



Utility-scale renewable energy

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2020

Market Intelligence Report

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GreenCape

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Exchange rates used

1 USD = R14.62 (October 2019)

List of abbreviations and acronyms

AUW	African Utility Week
BW	Bid window
CAGR	Compound annual growth rate
CCA	Customs controlled area
CCGE	Closed Cycle Gas Engine
CCGT	Closed Cycle Gas Turbine
CCT	City of Cape Town
COD	Commercial operation date City of Cape Town
CPUT	Cape Peninsula University of Technology
CSIR	Council for Scientific and Industrial Research
CSP	Concentrated solar power
DBSA	Development Bank of Southern Africa
DE	Distribution entity
DEA	Department of Environmental Affairs
DMRE	Department of Mineral Resources and Energy
dtic	Department of Trade, Industry and Competition
EAF	Energy availability factor
ED	Economic development
EKF	Danmarks Eksportkredit (Denmark Export Credit Agency)
EPC	Engineering, procurement and construction
ERA	Electricity Regulation Act No 4 of 2006
ETI	Employment tax incentive
GE	Generation entity
GWp	Gigawatt peak
ICE	Internal Combustion Engine
ICN	International Cleantech Network
IDC	Industrial Development Corporation
IDZ	Industrial Development Zone
IEA	International Energy Agency
IEP	Integrated Energy Plan
IFC	International Finance Corporation
IPP	Independent Power Producer
IPPO	Independent Power Producers Office
IRP	Integrated Resource Plan
kWh	Kilowatt-hour
LNG	Liquefied natural gas
MCSA	Minerals Council South Africa
MTPPP	Medium Term Power Purchase Procurement
MWp	Megawatt peak
NDP	National Development Plan
NEDLAC	National Economic Development and Labour Council
OCGT	Open cycle gas turbine
OEM	Original equipment manufacturer
O&M	Operation and maintenance
PCE	Portfolio Committee on Energy
PPA	Power purchase agreement
PV	Photovoltaic
RE	Renewable energy

RECP	Renewable Energy Cooperation Programme
REFIT	Renewable energy feed-in-tariff
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
RMB	Rand Merchant Bank
SAPVIA	South African Photovoltaic Industry Association
SARETEC	South African Renewable Energy Technology Centre
SAWEA	South African Wind Energy Association
SED	Socio-economic development
SEZ	Special Economic Zone
SIPs	Strategic infrastructure projects
SSEG	Small-scale embedded generation
TE	Transmission Entity
VRE	Variable Renewable Energy
WACC	Weighted Average Cost of Capital

Executive summary

This market intelligence report is written for investors, equipment suppliers, project developers, and technical advisers. It highlights opportunities in the utility-scale renewable energy market in South Africa.

South Africa has a single utility model managed by Eskom, with a total installed generation capacity of 44 GW. This capacity is currently dominated by coal power stations (over 80%).

Since the establishment of the Independent Power Producers Office (IPPO) in 2010, over 6.4 GW of electricity from renewable energy sources has been procured through the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP). Of this, just under 4 GW is already connected to the national electricity grid, with the balance expected to be connected by 2020/21. The cost of renewable energy projects continues to decrease, with the latest projects producing a levelised cost of energy of less than R0.61/kWh.

Key developments influencing the market in 2019/20:

- The appointment of a presidential task team to address the sustainability of the state-owned electricity utility Eskom in December 2018;
- The recommendation of this committee to unbundle Eskom into three separate entities, namely generation, distribution, and transmission, with the establishment of a separate transmission entity expected by March 2021;
- The release of the Integrated Resource Plan (IRP) in October 2019. The IRP is a national government document that aims to provide a clear indication of South Africa's electricity demand, how this demand will be supplied, and at what cost.
- The announcement that a new bid window for the REIPPPP (BW 5) can be expected in 2020;
- A request for information released for short-term supply capacity of approximately 3 000 MW was issued in December 2019.

Combined, these developments suggest growth in the utility-scale renewable energy market over the next 10 years (2020 – 2030). Based on the R/MW overnight capital cost per technology¹, the approximate market value per technology based on IRP 2019 allocations is R99 billion for solar PV, R271 billion for wind, and R48 billion for distributed generation of less than 10 MW. Indications are that prices as low as R0.46/kWh and R0.56/kWh for solar and wind respectively can be expected by 2030.

This will depend largely on (1) the commencement of new bid windows of the REIPPPP programme against the IRP2019 allocations, (2) the Eskom unbundling process, and (3) the removal of licensing requirements for distributed generation (1 – 10 MW).

Further market opportunities include the following:

- An increase in local manufacturing potential in South Africa:
 - wind energy (blade and tower) manufacturing;
 - local PV panel manufacturing; and
 - local battery manufacturing.
- Utility-scale batteries development and deployment.
- Municipalities exploring the option to procure directly from IPPs.
- Renewal and reissuing of Operations and Maintenance contracts of REIPPPP Bid Windows 1-4 projects
- Refinancing of REIPPPP Bid Windows 1-4 projects

Table 1: Overview of the market opportunities within the utility-scale renewable energy market

Opportunity	Stakeholders	Key Drivers	Barriers	Term	Macro Impact
Renewables (utility-scale wind and solar) sector growth by 2030, as per IRP 2019	<ul style="list-style-type: none"> • IPPs • OEMs • EPCs • manufacturers 	<ul style="list-style-type: none"> • Release of IRP in 2019 • Decommissioning of coal plants • Timeline of construction of new generation • Rolling blackouts – load shedding 	<ul style="list-style-type: none"> • Delayed announcement of REIPPPP Round 5 • Eskom financial health • Risk Mitigation PPP, which may reduce the size of bid window 5 	3 – 10 years	<ul style="list-style-type: none"> • Eskom's financial health • Job transition for coal • Integration of minerals and energy departments
Bid Window 5 of the REIPPPP by early to mid-2020	<ul style="list-style-type: none"> • Renewable energy value chain 	<ul style="list-style-type: none"> • Pre-determined preferred bid winners 	<ul style="list-style-type: none"> • Uncertainty with the timing of procurement announcements 	2 to 20 years	<ul style="list-style-type: none"> • Increased international and local investment • Job creation
RE manufacturing	<ul style="list-style-type: none"> • OEMs • EPCs • manufacturers 	<ul style="list-style-type: none"> • Local content requirements of REIPPPP 	<ul style="list-style-type: none"> • Consistency and scale of procurement 	5 to 10 years	<ul style="list-style-type: none"> • Realisation of 24.4 GW renewables by 2030 will unlock local manufacturing potential
Utility-scale batteries deployment	<ul style="list-style-type: none"> • EPCs • OEMs 	<ul style="list-style-type: none"> • USAID financing • Grid stability • Battery pricing • Increase in renewable energy • ESKOM battery flagship • Eskom's own capacity to install 25,6% wind and solar into energy mix by 2030 	<ul style="list-style-type: none"> • Limited policy and regulations for battery integration • No procurement process currently determined • Expectation of significant local content requirement 	2 to 5 years	<ul style="list-style-type: none"> • Mitigate transmission power losses • Abundant local battery raw materials • Upscale renewable energy to meet baseload requirements
Municipalities exploring the option to procure from IPPs	<ul style="list-style-type: none"> • IPPs • municipalities • commercial and industrial consumers. 	<ul style="list-style-type: none"> • Wheeling framework • Transmission • Entity Open Market model 	<ul style="list-style-type: none"> • Regulatory uncertainty • Monopoly utility structure 	10 to 15 years	<ul style="list-style-type: none"> • A shift away from traditional municipal business model. • Increased international and local investment
Optimisation of early bid window plants	<ul style="list-style-type: none"> • Advisory services (economic development, legal, private equity, etc.) • Financiers 	<ul style="list-style-type: none"> • Renewal of O&M contracts after 3 years • Selling of assets, achieve maximum performance 	<ul style="list-style-type: none"> • Option in implementing agreement contracts to change O&M provider • Suitable efficiencies to justify expense 	5 to 10 years	<ul style="list-style-type: none"> • Increased international and local investment

Introduction and purpose

This market intelligence report provides investors, equipment suppliers, project developers, and technical advisers in the utility-scale renewable energy sector with a greater understanding of current market opportunities in South Africa.

What's new?

Since the publication of the 2019 Utility-Scale Renewable Energy Market Intelligence Report, there have been a number of important developments in the sector and in the national government's Renewable Energy Independent Power Producers Procurement Programme (REIPPPP).

What happened in 2019:

- May: Gwede Mantashe appointed as Minister of Mineral Resources and Energy.
- July: Advocate Sandra Coetzee pronounced as the new acting head of the Independent Power Producer Office (IPPO).
- September: Eskom releases a tender for a 1.4 GWh flagship battery storage project in 2020/21.
- October: IRP 2019 officially approved by Cabinet;
- October: Department of Public Enterprises (DPE) announces official plan for the unbundling of Eskom into three separate entities, i.e. generation, transmission, and distribution, by 2021;
- November: Eskom appoints Andre De Ruyter as new permanent CEO.
- December: A request for information issued for short-term supply capacity of approximately 3 000 MW.
- Rolling blackouts (load shedding) continue as Eskom is unable to match current demand with available supply.

This MIR updates 2019 report highlights:

Changes in opportunity drivers/enabling environment:

- Updates on the state of the REIPPPP and IRP 2019
- The utility unbundling plan and its impact
- The opportunities for players within the distributed generation market (1 to 10 MW)

Emerging opportunities:

- Renewable energy IRP 2019 allocations
- Bid window 5 of the REIPPPP
- Manufacturing potential (i.e. blade, panel and tower manufacturing)
- Municipalities exploring the option to procure directly from IPPs
- Optimising of the early bid window rounds (i.e. BEE, refinancing, reviewing O&M contracts)

Globally, renewable energy is expected to increase by more than 50% between 2019 and 2024, with solar PV constituting 60% of this expected growth, and distributed solar PV growing as rapidly as onshore wind. The increase in the forecast is driven by improved policies and increasing competitiveness (IEA Renewables, 2019).

Renewables will represent the fastest growth in the electricity sector, providing almost 30% of power demand in 2023, up from 24% in 2017. During this period, renewables are forecast to meet more than 70% of the global energy demand, i.e. for power, heat, and transport fuels, led by solar PV and followed by wind, hydropower, and bioenergy.

A key driver behind this global shift has been government policy support and procurement programmes, which most recently include countries such as Mexico, Egypt, Morocco, Zambia, Ethiopia, Saudi Arabia and Rwanda, with \$0.016/kWh (R0.24/kWh) in Portugal's first solar auction under competitive processes (Parikh 2019).

For the first time, renewable capacity additions of 178 gigawatt (GW) accounted for more than two-thirds of global net electricity capacity growth in 2017. Solar PV capacity expanded the most (97 GW) (IEA Renewables, 2018). Meanwhile, onshore wind additions declined for the second year in a row, and hydropower growth continued to decelerate. Led by commercial and industrial projects, followed by residential applications, the expansion of distributed generation stimulates almost half of global PV capacity growth in the period 2018 to 2023.

The world's total renewable-based power capacity will grow by 50% between 2019 and 2024. This increase of 1 200 gigawatts – equivalent to the current total power capacity of the United States – is driven by cost reductions and concerted government policy efforts. Solar PV accounts for 60% of the rise. The share of renewables in global power generation is set to rise from 26% today to 30% in 2024 (Renewables 2019).

The South African renewable energy market is following a similar trend. Solar PV and wind are dominating the market, backed by a growing small-scale embedded generation market (mostly solar for commercial and industrial businesses).

As shown in [Figure 1](#), the introduction of renewable energy in the South African context dates back to 2003 with the delivery of the White Paper on renewable energy policy. However, only with the release of the Integrated Resource Plan (IRP) 2010-2030 in 2010 did the renewable energy framework really start to take shape. The purpose of the IRP 2010 was to determine the preferred energy mix over the next 20 years. It included determinations for renewable energy amounting to 14 725 MW, coal-fired plants of 6 250 MW, and gas-fired power plants of 3 726 MW.

2

Sector overview

In order to aid the uptake of renewable energy in South Africa, the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) was established. The Independent Power Procurement Office (IPPO) was created to fulfil three specific duties for the REIPPPP:

- 1 professional advisory services;
- 2 procurement management services; and
- 3 monitoring evaluation, and contract management services.



Figure 1: Commencement and timeline of REIPPPP in South Africa

In October 2019, the IRP 2019 with the preferred energy mix up until 2030 was released. The plan includes determinations for additional renewable energy amounting to 20 400 MW (excluding distributed generation of 4 GW), coal-fired plants of 1 500 MW, and gas-fired power plants of 3 100MW.

Given this context, there are a number of opportunities for potential investors in the renewable energy market in South Africa. This market intelligence report (MIR) provides potential investors in the utility-scale renewable energy space with a greater understanding of market opportunities in South Africa, taking into account the size of the opportunities and the level of risk involved. The MIR is compiled for foreign direct and local investors (persons or organisations) that are looking to invest directly in the utility-scale renewable energy market through project development, asset management, equity, debt, equipment manufacture, or support services.

In what follows:

- Section 2 gives an overview of the market, and describes market size and key players.
- Section 3 details the general legislative and regulatory framework governing renewable energy.
- Section 4 highlights emergent opportunities and barriers to growth in the market.
- Section 5 addresses market uncertainties that may affect the industry.
- Section 6 focuses on funding and incentives.
- Section 7 gives an overview of the Western Cape as Africa’s growing greentech hub.
- Section 8 focuses on the services that GreenCape provides to its members.

Note: GreenCape’s 2020 Energy Services Market Intelligence Report explores the energy services market, including the embedded generation renewable energy market (generation of less than 1 MW), and energy efficiency. The energy services market is thus not covered in this Utility Scale Renewable Energy Market Intelligence Report.

For enquiries or to access GreenCape’s services, contact the Renewable Energy Sector Desk at energy@greencape.co.za.

Accounting for nearly 9% of installed capacity, the South African utility-scale renewable energy sector is showing growth and potential with more than 3.9 GW of utility-scale projects connected and operational.

South Africa’s nominal capacity is dominated by coal-fired generation stations with an installed capacity of 36.5 GW. It represents more than 83% of the country’s total installed capacity of over 44 GW. Nuclear generation capacity comprises 4% of generation capacity, and comes from the Koeberg power station, the only nuclear generation facility on the African continent.

Power Producer Procurement Programme (REIPPPP), with 3 976 MW generation capacity added to the national grid (IPPO 2019).

The growth of SA’s RE industry in recent years is the result of several factors:

- Establishment of the REIPPPP, and offtake guarantees by government backed by the Treasury;
- Proactive government policy in procuring RE capacity;
- Increases in electricity tariffs charged by the national utility, Eskom;
- Wind and solar energy competing on a levelised cost of electricity basis with coal and nuclear;

Although renewable energy in the South African context dates back to 2003 with the delivery of the Energy White Paper, it is still a relatively new market in SA with the first commercial utility projects coming online in 2013. At the time of writing, 6 422 MW of RE had been procured through the Renewable Energy Independent

Figure 2 overleaf illustrates some of the key utility RE developments in SA to date, with additional drivers affecting the market listed in Table 2.

⁴ As illustrated through the Chemical and Waste Operation Phakisa

- Key**
- Key events
 - Determinations
 - Signing events
 - Minister appointments

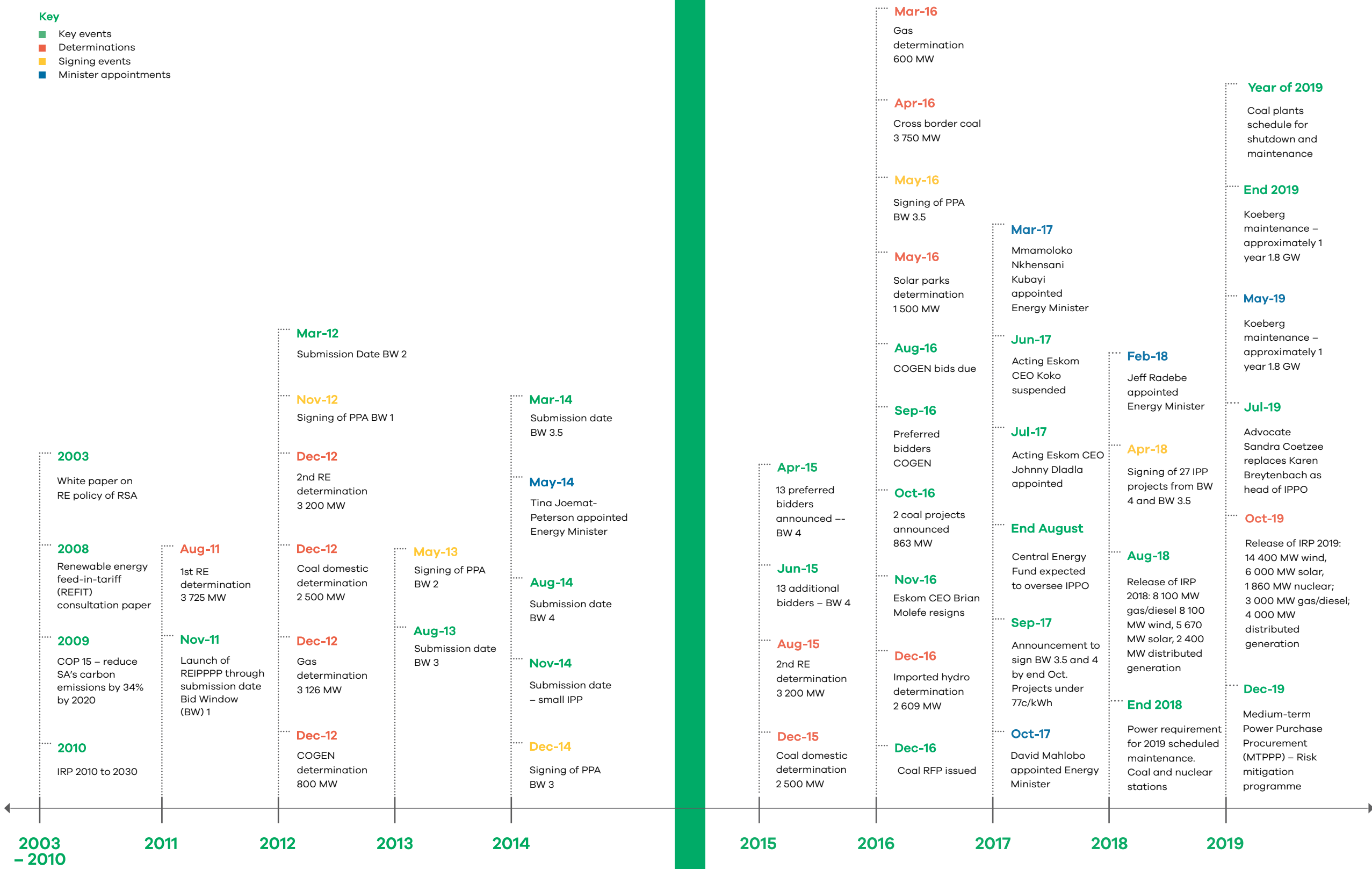


Figure 2: Key utility RE movements in South Africa to date

Beyond these key milestones in the South African utility renewable energy market, Table 2 below details additional drivers that have moved the market forward.

Table 2: Additional drivers in the South African RE market

Date	Movement
December 2016	CSIR Energy Centre Report highlights the actual tariffs from REIPPPP and coal IPP, showing how cheap RE builds have been: solar – R0.62/kWh; wind – R0.62/kWh; coal – R1.03/kWh
January 2017	Reason for not signing IPPs announced by the Minister of Energy – decreased growth below 2%, resulting in lower demand for electricity.
April 2017	Western Cape High Court Judgement nullifies government’s nuclear agreements for failing to consult public and undertake due processes. Minister of Energy decides to review all determinations after nuclear judgement. This is one of the main reasons for no response on municipal section 34 requests. ¹
July 2017	City of Cape Town files court application to purchase from IPPs.
Sep/Oct 2017	Public consultations for Atlantis Special Economic Zone (SEZ) for Green Technologies to inform best business practice frameworks for local manufacturing facilities keen to launch within the zone.
Dec 2018	Launch of Atlantis SEZ for Green Technologies, with national Department of Trade, Industry and Competition (dtic) encouraging greentech investment through incentives.
October 2019	Department of Public Enterprises (DPE) announces official plan for the unbundling of Eskom into three separate entities, i.e. generation, transmission, and distribution, by 2021

The biggest development and driver of the utility-scale renewable energy market in South Africa was the establishment of the REIPPPP in 2011.

¹ A Section 34 request entails a request to the Minister of Energy to make a determination against the IRP for the procurement of energy generation as detailed under section 34(1) of the Electricity Regulation Act 4 of 2006.

2.1. The Renewable Energy Independent Power Producer Procurement Programme

Table 3: Key policy movements in the establishment of the renewable energy sector in SA

	Initiation	Market Development	Transition	Consolidation
Pivotal movements	RE policy uncertainty	Programme development	Bid Window 1-2 [nascent market – high returns]	Bid Window 3-4 [competitive market]
Timeline	1998 – 2008	2009 – 2010	2011 – 2013	2014 – present
Government	1998 White Paper on Energy	2009 – Renewable energy feed-in-tariff (REFIT) ² phase 2 launched by NERSA	2011 – Department of Mineral Resources and Energy (DMRE) abandons REFIT for competitive tender process	Nuclear debate
	2003 White Paper on RE	2009 – COP 15 commitments	2011 – 1st determination: 3 725 MW	Delay in Bid Window 4 (BW4) announcement – job losses as a result
	2007/08 load shedding	IRP 2010 – 2030	Aug 2011 – Issue of REIPPPP RFP	April 2018 – Sign BW4
	2008 – REFIT draft guidelines issued by NERSA	2010 – Establishment of IPP office	Nov 2011 – Bid submission period	August 2018 – Updated IRP released for public comment
	2008 – Eskom solar hot water rebate programme	-	Dec 2011 – Preferred bidder announcement	October 2019 updated IRP released
	2008 – Energy Act enacted	-	11 Dec 2011 – COP 17 in Durban	Expected in 2020: <ul style="list-style-type: none"> • Determination based in new IRP • Bid Window 5 announcement • Issue of REIPPPP RFP • Bid submission
	2008 – Commissioning of Darling Wind Farm	-	2012 – 2nd determination – 3 200 MW	Expected in 2021/22: <ul style="list-style-type: none"> • Signing of PPA BW5 • BW 5 commissioning
	-	-	Nov 2012 – Signing of PPA BW1	-
	-	-	May 2013 – Signing of PPA BW2	-

² REFIT (renewable energy feed-in tariff) programme was a renewable energy programme launched by NERSA in 2009, that was later revised (with developers, lawyers and funders input) to the REIPPPP, launched in 2011.

The REIPPPP came about after a number of policy movements and programme refinements. These include the IRP 2010-30, the establishment of the IPP office and ultimate cancellation of the renewable energy feed-in-tariff (REFIT) programme.

The introduction of RE into national energy planning extends as far back as the 1998 White Paper on the Energy Policy of South Africa. The policy committed to encouraging private sector participation, competition, and open, non-discriminatory access to the transmission system. The sector was further supported in 2003 by the

White Paper on RE, by which the government set a target of 10 000 GWh renewable energy consumption by 2013, and in 2009 when NERSA approved the policy and tariffs for a REFIT programme.

Nevertheless, the 2011 promulgation of the IRP 2010 – 2030 Policy Adjusted Plan issued by the Department of Energy (DoE) had the greatest impact on the RE sector. Government set a target of 17.8 GW of new power generation capacity (Table 4) to be delivered through RE technologies, and abandoned the REFIT programme for a competitive RE tender approach.

Table 4: IRP 2010, IRP 2018, IRP 2019 determinations to date in MW

IRP 2010 – 2030 progress			
	IRP 2010 – 2030 Policy Adjusted Plan	2018 updated plan	2019 updated plan
Solar	8 400	7 958	6 000
Wind	8 400	11 442	14 400
CSP	1 000	600	0
Distributed generation	-	2 400	4 000 (+ unallocated)
RE goal 2030	17 800	22 400	24 400
Determinations to date		No determinations have been made to date on the IRP 2019	
1st Determination	3 725		
2nd Determination	3 200		
3rd Determination	6 300		
Solar Parks Determination	1 500		
Determined to date	14 725		

The major goal with the establishment of a renewable energy programme was to ensure fair competition and independence, free from undue influence. With all previous generation, transmission, and share of distribution managed by Eskom, the programme had to have a clear separation of powers.

Central to SA's RE programme was the establishment of the Independent Power Producer Procurement Programme (IPPPP) by the former Department of Energy (DoE) (now DMRE) (see Figure 3), National Treasury (NT), and the Development Bank of Southern Africa (DBSA) in 2010. A memorandum of agreement (MoA) was concluded between the parties, and the DBSA was directed to support the establishment of the

Independent Power Producer (IPP) office. In 2016, the MoA was extended for a further three years, and then again in April 2019 for another year.

The IPP office is housed in the DBSA, which oversees staff, operations and procurement of consultants, goods and services. Initial funding was provided as a loan recoverable once an IPP project reached its financial close stage. The office is now funded from IPP project fees. The office is an agent of the DMRE and is mandated to implement the IPPPP, whilst National Treasury, through the Government Technical Advisory Centre, manages the IPP office account. National Treasury also provides a guarantee to back the obligations of Eskom in terms of the Power Purchase Agreements (PPAs) with the IPPs.

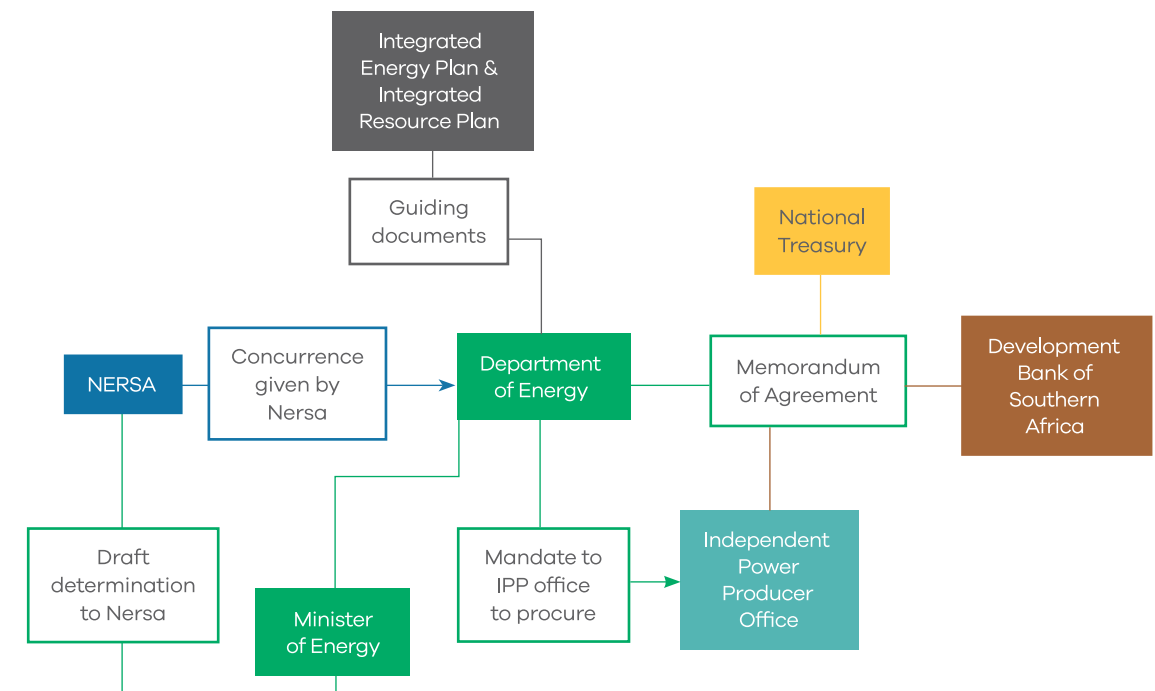


Figure 3: Governance structure of IPPPO³

³ DoE (Department of Energy) is now known as the Department of Mineral Resources and Energy (DMRE), established in June 2019 as a merger between the Department of Energy and Department of Mineral Resources



Figure 4: IPPO procurement process

South Africa's renewable energy market has grown exponentially over the last few years since the inauguration of the Independent Power Producers Office (IPPO) in 2010. The IPPO, with the support of the Department of Mineral Resources and Energy (DMRE), has procured 6 422 MW of

electricity to date (IPPO 2019). This has been managed through six bid windows (BW)⁴ in the large-scale REIPPPP, and through two bid rounds in the small REIPPPP. At the utility scale, IPPs are the mechanism through which renewable energy is currently added to the SA energy mix.

REIPPPP highlights to date:

- In the large-scale REIPPPP, 90 projects have reached financial close;
- The last BW4 project reached financial close on 15 December 2018;
- A remaining BW3.5 project is scheduled to reach financial close by end 2020, while financial close for a BW3 project still needs to be determined. Scheduled commercial operations for these projects will commence from late 2019 to 2022; and
- The small programme and future bid windows are currently on hold, pending the release of the new IRP2019 determinations.

Energy supply capacity impact of the REIPPPP (by March 2019):

- 6 422 MW of utility-scale renewable energy has been procured from 92 renewable energy Independent Power Producers (IPPs) in four bid rounds;
- 3 976 MW of electricity generation capacity from 64 IPP projects has been connected to the national grid; and
- 38 184 GWh of energy has been generated by renewable energy sources procured under the REIPPPP since the first project became operational in 2014.

The REIPPPP has been lauded globally for its clear mandate, growth path and independence in its procurement approach. This is clearly illustrated through a tariff decline of more than 150% over six years, with the levelised cost of electricity for wind and solar in the expedited round coming in at less than R0.62/kWh (see Figure 5). Each bid window has also seen a major oversubscription in tender submissions from numerous local and international developers and investors.

The impacts of the REIPPPP have included the following (IPPO 2019):

- Investment (equity and debt) to the value of R209.7 billion, of which R41.8 billion (20%) is foreign investment, was attracted;
- Created 40 134 job years to date;
- Socio-economic development contributions of R860.1 million to date; and
- Enterprise development contributions of R276.7 million to date.

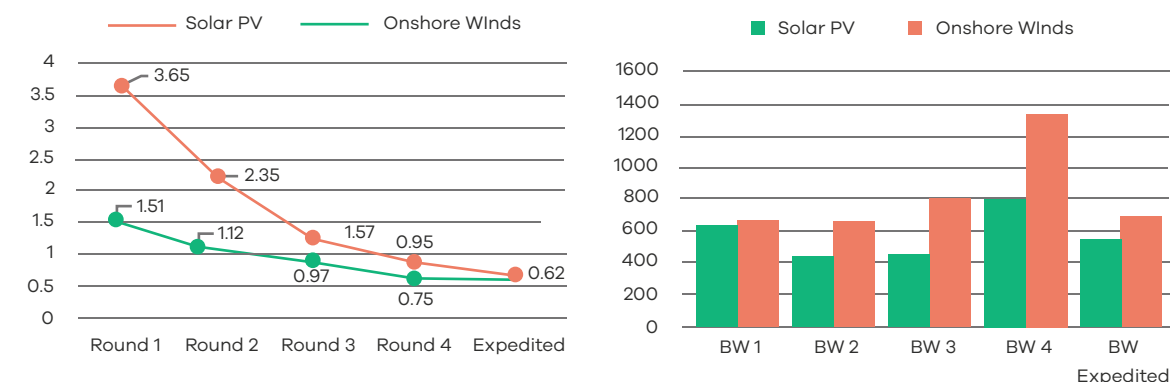


Figure 5: Tariff decline and MW awarded for solar PV and onshore wind across all bid windows

Figure 5 illustrates the average tariff decline in the wind and solar PV sector over the four bid windows, plus expedited rounds that have been initiated, together with the capacity awarded for each bid window.

To date, 6 422 MW has been procured in the large- and small-scale IPP programmes combined with the status of the un-concluded projects shown in Table 5 below.

Table 5: As of end of 2019, the breakdown of the large-scale and small-scale REIPPPP procured, determined and operational capacity allocations across all renewable energy technologies

Programmes	Large-scale IPP			Small-scale IPP		
	Procured	Operational	Determined	Procured	Operational	Determined
Wind	3 357	1 980	6 360	9	0	400
Solar PV	2 292	1 474	6 225	80	-	-
Concentrated solar power	600	500	1 200	0	-	-
Landfill gas	13	22	540	0	-	-
Small hydro	19	-	-	0	-	-
Biomass	42	-	-	10	-	-
Total	6 323	3 976	14 325	99	0	400

⁴ Determinations were made for 6 bid windows – 1, 2, 3, 3a, 4 and the expedited round. Energy has only been procured from 4 bid windows – 1, 2, 3 and 4.

2.2. 2019 Integrated Resource Plan (IRP 2019)

The integrated resource plan is a national government document that aims to provide a clear indication of South Africa's electricity demand and how this demand will be supplied and at what cost.

Section 34(1)(a) of the Electricity Regulation Act 4 of 2006 (ERA) allows the Minister of Energy, in consultation with the NERSA, to make Ministerial Determinations for new generation capacity if they believe that it is required to secure the continued, uninterrupted supply of electricity. The Ministerial Determinations may also outline the type of energy sources from which electricity must be generated. These decisions are based on the most up-to-date Integrated Resource Plan.

In May 2011 the then Department of Energy – now the Department of Mineral Resources and Energy (DMRE) – released the Integrated Resource Plan 2010–2030 (IRP 2010) in respect of South Africa's forecast energy demand for the 20-year period from 2010 to 2030. The IRP 2010 was intended to be a 'living plan' that would be reviewed by key stakeholders at least every two years. However, this was never done and resulted in an energy mix that failed to adequately meet the constantly changing supply and demand scenarios in South Africa. Since the promulgation of IRP 2010–2030, the following capacity developments have taken place:

As indicated in the preceding section, a total of 6 422 MW under the REIPPPP has been procured, with 3 976 MW operational and made available to the grid. In addition, IPPs have commissioned 1 005 MW from two open cycle gas turbine (OCGT) peaking plants. Under the Eskom build programme, the following capacity has been commissioned: 1 332 MW of Ingula pumped storage, 1 588 MW of coal (Medupi), 800 MW of coal (Kusile) and 100 MW of wind (Sere Wind Farm). In total, 18 000 MW of new generation capacity has been committed to (See Table 8). Besides capacity additions, a number of assumptions have changed since the promulgation of IRP 2010–2030. Key assumptions that changed include the electricity demand projection (decreased by 0.6% since 2010), Eskom's existing plant performance (ranging between 68% and 72% in 2019), as well as new technology costs.

Since 2010, there have been several draft revisions of the IRP that have been distributed for public comment. In 2018 an updated 2018 IRP was released for public comment and National Economic Development and Labour Council (NEDLAC) consultations. The IRP generally considers several scenarios, with the policy adjusted IRP being the primary plan.

Table 6: Capacities for least-cost plan by year 2030 (DoE 2019)

Year	PV (MW)	Wind (MW)	Gas (CCGT/CC-GE/OCGT) (MW)	Landfill Gas (MW)
2025	-	-	2 380	-
2026	-	-	750	250
2027	2 290	-	1 480	-
2028	1 640	2 500	2 200	-
2029	2 180	2 800	2 200	-
2030	1 710	3 700	1 930	-
Total	7 820	9 000	10 940	250

Different scenarios that led to the new IRP 2019 can be seen below:

- The least-cost scenario, dubbed IRP1
- IPR2 – including annual build limits
- IRP 2019 – the policy adjusted scenario

The least-cost scenario, dubbed IRP1 (see Table 6), outlined in the draft IRP 2018 document, envisages no yearly limits on the integration of variable renewable energy to 2030.

It includes only technology choices that represent the least cost to the country, and increased allocations as prices decrease. By forcing annual build limits on PV and wind, i.e. the maximum limit of a specified technology that can be built in a given year, the plan brings procurement of renewable energy closer to 2024 and creates a market for local manufacturing of RE components. The impact of adding build limits to the least cost scenario can be seen in Table 7. The annual build limits bring forward PV procurement from 2027 in Table 6 (no build limits) to 2024, Table 7.

Table 7: Capacities for least-cost plan by 2030 with annual build limits on renewable energy (DoE 2019)

Year	PV (MW)	Wind (MW)	Gas (CCGT/CC-GE/OCGT) (MW)	Landfill gas (MW)
2024	1 000	-	-	-
2025	1 000	1 600	-	-
2026	1 000	1 600	2 380	-
2027	1 000	1 600	1 650	-
2028	1 000	1 600	1 950	-
2029	1 000	1 600	3 000	250
2030	1 000	1 600	1 800	-
Total	7 000	9 600	10 780	250

The policy adjusted scenario is shown in Figure 6. below (the final IRP 2019). For the period ending 2030, a number of policy adjustments are proposed to ensure a practical plan that will be flexible to accommodate new, innovative technologies that are not currently cost competitive. It will minimise the impact of decommissioning of coal power plants and the changing demand profile.

Some of these adjustments include increased build limits to smooth the rollout of renewable energy, which will help sustain the industry, and the inclusion of 1500 MW of coal-to-power aimed at minimising the impact of job losses resulting from the decommissioning. These policy adjustments will be retained, pending a report on the just transition strategy⁵.

⁵ Just Transition is a report to be drafted by the National Planning Commission (NPC). It aims to develop pathways and inform a strategy to transition to a low carbon society that also addresses the triple challenge of reducing poverty and inequality, and create jobs

	Coal	Cost (Decommissioning)	Nuclear	Hydro	Storage	PV	Wind	CSP	GAS/ Diesel	Other (Distributed Generation, Cogeri, Biomass, Landfill)
Current	31715		1860	2100	2912	1474	1980	300	3830	499
2019	2155	-2372	-	-	-	-	244	300	-	Allocation to the intent of the short term capacity and energy gap
2020	1433	-557	-	-	-	114	300	-		
2021	1433	-1403	-	-	-	300	818	-		
2022	755	-344	-	-	513	400	1600	-		
2023	750	-555	-	-	-	1000	1600	-	-	500
2024	1 000	-	1660	-	-	-	1600	-	1000	500
2025	7 000	-	-	-	-	1000	1600	-	-	500
2026	-	-1734	-	-	-	-	1600	-	-	500
2027	750	-547	-	-	-	-	1600	-	2000	500
2028	-	-475	-	-	-	1000	1600	-	-	500
2029	-	-1654	-	-	1575	1000	1600	-	-	500
2030	-	-1656	-	1500	-	1000	1600	-	-	500
Total Installed Capacity by 2030 (MW)		33164	1660	4600	5000	8288	17742	600	6380	-
% 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)		58.3	4.5	0.3	1.2	6.3	17.8	0.6	1.3	-

Figure 6: Policy adjusted plan IRP 2019

Table 8: New additional capacity by 2030 based on IRP 2019

Technology	IRP 2019 Provisions by 2030 (MW)
Coal	1 500
Nuclear	1 860
Hydro	2 500
Storage	0
PV	6 000
Wind	14 400
CSP	0
Gas/Diesel	3 000
Other	4 000

The other technology category includes distributed generation, co-generation, biomass, and landfill. The 2019 IRP increased the renewable energy capacity, not including distributed generation, to 33% by 2030. It also makes a strong statement towards encouraging new industries, job creation and localisation across the value chain (IRP 2019).

2.3. Key market players

Stakeholders in the REIPPPP are best categorised according to the project development phases that the programme follows: development, construction, and operation and maintenance. Accordingly, the key players or company types involved in this market are described in Figure 7, with an indication of the project development phase in which they are typically involved.

IPP	Independent power producer. It is responsible for project inception and development, land acquisition, finance sourcing, and bid submission. It may sometimes be a project sponsor or may submit a bid with the backing of such an entity. Project stages involved: Project development, project construction, project operation and maintenance.
OEM	Original equipment manufacturer. Suppliers of key technology, e.g. the manufacturer of the selected turbine in a wind farm. This company will play a major role in determining the technology partners that will constitute a project, and may also play the role of O&M (see below). Project stages involved: Project construction, project operation and maintenance.
O&M	Operation and maintenance company. It is usually the main equipment supplier or a technical entity well-versed in the specific technology. Project stages involved: Project construction, project operation and maintenance.
EPC	Engineering, procurement and construction. Typically, this player is responsible for managing the various sub-contracts in the construction phase of a project. It may also be involved in the design and development phase of the project. Project stages involved: Project development, construction and O&M.

Figure 7: Typical company types involved at different stages of project life

2.4. REIPPPP market size

The REIPPPP has attracted investment from prominent global renewable energy project developers and Tier 1 component manufacturers. It has done so because of the growth potential, localisation requirements, the programme's transparency, and strong government support. Global leaders such as Abengoa, Mainstream Renewable Power, Jinko, and Canadian Solar, as well as South African developers such as Pele Green Energy, Aurora Power Solutions and Biotherm Energy, have entered the market.

The REIPPPP has attracted investment (equity and debt) to the value of R209.7 billion, with foreign investment constituting R41.8 billion (20%) of total investment attracted into SA. Some of the main contributing countries are Germany, France, Italy, Spain, and the USA.

2.4.1. Economic value of renewable energy facilities

A Council for Scientific and Industrial Research (CSIR) study (CSIR 2015) demonstrates that between January and June 2015, REIPPPP projects with some 800 MWp and 1 GWp of wind and solar PV respectively, generated up to R4 billion more in financial benefits than their cost. As projects from more recent rounds of the programme come online, the installed capacity and financial benefits realised will continue to increase as these projects offer much lower tariffs and costs (IPPO March 2017) than their predecessors (see Table 9).

Table 9: Tariffs offered by solar PV, wind, and CSP projects over bid windows [R/kWh]

Programmes	Large IPP						Small-scale IPP	
	Round 1	Round 2	Round 3	Round 3.5	Round 4 a, b	Expedited	S1	S2
Wind	1.51	1.19	0.87	-	0.75	0.62	1.15	-
Solar PV	3.65	2.18	1.17	-	0.91	0.62	1.22	1.01
Concentrated solar power	3.55	3.32	1.93	1.8	-	-	-	-
Landfill gas	-	-	1.11	-	-	-	-	-
Small hydro	-	1.36	-	-	1.24	-	-	-
Biomass	-	-	1.65	-	1.61	-	1.65	-

2.4.2. Investments made to date

Total investments made in the programme (debt and equity) over the procured bidding windows, excluding the expedited round, totalled more than R209.7 billion as of June 2019 (IPP Office). This is split between domestic (80%, R167.9 billion) and foreign (20%, R41.8 billion) investments.

The programme has been successful not only in attracting investments, but also in attracting them from a wide variety of investment sources (see Figure 8.)

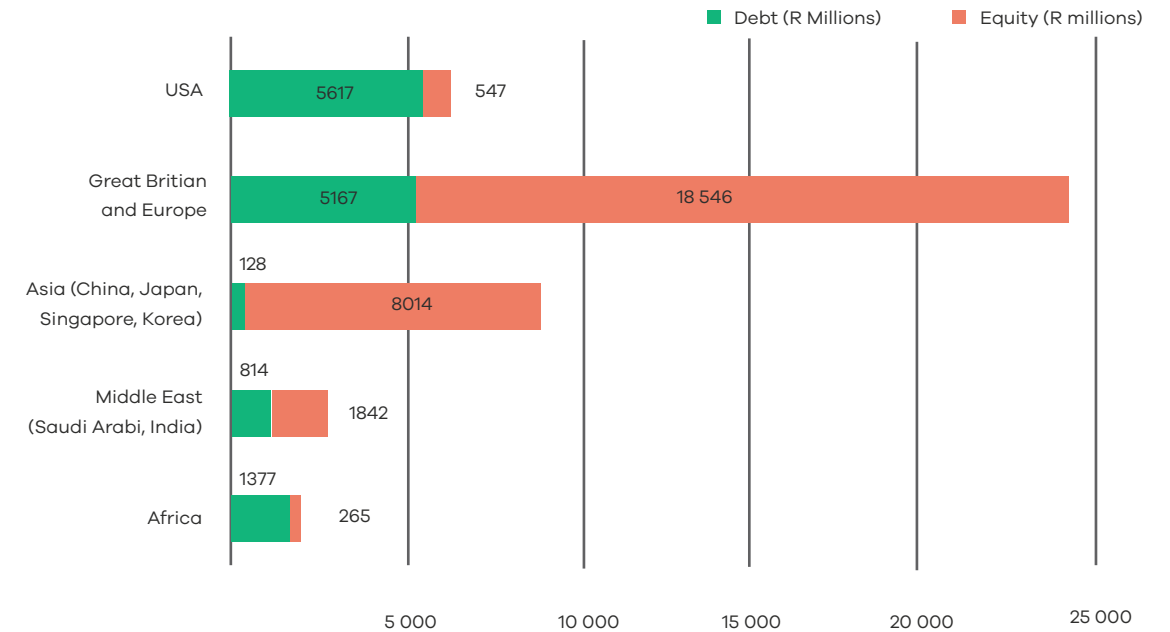


Figure 8: Countries from which private investments in the REIPPPP were made

Allocations of generation capacity Table 10 presents final capacities per round, including the small IPP programme. As the table shows, wind and solar PV are the dominant technologies in terms of actual capacity procured. Later rounds of the programme will have to adjust their allocated technology because of favourable bid prices as well as high (over-) subscription rates.

Table 10: Actual procured generation capacities per REIPPPP bid window⁶

Programmes	Large-scale IPP					Small-scale IPP	
	Round 1	Round 2	Round 3	Round 3.5	Round 4 a,b	S1	S2
Wind	639	555	785	0	1 363	5	5
Solar PV	625	414	435	0	813	30	50
Concentrated solar power	150	50	200	200	0	0	0
Landfill gas	0	0	13	0	0	0	0
Small hydro	0	14	0	0	5	0	0
Biomass	0	0	17	0	25	10	0

⁶ Determinations were made for 6 bid windows – 1, 2, 3, 3a, 4 and the expedited round. Energy has only been procured from 4 bid windows – 1, 2, 3 and 4

In the large scale REIPPPP, 90 of the 92 projects have reached financial close. The last BW4 project reached financial close on 15 December 2018. The remaining BW 3.5 project is scheduled to reach financial close by end 2019, while financial close for the remaining BW 3 project still needs to be determined. Scheduled commercial operations for these projects will commence from early 2020 to 2022. The small-scale programme and future bid windows are currently on hold, pending a determination by the Minister of Mineral Resources and Energy based on the IRP 2019.

Table 11: Future pipeline based on IRP 2019 allocations

Technology	Indicative ZAR (million/MW cost)	IRP 2019 new capacity (MW)	Potential market value
Solar PV	R16.5 million	6 000	R99 billion
Wind	R18.8 million	14 400	R271 billion
SSEG	R12.0 million	4 000	R48 billion

2.5. Economic development through the REIPPPP

Energy security and investment aside, the REIPPPP contributes directly to South Africa's broader national development agenda. This is both by design and through the willingness of industry players who recognise the South African socio-economic context in which they are developing projects.

The REIPPPP's economic development (ED) component comprises a 30% qualification criterion for each tender proposal, while the tariff price accounts for 70%. As the REIPPPP progresses, the tariffs are becoming increasingly competitive, with the range and impact on the overall tender becoming less significant. It is therefore becoming more important to improve the economic development objectives listed below in order to be more competitive.

- **Job creation:** focusing on South African citizens, black South African citizens⁷, and those local to projects;
- **Local content:** capturing as much of the local project spend as possible;

2.4.4. Future pipeline based on IRP 2019 allocations

Using an indicative R/MW overnight capital cost per technology, an approximate market value per technology based on IRP 2019 allocations is depicted in Table 11 below. The renewable energy potential market is valued at R 418 billion.

- **Ownership:** advancing ownership by black South Africans and local communities;
- **Management control:** increasing the presence of black South Africans in management of the economy;
- **Preferential procurement:** empowering black-, women-, youth-owned, and small enterprises;
- **Enterprise development:** developing small businesses in local communities, and stimulating the local economy;
- **Socio-economic development:** addressing some of the socio-economic needs of communities local to projects.

Over the six bid rounds there has been little change between the minimum and target development objectives, with contribution to the ED scorecard shown below. The only major change has been the local content requirements in bid windows 1, 2, 3, 3.5, and 4, and expedited round shown in Table 12. This is expected to continue to increase or at least remain the same in future bid windows.

Table 12: Economic development through the REIPPPP BW 1 – 4

Bid Windows	BW 1		BW 2		BW 3, 3.5 and 4	
	Min%	Target%	Min%	Target%	Min%	Target%
Job creation						
SA citizens	50	80	50	80	50	80
SA citizens who are black	30	50	30	50	30	50
Skilled black SA citizens	18	30	18	30	18	30
SA citizens from local communities	12	20	12	20	12	20
Local content						
Onshore wind, CSP with storage, small hydro, landfill gas, biomass, biogas	25	45	25	60	40	65
Solar PV and CSP	35	50	35	60	45	65
Ownership						
Shareholding by black people and/or black enterprises in the seller	12	30	12	30	12	30
Shareholding by local communities in the seller	3	5	3	5	3	5
Shareholding by black people and/or black enterprises in the construction contractor	8	20	8	20	8	20
Shareholding by black people and/or black enterprises in the operations contractor	8	20	8	20	8	20
Management control						
Black top management	0	40	0	40	0	40
Preferential procurement						
BBBEE procurement spend	–	60	–	60	–	60
SME and QME (QSE and EME) procurement	–	10	–	10	–	10
Women-owned vendor procurement	–	5	–	5	–	5
Enterprise development						
Enterprise development contributions	–	0.6	–	0.6	–	0.6
Adjusted enterprise development contributions	–	0.6	–	0.6	–	0.6
Socio-economic development						
Socio-economic development contributions	1.0	1.5	1.0	1.5	1.0	1.5
Adjusted socio-economic development contributions	1.0	1.5	1.0	1.5	1.0	1.5

⁷ "Black people is a generic word which means African, Coloured or Indian, who are citizens of the Republic of South Africa by birth; who became citizens of RSA by naturalisation before 27 April 1994; on or after 27 April 1994 and who would have been entitled to acquire citizenship by naturalisation prior that date" (dtic, November 2018)

The ED objectives are expected to change in future bid rounds as a result of local communities within a 50 km radius of the project site receiving delayed income⁸, and local content rules being open to exploitation.

In future rounds it is expected that there will be a number of improvements, including:

- Redefining a local community or clarity on the definition of 'a local community';
- ensuring that local communities receive early, efficient and equitable benefits;
- a focus on technology-specific items for localisation – laminating of panels, construction of towers, blades, etc. have to be done locally;
- more stringent burdens of proof, for instance, CFOs will require signed certificates supporting accurate financial reporting from auditors.

To date there are 62 community trusts implementing numerous economic development activities across SA. Many of these projects are supporting communities in rural locations, where community resourcing is scarce. As with many local development initiatives, the upskilling and integration of new technology, and partnerships between international and local teams require patience and consistency. Success stories are communicated by the various industry associations concerned, including the South African Photovoltaic Industry Association (SAPVIA) and the South African Wind Energy Association (SAWEA).

Among many others, highlights include more than 40 134 job years created in construction, and operation and maintenance (IPPO 2019), whilst numerous large investments have been made in manufacturing and assembly.

The IPPs and local communities partnerships have created 40 134 job years for South African citizens to date; socio-economic development contributions of R860.1 million and enterprise development contributions of R276.7 million. Qualifying communities will receive R29 billion in income over the project's 20-year lifespan as a result of the minimum ownership requirement of 2.5%.

To truly demonstrate the impact and future benefits of the programme, it is necessary to look at programmes on the ground. One such example is the South African Renewable Energy Technology Centre (SARETEC) at the Cape Peninsula University of Technology (CPUT) campus in Bellville, Cape Town. As well as short courses on solar PV systems and biomass technologies, SARETEC now offers internationally accredited courses for wind turbine services technicians and solar photovoltaic service technicians. The institution was specifically founded to cater for the REIPPPP's skills requirements, particularly in the long-term operation and maintenance phases of projects.

3

Policies and regulation

Policies and regulatory frameworks provide regulatory certainty to the market and guide the development of the renewable energy sector in South Africa

3.1. Guiding policies

According to the national Department of Economic Development, South Africa's economic growth is guided by several key policies, as shown in Figure 9. Of these, the policies highlighted relate directly to REIPPPP procurement (Figure 10). The economic development component ensures the REIPPPP creates

sustainable value for the local communities, and ultimately South Africa's economic development; through revenue obligations to which the IPPs have committed. The design of the REIPPPP takes into account all these policies, making it a highly strategic infrastructure and development programme.

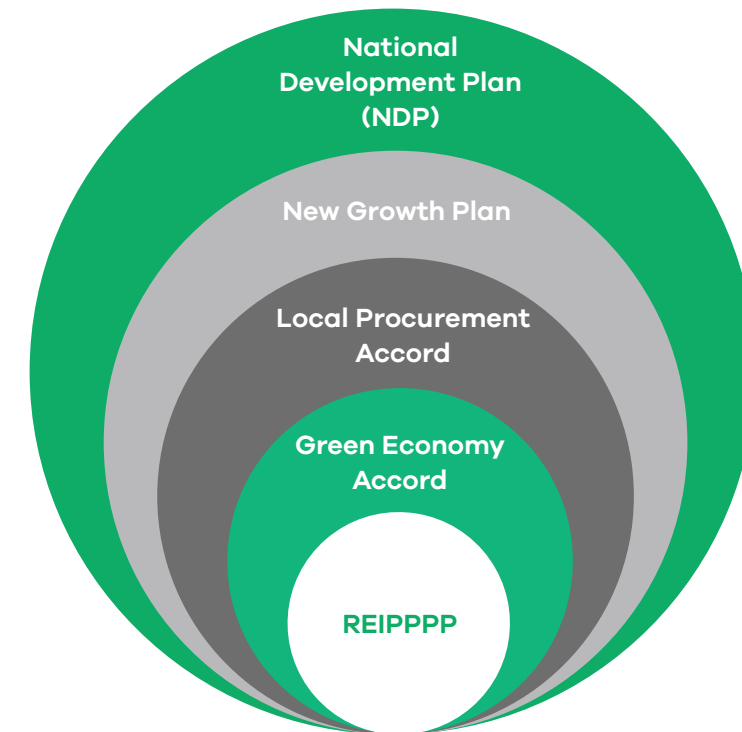


Figure 9: Policies guiding South Africa's economic growth trajectory

⁸ Price from the most recent bid window of South Africa's REIPPPP puts the capital costs used for wind and solar PV in the draft IRP 2018/19 at R18 847/kW and R16 555/kW respectively for large scale and R12 000/kW for small scale.

Plan (NDP) (August 2012)	Aims to eliminate poverty and reduce inequality by 2030.
New Growth Path (November 2010)	Sets targets for creating jobs and identifies priority areas, with infrastructure development named as key to the success of this vision.
Local Procurement Accord (October 2011)	As the economy grows and the country industrialises, this accord sets an aspirational target of 75% of all products used in the country to be manufactured locally. This is particularly evident in the REIPPPP's local content rules.
Green Economy Accord (November 2011)	Together with the New Growth Path, this accord between government, labour and business seeks to shift the country's economy towards sustainable development, green job creation, and industrial development.
Integrated Energy Plan (IEP) (December 2016)	Outlines the general energy plan for the country. The IEP looks into energy security, access to energy, reducing cost of energy supply, energy efficiency, localisation and sustainability in all energy matters.
Integrated Resource Plan (IRP) (November 2019)	Specifically outlines the planning, sourcing, and quantities of electricity generation sources contributing to the country's generation mix.
Renewable Energy White Paper (November 2003)	Determines that a significant and equitable level of national resources should be invested in Renewable Energy, while also setting targets for RE generation capacity.

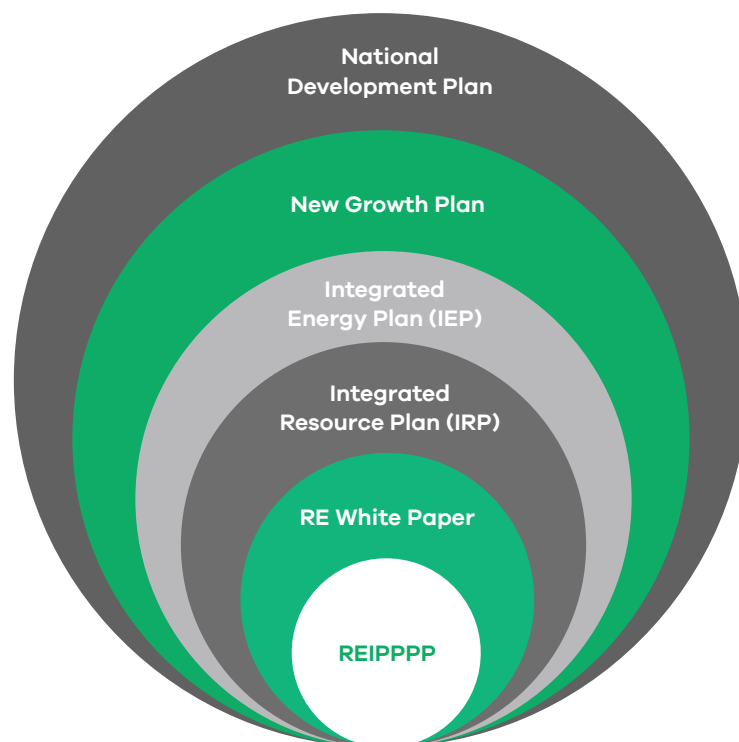


Figure 10: Eco-system of policies relating to the REIPPPP

3.2. Government departments involved in the energy and electricity sector

Different government departments are involved in various capacities in executing the policies listed in Section 3.1. The most prominent departments, according to the 2018 South African Energy Sector Report, are listed below with a brief summary of their interaction with the REIPPPP:

Department of Mineral Resources and Energy (DMRE)	The mission of the DMRE is to regulate and transform the sector for the provision of secure, sustainable and affordable energy, and the promotion and regulation of minerals and mining. This includes the electricity sector, which is governed mainly through the Electricity Regulation Act 4 of 2006). This department was previously referred to as the Department of Energy (DoE).
National Energy Regulator of South Africa (NERSA)	NERSA issues licences for the operation of generation, distribution, and transmission infrastructure; regulates imports, exports, and trading of electricity; determines and approves electricity prices, tariffs, and the conditions under which electricity may be sold.
National Nuclear Regulator (NNR)	NNR regulates the operation of nuclear power stations, such as Koeberg and all elements of the South African nuclear energy value chain. Its role is to protect people, property, and the environment against nuclear damage.
Department of Public Enterprises (DPE)	The Minister of Public Enterprises is the shareholder representative of the South African government and has oversight responsibility for Eskom.
National Treasury (NT)	NT is responsible for financial and reporting oversight for Eskom (as a state-owned entity), and has played a pivotal role in providing government loans and guarantees in favour of Eskom.
Department of Water Affairs (DWA)	DWA oversees water allocations and ensures that there is adequate water supply infrastructure, among others, for the South African electricity sector.
Department of Agriculture, Forestry and Fisheries (DAFF)	DAFF ensures adherence to environmental compliance and protection of rights relating to the prevention of pollution, ecological degradation, promotion of conservation, and securing ecologically sustainable development.
Department of Trade, Industry and Competition (DTIC)	Responsible for ensuring industrialisation through the REIPPPP's economic development component, especially local content; as well as black economic empowerment and development of small businesses.

4 Opportunities and barriers

Changes in the country's electricity sector continue to present a variety of opportunities in the utility-scale renewable energy market.

This section discusses the opportunities presented by the 2019 Integrated Resource Plan and challenges to the RE sector's growth. This section also details additional and continuing opportunities presented by the market.

4.1. Renewable energy IRP 2019 allocations

The substantial drop in solar PV and wind prices has had an impact on South Africa's future energy mix. Technology improvements, improved investor risk appetite, and the global renewable energy drive could result in solar PV and wind

prices as low as R0.46/kWh and R0.56/kWh by 2030 (Wright et al. 2017). Based on the IRP 2019, government still expects to procure more than 24 GW of renewable energy generation capacity by 2030 (see Table 13).

Using an indicative R/MW overnight capital cost per technology⁹, the approximate market value per technology based on IRP 2019 allocations is R99 billion (for solar PV), R271 billion (for wind) and R48 billion (for distributed generation less than 10 MW).

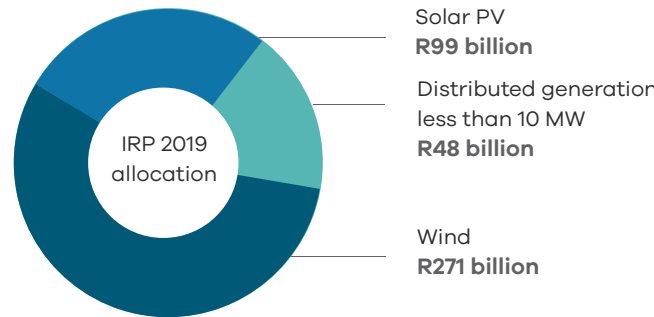


Table 13: Procurement outstanding based on IRP adjustments from 2010 – 2019

IRP adjustments	RE goal 2030	Procured to date	Determined to date	To be procured
IRP 2010 – 2030 policy adjusted	17 800	6 422	14 725	11 424
Draft 2016 IRP base case 2030	19 647			19 647
Draft 2016 IRP carbon budget 2030	33 347			33 347
IRP 2018 draft	22 490			16 068
IRP 2019	30 630			24 208

⁹ The Draft SoWR can be found at <http://sawic.environment.gov.za/?menu=346>

The latest Integrated Resource Plan (IRP) 2019 allocations indicate 14 400 MW for wind, 6 000 MW Solar Photovoltaic (PV), and a minimum of 4 000 MW of small-scale embedded generation (SSEG) to be procured by 2030. It has the potential of attracting more than R420 billion in the next 12 years.

An additional key outcome of the IRP 2019 is the coal decommissioning schedule. According to the IRP 2019, 5 400 MW of electricity from coal generation by Eskom will be decommissioned by 2022, increasing to 10 500 MW by 2030 and 35 000 MW by 2050. It is also expected that by 2024, 1 800 MW of nuclear power generation (Koeberg) will reach end-of-life. Eskom has initiated preparations and processes to extend the life of this plant to 2044 (IRP 2019).

The extent of the planned decommissioning will provide space for a completely different energy mix with a focus on incremental capacity addition (modular) and flexible technology, to complement the existing installed inflexible capacity (IRP 2019). This newly envisioned energy mix presents an exciting opportunity for the future of the REIPPPP as a tool that attracts investment and creates jobs in the South African economy.

Bid Window 5 of the REIPPPP and the influence of the IRP 2019

The major driver for BW 5 opportunities is the IRP 2019. It has some major changes in comparison to the policy-adjusted IRP of 2010. These major changes in the envisioned allocations have come on the back of a number of market shifts since 2010:

- A drop in Eskom plant performance availability (policy-adjusted IRP of 2010 assumed to be 86% but actual results have been 77% for 16/17 and below 70% in 2018/19 [Eskom 2019]);
- South African electricity demand is now 30% lower than the 2010 expectation with an overall decrease of 0.6% since 2010;
- Technology cost decline – wind, solar (see section 3.3). These market changes have led to shifts in the IRP 2019;
- The exclusion of concentrated solar plants up until 2030;
- The increase in the contribution of RE to the energy mix. RE can potentially fulfil 33% of energy production of 321 TWh by 2030;

Risk Mitigation Power Purchase Programme

A request for information call for a short term supply capacity of approximately 3 000 MW issued in December 2019. The aim of the program is to procure electricity from private producers that can be rapidly added to the grid to address the current electricity supply constraints. This represents an opportunity for all stakeholders in the RE value chain (see Section 2.3).

- Extended life of Koeberg plant to 2044, subject to the necessary regulatory approvals;
- Two new smaller coal-fired generation plants (750 MW each); and
- Gas and storage also playing a role in the energy mix over the next decade.

A closer look at the programme's yearly rollout as per the IRP 2019 — specifically solar PV and wind energy capacity, the dominant technologies — demonstrates a market opportunity with a future market of R50 billion/year (~2600 MW of wind and solar/annum) thereafter (excluding 2024, 2026 and 2027).

The timing of the bid window 5 remains unclear. However, it is expected that a new bid round, i.e. [bid window] 5 will be launched in 2020, and it is estimated to be 1 800 MW of similar technologies as in the expedited bid window. The new bid window is also set to include an increased focus on transformation, localisation, and community upliftment requirements, which will provide the government with an opportunity to accelerate its transformation agenda. Specifically, the bid window will encourage opportunities for black industrialists and the development of black owned IPPs.

The importance of local economic development in REIPPPP bid window 5

As the price points for successful bids bottom out, the strategic advantage for winning bids will shift to those with stronger, more creative economic development programmes, involving:

- local content;
- local procurement; and
- community benefits.

There are therefore opportunities for:

- investors into local manufacturing of RE technology components;
- local enterprises that supply into the RE value chain; and
- community initiatives in and around selected project locations.

Over successive bid windows, the local content levels required of successful projects have increased. This trend, combined with increasingly competitive tariffs and decreasing grid availability, all contribute to the growing importance of creatively delivered economic development plans, such as local content socio-economic development, in selecting successful projects.

Table 14: Local economic development opportunities in REIPPPP bid window 5

Local economic development potential	Opportunity description
South Africa to focus on the job creation potential of the renewable energy sector	<p>Directly linked to a shift in the South African electricity sector, as detailed by the IRP2019, is the transition of coal-based jobs. The loss of jobs in the coal sector and the job creation potential of the RE sector remains a major issue steering the IRP 2019. CSIR analysis shows that oil and gas sector can create 60 000 jobs with an additional 110 000 jobs in the PV and wind sector by 2030. However, only a net surplus of 30 000 jobs will be created by 2030 as a result of the decommissioning of coal plants.</p> <p>This can be viewed either as a major obstacle or a unique opportunity to embark on a just transition from coal mining jobs to jobs in renewable energy and gas. These jobs, however, might not be in the same geographies or employ the same individuals. A great deal of work is already underway to support this transition and provide opportunities to re-skill and re-train, but this will have to be ramped up. This represents an opportunity for training providers and for intergovernmental cooperation, for SA to learn how to manage these transitions and drive resilient job creation.</p>
The availability of black equity players to participate in meeting the 12.5% BEE shareholding requirement in each developed project	<p>The REIPPPP sets out a minimum BEE of 12.5% shareholding in each renewable energy project. Assuming there are consistent ministerial determinations, current major black equity players are likely to be the only stakeholders financially eligible to participate in the upcoming projects. Therefore, there is a potential opportunity within the REIPPPP shareholding equity structure that can enable medium-sized BEE equity players to participate.</p>

4.2. Renewable Energy manufacturing potential

There is an opportunity in the REIPPPP for solar PV, wind tower and battery OEMs who are already supplying into the REIPPPP¹⁰. They can sharpen their competitive advantage by aligning closely with the country's industrialisation agenda (see section 3) and with the dtic's Special Economic Zone (SEZ) programme, which in the Western Cape has translated into the Atlantis SEZ for Green Technologies.

Localisation studies have been commissioned by the Department of Trade, Industry and Competition (dtic) for solar PV, wind energy, and concentrated solar power (CSP) technologies. The purpose of these studies is to define which and how many components can be manufactured or assembled locally. The dtic, for example, indicates in its wind energy industry localisation roadmap (dtic 2017) that the localisation of wind energy technology could result in setting up:

- between one and five wind tower manufacturing facilities¹¹;
- one blade manufacturing facility; and
- one facility to assemble nacelles and hubs.

The dtic localisation study for solar PV has found that it is feasible to set up at least five solar PV component manufacturing facilities in the country (provided a minimum annual allocation of 1 000 MW). Noting the possibility of increasing the uptake of solar PV generation as per the IRP 2019 and the rapid growth of the SSEG solar PV industry (see GreenCape's [Energy Services MIR](#)) and distributed generation market, there is an even larger manufacturing opportunity than may have been determined previously.

According to the Provincial Economic Review and Outlook 2018/19, the Western Cape alone has in the past four years realised around R500 million in investments in RE component manufacturing. This amount excludes spend on local services such as logistics, and civil and electrical works for projects based within the province and nationally.

In line with the REIPPPP's developmental contribution, the Atlantis GreenTech SEZ and the Eastern Cape's East London and Coega IDZs have attracted investments in wind tower facilities and component manufacturing. The City of Cape Town has also welcomed a considerable number of developers, panel manufacturers and inverter companies that have set up offices and manufacturing facilities in the city.

With the increasing focus on local content and SED in REIPPPP bid rounds and the minimum annual allocation in the 2019 IRP, local manufacturing represents an opportunity for investors and OEMs.

4.2.1. Local PV panel manufacturing

The local content requirement of BW4 aims to enforce local lamination and assembly in the solar PV manufacturing value chain. However, panel providers require a minimum market of 1 000 MW per year to justify a local production facility. The IRP 2019 indicates that there is a market of approximately 6 GW of solar PV by 2030, with 814 MW already committed over three years.

Table 15 below shows a number of solar PV assemblies/manufacturers located in South Africa, which have been set up primarily as a result of the REIPPPP. To compensate for the delays in the REIPPPP, companies have followed different business paths to manage the risk.

¹⁰ Local content (65%) is one of the non-price ED categories (see Table 12) that contributes to total weighting contribution of the ED score. It is also one of the categories (together with job creation, ownership, and socioeconomic development) with a minimum threshold that should be met for a bid to progress to the next stages of evaluation.

¹¹ Two wind tower manufacturing facilities have already been set up in South Africa, one of which is located in Atlantis, Western Cape, and the other in Coega, Eastern Cape (recently shut down).

Table 15: Local solar PV manufacturing

Company	Status
Jinko Solar	Closed down 120 MW manufacturing facility due to delay in REIPPPP
Sun Power	160 MW/year facility – currently dormant
ART Solar	75 MW/year facility – decreased capacity due to delay in REIPPPP
ILB Helios	300 MW/year facility – recently upgraded to tier 1 manufacturer in partnership with Seraphim

4.2.2. Local wind tower manufacturing

Two steel tower manufacturers have been set up in South Africa over the past eight years as a result of the REIPPPP; however, with increased competition and improvements in technology, concrete towers have become a viable option for new plants in BW 4a and BW 4b. Large developers and EPCs such as Enel, Building Energy, Innwind and Nordex/Acciona are using

concrete towers for their projects. The updated IRP 2019 provides a market of approximately 14.4 GW of onshore wind by 2030 with ~1.3 GW commencing construction over a three-year period. Table 16 below shows some of the key players in the local market.

Table 16: Key players in wind tower manufacturing/construction located in SA

Company	Status
DCD wind towers	Capacity of 200 towers per year; currently dormant due to delay in REIPPPP.
GRI towers	Capacity of 150 towers per year; not running at full capacity due to slowdown in REIPPPP.
Concrete towers	At least 5/12 projects of BW 4 making use of concrete towers; competitive pricing and improved design driving the movement.

¹² Navigant Research is a renowned market research and advisory team that provides in-depth analysis on global clean technology markets.

¹³ Generation of 1-10 MW

4.2.3. Local battery manufacturing

Beyond South Africa’s conducive sun and wind resources, the country has some of the world’s largest high-grade resources in vanadium, platinum, palladium, nickel, manganese, rare earths, copper and cobalt, which are used in the global energy storage sector and create an opportunity for new industry and localisation.

Navigant Research¹² forecasts that global revenue in advanced batteries for utility-scale applications will grow from \$221.8 million in 2014 to \$17.8 billion in 2023 at a compound annual growth rate (CAGR) of 62.8%.

In SA, the battery value proposition is dependent on the service offering/value stacking: frequency and voltage control, peak shaving, deferral of grid infrastructure. The allocation of gas in the IRP 2019 can theoretically be replaced with battery storage if it becomes financially viable, and can offer the same service as envisioned for gas. When included with the storage allocation as per the IRP, this represents a market of ~5 GW between 2022 and 2030.

Although the local market remains small, local manufacturing to provide battery storage for both grid services and utility-scale storage may represent a viable opportunity – if manufacturers access other markets from a South African base.

4.3. Municipalities exploring the option to procure from IPPs

As a result of rising electricity prices plus their efforts to reinforce their energy security, municipalities — which rely heavily on revenue from the sale of electricity to subsidise other customer services to their consumers — have begun exploring options to procure electricity from RE IPPs.

This presents a market opportunity, potentially for utility-scale projects, and the distributed generation¹³ sector. Until recently, the generation of electricity has been almost exclusively the mandate of national government, through Eskom. The biggest hurdles facing municipal power procurement are the current national regulations governing generation licensing, and the need for a ministerial determination to allow public procurement.

Municipality owned generation facility

Distributed generation (1-10 MW) through biomass, biogas and municipal waste are areas holding great potential for improving municipal revenues. All municipalities have sites for processing waste and wastewater. Technologies are available for these resources to be added to the generation mix. The IRP makes provision for distributed generation with an unlimited allocation until 2022, and 500 MW per year from 2023 until 2030.

A specific ministerial determination, like the one that enabled the various IPP programmes, is needed to allow municipalities to purchase directly from IPPs. Currently, there is no precedent for this. However, the CCT has made a request for such a determination¹⁴, and Ekurhuleni municipality released an RFP for IPP generation in the second half of 2016, followed by Buffalo City in 2019.

The success of such a programme would ultimately rest on a ministerial determination being made. Accordingly, the ongoing changes in legislation around generation licensing and own-use present opportunities for municipalities to increase their participation in the generation sector and, therefore, their energy autonomy.

Eskom battery storage pilot project

Eskom is preparing to issue request for bids (RFBs) for the battery storage flagship pilot project that will achieve a total of 1.4 GWh energy shifting per day. The project is split into two phases. Phase 1, to be completed by December 2020, focuses on environmental and social risk impact identification within parts of Eskom's existing infrastructure where the containerised battery units will be located. The second phase will primarily support the Eskom grid with peak shaving, frequency support and ancillary services, to be completed by December 2021. The battery storage system has been selected as the preferred solution to meeting the strategic requirements.

Overall, the pilot will drive the upscale of renewable energy due to increased battery storage capacity. It could potentially eliminate the need for additional new power plants to supplement the coal plants to be decommissioned.

The value chain details pertaining the project/s and the opportunities available across the entire value chain that will support the manufacturing, supply of precursor raw materials, installation and assembling, etc., will become clearer once the requests for bids are released in 2020.

Electricity wheeling and trading

Beyond direct sales from IPPs to municipalities, electricity wheeling and energy trading provide

opportunities for local distributed generators to increase their access to off-take agreements. Electricity wheeling, as allowed by the DMRE and implemented by local municipalities, will allow generators to wheel their electricity to a willing buyer anywhere in the municipality or country. This is currently being implemented by City of Tshwane, Nelson Mandela Bay Metropolitan Municipality, the City of Cape Town and Eskom. The release of regulations allowing private sector energy trading will also open the market to private sector power purchase agreements and on-sales to private consumers using the national and local distribution networks¹⁵.

4.4. Optimising Early Bid Windows

Two opportunities exist to optimise the early bid windows (1-4). They are the implementation of contracts to change O&M providers for individual IPPs (increase local participation), and refinancing of projects.

4.4.1. Option in implementation agreement contracts to change O&M provider

The early bid window plants reached commercial operation date (COD) in 2013/14. Clause 16 of the Implementation Agreement between the DMRE and the individual IPPs binds the individual IPP to a certain regulatory and governance structure protocol that is only subject to review three years after the COD. Clause 16 details the conditions and restrictions over Changes in Control, and Black Equity holdings.

As this restriction period lapses, there is an opportunity for the implementation contracts to change O&M providers for individual IPPs. This represents an opportunity for both current investors and new O&M providers (possible increase in local participation).

4.4.2. Refinancing of REIPPPP Bid Windows 1-4

As a result of the early adoption risk of renewable energy technology in SA, a market for refinancing existing plants and purchasing equity has emerged. This has the potential to unlock substantial value, with indications of a 1% to 3% margin increase for debt in early REIPPPP projects, increasing leverage (75% to 85%), and potentially 5% to 10% margins for equity.

Lower Eskom risk profile and drop in tariffs:

The REIPPPP has gone through a number of risk mitigation stages in the course of nine years, from off-take risk (Eskom), to sovereign guarantee (Treasury), technology, and construction risk. Possibly the most demonstrable indicator of the change in risk associated with the REIPPPP is the drastic drop in tariffs over the programme's lifespan (shown in Figure 5).

Major contributors to the drop in tariffs have been:

- falling global technology prices;
- growing competition, from 53 bidders in BW1 to over 100 in the later rounds;
- improved efficiencies in site selection; and
- lower financing costs, related to both equity and debt.

Competition for financing and equity provision has never been more intense.

International financiers and equity providers are introducing new foreign funding models and, in some cases, expecting lower returns. There are, however, a number of constraints on change in ownership and refinancing, which are explicitly detailed in the Implementation Agreement, point 8 and 16, in the request for qualification and proposals for new generation. Investors should note that:

- **No change in ownership is allowed without written consent by the DMRE and within a three-year lock-in period after COD.** Black Equity can also not be diluted through a change in ownership. The percentage of Black Equity has to be the same as proposed at bid, and submitted in Schedule 2 to the RFP.

- **There are no refinancing of debt** cases from which to work; however, commercial debt arrangers generally have a cancellation clause upon exiting a finance agreement within a specific period (3 years). The DMRE has indicated that there would be a potential need to share in the benefits of refinancing on a 50:50 basis.

Refinancing options include:

- **Increasing leverage through mezzanine or senior debt (75% to 85%)** – cash out for equity players – see Table 16 below for average debt: equity ratios for the respective rounds (Eberhard & Naude 2017).
- **Improving on financing terms** – decrease debt rates and relax covenants on developers/EPC/O&M providers (improved tariffs and less restriction on developer/EPC).
- **Post construction (lower equity return expectations)** – early equity returns (prior to construction) are generally higher due to numerous development and construction risks. Post construction, early operations attract equity with lower risk appetite and lower returns expectations (pension, insurance, and mutual funds).

Table 17: Average debt funding as percentage of total funds

Average debt funding as percentage of total funds					
Technology	BW 1 (%)	BW 2 (%)	BW 3 (%)	BW 3.5 (%)	BW 4 (%)
Wind	74.5	75.4	75.0	-	70.7
Solar	73.5	72.6	77.5	-	75.4
CSP	70.0	70.5	75.0	71.7	-

Based on the IPP update of June 2019, R209.7 billion (including early revenue and VAT facility) is committed for BW 1-4, including small projects BW 1 and 2. [Table 17](#) below shows the split in debt and equity.

Table 18: Split in debt and equity REIPPPP BW 1-4

Values in Billions	Total	Equity	Debt
Total committed investments	201.8	34.2%	65.8%
Foreign investors and financiers	48.8	35.77	12.98
Local	153.1	33.20	119.80

Provided the lock-in period of three years after COD, a number of projects will become available for sale of equity and refinancing of debt over the next two to three years. [Table 18](#) below shows the years in which projects from BW 1-3 reached COD, and the size of projects (NERSA 2018).

Table 19: Commercial operation date BW 1-3

Commercial operation date						
	2013	2014	2015	2016	2017	2018
CSP	-	-	1	2	-	1
Hydro	-	-	1	1	-	-
Landfill	-	-	-	1	1	-
Solar PV	1	24	1	5	2	-
Wind	-	7	5	5	5	-
Grand Total	1	31	8	14	9	1

Given the competitive nature of the market and value on offer, a number of expert financial services are offering refinancing services for capital seeking to enter the market. An outline of the lead financiers and equity investors is provided in [Table 20](#) and [Table 21](#) below.

Table 20: Number of projects (BW 1 – 4) funded by lead financiers

Main project financiers					
	BW 1	BW 2	BW 3	BW 3.5	BW 4
Nedbank	9	5	7	1	7
Standard Bank	11	5	1	1	5
ABSA	3	4	6	1	7
IDC	10	5	5	0	0
DBSA	9	2	5	1	2
RMB	5	4	2	1	2
Future Growth	7	1	0	0	0
Investec	0	3	1	1	0
IFC	2	1	0	1	0

Table 21: Lead equity investors BW 1-4

Equity in projects	Projects (1-4)
Old Mutual	17
IDC	9
Enel	11
Mainstream	6
Mulilo	6
Thebe	6
Biotherm	7
Scatec Solar	6
Blue Falcon	6
Pele Green Energy	7

4.5. Market uncertainties that may affect REIPPPP market opportunities

Delays in the rollout of the REIPPPP, and statements made by Eskom and coal unions about the future of renewable energy have created doubt in the market. This has, to some extent, been addressed by statements in support of the programme by the Presidency, the Treasury, the DMRE, and signing of BW 4; however, the timing of future energy procurements such as BW 5 may still create substantial industry uncertainty.

There is a critical need for action by Government on four levels:

- ensuring continuity and continued transparency in the rollout of the programme;
- efforts to support the manufacturing base, attract new investment and build confidence;
- prioritising the reform of the country's electricity sector to reflect South Africa's sustainable resources and market offerings; and
- the availability of black equity players to participate in meeting the 12.5% BEE shareholding requirement in each project developed.

4.5.1. Ensuring continuity and transparency

The success of the REIPPPP programme has largely hinged on the market size and longevity that the programme affords investors, as well as the lauded transparency in the programme's execution. Substantial and consistent efforts are required to maintain these conditions, especially in light of recent programme delays.

Furthermore, markets in other parts of the world are on the rise. Consequently, local markets are facing greater competition for investments. For current players in the market, continued delays mean financial losses and idle manufacturing facilities, as well as losses in market confidence.

As a result of the uncertainty, the sector has lately seen a number of international businesses closures, suspended investment decisions, and manufacturers running on skeleton staff.

4.5.2. Maintaining the country's existing manufacturing base

Recognising the REIPPPP's success in attracting investments, it is important to ensure successful implementation of projects such as the dtic's SEZ programme. Likewise, to maintain and grow local manufacturing base, the local content and enterprise development components of the REIPPPP have to be executed effectively. Again, a long-term market view — through certainty and clarity on the rollout of the proposed 20.4 GW of wind and solar capacity allocated to renewable energy generation — is crucial to sustaining investor confidence. Beyond the uncertainty experienced by manufacturers lies the risk of projects failing to meet their local content commitments as a result of constrained manufacturing capacity and programme execution. In turn, it will increase the REIPPPP's reputational risk.

4.5.3. Eskom unbundling – reforming the country's electricity sector

The South African government has decided to unbundle the national electricity utility (Eskom) into three subsidiaries, namely Eskom Generation (generation entity), Eskom Transmission (transmission entity), and Eskom Distribution (distribution entity).

The aim of this new business model is to improve the power utility through greater transparency and accountability, and to allow stakeholders a more efficient approach to addressing generation, transmission and distribution challenges separately.

The process of unbundling will take place over several years (2019 – 2022). It will ensure that the generation capacity runs uninterrupted, and that South Africans will receive uninterrupted electricity. The Department of Public Enterprises office outlines the plan through a myriad of objectives, with key objectives listed overleaf in [Table 22](#).

Table 22: Number of projects (BW 1 – 4) funded by lead financiers

Key objectives	1	Reduce reliance on coal to other cleaner and cheaper energy sources indicated in the IRP 2019
	2	Create three separately managed and operated subsidiaries: Generation, Transmission, and Distribution
	3	Optimise operations and governance competency (including climate change impact)
	4	Implement cost-effective business practices for each entity
	5	Maintain the livelihood of the workers, and communities located around and economically dependent on coal mines

Transmission Entity (TE): systems and market operator. In the immediate future, the creation of the Transmission Entity is a priority as it is the keystone in Eskom's reform. This entity will be wholly owned by Eskom Holdings. Its core functions will be to act as an unbiased electricity market broker, to promote capital investment within the industry, and to catalyse energy efficiency and cost sustainability.

Once restructuring is complete, the TE will become the buyer for purposes of the power purchase agreements (PPAs) entered into with generators. All existing PPAs between Eskom and various IPPs will have to be transferred to the TE. The TE will continue to own and develop key infrastructure such as substations, transformers, and 3 000 kilometres of transmission lines. The key responsibilities of the TE are detailed in [Table 23](#) below.

Table 23: Key responsibilities of the new Transmissions Entity (Eskom Holdings)

Key objectives	1	Reduce reliance on coal to other cleaner and cheaper energy sources indicated in the IRP 2019
	2	Create three separately managed and operated subsidiaries: Generation, Transmission, and Distribution
	3	Optimise operations and governance competency (including climate change impact)
	4	Implement cost-effective business practices for each entity
	5	Maintain the livelihood of the workers, and communities located around and economically dependent on coal mines

Generation Entity (GE). The Generation Entity is responsible solely for generation. The current power plant base will be separated into a number of feasible smaller generation units with the intention that over time, the generation market will become more competitive and decentralised (including renewable energy generators).

All Eskom-owned power plants will be housed in the GE. The entity will contract with the TE for the right to sell electricity and use the grid in the same way as IPPs are using it at present. This would create a level of competition in the industry between private generators and the new GE. The key responsibilities of the GE are detailed in [Table 24](#) below.

Table 24: Key responsibilities of the new Generation Entity (Eskom Holdings)

Key responsibilities	1	Systems and market operator
	2	Manage the electricity selling function across all stakeholders
	3	Facilitate electricity selling function through open market model
	4	Dispatch the generators according to least-cost merit order
	5	Balance electricity supply and demand in real time

Distribution Entity (DE).

The DE will be authorised to buy from the TE, licensed municipal generators and embedded generation. The roadmap states that further consideration will be given to the structure of the distribution sector as a whole and that the appropriate policy structures need to be developed. This is a fundamental shift towards an open and competitive market and should be welcomed by the private sector.

even with a more than 500% tariff increase over recent years. In order to pave the way out of this debt crisis, the Minister of Finance tabled a Special Appropriation Bill that will allocate a further R26 billion in 2019/20, and R30 billion more in 2020/21, on top of the R350 billion guarantee already provided.

Implications of Eskom’s reform plan for the RE sector in South Africa

While Eskom undergoes this transformation, the RE industry is expected to gradually gain more access to market through enabling regulatory determinations from NERSA, DMRE and other relevant regulatory bodies. [Table 25](#) highlights key unbundling decisions and industry impacts to be expected from these decisions

Eskom’s financial sustainability

Eskom’s unsustainable debt status, including its failure to service even the interest payments on this debt, is the single biggest risk to Eskom’s continued operation. It contributes directly to South Africa’s deteriorating investment grade. Eskom has failed to finance its own borrowings

Table 25: Eskom unbundling highlights

Eskom unbundling decision	Industry impact
Revision of the early bid rounds tariff prices	Revising tariff prices of early bid window rounds may add to the risk that is already associated with the REIPPP programme. Risks have increased because of regulatory uncertainty and the delayed IRP. However, the plan highlights that there are ongoing discussions with the affected IPPs over PPA extension as a solution to offset the losses that will be incurred by the investors, and to repair dented investor confidence.
The Transmission Entity will be the buyer	Core to Eskom’s unbundling plan is the establishment of the TE as a market and system operator. As a separately managed transmission unit, the TE and intra-company competition will stimulate the market and project finance (locally and internationally). Insurance premium rates are likely to decline due to the reduced risk factor in the industry and within Eskom. The TE will play a major role in enabling competition in the market, as this will allow renewable energy to compete with Eskom over energy procurement to the national grid. When the restructuring is completed, the buyer will be the TE. Consequently, the existing PPAs between Eskom and various IPPs will have to be transferred to the TE. However, it should not be of great concern to IPPs and lenders, as long as the sovereign guarantees provided by the SA Government under the implementation agreements are not adversely affected.
Open market model and intra-company electricity trading	Ideally, the TE as a buyer could stimulate the market through an open market model. As a transition from the existing single utility model, the TE model will encourage competition that could lead to cheap and accessible clean energy to South African communities.
Eskom Generation Entity (GE) competition	Each power station will have its own PPA with predefined, fixed, and guaranteed tariffs with the TE. Eskom will then likely seek to broaden its business by diversifying into various sectors of energy production, including renewable energy.
Eskom financial crisis	It remains unclear how the Eskom debt issue will be resolved. It is possible that its debt will be transferred to National Treasury. Uncertainty will continue to affect international investors’ perception of South Africa’s REIPPP programme, the economy, and the country’s governance. However, the TE establishment will over a short-term period hopefully stimulate the industry and offer risk-adjusted returns to investors.



5

Funding and Incentives

A range of general and sector-funding solutions and incentives is available to investors, manufacturers and service companies in the green economy.

It covers international sources, such as Development Finance Institutions (DFI), local funding pools including the public and private sector, and a considerable range of tax incentives.

5.1. General database web page

The GreenCape Finance Desk hosts a web page¹⁴ with a number of Green Finance resources that cover funding and incentives available to companies in the green economy. A few of the available database are highlighted below.

5.1.1. Green Finance Database

In conjunction with the South African National Energy Development Institute (SANEDI), GreenCape maintains a database of funding sources and primarily dti-driven incentives that may be relevant to green economy investors. The database contains information on more than 100 funding opportunities, including an overview of the opportunity and its contact details and links. It is ideal for any entity seeking a broad range of funding solutions and financial incentives, with South African institutions being the main source of opportunities. The database is available to view and download online¹⁵.

5.1.2. Government funding and incentives database

An updated document focused on South African government funding and incentives is available to view and download online¹⁶.

5.1.3. Finfind database

Finfind¹⁷ is an innovative online finance solution that brings together SME finance providers and finance seekers. With a focus on finance readiness, Finfind has more than 200 lenders and over 350 loan products available to SMEs. The database is ideal for South African SMMEs who are seeking funding and/or business advisory services, and those who want to improve their understanding of finance.

5.1.4. AlliedCrowds database

AlliedCrowds¹⁸ is the first complete aggregator and directory of alternative finance providers in the developing world. Sign-up is free and allows users to access a global database where one can filter for sector (including greentech, agriculture and social impact), type of capital (equity, lending, grant), and type of funding (crowdfunding, angel investing, venture capital, impact investing). In addition:

- Themed databases around the Sustainable Development Goals (SDGs) and the World Green Economy Organisation (WGEO) are available.
- Reports, including a number specifically about African funding sources, can also be downloaded for free.
- You can also contact Allied Crowds to create a customised funding database for you. This resource is ideal for any entity seeking a broad range of financial solutions on a global scale.

¹⁴ <https://www.greencape.co.za/content/focusarea/green-finance-databases>

¹⁵ <https://www.greencape.co.za/assets/Uploads/GreenCape-Finance-Database-v6.xlsx>

¹⁶ <https://www.greencape.co.za/assets/Uploads/Government-Funding-and-Incentive-Booklet.pdf>

¹⁷ www.finfindeasy.co.za

¹⁸ <https://alliedcrowds.com/>



6

The Western Cape: Africa's green economy hub

The Western Cape is a world-class investment destination.

The province provides businesses and investors with prime locations, modern infrastructure, a skilled workforce, low operational costs and an abundance of natural resources. It is also a sought-after place to live, with unrivalled natural beauty, vibrant culture, excellent schools and universities, and an outstanding quality of life. In 2017, Cape Town was ranked among the top 21 global investment destinations by Foreign Direct Investment (fDi) Intelligence, a division of the Financial Times.

A great place for green business

There are compelling reasons why the Western Cape Province is viewed by many as Africa's green economy hub. Coupled with a strong and rapidly growing market for green technology and services in South Africa and beyond, the Western Cape offers:

- Africa's renewable energy (RE) and cleantech hub, with a critical mass of leading companies present.
- Local presence of major professional services and financiers.
- Significant market opportunities for businesses and investors in agriculture, energy services, utility scale solar and wind, waste, water, bioeconomy and resource efficiency.
- A supportive government that has made ease of doing business and the green economy key priorities.
- Five universities with comprehensive R&D capabilities and dedicated green economy skills programmes.
- A range of investment incentives in the Atlantis Special Economic Zone (SEZ) for Green Technologies.

Supporting businesses and investors

The province also offers dedicated support for businesses and investors focusing on greentech and services, including:

InvestSA One Stop Shop: Offers convenient investor support on permits, licensing and registrations - all under one roof.

GreenCape: Provides dedicated support and market intelligence to green economy sectors.

Wesgro: The official investment and trade promotion agency for the Western Cape.

SAREBI: A business incubator providing non-financial support to green entrepreneurs.

SARETEC: Offers specialised industry-related and accredited training for the wind and solar industries.

Market opportunities in the province and South Africa

Some of the major market opportunity areas in the province and South Africa in the next five years are outlined in the graphic on the next page (see individual MIRs and the GreenCape website for more information).

R&D capabilities and skills

The region's five universities – University of Cape Town, Stellenbosch University, University of the Western Cape, the Cape Peninsula University of Technology and the George campus of the Nelson Mandela Metropolitan University – underpin all of this with comprehensive research and development (R&D) capabilities and dedicated green economy skills programmes.



Atlantis Special Economic Zone for Green Technologies

The Atlantis SEZ is a zone dedicated to the manufacturing and provision of services in the green technology space - technologies that reduce or reverse the impact of people on the planet. Wind turbines, solar panels, insulation, biofuels, electric vehicles, materials recycling and green building materials are all examples of green technologies that will be welcomed to the zone.

The zone welcomes manufacturers, service providers, suppliers and other players in the value chains of different green technologies.

The SEZ is situated in the Atlantis industrial area north of Cape Town, south of Wesfleur, east of Dassenberg Road, and west of the Witsand community.

Why invest in the Atlantis SEZ?

There are strong and growing South African and African markets for greentech. The South African greentech manufacturing market is worth at least R30bn; with a growing greentech market in the neighbouring countries. South Africa has opportunities in energy, waste, agriculture, transport and other sectors and is a great entry point for the SADC market.

Atlantis is a great location and development ready. 93 hectares of zoned City of Cape Town land is available for leasing to investors. Bulk infrastructure is in place and Atlantis has new public transport and shipping links and fibre connectivity. Atlantis is also close to major ports, roads, universities and greentech markets.

Investors have access to extensive investment support through the One Stop Shop for investor support and the rest of the investor support ecosystem, which includes InvestSA, GreenCape, the City of Cape Town, and Wesgro. Together the ecosystem provides information and advocacy; market intelligence; facilitated access to permits and licenses, planning and development approval; and skills training.

Investors and tenants are accessing attractive incentives in the form of tax relief and allowances, employment tax incentives, fast-tracked development approvals, fee exemptions and subsidies.

There is an attractive, wide-ranging skills base to recruit from with 5 universities and many more colleges in the province, and a large range of unskilled, semi-skilled, technical and professional candidates.

For more information, contact the SEZ's: interim Chief Executive Officer, Pierre Voges
pierre@wesgro.co.za



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GreenCape's support to businesses and investors

GreenCape is a non-profit organisation that works at the interface of business, government and academia to identify and remove barriers to economically viable green economy infrastructure solutions. Our vision is a thriving prosperous Africa, mobilised by the green economy.

Working in developing countries, GreenCape catalyses the replication and large-scale uptake of green economy solutions to enable each country and its citizens to prosper.

We work with businesses, investors, academia and government to help unlock the investment and employment potential of greentech and services, and to support a transition to a resilient green economy.

We assist businesses by removing barriers to their establishment and growth and provide our members with:

- free, credible and impartial market information and insights
- access to networks of key players in government, industry, finance and academia
- an advocacy platform to help create an enabling policy and regulatory environment for green business

We assist local, provincial and national government to build a resilient green economy by providing:

- support on the development of standards, regulations, tools and policies
- expert technical knowledge on key sectors in the green economy
- access to networks of key players across business, academia, and internationally

Since inception in 2010, GreenCape has grown to a multi-disciplinary team of over 40 staff members, representing backgrounds in finance, engineering, environmental science and economics.

We have facilitated and supported R17bn of investments in renewable energy projects and manufacturing. From these investments, more than 10 000 jobs have been created. Through our WISP (industrial symbiosis) programme, by connecting businesses with waste / under-used resources, we have to date diverted nearly 63,000 tonnes of waste from landfill.

Our market intelligence reports form part of a working body of information generated by sector desks and projects within GreenCape's three main programmes – energy, waste and resources.

Figure 11 overleaf shows the different focus areas within each of our programmes.

Benefits of becoming a GreenCape member

We currently have over 1100 members, and offer free membership. Becoming a member of GreenCape will give you access to the latest information regarding developments in the various sectors; access to tools, reports, and project information; and offer you the opportunity – through our networking events – to meet and interact with various stakeholders in the green economy.



① **Renewable Energy**

Utility-scale projects, localisation of component manufacturing, incentives & financing options, wheeling & energy trading.

② **Energy Services**

Energy efficiency & embedded generation, electric vehicles, alternative basic electrification, incentives & financing options.

③ **Electric Mobility**

Electric vehicles and financing options.

④ **Alternative Waste Treatment**

Municipal decision-making & policy & legislative tools on alternative waste treatment options; small-scale biogas, recycling & reuse (dry recyclables, construction & demolition waste).

⑤ **Western Cape Industrial Symbiosis Programme (WISP)**

The team matches businesses to share unused resources, cut costs & create value. They also support entrepreneurs to identify & realise new business opportunities in the waste industry.

⑥ **Water**

Water provision & economic development; greentech opportunities for water use efficiency, treatment & reuse, business water resilience.

⑦ **Sustainable Agriculture**

Precision-, conservation- and controlled environment- agriculture; valorisation of wastes to high value bio- products, including bio-energy.

To become a member or to get your ICN passport, please contact GreenCape or visit our website: www.greencape.co.za

Figure 11: GreenCape's focus areas

Support through the International Cleantech Network

GreenCape's membership of the International Cleantech Network (ICN) gives our members access to international business opportunities in countries where other cleantech clusters are based (mainly Europe and North America).

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