Energy Storage Partnership

Battery Energy Storage Systems Projects Overview

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Generation Coal and Clean Projects

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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

~ 7 to 9 months
Construction

60 months for Operating and Maintenance

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

EPC: Design, supply, install and commission
This entails the provision of engineering designs, procurement and construction of a complete facility/works.

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

Source: DPE presentation October 2019: ROADMAP FOR ESKOM IN A REFORMED ELECTRICITY SUPPLY INDUSTRY
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 Kwano CSP (accepted at the time).

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 (REIPPPP). Signed 14 April 2018.; and
- Follow WB procurement process and obtain Preferential Procurement Policy Framework Act (PPPFA) exemption. Received 08 May 2018.

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.

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

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Package 4: Rietfontein
1.54MW
6.16MWh
2.04MWp PV

Kiwano
40MW
200MWh
58MWp PV

Cuprum
70MW
280MWh

Package 1: Skaapvllei
80MW
320MWh

Package 3A: Graafwater
5MW
30MWh

Package 3A: Paleisheuwel
9.5MW
45MWh

Package 3B: Hex
20MW
100MWh

Ashton
17MW
68MWh

Package 4: Melkhout
35MW
140MWh

Package 2B: Pongola
Graafwater
40MW
160MWh

Package 2B: Elandskop
8MW
32MWh

LEGEND

Phase 1
Phase 2
## BESS Phase 1 and Phase 2 Sites

### BESS Phase 1

<table>
<thead>
<tr>
<th>Name</th>
<th>Distribution Operating Unit (OU)</th>
<th>BESS Output</th>
<th>Daily MWh Capacity</th>
<th>Total Energy (MWh)</th>
<th>PV (MWp)</th>
<th>Use Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skaapvlei</td>
<td>Western Cape</td>
<td>80</td>
<td>320</td>
<td>116,800</td>
<td></td>
<td>AS &amp; ES, Reactive Power, ES</td>
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<tr>
<td>Melkhout</td>
<td>Eastern Cape</td>
<td>35</td>
<td>140</td>
<td>51,100</td>
<td></td>
<td>AS &amp; ES, Load Shaving</td>
</tr>
<tr>
<td>Elandskop</td>
<td>Kwa Zulu Natal</td>
<td>8</td>
<td>32</td>
<td>11,680</td>
<td></td>
<td>Load Shaving</td>
</tr>
<tr>
<td>Komati</td>
<td>Kwa Zulu Natal</td>
<td>40</td>
<td>160</td>
<td>58,400</td>
<td></td>
<td>AS &amp; ES, Load Shaving</td>
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<tr>
<td>Hex</td>
<td>Western Cape</td>
<td>20</td>
<td>100</td>
<td>36,500</td>
<td></td>
<td>AS &amp; ES, Load Shaving</td>
</tr>
<tr>
<td>Graafwater</td>
<td>Western Cape</td>
<td>5</td>
<td>30</td>
<td>10,950</td>
<td></td>
<td>ES &amp; Load Shaving</td>
</tr>
<tr>
<td>Paleisheuwel 11kV</td>
<td>Western Cape</td>
<td>6</td>
<td>24</td>
<td>8,760</td>
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<td>AS &amp; ES</td>
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<tr>
<td>Paleisheuwel 22kV</td>
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<td>3.5</td>
<td>21</td>
<td>7,665</td>
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<td>ES &amp; Load Shaving</td>
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<tr>
<td>Rietfontein</td>
<td>Northern Cape</td>
<td>1.54</td>
<td>6.16</td>
<td>2248.4</td>
<td>2.04</td>
<td>Load Shaving</td>
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<tr>
<td>TOTAL Ph1</td>
<td></td>
<td>199.04</td>
<td>833.16</td>
<td>304,103</td>
<td>2.04</td>
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### BESS Phase 2

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Distribution Operating Unit (OU)</th>
<th>BESS Output</th>
<th>Daily MWh Capacity</th>
<th>Total Energy (MWh)</th>
<th>PV (MWp)</th>
<th>Use Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Witzenberg</td>
<td>Western Cape</td>
<td>17</td>
<td>68</td>
<td>24,820</td>
<td></td>
<td>Reactive Power, ES</td>
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<tr>
<td>Ashton</td>
<td>Western Cape</td>
<td>17</td>
<td>68</td>
<td>24,820</td>
<td></td>
<td>Load Shaving, ES</td>
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<tr>
<td>Cuprum</td>
<td>Northern Cape</td>
<td>70</td>
<td>280</td>
<td>102,200</td>
<td></td>
<td>AS &amp; ES</td>
</tr>
<tr>
<td>Kiwano</td>
<td>Northern Cape</td>
<td>40</td>
<td>200</td>
<td>73,000</td>
<td>58</td>
<td>AS &amp; ES</td>
</tr>
<tr>
<td>Komati</td>
<td></td>
<td>150</td>
<td>600</td>
<td>100,300</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL Ph2</td>
<td></td>
<td>144</td>
<td>616</td>
<td>224,840</td>
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</tbody>
</table>

**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.

Komati Still to be confirmed  
Totals does not include Komati
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.

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

- 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.
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

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