy. The total potential large-scale renewable energy, energy storage, and component manufacturing market size is estimated at **R468 billion** by 2030 or **~R78 billion per year**.

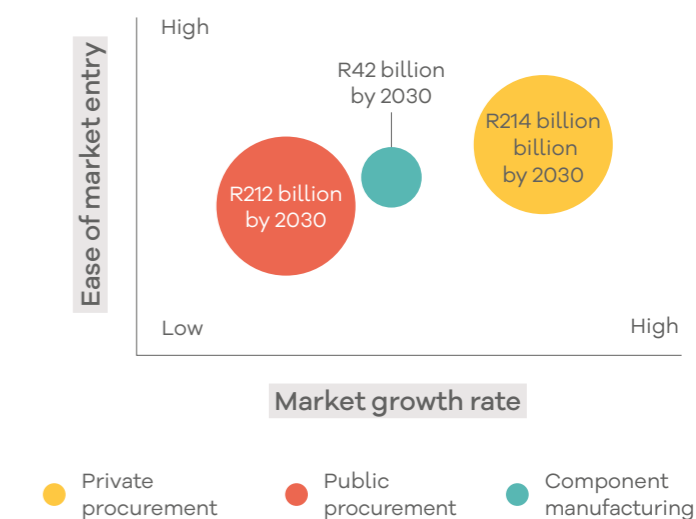


Figure 1: Market growth potential matrix of the large-scale renewable energy opportunities

¹ Large-scale renewable energy includes all projects of greater than 1 MW and excludes rooftop solar PV.

² Eskom is South Africa's state owned electricity services provider.

Table 1: Summary of opportunities within the large-scale renewable energy market

OPPORTUNITY					
PRIVATE PROCUREMENT OF RENEWABLE ENERGY					
MARKET SIZE	KEY DRIVERS	BARRIERS	STAKEHOLDERS	TERM	MACRO CONTEXT
<p>Solar PV: R116 billion</p> <p>Wind power: R98 billion</p> <p>Total: R214 billion by 2030 / R36 billion per year</p>	<ul style="list-style-type: none"> Improved cost competitiveness of renewable energy technology Carbon emissions reduction for large power users Energy security (loadshedding) Enabling environment for wheeling (virtual) Removal of generation licence requirements in 2023 Registering of energy traders Creation of the National Transmission Company of South Africa Eskom's transmission development plan Decommissioning of Eskom coal power fleet 2023 draft Taxation Laws Amendment Bill 	<ul style="list-style-type: none"> Grid capacity constraints Energy curtailment to accommodate grid constraints New Eskom grid allocation rules requiring higher state of readiness for developments Low carbon tax Skills shortage 	<ul style="list-style-type: none"> Developers Independent power producers (IPP) Energy-intensive users Energy traders Financiers Eskom DMRE NERSA 	Short-term (present)	<ul style="list-style-type: none"> Power blackouts driving a demand for energy storage and generation units National Energy Crisis Committee (NECOM) focussing on unblocking barriers to new energy projects Invest SA Energy One-Stop-Shop launched to provide assistance to investors to fast-track projects

OPPORTUNITY					
PUBLIC PROCUREMENT OF RENEWABLE ENERGY					
MARKET SIZE	KEY DRIVERS	BARRIERS	STAKEHOLDERS	TERM	MACRO CONTEXT
<p>Solar PV: R50 billion</p> <p>Wind power: R79 billion</p> <p>BESS: R83 billion</p> <p>Total: R212 billion by 2030 / R35 billion per year</p>	<ul style="list-style-type: none"> National level independent power producer procurement programmes: REIPPPP, Risk Mitigation Independent Power Producer Procurement Programme (RMIPPPP) Increased grid availability due to battery energy storage programmes: Eskom Battery Energy Storage System (BESS) Programme and DMRE's Battery Energy Storage Independent Power Producer Procurement Programme (BESIPPPP) Municipal tenders 	<ul style="list-style-type: none"> Extended project timelines and costs due to municipal procurement requirements Financial standing of municipalities Implementation of curtailment Lack of municipal wheeling frameworks, human resource capacity, and consistent tariffs Policy uncertainty due to new regulatory amendments under development: Preferential Procurement Bill, Electricity Regulation Act, Integrated Resource Plan and new REIPPPP BWs 	<ul style="list-style-type: none"> Municipalities IPPO DMRE Eskom National Treasury NERSA 	Short- to medium-term (1-10 years)	<ul style="list-style-type: none"> South Africa's Nationally Determined Contribution (NDC) to reduce emissions under the Paris Agreement drives the need for further renewable energy investment South Africa's investment rating is currently at below investment grade



OPPORTUNITY

LOCAL MANUFACTURING OF RENEWABLE ENERGY COMPONENTS

MARKET SIZE	KEY DRIVERS	BARRIERS	STAKEHOLDERS	TERM	MACRO CONTEXT
R42 billion by 2030 / R7 billion per year	<ul style="list-style-type: none"> Local content in public bid requirements Carbon reduction and supplier development reporting requirements of publicly listed and large companies Beneficial continental trade agreements, such as: Southern African Customs Union (SACU), South African Development Community (SADC) Free Trade Agreement and the African Continental Free Trade Agreement (AfCFTA) Beneficial intercontinental trade agreements, such as the United States of America's African Growth and Opportunity Act (AGOA) and the European Union's (EU) Trade Development and Cooperation Agreement 	<ul style="list-style-type: none"> Market uncertainty through inconsistent rollout of REIPPPP BWs and bidding requirements Poor local competitiveness with low cost imports Restrictive international trade instruments, such as: the Carbon Border Adjustment Mechanism (CBAM) by the EU³, and the Inflation Reduction Act (IRA) by the USA 	<ul style="list-style-type: none"> The dtic DMRE Component manufacturers Financiers Publicly listed and large companies with supplier development and carbon reduction reporting requirements Project developers Engineering, procurement and construction companies 	Medium- to long-term (3-10 years)	<ul style="list-style-type: none"> Manufacturing is a globally competitive industry reliant on a global value chain Just Energy Transition Investment Plan (JET-IP) which, among others, focuses on creating quality jobs and boosting economic growth, both of which can be achieved through the implementation of the SAREM

3 CBAM may apply to component exports in the future.





WHAT'S NEW?



Since the publication of the 2023 Large-Scale Renewable Energy Market Intelligence Report, there have been several important developments in the sector.

2023

JANUARY

The Preferential Procurement Regulation for 2022 took effect, replacing the Preferential Procurement Regulation of 2017 that was overturned by the Constitutional Court. For the renewable energy sector this changes the ownership and local content requirements of projects, depending on the energy offtaker or equipment purchaser, until a new Public Procurement Bill comes into effect.

MARCH

The DMRE requests energy storage bids for a total of 513 MW under the Battery Energy Storage Capacity BW of the IPP Procurement Programme.

MAY

The DMRE mentioned the intended release of BW7 and BW8 at the end of 2023, which would include a total of 5 GW each of renewable energy projects.

JULY

The Energy One Stop Shop and Energy Resilience Fund were launched to mitigate the impact of the energy crisis.

SEPTEMBER

Eskom received a R4 billion loan offer from a German bank to expand the transmission network in the Western and Northern Cape.

NOVEMBER

Eskom unveiled the Hex BESS as part of Eskom's BESS project that aims to help alleviate the pressure on the national electricity grid. The HEX BESS is South Africa and Africa's first large-scale BESS, with a total capacity of 1 440 Megawatt hours (MWh) per day enabled by a 60 MW solar PV capacity.

FEBRUARY

South African President, Cyril Ramaphosa, declared a national 'state of disaster' over the crippling power outages due to a shortage of supply. The state of disaster was revoked two months later, following pushback from civic organisations and lawsuits.

APRIL

Following cabinet approval, the amendment to the ERA that removed generation licensing requirements was submitted to parliament. Generation facilities are now only required to register their facility with the Regulator.

JUNE

Eskom briefed industry on new grid allocation rules.

AUGUST

Eskom signed South Africa's first virtual wheeling agreement with Vodacom.

OCTOBER

Eskom launched the cross-border standard offer programme, enabling procurement of power from neighbouring countries.

DECEMBER

The REIPPPP BW7 call for proposals was announced for 1 800 MW of solar PV and 3 200 MW of wind power.

Loadshedding⁴ worsened through 2023, with Eskom unable to match demand with supply. There has been a concerted effort to end loadshedding and achieve energy security through the implementation of South Africa's Energy Action Plan (EAP). Announced by President Cyril Ramaphosa in July 2022, the EAP outlines a set of actions aimed at fixing Eskom and adding new generation capacity to the grid (NDP 2023). The NECOM was established in 2022 to ensure that the EAP objectives are fully implemented.

Three of NECOM's top five priorities positively affect the large-scale renewable energy market (NECOM 2023):



Making it easier for the private sector to invest in new energy sources.



Fast-tracking the addition of new power from wind, solar, gas and battery storage.



Transforming the way the energy sector works to ensure South Africa has enough energy now and in the future.

There's also one big change to our MIR structure

This year we've also updated our 2024 MIRs to create new hybrid reports. In order to make our printed reports shorter, and to keep up with policy changes, we've moved the sector overview and policy sections, which were traditional chapters in our MIRs, online. These sections will now be updated in real time and can be accessed by clicking on the button below. Our PDF reports and printed booklets have been shortened to focus more directly on the emerging opportunities in the sector. We hope these changes improve your reading experience.

[ACCESS ONLINE CONTENT](#)

⁴ Loadshedding is a controlled demand reduction mechanism implemented by Eskom to protect the national electricity power system from a total blackout.



1

INTRODUCTION AND PURPOSE

This MIR is compiled for foreign and local investors (persons or organisations) looking to invest in the large-scale renewable energy market. This MIR provides potential investors with the latest emerging market opportunities, and highlights opportunities in the public and private large-scale renewable energy market in South Africa.



The South African renewable energy market demonstrated resilience and steady growth in 2023, despite facing uncertain policy conditions and technical hurdles.

The lifting of licensing requirements for large-scale generation projects and efforts to address the electricity crisis have all played a role in this growth. While public programs were the primary driver of market expansion in the past, the industry is increasingly propelled by private offtaker agreements, as evidenced by the rise in registered private generation facilities. Additionally, the continued process of unbundling Eskom's electricity infrastructure monopoly and the mining industry's shift towards renewable energy have further propelled the sector's progress.

The opportunities, drivers and barriers in the renewable energy market are best understood within a national and global context. Factors outside of the large-scale renewable energy sector have the potential to drive or block the industry to an extent that the listed opportunities can either be positively or negatively impacted or new opportunities may arise.

South Africa is a signatory of the Paris Agreement. The Paris Agreement was adopted at the 21st annual Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC) and set a global goal of staying well below a temperature rise of 2 °C, and preferably below 1.5 °C, compared to pre-industrial levels.

Announced at COP 26 in Glasgow in November 2021, South Africa, France, Germany, the UK, USA and the EU entered into a long-term partnership, the Just Energy Transition Partnership (JETP). The JETP aims to support South Africa's decarbonisation efforts, focusing on the electricity system and goals set out in South Africa's updated NDC to effect a just transition to a low carbon and climate-resilient economy. The first phase of financing will mobilise United States Dollars (USD) 8.5 billion (R156 billion) through various mechanisms including grants, concessional loans and investments, and risk-sharing instruments, including mobilising the private sector (European Commission 2022).

Subsequent to this, South Africa presented its JET-IP at COP 28 in December 2023. The JET-IP covers electricity, new energy vehicles, and green hydrogen and identified USD 98 billion (R1 803 billion) in financial requirements over the next five years. Denmark and the Netherlands have recently become integral members of the International Partners Group (IPG) within the broader framework of the JETP. Prior to this, commitments were made at COP 27, elevating the total funding available for South Africa's JET-IP from the IPG to USD 9.3 billion (R171 billion) (McKenzie 2023).

The large-scale renewable energy and energy storage market remains a promising avenue for sustainable growth and energy security. This growth will likely be driven by investment in the private procurement market. By navigating the opportunities, drivers and barriers provided in the report, investors are expected to be able to unlock significant investment opportunities.

This document sets out the market opportunities in the public and private sector large-scale renewable energy market in South Africa. A sector overview, historical trends, market sizing, policy and other datasets traditionally included in this document are now available through the associated online portal.

ONLINE PORTAL

Note: GreenCape's Energy Services MIR explores the energy services market, including rooftop solar PV, energy storage, and energy efficiency. The energy services market is thus not covered in this large-scale renewable energy MIR.

For enquiries or to access GreenCape's services, contact the Renewable Energy Sector Desk at energy@green-cape.co.za

CONTACT THE
RENEWABLE ENERGY
SECTOR DESK



2

EMERGING OPPORTUNITIES

The evolving South African energy landscape creates opportunities for investors, financiers, project developers, component manufacturers, and suppliers in the large-scale renewable energy market.



This section covers three key opportunities, namely **private procurement**, **public procurement**, and **local manufacturing** and each section is structured as follows:



THE INVESTMENT OPPORTUNITY

Describes the specific investment paths into South Africa's large-scale renewable energy market and the potential size of the market.



MARKET DRIVERS

Covers those factors that enhance the development and increase the growth of investment opportunities into large-scale renewable energy projects.



MARKET BARRIERS

Covers those factors that reduce the attractiveness and increase the risk of the investment opportunities. In some cases, these factors may block the development of new renewable energy projects.

2.1 Private procurement of renewable energy

The private renewable energy offtaker market is a core market for investment into South Africa's renewable energy sector, either through direct electricity sales or through build-to-own projects.



2.1.1 INVESTMENT OPPORTUNITY

The private procurement market is experiencing rapid growth, driven by amendments to Schedule 2 of the ERA. Amendments to the ERA changed the generation capacity limit for projects that do not require an electricity generation licence, which was previously set at 1 MW, revised to 100 MW in 2021, and proposed to be removed entirely in the latest draft (DMRE 2023a). The growth in private renewable energy developments is evident through the number of projects registered with the NERSA from 2021 to 2023, as shown in Figure 2.

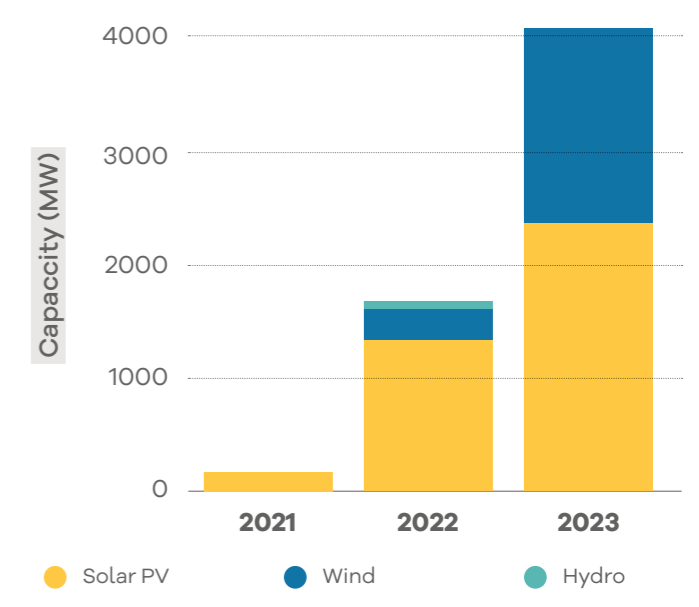


Figure 2: Annual number of registered private renewable energy projects, indicating growth of the sector since 2021 (Source: NERSA 2023).



Projects are registered with NERSA with the intent to build, however, these projects are not confirmed to have completed the development process or to be under construction, and as such, NERSA data is an indicative but not an entirely reliable indicator of a new projects pipeline.

The short-term opportunity for private procurement remains with large energy users that want to address their environmental, social and governance (ESG) targets, lower their energy costs, or increase their energy security. Direct electricity sales are enabled through wheeling agreements under Eskom's current wheeling regime but will be expanded upon through the realisation of the virtual wheeling platform. The mining sector is especially active in growing the renewable energy market and many mining companies are also investing in project development and ownership.

The mining sector remains a major energy-using sector in South Africa, representing 14% of total Eskom sales (Eskom 2023a), and also a large contributor to South Africa's economy, representing over 4.4% of expenditure contributing to the gross domestic product in 2022 (StatsSA 2023). Mining companies in South Africa are currently planning approximately 43 MW of combined solar PV and battery energy systems and over 1.2 GW of solar PV systems,⁵ making it a key player in the private energy space.

Electricity traders and virtual wheeling will enable large-scale projects to access multiple small private off-takers or low-energy users, allowing diversification away from single off-taker agreements with large energy users. Eskom has adopted a virtual wheeling policy to facilitate the virtual wheeling pilot. Once the proof of concept is confirmed, it is expected that virtual wheeling will be made available to the market by the end of 2024. Standard Eskom wheeling agreements are still being used between large off-takers and projects. The determination of the market size for private procurement in South Africa's RE presents challenges, contingent upon the finalization of IRP2023 and clarification regarding future REIPPPP BWs currently under development. These BWs are pivotal, delineating the extent of power plant capacity allocated to public programs within technical constraints, potentially reserving IRP-designated capacity for REIPPPP, thereby restricting grid connections available for private development. Given the draft status of IRP2023 and associated modelling uncertainties, market size estimation relies on GreenCape project pipeline assessments and publicly available data.

Projected private procurement market sizes indicate a growth of **6 GW for solar PV and 4 GW for wind power by 2030**, with corresponding investment values of **R116 billion and R98 billion**, respectively. Consequently, the total investment opportunity is estimated to reach **R214 billion by 2030**, equating to an **average growth rate of R36 billion per year**.

These estimations underscore the significant potential within South Africa's private renewable energy market, albeit subject to regulatory and infrastructural developments. As such, stakeholders must remain vigilant amidst evolving policies and market dynamics to capitalize on this burgeoning sector.



2.1.2 DRIVERS

The core drivers of private renewable energy offtake are the improved cost competitiveness of the technology, the potential for carbon emission reductions as part of corporate responsibility, energy security, and the transformation of Eskom that will enable further private participation in South Africa's electricity market.

2.1.2.1 Improved cost competitiveness of renewable energy

The global costs of large-scale solar PV and onshore wind projects have stabilised, if not increased, with no further cost reductions in the past two years. In fact, from 2021 to 2023, the average mean levelised cost of energy (LCOE) of solar PV has increased from USD 36/MWh in 2021 to USD 50/MWh in 2023, while the onshore wind project costs have risen from USD 38/MWh in 2021 to USD 50/MWh in 2023 (Lazard 2023). Similarly, the price of solar PV in the REIPPPP increased from R431/MWh (24 USD/MWh) in BW5 (2021) to R502/MWh (27 USD/MWh) for BW6 (2022) (IPPO 2023a).⁷ Increased equipment prices are partially attributed to increasing shipping costs due to supply and demand imbalances caused by the 2021 global pandemic that increased shipping lane and port congestion (Luman 2021). Despite these increases, large-scale solar PV and onshore wind energy systems still offer lower energy costs compared to other utility-scale solutions when comparing LCOE. This is due to, among other factors, decreasing capital costs, improving technologies and increased competition (Lazard 2023).

The RMIPPPP, which requires a consistent electricity supply, announced successful bidders who utilise renewable energy combined with battery energy storage at prices ranging from R1 550/MWh to R1 884/MWh. The decreasing cost of battery energy storage technology has made hybrid systems more competitive and available as dispatchable supply globally (IPPO 2023b). The affordability of renewable energy makes it an appealing alternative to relying solely on supply from public utilities like Eskom and municipalities, especially for large energy users. The tariff for Eskom's large power users increases above inflation each year, with an 18.65% increase for the 2023/24 financial year (Eskom 2023a). Figure 3 illustrates the international historical mean unsubsidised LCOE values, alongside the price of solar PV and wind in the most recent REIPPPP bid rounds⁸ and Eskom's average blended electricity price for mining⁹ for the same period. The USD values were adjusted using the average exchange rate for each year.¹⁰ To offset electricity costs, many private companies are incentivised to source electricity from renewable energy sources and private producers.

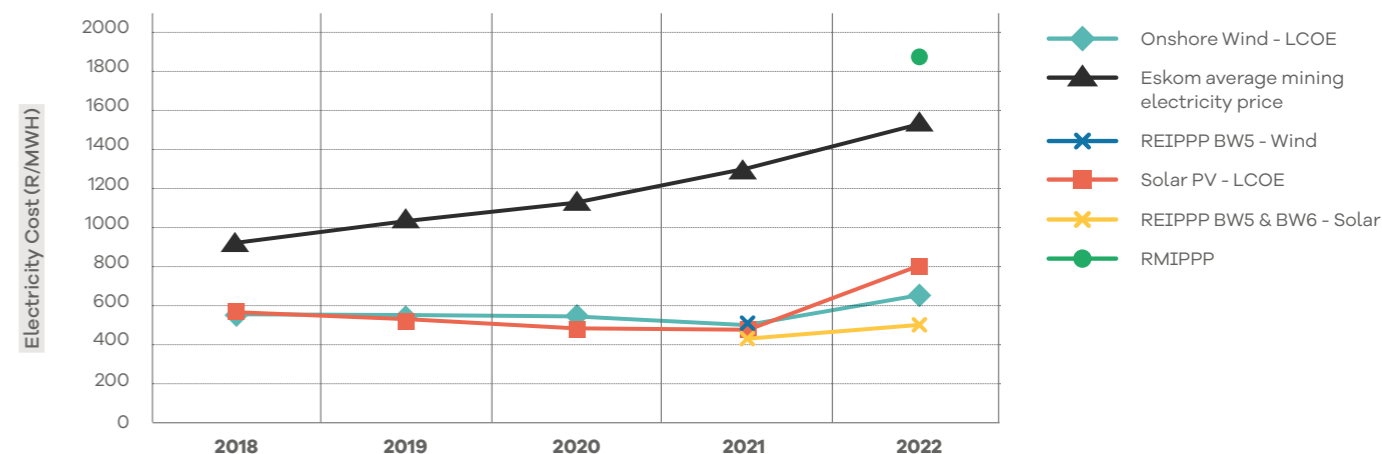


Figure 3: Renewable energy LCOE compared to Eskom average mining electricity price (lowest industrial price)

5 Data extracted from public media statements and AmaranthCX (2023).
 6 Estimated using average capital costs values of 1.34 USD/MW for wind and 1.05 USD/MW for solar PV based on Lazard (2023).
 7 No wind projects were shortlisted for BW due to grid constraints.
 8 Private off-takers will not pay the REIPPPP price but rather a negotiated price with the IPP.
 9 Eskom's average blended electricity price is calculated from the total income from sales divided by the total number of units sold. It is not reflective of the tariff, which is more complex in its structure (Eskom 2023a).
 10 Exchange rates applied (ZAR/USD): 2018~13.25; 2019~14.45; 2020~16.47; 2021~14.79; 2022~16.37.

It is evident that wind and solar technologies have the potential to compete with Eskom's tariffs when implemented at scale. The competitiveness will likely improve with the available tax benefits announced through the Draft Taxation Laws Amendment Bill, 2023.

A new section 12BA of the Draft Taxation Laws Amendment Bill, 2023, was published by the National Treasury on 31 July 2023. The Bill aims to encourage private business investment in renewable energy for electricity production. The Amendment Bill removed electricity generation limits, allowing any sized generation capacity to deduct an upfront 125% of cost incurred for eligible assets. This tax incentive is valid for energy plants brought into operation from 1 March 2023 to 1 March 2026. This Bill will enable private offtakers to realise lower energy costs through tax incentives (National Treasury 2023a).



2.1.2.2 Energy security

Electricity blackouts, locally referred to as 'loadshedding',¹¹ has a significant impact on large power users and their entire supply chain. With the ongoing escalation of loadshedding in 2023, as shown in Figure 4, the demand for energy security solutions rose and is expected to continue to rise to offset the impact of loadshedding. While carbon-based sources like diesel generators can provide energy security, their high operating costs make them less attractive for many energy-intensive users. As an alternative, these users are increasingly investing in large-scale battery storage systems, combined with solar PV or onshore wind projects. This combination offers a more cost-effective and sustainable solution.

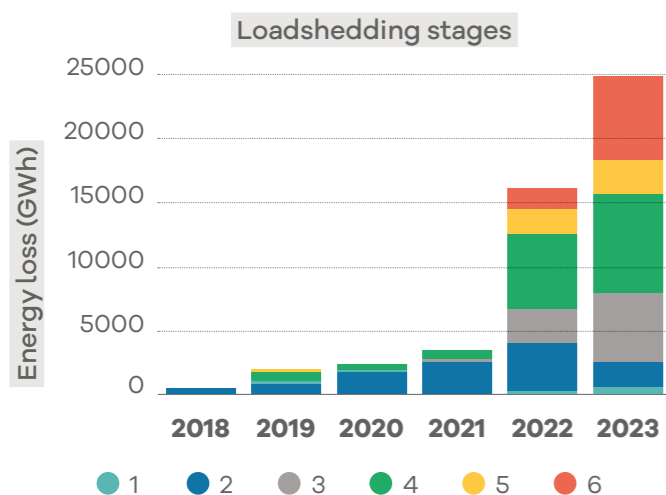


Figure 4: Loadshedding statistics¹²

¹¹ Loadshedding is categorised into 'stages' accompanied with a schedule of when power users will experience a blackout. Each 'stage' is indicative of the shortfall of power available to the grid in GW, i.e. stage 4 loadshedding is indicative of a 4 GW shortfall.

¹² Loadshedding statistics are sourced from ESP (2023).

2.1.2.3 Carbon emissions reduction for large power users

Companies are setting internal targets for carbon emission reduction, with use of renewable energy being a key contributor to achieving these targets. Targets are driven by the awareness of climate impact, international commitments, trade requirements, and legislation.

The disclosure requirements established by the Johannesburg Stock Exchange (JSE) act as a catalyst for listed companies to prioritise the sourcing of clean energy. The JSE's King IV Code on Corporate Governance requires listed companies to disclose sustainability metrics as part of their ESG disclosures. These disclosures encompass a whole range of metrics, including greenhouse gas emissions, energy mix, supply chain impact, localisation, and materials sourcing. The JSE's emphasis on ESG disclosures and sustainability metrics reflects a growing global trend towards responsible investing and corporate responsibility. Investors and stakeholders are increasingly interested in supporting companies that prioritise sustainability and demonstrate good governance practices. Consequently, listed companies are compelled to align with these requirements to meet investor expectations, attract capital, and enhance their reputation (JSE 2023).

International regulations are also driving industry commitments. These include the CBAM in the EU, which aims to address the greenhouse gas emissions associated with products or materials processed outside of the EU by issuing a tax on imported goods produced in non-EU countries from high-carbon intensive sources. South African companies seeking to do business with the EU will have to align with CBAM requirements.

The CBAM regulation officially entered into force on 16 May 2023. The CBAM itself entered into application in its transitional phase on 1 October 2023, with the first reporting period for importers ending 31 January 2024. Initially, CBAM will focus on carbon intensive products, especially raw products such as cement, fertilisers, iron, steel, electricity, aluminium, and hydrogen. However, it aims to expand to other products in the future. The EU is a major trading partner for South African goods which will be affected by CBAM (European Commission 2023).



2.1.2.4 Eskom transformation

The unbundling of Eskom into separate transmission, distribution, and generation entities is seen as a key part in successfully resolving the current energy crisis. Progress has been made with regards to the unbundling of the transmission division, with NERSA issuing transmission, import and export, as well as trading licences to the National Transmission Company of South Africa (NTCSA). The last two outstanding conditions for the operationalisation of the NTCSA are lender consent for the separation from Eskom and the appointing of an independent board (Creamer 2023a).

The NTCSA, when fully separated, will operate the transmission system, and fulfil the roles of transmission network service provider, system operator, transmission system planner and grid code secretariat. The NTCSA will thus operate as a single-buyer entity, purchasing power from both Eskom and IPPs. This will allow IPPs to directly compete with Eskom, ensuring transparent and non-discriminatory access to the grid (Creamer 2023a). An independent transmission company is also expected to lead to the improved allocation of funds for the required transmission assets.

According to Eskom's TDP, approximately 53 GW of new generation capacity is required by 2032, most of which will come from renewable energy sources. To accommodate this expansion in generation capacity, at least 14 200 km of extra-high-voltage transmission lines and 170 transformers are needed by 2032. Eskom has allocated R72.2 billion for extremely critical projects (approximately 2 890 km of extra high-voltage lines and 60 transformers) to be completed by financial year 2027, with most of these projects focussed on the Northern and Western Cape (Eskom 2023b).

Alongside the expansion of the transmission network, Eskom plans to decommission around 10 GW of coal generation by 2030, with Hendrina, Grootvlei, Arnot, Camden, and Kriel being phased out. From 2030 onwards, Duvha, Tutuka, and Matla will be decommissioned. All of these power stations are situated within Mpumalanga. There is, however, uncertainty with regards to the decommissioning plans as the government and Eskom are planning to delay the decommissioning of Hendrina, Grootvlei, and Camden in response to the current supply deficit (Sguazzin and Naidoo 2023).

Opportunities for the private sector enabled by the new TDP are largely through the ability to wheel electricity through the transmission network. Wheeling is the delivery of electrical energy from an IPP to an end user through the use of third party transmission and distribution networks, allowing independent power producers to sell directly to customers while paying for the use of the electricity grid through use-of-system charges. Wheeling allows offtakers (customers) to enter private procurement contracts for power to, for example, reduce their carbon footprint, increase price certainty, and potentially decrease costs. An illustration of traditional wheeling is given in Figure 5.

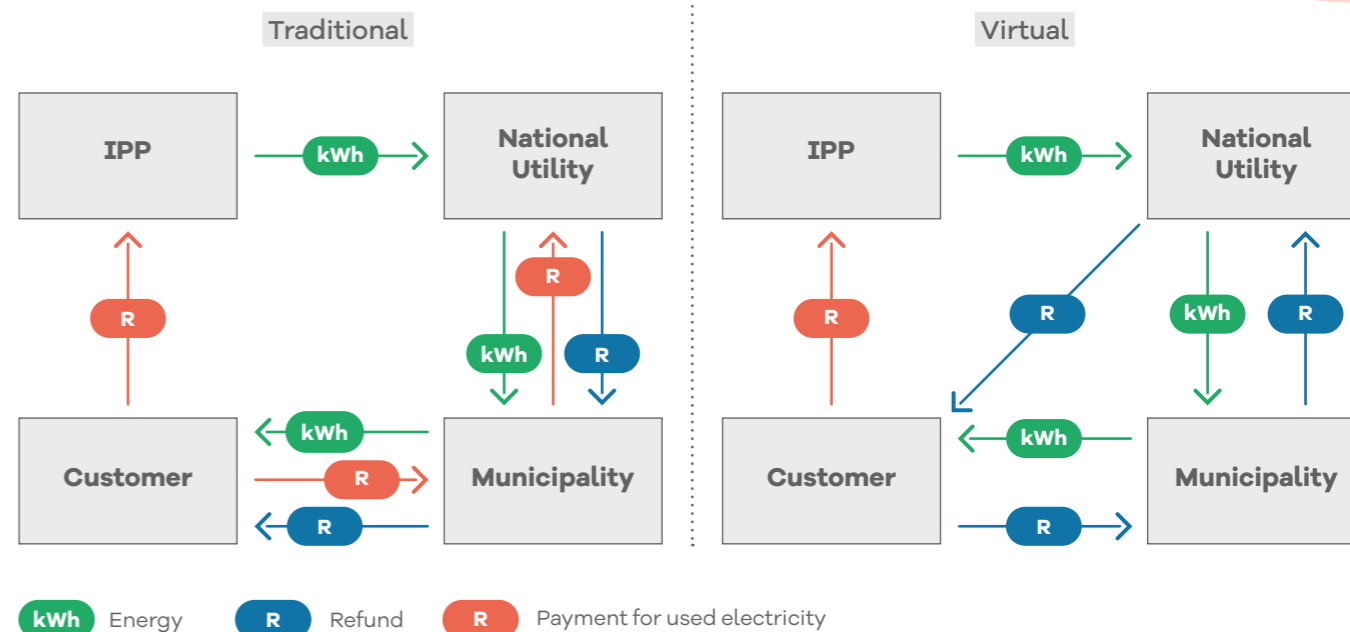


Figure 5: Traditional wheeling compared to virtual wheeling payment structure

Traditional third-party wheeling involves a one-to-one relationship between the IPP and the offtaker and requires an amendment to the Electricity Supply Agreement (ESA) between the offtaker and Eskom, and where applicable, an amendment of the ESA between Eskom and the municipality. This has led to limited uptake, and wheeling generally only occurs between larger Eskom-connected buyers. Additionally, the user pays twice for the electricity usage and has to wait for a rebate to balance the energy usage with the payments. Rebates are supplied from Eskom to the municipality and then from the municipality to the user.

In an attempt to solve some of the problems with traditional wheeling and extend wheeling to low voltage connected offtakers, Eskom is developing a virtual wheeling platform, which is illustrated in Figure 5. The virtual wheeling platform is a digital tool that collects, aggregates, processes, and reports time-of-use data for both energy generation and consumption, allowing Eskom to calculate the offtaker's wheeled energy refund. The offtaker continues to pay Eskom or their municipality as normal, with Eskom providing a wheeled energy refund at the end of the month. This allows wheeling to take place without an amendment to the ESA (Eskom 2023c).

While virtual wheeling removes the need for a municipal framework, and thus the need for municipalities to adjust their billing systems, this platform still requires smart metres. A step towards the implementation of this platform was taken when Vodacom signed a virtual wheeling agreement with Eskom, driven by the group's goal of sourcing 100% of its energy from renewable sources by 2025. Vodacom is helping to develop the platform alongside Eskom (Odendaal 2023).



2.1.3 BARRIERS

The key barriers to unlocking the private large-scale renewable energy market in South Africa are infrastructure deficiencies, which also proved detrimental to the REIPPPP, policy uncertainty, and skills shortages. Overcoming these barriers has the potential to unlock further investment in large-scale renewable energy.

2.1.3.1 Grid capacity constraints

There are grid constraints in South Africa's high-yield renewable energy areas. Eskom published the results of a generation connection capacity assessment that reveals substantial grid capacity constraints (see Figure 6). There is no longer any grid capacity available for large-scale renewable energy projects in the Northern Cape, Western Cape, Eastern Cape, and parts of the Free State. In the lower resource areas, such as Mpumalanga, Limpopo, Gauteng, and KwaZulu-Natal, there is limited capacity available. Project developers can thus access the available capacity but at lower energy production potential within those areas (Eskom 2023b).

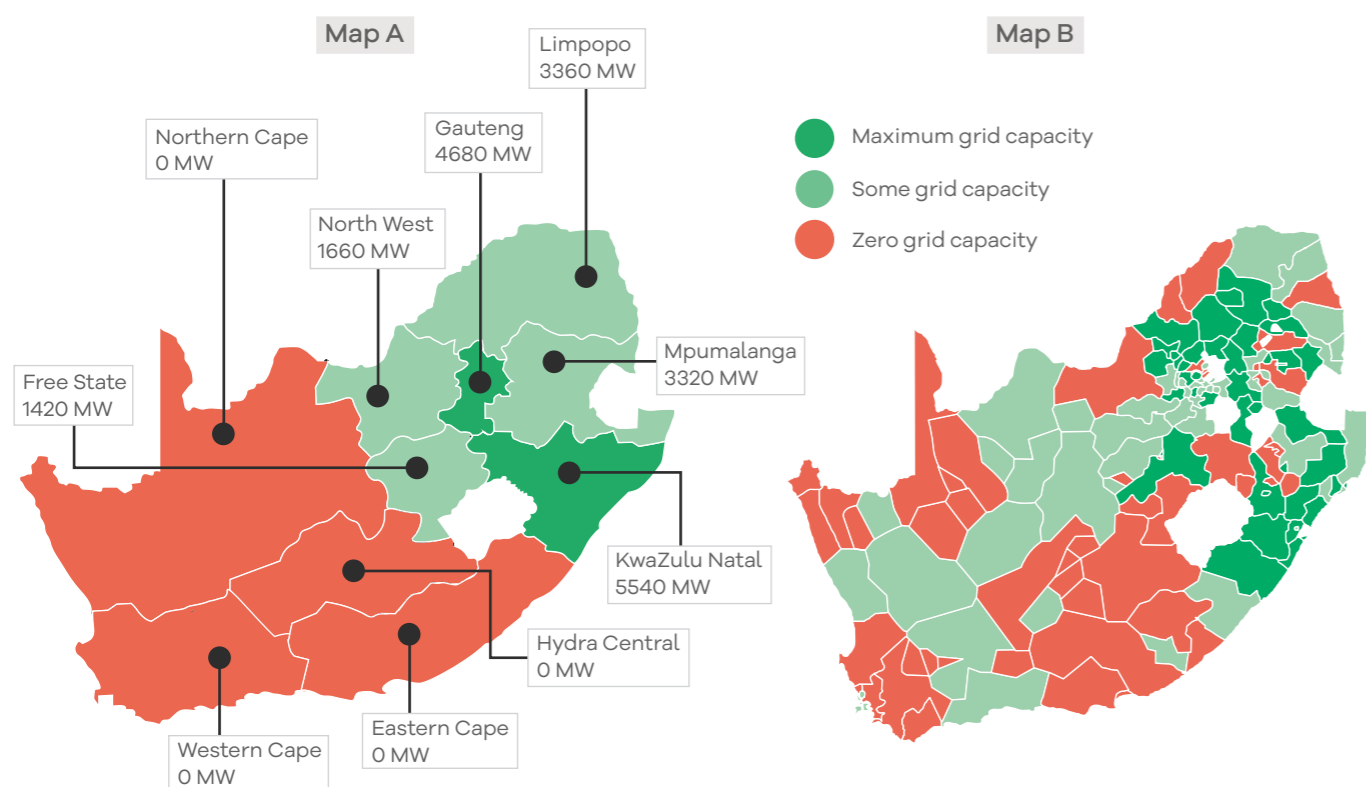


Figure 6: Eskom supply area grid capacity at (a) provincial and (b) substation area levels (Source: app.powerbi.com/view)

The grid availability challenge is exacerbated by the grid allocation process. Eskom identified that multiple projects have been allocated to substations, but the projects failed to enter the construction phase. In response to this, Eskom provided a briefing session on new grid capacity allocation rules in June 2023. The key changes in the rules are the additional requirements placed on project developers to be ready for construction prior to being given grid allocation. The new rules have not been approved by NERSA at the time of writing (Eskom 2023e).

Furthermore, Eskom seeks to unlock more grid capacity for renewable energy through implementing curtailment¹³ of renewable energy power plants. Eskom commissioned curtailment studies and is in the process of developing a curtailment framework to provide developers with an alternative option for connecting at grid constraint areas (Eskom 2023f).

2.1.3.2 Low carbon tax

The carbon tax is one of the mechanisms that the South African government has put in place to help achieve its NDC as communicated under the Paris Agreement. Carbon tax has been set at R134 per tonne as of January 2022. However, based on the carbon tax revenue collected, the estimated effective rate was less than R7 per tonne of Carbon Dioxide Equivalent during the financial year 2021 to 2022. With the transition phase of the carbon tax extended from end 2022 to end 2025, the effective carbon tax rate is expected to remain low, despite the planned increase in the headline official rate in the coming years (IMF 2023). A higher carbon tax rate could drive further growth in the renewable energy market.

2.1.3.3 Skills shortage

South Africa's reliance on a BW process for public procurement of large-scale renewable energy systems concentrates the demand for skills over a short period, creating an industry-wide skills shortage that delays project execution for many large-scale renewable energy projects. The skills shortage within the industry is not limited to South Africa and is considered a global challenge driven by the rapid growth of the market. Skills shortages were identified by project developers, engineering firms and manufacturers as contributing to project implementation delays.

Areas where there are critical skills shortages identified in a study for Australia (PWC 2022) appear to hold true too for South Africa. These are:

- **Electrical commissioning and installation of renewable energy systems are required wherever new generation projects need to connect to the transmission network.** There is a shortage of people with skills and experience of electrical commissioning and installation in remote areas where many of the projects are located.
- **Installing and maintaining grid-scale battery energy storage systems is a relatively new and developing industry,** resulting in a shortage of people qualified and experienced in installing and maintaining these systems.
- **Operating and planning power networks and the related technical skills are required to accommodate the expanding transmission network over a larger geographic area.** These skills are expected to limit the scale of grid expansion and upgrades required (as outlined in section 2.1.2.1).

As large-scale renewable energy expands globally, there will be increased international competition for the available skill sets. South African industry will have to compete for talented and experienced staff at a global level.



¹³ Curtailment reduces the peak power production below the designed capacity, using this approach for renewable energy generation maximises the total energy production in that period.

2.2 Public procurement of renewable energy

As South Africa continues to roll out public procurement programmes for new electricity generation projects, opportunities emerge for strategic investments in the sale of electricity from renewable sources to national government entities and municipal off-takers.



2.2.1 INVESTMENT OPPORTUNITY

The most noteworthy government program has been the REIPPPP, which has been responsible for the construction of the majority of South Africa's renewable energy projects. However, a number of smaller procurements for IPP projects were also launched to address energy challenges, including the RMIPPPP, the BESIPPPP, Eskom's BESS Programme, and municipal programmes.

In December 2023, the DMRE launched REIPPPP BW7 which includes 1 800 MW solar PV and 3 200 MW of wind (DMRE 2023b). These allocations exceed the allocations in the draft IRP2023 published in January 2024, which indicates an additional new capacity of 1 500 MW for solar PV and 3 000 MW for wind by 2030 (DMRE 2024).

The RMIPPPP was launched in 2020 as an emergency programme to address the energy shortage and reduce the use of diesel-based peaking open cycle gas turbines. The programme did not specify the type of technology. The low cost and rapid deployment of renewable energy with battery storage highlights the ability of the technology to compete with other sources on a cost and time basis.

In December 2023, BW2 for BESIPPPP was announced with the aim to secure 615 MW or 2 460 MWh of new battery capacity and ancillary services. This new BW calls for BESS to be developed at eight Eskom substations, with the first bidder's conference held in January 2024 (IPPO 2023a).

Government or private project developments are currently limited by the grid constraints, thus locating these project opportunities to substations that have sufficient capacity to accommodate additional large-scale projects. Mpumalanga, Limpopo, Gauteng, and KwaZulu-Natal have the highest capacity availability. In an attempt to reduce the grid constraints, the IPPO launched the BESIPPPP which is independent of Eskom's BESS programme. The projects will provide capacity, energy, and ancillary services to Eskom (Murray 2023). Municipalities that are in good financial standing and have a feasible project proposal are able to procure electricity from private companies if the municipality complies with the relevant regulations,

such as the Municipal Financial Management Act (MFMA). Many of the requests for proposals announced by municipalities include gas-to-power, however an estimated 0.6 GW to 2.2 GW of renewable energy projects could materialise, mostly solar PV. The Department of Public Works & Infrastructure, as the largest landlord and facilities manager in the country, released a request for information for the Integrated Renewable Energy and Resource Efficiency Programme. Announcements are expected on a request for proposals for renewable energy and energy efficiency, however, it is expected that the focus of these projects will be on embedded generation, not large-scale renewable energy (DPWI 2021).

The uncertainty around the revisions to the IRP poses a challenge for estimating the market size. However, the announcement of a BW7 and a comparison of the capacity with the planned capacity outlined in the draft IRP2023 suggests that only BW7 will be implemented by 2030 as part of the REIPPPP. The increasing focus on solar PV projects by municipalities, and the announcement of battery energy storage programmes by both the IPPO and Eskom, illustrate a growing trend towards solar PV and battery energy storage for public programmes.

The public procurement market is expected to be limited to BW7, energy storage and municipal solar PV projects. The public procurement market is estimated at **2.6 GW of solar PV, 3.2 GW of wind power and 3.7 GW of battery energy storage systems by 2030**. The investment value is estimated to be **R50 billion for solar PV, R79 billion for wind power and R83 billion for battery energy storage systems**. The total investment value is **R212 billion¹⁴ by 2030 or ~R35 billion per year**.



2.2.2 DRIVERS

As indicated, most of South Africa's large-scale renewable energy projects were realised through the REIPPPP. Of the two new BWs referred to during the budget vote speech, only one (BW7) has been announced and it is not yet clear whether BW8 will proceed. The key drivers of public procurement of renewable energy are the national level Independent Power Producer Procurement Programmes, municipal tenders, and relieving grid constraints from battery energy storage projects.

2.2.2.1 National level independent power producer procurement programmes

As stated before, the REIPPPP has been the main contributor of growth for the renewable energy market. In May 2023, the Minister of Mineral Resources and Energy, Mr. Gwede Mantashe, mentioned REIPPPP BW7 and BW8, with a total capacity of 10 GW, during a Budget Vote Speech. In December 2023, the DMRE launched REIPPPP BW7 for 1 800 MW solar PV and 3 200 MW of wind (DMRE 2023b).

Similarly, the RMIPPPP could become the implementation vehicle for the 1 376 MW of new dispatchable capacity indicated in the draft IRP2023. The programme has not yet concluded; however, five key projects have signed agreements, amounting to 353 MW of dispatchable electricity from 655 MW solar PV, 300 MW BESS and 63 MW wind. The continuation of these programmes is uncertain until new government announcements are made or more information is made available through the finalisation of the IRP2023 (Creamer 2023b).

2.2.2.2 Municipal tenders

Municipal participation in large-scale renewable energy projects is achieved through either procuring electricity directly from IPPs and reselling it to customers or by developing a wheeling framework and charging a fee to private entities for wheeling electricity through the municipal electrical grid to private off-takers.

A few municipalities have a wheeling framework in place or are in the process of developing one. Nelson Mandela Bay Metro has allowed wheeling to commercial and industrial customers for over 10 years. George and the City of Cape Town (CCT) have completed their pilot projects, with wheeling actively taking place in small volumes in George, and CCT aiming to finalise the wheeling service in 2024. The City of Ekurhuleni has developed a wheeling policy, which has been approved by the council, while other municipalities that have started developing frameworks include Bitou, Johannesburg (City Power), uMhlathuze, Msunduzi, Overstrand, eThekweni, Stellenbosch and Swartland.

Further growth in the municipal space is expected with an increasing number of municipalities seeking electricity sources at lower costs than Eskom. Municipalities in good financial standing that have developed their own wheeling or PPA framework will be in a position to source renewable energy from private developers. The eThekweni municipality has announced plans to procure 400 MW of new generation capacity through PPAs, including 100 MW of solar PV. City Power (Johannesburg) has announced plans to secure 500 MW in the form of short-term PPA. The CCT issued a tender in 2022 for procuring 200 MW of renewable energy from IPPs, and more recently announced plans to procure an additional 500 MW of dispatchable power from renewable energy and battery storage, as well as gas-to-power IPPs (CCT 2023). Ekurhuleni has announced plans to acquire between 150 and 680 MW of renewable power, while Nelson Mandela Bay municipality plans to build its own 150 MW solar power plant and has indicated its interest in purchasing 100 MW from IPPs. Further opportunities may become available as more municipalities develop their own procurement plans (Ryan 2023).

However, through Eskom's virtual wheeling structure, municipal wheeling frameworks will become less relevant, and wheeling will be accessible to customers in municipalities, which represent roughly 42% of the country's load (Eskom 2022), since the trading and payment of electricity will be done outside of the existing municipal structures (see section 2.1.1.4).

¹⁴ Solar PV system cost of R19.32 million/MW, wind system cost of R24.61 million/MW, and BESS system cost of R22.21 million/MW were used for the calculation. Cost estimates are calculated from averages sourced from Lazard (2023) and the National Renewable Energy Laboratory (NREL 2023).



2.2.2.3 Relieving grid capacity through battery energy storage programmes

Eskom launched a BESS programme aimed at diversifying the generation energy mix and addressing grid capacity constraints. The programme employs a bidding process for private companies for the design, supply, and installation as well as operation and maintenance for a five-year period (Eskom 2023g). These types of programmes are expected to be a driver for the renewable energy market due to their ability to relieve grid constraints.

The first phase of the BESS programme includes a total power production capacity of 199 MW and an annual 304 130 MWh energy supply. The second phase will have a total power capacity of 144 MW and an annual energy supply of 224 840 MWh. The first phase of the project was scheduled to complete at the end of 2023 (Eskom 2023g); however, some delays have occurred and phase 2 has been placed on hold in order to clarify debt-relief requirements with the National Treasury.

Although no further announcements have been made on more phases to the programme, Eskom selected two BESS service providers, South Korea's Hyosung Heavy Industries and Chinese company Pinggao Group (Colthorpe 2022). One of the installations, located at Hex substation in the Western Cape, was launched in November 2023; the status of the remaining projects is unknown. The intention of the programme is to serve as pilot for future rollout, leading to a potential opportunity for future BESS projects and enabling more renewable energy projects onto the grid by increasing the grid capacity during peak times and reducing curtailment risks.

The DMRE launched the first BW of BESIPPPP in March 2023. In November 2023, the DMRE Minister announced the appointment of four preferred bidders to procure 513 MW or 2 052 MWh storage solutions at five locations (IPPO 2023a). The draft IRP2023 also indicates a possible new storage capacity addition of 2 000 MW, which implies another BESIPPPP bid round in the future.

At this stage, it is not possible to estimate the exact amount of grid capacity that will be unlocked via these battery storage procurement programmes, but considering the current placement of those currently awarded, it is expected that the greatest impact will be on the grid availability in the Northern Cape area.



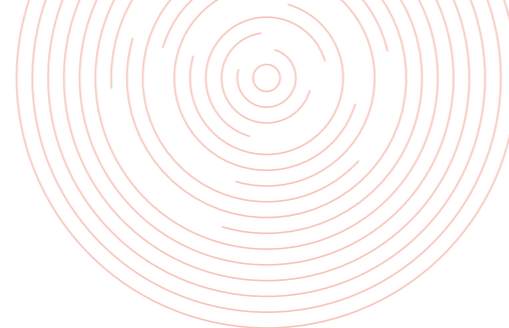
2.2.3 BARRIERS

The key challenges that limit investment in large-scale renewable energy for public procurement are potentially extended project development timeframes and costs due to municipal regulatory requirements, and South Africa's global ranking for investment. Overcoming these barriers has the potential to unlock further investment in large-scale renewable energy.

2.2.3.1 Extended project development timelines and costs due to municipal procurement requirements

Municipalities need to adhere to procurement requirements outlined in the MFMA, Act 53 of 2003 (National Treasury 2003). Among others, the MFMA requires municipalities to comply with the following:

- Municipalities cannot engage in unsolicited bids without prior approval from the National Treasury. A competitive energy bidding process is thus required for each new project (Section 113, MFMA).
- Municipalities that want to engage in financial obligations beyond three years are required to engage in a public participation process and acquire relevant sector department comments, including from the National Treasury. This increases the timeline and administrative burden on municipalities that seek to engage with IPPs on standard 15 to 20 year PPA of power purchase contracts (Section 33, MFMA).
- Special conditions are placed on municipalities for engaging in public-private partnership, including, but not limited to, approvals from the national government, proof that the agreement provides value for money to the municipality, proof of affordability and that the risk is transferred to the private party (Section 120, MFMA).



However, the largest challenge for procurement of renewable energy by municipalities is their financial position. According to the Auditor-General report of 2022, 56% of municipalities have indicators of financial strain; 52% owe their creditors more money than they had available and 29% are considered at risk of failure (Auditor-General 2022). According to the DMRE, amendments to the ERA will ensure that only municipalities in good financial standing will be able to develop their own generation facilities or procure power from IPPs (DMRE 2020). Although the regulations do not provide a definition for "good financial standing", which can be interpreted in many ways, the findings of the Auditor-General report suggest that there may be a limited number of municipalities that will be able to source electricity from IPPs through PPAs.

2.2.3.2 Policy uncertainty

For the long-term sustainability of the large-scale renewable energy sector, a more consistent and predictable rollout of new projects is required. The development and implementation of (new) national policies and regulations may pose additional requirements and add to uncertainty in the market.

The implementation of the REIPPPP has been inconsistent, with long gaps between BWs, followed by shorter intervals. This inconsistency creates an unpredictable project pipeline, posing risks to all stakeholders. Additionally, the local content and ownership requirements placed on developers and their ability to meet these requirements are proving to be challenging for developers.

The latest BW7 for the REIPPPP was announced in the context of grid capacity constraints that impacted the ability to select wind projects as preferred bidders in BW6. Furthermore, there were challenges with closing BW5 projects due to, among other factors, the inability of project developers to meet the local content commitments made under changing global supply chain conditions. This added to the uncertainty surrounding the future of public procurement of renewable energy.

At the time of writing, no details of BW8 have yet been published, and the publication of a draft IRP2023 that does not indicate further new renewable energy projects until 2028 creates uncertainty on the future market potential through the REIPPPP. Furthermore, the IRP¹⁵ is currently being revised and the new Electricity Regulations Act Amendment Bill,¹⁶ has been delayed, creating further policy uncertainty (Mavuso 2023).

Companies seeking to do business with government entities, such as through the REIPPPP, must also comply with the Preferential Procurement Regulations which will be replaced by the Preferential Procurement Bill, currently being drafted.



In February 2022, the Constitutional Court ruled that the Minister of Finance exceeded his powers in prescribing procurement regulations through the Preferential Procurement Regulations of 2017 under the Preferential Procurement Policy Framework Act of 2000 (PPFPA). To comply with the ruling and to address uncertainty, the Preferential Procurement Regulation of 2022 came into effect in January 2023, as an interim measure until a new **Public Procurement Bill** would come into effect (National Treasury 2022). The draft **Public Procurement Bill** was introduced in the National Assembly on 30 June 2023.

The 2022 regulation requires organs of state to establish a preference point system and goals for point awards, but it does not specify the values or number of points required. This allows government entities, including municipalities and Eskom, to set their own targets for preferential procurement, leading to potential inconsistency and creating uncertainty.

The Public Procurement Bill has not yet been signed into law. It contains provisions for targets for local content to be set by the Minister of Finance through consultation with stakeholders. The PPFPA applies to public entities, including Eskom and municipalities. Further clarity is needed on the targets and implementation of the Bill to provide the level of certainty required for long-term investment. The Public Procurement Bill is expected to be passed in 2024.

2.2.3.3 South Africa's global rankings for investment

South Africa's deteriorating global ranking in recent years has added risk to investments in the country and increased the cost of doing business. South Africa's creditworthiness has deteriorated over the past five years, resulting in a downgrade from Investment Grade to Speculative Grade by all three major credit rating agencies. This downgrade has raised the country's borrowing costs, making it more expensive to fund major infrastructure projects like grid expansion. The assessments of major credit rating agencies that rank South Africa are listed in [Table 2](#).

¹⁵ This forms the basis for ministerial determinations enacted through programmes such as the REIPPPP.

¹⁶ Among others, the Bill assigns the duties, powers, and functions of the Transmission System Operator to the NTCSA.

Table 2: South Africa's credit rating from the three major credit rating agencies (Trading Economics 2023)

AGENCY	RATING	OUTLOOK	LAST CHANGED
Standard & Poor's (S&P)	BB- (below investment grade)	Stable	08 March 2023
Moody's	Ba2 (below investment grade)	Stable	01 April 2022
Fitch	BB- (below investment grade)	Stable	15 December 2021

Compounding the investment risk, South Africa has also been grey listed by the Financial Action Task Force (FATF), a global inter-governmental body that promotes policies and sets international standards related to combating money laundering, terrorist financing and financing of the proliferation of weapons of mass destruction. The FATF grey listing was triggered by the 2021 mutual evaluation that identified weaknesses in South Africa's legal framework (National Treasury 2023b).

South Africa also ranked lower on Transparency International's Corruption Perceptions Index, dropping 1 point to 43/100 in 2022. However, this is not considered a statistically significant change, but ranks South Africa at 72nd of the 180 countries ranked (Transparency International, 2022).

2.3 Local manufacturing

As South Africa undergoes rapid growth in the clean energy market, an opportunity is created to facilitate economic development, job creation, and social transformation through manufacturing. This section aims to outline key investment opportunities into the South African renewable energy component manufacturing industry, emphasising the drivers of the market and the key barriers that, when overcome, could open up a lucrative market for investors.



2.3.1 INVESTMENT OPPORTUNITY

The South African government is actively working towards localising renewable energy manufacturing through various departments and initiatives. The recently launched JET-IP highlights the importance of local manufacturing through the inclusion of the SAREM.

The SAREM, which is essentially a renewable energy industrialisation plan, envisions the industrialisation of South Africa's renewable energy and energy storage value chain to enable inclusive participation in the energy transition, serving the needs of society and contributing to economic revival. It aims to achieve this through:

- **Supporting demand** through enabling market certainty and improving system readiness;
- **Driving industrial development** through establishing localisation objectives, aligning industrial policy and programmes, and harnessing trade policy;
- **Fostering inclusive development** through establishing clear transformation objectives, fostering integration of emerging suppliers, directing activities to Just Transition hotspots and driving an inclusive rollout of projects; and
- **Building capabilities** through skills and technology development.

A final draft of SAREM has been developed. SAREM is expected to be launched by the DMRE in 2024.



2.3.2 DRIVERS

A number of programmes and strategies exist that target the development of a local manufacturing industry for renewable energy in South Africa. These programmes are focussed on creating an enabling environment for local manufacturers. Along with these local drivers for local manufacturing, there are also international drivers, the most significant being international trade agreements within SADC, the EU and the USA.

There are opportunities for local manufacturing of renewable energy components within the context of local content targets for public and private offtake agreements and a growing renewable energy market. Local content requirements aim to grow the South African manufacturing sector. These requirements vary for large-scale renewable energy projects, depending on the offtaker's obligations to local content requirements through mechanisms such as Preferential Procurement Regulations (2022) (forthcoming Public Procurement Bill), MFMA, and the Mining Charter.

Additionally, there is potential to manufacture components for both utility-scale and small-scale renewable energy projects, such as balance of plant or system components.¹⁷ Smaller-scale projects can provide a steady demand, reducing manufacturers' vulnerability to fluctuations in utility-scale project demand and resulting in cost savings through economies of scale. According to statistics obtained from the South African Revenue Services (SARS), the import market for key solar PV components in 2023 was R36 billion for solar inverters and modules. International agreements also open the opportunity to export South African manufactured components to other African countries as well as major South African trading partners such as the EU and the USA.

The IPPO reported that the REIPPPP projects achieved 50% local procurement (of physical assets and services), exceeding the 44% commitment from IPPs (IPPO 2022). Independently, IPPs also indicated that high local content levels are achievable for private projects and can be beneficial due to the cost and uncertainties associated with international shipping, among other factors. Assuming all services are procured locally and the total expenditure on local content is in line with REIPPPP achievements for both private and public projects, the remainder of the potential local equipment expenditure can be estimated for wind and solar PV projects.¹⁸ The key components for battery energy storage systems, inverter, and battery cabinet, are assumed to be imported, limiting the localisation component to the balance of system.¹⁹ The total domestic²⁰ market size of the renewable energy manufacturing sector is estimated at **R42 billion by 2030 or R7 billion per year** for renewable energy component manufacturing.

¹⁷ Studies conducted by South African Photovoltaic Industry Association (2022) and the Localisation Support Fund (2023) outline the local manufacturing potential in South Africa.

¹⁸ According to IRENA (2012), 64% of wind project costs are associated with turbine components, and according to IEA (2021), 79% of solar PV project costs are associated with solar PV components.

¹⁹ According to NREL (2022), 15% of BESS project costs are associated with the balance of system components for a four-hour duration 240 MWh system.

²⁰ South Africa's renewable energy component exports exceeded R1.6 billion in 2023, however, this is excluded from the market sizing due to uncertainty of the nature of the export or market sizing of the destination countries.





2.3.2.1 Local content requirements

Local content requirements are placed on developers from both public and private offtakers. The JSE's King IV Code on Corporate Governance requires listed companies to disclose sustainability metrics as part of their ESG disclosures. These metrics encompass a large range of components, such as supply chain impact, localisation, and materials sourcing (JSE 2023). JSE-listed companies are required to publish a compliance report on their broad-based black economic empowerment (B-BBEE) status, which should include whether the company is an empowering supplier and whether it has achieved the priority element thresholds of ownership, skills development, and supplier development, among others (the dti 2016). This enables local manufacturers and developers with a high B-BBEE score to benefit from private offtakers that seek to improve their B-BBEE status through their suppliers.

Public procurement programmes are also geared towards local content through preferential procurement requirements. The local content spend reported for IPPs that have started construction amounts to R64.5 billion against a corresponding project value (as realised by the end of 2022) of R130.2 billion. As indicated earlier, this means 50% of the project value has been locally procured, which includes services, exceeding the 44% commitment from IPPs as part of the REIPPPP (IPPO 2022). Further to this, the RMIPPPP preferred bidder projects had a requirement of 40% local content, however an average of 50% local content during construction were committed by the eight preferred bidders (DMRE 2021).²¹ The local content requirements of upcoming REIPPPP rounds also have potential to drive demand, however, BW7 has no local content designation and relies on a scoring mechanism as part of the economic evaluation criteria, the details of which will be made available in 2024.

2.3.2.2 Beneficial international agreements

International partnerships can create opportunities to boost local manufacturing through export. Continental trade agreements, such as the SACU, AfCFTA and the SADC Free Trade Agreement, gives South African based manufacturers improved access to African markets through duty-free or preferential trade conditions. There are also other agreements in development to further expand trade within the continent (International Trade Administration 2023). South Africa's top global renewable energy component export destinations were mostly located in SADC countries, many of which are free trade agreement partners (see Table 3). Although many of these partners are also signatories to AfCFTA, meaningful trade under AfCFTA only began in October 2022, with seven pilot countries, namely Cameroon, Egypt, Ghana, Kenya, Mauritius, Rwanda, and Tunisia. Table 3 highlights the current and potential future opportunity for South African based manufacturers to export products within the African continent.

Table 3: List of South Africa's top 10 global renewable energy component export destinations and trade agreements on the African continent

COUNTRY	Export value for renewable energy components in ZAR (Source: SARS 2023)	SACU (Source: the dtic 2023)	SADC Free Trade Agreement (Source: the dtic 2023)	AfCFTA (Source: African Union 2023)
Zambia	218 545 652	-	Member	Signatory
Namibia	191 557 303	Member	Member	Signatory
Botswana	129 579 520	Member	Member	Signatory
Democratic Republic of the Congo	119 412 414	-	In-process	Signatory
Nigeria	98 037 115	-	-	Signatory
Zambia	93 776 434	-	Member	Signatory
Mozambique	90 891 820	-	Member	Signatory
United Arab Emirates	89 990 572	-	-	-
Angola	44 589 506	-	In-process	Signatory
Eswatini	39 682 883	Member	Member	Signatory

Intercontinental trade agreements also allow for potential export market opportunities. The most noteworthy opportunities are the AGOA with the USA, and the Trade, Development and Cooperation Agreement (TDCA) with the EU. These agreements typically cover specific products, which could include renewable energy components. International manufacturers can expand their market access by manufacturing in South Africa, either independently or with local partners, benefiting from both trade agreements and local content requirements (the dtic 2023).

European-South African trade is largely facilitated through the TDCA, which establishes preferential trade arrangements between the EU and South Africa, with the introduction of a Free Trade Area (FTA). The EU is South Africa's main trading and investment partner, with the agreement covering around 90% of current bilateral trade between the two parties. In order to protect the vulnerable sectors in the EU, certain products are excluded from the FTA and others have been only partially liberalised (mainly agricultural products for the EU) (EUR-Lex 2018).

An opportunity exists to export products to the USA, through taking advantage of the AGOA. AGOA provides eligible sub-Saharan African countries with duty-free access to the USA market for over 1 800 products, in addition to the more than 5 000 products that are eligible for duty-free access under the Generalized System of Preferences Program (USTR 2023). The Generalised System of Preferences Program is designed to provide opportunities for the world's poorest countries to use trade to grow their economies and climb out of poverty. AGOA opens up the opportunity to export South Africa produced products to the United States with a low or no import duties. Component manufacturers can leverage this opportunity to access a much larger renewable energy market than what is available in South Africa.

²¹ The RMIPPPP preferred bidders had five renewable energy and battery based projects – ACWA Power Project DAO, Mulilo Total Hydra Storage, Mulilo Total Coega, Oya Energy Hybrid Facility and Umoyilanga Energy – with the remaining three bids for ship-based gas power plants (DMRE 2021).



2.3.3 BARRIERS

Despite policies aimed at driving local manufacturing, uncertainties exist around the enforcement and implementation of local content requirements, particularly with the current emphasis on the swift rollout of energy projects at a low cost. The cost competitiveness and quality of locally sourced components thus remains a key determinant of local market access for local manufacturers. The opportunity to access larger international markets are also challenging in the long-term, due to increasing requirements from major trading partners.

2.3.3.1 Market uncertainty

The structure of the REIPPPP creates a bulk demand for projects and components from each BW round. As such, the demand for skills, equipment, and resources are high over a short period of time. This creates demand challenges for component manufacturers and service providers, such as heavy duty crane and material suppliers. It is unsustainable for local manufacturers to stock high volumes of equipment and material to meet demand if the demand is unpredictable. Developers that are unable to source this high volume of product over a short period of time for programmes such as the REIPPPP apply for exemption from the local content requirements. Outside of the public procurement programmes, the anticipated growth in the private market has the potential to provide a more predictable and stable demand for locally manufactured components.

2.3.3.2 Local competitiveness

The demand for renewable energy components, particularly solar PV modules, has witnessed a notable surge. This trend is underscored by statistics provided by SARS, showcasing a substantial growth in renewable energy component imports. In 2022, the total imports amounted to R17 114 billion, surging substantially to R40 625 billion (237% growth) in 2023, as depicted in Figure 7. This surge in imports stands in stark contrast to the export figures, which amounted to R1.6 billion in 2023, a 22% increase from the R1.3 billion exported in 2022. The growth in solar PV module imports occurred, despite the fact that local PV module manufacturers reported operating below their manufacturing capacity, highlighting the challenge for manufacturers to compete with the imported components. This surge is expected to have been driven by a combination of rooftop PV, construction of previously awarded large-scale renewable energy projects and private sector projects. It is important to note that while these statistics offer a valuable snapshot of the overall trend, the data remains indicative. It lacks granularity in distinguishing between specific components and their applications, providing a broad overview rather than a detailed breakdown.

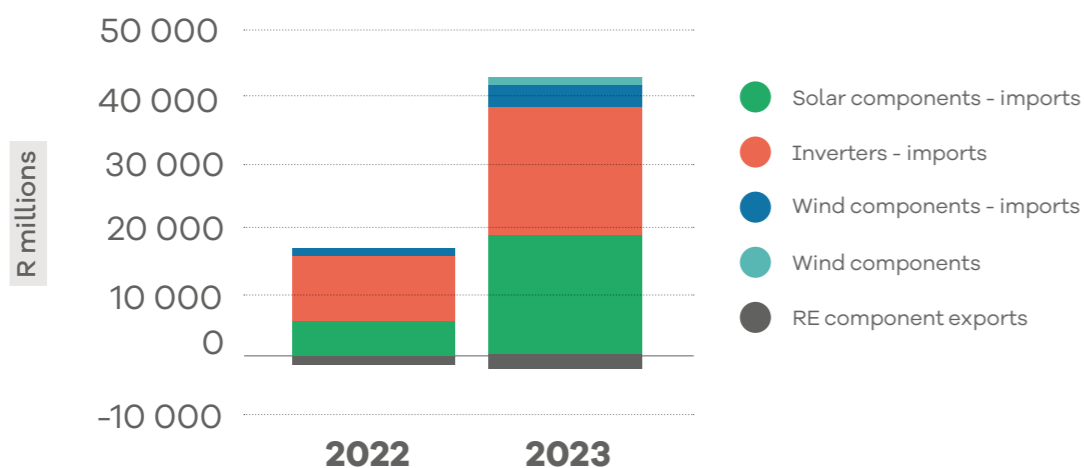


Figure 7: Import and export statistics of major solar PV and wind project components²²
(Source: Author's calculations from statistics drawn down from SARS)

²² The SARS tariff classification codes used are: 85414300 (PV cells assembled in modules or made up into panels), 85414200 (PV cells not assembled in modules or made up onto panels), 85044000 (static converters), 85030090 (other parts suitable for machines) and 85023100 (wind-powered electric generating sets).

South African manufacturers face an added challenge in terms of competitiveness with international manufacturers due to loadshedding. Although attempts are being made to connect more generation units onto the network, a substantial mismatch between generation and demand persists. Many industries are attempting to offset the impact of loadshedding through negotiations for exemptions or adjusted schedules, backup power supply and storage solutions, and adding capital and operating costs to their operations. These measures further reduce the competitiveness of manufacturers of renewable energy components but enable them to operate unhindered by the electricity supply challenges.

2.3.3.3 Restrictive international trade instruments

Although trade agreements and international policies and regulations create opportunities for improved access to larger international markets they can also pose challenges. South Africa's largest trading partners, the EU, and the USA, have introduced legislation with long-term risks for the export of renewable energy components.

The EU has introduced the CBAM. The CBAM aims to address the greenhouse gas emissions associated with products or materials processed outside of the EU by issuing a tax on imported goods produced from high-carbon intensive sources in non-EU countries. Initially, CBAM will focus on carbon intensive products, especially raw products such as cement, fertilisers, iron, steel, electricity, aluminium, and hydrogen. However, it aims to expand to other products

in the future and may include manufactured components (European Commission 2023).

In terms of renewable energy manufacturing, CBAM could pose a risk to the export of locally produced renewable energy components should these be included under CBAM in future.

At the same time CBAM could act as a driver for more clean energy solutions at both large and small scale renewable energy projects for companies wanting to export to the EU which in turn could be beneficial for the local renewable energy industry.

On August 16, 2022, the USA passed the IRA. Despite its name, the primary aim of the IRA is to catalyse investments in domestic manufacturing capacity within the USA, diversify the sourcing of critical supplies from partner countries, and revitalise research, development, and commercialisation of clean technology. Notably, the legislation also designates direct funding toward environmental justice priorities (McKinsey & Company, 2022).

In the long-term, the IRA aims to revitalise the manufacturing sector in the USA, with the ultimate goal of turning the USA into a net exporter of products, potentially posing competition for South African exporters. However, the IRA also seeks to diversify the USA's imports, creating an opportunity for the USA's trading partners. The extent to which South Africa may be regarded as a beneficial partner for access to the USA as an export market under the IRA in future remains to be seen.



REFERENCES

African Union 2023. Agreement Establishing the African Continental Free Trade Area. African Union. Available from <<https://au.int/en/treaties/agreement-establishing-african-continental-free-trade-area>> [Accessed 15 January 2024].

AmaranthCX 2023. Over 1GW of mining embedded PV power on its way. AmaranthCX. Accessed from <<https://www.amarantxcx.co.za/post/over-1gw-of-mining-embedded-pv-power-on-its-way>> [Accessed 28 September 2023]

Auditor-General 2022. Consolidated General Report on Local Government Audit Outcomes [PDF]. MFMA 2021-22. Available from <<https://www.agsa.co.za/Reporting/MFMAReports/MFMA2021-2022.asp>> [Accessed date needed]

City of Cape Town (CCT) 2023. Independent power producers. City of Cape Town. Available from <<https://www.capetown.gov.za/Work%20and%20business/Greener-business/Cape-Towns-green-future/independent-power-producers>> [Accessed 10 January 2024]

Colthorpe, Andy 2022. South Africa's Eskom confirms contract awards for 1440MWh battery storage. Energy-Storage.News, 1 August 2022. Available from <<https://www.energy-storage.news/south-africas-eskom-confirms-contract-awards-for-1440mwh-battery-storage/>> [Accessed 2 August 2023]

Cremer, Terence 2023a. Energy Regulator approves two outstanding licences for new grid company. Engineering News, 18 September 2023. Available from <<https://www.engineeringnews.co.za/article/energy-regulator-approves-two-outstanding-licences-for-new-grid-company-2023-09-18>> [Accessed date needed]

Cremer, Terence 2023b. Two more risk mitigation hybrid projects take steps toward financial close. Engineering News, 31 August 2023. Available from <<https://www.engineeringnews.co.za/article/two-more-risk-mitigation-hybrid-projects-take-steps-toward-financial-close-2023-08-31>> [Accessed date needed]

Department of Mineral Resources and Energy (DMRE) 2020. Media Statement: Minister Gwede Mantashe gazettes amendments to Electricity Regulations on New Generation Capacity. 16 October 2020. Pretoria, South African Government. Available from <<https://www.gov.za/news/media-statements/minister-gwede-mantashe-gazettes-amendments-electricity-regulations-new>> [Accessed date needed]

Department of Mineral Resources and Energy (DMRE) 2021. Minister Gwede Mantashe: Media briefing announcing preferred bidders for Risk Mitigation IPP Procurement Programme. 18 March 2021. Pretoria, South African Government. Available from <<https://www.gov.za/news/speeches/minister-gwede-mantashe-media-briefing-announcing-preferred-bidders-risk-mitigation>> [Accessed 20 November 2023]

Department of Mineral Resources and Energy (DMRE) 2023a. Electricity Regulation Amendment Bill. 19 April 2023. Pretoria, South African Government. Available from <https://www.gov.za/sites/default/files/gcis_document/202308/b23-2023electricityregulation.pdf> [Accessed date needed]

Department of Mineral Resources and Energy (DMRE) 2023b. Mineral Resources and Energy on three new bid windows released under the Independent Power Producer Procurement Programme (IPPPP), calling for renewable energy, gas and battery energy storage technologies. 14 December 2023. Pretoria, South African Government. Available from <<https://www.gov.za/news/media-statements/mineral-resources-and-energy-three-new-bid-windows-released-under-independent>> [Accessed 9 January 2024]

Department of Mineral Resources and Energy (DMRE) 2024. Publication for comments: Integrated Resource Plan, 2023. Government Gazette, 4238th ed. Pretoria, South African Government. 4 January 2024. Available from <[https://www.dmr.gov.za/Portals/0/Resources/Documents%20for%20Public%20Comments/IRP%202023%20\[INTEGRATED%20RESOURCE%20PLAN\]/Publication%20for%20comments%20Integrated%20Resource%20Plan%202023.pdf?ver=2024-01-05-134833-383](https://www.dmr.gov.za/Portals/0/Resources/Documents%20for%20Public%20Comments/IRP%202023%20[INTEGRATED%20RESOURCE%20PLAN]/Publication%20for%20comments%20Integrated%20Resource%20Plan%202023.pdf?ver=2024-01-05-134833-383)> [Accessed date needed]

Department of Public Works & Infrastructure (DPWI) 2021. Public Works and Infrastructure on Integrated Renewable Energy and Resource Efficiency Programme. 2 September 2021. Pretoria, South African Government. Available from <<https://www.gov.za/speeches/public-works-infrastructure-integrated-renewable-energy-and-resource-efficiency-programme-2>> [Accessed date needed]

Department of Trade and Industry and Competition (the dtic) 2023. Trade Agreements. Pretoria, South African Government. Available from <<https://www.thedtic.gov.za/sectors-and-services-2/1-4-2-trade-and-export/market-access/trade-agreements/>> [Accessed 15 January 2024].

Department of Trade and Industry (the dti) 2016. Broad-Based Black Economic Empowerment Regulations, 2016 Government Gazette, R.689 ed., Issue 40053. 6 June 2016. Pretoria, South African Government. Available from <https://www.gov.za/sites/default/files/gcis_document/201606/40053rg10610gon689.pdf> [Accessed date needed]

Eskom 2022. Integrated Report. Sandton, Eskom. Available from <https://www.eskom.co.za/wp-content/uploads/2022/12/2022_integrated_report.pdf> [Accessed date needed]

Eskom 2023a. Tariff history - Distribution. Sandton, Eskom. Available from <<https://www.eskom.co.za/distribution/tariffs-and-charges/tariff-history/>> [Accessed 28 September 2023]

Eskom 2023b. Transmission Development Plan 2023-2032 [Report]. Sandton, Eskom. Available from <<https://www.eskom.co.za/eskom-divisions/tx/transmission-development-plans/>> [Accessed date needed]

Eskom 2023c. Virtual Wheeling Platform. Sandton, Eskom. Available from <https://www.eskom.co.za/distribution/wp-content/uploads/2023/07/20230710_-9553-Virtual-Wheeling-Digital-Brochure-FINAL.pdf> [Accessed 29 September 2023]

Eskom 2023d. GCCA 2025. Sandton, Eskom. Retrieved January 9, 2024. Available from <<https://www.eskom.co.za/eskom-divisions/tx/gcca/gcca-2025/>> [Accessed 9 January 2024]

Eskom 2023e. Briefing session: Grid Access Unit Interim Grid Capacity Allocation Rules. [Online Briefing Session]. 27 June 2023. Sandton, Eskom.

Eskom 2023f. Generation Connection Capacity Assessment (GCCA) 2025. Sandton, Eskom. Available from <https://www.eskom.co.za/wp-content/uploads/2023/10/Generation_Connection_Capacity_AssessmentGCCA-2025final_rev0003.pdf> [Accessed date needed]

Eskom 2023g. Battery Energy Storage System - Distribution. Sandton, Eskom. Available from <<https://www.eskom.co.za/distribution/battery-energy-storage-system/>> [Accessed 26 September 2023]

Eskom Se Push (ESP). 2023. Loadshedding statistics. <<https://esp.info/>> [Accessed date needed]

EUR-Lex 2018. Trade, Development and Cooperation Agreement (TDCA) with South Africa. EUR-Lex. 8 October 2018. Available from <<https://eur-lex.europa.eu/EN/legal-content/summary/trade-development-and-cooperation-agreement-tdca-with-south-africa.html>> [Accessed 15 January 2024].

European Commission 2022. Joint Statement: South Africa Just Energy Transition Investment Plan. 7 November 2022. Brussels and Luxembourg, European Commission. Available from <https://ec.europa.eu/commission/presscorner/detail/en/statement_22_6664> [Accessed 16 January 2024]

European Commission 2023. Carbon Border Adjustment Mechanism. Brussels and Luxembourg, European Commission. Available from <https://taxation-customs.ec.europa.eu/carbon-border-adjustment-mechanism_en> [Accessed 16 January 2024]

International Monetary Fund (IMF) 2023. South Africa Carbon Pricing And Climate Mitigation Policy. IMF eLibrary. 6 June 2023. Available from <<https://www.elibrary.imf.org/view/journals/002/2023/195/article-A003-en.xml>> [Accessed 27 September 2023]

International Energy Agency (IEA) 2021. Utility-scale PV investment cost structure by component and by commodity breakdown. 24 November 2021. Available from <<https://www.iea.org/data-and-statistics/charts/utility-scale-pv-investment-cost-structure-by-component-and-by-commodity-breakdown>> [Accessed 11 January 2024].

International Renewable Energy Agency (IRENA) 2012. Renewable Energy Technologies: Cost Analysis Series (Vol. 1, Issue 5/5). June 2012. Abu Dhabi, IRENA. Available from <https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2012/RE_Technologies_Cost_Analysis-WIND_POWER.pdf> [Accessed date needed]

International Trade Administration 2023. South Africa - Trade Agreements. 6 May 2023. Washington, International Trade Administration. Available from <<https://www.trade.gov/country-commercial-guides/south-africa-trade-agreements>> [Accessed 15 January 2024].

Independent Power Producer Office (IPPO) 2022. Independent Power Procurement Programme (IPPPP) - An Overview. 31 December 2022. Pretoria, South African Government. <<https://www.ipp-projects.co.za/Publications>> [Accessed date needed]

Independent Power Producer Office (IPPOa) 2023. Risk Mitigation IPP Procurement Programme. IPP Risk Mitigation. Pretoria, South African Government. Available from <<https://www.ipp-projects.co.za/Home/PressCentre>> [Accessed 27 September 2023]

Independent Power Producer Office (IPPOb) 2023a. Independent Power Producer Procurement Programme. IPP Renewables. Pretoria, South African Government. Available from <<https://www.ipp-renewables.co.za/>> [Accessed 21 September 2023]

JSE 2023. The JSE Sustainability Disclosure Guidance – Narrative Disclosures and Metrics. Sandton, Johannesburg Stock Exchange. Available from <https://www.jse.co.za/sites/default/files/media/documents/JSE%20Sustainability%20Recommended%20Disclosures%20and%20Metrics_FA_.pdf> [Accessed 21 September 2023]

Lazard 2023. Lazard's Levelized Cost of Energy Analysis (LCOE) [Presentation] [PDF]. April 2023. Bermuda and New York City, Lazard. Available from <<https://www.lazard.com/research-insights/levelized-cost-of-energy-plus/>> [Accessed 19 September 2023]

Localisation Support Fund 2023. Value chain mapping - Local manufacturing capability in the transmission & distribution sector. 27 September 2023. Sandton, Localisation Support Fund. Available from <<https://www.lsf-sa.co.za/post/value-chain-mapping-local-manufacturing-capability-in-the-transmission-distribution-sector>> [Accessed date needed.]

Luman, Rico 2021. 5 reasons global shipping costs will continue to rise. ING Think, 7 June 2021. Accessed from <<https://think.ing.com/articles/the-rise-and-rise-of-global-shipping-costs>> [Accessed 10 January 2024]

Mavuso, Busisiwe 2023. BLSA CEO slams DMRE for Electricity Regulation Act Amendment Bill delay. Green Building Africa, 21 August 2023. Available from <<https://www.greenbuildingafrica.co.za/blsa-ceo-slams-dmre-for-electricity-regulation-act-amendment-bill-delay/>> [Accessed 5 September 2023]

McKenzie, Baker 2023. Africa: COP 28 highlights. Lexology, 12 December 2023. Available from <<https://www.lexology.com/library/detail.aspx?g=8e0cc6c3-81d8-4399-b37a-8614a7b2efd1>> [Accessed 11 January 2024]

McKinsey & Company 2022. What's in the Inflation Reduction Act (IRA) of 2022. McKinsey, 24 October 2022. Available from <<https://www.mckinsey.com/industries/public-sector/our-insights/the-inflation-reduction-act-heres-whats-in-it>> [Accessed 26 September 2023]

Murray, Cameron 2023. South Africa's DMRE issues 513MW/2GWh battery storage RFP. Energy-Storage.News, 9 March 2023. Available from <<https://www.energy-storage.news/south-africa-dmre-issues-513mw-2gwh-battery-storage-rfp/>> [Accessed 1 December 2023]

National Development Plan (NDP) 2023. Energy Action Plan: One year progress report. August 2023. Pretoria, South African Government. Available from <https://www.stateofthenation.gov.za/assets/downloads/Update_on_energy_action_plan_AUG23.pdf> [Accessed date needed]

National Renewable Energy Laboratory (NREL) 2022. Utility-Scale Battery Storage | Electricity | 2022 | Annual Technology Baseline. Last updated 21 July 2022. Denver and Washington, DC: NREL. Available from <https://atb.nrel.gov/electricity/2022/utility-scale_battery_storage> [Accessed 5 December 2023]

National Renewable Energy Laboratory (NREL) 2023. Utility-Scale Battery Storage | Electricity | 2023. ATB | 15 July 2023. Denver and Washington, DC: NREL Available from <https://atb.nrel.gov/electricity/2023/utility-scale_battery_storage> [Accessed 18 October 2023]

National Treasury 2003. Local Government: Municipal Finance Management Act, 2003. Act no. 56. Pretoria, South African Government. Available from <https://www.gov.za/sites/default/files/gcis_document/201409/a56-03.pdf> [Accessed date needed]

National Treasury 2022. Media Statement: Preferential Procurement Regulation. 8 November 2022. Pretoria, South African Government. Available from <https://www.treasury.gov.za/comm_media/press/2022/2022110801%20Media%20Statement%20-%20PPP%20Regulations%202022.pdf> [Accessed date needed]

National Treasury 2023a. Draft Explanatory Memorandum on the Draft Taxation Laws Amendment Bill [Draft Explanatory Memorandum]. 31 July 2023. Pretoria, South African Government. Accessed from <<https://www.sars.gov.za/wp-content/uploads/Legal/Drafts/Legal-LPrep-Draft-2023-33a-Draft-Explanatory-Memorandum-on-the-Draft-Taxation-Laws-Amendment-Bill-2023-31-July-2023.pdf>> [Accessed date needed]

National Treasury 2023b. Fact Sheet: What does FATF Greylisting mean for a country? Pretoria, South African Government. Available from: <https://www.treasury.gov.za/comm_media/press/2023/2023022501%20FATF%20Grey%20Listing%20Fact%20Sheet.pdf> [Accessed date needed]

National Energy Crisis Committee (NECOM) 2023. NECOM's Top 5 Priorities. About NECOM. Available from <<https://www.stateofthenation.gov.za/takechargetsa/about-necom>> [Accessed 7 September 2023]

Odendaal, Natasha 2023. Vodacom, Eskom sign historic first virtual wheeling agreement. Engineering News, 30 August 2023. Available from <<https://www.engineeringnews.co.za/article/vodacom-eskom-sign-historic-first-virtual-wheeling-agreement-2023-08-30>> [Accessed 29 September 2023]

PriceWaterhouseCoopers (PWC) 2022. Future Skills Gap Analysis - Renewable Energy Sector. PriceWaterhouseCoopers. Available from <https://www.epw.qld.gov.au/__data/assets/pdf_file/0019/34057/queensland-energy-plan-future-skills-gap.pdf> [Accessed date needed]

Ryan, Ciaran. 2023. Metros in a race to get Eskom off their backs. The Citizen, 22 March 2023. Available from <<https://www.citizen.co.za/business/metros-in-a-race-to-get-eskom-off-their-backs/>> [Accessed 29 September 2023]

Sguazzin, Anthony and Naidoo, Prinesha 2023. South Africa Weighs Extending Lives of Larger Coal Power Plants. Bloomberg.com, 24 May 2023. Available from <<https://www.bloomberg.com/news/articles/2023-05-24/south-africa-weighs-extending-lives-of-larger-coal-power-plants#xj4y7vzkg>> [Accessed date needed]

South African Revenue Services (SARS) 2023

South African Photovoltaic Industry Association 2022. The Localisation Potential of the South African Solar PV Industry and Recommendations to Support Local Manufacturing in South Africa. Johannesburg, South African Photovoltaic Industry Association.

Statistics South Africa (StatsSA) 2023. Gross domestic product [Second quarter 2023]. Pretoria, Statistics South Africa. Available from <<https://www.statssa.gov.za/publications/P0441/P04412ndQuarter2023.pdf>> [Accessed 19 September 2023]

Trading Economics 2023. South Africa - Credit Rating. Available from <<https://tradingeconomics.com/south-africa/rating>> [Accessed 26 September 2023]

Transparency International 2022. Corruption Perceptions Index. Berlin, Transparency International. Available from <<https://www.transparency.org/en/cpi/2022/index/zaf>> [Accessed 26 September 2023]

United States Trade Representative (USTR) 2023. African Growth and Opportunity Act (AGOA) | United States Trade Representative. USTR. Available from <<https://ustr.gov/issue-areas/trade-development/preference-programs/african-growth-and-opportunity-act-agoa>> [Accessed 26 September 2023]





There's also one big change to our MIR structure

This year we've also updated our 2024 MIRs to create new hybrid reports. In order to make our printed reports shorter, and to keep up with policy changes, we've moved the sector overview and policy sections, which were traditional chapters in our MIRs, online. These sections will now be updated in real time and can be accessed by clicking on the button below. Our PDF reports and printed booklets have been shortened to focus more directly on the emerging opportunities in the sector. We hope these changes improve your reading experience.

**ACCESS ONLINE
CONTENT**

