DRAFT FOR PUBLIC CONSULTATION

South African Renewable Energy Masterplan (SAREM)

An industrial and inclusive development plan
for the renewable energy and storage value chains by 2030.

Draft version for review 7 July 2023

Mineral Resources & Energy
Science and Innovation
Trade, Industry and Competition

2030 NDP

Acknowledgements

Project Steering Committee representatives

To be updated for the final version.

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South African Photovoltaic Industry Association

SAESA | South African Energy Storage Association

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TRADE & INDUSTRIAL POLICY STRATEGIES

PUBLIC PRIVATE GROWTH INITIATIVE

GreenCape

Black Energy Professionals Association

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Foreword

[To be added to the final version]

Contents

Abbreviations

AfCFTA	African Continental Free Trade Area
AGOA	African Growth and Opportunity Act
B-BBEE	Broad-Based Black Economic Empowerment
BRICS	Brazil, Russia, India, China, South Africa
BW	Bid Window
CHE	Council on Higher Education
CoGTA	Department of Cooperative Governance and Traditional Affairs
DFIs	Development Finance Institutions
DHET	Department of Higher Education and Training
DHS	Department of Human Settlement
DMRE	Department of Mineral Resources and Energy
DPWI	Department of Public Works and Infrastructure
DSBD	Department of Small Business Development
DSI	Department of Science and Innovation
dtic (the)	Department of Trade, Industry and Competition
DWYPD	Department of Women, Youth and Persons with Disabilities
EOC	Executive Oversight Committee
EPC	Engineering, Procurement, and Construction
ESIPPPP	Energy Storage Independent Power Producer Procurement Programme
ESOP	Employee Share Ownership Plan
EU	European Union
GDP	Gross domestic product
IDC	Industrial Development Corporation
IDZ	Industrial Development Zone
IRENA	International Renewable Energy Agency
IPP	Independent Power Producer
IPPO	Independent Power Producer Office
IRP	Integrated Resource Plan
ITAC	International Trade Administration Commission
NECOM	National Energy Crisis Committee
NERSA	National Energy Regulator of South Africa
NEVs	New Energy Vehicles
NT	National Treasury
OEM	Original Equipment Manufacturer
RDI	Research, development and innovation
REDZ	Renewable Energy Development Zone
PCC	Presidential Climate Commission
PMU	Project Management Unit
PV	Photovoltaic
R&D	Research and development
RDP	Reconstruction and Development Programme
RE	Renewable energy
REIPPPP	Renewable Energy Independent Power Procurer Procurement Programme
RMIPPPP	Risk Mitigation Independent Power Producer Procurement Programme
SADC	Southern African Development Community
SAEEC	South African Electrotechnical Export Council
SANEDI	South African National Energy Development Institute
SAREM	South African Renewable Energy Masterplan
SETA	Sector Education and Training Authority
SEZ	Special Economic Zone
SMME	Small, micro and medium enterprises
SPP	Strategic Partnership Programme
SSEG	Small-scale embedded generation
TIA	Technology Innovation Agency
TVET	Tertiary Vocational Educational Training
VRFB	Vanadium redox flow battery
WECONA	Women's Economic Assembly Initiative

1. Introduction

Renewable energy technologies provide the least-cost avenues to generate electricity. Globally, solar photovoltaic (solar PV) and wind energy technologies reached, on average, US$0.048 and US$0.033 per kilowatt-hour (kWh) respectively in 2021.[1] In South Africa, they similarly reached R0.375 per kWh for solar PV and R0.344 per kWh for wind energy technologies in 2021.[2] Economic dynamics have seen renewable energy costs drop significantly (-88% for solar PV and -68% for onshore wind between 2010 and 2021). In addition, public policies, primarily targeted at fast-tracking the decarbonisation of economies in the pursuit of climate change objectives, have further driven an exponential rollout of renewable energy technologies worldwide. In turn, the rise of renewable energy technologies has supported an exponential growth in the rollout of storage technologies, primarily driven by e-mobility applications, from 0.5 gigawatt-hour (GWh) in 2010 to 997GWh in 2021. Correspondingly, average lithium-ion battery costs decreased from US$1036 per kWh in 2010 to US$141 per kWh in 2021.[3] Currently dominated by a few countries (led by China and Japan), the vanadium redox flow battery (VRFB) market is set to grow exponentially, reaching close to 30GWh of annual installed capacity in 2030.[4]

Globally, the renewable energy sector has risen from 18.6% of global electricity supply in 2000 to 28% in 2021. In 2000, a total of 849GW of renewable energy was installed worldwide. This reached 3 258GW in 2021.[5] Global trade in solar panels, wind energy generation sets (turbines), inverters and lithium-ion batteries respectively reached US$66 billion, US$6 billion, US$95 billion, US$100 billion in 2022.

In South Africa, the early deployment of renewable energy and battery technologies consisted of pilot projects and niche applications, such as the electrification of remote communities and back-up for telecommunication towers. The rollout of renewable energy technologies took off from 2011 with the launch of the government-led Renewable Energy Independent Power Procurer Procurement Programme (REIPPPP). Large-scale battery procurement started only in 2022. The private sector market, historically constrained, has been progressively unlocked since mid-2021. Many municipalities have taken steps to foster the residential and commercial market, with the number of municipalities allowing small-scale embedded generation (SSEG) installations (which generally combined solar PV and battery systems) progressively rising. The contribution of renewable energy technologies to electricity generation (in terawatt-hours – TWh) increased from less than 1% in 2000 to almost 7% in 2022.[6]

Looking ahead, by 2030, the global renewable energy market is forecasted to reach between 5.4TW (based on the existing trend) and 10.8TW (based on what is required to achieve climate goals), as decarbonisation efforts continue and new sources of demand, such as green hydrogen and New Energy Vehicles (NEVs), arise.[7] The global market for

1. Data based on a Levelised Cost of Energy from IRENA, 2022. Renewable Power Generation Costs in 2021. Abu Dhabi: International Renewable Energy Agency.
2. These correspond to the lowest prices achieved in the fifth bid window of the REIPPPP, awarded in 2021. Further information can be found at https://www.ipp-renewables.co.za.
3. Data from Bloomberg New Energy Finance. Available at https://about.bnef.com.
4. Data from Guidehouse Insights. Available at https://vanitec.org.
5. Data from the International Energy Agency (IEA). Available at https://www.iea.org. Renewable energy here includes hydropower.
6. Data based on South Africa's energy balances.
7. IRENA, 2022. Renewable Energy Targets in 2022: A Guide to Design. Abu Dhabi: International Renewable Energy Agency.

battery storage is similarly set to grow exponentially, to 4.7TWh per annum by 2030 (compared to about 700GWh in 2022).[8] In South Africa, the rollout of renewable energy technologies is similarly set to increase rapidly, as the country aims to achieve energy security for all as well as decarbonise its electricity supply. Utility-scale renewable energy and battery storage public procurement of 22.9GW is planned from 2022 to 2030 according the 2019 Integrated Resource Plan (IRP). In addition, various spheres of government have plans for extensive rollout of renewable energy, such as the Department of Public Works and Infrastructure (DPWI) (up to 4 000 megawatt (MW), the Gauteng and Western Cape provinces, and the Garden Route Municipality. The Department of Human Settlement (DHS) has announced it is considering the installation of solar energy on newly-built Reconstruction and Development Programme (RDP) houses. Private sector investment in large-scale renewable energy projects is set to balloon. As of February 2023, more than 13GW (5GW of wind and 8.3GW of solar PV) of private sector-led projects (>1 MW) were in advanced development[9] in the country. SSEG installations are also expected to rise significantly in the country, driven by grid electricity price increases, energy security concerns and government support. The Presidential Climate Commission (PCC) points to the need to roll out 50-60GW of renewable energy, supported by co-located storage, by 2030.[10]

This booming market, both domestically and globally, presents an opportunity for South Africa to foster economic development, employment creation and social transformation. The fast-rising roll-out of renewable energy and storage technologies opens the door for both demand- and supply-side opportunities. The development of industrial value chains, leveraging South Africa's existing manufacturing and service provision capabilities, is one such opportunity. The push for a more inclusive rollout of renewable energy and storage, notably to the benefit of all, is another.

The South African Renewable Energy Masterplan (SAREM) articulates a vision, objectives and an action plan for South Africa to tap into these opportunities. It aims to leverage the rising demand for renewable energy and storage technologies, with a focus on solar energy, wind energy, lithium-ion battery and vanadium-based battery technologies, to unlock the industrial and inclusive development of associated value chains in the country. This initial technological focus is aligned with global and domestic demand dynamics as well as South Africa's supply-side capabilities. In time, other technologies (such as offshore wind or rechargeable alkaline batteries) will receive increased focus, as they mature and industrial capabilities are developed. The Masterplan builds on the Draft SAREM document released in March 2022 and attached as Annexure B, and an extensive research and stakeholder engagement process, detailed in Annexure A.

8. Data from McKinsey. Available at https://www.mckinsey.com.
9. These projects were at "budget quote" stage with the national utility. Budget quotes are final cost calculations and technical specifications that Eskom issues to Independent Power Producers (IPPs) for the necessary grid connections.
10. PCC, 2023. Recommendations from the PCC on South Africa's Electricity System. Johannesburg: Presidential Climate Commission.

It is anchored on four key areas:

1. Supporting the local demand for renewable energy and storage by unlocking market demand and system readiness, as a large-scale rollout of renewable energy systems is a critical pre-condition to achieve the core objectives of SAREM;
2. Driving industrial development by building renewable energy and storage value chains, through localisation drives on both the public and private sector markets and supportive trade and industrial policy;[11]
3. Fostering inclusive development of renewable energy and battery storage, by driving the transformation of the industry, supporting the development of emerging suppliers, and contributing to a just transition; and
4. Building local capabilities in terms of skills and technological innovation, to enable the rollout of renewable energy and storage technologies and associated industrial development.

Section 2 details the vision of SAREM as well as its key objectives and targets. It also highlights SAREM's four pillars and catalytic interventions. Section 3 to Section 6 unpack the key pillars of SAREM, setting the context and fleshing out associated interventions. Section 7 concludes by capturing the support from social partners. A set of annexures provides further details on the process and opportunities associated with SAREM.

11. South Africa has experienced several years of energy insecurity. Energy security is a key determinant for successful industrialisation. SAREM will address this directly by enhancing energy security at key industrial nodes, ensuring adequate power supply for renewable energy and battery storage component manufacturing.

2. Vision, key objectives and pillars

The renewable energy and battery storage value chain has a core role to play in South Africa's sustainable development and achieving the socio-economic objectives laid out in the country's National Development Plan. In line with this opportunity, SAREM's overarching vision is industrialisation of the renewable energy value chain to enable inclusive participation in the energy transition, serving the needs of society, and contributing to economic revival.

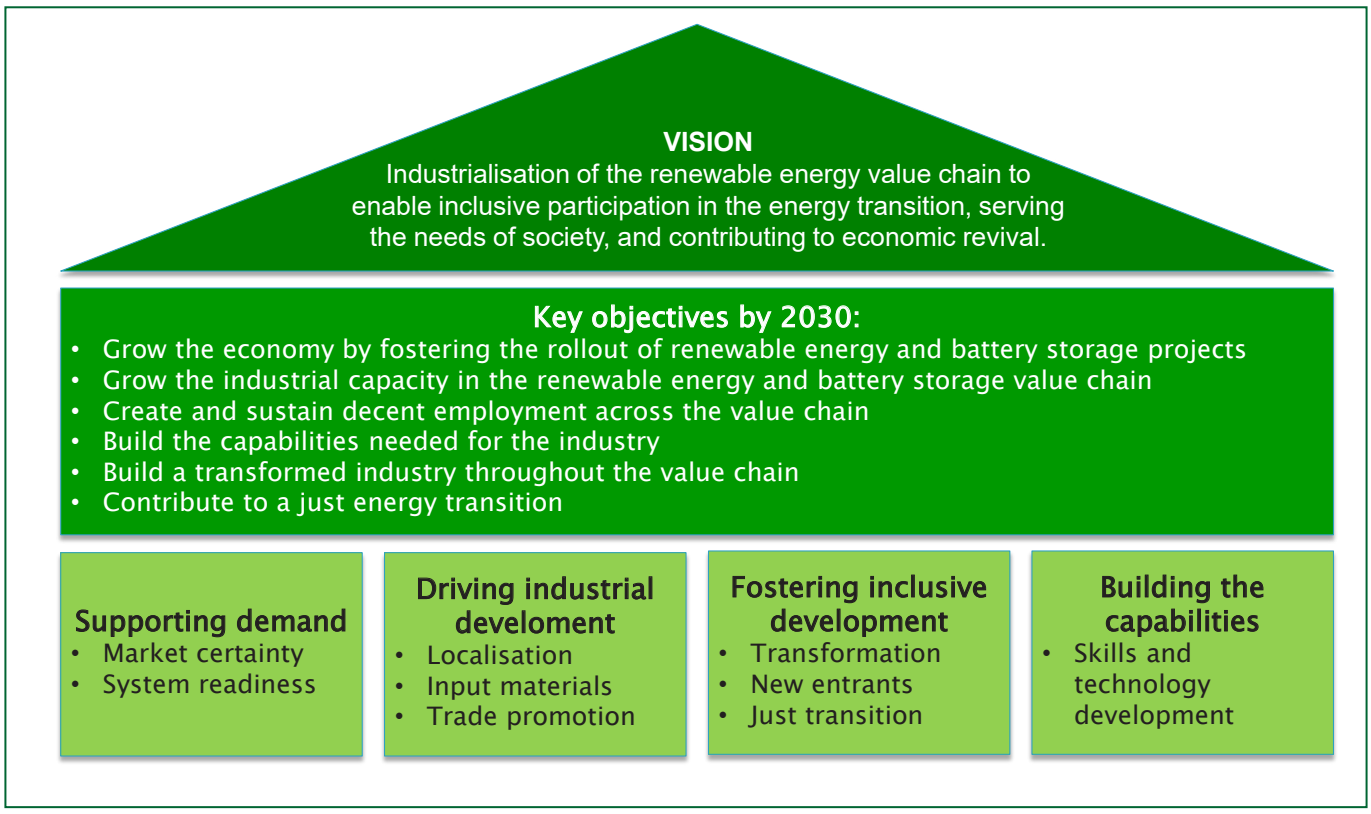
1. Grow the economy by fostering the rollout of renewable and storage projects. Direct investment in projects make a notable contribution to the local economy. For instance, REIPPPP projects from Bid Windows (BWs) 1 to 4 injected over R200 billion into the local economy.[12] In addition, access to reliable, affordable and low-carbon energy enables further economic activity in the country, by providing energy security, reducing costs, and protecting against climate risks (such as foreign and local carbon taxes).
2. Expand the industrial capacity in the renewable energy and storage value chain. Industrial value chains, particularly manufacturing operations, have inherent positive linkages and spillover effects in the economy (such as employment multiplier effects) that lead to increased employment and economic activity. In addition, in a context of exponentially-rising demand and supply constraint, the development of local industrial capabilities in the production of renewable energy and storage components, parts and systems is a strategic avenue to ensure the availability of supply for the domestic market as well as shield the local market from excessive price volatility.
3. Create and sustain decent employment across the value chain, from development and construction, to manufacturing and services, to operations and maintenance, to end-of-life management. Renewable energy and battery value chains create a wide range of employment opportunities, particularly for skilled and semi-skilled workers. Over the first four bid windows, REIPPPP projects committed to the creation of 63 291 job-years (48 110 in construction and 15 182 in operations).[13] It is further estimated that about 20 000 people were directly employed in the solar energy value chain in South Africa in 2022.[14]
4. Build the capabilities needed for the industry. Building the skills base can enable the upskilling of workers already in the energy and manufacturing industries as well as open opportunities for new individuals. Support for technology commercialisation, to bring local or foreign innovation to the domestic market, can contribute to bridging the "valley of death" and improve South Africa's technology readiness, in turn increasing competitiveness and export opportunities.
5. Build a transformed industry throughout the value chain. As a new, fast-rising value chain, the renewable energy and storage sector offers a platform for inclusive development. The REIPPPP provided important foundations in this respect, with 83% of procurement expenditure sourced from Broad-Based Black Economic Empowerment (B-BBEE) suppliers and 34% Black ownership of projects. Building on this platform, and the significant growth in renewable energy and storage, the value chain can actively foster broad-based inclusivity at all stages. Notably, the broadening of the local supplier base can further deepen the local value chain and its associated benefits to the country.

12. IPPO, 2022. Independent Power Producers Procurement Programme (IPPPP): An Overview as at 31 December 2021. Independent Power Producer Office. Pretoria and Johannesburg: Department of Mineral Resources and Energy, Development Bank of Southern Africa and National Treasury.
13. Ibid. Job-year is the metric used by the IPP Office to monitor job creation. A job-year is a unit of employment that counts a quantity of time worked, benchmarked at an average equivalent for a year of employment for one person, working full-time. A job-year is not necessarily attributed to a particular working person. Several part-time or short-term jobs can be added to comprise a single job-year. The IPP Office defined a job-year as 174 hours a month for 12 months for BW1 and BW2. Thereafter, a job-year has been defined as 160 hours a month
14. Urban-Econ Development Economists, Urban-Econ:NIKELA and Blue Horizon Energy Consulting Services, 2022. The localisation potential of the South African solar photovoltaics (PV) industry and recommendations to support local manufacturing in South Africa. Johannesburg: South African Photovoltaic Industry Association.

6. Contribute to a just transition and support the inclusive shift of South Africa's electricity supply industry from a centralised model to a decentralised energy structure. The development of renewable energy and storage remains (worldwide and in South Africa) mainly limited to middle- and high-income households as well as medium- and large-scale businesses. Widening access to all is not only a socially imperative but would further augment the scale of the local market, underpinning industrial development. Renewable energy and storage activities (both power plants and industrial operations), if located in just transition hotspots, such as Mpumalanga's coalfields, can also contribute to addressing the impacts associated with the closure of coal-based activities.

Figure 1 depicts the "SAREM house" with its vision, key set of objectives and four key pillars, namely supporting demand for renewable energy and storage technologies; driving industrial development in the associated value chains; fostering inclusive development of the sector; and building the necessary capabilities.

Figure 1: The SAREM house



Targets

SAREM aims to foster the industrial and inclusive development of renewable energy value chains, in line with the vision and objectives detailed above. In addition to the 43 interventions identified as part of the masterplan process, unpacked in following sections, this goal is embodied in a series of realistic yet ambitious targets to be pursued by the stakeholders in the sector. Targets are not pre-determined in this draft and are to be negotiated by social partners through an upcoming facilitated process, for inclusion in the final masterplan document.

Importantly, for them to be monitored and evaluated, targets should be Specific, Measurable, Achievable, Relevant, and Time-bound (SMART) indicators. In addition, targets should in their design provide a logical "ramp up" trajectory. This is illustrated in Figure 2, stylistically, in the case of local content. The existing baseline must be established,

as well as the frontier (i.e. maximum). Such a frontier may or may not be achievable within the initial timeframe of SAREM (2030). In this inception phase, targets should be determined until 2030.

Figure 2: Stylised illustration of the proposed approach to the local content trajectory

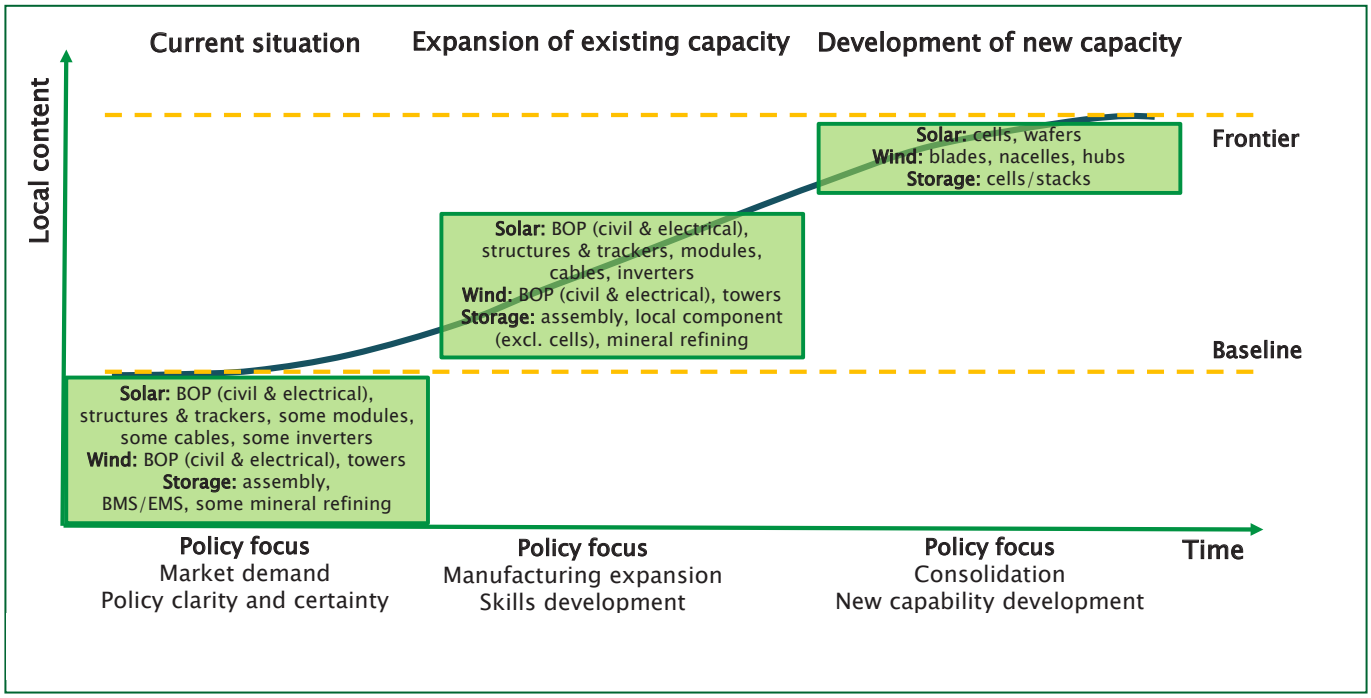


Table 1 summarises a preliminary set of proposed targets. The final list of targets as well as their ambition will be determined by social partners, as indicated above, and included in the final plan.

Table 1: Proposed targets for the South African Renewable Energy Masterplan

Area	Target	Indicator	Baseline	2024	2025	2026	2027	2028	2029	2030
Cross-cutting	Grow employment in the value chain	Number of people employed in the value chain								
Cross-cutting	Increase investment in the value chain	Value of investment in the value chain								
Industrial development	Increase local content	Share of project total expenditure procured locally								
Inclusive development	Achieve higher level of B-BBEE scoring	Level of B-BBEE scoring								
Skills and technology development	Increase the number of graduates/ skilled people	Number of qualified graduates								
Skills and technology development	Widen sector participation to Yes4Youth	Share of sector participating in Yes4Youth								
Skills and technology development	Augment funding for incubation and capacity building of emerging suppliers	Value of funding targeting incubation and capacity building								

Catalytic interventions

As part of a broader mix of measures (see following sections), SAREM is anchored on a number of catalytic interventions across the four key pillars of action. Table 2 provides an overview of the 13 catalytic interventions which form the backbone of the masterplan.

Table 2: SAREM's catalytic interventions

Pillar	Objective	Intervention	Rationale
Supporting demand	Clarify the market for renewable energy and storage	Publish and update quarterly the pipeline of public procurement (e.g. REIPPPP, ESIPPPP, DPWI, provinces, municipalities) for renewable energy and storage technologies	Public procurement can operate as the anchor market for industrial and inclusive development. Industrial development is conditioned on continual market demand. Public procurement generally sets the tone in terms of inclusive development. A clear picture (on a yearly basis) of public procurement to 2030 (all spheres of government and organs of state) is necessary to support SAREM objectives.
		Publish and update quarterly the pipeline of private procurement (large-, medium- and small-scale projects) for renewable energy and storage technologies	Private procurement is forecasted to account for the majority of renewable energy and storage demand in the foreseeable future. As such, private procurement is set to drive the market going forward. Existing stocktakes, such as the one done by the Minerals Council, are a starting point but only provide a partial understanding. A clear picture (on a yearly basis) of private procurement to 2030 (all market segments, including SSEG) is necessary to support SAREM objectives.
Driving industrial development	Establish clear localisation objectives	Establish a consistent set of local content targets and criteria for future public and private procurement programmes, with the aim of achieving xx% local content by 2030	For public and private procurement to act as the anchor market for industrial development, consistent, realistic local content targets for localisation (along general tender specifications) are required alongside a clear picture of yearly rollout.
	Align industrial policy and programmes with renewable energy and storage localisation	Re-activate the 12i tax allowance incentive with a focus on supporting the development of renewable energy and battery manufacturing value chains	A number of cross-cutting programmes provide a degree of support to local manufacturing. Based on international experience, ambitious industrial development in the renewable energy and battery value chains requires dedicated supply-side support and is a no-regret intervention given spillover benefits associated with manufacturing. The existing, but currently inactive, provisions for the 12i tax incentive provide an effective avenue for such support.
		Align existing public sector programmes and policy support with SAREM's localisation objectives (e.g. Energy Resilience Scheme, Industrial Development Corporation (IDC) funding, Department of Small Business Development (DSBD) Bounce Back scheme, municipal/provincial procurement)	Government programmes, policies and support schemes directly or indirectly support a large number of entities in rolling out renewable energy and storage systems. To support SAREM objectives, particularly industrial development, such measures must include localisation objectives and/or conditionalities.
		Formulate and implement value proposition (including energy security) to attract investment in the country, particularly Special Economic Zones (SEZs)/Industrial Development Zones/ industrial parks (including incentives where relevant)	The competition to attract industrial investment in the renewable energy and storage value chain is extremely high. The lack of a clear value proposition from South Africa (particularly industrial parks), harnessing all possible tools at disposal and supported by all spheres of government, has hindered their ability to attract investment.

Pillar	Objective	Intervention	Rationale
Fostering inclusive development	Establish clear transformation objectives	Develop and implement B-BBEE sector specific scorecard for renewable energy and storage, with the aim of achieving B-BBEE Level X by 2030	The lack of a sector-specific B-BBEE scorecard for renewable energy and storage has hindered progress in terms of inclusive development. The development of the scorecard will provide a clear trajectory for the industry.
	Foster integration of emerging suppliers	Develop, resource and establish Transformation Fund to support new entrants in the value chain (e.g. competitive rates for factory investment capital as well as warrantees/guarantees)	Local suppliers in the renewable energy and storage value chain face a number of finance-related challenges. A dedicated fund targeting new entrants and emerging suppliers is required to support their growth.
	Direct renewable energy and storage activities to just transition hotspots	Launch public procurement rounds for renewable energy and storage for Mpumalanga and other just transition hotspots (based on grid availability), notably leveraging Renewable Energy Development Zones (REDZs).	Less than 2% of South Africa's renewable energy and storage generation capacity is located in Mpumalanga. Given the imperative of a just transition and the infrastructural assets of the province (e.g. the grid and proximity of the load centre of Gauteng), a significant ramp-up of the rollout of projects is not only possible, but actually sensible economically, socially and environmentally. Multiple other areas, such as REDZs, also host significant potential.
	Driving inclusive rollout of renewable energy and storage	Launch solar PV rollout programme for schools/ clinics/etc. based on panels replaced by large projects	A large number of well-functioning solar panels are replaced by utility-scale IPPs on a yearly basis. Projects for early REIPPPP rounds are also considering partial repowering. These panels could be utilised to power public and community structures. A dedicated programme is required to drive the collection, refurbishment (if needed), installation and maintenance of such panels.
Building the capabilities	Map and build skills	Develop and run a digital match-making platform (PowerUp) between industry, education providers and social compact partners, creating a demand-led skills and planning communication hub, to address skills priorities in the sector	The availability of skills is rapidly becoming a hindering factor for the growth of the industry. A dedicated platform (inspired by the HighGear platform for the automotive value chain) focused on matching the skills required by industry with the broader education system is necessary to address the growing constraint. In turn, educational institutions require further support in facilitating the entry of graduates into the labour market.
	Activate skills	Consolidate and expand internship programmes/ opportunities in the renewable energy and storage sector by participating in Yes4Youth, with the aim of reaching xx% participation by 2030	Entering the labour market is generally conditioned on experience. Existing on-the-job training opportunities are largely unstructured. A clear pipeline for graduates to enter the labour market is necessary. Yes4Youth provides a trusted and beneficial platform to that effect.
	Foster technology commercialisation	Establish a match-making platform between innovators and possible users to accelerate the adoption of new renewable and energy and storage technologies, along with an innovative funding model for de-risking costs of running trials	Commercialisation of innovations is a key challenge, particularly due to the lack of a track record. A dedicated platform (inspired by the Trial Reservoir developed in the water and sanitation sector) focused on matching renewable energy and storage innovators with technology users is needed to support technology adoption. The platform also provides an innovative model to de-risk the funding of trial costs.

3. Fostering demand for renewable energy and storage technologies

Achieving SAREM's core objectives of fostering industrial and inclusive development is pre-conditioned on demand for renewable energy and storage technologies in the domestic market (as well as export markets to a lesser extent). Widespread, continual demand is necessary to justify investment in industrial capacity. It also underpins a more inclusive rollout and development of the value chain.

Context

South Africa's renewable energy and storage market has been historically concentrated on utility-scale government-led procurement, through the REIPPPP. This has kickstarted the industry domestically, notably from 2011 to 2015. Since 2011, the REIPPPP, along with the Risk Mitigation Independent Power Producer Procurement Programme (RMIPPPP), has procured 11 590MW of renewable energy technologies[15] and 415MW of battery storage capacity. This has supported many learnings (for policy and market development) as well as material cost reductions. Procurement programmes for battery storage technologies were also initiated directly by Eskom (500MW, with 343MW[16] already awarded in 2022), and through the Energy Storage Independent Power Producer Procurement Programme (ESIPPPP) (513MW released for procurement in March 2023).[17] Bushveld Energy is also spearheading the installation of the first hybrid mini-grid system in the country using 1MW/4MWh VRFB storage along with a 3.5MW solar plant.

The REIPPPP has, however, been undermined by a series of problems, leading to a stop-start pattern of demand. The programme was stalled between 2015 and 2019 due to institutional issues, and the implementation of procurement rounds has been haphazard since then. The procurement of solar PV projects under BW5 was hamstrung by the implementation of local content rules. Grid constraints undermined the procurement of wind energy under BW6. Numerous delays and changes to the procurement framework have also undermined policy certainty. As a result, market confidence in South Africa's utility-scale public procurement appears too low to underpin industrial and inclusive development on its own.

Further public procurement is nevertheless on the cards, which could provide foundational anchor demand. A BW7 of 5 000MW is planned for procurement in 2023, followed by another 5 000MW procurement window (BW8). In line with the 2019 IRP, substantial generation capacity remains to be procured by the public sector, as the plan envisages to add 14 400MW of wind, 6 400MW of solar PV, 2 088MW of storage and at least 4 000MW of embedded generation over the 2022-2030 period.

Since 2021, regulatory reforms have opened up the private sector market, by first loosening (in August 2021) and then removing (in December 2022) the licensing requirements for IPPs. Despite some persisting regulatory challenges, these policy changes have triggered a massive development of renewable energy projects by the private sector. They are complemented by a tax incentive scheme, first implemented in 2005 and enhanced in 2012, 2015 and 2023. In addition, fast-rising electricity prices, combined with rising carbon

15 Total of 6 323MW from BW1-4, 2 583MW from BW5, 1 000MW from BW6 and 1 684MW from the RMIPPPP.
16 This also includes 60MW of solar PV capacity. Further information available at https://www.eskom.co.za.
17 See https://www.ipp-storage.co.za for more information.

pricing domestically and border carbon taxes in export markets, have further strengthened the business case. As showed in Figure 3, in 2022, about 1.6GW of renewable energy projects were registered with the National Energy Regulator of South Africa (NERSA), compared to 86MW in 2021. In the first quarter of 2023 alone, 2.5GW were registered. Eskom data, depicted in Figure 4, furthermore indicates that, as of February 2023, a total of 13GW of renewable energy projects (above 1MW) were at advanced stages of development (budget quote for grid connection issued or in progress).

Figure 3: Power generation capacity registered with NERSA under licensing exemption conditions

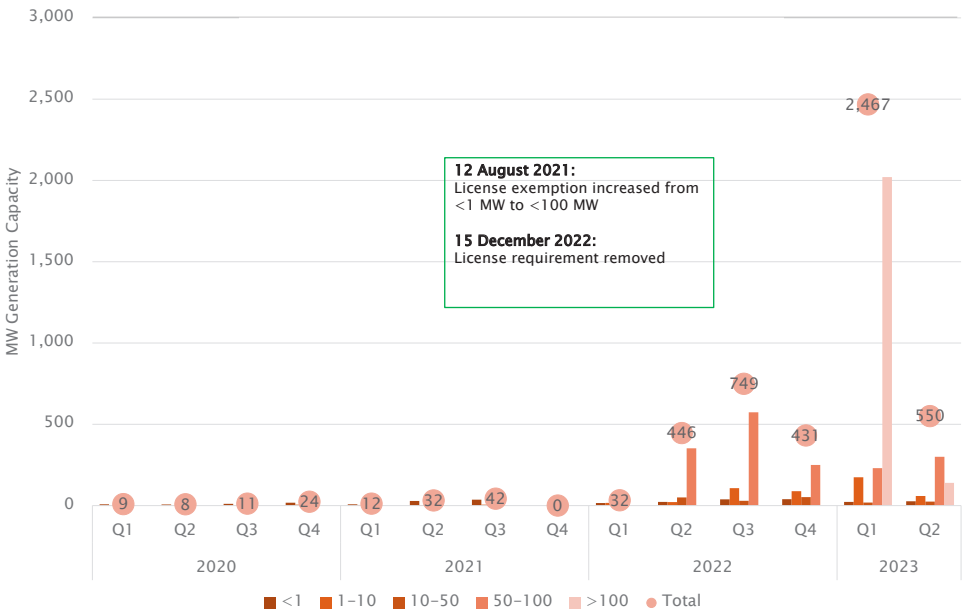
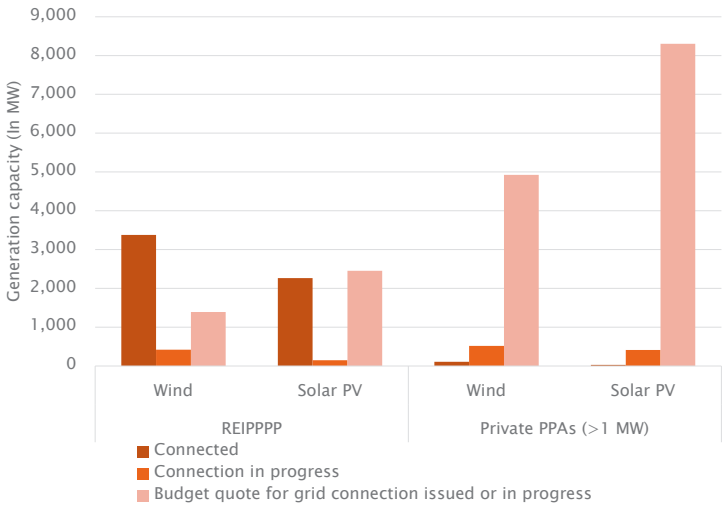


Figure 4: Renewable energy generation capacity (>1MW; Eskom grid) in South Africa (as of February 2023)



Source: Montmasson-Clair, based on data from NERSA and Eskom

Other streams of demand have also progressively emerged. SSEG has been increasingly enabled and, in some cases, incentivised, by municipalities. In 2020, 56 municipalities (out of 177 licensed municipal authorities) allowed SSEG, 31 had an approved SSEG tariff, and 44 had application processes in place. In 2023, National Treasury announced a tax incentive for households to invest in solar systems (and enhanced the existing incentive for businesses). A number of national departments (such as DPWI), municipalities (such as Garden Route), provincial governments (such as Gauteng and Western Cape) and state-owned entities (such as Transnet) have also embarked on their own procurement processes.

Action Plan

Overall, all data indicates a massive pipeline of both public and private sector-led projects in the years to come. In addition, in the longer run, new demand drivers from power-to-x applications, such as green hydrogen and NEVs, should further support the market. Regional demand from the African continent is also forecasted to drive South Africa's export market.[18] Yet, numerous issues, in terms of market demand and system readiness, continue to hamper the rollout of renewable energy and storage in the country. SAREM acknowledges the existing efforts undertaken by the National Energy Crisis Committee (NECOM), Eskom, municipalities and the private sector to address such issues. As such, SAREM aims to leverage such workstreams, rather than duplicate them. Table 3 lists all the initial interventions included in this pillar.

First, a clear picture of both public and private sector-led demand over the next years is required, across market segments. An update on the pipeline of both public and private procurement (across segments) for renewable energy and storage technologies in South Africa will be published quarterly, with the first iteration to be released at the launch of SAREM. This is crucial to provide existing and prospective manufacturers with a robust view of the upcoming market demand in the country. Clarity is required from government (all spheres and entities) on the scale, nature and specifications of public procurement. A yearly schedule of public procurement, across programmes, would provide foundational demand. To be effective, this should be accompanied by clear, consistent and enforced bidding rules and timelines. Similarly, a robust understanding of the pipeline of projects on the private market, across market segments, is central to scaling the size of the market. Steps to track markets currently unmonitored, such as SSEG, will be prioritised.

Second, a number of cross-cutting issues, particularly affecting utility-scale, mining, commercial and industrial, and municipal-level market segments, remain to be addressed. Expansion of the physical infrastructure, i.e. the transmission and distribution networks, along with clear rules for an open and non-discriminatory access to the network (i.e. a transparent grid queuing system), is paramount to the large-scale rollout of renewable energy. Investment in grid infrastructure, as per the Transmission Development Plan, is urgently necessary. This will be accelerated by the development of an Implementation Plan (updated yearly). As of February 2023, the national grid had significant availability constraint in some areas. Little to no grid capacity was available in the Cape provinces, which offer the best renewable energy resources. The remaining grid capacity (22 754MW, mainly in KwaZulu-Natal and Mpumalanga, as of March 2023) is expected to be rapidly utilised. The distribution network is further in dire condition, with a significant maintenance backlog nationwide.

18 For instance, over the 2020-2022 period, over 90% of South Africa's exports of lithium-ion batteries (which totalled US$ 50 million in 2022) were to African countries, principally to Nigeria, Uganda and Zimbabwe.

In parallel, the development of the market infrastructure, i.e. tariffs, licensing/registration, wheeling and trading frameworks as well as a fully-fledged power exchange (as envisaged as part of the Eskom unbundling process), will be fast-tracked to ensure the growth of all market segments. The capacity of private offtakers to develop and/or contract projects directly on the balance sheet or through long-term power purchase agreements, which has been the main model in 2022-2023, is inherently limited and long-term growth of large-scale private sector-led renewable energy projects is conditioned on effective and efficient market infrastructure. The implementation of SSEG frameworks with associated tariffs is a precondition for the efficient integration of prosumers into the electricity system. It will also help understand the scale of SSEG installations in the country, in turn improving their integration and management. Additionally, it is proposed that energy storage systems be recognised as a new, separate asset class. Along with cost-reflective, Time-of-Use tariffs, this would enable storage systems to provide services to all parts of the electricity value chain and further support their large-scale rollout.

Third, dedicated interventions are necessary to unlock other market segments. In addition to supporting demand, assisting industrial parks (i.e. SEZs, IDZs), and other industrial zones) in rolling out renewable energy and battery systems will increase energy security for industrial activities, a key impeding factor to manufacturing development in the country. Similarly, SMMEs, especially industrial, commercial and farming operations, constitute another stream of largely untapped demand. As for industrial parks, measures targeted at SMMEs will both support demand for renewable energy and storage and ensure the energy security of such businesses. In the longer run, aligning with existing initiatives to foster power-to-x applications (such as green hydrogen, NEVs and thermal load conversation) will ensure consistent demand for renewable energy and storage technologies, even once the demand linked to traditional electricity use plateaus.

Table 3: SAREM interventions aimed at supporting demand for renewable energy and storage technologies

Implementation plan element	Category	Intervention	Timeframe	Mandate/ decision maker	Implementer
Clarify the market demand for RE and storage	Catalytic intervention	Publish and update quarterly the pipeline of public procurement (e.g. REIPPPP, ESIPPPP, DPWI, provinces, municipalities) for renewable energy and storage technologies	By launch, then quarterly	Department of Mineral Resources and Energy (DMRE), NECOM	Project Management Unit (PMU)
	Catalytic intervention	Publish and update quarterly the pipeline of private procurement (large-, medium- and small-scale projects) for renewable energy and storage technologies	By launch, then quarterly	Private sector, NECOM	PMU
Address cross-cutting issues hindering demand for RE and storage	Supporting intervention	Develop an Implementation Plan (updated yearly) for infrastructure, i.e. transmission and distribution networks, along with clear grid access rules, to enable best renewable energy resource deployment	1 year	Eskom	Eskom
	Supporting intervention	Develop the market infrastructure, i.e. registration/ licensing, wheeling, trading and SSEG frameworks as well as a fully-fledged power exchange (and build institutional capacity of key stakeholders)	1 year for regulatory frameworks 3 years for power exchange	Presidency, NECOM, InvestSA, DMRE, Cooperative Governance and Traditional Affairs (CoGTA), National Treasury (NT)	DMRE, NERSA, Eskom, municipalities, industry
Support demand for RE and storage from small, micro and medium enterprises (SMMEs) in the commercial, industrial and farming sectors	Supporting intervention	Design and implement programme for energy security (through renewable energy and storage) in industrial parks, in line with SAREM's localisation objectives	1 year	Department of Trade, Industry and Competition **(the dtic)**, CSIR, NCPC	SEZs, IDZs, industrial parks
	Supporting intervention	Design and implement a R1.3-billion Energy Resilience Scheme (blended finance to support companies affected by loadshedding, and grant financing for township and rural enterprises aiming to invest in solar back-up solutions), in line with SAREM's localisation objectives	1 year	**the dtic**	IDC
	Supporting intervention	Design and implement concessional financing mechanisms for small and medium-size industrial, commercial and farming operations to procure renewable energy and storage, in line with SAREM's localisation objectives	By launch	the dtic, Department of Agriculture, Land Reform and Rural Development	IDC, Land Bank, National Empowerment Fund
	Supporting intervention	Design and implement dedicated support for SMMEs (e.g. SMME Energy Relief Fund Mechanism, SMME Energy Security Fund of Funds), in line with SAREM's localisation objectives	By launch	DSBD, NT	sefa, SEDA
Support demand for RE and storage from power-to-x markets	Alignment intervention	Coordinate with initiatives aimed at fostering power-to-x market (e.g. green hydrogen, NEVs, Country Investment Strategy) (PMU-PMU quarterly sessions)	By launch	Department of Science and Innovation (DSI), IDC, **the dtic**, DMRE	PMUs

4. Driving industrial development

Driving the industrial development of the renewable energy and storage value chains in South Africa is one of the two core objectives of SAREM (the other being fostering inclusive development). As demand for renewable energy and storage grows domestically, in the region and globally, an opportunity exists to build domestic industrial value chains to supply the booming market.

Context

To date, South Africa's attempts at building industrial capabilities in renewable energy and storage have delivered mixed results. As discussed in the previous section, market demand has historically been concentrated, almost entirely, on the REIPPPP. Since 2015, the stop-start nature of the procurement, combined with local content rules often out of the sync with market dynamics, and a lack of policy consistency, has not supported the development and growth of domestic industrial capacity. Much of the industrial capability built in the inception period of the REIPPPP (2011-2015) has been dormant or lost. As a result, besides balance of plants (e.g. civil works, electricals) and a few exceptions (such as towers for wind turbines), the sector has relied primarily on imports. By end 2021, projects from BW1-4 had procured 50% of their project value locally. In BW5, local content commitments stood at 44% for construction and 41% for operations.[19] At the same time, from 2010 to 2022, South Africa's imports of solar panels, inverters, lithium-ion batteries and wind turbines respectively totalled R31 billion, R53 billion, R22 billion and R30 billion (see also Figure 5, Figure 6 and Figure 7).[20]

Despite these shortcomings, utility-scale public procurement delivered R63.3 billion of local content over the 2011-2021 period. Combined with South Africa's broad industrial capabilities in connected or related value chains (such as steel, aluminium, shipbuilding, capital equipment and electro-technical equipment), the historical rollout of renewable energy, however imperfect, has displayed wide-ranging domestic capacity in supplying the renewable energy and storage sector (see Annexures B and C for details on this).

- In the solar PV value chain, local industries have capabilities in the assembly of mounting structures, trackers, modules. Production capacity is, however, often limited and at times mothballed. Cell and wafer production, which are heavily dependent on raw materials sourcing and economies of scale, are at exploratory stages.
- In the wind energy value chain, the manufacturing of both steel and concrete towers, the assembly of rotors (including the production of blades) and many services can be provided locally. Hub manufacturing and the production and assembly of nacelles constitute the next frontier.
- The lithium-ion battery value chain is, apart from battery cells (primarily imported from China), well developed, with capabilities in mineral beneficiation, casing and assembly and electrical systems (including battery and energy management systems). Whether cell production would be economically viable in South Africa remains to be established.
- The vanadium-based battery value chain, although nascent domestically, also boasts material local capabilities, including vanadium mining and refining, electrolyte production and VRFB assembly. The manufacturing of stacks, dependent on intellectual property, would be a possible next step for the industry.
- Across the value chains, local capabilities also exist in the manufacturing of (centralised) inverters, civil works, electrical balance of plant (e.g. cables) as well as numerous services (such as yield assessment and various advisory services). In the future, existing capabilities could also be leveraged to develop opportunities around end-of-life management (reuse, remanufacturing and recycling).

19 IPPO, 2022.
20 Data from Trade Map. Available at https://www.trademap.org. Data for lithium-ion battery from 2012 only.

Table 4: Summary of renewable energy and battery storage industrial development opportunities for South Africa

Technology	Past/existing activities	Short- to medium-term opportunities	Frontier
Solar PV	Mounting structures, trackers, modules	Growth of existing industry Cell manufacturing	Production of ingots and wafers
Wind energy	Steel and concrete towers, rotors (including blades)	Growth of existing industry Blade manufacturing	Hub manufacturing Production and assembly of nacelles
Lithium-ion batteries	Mineral beneficiation, casing and assembly and electrical systems (including battery and energy management systems)	Growth of battery manufacturing Growth of mineral beneficiation	Cell manufacturing
VRFB	Vanadium mining and refining, electrolyte production and VRFB assembly	Overall growth (conditional to demand)	Stack manufacturing
Cross-cutting	Manufacturing of (centralised) inverters, civil works, electrical balance of plant (e.g. cables) as well as numerous services	Overall growth	Overall growth

Note: while individual component manufacturing would benefit from domestic value chain integration, most can be developed independently of each other. A few stages, such as wafers to cells, require integration.

Figure 5: South Africa's imports of solar cells, modules & panels (in US$ millions and ZAR billions)

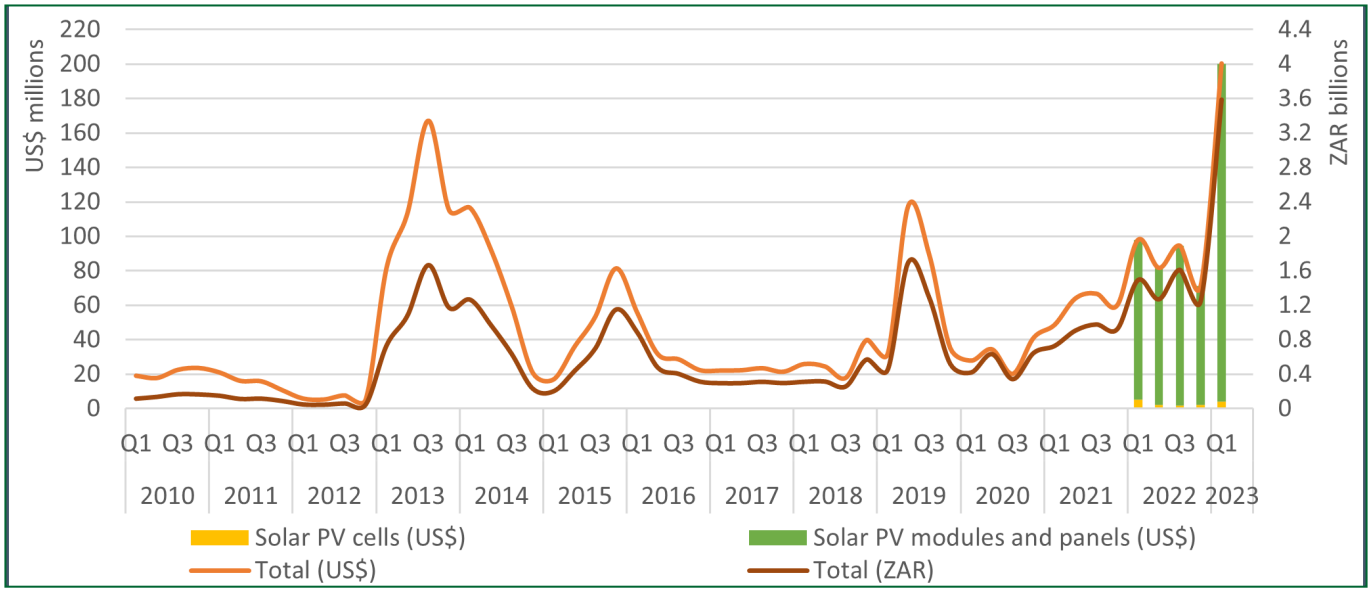


Figure 6: South Africa's import of wind energy generators (in US$ millions)

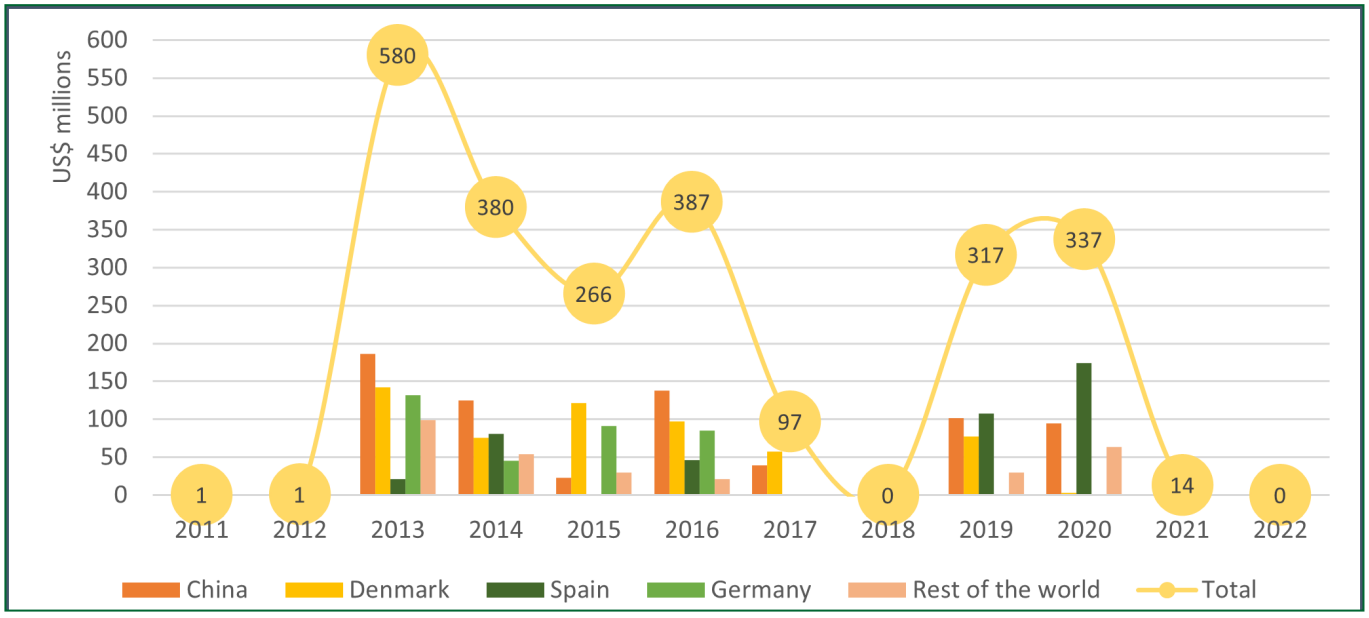
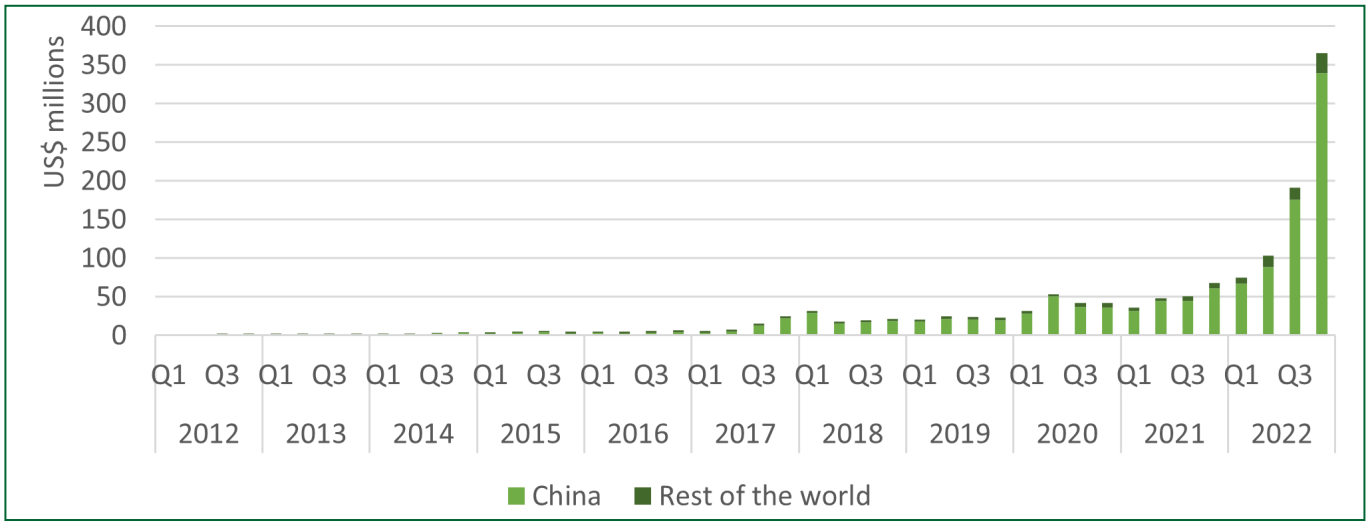


Figure 7: South Africa's import of lithium-ion cells & batteries (in US$ millions)



Source for Figures 5, 6 and 7: Montmasson-Clair, based on data from TradeMap and Quantec

Action Plan

Looking ahead, as detailed in the previous section, industrial development in the renewable energy and storage value chains first and foremost depends on local (and to some extent export) demand. Then, the availability of skills represents another condition for growth. This is unpacked in Section 6. Overall, the broader political-economic environment, such as the quality of (physical and market) infrastructure (such as roads, railways and ports) and the ease of doing business, also has an impact on the prospect of developing industrial value chains. This is acknowledged but falls beyond the scope of SAREM. In this stream, the focus is on addressing issues which are specific to (or particularly prevalent in) the development of industrial capacity in renewable energy and storage value chains. Table 6 provides the list of interventions forming this pillar.

First, clear localisation objectives, encompassing both the public and private sector markets, must be established. As introduced in Section 2, adoption of a realistic, yet ambitious, trajectory for ramping up localisation, with yearly (or biennial) targets, is the backbone of any ambitious industrial development plan aimed at leveraging the growing market for renewable energy and storage. Such a "ramping curve" should be in line with market realities (in terms of existing industrial capacity, demand and lead times for industrial investment) and encompass both public and private sector markets.[21] Correspondingly, public procurement criteria relating to local content (such as scoring mechanisms, thresholds, targets) should be clear, consistent and enforced. For public procurement, it is proposed that the entirety of economic development points (i.e. 10 out of 100 points, as per the Preferential Procurement Policy Framework Act, 2000[22]) is allocated to local content, with points awarded competitively, based on a sliding scale from the existing baseline to the agreed target.[23]

21 The development of a voluntary Sector Charter to galvanise support from offtakers as well as IPPs / developers is aligned with SAREM objectives. It will be included as an intervention subject to progress at the level of industry associations.

22 A new Public Procurement Act is expected in the coming months, which may provide more flexibility in designing procurement specifications. Accordingly, the possibility of enhancing the weight given to industrial and inclusive development in public procurement will be investigated in due course.

23 As discussed in the next section, it is proposed that other economic development objectives, notably transformation, are positioned as entry requirements, rather than competitive elements.

Second, a mix of trade and industrial policy measures aimed at supporting local value chains is needed to foster local demand and improve the competitiveness of domestic suppliers.[24] At the core, public policy related to renewable energy and storage must be aligned with localisation objectives. Public procurement programmes from all spheres of government and organs of state, as well as government support programmes (such as incentives, subsidies and funding schemes) must integrate localisation objectives in their design. This will be targeted through fit-for-purpose design, not to hamstring the rollout of such programmes as a result of a lack of domestic supply. For instance, additional and/or more advantageous support should be awarded to beneficiaries procuring locally.

Furthermore, besides this demand support, supply-side interventions would improve the investment case. Most countries seeking to attract investment in green industries have offered substantial supply-side support in the form of grants, tax incentives and concessional funding. This is clearly illustrated by the widespread "green industrial policy" packages promulgated by governments in the United States, the European Union, China and multiple other jurisdictions. Accordingly, a clear industrial development 'value proposition will be formulated for South Africa. As detailed in Table 5, a set of cross-cutting industrial policy measures provides a degree of support to existing and prospective manufacturers in the country. Dedicated policy support for "greentech" manufacturing value chains is, however, necessary to decisively bolster investment in the sector. As such, the implementation of a targeted incentive will be pursued by re-activating the existing (but currently inactive) 12i tax allowance incentive with a focus on renewable energy and battery value chains (and possibly other "green technologies"). The scheme provided a tax incentive for both greenfield and brownfield manufacturing investments, through which the value of qualifying assets (up to a certain amount) could be deducted from taxable income. Projects meeting certain criteria were furthermore awarded more generous support, enabling the scheme to drive specific objectives.[25] Such an incentive is considered a no-regret intervention given the spillover benefits associated with manufacturing.

In addition, dedicated support for energy security in industrial parks will address the single largest supply-side constraint on the development of industrial capacity. This will include but not be limited to access to the full suite of incentives promulgated for SEZs. The launch of InvestSA's One Stop Shop is geared towards improving the ease of doing business, by providing investors with services to fast-track projects and reduce red tape when establishing a business.[26] Establishing certification facilities (for batteries in the short term,

24 See the Draft SAREM document of March 2022 (Section 3 and Annexure B) for an international policy review of frameworks in favour of renewable energy and battery storage manufacturing value chains.

25 The scheme provided a tax incentive for manufacturing projects of a minimum of R50 million for greenfield projects and R30 million for brownfield projects. An Investment Allowance could be deducted from taxable income in the financial year when assets were brought into use:
- 55% of qualifying assets or a maximum of R900 million for greenfield project with a preferred status (100% if located in a SEZ);
- 35% of qualifying assets or a maximum R550 million for other greenfield project (75% if located in a SEZ);
- 55% of qualifying assets or a maximum of R550 million for brownfield project with a preferred status;
- 35% of qualifying assets or a maximum of R350 million for other brownfield project.
A Training Allowance was also available, of the lesser of R36 000 per full time employee or total training expenses (to a maximum of R20 million for a qualifying project, or R30 million for a preferred project).
B-BBEE compliance by beneficiaries was voluntary. However, applicants needed to meet at least four of the following criteria: skills development expenditure above 2.5% of the average annual wage bill (mandatory requirement); improve energy efficiency by at least 12.5% (mandatory requirement); innovation to improve production time, reduce costs, improve product quality or longevity; increase local production or improve global competitiveness; acquire at least 10% of inputs including services from SMMEs; located in a SEZ.

26 InvestSA is already actively working on streamlining the 58 approvals required to set up a renewable energy or storage plant.

and solar panels and inverters in the medium term) will prevent existing (and prospective) manufacturers from having to obtain certifications overseas (generally in the European Union (EU) and the United States).

On the trade front, a comprehensive review of the trade balance and duties on the bills of materials for renewable energy and storage value chains (at the component level) will inform further intervention, namely duty relaxation/exemption or duty protection. It is counter-productive if the import of a final product is duty free while one or more of the inputs needed to manufacture this final product domestically attract high tariffs. For instance, duties could play a role in protecting the domestic manufacturers of solar panel mounting structures made with locally-sourced steel (by imposing higher tariffs on imported mounting structures) as well as lithium-ion batteries (by imposing tariffs on imported fully-assembled battery packs). To support exports, in addition to the value proposition highlighted in the previous paragraph, the implementation of a Customs Control Area and associated zero-rated VAT/duty-free benefits by SEZs which have not yet done so, such as the Atlantis SEZ, will be fast-tracked. This will complement existing trade promotion measures, such as **the dtic**'s Capital Projects Feasibility Programme and the Export Marketing and Investment Assistance Scheme. Then, the launch by the South African Electrotechnical Export Council (SAEEC) of a database of African renewable energy projects which local manufacturers could supply will be complemented by a broader investigation into the potential of harnessing existing trade relationships (such as the African Continental Free Trade Area (AfCFTA), the Southern African Development Community (SADC), the Southern African Customs Union, the SADC-EU Economic Partnership Agreement, the African Growth and Opportunity Act (AGOA) and the BRICS group) and trade promotion tools.

Third, further work is required to unpack and strengthen linkages between the existing renewable energy and storage value chain and connected industries.27 The Steel Master Plan, launched in 2021, has the potential to foster the use of local steel inputs into the renewable energy and storage value chains, for instance to produce towers and mounting structures. The Automotive Masterplan implemented since 2019 as well as the Battery Minerals Masterplan (in development at the time of writing) can both help grow the battery value chains, notably by unlocking other markets driving demand for batteries, such as NEVs. Then, research on the potential to develop an end-of-life management industry in South Africa, covering reuse, remanufacturing and/or recycling, will be conducted to inform the development of the sector.

27 For instance, Manufacturing Circle (2022) identified that wind energy plants (with a steel tower) require, per 1MW installed, 9.6 tons of flat, special steel (in nacelle), 110.4 tons of flat steel (tower and other steel), 38 tons of reinforcing bar (steel), 20 tons of cast iron, 71.4 tons of cement, 8.2 tons of glass/carbon composite, 1.4 ton of aluminium, 2.0 tons of copper, 5.5 tons of zinc and 2.9 tons of plastics. Similarly, ground-mounted solar PV projects require, per 1MW installed, 68 tons of long (galvanized) steel, 3.7 tons of reinforcing bar (steel), 10.2 tons of cement, 46.4 tons of glass, 7.5 tons of aluminium, 4.6 tons of copper, 3.4 tons of zinc, 8.6 tons of plastics and 0.04 ton of silicon (wafer). See Manufacturing Circle, 2022. South African Renewable Energy Material Demand Study, Johannesburg: Manufacturing Circle.

Table 5: Key industrial policy support for renewable energy and battery manufacturing in South Africa

Scheme	Institutions	Intent	Key benefits and conditions
Black Industrialist Programme	**the dtic** & DFIs (e.g. IDC)	The Black Industrialist Programme supports the growth of black-owned and -managed businesses in industrial value chains, through financial and non-financial interventions	The scheme offers a cost-sharing grant ranging from 30% to 50% of total investment cost, to a maximum of R50 million. The quantum of the grant depends on the level of Black ownership and management control, the economic benefit of the project and the project value. Eligible costs include capital investment as well as feasibility studies, post-investment support (such as product design and patent costs) and business development services. Only Black-owned and -managed businesses (>50% shareholding and management control) with a minimum investment of R30 million are eligible. Additional criteria (such as benefits in terms of employment; pricing, quality of products; use of green technology and resource efficiency, local procurement, localisation of production activities and B-BBEE level) also apply.
Manufacturing Competitiveness Enhancement Programme (MCEP)	**the dtic** / IDC	MCEP supports the growth of domestic manufacturers through concessional financial loan facilities	The programme offers working capital loans as well as plant and equipment loans to Black-owned manufacturing firms at a preferential rate fixed of 4%. The working capital facility is capped at R50 million per annum, while plant and equipment loans are capped at R50 million per applicant. Business support is also offered at a maximum of R3 million. Only businesses with B-BBEE levels 1-4 (within 24 months of approval) are eligible.
Industrial financing	IDC and other development finance institutions (DFIs)	Local DFIs support the enhancement and growth of South African industrial capabilities, through a variety of funding instruments	Local DFIs offer a suite of niche and innovative funding products. For instance, the IDC provides concessional debt, equity and quasi-equity, guarantees, trade finance and venture capital to industrial development projects. It also runs a number of targeted, manufacturing-related programmes, focused on SMME development (Khoebo Innovation Promotion Programme SME-Connect, SME and MIDCAP companies programme) and youth entrepreneurship (GRO-E Youth Scheme).
Special Economic Zones (SEZs)	**the dtic**, NT and individual SEZs	SEZs are geographically designated areas reserved for targeted economic activities to promote trade, economic growth and industrialisation. SEZs are supported through special arrangements (including laws) and systems that are different to those that apply elsewhere in the country.	Companies carrying on business within an SEZ are eligible for tax relief, including a corporate income tax rate of 15%, instead of 27%, provided at least 90% of their income is derived from the carrying on of business or provision of services within that SEZ. Businesses in an approved SEZs are also eligible for an accelerated depreciation allowance on capital structures (erecting or improving buildings and other fixed structures). This allowance may be claimed at a rate of 10% per annum on the cost of such building or improvement. Businesses in a SEZ are eligible to the employment tax incentive, without age limitation (unlike in the rest of the country it is limited to the employment of young persons from 18 to 29 years old). The incentive allows employers to reduce the amount of employees' tax paid on behalf of their employees whilst leaving the wage received by the employee unaffected for employees earning below R60 000 per annum. Businesses located within a customs controlled area of a SEZ are eligible for tax relief for export, in the form of zero-rated VAT and import duty rebates.
Critical Infrastructure Programme (CIP)	**the dtic**	The CIP supports businesses, state-owned strategic testing facilities, the revitalisation of state-owned industrial parks, and strategic feasibility studies, by stimulating and encouraging investment through efforts of lowering infrastructure costs.	The CIP is primarily a cost-sharing incentive. The applicant must be at least a level 6 B-BBEE contributor. For generic investments, it can cover 10% to 30% of total qualifying infrastructural development costs capped at R50 million based on an economic benefit criteria. For an investor within a distressed municipality (or a distressed municipalities directly), between 15% and 100% of total qualifying infrastructure development costs can be covered by the CIP. For other municipalities, 15% to 50% of total qualifying infrastructure development costs are supported, up to a maximum of R50 million. Strategic Infrastructure Feasibility Studies are supported on a 80:20 cost sharing basis (80% by the dtic) cost sharing for projects inside SEZs, and 60:40 cost sharing for projects outside SEZs. This is capped at 5% of project value to a maximum of R50 million in both cases. In addition, the CIP provides support to state-owned industrial parks (100% of total qualifying infrastructural development costs capped at R50 million, under the Industrial Parks Revitalisation Programme) and state-owned testing facilities (50:50 cost sharing of total qualifying infrastructural development costs capped at R50 million).

Table 6: SAREM interventions aimed at driving industrial development in the renewable energy and storage value chains

Implementation plan element	Category	Intervention	Timeframe	Mandate/ decision maker	Implementer
Establish clear localisation objectives	Catalytic intervention	Establish a consistent set of local content targets and criteria for future public and private procurement programmes, with the aim of achieving xx% local content by 2030	By launch, then ramping curve	National Treasury, DMRE, the dtic, private sector	IPPO, Eskom, private sector
	Supporting intervention	Conduct detailed study of currently available local supply for each component/part in the renewable energy and battery value chain	By launch	Localisation Support Fund	Localisation Support Fund
Align industrial policy and programmes with renewable energy and storage localisation	Catalytic intervention	Re-activate the 12i tax allowance incentive with a focus on supporting the development of renewable energy and battery manufacturing value chains	By launch: commitment with clear timeframe	**the dtic,** NT	**the dtic,** NT
	Catalytic intervention	Align existing public sector programmes and policy support with SAREM's localisation objectives (e.g. Energy Resilience Scheme, IDC funding, DSBD Bounce Back scheme, municipal/provincial procurement)	1 year or as programmes develop	Respective departmental leads	Respective programme leads
	Catalytic intervention	Formulate and implement value proposition (including energy security) to attract investment in SEZs/IDZs/industrial parks (including incentives where relevant)	6 months for design	**the dtic**	Individual SEZs, IDZs, industrial parks
	Supporting intervention	Establish (testing and) certification laboratory/facilities for locally-manufactured a) batteries, b) solar panels, c) inverters	1 year for batteries 3 years for panels and inverters	**the dtic** / DSI	CSIR, uYilo, National Metrology Institute of South Africa
	Supporting intervention	Conduct detailed analysis of the potential to build an end-of-life industry (life expansion, reuse, remanufacturing, recycling in the renewable energy and storage value chains)	1 year	**the dtic** / DSI	**the dtic** / DSI
	Supporting intervention	Establish one-stop-shop for renewable energy and storage	By launch	InvestSA	InvestSA
	Alignment intervention	Align with Steel, Automotive and Battery Minerals Masterplans to improve competitiveness of local materials (PMU-PMU quarterly sessions)	Ongoing	the dtic, DMRE	PMUs
Harness trade policy to support local manufacturing in renewable energy and storage value chains	Supporting intervention	Map, apply for and obtain import duty exemption or protection on strategic inputs	By launch: application	**the dtic**	International Trade Administration Commission (ITAC), individual applicants
	Supporting intervention	Implement Customs Control Area and associated zero-rated VAT / duties at relevant SEZs	6 months	NT, **the dtic**	Individual SEZs
	Supporting intervention	Establish, publish (and regularly update) database of African renewable energy projects	By launch	SAEEC	SAEEC
	Supporting intervention	Design a strategy to harness bilateral arrangements and trade promotion instruments to promote renewable energy and storage exports from South Africa (AfCFTA, BRICS, SADC-EU Economic Partnership Agreement, AGOA)	6 months	**the dtic**	**the dtic**, ITAC
	Supporting intervention	Develop a regional integration strategy in collaboration with other SADC countries, particularly on LIBs	6 months	**the dtic** / DMRE	**the dtic** / DMRE

5. Fostering inclusive development

Fostering the inclusive development of the renewable energy and storage value chains in South Africa is the second core objective of SAREM (the other being driving industrial development, as unpacked in the previous section). The rollout of renewable energy and storage technologies, while on an exponential growth trajectory, has been limited to a small part of society, namely middle- and high-income households and medium to large firms. Furthermore, the industry remains, to date, largely concentrated in terms of development, manufacturing, supply chain, management, ownership and geography. This has constrained the contribution of the sector to South Africa's just transition.

Context

Access to renewable energy and storage technologies in South Africa (and globally) remains the prospect of a minority. The vast majority of South African households do not have the means to invest in such technologies. While the increasing availability of alternative uptake options (such as rent and leasing) does widen accessibility somewhat, most people remain unable to afford it. For instance, in 2014/2015, 90% of households spent less than R6 236 on electricity (and R6 437 on energy) per year.[28] In 2019/2020, 10.1 million households qualified to receive free basic electricity from municipalities (even though only about 21% actually did benefit from it). Overall, a large share of the South African population (43% in 2013) lives in a situation of energy poverty. Similarly, most SMMEs, particularly micro and small-sized enterprises, do not the financial resources to access renewable energy and storage technologies.

Furthermore, while inclusive development has been a key component of the rollout of renewable energy through the REIPPPP, it has delivered mixed results. In the absence of a sector-specific scorecard for renewable energy (and storage), thresholds and targets have been static through the various procurement windows. In addition, the first round of the RESIPPPP only included optional economic development objectives. As such, the design of the tender specifications has not enabled, in most cases, a ramp-up in supply chain inclusivity. The share of expenditure channelled to women-owned businesses has been pegged at 5% over the first four bid windows, achieving 5% for construction and 6% for operations on average, compared to the target of 40% set by the Department of Women, Youth and Persons with Disabilities (DWYPD). Similarly, the share of spend towards Black-owned firms has been fixed at 60%, reaching 85% for construction and 74% for operations on average. The target for the expenditure share to Exempt Micro Enterprises and Qualifying Small Enterprises has stood at 10% but achieving 31% for construction and 26% for operation over the first four bid windows. Overall, the integration of new entrants and emerging suppliers into the existing value chain still proves to be a challenge, with suppliers facing issues with access to capital, provision of guarantees and warrantees, and certification. The inclusion of certain groups is also not promoted. The DWYPD has for instance set targets for public procurement at 30% for youth-owned companies and 7% for firms owned by persons with disabilities.

The local equity shareholding across BW1 to BW4 equated to 51% (compared to a requirement of 40%) while Black shareholding reached 34% against a target of 30%. Community ownership has averaged 9% over the same procurement period (for a set

28 Data from Statistics South Africa, 2017. Living Conditions Survey 2014/2015. Pretoria: Statistics South Africa. More recent data are not available at the time of writing.

target of 5%). For BW5 projects, South African entities hold 49% of shares, while 35% of shares are held by Black South Africans. Black shareholding in Engineering, Procurement, and Construction (EPC) contractors stood at 21%, in line with a 20% target. Besides the REIPPPP, little efforts have been made to promote local ownerships by workers and communities.

On the employment front, over BW1-4, Black South Africans took up 81% of opportunities (in percentage of job-years), local community members (50km radius) 48%, youth 44%, women 10%, and persons with disabilities 0.4%. 68% of top management positions have been held by Black professionals, for a fixed target of 40%. By comparison, South Africa's empowerment strategy for women and persons with disabilities targets 50%, and 3% of total employment, respectively.

In addition to these project- and procurement-level targets aimed at fostering inclusive development within the industry, renewable energy and storage projects and associated value chains have a role to play in supporting a just transition in South Africa. In the short term, this is particularly focused on the country's coalfields. As of March 2023, less than 2% of South Africa's renewable energy generation capacity was located in Mpumalanga. As coal-based activities phase down, an opportunity exists for renewable energy and storage value chains to contribute to the economic diversification and rejuvenation of the coalfields. Unlike other parts of the country, grid capacity is available and will be progressively released as coal-fired power plants close down, freeing space for renewable energy projects. Industrial opportunities could also be nurtured, notably in the vanadium-based battery value chain.

Action plan

In line with the above context, fostering inclusive development requires a multi-pronged approach and intersects directly with the three other pillars of SAREM, particularly support mechanisms to widen access to renewable energy and storage technologies; skills development; and technology commercialisation. In this section, the focus is on increasing transformation, strengthening the entry of new suppliers into the value chain and supporting the imperative of a just transition. Table 7 highlights the series of interventions under this pillar.

The first avenue to promote inclusive development in the renewable energy and storage sector is the establishment of clear transformation objectives. The definition and implementation of sector-specific B-BBEE scorecards for renewable energy and storage projects is a priority for SAREM.[29] As the B-BBEE scorecard is developed, particular attention will be paid to align with national strategies on the inclusion of women, youth and persons with disabilities. Furthermore, it is proposed that B-BBEE scoring becomes an entry requirement to take part in procurement processes, rather than part of the competitive adjudication process. In line with the trajectory agreed upon by stakeholders, minimum empowerment levels will be increased over time. Complementarily, proposals to foster Environmental, Social, and Governance (ESG) certification in the sector, to attract more and better funding, are aligned with SAREM's objectives and supported. This also reinforces the imperative of promoting decent work in new economic sectors.

29 Correspondingly, as introduced in Section 5 on industrial development, the development of a Sector Charter covering defined goals in terms of transformation for private sector projects is aligned with SAREM, and will be included should it gain traction at the level of industry associations.

The second avenue consists of facilitating the integration of new entrants into the various stages of the renewable energy and storage value chain. Existing SMME support programmes by the DSBD (such as the Small Enterprise Manufacturing Support managed by the Small Enterprise Finance Agency), the IDC (such as the Khoebo Innovation Promotion Programme, SME-Connect, the programme for SME and MIDCAP companies) and a number of other institutions, as well as efforts by Original Equipment Manufacturers (OEMs) have made a positive contribution but remain insufficient. A Transformation Fund, aimed at providing capital, but also support guarantees and warrantees (and possibly other support required by beneficiaries), for emerging suppliers into the sector will be established. It will aim to catalyse existing (and additional) funding streams in the sector. This will be supported by an extended focus on supplier development, starting with the launch of the Strategic Partnership Programme (SPP)[30] by the SAEEC and the dtic with an initial 8 companies in the renewable energy and storage value chains. The SPP is a cost-sharing progamme (up to 50:50 basis) of **the dtic**, aimed at incentivising large private-sector enterprises to support, nurture and develop the capacity of SMMEs within their supply chain.

The third avenue speaks to the necessary contribution of the renewable energy and storage sector to South Africa's just transition. This is made of two key areas, namely directing activities into just transition hotspots and fostering an inclusive rollout of renewable energy and storage technologies.

In line with South Africa's Just Transition Framework,[31] renewable energy and storage activities can directly contribute to the economic diversification of the country's coalfields, along with positive impacts on social progress and environmental sustainability. Renewable energy and storage, in line with grid availability, will be increasingly located in the coalfields (as well as other regions with grid capacity). A consistent, sustained pipeline of projects would positively contribute to employment creation in the region. Importantly, particular attention will be paid to developing industrial activities linked to the renewable energy and storage value chains in the region, by supporting industrial parks notably, as well as other Renewable Energy Development Zones (REDZs).[32] In this respect, the development of the vanadium-based battery value chain carries notable opportunities in the coalfields.

Then, major efforts are needed to widen access to renewable energy and storage technologies. A programme to collect, refurbish (if necessary) and reuse solar panels replaced by IPPs will be developed for rollout on public and community buildings, such as nurseries, schools, clinics, and community halls. The possibility of scaling up community-owned projects, Employee Share Ownership Plans (ESOPs), as well as widespread rollout for low-income households will be explored through a number of pilot projects. These projects will be focused on ascertaining the potential to scale up interventions. As such, the opportunity to learn from and partner with existing community-focused initiatives, such as the Development Bank of Southern Africa's DLab programme, will be particularly explored.

30 See http://www.thedtic.gov.za for more information on the programme.
31 PCC, 2022. A Framework for a Just Transition in South Africa. Johannesburg: Presidential Climate Commission.
32 A map of the 11 geographically defined REDZs can be accessed here: https://sfiler.environment.gov.za:8443/ssf/s/readFile/folderEntry/49343/8afbc1c77f1bb7ca017f6433d7460a0c/1643207123000/last/REDZ_11_Zones.png.

Table 7: SAREM interventions aimed at fostering inclusive development in the renewable energy and storage value chains

Implementation plan element	Category	Intervention	Timeframe	Mandate/ decision maker	Implementer
Establish clear transformation objectives	Catalytic intervention	Develop and implement B-BBEE sector specific scorecard for renewable energy and storage, with the aim of achieving B-BBEE Level X by 2030	6 months	IPPO, **the dtic**, DMRE	IPPO
	Alignment intervention	Align with the Execution Plan for the Women's Economic Assembly Initiative (WECONA): Mainstreaming Electricity Value Chains in South Africa	By launch	WECONA, DWYPD, Presidency	PMU
	Alignment intervention	Align with the DMRE's Women Empowerment and Gender Equality Strategy for the Energy Sector	Ongoing	DMRE	PMU
Foster integration of emerging suppliers	Catalytic intervention	Develop, resource and establish Transformation Fund to support new entrants (e.g. competitive rates for factory investment capital as well as warrantees/ guarantees)	1 year	DMRE/IPPO, IDC, private sector	Possibly IDC
	Supporting intervention	Launch and progressively expand the SPP for companies in the renewable energy and storage value chains. The SPP aims to incentivise large private-sector enterprises to develop the capacity of SMMEs within their supply chain.	By launch	**the dtic**	SAEEC
Direct renewable energy and storage activities to just transition hotspots	Catalytic intervention	Launch public procurement rounds for renewable energy and storage for Mpumalanga and other just transition hotspots (based on grid availability), leveraging REDZs	By launch for first round	DMRE, NECOM	IPPO
	Supporting intervention	Strengthen industrial park(s) in hotspot areas, in alignment with existing REDZs (including a possible SEZ in the coalfields)	6 months (implementation plan)	**the dtic**	**the dtic,** provincial governments
Driving inclusive rollout of renewable energy and storage	Catalytic intervention	Launch solar PV rollout programme for schools/clinics/etc. based on panels replaced by large projects	1 year	DMRE, CoGTA, Private sector	South African National Energy Development Institute (SANEDI)
	Supporting intervention	Pilot programmes to explore options to support rollout to low-income households (e.g. renewable energy systems through RDP programme; implementing Property Assessed Clean Energy programmes, expansion of free basic alternative energy for renewable energy systems)	1 year	DHS, CoGTA, municipalities	Municipalities, civil society
	Supporting intervention	Implement pilot projects to test community-led ownership models for scale up	1 year	DHS, CoGTA, municipalities	Municipalities, civil society
	Supporting intervention	Pilot the rollout of ESOPs, with the aim of ascertaining the potential for upscaling	1 year	Industry, Labour	Industry, Labour

6. Building capabilities

Pursuing the inclusive and industrial development of the renewable energy and storage value chains, by leveraging rising demand, is underpinned by the availability of skills in the domestic economy. In addition, adequate technology development systems, particularly to adopt and localise innovation, are paramount. The absence or lack of skills and technological awareness would stifle the growth of the value chains and the prospect of inclusive and industrial development.

Context

Companies in the value chain require a range of skills. White collar skills (e.g. project and business development managers) are mostly in demand during the early stages of projects, whilst highly skilled roles, like engineers and designers, are required across various parts of the value chain. Blue collar skills are predominantly located in the later part of the value chain from the EPC stage onwards and in the manufacturing stage. Skilled technicians, such as high voltage electricians, welders, solar PV installers, and wind turbine service technicians, are the most sought-after blue-collar skills.[33] In addition to these "technical" skills, the growth of the renewable energy and battery storage industries (and the broader transitions experienced by the energy sector) require a vast range of skills in governance, policy and planning, legislation and pricing, as well as customer engagement, education and awareness.[34]

To date, companies in the renewable energy and storage value chains have faced a number of skills-related challenges. The lack of skills on the local market is the primary constraint to the development of the industry. In addition, skills retention, particularly of young professionals, appears problematic. This is primarily a result of the mismatch between the limited supply and rising demand of skills in the industry. These challenges are compounded by the lack of inclusivity and integration of previously-disadvantaged individuals in the sector, particularly women.

A bidirectional misalignment also exists between occupational demand and education supply and (particularly, but not limited to, the interplay between industry and academia), hindering ongoing efforts to improve the number and quality of graduates coming out of universities, Tertiary Vocational Educational Training (TVET) colleges and training institutions, such as Sector Education and Training Authorities (SETAs).[35] As a result, the quality of graduates has not, on average, matched the expectation of industries. In turn, education and training institutions require greater industry guidance and support to craft relevant training and provide practical learning opportunities for students and graduates. This mismatch poses a challenge for the development of current as well as future skills.

In addition to skills development and retention, a dynamic, inclusive value chain depends on being technologically ready. The renewable energy and storage sector, like other "greentech", is rapidly evolving. South Africa does not have, on the whole, the capacity to compete with market leaders (namely China, the United States, Japan, South Korea

33 GreenCape, 2022. Assessment of local skills for the South African renewable energy value chain. Pretoria and Cape Town: Department of Science and Innovation and GreenCape.

34 African Energy Leadership Centre and Centre for Researching Education and Labour, 2023. Energy Skills Roadmap South Africa 2023, Johannesburg: South African National Energy Association.

35 Such challenges extent beyond such institutions, starting from primary and secondary education. However, addressing broader issues within the South African education system is beyond the scope of SAREM.

and the European Union) in research, development and innovation (RDI). Nevertheless, South Africa displays some pockets of excellence (e.g. in the battery value chains) which can be leveraged to facilitate local innovation, technology adoption (of both local and foreign origins), as well skills development.

Within the RDI value chain, technology commercialisation, i.e. the transition from research and development (R&D) to market readiness (and scale-up), remains the primary barrier in South Africa. Despite some existing support mechanisms, such as the Technology Innovation Agency's pre-commercialisation and commercialisation programmes, the dtic's Support Programme for Industrial Innovation and the Khoebo Innovation Promotion Programme managed by the IDC, multiple incubation programmes and a number of private sector funders, overall market access remains highly insufficient. A "valley of death", fuelled notably by a lack of venture capital, hinders the innovation journey of local entrepreneurs. Within a context of low expenditure on R&D (0.6% of GDP in 2020/2021, against a target of 1.5%), and less than 3% of that going to energy supply issues, this materially weakens South Africa's technological readiness.[36] The rapid pace of technological evolution in the renewable energy and storage value chains requires countries that are not at the frontier (which is South Africa's case) to remain abreast of developments and nurture the capabilities necessary to rapidly adopt technologies as they emerge and mature.

Action Plan

Unlocking the capabilities in the value chain is dependent on forming a coherent pathway for skills and technologies to reach the market. Table 8 details the interventions under this pillar.

Mapping, building and activating skills in the first component of such a pipeline. It starts by understanding the needs through regular mapping of the skills (and their volume) required to grow the value chain. It is crucial to continuously update and deepen existing mappings[37] to inform the amendment of existing qualifications and training and the development of new ones. In parallel, the development and rollout of a set of standardised trainings and qualifications, to ensure quality and provide clarity to the market, will be prioritised. To ensure that skills development aligns with industry needs, a match-making platform, between skills development planners and education providers and firms in the value chain (as well as the broader ecosystem), called PowerUp, has been developed under the auspices of SAREM and will be further enhanced over time. Taken together, these interventions will directly contribute to strengthening skills planning processes for the value chain and feed into existing processes, such as the Department of Higher Education and Training's (DHET) Skills Masterplan and the planning processes of the Quality Council for Trades and Occupations (QCTO) and the Council on Higher Education (CHE).

Then, to materially enhance the availability of work-based opportunities for new graduates, SAREM targets the widespread participation of the renewable energy and storage value chain to the Youth Employment Service (Yes4Youth) programme. Yes4Youth

36 See Centre for Science, Technology and Innovation Indicators (CesTII), 2022. South African National Survey of Research and Experimental Development. Pretoria: Department of Science and Innovation, Human Sciences Research Council and Statistics South Africa.

37 See notably GreenCape, 2022, and African Energy Leadership Centre and Centre for Researching Education and Labour, 2023.

is a business-led collaboration with government aimed at providing jobs for young Black people (through 12-month quality work experience). Yes4Youth also enables any organisation to enhance its B-BBEE score (by 1 or 2 levels) by contributing towards reducing youth unemployment and building the skills necessary for the development of the value chain. It is the ambition of SAREM to consolidate the multiple ad hoc internship programmes in the sector through Yes4Youth.[38] In addition, a clear pathway for Artisan Recognition of Prior Learning (ARPL) in the value chain will be developed by the industry, in collaboration with the public sector. The identification of existing unemployed graduates where minimal upskilling or on-the-job learning could result in meeting the qualification and competency requirements for different positions is here a priority. Over time, synergies with PowerUp, which has already facilitated the placement of graduates in the value chains, will also be explored.

The second component supporting the development of local capabilities focuses on fostering technology commercialisation. A platform between innovators and possible users, inspired by the Trial Reservoir initiative in the water and sanitation sector,[39] will be established for renewable energy and storage value chains. It aims to accelerate the adoption of new technologies, through facilitated matchmaking, along with an innovative funding model for de-risking trials. This will be complemented by a collaborative platform for technology users to review emerging (local and foreign) technologies in the sector and fast-track the development (and rollout) of innovation. Such Technology Approval Groups have been widely used in other sectors, including in South Africa (for water and sanitation). In addition, public procurement, such as the REIPPPP, could be used as a vehicle for technology piloting and learning. It is recommended that public procurement programmes require successful projects to integrate, at the margin, the trial of new technologies into their design. More broadly, dedicated work is required to investigate how public sector procurement regulations (such as the Public Finance Management Act 1 of 1999 and Municipal Finance Management Act 56 of 2003), which currently do not support the deployment of innovative solutions across all economic sectors, could be harnessed to that effect.

A material increase in the incubation and capacity building support for innovators in the renewable energy and storage value chains is targeted through SAREM. This will notably include the reopening of the mothballed Manufacturing Technology Centre for renewable energy and storage technologies, located at the South African Renewable Energy Business Incubator (SAREBI). The centre is designed to provide factory space, machinery, tools and testing facilities for entrepreneurs in the value chains. In time, additional centres may also be required. The opening of a Solar Research Facility to enhance the integration of local innovations into existing value chains, supported by the DSI, is also targeted. Finally, a technology transfer system to enhance South Africa's technological adoption capabilities will be developed. It will aim to institutionalise and coordinate the processes through which technology absorption occurs and complementary local technical capacity is built.

38 Acknowledging the diversity of existing programmes in the sector, such as those run by South African Wind Energy Association, the National Business Initiative and individual companies, the consolidation of internship opportunities through Yes4Youth will be done in close partnership with current programme leads. Market needs may also require the persistence of separate, additional programmes.

39 See https://www.isleutilities.com for further information.

Table 8: SAREM interventions aimed at building capabilities in the renewable energy and storage value chains

Implementation plan element	Category	Intervention	Timeframe	Mandate/ decision maker	Implementer
Map and build skills	Catalytic Intervention	Develop and run a digital match-making platform (PowerUp) between industry, education providers and social compact partners, creating a demand-led skills and planning communication hub, to address skills priorities in the sector	End 2023	PowerUp Steering Committee	PowerUp Steering Committee
	Supporting intervention	Continuously update (every three years) and enhance the mapping of (technical and non-technical) skills required for the renewable energy and storage value chain	By launch	DHET, DSI	DHET, DSI, QCTO, CHE, SETAs, PowerUp
	Supporting intervention	Based on mapping, develop and implement a set of standardised trainings and qualifications (made of new and amended trainings and qualifications), with the aim of increasing the number of graduates/ skilled people by xx% by 2030	By launch, then ramping up curve	DHET, DSI	QCTO, CHE, SETAs, TVETs, Universities, SARETEC
Activate skills	Catalytic Intervention	Consolidate and expand internship programmes/opportunities in the renewable energy and storage sector by participating in Yes4Youth, with the aim of reaching xx% participation by 2030	By launch, then ramping up curve	Industry	Yes4Youth, Harambee, industry
	Supporting intervention	Design and roll out a programme for Artisan Recognition of Prior Learning in the renewable energy and battery storage value chain	1 year	Industry, SETAs	Industry, SETAs
Foster technology commercialisation	Catalytic Intervention	Establish a match-making platform between innovators and possible users to accelerate the adoption of new renewable and energy and storage technologies, along with innovative funding model for running costs of trials	1 year	SANEDI, Technology Innovation Agency (TIA)	SANEDI, TIA, Isle
	Supporting intervention	Establish a collaborative platform for technology users to review emerging renewable energy and storage technologies	1 year	SANEDI, TIA	SANEDI, TIA, CSIR, Isle
	Supporting intervention	Scale up business incubation and capacity building support to emerging suppliers, with the aim of increasing funding by xx% by 2030	Ongoing	DSBD/seda, private sector	SAREBI
	Supporting intervention	Re-establish a Manufacturing Technology Centre for renewable energy and storage technologies	1 year	DSBD/seda, private sector	SAREBI
	Supporting intervention	Set up Solar Research Facility to support the integration of local innovations into existing value chain	3 years	DSI	CSIR, industry
	Supporting intervention	Build a system to enable technology transfer in the renewable energy and storage value chains	By launch: commitment	the dtic	the dtic, OEMs

7. Support for the South African Renewable Energy Masterplan

SAREM, like all masterplans developed under the leadership of the South African government, is a social compact between government, business and labour unions. SAREM is an action-oriented plan that focuses on leveraging investment in the renewable energy and storage value chain to deliver industrial development and decent jobs while supporting inclusive development.

Its development followed an extensive process, rich in engagements and inputs (see Annexure A for more details on the process). It reflects the diversity and complexity of the sector, while channelling resources to bolster the industrial and inclusive development of the value chains in the country. Operationally, the implementation of SAREM will be supported by a PMU, to be established by the launch, and a series of multi-stakeholder task teams (at first mirroring the four key workstreams identified in the drafting process), but its success depends on the active support of all social partners.

The following parties express support for the Masterplan and commit to working with all social partners towards its outcomes:

Name and institution	On behalf of	Signature

Annexure A:
Overview of the SAREM process

The development of SAREM was initiated in late 2020 under the leadership of the DMRE and the dtic. The process has been overseen by an Executive Oversight Committee (EOC), chaired by the Minister of Mineral Resources and Energy, and comprising selected senior government officials, the IPPO, industry representatives from both the supply and demand side of the sector, labour and civil society representatives, and the project team.

In addition, a Steering Committee, composed of representatives of the relevant renewable energy and storage industry associations, government departments, labour unions and academia, has provided guidance to the project team on a monthly (and at times fortnightly) basis.

The development of SAREM was structured around two phases. The first phase focused on setting up institutional arrangements for SAREM, building the evidence base, mobilising stakeholders and identifying key areas of work for the plan. It culminated with the publication of the first draft document in March 2022. The document provided a thorough understanding of global and local renewable energy and battery storage value chains, the industry's contribution to employment and investment, challenges and opportunities, and recommended policy interventions.

In addition to extensive research, the first phase was informed by four consultation channels:

- An Industry Working Group, made up of representatives from various stakeholder groups, was convened on regular intervals to strategically guide the process;
- Industry Reference Groups, composed of selected industry experts, were convened on an ad hoc basis to provide guidance on specific issues (such as macroeconomic dynamics or global supply chains);
- Task Teams, mirroring each of the nine workstreams identified in the first phase, and consisting of selected representatives from social partners as well as and experts, informed the development of policy interventions; and
- Bilateral engagement with stakeholders and key informants on specific issues, as required.

Following the completion of the Draft SAREM document in March 2022, a stress testing exercise was conducted in October-November 2022. Based on a desktop review of SAREM documents and a series of interviews with selected stakeholders, the stress test provided the platform for a successful finalisation of the process, surfacing points of agreement and contention as well as areas for further work. A facilitator was subsequently appointed in December 2022 by the EOC.

Leveraging the 2022 draft document, the stress testing exercise, further research as well as extensive bilateral and stakeholder-specific engagements (over 200 engagements across manufacturers, service providers, project developers, IPPs, financiers, business associations, labour unions and federations, national, provincial and local government, state-owned enterprises, SEZs, education and training providers, and researchers), a new draft SAREM document was produced in May 2023 (this document).

This new draft has been subject to further review and engagement in a staggered fashion, first through the SAREM Project Steering Committee, then through four consolidated Task Teams (mirroring the four key pillars of SAREM, but encompassing the nine task teams established in the first phase), and finally through broader stakeholder-specific and public engagement. In parallel, a facilitated process will be hosted to finalise the negotiations of targets by key stakeholders.

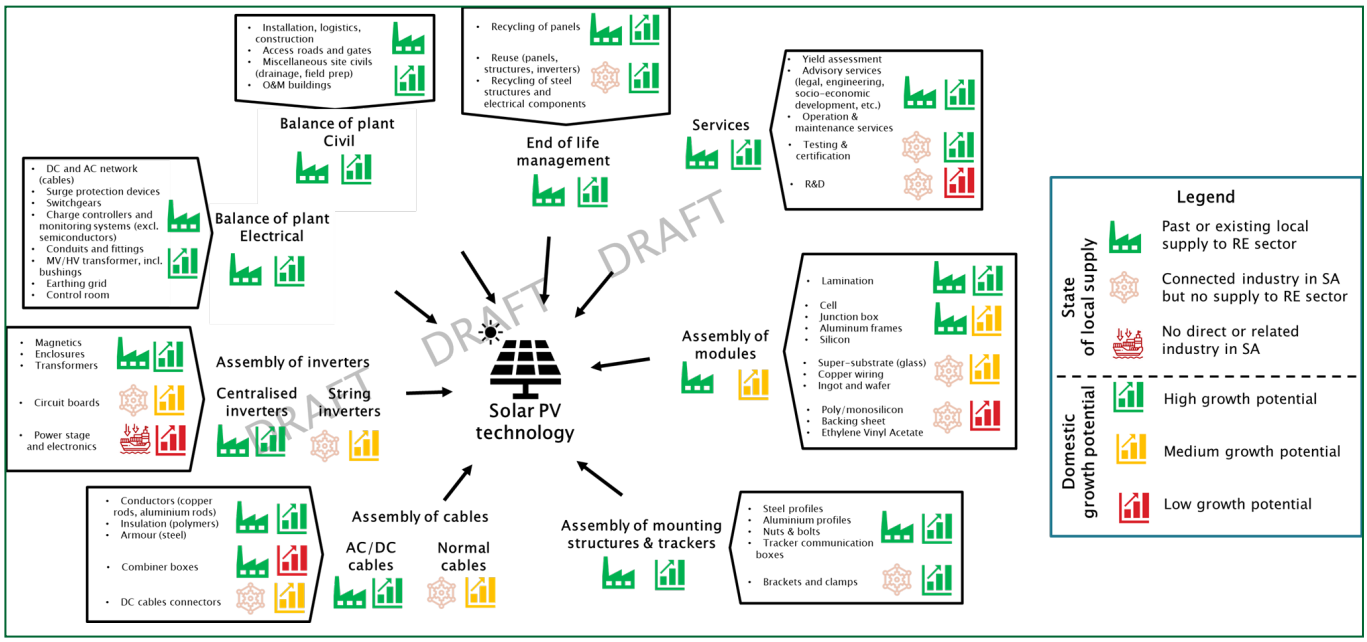
On completion of the review and target setting processes, SAREM will be presented at the EOC and finalised for signature. A PMU, in charge of the managing, monitoring, evaluating the implementation of SAREM, will be established by the launch.

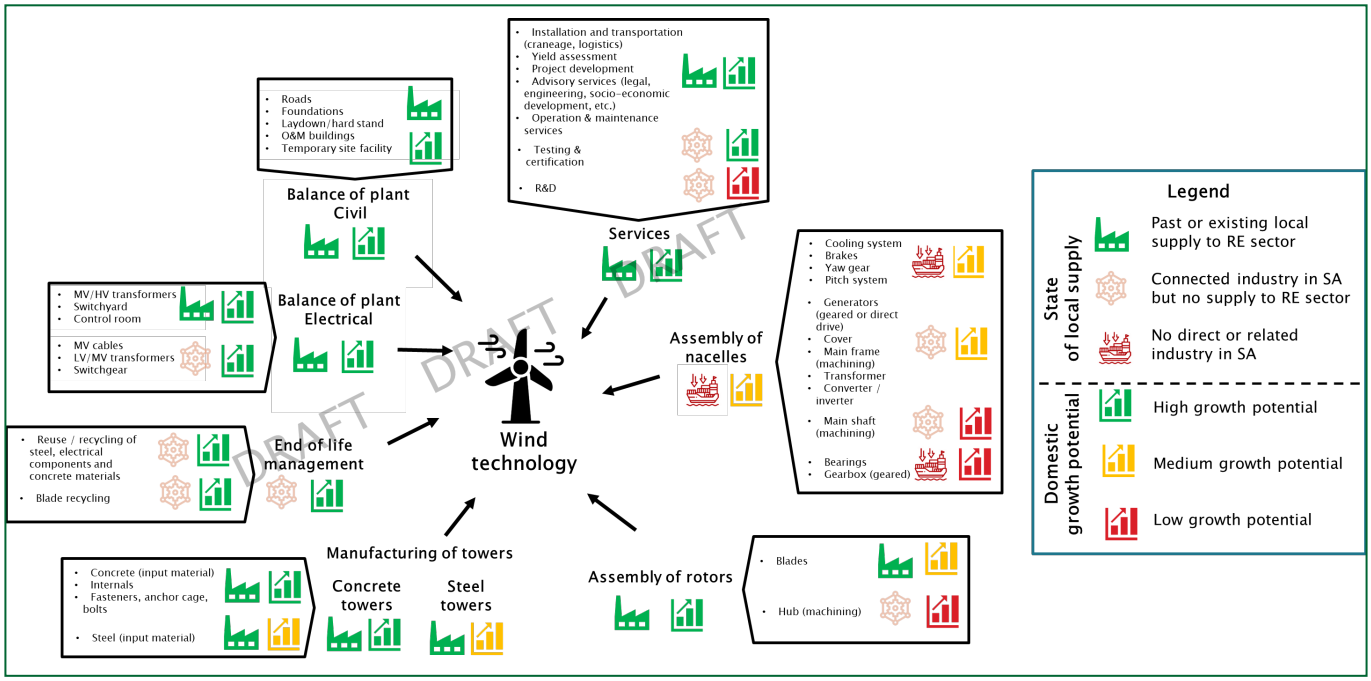
Annexure B:
Draft SAREM document from March 2022

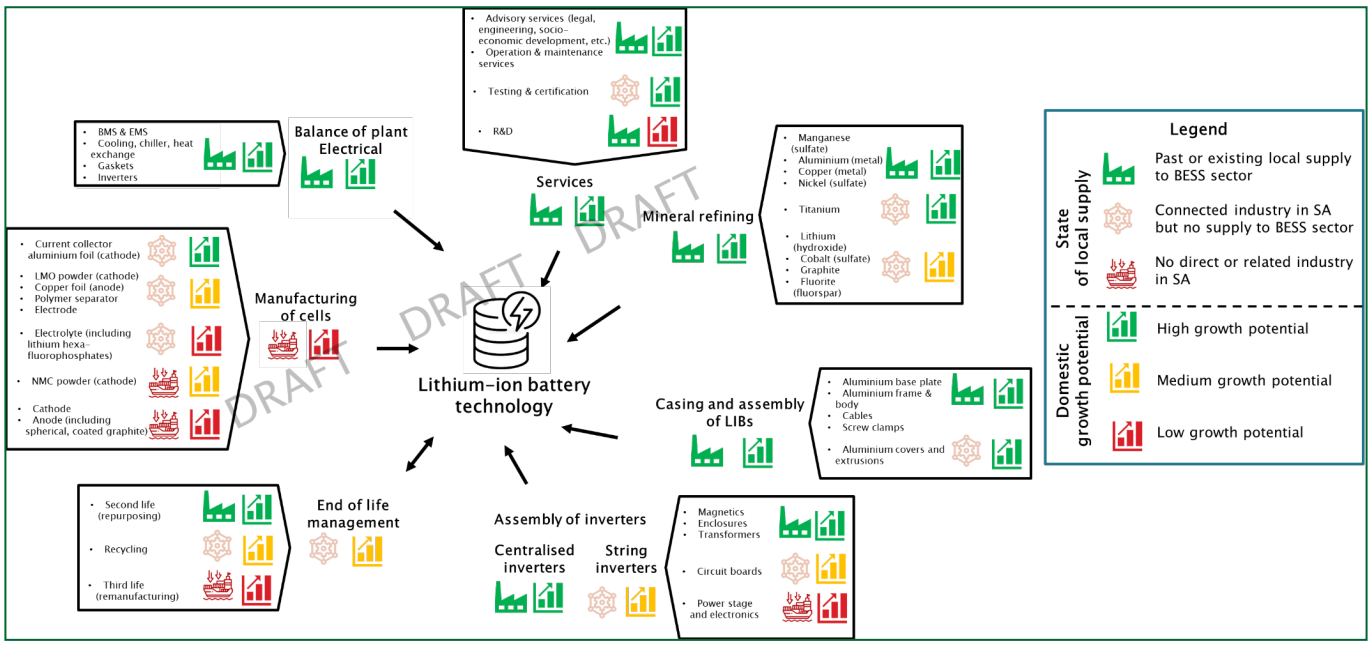
The Draft SAREM document from March 2022 is available here.

[Add document as Annexure to final version]

Annexure C:
Mapping of localisation opportunities in renewable energy and battery storage



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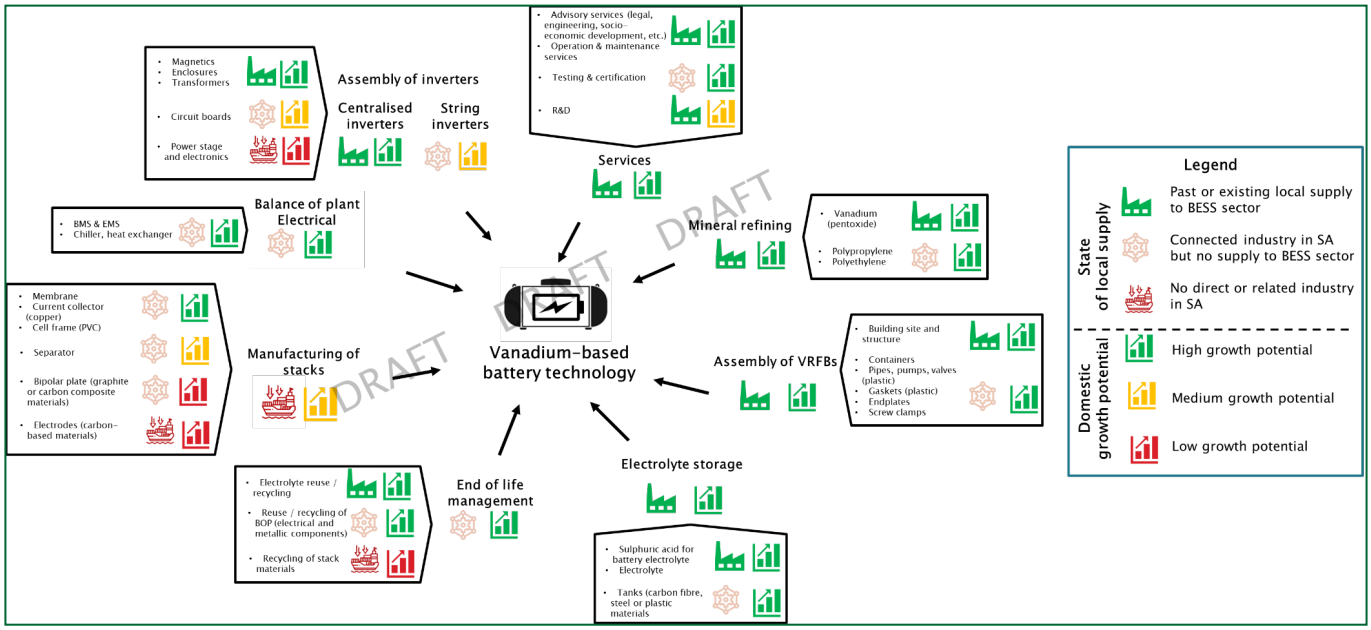
Operation & maintenance services
Testing & certification
R&D
Services
BMS & EMS
Cooling, chiller, heat exchange
Gaskets
Inverters
Balance of plant Electrical
Mineral refining
Manganese (sulfate)
Aluminium (metal)
Copper (metal)
Nickel (sulfate)
Titanium
Lithium (hydroxide)
Cobalt (sulfate)
Graphite
Fluorite (fluorspar)
Current collector aluminium foil (cathode)
LMO powder (cathode)
Copper foil (anode)
Polymer separator
Electrode
Electrolyte (including lithium hexa-fluorophosphates)
NMC powder (cathode)
Cathode
Anode (including spherical, coated graphite)
Manufacturing of cells
Lithium-ion battery technology
Casing and assembly of LIBs
Aluminium base plate
Aluminium frame & body
Cables
Screw clamps
Aluminium covers and extrusions
Second life (repurposing)
Recycling
Third life (remanufacturing)
End of life management
Assembly of inverters
Centralised inverters
String inverters
Magnetics
Enclosures
Transformers
Circuit boards
Power stage and electronics
Legend
State of local supply
Past or existing local supply to BESS sector
Connected industry in SA but no supply to BESS sector
No direct or related industry in SA
Domestic growth potential
High growth potential
Medium growth potential
Low growth potential
DRAFT


Advisory services (legal, engineering, socio-economic development, etc.)
Operation & maintenance services
Testing & certification
R&D
Services
Magnetics
Enclosures
Transformers
Circuit boards
Power stage and electronics
Assembly of inverters
Centralised inverters
String inverters
BMS & EMS
Chiller, heat exchanger
Balance of plant Electrical
Mineral refining
Vanadium (pentoxide)
Polypropylene
Polyethylene
Membrane
Current collector (copper)
Cell frame (PVC)
Separator
Bipolar plate (graphite or carbon composite materials)
Electrodes (carbon-based materials)
Manufacturing of stacks
Vanadium-based battery technology
Assembly of VRFBs
Building site and structure
Containers
Pipes, pumps, valves (plastic)
Gaskets (plastic)
Endplates
Screw clamps
Electrolyte reuse / recycling
Reuse / recycling of BOP (electrical and metallic components)
Recycling of stack materials
End of life management
Electrolyte storage
Sulphuric acid for battery electrolyte
Electrolyte
Tanks (carbon fibre, steel or plastic materials
Legend
State of local supply
Past or existing local supply to BESS sector
Connected industry in SA but no supply to BESS sector
No direct or related industry in SA
Domestic growth potential
High growth potential
Medium growth potential
Low growth potential
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