



Eskom

Report

Technology

Title: **TRANSACTIONAL ADVISOR
SERVICES TO CONDUCT
FEASIBILITY STUDY FOR
ESTABLISHMENT OF THE BESS
MANUFACTURING FACILITY**

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Compiled by

Thomas Jacobs
Chief Engineer

Functional Responsibility

Thomas Jacobs
DC & Auxiliaries Supplies
SC ESS CG Member

Authorized by

Mfundu Songo
Senior Manager:
Generation Engineering

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Executive Summary

This report provides the functional technical requirements for a scalable 1GWh battery manufacturing plant as part of a repurposing project at the Eskom Grootvlei Power Station.

SCOT Study Committee Number/Name: **Part 16 - DC & Auxiliary Supplies**

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1. Introduction

This report provides the functional technical requirements for a scalable 1GWh battery energy storage system (BESS) manufacturing plant as part of the repurposing project at the Eskom Grootvlei Power Station.

2. Supporting clauses

2.1 Scope

2.1.1 Purpose

The main purpose of this report is to detail the functional technical requirements for a scalable 1GWh battery energy storage system manufacturing plant as part of a repurposing project at the Eskom Grootvlei Power Station.

2.1.2 Applicability

This document shall apply to the Grootvlei Power Station of Eskom Holdings Limited.

2.2 Normative/informative references

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

2.2.1 Normative

- [1] ISO 9001 Quality Management Systems.
- [2] ISO 14001 Environmental Management Systems.

2.2.2 Informative

- [3] Assembly Magazine, September 15, 2023, Battery Plant Design Do's and Don'ts, David Verner: [Battery Plant Design Do's and Don'ts | ASSEMBLY](#)

2.3 Definitions

2.3.1 General

2.3.2 Disclosure classification

Controlled disclosure: controlled disclosure to external parties (either enforced by law, or discretionary).

2.4 Abbreviations

Abbreviation	Description
Ah	Ampere Hour
BESS	Battery Energy Storage System
C5	5 hour Rated Ampere Hour Capacity of the Cell
DC	Direct Current
DoD	Depth of Discharge
GWh	Gigawatt hour

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2.5 Roles and responsibilities

The research project shall ensure that the requirements of this report are adhered to during the technical evaluation of the bids.

2.6 Process for monitoring

This document shall be reviewed and updated as and when required by the research project team.

2.7 Related/supporting documents

Not applicable.

3. Requirements

3.1 Location Site Layout

- 3.1.1** The battery manufacturing plant shall be constructed at the Grootvlei Power Station. The piece of land earmarked for the location of the plant is indicated within the power station's perimeter.
- 3.1.2** Provide a high-level general arrangement of the site, taking into consideration of all the logistical aspects such as the manufacturing area, offices, laboratories, test areas, amenities, parking, goods receiving, goods dispatching, storage areas, waste disposal area and methods, and access ways.
- 3.1.3** Indicate what permits and licences would be required to construct and operate a battery manufacturing plant in South Africa.
- 3.1.4** Indicate the services e.g. water supply, electricity supply required to support the required manufacturing capacity with a provision for future expansion and assess the suitability of the existing resources and / or services. Indicate any upgrade requirements and / or the need for new or additional resources.
- 3.1.5** Indicate the feasibility of redesigning/reconfiguration of the existing buildings and / or vacant land provided for the battery manufacturing facility.
- 3.1.6** Indicate the need for additional infrastructure to be constructed.
- 3.1.7** Provide a detailed Scope of Work on establishing a battery manufacturing facility site within the designated area at Grootvlei Power Station.
- 3.1.8** Provide a detailed budget breakdown for all activities and equipment in establishing the battery manufacturing facility.
- 3.1.9** Provide a detailed time schedule for all activities from detailed engineering design up to hand-over. The schedule shall include the calibration of the plant operations until the plant is fully functional at the design capacity.

3.2 Production capacity and plant layout

- 3.2.1** The battery manufacturing facility pilot plant shall have an annual production capacity of at least 1GWh with the capability to be scaled up to 4GWh and beyond, annual production capacity within the designated area.
- 3.2.2** Indicate the logical layout of the plant and process flow to support the efficient manufacturing of the particular battery technology that you propose. The battery manufacturing facility must meet high quality standards aligned with industry best practices. Indicate the international standards that the battery energy storage products will be designed to meet.

- 3.2.3 Show the manufacturing line from raw material delivery right through to dispatching of the end product as per the example in Figure 1 or similar that meets the planned end state within the designated area.

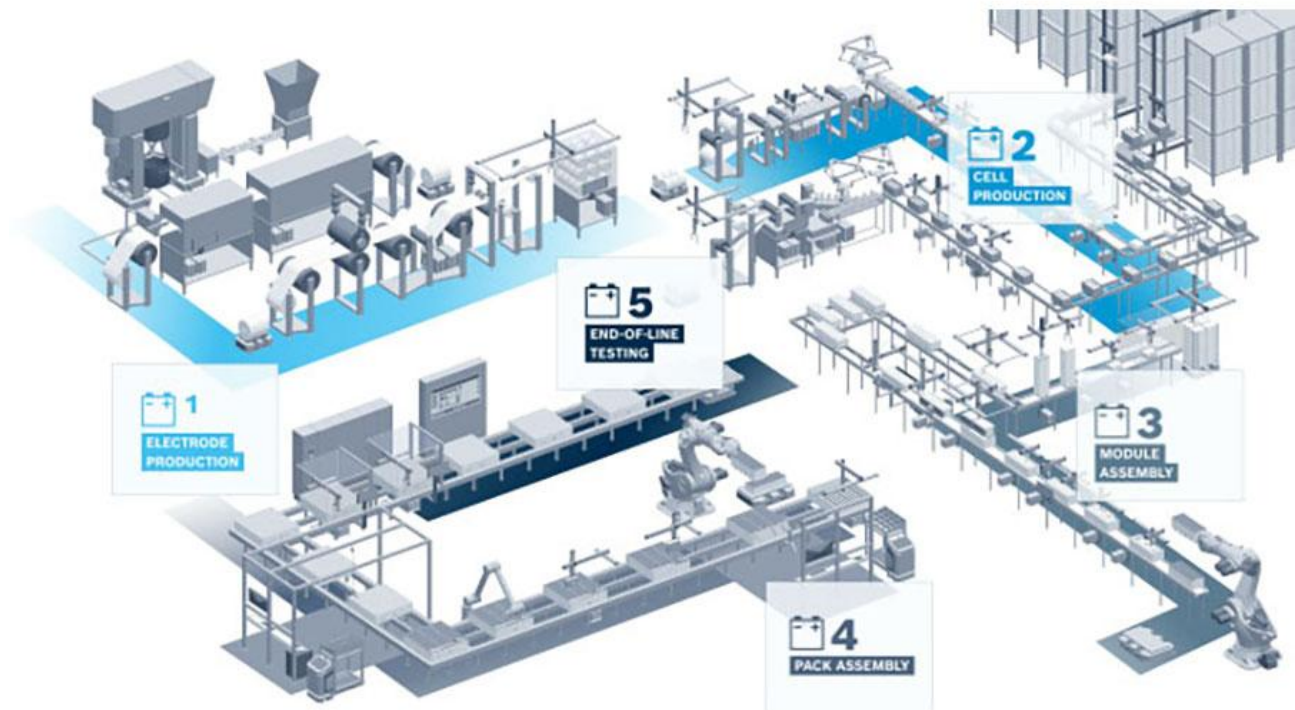


Figure 1: Schematic Battery Manufacturing Plant Layout [3]

- 3.2.4 All manufacturing activities shall be clearly indicated. The manufacturing line shall make optimal use of the designated space and be arranged in a manner that minimizes strain on workers and wastage.
- 3.2.5 The battery energy storage manufacturing plant shall be designed to optimize material flow, maximize productivity and reduce time to market.
- 3.2.6 Indicate how and where clean rooms shall be deployed to prevent contamination.
- 3.2.7 Indicate the emissions level expected to be achieved because of the battery energy storage manufacturing plant and indicate mitigation measures to be put in place.
- 3.2.8 Clearly indicate what parts of the process will be automated and motivate why.
- 3.2.9 Show a process flow diagram indicating the different activities.
- 3.2.10 The layout design shall have the capacity and flexibility for future expansion of up to at least 4GWh annual production.

3.3 Products

- 3.3.1 The plant shall have the capability to manufacture fully integrated battery systems that can be readily incorporated into any BESS project using standard equipment available in the market.
- 3.3.2 As a minimum, the end-product shall comply with relevant and equivalent standards of battery energy storage of that particular technology or equivalent. Supply the type test certificates and type test reports of the cell / module and system models that will be manufactured at the plant. The certificate should be from an independent body or testing facility from the manufacturer.

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- 3.3.3** The battery cabinet / container shall have fully integrated HVAC system, Fire Detection and Suppression systems (where applicable), Battery Management System (cell-level to cabinet / rack level), with the necessary control, monitoring and communications interfaces.
- 3.3.4** The minimum required Technology Readiness Level (TRL) of the battery system shall be Level 9.
- 3.3.5** Provide the following information on the battery systems that will be manufactured:
- a) The chemistry or technology used in the manufacturing process.
 - b) What form factor/s will be manufactured and why?
 - c) Provide the rating of the cells Nominal Voltage, Rated Wh, Ah capacities at reference temperature, the C rate, cycle life information at different depth of discharge levels.
 - d) The manufacturer should provide references with statistics of the number of units manufactured annually at other facilities, the maturity level of the technology, known failure rates, applications information.

3.4 Quality and Environmental Management Systems

- 3.4.1** Explain the Quality Assurance and Quality Control procedures that will be followed throughout the entire manufacturing process to ensure optimal cell performance, safety and reliability. The quality management system shall achieve ISO 9001 certification.
- 3.4.2** Clearly indicate what environmental management systems will be followed. The environmental management systems shall achieve ISO 14001 certification.
- 3.4.3** List the different waste streams of end products. Explain how the waste will be managed and recycled in an environmentally responsible manner.
- 3.4.4** Indicate the areas where waste will be stored, recycled, how it will be transported and disposed of.
- 3.4.5** Indicate/provide Quality and environmental control expertise in the management of waste.

3.5 Water and Energy Management

- 3.5.1** Clearly explain the measures that will be implemented to ensure the efficient use of energy sources, minimizing operational costs and environmental impact. Integration of renewable energy systems to minimize the carbon footprint would be an advantage.
- 3.5.2** Indicate volumes and levels of purity and the source of water that will be used at the site. Indicate additional water management infrastructure that may be required in addition to the site's current water resources.
- 3.5.3** What measures will be taken to minimize water wastage and treatment?
- 3.5.4** Indicate or provide water quality and environmental control expertise that will ensure that the manufacturing plant meets requirements from a substation, power station perspective.

3.6 Safety Systems

- 3.6.1** State what safety systems will be employed to protect workers and prevent accidents.
- 3.6.2** Indicate the emergency evacuation process and assembly area. Indicate how fires or other emergencies will be dealt with on the site.
- 3.6.3** Indicate or provide quality and safety control expertise on safety systems during material delivery, manufacturing, transportation, storage and usage of the manufactured battery energy storage technology and associated processes.

3.7 Testing

- 3.7.1** State the different tests that will be conducted along the production line, storage, operations and the function of the tests. Reference the relevant test standards.
- 3.7.2** Indicate what tests will be done on site and which ones will be done externally by other bodies, where applicable.

4. Authorization

This document has been seen and accepted by:

Name and surname	Designation
Thomas Jacobs	Chief Engineer: DC & Auxiliary Supplies
Mfundu Songo	Senior Manager: Generation
Mashudu Ndwambi	Senior Advisor: RT&D

5. Revisions

Date	Rev	Compiler	Remarks
July 2025	1	T Jacobs	New document.

6. Development team

The following people were involved in the development of this document:

- Thomas Jacobs
- Mfundu Songo

7. Acknowledgements

None