Graduate School of BUSINESS
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South Africa Country Report – Update 2022

Report 6.1: Energy and Economic Growth Research Programme

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Power Futures Lab

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Frequently used acronyms and abbreviations

BBBEE	Broad-Based Black Economic Empowerment
COD	Commercial operation date
DA	Direct agreement
DFI	Development finance institution
DMRE	Department of Mineral Resources and Energy
ED	Economic development
EPC	Engineering, procurement, and construction
HFO	Heavy fuel oil
IA	Implementation agreement
IPP	Independent power producer
IPPO	Independent power producers' office
IPPPP	Independent Power Producer Procurement Programme
IRP	Integrated Resource Plan
kWh	Kilowatt hour
LNG	Liquified natural gas
LPG	Liquified petroleum gas
MIGA	Multilateral Investment Guarantee Agency
MW	Megawatt
NDC	Nationally Determined Contribution
NDP	National Development Plan
NERSA	National Electricity Regulator of South Africa
O&M	Operations and maintenance
PPA	Power purchase agreement
PPPFA	Preferential Procurement Policy Framework Act
PPP	Public private partnership
PV	Photovoltaic
REFiT	Renewable energy feed-in tariff
REI4P	Renewable Energy Independent Power Producers Procurement Programme
RfP	Request for proposals
SED	Socioeconomic development
SME	Small and medium enterprises
SONA	State of the Nation Address
SP-I4P	Small Projects Independent Power Producer Procurement Programme
SPV	Special purpose vehicle
SSA	Sub-Saharan Africa

1. Introduction

South Africa is undergoing a promising and potentially disruptive, but also highly contested, energy transition. The country's widely lauded Renewable Energy Independent Power Projects Procurement Programme (REI4P) seems to be gaining new-found momentum after a deeply damaging hiatus of more than 5 years, with new bid windows being launched and a pipeline of procurement opportunities being announced to deal with a worsening electricity supply crisis (Figure 1). These developments are taking place against the backdrop of a far-reaching power sector reform programme which will not only see the unbundling of Eskom into three state-owned entities covering generation, transmission and distribution, but is also opening up a multi-market model in which municipalities as well as commercial and industrial consumers can buy power directly from IPPs. This report is an update of a report published in 2019 (Filipova *et al.*, 2019) on the status of the REI4P, and as such will provide insights into the status and important changes in the programme, as well as reflect more broadly on the likely future direction of the sector and its implications for the auction programme.

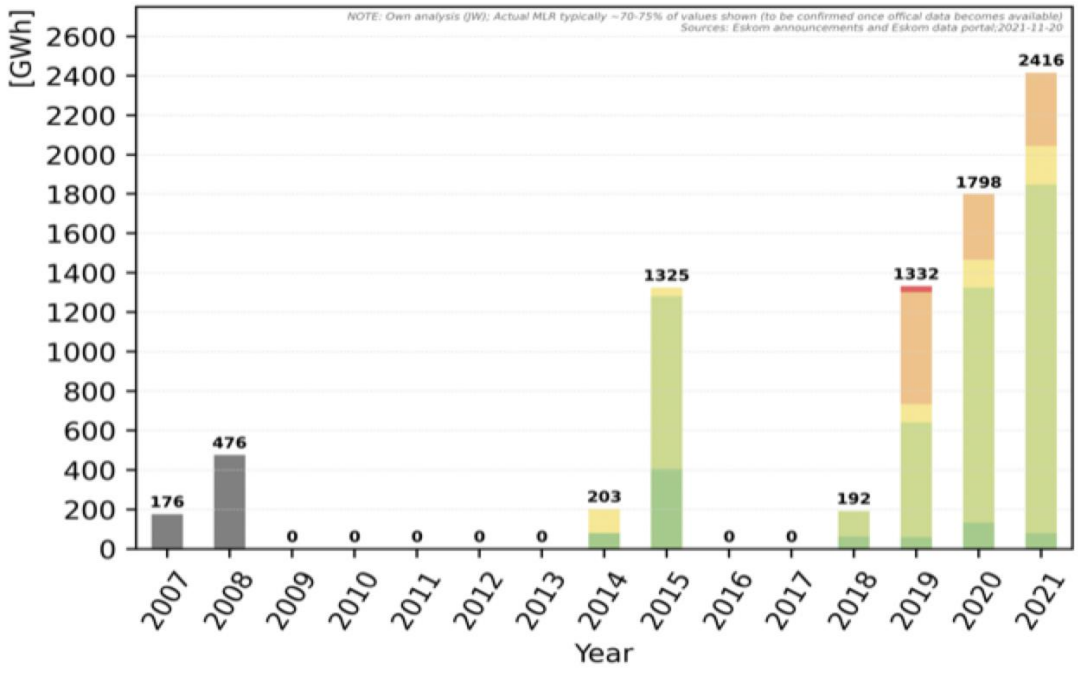

Figure 1: Annual loadshedding (2007 - 2021) (Source: CSIR)

The REI4P was established by the government of South Africa to contract renewable energy capacity from the private sector. Five REI4P bid windows (1, 2, 3, 3.5, and 4) were implemented between 2011 and 2015, awarding 6,300 MW capacity to almost 100 utility-scale renewable energy IPPs (IPP Office, 2022d). Two bid windows were released under the Small IPP procurement programme (SP-I4P), specifically meant to increase the successful participation of South African entities in the programme, resulting in 100 MW being awarded to twenty 5 MW renewable energy projects.

A remarkable outcome of the REI4P has been dramatic reductions in project prices: average prices declined from US$c 15.7/kWh in the first bid window in 2011 to US$c 6.7/kWh in the fourth bid window in 2015 (PFL, 2022). Project realisation rates remained high throughout the bid windows, despite delays in the finalisation of bid windows 3.5 and 4.

The bid window 3.5 and 4 projects awarded in 2015, as well as the SPI4P projects, faced an impasse due to Eskom's refusal to sign the awarded power purchase agreements (PPAs) and the Department of Mineral Resources and Energy (DMRE)'s seeming reluctance to continue the REI4P. By proving that renewable energy IPPs were cost-competitive and effective at rapidly deploying capital at scale, the auction programme undermined the ideas that supported the power-bases of incumbent interests – whether located around the utility or adjacent industrial or political configurations. This techno-economic disruption coincided with institutional disruptions as new entities were created or repurposed to design and implement the procurement programmes, causing a shift in institutional power dynamics that extended the threat posed by these auctions to the political-administrative spheres.

Reactions to the impacts of the auctions coalesced around trying to restrain the scope and scale of the transition. The auction results sparked a concerted and coordinated programme of resistance – including aggressive social media and PR campaigns, persistent lobbying, direct court challenges and protests - encompassing interests as wide-ranging as organised labour, the free market foundation, the coal mining industry, Eskom's board and management, various government departments and officials (most prominently the department of public enterprises – Eskom's direct shareholder, but also certain sections of the department of energy), the upper echelons of the ruling ANC and even the former president's office. This coincided with increasing instability at a leadership level in the electricity supply industry as ministers and Eskom's CEOs were replaced at an alarming rate.

Still, there are signs that REI4P started an inexorable transition for the country.

The REI4P BW3.5 and BW4 projects' PPAs were finally signed in October 2018 after Jeff Radebe was appointed Minister of Energy and the Eskom board and senior management was replaced by incoming president Cyril Ramaphosa. This allowed these projects to move towards financial close. Bizarrely, none of the SPI4P projects' PPAs have been signed, and this programme that was meant to address core objectives of the government seems to have been largely forgotten – even as the country faces a deepening electricity supply crisis.

South Africa's Integrated Resource Plan was finally approved by cabinet and gazetted in 2019, and although some coal and nuclear capacity was forced in through a "policy adjustment" process, it makes provision for large volumes of renewables, including 8.2GW solar PV and 17.7 GW of wind, raising the proportion of electricity produced by renewables to a third by 2030 (Department of Mineral Resources and Energy, 2019).

South Africa also procured power via a controversial 2,000 MW "technology-neutral" Risk Mitigation Independent Power Programme (RMI4P) initiated in August 2020 (IPP Office, 2022e).

The RMI4P was to serve as a direct response to the electricity supply shortage and limit the use of diesel-based peaking generators in the medium- to long-term (IPP Office, 2020b). There are some positives from the programme, such as the award of Africa's largest wholly renewable-based dispatchable hybrid power project featuring solar PV and battery technologies. However, the programme seemed ostensibly designed for gas-fired projects - in particular power ships – and apart from the abovementioned solar PV-battery project, none of the awarded bidders have been able to reach financial close, despite the "emergency" nature of the procurement programme.

Shortly after the procurement of projects under RMI4P, the bid documentation for bid window 5 of the REI4P was released, seeking bids for 1600 MW of wind and 1000 MW of solar PV capacity to be added to the national network before 2024. BW5 is the first of a series of bid windows to procure 11,813 MW from various energy sources over the next five to eight years, including solar PV, onshore wind, battery storage, gas and coal (Alao and Kruger, 2022).

Price results from bid window 5 have been the most competitive to date: 25 projects were awarded at average prices of ZARc 49.5/kWh (US$c 3,27/kWh with the lowest bid coming in at US$c 2.27/kWh[1]) for onshore wind and ZARc 42,9/kWh (US$c 2.83/kWh; lowest bid: US$c 2.47/kWh) for solar PV. There are however concerns about the viability of some of these prices, as equipment costs have increased since bid awards. Bid window 5 also sparked further concern about market concentration, as the 25 projects were awarded to 6 bidder consortia. Further evidence of greater concentration among BEE shareholders (with one shareholder present in 21 of the 25 projects) and reduced margins is prompting concerns about the ability of the programme to stimulate and maintain upstream socio-economic benefits.

There have also been several utility-scale renewable energy tenders launched by commercial and industrial entities (including mines) as well as municipalities largely due to the economic benefits of renewables (Mfobo, 2019; Bellini, 2020; Kew, 2020). This trend accelerated in June 2021, when the government raised the generation license exemption threshold for new embedded generation projects from 1 MW to 100 MW and revised the regulations to permit municipalities to procure power independently (Alao and Kruger, 2022). These measures were widely welcomed by the industry, unlocking a pipeline of over 80 IPPs, totalling more than 6,000 MW (South African Government, 2022).

Bid window 6 of the REI4P for 1,000 MW solar and 1,600 MW wind capacity was opened in April 2022. The persistent and steadily worsening loadshedding crisis in the country prompted President Ramaphosa to declare that bid window 6 capacity will be doubled from the planned 2,600 MW to 5,200 MW[2] (South African Government, 2022). To ensure compliance with this national procurement order, the DMRE has postponed the bid submission date for bid window 6 from 11 Aug 2022 to 22 September 2022 – and later again to 3 October 2022 (DMRE, 2022). The President also announced the complete removal of the generation license exemption threshold for embedded generation and the introduction of a REFiT scheme for grid-connected commercial and residential

[1] Exchange rate as at the time of award: ZAR 1 = US$ 0.066

[2] This was later reduced to 4200 MW to align with the available capacity of the current ministerial determination.

(C&I) installations to incentivise greater uptake of rooftop solar (South African Government, 2022).

The challenge now is to ensure that these measures are implemented with greater urgency to address the energy crisis. It is also important to ensure that South Africa's transition from a coal-dominated power system to one built on low-cost renewables is just – meaning at a minimum that the impacts on workers and communities currently dependent on the coal industry are mitigated through a range of measures, including reskilling and building of renewable infrastructure in coal areas (Cruywagen, Swilling and Davies, 2019; Bloom, 2020). The next challenge will be to identify and integrate transition measures into the procurement programme's design, also being careful to recognize the limitations of a procurement programme to carry and drive macro-level policy agendas in isolation. The country furthermore needs to come to terms with the realities of managing such a transition in the midst of a power sector reform process and energy crisis, with important decisions around the role and home of procurement in future energy markets still not having been made.

This report details the major design changes and implementation structures of the RMI4P and REI4P bid windows 5 and 6 compared to earlier procurement rounds. It describes their outcomes, status and underlying reasons for these. It furthermore outlines lessons from the overall process and recommendations for future procurement programmes. Important reforms for attracting private power investments are also highlighted.

The rest of the report is structured as follows: Section 2 provides an overview of South Africa's power sector; section 3 details the designs of the RMI4P and latest REI4P bid windows; section 4 discusses the core auction implementation factors and challenges; section 5 outlines notable outcomes, while section 6 analyses risks and opportunities in the current environment. The report concludes with lessons for other countries planning to embark on similar procurement programmes (section 7).

2. South Africa's power sector

2.1. Overview

With a nominal Gross Domestic Product (GDP) of US$ 420 billion in 2021, South Africa is the second largest economy in Africa and is considered an upper-middle income country (World Bank Group, 2021). GDP growth was negative since 2019 but returned to positive (albeit low) levels in 2021 following global economic recovery after the COVID-19 pandemic (Figure 2) (World Bank Group, 2021). Official unemployment reached 32.6% in the first quarter of 2021, one of the highest levels in the world (StatsSA, 2021).

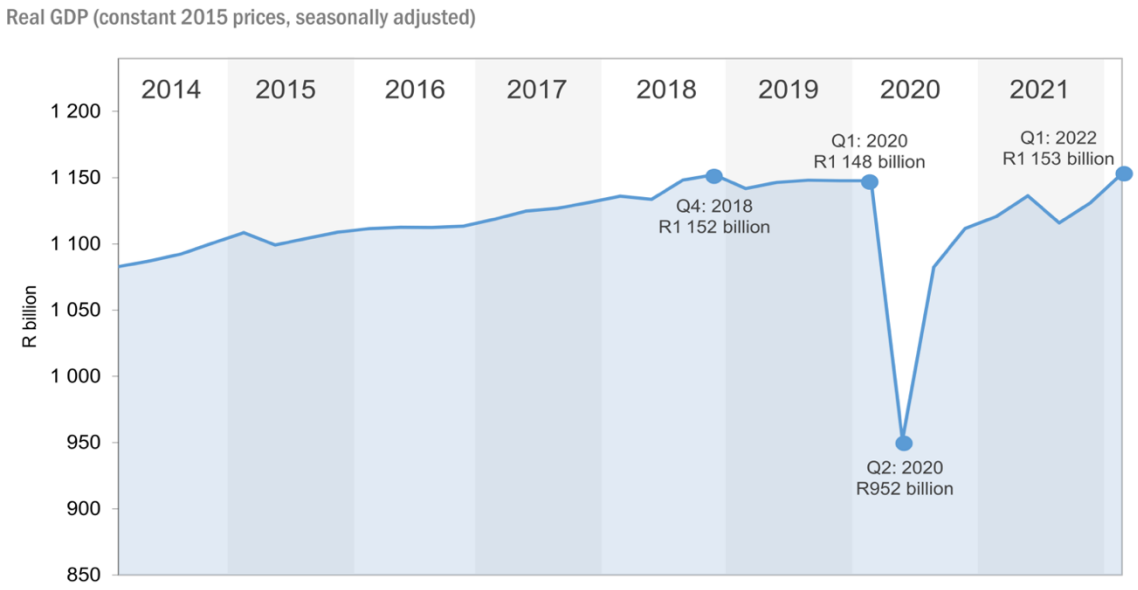

Figure 2: COVID's impact on South Africa's GDP (Source: StatsSA, 2022)

Economic growth has been constrained by Eskom's worsening electricity supply problems, as well as the financial burden to the fiscus represented by the utility's outstanding debt. In 2021, for example, Eskom's total revenue was only able to cover 30% of its outstanding debt principal and interest payments (Table 1). Eskom (and its shareholder, the state) is therefore unable to invest in new generation capacity, despite the urgent need for more power. This situation is all the more urgent considering the fact that 11 GW of Eskom's existing coal fleet is scheduled for decommissioning by 2030. It is therefore crucial that private power investment is accelerated through a variety of means and avenues.

Table 1: Eskom's dire financial situation (Source: Eskom, 2022)

Financial indicator	2021		2020 [1]
Revenue, R million	**204 326**	●	199 468
EBITDA, R million	**32 813**	■	36 816
EBITDA margin, %	**16.06**	■	18.46
Operating profit (EBIT), R million	**5 797**	■	9 037
Net loss after tax, R million	**(18 934)**	●	(20 769)
Pre-tax nominal return on assets, %	**0.98**	■	1.56
Cash interest cover, ratio	**0.85**	■	0.94
Debt service cover, ratio	**0.30**	■	0.52
Gross debt/EBITDA, ratio	**13.96**	●	14.46
Debt/equity (including long-term provisions), ratio	**2.03**	●	2.45
Gearing, %	**67**	●	71
Free funds from operations (FFO) as % of gross debt	**9.53**	●	7.72

● Performance improved ■ Performance declined

To address Eskom's problems, the President's Eskom Sustainability Task Team formulated a restructuring proposal, some of which was taken forward by Department of Public Enterprises (DPE) in the Roadmap for Eskom in a Reformed Electricity Supply Industry (2019). The Roadmap outlined specific steps and timelines for restructuring Eskom, including the incremental process of separating Eskom into three state-owned subsidiaries: Generation, Transmission, and Distribution. The first step outlined by the document is the creation of a fully Eskom-owned transmission subsidiary, responsible for purchasing, system operation, and grid management. The Roadmap set timelines for the functional separation of a transmission subsidiary to be completed by March 2020, while the legal separation of the Generation, Transmission, and Distribution entities was to be completed by 2020/21 (Filipova and Wewege, 2019).

Eskom has completed a process of functional separation of its power transmission unit, but failed to meet the initial timeline for the legal separation of its businesses (Enerdata, 2021). An urgent priority is the establishment of the independent, state-owned transmission, system and market operator outside of Eskom Holdings. The President declared that this separation would be finalized before the end of 2022 (South African Government, 2022).

The emergence of distributed generation due to Eskom's inability to meet electricity demand and rising electricity tariffs is further disrupting and changing South Africa's electricity landscape. The regulatory reforms and policy decisions required to unlock this market were initially slow to develop and incomplete. However, the increasing severity of the power crisis has prompted the government to be more decisive in creating a conducive enabling environment for increased investment (Alao and Kruger, 2021).

In March 2020, the DMRE gazetted an amendment of Schedule 2 of the Electricity Regulation Act, exempting generation facilities, resellers and self-generators from the requirement to hold a generation license for facilities below 1 MW. It also removed the need for ministerial approval for deviation from the IRP 2019 (Alao and Kruger, 2021). In June 2021, the licensing threshold was raised from 1 MW to 100 MW (Alao and Kruger, 2022). In July 2022 the government declared that the threshold for these embedded generators have been entirely removed, but that projects must still register with NERSA and observe the technical requirements for grid connection and environmental legislation (South African Government, 2022). Energy-intensive industries such as mines, data centres, etc., are likely to be the early beneficiaries of these regulatory changes.

At the same time, a REFiT scheme for grid-connected C&I installations was reintroduced to incentivise greater uptake of rooftop solar (South African Government, 2022). While details on the actual design and implementation of this programme have not been released, its aim is to allow businesses to sell surplus electricity to the utility. While all of these measures are welcome and, some would argue, long overdue, it remains to be seen whether they will be implemented timeously and effectively.

2.2. Supply and Demand

The changes that have taken place in the electricity generation sector over the past decade have fundamentally changed the shape of the South African electricity system. Prior to 2011, the majority of generation capacity was located along the coal belt in the Mpumalanga province, with power generation facilities often built almost on top of the coal mines. Power would flow from Mpumalanga to the rest of the country via a massive transmission network – equal in size to that of the EU. A few exceptions were the Koeberg nuclear plant in the Western Cape, as well as a few "peaking" Open Cycle Gas Turbine (OCGT) and pumped storage plants scattered along the coast and parts of the interior. When one compares this to the 2022 picture (Figure 3), it is clear that the physical shape of the grid has been fundamentally altered, with large-scale distributed renewable energy projects located in the Northern, Western and Eastern Cape provinces where solar and wind resources are strongest. It is also not merely the variable nature or geographic location of these plants that is significant, but also the sheer number (Figure 3).

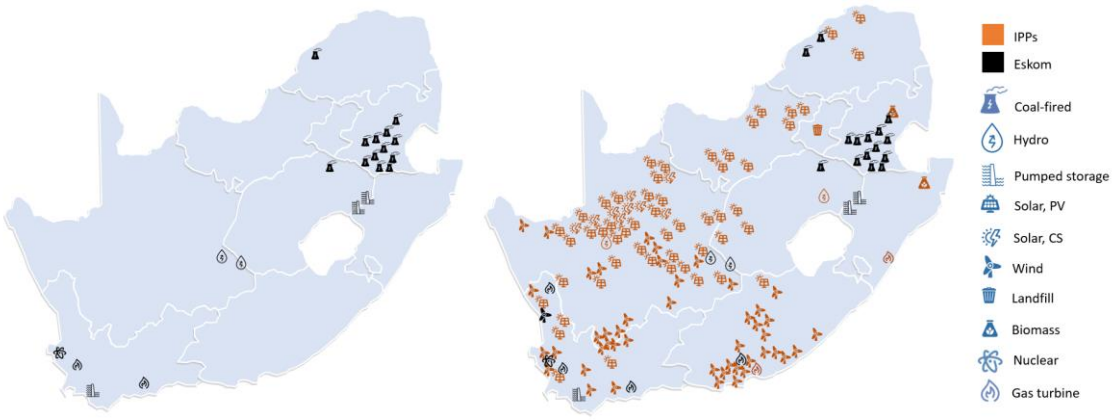

Figure 3: Geographic distribution of South Africa's utility-scale generation plants, 2011 vs. 2022 (Author's compilation)

As a result, while the load profile across the country is bound to remain broadly similar in the medium- to long-term, the generation profile will change substantially, with massive increases in particular in the South (Figure 4).

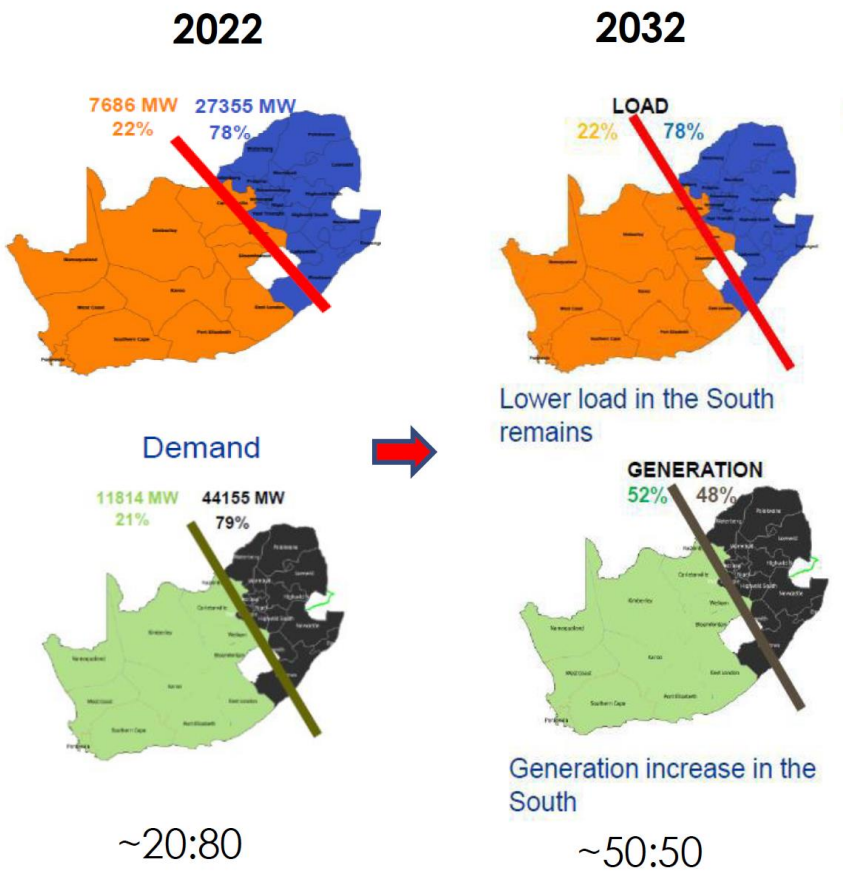

Figure 4: Changes in geographic demand and supply profiles (Source: Eskom TDP, 2021)

Key to enabling this transition is significant investment in new transmission infrastructure (Figure 5) that will allow for the evacuation of generation from the South to the rest of the country. Transmission constraints are already significantly impacting the rollout of the renewables programme (discussed in further detail below) and there are major concerns about timelines and investments required since Eskom's transmission section has still not been taken out as an independent entity able to raise capital at reasonable rates. While this has repeatedly been announced as a key priority, progress has been slow and multiple deadlines have been missed.

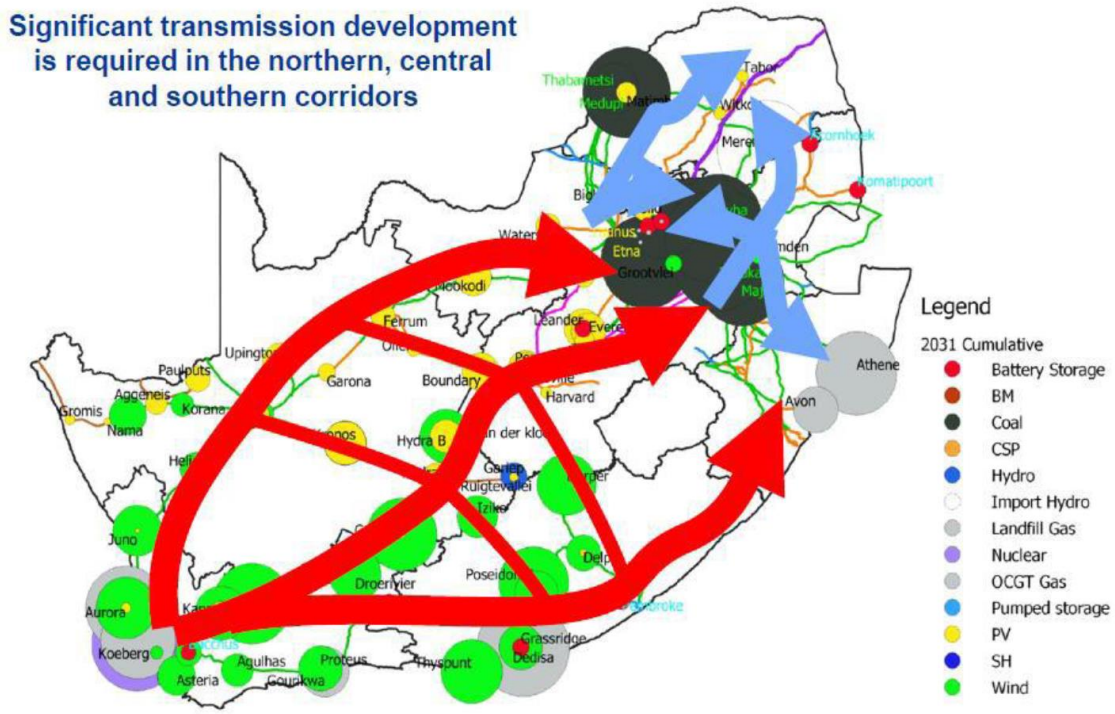

Figure 5: Transmission requirements up to 2031 (Source: Eskom TDP, 2021)

2.3. Electricity demand and planning

Over the past decade, South Africa's electricity sales have declined due to higher tariffs (causing a reduction in the energy intensity of the economy – figure 6) and a slowdown in economic growth, exacerbated recently by the Coronavirus pandemic (Eskom, 2021) (Figure 8). Consequently, in 2021 Eskom's electricity sales totalled 191,852 GWh, compared to around 224,446 GWh in 2011 (Eskom, 2011, 2021).

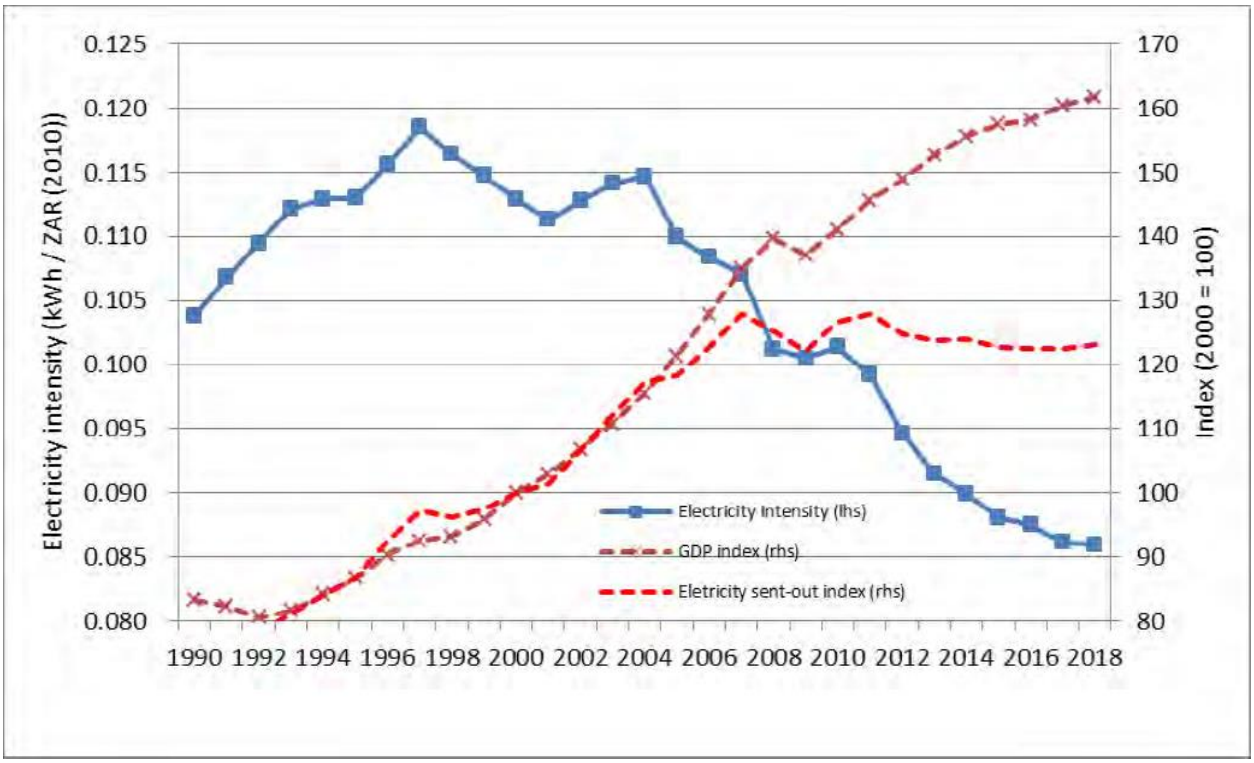

Figure 6: Electricity intensity history, 1990 - 2016 (Source: DMRE, 2019)

The major driver of the increase in tariffs has been the utility's disastrous new-build programme, with the Medupi and Kusile mega coal-fired projects being several times over-budget, way behind schedule and severely underperforming due to multiple design flaws. The resulting debt (table 1) has been a massive financial burden for the utility (and by implication, the state). Eskom has also been the locus of large-scale rent-seeking and corruption – increasing costs and reducing efficiency and performance. Eskom's tariff applications have also been consistently turned down by the regulator (NERSA) – despite several recent court rulings in Eskom's favour – further exacerbating the utility's precarious financial position. Added to this is the fact that municipal payments to Eskom have been declining, with municipal arrears growing by between R6 – 9 billion per annum (Figure 7). It is now feared that Eskom has entered a utility death spiral, with ever rising tariffs causing reduced sales as users reduce consumption, switch to alternative sources or go completely off-grid. Eskom's new management is committed to transforming the utility into an enabler of the energy transition, but it remains to be seen whether it is too little too late for the massive utility.

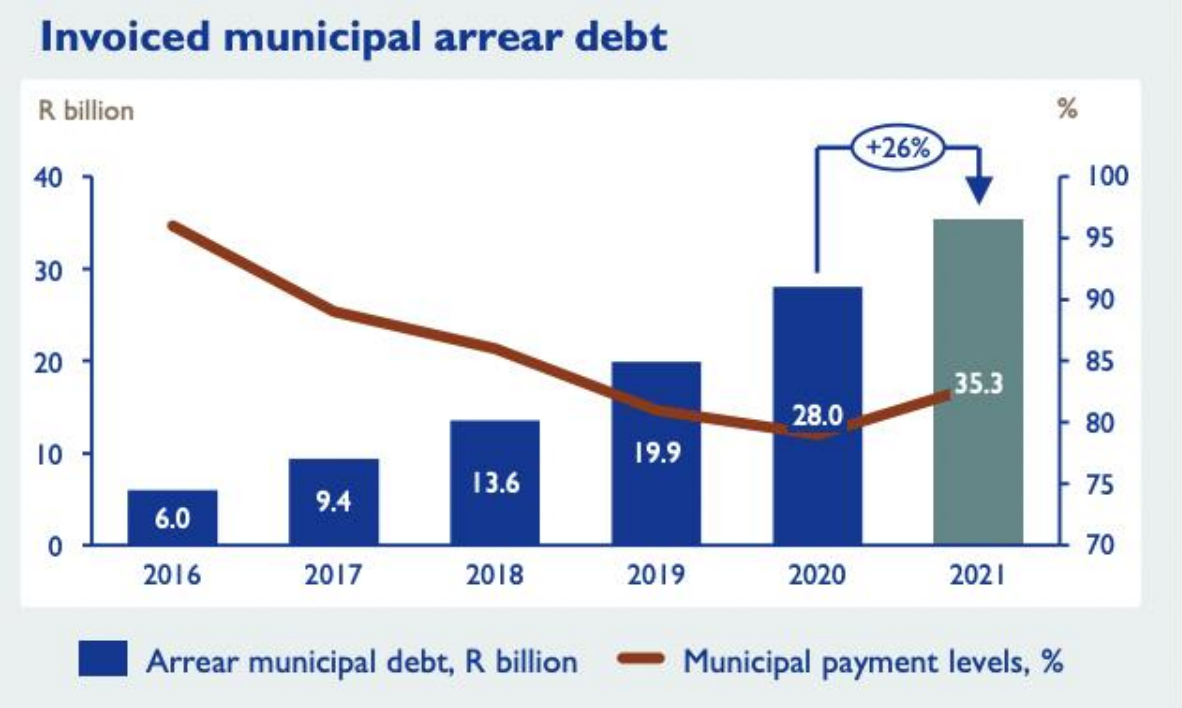

Figure 7: Municipal payment arrears, 2016 - 2021 (Source: Eskom, 2022)

As a result of this reduction in sales, electricity demand projections used in the Integrated Resource Plan (IRP) models have had to be adjusted. Nevertheless, the IRP requires massive new build of generation assets, in large part due to the decommissioning of old coal-fired power stations. The latest approved version of the IRP, the IRP 2019, makes provision for 20,400 MW of new renewable energy capacity by 2030, including 6,000 MW of solar PV, 14,400 MW of wind, and 2,088 MW of storage (Table 2).

Table 2: Emerging long-term plan – IRP 2019 (Source: DMRE, 2019)

	Coal	Coal (Decom.)	Nuclear	Hydro	Storage	PV	Wind	CSP	Gas & Diesel	Other (Distributed Generation, CoGen, Biomass, Landfill)
Current Base	37,149		1,860	2,100	2,912	1,474	1,980	300	3,830	499
2019	1,433	-2,373					244	300		Allocation to the extent of the short-term gap.
2020	711	-557				114	300			
2021	750	-1,403				300	818			
2022		-844				400 1,000	1,600			
2023		-555			513	1,000	1,600			500
2024			1860				1,600		1,000	500
2025						1,000	1,600			500
2026		-1,219					1,600			500
2027	750	-847					1,600		2,000	500
2028		-475				1,000	1,600			500
2029		-1,694			1,575	1,000	1,600			500
2030		-1,050		2,500		1,000	1,600			500
TOTAL INSTALLED CAPACITY by 2030 (MW)	33,364		1,860	4,600	5,000	8,288	17,742	600	6,380	
% Total Installed Capacity (% of MW)	43		2.36	5.84	6.35	10.52	22.53	0.76	8.1	
% Annual Energy Contribution (% of MWh)	58.8		4.5	8.4	1.2*	6.3	17.8	0.6	1.3	

Installed Capacity
Committed / Already Contracted Capacity
Capacity Decommissioned
New Additional Capacity
Extension of Koeberg Plant Design Life
Includes Distributed Generation Capacity for own use

- *2030 Coal Installed Capacity is less capacity decommissioned between years 2020 and 2030.*
- *Koeberg power station rated / installed capacity will revert to 1926MW (original design capacity) following design life extension work.*
- *Other / Distributed generation includes all generation facilities in circumstances in which the facility is operated solely to supply electricity to an end-use customer within the same property with the facility.*
- *Short term capacity gap is estimated at 2000MW.*

However, the IRP was out of date by the time it was published – primarily with regards to assumptions about Eskom's fleet performance (with actual performance much lower than assumed) and renewable energy input costs. Recent analysis indicates that implementing the IRP as is will not solve the country's energy supply crisis in the medium term (up to 2026) (Figure 8).

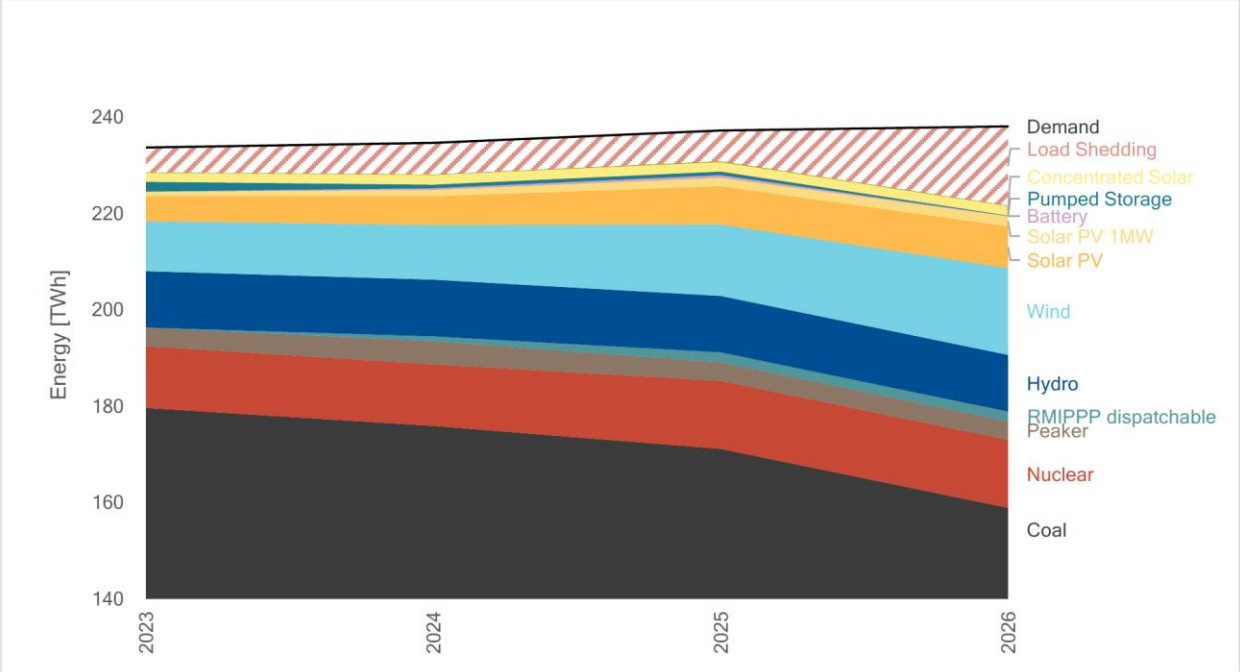

Figure 8: Supply gap evolution based on the IRP 2019, Ministerial Determination for the procurement of RMI4P and bid windows 5 and 6, and potential financial close issues for these tender (Source: Meridian Economics)

The following sections will analyse some of the reasons for this proposed shortfall, specifically with regards to the design, implementation and outcomes of the RMI4P and REI4P BW5 – as well as implications for BW6 and others going forward.

3. Power procurement programmes

The following section provides an introduction to the RMI4P, as well as REI4P BW5 and 6 – with a special emphasis on the determination of auction demand, the approach to project site selection, the use of qualification and compliance criteria, changes to the bidder ranking and winner selection criteria, and measures meant to secure the projects' revenue stream.

3.1. The Risk Mitigation Independent Power Programme

The RMI4P is a "technology-neutral" competitive tender launched by the DMRE in 2020. It aimed to contract 2,000 MW "dispatchable power" to mitigate short-term electricity supply gaps identified in the 2019 IRP, ease supply constraints, and minimize the considerable use of diesel-based peaking generators. The programme was technology agnostic but required bidding IPPs to provide firm power between 5h00 and 21h30. The tender provided the opportunity for bidders to bid in a portfolio manner. The emergency nature of the RMI4P meant that only near-ready projects that could come online within two years of the tender launch were encouraged to bid (IPP Office, 2022e).

As with previous procurement programmes, the RMI4P was designed as a single-stage bidding process with no separate prequalification stage (IPP Office, 2022e). The tender resulted in the award of 11 projects to six different developers, including eight projects that comprised renewable energy technologies (Alao and Kruger, 2022). However, most of the contracted capacity (1,220 MW) was awarded to three gas-fired power ships. At the time of award, the DMRE envisioned financial close for all the RMI4P projects in 2021 and commercial operations by 2022 (IPP Office, 2022e). Only a portfolio of three renewable energy facilities, comprising solar PV and battery storage, has closed and begun construction so far (Scatec Solar, 2022). The outcomes and reasons for these delays will be discussed in greater detail in section 5.

3.2. The Renewable Energy Independent Power Producer Procurement Programme

The Renewable Energy Independent Power Producer Procurement Programme (REI4P) can be considered the most successful competitive procurement programme in SSA based on the number of projects developed and quantum of mobilised capital, despite some shortcomings (Alao and Kruger, 2022). As such, the programme has largely retained its original design approach and parameters, despite large-scale changes in the industry, the investment context and the programme in general. It is perhaps regrettable that the hiatus in the roll-out of the programme was not used to fundamentally rethink and redesign the programme, based on these new conditions. Still, given the programme's historic success, industry's growing comfort with its design and the fact that the IPP office did not have a clear mandate to change the programme, it is perhaps understandable that the REI4P looks largely the same in 2022 as it did in 2011.

In line with earlier REI4P bid windows, bid windows 5 and 6 were designed as a single-round bidding process with no prequalification round (IPP Office, 2022e). Bid window 5 for 1,000 MW solar and 1,600 MW wind capacity led to the selection of 25 IPPs as preferred bidders from 102 proposals. Record-breaking renewable energy prices were realized in the programme.

3.3. Auction demand

South Africa's state-controlled electricity expansion planning regime is highly contested since the outcomes of the IRP determines "winners and losers" in the market. While the long-term planning framework has been useful in providing some level of certainty to the market, its overly prescriptive nature has limited the ability of the market to respond to demand in a flexible and timely manner. The contestation around the outcomes of the plan has meant that the country has had to wait more than 8 years for an approved updated version – a timeframe completely out of touch with a rapidly changing power sector and deepening energy crisis. It has also meant that the IRP has been subject to opaque "policy adjustment" processes that undermine the least-cost principles meant to underpin the plan.

Similar to the IRP 2010, the IRP 2019 prescribes a varied energy mix to meet the country's electricity demand through 2030 and specifically notes that 39,696 MW will be added to the national grid between 2019 and 2030. This capacity comprises 8,208 MW (20.7%) that has already been committed or procured under IRP 2010 for grid connection between 2019 and 2022 and 31,488 MW (79.3%) that has to be added between 2019 and 2030 (IPP Office, 2022a). Recent analysis by Eskom and the CSIR notes that much more capacity is needed by 2030 – in the region of 50 – 60 GW.

According to Section 34 of the Electricity Regulation Act No.4 of 2006, the Minister of the DMRE, in consultation with the National Energy Regulator (NERSA), determines new generation capacity requirements to give effect to the procurement process and implementation of the pertinent capacity allocations of the IRP. The determination also defines who will establish the new generation capacity: Eskom, another governmental entity, or an IPP (IPP Office, 2022a). This process effectively concentrates a great deal of power in the minister of energy which has come to haunt the country due to long delays in new determinations.

Prior to the promulgation of the IRP 2019, ministerial determinations taken in accordance with the IRP 2010 guided the procurement of electrical energy from IPPs, as shown in table 3. However, uncontracted capacity prior to the publication of the IRP 2019 has been deemed expired. New ministerial determinations, with NERSA's concurrence, now gives effect to the capacity allotments prescribed in the IRP 2019. A total of 13,813 MW has been determined, representing 43.9% of the overall 31,488 MW target for new additional capacity required by 2030 as specified in the IRP 2019 (IPP Office, 2022a).

The first determination, promulgated in May 2020, called for the procurement of 2,000 MW from diverse technologies to address the short-term supply deficit (IPP Office, 2022e). This capacity was procured through the RMI4P in August 2020 (IPP Office, 2022e). A second determination, promulgated in September 2020, allowed for the procurement of 13,813 MW from the following technologies for the short and medium term: 6,800 MW from solar PV and wind; 513 MW from storage; 3,000 MW from gas; and 1,500 MW from coal (Alao and Kruger, 2022).

Bid windows 5 and 6 floated in April 2021 and April 2022 for 2,600 MW wind and solar capacity, respectively, correspond to a series of procurement rounds that will be used to contract the capacity allocated in the second Ministerial determination under IRP 2019. The capacity allocation for bid window 6 was doubled from 2,600 MW to 5,200 MW in July 2022 (South African Government, 2022). The new capacity to be procured in this round, together with that already contracted in bid window 5, surpasses the 6,800 MW capacity allocation for this recent Ministerial determination.

A new determination therefore needs to be made, with NERSA's concurrence – an unnecessarily convoluted administrative process, especially considering the country's emergency power supply context.

Table 3: Ministerial determinations on renewable energy technologies

New renewable energy generation capacity allocations (MW)								
Technology	**First det. (Aug 2011) - IRP 2010**	**Second det. (Oct 2012) - IRP 2010**	**Third det. (Aug 2015) - IRP 2010**	**Fourth det. (May 2016) - IRP 2010**	**First det. (May 2020) - IRP 2019**	**Second det. (Sep 2020) - IRP 2019**	**Total**	**Share of Total %**
Wind	1,850	1,470	3,040	N/A	N/A	4,200*	10,560	44%
CSP	200	400	600	N/A	N/A	N/A	1,200	5%
Solar PV	1,450	1,075	2,200	1,500*	N/A	2,600*	8,825	37%
Biomass	13	48	150	N/A	N/A	N/A	210	1%
Biogas	13	48	50	N/A	N/A	N/A	110	0%
Landfill gas	25	0	0	N/A	N/A	N/A	25	0%
Hydro	75	60	60	N/A	N/A	N/A	195	1%
SP-I4P	100	100	200	N/A	N/A	N/A	400	2%
Neutral	N/A	N/A	N/A	N/A	2,000	N/A	2,000	8%
Storage	N/A	N/A	N/A	N/A	N/A	513	513	2%
Total	*3,725*	*3,200*	*6,300*	*1,500*	*2,000*	*7,313*	*24,038*	*100%*

**The 6,800 MW total capacity is to be split between wind and solar PV. Notional values have been assigned for each technology based on an extrapolation from the allocations in bid windows 5 and 6.*

***The Ministerial Determination makes an allocation for solar PV technology, but it also states that the generation capacity may be generated from any solar technology, including CSP and storage solutions, despite the fact that such technologies were not stipulated in the IRP (2010-2030) (DoE, 2016c).*

Wind refers to onshore wind. Hydro refers to small hydro.

Source: (Filipova and Wewege, 2019; IPP Office, 2022a)

3.4. Site selection

South Africa's procurement programmes are largely geography-agnostic, with project developers/bidders needing to find, secure and prepare project sites prior to bidding. While perhaps not unique in the broader international context, this makes South Africa an outlier in sub-Saharan Africa, where the majority of renewable energy auctions incorporate some form of government involvement in the site selection and preparation process (Kruger, Stritzke and Trotter, 2019). The country's history with REI4P has shown that the private sector is more than capable of fulfilling this role.

Nevertheless, site selection is becoming an increasingly important component of fulfilling the country's renewable energy ambitions and represents a growing risk to investors. This is largely due to constraints in the transmission and distribution network, with grid capacity in some of the country's richest renewables locations being completely saturated. There are also compelling reasons to incentivise or direct renewable energy projects to specific regions due to a grid stabilisation and socio-economic impact considerations. It was initially thought that the promulgated Renewable Energy Development Zones (REDZ) would fulfil this role, but it seems that apart from lighter environmental impact assessment requirements, these have not been incorporated into the procurement programme in a meaningful way. The failure to explicitly

incorporate location incentives in bid evaluation criteria is a missed opportunity that will need to be addressed in the coming iterations of the programme (Swilling *et al.*, 2021).

In addition, there are important coordination challenges and capacity constraints with regards to securing grid access (incl. costing) (Figure 9) – an issue that has been exacerbated by the explosion of distributed generation projects wanting to connect to the grid outside of the REI4P process as well. While Eskom has indicated that they are working on addressing capacity constraints in the Grid Access Unit, the current reality is that this remains a key bottleneck facing not only the procurement programme but the rollout of any new generation capacity in the country in general.

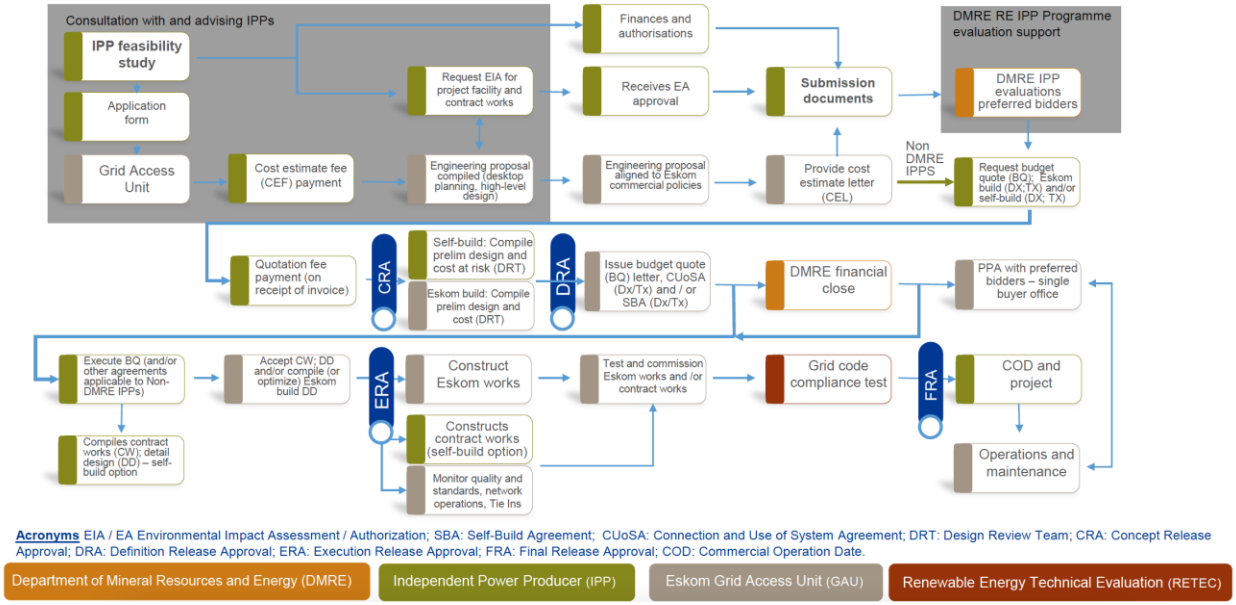

Figure 9: Grid coordination stakeholders and process (Source: Eskom, 2022)

3.4.1. RMI4P

Under the RMI4P, site-related qualification criteria were targeted at facilitating projects where grid capacity was available and connection could take place within the envisaged procurement timelines. Given the "emergency" impetus of the programme, any project requiring extensive grid connection works or grid strengthening would not be able to meet the envisaged timelines (IPP Office, 2020b).

Site selection could very well be seen as the Achille's heel of the RMI4P: awarded projects – specifically those of Karpowership, which was awarded the majority of capacity – have been delayed due to their failure to secure environmental permits as well as authorisations from the national ports authorities. Twice now the Department of Forestry, Fisheries and the Environment have denied the company environmental permits citing flawed and incomplete environmental impact assessments. The company also faces further investigation after an emergency

environmental authorisation, which would allow it to bypass all EIA assessment requirements, was granted but shortly after withdrawn (amaBhungane team, 2021).

Most projects awarded under the RMI4P plan to make use of LNG – often in combination with other sources of power, such as renewables. A key issue in this regard is the use of national ports infrastructure, since new tenders would be required before Transnet, which owns and operates South Africa's ports, can approve this use. This opens up the procurement process to further legal challenge and additional delays (Cronje, 2021).

At this point, it seems increasingly unlikely that any of the LNG-based RMI4P bids will be able to secure the required authorisations and reach financial close within the short- to medium-term.

3.4.2. BW5

Bid window 5 followed a similar approach to site selection as previous windows (BW 1-4). A key issue though was grid capacity. Grid constraints were not explicitly elucidated in the RFP, and Eskom only provided a Grid Connection Capacity Assessment (GCCA) after the bid window had been opened. As a result, several projects that were thought to be eligible to bid suddenly found themselves disqualified. This is largely due to the fact that the majority of prepared projects are in the country's Cape region, where renewable energy resources are plentiful and population densities relatively low (especially in the sparsely populated Northern Cape province) (Figure 10).

As a result, prices awarded in BW5 were higher than they would have been had there been sufficient grid capacity in these high-resource areas. This is all the more remarkable considering the record-breaking prices of the awarded projects. For instance, despite the Northern Cape's abundant solar resource, only two of the awarded solar PV projects would be built in the province, as other competitive offers were overlooked due to network restrictions (Alao and Kruger, 2022).

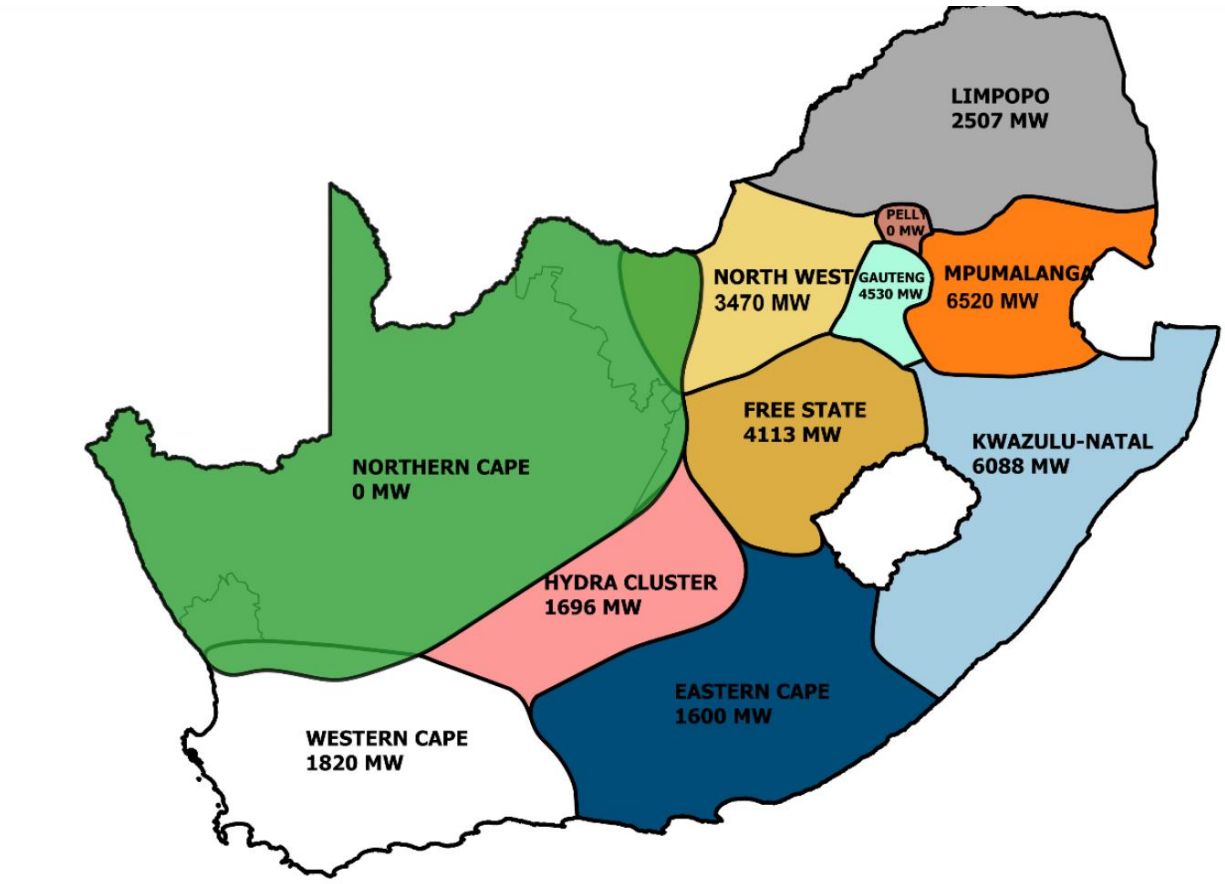

Figure 10: Eskom's 2021 GCCA shows limited available grid capacity in the Cape region (Source: Eskom, 2021)

3.4.3. BW6

The outcome of bid window 5 elicited a more timely and proactive grid capacity assessment. Unlike in bid window 5, Eskom published the Generation Connection Capacity Assessment of the 2024 Transmission Network (GCCA - 2024) before bid window 6 opened, providing more certainty to the market (IPP Office, 2022d). Given the long construction timelines for new transmission lines (8 – 10 years), the lack of sufficient capital for grid strengthening and expansion, the limited capability and capacity in the EPC sector, the onerous environmental impact and other permitting requirements, the difficulties in acquiring the land required for transmission corridors, community interference and encroachment of servitudes, Eskom therefore recommended that bidders consider project sites in the Eastern region of the country (Figure 11). This will likely result in projects with slightly poorer resource profiles being selected, and less competition in general in the bidding round, which will exert some upward price pressure (alongside other cost drivers).

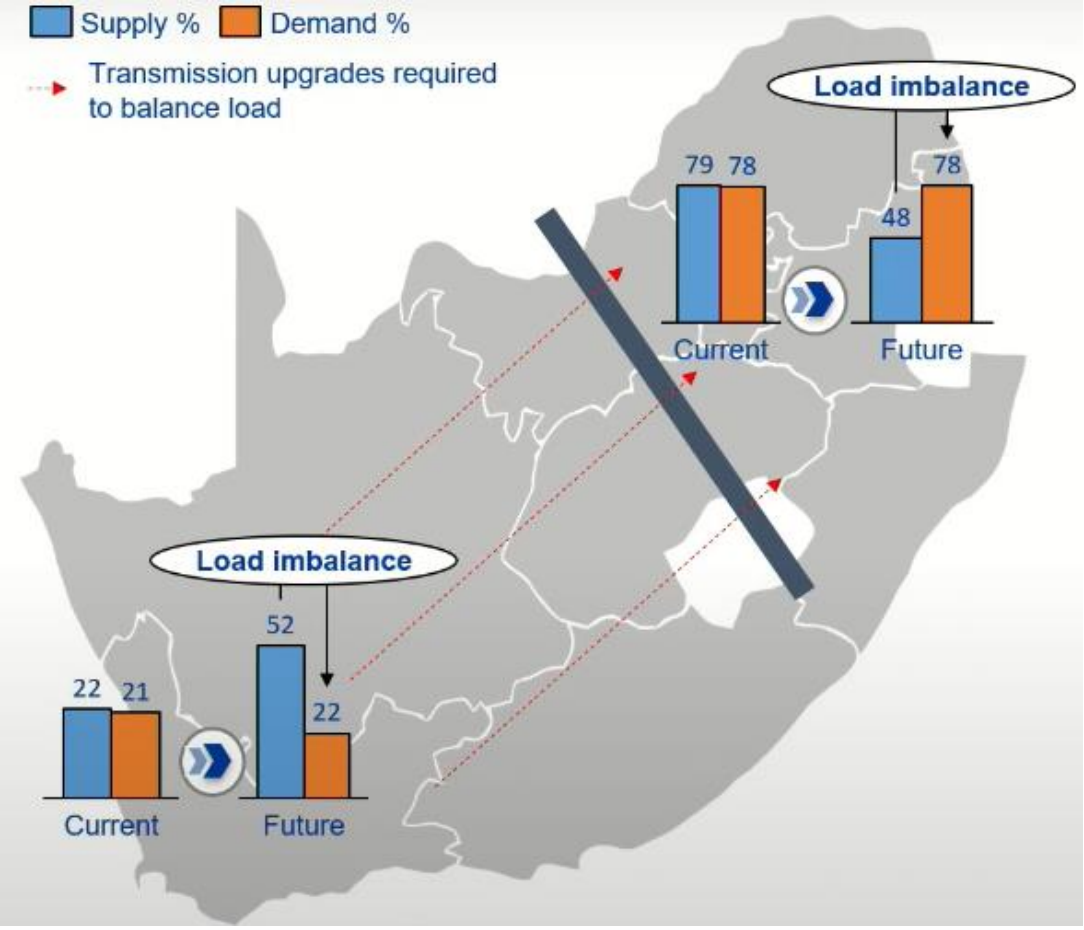

Figure 11: The need for transmission upgrades and expansion to address the geographic load imbalance (IPP Office, 2022d)

3.5. Qualification and compliance requirements

The functional and qualification requirements of RMI4P and REI4P bid windows 5 and 6 remained rigorous to ensure that – theoretically at least - only highly motivated and capable bidders that could execute their projects timeously were selected (Table 4). RMI4P and REI4P bid windows 5 and 6 were designed with no separate prequalification round, as with earlier REI4Ps (IPP Office, 2022e). The selection process began with an initial pass/fail evaluation of certain functional and qualification requirements. Compliant bids[3] were thereafter assessed on a competitive and comparative basis, with Preferred Bidder status awarded to the highest ranked projects within the capacity allocation.

28 bids representing 5117 MW were submitted for RMI4P, while 102 responses representing close to 10 GW were submitted in BW5. Competition therefore remains fierce across the programme

[3] A complete Bid Response that meets or exceeds the requirements in respect of every applicable Qualification Criterion.

and it appears that there is a substantial pipeline of bid-ready projects scattered across the country that could meet the considerable energy investment needs.

Table 4: Functional and qualification requirements

Evaluation Criteria	RMI4P	BW 5	BW 6
Structure of the Project	✓	✓	✓
Legal Criteria & Evaluation	✓	✓	✓
Land (Acquisition & Use rights)	✓	✓	✓
Environmental Criteria & Evaluation	✓	✓	✓
Technical Criteria & Evaluation	✓	✓	✓
Economic Development Criteria	✓	✓	✓
Financial Criteria & Evaluation	✓	✓	✓
Value for Money	✓	✓	✓

Source: (IPP Office, 2020a, 2021a, 2022c)

3.5.1. Timelines

Table 5 presents the timelines for the RMI4P and REI4P bid windows 5 and 6. Unlike the REI4P rounds, the timelines for the RMI4P were meant to be shorter to address the energy shortages in the country. The RMI4P permitted a phased grid connection approach, encouraging early power with a long-stop date for the last permissible COD before end June 2022. However, this timeline was not met by any of the preferred bidders and has been consistently moved out.

The timelines for REI4P bid windows 5 and 6 were also slightly shorter than previous REI4P rounds. In earlier rounds, projects were expected to reach financial close within 9 to 12 months of being awarded Preferred Bidder status. In bid windows 5 and 6, this timeline was shortened to 6 months. Similarly, previous rounds required bidders to achieve commercial operation within 24 to 30 months after financial close. In bid windows 5 and 6, this milestone was expected within 24 months.

In reality, none of the BW5 preferred bidders have been able to reach the financial close deadlines. This is largely due to delays in securing accurate budget quotes from Eskom. These quotes are essential for the financial close process and the delays have been ascribed to both late grid connection design submissions by the IPPs, as well as capacity constraints within Eskom's grid access unit (causing delays in processing applications). It also appears that the IPP Office and Eskom included a number of last-minute changes in the Power Purchase Agreements, which further delayed contract finalisation.

As a result, the IPP office postponed the financial close deadline for the awarded projects, following a staggered approach. It was projected that the first batch of projects would reach financial close in July 2022 (after Eskom provided their budget quotes in June 2022), while the remaining 14 projects would reach financial close by the end of September 2022. At the time of writing, none of the awarded projects have reached financial close – though three projects have

reached "commercial close". This is a concerning development, since sticking to timelines has been a cornerstone of the REI4P's success and there is immense pressure to get as much capacity onto the grid as soon as possible.

Table 5: Timelines for RMI4P and REI4P bid windows 5 and 6 procurement

Activities	RMI4P	BW 5	BW 6
RFP release in the market:	23 Aug 2020	12 April 2021	06 April 2022
Bid Registration and Notification Open:	24 Aug 2020	N/A	N/A
Bidders' Conference	25 Sep 2020	26 May 2021	07 Jul 2022
Request for clarification on the RFP	N/A	02 Jul 2021	14 Jul 2022
Bid Registration & Notifications Close:	30 Nov 2020	N/A	14 Jul 2022
Bid Submission:	22 Dec 2020	16 Aug 2021	22 Sep 2022
Preferred Bidder announcement:	18 Mar 2021	Oct 2021	+ 2 months*
Additional Preferred Bidder announcement:	01 Jun 2021	N/A	N/A
Financial Close	N/A	Feb/Mar 2022 (Jun - Sep 2022)	+ 6 months**
Construction	N/A	N/A	N/A
Commercial Operations	+ 4 months*	+ 24 months***	+ 24 months***

**This timelines begins counting from Bid Submission.*

***This timelines begins counting from Preferred Bidder announcement.*

****This timelines begins counting from Financial Close.*

Source: (IPP Office, 2021b, 2022b, 2022d; DMRE, 2022)

3.5.2. Legal compliance

In REI4P bid windows 1 to 3, bidders needed to establish a special purpose vehicle (SPV) with the sole purpose of building, owning and operating the project prior to submitting their bids. From BW4, bidders were no longer required to set up an SPV before bid submission. However, they were obliged to provide an undertaking that if selected as Preferred Bidder, the resulting company will be established as an SPV (Filipova and Wewege, 2019; IPP Office, 2020a, 2021a, 2022c). Likewise, bidders (incl. shareholders and lenders) are required to provide confirmation that they accept all the project agreements (IPP Office, 2020a, 2021a, 2022c). In RMI4P, this provision extended to proposed fuel suppliers who were required to provide confirmation that they consent to the terms and conditions that will regulate their fuel supply agreement (IPP Office, 2020a).

Earlier REI4P rounds permitted members or shareholders, advisors and lenders to participate in more than one bid submission. Member participation across bids were mainly observed in sister bids[4] and sometimes across sister bids. However, recent experiences have revealed a substantial desire by certain entities, some of whom have secured substantial portfolios of projects in previous rounds, to participate in a large number of bids across sister bids. Specifically, in bid window 5, there was a marked increase in similar participants across a large number of bids. This development raised concerns about fair competition because the participation of a member across competing sister bids brings such party into close proximity with commercial issues relating to the bids. This, in turn, could lead to collusion among bidders (though there is no evidence of such behaviour at

[4] A case where the same entities or consortium members have more than one bid in a particular procurement round.

the moment). This also made it more challenging for evaluators to assess bidders' ability to raise the required funding for their projects.

The legal requirements in bid window 6 were therefore designed to limit such concentration and financing risks. To mitigate collusion and discourage anti-competitive behaviour, in line with the Competition Act, members were not permitted to participate across sister bids but were allowed to be involved with more than one bid within the same group of sister bids. This limitation does not extend to community groups, who are still allowed to participate across multiple bids. To mitigate financing risk, extensive compliance requirements were put in place to ensure that members were able to meet their equity finance commitments, with reference to their involvement with present and previous procurement rounds. In particular, the RFP stipulated that the IPP Office could ask preferred bidders to demonstrate how the ultimate providers of equity and corporate finance would be raising funding for all awarded bids – to their satisfaction.

3.5.2.1. Decommissioning

For the first time, the RFP documentation contain explicit project decommissioning obligations. These are specifically contained in the Implementation Agreement with the DMRE, which specifies that preferred bidders are required to maintain a decommissioning reserve that covers the full cost of project decommissioning at the end of the contract or project life, including but not limited to remedying all environmental impacts, safe disposal of equipment and the full rehabilitation of the project site. This decommissioning reserve can take the form of either a "decommissioning bank guarantee" (similar to a bid bond), a rehabilitation trust, or a combination of both – and needs to be sufficient to cover all decommissioning costs at all times. Awarded bidders need to report on the status of this fund on an annual basis to the IPP office. Failure to comply may lead to project cancellation, although the department also has the option of recouping the costs needed for the reserve account by subtracting this from the IPP's monthly electricity sales invoices. In the RMI4P case, the implementation agreement additionally provides a variation process for future conversion of the dispatchable power generation facilities to use gas or LNG as a fuel source when available in South Africa.

3.5.3. Technical compliance

The increasing demand for energy security in South Africa meant that the technical compliance requirements evolved in recent procurement rounds, particularly RMI4P and REI4P bid window 6. Bid window 5 generally maintained the compliance requirements of previous REI4P rounds.

3.5.3.1. Project size limits

The project size limits for the tendered technologies in bid window 5 was consistent with that of previous REI4P rounds. The minimum capacity for solar PV and wind was 1 MW and their cap

was 75 MW and 140 MW, respectively (Table 6). Previous REI4P rounds placed technology-differentiated restrictions on the maximum contracted capacity per project. However, such variations were abandoned in RMI4P and bid window 6. The RMI4P had a minimum project size limit of 50 MW and a ceiling of 450 MW. For bid window 6, the minimum project size remained 50MW, but the upper limit was adjusted to 240 MW (Table 6).

This is a significant and arguably long overdue change to the programme. The arbitrary project size limits of previous rounds limited economies of scale and did little to protect the programme against market concentration.

Table 6: Contracted capacity (MW) permitted per project in RMI4P and REI4P bid windows 5 and 6

	RMI4P		BW5		BW6	
Technology	Min	Max	Min	Max	Min	Max
Onshore Wind	N/A	N/A	1	140	50	240
Solar PV	N/A	N/A	1	75	50	240
Neutral	50	450	N/A	N/A	N/A	N/A

Source: (IPP Office, 2020a, 2021a, 2022c)

3.5.3.2. REI4P Energy sales report forecasts

Unlike previous REI4P rounds, bid window 5 bidders were not only required to provide accurate forecasts of their future generation, but could also be penalised for deviating from this. Every preceding day by 10h00, projects were mandated to provide to the bulk buyer, Eskom, their 7-day hourly generation forecast, starting at 00h00 on the day and terminating at 24h00 on day 7. Projects could revise their forecasts 12 hours before the trading period.

Arguably the most important change is the fact that projects were now liable for significant deviations from the forecast. Projects were liable for a penalty if they do not provide a forecast or if their actual generation at any trading period deviates significantly (by 10%) from their predictions. As more variable renewable resource projects connect to the grid, the system operator requires increasingly accurate and granular forecasting to be able to maintain grid stability. While this provision allocates more risk to the IPPs, it is also an encouraging pro-active step by the system operator preparing for a system dominated by renewables.

The forecast penalty (FP) is calculated according to the following formula:

$$\boldsymbol{FP = ER_n \times PF_h \times (FEO_h - (AEO_h + AS_h)}$$

Where

FP = Forecast Penalty (in Rand) for the hour

ER_n = Energy Rate (R/MWh) for contract year n

PF_h = Penalty Rate for the hour

FEO_h = Forecast Energy Output (in MWh) in hour h as specified in the Daily Generation Forecast Generation Profile

AEO_h = Actual Energy Output (in MWh) in hour h

AS_h = Equivalent Ancillary Services Energy (in MWh)

The forecast penalty is based on the variation factor in each hour, calculated according to the following formula (Table 7):

Table 7: Determination of the generation forecast penalty factor

Forecast Variation Ratio	Penalty Factor (PF)
Variation of 0 to 10%	0,00
Variation of 10 – 20%	0,025
Variation of 20 – 30%	0,05
Variation of more than 30%	0,1

The financial impact of major deviation from the forecast energy output can be significant and provides a powerful incentive for project owners and operators to improve their predictive capabilities.

3.5.3.3. RMI4P Dispatchability

Unlike REI4P rounds, the RMI4P was technology-agnostic and required projects to have dispatch capabilities. Facilities needed to provide power consistently for extended periods (operating between 5h00 to 21h30) and flexibly scale their power output based on demand. The RFP contained detailed technical requirements aimed at ensuring quick dispatchability for the system operator (Tables 8 and 9).

Table 8: Project start-up minimum requirements - Synchronising and load pickup times

Project start-up parameters	Criteria
From ignition to synchronisation	Less than 5 min
Average ramp rate	More than 18% of contracted capacity/minute
From synchronisation to 100% Project Contracted Capacity	Less than 10 min

Table 9: Minimum response times and maximum dispatch ramp rates

Automatic load range	Condition
Cold start, from 0% to 100% contracted capacity	Raise in less than 15 minutes
Instantaneous reserves minimum capacity capability	Raise or lower 3% of contracted capacity within 10 seconds to achieve full activation, sustained for 10 minutes
Instantaneous reserves – either max hours of operation or max number of events of operation per annum	At least 3723 hours/annum or 155 events/ annum
Regulating reserves minimum capacity capability	Raise or lower 10% of contracted capacity, ramp rate of greater than 1,67% of contracted capacity after time delay of 12 minutes from trigger and 10 minute full activation sustained for 1 hour.
Regulating reserves maximum hours of operation per annum	At least 3723 hours/annum

For the first time, bidders were allowed to bid in a portfolio manner to integrate several technologies that will meet the earlier mentioned system operator demands. It was argued that the blended cost of a range of technology solutions could be cheaper than having one fuel-based technology. Notably, the project portfolio could be developed on a single or across multiple project site(s).

Projects incorporating battery energy storage systems were to co-locate this technology with a generator such as solar PV, gas, etc., as they were not allowed to be charged using power from the utility. To align with the government's long-term strategies, bidders considering reciprocating engine and gas turbine technology were required to utilise dual-fuel machines capable of burning natural gas as one of the alternative fuels without the need for material conversions or refurbishments in the future.

3.5.3.4. Ancillary Services

In previous procurement rounds, projects were required to have the technical ability to provide ancillary services. However, under RMI4P and bid window 6, the provision of ancillary services became a mandatory requirement and a payment mechanism was built into the tenders to compensate bidders for these services. The two ancillary services that were to be provided are instantaneous reserve and regulating reserve (see Table 10). These services refer to generating capacity that can be ramped up or down within a certain period in response to a system stability call by the national operator (Energydynamics, 2022; Transpower, 2022). The ancillary utilization requirement for RMI4P was more stringent than in bid window 6 (Table 10). Bidders needed to consider demand for ancillary services in the forecast assumptions of the project.

Table 10: Ancillary services requirement for RMI4P and REI4P bid window 6 procurement

Ancillary Service	Max. Activation Time	Min. Sustained Time	Max. Utilisation per annum (RMI4P)	Max. Utilisation per annum (BW 6)	Min. Percentage Required Relative to Contracted Capacity
Instantaneous Reserve	10 seconds	10 minutes	155 events or 1855 hours scheduled	155 events or 3723 hours scheduled	3%
Regulating Reserve	10 minutes	1 hour	1855 hours scheduled	3723 hours scheduled	10%

Source: (IPP Office, 2020b, 2022d)

3.5.4. Financial and commercial capability

As with previous REI4P rounds, the three key financial qualification criteria were price, financial standing and robustness of the funding proposal, and robustness of the financial model(s).

3.5.4.1. Price

The price criterion considers several costs consistent with previous REI4P rounds. The new cost additions are described as follows.

In RMI4P, the project price was made up of energy costs, capacity and ancillary services. Fuel costs in RMI4P were treated on a pass-through basis, since they were indexed monthly to the movement in the underlying fuel price. Bidders were meant to submit the fuel price forecast used in their models. This proved to be a controversial requirement, since the pass-through nature of the fuel costs constituted a significant risk for the offtaker, yet was not taken into account in the bid evaluation criteria (discussed further in section 4.9). An additional price factor was carbon tax which had been introduced in 2020 in South Africa.

The only new cost included in bid window 6 compared to earlier REI4Ps, was ancillary services.

3.5.4.2. Financial standing and robustness of the funding proposal

As discussed, BW 6 financial qualification criteria included the explicit analysis of a bidders' ability to raise funding for all projects, including those awarded in previous rounds that have not yet reached financial close. A new addition in this round was the presentation of a diagram of the project structure so that evaluators could have a clear representation of the members, funders and lenders comprising the project bid. Another change was with respect to the proof of funds to satisfy the equity requirements. The net asset or track record tests were replaced by a requirement that the ultimate provider(s) of equity finance were to furnish the IPP Office with a letter of confirmation from an independent financial advisor or auditor that there is sufficient funds to meet the equity finance obligations and that such monies have been ring-fenced for the project.

3.5.4.3. Robustness of the financial model(s)

As with previous REI4P bid windows, bidders needed to submit full financial models that could be assessed by independent evaluators. An additional requirement from BW5 was the need for bidders to supply a model audit opinion letter in relation to the financial model(s). Such letter was to be ratified by a qualified and independent professional audit firm.

3.5.4.4. Value for money

For RMI4P a benchmarking exercise was introduced. Bidder price information would be compared to local and international benchmarks or other bidders, to confirm the value for money to the government as well as the buyer. Depending on the outcome of the benchmarking exercise, the IPP Office may invite bidders to provide a best and final offer (BAFO).

3.5.4.5. Bid bond and performance guarantee

As with previous bidding rounds, bidders were again required to furnish the IPP office with bid bonds meant to incentivise realistic bids and ensure bidder commitment. On being appointed preferred bidder, this bid guarantee needed to be replaced by a preferred bidder guarantee (performance bond) meant to be in place until the project reaches financial close.

Bidders also needed to pay a Development Fee upon reaching financial close to cover the costs of running the programme. In addition, these latest rounds introduced the requirement for a Preferred Bidders Fee to be paid on award of preferred bidder status. This was mainly meant as a liquidity mechanism for the IPP office and would be deducted from the Development Fee total.

Table 11 sets out the different guarantee and fee amounts for the analysed bidding rounds.

Table 11: Bidder guarantees and fees

	RMI4P	BW5	BW6
Bid guarantee	R150 000/MW	R100 000/MW	R100 000/MW
Preferred bidder guarantee	R200 000/MW	R200 000/MW	R200 000/MW
Development fee	2% of Total Project Value	1,5% of Total Project Value	1,5% of Total Project Value
Preferred bidder fee	R25 000/MW	R50 000/MW	R50 000/MW

3.5.5. Economic and socioeconomic development

Like previous procurement rounds, economic development (ED) requirements were part of the RMI4P and REI4P bid windows 5 and 6 to foster job creation, local industrialisation, community development, and black economic empowerment.

In REI4P bid windows 1 to 4, ED requirements generally featured in the qualification and competitive stages. In the qualification phase, they were defined as thresholds, while in the competitive stage, they were comparatively scored based on certain targets. Bidders needed to pass two ED primary qualification criteria to partake in the RFP process. The first criterion was South African entity participation of at least 40%. The other was satisfying a broad-based black economic empowerment (B-BBEE) contributor status level (CSL) of at least 5. Aside from the two principal thresholds, bidders had to meet or surpass the minimum thresholds outlined in the ED scorecard. Thresholds were applied for 19 sub-categories covering these ED elements.

In RMI4P and bid window 6, ED requirements appeared in the qualification and competitive stage, as in bid windows 1 to 4. The DMRE obtained a deviation from the Minister of Trade, Industry and Competition regarding the application of the B-BBEE Act and more precisely, the Amended Codes of Good Practice. The Department also got an exemption from the National Treasury, permitting the implementation of a competitive scoring where points can be assigned to projects with more (socio-)economic development commitments (IPP Office, 2022d). However, bid window 5 did not receive such exemptions. Hence, ED was not a scoring and ranking criteria but a qualification (pass/fail) criteria.

RMI4P and bid windows 5 and 6 applied similar ED primary qualification requirements as bid windows 1 to 4, but with higher thresholds: South African entity participation of at least 49% and a B-BBEE CSL 4 were now required to qualify. From bid window 6, bidders were mandated to provide proof of compliance with these qualification requirements by submitting reports from auditors, chartered accountants and B-BBEE verification agents. This corroboration process was previously undertaken by the DMRE.

The ED scorecards in RMI4P and bid windows 5 and 6 were significantly reviewed compared to previous procurement rounds. These elements generally became more stringent and extensive. The sub-elements in the ED scorecard was increased to 20 in RMI4P, 30 in bid windows 5, and 35 in bid window 6 (see Table 12). For instance, black women participation was included under job creation in RMI4P, and also became a sub-category of ownership and management control in bid windows 5 and 6. The scorecards also included new areas, such as supplier development and elements to cater for youth, women and people living with disabilities. A skills development element was specifically introduced to support critical skills development for black students and disabled employees.

A further notable development was the inclusion of measures to ensure a more enduring ED impact. For example, local content requirements now included commitments during the operational phase of the project. A similar situation was observed in black (women) shareholding and supplier development sub-elements.

Table 12: Economic development qualification scorecard for RMI4P and REI4P bid windows 5 and 6 procurement

Element	Description	RMI4P in %		BW5 in %	BW6 in %	
		Threshold	Target	Threshold	Threshold	Target
Job Creation	South Africa-based employees who are citizens	65	90	65	65	90
	South Africa-based employees who are black people	40	60	40	40	60
	South Africa-based skilled employees who are black people	20	40	20	20	40
	South Africa-based employees who are black people with specialized skills (e.g. engineering, artisans, etc.)	N/A	N/A	10	10	20
	South Africa-based employees who are citizens from local communities	20	50	20	20	50
	South Africa-based employees who are black youth, aged 15 to 35 years	30	50	30	30	50
	South Africa-based employees who are black women	10	30	10	10	30
	South Africa-based employees who are people with disabilities	0	2	0	0	2
Local Content	Value of local content spending during construction and operation	40	75	40 (45 for solar PV)	40 (45 for solar PV)	65
	Value of local production and content of designated sectors, components, and products	As applicable based on National Treasury Designated Sectors Circulars				
Ownership	Shareholding by citizens in the seller (bidder)	49	60	N/A	49	60
	Shareholding by black people in the seller (bidder)	30	40	N/A	30	40
	Shareholding by local communities in the seller (bidder)	N/A	N/A	N/A	2.5	5
	Shareholding by black women in the seller (bidder)	N/A	N/A	N/A	5	10
	Shareholding by black people in the construction contractor	25	N/A	25	25	40
	Shareholding by black people in the operations contractor	25	N/A	25	25	40
	Shareholding by black women in the construction contractor	N/A	N/A	5	5	10
	Shareholding by black women in the operations contractor	N/A	N/A	5	5	10
Management Control	Black people in top management	25	40	N/A	N/A	N/A
	Black board directors	N/A	N/A	25	25	50
	Black executive management	N/A	N/A	30	30	60
	Black senior management	N/A	N/A	30	30	60
	Black women board directors	N/A	N/A	8	8	25
	Black women in executive managements	N/A	N/A	8	8	30
	Black women in senior management	N/A	N/A	8	8	30

Skills Development	Skills development contributions	0	0.5	0.05	0.05	0.30
	Bursaries for black student at higher education institutions	N/A	N/A	0.05	0.05	0.20
	Skills development contribution towards black disabled employees	N/A	N/A	0.05	0.005	0.025
Preferential Procurement	B-BBEE procurement spend	30	80	30	30	80
	Procurement spend on black enterprises	10	12	10	10	50
	B-BBEE procurement spend on qualifying small enterprises and small and medium enterprises procurement	5	20	5	5	30
	B-BBEE procurement spend on black women-owned vendors	3	10	3	3	12
Supplier Development	Supplier development contributions during construction	0.1	0.2	0.1	0.1	0.2
	Supplier development contributions during operation	0	0.2	0.1	0.0	0.2
Enterprise development	Enterprise development contributions	0.4	1.0	N/A	0.6	1.0
Socio-economic Development	Socioeconomic development contributions	1	1.5	1.1	1.1	1.5

Source: (IPP Office, 2020a, 2021b, 2022c)

3.5.5.1. Local content

Bidders that could not meet the new local content requirements under RMI4P and RE4P bid windows 5 and 6, could apply for an exemption from the Department of Trade, Industry and Competition (DTIC) before the bid submission date. Approved exemptions were applied to all bidders (IPP Office, 2020a; SAWEA, 2021). This has become one of the most contentious and controversial elements of the bid programme. In the RMI4P, Karpowership in particular was granted major local content exemptions.

3.5.5.2. Implementation Agreement

As before, the implementation agreement contains both commitments from the government backstopping Eskom's offtake commitments, as well as provisions governing bidders' ED commitment performance. A new requirement in the Implementation Agreement (IA) under the RMI4P is the provision for variation of natural gas or LNG. In terms of this clause, the seller (bidder) might approach the DMRE and propose a switch from LPG to LNG or natural gas. The DMRE will consider such a proposition after consultation with other stakeholders. If accepted by the DMRE, the change will be implemented. The converse is also true in that the DMRE may approach the seller on LNG or NG becoming available.

3.6. Bidder ranking and winner selection

In earlier auctions, bid submissions were assessed based on a 70:30 price:economic development weighting. This differed from government's standard 90/10 split between price and B-BBEE status level as per the Preferential Procurement Policy Framework Act (SAWEA, 2021). The methodology also required that DMRE obtain an exemption from the Minister of Finance with regards to the PPPFA (Filipova and Wewege, 2019).

Since RMI4P, the procurement point system has been adjusted to align with the 90/10 principles espoused in the PPPFA, indicating emphasis on tariff and a reduced weighting for ED objectives. In RMI4P and bid window 6, evaluations retained the same methodology as the earliest REI4P rounds, whereby scoring was on an absolute, points-based premise for specific ED elements (Filipova and Wewege, 2019), as seen in Table 13. However, bid window 6 had a points allocation system that explicitly considered black women participation in the awarded projects.

Table 13: Model for calculating the points out of 10 for economic development under RMI4P and bid window 6

Element	Description	RMI4P	BW6
Job Creation	South Africa-based employees who are citizens	0.20	0.250
	South Africa-based employees who are black people	0.20	0.350
	South Africa-based skilled employees who are black people	0.20	0.350
	South Africa-based employees who are black people with specialized skills (e.g. engineering, artisans, etc.)	N/A	0.350
	South Africa-based employees who are citizens from local communities	0.25	0.250
	South Africa-based employees who are black youth, aged 15 to 35 years	0.10	0.350
	South Africa-based employees who are black women	0.10	0.350
	South Africa-based employees who are people with disabilities	0.10	0.250
	Jobs for South Africa-based employees who are citizens per MW of contracted capacity	1.35	N/A
Local Content	Value of local content spending during construction and operation	1.25	2.5
	Value of local production and content of designated sectors, components, and products	N/A	2.5
Ownership	Shareholding by citizens in the seller (bidder)	0.1	0.100
	Shareholding by black people in the seller (bidder)	0.4	0.300
	Shareholding by local communities in the seller (bidder)	0.3	0.200
	Shareholding by black women in the seller (bidder)	N/A	0.100
	Shareholding by black people in the construction contractor	0.35	0.300
	Shareholding by black people in the operations contractor	0.35	0.300
	Shareholding by black women in the construction contractor	N/A	0.100
	Shareholding by black women in the operations contractor	N/A	0.100
Management Control	Black people in top management	0.5	N/A
	Black board directors	N/A	0.050
	Black executive management	N/A	0.125
	Black senior management	N/A	0.125
	Black women board directors	N/A	0.050
	Black women in executive managements	N/A	0.075
	Black women in senior management	N/A	0.075
	Skills development contributions	0.5	0.200

Skills Development	Bursaries for black student at higher education institutions	N/A	0.150
	Skills development contribution towards black disabled employees	N/A	0.150
Preferential Procurement	B-BBEE procurement spend	0.50	0.500
	Procurement spend on black enterprises	0.35	0.350
	B-BBEE procurement spend on qualifying small enterprises and small and medium enterprises procurement	0.30	0.300
	B-BBEE procurement spend on black women-owned vendors	0.25	0.250
Supplier Development	Supplier development contributions during construction	0.05	0.050
	Supplier development contributions during operation	0.05	0.050
Enterprise development	Enterprise development contributions	0.3	0.300
Socio-economic Development	Socioeconomic development contributions	0.7	0.700

Source: (IPP Office, 2020a, 2022c)

A major difference in the RMI4P evaluation criteria was the composition and measurement of the evaluation price. The composition of this evaluation price was incredibly complex; a simplified version is presented here.

The evaluation price was weighted, based on the electricity tariff (95%) – which included the cost of grid connection - and the cost of ancillary services (5%). The electricity tariff was the average of the net present value of the following at 100% and 70% load factors:

- Capital Cost Recovery Charge Rate (CCR): 100% capital cost for a dispatchable facility, 50% for a non-dispatchable facility
- Fixed Operations and Maintenance Costs Recovery Charge Rate (FOMRb): 100% for a dispatchable facility, 50% for non-dispatchable
- Fuel Charge Rate and Neat Heat Rate
- Variable Recovery Cost Charge Rate & Renewable Recovery Cost Charge Rate
- Total annual start-up payments (hot, warm and cold)
- Carbon tax payments

The ancillary services tariff was the average of the net present value of Instantaneous Reserve and Regulating Reserve at 100% load factor and 70% load factor. Fuel was treated in a pass-through manner, as previously discussed. The department also sought to benchmark prices against local and international costs and rates, though the unique design for RMI4P made this difficult.

Bid window 5 applied the same scoring methodology as stipulated in the PPPFA, with a 90/10 scoring system. The 10-point scoring was based on B-BBEE CSL only, as shown in Table 14. This was mainly due to the DMRE not obtaining a deviation from the Minister of Trade, Industry and Competition regarding the application of the B-BBEE Act. It also did not receive an exemption from the National Treasury which would allow it implement competitive scoring for ED and SED commitments (IPP Office, 2022d).

Table 14: Model for calculating the points out of 10 for BBBEE in bid window 5 procurement

B-BBEE Status Level of Contributor	Number of Points
1	10
2	9
3	6
4	5
5	4
6	3
7	2
8	1
Non-compliant contributor	0

Source: (IPP Office, 2021a)

The procurement point system in REI4P rounds 1 to 4 attracted some criticism due to fears that it would lead to higher bid prices. However, realised tariffs were still considered globally competitive (Filipova and Wewege, 2019). In bid window 5, bidders admitted that the reduced weighting of ED objectives allowed for an even more competitive tariff (PFL, 2021).

3.7. Securing the revenue stream and addressing off-taker risk

Eskom is still effectively insolvent, with revenues not nearly covering debt repayment requirements. Since Eskom remains the sole off-taker for the RMI4P and REI4P projects, securing the revenue stream and limiting offtaker risk was critical for the bankability of the tendered projects. The following discussions highlight the new measures that were introduced to achieve these credit enhancement goals in RMI4P and REI4P bid windows 5 and 6.

3.7.1. Hedging off-taker risks

Eskom's weak financial position meant that the South African government has continued to provide sovereign guarantees as part of the IA in all procurement rounds. The government framework support agreement (Figure 12) is an important part of mitigating this risk to National Treasury, as it ensures that NERSA treats the IPP costs on a pass-through basis when determining Eskom's revenue. Eskom for its part has paid all IPP invoices to date on time, which has further mitigated this perceived risk. Nevertheless, investors (and specifically lenders) remain adamant that a sovereign guarantee is required as long as Eskom remains the offtaker of power.

There have however been recent discussions about replacing the guarantee with another product or at least reducing its cover based on the fact that it continues to represent a contingent liability to the country. Analysts and investors have pointed out that the unbundling of Eskom, as well as the option to sell power to other offtakers if Eskom defaults, would reduce the need for this guarantee by offering the possibility of alternative revenue streams (if required, something that is not currently an option) and improving the financial standing of the assigned offtaker (which would be the Independent Transmission, System and Market Operator in an unbundled Eskom).

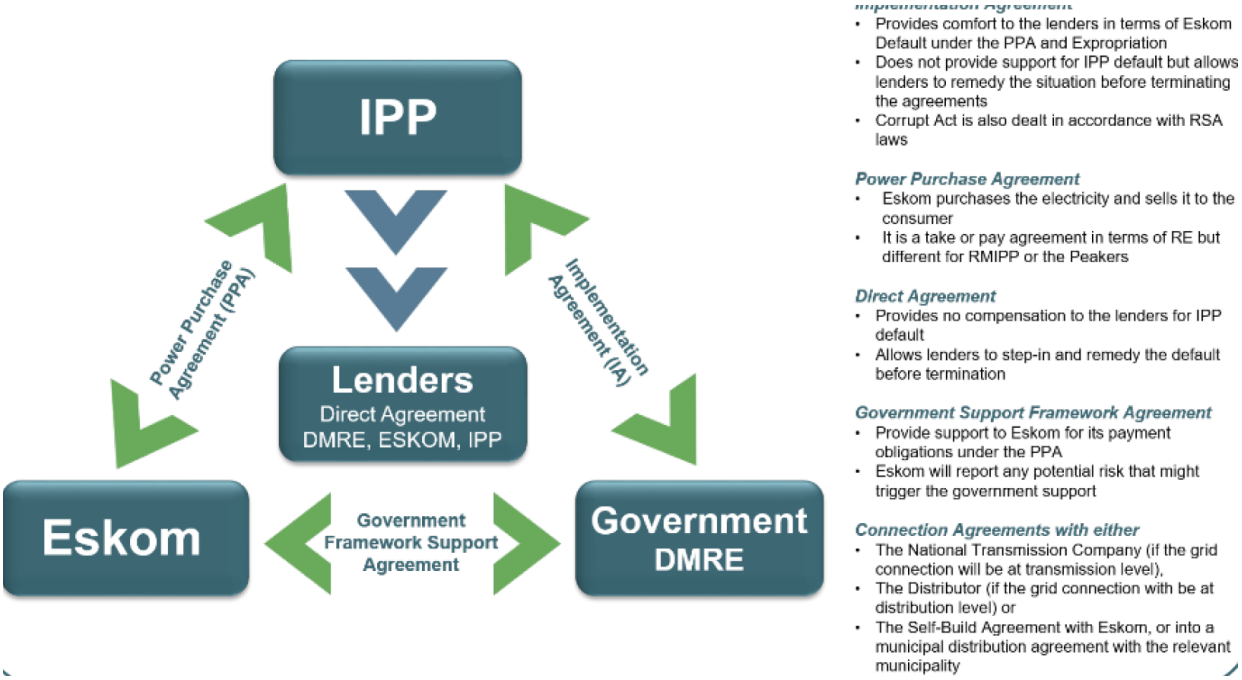

Figure 12: Contractual agreements in the REI4P and RMI4P programmes (Source: DMRE, 2022)

Eskom's declining credit rating and NERSA's stance on renegotiating existing REI4P PPAs prompted already-operational IPPs to resort to purchasing political risk insurance from the World Bank Group's Multilateral Investment Guarantee Agency (MIGA) (Alao and Kruger, 2021). From 2018 to 2020, 36 private power projects, 11 of which were based in South Africa, had taken out MIGA cover, reflecting growing investor concern regarding the honouring of contracts. These guarantees are meant to protect investors against the risks of transfer, inconvertibility, expropriation, breach of contract, civil unrest and war for 15 years (Alao and Kruger, 2021). NERSA's initial position on PPA renegotiations has been changed to a voluntary measure in exchange for a contract extension – though at this stage no projects have taken them up on this offer (Filipova and Wewege, 2019). MIGA cover has also dried up since 2020 (PFL, 2022).

3.7.2. Revenue streams for bidders

For the first time, the revenue stream for bidders in RMI4P included payments for energy, capacity, and ancillary services, unlike in REI4P bid windows 1 to 5 where only energy was contracted. The capacity charge is bundled in the energy price, as power provision was to be guaranteed between 5h00 and 21h30. Variable O&M costs are based on a fuel charge rate. A rate with a base date is initially provided but the fuel cost is reviewed every contract month using a pre-set formula contingent on fuel type. The carbon tax is based on the technology considered by the bidder. The ancillary services payment is a sum of the instantaneous reserve and regulating reserve payments, consisting of the variable costs associated with providing the services. The sellers can bill Eskom, based on the ancillary service schedule, whether called upon or not. However, unused ancillary services cannot be sold to a third-party or another load during the system operation instruction

period. The revenue stream for bid window 6 was consistent with earlier REI4P tenders except for the introduction of ancillary services payment, which was structured as per RMI4P.

3.7.3. Assigned liabilities for transmission delays

The assigned liabilities for transmission delays in REI4P bid windows 5 and 6 were consistent with earlier REI4P procurement rounds, whereby the project would be renumerated for the energy that it would have supplied in the case of transmission connection delays (due to Eskom) (Filipova and Wewege, 2019). However, RMI4P was structured differently, given the mixed revenue stream of capacity and energy payments. Here, dispatchable generators would receive capacity payments based on their most recent declared capacity or minimum load commitment, in the event of late system availability. For project portfolios comprising non-dispatchable generation, the bidder would qualify to receive energy payments for that portion of generation based on an energy and renewable recovery charge rate (IPP Office, 2020a).

BW5 did not make sufficient provision for dealing with this, since delays in reaching financial close was largely due to delays in securing budget quotes from Eskom for grid connection. These budget quotes in turn required detailed connection designs from the IPPs, several of which were apparently late - which had a cascading effect.

Transmission capacity remains a significant challenge/risk to the programme. Eskom's transmission unit for example does not have expropriation rights. As a result, power lines need to cross many private properties, and land can only be made available on a willing seller willing buyer basis. This results in significant delays, and the average timeline envisaged for securing these rights and building new transmission lines to the Cape region is 7 years. Many IPPs (and others) have expressed interested in constructing private transmission lines (ITPs), but thus far this has not been allowed/taken up.

3.7.4. Delay and underbuilding penalties

In previous REI4P tenders, for every day that the COD was extended past the scheduled COD, save for a system or compensation event, the PPA term was to be decreased by one day, in addition to the day in the term lost through the COD delay (Eberhard and Naude, 2017). The RMI4P delay and underbuilding penalties were stricter for bidders to ensure that power could be promptly connected to the grid to address the supply crisis in the country. In this tender, delays in COD would reduce the PPA term by six days. Another exception was included in the clause to consider a force majeure event (IPP Office, 2020a), especially in light of the Corona pandemic that had been disrupting global energy supply chains. At this stage it seems that none of these penalties have been implemented as yet.

Bid windows 5 and 6 delay penalties aligned with that of previous REI4P tenders (IPP Office, 2021a, 2022c). Bidders could have their PPA terminated if they did not come online before the last COD or if the installed capacity was below the minimum acceptable value. In RMI4P, the

minimum acceptable capacity was 95% of the contracted volume while the value was 50% for bid windows 5 and 6.

3.7.5. Forecasting and ancillary services penalty

As opposed to earlier REI4P tenders, bidders in bid windows 5 and 6 needed to provide accurate forecasts of their future generation. Forecast penalties were to apply to projects whose actual energy output differed materially from their predictions (IPP Office, 2021a, 2022d). In RMI4P and bid window 6, where ancillary services applied, bidders who do not provide such services were also subject to penalties. Likewise, bidders were not to receive payment for ancillary service provision if the performance parameters falls below the acceptable level, as determined by Eskom (IPP Office, 2020b, 2022d).

4. Auction implementation

As with previous auction rounds, the IPP office remains the key institution mandated with designing and implementing the procurement programme. This is done in coordination with the Department of Mineral Resources and Energy (DMRE), the Development Bank of Southern Africa (DBSA) and National Treasury (NT) (Figure 13). While this formal arrangement has not changed significantly since being set up, there have been important internal shifts.

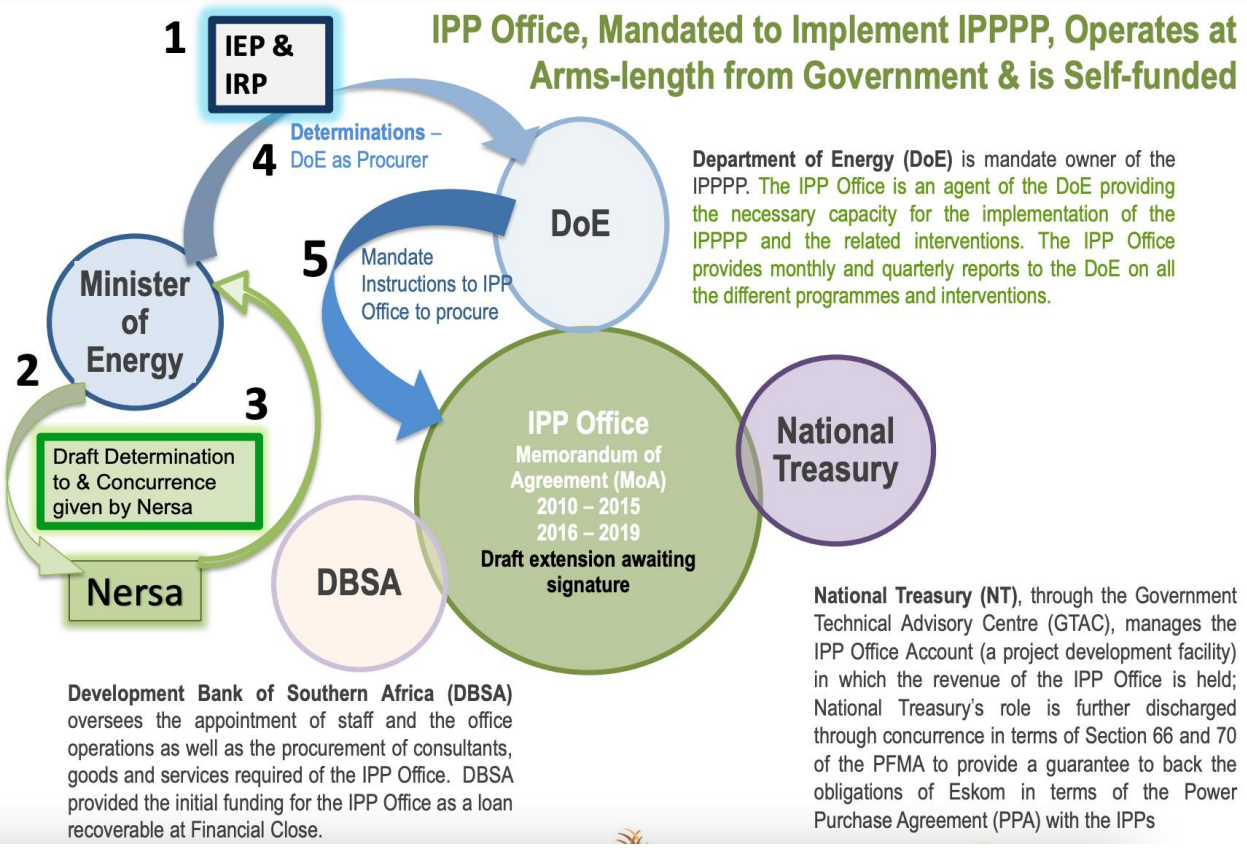

Figure 13: The IPP procurement programme's institutional arrangement (Source: IPP office, 2018)

One of these is the fact that the IPP office's main governmental relationship shifted from National Treasury to the DMRE around 2014/15. This has been an important change, since the DMRE has been more ambivalent in its support for the programme. The programme therefore seems to be beholden to a reluctant, if not overtly hostile, political principal which has necessitated involvement at the highest level to move things along.

Another important change has been in terms of personnel: the procurement hiatus of 2015 – 2019 created a funding shortfall and forced the unit – which is self-funded – to reduce its staff complement. While the resumption of new procurement rounds have opened up funding opportunities for the IPP office, the loss of capacity and institutional memory has impacted overall performance. There has also been a significant change in the programme's management at the

highest level. Karen Breytenbach, who started and headed up the IPP office, was replaced first by Sandra Coetzee and then by Bernard Magoro (former head of the system operator at Eskom).

A further important change has been the fact that the IPP Office is now much more dependent on the DBSA's procurement policies than before, especially when it comes to advisors. The programme has always relied heavily on a range of legal, technical, financial and development advisors – both to ensure the quality of the procurement programme, and the integrity of the procurement process. The DBSA's approach to transaction advisors is to rotate firms, thereby "spreading the opportunity" for involvement. While perhaps laudable in principle, the practical impact has been a perceived reduction in advisory quality by industry. It is felt that this has led to sub-optimal procurement design and contractual outcomes – in part responsible for the delays currently plaguing the latest procurement rounds.

Given the size of the programme, the increasing complexity, the urgency of South Africa's energy security challenge and the volume of new power required, it is clear that much more advisory capacity is needed, alongside other skills. This is potentially further impacted by the fact that municipalities and large commercial and industrial customers are exploring the possibility of procuring power from IPPs – but that they are also daunted by the substantial transaction costs involved. For the sake of reducing these costs, as well as optimising economies of scale, it is possible that the IPP office may play a stronger centralised procurement role on behalf of these customers, similar to a model employed in Brazil.

The IPP office remains under immense pressure, given the urgency of procurement, the increasing complexity of new auctions and technologies and the size and frequency of bidding windows. This means that there is precious little time for strategic reflection and learning between rounds, and as a result the programme remains largely similar to what it was 10 years ago – despite important and fundamental sector changes taking place in the intervening years.

In addition, there is current uncertainty regarding the IPP office's future institutional setting, with the most obvious location being the Independent Transmission, System and Market Operator (ITSMO). This has however not been decided.

Finally, there are concerning accusations regarding impropriety in the bidding process and outcomes – specifically the RMI4P. Allegations largely concern the fact that the tender rules were designed to specifically favour gas-fired power projects, and were adjusted throughout the bidding process to provide an unfair advantage to specifically Karpowership. These allegations concern the granting of local content exemptions to these bidders (which artificially increased their score on this front), the extension of the bid submission deadline at the last moment, the requirement that all facilities be "greenfield" (except for FSRUs, which the DMRE confirmed could be brownfield), the late decision to allow diesel as fuel and a last-minute scrapping of the remaining local content threshold.

One of the most important changes (and design flaws) in the programme concerned the reliability run test. This test initially required that a project needed to be able to run at full tilt for 10 days consecutively. This was later changed to 15 days – halfway through the bidding process. It is argued that this requirement undermined the competitiveness of renewable-based facilities, as they

now had to massively overbuild capacity (and would be unable to provide much-needed energy to Eskom outside of the design parameters), which unnecessarily increased their costs.

Finally, the fact that fuel-costs were treated in a pass-through manner was equally problematic, as it provided no comparable basis for evaluation and exposed Eskom and South African electricity consumers to fluctuations in fuel prices and exchange rates (since these fuel bills would need to be settled in hard currency). Given the absurdly long-term nature of the offtake agreements (20 years for power ships – a worldwide first), this represented a substantial long-term risk to the country.

DNG, a local company, launched a legal challenge against the RMI4P awards to Karpowership after company representatives claimed that DMRE officials met with them to influence the tendering process. The challenge has since been dismissed (with costs) by the courts on the grounds that DNG did not meet several qualification criteria. It therefore does not appear that the courts made a finding on the corruption allegations. Nevertheless, this challenge – alongside the numerous delays in reaching financial close - has cost the programme dearly and is further eroding the trust and political support that is so crucial to its continued success.

5. Auction outcomes

South Africa's auction programme's project price and realisation outcomes have been notoriously impressive, especially when considered alongside the substantial economic development commitments that form part of these bids. Prices have continually declined over successive rounds to a point where renewable energy is now consider the least-cost option for new power generation capacity, while project realisation rates has been some of the highest in the world. These outcomes have been instrumental in the spread of renewable energy auctions across the continent. The following section seeks to analyse whether these outcomes have continued, and are likely to continue, with these latest bidding rounds.

5.1. Finalising BW4

Before discussing the outcomes of the RMI4P and BW5, it needs stating that some of the projects delayed by the procurement hiatus have only recently been able to advance to financial close and construction. The eventual closing of the funding arrangement of the 100 MW Redstone Concentrated Solar Power (CSP) plant in 2021 now means that all REI4P projects contracted between bid windows 1 and 4 have been fully financed, except for the Mkuze biomass project. At the time of writing, only three of the funded IPPs were yet to come online: the 75 MW Capital Orange solar PV project, the 102 MW Copperton wind farm, and the 25 MW Ngodwana biomass power plant (PFL, 2022). This is an impressive realisation rate that is in large part due to REI4P design features aimed at ensuring project financing and due diligence (Kitzing et al, 2022).

Nevertheless, the 20 projects procured through the Small IPP procurement programme (SI4P) have still not been finalised, despite the projects having been asked to extend the validity of their bids multiple times and to adjust their bid prices and ED commitment levels. This is understandably frustrating for these bidders and exposes the discrepancies between what the South African government often touts as its priorities and the actual reality. These projects were specifically designed to help stimulate and support the local market – something that has repeatedly been highlighted as a major aim of the renewables programme – yet they seem to have fallen by the wayside.

A similar fate awaited the projects awarded through the expedited bidding round in 2015/16 – none of which were officially announced or allowed to progress to financial close, despite record-breaking prices at the time. Again, if one considers the extent of loadshedding in the country (and its economic impacts) as well as the amount of resources required to bid into this programme, it is difficult to not take a very cynical view regarding the government's commitment to its own policy priorities.

While one can hope that the future bidding rounds will be marked by more certainty and good faith implementation, the lack of follow-through on these earlier rounds, as well as the prolonged hiatus in procurement, has done massive damage to the reputation of the programme and the country's investment climate, to not even mention the damage caused to the nascent local renewable energy industry (Table 15). This lack of policy and investment certainty is now haunting these latest

procurement windows as the local manufacturing capacity, technical skills and expertise needed to meet the country's urgent energy needs have been decimated, which is bound to delay and undermine the rollout of future procurement programmes.

Table 15: Solar PV & wind tower manufacturing facilities – status (Source: GreenCape, 2020)

Company	Status
Jinko Solar	Closed down 120 MW manufacturing facility due to delay in REI4P
Sun Power	160MW/year facility – currently dormant.
ART Solar	75 MW/year facility – decreased capacity due to delay in REI4P
ILB Helios	300 MW/year facility – recently upgraded to tier 1 manufacturer in partnership with Seraphim.
DCD Wind Towers	Capacity of 200 towers/year, filed for bankruptcy.
GRI Towers	Capacity of 150 towers/year, not running at full capacity due to REI4P slowdown.
Concrete Towers	At least 5/12 projects of BW4 are making use of concrete towers.

5.2. RMI4P outcomes

The 2000 MW RMI4P tender was oversubscribed. 28 bids were submitted, offering around 5,000 MW dispatchable capacity. Preferred bidders were initially announced for eight projects (1845 MW) from five project companies. The prices for the selected bids ranged from US$ 9.9/kWh[5] to US$ 12.7/kWh, with a weighted average tariff of US$ 10.6/kWh. The DMRE announced that these projects will inject investments of up to US$ 3 billion into the country and create 3,800 job opportunities during the 18 months construction period and a further 13,500 over the PPA term. It also highlighted the programme's anticipated SED contributions, with 51% local entity participation, black ownership of 41%, and average local content of 50%[6] during the construction phase (South African Government, 2021). Three months later, an additional three projects (totalling 150 MW) were awarded to Scatec after "value for money" negotiations (Table 16).

The contracted facilities included eight projects that comprised renewable energy technologies (IPP Office, 2022e) and led to the award of SSA's largest wholly renewable-based dispatchable power plant, the Kenhardt 3 x 50 MW solar PV project with battery storage developed by Scatec. Likewise, the lowest price in the competitive tender was for a 150 MW hybrid project consisting of solar PV, wind, battery, and diesel technologies, developed by ACWA Power (Figure 14) (Alao and Kruger, 2022).

Table 16: RMI4P preferred bidder details incl. energy source, price and capacity

Project	Technology/Energy source	Price (ZAR/MWh)	Price (USD/MWh)	Capacity (MW)
ACWA Power Project DAO	Solar PV, wind, battery storage, diesel	1462,00	98,98	150

[5] Exchange rate as at the time of award: ZAR 1 = US$ 0.0677

[6] As noted in section 5, there are serious questions about the extent of these local content commitments given the exemptions granted to especially the Karpowerships.

Karpowership SA Coega	Liquid Natural Gas	1468,87	99,44	450
Karpowership SA Saldanha	Liquid natural gas	1496,03	101,28	450
Mulilo Total Hydra Storage	Solar PV, battery storage, diesel	1515,97	102,63	75
Oya Energy Hybrid Facility	Solar PV, wind, battery storage	1550.34	104,96	128
Karpowership SA Saldanha	Liquid natural gas	1686,48	114,17	320
Umoyilanga Energy	Solar PV, wind, battery storage, diesel	1721,64	116,56	75
Mulilo Total Coega	Solar PV, Liquid natural gas	1885,37	127,64	197,76
Scatec Kenhardt 3	Solar PV, battery storage	1884,56	127,58	50
Scatec Kenhardt 1	Solar PV, battery storage	1884,61	127,59	50
Scatec Kenhardt 2	Solar PV, battery storage	1884,64	127,59	50

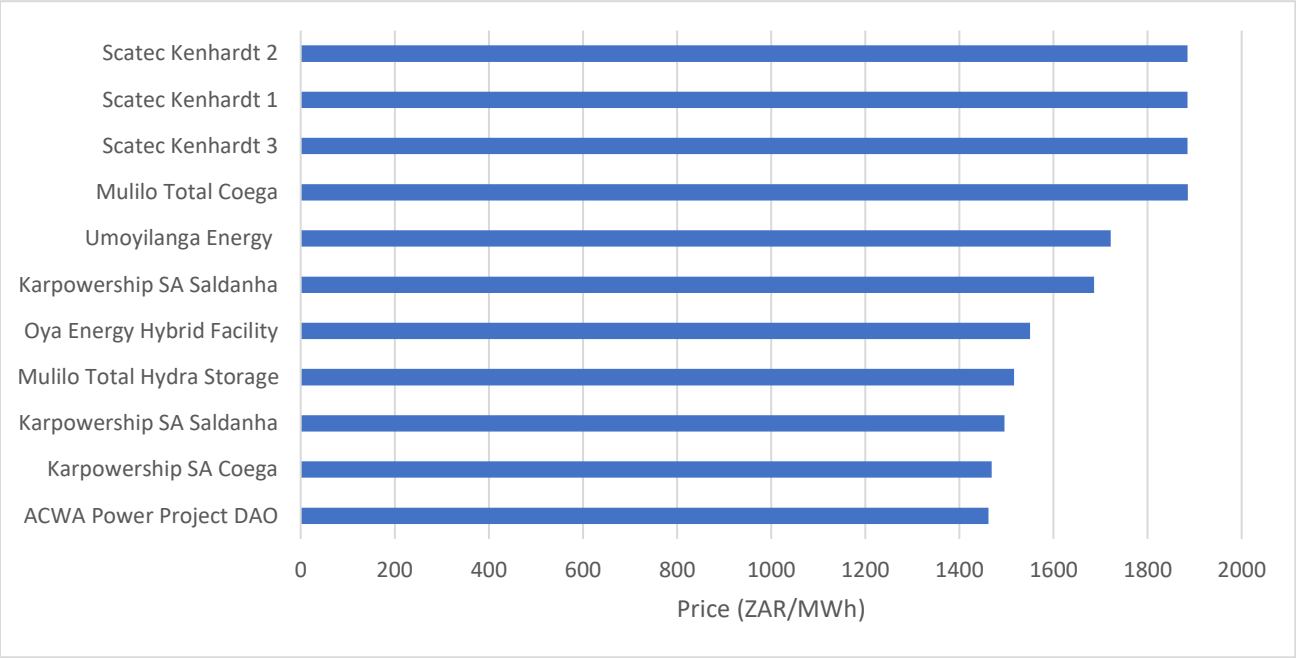

Figure 14: RMI4P prices

However, most of the contracted capacity (1,220 MW) was awarded to Turkish company Karpowership for three gas-fired power ships that have zero local content, are relatively expensive, and are responsible for emitting methane, a potent greenhouse gas (see figures 15 and 16). Already, the implementation of the power ships has experienced delays as the project failed to secure environmental permits (after an emergency environmental permitting exemption was retracted) as well as permits form the local ports authorities. The latest appeal in August 2021 to overturn the DFFE's environmental ruling against the developer's plans has been rejected (news24, 2022).

These floating power plants can be considered a symbol of major failures in the country's long-term power sector planning-procurement strategy. Powerships are only used in emergency settings, and then never as long-term power plants. To award 20-year PPAs to these projects set to run at high capacity factors is deeply problematic, especially considering the long-term pricing and currency risks on gas. There is much uncertainty regarding whether these power ships might ever reach financial close. At the time of award, the DMRE envisioned financial close for all the RMI4P projects in 2021 and commercial operations by 2022. Only Scatec's portfolio renewable energy facilities closed and began construction in July 2022 (Scatec Solar, 2022).

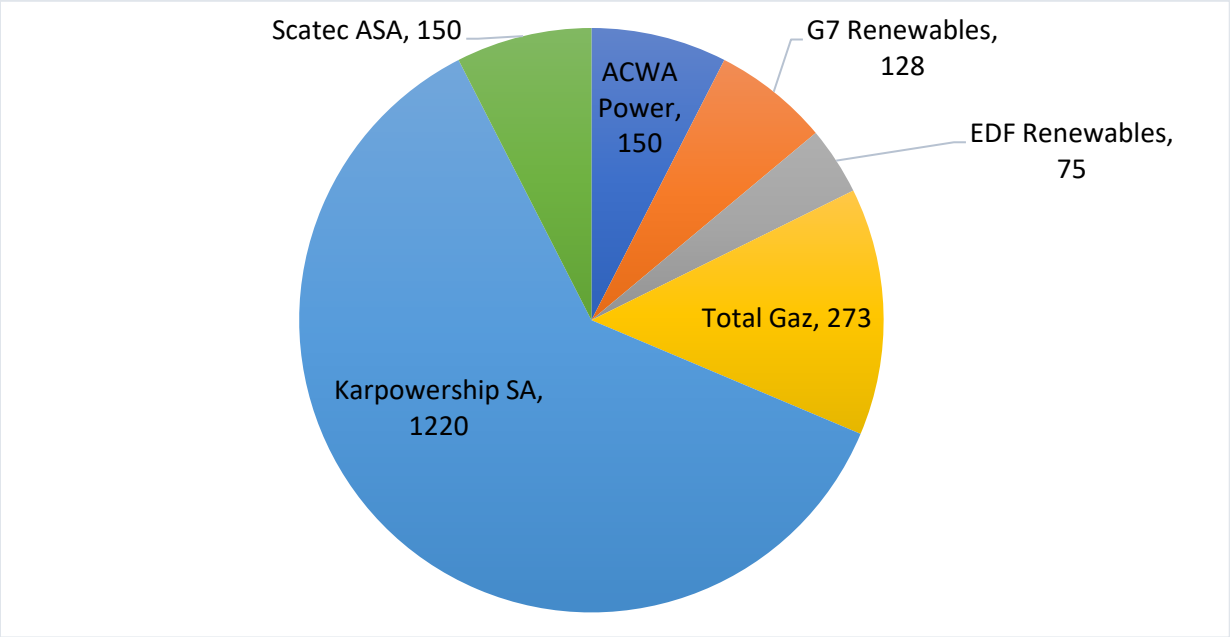

Figure 15: RMI4P dispatchable capacity (MW) awarded to project majority shareholders (Source: DMRE, 2021; PFL, 2022)

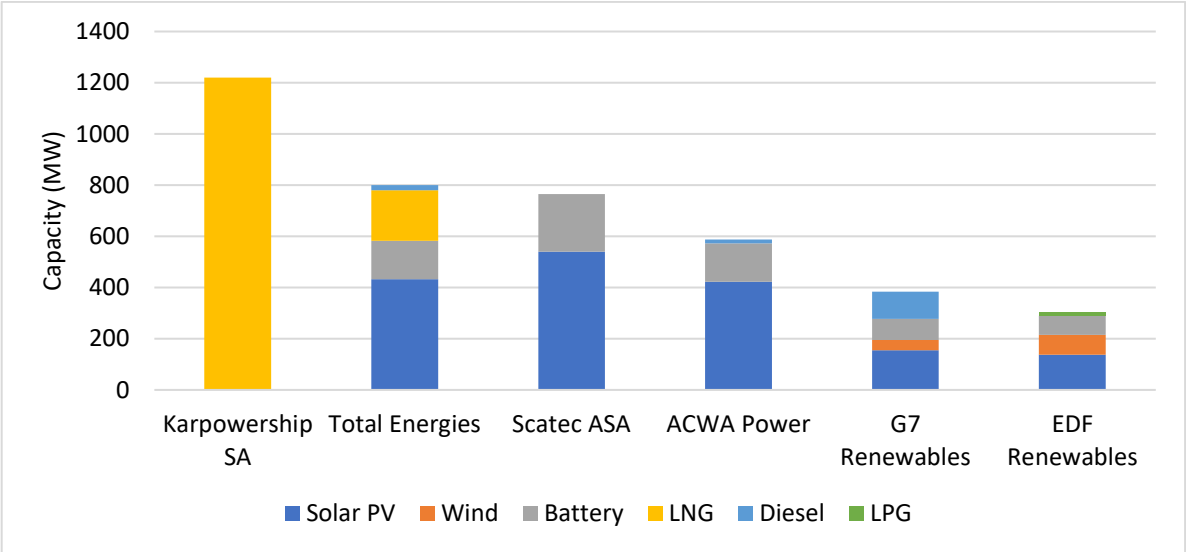

Figure 16: Installed capacity (MW) by technology of RMI4P project majority shareholders (Source: DMRE, 2021; PFL, 2022)

Had the RMI4P been designed to optimise resources and costs at a systemic level, costs would have been lower and fossil-fuel based technologies feature less prominently. Unfortunately the RMI4P did not do much to restore the industry's confidence in the government's IPP procurement programme. Design flaws, unnecessary complexity, legal challenges and substantive allegations

of undue influence continue to taint the programme and may ultimately sink the remaining projects.

5.3. REI4P BW5 outcomes

REI4P bid window 5 was launched in April 2021, following a six-year suspension of the programme. Six months after the tender issue, 25 IPPs (12 wind and 13 solar PV) were selected as preferred bidders from 102 proposals, offering 12,200 MW capacity. Competition levels remained high – despite (or perhaps because of) the procurement hiatus (Figure 17) – with stronger, bigger bidders coming in even more aggressively than in previous rounds. At the time of award, the DMRE noted that these projects will inject private sector investments of around US$ 3.3 billion[7] into the country and create 13,912 job-years.

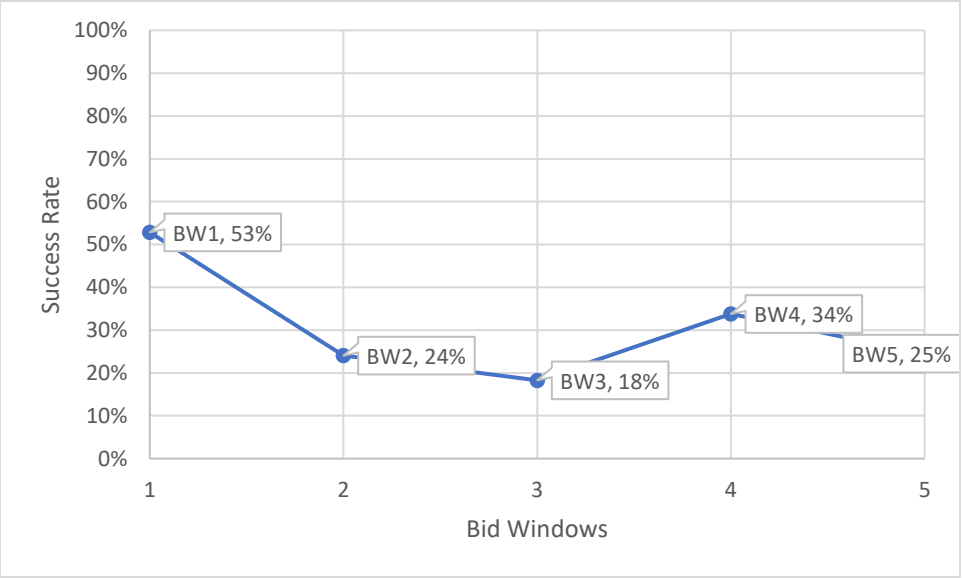

Figure 17: Bidder success rates, BW1 - 5

The tender resulted in competitive prices, averaging US$ 3.26/kWh for wind and US$ 2.85/kWh for solar PV – continuing the downward price trend observed in previous windows. In fact, the price reduction from BW4 to BW5 is the biggest in the programme's history (Figure 18). Wind power became the cheapest form of renewable technology in SA after the Dwarsrug farm was awarded to a consortium led by Mainstream at a tariff of US$c 2.27/kWh. The lowest price for solar PV also fell to US$c 2.47/kWh (PFL, 2022). More remarkable is that these prices were primarily achieved in the presence of substantial local content and ownership requirements. The prices were also realized without the availability of concessional finance from DFIs. Had transmission constraints in the Western part of the country not been an issue, prices would likely have been even lower.

[7] Exchange rate as at the time of award: ZAR 1 = US$ 0.066

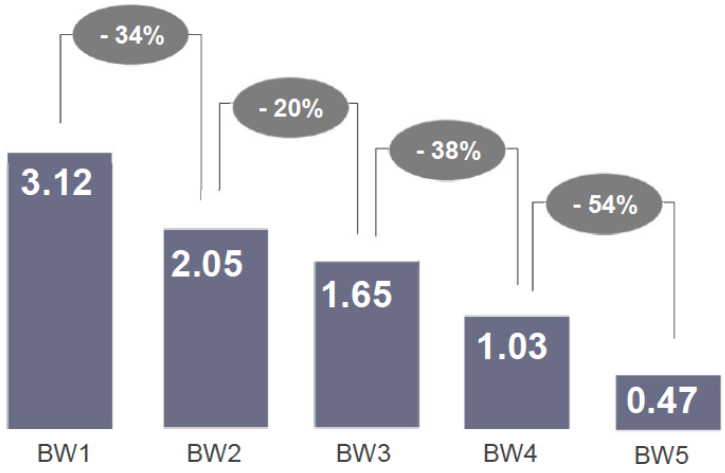

Figure 18: Average REI4P prices in ZAR (expressed in Apr 2021 terms) (Source: IPP Office, 2021)

5.3.1. Competitive debt and equity

All bids were backed by local commercial banks, some of whom remain motivated to participate in the tender due to global ESG requirements for financial institutions. The low-interest rates and long tenors provided by participating banks could be attributed to increased competitive tension amongst the lenders that was not a strong feature of previous rounds. Average loan tenors stretched to 18,5 years, debt service coverage ratios hovered around 1,1x and interest rates declined to levels at least 2,5% lower than in the RMI4P. Most awarded bidders appear to have bid on the assumption that they will be able to sell their power after the project's 20-year PPA has come to an end, effectively prolonging the revenue stream and allowing for further price reductions.

Interestingly, project gearing ratios – meaning the percentage of capital cost provided by debt – has decreased in BW5 (Table 17). This is seemingly counterintuitive, since debt is generally a cheaper source of capital than equity.

Table 17: Average project gearing ratio, BW1 - 5 (Source: IPP office, 2021)

% Split	BW1	BW2	BW3	BW4	BW5
Debt	72	75	71	77	65
Equity	28	25	29	23	35

However, looking at the average Internal Rate of Return (IRR) for equity investors in BW5 (Table 18), it seems that equity has taken an even more aggressive approach to capital cost than debt providers – which might explain the lower gearing ratio. With an average IRR of 11,35%, it seems that equity is likely cheaper than debt as a source of funding. This in turn seems to have been facilitated by equity investors taking a longer-term view on the ability to sell power post-PPA (project terminal value); actively pursuing additional sources of revenue such as development premiums and O&M fees through vertical integration; and bidding in a cluster strategy to optimise scale and minimise costs. In essence, this is a continuation of strategies increasingly employed in

previous bid windows (Kruger et al., 2021), but with the added pressure of a long procurement hiatus. The result is incredibly competitively priced bids.

Table 18: Average equity internal rate of return, BW4 - BW5 (Source: IPP Office, 2021)

	BW4	BW5
IRR%	17,27	11,35

5.3.2. Project price feasibility

There are real concerns around the viability of many of these prices. At the time of announcement, global value chains were already under pressure due to the global pandemic and commodity prices were on the rise. In the intervening period, the Russia-Ukraine war has caused global inflation spikes and put global value chains under even more pressure. It therefore seems likely that a number of the awarded projects would be unable to reach financial close due to overly aggressive pricing assumptions.

Some have argued for a blanket price increase (based on a predefined index) to allow all awarded BW5 projects to close, considering the country's energy security concerns (Meridian Economics, 2022). The DMRE and IPP office have however declined to implement such a change, arguing that it would open the tender to legal challenge since it would be unfair to unawarded bidders who had taken a more cautious approach. At the time of writing, it is not yet clear how many projects, if any, will be able to reach the financial close deadline.

REI4P bid window 5 projects were expected to reach financial close by the first quarter of 2022 and come online within two to three years (Alao and Kruger, 2022). However, the financial close deadline has been moved out to Q3 2022, largely due to grid connection costing delays (as previously discussed). It is nevertheless expected that all project should have reached financial close by September 2022, or have their bid bonds pulled.

5.3.3. Market concentration concerns

BW5 also appeared to show increased market concentration amongst the project companies and especially B-BBEE partners (Figures 19 and 20). Irish developer, Mainstream Renewable Power, with consortium associate Globeleq and B-BBEE investors H1 Holdings and AREP were awarded 12 projects (1,274 MW) (Alao and Kruger, 2022). The remaining projects were awarded to EDF, Red Rocket, Engie, Scatec, Juwi (with Red Rocket) and Mulilo – all companies that had previously been successful in REI4P bidding rounds.

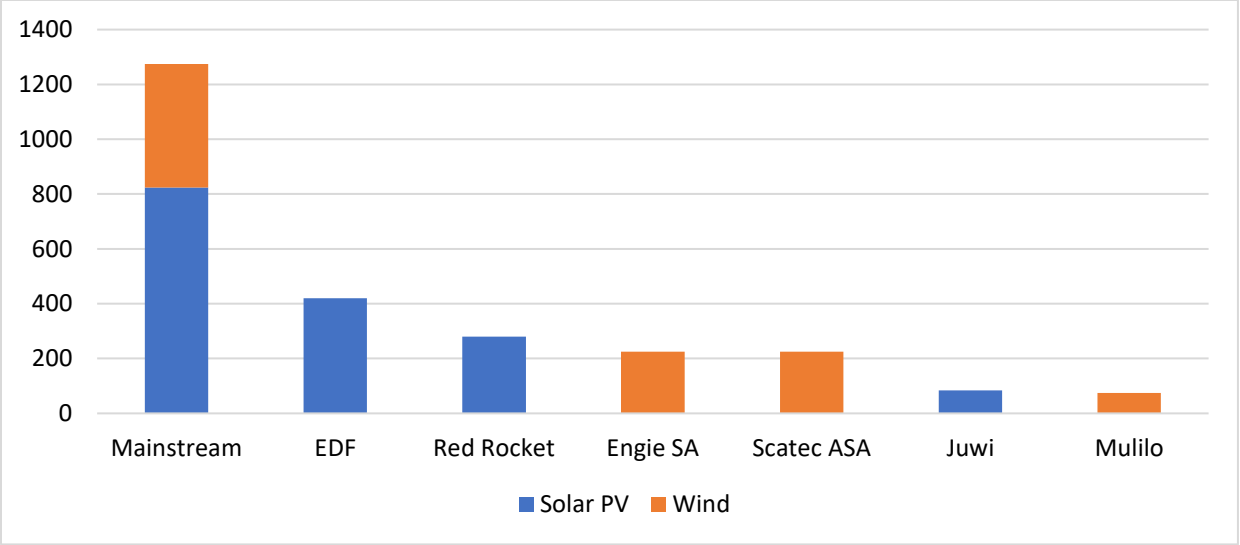

Figure 19: REI4P bid window 5 capacity awarded to project majority shareholders by technology (Source: PFL, 2022)

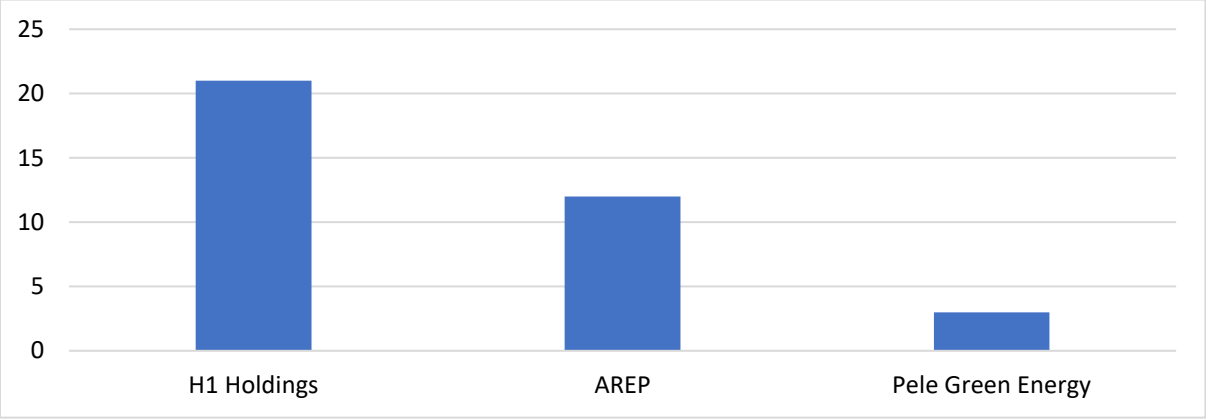

Figure 20: B-BBEE investors shareholding in selected bids by project number (Source: PFL, 2022)

Market concentration can be measured using one of two measures: the concentration ration (CR), calculated as the sum of percentages of the market share of the largest enterprises in the industry concerned; or the Herfindahl-Hirschmann Index (HHI), calculated by summing the squares of each firm's market share, thereby giving a larger weight to firms with large market shares. A HHI score of 10 000 denotes a situation where one firm owns 100% of the market (monopoly), whereas a score of 1000 might denote e.g. 10 firms of equal size, each with 10% market share. For practical use the US Department of Justice uses a HHI score of 2500 to identify a highly concentrated market.

Analysing the HHI scores for bid windows 1 – 5 (Figure 21), it is clear that market concentration increased in BW5 relative to BW4 – although it is still not at the levels of BW3. Nevertheless, the HHI score of 2 899 indicates a highly concentrated market.

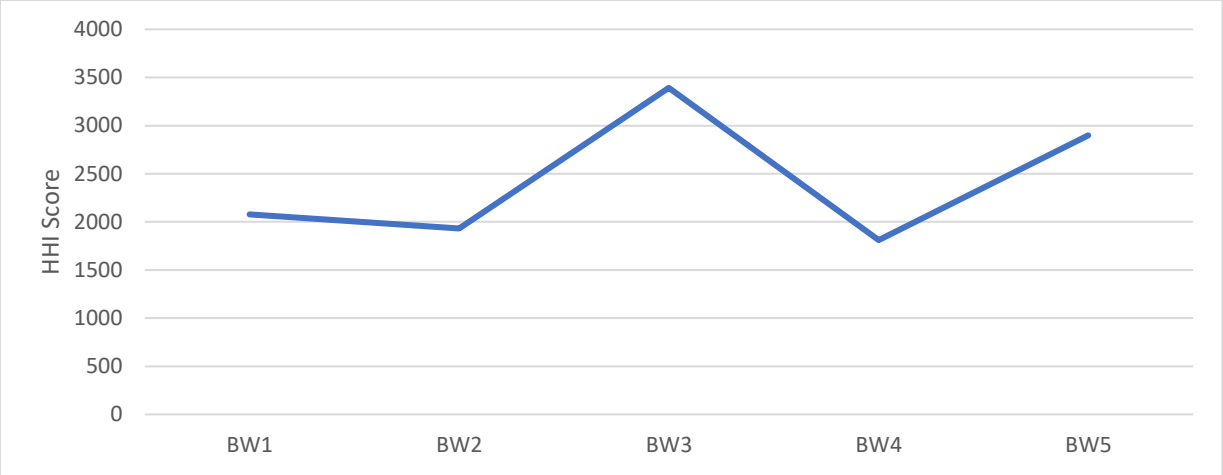

Figure 21: HHI Scores - BW 1 -5

Analysing this concentration level by technology seems appropriate given the fact that this is not a technology-neutral auction; in other words, technologies are not competing against each other, and bidders are only competing within specified technology demand bands. Analysing BW5 outcomes in this way, it seems clear that there has been a slight decrease in market concentration for solar PV projects (although still at levels above 3000), and a slight increase for the wind sector (also above 3500) (Figure 22). This is perhaps to be expected given the relative complexity, site-specificity and capital intensive nature of wind project development vis-a-vis solar PV.

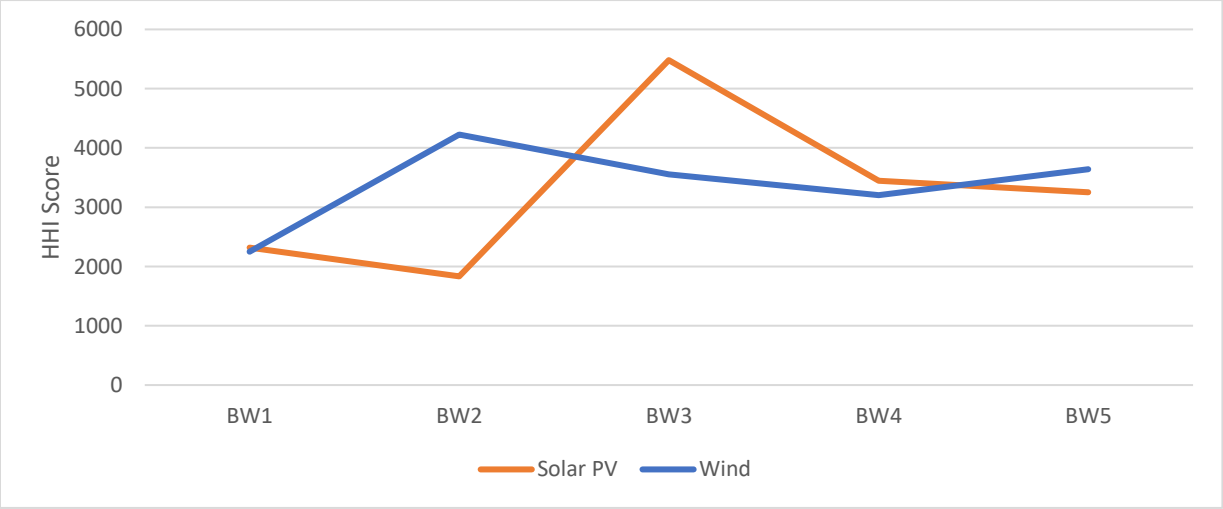

Figure 22: HHI Scores by technology - BW1 - 5

Nevertheless, this analysis shows that it is not simply a story of a straightforward increase in market concentration over time. One would expect that, as bidding volumes increase in subsequent rounds, market concentration should also decrease as more bidders are awarded. It is also important to note that market concentration does not mean market domination. The incredible competition between bidders, and the subsequent low prices achieved, shows that competition levels remain high enough for market power not leading to market domination. This might change in later rounds if, for example, fewer and fewer firms keep on being awarded, but at the time this is not a significant threat.

The choice of partnership with established B-BBEE investors was attributed to the fact that it had become more advantageous involving B-BBEE associates with high operational involvement or scale to enable bidders to match aggressive price competition (PFL, 2021). The fierce competition between B-BBEE investors seems to be undermining the envisaged broader empowerment goals of the programme, and indeed the underlying BBBEE policy. Given the South African governments aims of broadening participation in the sector, it would be wise to specifically incorporate auction design measures meant to limit concentration in the next rounds – specifically also targeting empowerment (BBBEE) shareholding (as seems to have been done for BW6).

Market concentration was attributed to economies of scale and existing relationships between consortium members, funders, and key value chain partners that had persisted since the earliest round of the procurement programme. It is also important to highlight that medium-sized local companies such as Red Rocket were also awarded capacity in the tender. In addition, most awarded projects have considerable local shareholding – apart from the lead bidders. In some instances, such as EDF's projects, EDF owns only 40% of the projects, with the remainder owned by two B-BBEE investors. There thus appears to be a deliberate move towards local market strengthening, and perhaps the consolidation one is seeing is an inevitable consequence of that.

A further point worth considering is that the "lead bidders" only represent a part of the project value chain. All projects involve local service and goods providers, from specialised logistics to legal services to catering. The REI4P has, in this sense, succeeded in developing a local renewable energy eco-system that is not only now serving the rapidly growing South African C&I as well as residential market, but is increasingly serving a global sector. South African skills and expertise are being used in projects across Africa and beyond.

A prominent example of this is Scatec: a company originally started in and still headquartered in Norway, it has now moved the majority of its technical and operational functions to its Cape Town office, from where a global portfolio of projects in 4 continents are developed, implemented and managed. Scatec is now one of the world's top 10 solar developers, and has recently also acquired a hydropower company – substantially increasing its portfolio. The company's Cape Town office, where most of its personnel is located, is staffed more than 90% by South Africans (Davy, Hansen and Nygaard, 2021).

5.4. ED Contributions

The use and make-up of economic development criteria as bid qualification and evaluation has seen considerable changes (discussed in section 3.5.5) during these latest rounds. While not all data on these elements is available, it seems clear that bidders have continued to commit to considerable levels of low ownership, job creation, local content and local investment (Table 19).

Nevertheless, as discussed previously (3.5.5.1), there are serious questions about several of these elements in the RMI4P, especially considering the number of exemptions granted. The fact that Karpowership's local content value spend is apparently the highest of all awarded bidders – despite the fact that almost none of the project will be built in South Africa – points to severe problems with how these elements are being set and treated. Further local content exemptions have been granted under bid windows 5 and 6 of REI4P based on a lack of local capacity – pointing to the fact that the local content needs and capacities seem to have never been systematically assessed and backed by a realistic industrialisation strategy.

Table 19: Economic Development commitments: RMI4P and REI4P BW5

Element	Description	RMI4P in %			BW5 in %	
		Threshold	Target	Committed	Threshold	Committed
Job Creation	South Africa-based employees who are citizens	65	90	Not available	65	70,4
	South Africa-based employees who are black people	40	60	Not available	40	47,5
	South Africa-based skilled employees who are black people	20	40	Not available	20	31,1
	South Africa-based employees who are black people with specialized skills (e.g. engineering, artisans, etc.)	N/A	N/A	-	10	11,5
	South Africa-based employees who are citizens from local communities	20	50	Not available	20	25,7
	South Africa-based employees who are black youth, aged 15 to 35 years	30	50	Not available	30	32,9
	South Africa-based employees who are black women	10	30	Not available	10	10,6
	South Africa-based employees who are people with disabilities	0	2	Not available	0	0,1

Local Content	Value of local content spending during construction and operation	40	75	50 (excluding exemption)	40 (45 for solar PV)	44
Ownership	Shareholding by citizens in the seller (bidder)	49	60	52,6	N/A	49,2
	Shareholding by black people in the seller (bidder)	30	40	41	N/A	34,7
	Shareholding by local communities in the seller (bidder)	N/A	N/A	-	N/A	2,5
	Shareholding by black women in the seller (bidder)	N/A	N/A	-	N/A	7
	Shareholding by black people in the construction contractor	25	N/A	Not available	25	25
	Shareholding by black people in the operations contractor	25	N/A	Not available	25	28,5
	Shareholding by black women in the construction contractor	N/A	N/A	-	5	6,7
	Shareholding by black women in the operations contractor	N/A	N/A	-	5	6,7
Management Control	Black people in top management	25	40	Not available	N/A	37
	Black board directors	N/A	N/A	-	25	Not available
	Black executive management	N/A	N/A	-	30	Not available
	Black senior management	N/A	N/A	-	30	Not available
	Black women board directors	N/A	N/A	-	8	Not available
	Black women in executive managements	N/A	N/A	-	8	Not available
	Black women in senior management	N/A	N/A	-	8	Not available
Skills Development	Skills development contributions	0	0.5	Not available	0.05	0,1
	Bursaries for black student at higher	N/A	N/A	-	0.05	Not available

	education institutions					
	Skills development contribution towards black disabled employees	N/A	N/A	-	0.05	Not available
Preferential Procurement	B-BBEE procurement spend	30	80	Not available	30	56,4
	Procurement spend on black enterprises	10	12	Not available	10	18,4
	B-BBEE procurement spend on qualifying small enterprises and small and medium enterprises procurement	5	20	Not available	5	8,1
	B-BBEE procurement spend on black women-owned vendors	3	10	Not available	3	7,3
Supplier Development	Supplier development contributions during construction	0.1	0.2	Not available	0.1	Not available
	Supplier development contributions during operation	0	0.2	Not available	0.1	Not available
Enterprise development	Enterprise development contributions	0.4	1.0	Not available	N/A	0.6
Socio-economic Development	Socioeconomic development contributions	1	1.5	Not available	1.1	1.1

Bid Window 5 also saw notable changes in ED commitments. This is due, in part, to the fact that ED was largely removed as a bid scoring criterion in BW5 (except for BBBEE status level), and that the weight of price was increased to 90%. This change in bid scoring, alongside the increased competitive pressure (especially on price) in this bid window seems to have led to lower ED commitments almost across the board. Local employment commitments, for example, decreased considerably to levels lower than any previous rounds (except for local community employees) (Figure 23).

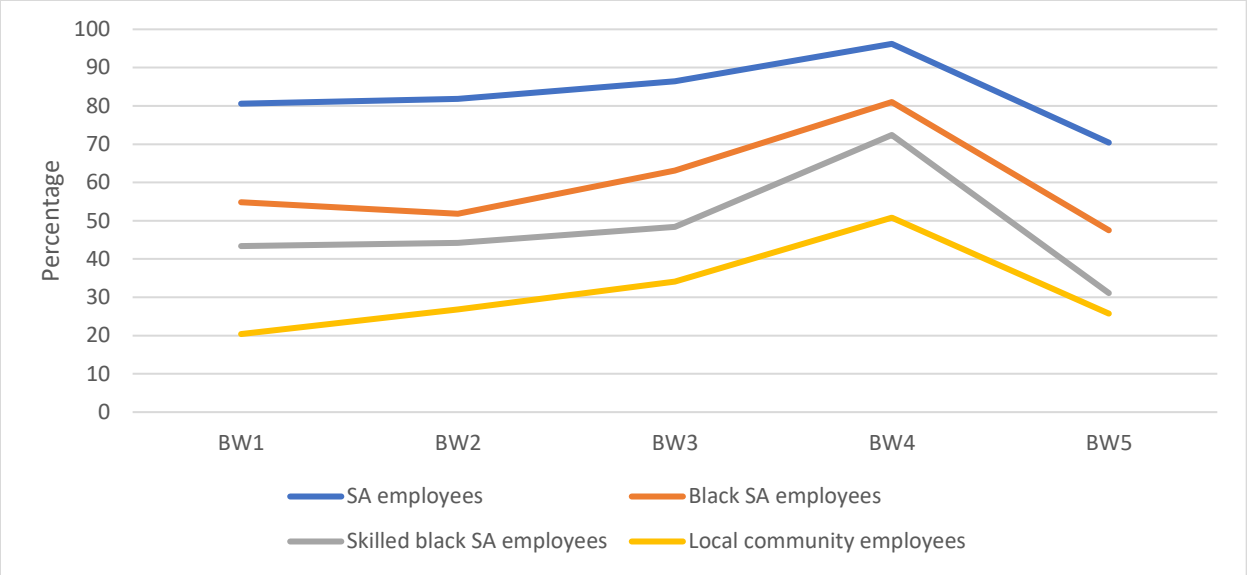

Figure 23: Local employment commitments: BW1-5

Similarly, local content commitments have decreased to their lower levels since BW1 (Figure 24). This is of course in part due to the fact that the procurement hiatus after BW4 destroyed much of the local manufacturing capacity able to meet this demand, but the fact that higher local content commitments were not incentivised also played a part. It now looks as if even these commitments will be diluted in the interest of accelerating project financial close and commercial operation.

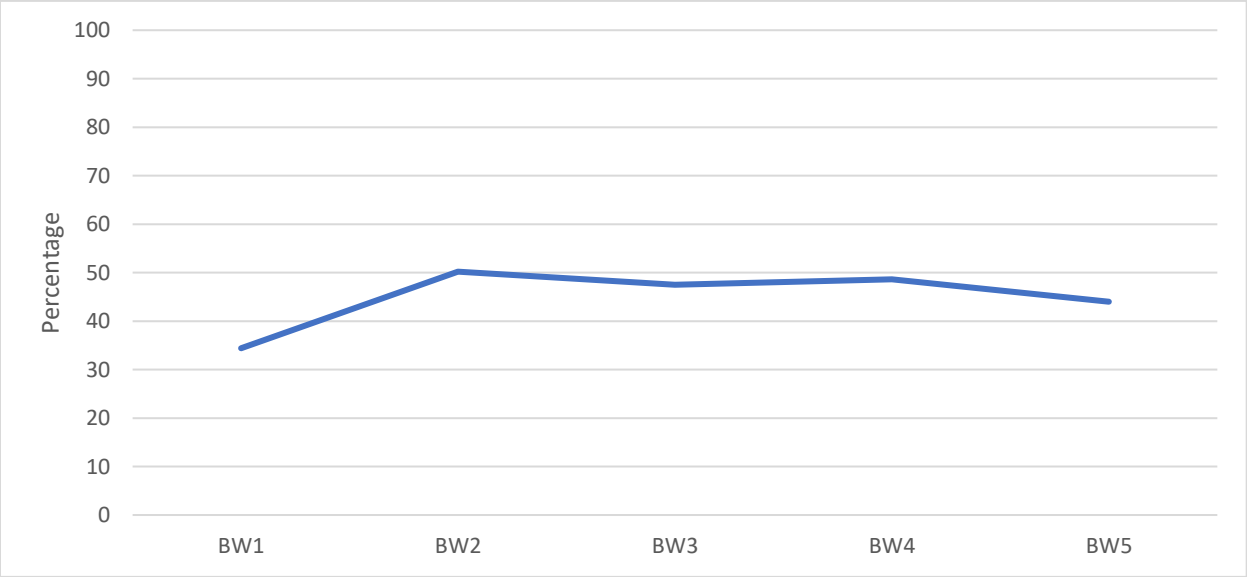

Figure 24: Local content value: BW1-5

Local shareholding commitments have likewise decreased in BW5 – although to a lesser extent that employment and, to a degree, local content commitments (Figure 25). The upward trajectory in terms of local, empowerment and community shareholding seems to have been somewhat reversed in this latest round – again in part due to auction design decisions and increased price competition.

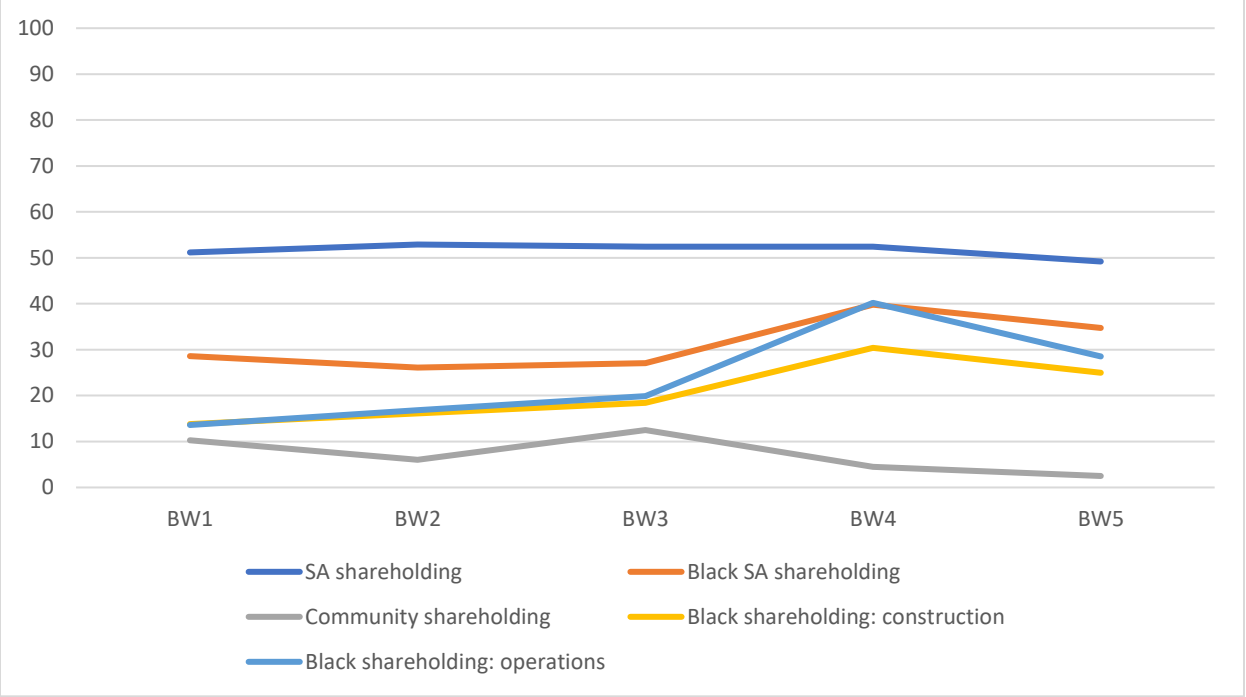

Figure 25: Shareholding commitments, BW1-5

Some of the most dramatic reductions have however been in the areas of black people in top management, B-BBEE procurement spend and socio-economic development contributions (Figure 26). Commitments in BW5 reduced considerably in all of these areas, to some of their lowest levels in the history of the programme – with the key exception of "B-BBEE procurement spend on black women-owned vendors".

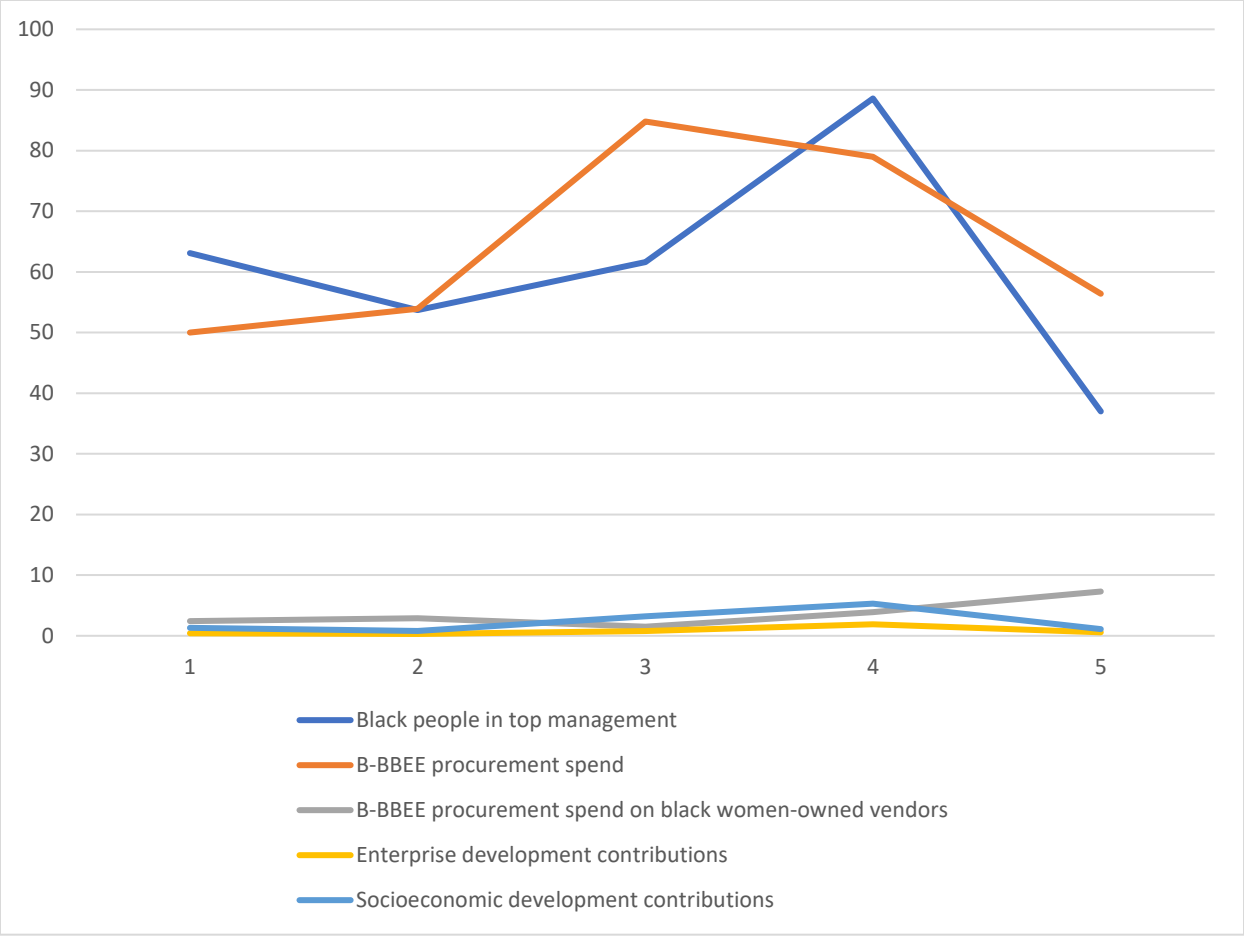

Figure 26: BBBEE spend, enterprise development, SED contributions: BW1-5

While this downward trend in terms of economic development commitments is concerning, it should also be kept in mind that a number of additional commitment areas were added during BW5, including "Skilled black employees with specialised skills", "Employees who are black youth", "Employees who are black women", "Employees who are disabled", "Shareholding by black women in the seller/construction company/operations contractor", "Skills development contributions" and "Black enterprise procurement". Each of these additional areas entail additional costs for bidders, and the seeming "dilution" of performance in the other areas observed can in part also be explained by the need to meet these additional commitments.

Nevertheless, the IPP office seems to have returned to a model that incentivises better ED commitments in BW6, where these elements will once again feature as part of bid scoring as well – although at a lower weighting level (90:10) than bid windows 1-4. Whether this will lead to lower ED commitments remains to be seen.

5.5. RE fleet performance

Analysis by the CSIR shows that South Africa's renewable energy fleet is performing well and making significant contributions to energy security. The REI4P continues adding to South Africa's renewable energy fleet, with each year seeing more renewable energy being produced (Figure 27).

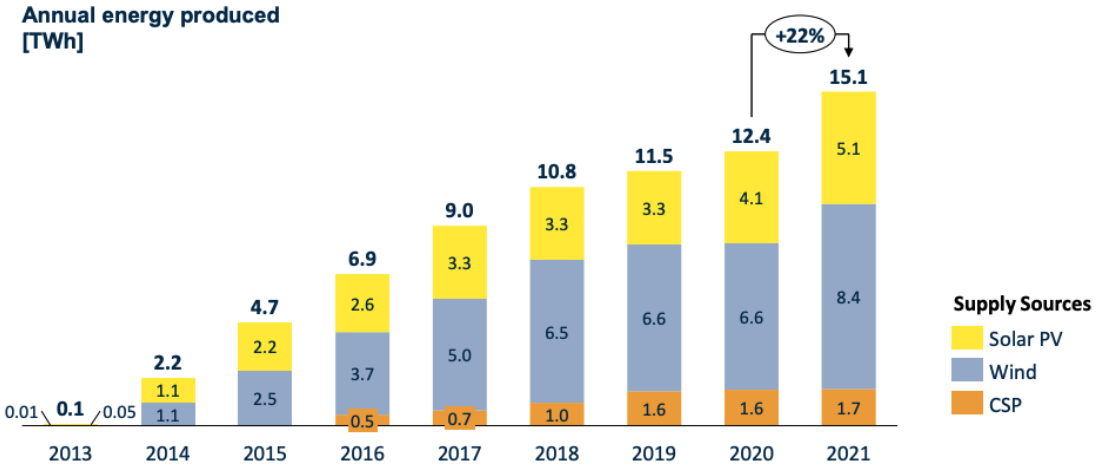

Figure 27: Annual renewable energy production in South Africa (TWh) (Source: CSIR, 2022)

Despite coal still dominating the South African power generation sector, the contribution of coal (and nuclear) to energy production has been declining, while renewable energy production has been increasing (Figure 28).

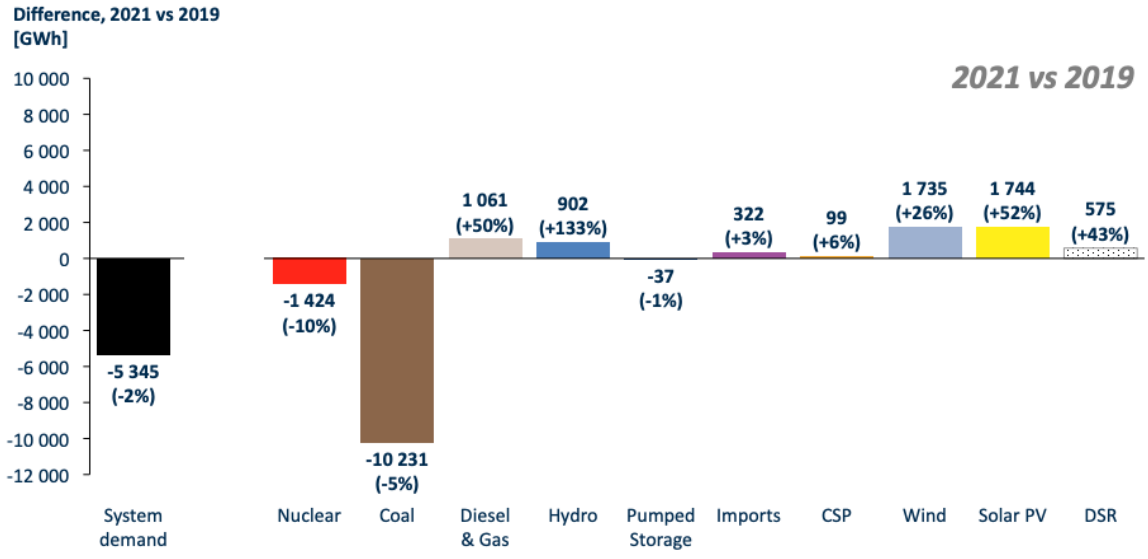

Figure 28: Power technology performance (energy output), 2019 vs 2021 (Source: CSIR, 2022)

Renewables also made a considerable contribution to energy security – despite the relatively small amount of installed capacity – mainly by reducing the number of hours that the system has a residual demand of more than 30 GW by more than 70%. Without this contribution, loadshedding would have been much more severe (Figure 29).

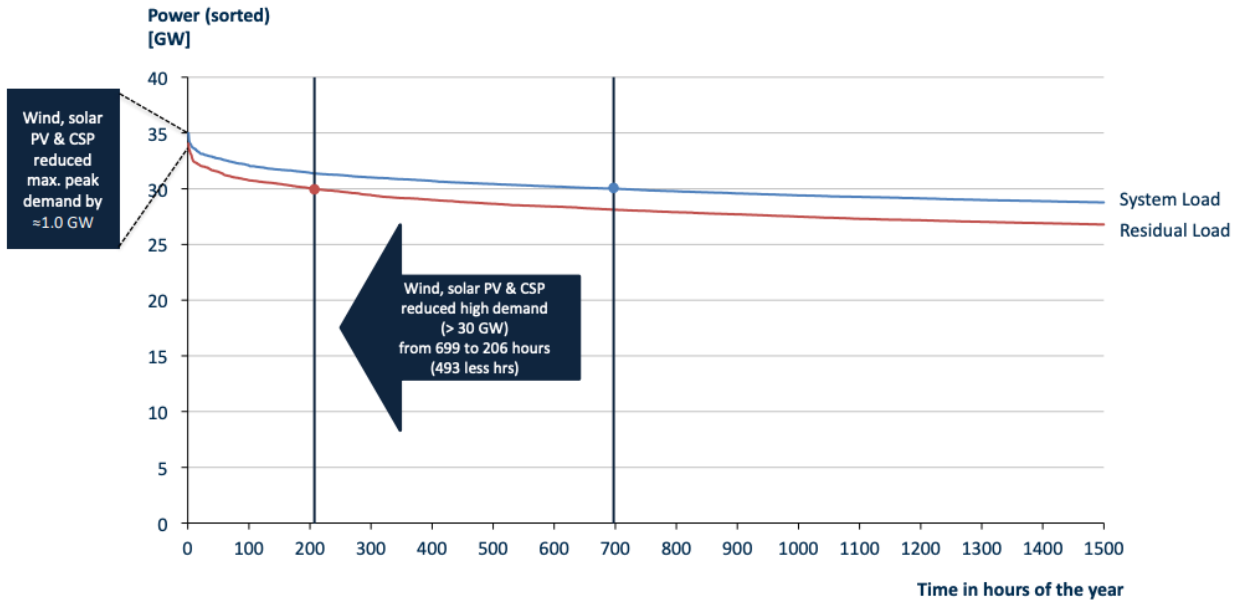

Figure 29: Residual demand hours in 2021 (Source: CSIR, 2022)

Despite this positive contribution, it is also clear that greater levels of renewable energy penetration increases variability on the grid (Figures 31 and 32), and that more sophistication, flexibility and predictability will be required in the future to ensure grid stability. The incorporation of some predictive measures in the latest bid windows is a positive aspect in this regard, but more is needed, especially with regards to markets for flexibility and ancillary services.

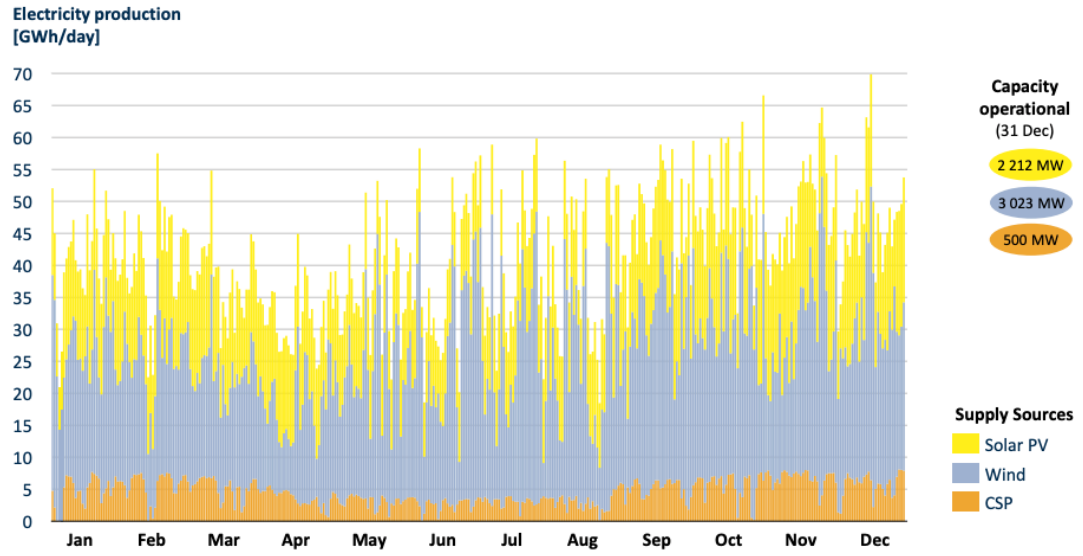

Figure 30: Daily renewable energy production, 2021 (Source: CSIR, 2022)

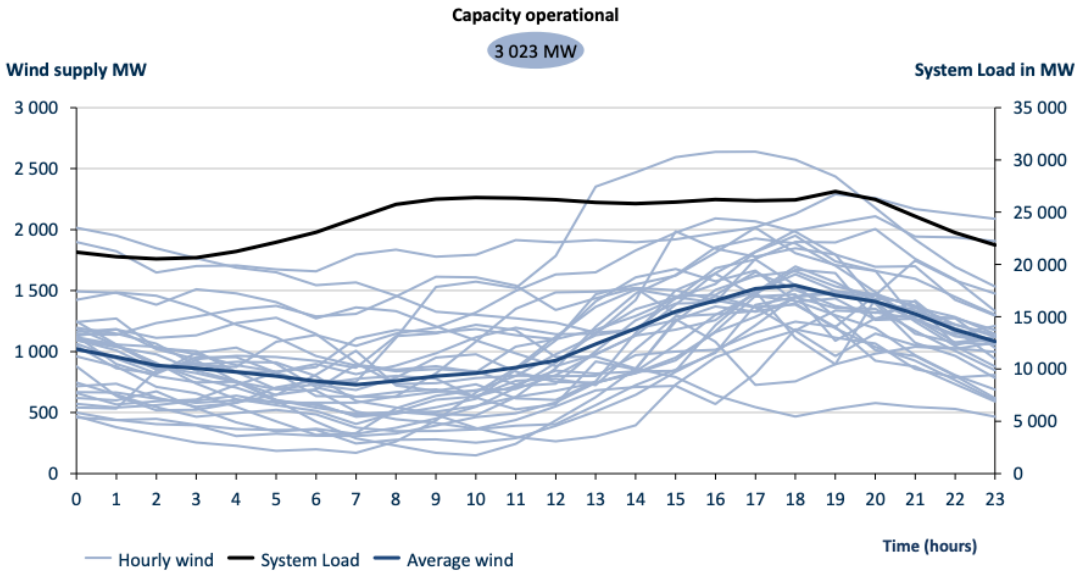

Figure 31: Hourly wind production in Dec 2021 (Source: CSIR, 2022)

6. Risks and opportunities for future procurement rounds

This section discusses some of the risks and opportunities which have the potential to define the future of renewable energy procurement in South Africa.

6.1. Restructuring Eskom: ensuring sustainability

Eskom's increasing financial and operational woes furthers the need for sovereign guarantees.

In previous tenders, this support mechanism was provided to Eskom for its payment obligations under the PPA. It granted the government step-in obligations should the utility company find it challenging to pay the IPP or if there is any national policy review that could impact the PPA (IPP Office, 2022d). However, the government is looking to reduce or abandon sovereign guarantees for upcoming REI4P projects, citing soaring exposure expected to total at least US$ 11.3 billion[8] by 2022 (Creamer, 2022). This move would make it more difficult and expensive for IPPs to obtain finance for their projects, especially considering Eskom's uncertain position as a creditworthy offtaker.

Eskom should be reformed to improve its operational efficiency and financial health amongst other performance metrics. Already, the utility has finalized the process of functional and legal separation of its power transmission arm, but did not meet the initial timeline for the legal separation of its generation and distribution units (Enerdata, 2021). The eventual decoupling of these businesses is expected to be completed by the end of 2022 but poses a new challenge for investors as to how existing contractual obligations might be fulfilled and structural alterations managed.

This reform process will also introduce the opportunity for a range of power market developments meant to incentivise investment in a number of key areas (Figure 32). Exactly how these markets will interact with the long-term procurement programmes – if at all – is still not clear, but is likely to be a key aspect of the programme's future. As previously mentioned, many bidders are already taking long-term "bets" that they will be able to sell power onto these markets once their PPAs have run out – a trend that is likely to continue in the near future.

[8] At an exchange rate of ZAR 1 = US$ 0.0639

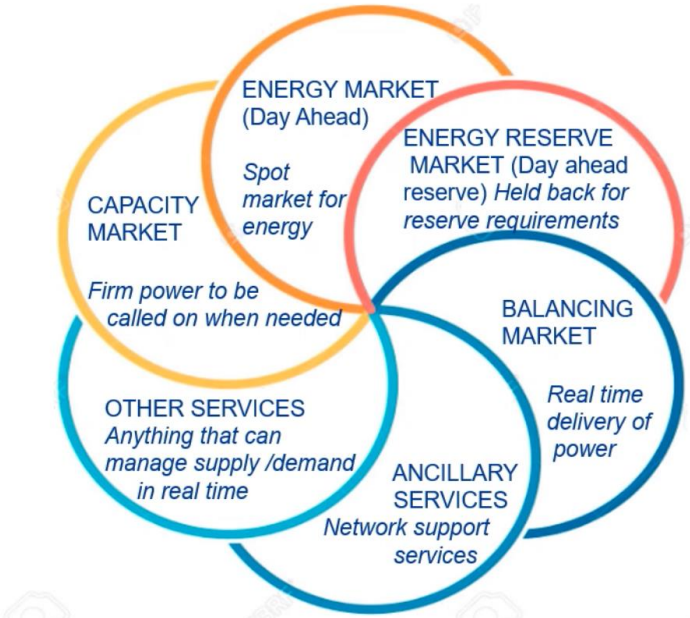

Figure 32: Markets under development (Source: Eskom, 2022)

6.2. New electricity business models: opportunities for IPPs

The emergence of distributed generation due to Eskom's inability to meet electricity demand is further disrupting and changing the landscape of the power sector. The regulatory reforms and policy decisions required to unlock this market were initially slow to develop and incomplete. However, the increasing severity of the power crisis has prompted the government to be more decisive in creating the enabling environment for accelerated investment (Alao and Kruger, 2021).

Recent regulatory reforms meant to ease project registration and shorten development timelines are already impacting deal-flow in the sector, with a substantial increase in the number of project registrations with the regulator in 2022 off the back of the announced changes (Figure 33).

Figure 33: NERSA embedded generation registrations (Source: GreenCape, 2022)

South Africa's latest reforms mean that developers have various opportunities to enter and participate in the industry. In 2021, the eThekwini (formally Durban) Metropolitan Municipality issued a Request for Information to procure 400 MW capacity from sustainable and dispatchable generation technologies. 104 projects for 16,000 MW responded to this competitive tender. Several other procurement programmes by municipalities, C&I offtakers and energy traders are being implemented. The industry is therefore facing numerous opportunities and it will become harder to attract bidders and their investors to government procurement programmes if risks are not perceived to be adequately mitigated.

6.3. Expanding transmission capacity

Many competitively priced bids were overlooked in REI4P bid window 5 because of grid limitations in the Northern and Eastern Cape provinces (Alao and Kruger, 2022). Grid constraints in high yield areas need to be addressed urgently. Eskom confirmed the remaining grid capacity before bid window 6, noting opportunity for projects in the Eastern region of the country: Gauteng and KwaZulu natal, where there is more transmission capacity. While it is important that more renewable energy capacity be built in these areas, Eskom's current transmission capacity can only absorb between 19 and 32 GW of new capacity, much less than the 50 – 60 GW needed in the next 7 years. Massive investment in new grid capacity is therefore urgently needed.

6.4. Market concentration

Bid window 5 tender results showed a marked increase in concentration amongst the project companies and B-BBEE partners. While there were valid economic reasons for this concentration, the DMRE noted that such alliances could result in collusion and encourage anti-competitive

behaviour in the future. Moreover, the underlying principle of B-BBEE - to spread wealth sustainably, equitably, and uniformly to the previously disadvantaged - was not evident in the tender outcome.

The issue of market concentration was partly addressed in bid window 6's RFP. Members were no longer permitted to participate across sister bids but were allowed to be involved with more than one bid within the same group of sister bids. Further measures to limit market concentration are available, but need to be carefully analysed in terms of their impacts on competition and costs.

6.5. Providing grid management services

The provision of grid management services is likely to become more central in future procurement rounds. Ancillary service capabilities was a technical requirement for bidders in RMI4P and bid window 6 and was factored into the tariff pricing. Bidders who do not provide the required service when called upon by the system operator were subject to penalties.

In bid windows 5 and 6, projects were liable to a penalty if they do not provide a forecast or if their actual generation at any trading period deviates significantly from their predictions. As margins get tighter from energy price competition, the provision of robust and reliable grid management services will likely become a crucial factor determining competitive bids in future procurement rounds.

6.6. Maintaining certainty of procurement roll out

The delay in signing the contracts of REI4P bid window 4 projects and the impasse before the commencement of bid window 5 severely impacted market certainty. Most manufacturers who had established facilities in the country to meet the demands of earlier procurement rounds were compelled to shut down (Filipova and Wewege, 2019). It is thus important that the roll out of future procurement rounds in line with the IRP is timely and certain.

The outlook is promising:

- The RFP for bid window 6 has been launched with the initial volume now doubled to 5,200 MW.
- The 513 MW storage bid window is in the final drafting stages before government approval.
- Bid window 7 tender concept is under development.
- The Minister has recently confirmed that further determinations will be made in order to reach the current 14,400 MW total target for wind generation and 6,000 MW target for Solar PV generation by 2030 (but much more is needed).
- The Minister also announced review and update of IRP 2019.

As with most of these announcements, the actual timely implementation of these measures remains a key concern.

6.7. Commodity price volatility and supply chain disruptions

Increasing input costs on the back of rising global commodity prices and supply chain disruptions from the Corona pandemic and the Ukraine-Russia war remain a considerable risk. Raw material and transportation costs have risen, and key components are in short supply. Ongoing port congestion has made logistics and associated timelines difficult. Some major international companies are experiencing severe financial problems, which has led some IPPs to shuffle their supplier cards, resulting in higher component price outcomes. These factors have caused a substantial rise in EPC pricing compared to when preferred bidders were announced for project implementation.

Only time will tell whether these rising input and capital costs caused by supply chain disruptions and commodity price volatility are part of a longer-term trend or a short-term blip. Analysis by the IEA suggests that this is most likely the latter. In the meantime, it might be worth considering whether bidders should be required to present their financial models, considering EPC cost volatility scenarios, to prove the robustness of their models in future rounds. It could also be worth considering whether the programme should introduce hedging mechanisms for managing EPC cost volatilities in future rounds.

7. Conclusion

South Africa's renewable energy IPP procurement programme remains impressive – both in terms of how it has been designed and implemented, as well as the project price and investment outcomes it has delivered. The REI4P also remains one of the best options for addressing the country's long-standing and rapidly worsening energy supply crisis. It is therefore crucially important that the integrity and professionalism of the programme remains top priorities, especially as South Africa's general investment context seems to worsen. The REI4P has shown that it is possible to get gigawatts of capacity onto the grid in a short span of time, and at increasingly competitive prices. This now needs to be ramped up to a new level. The foundation has been laid for a successful transition, but more urgency, clarity and capacity is needed to secure the country's energy future.

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