South Africa Country Report

Report 6: Energy and Economic Growth Research Programme (W01 and W05) *PO Number: PO00022908*

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DISCLAIMER

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Frequently used acronyms and abbreviations

1S2	1st Stage 2
2S2	2nd Stage 2
AMEU	Association of Municipal Electricity Utilities
BAR	Basic Assessment Report
BBBEE	Broad-Based Black Economic Empowerment
CA	Connection agreement
CEF	Central Energy Fund
CEL	Cost estimate letter
COD	Commercial operation date
COGTA	Department of Cooperative Governance and Traditional Affairs
COSATU	Congress of South African Trade Unions
CPI	Consumer Price Index
CSL	Contributor status level
CSP	Concentrated solar power
DA	Direct agreement
DBSA	Development Bank of Southern Africa
DEFF	Department of Environment, Forestry and Fisheries
DFI	Development finance institution
DME	Department of Minerals and Energy
DMRE	Department of Mineral Resources and Energy
DoE	Department of Energy
DPE	Department of Public Enterprises
DTI	Department of Trade and Industry
DWA	Department of Water Affairs
EAF	Energy availability factor
EAP	Environmental Assessment Practitioner
ED	Economic development
EDI	Electricity Distribution Industry
EEDSM	Energy Efficiency Demand Side Management
EIB	European Investment Bank
EIAR	Environmental Impact Assessment Report
EIUG	Energy Intensive User Group
EPC	Engineering, procurement and construction
ERA	Electricity Regulatory Act
FBE	Free basic electricity
FIRST	Facility for Investment in Renewable Small Transactions
FPC	Facility Power Curve
GEF	Global Environment Facility
GDP	Gross Domestic Product
GW	Gigawatt
GWh	Gigawatt hour
IA	Implementation agreement
IEA	International Energy Agency
IEC	International Electrotechnical Commission

IBRD	International Bank for Reconstruction and Development
IDC	Industrial Development Corporation
IFC	International Finance Corporation
INEP	Integrated National Electrification Programme
IPP	Independent power producer
IPPO	Independent power producers office
IPPPP	Independent Power Producer Procurement Programme
IRP	Integrated Resource Plan
ISMO	Independent System and Market Operator
kWh	Kilowatt hour
LPG	Liquified petroleum gas
MES	Minimum emissions standard
MIGA	Multilateral Investment Guarantee Agency
MOA	Memorandum of agreement
MW	Megawatt
NDC	Nationally Determined Contribution
NDP	National Development Plan
Nedlac	National Economic Development and Labour Council
NEMA	National Environmental Management Act
NER	National Energy Regulator
NERSA	National Electricity Regulator of South Africa
NFMIP	National Framework for Municipal Indigent Policies
NPC	National Planning Commission
NT	National Treasury
NUM	National Union of Mineworkers
NUMSA	National Union of Metalworkers of South Africa
O&M	Operations and maintenance
OECD	Organisation for Economic Co-operation and Development
PIC	Public Investment Corporation
PPA	Power purchase agreement
PPP	Public private partnership
PV	Photovoltaic
QLFS	Quarterly Labour Force Survey
RED	Regional electricity distributor
REDZ	Renewable Energy Development Zones
REFiT	Renewable energy feed-in tariff
REI4P	Renewable Energy Independent Power Producers Procurement Programme
RfI	Request for information
RfP	Request for proposals
SADC	Southern African Development Community
SAIPPA	South African Independent Power Producer Association
SALGA	South African Local Government Association
SAPP	Southern African Power Pool
SAPVIA	South African Photovoltaic Industry Association
SAREC	South African Renewable Energy Council
SAWEA	South African Wind Energy Association
SEA	Strategic environmental assessment

SED	Socioeconomic development
SME	Small and medium enterprises
SOE	State-owned enterprise
SONA	State of the Nation Address
SP-I4P	Small Projects Independent Power Producer Procurement Programme
SVP	Special purpose vehicle
SSEG	Small-scale embedded generation
StatsSA	Statistics South Africa
TWh	Terawatt hour
UNFCCC	United Nations Framework Convention on Climate Change
US	United States

1 Introduction

The Department of Energy (DoE) established the South African Independent Power Producer Procurement Programme (IPPPP) in late 2010 to diversify electricity generation and urgently address the power shortages that had been affecting the country since 2008. The programme was also to a large extent a mechanism for demonstrating South Africa's political commitment to introducing renewable energy at the 15th UN Climate Change Conference (COP 15), when President Zuma voluntarily committed to reducing the country's carbon emissions by 42% by 2025, and at COP 17, which was hosted in Durban.

The Renewable Energy Independent Power Producer Procurement Programme (REI4P) and the Small Projects Independent Power Producer Procurement Programme (SP-I4P), subsets of the IPPPP, were specifically set up to procure renewable energy capacity from the private sector. The programmes replaced the Renewable Energy Feed-in Tariff (REFiT) mechanism, previously developed by the National Electricity Regulator of South Africa (NERSA), after an independent legal assessment concluded that a feed-in tariff violated South Africa's procurement regulations.

As at the end of the first quarter of 2019, under REI4P, 90 of the 92 awarded projects, representing more than 6 GW of capacity, had reached financial close. By the end of June 2019, 64 of these projects, with a combined generation capacity of 3,9 GW, had been connected to the grid. Most of the projects awarded in the latest bid window only need to achieve commercial operation in 2020.

As competition has increased, project costs have fallen dramatically. On average this has reduced by more than 50% for wind projects and 70% for solar PV projects between 2011 and 2015. The latest round of procurement saw projects secured at prices below Eskom's average cost of supply. These projects have been instrumental in enhancing energy security and diversifying the country's energy mix. They have also been very reliable: 62 of the 64 operational projects have been online for longer than a year and have generated 10,8 TWh of electricity, reaching 97% of their annual production projections (DoE, 2019).

REI4P has had significant positive economic and environmental impacts. The programme attracted private sector investments to the value of US$14,27[1] billion, 20% of which is foreign investment. This equates to more investment in IPPs than the rest of sub-Saharan Africa has managed to attract as a whole in the last two decades. The programme has also made economic development contributions, with the creation of 42,374 job years for South African citizens, and economic and enterprise development contributions amounting to US$98,1 million by the end of June 2019. It is estimated that the programme has also contributed to South Africa's climate change mitigation and adaptation objectives by reducing carbon emissions by 38,8 metric tons and achieving water savings of 45,8 million kilolitres since its inception (DoE, 2019).

Despite its achievements, the REI4P has faced several implementation challenges in recent years. The influence of vested interests, threatened by the programme's success, delayed the implementation of later rounds of the programme and has limited the scope of its impacts (Montmasson-Clair and das Nair, 2017). The programme has specifically experienced significant (3+ years) delays in the signing of the key off-taker contracts (power purchase agreements) for projects awarded in 2015 under bid window 4. While further project awards have either been cancelled, in the case of the expedited REI4P bid window, or ignored, as in the case of the SP-I4P. There have also been no further rounds of procurement despite the country facing electricity blackouts (load shedding) on an increasingly frequent basis. Investor

[1] Based on a USD/ZAR exchange rate of 1:14,7.

confidence has been further eroded by prolonged policy uncertainty and the deterioration of Eskom's financial and operational status.

This hiatus in procurement and investment is all the more concerning when one considers what has been lost. Several countries in sub-Saharan Africa have now procured renewable energy projects at prices below those achieved in REI4P, largely thanks to the procurement model pioneered in South Africa. The capacities developed to service REI4P in South Africa – whether project developers, transaction advisers, or a host of other skilled blue collar and white collar professionals – have now been forced to leave South Africa or the industry, representing a real loss of skills and knowledge for the country. South Africa has also squandered investors' and lenders' growing comfort with the programme that could have opened the door to less onerous and less costly risk mitigation requirements. And many of the local manufacturing and job creation ambitions driving the programme have ground to a halt as factories and project developers had to close their doors or lay off workers.

Recent belated progress in electricity system planning has unfortunately not translated into procurement certainty. In October 2019, the Department of Mineral Resources and Energy (DMRE, previously known as DoE) approved and published the first update of the Integrated Resource Plan (IRP) since 2010 – despite policy requiring an update every two years. While the IRP 2019 states that South Africa urgently needs to procure generation capacity, Ministerial Determinations for capacity, which signify the start of a new procurement process and, most importantly, contribute to investor certainty, have not been issued by December 2019. This is all the more concerning considering that the country experienced its worst period of rolling electricity blackouts (also called load shedding) ever in late 2019, with power system stability a daily concern.

Contributing to this sense of uncertainty are the important but complex changes underway in the country's power sector. South Africa has not been exempt from the sociotechnical changes occurring in energy sectors globally, where a rapid transition towards low-carbon, decentralised electricity markets is underpinned by the falling costs of renewable energy technologies. This has important implications – many of which are still unclear – for a country built on a coal-based power system, both at a national and local levels. In addition, Eskom's ongoing financial and operational crisis has triggered a process of reforming the current organisational structure of the power sector. While this is a welcome and much-needed development, the pace of reforms has been slow and the process has met with fierce opposition by many in the industry.

Despite its current challenges, South Africa has demonstrated that it is possible to introduce renewable energy IPPs at scale in a highly centralised, vertically integrated power sector (IRENA, 2018). It has also shown that rapid, low-cost generation capacity expansion can be achieved in the African context, while also contributing to socioeconomic objectives. As seen from the REI4P outcomes to date, these competitive tender processes are able to secure a pipeline of high quality projects within a short time, while rigorous compliance requirements ensure transparency and minimise opportunities for rent-seeking.

This case study details the design features and implementation structures of the REI4P and SP-I4P and describes how these have contributed to their success. It also delves into the current policy uncertainty and implementation challenges, in order to consider how these affect the future design and sustainability of the programmes. This case study begins by outlining the political and socioeconomic context surrounding South Africa's electricity sector (section 2) and then describes the two key renewable energy procurement programmes and their underlying qualification and evaluation criteria and processes (section 3). Section 4 discusses the key actors and stakeholders involved in the governance and implementation of the REI4P and SP-I4P, whilst section 5 discusses the key sources of project funding and mechanisms for risk mitigation. In section 6 the current risks and opportunities for the future of the two

programmes is outlined; and finally section 7 draws on lessons from both the successes and challenges of REI4P and SP-I4P.

2 South Africa's power sector

With a Gross Domestic Product (GDP) of US$366 billion in 2018, South Africa is the second largest economy in Africa and is classified as an upper-middle income economy (Trading Economics, 2019). Economic growth has been meagre in recent years. GDP grew by 1,3% in 2017 and 0,8% in 2018 and has failed to keep up with population growth. Finance, real estate, and business services are the largest contributors to GDP (22,4%) followed by general government services (16,7%). The most energy intensive economic sectors are industry and transport, at 36% and 27% of total energy demand respectively. Within the industrial sector, the most energy intensive activities are connected to iron and steel processing (19% of total demand), mining and quarrying (16%), and chemicals and petrochemicals processing (12%). Based on global rankings, South Africa is the 14th largest emitter of greenhouse gases in the world (Carbon Brief, 2018), primarily due to its reliance on coal for electricity generation.

South Africa faces the triple challenges of unemployment, poverty, and inequality. Official unemployment reached 29% in the second quarter of 2019, one of the highest levels in the world (StatsSA, 2019b). Based on South Africa's lower-bound poverty line, 40% of South Africans were categorised as poor in 2015, an increase from 36,4% in 2011 (StatsSA, 2017). Inequality, measured by the GINI coefficient, stood at 0,68 in 2015 (StatsSA, 2017). Sluggish economic growth, high unemployment rates, decreased investment, low commodity prices, and policy uncertainty are just some of the factors that contribute to these continued trends.

The South African power sector is dominated by the vertically integrated, state-owned, national power utility – Eskom – controlling the generation, transmission, and much of the distribution of electricity. Since 2011 privately owned IPPs have been able to enter the market, but produce less than 5% of the country's electricity. Eskom supplies electricity directly to some of the largest electricity consumers in industry and mining, while also supplying medium-voltage electricity to municipal distributors (Figure 1). The electricity distribution network is shared between Eskom (58%) and municipal distributors (42%) (NERSA, 2012 and Eskom, 2019a). There are 188 distributors of electricity in South Africa, licensed according to the Electricity Regulatory Act (ERA), including 6 metropolitan municipalities, 2 metropolitan electricity service providers (City Power in Johannesburg and Centlec in Buffalo City), 164 local municipalities, 1 district municipality (uMkhanyakude), 13 private distributors, and Eskom (StatsSA, 2016).

Eskom's severe structural, operational, and financial crises have resulted from a process of deterioration since 2007, as measured by key indicators presented in table 1.

Table 1: Eskom key indicators: 2007 vs 2019

Indicator	2007	2017	2019	Change 2007-2019
Generation Capacity (GW)	42,7	44,1	44,2	3.5%
Employee Costs (billion Rand)	9,5	33,2	33,3	250.5%
Employees (number of people)	32674	47658	46665	42.8%
Coal Costs (billion Rand)	10	50,3	58,5	485%
Coal Purchases (million tonnes)	117,4	120,3	118	0.8%
Electricity Sales (GWh)	218120	214121	208319	-4.5%
Revenue (billion Rand)	39,4	177,1	177	356.6%
Debt (billion Rand)	40,5	355,3	440,6	987.9%
Debt Service Cover	-	-	0,47	-
Average Tariff (Rc/kWh)	18,38	83,6	98,01	433.4%*

* Nominal increase

Burkhardt & Cohen, 2019; Eskom, 2019a, b

Electricity sales have been on the decline, while revenue has stagnated and operational costs (employee and coal costs) have skyrocketed. Despite the fact that generation capacity has increased only slightly by 3,5%, Eskom's debt has risen by 988% to reach US$30,6 billion[2] in 2019 (Eskom, 2019a). Eskom has accumulated unsustainable levels of debt – mainly in pursuit of building the Medupi and Kusile mega coal power stations – but only generates enough cash to cover 47% of its debt obligations. As South Africa's biggest state-owned enterprise (SOE), Eskom represents a massive risk to the fiscus and the economy. Eskom's operational crisis has also led to ongoing load shedding in 2018 and 2019, with significant negative consequences for South Africa's economic growth and development.

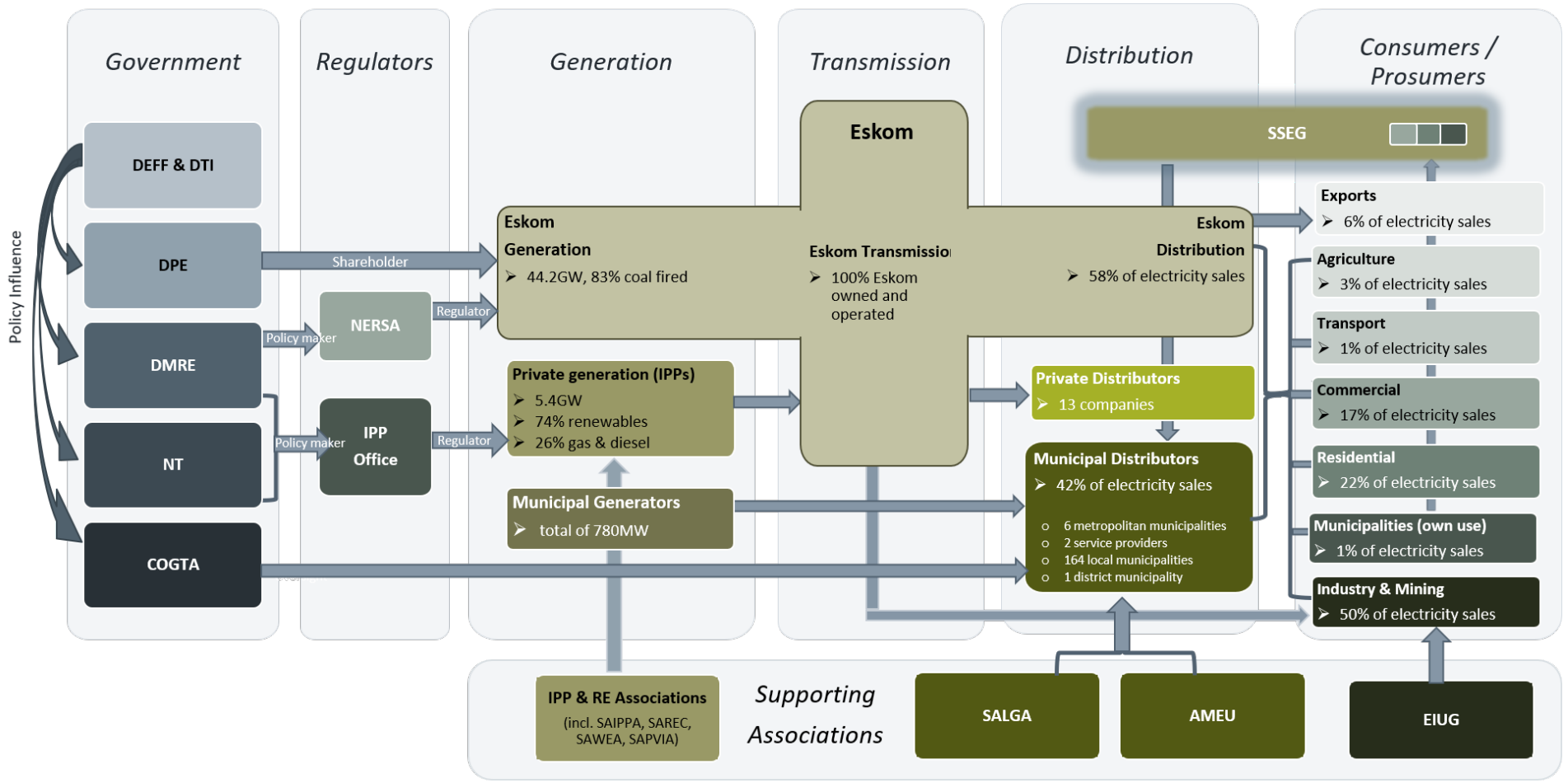
Eskom is also still reeling from a serious governance crisis based on facilitated rent-seeking and corruption (Godinho & Hermanus, 2018). This has hollowed out skills at all levels, which will take years to rebuild, and which has also negatively affected its ability to secure funding (Eskom, 2019a).

Eskom's poor financial and operational health, coupled with its position as single off-taker of IPP power, exposed private sector investors to increasing off-taker (payment) risk. Despite its deep crisis, Eskom, as the dominant entity in the electricity sector, is considered too big to be allowed to fail and it therefore received (and continues to receive) significant government support, including multiple financial bailouts (Hartley and Mills, 2019; Paton, 2019). At the same time, its near-monopoly status undermined interventions to restore its financial health and allowed it to prevent access by private sector players to the national transmission network.

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

The emergence of distributed generation, or small-scale embedded generation (SSEG), is further disrupting and changing the landscape of the power sector. SSEG occurs at both the consumption and the distribution level of the value chain, as it is implemented both by municipalities, and by electricity consumers (creating what is known as prosumers, or consumers who also produce electricity). SSEG allows for decentralised energy generation, thus blurring the traditional lines between the roles of distribution, generation, and consumption along the value chain. SSEG allows for additional actors to take on roles previously controlled by Eskom. Unlike large-scale IPP projects, SSEG is less dependent on centralised decision-making. Despite the lack of a clear national-level regulatory framework, SSEG has emerged as a disruptive force for the vertically integrated structure of the South African electric power sector, from the subnational level. There are currently just under 1GW of installed SSEG capacity nationally, projected to reach 7,5GW by 2035 (GreenCape, 2019). The City of Cape Town (CCT), one of the strongest proponents of municipal engagement in decentralised generation and purchasing electricity from IPPs, requested ministerial permission in 2014 to procure its own electricity but never received a response. In July 2017, the CCT took the Energy Minister to court on this matter (Deklerk, 2017).

[2] At current exchange rate of US$1:ZAR14,7 equivalent to about ZAR 450 billion.



DEFF	Dept. of Environmental Affairs, Forestry & Fisheries	DMRE	Dept. of Mineral Resources & Energy	NERSA	National Electricity Regulator of South Africa	SALGA	South African Local Government Association
DTI	Dept. of Trade & Industry	NT	National Treasury	IPP	Independent Power Producers	AMEU	Association of Municipal Electricity Utilities
DPE	Dept. of Public Enterprises	COGTA	Dept. of Cooperative Governance & Traditional Affairs	RE	Renewable energy	EIUG	Energy Intensive User Group

Figure 1: The structure of the South African electricity sector and key sector entities
Source: OneWorld

Much of the blame for the South African power sector's current state of affairs can be laid at the doors of a handful of strategically important public sector entities (Table 1). Key among these are the Department of Mineral Resources and Energy (DMRE), the Department of Public Enterprises (DPE), Eskom, and the National Energy Regulator of South Africa (NERSA) (Table 1). The ministries, parastatal, and regulator have all been subject to massive instability and lost significant capacity over the past decade, in large part due to the coordinated, deliberate repurposing of South Africa's public sector and in particular state-owned enterprises to facilitate rent-seeking and corruption (Godinho and Hermanus, 2018). The Department of Energy (renamed Mineral Resources and Energy in 2019) has for example had six ministers since 2012, while Eskom has had 13 CEOs in the past decade. NERSA has also recently been taken to court by Eskom regarding its most recent regulatory decisions which effectively wiped out a crucial bailout from the state. The result is a sector stumbling from one crisis to the next, propped up by a few remaining pockets of excellence in, among others, National Treasury and certain sections of Eskom. President Ramaphosa's administration has done much to start reversing this trend, but a massive amount of work remains to be done to change the political economy of the sector and rebuild what was destroyed.

Table 2: Key institutions in South Africa's electricity sector

Institution	Key features
National Treasury (NT)	• Manages government spending and approves budgets of all government departments. Its powerful influence enabled it to build a strong foundation of political support and buy-in necessary for implementation of the REI4P programme (Morris and Martin, 2015).
The Department of Mineral Resources and Energy (DMRE), **changed from Department of Energy (DoE) in 2019**	• Secures provision of energy and mineral resources to promote socioeconomic development. • Drafts electricity sector legislation, policies and plans, and oversees the Integrated National Electrification Programme (INEP); sets the Electricity Pricing Policy against which NERSA regulates and sets tariffs; provides oversight of the Central Energy Fund (CEF) and the IPP Office. • Develops energy policy and plans (including IEP and IRP). Minister also initiates procurement of new generation capacity by issuing ministerial determinations, specifying the technologies, capacity and entities (public vs private) responsible for building new capacity.
Independent Power Producers Office (IPPO)	• Designs and runs competitive procurement programmes or auctions for IPPs to contribute to renewable and non-renewable sources of new electricity generation capacity. • Setup through an MOU between the DMRE, NT, and the DBSA.
Department of Public Enterprises (DPE)	• Provides oversight of all SOEs and is the sole shareholder of Eskom; with its primary mandate being to ensure Eskom's efficiency and sustainability. Has from time to time been less than supportive of competition and the entry of IPPs (Morris and Martin, 2015).
Department of Environment, Forestry and Fisheries (DEFF)	• Promotes clean and efficient energy use in SA, in line with international climate objectives. • Negotiates and determines South Africa's international greenhouse gas mitigation commitments (NDCs).
Department of Trade and Industry (DTI)	• Promotes inclusive and equitable economic and industrial development. Plays a small but critical role in the energy sector, including in the design process of REI4P.

Eskom	• South Africa's power utility, a parastatal. Regulated by NERSA and the National Nuclear Regulator. Currently in a deep operational, structural, and financial crisis, and unable to service its debt obligations, which exceed US$30,6 billion[3] (Eskom, 2019a). • The President appointed the Eskom Sustainability Task Team in early 2019 to provide expert support and advice (see Section 2H).
National Energy Regulator (NERSA)	• Regulates and determines electricity tariffs; grants licenses for generation, transmission and distribution of electricity; establishes and monitors technical supply and service standards.
Local Government/ Municipalities	• The electricity distribution network is shared between Eskom and municipal distributors, with municipalities distributing 42% of electricity sold (NERSA, 2012; Eskom, 2019a). • The Constitution of the Republic of South Africa (1996) mandates municipalities to distribute electricity in their areas of jurisdiction, subject to national and provincial legislation, and regulation.
South African Development Finance Institutions (DFIs)	• The Development Bank of Southern Africa (DBSA) is wholly owned by the South African government; its objective is to enhance sustainable development in the Southern African Development Community (SADC) by driving financial and non-financial investments in the social and economic infrastructure sectors; DBSA entered into a memorandum of agreement (MOA) with National Treasury and DoE to provide funding for the REI4P programme. • The Industrial Development Corporation (IDC), owned by the South African government, under the supervision of the Economic Development Department, was set up to promote economic growth and industrial development; it played a significant role as a debt financier for REI4P, as well as an equity investor, providing support to community trusts and B-BBEE companies to purchase their share of equity.

South Africa has developed an unfortunate reputation for being able to develop world-class policy, yet struggle to implement the same policies (Kruger, 2012; Trollip and Boulle, 2017). Table 2 provides an overview of the legislation and policies that govern South Africa's power sector. It shows that the policy and legislative basis for a more decentralised, renewable energy-based power sector has long been in place – starting with the White Paper on Energy Policy (1998). It nevertheless required an extraordinary set of circumstances (discussed in section 3) to realise at least some of these policy objectives. This disconnect between stated intent and action has long plagued the sector and continues to impede progress.

Table 3: Legislation and policies

Policy	Key features
National Development Plan 2030 (NDP), 2013	• Long-term strategic development plan, focuses on reducing poverty and inequality by 2030 (NPC, 2011).
Nationally Determined Contribution to the UNFCCC, 2015	• Aligns with objectives of the NDP; outlines South Africa's climate change commitments (targeted GHG emission reductions following a peak, plateau, and decline trajectory). • Identifies energy efficiency, renewable and nuclear energy and advanced biofuels as key mechanisms for achieving the country's mitigation objectives (DoE, 2015a). Articulates diversification and transformation of the electricity mix.

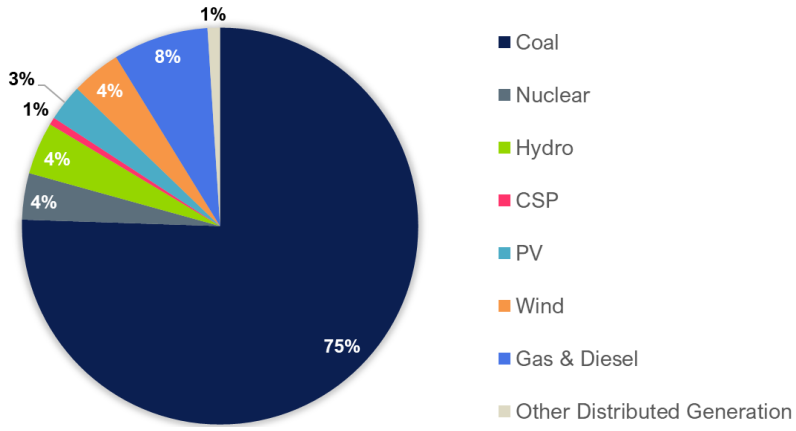
[3] At current exchange rate of US$1:ZAR14,7 equivalent to about ZAR450 billion.

Electricity Regulation Act (ERA), 2006	• Empowers the Energy Minister to make "determinations" on how much electricity should be procured, and when, by whom and who should be the buyers. Defines NERSA's powers and functions, including tariff setting, licensing and technical standards.
Electricity Pricing Policy of 2008	• Provides electricity pricing guidelines, and a methodology for determining electricity tariffs (Amra, 2013).
White Paper on Energy Policy, 1998	• Aimed to increase access to affordable electricity, post-1994, and to improve energy governance, stimulate economic development, and diversify the supply of electricity. • Two key objectives were to introduce IPPs and to restructure the electricity distribution industry.
Eskom Conversion Act No. 13, 2001	• Converted Eskom into a public company in terms of the Companies Act, making government ownership of Eskom explicit, with Eskom no longer able to operate under its own special legislation (Maroga, 2009).
Renewable Energy Policy Paper, 2003	• Established a target of 10,000 GWh of renewable energy to be achieved by 2013 (DME, 2003).
Roadmap for Eskom in a Reformed Electricity Supply Industry, 2019	• Published by DPE in October 2019, provides a roadmap and institutional arrangements for separating Eskom into three subsidiaries: generation, transmission, and distribution. Provides timelines to complete the unbundling process by 2020/2021 and provides for financial support to Eskom through two fiscal injections over the period. • Eskom will be allowed to operate and own its own renewable energy capacity.
Integrated Energy Plan (IEP), 2016 and Integrated Resource Plan (IRP)	• IEP is the overall energy plan for the sector, covering liquid fuels (diesel, petrol, paraffin), electricity and gas, while the IRP provides a detailed plan for future electricity generation options (DoE, 2016a). The IRP provides the legal basis for electricity generation procurement and investments in the electricity sector and establishes the country's energy mix. • The IRP 2010-2030 set a target of approximately 17,88 MW of new power generation capacity to be derived from renewable energy sources. The IRP is meant to be updated every 2 years. See Sections 2H and 6B of this report. IRP 2019 is discussed in more detail in Section 2E.

Supply and demand

South Africa's power system (49,2 GW – Figure 2) is the biggest in sub-Saharan Africa by some margin, representing about half of the installed capacity of the entire region. Coal dominates with 37 GW (less than 70% of which is available at any one time), followed by renewable energy with 3,9 GW. Nuclear and hydropower (hydro) contribute around 4% of generation capacity each (DoE, 2019b). There are three main groups of electricity generators: (i) Eskom, which operates 89% of total generation capacity in South Africa; (ii) municipal generators (with about 1%); and (iii) IPPs and private generators (with about 10%), including cogeneration. In kWh terms, IPPs contribute less than 5% of total electricity.

Figure 2: Breakdown of South Africa's total generation capacity

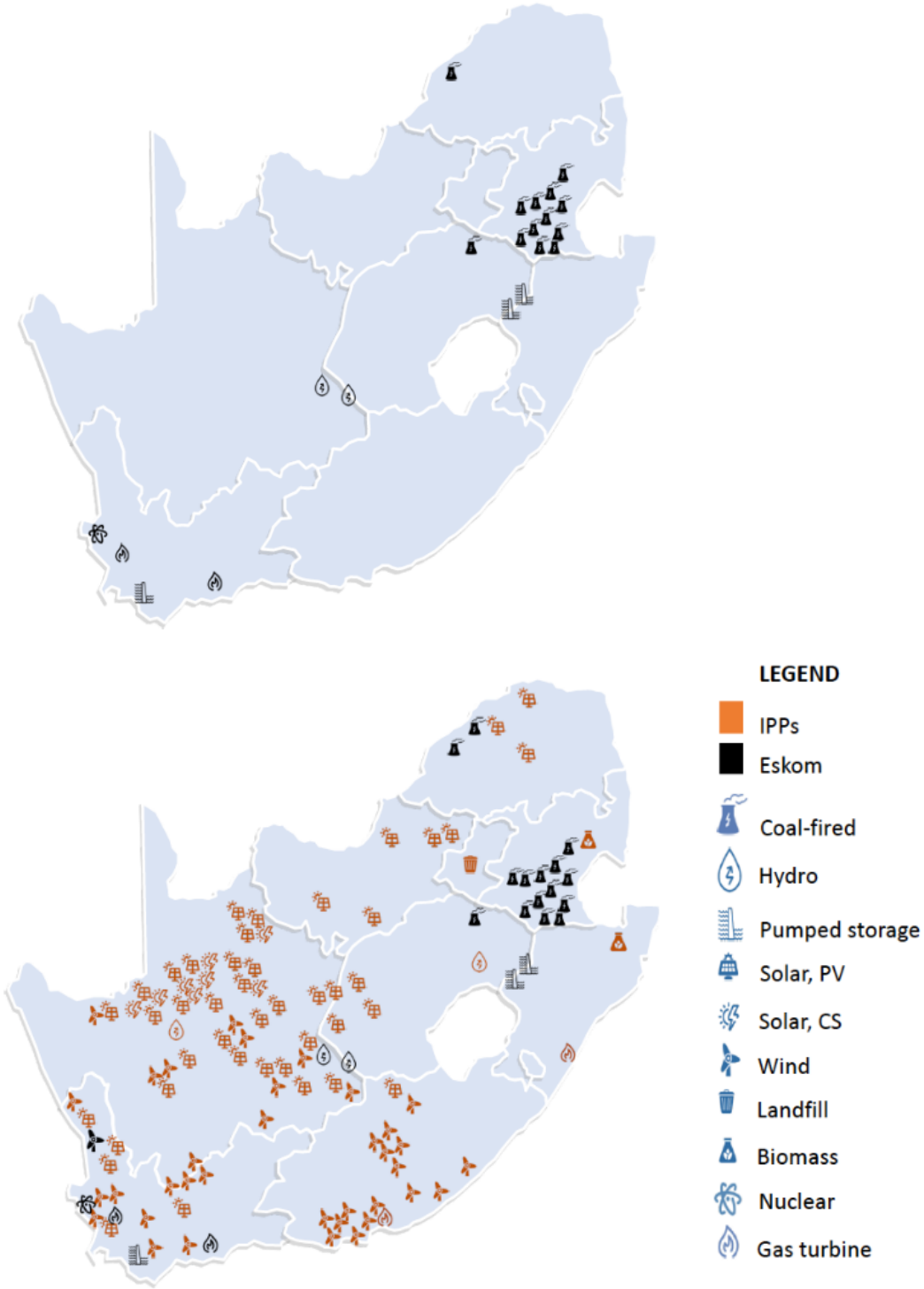


Source: DoE, 2019b

The country's power sector has historically been built on a highly centralised model that prioritised scale and the close alignment of mining and energy interests, resulting in what has been termed the minerals-energy complex (Baker, Newell and Phillips, 2014; Baker, 2015). South Africa's coal fired power stations are clustered in the north-east of the country, close to the coal-mining belt (Figure 3). Eskom's newest mega coal power stations Medupi and Kusile, both still under construction, have experienced multiple delays and disastrous cost overruns (McCann, 2019). The associated debt burden has resulted in steep annual electricity tariff increases and represents the single biggest threat to South Africa's fiscal health. To compound matters, these stations are performing poorly, operating at less than two-thirds of design capacity (DoE, 2019b; McCann, 2019).

South Africa is facing a major transition in the energy system, mainly driven by the economics of increasingly cost-competitive renewable energy technologies and the declining dominance of coal. Global investments in coal power have fallen around 25% between 2015 and 2017 (IEA, 2018) and the transition away from fossil fuels is impacting South Africa as global coal demand weakens. This is already dramatically altering the geography of South Africa's power sector (Figure 3) (StatsSA, 2018b; Eskom, 2019a). The transition is also impacting coal-mining towns and workers, resulting in job losses and devastating local economic impacts, and is set to accelerate in coming years. Recent analyses estimate that mitigating these impacts to ensure a "just transition" will cost South Africa in the region of US$400 million – a fraction of the costs of the Medupi and Kusile power stations (Cruywagen, Swilling and Davies, 2019).

Figure 3: Geographic distribution of South Africa's power stations: 2011 vs 2018



Source: Author compilation

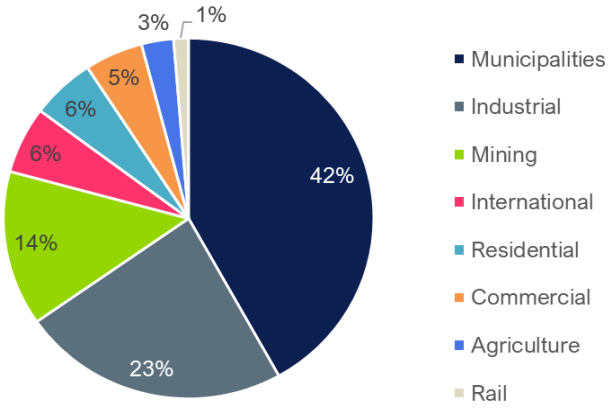
South Africa has experienced rolling power cuts over the past 12 years, initially caused by insufficient generation capacity to meet demand. More recent rounds of load shedding are mainly attributable to maintenance issues linked to Eskom's ageing power plants and coal supply problems, preventing optimal plant operation and destabilising electricity supply. As projected by the IRP 2019, and Eskom's Medium-Term System Adequacy reports, there is a high risk of energy shortages as Eskom's energy availability factor (EAF) remains low (60-70%), and non-compliance with the National Environmental Management Act (NEMA) in

terms of air pollution from its coal fired power plants could result in shutdowns of power plants (DoE, 2019b).

Electricity sales and tariffs

Over the past decade, South Africa's electricity sales have been declining due to higher tariffs and a slowdown in economic growth. In 2019, Eskom electricity sales totalled 208,319 GWh, compared to around 215,000 GWh in 2009. Of this, the largest share, 42%, was sold to municipalities (Figure 4). Only a small portion (6%) is exported to members of the Southern African Power Pool (SAPP: Botswana, eSwatini, Lesotho, Mozambique, Namibia, Zambia, and Zimbabwe), but represents a critical source of electricity supply to these countries (Eskom, 2019a, Deloitte Touche Tohmatsu Limited, 2017).

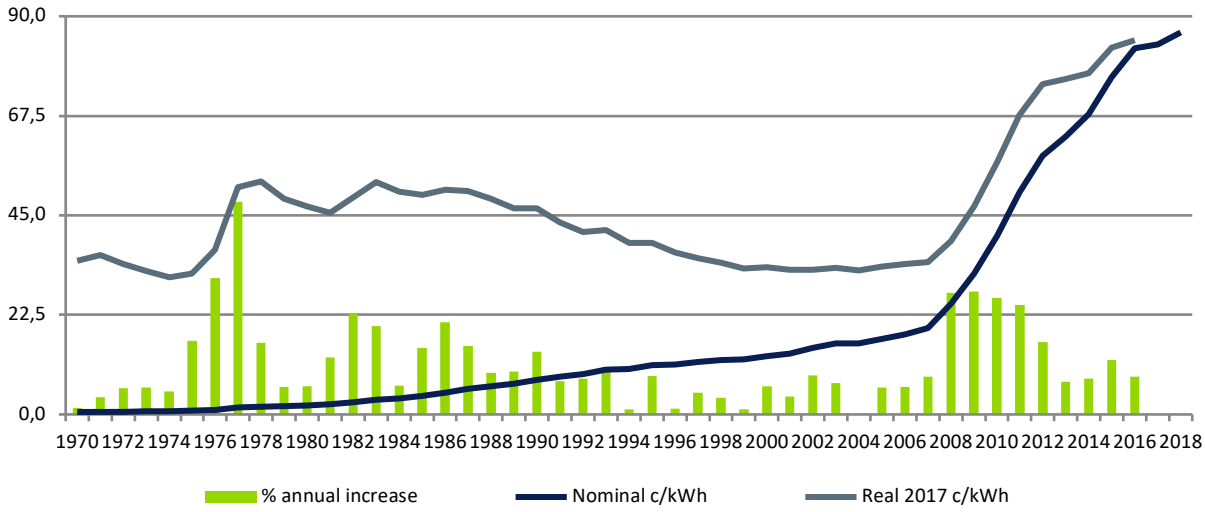
Figure 4: Eskom electricity customers



Source: Eskom, 2019a

Eskom's electricity tariffs have increased significantly in the last 10 years, shifting South Africa away from being one of the cheapest electricity providers in the world. The average electricity tariff increased by 120% in real terms between 2008 and 2018 (Figure 5). This trend in steeply rising tariffs is likely to continue, with NERSA recently processing an application from Eskom for a 15% annual tariff increase over the next three years beginning in April 2019. Price increases amplify the problem of affordability, especially for low income households already in energy poverty. But it also threatens the retention of intensive energy investors, who may consider implementing their own generation capacity projects or moving their businesses offshore.

Figure 5: Eskom average tariff increases: 1970-2018



Source: Eskom

The Integrated Resource Plan (IRP)

The 2019 IRP indicates a need for 39,7 GW of new electricity generation capacity between 2019 and 2030. It identifies the decommissioning of old coal power plants as the opportunity for creating a completely different mix of generation sources to the current one, with a predominant need for modular and flexible capacity to complement the existing inflexible capacity in the period up to 2030 (DoE, 2019b).

The long-term plan envisages the following interventions (DoE, 2019b):

- The addition of 7,2 GW of new coal generation capacity, of which 5,7 GW has already been contracted. Combined with the decommissioning of 11 GW of old coal-fired power stations, this results in an overall reduction in the share of coal generation capacity to 43% of the country's total by 2030.
- The extension of the plant life of Koeberg Nuclear Power Station. The IRP recommends extending this until 2044.
- The addition of 2,5 GW of hydroelectric generation capacity.
- The addition of 22,9 GW of renewable energy generation capacity, including wind (15,8 GW), solar PV (6,8 GW), and CSP (300 MW). Out of this, 10.8% has already been contracted, while commissioning the remaining 20,4 GW is 'smoothed out' across the 12 years until 2030. The plan acknowledges renewable energy as an opportunity to diversify the electricity mix and demonstrates that the least-cost unconstrained scenario would build only solar PV, wind, and gas plants. However, the published IRP puts annual limits on new capacity of solar PV (1 GW) and wind (1,6 GW).
- The addition of 2 GW of storage capacity. The IRP 2019 envisages storage as a disruptive technology which can be used to harness the full potential of variable renewable energy.
- An additional 3 GW of gas and diesel turbine generation capacity to provide the flexibility needed to complement variable renewable energy.
- An additional 500 MW of other generation capacity every year between 2023 and 2030, including distributed generation, co-generation, biomass, and landfill gas.

The IRP has been characterised as a political compromise document that tries to accommodate all interests (Eberhard, 2019). It is not based on the least-cost scenario – which would be based on wind and solar PV complemented by flexible resources such as natural gas or possibly storage. Rather, it includes several policy adjustments aimed at incorporating "new, innovative technologies that are not currently cost competitive" and minimising the "impact of decommissioning of coal power plants and the changing demand profile" (DoE, 2019b, p. 93). The policy-adjusted scenario of IRP 2019 results in a 5% higher tariff in 2030, compared to the least-cost test scenario, mainly due to the inclusion of coal and hydro power and the envisaged need to continue to utilise Eskom's diesel fired capacity to address supply shortages in the immediate term (DoE, 2019b).

While far from ideal, the 2019 IRP offers some certainty to the sector by charting a way forward and establishing the legislative basis for new procurement decisions. The cabinet-approved IRP indicates that new generation (apart from nuclear) will be built by third parties (i.e. the private sector) and provides indicative timelines in terms of when this new capacity will be required. The Minister of Mineral Resources and Energy still needs to publish a determination in terms of section 34 of the Electricity Act, which NERSA is required to concur with after public consultations, before any new procurement can begin. Unfortunately it seems that there is little urgency about these decisions, despite the severe energy security challenges facing the country (Eberhard, 2019).

3 Renewable energy tendering programmes

The Renewable Energy Independent Power Producer Procurement Programme

REI4P is a competitive tender process aimed at facilitating private investment into utility-scale, grid-connected renewable energy projects (IRENA, 2018). Under this programme, IPPs could submit bids for renewable energy generation projects using wind, solar PV, CSP, small hydro, biomass, biogas, or landfill gas. The electricity supply constraints experienced in the 2008-2011 period, as well as the need to demonstrate a political commitment to climate change mitigation (when South Africa hosted international climate change negotiations at the COP in Durban) (2011) opened up the political space for the rapid implementation of the programme (IRENA, 2018; Morris and Martin, 2015).

The REI4P was designed as a single-round bidding process with no prequalification round, mainly driven by the need to speed up the procurement process (IRENA, 2018). REI4P has implemented five rounds of bidding, referred to as bid windows 1, 2, 3, 3.5 (limited to CSP), and 4 (IPP Office, 2019). The programme attracted fierce competition and led to significant reductions in bid prices. The latest prices of awarded bids indicate that solar PV and wind energy are now cheaper than Eskom's average cost of supply and far below the cost of new coal power stations (Eberhard and Naude, 2017). The low prices submitted in bid window 4 prompted the DoE to double the awarded capacity. An expedited bid window was also introduced in 2015, aimed at giving a second chance to all bids that were not successful during previous rounds.

The Small Projects Independent Power Producer Procurement Programme

In 2013, the DoE introduced the SP-I4P, as a subset of the REI4P, with the objective of procuring 200 MW of generation capacity from small (1-5 MW) projects. This included projects using onshore wind, solar PV, biomass, biogas, and landfill gas (Eberhard and Naude, 2017). The SP-I4P was designed to be less costly and simpler than the REI4P, with the purpose of attracting emerging South African small and medium enterprises (SMEs), who were crowded out by large international companies in the REI4P process. These smaller IPPs faced a number of barriers to entry in REI4P, including the cost of bidding, the ability to meet financial qualification criteria and the difficulty of competing with large, international firms. By reducing the project size, and adjusting the bidding process and qualification criteria, the DoE hoped to deepen the programme's economic development impact. The SP-I4P ran two bid windows, which resulted in 99 MW of generation capacity being awarded to 20 small scale renewable energy projects (IPP Office, 2019). None of the contracts approved under SP-I4P have been signed to date, which is surprising considering that these projects faced the same impasse that prevented the BW4 projects from advancing and which was resolved in 2018 (Interviews, 2019).

Auction demand

Consistent and predictable planning is an important contributor for attracting private sector investment in new generation capacity (Eberhard et al., 2017). As noted above, in South Africa the IRP is the key electricity sector planning tool which determines the electricity mix of the country in the long term. Based on the IRP, the Minister of Mineral Resources and Energy issues Ministerial Determinations which define the capacity that can be procured from a particular type of technology, as well as the timelines for implementation, and specifications of the ownership structure of the new generation capacity (Table 4).

Following a public consultation process[4], NERSA is bound to issue licences as per these determinations, and the RfPs issued by REI4P and SP-I4P are also required to align with these determinations, in terms of the amount of generation capacity to be procured. To date, four determinations have been made, towards adding new renewable energy generation capacity to South Africa's energy mix (Table 4). As seen from the table, the determinations make specific, separate allocations for renewable energy projects under SP-I4P.

Not all of the determined capacity, detailed in table 4, has been procured yet. However, DMRE now considers the unprocured capacity from previous determinations as cancelled, since they do not align with the newly published IRP 2019. New Ministerial Determinations as per IRP 2019 are yet to be published at the time of writing this report.

Renewable energy allocations, which drive REI4P procurement, are differentiated by technology type and include onshore wind, CSP, solar PV, biomass, biogas, landfill gas, and small hydro (less than 40 MW) (IRENA, 2018). Allocations for SP-I4P, however, are not technology specific, placing different technologies in a position to bid against one another for the available capacity (IPP Office, 2019). As seen in table 4, onshore wind and solar PV dominate in terms of demand allocations for new capacity, largely driven by the significant reduction in costs over the course of the bidding rounds (IRENA, 2018). By June 2019, 44% of the total targeted renewable energy capacity of 14,725 MW had been procured (IPP Office, 2019).

Table 4: Ministerial determinations on renewable energy technologies

	New renewable energy generation capacity allocations (MW)					
Technology	**First determination (Aug 2011)**	**Second determination (Oct 2012)**	**Third determination (Aug 2015)**	**Fourth determination (May 2016)**	**Total**	**Share of Total %**
Onshore Wind	1,850	1,470	3,040		6,360	43%
CSP	200	400	600		1,200	8%
Solar PV	1,450	1,075	2,200	1,500*	6,225	42%
Biomass	13	48	150		210	1.5%
Biogas	13	48	50		110	1%
Landfill gas	25	0	0		25	0%
Small hydro	75	60	60		195	1.5%
Small Projects (SP-I4P)	100	100	200		400	3%
Total	*3,725*	*3,200*	*6,300*		*14,725*	*100%*

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

Source: DoE, 2016c; IRENA, 2018

Site selection

The South African approach to project site selection and preparation, which is mainly private-sector led, remains a relative anomaly in the sub-Saharan context. In most other auction programmes in the region, project sites are usually "provided" by the state with the intention of reducing bidding costs and project development timelines. In reality, this intention is often subverted by poorly selected and developed sites, leading bidders to prefer finding and preparing their own project sites (Kruger, Stritzke and Trotter, 2019).

[4] The initial determinations that underpinned the REI4P were not subject to the same public consultation process, although a public participation process was required for the licensing of each awarded project.

Under REI4P, bidders were responsible for carrying out their own respective site selection processes, and thereafter had to submit adequate proof of land acquisition. The bidder was required to give the coordinates of the proposed project site and details of the registered owner (if the bidder was not the owner of the land). This associated submission could involve a notarial lease or title deeds for the project site; an unconditional land option, sale, or lease of land agreement; or a conveyancer's certificate (in the event that the title deeds were unattainable at the time of submission). Following legal advice, the bidder needed to provide a report which detailed land use change, zoning applications, subdivisions, and other relevant factors pertaining to the site. If a bidder intended to use landfill gas or municipal land for the site, they needed to submit a letter of approval from the relevant municipality (Eberhard and Naude, 2016).

This process proved to be arduous and costly for unsuccessful bidders, prompting a change from bid window 4 onwards. Bidders were no longer required to submit applications for subdivision, zoning, and land use change as proof of land acquisition. But bidders could provide proof of a land lease option, including requirements (but not approved applications) related to subdivision and zoning applications, as well as land use change.

SP-I4P site-related bid requirements were much lighter. Bidders only needed to submit a letter from the land owner indicating that they were willing to enter into negotiations with the project owner, if the project was awarded, and a letter indicating the types of legal authorisation that would be required with respect to the site.

Under REI4P and SP-I4P, responsibility for securing grid access lay primarily with the bidder, who needed prior confirmation from the grid provider (Eskom) that the relevant substations and transmission and distribution lines had enough capacity to accommodate the proposed project. A project could either connect to the transmission system (i.e. through the Eskom transmission business unit) or to the distribution system (i.e. through the Eskom distribution business unit or the local municipality) – depending on the project's location, and on the location of the point of connection. Thus successful bidders included either a transmission or distribution agreement with the respective grid provider as part of their power purchase agreement (PPA). Bidders were also responsible for acquiring all land needed for the installation of power lines that were required. These lines often spanned many kilometres and crossed multiple properties. It is also worth noting that in the event of a municipality being the grid provider, bidders were required to provide relevant agreements (i.e. an implementation protocol and an amendment agreement to the electricity supply agreement), prepared ahead of financial close.

Generally, the grid operators were responsible for "deep connection works" (connection works on shared assets) and bidders were responsible for the "shallow connection works" (works for the dedicated customer connection of the facility to the system). Shallow connection works could be done in one of three ways: i) Eskom-built; ii) own-built (in a case where the bidder held ownership of the connection works, requiring another transmission or distribution license); or iii) self-built (in a case where the bidder had built the connection works and thereafter transferred it to the grid provider). Bidders were required to provide a letter affirming their ability to comply with grid codes ahead of the commercial date of operation, and they also needed to specify which part of the grid connection works they would perform. Bidders needed to submit a cost estimate letter (CEL) from the municipality or Eskom at their own cost, providing an indicative timeline, together with costs required for the deep connection works. This had to be replaced by budget quotes after preferred bidder award. There were major discrepancies between the CELs and budget quotes in many instances, with the latter being several times more expensive than was originally indicated in the CEL. This was problematic since bidders had bid on the basis of the CEL costs and could not adjust their bids based on the actual costs incurred.

As part of the REI4P process, bidders needed to provide evidence that all required environmental approvals had been received before the bid submission. In general, the key requirement across the technology spectrum is an environmental authorisation, as stipulated by the South African NEMA. Depending on the power plant's size and capacity, this authorisation is either in the form of a Basic Assessment Report (BAR) or an Environmental Impact Assessment Report (EIAR). This proved to be one of the costliest and most time-consuming requirements of the bidding process (for example, for wind projects, at least 12 months of costly bird and bat monitoring data was required).

In an effort to mitigate this risk and minimise such costs, the government established a coordination plan for renewable energy generation and transmission planning. In 2016, eight Renewable Energy Development Zones (REDZs) and five Power Corridors were approved through strategic environmental assessments (SEAs) to serve as a guideline for future locational selections. This is expected to come into effect when bid window 5 is eventually initiated. Three additional REDZs were proposed in the second phase of the wind and solar PV SEA, in line with the provisions for new renewable energy capacity in IRP 2019. The REDZs have the potential to stimulate the development of renewable energy projects in specific areas. This proposal could thus contribute to coal mine rehabilitation and support a just energy transition in areas where the government is planning the decommissioning of 12 GW of existing coal power stations by 2030 (CSIR, 2019).

The environmental permitting requirements for the SP-I4P were generally less onerous than for REI4P, only requiring an Environmental Impact Assessment Report if deemed necessary by an independent, qualified practitioner. If the potential project would not cause major environmental impacts, the independent practitioner simply needed to present a document verifying this.

Qualification and compliance requirements

Both REI4P and SP-I4P had stringent qualification criteria for screening potential bidders and has been described by one international developer as "the most onerous bidding programme in the world". This process aimed to ensure that only committed and highly capacitated bidders were selected and that projects had a high likelihood of being built on time.

The SP-I4P generally followed a similar process to that of REI4P for bid qualification and evaluation. However, the SP-I4P utilised a two-stage bidding process, aimed at limiting the cost-at-risk incurred by bidders, unlike the single-stage REI4P (Eberhard & Naude, 2017). Under the two-stage process, only bidders who met the high-level Stage 1 qualification criteria and were awarded 'Selected Bidder' status could prepare and submit bids for Stage 2 of the process. Unfortunately, the qualification criteria for stage 1 were set so high that this process made little difference to the cost of bidding, with many arguing that it in fact increased transaction costs for both the bidders and the procuring authority (Table 5).

Table 5: SP-I4P (pre)qualification criteria

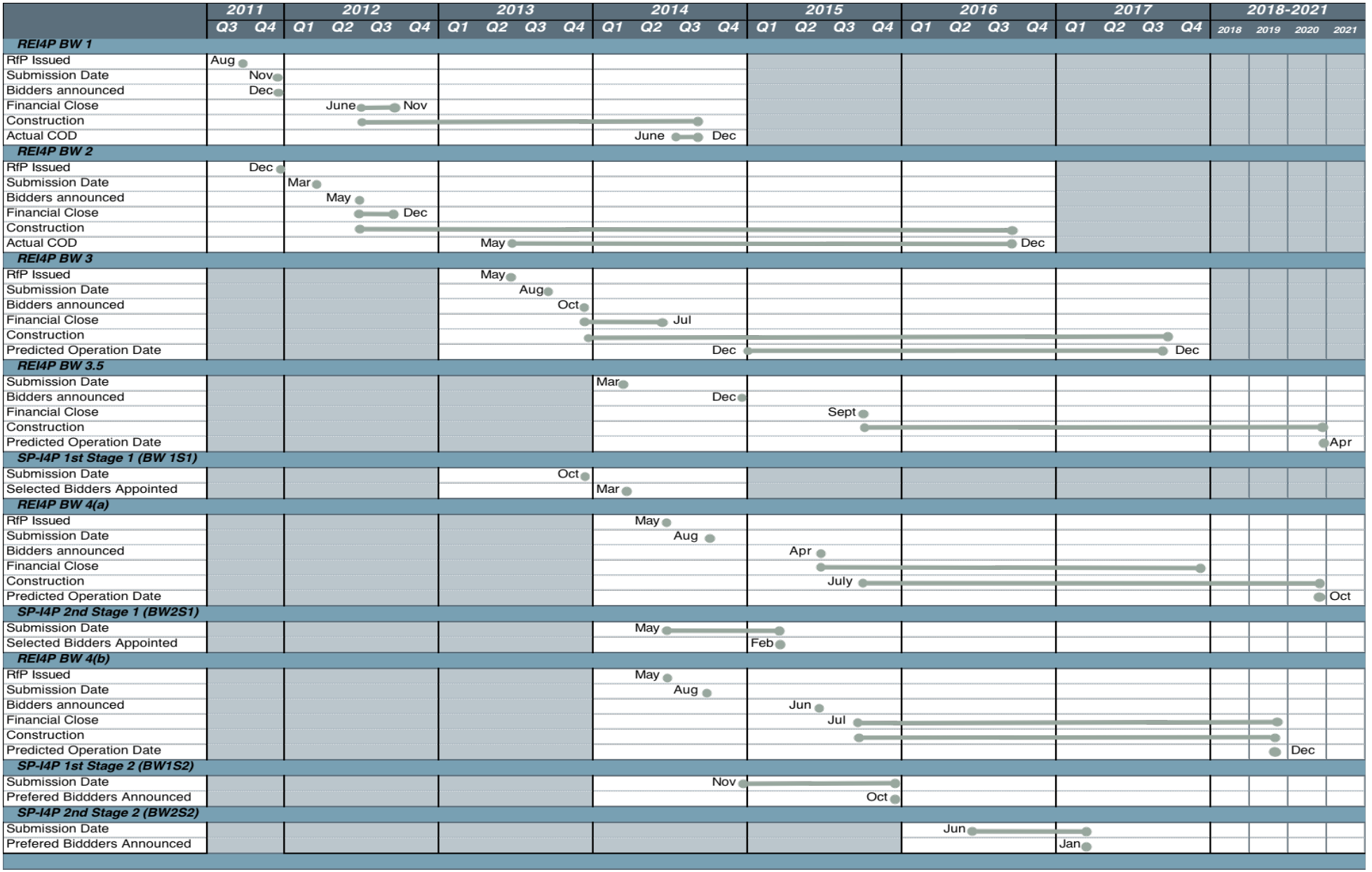
Evaluation Criteria	Stage 1	Stage 2
Legal Criteria & Evaluation	✓	✓
Land (Acquisition & Use rights)	✓	✓
Environmental Criteria & Evaluation	✓	✓
Technical Criteria & Evaluation	✓	✓
Economic Development Criteria	✓	✓
Financial Criteria & Evaluation	×	✓
Structure of the Project	×	✓
Value for Money	×	✓

Source: Naude & Eberhard, 2016

A bidder who submitted under the REI4P was not allowed to simultaneously submit a bid under SP-I4P, if both programmes were open for submission at the same time (Eberhard and Naude, 2017). Only if a bidder had registered for REI4P but not submitted a response by the submission date, or if their submission was unsuccessful, could they submit their response under SP-I4P, provided that they had disclosed their REI4P registration/submission. Furthermore, in order to prevent large IPPs detracting from the objectives of the SP-I4P, they were not permitted to split up existing large projects and submit these as several small ones.

Figure 6 presents a timeline of the REI4P and SP-I4P rounds launched and completed to date. There were usually three months between the RfP release date and the final date for submission of bids. Once the evaluation consultants had completed the screening for compliance with qualification criteria and general requirements, and bidders were awarded, the preferred bidders were expected to reach financial close of their projects within 9 to 12 months. Commercial operation date (COD) was expected within 24 to 30 months after financial close. Despite these pre-defined timelines, and the fact that penalties were envisioned for delays in implementation, the DoE sometimes allowed for delays in these timelines. As can be seen from Figure 6, in reality, most projects under the BWs to date exceeded these timelines.

Figure 6: Timeline of REI4P and SP-I4P: 2011-2018



Legal compliance

In order to comply with the REI4P legal qualification requirements, bidders had to establish a special purpose vehicle (SPV) ahead of submitting their bid. The purpose of this SPV was to ensure that the project was "ring-fenced" in terms of the South African Companies Act. This condition was relaxed with the launch of bid window 4 in 2014. It was no longer necessary to create an SPV before bid submission, but an undertaking was required which indicated that if the bid was awarded the company would be established as such. Bidders as well as their investors and lenders were also required to confirm their acceptance of the conditions of the PPA, implementation agreement (IA) and connection agreement (CA) (IRENA, 2018).

Under SP-I4P, prospective bidders needed to comply with three legal criteria in order to pass Stage 1 of the process (prequalification). Firstly bidders needed to complete the standardised returnable schedules in the RfP. Secondly, if the bidder was a consortium, they also needed to submit the consortium or founding agreement. Lastly, detailed legal information about the bidders needed to be submitted, including information about its members, potential engineering, procurement and construction (EPC), contractors and operations contractors, and legal advisers (Eberhard and Naude, 2017).

Technical compliance

Technical compliance requirements differed significantly between REI4P and SP-I4P. Technological differences between projects resulted in variations between PPAs and variations in size constraints.

Under REI4P, bidders were required to provide energy sales report forecasts, reviewed by an independent third-party body. The forecast minimum requirements differed per technology, with for example, at least one year of site-specific data required for onshore wind projects and ten years for solar PV. In the case of biomass and biogas projects, bidders needed to provide fuel supply agreements or market studies covering at least two years of the project's operation, as documentary evidence of energy resource certainty (IRENA, 2018).

Under REI4P, bidders were also required to submit evidence that the equipment met international standards and adhered to prescribed certification programme designs. Bidders also needed to provide proof that the proposed projects met prescribed technical availability standards. Prescribed standards were specified according to the underlying technology type and technology-specific PPAs were provided as part of the RfP documentation.

The REI4P process put technology-differentiated limitations on the maximum contracted capacity per project (Table 6). The purpose of the capacity constraints was to promote competition by preventing companies who were able to invest in large-scale projects from dominating the procurement process (IRENA, 2018). There were, however, no limits on the number of projects that one bidder could submit or be awarded in the same REI4P round. The result has therefore been a process that limits the cost-benefits associated with economies of scale without necessarily increasing competition between bidders.

Table 6: Contracted capacity permitted per project

Technology	Minimum Capacity (MW)	Maximum Capacity (MW)
Onshore Wind	1	140
CSP	1	75
Solar PV	1	100
Biomass	1	25
Biogas	1	10
Landfill gas	1	20
Small hydro	1	40

Source: IRENA, 2018

Technical requirements were relaxed slightly for SP-I4P, although the procurement conditions were fairly similar to those under REI4P. The small projects procurement programme did not require bidders to provide evidence that technologies had a "proven" track record, as was the case in the REI4P. SP-I4P did not require international certification of equipment, although South African Bureau of Standards (SABS) and Grid Code compliance was still needed. In order to ensure the viability of projects where the equipment was not internationally certified, the DoE suggested that bidders engage with potential lenders early in the process in order to ensure that they were willing to lend money for the particular equipment (Eberhard and Naude, 2017).

Energy sales forecast requirements were at first glance also less stringent under SP-I4P: only six months of wind data, versus one year, was required for onshore wind projects during stage 1. However, stage 2 required 12 months of data. In addition, SP-I4P required that the wind assessment expert had at least three years of experience, versus a minimum 5-year requirement under REI4P. Under SP-I4P there was also no requirement for an additional independent review of the forecast data, as long as this was provided by an independent expert.

Financial and commercial capability

To assess the financial standing of bidders, REI4P had standard requirements for commercial bids, including audited financial statements, net asset tests and/or track record tests of all finance and equity providers (IRENA, 2018). In the first rounds of REI4P these documents were also required with regards to sub-contractors, including a signed contract with EPC contractors and O&M providers, but this requirement was relaxed in later bid windows. Bidders were also required to provide a detailed breakdown of all funding sources, including equity finance, corporate finance, and external debt requirements, and how these funds would be allocated. Financial due diligence plans accompanied by risk mitigation strategies were also required to establish the funding proposal's robustness and viability.

Under REI4P, debt-funded project bids had to be accompanied by credit committee approved commitment letters and term sheets from lenders. This assured the IPP office that by the time bids were submitted, a stringent due diligence process had already been completed. Lenders played a pivotal role in shaping REI4P and the structure and contents of the underlying contracts. In an effort to ensure that the awarded projects would be bankable, the IPP office tested all contracts with lenders prior to going to market. This was one of the reasons why only "proven technologies" were included in the procurement process, and why the bidding documents were non-negotiable.

Funders needed to agree to the assigned risk allocation by accepting the relevant provisions in the PPA, IA, and direct agreement (DA). In order to prove the robustness of their financial models, bidders were also asked to submit two financial models which needed to include a foreign exchange exposure sensitivity analysis, tax and accounting treatment disclosures, as

well as a list of all underlying assumptions. A success payment declaration also had to be submitted, outlining those costs incurred during the bid preparation process that would be eligible for reimbursement, should the project reach financial close (IRENA, 2018).

The Stage 1 qualification process under SP-I4P did not involve any financial compliance requirements. In Stage 2, bidders were assessed against two sets of financial criteria, the first being price, similar to the REI4P. The second financial criterion related to the viability and robustness of the funding proposal and assessed the project in terms of underlying funding sources, including equity finance and debt funding. To this end, each of the equity holders had to submit a letter of support, certifying that due diligence had been completed. In contrast, senior and mezzanine debt financiers were only required to submit a letter indicating credit approval of preliminary term sheets, and a detailed plan for reaching final credit approval. Similar to REI4P, a schedule had to be submitted of all project development costs that were subject to reimbursement through success payments once the project reached financial close. However, reimbursements were limited to only 2,5% of the total costs, with the objective of ensuring that project preparation costs remained low for small projects (Eberhard and Naude, 2017).

A bid bond guarantee mechanism was required by the REI4P, in order to ensure that awarded bidders fulfil their commitment to contract signing. Bidders were required to submit a bond guarantee of R100,000 per MW (equivalent to about US$6800/MW), which selected bidders were required to double before being officially awarded preferred bidder status, effectively making it a performance guarantee. In contrast, no bid bond was required under SP-I4P, but a performance guarantee was required from the preferred bidder once they were qualified. The performance guarantee was meant to be in place until COD and act as incentive for the project to reach COD on time. The IPP office did, however, waive this requirement for awarded/announced SP-I4P projects since there has been such uncertainty around their final awards.

Economic and socioeconomic development

Economic development requirements under REI4P and SP-I4P were designed to incentivise the promotion of job creation, local industrialisation, community development, and black economic empowerment through the implementation of renewable energy projects. In this way, the programmes were designed not only as a mechanism for procuring new energy generation capacity, but also as a tool for contributing to broader national development objectives through stimulating an indigenous renewable energy industry, which creates employment opportunities, uplifts society and diversifies ownership (IPP Office, 2019). These requirements generated conflicting responses, with some bidders finding them too subjective and stringent, while labour unions viewed them as not stringent enough to generate real change (Eberhard et al., 2014). However, they were instrumental in generating critical political support for the programme (Eberhard et al., 2014).

Bidders needed to pass two primary economic development (ED) thresholds in order to qualify to participate in the auction process under REI4P. The first threshold set a minimum of 40% ‘South African Equity Participation’ in the bidding entity, with the initial definition stating that in order to qualify as South African, the company had to be based and registered in the country and involve shareholding by South African citizens. From bid window 3, the definition was narrowed to a requirement for participation of South African citizens in the entity as direct or indirect shareholders in the project company (IRENA, 2018). Authorised shareholding letters, shareholders’ agreements and constitutional documents, or shareholder certificates could be presented as proof of compliance with this requirement. In addition, identity numbers and copies of identity documents of the ultimate natural citizens needed to be provided.

The second economic development threshold required that bidders demonstrate a broad-based black economic empowerment (B-BBEE) contributor status level (CSL) of at least five. CSL is determined in accordance with B-BBEE codes as dictated by the South African BBBEE Act (53/2003). The purpose of the Act and this qualification requirement is to promote the achievement of higher economic growth, increased employment, and more equitable income distribution through increased broad-based and effective participation of (historically disadvantaged) black people in the South African economy. Proof of compliance was required, in the form of a valid verification certificate issued by an eligible entity, which indicated the entity's actual qualification score, B-BBEE status, and recognition level. If these were not indicated in the certificate, a verified letter from a registered and recognised organisation, auditor or accountant was required, indicating the company's B-BBEE score.

In addition to the two primary thresholds, bidders were also required to meet or exceed the minimum thresholds indicated in the economic development scorecard, with supporting evidence. These thresholds differed for REI4P and SP-I4P (Table 7), with economic development qualification requirements significantly reduced for small renewable energy projects (IRENA, 2018).

Table 7: Economic development minimum thresholds for REI4P and SP-I4P bidders

Element	Description	REI4P		SP-I4P	
		Threshold %	Target %	Threshold %	Target %
Job Creation	South Africa-based employees who are citizens	50	80	-	90
	South Africa-based employees who are black people	30	50	-	60
	Skilled employees who are black people	18	30	-	50
	RSA-based employees who are citizens and from local communities	12	20	-	30
Local Content	Value of local content spending	40 (45 for solar PV)	65	50	70
Ownership	Shareholding by black people in the seller (bidder)	12	30	-	40
	Shareholding by local communities in the seller	2.5	5	-	10
	Shareholding by black people in the construction contractor	8	20	-	30
	Shareholding by black people in the operations contractor	8	20	-	30
Management Control	Black people in top management	-	40	-	40
Preferential Procurement	B-BBEE procurement, as percentage of total procurement spend	-	60	-	70
	Qualifying small enterprises and SME procurement, as percentage of total procurement spend	-	10	-	20
	Women-owned vendor procurement, as percentage of total procurement spend	-	5	-	10
Enterprise Development	Enterprise development contributions, as a percentage of revenue	-	0.6	-	1

	Adjusted enterprise development contributions, as a percentage of revenue	-	0.6	-	1
	Enterprise development contributions on SMEs	N/A	N/A	0.5	1
Socioeconomic Development	Socioeconomic development contributions, as a percentage of revenue	1	1.5	-	3
	Adjusted socioeconomic development contributions, as a percentage of revenue	1	1.5	-	3
SME Participation	Key components and/or equipment and balance-of-plant spend on SMEs	N/A	N/A	50	70

Source: IRENA, 2018

As part of the local content criteria, a share of the total project cost needed to be spent in South Africa (45% for solar PV projects and 40% for all other technologies). This constituted 25% of the economic development score (discussed in more detail in the following sections) and both thresholds and targets were increased over the bidding windows.

Local content requirements were a key driver under SP-I4P and were generally set at higher levels across all technologies compared to REI4P. Bidders were required to have a 40% South African Entity Participation at bid submission. This needed to increase to 60% within no more than one third of the Scheduled Operating Period (Eberhard and Naude, 2017). Similarly, in order to stimulate SME participation, bidders were required to show SME shareholding of at least 10% at bid submission and to increase this to 30% within one third of the Scheduled Operating Period (Eberhard and Naude, 2017). Bidders were also required to submit a plan for achieving the increases within the stipulated timeframe. As in REI4P, bidders were required to submit documentation to prove a minimum Level 5 BBBEE CSL.

Bidder ranking and winner selection

Projects under REI4P and SP-I4P were evaluated based on a multicriteria 70:30 split between price and economic development criteria respectively. This split, which was unique to the South African renewable energy auction, placed a significant weight on economic development criteria. This was notably different from the general South African government procurement policy split of 90:10 (for projects of this size), which favours the price criteria significantly. In order to apply the weighting, the IPP office had to obtain an exemption from the Public Preferential Procurement Framework Act in order to maximise economic development objectives. The strong focus on economic development criteria attracted some criticism due to fears that it would lead to higher bid prices. The bid tariff outcomes (Table 11), however, indicate that while tariffs might have been lower in the absence of these requirements, REI4P still saw a significant decline in prices throughout the process (IRENA, 2018).

A price ceiling mechanism was applied and made public prior to the bid submission deadline. Table 11 presents the price caps across the different REI4P bid windows as well as the average price outcome, by technology type. Price caps were adjusted downwards in each round, based on local and global influencing factors. Price caps were removed for solar PV- and wind-based projects in bid window 4 due to the significant cost decreases for these technologies.

Table 8: Price caps and average bid tariffs for bid windows (BWs) 1 to 4 (in US$/MWh)

Bid Window (BW)	BW 1		BW 2		BW 3		BW 4 (b)		BW 4(a)	
Technology	**Price cap**	**Bid tariff**	**Price cap**	**Bid tariff**	**Price cap**	**Bid tariff**	**Price cap**	**Bid tariff**	**Price cap**	**Bid tariff**
Onshore Wind	140	140	150	110	100	80	70	60	-	50
Solar PV	360	350	360	210	140	100	80	70	-	70
CSP	360	340	360	320	170	170	130	-	140	-
Biomass	130	-	140	-	140	140	140	-	120	120
Biogas	100	-	100	-	80	-	140*	-	-*	-
Landfill gas	80	-	110	-	100	100	90	-	80	-
Small hydro	130	-	130	130	90	-	110	-	90	90

**No biogas capacity was made available for tender under bid window 4.*

Source: IRENA, 2018

The weighting assigned to different elements of economic development are presented in table 12, comparing REI4P weighting to SP-I4P weighting. SP-I4P differed from REI4P in terms of assigning less weight to job creation and local content elements. It also has an additional element which measures SME participation. Economic development contributions were evaluated and scored on an absolute, points-based basis in earlier rounds. In later rounds, the programme used relative scoring: all bids were evaluated against the bid with the highest economic development score, which met or exceeded all economic development targets (Table 8). The IPP Office published quarterly reports on the REI4P programme, which indicate that all contracted projects either reached or exceeded economic development commitments, noting that the data provided still needed to be audited and verified (IRENA, 2018).

Table 9: Weighting of the elements of economic development criteria under REI4P and SP-I4P

Element	Description	REI4P Weighting	SP-I4P Weighting
Job Creation	RSA-based employees who are citizens	25%	20%
	RSA-based employees who are black people		
	Skilled employees who are black people		
	RSA-based employees who are citizens and from local communities		
Local Content	Value of local content spending	25%	20%
Ownership	Shareholding by black people in the seller	15%	15%
	Shareholding by local communities in the seller		
	Shareholding by black people in the construction contractor		
	Shareholding by black people in the operations contractor		
Management Control	Black people in top management	5%	5%
Preferential Procurement	B-BBEE procurement, as percentage of total procurement spend	10%	10%
	Qualifying Small Enterprise and SME Procurement, as percentage of total procurement spend		
	Women-owned vendor procurement, as percentage of total procurement spend		
Enterprise Development	Enterprise development contributions, as a percentage of revenue	5%	5%
	Adjusted enterprise development contributions, as a percentage of revenue		
Socioeconomic Development	Socioeconomic development contributions, as a percentage of revenue	15%	15%
	Adjusted socioeconomic development contributions		
SME Participation		-	10%

Securing the revenue stream and addressing off-taker risk

In order to ensure investment in the REI4P, a secure revenue stream and limiting off-taker risk was essential. The REI4P put various mechanisms in place to ensure this, such as sovereign guarantees, as well as limiting foreign exchange risk. More recently, project owners have also secured guarantees from the World Bank's Multilateral Investment Guarantee Agency (MIGA), in an effort to mitigate political risk.

In order to limit the exposure of bid prices to inflation risks, bidders were required to submit fully and partially indexed prices according to the South African Consumer Price Index (CPI) for the 20-year period of the PPA. Bidders would be paid in South African Rand (ZAR) on a take-or-pay basis: the off-taker (e.g. Eskom) was obligated to either take delivery of electricity – regardless of whether it needs it or not – or to pay the amount that the IPP would have been paid had Eskom been able to take the power. This is a standard requirement for renewable energy projects, most of which are not dispatchable due to the variable nature of the resource.

While sellers were exposed to some foreign exchange risks for upfront capital expenditure, the prescribed spot price (and corresponding bid tariffs which were submitted in the bid at financial close) could be adjusted for capital expenditures. Bidders indicated an electricity price at bid submission based on a forex rate stipulated by DoE/IPP Office at the time. During the time between bid submission and financial close, there would have been forex fluctuations. Bidders were allowed to adjust their submitted price (up to a maximum of 60% due to the 40% local

content requirement) based on the changes in the exchange rate between bid submission and financial close.

Preferred bidders signed an implementation agreement (IA) with the DoE that functioned as a sovereign guarantee but also formed the contractual basis for the bidders' socioeconomic development commitments. The contingent liability presented by the sovereign guarantees was seen by National Treasury as presenting a very low risk (Van Rensburg, 2016) because of an Intergovernmental Framework Agreement between NERSA, Eskom and National Treasury. This agreement essentially ensured that NERSA passed through the costs of the PPAs to Eskom customers – without affecting Eskom's allowed tariffs.

Additional risk mitigation instruments have also become involved more recently, specifically to insure against political risk. There has been an increase in cover provided by the World Bank Group's Multilateral Investment Guarantee Agency (MIGA) for foreign investors, with REI4P projects now being MIGA's biggest exposure in Africa. MIGA provides break of contract cover, which comes at a significant cost to the project (Mayer, 2018). This has been motivated by worries about announcements from NERSA and the relevant ministries that the tariffs from the earlier bid windows will be renegotiated (Creamer, 2019). This announcement has since been changed to a "voluntary" renegotiation process in exchange for a contract extension (Bellini, 2019; Omarjee, 2019b).

Assigned liabilities for transmission delays

The costs of extending the grid from the generation facility to the main network delivery point ("shallow" connection works) were borne by the project developer, with the grid interconnection works beyond the delivery point ("deep" connection works) remaining the responsibility of the grid operator (e.g. Eskom) upon COD. If transmission was not provided by Eskom as stated in the budget quote, it was classified as a system event. This meant that the project would be paid for the energy that it would have delivered, and the last-stop COD would be moved out in accordance with the delay.

Delay and underbuilding penalties

Bidders for the REI4P were not required to provide any completion or performance bonds. However, if construction had not started within 180 days of the effective date, the project would be terminated. Furthermore, the PPA stated that for each day that construction went beyond the scheduled COD, the operating period of the contract was decreased by one additional day, i.e. for each day's delay, two days' worth of revenue was lost (IRENA, 2018).

A project could also be terminated or fined if it failed to comply with its economic development (ED) obligations. Projects were awarded financial penalties and/or half a termination point for performance below 65% on any ED obligation, which are reported on quarterly (IRENA, 2018). There is anecdotal evidence that some bidders included the cost of penalties/non-compliance in their bids as part of a bidding strategy aimed at maximising ED scores in the evaluation process. If an IPP received more than 9 termination points over a 12-month period, the PPA could be terminated – something which has not happened to date. Most termination points awarded to date have been for projects failing to comply with their "women-owned businesses" commitments.

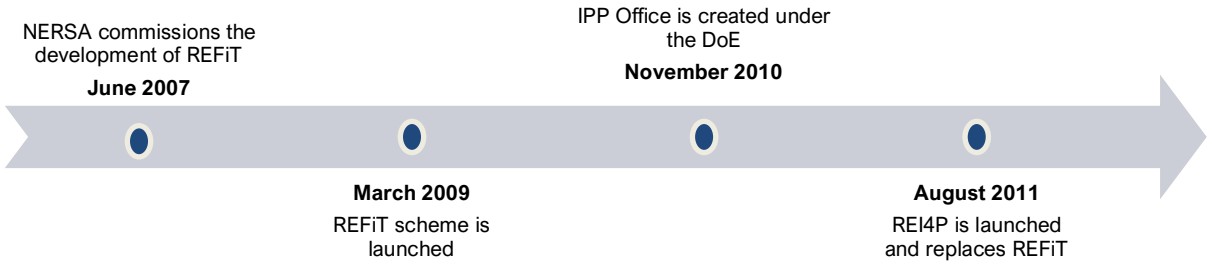
4 Running the auction: key role-players

In order to ensure that potential bidders trusted both the agency and the auction process, there was a need to match existing institutional resources with the bidders' needs and expectations. Auction success in general is as much dependent on good auction design as on bidder trust in the auction process and in the implementing unit, which is built on the underlying institutional framework. The presence of a clearly mandated, credible, well-capacitated, and well-resourced agency responsible for managing and implementing the auction process was a critical success factor.

The initial step in procuring renewable energy generation in South Africa was the design of a renewable energy feed-in tariff (REFiT). The Electricity Regulatory Division at NERSA initiated and lead this process in 2007 (Figure 7), as a way of meeting the target of 10,000 GWh of renewable energy by 2013, as set out in the 2003 Renewable Energy White Paper (Baker, 2016). A number of government departments provided support, including National Treasury, the Department of Public Enterprises (DPE), and the Department of Environmental Affairs (DEA), as well as various bilateral donors. The process of designing the programme and determining the tariff levels involved a prolonged negotiation process, with NERSA, various government departments, funders, and project developers, as well as civil society representatives involved.

REFiT was launched in March 2009, despite significant opposition to renewable energy within NERSA itself. There was also opposition from the DoE and Eskom, and disagreements around the level of tariffs, mistrust of renewable energy, and perceived financial and political risks (Baker and Wlokas, 2015). The NERSA REFiT consultation paper, published in 2008, was South Africa's first mechanism intended to attract renewable energy investments and marked the first time that global renewable energy investors turned their eyes towards South Africa as an investment destination (Baker and Wlokas, 2015).

Figure 7: Timeline of REFiT and REI4P



National Treasury finally declared REFiT illegal, following an assessment by legal advisers who found that a predetermined feed-in tariff would be against South Africa's procurement rules (Baker and Wlokas, 2015). In addition National Treasury and the DoE expressed concern that NERSA did not have the financial or technical capabilities to run REFiT, putting the scheme at risk of corruption given the high tariffs set by the regulator (Baker, 2016). As a result, in 2010 the DoE was mandated with replacing REFiT with a competitive bidding system in the form of REI4P (Eberhard et al., 2014).

To ensure the success of the REI4P and to avoid similar institutional capacity shortfalls to those experienced by NERSA, the DoE sought the assistance of National Treasury's public private partnership (PPP) unit to help manage the process of setting up the programme. The PPP unit was established in 2000 and since 2007 had been working with the private sector, helping

promote IPPs. It was widely viewed as a highly capable, well-capacitated team that had a proven track-record and understood both the public and private sectors' objectives, needs and concerns. In November 2010, a small team from the PPP unit and the DoE together created the IPP Office, overseen by the DoE. The office had the advantage of being highly respected by both private and public sector stakeholders and it enjoyed high-level public-sector support, which enhanced its credibility and, as a result, that of the REI4P.

An important and highly valued aspect of the programme was the degree of autonomy enjoyed by the IPP office. The IPP Office's primary responsibility was to provide procurement opportunities for IPPs (PMG, 2018). Despite the IPP Office reporting to the DoE, it was mandated with facilitating and running the entire REI4P process and was allowed to operate fairly independently (Figure 7), outside the regulatory and funding scope of the DoE. This created credibility and flexibility for this dedicated unit, which allowed the office to focus more on practical problem solving, rather than compliance with standardised governmental policies and procedures.

Coordination among government entities was key to the success of REI4P. The IPP Office ran the REI4P bidding process, selected the preferred bidders and submitted a motivated list to the DoE. The DoE then approved the list of preferred bidders. Once preferred bidders had been selected, NERSA was mandated to provide them with generation licences. Other government departments, including the DTI, also needed to provide their input on qualification criteria, such as local content requirements and BBBEE legislation compliance. IPP project developers prepared and submitted bids through the IPP office. This process also required the involvement of relevant provincial and municipal departments, to provide authorisation to meet the bid qualification criteria (Eberhard and Naude, 2017). Licensing was at times an onerous process for some government departments, given the number of bids submitted in each round. For example, between late 2010 and 2013, the DEA received 1500 environmental authorisation applications, putting enormous pressure on the capacity of the department (Eberhard and Naude, 2017). Eskom had to issue cost estimate letters (CELs) of both the feasibility and approximate cost of connecting these projects to the grid to all the projects that had submitted bids (Eberhard and Naude, 2017). This required an extensive assessment of each project in order to issue the CEL. Given the increasing numbers of bidders that have applied for each successive round, this has become an extremely laborious process for Eskom and other governmental departments. To minimise the administrative burden that accompanied the REI4P, the Department of Water Affairs (DWA), for example, only considered water use license applications of preferred bidders, as opposed to all bidders, in order to limit the number of licensing applications submitted (Eberhard and Naude, 2017). Once preferred bidders have been selected, approved, and granted the necessary licenses, Eskom then signed PPAs which allows these projects to reach financial close and construction to begin.

Securing sufficient funding for designing and implementing the programme has been essential. The DoE, National Treasury, and the Development Bank of Southern Africa (DBSA) entered into a MOU to provide funding for the REI4P programme. The DBSA provided US$4,6 million[5] in financing for the IPP Office to hire transaction advisers, set up a project office, and facilitate capacity building (Eberhard et al., 2014). National Treasury provided a further US$6,8 million to the IPP Office to repay the DBSA and ensure the smooth running of the REI4P through bid windows 1 and 2 (Martin and Winkler, 2014). Subsequent to this, on signing of implementation agreements, successful IPP companies paid a bidder registration fee, as well as a project development fee totalling 1% of the total project costs, into a project development

[5] At current exchange rate of US$1:ZAR14,7 equivalent to about ZAR80 million.

fund for renewable energy projects. This fund effectively provided financing for the IPP Office and all its activities. This fund is managed by the DoE (now DMRE) and ensures that the REI4P programme is not attached to the formal government budget. The funding covers the current and future costs of the REI4P, including the oversight costs of the REI4P programme (Eberhard et al., 2014). Financial independence of the office ensured greater flexibility, credibility, and transparency in decision-making, as well as in hiring and compensation decisions. Various bilateral donor agencies representing the UK, Spain, Germany, and Denmark, also provided funding for technical assistance to establish this programme. A grant of US$6 million from the Global Environment Facility (GEF) was for example made available by the World Bank to fund advisory services under the Renewable Energy Market Transformation Project. Donor agencies also provided advice on setting up the REI4P tender process based on a review of international good practice and tender processes that had been conducted in Brazil, Germany, France, India, and Spain, amongst other countries (Eberhard et al., 2014).

The IPP Office contracted various local and international financial, legal, and technical transaction advisers to provide technical support in setting up and running REI4P. In the initial design stages of the programme, 50 advisers with knowledge and expertise in auction design international best practice provided input into the development of REI4P. This grew to over 100 representatives from 13 professional firms (Eberhard et al., 2014). The IPP Office also hired external professional firms (Table 10) to independently evaluate the procurement process and its outcomes. This independence was widely acknowledged by bidders as being an important driver of their decision to participate in the REI4P (Eberhard et al., 2014).

Table 10: REI4P evaluation consultants

Function	Firm
International Reviewers	Legal: Linklaters (United Kingdom (UK))
	Technical: Tony Wheeler Consulting (UK)
	Governance: Ernst & Young (SA)
Project Management	SPP Project Solutions (SA)
Legal Evaluation	Bowman Gilfillan (SA)
	Edward Nathan Sonnenbergs (ENSafrica)
	Ledwaba Mazwai (SA)
	Webber Wentzel (SA)
Technical Evaluation	Mott MacDonald (SA)
Financial Evaluation	Ernst & Young (SA)
	PWC (SA)

Source: Adapted from Eberhard et al., 2014

From November 2010, the IPP Office was given nine months to prepare all the necessary bid documentation and associated legal contracts for the launch of the REI4P programme. South Africa had never before run a competitive renewable energy tendering process. It was therefore critical that the IPP Office was comprised of experienced and respected team members. Karen Breytenbach, a senior manager from the PPP unit was appointed to lead the IPP Office. Her extensive experience working with the private sector, managing consultants, and working with PPP contracts made her an ideal candidate to manage this process (Eberhard et al., 2014).

Other members of the unit included technical and legal experts, all with a recognised track record in closing IPP contracts. This team was viewed favourably in both the public and private sectors; and cumulatively, had a reputation for being problem solvers and facilitators as opposed to regulators. The experts in the team were well known to the bankers, lawyers, and consultants working in private sector infrastructure projects in South Africa. There was therefore less of the typical mistrust from private sector business that often accompanies the

workings of government agencies in South Africa (Eberhard et al., 2014). Furthermore, dialogue and engagements with private sector counterparts on critical components of the REI4P design and implementation began almost immediately with the launch of the office. This engagement continued throughout the REI4P process and catalysed enthusiastic participation from private sector players from the start (Eberhard and Naude, 2017).

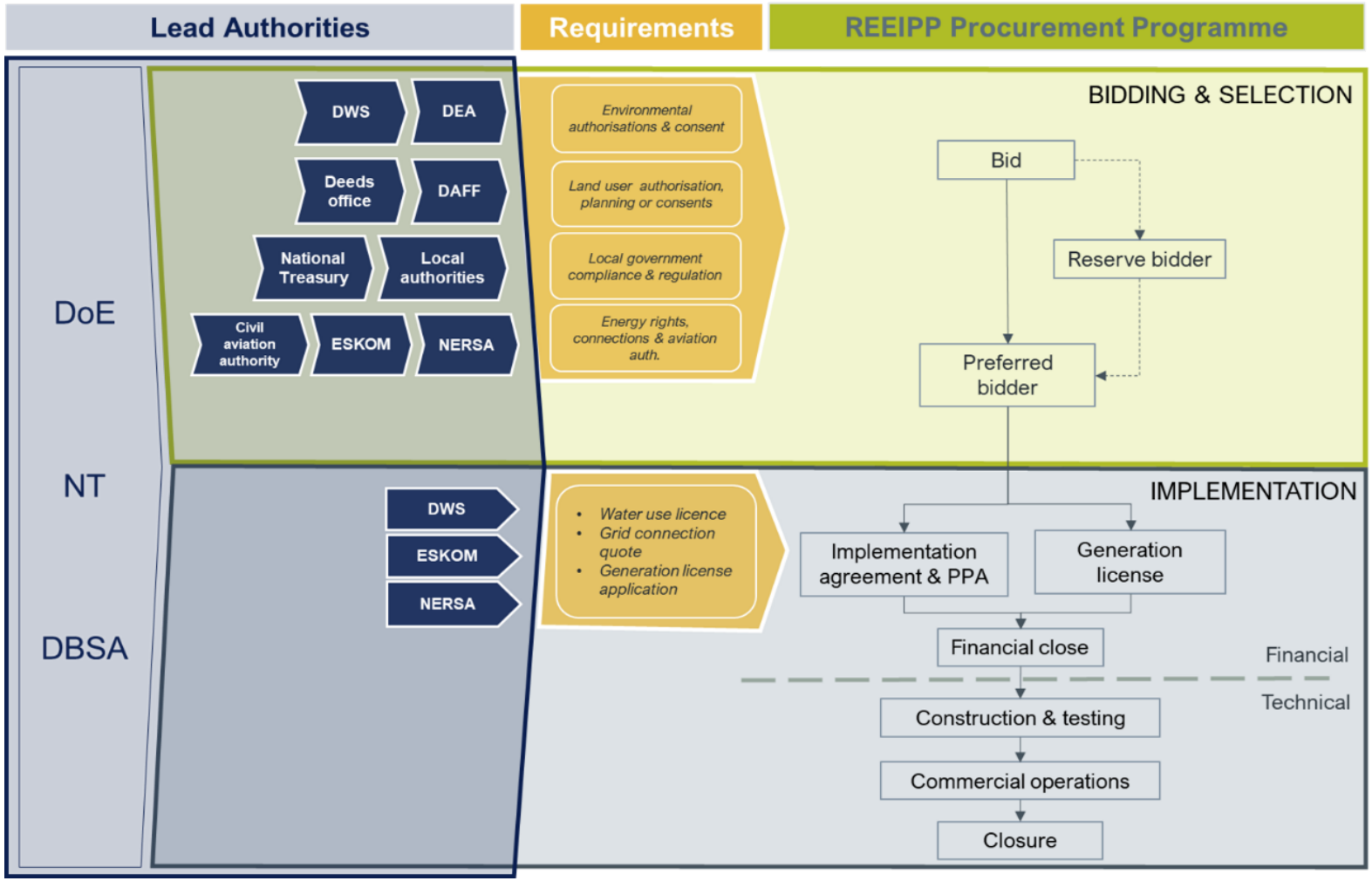
Despite the programmes' intial success, implementation has been hampered by industry incumbents. Eskom has played a major role in this regard. Eskom's top management refused to sign 37 PPAs awarded in bid window 4 and the first SP-I4P bid window. This impasse lasted until April 2018, causing a three-year delay. This undermined investor confidence in the sector and created uncertainty regarding the future of South Africa's IPP Programme (Creamer, 2017). Given that the IPP Office derives funding from IPPs through the Project Development Fund for Renewable Energy projects, and is not dependent on government budgets, a hiatus in the signing of PPAs also reduced funding for the programme between 2015 and 2018. The impasse was only resolved after a series of appointments of new people in key positions, including a new Minister of Energy, new Minister of Public Enterprises, and a new Eskom board and management team.

Another event which highlights vulnerabilities in the IPP Office's institutional setup was the attempt of the Minister of Energy to move it out of the DoE, and house it under the Central Energy Fund (CEF). CEF was initially set up under the Apartheid regime as a sanctions-busting fund to ensure South African energy security. In 2017, during a speech in Parliament, former Energy Minister Mmamoloko Kubayi announced that the IPP Office would move to CEF because of the financial constraints facing the IPP Office and in order to ensure the sustainability of the IPP programme (DoE, 2017e). This decision was queried extensively by Members of Parliament, given that two CEF companies, PetroSA and the Strategic Fuel Fund (SEF), were both facing severe financial and governance issues. These financial and governance issues could impact on the sustainability of CEF and therefore, housing the IPP Office in the CEF had the potential to undermine the sustainability of the REI4P (Creamer, 2017). The move was also fiercely opposed and resisted by the IPP Office. Jeff Radebe, who became Minister of Energy in early 2018, stated in a meeting with the Portfolio Committee on Energy in May 2018 that the Ministry had no intention of moving the IPP Office. Furthermore, he said that the REI4P was one of the best programmes of its kind globally and in fact, that the role of the IPP Office should be enhanced and its independence maintained (Omarjee, 2019; PMG, 2018). He enforced the signing of the outstanding PPAs and reaffirmed government's commitment to the REI4P.

It is widely acknowledged that the success of the REI4P can be attributed to the functioning of the IPP Office under the leadership of Karen Breytenbach, who, during her tenure, oversaw the approval of US$12 billion[6] of investment in renewable energy projects (Theron, 2019). Despite this general consensus, in July 2019, the DBSA and the DMRE took the decision not to renew the contract of Ms Breytenbach, with Advocate Sandra Coetzee appointed as acting Head of the Office. It is unclear what motivated the decision not to renew Ms Breytenbach's contract. The uncertainty that has been created undermines the foundation that has made the IPP office so successful.

[6] At current exchange rate of USD1:ZAR14,7 equivalent to about ZAR80 million.

Figure 8: Institutional setup and governance structure of the REI4P



Source: Adapted from Eberhard and Naude, 2017

The IPP Office is set to begin extensive stakeholder engagements now that the IRP 2019 has been promulgated. These engagements will seek to ensure the bankability of programmes and that the REI4P remains an attractive investment to potential IPP investors (Creamer, 2019). Despite the tumultuous years from 2015 that have prevented the REI4P from reaching its full potential, the signing of bid window 4 PPAs allowed projects to reach financial close after four years, and the finalisation of the IRP signalled a renewed era for the REI4P and IPPs. It is imperative that strong leadership, stemming from the IPP Office, continues to underpin the I4P process to ensure consistency and maintain investor confidence necessary for continued growth.

5 Auction outcomes

Outcomes from the first four REI4P bid windows have been impressive. Between bid windows 1 and 4, the average price for wind projects declined by 50%, from R1,75/kWh to R0,88/kWh, while the average price for solar PV projects declined by 75%, from R4,22 to R1,06/kWh (in 2019 prices) (IPP Office, 2019). As of June 2019, there are 91 active projects[7] (6,3 GW – Table 6) of which 64 are in operation representing 4 GW of installed capacity.

Renewable energy IPPs have proved to be very reliable. Of the 64 projects that have reached COD, 62 projects have been operational for longer than a year. The energy generated over the past 12-month period for these 62 projects is 10,648 GWh, which is 96% of their annual energy contribution projections (P50[8]) of 11,146 GWh over a 12-month delivery period. 28 of the 62 projects (45%) have individually exceeded their P50 projections (DoE, 2019c).

Eskom claims that it has struggled to manage integration of RE due to the variable nature of generation (Pombo-van Zyl, 2014). However, the utility-scale Variable Renewable Energy (VRE) fleet proved to be vital in limiting the extent of load shedding in 2019. This was the most intensive load shedding experienced in South Africa with 595 GWh of load shed in March 2019 alone, of the total 769 GWh in Q1-2019 (there was 1,325 GWh of load shedding throughout 2015) (Wright and Calitz, 2019b). VRE contributed 2,975 GWh (5.3%) to the power system in Q1-2019, with monthly contributions ranging from 4.9-6.0%, weekly contributions from 4.1-7.0% and daily contributions from 2.9-7.7%. During load shedding periods, VRE contributed 357 GWh of the total 2,975 GWh during Q1-2019, i.e. load shedding could have increased from 769 GWh to 1,126 GWh (a 46% increase). Instantaneous contributions from the VRE fleet during load shedding periods was up to 2,3 GW, meaning that, without the VRE fleet, load shedding stages 5 and 6 (5000 MW and 6000 MW load reduction respectively) could have occurred (Wright and Calitz, 2019b). The project contracts and agreements contained no provision for increasing the contracted capacity, which led the local wind industry association to call for a relaxing of these provisions in the face of severe load shedding in late 2019, which would allow wind IPPs to inject an additional 500 MW into the system (IRENA, 2018; SAWEA, 2019).

Table 11: Capacity and investment outcomes from REI4P bid windows 1 to 4

Bid Windows (BW)	Wind	Solar PV	CSP	Biomass	Biogas	Landfill Gas	Hydro	Total
BW 1 (2011)								
Capacity Tendered (MW)	1850	1450	200	13	13	25	75	3626
Capacity Awarded (MW)	649	627	150	0	0	0	0	1425
Number of Projects Awarded	8	18	2	0	0	0	0	28
Average Tariff (US$/kWh)	0,14	0,35	0,34	-	-	-	-	-
Total Investment (US$ million)	1734	2945	1486	0	0	0	0	6166
BW 2 (2012)								
Capacity Tendered (MW)	650	450	50	13	13	25	75	1276

[7] Projects that have begun construction (Wright and Calitz, 2019b).

[8] "P50" refers to probabilities for annual energy production which are expressed as Pvalues. A P50 figure is the level of generation that is forecasted to be exceeded in 50% of years over a 10 year (or sometimes 20 year) period (Wright and Calitz, 2019b).

Capacity Awarded (MW)	559	417	50	0	0	0	14	1040
Number of Projects Awarded	7	9	1	0	0	0	2	19
Average Tariff (US$/kWh)	0,11	0,21	0,32	-	-	-	0,13	-
Total Investment (US$ million)	1736	1743	642	0	0	0	91	4212
BW 3 (2013)								
Capacity Tendered (MW)	645	401	200	60	12	25	121	1473
Capacity Awarded (MW)	787	435	200	17	0	18	0	1457
Number of Projects Awarded	7	6	2	1	0	1	0	17
Average Tariff (US$/kWh)	0,08	0,10	0,17	0,014	-	0,01	-	-
Total Investment (US$ million)	1721	826	1820	108	0	29	0	4504
BW 3.5 (2014)								
Capacity Tendered (MW)			200					200
Capacity Awarded (MW)			200					200
Number of Projects Awarded			2					2
Average Tariff (US$/kWh)			0,15					0,15
Total Investment (US$ million)			1741					1741
BW 4(a) (2014)								
Capacity Tendered (MW)	590	400	0	40	0	15	60	1105
Capacity Awarded (MW)	676	415	0	25	0	0	5	1121
Number of Projects Awarded	5	6	0	0	0	0	0	13
Average Tariff (US$/kWh)	0,05	0,07	-	0,12	-	-	0,09	-
Total Investment (US$ million)	1,122	709	0	100	0	0	20	1951
BW 4(b) (2015)								
Capacity Tendered (MW)								
Capacity Awarded (MW)	686	398	0	0	0	0	0	1084
Number of Projects Awarded	7	6	0	0	0	0	0	13
Average Tariff (US$/kWh)	0,06	0,07	-	-	-	-	-	-
Total Investment (US$ million)	1226	669	0	0	0	0	0	1,895
TOTALS								
Capacity Tendered (MW)	3744	2701	650	126	38	90	331	7680
Capacity Awarded (MW)	3357	2292	600	42	0	18	19	6328
Number of Projects Awarded	34	45	7	2	0	1	3	92
Total Investment (US$ million)	7540	6892	5690	207	0	29	111	20470

Source: IRENA, 2018

The statistics from table 6 suggest that market readiness for bid window 1 was overestimated significantly: only 41% of tendered capacity was awarded, compared to 82% in bid window 2. This resulted in limited competition and high prices. The tendered volume was reduced in subsequent auctions, thus increasing competition and lowering winning prices (IRENA, 2018).

Table 12 provides detail on the capacity procured under SP-I4P by type of technology, including average price outcomes and levels of investment attracted. As one would expect, the average price coming out of SP-I4P is higher than the prices coming out of REI4P, due to the smaller size of the projects (1-5MW). However, small projects have also seen a reduction (of 20%) in price between Stage 1S2 and Stage 2S2, despite these rounds being run less than a year apart. Wind, solar PV, and biomass have been the only technologies utilised by SP-I4P bidders, with 100% of projects under 2S2 utilising solar PV.

Table 12: Capacity and investment outcomes from SP-I4P 1S2 and 2S2

Bid Windows	Wind	Solar PV	Biomass	Total
Bid Window 1S2 (2013)				
Capacity Tendered (MW)				50
Capacity Awarded (MW)	9	30	10	49
Number of Projects Awarded				10
Average Tariff (US$/kWh)				0,11
Total Investment (US$ million)				90,8
Bid Window 2S2 (2014)				
Capacity Tendered (MW)				51
Capacity Awarded (MW)	-	50	-	50
Number of Projects Awarded				10
Average Tariff (US$/kWh)				0,08
Total Investment (US$ million)				87,9

Source: (DoE, 2015b and 2017d; IPP Office, 2019)

Table 13 presents average local content outcomes from each REI4P bid window per technology type, against targets, and thresholds (minimum obligation requirements for bidders).

Table 13: Average (Avg.) local content against REI4P thresholds and targets

Bid Window (BW)	BW 1			BW 2			BW 3			BW 3.5	BW 4		
Technology	Min.	Target	Avg.	Min.	Target	Avg.	Min.	Target	Avg.	Avg.	Min.	Target	Avg.
	Share of local content in total project expenditure (%)												
Onshore Wind	25	45	27.4	25	60	48.1	40	65	46.9	-	40	65	44.4
Solar PV	35	50	38.4	35	60	53.4	45	65	53.8	-	45	65	62.3
CSP	35	50	38.4	35	60	43.8	45	65	44.3	43	40	65	-
Biomass	25	45	-	25	60	-	40	65	40	-	40	65	47.8
Biogas	25	45	-	25	60	-	40	65	-	-	40	65	-
Landfill Gas	25	45	-	25	60	-	40	65	41.9	-	40	65	-
Small Hydro	25	45	-	25	60	76.3	40	65	-	-	40	65	40

Source: IRENA, 2018

It is evident from table 13 that the average local content commitments increased over time as local industry developed around the programme. In bid window 1, local content commitments were closer to the minimum prescribed levels than to the targets. In bid window 2, targets were increased and the programme saw significantly higher levels of local content commitment, although in several cases, the average was still closer to the minimum than to the target (IRENA, 2018). In bid window 3 minimum thresholds were also increased, in line with an additional 5% increase in targets across all technology types. This did not result in notable changes in the average local content outcomes, which were already quite high at this stage (IRENA, 2018). In bid window 4, the targets and thresholds remained at the same levels as in bid window 3 and local content commitment outcomes were closer to thresholds than targets.

Local content outcomes for solar PV projects saw the most significant increase, almost reaching the targets set for bid window 4. The real impact of local content requirements for economic development have been challenged, especially in the solar PV sector, where some bidders utilised transfer pricing (selling goods from one division of the company to another division of the same company) in order to meet local content requirements (Baker and Sovacool, 2017). Still, REI4P did result in the establishment of several local RE manufacturing facilities and significant local capacity to support this market (Matsuo and Schmidt, 2019).

The REI4P has also created numerous employment opportunities. As of the end of June 2019, a total of 42,374 job years have been created for South African citizens (a job year is the equivalent of a full-time employment opportunity for one person for one year). Of these, 34,664 were in construction and 7710 in operations. The construction phase offers a job opportunity over a shorter duration, while the operations phase requires fewer people, but over an extended operating period. For the construction phase of projects, achieved employment opportunities across all the bid windows are 106% of the planned numbers (i.e. 32,602 job years), with 26 projects still in construction and employing people (DoE, 2019d).

The share of black citizens employed during construction (79%) and the early stages of operations (83%) significantly exceeded the 50% target and the 30% minimum threshold. Additionally, the share of skilled black citizens (as a percentage of skilled employees) for both construction (68%) and operations (79%) exceeded the 30% target and the minimum threshold of 18%. The share of local community members as a share of South Africa-based employees was 49% and 67% for construction and operations respectively – exceeding the minimum threshold of 12% and the target of 20% (DoE, 2019d).

Initially the REI4P had preponderant foreign involvement in how projects were set up and designed. Over time many of these skills have been transferred to South Africans (Matsuo and Schmidt, 2019). Given the stringent RfP and lender requirements, local developers have often needed to partner with international companies, or on-sell projects to them (Eberhard and Naude, 2017). Local-foreign partnerships have become an increasingly popular and successful option for project developers (Eberhard and Naude, 2017). Many internationally backed IPPs have established local offices in South Africa as a result of the REI4P, including Biotherm, Scatec Solar, Globeleq, Gestamp, Acciona, Abengoa, Windlab, Engie, ENEL Green Power, and Building Energy. Scatec Solar is a good example of an integrated project developer, owner and operator, covering the entire value chain (with the exception of PV panel manufacturing). The Cape Town office has more than 90 employees, 90%+ of which are South African, and houses their engineering hub and global control and monitoring centre, as well as being the base for the development of their new projects in Africa and beyond.

This international-local partnering and skills transfer was not limited to project development. Under the REI4P bid requirements, EPC companies had to have a minimum of 8% black shareholders and a target of 20% (Baker and Wlokas, 2015). EPCs tended to be international companies that formed joint ventures or consortiums with one or more South African firms.

Local large engineering firms such as Group Five, Murray and Roberts, and Aveng were therefore appealing to these international companies, not only for their extensive experience in the construction industry in the country, but also for their levels of black ownership. Partnering with one of these large, local companies removed the need to form complicated joint ventures and consortiums (Baker and Wlokas, 2015).

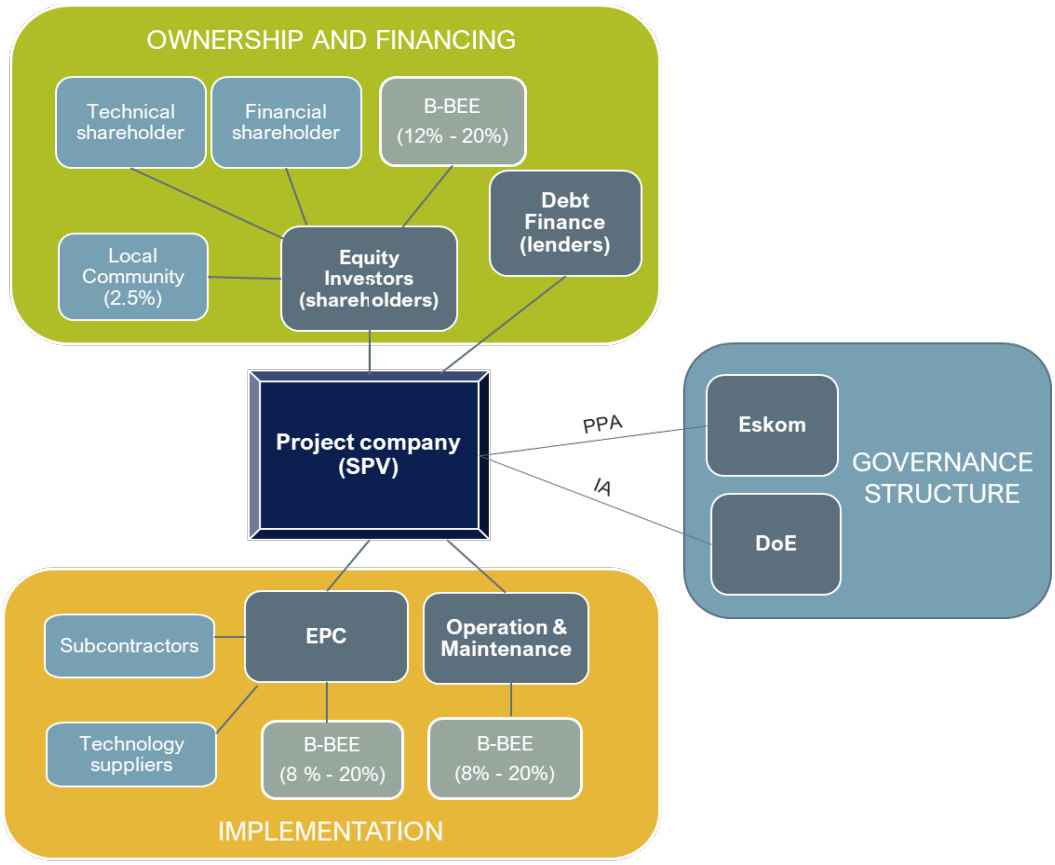
Securing equity providers

IPPs were financed through debt, or equity, or – most often – a combination of the two. Although the larger portion of financing was generally secured through debt finance, stringent rules around equity and ownership had to be met. Equity providers for REI4P needed to comply with defined ownership structures that ensured BBBEE, local, and community ownership (Figure 9). The nature of these ownership structures allowed a secondary equity market to develop, in which equity on-selling occurs.

Ownership requirements of IPP projects resulted in multiple complex ownership structures, involving a diversity of stakeholders including the developer and other international, national, private and public stakeholders. These included developers of IPP projects entering into a 50/50 joint venture with a South African and foreign company; international companies setting up a South African subsidiary company; and the formation of a consortium comprising predominantly international firms (Baker and Wlokas, 2015).

On average, South Africans owned 48% of the equity of all projects approved under REI4P (DoE, 2018b). Under bid windows 3, 5 and 4 alone, this was 57.8% on average, with 64.2% of this owned by black shareholders. In contrast, only 25% of the equity was foreign. Foreign investment in renewable energy projects provided opportunities for skills transfer and establishment of a local industry (DoE, 2018b). Local community structures owned 7.1% of the equity share under bid window 4, entitling local communities to US$400 million net dividends over the 20-year lifetime of the projects. The DMRE through the IPP Office committed to ensuring that community participation and impact were monitored (DoE, 2018b).

Figure 9: Project structure and ownership requirements for REI4P project development



Source: adapted from Baker and Wlokas, 2015

Equity investment was provided by a range of entities, which included South African companies such as Old Mutual, South Africa's development finance institutions (DFIs), international infrastructure and investment funds, B-BBEE investors and partners, and community trusts which were often funded by the DBSA, IDC and the Public Investment Corporation (PIC) (Baker and Wlokas, 2015).

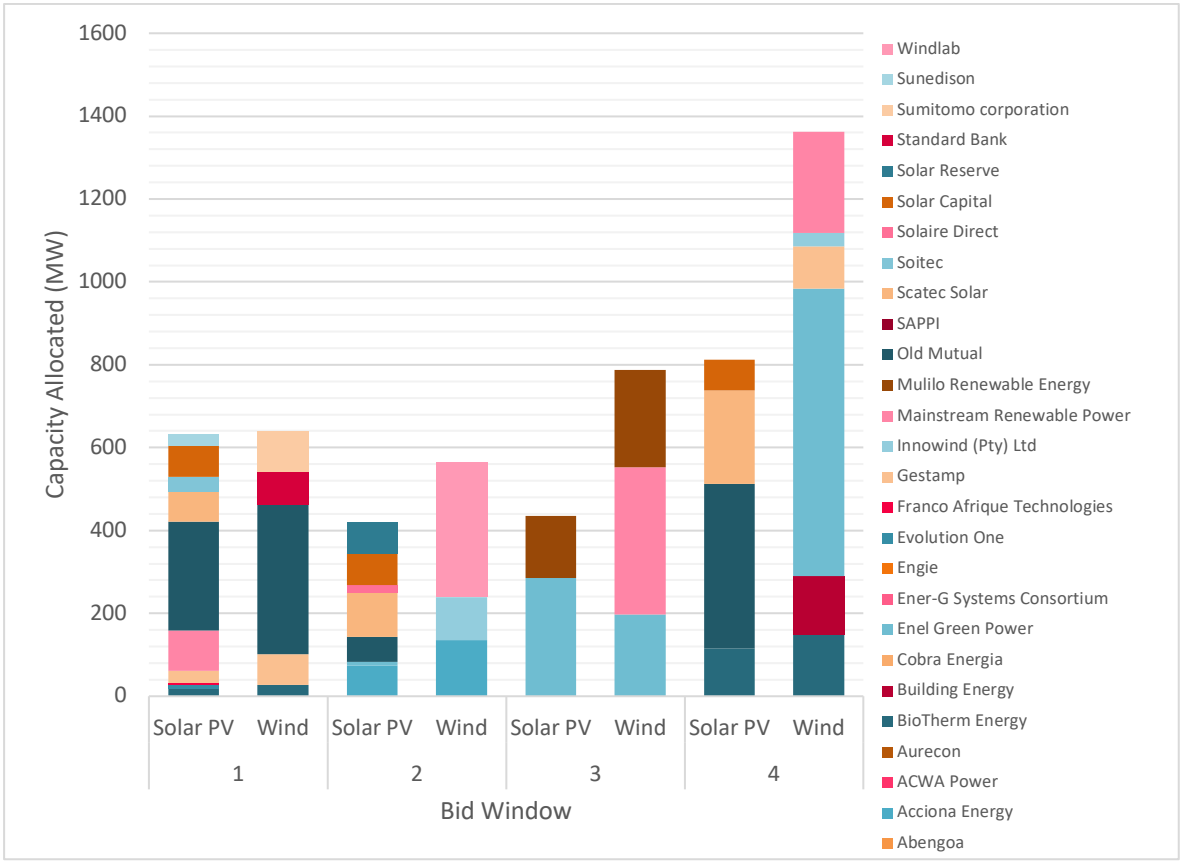
There was also sustained interest from international companies. Firms were attracted to the potential for investor diversification and higher returns on capital in comparison to developed countries (Eberhard and Naude, 2017). Generally, the dominant equity shareholders tended to be international developers. In addition, unusual foreign equity shareholders included the Japanese Sumitomo Corporation that owns a 60% share in the Dorper Wind Farm in the Eastern Cape and Google (US), providing US$12 million in equity to Jasper PV plant in the Northern Cape (Baker and Wlokas, 2015).

Analysing awarded REI4P bids based on the projects' majority shareholders (Figure 10) shows that each round of bidding generally saw more capacity being awarded to a smaller pool of mostly large international bidders (e.g. ENEL Green Power, Old Mutual, and Mainstream). In this context, there was a perceived risk that local industry could be stifled as local firms were discouraged from competing (Kruger, Nygaard & Kitzing, Forthcoming). Additionally, BBEEE shareholding tended to be concentrated in no more than10 firms.

However it would be incorrect to conclude that market concentration took place to a significant degree. The major successful bidders tended to differ from round to round. Figure 10 shows that in bid window 3 only two bidders – ENEL Green Power and Mulilo Renewable Energy – secured any solar PV capacity, while these same firms, along with Mainstream Renewable

Power, secured all onshore wind capacity. None of these firms secured any projects in bid window 2. Bid window 4 saw more bidders awarded, and while ENEL and Mulilo were awarded most of the onshore wind capacity, Old Mutual[9] and Scatec were awarded the lion's share of the solar PV projects.

Figure 10: REI4P capacity awarded to project majority shareholders by technology: bid windows 1-4



Source: Author compilation

The apparent dominance of certain international firms in REI4P's later rounds ultimately came down to cost, determined by five elements that were unique to these types of bidders:

- their ability to access cheaper capital, often in the form of corporate financing;
- economies of scale;
- the ability to develop and bid a portfolio of projects, thereby aggregating and reducing costs across the portfolio;
- the negotiating power that came with being a major international player driving down supplier and service provider costs; and
- the ability to integrate the project development and operations functions, thereby squeezing margins across the value chain and opening up additional sources of revenue for a project.

What was the impact of this level of market concentration? Auction efficiency was not affected, with prices continuing their steep decline over the bidding rounds, even as larger volumes were

[9] Old Mutual bought SunEdison's projects after the latter declared bankruptcy in 2016.

awarded to fewer bidders. Neither was there a significant decrease in competition levels. In fact, there was a general trend of more bids being submitted during each round (Table 14). It is also important to note that the prominence of large, international firms in the awarded pool of bidders did not necessarily imply a crowding out of other players. They represented only one part of the value chain – in this case majority shareholding – which was still coupled in the South African programme with community, BBBEE, and local shareholding. More generally the South African renewable energy industry expanded significantly over time with many more project developers, investors, lenders, advisers, and service providers active than before (Matsuo and Schmidt, 2019). While there was some consolidation and loss of skills in the industry in recent years, this was driven by the uncertainty caused by the delays in the signing of the bid window 4 PPAs and government's seeming inability or unwillingness to launch new procurement rounds.

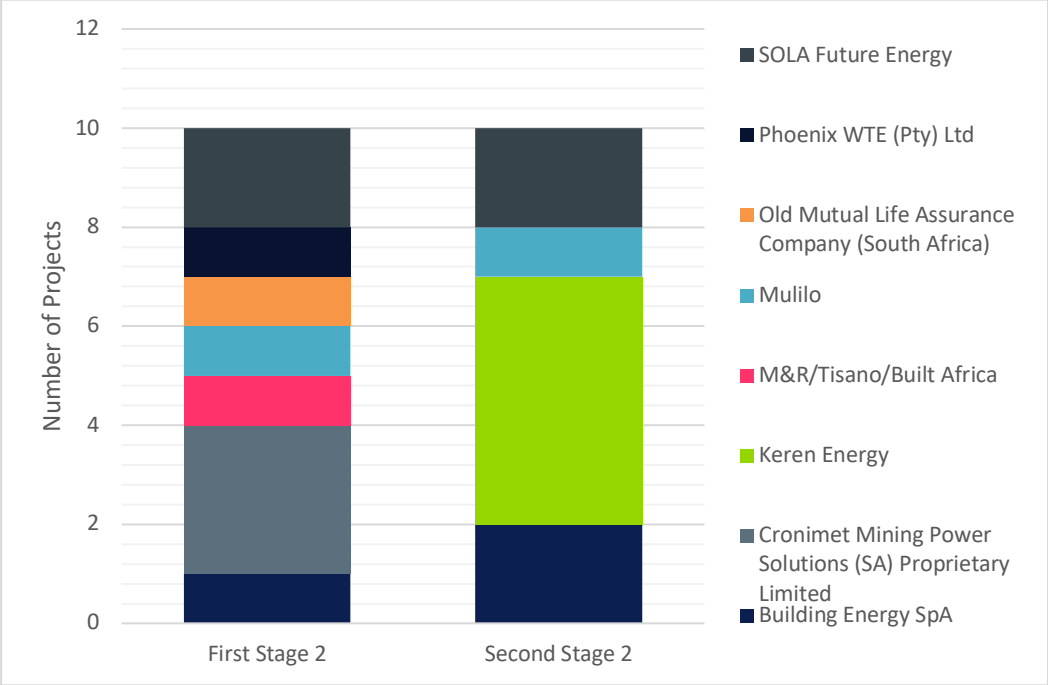
Table 14: Number of bids per REI4P bid window

Bid Window	Number of bids received	Number of bids awarded
1	53	28
2	79	19
3	93	17
3.5	3	2
4	77	26*
Expedited	106	19**

Equity providers for the SP-I4P included corporate companies, which financed 50% of all the projects awarded (Eberhard and Naude, 2017). Since these projects were smaller, it could have been difficult to access debt financing as the costs involved in a project financed deal remained substantial, while representing a much smaller return. Consequently, financing from corporate entities was a general expectation.

In SP-I4P, several projects were awarded to, among others, a consortium led by Cronimet, a multinational company that develops, constructs, and operates its own power projects in the mining and industrial sector; Building Energy, an Italian company active in REI4P; and Mulilo, a large South African developer and owner-operator of several REI4P projects, as shown in Figure 11. Several project sponsors such as Aurora/SOLA future, Building Energy, Mulilo, Pele, and Old Mutual participated as equity holders in the REI4P as well, raising the question as to whether the SP-I4P truly afforded "smaller", "emerging" power developers/consortiums an opportunity for project award or simply awarding smaller projects to entrenched players. On the other hand, the award of Aurora's/SOLA Futures' and KEREN Energy's projects demonstrated the SP-I4P's ability to facilitate local players competing at a higher level.

Figure 11: SP-I4P capacity awarded to project majority shareholders



Source: Author compilation

While REI4P projects' debt could be on-sold almost immediately after commercial operation began, with approval from the DoE or IPP office, equity could only be sold three years after COD, subject to the approval of the DoE and the initial lenders. BBEEE ownership could, however, not be on-sold. This created a problem for many BBEEE shareholders, whose shareholding was financed on relatively expensive terms by South African DFIs and who consequently did not see substantial economic benefits in the short- to medium-term (Makamure, 2016).

Equity shareholding in these projects could quickly become assets that were purchased, sold, and repackaged in financial markets (Baker and Wlokas, 2015). This could defeat the purpose of conducting due diligence of a project and posed a problem in assigning responsibility to ownership structures. Given that project owners held responsibility for implementing a project, changes in ownership structures caused by the sale of equity shares could have prevented responsibilities from being upheld (Baker and Wlokas, 2015). Thus far, this has not proved to be the case, with most equity transactions involving entities already invested in REI4P in one form or another. Examples of successful acquisitions included Actis' purchase of BioTherm Energy in mid-2019, whose capacity included Golden Valley, a 123 MW wind project in the Eastern Cape; Excelsior, a 33 MW wind project in the Western Cape; Aggeneys, a 46 MW solar project in the Northern Cape; Konkoonsies II, an 86 MW solar project in the Northern Cape and a 4 MW biogas facility (Actis, 2019). Additionally, AIIM's Ideas Managed Fund, as part of Old Mutual Alternative Investments, acquired 50.01% stakes in six PV projects formerly owned by SunEdison: Bokamoso (63 MW), Waterloo (75 MW), Droogfontein II (75 MW), Zeerust (75 MW), Greefspan II (55 MW), and De Wildt (50 MW). The Ideas Managed Fund also held stakes in three wind farms: Roggeveld (147 MW), Perdekraal East (110 MW), and Kangnas (140 MW) (African Energy, 2018).

Securing debt providers

Debt financing

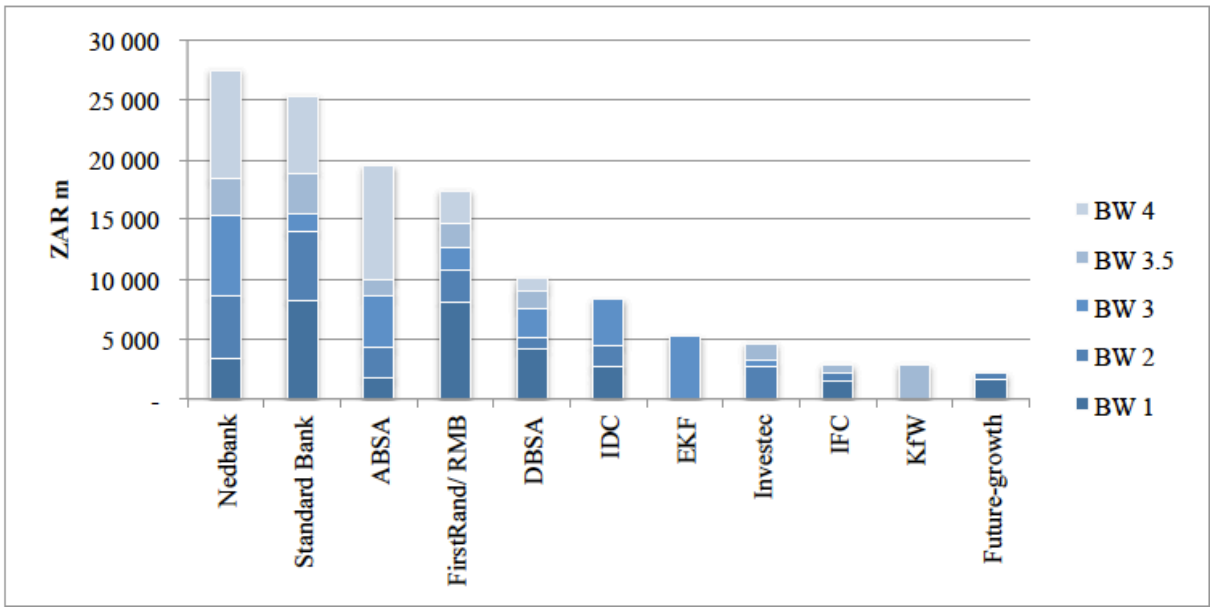
A higher gearing ratio, or ratio of equity to debt, is generally an indication of lower levels of risk in an infrastructure investment project. In the case of South Africa's REI4P, this gearing ratio was often as high as 80:20. Essentially, more debt translates into a lower average cost of funding since debt finance returns are generally lower than those required by equity, which leads to a lower tariff and consequently, decreases the price of the project (Baker and Wlokas, 2015). Since lenders provide debt on fixed loan terms, a key priority is the minimisation of risk (Baker and Wlokas, 2015). Lenders are the first in line to receive revenue generated by a project. Project sponsors (equity investors) carry more risk, since their revenue returns are dependent on the success of the project.

Project finance loans are non- or limited-recourse loans, meaning that lenders have almost no access to the company's balance sheet. In the event of a default, the lender would be able to seize only the SPV's assets. Corporate finance loans are lent against a company's balance sheet and therefore companies are more vulnerable in the event of a default. Due to the limited recourse offered by project finance loans, a significant amount of due diligence is required by commercial banks to ensure the bankability of the project, regardless of its size. It is a costly and lengthy process, and so for smaller projects, like those in the SP-I4P, the marginal returns of the banks were often too low (Eberhard and Naude, 2017).

Of the 92 preferred bidders to date (excluding SP-I4P), 79 projects used a combination of project finance and equity, and the remaining 13 bids used corporate finance only. As a result, external debt (project financing) accounted for a significant R125,6bn (65%) of the R193bn total funding raised in bid windows 1 to 4, while equity and corporate finance accounted for the remaining 23% and 12%, respectively (Eberhard and Naude, 2017). The large bidders that could afford to bid on a corporate finance basis did not necessarily end up financing projects on these terms. Rather, after using this cheaper form of debt to bid low tariffs and secure a large number of projects, these entities approached South African commercial banks to provide debt to these projects on a project finance basis.

Debt was mainly provided by local entities. South Africa's five largest banks, ABSA, Nedbank, RMB, Standard Bank, and Investec, contributed 68% of the debt pool (Eberhard and Naude, 2017). DBSA and IDC provided 13% of the debt, with the remainder provided by other DFIs and local insurance/asset management companies. The significant involvement of institutional investors is an important development since it represents the deepest but most risk averse pool of funding for renewable energy projects (Wuester *et al.*, 2016). The fact that institutional investors, such as pension funds, were willing to commit debt prior to commercial operation shows that the financial markets had grown very comfortable with the risks associated with renewable energy projects (Eberhard and Naude, 2017).

Figure 12: Largest nominal debt investors in the REI4P (ZAR million) at bidding stage



Source: Eberhard and Naude, 2017

The 'Big 4' local banks (ABSA, Standard Bank, Nedbank, and FirstRand/RMB) and the DBSA participated in every bid window, demonstrating their commitment to the programme. The dominance of these local financial institutions unfortunately also means that there was not a great deal of competition between lenders, which resulted in the cost of debt financing remaining relatively static throughout the programme and across projects. While the international DFIs such as IFC and KfW did not fund a large number of projects, their nominal contributions were significant.

On average, debt financing on renewable energy projects under the REI4P was based on an annual interest rate of 12% for a 20-year period. Compared to the United States and other European countries, this interest rate was significantly higher than their relatively fixed annual interest rate of 7% over a 10-15-year period (Nelson and Shrimali, 2014). Therefore, higher interest rates in South Africa for debt financing under the REI4P created strong incentives for investment into renewable energy project investments in the country.

Under the SP-I4P, the first 10 project financed projects would receive senior debt from the IDC and specialist black-owned fund manager, Mergence Investment Managers. However, as mentioned above, project finance, typically supplied by commercial banks, was difficult to access for smaller projects. Corporate finance and DFIs therefore became an important source of funding (Eberhard and Naude, 2017).

The difficulty small projects faced in accessing project finance was partially mitigated by KfW's Facility for Investment in Renewable Small Transactions (FIRST) Fund. This fund was a partnership between KfW and South African commercial banks where banks contribute senior debt to the fund while KfW set up a first-loss debt facility as well as grant-type funding to fill the development finance role in the fund (Hawarden, n.d.; van Zyl, 2018). FIRST tried to overcome the challenges involved in financing smaller IPPs by having the development funding included in the debt mix, as well as having a fund manager to conduct the detailed project assessment and build up a portfolio of projects that could share the burden of closing the

financing. The fund was structured and closed to make US$88,4 million[10] of funding available for preferred SP-I4P bidders (Hawarden, n.d.). The FIRST Fund is yet to finance any SP-I4P projects as none have had their PPAs signed and so has diverted its funding to commercial and industrial projects.

Strategic management of project implementation

Strategic management, in terms of how the private sector and investors manage relationships with the public and broader society, was one of the weaker areas of REI4P. The sector includes a diverse group of people and entities, making it difficult to develop a coherent message. Entities involved include for example SAPVIA, SAWEA, SAIPPA, all with different backgrounds and interests.

The REI4P aimed to contribute to B-BBEEE and the creation of black industrialists, a key strategic priority for the sustainability of the industry. Black South Africans own, on average, 33% of projects that have reached financial close (i.e. projects which is 3% higher than the 30% target). This includes black people in local communities that have ownership in the IPP projects that operate in their vicinities or nearby (DoE, 2019c). Previously projects were able to use community trusts as a contributor to the black ownership target but, as trusts are not a partner in project delivery, limited skills or expertise were transferred from the foreign companies leading the projects. This has reportedly inhibited the growth of a "genuine local energy industry" (Mthembi, 2016). Bid window 4 placed more emphasis on active ownership and participation in the project company through changing the economic development thresholds.

The communities who are most affected by and have the most opportunity to benefit from IPP projects have generally also not been part of the broader dialogue. The procurement documents did not clearly define a framework associated with socioeconomic development (SED), economic development ED, and local ownership (WWF, 2016). Despite the specific attention paid to local communities in the REI4P, there is also no guidance or even a mandatory process for the actual engagement with the local communities around projects (besides the Environmental Impact Assessment Report).

The degree to which communities participate in decision-making around the project's local economic development investments was therefore at the sole discretion of the company in question (WWF, 2016). Companies were concerned about project compliance, meeting investor and shareholder expectations, and negotiating associated risks. Community involvement in projects was associated with high levels of risk, which led companies to favour the funding of established NGOs and pre-established projects to fulfil their obligations (WWF, 2016).

Additionally, there has been limited cooperation amongst IPPs to date regarding their ED work – although there are some examples of new governance and coordination models being tested. The uncoordinated nature of efforts by individual IPPs, community trusts and other development partners limited the potential for meaningful development impact at the municipal and community levels. This is especially important in areas which have multiple renewable energy projects (Mabilu, 2018).

[10] At an exchange rate of 14,7, equivalent to ZAR1,3 billion.

6 Risks and opportunities for the future of REI4P and SP-I4P

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

Restructuring Eskom: ensuring sustainability

Eskom's refusal to sign IPP contracts from bid window 4 has introduced significant uncertainty about the future of the programme. Normally, the need for sovereign guarantees for IPPs steadily decreases with the successful progress of the procurement programme. However, due to the bid window 4 delays, prolonged policy uncertainty (including a lack of new Ministerial Determinations), as well as Eskom's financial and operational crises, there is an increased need for risk mitigation for any new REI4P projects.

The implementation of the Eskom Restructuring Roadmap will be critical in determining the future sustainability of Eskom, the electricity supply industry as a whole, and the REI4P and SP-I4P programmes. One of the key objectives of the restructuring process is to ensure non-discriminatory and open access to the transmission grid, particularly for newcomers such as IPPs, generally achieved by establishing an independent transmission system and market operator (Filipova and Boulle, 2019).

At the same time, Eskom's transition from being one entity to three separate subsidiaries poses challenges for REI4P. The DPE and DoE need to consider what will happen with existing PPAs signed with Eskom, and whether these will be transferred from Eskom to the newly established transmission and systems operator. In addition, the two ministries need to take into account how the creation of a system operator impacts on the IPP Office and decide whether the Office needs to be moved into the system operator's structure.

Implementing the just transition

The REI4P and SP-I4P were intended to stimulate socioeconomic development through local industrialisation, manufacturing, and job creation, in addition to providing clean, affordable electricity. The DMRE has continued to increase economic development and local content thresholds and targets in each bid window. However, it has done this without addressing the underlying socioeconomic problems or embedding these in broader strategic government policy initiatives. At the same time, local renewable energy component manufacturers and investors were held hostage by Eskom's refusal to sign contracts. Despite significant efforts of industry associations, the stalemate took years to resolve and most manufacturers who had established facilities in South Africa were forced to close down (Ntuli and Winand, 2019).

Renewable energy projects also have the capacity to empower and improve the wellbeing of local communities, as the outcomes in terms of socioeconomic development from REI4P indicate. However, under REI4P, in some instances the expectation that bidders need to make provisions for community development initiatives has introduced additional uncertainty and has had unintended consequences. With governance structures lacking at the local level and monitoring and evaluation systems lacking at the national level, there have been cases of increased marginalisation and conflict within already vulnerable communities (Montmasson-Clair and das Nair, 2017). There is a need for DMRE to consider further institutionalisation of this community component and mechanisms for most appropriately meeting community needs to ensure that this element of the programme is successful.

There exists a perception that a transition from coal will result in a loss of tens of thousands of jobs. The country's trade unions strongly support this view, and many of them consequently refused to participate in the National Planning Commission's Just Transition dialogue process

during 2018/2019. This process was aimed at ensuring that a low carbon transition protects livelihoods through providing alternatives and managing trade-offs, while ensuring reliable and affordable electricity to support social and economic development (OneWorld, 2019). This perception aligns with the IRP 2019, which highlighted the need for such a transition to be socially just, and sensitive to the potential impacts on jobs and local economies (DoE, 2019b).

Currently there appears to be a coalition of vested interests against introducing competition in electricity generation. In March 2017, coal transporters brought Pretoria to a standstill with protest action against renewable energy IPPs, who they claim are threatening their jobs as Eskom is producing less coal-generated electricity. In June 2017, the Coal Transporters Forum filed a court application against Eskom, NERSA, the Energy Minister of South Africa and renewable energy IPPs, seeking to obstruct the signing of new PPAs. In the same month, COSATU filed a notice with the National Economic Development and Labour Council (Nedlac) about possible protest action aiming to "stop government from buying renewable energy at the expense of jobs and as an excuse to privatise Eskom" (COSATU, 2017). COSATU reinforced its position against energy sector reform, stating that energy is a public good and as such it should be in the control of government and public entities, as its privatisation may result in an unjust transition (COSATU, 2017). In March 2019, the High Court in Pretoria dismissed the application of the Coal Transporters Forum, based on overwhelming evidence by the defendants. These, including NERSA, provided evidence that each successful IPP bidder was only issued with an electricity generation licence after following a due public participation process for their particular project (Smith, 2019). Despite the successful rebuttal of this case, the future of South Africa's electricity system is highly contentious and any change in the status quo (including the introduction of more renewable energy) will be subject to considerable pushback.

Careful planning and management of the transition are critical to ensuring that it is socially just. Policy frameworks for a just transition need to be proactive, flexible and clear, and adapt to the changes in the global energy space. Policy frameworks also need to take full advantage of opportunities afforded by the growth of emerging sectors, such as renewable energy. Government sees the REI4P as a key tool for implementing the just transition process through the programme's economic development requirements and criteria (Interviews, 2019). Auction design has the potential to play a key role in managing the transition and ensuring that it is economically and socially just. However, while auction design can contribute to this objective, it simply cannot be the sole or even prime tool for managing the transition. In fact, South Africa's auction experience has demonstrated the complexity involved in using a procurement method to deliver a range of benefits beyond electricity price reduction and energy security. Burdening REI4P (and by implication private investors) with mitigating the transition impacts is problematic, as neither the IPP Office nor the project developers have the resources or the mandate to fulfil this purpose.

New electricity business models: opportunities for IPPs

South Africa's electricity sector is facing technological disruptions, largely driven by the reducing costs of renewable energy technologies, which make decentralised options for electricity generation ever more competitive and attractive. These changes add impetus to the need to rethink the sector's structure and business model, across the value chain and at all levels of governance, including for example municipal electricity service delivery models. Enabling local and provincial governments to purchase electricity from IPPs will reduce the country's dependence on coal as a primary source of energy, help to reduce carbon emissions and help cities to increase their energy security.

Urgent need for certainty: launching a new bid window

Energy security concerns and the Eskom crisis have highlighted the need to urgently secure new generation capacity. The lengthy delay between IRP 2011 and IRP 2019 significantly damaged the emerging renewable energy industry in South Africa. Without the necessary Ministerial Determinations for new renewable energy generation capacity emerging from IRP 2019, a new bid window cannot be launched.

The approval of IRP 2019 does however send positive signals to investors, since it includes plans for an additional 20 GW of renewable energy generation to be procured and come online by 2030. However, it also acknowledges that the risk of prolonged supply shortages in the immediate term is significant in Eskom's current state (DoE, 2019b). New generation capacity takes time to procure and implement, even if it is modular and decentralised, as in the case of renewable-energy-based projects. The IRP indicates a capacity gap of 2 to 3 GW of short-term generation, highlighting the need for urgent procurement of new plants, coupled with the implementation of supply and demand side measures in the short term to avoid power supply shortages and power cuts (DoE, 2019b).

The IRP 2019 makes a specific policy recommendation for the immediate initiation of a medium-term power purchase programme similar to that adopted following the IRP 2010-2030 (DoE, 2019b). In addition, the plan encourages government support for the development of generation for own use through "the enactment of policies and regulations that eliminate red tape without compromising security of supply" (DoE, 2019b, p. 40).

In addition, the certainty which surrounded the REI4P in the past has been eroded due to governments attempts at renegotiating PPAs. Bid window 4 projects were first asked to reduce the prices from the levels at which they were contracted. This request was later retracted as it was deemed to be unconstitutional. Later, the IPPs were asked to increase their BBBEE shareholding shares, which they were allowed to do under the value for money criteria (aimed at preventing excessive success payments to awarded bidders). This introduced additional uncertainty for IPPs, as another attempt to change the conditions under which they had bid. The projects awarded under SP-I4P have also been asked by the IPP Office to propose various ways of reducing their prices, from extending their PPAs, to reducing enterprise development and socioeconomic development commitments, among others. This has contributed to their inability to reach financial close and has once again undermined certainty in the programme's commitment.

The lack of decisions, changes in top leadership positions, reneging on government commitments, threats to renegotiate prices, moving of goalposts, and failure to stick to the rules of the procurement process are all contributing to a much more risky investment environment for the country. In the end, South African citizens end up carrying these costs through limited energy security, depressed economic growth levels, higher costs of borrowing, and higher electricity costs.

7 Learning from South Africa

Several design features of the REI4P have been instrumental in reducing barriers to entry and allowing new electricity generation actors to enter South Africa's vertically integrated power sector. It is important to note that the REI4P design was benchmarked against international best practice and in wide consultation with the private sector and lenders, thus incorporating their specific needs and requirements.

Enabling policy environment

In South Africa, the REI4P procurement framework could only be successfully implemented once there was policy certainty about the role of renewable energy and an associated investment strategy – clearly defining the role of the private sector (Eberhard and Naude, 2017). The importance of a coherent underlying policy framework for the success of the REI4P cannot be overstated (Eberhard and Naude, 2017). National energy policies, and renewable energy policies more specifically, are key for setting up and communicating a roadmap to guide investments in renewable energy generation. Policy objectives and targets on their own are not enough to drive progress, as the private sector will remain reluctant to invest on this basis alone. As noted earlier, in South Africa, renewable energy targets were in place for almost a decade prior to the introduction of the REI4P but did not lead to any increase in renewable energy investments (Eberhard and Naude, 2017). A country's energy policy framework needs to include a clear implementation strategy that is linked to electricity planning and timely procurement. In addition, specific actors must be identified and mandated to drive this process.

Political support and coordinated governance

South Africa's commitments to increasing the share of renewable energy in the generation mix, as per the country's Nationally Determined Contributions (NDCs), have had a significant impact on electricity planning, including the launch of REI4P. However, power shortages and power cuts between 2008 and 2011 also played a key role in both influencing electricity planning and driving political support for urgent additions of new generation capacity, which was most easily achieved by renewable energy projects (Eberhard and Naude, 2017; Morris and Martin, 2015).

Political support played a crucial role in launching the REI4P and continued support has helped to sustain it. This political support has been created as a result of the REI4P procurement process which has been underpinned by transparency and a lack of corruption. The programme's actual impact in terms of broader social and economic benefits has also contributed towards strengthening the political support behind it, despite the fact that challenges remain, as seen by recent delays and the lack of progress under the long-awaited bid window 5 (Eberhard and Naude, 2017).

The independence of the implementing unit and transparency of the process helped build and sustain trust in the programme. Bid evaluations were conducted by independent professional firms, according to transparent and consistent evaluation criteria, in a secure environment, with CCTV cameras. The use of high quality, standardised and bankable documentation, including the PPAs and IAs, as part of the RfP, guaranteed security in terms of non-discriminatory access to the grid and removed any barriers to entry for IPPs competing with the national utility in terms of electricity generation (Eberhard and Naude, 2017).

Clearly mandated and coordinated leadership has been a key success factor behind the programme (Montmasson-Clair and das Nair, 2017; Morris and Martin 2015). The appointment of a programme champion to head up the IPP Office was key in ensuring the programme's success. Karen Breytenbach's competency and experience in managing transaction advisers

and challenging them to find tailored solutions for the country was a main contributing success factor.

Risk allocation

Another critical factor for success was the perception of potential investors regarding the level of risk, compared to the rate of return associated with participating in the REI4P and the SP-I4P. The design of REI4P and SP-I4P incorporates various mechanisms for mitigating risk, for the bidders, government, and the off-taker (Eskom). The way in which these instruments were designed and implemented has contributed significantly to appropriate risk allocation between all stakeholders (Section 5). In addition, international standards were applied in designing the PPA that governs the revenue streams of investors and funders alike (Montmasson-Clair and das Nair, 2017).

Implementation structure and process

There are several key implementation structure features of the REI4P and SP-I4P which contributed to their past success. These included the **single-stage model** for REI4P, which proved to be less costly and time consuming for government. However, while this reduced costs for government, it shifted the burden in terms of transaction costs to bidders, as many had to incur these costs, despite losing the tender.

The REI4P is structured as a multiple-bid-round programme, which has had several positive effects:

- It enabled a learning-by-doing model and has generated important learnings for both the DoE (now DMRE) and the bidders. Between the various bid windows, both bidders and the IPP Office had the opportunity to test different approaches. This allowed the IPP Office to improve on the overall process, and the outcomes, as seen from increased competition and low prices.
- The ongoing process and consecutive bid rounds were key in increasing competition by ensuring continued interest in the programme.
- Reduced prices from consecutive bid windows in turn enhanced political support for the REI4P.
- The staggered procurement process has the potential to contribute to the development of a local renewable energy industry (conditional upon policy and planning certainty).

Lessons from the failures: The need for policy certainty

Ensuring policy certainty is absolutely critical to sustain investor confidence in the renewable energy programme, since the entire IPP auction model depends on continuous and sustained investment. The start-stop-start, delayed procurement process has leeched investor confidence, with negative impacts along the value chain. Large industrial manufacturers of critical first-tier components have either halted production, exited the market, or shelved future investment decisions. Smaller local firms, who were dependent on contracts within the value chain and unable to deal with structural breaks in supplier contracts felt the impact the most, and many disappeared. As a consequence, the local content program, instead of taking off, has rather limped along.

There is a clear and simple lesson to be learnt from these failures. Trust is hard won and easily lost. Building and sustaining trust should be the top priority for any auction programme as it underpins the success of the entire endeavour.

Appendix A

Analytical framework

The analytical framework used represents a widening and deepening of the work done by Eberhard and Gratwick (2011) and Eberhard et al. (2017) in their analyses of factors contributing to the success of IPPs in sub-Saharan Africa. These authors have identified a host of factors, at both country and project level, that influence the success of these projects. In particular, they have emphasised the importance of competitive procurement (Eberhard et al., 2016) without explicitly making recommendations concerning the design and implementation of such procurement programmes – largely because the most of sub-Saharan Africa's IPP capacity has been procured through direct negotiations, often initiated by unsolicited proposals (Eberhard et al., 2016).

How procurement interactions between the public and private sectors need to be structured and managed is a key concern for the development of successful new renewable generation capacity in this region. Renewable energy auction design is a field of growing scholarly and practitioner interest. The work of, for example, Del Río and Linares (2014); Lucas, Ferroukhi and Hawila (2013); Kreiss, et al., (2016); Del Río (2017); Lucas, Del Rio and Sokona (2017); Dobrotkova, et al.(2018); Hochberg and Poudineh (2018); and Kruger and Eberhard (2018) offers a useful body of literature for developing a deeper understanding of how choices made in the design of procurement programmes can influence price, investment outcomes, and so on. Eberhard and Naude (2016) as well as Eberhard, Kolker and Leigland (2014) have also emphasised how choices made around procurement programme implementation can play a role in determining outcomes.

The analytical framework used in this case study attempts to combine lessons from the literature on IPP success factors with studies of auction design and implementation to offer a detailed and nuanced understanding of various factors that influenced the auction outcomes. Factors investigated and assessed in the study are outlined in the table below.

Table 15: Factors investigated and assessed under the study

Factors	Details
Country level	
Stability of economic and legal context	Stability of macroeconomic policies
	Extent to which the legal system allows contracts to be enforced, laws to be upheld, and arbitration to be fair
	Repayment record and investment rating
	Previous experience with private investment
Energy policy framework	Framework enshrined in legislation
	Framework clearly specifies market structure and roles and terms for private and public sector investments (generally for a single-buyer model, since wholesale competition is not yet seen in the African context)
	Reform-minded 'champions' to lead and implement framework with a long-term view
Regulatory transparency, consistency, and fairness	Transparent and predictable licensing and tariff framework
	Cost-reflective tariffs
	Consumers protected

Coherent sectoral planning	Power-planning roles and functions clear and allocated
	Planners skilled, resourced, and empowered
	Fair allocation of new-build opportunities between utilities and IPPs
	Built-in contingencies to avoid emergency power plants and blackouts
Competitive bidding practices	Planning linked to timely initiation of competitive tenders/auctions
	Competitive procurement processes are adequately resourced, fair and transparent
Programme level	
Programme design	Bidder participation is limited to serious, capable and committed companies
	Contracts are bankable and non-negotiable
	Balance between price (competition) and investment risks/outcomes is appropriate
	Programme is linked to and informed by planning frameworks (volume, transmission etc.)
	Investment risks and costs are allocated fairly
	Design takes local political and socioeconomic context into consideration
	Transaction costs (bidders and procuring entity) offset by price and investment outcomes
	Qualification and evaluation criteria are transparent and quantifiable
	Design allows for multiple scheduled procurement rounds
	Measures to create local capacity/market are built in through local currency PPA, shareholding requirements, etc.
Programme implementation	Both the programme and the procuring entity have appropriate and unbiased political support, as well as an appropriate institutional setting and governance structures
	The procuring entity is capable, resourced and respected
	Coordination between various government entities is effective
	The procurement process is clear, transparent and predictable
Project level	
Favourable equity partners	Local capital/partner contributions are encouraged
	Partners have experience with and an appetite for project risk
	A DFI partner (and/or host country government) is involved
	Firms are development minded and ROEs are fair and reasonable
Favourable debt arrangements	Competitive financing
	Local capital/markets mitigate foreign-exchange risk
	Risk premium demanded by financiers or capped by off-taker matches country/project risk
	Some flexibility in terms and conditions (possible refinancing)
Creditworthy off-taker	Adequate managerial capacity
	Efficient operational practices
	Low technical losses
	Commercially sound metering, billing, and collection
	Sound customer service

Secure and adequate revenue stream	Robust PPA (stipulates capacity and payment as well as dispatch, fuel metering, interconnection, insurance, *force majeure*, transfer, termination, change-of-law provisions, refinancing arrangements, dispute resolution, and so on) Security arrangements are in place where necessary (including escrow accounts, letters of credit, standby debt facilities, hedging and other derivative instruments, committed public budget and/or taxes/levies, targeted subsidies and output-based aid, hard currency contracts, indexation in contracts)
Credit enhancements and other risk management and mitigation measures	Sovereign guarantees Political risk insurance Partial risk guarantees International arbitration
Positive technical performance	Efficient technical performance high (including availability) Sponsors anticipate potential conflicts (especially related to O&M and budgeting) and mitigate them
Strategic management and relationship building	Sponsors work to create a good image in the country through political relationships, development funds, effective communications, and strategically managing their contracts, particularly in the face of exogenous shocks and other stresses

Source: Adapted from Eberhard et al. 2016

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