In collaboration with the Development Bank of Southern Africa (DBSA) and Accenture

WORLD ECONOMIC FORUM

Mobilizing Clean Energy Investments in South Africa: Community Solutions to Help Accelerate Financing

COMMUNITY PAPER

JUNE 2024

Images: Midjourney, Getty Images

Contents

Executive summary

South Africa has set a goal of achieving net-zero greenhouse gas (GHG) emissions by 2050 while also ensuring its short- and long-term energy security. To reach this ambitious target, the country must reduce its emissions by 12–27% by 2030 compared with 2022,[1] while restoring dynamic economic growth.[2] This goal will require significant investment in renewable energy capacity, as South Africa has the most coal-dependent energy system of the emerging markets and developing economies (EMDE),[3] as well as significant unserved energy demand. Fortunately, the country benefits from abundant renewable energy resources and a deep pool of capital, with Africa's highest financial development index.[4] Furthermore, important progress has been made in the past decade, with +14 gigawatts (GW) of renewable energy installed capacity.[5] The challenge now is to accelerate and scale the transition of the electricity sector by removing the barriers (see Appendix A) to the development of clean energy in the context of a just transition.[6]

During the first half of 2024, the World Economic Forum, supported by Accenture, collaborated with the Development Bank of Southern Africa (DBSA) to identify, prioritize and publicize the main barriers and solutions for South Africa to enable it to attract clean energy finance at the scale and pace needed to realize its ambition. Together they established a public–private working group of South African and international stakeholders from industry, finance and academia to explore solutions to unlock capital for clean energy investments in the country. The working group selected four main focus areas for investment based on the investment gap and the importance of the remaining barriers: transmission and distribution, large-scale renewables, small-scale embedded generation (SSEG) and green hydrogen.

This report summarizes the working group's main findings, including recommendations for improving the regulatory and policy environment as well as non-policy solutions to facilitate clean energy investment. The overarching aim is to support net-zero targets and a long-term just transition.

TABLE 1 **Summary of identified policy messages and non-policy solutions**

Policy opportunities to advance clean energy investment in South Africa	**Policy message #1: Policy planning and implementation** Strengthen national and municipal policy planning, backed by effective guidance on implementation measures at all government levels.
	Policy message #2: Power market structuring and governance Improve existing conditions in the power market to increase its efficiency and unlock new pools of capital.
	Policy message #3: Grid availability and permitting Facilitate clean energy uptake through increased grid deployment and enhanced permitting measures.
	Policy message #4: Incentive mechanisms and renewable energy tariff regime Establish a level playing field for renewable electricity to compete fairly with fossil fuel-based electricity and create incentives for the advent of green hydrogen.
Non-policy solutions to accelerate financing for South Africa's clean energy sector	**Solution 1: Credit guarantee facility for SSEG** Financial instrument accelerating the deployment of SSEG by protecting debt funders against loan payment default.
	Solution 2: Clean finance awareness programmes Training programmes increasing companies' and investors' awareness and decreasing listing costs to encourage green bond financing and clean finance uptake.
	Solution 3: Working capital credit facility for small-scale solar EPCs The creation of an equipment procurement aggregator, coupled with a working capital credit facility targeting small-scale solar EPCs, is proposed as a solution to accelerate SSEG's deployment and accelerate renewables ramp-up in the country.
	Solution 4: Clean hydrogen and technology innovation consortium The creation of a consortium to reduce duplicative or divergent research, development and innovation (RD&I) efforts and risks.
	Solution 5: Industrial clusters as a solution to increase clean energy finance The formalization of industrial clusters' decarbonization commitment to improve cooperation from co-located companies and public institutions and drive investment in clean energy.

1

Overview of South Africa's energy sector

Increasing investment is urgently needed to develop a reliable clean energy supply in South Africa as the country suffers regular power outages and remains dependent on fossil fuels.

South Africa is a major economy, with the highest gross domestic product (GDP) in Africa.[7] Its economic activities are diversified and include a large, energy-intensive industrial sector. However, unlike most major emerging economies,[8] South Africa's primary energy consumption has been decreasing over the past decade (-0.6% annual average),[9] a trend driven by a 0.9% average annual drop in electricity consumption.[10]

TABLE 2 **South Africa's primary energy demand by sector (2019)**

	Primary energy demand by sector (%)[11]
Industry	41
Transport	23
Residential	18
Commerce and public service	12
Agriculture	2
Other	4

The South African power system suffers from energy-supply constraints, driven by a declining energy availability factor (EAF) in its coal-fired power stations and by transmission network faults. Supply constraints result in system operator-initiated load reductions (i.e. loadshedding), leading to the country experiencing record outages during 335 out of 365 days in 2023, an increase of 63% from 2022.[12]

Persistent loadshedding, the COVID-19 pandemic and the international geopolitical context strongly affected electricity demand, which, in 2023, was 19% lower than government projections had set out for the year in 2019.[13] The Draft 2023 Integrated Resource Plan (IRP) estimated that electricity demand growth will be limited to 1% per year between 2024 and 2030.[14]

South Africa's electricity mix is dominated by fossil fuels, with coal representing 75% of the country's generation in 2022, as well as extensive use of diesel peaking power plants. Although renewable energy use has increased over the past decade, representing 7.4% of generated power, South Africa's electricity mix remains one of the most carbon-intensive in the world.[15] Mobilizing clean energy investments is therefore an absolute necessity if the country is to reach net zero by 2050.

TABLE 3 **Installed capacity and generation mix in South Africa (2023)**

	Installed capacity (GW)[16]	Generation (TWh)[17]
Coal-fired	38.8	171.1
Diesel and gas	3.8	3.0
Nuclear	1.9	9.8
Solar and wind	6.2	21.1
Pumped storage	2.7	4.1
Hydroelectric stations[18]	0.6	3.1
Energy imports	—	8.6
Total utility scale (2023)	**54.0**	**220.8**
Small-scale embedded generation	5.0	n.a.

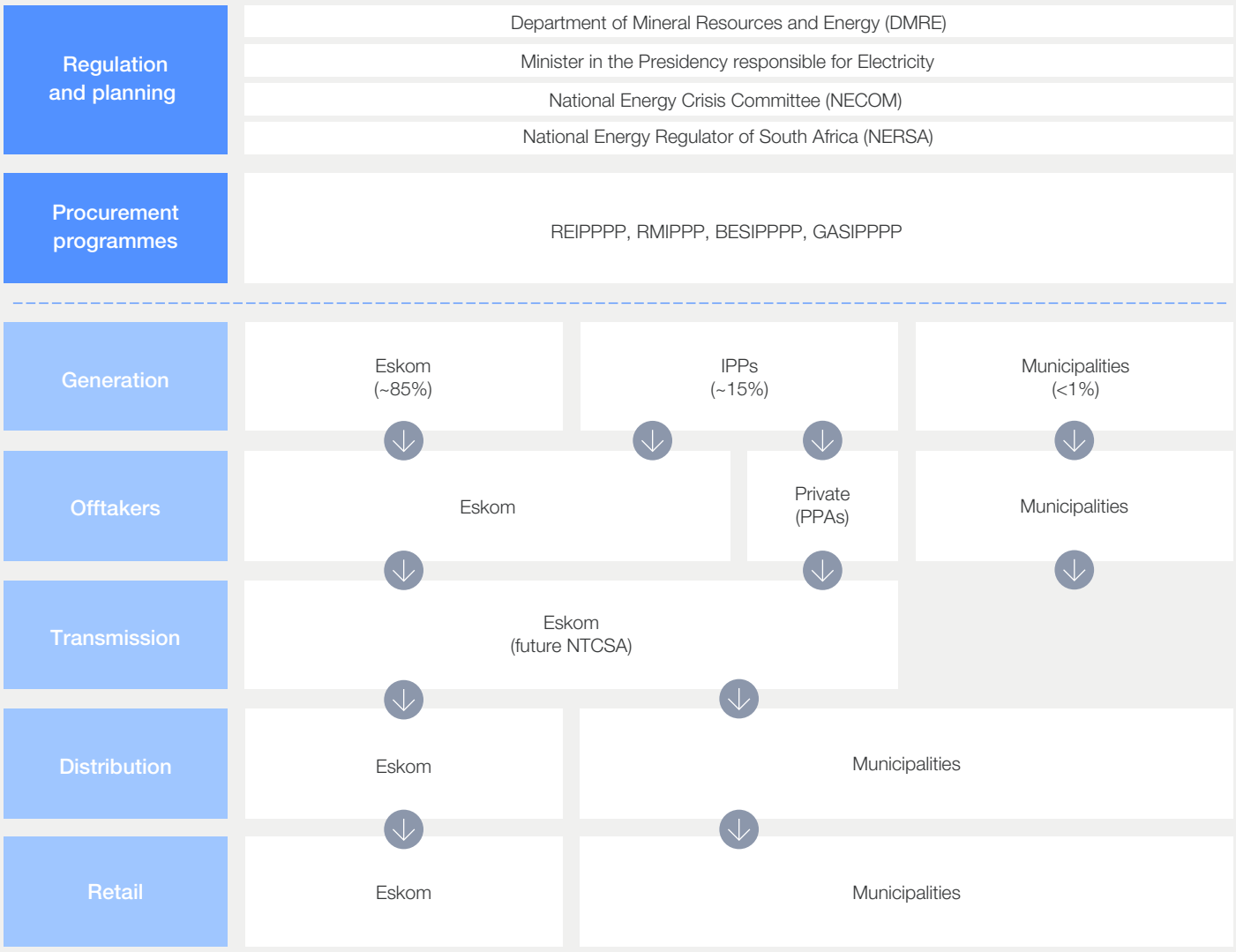
1.1 South Africa's electricity market structure

The ongoing liberalization of South Africa's electricity market is bringing about major structural changes. Originally vertically integrated, the electricity market has opened up to generation competition, with several public procurement programmes[19] bringing in independent power producers (IPPs). Offtake is mainly operated by the South African public utility company Eskom, but the structuring of wheeling tariffs is enabling the development of private offtakers buying wheeled electricity (i.e. transmitted from generator to customer through the national grid).

Transmission, currently operated by Eskom, has been transferred to the National Transmission Company of South Africa (NTCSA), which has independent governance structures. The NTCSA is expected to be mandated in mid-2024 as the transmitter, central purchasing agency and market operator.[20] Distribution is shared between Eskom and municipalities, with the distributor also acting as retailer, handling billing and payment collection, among other tasks.

Regulation of and planning for the energy sector are carried out by the Department of Mineral Resources and Energy (DMRE). Some of the powers and functions entrusted by the Electricity Regulation Act[21] were transferred from the Minister of Minerals and Energy to the Minister in the Presidency responsible for Electricity. The Minister of Electricity steers the Energy Action Plan to end loadshedding through the National Energy Crisis Committee (NECOM), which brings together Eskom and officials from within government and works closely with business and social partners. The National Energy Regulator of South Africa (NERSA) enforces electricity market regulations, including the setting of tariffs and licensing of power suppliers.

FIGURE 1 **South Africa's electricity market structure**



Source: World Economic Forum

1.2 Renewable energy in South Africa

South Africa has an abundance of renewable energy (RE) resources, mostly solar and wind. Since the opening of power generation to competition and the first round of public procurement of renewable power projects in 2011, RE capacity has expanded rapidly. In 2023, RE installed capacity was 14.5GW, with solar power accounting for almost half of it.

Developing RE offers several advantages in the South African context. It increases generation capacity and reduces unserved demand, as well as decarbonizing electricity production, while, in the context of a just transition, creating jobs distributed throughout the country.

The draft IRP published by the Department of Mineral Resources and Energy (DMRE) sets new generation capacity targets. The latest IRP 2023 plans to more than double large-scale solar, wind and small-scale embedded generation capacity (i.e. generators with a maximum 1 megawatt [MW] production capacity,[22] mainly rooftop solar) for an estimated investment requirement of around ZAR245 billion ($13.4 billion).

South Africa also intends to capitalize on its abundant renewable resources through the production of green hydrogen, aiming to decarbonize its transportation and energy-intensive industries while becoming a leader in green hydrogen export.[23]

TABLE 4 **South Africa's installed and targeted capacity of renewables, transmission and distribution infrastructure**

GW	Hydro	Pump and storage	Concentrated solar	Large-scale solar photo-voltaic (PV)	Wind	Small-scale embedded generation	Total	Transmission infrastructure[24]
2023 installed capacity	0.6[25]	2.7	0.5	2.3	3.4	5.0	14.5	
2030 capacity target	0.6	2.7	0.6	5.9	7.9	11.3	29.0	**14,000 km of lines**
Financing requirements ZAR billions[26]	–	–	~85		~95	~65	~245	**~390**

1.3 Current RE support programmes

The South African government has implemented several schemes to support the growth of renewables:

1. **The Renewable Energy Independent Power Producer Procurement Programme (REIPPPP).** A competitive tender process structured into rolling bid windows for private developers, this has led to the procurement of a total projected +7.5GW[27] of wind and solar capacity since its inception in 2011. The ongoing seventh procurement window is expected to allocate an additional 1.8GW of solar PV and 3.2GW of wind in 2024.[28]

2. **The Risk Mitigation Independent Power Producer Procurement Programme (RMIPPPP).** This competitive tender process procured 2GW of new generation dispatchable capacity from a hybrid solution such as a combination of gas, solar PV, wind and battery energy storage technologies.

3. **The Battery Energy Storage Independent Power Producer Procurement Programme (BESIPPPP).** This competitive tender process to procure new generation capacity from battery energy storage is in accordance with ministerial determinations gazetted under the Integrated Resource Plan 2019. The first bid window called for 0.5GW during 2023 and an additional 1.2GW will be procured in 2024 in the second and third bid windows.

4. **Energy Bounce-Back Loan Guarantee Scheme.** This aims to deploy 1GW in additional solar PV generation capacity between 2023 and 2024 through three mechanisms: a loan guarantee for rooftop solar for small and medium-sized enterprises (SMEs) and households; a loan guarantee for rooftop solar for energy service companies; and a working capital loan for businesses in the rooftop solar supply chain.

5. **Solar Panel Tax Incentive for Individuals and Businesses.** This national incentive supports households to install rooftop solar equipment through an income tax rebate of 25% of the cost of PV panels, limited to ZAR15,000 ($800) per individual, as well as accelerated depreciation of electricity generation assets for businesses.[29]

6. **Green Energy Fund (GEF).** This scheme finances small-scale renewable energy and energy efficiency projects through subsidized loans.

7. **Municipal feed-in tariffs.** Municipalities have started supporting the development of small-scale embedded generation (SSEG), allowing residents to sell power back to the grid at net metering or feed-in tariffs, reflected as a deduction on their monthly electricity bill. The City of Cape Town also provides an extra subsidy on top of the feedback tariff to municipal residents.[30]

2 Policy opportunities to advance clean energy investment in South Africa

The working group identified four main areas that could help create a more conducive policy and regulatory environment to accelerate clean energy finance in South Africa.

2.1 Policy planning and implementation

Situation

In the 2000s and 2010s, South Africa built a national policy framework, opening power generation to IPPs for large-scale traditional renewables. Since 2012, the country has procured 9.5GW of new large-scale generation capacity from 116 IPPs under the REIPPPP and the RMIPPPP, and it aims to double large-scale renewable capacity by 2030. However, a gap still exists between policy and implementation at the local level, which is likely to restrain RE uptake.

Power generation liberalization gives municipalities the opportunity to procure electricity from IPPs through power purchase agreements (PPAs), in addition to running their own generation capacity. While owning and operating municipal generation capacity is a long-term prospect, sourcing power from IPPs can be an opportunity to diversify supply in the shorter term. However, this option is largely underused – due in part to the lack of technical and financial capacity, and the absence of guidance on procurement diversification and ways to attract private investment.

In 2023, only 43% of licensed municipal distributors allowed SSEG installations on their network.[31] While those municipalities represented the majority of total electricity demand and the population, clear connection requirements were still lacking in most. Lastly, many municipalities have limited capacity to deal with the number and scale of SSEG permit applications, which can lead to a deployment of substandard renewable energy components such as inverters. The use of substandard components has the potential to undermine the stability of the grid.

While the introduction of a regulatory framework for wheeling is a major step forward, its implementation at the municipal level is uneven and is not harmonized, preventing wheeling on the distribution grid or making it more difficult to do so.

Finally, despite the government's active commitment to creating a national green hydrogen market, as reflected by the Hydrogen Society Roadmap and the Green Hydrogen Commercialization Strategy, there is currently no green hydrogen investment regulatory framework or structured national and provincial coordination, and green hydrogen standards or certification mechanisms are not in place.

Policy message #1

Strengthen national and municipal policy planning, backed by effective guidance on implementation measures at all government levels.

The following measures could help to enhance and facilitate policy planning and complement the existing policy and regulatory frameworks for traditional renewables at the local level as well as for green hydrogen nationally:

- Publish guidelines for municipal electricity procurement, detailing opportunities to diversify electricity supply and clarifying procurement process set-up and financing options (e.g. financial modelling and risk assessment). These guidelines should ideally also highlight cooperation schemes between municipalities that allow demand aggregation and economies of scale.
- Produce guidelines on the municipal SSEG framework, clarifying the power sale-back scheme as well as measures to deploy net metering or feed-in tariffs. These guidelines could include best practices in permitting processes and stakeholder engagement as well as staffing and capacity-building recommendations.
- Attract and pool technical assistance funding at a national or development finance institution (DFI) level to assist and streamline municipalities in creating and implementing their own renewable energy IPP procurement programmes, including the standardization of important project documents such as PPAs; implementation agreements; engineering, procurement and construction (EPC); and operation and maintenance (O&M) agreements.
- Develop a green hydrogen regulatory framework and clarify its governance ownership. This framework should include permitting requirements and green hydrogen standards, coherent with international standards, as well as green power certification mechanisms.

2.2 Power market structuring and governance

Situation

The electricity market structure has fundamentally changed over the past few years, with the introduction of power wheeling and the ongoing unbundling of Eskom's generation, distribution and transmission functions. The Electricity Amendment Bill outlines the target state of the market, centred on wholesale operations.[32] The announcement in January 2024 of the creation of an Independent Transmission Project Office (ITPO)[33] to assist with attracting private-sector investment in transmission infrastructure is a welcome future enhancement of the power sector market. However, uncertainties remain with regard to market structuring, specifically in terms of implementation timelines for announced changes and future governance.

Ongoing discussions about the structuring and role of the NTCSA and the ITPO represent significant steps forward. However, working-group participants noted the seeming lack of assurance regarding the NTCSA's governance independence from Eskom, the ITPO's operating model, private transmission investment models, including bankable financing mechanisms, and the regulatory framework surrounding them.

The distribution network will require major investment to pursue electrification and support the development of distributed generation. Yet 40% of customers are serviced by the municipal distribution network, most of which are however under financial strain or distress,[34] limiting their capacity to finance upgrades and extensions.

Policy message #2

Improve existing conditions in the power market to increase its efficiency and unlock new pools of capital.

The following measures could help clarify power market structure and governance, while opening market participation to new pools of capital:

- Publish a detailed vision for future targeted power market structure (e.g. target market segments, treatments of legacy contract, balancing responsibilities) together with a detailed roadmap of next market opening steps.
- Define financing mechanisms for private investment in transmission infrastructure (see Figure 2).
- Revisit the consolidation of municipal distribution networks into regional energy distributors (REDs), as originally explored in the 1990s. This is a way to improve financing options, optimize investment and extend network operations. Those involved should pay attention to measures safeguarding municipalities' revenue models. A possible implementation avenue could entail the deployment of a pilot scheme, aggregating a metropolitan municipality with surrounding district municipalities, with progressive transfer of skills and a balanced grouping of municipalities.
- Produce a national wheeling framework to guide, accelerate and harmonize municipal wheeling practices. This framework could encompass available capacity determination, tariff mechanism, contract types and inter-distribution grid wheeling rules.

FIGURE 2 | **Transmission investment model recommendations**

Parameter	Options	Options definition	Working group recommendation
Tender scope	Early Late	– **Early**: preliminary work is managed by private developers. – **Late**: preliminary work (e.g. route selection, right-of-way acquisition, environmental impact assessment) is managed by a public entity.	– Late tendering process is the preferred avenue as it allows for an accelerated preliminary phase whereby permits are secured through the use of public authority, and route selection is based on existing servitudes (i.e. rights someone has over another's property). – If the developer or investor has project preparation capabilities, this can be used to accelerate the process further. – Eskom's close involvement in the preliminary work is also essential to make the most of its technical skills and experience.
Revenue model	Merchant Regulated	– **Merchant**: revenues are generated from sale of transmission service to generators and/or customers. – **Regulated**: revenues are generated from tariffs determined and guaranteed by the regulatory entity and based on predetermined criteria (e.g. availability, energy loss).	– The regulated model is preferred because it provides transparency and certainty to investors in the context of a restructuring of the electricity market. – It is necessary to overhaul current transmission tariffs to allow for a fair return while ensuring they can evolve in line with market structure.
Tender process	Competitive bidding Direct negotiation	– **Competitive bidding**: open competitive process where bids are solicited from multiple potential investors. – **Direct negotiation**: regulatory entity engages in direct negotiations with potential investors.	– A bidding model similar to that of the IPPO is preferred as the main tender process because it allows for transparency, cost efficiency and wide market access. – In parallel, a mechanism for the contracting authority to consider unsolicited proposals in direct negotiations could be implemented and would allow for an increase in the volume of projects.
Risk allocation	Concession BOO (ITP) BT (ITP) BTO (ITP) BOOT (ITP)	– **Concession**: private operator builds and operates the infrastructure and collects fees from users during concession period. – **BOO** (Build, Own, Operate): private developer designs, builds, owns and operates the transmission infrastructure. – **BT** (Build, Transfer): private developer builds transmission infrastructure and transfers it to the public sector at commercial operations date. – **BTO** (Build, Transfer, Operate): private developer builds and operates the transmission infrastructure; however, ownership remains with the public sector. – **BOOT** (Build, Own, Operate, Transfer): private developer builds, operates and owns the transmission infrastructure during the operational period.	– The BTO or BOOT models are preferred for large-scale projects as opposed to BOO because they maintain public ownership and control of the transmission infrastructure. – The BT model could be considered for small-scale projects because it allows for quicker financing and execution than a public-built project but maintains public ownership. Remuneration can take place through back-to-back payments.
Credit enhancement	Collateralization Special funding/blended finance vehicle Guarantees and credit enhancement vehicle Traditional government guarantees Guarantee fund or partial credit guarantee Political risk insurance Procurement and project preparation facility	– **Collateral**: transmission asset securitization to reduce credit risk. – **Special funding/blended finance vehicle**: investment platform where concessional funding is pooled together with commercial funding to contribute to debt and equity finance. – **Traditional government guarantees**: National Treasury guaranteeing NTCSA payment. – **Guarantee fund or partial credit guarantee**: revolving payment guarantee to cover liquidity risk of public entity payment obligations and/or early termination payment guarantee, with seed capital from National Treasury, Infrastructure Fund, DFIs or institutional investors. – **Political risk insurance**: coverage provided by the Multilateral Investment Guarantee Agency (MIGA) in case of losses related to political causes. – **Procurement and project preparation facility**: grant funding used for technical assistance or development capital for project preparation.	– The specifics of transmission infrastructure investment (e.g. capex intensive, long operating periods) necessitate the mobilization of new pools of capital beyond traditional bank loans. – Additionally, transmission infrastructure projects will require specific guarantees as they cannot be collateralized. – Given current fiscal constraints, traditional government guarantees (i.e. counterparty guarantee assumed by the National Treasury) were excluded. – The preferred solution is the establishment of a guarantee fund that pools various types of capital (i.e. blended finance) and offers different layers of guarantees (e.g. currency, credit, counterparty). – The fund could also directly finance infrastructure projects, providing investors with the opportunity to invest in a specific asset class. – Political risk insurance as well as procurement and project preparation facilities are not excluded and can be combined with other credit enhancement mechanisms.

Working group preferred option Other option

Source: World Economic Forum

2.3 Grid availability and permitting

Situation

While the deployment of renewable capacity has been successful over the past decade, working-group participants note grid availability as the main impediment to future developments.

Grid availability is constrained in the wind and solar resource-rich Cape provinces (0.0GW in the Northern Cape, 1.6GW in the Eastern Cape, 1.8GW in the Western Cape supply areas).[35] This situation has jeopardized the number of projects that were awarded in the fifth and sixth bid windows of the REIPPPP[36] and is set to undermine the success of future windows. While Eskom's curtailment plan is a short-term solution to increase grid availability, the company's unbundling and the opening of transmission to private investment through the ITPO and NTCSA are expected to accelerate the upgrade and extension of the network in the medium to long term.

Access to land is complex for both large-scale renewable energy projects and the construction of new transmission lines. The absence of a mining cadastre makes the identification of land rights difficult. IPPs and Eskom also often have to negotiate with multiple landowners, and the right of expropriation is rarely applied for transmission projects.

Moreover, the development of large-scale renewables and transmission-line projects requires numerous permits and licences, which are granted by different entities that sometimes do not share information leading to duplicate requests. While projects to accelerate environmental authorizations (EA) are drawn up (i.e. exemptions for substations[37] and solar facilities in low or medium environmentally sensitive areas),[38] these factors have been seen as increasing uncertainty and lengthening the time it takes to obtain permits. The Energy One Stop Shop (EOSS), launched in July 2023 to coordinate the procuring of permits and licences, should address the aforementioned barriers, provided its use rapidly gains momentum.

Lastly, regarding the procedure for connecting large-scale renewable projects to the grid, the shift from "first come, first served" to the "first ready, first served" system that now covers allocation of capacity is welcome. However, under current circumstances, the time to obtain an Eskom budget connection quotation is lengthy, while little visibility is given to connection costs. It is possible that developers may have to finance more network connection capacity than they require, with the surplus allocated to another developer.

Policy message #3

Facilitate clean energy uptake through increased grid deployment and enhanced permitting measures.

The following measures could help enhance land access, permitting and grid capacity access:

- Increase government support for the acquisition of privately owned land through the reiteration of the Ministry's commitment to expropriation for transmission line extensions, ensuring fast processing of expropriation requests and swift clarification of expropriation compensation processes for transmission projects.
- Clarify the mandate of the EOSS in relation to Infrastructure South Africa (ISA), accelerate its ramp-up and extend its scope to transmission projects.
- Expand the existing Eskom Land Leasing Programme to other government departments such as the Department of Public Works and Infrastructure to facilitate IPPs' access to government-owned land with secured transmission capacity.
- Reform the grid capacity allocation process by introducing an equitable allocation of connection charges so that IPPs finance only the connection capacity they use. The transmission operator can recover the cost of the additional capacity, offering other IPPs the opportunity to connect a project in the area.
- Additionally, to reduce uncertainty linked to the "first ready, first served" principle, the introduction of a "grid access option" in the grid allocation process could be envisaged. Under this principle, developers could pay for a reserved capacity with an expiry date, giving them certainty of grid access if they gather the necessary authorizations in due time.

2.4 Incentive mechanisms and renewable energy tariff regime

Situation

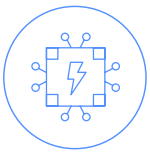
Incentive mechanisms are fundamental tools for accelerating the energy transition as they ensure the competitiveness of RE and technologies enabling the decarbonization of the energy system (including green hydrogen) with regard to fossil fuels.

While incentives have recently been put in place to facilitate SSEG implementation and the development of local industries such as rooftop solar tax incentives and the Energy Bounce Back Loan Guarantee Scheme (EBB), they have a restrictive distribution model preventing certain groups from benefiting from them (e.g. households not paying income tax). On top of not being conducive to equitable access to SSEG technologies, these incentives are often cited as being insufficient in scale and in scope (i.e. not covering batteries, inverters or mini grids), and as not offering the kind of medium-term visibility that is necessary to structure a local supply chain.

The concentration of subsidies on small-scale rooftop solar also overlooks large-scale renewables, which, while showing steady growth to date, are likely to lack local EPC capacity and skills in the years ahead.

Additionally, feed-in tariffs, which remunerate the injection of electricity produced by residential, commercial and industrial SSEGs, are absent in 74% of municipal distributors.[39] Yet they are an additional accessibility factor that would help accelerate equipment payback and crowd in private investment in the sector.

Lastly, the lack of substantial incentives dedicated to green hydrogen was pointed out as currently hindering the emergence of a local market while limiting the initiation and bankability of green hydrogen projects that are typically capital-intensive.



Policy message #4

Establish a level playing field for renewable electricity to compete fairly with fossil fuel-based electricity and create incentives for the advent of green hydrogen.

The following measures would help further enhance renewable energy tariffs and incentive mechanisms supporting clean energy:

- Expand existing SSEG incentives (i.e. rooftop solar tax incentives and the EBB scheme) beyond their announced end date (2024), thus increasing investors' confidence while boosting the local supply chain.
- Broaden the rooftop solar tax incentive by increasing its ceiling to include solar PV-connected batteries and inverters as well as mini grids. Additionally, transform the incentive from a tax rebate in the year following expenditure to direct aid targeting households that do not pay income tax.
- Under the EBB scheme, broaden working capital loans to include large-scale renewable energy services and manufacturing companies, thus strengthening local skills and business development in EPC.
- Create SSEG non-financial incentives, such as renting public building rooftop space to SSEG developers at a below-market rate.
- In addition to the ongoing carbon tax build-up, steps could be taken to create incentives for green hydrogen use to help lower tariffs and improve the bankability of projects.

3

Solutions to accelerate financing for South Africa's clean energy sector

The working group proposes five non-policy solutions that can help increase investment for clean energy in South Africa.

Recognizing that creating an enabling environment for clean energy in South Africa cannot rely solely on policy, the working group is taking steps to identify non-policy solutions that can be initiated immediately. Five of these have been framed. Like the policy solutions, they aim to address identified barriers and facilitate the scaling of clean energy investments in the country. In the coming months, local institutions leading each of the proposed solutions will seek their operationalization with the support of working-group members.

Solution 1

Credit guarantee facility for SSEG

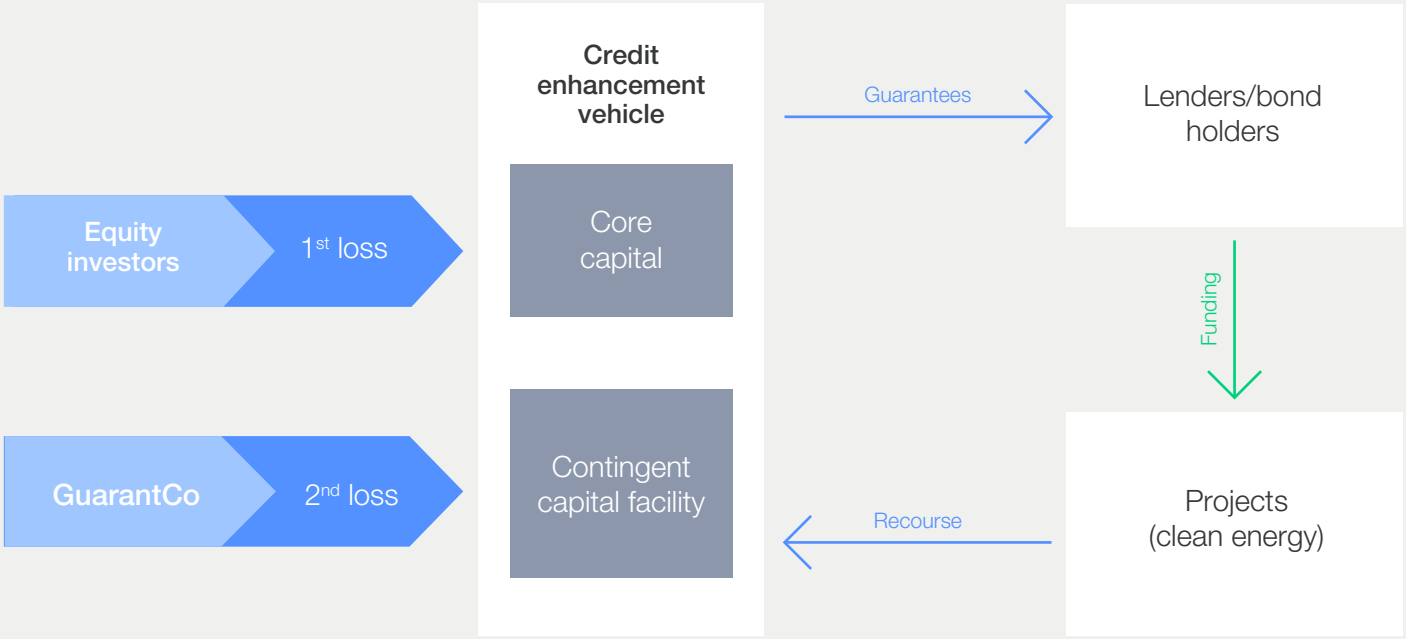
South Africa benefits from a large pool of capital that contributed to the rapid development of large-scale RE projects over the past decade. While SSEG also progressed well over the same period, structural higher risk (i.e. lower credit rating) and fewer financing options (i.e. lack of access to debt financing, lack of long tenors) tend to limit their access to large pools of capital and are hindering their expansion. As a result, SSEG projects are unevenly distributed throughout the population and concentrated in high-income households and commercial and industrial segments.

The creation of a new credit guarantee facility focused on SSEG has been proposed as a solution to facilitate access to debt financing and contribute to an inclusive expansion of SSEG in the country.

The credit guarantee is a financial instrument providing protection to the funder of a debt instrument against potential default on interests or principal payment. In the proposed scheme, equity investors along with concessional funding capitalize a credit enhancement vehicle (CEV), issuing guarantees to local lenders or bond holders. Ideally positioned to identify a pipeline of projects, local lenders can finance riskier projects. In the case of payment default, the CEV steps in to repay the loan under the specific terms of the guarantee.

GuarantCo (Private Investment Development Group) is in the process of completing a feasibility study. If the result is positive, it will take the next step and prepare a business plan before presenting the project to the regulator and engaging with potential investors (i.e. DFIs, local patient funds) to raise equity and identify local lenders willing to participate in the scheme.

FIGURE 3 | **Credit guarantee facility for SSEG structure**



Source: GuarantCo

Solution 2

Clean finance awareness programmes

The lack of awareness of clean energy finance mechanisms available in South Africa was noted as limiting the potential for expansion of green investments. Green, social, sustainability-linked and transition bonds are essential tools for financing the transition to clean energy. They facilitate the raising of dedicated debt for environmentally responsible projects and demonstrate the commitment of investors in supporting them. The South African context is particularly favourable to green bonds issuance, with developed capital markets, evidenced in the Johannesburg Stock Exchange's (JSE) Sustainability Segment. From 2020 to 2022, the segment saw marketed growth of 71% (annualized growth rate), helping corporates raise a cumulative ZAR63 billion ($3.4 billion) over the period. However, after a few years of consistent growth, sustainability bond issuance has encountered a slowdown, sometimes labelled as "green fatigue". In 2023, only 12 new bonds were listed on the JSE's Sustainability Segment, of which seven were green bonds. This trend can be attributed partially to the lack of issuers' awareness of available opportunities in the public capital market and a listing process that is considered onerous and expensive.[40]

The development of training programmes encouraging green bond financing has been proposed as a solution to increase awareness and decrease listing costs. These programmes should be designed to give borrowers an understanding of the green bonds' advantages and principles as well as to build additional local second-party opinion (SPO) capabilities.

Leading the charge on this effort, JSE is partnering with the International Finance Corporation, the European Commission and the United Nations Development Programme. The aim is to launch a free training programme and an individual capacity-building support programme tailored to chief sustainability officers, chief financial officers, independent second-opinion providers and/or sustainability experts. JSE will also deploy an assistance programme to support potential issuers ready to issue green bonds by covering the pre-issuance technical assistance costs.

Solution 3

Working capital credit facility for small-scale solar EPCs

Small-scale solar Engineering Procurement Construction (EPC) companies play a pivotal role in the just energy transition. They address an essential customer segment while creating local jobs and strengthening the local economy. However, many small-scale EPCs struggle to unlock working capital financing. Equipment purchases account for around 70% of a project's total cost and are typically paid upfront to the supplier, while project revenues are collected at project milestones or completion. Access to working capital loans is also difficult due to the nature of these companies, which are generally asset-light, with limited collateral options. Lastly, the relatively small volumes of equipment they typically order prevent them from having significant leverage on price negotiations, and hinder supply-chain economies of scale.

The creation of an equipment procurement aggregator and working capital credit facility targeting small-scale solar EPCs is proposed as a solution to accelerate EPC development and accelerate renewables ramp-up in the country.

The solution is proposed by Odyssey Energy Solutions as a concept to be launched in South Africa, following the success of a similar programme for small-scale solar and mini-grid EPCs in Nigeria. The concept entails aggregating equipment orders of solar PV panels, inverters and batteries from multiple small-scale solar EPCs, while also streamlining import and delivery in order to substantially reduce procurement costs. Odyssey would order, ship and clear customs under its name, in exchange for a 15–20% upfront deposit from EPCs, which would thereby enjoy substantial working capital at the project initiation phase. The remaining procurement costs would be repaid either at the start of the construction phase (procurement credit) or at the time of commissioning, post-construction (construction credit). This credit facility would be managed by Odyssey with the support of DFIs and impact funds. These services would be compensated through a commission on the equipment order and on the cost of credit.

This solution, currently in the due diligence phase, is expected to be launched in South Africa by Odyssey in 2024. It will rely on collaboration with members from the working group. In particular, feedback is welcomed from impact funds and DFIs looking to deploy capital across multiple small-scale solar EPCs. Partnerships with local banks to co-launch the financing facility, as well as with equipment distributors and manufacturers interested in extending credit to their customers, will be sought in the next few months.

Solution 4

Clean hydrogen and technology innovation consortium

South Africa has set an ambitious target for green hydrogen production (500,000 kilotonnes by 2030)[41] that may be constrained by the nascency of the technology and its supply chain. Significant investments are required, but projects are risky, especially those in the research, development and innovation (RD&I) phases. Furthermore, while several major players have ambitious clean technology RD&I programmes, these are not coordinated. Smaller-scale players lack the resources to compete (e.g. test infrastructure development) and these programmes often lead to smaller investment sizes that are less attractive for investors when balanced with their risk profiles.

The working group supported the creation of a clean hydrogen and technology innovation consortium as a solution to reduce duplicative or divergent RD&I efforts and decrease overall risks.

The consortium will be structured around common governance:

- Establishing an RD&I roadmap that complements existing initiatives and encourages private-sector participation
- Convening and coordinating green hydrogen-related RD&I with local and global partners
- Managing RD&I activities as a neutral programme manager
- Securing joint funding for RD&I activities and infrastructure development
- Supporting practitioners in intellectual property (IP) progression and commercialization efforts

The working group anticipates that the consortium will facilitate increased visibility for technology research efforts, reduce the risks associated with advancing RD&I (including financial risks) and align objectives and planning across a multitude of actors and stakeholders. Once active, the consortium should accelerate timelines for RD&I outcomes through effectively managed programmes and improve the commercialization of new technologies ready for market.

The Research Institute for Innovation and Sustainability (RIIS), in partnership with the Freeport Saldanha Industrial Development Zone, is piloting the creation of such an innovation consortium with a wide range of stakeholders being consulted: public agencies (e.g. DMRE, the Department of Science and Innovation [DSI], the Council for Scientific and Industrial Research [CSIR], the Department of Trade Industry and Competition [DTIC]), industrials and industrial representative bodies (e.g. Sasol, Anglo American, Minerals Council SA), research entities (e.g. the South Africa National Energy Development Institute [SANEDI], Hydrogen South Africa, universities) and investors (e.g. the German Agency for International Cooperation [GIZ], the United Kingdom Foreign, Commonwealth and Development Office [UK FCDO] and InvestSA). After a soft launch in April 2024, a member-based working group will be mobilized until October 2024 to co-create RD&I focus areas for 2025 and secure operational funding.

Solution 5

Industrial clusters as a solution to increase clean energy finance

South Africa's industrial and mining sectors represented more than 20% of the country's GDP in 2022.[42] As such, they play a pivotal role in the country's energy transition and a variety of decarbonization levers are available (e.g. improved energy efficiency, electrification, development of renewable energies and green hydrogen). While notable initiatives are under way, the lack of effective public–private and private–private collaboration limits further investment and optimization opportunities.

Industrial clusters offer a unique opportunity to provide scale, risk sharing and efficiency while playing a pivotal role in deploying large-scale energy and transport infrastructure. In addition, they represent an important building block of regional competitiveness, contributing to GDP and job creation. The working group proposed that improving cooperation and common vision from co-located companies and public institutions is a solution to driving investment in clean energy.

To mobilize its full economic, employment and energy potential, the Durban Industrial Cluster is exploring joining the World Economic Forum's Transitioning Industrial Clusters initiative, a network of more than 20 industrial clusters that have committed to accelerating the transition to net zero in more than 10 countries and five continents.

Conclusion

Creating an enabling environment is crucial to accelerate clean energy investment in South Africa.

The working group calls on South African stakeholders and government entities to reflect on the arguments made in this paper and take steps to create an enabling environment for clean energy investments in the country. In the coming months, local institutions identified as leads for each of the proposed solutions will seek their operationalization following the implementation plans with the support of the working-group members. Group members hope that insights from the exercise can support additional decarbonization and energy transition processes in the country.

Appendix A: Barriers to clean energy investment

The following barriers to investment were identified through consultations with members of the working group and serve as the basis for the proposed solutions in this report.

FIGURE 4 **Analysis of barriers to clean energy finance in South Africa**

Barriers to investment in transmission and distribution

Barrier criticality: +++ ... +

Regulatory framework

1. No legal framework for private investment in new/upgrades of Eskom-operated transmission/distribution lines
2. No national framework supporting municipalities bringing private investors into distribution network
3. Slow policy implementation

Future network operator organization

1. Business case and financial model for private investments into the grid to be defined (including tariffs structure)
2. No visibility on NTCSA and ITPO governance, operating model, government guarantees
3. Lack of trust between private investors and Eskom (e.g. potential conflict of interest with NTCSA)
4. Public opinion seeing opening to private investments as privatization of public services

Grid development planning and execution

1. Important delays in grid deployment not meeting demand in renewable resources-rich provinces
2. Inconsistent and unstructured interactions in transmission lines deployment planning between Eskom and municipalities/IPPs
3. Lack of human skills for project development (e.g. construction, engineering)
4. Energy flexibility focus on batteries only

Permitting

1. Extensive land acquisition delays (e.g. lengthy expropriation process, misalignment between some local and traditional authorities)
2. Complex procedure and extensive environmental permitting delays (especially for wind)
3. Information duplication among Eskom departments and administrative levels

Capacity allocation procedure

1. Long delays in grid capacity allocation process and quotation with lack of visibility on connection costs[1]
2. No guaranteed access to full capacity when a developer funds a line; excess capacity can be allocated to other developers
3. Important information requirement/upfront investments requested from developers with no certainty that grid connection will be obtained[1]

Barriers to investment in small-scale embedded generation

Barrier criticality: +++ ... +

Incentives

1. Low and restricted households rooftop PV panels tax incentive not covering batteries or invertors
2. Low commerce and industry and households' SSEG subsidy currently preventing access, especially for low-revenue categories
3. Lack of mid-term predictability for SSEG incentives (e.g. Rooftop Solar Incentive, Bounce-Back Loan Guarantee Scheme)
4. Absence of feed-in tariff in most municipalities delaying SSEG payback period
5. When available, the feed-in tariffs are too low to make a difference in the investment decision

Skills and awareness

1. Understaffed municipalities with missing skills to advise on SSEG, develop new grid-related services and manage feed-in tariffs
2. Lack of SSEG installation professionals
3. Poor data quality on municipal energy backlog, making it impossible to build a business case
4. Lack of household education on rooftop PV financing opportunities

Equipment and grid availability

1. Low technical readiness of distribution grid for SSEG (i.e. two-way)
2. Fluctuating PV equipment availability with undersized local supply chain
3. Lack of PV equipment standards

Private funding accessibility

1. Limited access of individuals and commerce and industry SSEG projects to institutional debt financing
2. Absence of defined business model for private investment in residential SSEG to lower costs for households

Regulatory framework

1. Lack of municipal framework allowing or supporting development of SSEG
2. When authorized, lack of municipality guidance on SSEG grid connection requirements

Development planning

1. SSEG incentive policies not covering mini grids
2. Limited capacity for municipalities and administration to deal with amount/scale of permit applications

Barriers to investment in large-scale renewables

Barrier criticality: +++ ... +

Development planning

1. Grid constraints in certain provinces (e.g. Northern Cape, Western Cape)
2. Policy uncertainty on future power market structure
3. Limited capacity for government and administration to deal with amount/scale of permit applications
4. Uncertainty linked to past national administrations' "stop and go" approach in large-scale renewable procurement (prevented structuring of a local supply chain)

Wheeling

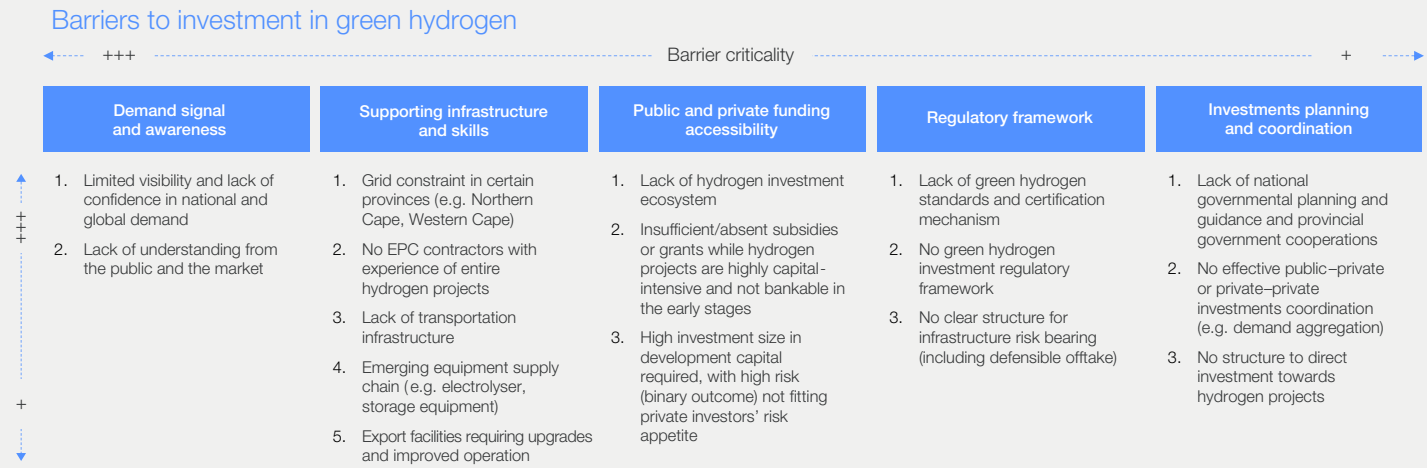
1. Lack of municipal policies framing wheeling, absence of harmonization between municipalities
2. Low maturity on virtual power wheeling (e.g. unclear transmission and distribution costs, complex traders' agreement process)
3. Low security of supply delaying adoption of wheeling scheme by consumers
4. Unclear responsibility for "last resort buyer" in wheeling scheme

Skills and awareness

1. Lack of EPCs and balance of plant capacity (no organized effort to develop amount and level of skills to meet demand)
2. Lack of green/sustainability bonds and carbon/green pricing opportunities awareness

Private funding accessibility

1. Low credit rating of some municipalities preventing them from issuing tenders to private producers
2. Expensive and complex green/sustainability bonds listing procedure (e.g. mandatory SPO certification, restrictive reporting rules)



Note: 1. Barriers to faster deployment of both grid and large-scale renewables.

Appendix B: Key abbreviations

BESIPPPP – Battery Energy Storage Independent Power Producer Procurement Programme

BOO – Build, own, operate

BOOT – Build, own, operate, transfer

BT – Build, transfer

BTO – Build, transfer, operate

CEV – Credit enhancement vehicle

CSIR – Council for Scientific and Industrial Research

DBSA – Development Bank of Southern Africa

DFI – Development finance institution

DMRE – Department of Mineral Resources and Energy

DSI - Department of Science and Innovation

DTIC – Department of Trade, Industry and Competition

EA – Environmental authorization

EAF – Energy availability factor

EBB – Energy Bounce Back Loan Guarantee Scheme

EMDE – Emerging market and developing economies

EPC – Engineering, procurement and construction

EOSS – Energy One-Stop Shop

GASIPPPP – Gas Independent Power Producer Procurement Programme

GDP – Gross domestic product

GEF – Green Energy Fund

GHG – Greenhouse gases

IP – Intellectual property

IPP – Independent power producer

IPPO – Independent Power Producer Office

IRP – Integrated resource plan

ISA – Infrastructure South Africa

ITP – Independent Transmission Project

ITPO – Independent Transmission Project Office

JSE – Johannesburg Stock Exchange

MIGA – Multilateral Investment Guarantee Agency

NECOM – National Energy Crisis Committee

NERSA – National Energy Regulator of South Africa

NTCSA – National Transmission Company of South Africa

O&M – Operation and maintenance

PPA – Power purchase agreement

PV – Photovoltaic

RD&I – Research, development and innovation

RE – Renewable energy

RED – Regional energy distributor

REIPPPP – Renewable Energy Independent Power Producer Procurement Programme

RIIS – Research Institute for Innovation and Sustainability

RMIPPPP – Risk Mitigation Independent Power Producer Procurement Programme

SANEDI – South Africa National Energy Development Institute

SAPP – Southern African Power Pool

SME – Small & Medium-sized Enterprise

SPO – Second-party opinion

SSEG – Small-scale embedded generation

UK FCDO – United Kingdom Foreign, Commonwealth and Development Office

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For their comments and input, particular thanks go to Miguel G. Torreira, Global Utilities Strategy Lead at Accenture and Jose Gamez, VP Construction Consulting Services at Marsh and World Economic Forum Fellow.

With thanks to the more than 50 active members of the Working Group on Mobilizing Investment for Clean Energy in South Africa including the Africa Finance Corporation, African Infrastructure Investment Managers, Anza Capital, Business Unity South Africa, the CSIR, ED Advisory, Enel Green Power, Engie, the Environmental Defense Fund, Eskom, eThekwini Municipality, Green Cape, the Independent Power Producer Office, JSE, Kolobe Nala Investments, Mahlako A Phahla Investments, Ministry in the Presidency for Electricity, MVR Attorneys, Nedbank, Odyssey Energy Solutions, GuarantCo (Private Investment Development Group), Power Africa, Presidential Climate Commission, Renewable Energy and Energy Efficiency Partnership and Standard Bank.

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