Energy Storage Partnership

Battery Energy Storage Systems Projects Overview

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Background on Eskom

Eskom is a South African electricity public utility, **established in 1923**. Eskom represents SA in the Southern African Power Pool. The utility is the largest producer of electricity in Africa, is Ranked 17th Power utility in the world according to the International Energy Agency (IEA) 2017 Report. It is the **largest of SA's State Owned Companies** (SOC's).

Eskom operates a number of power stations **coal, hydro, nuclear, renewables, gas to power and hydro pumped storage)**. The company is divided into **Generation, Transmission and Distribution divisions** and Eskom generates approximately **95% of electricity** used in SA.

BESS in Eskom

First large-scale use in Africa and will transform SA Energy Mix

Capacity increase

1440 MWh per day in BESS

60 MW PV

The BESS primary use case would be for national peak shaving purposes for 4 hours a day for at least 250 days of the year. Charging will be conducted during off-peak periods or when the network conditions permit

~ R11 bn

In value of projects for phase 1 and phase 2

Project supports **transformational aspects** by demonstrating **large-scale** deployment in support of the South African renewable energy strategy and addresses local overall system challenges.

Phase 1: 8 sites

Construction complete by June 2023

Phase 2: 4 sites

Construction complete by December 2024

SDL&I Levers

Technology Localisation

- Skills transfer
- Technology transfer – IP
- Localisation
- Capacity Building – SA Inc,
- Research and Development
- Contracting Methodology

Natural Localisation

- Preferential Procurement
- Designation
- Skills Development
- Job Creation
- Enterprise Development

~ 7 to 9 months

Construction

60 months for

Operating and Maintenance

EPC Design, supply, install and commission

This entails the provision of engineering designs, procurement and construction of a complete facility/works.

Clean Technology Fund (CTF)

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There is an agreement amongst the co-financiers and Eskom that Eskom follows the WB procurement process. The procurement rules, policies & procedures from the WB will therefore be the main guiding principles during the procurement process. Hence, the procurement of the project is exempted from the prescripts of Preferential Procurement Policy Framework Act (PPPFA) and its regulations.

IRP 2019

The IRP 2019

Recommended Plan IRP 2019	Coal	Coal (Decommissioning)	Nuclear	Hydro	Storage	PV	Wind	CSP	Gas & Diesel	Other (Distributed Generation, CoGen,Biomass,Landfill)
Current Base	37149		1860	2100	2912	1474	1980	300	3830	499
2019	2155	-2373					244	300		Allocation to the extent of the short term capacity and energy gap
2020	1433	-557				114	300			
2021	1433	-1403				300	818			
2022	711	-844			513	400 1000	1600			
2023	750	-555				1000	1600			500
2024			1860				1600		1000	500
2025						1000	1600			500
2026		-1219					1600			500
2027	750	-847					1600		2000	500
2028		-475				1000	1600			500
2029		-1694			1575	1000	1600			500
2030		-1050		2500		1000	1600			500
TOTAL INSTALLED CAPACITY by 2030 (MW)	33364		1860	4600	5000	8288	17742	600	6380	
% Total Installed Capacity (% of MW)	43		2.36	5.84	6.35	10.52	22.53	0.76	8.1	
% Annual Energy Contribution (% of MWh)	58.8		4.5	8.4	1.2	6.3	17.8	0.6	1.3	

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

Application to DMRE in 2021 for a determination in bringing forward some of the 2029 allocation for storage

NERSA views battery storage as a generator and therefore a generation license is required.

Integrated Resource Plan (IRP) Intentions

1. **Increase the share of renewable energy capacity** to approximately 40% by 2030
2. **Addition** of other forms of **clean energy, including hydro and nuclear.**
3. **The closure of existing power stations** according to their stated de-commissioning schedules.
4. **Just Transition**

Source: DPE presentation October 2019: ROADMAPFOR ESKOM IN A REFORMED ELECTRICITY SUPPLY INDUSTRY

Timeline track of BESS in Eskom

- Grant of Loan Facility
- BESS inception
- WB acceptance
- Eskom Approvals
- Execution

- Eskom was granted a loan facility of US$3,75 billion by the World Bank (WB) and other Development Funding Institutions (DFIs) to support the Medupi project (approximately US$3 billion) and projects reducing carbon footprint including Majuba Rail, Sere Wind Farm and 100 MW Kiwano CSP (accepted at the time).

2010

- The Battery Energy Storage System (BESS) project replaced the Kiwano project due to technology risk, cost, and a non-responsive tender process ending in February 2016.

2016

- On 13 November 2017, WB accepted Eskom's proposal submitted 13 October 2017 after investigating many alternative renewable energy technologies subject to the following conditions, namely that Eskom:
- Board formally approve the BESS alternative, approved 26 November 2018;
- Sign Power Purchase Agreements (PPPA's) for bid windows 3.5 and 4 of the Renewable Energy Independent Power Producer Programme (REIPPP). Signed 14 April 2018.; and
- Follow WB procurement process and obtain Preferential Procurement Policy Framework Act (PPPFA) exemption. Received 08 May 2018.

2017

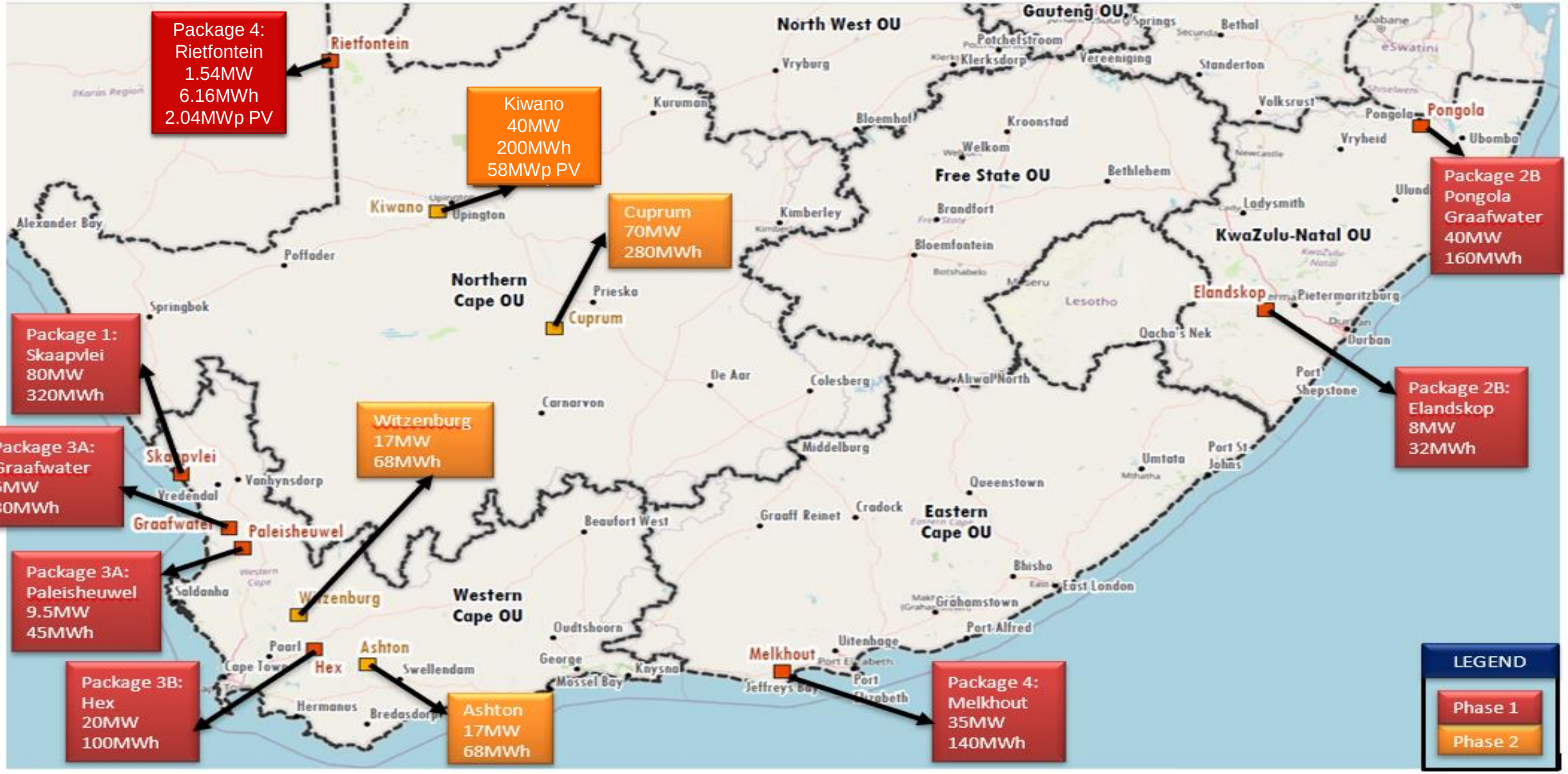
- The BESS project has received various tender and governance committee approvals including:
- 26 November 2018, Board approval for execution release approval (ERA) of R15, 616 billion; with a condition stating " The ERA's, for phase one (1) and phase two (2), will comprise of confirmed and competitive evaluated bids from the market and will be submitted to all relevant investment committees for approval of release of funds" and
- 13 March 2019, Board approval for the Phase 1 procurement strategy and later submission for the Phase 2 supplementary strategy.

2018/19

- Went out to market in March 2021 and was closed in June 2021.
- May 2022 busy with finalization of contracts with the preferred bidders.

2020 to 2022

BESS Phase 1 and 2 Site Locations



BESS Phase 1 and Phase 2 Sites

BESS Phase 1

Name	Distribution Operating Unit (OU)	BESS MW Output	Daily MWh Capacity	Total Annual Energy (MWh)	PV(MWp)	Use Case
Skaapvlei	Western Cape	80	320	116 800		AS & ES
Melkhout	Eastern Cape	35	140	51 100		AS & ES, Load Shaving
Elandskop	Kwa Zulu Natal	8	32	11 680		Load Shaving
Pongola	Kwa Zulu Natal	40	160	58 400		AS & ES
Hex	Western Cape	20	100	36 500		AS & ES, Load Shaving
Graafwater	Western Cape	5	30	10 950		ES & Load Shaving
Paleisheuwel 11kV	Western Cape	6	24	8 760		AS & ES
Paleisheuwel 22kV	Western Cape	3.5	21	7 665		ES & Load Shaving
Rietfontein	Northern Cape	1.54	6.16	2248.4	2.04	Load Shaving
TOTAL Ph1		**199.04**	**833.16**	**304 103**	2.04	

BESS Phase 2

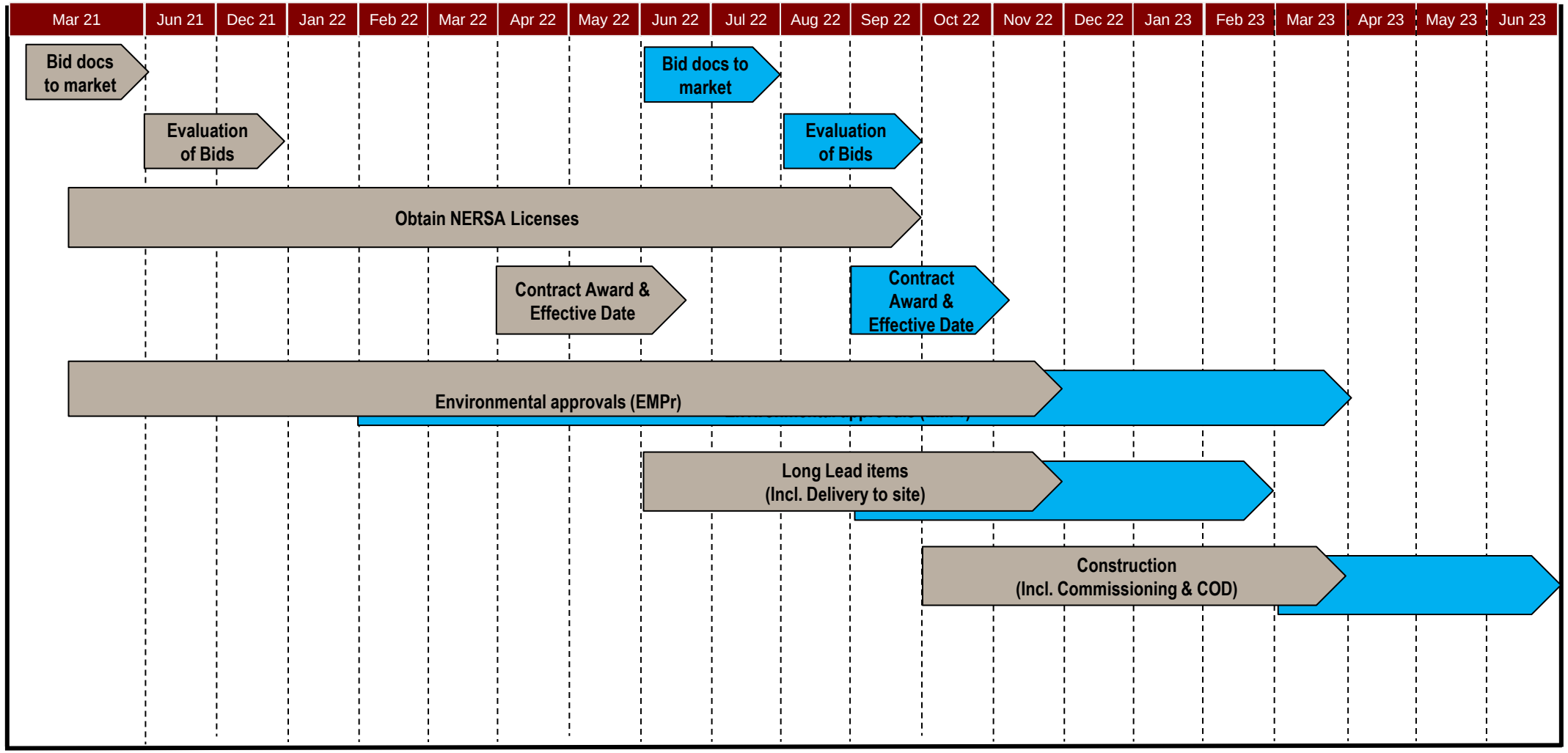
Project Name	Distribution Operating Unit (OU)	BESS MW Output	Daily MWh Capacity	Total Annual Energy (MWh)	PV (MWp)	Use Case
Witzenberg	Western Cape	17	68	24 820		Reactive Power, ES
Ashton	Western Cape	17	68	24 820		Reactive Power, Load Shaving, ES
Cuprum	Northern Cape	70	280	102 200		AS & ES
Kiwano	Northern Cape	40	200	73 000	58	AS & ES
Komati		150	600		100	
Total Ph 2		**144**	**616**	**224 840**		

Komati Still to be confirmed
Totals does not include Komati

Note: The main applications include (Use Case):

- Reactive power (RP) in networks with low fault levels and/or poor RP support;
- Load shaving (LS);
- Energy support (ES); and
- Ancillary services (AS) such as frequency support.

BESS Phase 1 High Level Schedule



Legend

Package 1,2,3

Package 4

Growing the Economy

Eskom views the development of local industry as a critical part of the government's socio-economic and transformation developmental agenda.




Item No.	Description of Item (Possible areas of subcontracting)
1	Civil (including roads), Site Establishment, Buildings and Steel work
2	Survey and Geo-technical studies
3	Network Integration Equipment (NIE) and installation
4	Shipping / Transportation Services
5	Construction/Project Management Services
6	Security installation and Services
7	O&M Sub-contracting/Joint Venture
8	Training and development of companies to be utilised by Contractor

- Improving the capacity and competitiveness of the local supply base
- Shared growth
- Employment creation
- Poverty reduction
- Skills development
- SMME and Broad-Based Black Economic Empowerment (BBBEE)
- Investment
- Export opportunities
- Increased local sales
- Research and Development (R & D)
- Technology transfer.

Some of the Key lessons learned from the BESS programme to date..

Sufficient **Front-end engineering and development** (FEED) (Technology agnostic strategy)

BESS market maturity and availability of information makes it difficult to do proper cost estimates and scheduling during planning

Introduction of new legislation which conflicts with previously agreed loan conditions (Country specific requirements i.e. NIPP, Designated materials, SDL&I)

Regulatory framework around BESS in South Africa is still being developed and refined

(Licensing, IRP Determination, Environmental)

Different rules for IPP's vs SOE's (e.g. 100MW limit)

Lack of specialized BESS skills within the country

COVID pandemic

Organisational changes creating disruptions with roles and responsibilities

END – THANK YOU

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