NATIONAL ENERGY REGULATOR OF SOUTH AFRICA

CONSULTATION PAPER

CONCURRENCE WITH THE MINISTERIAL DETERMINATION ON THE PROCUREMENT OF ESKOM'S 404MW OF NEW GENERATION CAPACITY

(BATTERY ENERGY STORAGE SYSTEMS AND SOLAR PV)

PUBLISHED ON 11 NOVEMBER 2021

Issued By

The National Energy Regulator of South Africa

Contact Details:

Tel: +27 (0)12 401 600

Fax: +27 (0)12 401 4700

irp-procurement.techrange@nersa.org.za

www.nersa.org.za

TABLE OF CONTENTS

TABLE OF CONTENTS 2
DEFINITIONS 3
ABBREVIATIONS AND ACRONYMS 4
1. NERSA'S LEGAL MANDATE 5
2. THE DRAFT SECTION 34 DETERMINATION FROM THE MINISTER 6
3. NEED FOR NEW GENERATION CAPACITY 7
4. TECHNOLOGY COSTS 8
5. PROCURER 8
6. GENERATOR 9
7. PROCUREMENT PROCESS 9
8. ANY OTHER STAKEHOLDER COMMENTS 9
9. INDICATIVE TIMELINES FOR CONCURRENCE WITH THE DETERMINATION .. **Error! Bookmark not defined.**

DEFINITIONS

In this consultation paper, any word or expression to which a meaning has been assigned, shall have a meaning so assigned, unless the context otherwise indicates.

Ancillary service	means a service supplied to the National Transmission Company by generators, network service providers, or end-user customers, necessary for the reliable and secure transport of electricity from generators to network service providers and other customers, as defined in section 4 of the System Operation Code.
Buyer	means, in relation to a new generation capacity project, any organ of state designated by the Minister of Mineral Resources and Energy in terms of section 34(1)(c) and (d) of the Electricity Regulation Act, 2006 (Act No. 4 of 2006). In this regard the buyer is Eskom.
Eskom	means Eskom Holdings Limited contemplated in section 3(1) of the Eskom Conversion Act, 2001(Act No. 13 of 2001).
Generator	means a person who generates electricity, in terms of the Electricity Regulation Act, 2006.
Government	means the Government of the Republic of South Africa.
Independent Power Producer (IPP)	means any person in which the Government or any organ of state does not hold a controlling ownership interest (whether directly or indirectly), which undertakes or intends to undertake the development of new generation pursuant to a determination made by the Minister of Mineral Resources and Energy in terms of section 34(1) of the Electricity Regulation Act, 2006 (Act No. 4 of 2006).
Minister	means the Minister of Mineral Resources and Energy
Organ of state	bears the meaning ascribed to it in section 239 of the Constitution.
Peaking project	means the energy plants or power stations that have very low capacity factors, i.e. generally produce energy for limited periods, specifically during peak-demand periods, with storage that supports energy on demand.
Power purchase agreement	or 'PPA' means an agreement concluded between a generator and the buyer for the sale and purchase of new electricity generation capacity or electricity derived therefrom, or both.
Procurer	means the person designated by the Minister in terms of section 34 of the Electricity

	Regulation Act, 2006 (Act No. 4 of 2006) as being responsible for the preparation, management and implementation of the activities related to procurement of new generation capacity under an IPP procurement programme including the negotiation of the applicable power purchase agreements, which person may or may not be a buyer.
The Act	means the Electricity Regulation Act, 2006 (Act No. 4 of 2006).
New generation capacity	**New generation capacity means –** (a) the electricity generation capacity other than the capacity of existing generation facilities; (b) the electricity derived from the capacity referred to in (a); and (c) ancillary services related thereto, individually or in any combination thereof and including an increase in the electricity generation capacity of existing generation facilities.

ABBREVIATIONS AND ACRONYMS

BESS	Battery Energy Storage Systems
DMRE	Department of Mineral Resources and Energy
IRP	Integrated Resource Plan
LCOE	Levelised Cost of Electricity
MW	Megawatt
NERSA	National Energy Regulator of South Africa
OCGT	Open Cycle Gas Turbine
PV	Photovoltaic

1. NERSA'S LEGAL MANDATE

1.1 The National Energy Regulator (NERSA) is a regulatory authority established as a juristic person in Terms of Section 3 of the National Energy Regulator Act, 2004 (Act No. 40 of 2004). NERSA's mandate includes regulation of the Electricity Supply Industry.

1.2 In accordance with section 34 of the Electricity Regulation Act, 2006 (Act No. 4 of 2006) ('the Act'), the Minister of Mineral Resources and Energy ('the Minister') may, in consultation with the Energy Regulator:

a) determine that new generation capacity is needed to ensure the continued uninterrupted supply of electricity;
b) determine the types of energy sources from which electricity must be generated, andthe percentages of electricity that must be generated from such sources;
c) determine that the electricity thus produced may only be sold to the persons or in a manner set out in such notice;
d) determine that electricity thus produced must be purchased by the persons set out in such notice; and
e) require that new generation capacity must –
    i. be established through a tendering procedure which is fair, equitable,transparent, competitive and cost-effective; and
    ii. provide for private sector participation.

1.3 In line with the Promotion of Administrative Justice Act, 2000 (Act No. 3 of 2000) (PAJA), which intends to give effect to the right to administrative action that is lawful, reasonable and procedurally fair; NERSA is required to seek public participation before concurring to the section 34 determination.

1.4 This public participation process will enable NERSA to appropriately apply its regulatory mandate and decision-making, having considered public opinion prior to concurrence with the ministerial determination.

1.5 NERSA is therefore requesting stakeholders to comment on the new generation capacity to be procured from BESS and Solar PV as set out in this consultation paper and the Ministerial draft determination attached as **ANNEXURE A**.

2. THE DRAFT SECTION 34 DETERMINATION FROM THE MINISTER

2.1 On 31 August 2021 NERSA received the draft section 34 determination attached as from the Minister of the Department of Mineral Resources and Energy (DMRE) (hereinafter referred to as ‘’the Minister’’), requesting NERSA to confirm concurrence with the section 34 determination for the procurement of 344MW from BESS and 60MW Solar PV based on capacities shown in Table 5 of the IRP2019[1].

2.2 The Minister acting under section 34(1) of the Act and the Electricity Regulations on New Generation Capacity (published as GNR399 in Government Gazette No.34262 dated 04 May 2011) has determined as follows:

1) that new generation capacity is needed to be procured or bought to contribute towards energy security, accordingly;
    a. 344 megawatts (MW) should be generated from Battery Energy Storage Systems (BESS), which represents a portion of the capacity allocated under the heading ‘’Storage’’, for the year 2029, in Table 5 of the Integrated Resource Plan for Electricity 2019-2030 (published as GN1360 of 18 October 2019 in Government Gazette No. 42784) (‘’IRP2019’’);

    b. 60 megawatts (MW) should be generated from Solar PV, which represents a portion of the capacity allocated under the heading ‘’Solar PV’’, for the year 2025, in Table 5 of the Integrated Resource Plan for Electricity 2019-2030 (published as GN.1360 of 18 October 2019 in Government Gazette No. 42784) (‘’IRP2019’’);

2) electricity produced from the new generation capacity (‘’the electricity’’) shall be procured or bought through one or more of tendering procedures which are fair, equitable, transparent, competitive and cost effective;

3) the electricity procured or bought shall target connection to the Grid as soon as reasonably possible in line with the timetable set out in Table 5 of the IRP2019. Deviations from the timetable set out in Table 5 are permitted to the extent necessary taking into account all relevant factors including prevailing energy security risks, the time required for efficient procurement and the required construction timelines for such new generation capacity facility;

[1] IRP 2019, Page 47

4) the generation capacity must be procured or bought by Eskom Holdings SOC Ltd.

3. NEED FOR NEW GENERATION CAPACITY

3.1 The IRP2019 states that when energy storage costs were revised to the latest information, and taking into account the longer gas infrastructure lead time, the modelling system selected more energy storage. This can be expected, given the extent of the wind and solar PV option in the IRP.

3.2 According to the IRP2019, 5400MW of coal generation will be decommissioned by 2022, increasing to 10 500MW by 2030.

3.3 One of the conditions of the loan agreements concluded for the construction of Medupi Power station in 2010 was for Eskom to develop and implement projects that would reduce their carbon footprint. As part of the deal, Eskom secured highly concessional financing for these projects.

3.4 In view of the above, Eskom seeks to procure a 344MW (approximately 1440MWh daily capacity) BESS with 60MW Solar PV based on IRP2019 capacity allocations.

3.5 According to the Feasibility Report attached hereto as **ANNEXURE 2**, Eskom has identified 13 projects to be implemented mostly in the Western Cape, Northern Cape and KwaZulu Natal provinces. The Feasibility Report was used to establish the validity of benefits to be derived for the country and provides a justification for the Eskom BESS project in order for DMRE to make an informed decision.

3.6 In view of the above, stakeholders are requested to provide inputs on the following aspects:

a) The IRP2019 planned for 513MW by 2022 and 1575MW by 2029 of storage. Eskom proposes that this new generation capacity should come online earlier than 2029 in order to address the current challenges of keeping the lights on in South Africa. Furthermore Eskom can only make capital expenditure drawdowns before the loan closing date of 31 Dec 2022 as per conditions from the funders. Failure to complete the identified projects by the closing date will damage Eskom's reputation and also negatively impact future business dealings with the funders. Therefore it became necessary to bring forward the completion date of the projects.

Please comment on the appropriate timing for bringing this new generation capacity online.

b) Eskom's feasibility study states that network strengthening requirements for capacity, ancillary services, energy support services and voltage constraints will be addressed by battery energy storage solution.

Comment on the role and appropriateness of BESS in addressing the issues identified in the feasibility study. Include benefits of the 404MW in terms of reducing load shedding, usage of OCGTs and dumped energy payments.

4. TECHNOLOGY COSTS

4.1 The IRP2019 annexure report on Power Generation Technology Data indicated the costs shown in Table 1.

Table 1: BESS and Solar PV costs

Technology type	Battery Li-ion	Solar PV
Rated capacity,MW net	3	10
Storage hours	3	
Capacity Factor %		19.9
Fuel cost R/MWh	0	0
O&M R/MWh	778.1	158.1
Capital Cost R/MWh	3980.4	2706.1
LCOE EPRI,R/MWh	6141.3	2864.3

Do you think that Batteries are the best technology to ensure affordability of electricity by customers? In your discussion, include: variable O&M (cost of charging the BESS), fixed O&M costs, capital costs and LCOE.

5. PROCURER

5.1 The generation capacity must be procured or bought by Eskom Holdings SOC Ltd.

a) *Provide your thoughts on Eskom as the Procurer of the new generation capacity in light of the current unbundling process taking place?*

b) *Given that the 404MW will form part of Eskom's existing generation fleet, provide your thoughts on Eskom as the Buyer of the new generation capacity in light of the unbundling that is presently taking place, as well as any risk associated therewith considering the state of Eskom's finances.*

6. GENERATOR

6.1 The generation capacity must be procured or bought by Eskom Holdings SOC Ltd.

a) Provide your thoughts on Eskom as the chosen entity to establish (i.e. power producer) of this new generation capacity, as well as any risk associated therewith.

b) Provide what you consider to be the risks (technical, financial or otherwise), associated with the new capacity. Propose how Eskom should be allowed to recover costs in order to protect electricity customers from project cost overruns.

c) Do you think that Eskom should consider Public-Private Partnerships with Independent Power Producers (IPP) in order to share the risk associated with the costs of the 344MW BESS with the 60MW Solar PV?

7. PROCUREMENT PROCESS

7.1 The electricity produced from the new generation capacity (''electricity'') shall be procured or bought through one or more tendering procedures which are fair, equitable, transparent, competitive and cost-effective.

a) Provide your thoughts on the method of procurement chosen for the procurement of new generation capacity? Include comments on the most appropriate plant construction model (e.g. multiple-contractors, single contractor, EPC or EPCM).

8. OTHER STAKEHOLDER COMMENTS

a) Should NERSA concur with this ministerial determination as per the prescripts of section 34 of the Act?

b) Provide any other input or comment on any other aspects that were not raised in this consultation paper but form part of the proposed concurrence with the Ministerial Determination on the procurement of 404MW of new generation capacity.

Written comments should be sent to NERSA for the attention of **Mr Mondli Shozi** at:

Physical address: Kulawula House
526 Madiba Street
Arcadia

Pretoria,0083

Postal address: PO Box 40343
Arcadia
Pretoria,0007

Email: irp-procurement.techrange@nersa.org.za;

The closing date for the submission is 30 November 2021. For more information and queries on the above, please contact **Mr Mondli Shozi** at:

Tel.: 012 401 4769

Fax: 012 401 4700

Kindly provide the name, address, telephone number, fax number and email address of the person or organisation submitting the comments. Submissions made after the deadline will not be considered.

ATTACHMENTS

ANNEXURE 1: Draft section 34 determination

ANNEXURE 2: Public version: Eskom Bankable Feasibility Report

DEPARTMENT OF MINERAL RESOURCES AND ENERGY

DETERMINATION UNDER SECTION 34(1) OF THE ELECTRICITY REGULATION ACT, 2006 (ACT NO. 4 OF 2006)

The Minister of Mineral Resources and Energy ("the Minister"), in consultation with the National Energy Regulator of South Africa ("NERSA"), acting under section 34(1) of the Electricity Regulation Act, 2006 (Act No. 4 of 2006) (as amended) (the **ERA**) and the Electricity Regulations on New Generation Capacity (published as GNR. 399 in Government Gazette No. 34262 dated 04 May 2011) ("Regulations"), has determined as follows:

1. that new generation capacity is needed to be procured or bought to contribute towards energy security, accordingly,
   1.1 344 megawatts (MW) should be generated from Battery Energy Storage Systems (BESS), which represents a portion of the capacity allocated under the heading "Storage", for the year 2029, in Table 5 of the Integrated Resource Plan for Electricity 2019 - 2030 (published as GN 1360 of 18 October 2019 in Government Gazette No. 42784)("IRP 2019");
   1.2 60 megawatts (MW) should be generated from Solar PV, which represents a portion of the capacity allocated under the heading " Solar PV", for the year 2025, in Table 5 of the Integrated Resource Plan for Electricity 2019 - 2030 (published as GN 1360 of 18 October 2019 in Government Gazette No. 42784)("IRP 2019");

2. electricity produced from the new generation capacity ("the electricity") shall be procured or bought through one or more tendering procedures which are fair, equitable, transparent, competitive and cost-effective;

3. the electricity procured or bought shall target connection to the Grid as soon as reasonably possible in line with the timetable set out in Table 5 of the IRP 2019. Deviations from the timetable set out in Table 5 are permitted to the extent necessary taking into account all relevant factors including prevailing energy security risks, the time required for efficient procurement and the required construction timelines for such new generation capacity facility;

4. the generation capacity must be procured or bought by Eskom Holdings SOC Ltd.

Concurrence to this Determination given by the National Energy Regulator of South Africa on the below mentioned date:

Signed: _____
MR FUNGAI SIBANDA
PART-TIME REGULATOR MEMBER: NERSA
DATE:

Determination made by the Minister of Mineral Resources and Energy on the below mentioned date:

Signed: _____
MR GWEDE MANTASHE, MP
MINISTER: MINERAL RESOUCES AND ENERGY
DATE: 31/08/2021

Eskom	**Report**	

Title:

Battery Energy Storage Systems (BESS)

Bankable Feasibility Report

Content

1. DOCUMENT PURPOSE 3
2. HIGH LEVEL PROBLEM STATEMENT 4
3. STRATEGIC ALIGNMENT 5
4. EXECUTIVE SUMMARY 5
5. STRATEGIC CONSIDERATIONS AND OVERVIEW 7
6. TECHNICAL INFORMATION 10
7. REGULATORY AND LEGAL 22
8. FINANCE 29
9. FUNDING 32
10. SCHEDULE 33
11. STAKEHOLDER MANAGEMENT 35
12. RISKS OF NOT RECEIVING A DETERMINATION 38
13. CONCLUSION 40
14. DOCUMENT ACKOWLEDGEMENT 41

1. LIST OF ABBREVIATIONS

BESS	Battery Energy Storage Systems
DMRE	Department of Mineral Resources and Energy
IPP	Independent Power Producers
IRP	The Integrated Resource Plan
PV	Photovoltaic
DFI	Development Funding Institution
NCOU	Northern Cape Operating Unit
ECOU	Eastern Cape Operating Unit
WCOU	Western Cape Operating Unit
KZNOU	Kwa Zulu Natal Operating Unit
AS	Ancillary services
ES	Energy Support
MW	Megawatt
MWh	Megawatt hour
NT	National Treasury
DPE	Department of Public Enterprises
PFMA	Public Finance Management Act
BA	Basic Assessment
BAR	Basic Assessment Report
EAP	Environmental Assessment Practitioner
EMPr	Environmental Management Programme
NTC	National Transmission Company
SO	System Operator
SAPP	Southern African Power Pool
SADC	Southern African Development Community
FFR	Fast Frequency Response
RoCoF	Rate of Change of Frequency
WEF	Wind Energy Farm
POC	Point of Connection
NMD	Notified Maximum Demand
RE	Renewable Energy

NERSA	National Energy Regulator of South Africa
PFMA	Public Finance Management Act
PPP	Public Participation Process
CSDP	Competitive Supplier Development Programme
SDL&I	Supplier Development Localisation and Industrialisation
RfB	Request for Bid
Exco	Executive Tender Committee
IFC	Board Investment and Finance Committee
NIPP	National Industrialisation Participation Programme
SMME	Small Medium and Micro Enterprise
BEE	Black Economic Empowerment
B-BBEE	Broad Based Black Economic Empowerment
CTF	Clean Technology Fund
WB	World Bank
AFDB	African Development Bank
NDB	New Development Bank
JET	Just Energy Transition
COD	Commercial Operation Date
NGO	Non-Governmental Organisation
EPC	Engineer Procure Construct
CoE	Center of Excellence
Dx	Distribution

2. DOCUMENT PURPOSE

This document presents benefits to be delivered by the BESS facilities to the country to DMRE for the purpose of determination application. Eskom's application is for a determination against the 1575MW planned for in 2029 for storage according to IRP 2019.

3. HIGH LEVEL PROBLEM STATEMENT

The country is currently experiencing load shedding as a result of Eskom not meeting current demand with the fleet of generation capacity constraints. This is due to numerous factors, one being a lack of additional generation capacity being added to the Grid.

4. STRATEGIC ALIGNMENT

Department of Mineral Resources and Energy commits to develop adequate generation capacity to meet electricity demand. This will be done via IPP's as per IRP 2019. In response to the need for additional capacity and also to support the IPP's coming on line, Eskom has invested in the BESS project which forms part of the loan agreements concluded for the construction of Medupi power station in 2010.

5. EXECUTIVE SUMMARY

5.1. Introduction

The IRP gazetted in March 2019, recognises the fast developments in the battery energy storage and in section 5.3.8, it acknowledges that. The IRP model has picked more storage ahead of gas in the period to 2030; storage 2088 MW (513 MW in 2022 and 1575 MW in 2029) is required.

Investment into BESS and PV in the generation capacity is useful in that it will catch excess PV and wind, thereby making the power system more resilient to possible blackouts without flexible generation, of which energy storage is a cheaper solution. It will be impossible to ramp up for peak in future when PV tapers off daily in the evening.

The Eskom BESS project supports transformational aspects by demonstrating large-scale deployment in support of the South African renewable energy strategy and addresses local overall system challenges. The BESS primary use case would be for energy support to the grid 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.

This project forms part of the World Bank funding set of criteria for the Major Build program, and requires a carbon friendly solution to be implemented in Eskom.

5.2. Technical Information

The network strengthening requirements for capacity, ancillary, energy support services and voltage constraints are addressed by BESS projects.

The projects are being pursued as Phases 1 and 2 of the DFIs co-funded project. The comprehensive list of phase 1 and 2 projects are presented in Table 1 and Table 2, respectively.

Table 1: Phase 1

Name	**MW Output**	**Daily MWh Capacity**	**Total Annual Energy (MWh)**	**Use Case**
Skaapvlei (WCOU)	80	320	116 800	AS & ES
Melkhout (ECOU)	35	140	51 100	AS & ES, Load Shaving
Elandskop (KZNOU)	8	32	11 680	Load Shaving
Pongola (KZNOU)	40	160	58 400	AS & ES
Hex (WCOU)	20	100	36 500	AS & ES, Load Shaving
Graafwater (WCOU)	5	30	10 950	ES & Load Shaving
Paleisheuwel 11kV	6	24	8 760	AS & ES
Paleisheuwel 22kV	3.5	21	7 665	ES & Load Shaving
Rietfontein (NCOU)	1.54 (plus 2.04MW PV)	6.16	2248.4	Load Shaving
TOTAL Ph1	**199.04**	**833.16**	**304 103**	

Table 2: Phase 2

Project Name	**MW Output**	**Daily MWh Capacity**	**Total Annual Energy (MWh)**	**Use Case**
Witzenberg (WCOU)	17	68	24 820	Reactive Power, ES
Ashton (WCOU)	17	68	24 820	Reactive Power, Load Shaving, ES
Cuprum (NCOU)	70	280	102 200	AS & ES
Kiwano (NCOU)	40 (plus 58MW PV)	200	73 000	AS & ES
Total Ph 2	**144**	**616**	**224 840**	

5.3. Regulatory and Permits

Eskom received full PFMA approval from NT on 8 August 2019 and from the DPE Minister on 22 November 2019 for Phase 1 only for R7.2 billion. A separate PFMA application for Phase 2 will be submitted to DPE for a decision consequent to completion of detailed technical feasibility studies.

The proposed BESS projects triggers the need for a BA. The BA process has been undertaken for eight sites (seven for phase 1 and one for phase 2). Mitigation measures to minimise or eliminate impacts that were identified by the specialists and EAPs were utilised towards the preparation of the EMPr. The EMPr must be read in conjunction with the BAR of each site respectively and is essential towards the protection of the environmental elements whilst establishing BESS. The project has to date obtained EAs for Phase 1 except Rietfontein and 1 for Phase 2 projects.

5.4. Funding

Eskom secured highly concessional funding from Development Funding Institutions (DFIs) to support the Battery Energy Storage System (BESS) project. The project will be co-financed by the Clean Technology Fund (CTF) under two USD denominated facilities with the World Bank (WB) and African Development Bank (AFDB) separately as implementing agencies, as well as a ZAR denominated facility from the New Development Bank (NDB). Delivery of this project would contribute towards meeting the developmental outcomes and objectives of the financing agreements, which in most part affect the performance of the loans and impact on future collaboration between Eskom and the DFIs.

Phase 1 sites are anticipated to be commissioned in August 2022 while Rietfontein, which forms part of Phase 1 is expect to be commissioned in December 2022. Phase 2 is forecasted to be commissioned in December 2023.

Eskom will actively engage with its stakeholders to ensure the achievement of our strategy and strive towards a multi-stakeholder approach towards solving difficult project challenges.

6. STRATEGIC CONSIDERATIONS AND OVERVIEW

This document describes the business case for the development and implementation of the 1449 MWh of Distributed Battery Energy Storage System (BESS) with 60 MW of Distributed Solar Photo Voltaic (PV) Project. The project is located in four provinces thus; Western Cape, Eastern Cape, Kwazulu-Natal and Northern Cape for BESS rollout.

6.1. Justification for BESS Project

The IRP 2019 presents an outlook of increased renewable energy share in the South African power system. The shortcomings associated with the renewable energy generation is that it is not dispatchable and it is also variable depending on the resource availability. BESS is required to provide a level of flexibility to the System Operator and provide system security.

The Eskom BESS will be used to operate as a load during the low load high RE generation on the system and it will be used as a generator when there is less generation and high load demand. Thus, the BESS will be used for grid energy support at System Operator's request.

In addition to energy support, the BESS will be applied for provision of ancillary services to the power system. The BESS's unique capability to operate within milli-seconds of activation dispatch instruction makes it a favourable technology for a grid that has a high RE share.

At a local distribution network level, the BESS will be used to create network capacity and allow for connection of customers such as electrification. This application is referred to as load shaving in this report. Instead of building network infrastructure, the BESS will be applied to create the required capacity.

With the increase in RE share at a local network level, such as the wind energy farms in the Eastern Cape and solar PV based generation in the Northern Cape, the network is likely to experience voltage fluctuations when these generators are operating. The Eskom BESS is required to manage and control such situations to ensure a secured network with green energy generation. As such, the BESS will assist in allowing more RE generation, thus improving Eskom's carbon footprint reduction.

The Eskom BESS will assist the network operating at both local and system level.

6.2. Project support to the long-term objectives of South Africa

The development of new power stations needs to consider a trade-off between three fundamental issues namely (i) security of supply (the country should always have sufficient electricity and primary energy resources as an enabler for economic growth), (ii) environmental concerns (South Africa will pursue low carbon generation options going forward, to contribute positively to climate change initiatives) and (iii) economic efficiency and cost (electricity infrastructure development and a globally competitive supply chain should be a driver of macro-economic development).

The BESS development supports the supply security, environmental sustainability and economic efficiency.

6.3. Supply considerations

The Integrated Resource Plan (IRP 2019) developed by the Department of Mineral Resources and Energy (DMRE) reflects committed and new build options until 2030. Energy Storage will be required in 2029 as stipulated on the IRP 2019.

	Coal	Coal (Decommissioning)	Nuclear	Hydro	Storage	PV	Wind	CSP	Gas & Diesel	Other (Distributed Generation, CoGen, Biomass, Landfill)
Current Base	37 149		1 860	2 100	2 912	1 474	1 980	300	3 830	499
2019	2 155	-2373					244	300		Allocation to the extent of the short term capacity and energy gap.
2020	1 433	-557				114	300			
2021	1 433	-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					1 600		2000	500
2028		-475				1000	1 600			500
2029		-1684			1575	1000	1 600			500
2030		-3050		2 500		1 000	1 600			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 Design Life
Includes Distributed Generation Capacity for own use

Figure 2: IRP 2019

The anticipated future growth in the South African economy and the impact that this could have on the long-term power generating capacity of Eskom has initiated a long term planning scenario with respect to the requirements for new generating plant when the need arises. The IRP 2019 is the product of a planning process by DMRE that has the strategic objective of developing a sustainable electricity investment strategy for generation in the Southern African interconnected system.

It must be noted that Eskom was already preparing to pilot an energy storage technology project based on batteries when the IRP 2019 was prepared and proclaimed. Since energy storage-technology is a proven technology, Eskom is pursuing a commercial operating license with NERSA for the BESS facilities. The project will enable the assessment and development of the technical applications and benefits, the regulatory matters that relate to a utility-scale energy storage technology and the enhancement of assumptions for future iterations of the IRP.

Eskom developed a business case for the BESS project to be considered earlier in year 2022/2023 based on the following:

- Eskom secured funding from Development Funding Institutions (DFIs) to support the Eskom Capital Expansion Programme, which included financing for projects that would reduce carbon footprint like Majuba Rail, Sere Wind Farm and 100 MW Kiwano CSP (currently replaced with the BESS project in February 2018).
- Delivery of these projects would contribute towards meeting the developmental outcomes and objectives of the financing agreements, which in most part affect the loan performance and impact on future collaboration between Eskom and the DFIs.
- Eskom faces serious challenges in terms of keeping the lights on in South Africa and has committed to the diversification of its portfolio. The BESS project will help in both ways.

7. TECHNICAL INFORMATION

This section presents BESS projects, where network strengthening requirements for capacity, ancillary, energy support services and voltage constraint are addressed via a battery storage solution.

The Battery Storage technology enables the immediate levels of constraint to be addressed, and provide continued electricity supply access to the customers.

This section discusses the set of projects that are being pursued as phases 1 and 2 of the DFIs co-funded project. The comprehensive list of phase 1 and 2 projects are presented in Table 3 and Table 4, respectively.

Table 3: BESS Phase 1 Project list

Name	MW Output	Daily MWh Capacity	Total Annual Energy (MWh)	Use Case
Skaapvlei (WCOU)	80	320	116 800	AS & ES

Melkhout (ECOU)	35	140	51 100	AS & ES, Load Shaving
Elandskop (KZNOU)	8	32	11 680	Load Shaving
Pongola (KZNOU)	40	160	58 400	AS & ES
Hex (WCOU)	20	100	36 500	AS & ES, Load Shaving
Graafwater (WCOU)	5	30	10 950	ES & Load Shaving
Paleisheuwel 11kV	6	24	8 760	AS & ES
Paleisheuwel 22kV	3.5	21	7 665	ES & Load Shaving
Rietfontein (NCOU)	1.54 (plus 2.04MW) PV)	6.16	2248.4	Load Shaving
TOTAL Ph1	**199.04**	**833.16**	**304 103**	

Table 4: BESS Phase 2 Project list

Project Name	**MW Output**	**Daily MWh Capacity**	**Total Annual Energy (MWh)**	**Use Case**
Witzenberg (WCOU)	17	68	24 820	Reactive Power, ES
Ashton (WCOU)	17	68	24 820	Reactive Power, Load Shaving, ES
Cuprum (NCOU)	70	280	102 200	AS & ES
Kiwano (NCOU)	40	200	73 000	AS & ES
Total Ph 2	**144**	**616**	**224 840**	

Notes:

- Load shaving can be interpreted as Distribution Capital Deferment

The geographical locations for phase 1 and 2 projects listed above are shown on the map below.

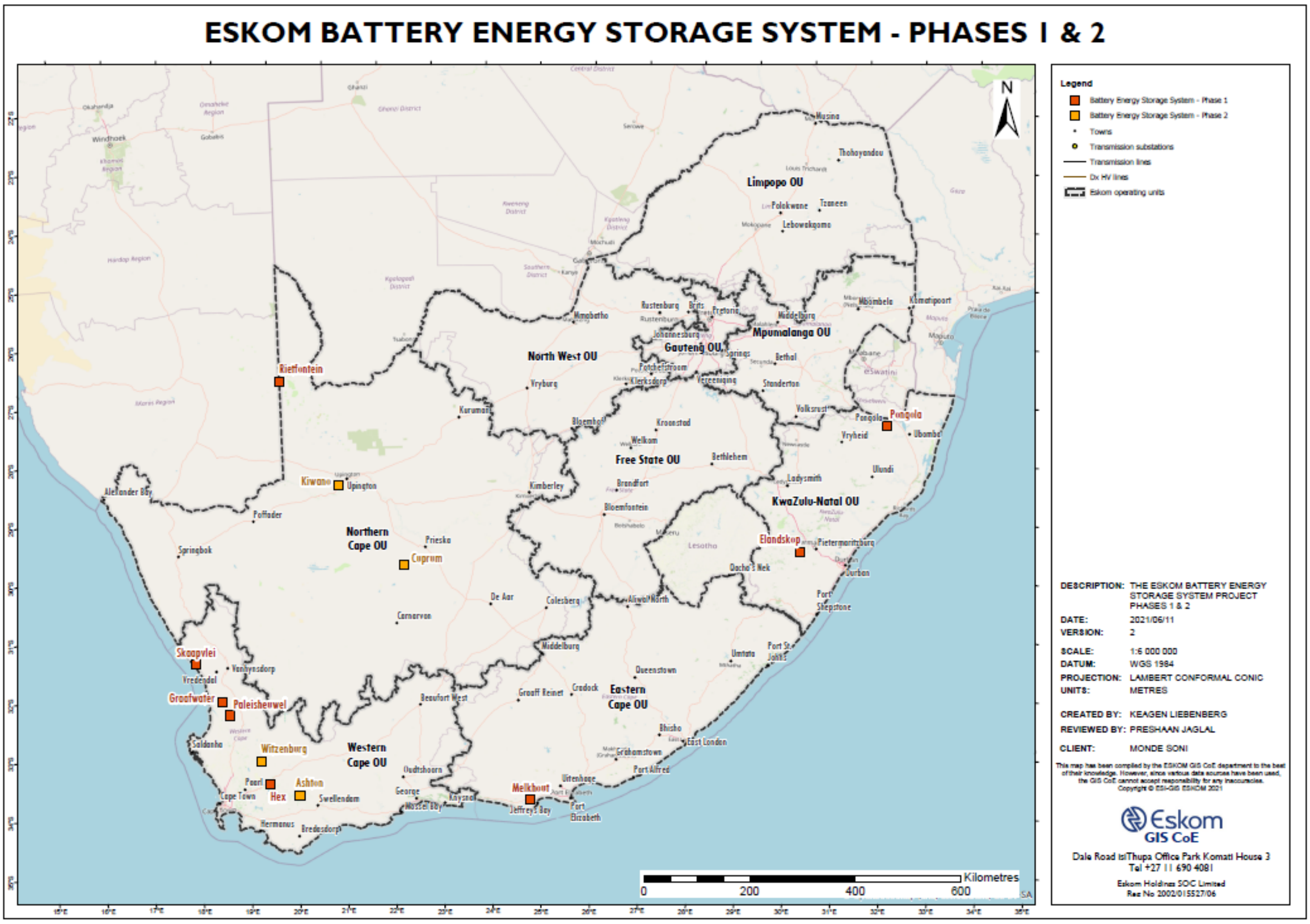


Figure 3: Geographical Overview of BESS Phase 1 & 2 (Source: Eskom GIS CoE)

In the sections below, each project is discussed in detail with regard to its application towards the grid.

7.1 Distribution Capital Deferral

Distribution network in South Africa is characterised by long feeders and remote substations with constraints such as low voltage and thermal overloading. Figure 4 below shows a spatial representation of constrained networks in at Eskom.

Figure 4: Eskom's Constrained Networks

Due to financial constraints, Eskom Distribution is unable to finance the conventional solutions for some of the networks . One of the criteria that were followed in selecting BESS sites was that it must be applicable to the surrounding network to assist in solving the Dx network constraints. As such, the BESS will be distributed on the Distribution network in order to alleviate some of the network constraints.
Below is the list of BESS projects that will be used to solve Distribution network constraints.

Table 5: Phase 1 Capex Deferral Costs

Name
Melkhout (ECOU)
Elandskop (KZNOU)
Pongola (KZNOU)
Hex (WCOU)
Paleisheuwel 11kV, 22kV & Graafwater (WCOU)
Rietfontein (NCOU)
TOTAL Ph1

Table 6: Phase 2 Capex Deferral Costs

Project Name
Witzenberg (WCOU)
Ashton (WCOU)
TOTAL Ph2

Network technical violation issues are largely seasonal. This means that the load increases to its peak for few days during the season (usually winter for residential customers and summer for farming customers). This makes it possible to use the BESS for Distribution investment deferral where the BESS will serve the Distribution network during high load season and the BESS would be available for the system operator on the remainder of other seasons.

While the BESS will be used to perform load shaving on the local network, it inevitably contributes towards peak and duck curve reduction when it is dispatched in the evening or morning. This promotes the stacking of benefits from the BESS.

7.2 Ancillary Services Application

Eskom BESS facilities will be used for Ancillary Services as benefit stacking.

7.2.1 What are Ancillary Services?

Ancillary Services are services supplied to the National Transmission Company by generators, distributors or end-use customers. They are necessary for the reliable and secure transportation of power from generators to distributors and other customers, as defined in the South African Grid Code (System Operation Code, Section 4). System Operator specifies technical requirements for ancillary services over a 5-year time horizon and uses these to contract for the forthcoming financial year.

7.2.2 Current Reserves Provision

The System Operator contracts with service providers (generators and customers) based on the quantified technical requirements as stated above. Owing to the prevailing generation capacity constraints, the current provision of generation reserves is below target and this makes it difficult for SO to adhere to the

minimum grid code requirements on frequency control. The South African power system is interconnected with the SAPP network, which comprises of mainly SADC countries. It is critical for SO to carry sufficient operating reserves to comply with SAPP and grid code requirements on frequency control. The current generation capacity constraints make it a challenge for SO to meet set frequency control targets. The BESS capacity being developed by Eskom, will contribute towards assisting the SO to alleviate some of these challenges by providing additional capacity required to control frequency within prescribed limits.

7.2.3 System Reliability as the RE Share Increases

The 2019 IRP indicates that over 15 GW of inverter-based renewable generation will be installed by 2025. This significant penetration of intermittent generation is expected to introduce reliability and other operational related challenges. The ancillary services technical requirements indicate that regulating reserves requirements will increase to cater for the volatility of inverter-based generation. This highlights the need for more flexible resources required to operate the grid in a reliable manner. BESS has the required characteristics to increase flexibility on the interconnected power system in terms of speed of response, faster ramping, acting as a generator (supplying power) or acting as a load (consuming power) and providing frequency response in both operational modes.

7.2.4 Contribution of BESS on System Stability

The integration of significant amount of inverter-based generation to the grid may result in displacement of synchronous generation capacity during certain hours in a year. Consequently, the system will be operated with lower rotational energy or inertia in those hours. This will have an impact on power system stability. The extent of the expected impact is currently being evaluated by SO. Internationally, utilities use BESS capacity to provide ancillary services such as FFR to counter the impact of lower grid inertia, which often results in lower frequency nadir and higher rate of change of frequency during network disturbances and facilitate the integration of renewables on the grid. In addition to offering other operating reserves, the Eskom BESS is required to also offer FFR to stabilise system frequency in the event of unexpected loss of generation capacity or load.

Table 7 lists the requirements from the SO that will be played by the Eskom battery energy storage facilities towards grid stabilisation.

Table 7: System Operator ancillary services requirements for BESS

Reserve type	% MW Available capacity	Maximum response time (Full activation)	Maximum required duration to maintain response	Notification time	Typical dispatches
Instantaneous	+/-100%	400 milliseconds	10 minutes	Automatic	2/day
Regulating	+/-100%	4 seconds	1 hour	Automatic	300/hour
Ten minute	+/-100%	1 minute	2 hours	1 minute	2/day
Supplemental	+/-100%	1 minute	2 hours	10 minutes	1/day

7.2.5 BESS Facilities to be used for Ancillary Services

In addition to providing energy support, phases 1 and 2 projects will also provide capacity for ancillary services. The sites and capacities are listed in Table 8.

Table 8: BESS Facilities to be applied for Ancillary Services

Phase 1 Projects		**Phase 2 Projects**	
Name	**MW**	**Name**	**MW**
Skaapvlei (WCOU)	80	Cuprum (NCOU)	70
Melkhout (ECOU)	35	Kiwano (NCOU)	40
Pongola (KZNOU)	40		
Hex (WCOU)	20		
Paleisheuwel & Graafwater (WCOU)	14.5		
Totals	**189.5**		**110**

7.3 Energy Support

The System Operator's Medium Term System Adequacy Outlook 2020 report indicates that system adequacy is dependent on the realisation of the IRP capacity, risk mitigation power and extension of the current fleet's shutdown dates. It further highlights that load reduction has resulted in System Operator being unable to supply 1.0 TWh and 1.2 TWh in 2019 and 2020 respectively. BESS capacity will contribute

towards the provision of energy capacity required to minimise unserved energy and support economic growth.

7.4 Review of BESS Projects and their Applications

This section summarises phase 1 and 2 BESS projects. The detailed reports per project are attached as appendices.

7.4.1 Skaapvlei (WCOU) 80MW/320MWh BESS

Skaapvlei BESS will be situated at Sere Wind Energy Facility in Western Cape.
The BESS will be used for

- Energy Support,
- Ancillary services, and
- Renewable energy shifting

It is strategically located such that it can be charged from the adjacent WEF or from the grid. Its full capacity will be available to provide all reserves required by the SO on day-ahead contract basis. This BESS will be well suited to provide reactive power support to the system when dispatched to do so.

7.4.2 Melkhout (ECOU) 35MW/140MWh

Melkhout BESS will be situated in an area that has high variable renewable energy share in the Eastern Cape. It will be connected at Melkhout Substation that is a collector substation for five wind generation IPPs. The 132kV corridor between Grassridge MTS and Melkhout substation experiences congestion when all wind generating plants are generating in the vicinity. This makes it difficult to evacuate power from Melkhout to the rest of the system. On days when the congestion takes place, the BESS will be dispatched to charge from the nearby WEFs and the energy can be used when required by the SO.
Melkhout BESS will be used for

- Congestion relief,
- Energy Support,
- Ancillary services, and
- Renewable energy shifting

The congestion issue is estimated to take place 10 times in a year. That means the BESS will be largely available to support the SO requirements.
The BESS integration to the grid is via 132kV POC. This enables the BESS to be scheduled to charge during WEF generation in the area and it can be applied for Ancillary Services when available.

7.4.3 Elandskop (KZNOU) 8MW/32MWh

Elandskop network is operated at 88kV and it gets its supply via 132kV radial line from Ariadne MTS situated in Kwa Zulu Natal. The dominant load type at Elandskop is residential load. It is envisaged that the 80MVA, 132/88kV transformer is likely to overload within the next ten year horizon. Also, the 20MVA, 88/11kV transformer is currently running at its full capacity and the load is expected to grow, creating a thermal issue and accelerating transformer aging.

A single BESS facility is proposed to perform load shaving on the 20MVA and 80MVA transformers, thereby creating capacity to electrify more households and businesses in the area. The BESS is expected charge during the night time from the grid when the national demand is low and discharge in the morning to de-load the transformer. During the day, the BESS will be allowed to charge in preparation for the evening peak. The proposed operation will benefit the system as the loading at Elandskop is highly correlated to the system level. Thus, Elandskop will contribute towards peak reduction or what is known as the duck curve.

The selected use case for Elandskop BESS is:

- Load shaving for the 20MVA, 88/11kV and 80MVA, 132/88kV transformers.

The BESS is expected to perform this function on a daily basis throughout the year.

7.4.4 Pongola (KZNOU) 40MW/160MWh

Pongola substation feeds from Normandie MTS via 2x132kV lines. The network is not constrained in terms of voltage and thermal capacity situated in Kwa Zulu Natal. The BESS will be used by Dx to contract to the system operator on

- Energy support
- Ancillary services

The application of Pongola BESS will assist the system operator to have a level of flexibility in running the system and to counter supply-demand imbalance at the system level. This BESS is expected to be available to contract to the SO throughout the year.

7.4.5 Hex (WCOU) 20MW/100MWh

The Hex BESS is required to deliver a maximum daily capacity of 20MW/100MWh at the 11kV point of connection at Hex substation situated in Western Cape. The BESS is expected to charge from the grid during night time where the national load demand is lower.

The BESS will be required to provide energy and ancillary services support as the immediate primary use case, until the load growth exceeds the thermal limit on the incoming 132kV Boskloof-Hex line. Thereafter, the BESS will provide local load shaving support as the primary use case during summer periods only. Ancillary and energy services support will be derived as primary use case during winter months when the network is lightly loaded. The BESS will be equipped with a day-ahead forecasting capability.

The ancillary and energy services will be provided at the request of the SO. The BESS owner will be informed by the SO when they are required to provide these services during storage operation, while some reserves will require an automated response.

Use cases for Hex BESS

- Ancillary services
- Energy support
- Load shaving

7.4.6 Paleisheuwel 11kV (6MW/24MWh) and 22kV (3.5MW/21MWh) (WCOU)

The Paleisheuwel BESS is divided into two projects; 11kV integration and 22kV integration. These two facilities will be located at the same place but serve different objectives situated in Western Cape.

Paleisheuwel 11kV BESS: the 11kV network at Paleisheuwel is not constrained. As such, the 6MW/24MWh BESS will be utilised for the following use cases:

- Ancillary services
- Energy support

Paleisheuwel 22kV BESS: the 5MVA, 132/22kV transformer at Paleisheuwel substation is thermally constrained. Due to the load type being farming load at Paleisheuwel, the overloading takes place in summer and the transformer is usually not overloaded during the remainder of the year. The BESS will be applied to control the load to ensure that this transformer does not get overloaded, as that will affect the transformer life span. In winter months, the BESS will be available for scheduling for energy support. Thus, the following use cases apply for the 3.5MW/21MWh BESS at Paleisheuwel:

- Load shaving
- Energy support

7.4.7 Graafwater (WCOU) (5MW/30MWh)

Graafwater substation is thermally constrained in summer due to the farming load it supplies. The BESS is to be applied to control the loading during farming peak seasons and it will be applied for energy support for the rest of the year including the winter time situated in Western Cape.

The following use cases are applied at Graafwater:

- Load shaving
- Energy support

The load shaving will allow the connection of additional customers as well, thus providing investment deferral.

7.4.8 Rietfontein (NCOU) (1.54MW/6.16MWh and 2.04MW PV)

Rietfontein-Rietfontein 33kV Line is supplied from Namibia's Nabbas Substation. It is 208km long on the SA side and is made up of Hare, Mink and Fox substations situated in Northern Cape. Thus, it is rated at 8MVA. The NMD for the SA-Nampower POS is 1.5MVA. Line is loaded at 1.4MVA and forecasted to 2.5MVA in 10 years. Nampower indicated that there is no capacity on their side to increase NMD above 1.5MVA. The nearest substation in SA is Gordonia and will need 270km of HV line and a substation if considered for strengthening.

PV and BESS Micro grid will be used to supply the envisaged load and allow for connection of electrification of indigenous people, the surrounding communities and businesses.

Use case:

- Load shaving – this will defer the capital investment.

7.4.9 Witzenberg (WC) 17MW/68MWh

Witzenberg substation is fed via a long radial line and it has low fault levels. The substation experiences low voltages due to the reactive power on the network situated in Western Cape. The BESS is to be applied to provide continuous reactive power support on the Distribution network and energy support to the system.
Use case:

- Reactive power support
- Energy support

7.4.10 Ashton (WC) (17MW/68MWh)

Ashton substation is constrained in terms of voltage and thermal loading. As the substation mainly supplies citrus farms, it usually experiences the constraints in summer season situated in Western Cape. The following use cases have been established for the Ashton BESS:

- Reactive power support
- Load Shaving
- Energy support.

Thus the BESS will provide an effective Dx capital deferral and allow for connection of customers.

7.4.11 Cuprum (NC) (70MW/280MWh)

Cuprum substation is collector substation for several RE IPPs in the surrounding area. The proposed BESS will be fully utilised for the purpose of the system in line with Scheduling and Dispatch Rules situated in Northern Cape. The following use cases will be applied:

- Ancillary services
- Energy support

Distribution will contract to the System Operator on a day-ahead basis for the above stated services.

7.4.12 Kiwano (NC) (40MW/200MWh and 58MW PV)

Kiwano BESS and PV is planned to be located where the original Kiwano CSP site was acquired near Upington in Northern Cape. The co-located plants will be operated freely from one another, making it possible to charge from the grid at night time or from the nearby PV plant during the day. The use cases for this hybrid plant are:

- Ancillary services
- Energy support

The hybrid is designed such that the above services can be provided throughout the day when requested by the System Operator.

7.5 TECHNICAL INFORMATION CONCLUSION

This section of the report presented the technical applications of the BESS on the grid. All BESS projects being undertaken by Eskom will either have a contribution towards deferring Distribution capital investment or will assist in contributing towards the system flexibility that is required by the System Operator to operate a secure system. In some cases, the BESS projects will be able to perform applications for the local network as well as the system level, which then increases the utilisation of the investment.

8. REGULATORY AND LEGAL

8.1 GRID CODE COMPLIANCE

The National Energy Regulator of South Africa, together with various industry stakeholders (including Eskom), developed the Battery Energy Storage Facility Grid Code, version 5.2 (Annexure B2). The code has been out for public comment and has yet to be passed by NERSA as a regulatory requirement.

Eskom, as part developers of the code, are fully conversant with the requirements and will ensure compliance during implementation at the various sites.

During several engagements with NERSA, it has been indicated that exemption from the code can be sought during the licensing application process if at that time the code has not been officially adopted as a regulatory requirement. If during the license application process, the code has been adopted as a regulatory requirement, Eskom will ensure adherence to the requirements.

8.2 PUBLIC FINANCE MANAGEMNT ACT (PFMA) APPROVAL

Eskom received full PFMA approval from National Treasury (NT) on 8 August 2019 and from the Department of Public Enterprises (DPE) Minister on 22 November 2019 for Phase 1 only for R7.2 billion (Annexure B1). A separate PFMA application for Phase 2 will be submitted to DPE for decision consequent to completion of a detailed technical feasibility studies.

8.3 ENVIRONMENTAL APPROVALS

The proposed BESS projects trigger the need for a BA. The BA Process has been undertaken for eight sites (Seven for phase 1 and one for phase 2). The environmental outcomes, impacts and residual risks of the proposed listed activities being applied for have been noted in the BA reports and assessed accordingly. The impacts associated with the proposed developments focused on both the construction and operational phases. Mitigation measures to minimise or eliminate impacts that were identified by the specialists and EAPs were utilised towards the preparation of the EMPr. The EMPr must be read in conjunction with the BAR of each site and is essential towards the protection of the environmental elements whilst establishing BESS.

A PPP to review the BAR and EMPr involved consultation with the relevant authorities, the landowners affected along the way, community leaders and other identified interested and affected parties. Newspaper advertisements were published to inform the general public of the BA process.

The tables below describes the status of Environmental Approvals for the 12 BESS sites as part of Phase 1 and 2 of the project.

Table 9: Phase 1 EA status

Phase 1	
Site	**Status**
Skaapvlei	EA received 10 February 2020
Melkhout	EA received 04 February 2020
Elandskop	EA received 19 June 2020
Pongola	EA received 19 June 2020

Table 10: Phase 2 EA status

Phase 2	
Site	**Status**
Ashton	Appointed EAP to conduct BA EA Anticipated February 2022
Witzenburg	EA received 19 June 2020
Cuprum	EIA Process Underway EA Anticipated November 2021
Kiwano	EIA Process Underway

Hex	EA received 01 March 2020
Paleisheuwel	EA received 04 March 2020
Graafwater	EA received 08 March 2021
Rietfontein	EIA Process Underway EA Anticipated February 2022

	EA Anticipated February 2022

8.4 COMPETITIVE SUPPLIER DEVELOPMENT PROGRAM (CSDP)/INDUSTRIALISATION

- On 08 May 2018, the former Minister of Pubic Enterprises granted Eskom exemption in terms of section 3(b) of PPPFA of 2000 on condition that the principles of Section 217(1) of the Constitution are complied with.

- On 13 March 2019, the Eskom board approved the Phase 1 procurement strategy and later submission for the Phase 2 supplementary strategy.

- Eskom received full PFMA approval from National Treasury (NT) on 8 August 2019. This application was based on a high level market sounding exercise and proposed that all battery technology providers will localize a minimum of 20% of the total contract value in phase 1, approximately 45% in phase 2 and approximately 80% in the future. This approval was in line with the DPE CSDP with the aim of increasing the competitiveness, capacity and capability of the local supply base.

Eskom views the development of local industry as a critical part of the government's socio-economic and transformation developmental agenda. As a result Eskom adopted the Supplier Development Localisation and Industrialisation strategy, as an enabler for the implementation of the CSDP. This programme was initiated by DPE with the aim of increasing the competitiveness, capacity and capability of the local supply base and succinctly, amplifies the role played by state-owned companies as a major economic stimulus, through various capital expansion programmes. Hence, the SDL&I mandate aims to leverage and optimise procurement spend in order to maximise sustainable local development impact within the South African business environment. The Department of Public Enterprises has set KPI's and targets which are tracked, monitored and reported on an annual basis.

The BESS project was, therefore, identified as an opportunity to advance government's socio-economic imperatives and in pursuant of the business case, Eskom conducted a preliminary localisation and industrialisation study. The purpose of the study was primarily to determine the capabilities & capacities within various supply chains of the BESS in South Africa to inform the implementation strategy of similar projects in the near future.

Although a desktop methodology was followed examining high level elements across the project life cycle in relation to localisation opportunities, this was complemented by the findings of an RFI issued to the open market in 2018. SDL&I received 8 responses from the project technical team for analysis, which constitutes about 27% of the identified market players globally (Annexure B13).

The analysis conducted together with a number of technical feasibility studies provided inputs in terms of the required governance approvals.

8.4.1 Legal and Governance Approvals

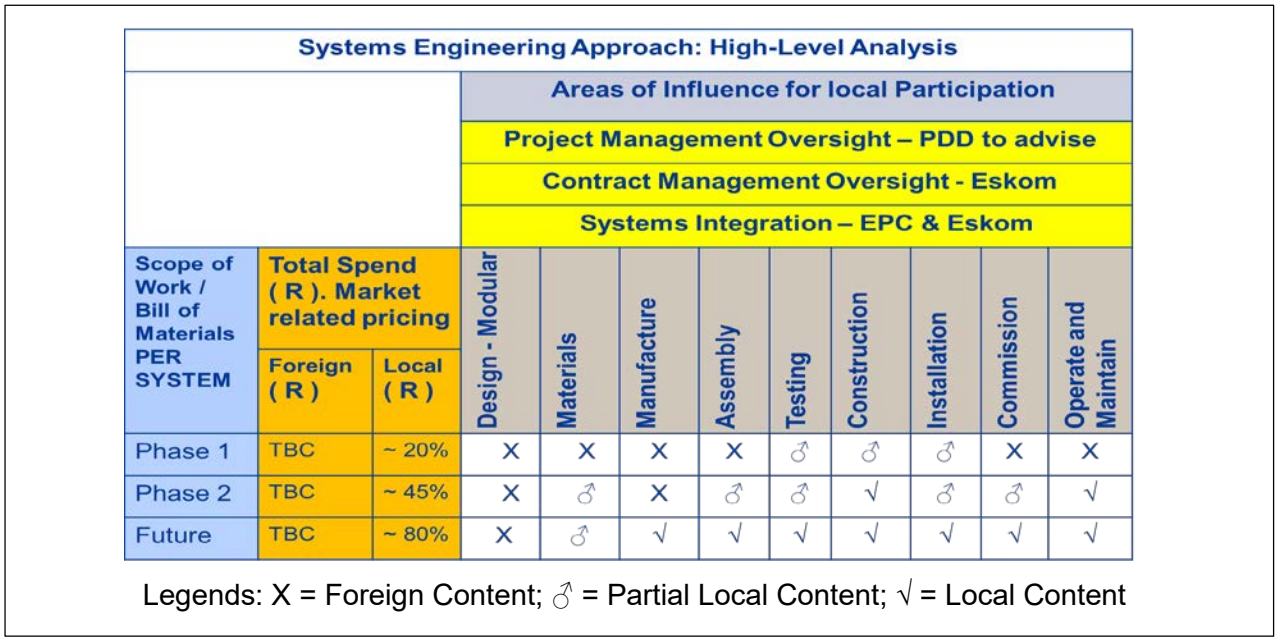
On 08 May 2018, the Minister of Pubic Enterprises granted Eskom exemption in terms of section 3(b) of PPPFA of 2000 on condition that the principles of Section 217(1) of the Constitution are complied with.

On 13 March 2019, the Eskom board approved the Phase 1 procurement strategy and later submission for the Phase 2 supplementary strategy. Moreover, the letter of application for PFMA approval dated 10 April 2019 to the Minister of Public Enterprises (Annexure B12), was approved on the 21 November 2019 with emphasis on the following paragraph 9.13.3 and 9.13.4 respectively:

9.13.3 "Based on the high-level market sounding exercise Eskom completed, indications are that all battery technology providers will localise a minimum of 20% of the local contract value in phase 1, approximately 45% in phase 2 and approximately 80% in future phases. The targeted subcontractors for component supply will be various contractors with BBBEE Level 1 or 2 which are South African companies based locally. This will form part of evaluation of the bids."

9.13.4 "The contracting methodology shall enable the transition from achieving natural localisation in phase (1) one and to technology (battery) localisation on a time-phased approach, implemented in phase (2) two and beyond. Effective and successful localisation of the BESS project will be supported by co-

ordination of capacity building by imparting core skills to the South African skilled workforce, both at the technology partners design office and the manufacturing facilities. The already existing research and Development programmes (CSIR, Eskom Rosherville, etc.) will need to be fully supported by the DTI and other research institutes to ensure maximum benefit in the next three to eight years. Figure 5 below further unpacks and provides a better illustration to the above.



Systems Engineering Approach: High-Level Analysis											
			Areas of Influence for local Participation								
			Project Management Oversight – PDD to advise								
			Contract Management Oversight - Eskom								
			Systems Integration – EPC & Eskom								
Scope of Work / Bill of Materials PER SYSTEM	Total Spend (R). Market related pricing		Design - Modular	Materials	Manufacture	Assembly	Testing	Construction	Installation	Commission	Operate and Maintain
	Foreign (R)	Local (R)									
Phase 1	TBC	~ 20%	X	X	X	X	♂	♂	♂	X	X
Phase 2	TBC	~ 45%	X	♂	X	♂	♂	√	♂	♂	√
Future	TBC	~ 80%	X	♂	√	√	√	√	√	√	√

Legends: X = Foreign Content; ♂ = Partial Local Content; √ = Local Content

Figure 5: Identified areas for localisation and industrialisation – Phased approach

9.13.5 The above analysis is based on phase 1 being an EPC (Turnkey) project whereby the technology is fully imported, with a few materials for the system sourced locally from site 5 onwards.

9.13.6 The phase 2 contracting methodology is revised taking lessons from phase 1 EPC, whereby Eskom can maximise the identified opportunities and integration into the system done by the Technology provider.

9.13.7 The current trend indicates that the BESS technology is going to grow into the future. Therefore Eskom can achieve maximum localisation content of approximately 80%, whereby the negotiation of IP is undertaken during phase 2. This also assumes that Eskom will procure multi-faceted technologies in the first phase (1).

9.13.8 The SDL&I imperatives above are supported by the Desktop study document "Battery Energy Storage System (BESS) Localisation and Industrialisation Study" – Unique Identifier 240-141273218, which is Annexure D to this application.

9.13.9 The Codes of Good Practice on Black Economic Empowerment issued under section 9(1) of the Broad-Based Black Economic Empowerment Act 53 of 2003 (the "Codes") describe the criteria to be used in the assessment of a company's BBBEE status.

9.13.10 The focal point of Eskom's BEE programme is the sustainable development and empowerment of local black businesses, while continuing to uphold Eskom's core values. The programme forms part of Eskom's broader Procurement and Supply Chain Management Strategy. It aims to promote entrepreneurship in black communities and to give black businesses access to opportunities in the mainstream "first" economy by empowering and developing these businesses into sustainable suppliers of reliable, cost-effective products and services.

9.13.11 Although BBBEE will not form part of the evaluation criteria for tenders under the WB procurement process, Eskom will require main bidders, local and international (who have a local presence), and to submit BBBEE certificates to indicate their BBBEE status. These certificates are for record-keeping purposes and are part of the statistics reported to government by Eskom.

8.4.2 The Bidding process and requirements

On the 31 July 2020, the RfBs for the design, engineering, supply, construction, installation, testing and commissioning of BESS Package 01, was issued to the market and closed on the 21 October 2020. On the 18 January 2021, the outcome of the evaluations and recommendation to cancel and re-issue Package 01 with revised technical requirements, was approved by the Eskom Board after receiving support from the Executive Tender Committee and Board Investment and Finance Committee.

The RfB documents were revised in view of all the lessons learnt from the cancelled Package 01 bid, for the Skaapvlei site. This revised documents for BESS phase 1 (package 01, 02, 03) were submitted to the market on 30 March 2021.

8.4.3 The National Industrial Participation Programme

Although the originally accepted bidding document that was approved by the DPE was based on CSDP, the expectation to review the resubmission and include additional conditions came with its own challenges. However, the NIPP inclusion into the bidding document is based on the Minister's instruction on 7 August 2020 and places a statutory obligation on the suppliers of goods and services to Government, that have an imported content of $5million and above, to participate in domestic economic activity, by supporting the productive sectors of the economy through any or a combination of investment; export sales, research and development, technology transfer and transformation of the domestic economy, with special emphasis on the manufacturing sector.

South African industry derives benefit through the NIPP in terms of investment, export opportunities, job creation, increased local sales, SMME and BEE promotion, Research and Development and technology transfer.

Foreign suppliers derive benefit from the programme through increased participation in the South African economy.

8.4.4 BESS Phase 1 – Original Bidding Requirements (as per PFMA Approval)

8.4.4.1 Localisation

Procurement Spend within South Africa defined as "subcontracting a minimum of 20% of the total contract value to previously disadvantaged groups and associated skills development".

8.4.4.2 Skills Development

Bidders are required to complete and submit a fully signed skills development compliance matrix (Annexure B14) to indicate the proposed number of persons to be trained per skills type on the skills development matrix.

8.4.4.3 Job Creation

Job creation proposal by bidders does not form part of the evaluation criteria. All bidders are therefore required to propose to Eskom a resource plan for the work or number of jobs to be sourced from surrounding local communities.

8.4.4.4 Localisation and Industrialisation requirements

A comprehensive plan on knowledge transfer in terms of operations and maintenance capabilities to Eskom employees which includes battery maintenance to ensure systematic and upkeep of battery power output. Although this item was part of the original CSDP requirements, it is also a NIPP condition in terms of the NIPP objectives (i.e. Skills & Technology transfer)

8.4.5 Broad Based Black Economic Empowerment

In respect of the Contractor being an international company they will be exempted from submitting a BBBEE certificate, however in respect of the main contractor being a local bidder, the Broad-Based Black Economic Empowerment certificates will not form part of the bid evaluation but must be provided for record keeping purposes and reporting to government. Therefore either a SANAS Accredited BBBEE certificates for transactions more than R50 million or valid sworn affidavit (DTI Template) will be required for transactions below R50 million.

8.4.6 BESS Phase 2 – Bidding documents

The BESS project is of critical importance as it will enable renewable energy integration and grid stability while achieving the socio-economic development of the South African power industry. Therefore phase 2 of the BESS project will be fully compliant with the NIPP requirements in order to build local capacity and capability to create, operate maintain and sustain the local supply base.

9. FINANCE

The nominal and levelised costs of the distributed battery storage have been calculated taking into account the implementation over a three phases/periods.

Figure five (6) below provides the final Levelised Cost of Energy (LCOE), for the project.

Figure 6: LCOE Phase 1, 2 and PV

- When the concessional funding rate of [redacted] is applied, this benefit results in a lower LCOE of [redacted] for Phase 1, 2 and PV respectively on a per R/MWh basis.

- When the Eskom weighted average cost of capital (WACC) of [redacted] is applied, the BESS LCOE increases to [redacted] for the BESS phases and PV respectively on a R/MWh basis.

- The biggest component of the levelised cost for BESS is the CAPEX at [redacted] which is [redacted] of the total levelised cost. The variable cost of [redacted] and [redacted] is the cost of charging the battery at off-peak. The figure below indicates the levelised cost of BESS compared to benchmarks.

Figure 7: The LCOE for Phase 1 as compared to EPRI and Lazard benchmarks.

- The R/MWh compares favourably when compared to all benchmarks. The [redacted] is [redacted] the Lazard and EPRI benchmark. The [redacted] end of the Lazard range and is [redacted] the EPRI benchmark.

- When the deferred Distribution capex portion is taken into account, the LCOE reduces with a further benefit of [redacted]

- The figure below indicate the levelised cost of BESS compared to the alternative technologies.

Figure 8: The LCOE for Phase 1 compared to Alternative options.

- [redacted]

9.1 Cost benefit and break even analysis

- [redacted]

- Battery storage is capable of providing a maximum of 362MW in one hour, up to a maximum of four consecutive hours.

- Figure 9 below shows historic load factors and the extent that BESS could potentially replace actual OCGT usage on a daily basis (at a max of ~ 4 hours a day) in the periods of high utilisation.

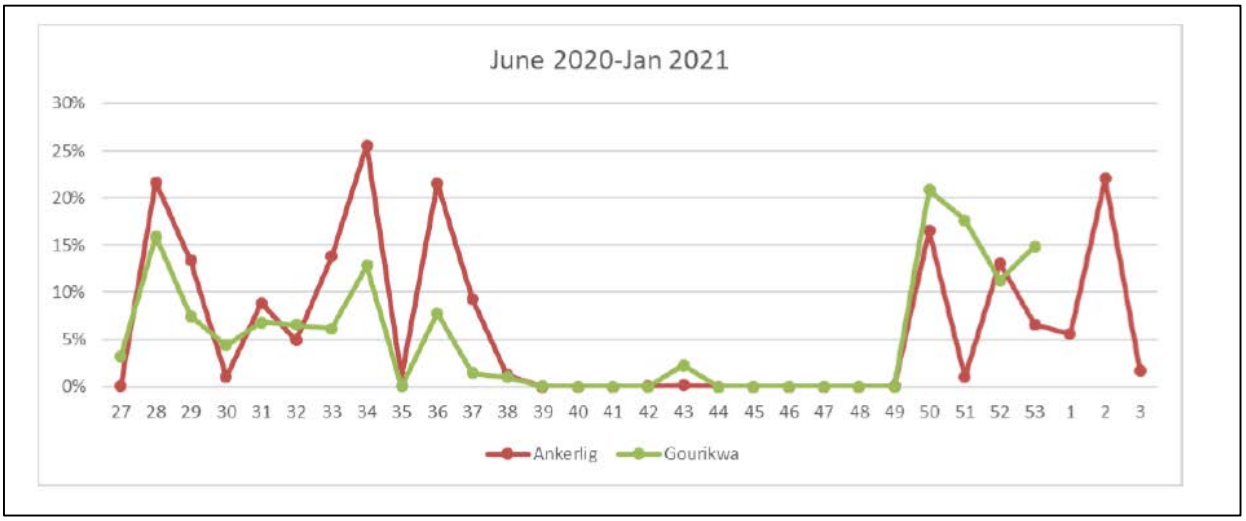


Figure 9: Historic load factor of OCGT.

9.2 Results of the cost benefit and break even analysis

Table 11: Results of Cost benefit and Break even analysis

- The analysis was performed at different OCGT usage profiles and at the current diesel price of [redacted] using the concessional funding WACC [redacted] (nominal after tax).

- The lifecycle cost of Battery (option 2) has been compared to “Do nothing” (Option1) to derive the relative benefit of the battery installation, over a 20 year period.

- The “Do nothing” option assumes that coal (Kusile used as a reference) and OCGT will make up the shortfall in place of the 4 hours of battery. (This is shown at differing Coal & OCGT usage profiles). This analysis includes the cost of carbon tax and the capex cost to extend the life of the OCGT stations.

- The NPV column shows the impact of battery storage when compared to the “Do Nothing” option.

- [redacted]

- [redacted]

- The same analysis applies to Phase 2. These results will be consistent with phase 1 results.

10. FUNDING

Eskom secured highly concessional funding from DFIs to support the BESS project. The project will be co-financed by the CTF under two USD denominated facilities with the WB and AFDB separately as implementing agencies, as well as a ZAR denominated facility from the NDB. In the financial front, the delivery of this project would contribute towards meeting the developmental outcomes and objectives of the financing agreements, which in most part affect the performance of the loans and impact on future collaboration between Eskom and the DFIs.

Eskom can only drawdown actual capital expenditure incurred before the above closing dates for all the funders. Being unable to complete the project by the above closing dates will mean that the developmental objectives associated with the funding agreements will not be achieved and it will negatively affect Eskom's reputation. This reputational damage will have a negative impact on future business with the funders for both Eskom and South Africa. The World Bank has already alluded that the CTF will view this negatively in considering the JET project.

11. SCHEDULE

The two figures below show the target schedule to achieve project completion:

Key milestones

	[Package 1]		[Package 2]				
	Skaapvlei		Lot A - Melkout		Lot B – Pongola & Elandskop		Remarks
	Forecast/ Actual Start	Forecast/ Actual Finish	Forecast/ Actual Start	Forecast/ Actual Finish	Forecast/ Actual Start	Forecast/ Actual Finish	
Issue bidding document to the market	29-Mar-21	29-Mar-21	29-Mar-21	29-Mar-21	29-Mar-21	29-Mar-21	
Closing of bids from the market	14-Jun-21	14-Jun-21	15-Jun-21	15-Jun-21	15-Jun-21	15-Jun-21	Issue to market on 29 March 2021.
Opening of bids (incl stamping of files)	14-Jun-21	22-Jun-21	15-Jun-21	23-Jun-21	15-Jun-21	23-Jun-21	Extension of bid period has been extended to
Evaluation of Bids (Incl No Objection from Bank)	22-Jun-21	14-Sep-21	23-Jun-21	16-Sep-21	23-Jun-21	16-Sep-21	1. Skaapvlei closing 14 June 2021
Evaluation Report Appr. (ETC, IFC & Board)	14-Sep-21	04-Oct-21	16-Sep-21	06-Oct-21	16-Sep-21	06-Oct-21	2. Package 2 closing 15 June 2021
Obtain NERSA Licenses	30-Dec-21	30-Dec-21	30-Dec-21	30-Dec-21	30-Dec-21	30-Dec-21	3. Package 3 closing 21 June 2021
Contract Award & Effective Date (Incl. vendor registration)	30-Dec-21	25-Jan-22	30-Dec-21	25-Jan-22	30-Dec-21	25-Jan-22	4. * EMPr Approved on 19 June 2020 for Elandskop and Pongola sites
EMPr(DEFF announces decision)	03-Mar-22	03-Mar-22	15-Mar-22	15-Mar-22	19-Jun-20 A	19-Jun -20 A	
Long Lead items (Incl. Delivery to site)	25-Jan-22	18-Jul-22	25-Jan-22	27-May-22	25-Jan-22	27-May-22	
Construction (Incl. Commissioning & COD)	15-Mar-22	14-Nov-22	15-Mar-21	11-Sep-22	25-Jan-22	11-Sep-22	

Figure 10: Package 1 and 2

Key milestones

[Package 3]

	Lot A- Hex		Lot B – Paleisheuwel		Lot B – Graafwater		Remarks
	Forecast/ Actual Start	Forecast/ Actual Finish	Forecast/ Actual Start	Forecast/ Actual Finish	Forecast/ Actual Start	Forecast/ Actual Finish	
Issue bidding document to the market	29-Mar-21	29-Mar-21	29-Mar-21	29-Mar-21	29-Mar-21	29-Mar-21	Issue to market on 29 March 2021. Extension of bid period has been extended to 1. Skaapvlei closing 14 June 2021 2. Package 2 closing 15 June 2021 3. Package 3 closing 21 June 2021 4. * EMPr Approved on the 08 March 2021for Graafwater site
Closing of bids from the market	21-Jun-21	21-Jun-21	21-Jun-21	21-Jun-21	21-Jun-21	21-Jun-21	
Opening of bids (incl Stamping of files)	21-Jun-21	27-Jun-21	21-Jun-21	27-Jun-21	21-Jun-21	27-Jun-21	
Evaluation of Bids (Incl No Objection from Bank)	27-Jun-21	20-Sep-21	27-Jun-21	20-Sep-21	27-Jun-21	20-Sep-21	
Evaluation Report Appr. (ETC, IFC & Board)	20-Sep-21	10-Oct-21	20-Sep-21	10-Oct-21	20-Sep-21	10-Oct-21	
Obtain NERSA Licenses	30-Dec-21	30-Dec-21	30-Dec-21	30-Dec-21	30-Dec-21	30-Dec-21	
Contract Award & Effective Date (Incl. vendor registration)	30-Dec-21	25-Jan-22	30-Dec-21	25-Jan-22	30-Dec-21	25-Jan-22	
EMPr(DEFF announces decision)	15-Mar-22	15-Mar-22	15-Mar-22	15-Mar-22	08-Mar-21 A	08-Mar-21 A	
Long Lead items (Incl. Delivery to site)	25-Jan-22	28-Mar-22	25-Jan-22	28-Mar-22	25-Jan-22	28-Mar-22	
Construction (Incl. Commissioning & COD)	15-Mar-22	13-Jul-22	15-Mar-22	13-Jul-22	25-Jan-22	13-Jul-22	

Figure 11: Package 3

The biggest risk on the schedule is obtaining the NERSA licenses. Eskom is unable to award a contract unless the license is granted.

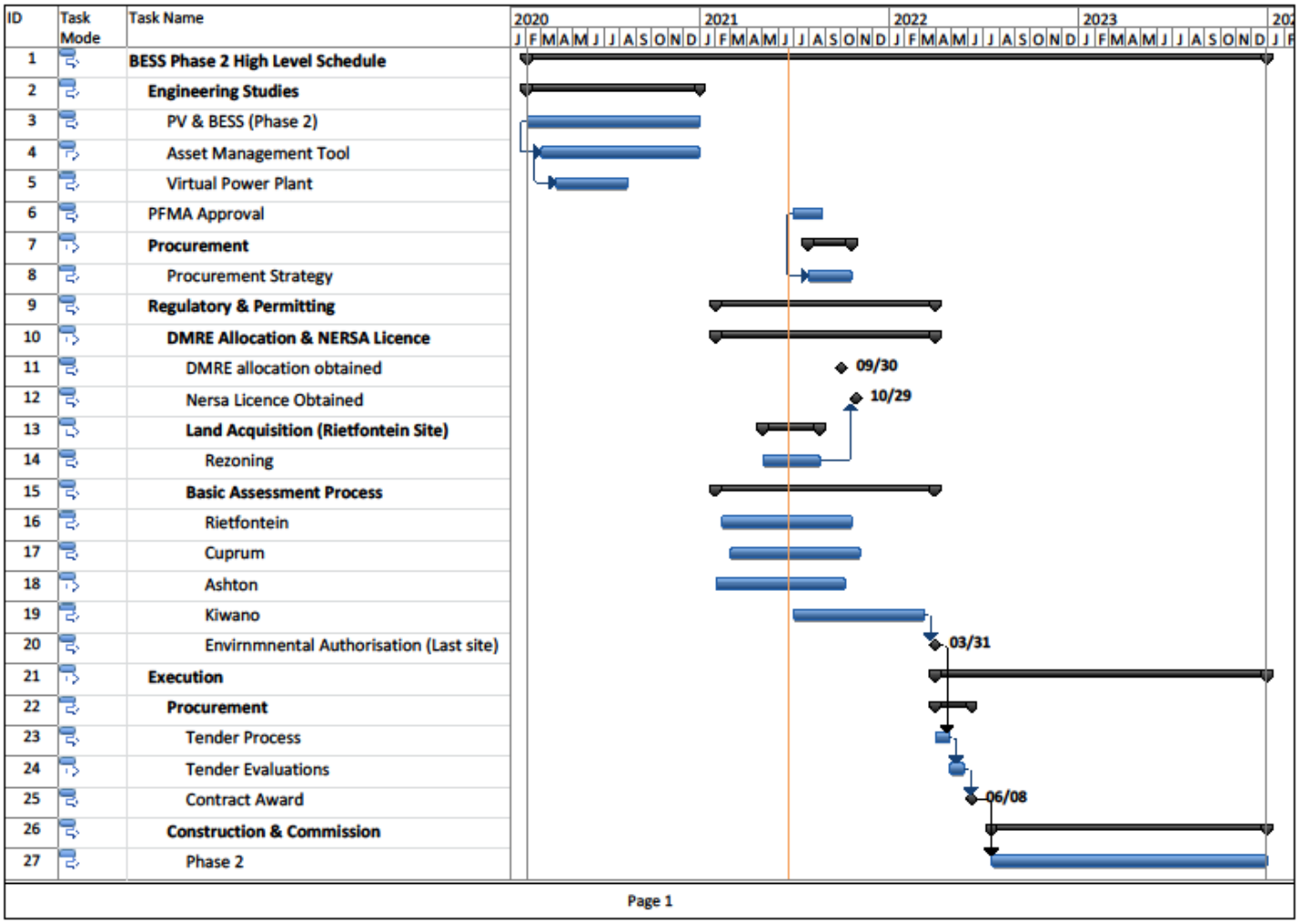


Figure 12: Key milestones of Phase 2 required to achieve the COD of December 2023.

Phase 2 regulatory, DMRE Section 34, Minister's Determination and NERSA engagement are on-going.

12. STAKEHOLDER MANAGEMENT

Eskom will actively engage with its stakeholders to ensure the achievement of our strategy and strive towards a multi-stakeholder approach towards solving difficult project challenges. The BESS stakeholder management plan is informed by Eskom's and its internal and external stakeholder priorities.

The strategy aims to respond to Eskom's strategic issues, addressing stakeholder concerns, as well as building more trust-based relationships with stakeholders. Eskom's engagements will include communities, environmental NGOs, Parliamentary Portfolio Committees, senior government officials, local government officials, the media and contractors' employees.

As such Eskom has a well-established history of maintaining constructive relationships with a range of stakeholders within its new build construction sites. The process to improve Eskom's understanding of its stakeholders is ongoing. Eskom will proactively interface regularly, and in an open and honest manner with a range of identified internal stakeholders and the external stakeholders in government, business, landowners and their respective bodies, communities, organised business, media, and all persons to be directly impacted by all BESS Sites.

There are six host local municipalities identified for phase 1 of the BESS Project namely, Matzikamma, Cedarberg and Breede Valley Local in the Western Cape for Skaapvlei, Graafwater, Paleisheuwel, and Hex respectively. Kouga Local Municipality in the Eastern Cape is the host for the Melkhout BESS Project. Pongola and Elandskop are hosted by uPhongola and uMsundusi Local Municipality respectively.

Stakeholder engagements have been held with Matzikamma, uMsundusi and Kouga Local Municipality to introduce the project and obtain buy in and social license to operate. Project has received positive feedback from municipalities as it deals with infrastructure upgrade and brings about economic relief in the local communities in the times of Covid-19.

Key stakeholders in business were invited to form part of the site clarification meetings in April 2021 in order to network with the potential bidders. Bidders were encouraged to work closely with the local communities in addressing high rate of unemployment. Dawid Kruiper Local Municipality, which is the host for the Rietfontein BESS project has been engaged and project introduced. A social economic impact assessment study including indigenous People's Plan in currently being done in Dawid Kruiper Local Municipality. Projects to be supported as part of Corporate Social Investment have been identified within Dawid Kruiper Local Municipality.

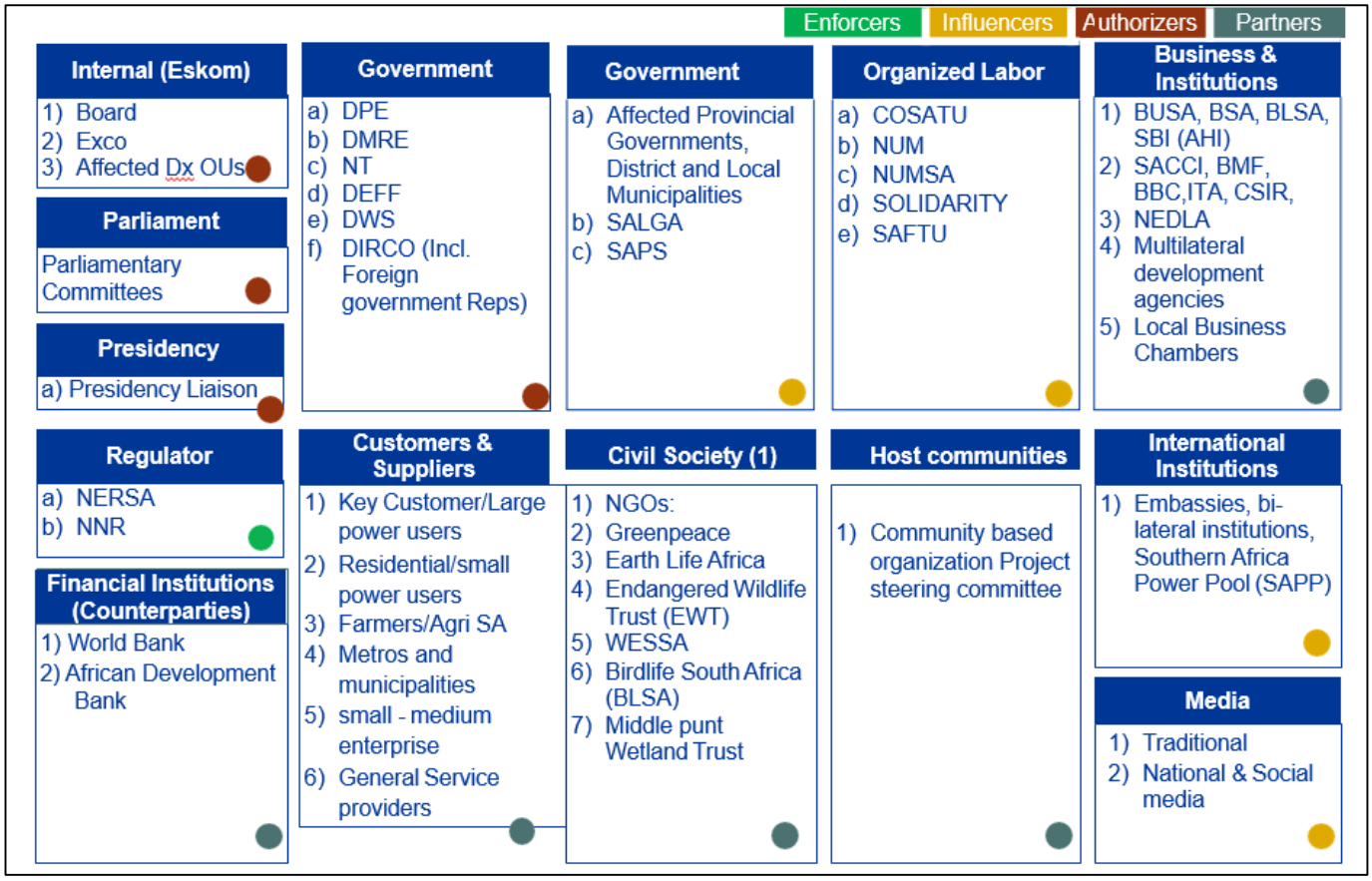


Figure 13: Key stakeholders for BESS have been identified within a broad Stakeholder landscape

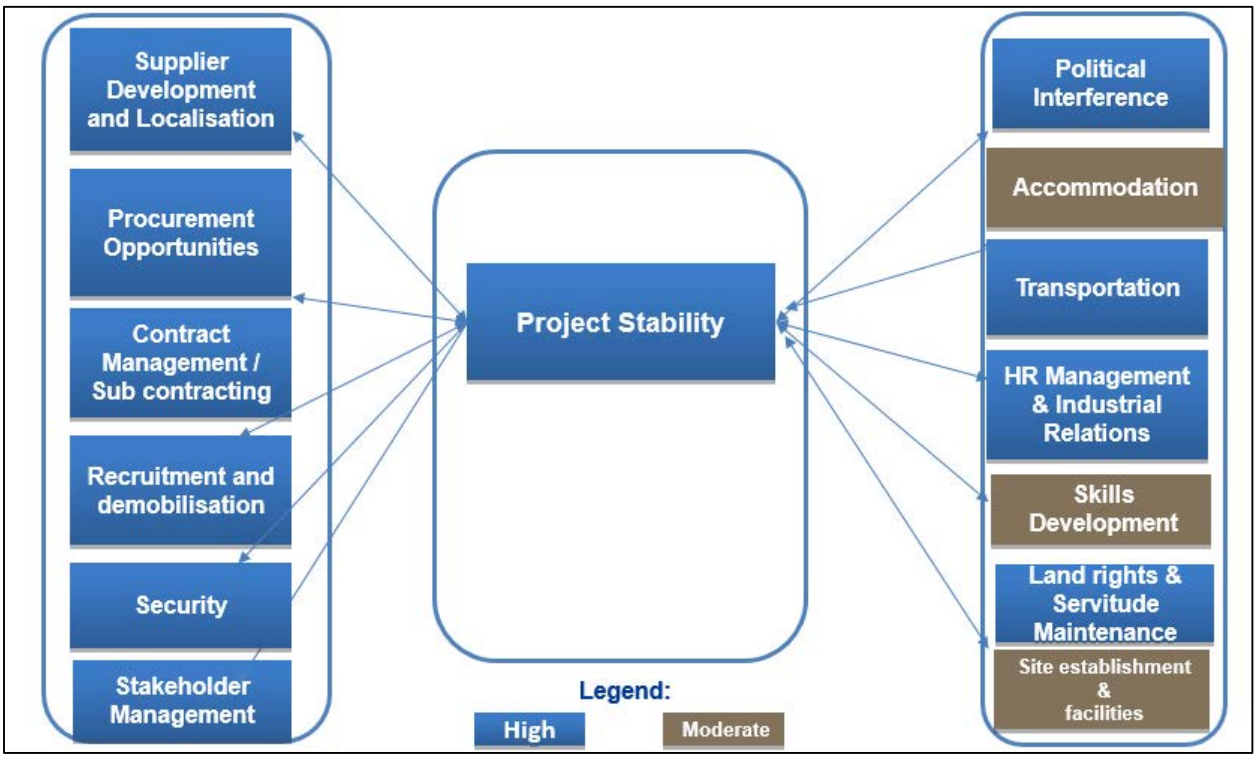


Figure 14: Key project stability issues identified

The key deliverables are:

- Pro-actively disclose clear, comprehensive and timely information on project stability activities aimed at achieving business objectives

- Being responsive to project interests and concerns & maintain on-going communications & guidance to enhance project stability

13. RISKS OF NOT RECEIVING A DETERMINATION

If Eskom does not get a favourable determination, the impacts will be on many fronts in Eskom as follows:
The power system:

- As it was stated earlier in this report, Eskom BESS is critical for operation of a secure system. In the absence of the BESS, the flexibility that the SO would have benefitted from the BESS will not be possible, thereby leaving the system vulnerable to collapse.

- The share of RE on the system is going to increase in line with the IRP 2019, leaving the system in a more vulnerable state without the BESS.
- The Eskom BESS projects are meant for deferral of investment in distribution networks. This is the case where capacity for connecting new customers has been depleted. The risk of not having the BESS implemented on time will prolong the time for customers remaining without electricity making Eskom's financial position worse and capping the country's economic growth.
- BESS is expected to assist in alleviating loadshedding. Without a determination, the risk of loadshedding remains higher.
- Reputational damage of Eskom with delayed means to alleviate loadshedding will deter investors.
- Breach of contractual obligations with Southern Africa Power Pool on power quality regulations that are dependent on a stable and secure Eskom system.

The inability for Eskom to achieve a determination from the DMRE means that Eskom will not be able to apply for a license. The failure to acquire a license will have the following consequences for Eskom:

- The commercial operation of the BESS without a license will be unlawful
- The unlawful operation of the BESS means that the energy generated will not be able to be sold
- The inability to sell the energy means that Eskom cannot generate additional revenue.
- The capital cost of the BESS will be irrecoverable through the MYPD process, as it will not have been approved/licensed by NERSA
- There are penalties applicable to the unlawful commercial operation of any generation plant.

World Bank Funding

In the process of securing funding for the Medupi coal-fired Power Station, Eskom approached the World Bank (WB). In the ensuing discussions, commitments were made to the WB that Eskom would pursue renewable energy projects, and concessionary loans were granted to Eskom in order to diversify its energy mix. On the 13 October 2017, Eskom proposed to the WB and AfDB the 1440 MWh distributed Battery Energy Storage System (BESS) with 60 MW distributed Solar Photo Voltaic (PV) project be installed in its distribution networks and substations as the most suitable solution to the grid technical issues.

Eskom defaulting on the loan conditions has negative implications with the bank:

- Withdrawal of funding for the BESS and other related projects by the Funders
- Further delays for timeous execution and commissioning of the project
- Potential bidders have submitted their bids and this will have a negative reputational damage to Eskom as the total bidding process will have to be cancelled.

In order to mitigate this risk, Eskom has approached DMRE for a determination and this report has been compiled as supporting information to the determination application.

14. CONCLUSION

Eskom has taken the necessary steps in ensuring the successful implementation of the BESS project. Through the BESS project, Eskom aspires to diversify the existing generation energy mix by pursuing a low carbon future in order to reduce the impact on the environment. The 1449MWh distributed BESS with 60 MW Solar PV represents a giant leap forward in achieving this aspiration, as it will be one of the largest BESS projects to be developed and implemented in SA.

15. DOCUMENT ACKOWLEDGEMENT

By signing this document, the people listed record their agreement to the contents of this document.

Eskom Distribution:

: **Name** : Azwimbavhi Mamanyuha

: **Signature** :

: **Date** : ----------

Project Director for BESS:

: **Name** : Luke Walker

: **Signature** :

: **Date** : ----------

Commercial:

: **Name** : Antonnie Mammes

: **Signature** :

: **Date** : ----------

Corporate Finance:

: **Name** : Mohamed Khan

: **Signature** :

: **Date** : ----------

Treasury:

: **Name** : Gertrude Molokoane

: **Signature** :

: **Date** : ----------

Legal and Regulatory:

: **Name** : Hendrick Thwala

: **Signature** :

: **Date** : ----------

Project Development Department:

: **Name** : Beke Moloi

: **Signature** :

: **Date** : ----------

ANNEXURES

Number	Section	Name
A1	Technical	Phase 1_Memo for Elandskop Addendum-signed
A2	Technical	Phase 1_Memo for Hex Addendum signed-signed
A3	Technical	Phase 1_Memo for Melkhout Addendum-signed-signed
A4	Technical	Phase 1_Memo for Paleisheuwel 11kV 22kV and Graaf Addendum-01-signed-signed
A5	Technical	Phase 1_Memo for Pongola Addendum - 01-signed-signed
A6	Technical	Phase 1_Memo for Skaapvlei Addendum25Maysigned
A7	Technical	Phase 1_Rietfontein 33kV Feeder_Rev3.1-signed
A8	Technical	Phase 1_Elandskop BESS Planning Proposal
A9	Technical	Phase 1_Hex BESS Planning Proposal V5.5 20190315
A10	Technical	Phase 1_Paleisheuwel, Graafwater BESS Planning Proposal V1.3 20190315
A11	Technical	Phase 1_Pongola BESS Planning Proposal V1.3 20190315
A12	Technical	Phase 1_Melkhout BESS Planning Proposal V5.5 20190313
A13	Technical	Phase 1_Skaapvlei BESS Planning Proposal V5.7 20190313
A14	Technical	Phase 2_Ashton BESS Planning Proposal (Phase 2)_rev 3.1 - 20210127
A15	Technical	Phase 2_BESS Phase 1 Planning Report for Witzenburg substation_Rev 6-signed
A16	Technical	Phase 2_BESS Phase 2 Planning Report for Cuprum Substation rev MS20200907
A17	Technical	Phase 2_KIWANO BESS Planning Proposal - Final- 200MWh-2-signed

B1	Legal and Regulatory	20191122_DPE_ BESS PFMA approval
B2	Legal and Regulatory	Battery Energy Storage Facility_Connection_Code_Draft_5.2
B3	Legal and Regulatory	https://www.eskom.co.za/OurCompany/SustainableDevelopment/EnvironmentalImpactAssessments/SkaapvleiSereBESS/Pages/default.aspx (Skaapvlei: EA received 10 February 2020)
B4	Legal and Regulatory	https://www.eskom.co.za/OurCompany/SustainableDevelopment/EnvironmentalImpactAssessments/melkhoutbessbar/Pages/default.aspx (Melkhout: EA received 04 February 2020)
B5	Legal and Regulatory	https://www.eskom.co.za/OurCompany/SustainableDevelopment/EnvironmentalImpactAssessments/ElandskopBESS/Pages/default.aspx (Elandskop: EA received 19 June 2020)
B6	Legal and Regulatory	https://www.eskom.co.za/OurCompany/SustainableDevelopment/EnvironmentalImpactAssessments/PongolaSstnBESS/Pages/default.aspx (Pongola EA received 19 June 2020)
B7	Legal and Regulatory	https://www.eskom.co.za/OurCompany/SustainableDevelopment/EnvironmentalImpactAssessments/HexBESS/Pages/default.aspx (Hex: EA received 01 March 2020)
B8	Legal and Regulatory	https://www.eskom.co.za/OurCompany/SustainableDevelopment/EnvironmentalImpactAssessments/PaleisheuwelBESS/Pages/default.aspx (Paleisheuwel: EA received 04 March 2020)
B9	Legal and Regulatory	https://www.eskom.co.za/OurCompany/SustainableDevelopment/EnvironmentalImpactAssessments/GraafwaterBESS/Pages/default.aspx (Graafwater: EA received 08 March 2021)
B10	Legal and Regulatory	https://www.eskom.co.za/OurCompany/SustainableDevelopment/EnvironmentalImpactAssessments/WitzenbergBESS/Pages/default.aspx (Witzenburg: EA received 19 June 2020)
B11	Legal and Regulatory	https://www.eskom.co.za/OurCompany/SustainableDevelopment/EnvironmentalImpactAssessments/Pages/Environment_Impact_Assessments.aspx (Authorisations can be accessed at this site)

B12	Legal and Regulatory	Letter to Minister Gordhan for PFMA application
B13	Legal and Regulatory	(1) 240-141273218_BESS Localisation Study
B14	Legal and Regulatory	Copy of Revised SDL I MATRIX FORM30122020
C1	Finance	BESS Finance Section