Large-Scale Battery Storage Opportunity in South Africa

ESKOM Flagship Battery Energy Storage Systems (BESS) Project

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Three main objectives

1. Provide background of the project
2. Discuss requirements
3. Clarify next steps
100% state-owned electricity utility, strong government support
Supplies approximately 90% of South Africa’s electricity
Connected 215 519 households to the grid during the 2018 year
As at 31 March 2019:
- 6.497 million direct customers (2018: 6.258 million)
- 30 operational power stations (including 1 nuclear) with a nominal generating capacity of 45 561 MW
- 17.4GW of new generation capacity being built, of which 10.7GW already commissioned (Medupi, Kusile, Ingula)
- Energy sold ~200TWh/annum
- Approximately 381 594 km of cables and power lines
- 48 628 employees, inclusive of subsidiaries

SOURCE: Eskom
Towards cleaner power with BESS

In the beginning
- In 2010 Eskom concluded a loan agreement with the World Bank and others for Medupi PS
- Additional project development objectives (PDOs) stipulated
- Implement a 100MW mid-merit Kiwano Concentrated Solar Plant (CSP) … catalyst to roll out clean energy

Circumstances changed
- In 2016 Eskom took a decision to investigate alternative solutions to still meet the PDO
  - Approval was granted by funders to investigate alternatives
  - Engineering continued by Generation engineers

Now, we start
- In 2017, Eskom proposed the distributed battery storage with solar photovoltaic to be installed as an alternative to CSP
  - Battery Energy Storage Systems (BESS) to be implemented in 2 phases achieving a total of 1440 megawatt-hours of energy shifting per day
Agenda

• Scope
  • Timeline
  • Process to follow
  • Considerations
  • Next steps
BESS solution scope

- Achieve 1,440MWh/day of energy output
- Fixed in terms of BESS and solar PV capacity; implement in 2 phases
- Virtual Power Plant (VPP) and Asset Performance Management (APM)
- 60MW of PV at various sites to be constructed
- Technical due diligence of 200MW/800MWh (Ph1) & 160MW/640MWh (Ph2)
## Six components identified

<table>
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<tr>
<th>BESS Scope</th>
<th>Description</th>
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<tr>
<td>Technology agnostic</td>
<td>1. Technology agnostic</td>
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<tr>
<td>Use case rqmnts &amp; Integration</td>
<td>2. Focusing on functional and technical requirements for BESS to meet the use case and integrate with Eskom control and monitoring infrastructure.</td>
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<tr>
<td>BESS system components</td>
<td>3. BESS equipment can be configured to meet Eskom use case; work with VPP</td>
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<tr>
<td>Configuration</td>
<td>4. Test certificates, compliance with industry best practices, including safety</td>
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<td>Compliance</td>
<td>5. Compliance with the RPP Grid Code as well as draft BESF Grid Code for interconnection to the grid.</td>
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<tr>
<td>Training</td>
<td>6. Training of applicable stakeholders e.g. First Responders, Operating and Maintenance</td>
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</table>
Operating and maintenance scope

- **In scope**
  - O&M of the BESS and all associated equipment and facilities
  - O&M of the Physical Security Systems (CCTV, detection and alarm system, access control system and non-lethal electrified fence, public address system and security lights)
  - O&M of the Control Plant and Power Plant (Network Integration Equipment) even in the BESS yard
  - Security system monitoring service by an off-site security monitoring centre and reaction service

- **Out of scope**
Clearly defined roles

**Eskom’s responsibility**

- Technical specifications
- Environmental approvals
- Site selection
- Land acquisition
- NERSA Licensing

**Eskom Expectation of Supplier**

- Verification of technical studies
- Detail Design per site
- Execution – full DSI/ EPC
- Hazardous Material management – Construction, Operation (spares) and Disposal at end of life
- Product & Functional guarantees

SOURCE: Photo Courtesy Irvine Ranch Water District, [https://www.newsdeeply.com/water/community/2018/02/01/battery-storage-begins-to-find-a-home-at-some-water-utilities](https://www.newsdeeply.com/water/community/2018/02/01/battery-storage-begins-to-find-a-home-at-some-water-utilities)
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Phase 1 completion target

The delivery of the value will depend on the following:

**Phase 1**
- 8 sites*
- 200MW/800MWh of distributed battery storage

**Phase 2**
- < 10 sites*
- 160MW/640MWh of distributed battery storage
- + 60MW of PV
- + Virtual Power Plant (VPP)
- + Asset Performance Management (APM) system

**Deliverables**

*Phase 1 to be completed 31 Dec 2020*
*Phase 2 to be completed 31 Dec 2021*

*Sites subject to due diligence*
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Procurement method

Process flow of the procurement process

- Project Financing Obtained
- Procurement Strategy Selected
- Request for bids
- Post Qualification & contract award

Insights

- Four packages for Phase 1; staggered
- Approach for Phase 2 being defined
- Post qualification assessment:
  - past experience & installations, appropriate skills, track record, capacity and capability
  - information of subcontractors
- Regulation 24 of the Construction Industry Development Board (CIDB) applicable
- Localisation targets for phase 1:
  - Minimum 20% local content (local to site and South Africa) to be achieved for each package
  - Subcontracting to local suppliers, M&O
  - Designated material (as prescribed by the South African Department of Trade and Industry) - http://www.thedti.gov.za/industrial_development/ip.jsp
  - Skills development (as prescribed by the skill development regulation)

Financed in part by a WB loan, African Development Bank (AfDB) and others

Design, Supply & Install including Operating and Maintenance i.e. EPCM for the first phase of the project

Conduct pre-bid Webinar

Procurement approach is Request for Bids (RfB)

Using guidelines in the Standard Procurement Documents (SPDs) as issued by the bank

Source: Eskom
Evaluation of bids

1. **Substantial responsiveness**
   - Preliminary examination
     - Eligibility, Completeness, Verification and Bid Security
   - Commercial Evaluation
     - Qualifying Pass/Fail criteria, contract conditions
   - Technical Evaluation including Safety, Health and Environmental
     - All Mandatory requirements are met on a Pass/Fail criteria

2. **Evaluation of cost**
   - Price, Total Cost of Ownership – capital, operating, O&M, disposal costs

3. **Most Advantageous Bid/ Post Qualification**
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### Special Considerations

#### Groups

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<td>Space and time</td>
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<td>3</td>
<td>Augmentation</td>
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<td>4</td>
<td>Product guarantees vs Performance guarantees</td>
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#### Considerations

- **Environmental considerations**
  - 500m³ hazardous substances limit
  - Management of hazardous materials, spares, disposal of failed units, recycling, value of electrolyte/active material

- **Space and time**
  - Limited to available space per site
  - Time constraints as per deliverables

- **Augmentation**
  - Augmentation allowed for in the bid

- **Product guarantees vs Performance guarantees**
  - Normal product guarantees
  - Performance guarantee 20yrs/life of plant
  - Consideration of penalties for breaching performance guarantees
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Next steps

For Eskom

• Request for Bids (RfB) to be issued to market subject to governance approval

• Contract award to successful bidder for the first site

For potential bidders

• Note special conditions; World Bank procurement approach

• Submit questions, comments, suggestions and feedback via the webinar platform provided

• Look out for bid notifications on the relevant sites – Eskom, CIDB, WBG, AfDB, etc

• Respond to bids in full
THANK YOU