

	<p style="text-align: center;">Report</p>	<p style="text-align: center;">LimLanga Cluster</p>
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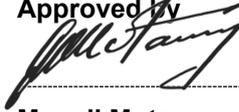
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1. INTRODUCTION

The Eskom Integrated Long Term Plan and the Eskom Corporate Plan sets up the organisation for growth and maps out a low carbon future in a post-coal environment. The plan describes Eskom's participation in renewable energy and other technologies to deliver on opportunities that will add generating capacity and in turn aid in alleviating system constraints, while also pursuing a low carbon future. The deployment of Solar Photovoltaic (PV) systems at Eskom offices aligns with this plan.

This document thus, provides an overview of Eskom Limlanga Cluster technical evaluation criteria and the process to be adopted by the cluster technical evaluation team when evaluating tender submissions for Engineering, Procurement and Construction (EPC) of Solar PV Service Providers in Limlanga Cluster.

2. SUPPORTING CLAUSES

2.1 Scope

The document covers the requirements for both the desktop and site technical evaluations. The desktop evaluation will assess elements such as skills, vehicles, tools and equipment requirements to determine compliance to the technical competency requirements for tenderers.

The evidence submitted in the tender for vehicles, tools & equipment and other objective documents/requirements will be assessed on site.

2.2 Purpose

The purpose of this document is to set out the minimum criteria to be used when evaluating Solar PV Service Providers contractors in LimLanga Cluster.

2.3 Applicability

This document shall apply to Eskom Distribution LimLanga Cluster.

2.4 Effective date

The document is effective from the authorisation date.

2.5 Normative/Informative References

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

2.6 Normative

- [1] ISO 9001 Quality Management Systems
- [2] Eskom Guideline 240: 70413681 (Portfolio of Evidence for Authorisation).
- [3] QM 58 – Supplier Contract Quality Requirements Specifications
- [4] 240-128559117 Method Statements for Eskom Substations
- [5] 240-48929482: Tender Technical Evaluation Procedure

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2.7 Informative

- [6] Eskom Standards – Part 7: Substations.
- [7] 240-171000166 - SSEG - Major Equipment Requirements for DX Solar PV AND BES systems
- [8] 240-171000169 - Functional Specification for a Solar Photovoltaic and Battery Energy Storage System
- [9] EI_240-170000777 EI FOR OPERATING LV NETWORKS WITH SSEGs
- [10] ST_240-134438470 Maintenance Standard for Small Scale Embedded Generators (SSEG) Rev 1
- [11] 240-170000103 LITHIUM IRON PHOSPHATE BATTERIES STANDARD

2.8 Definitions

Word	Definition
Inverter	Device that converts DC input into AC output
Small-Scale Embedded Generator (SSEG)	Embedded generator rated at up to 1 MVA which includes the energy conversion device (devices), the static power converter (converters), if applicable, and the control and protection gear within a customer's network that operates in synchronism with low-voltage networks. For avoidance of any doubt, the point of generator connection must be at low voltage even if the point of utility supply is not at low voltage.
Enclosure structure	Containment solutions designed to store and protect Battery Energy Storage Systems (BESS), inverters, and associated electrical components

2.9 Abbreviations

Abbreviation	Description
DoL	Department of Labor
ISO	International Standard Organization
PLATO	The South African Council for Professional Technical Surveyors
SAGC	South Africa Geomatics Council
SACPCMP	South African Council for the Project and Construction Management Professions
SCOT	Steering Committee of Technology
TET	Technical Evaluation Team
AC	Asset Creation
IPP	Independent Power Producer
EPC	Engineering, Procurement and Construction
BESS	Battery Energy Storage System
SCADA	Supervisory, Control and Data Acquisition
SSEG	Small Scale Embedded Generators
PCE	Power Conversion Equipment
M & O	Maintenance and Operations

2.10 Roles and Responsibilities

The appointed LimLanga Technical Evaluation Team will use this document to evaluate tenders for this Enquiry. Standards Implementation manager will ensure that this document is implemented accordingly.

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2.11 Process for Monitoring

The document shall be reviewed as and when required to be always in line with the best technological practices and the Eskom procurement policies.

2.12 Related/Supporting Documents

Not applicable.

3. TENDER TECHNICAL EVALUATION STRATEGY

This section details the methodology to be followed by Eskom Distribution, LimLanga Cluster in the evaluation of the “Technical” category of the tender returnable of this Enquiry.

3.1 Tender Technical Evaluation Process

The technical evaluation team will evaluate the submissions. The submissions shall be subjected to a progressive series of evaluation levels. Passing of each level is a prerequisite for proceeding to the next evaluation level.

The evaluation levels entail the following:

- Level 1: Desktop Evaluation
- Level 2: Site and Factory Assessment and Verification

Note 1: Sharing of resources amongst contractors’ resources i.e., tools, vehicles and manpower, is not allowed in this contract and if a company is found to do so, it will be disqualified.

Note2: In cases where the main service providers are allowed to sub-contract some activities by Eskom Procurement, the subcontracted service provider/s will be evaluated for the specified activity. Only Eskom evaluated subcontractors may be used.

3.1.1 Level 1: Desktop Evaluation

This will be conducted in two phases namely: Mandatory Returnables Evaluation (Phase 1) and Functional Returnables Evaluation (Phase 2).

Phase 1: Mandatory Requirements Evaluations

There will be no scoring linked to these requirements, the evaluator shall indicate with a **Yes / No** whether the requirement is met or not. Full compliance is required, i.e., The tenderer needs to meet all the requirements to proceed to the next level. Once the mandatory requirements are met through an evaluation conducted by the evaluation team, the technical evaluation for functionality evidence will proceed, else the tenderer will be deemed unsuccessful for this enquiry.

Phase 2: Functional Requirements Evaluations

There will be scoring linked to these requirements. The tenderer needs to obtain a minimum threshold score of **seventy (70%) percent** to proceed to the next level. Tenderers who fail to meet the minimum threshold will not be evaluated further and will be deemed unsuccessful.

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3.1.2 Level 2: Site and Factory Assessment and Verification

Tenderers that met the minimum threshold of Level 1 will undergo an on-site, and factory assessment and verification. The aim with the site visit will be to assess and verify vehicles, tools and equipment submitted for desktop evaluations and the factory visit to assess compliance of the sample products to specification.

If any information provided during the desktop evaluation is found to be a mismatch and / or inaccurate during the verification process, Eskom reserves the right to disqualify the tenderer from this enquiry or rectify the desktop score accordingly.

4. TENDER TECHNICAL EVALUATION CRITERIA AND RETURNABLE

The requirements are divided into four (4) levels namely: Mandatory Requirements, Functional Requirements, and Site Assessments / Verification.

4.1 Mandatory Requirements

These are documents not required for functionality scoring. There will be no scoring linked to these requirements, the evaluator shall indicate with a **Yes / No** whether the requirement is met or not. Once the requirements are met, the technical evaluation for functionality evidence will proceed otherwise the submission will be deemed non-responsive and will not proceed to the next evaluation stage.

Table 1 below lists the mandatory returnable that must be submitted by the tenderer. Failure to submit documents as prescribed below, will lead to the tenderer discarded / disqualified.

Table 1: Mandatory Requirements

Item No:	Requirement/s	Evidence Required	Evidence Notes	Submitted? (Yes/No)
1.	Letter of Registration as Electrical Contractor (DoL) with an Installation Electrician (IE) or Master Installation Electrician (MIE)	Valid (at the time of submission) Department of Labour Certificate (Letter of Registration) in your Company Name. Minimum - Three phase installations. Single phase will NOT be accepted.	The DoL Letter must be in company name or company director's name, and the registration must be valid (Not expired, not forged). The Letter does not need to be certified.	
2.	ECSA registration as a Professional Engineer / Engineering Technologist in Electrical Engineering.	Submit valid (at the time of submission) registration certificate with the Engineering Council of South Africa, ECSA. Registration certificate may be in the name of the company owner / co-owner / senior staff member. An affidavit per employee, in the template provided (see Annexure A: Affidavit Confirming Employment of Resource), completed by the resources named on the certificates and certified by a Commissioner of Oaths.	Certificate must be certified by the commissioner of oaths and not older than six (6) months from tender issue date.	

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Item No:	Requirement/s	Evidence Required	Evidence Notes	Submitted? (Yes/No)
3.	ECSA registration as a Professional Engineer / Engineering Technologist in Civil Engineering.	Submit valid (at the time of submission) registration certificate with the Engineering Council of South Africa, ECSA. Registration certificate may be in the name of the company owner / co-owner / senior staff member. An affidavit per employee, in the template provided (see Annexure A: Affidavit Confirming Employment of Resource), completed by the resources named on the certificates and certified by a Commissioner of Oaths.	Certificate must be certified by the commissioner of oaths and not older than six (6) months from tender issue date.	
4.	Concession Letter	Tenderer to submit a completed, signed and dated concession letter, confirming ownership and/or authorised use of listed design softwares.	Complete, sign and date the Eskom attached form, Annexure H	

4.2 Functional Requirements

This section entails functional requirements for services and technical specification of material required for the execution of this contract.

Tenderers need to obtain a minimum score of **seventy (70%) percent** to be deemed successful for this Enquiry.

Table 2: Functional Criteria (Overall)

Item	Description	Weight
1.	Services (design / construction/commission)	50%
2	Specification for the Solar PV and BESS	50%
TOTAL		100%

4.2.1 Desktop Requirements for Services

Tenderers need to obtain a minimum score of **thirty-five (35%) percent** to be deemed successful and proceed to the next stage, i.e., Site Assessment and Verification. **Table 3** below details the functional criteria for services (design / construction).

Table 3: Functional Criteria for Services

Item	Description	Weight
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1.	Training Requirements & Qualifications	5%
2	Company Work Related Experience	20%
3	Vehicles	20%
4	Tool & Equipment	5%
TOTAL		50%

4.2.1.1 Training, Qualifications & Accreditations Requirements

This section entails the training, qualification and accreditation requirements for Solar PV and BESS professional service providers and contractors respectively, as listed in **Table 4** below.

Table 4: Training, Qualifications & Accreditations Requirements for Solar PV

No	Requirements	Evidence required	Evidence notes	Min Qty	Max Score
1.	Substation Construction Training / Course	Valid Substation Construction Training / Course Certificate/s	<p>Certificates must be certified by the commissioner of oaths and not older than six (6) months from tender closing date.</p> <p>Certificate must be valid at tender issue date i.e., not expired.</p> <p>On the certificates it must be clear that the following modules were covered during the training:</p> <ul style="list-style-type: none"> a. Earthworks and related installations b. Structure foundations and assembly c. Equipment installation/erection d. Overhead conductor & Tubular Busbar installation e. Power cable general installation, jointing and terminations f. Basic Rigging g. Crimping (30T & 100T) <p>Curriculum of training for substation construction course to be submitted if listed modules above are not indicated on the training certificate.</p> <p>Curriculum shall be from the service provider.</p> <p>Valid certificate accredited by training authorities e.g. EWSETA, SETA. Will be accepted.</p>	X1	20

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No	Requirements	Evidence required	Evidence notes	Min Qty	Max Score
2.	Renewable Energies Training Course for Solar PV and BESS	Valid Renewable Energy Construction/ Commissioning Training / Course Certificate/s	<p>Certificates must be certified by the commissioner of oaths and not older than six (6) months from tender closing date.</p> <p>Certificate must be valid at tender issue date i.e., not expired.</p> <p>Valid certificate accredited by training authorities e.g. EWSETA, SETA. Will be accepted.</p>	X1	20
3.	BSc Eng. / B. Eng / B Tech / National Diploma Qualifications	Valid BSc Eng. / B. Eng / B Tech. Degrees / National Diploma Degree Certificates in electrical engineering	<p>Certificates must be certified by the commissioner of oaths and not older than six (6) months from tender closing date.</p> <ul style="list-style-type: none"> BSc Eng. / B. Eng / B Tech. degree certificate will score 20 points per certificate, National diploma certificate will score 10 points per certificate. 	x1	20
4.	National Diploma / B-Tech / Degree for Survey Technician / Surveyor (Technologist) / Land Surveyor (Professional)	Valid National Diploma / B-Tech / Degree certificates In Engineering Survey	<p>Certificates must be certified by the commissioner of oaths and not older than six (6) months from tender closing date.</p> <p>Certificate must be valid at tender issue date i.e., not expired.</p> <ul style="list-style-type: none"> Degree. / B Tech. qualification certificate will score 20 points per certificate, National diploma certificate will score 10 points per certificate. 	x1	20
5.	Construction Regulations	Valid SACPCMP registration certificate as a construction project manager	<p>Submit a certified copy of SACPCMP registration certificate.</p> <p>The certified copy submitted must not be older than six (6) months from the tender closing date.</p> <p>Certificate must be valid at tender issue date i.e., not expired.</p>	x1	10
6.					
7.	Crane Operator	Valid Training Certificate/s	<p>Submit a training certificate for the authorised crane operator, F32/C32 minimum (certified copy)</p> <p>Certified copies submitted must not be older than six (6) months from the tender closing date.</p>	x1	10

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No	Requirements	Evidence required	Evidence notes	Min Qty	Max Score
			Certificate must be valid at tender issue date i.e., not expired.		
TOTAL POINTS					100
Note: An affidavit per employee, in the template provided (see Annexure A: Affidavit Confirming Employment of Resource), completed by the resources named on the certificates and certified by a Commissioner of Oaths must be submitted.					
SCORING METHODOLOGY					
Score	(%)	Definition			
5	100	Certificate is valid, not expired, certified, covers all modules required and is from accredited service provider.			
4	80	Certificate is valid, not expired, covers all modules required and is from accredited service provider but is not certified.			
2	40	Certificate certified but expired / modules not indicated / not from accredited service provider.			
0	0	Certificate not submitted			
The final weighted score for Training will be calculated by the formula below:					
$Final\ Score = \frac{Tenderer\ Score}{Grand\ Total\ Points} \times 5\%$					
Notes: Certified copies submitted must not be older than six (6) months from the tender closing date.					
Certificate must be valid at tender closing date.					

4.2.1.2 Company Work Related Experience Requirements

This section assesses the experience of the contractor to enable Eskom LimLanga Cluster to identify the risk associated with using incompetent / inexperienced contractors for this enquiry. Contractors are expected to demonstrate experience as depicted in **Table 5** below, for Solar PV respectively.

Note 3: Any experience that does not involve related construction activities tabled below will not be accepted e.g., dismantling equipment / apparatus, maintenance of equipment / apparatus.

Table 5: Work Related Experience Requirements for Solar PV and BESS

Item No	Requirements	Evidence Required	Qty	Max. Score
1.	Work-related experience in the design of off grid / grid tied Solar PV (>500kW) and BESS (>5000kWh).	The tenderers to attach the Completion Certificates / Acceptance or Reference Letter with traceable contact details and project name and numbers for all completed projects / designs. The scope must demonstrate experience in supplying, installing and commissioning of on-grid / off-grid plants.	X2	40

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Item No	Requirements	Evidence Required	Qty	Max. Score
		20 points for each project completed.		
2.	<p>Work-related experience in engineering survey projects in any of the following categories:</p> <ul style="list-style-type: none"> • Solar PV Plant and BESS • Substation 	<p>The tenderers to attach the Completion Certificates / Acceptance or Reference Letter with traceable contact details and project name and numbers for all completed projects / designs.</p> <p>20 points for each project completed.</p>	X2	40
3.	<p>Work-related experience in substation construction.</p>	<p>The tenderers to attach the Completion Certificates / Handover Document/s for each completed project. (The completion certificate must include minimum requirements such as project name, high level scope of work, client name, contractor name, start date, end date, task/project value and signature). It must also stipulate the completion date.</p> <p>High Level Scope of Work must demonstrate experience in the following:</p> <ol style="list-style-type: none"> a. Substation civil work (earthworks, equipment foundations) b. Substation Earth mat construction c. Building Structure (e.g., control room, housing structure) d. Substation Steel work & Equipment assembly, installation and erection e. Conductor and Tubular Busbar installation f. Wiring, Cable installation, jointing and terminations <p>The experience may be as a Subcontractor or Main contractor.</p> <p>Subcontractors to submit Job Completion Certificates and the memorandum of understanding between the main contractor and the subcontractor.</p> <p>20 points for each project completed.</p> <p>Note: Any experience that does not involve related construction activities tabled above will not be accepted e.g., Dismantling equipment / apparatus, Maintenance of equipment / apparatus.</p>	X2	40
4.	<p>Work-related experience in the construction / installation / commissioning of Solar PV (>500kW) and BESS (>5000kWh).</p>	<p>The tenderers to attach the Completion Certificates / Handover Document/s for each completed project. (The completion certificate must include minimum requirements such as project name, high level scope of work, client name, contractor name, start date, end date, task/project value and signature). It must also stipulate the completion date.</p> <p>High Level Scope of Work must demonstrate experience in the following:</p> <ol style="list-style-type: none"> g. Installation and wiring of solar panels, batteries, inverters, programming and commissioning. h. Control plant wiring for metering, protection, telecontrol, telecommunication and DC. i. Steel work & equipment assembly, mounting structures, installation and erection 	X2	40

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Item No	Requirements	Evidence Required	Qty	Max. Score
		<p>The experience may be as a Subcontractor or Main contractor.</p> <p>Subcontractors to submit Job Completion Certificates and the memorandum of understanding between the main contractor and the subcontractor.</p> <p>20 points for each project completed.</p> <p>Note: Any experience that does not involve related construction activities tabled above will not be accepted e.g., Dismantling equipment / apparatus, Maintenance of equipment / apparatus.</p>		
Total				160
<p>The final score for Related work experience will be calculated by the formula below:</p> $Final\ Score = \frac{Tenderer\ Score}{Total\ Points} \times 20\%$				

4.2.1.3 Vehicles Requirements

Vehicle requirements for the construction of Solar PV (PV Solar Panels, Power Plant, Control Plant and Civil Works) are listed and stipulated in **Table 6** below, for Solar PV respectively.

The evidence required on this table should be provided utilising an Eskom format / template provided in **Annexure B: Vehicles List / Register** to be considered and shall be accompanied by relevant vehicle registration certificates as per **Table 6**. Vehicle List / Register must be completed in full and signed by the tenderer. It will also be used for site assessment / verification.

Certified copies of the vehicle registration document/s or equivalent document (not just the license disc) shall be submitted as proof of ownership. Registration documents shall bear the company name or owner(s) / director's name.

Where vehicles are hired the tenderer shall in addition submit a letter from a bona- fide hiring companies. The hiring letter must indicate the specific vehicle(s) as well as the tenderer's company name.

Table 6: Vehicle Requirements for Solar PV and BESS

Item No.	Requirement/s	Evidence	Indicate if Owned or Hired	Min Qty	Max. Score
1.	Truck with suitable VMC (with aerial device) - (Valid Crane Inspection Certificate indicating minimum reach of 15m)	<p>Submit valid vehicle registration document/s (not just the license disc). Registration documents shall bear the company name or owner(s)/director's name.</p> <p>In cases of hiring, submit proof that this will be hired from Bona Fide Vehicle Hire Companies.</p>		1	20
2.	Transport for workers: (Not open Bakkie – Minimum 4 workers.	Submit valid vehicle registration document/s (not just the license disc). Registration documents shall bear the company name or owner(s)/director's name.		1	5

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		In cases of hiring, submit proof that this will be hired from Bona Fide Vehicle Hire Companies.			
3.	4x4 or 4x2 Pick-up Bakkie with Ladder Rack (LDV/Double Cab) with a minimum of 1 ton load.	Submit valid vehicle registration document/s (not just the license disc). Registration documents shall bear the company name or owner(s)/director's name. In cases of hiring, submit proof that this will be hired from Bona Fide Vehicle Hire Companies.		1	5
TOTAL POINTS				30	
SCORING METHODOLOGY					
Score	(%)	Definition			
5	100	Registration certificate is valid, and bears the company name or owner(s)/director's name.			
4	80	Vehicle is rented from bona fide hiring company with valid, signed rental agreement			
2	40	Rental agreement not valid and signed.			
0	0	Registration certificate / rental agreement not submitted			
<p>The final weighted score for Vehicles will be calculated by the formula below:</p> $Final\ Score = \frac{Tenderer\ Score}{Total\ Points} \times 20\%$					

4.2.1.4 Tools and Equipment Requirements

This section stipulates requirements for Tools & Equipment for Power Plant Construction contractors as listed in **Table 7** below, for Solar PV.

The evidence required on this table should be provided as per the Eskom template provided in **Annexure B: Tools & Equipment List / Register for Solar PV** respectively.

Please complete Annexure B to indicate whether you Own / Hire (Column E) tools & equipment and the corresponding quantities (Column F). The list / register must be completed in full and signed by the tenderer.

- a) Tools and equipment will be evaluated based on the tools register (Annexure B) submitted by the tenderers and it must be in the Eskom format provided
- b) The tenders shall indicate in the tools register/s if the tools are Owned/ Hired by the company. Where tools are hired the tenderer shall in addition submit an agreement / contract / letter from a bona- fide hiring company. The hiring letter must indicate the specific tools or equipment as well as the tenderer's company name indicating all the tools that are hired for points to be allocated.
- c) Calibration and test certificates (where required / necessary) for tools and equipment are NOT required at tendering stage but shall be required at Tender award stage.

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Table 7: Tools & Equipment Requirements for Solar PV

Item	Equipment Description	Size	Min Qty	Indicate if Owned or Hired.	Quantity Owned or Hired	Calibration Required?	Max. Score
Safety & Working at Heights							
1.	Ladders (Step and Extension)	2,54 m & 8-9 m	1 each per team	Own			5
2.	Scaffolding	2 m high	1 set per team	Own / Hire			5
Total Points (Safety & Working at Heights)							10
Operating & Testing							
3.	Safety Tester (Voltage detectors) (if applicable)	Up to 132 kV	1 per authorized person	Own		Yes	5
4.	Earth resistance tester with suitable wires	N/A	1	Own		Yes	5
5.	Continuity tester	Min. 10 A	1 per electrician	Own		Yes	5
6.	Insulation tester	5 kV	1	Own		Yes	5
Total Points (Operating & Testing)							20
General Work Tools							
7.	Gas Welding/Exothermic Welding Set Complete	Complete	1 per team	Own			5
8.	Torque Wrench	30-150 Nm	1 per team	Own			5
Total Points (General Work Tools)							10
Control Plant Tools (must be owned)							
9.	Portable gas soldering iron	e.g. Portasol P-1K	1 per team	Own			5
10.	Solder Sucker		1 per team	Own			5
11.	Wire Stripper		1 per team	Own			5
12.	Krone Tool		1 per team	Own			5
13.	Test Lead	(Krone) - Disconnect and Through	1 per team	Own			5
14.	RJ45 crimping tool		1 per team	Own			5
15.	Pop Rivet gun		1 per team	Own			5
16.	Pre-insulated Ratchet Type Terminal Crimper	1.5 mm – 6 mm Red, Blue, Yellow	1 per team	Own			5
17.	Bootlace Ferrule Crimper	0.5 mm – 6 mm	1 per team	Own			5
18.	Polarity tester (Calibration certificate required at task order issue)		1 per team	Own			5
19.	Digital multi-meter (Calibration certificate required at task order issue)	4 ½ Digit true RMS as per DSP 34-1053	1 per team	Own			5

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Item	Equipment Description	Size	Min Qty	Indicate if Owned or Hired.	Quantity Owned or Hired	Calibration Required?	Max. Score
20.	Insulation tester	500 V	1 per team 1	Own			5
21.	Multimeter		1 per team 1	Own			5
22.	AC Clamp meter		1 per team 1	Own			5
23.	Battery Capacity tester	Automated	1	Own			10
Total (Control Plant Tools)							80
GRAND TOTAL FOR TOOLS AND EQUIPMENT SCORE							120
SCORING METHODOLOGY							
Score	(%)	Definition					
5	100	Tool is owned.					
4	80	Tool is hired					
2	40	Non-Eskom register submitted					
0	0	Tool register not submitted					
<p>The final weighted score for Tools and Equipment will be calculated by the formula below:</p> $Final\ Score = \frac{Tenderer\ Score}{Grand\ Total\ Points} \times 5\%$							

4.2.2 Desktop Requirements for Material Specification

This section details desktop requirements to be met by contractors, as entailed in **Table 8** below lists desktop requirements for material required for this enquiry, and detailed specifications are contained in annexures D to G. Tenderers need to obtain a minimum threshold score of **thirty-five (35%) percent** to be deemed successful and proceed to the next stage, i.e., Site Assessment and Verification.

Tenderers must complete **Annexure D – Technical Schedule A & B Solar PV and BESS**. It is required for the tenderer to complete Schedule B. Each correct entry by the tenderer in the Schedule B, will earn the tenderer one point. Where there is a submitted deviation in the Deviation Schedule and it is acceptable, the tenderer will earn one point.

Words like, “NOTED”, “TBA”, “OK”, etc. must not be used in Schedule B. If these words are used, zero point will be received by the tenderer.

Table 8: Material Specification Summary of Scores

MATERIAL SPECIFICATION AND FINAL PRODUCT			
Item	Description	Max Score	Score
1	Technical Schedules A and B for PHOTOVOLTAIC MODULES (PANELS)	5	
2	Technical Schedules A and B for BATTERIES	5	
3	Technical Schedules A and B for BATTERY ENCLOSURE	5	
4	Technical Schedules A and B for REGULATOR, CHARGE CONTROLLER AND MPPT	5	

CONTROLLED DISCLOSURE

5	Technical Schedules A and B for INVERTER	5	
6	Test Reports	5	
7	Deviation Schedule	5	
GRAND TOTAL		35	
SCORING METHODOLOGY FOR ANNEXURES D TO F			
Score	(%)	Definition	
5	100	Meet technical requirement(s) with no discrepancies. No foreseen technical risk(s) in meeting technical requirements.	
4	80	Meet technical requirement(s) with less than two (2) discrepancies.	
2	40	Does not meet technical requirement(s). Discrepancies are more than two (2) and less than five (5).	
0	0	Totally deficient (discrepancies are more than five (5)) or non-responsive	
<p>The final weighted score for material specification will be calculated by the formula below:</p> $Final\ Score = \frac{Tenderer\ Score}{Grand\ Total\ Points} \times 50\%$			

4.2.3 Site and Factory Assessment & Verification

4.2.3.1 Site Assessment & Verification

Site assessment and verification will be conducted to all those service providers that met the threshold of **seventy (70%) percent** of the desktop evaluations. The verification and assessment process will involve vehicles, tools & equipment required to perform the job.

The site verification will be conducted to confirm the score of **twenty-five (25%) percent** (Ownership and availability of Vehicles, Tools & Equipment). During site evaluation, if ownership or availability of vehicles, tools and equipment, will not be proven the score will be adjusted accordingly.

If any information provided during the desktop evaluation is found to be a mismatch and / or inaccurate during the verification process, Eskom reserves the right to disqualify the tenderer from this enquiry or rectify the desktop score accordingly. Tenderers will be contacted by Eskom officials to make arrangements for the site assessment.

4.2.3.2 Factory Assessment & Verification

Factory assessment and verification will be conducted to all those service providers that met the threshold of **seventy (70%) percent** of the desktop evaluations, and if the factory is not located in South Africa, then the designated local distributor will be visited instead.

The aim of the visit will be to assess the compliance of the sample product to specification, tenderers will be expected to make their sample products available.

If any information provided during the desktop evaluation is found to be a mismatch and / or inaccurate during the verification process, Eskom reserves the right to disqualify the tenderer from this enquiry or rectify the desktop score accordingly. Tenderers will be contacted by Eskom officials to make arrangements for the site assessment.

CONTROLLED DISCLOSURE

5. ACCEPTANCE

This document has been seen and accepted by:

Name	Designation
Pravind Orrie	Senior Manager: Asset Creation
Musa Mabila	Senior Manager: Business Enablement
Marumo Marumo	Middle Manager: Network Engineering Manager MOU (Acting)
Faans van Zyl	Chief Engineer: Asset Creation
Bafana Sithole	Middle Manager: Project Execution MOU
Nelly Nkosi	Manager: Procurement MOU
Koena Moholola	Middle Manager: Procurement

6. REVISIONS

Date	Rev.	Compiler	Remarks
October 2025	1	Fundiswa Mthethwa	First Issue

7. DEVELOPMENT TEAM

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

- Christo Van Zyl
- Martin Venter
- Fundiswa Mthethwa
- Mmedi Motaung

8. ACKNOWLEDGEMENTS

None

CONTROLLED DISCLOSURE

ANNEXURE A – AFFIDAVIT CONFIRMING EMPLOYMENT OF RESOURCE

I, _____ full names),

ID Number: _____,

hereby confirm that I am currently employed as (tick all where appropriate):

Accredited Training Resource

Eskom Authorized Person

_____ (Tendering Company Name).

I solemnly declare that all the information contained herein is true.

Signature of Employee: _____

Sworn to/Affirmed before me at _____

on this the _____ day of _____ (month & year).

Commissioner of Oaths/Justice of Peace:

..... (Commissioner's stamp, with signature and date not older than
three months from the date of tender close)

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ANNEXURE B – TOOLS AND EQUIPMENT LIST / REGISTER FOR SOLAR PV AND BESS

A	B	C	D	E	F	G	H
Item	Equipment Description	Size	Min Qty	Indicate if Owned or Hired?	Quantity Owned or Hired	Calibration Required?	Max. Score
Safety & Working at Heights							
1.	Ladders (Step and Extension)	2,54 m & 8-9 m	1 each per team				
2.	Scaffolding	2 m high	1 set per team				
Total Points (Safety & Working at Heights)							
Operating & Testing							
3.	Safety Tester (Voltage detectors) (if applicable)	Up to 132 kV	1 per authorized person			Yes	
4.	Earth resistance tester with suitable wires	N/A	1			Yes	
5.	Continuity tester	Min. 10 A	1 per electrician			Yes	
6.	Insulation tester	5 kV	1			Yes	
Total Points (Operating & Testing)							
General Work Tools							
7.	Gas Welding/Exothermic Welding Set Complete	Complete	1 per team				
8.	Torque Wrench	30-150 Nm	1 per team				
Total Points (General Work Tools)							
Control Plant Tools (must be owned)							
9.	Portable gas soldering iron	e.g. Portasol P-1 K	1 per team				
10.	Solder Sucker		1 per team				
11.	Wire Stripper		1 per team				
12.	Krone Tool		1 per team				
13.	Test Lead	(Krone) - Disconnect and Through	1 per team				
14.	RJ45 crimping tool		1 per team				
15.	Pop Rivet gun		1 per team				
16.	Pre-insulated Ratchet Type Terminal Crimper	1.5mm – 6mm Red, Blue, Yellow	1 per team				
17.	Bootlace Ferrule Crimper	0.5 mm – 6 mm	1 per team				
18.	Polarity tester (Calibration certificate required at task order issue)		1 per team				

CONTROLLED DISCLOSURE

A	B	C	D	E	F	G	H
Item	Equipment Description	Size	Min Qty	Indicate if Owned or Hired?	Quantity Owned or Hired	Calibration Required?	Max. Score
19.	Digital multi-meter (Calibration certificate required at task order issue)	4 ½ Digit true RMS as per DSP 34-1053	1 per team				
20.	Insulation tester	500 V	1 per team 1				
21.	Multimeter		1 per team 1				
22.	AC clamp meter		1 per team 1				
23.	Battery capacity tester		1				
Total (Control Plant Tools)							
GRAND TOTAL FOR TOOLS AND EQUIPMENT SCORE							
SCORING METHODOLOGY							
Score	(%)	Definition					
5	100	Tool is owned.					
4	80	Tool is hired					
2	40	Non-Eskom register submitted					
0	0	Tool register not submitted					
The final weighted score for Tools and Equipment will be calculated by the formula below:							
$Final\ Score = \frac{Tenderer\ Score}{Grand\ Total\ Points} \times 5\%$							
I hereby confirm that the list above, is a true reflection of the Tools and Equipment owned or hired by my company.							
Name:		(Company Owner)					
Signature:		(Company Owner)					
Date:							

CONTROLLED DISCLOSURE

ANNEXURE C – VEHICLES LIST / REGISTER (SOLAR PV AND BESS)

A	B	C	D	E	F	G
Item No.	Vehicle	Min Qty.	Indicate if Owned or Hired	Vehicle Make	Registration Number	Max. Score
1.	Truck with suitable VMC (with aerial device) - (Valid Crane Inspection Certificate indicating minimum reach of 15m)					
2.	Suitable transport for workers: Minimum 4 workers					
3.	Bakkie / LDVs					
TOTAL POINTS						
<p>Note: the tenderer will obtain a point for each LDV</p> <p>The final weighted score for Vehicles will be calculated by the formula below:</p> $Final\ Score = \frac{Tenderer\ Score}{Total\ Points} \times 20\%$						
I hereby confirm that the list above is a true reflection of the Vehicles owned or hired by my company.						
Name:		(Company Owner)				
Signature:		(Company Owner)				
Date:						

CONTROLLED DISCLOSURE

ANNEXURE D – TECHNICAL SCHEDULE A & B SOLAR PV AND BESS

TECHNICAL SCHEDULES A AND B FOR PHOTOVOLTAIC MODULES (PANELS)

Technical Schedules A and B for PHOTOVOLTAIC MODULES (PANELS)					
Schedule A: Purchasers specific requirements					
Schedule B: Guarantees and technical particulars of equipment offered					
1	2	3	4	5	6
Item	SANS 959-1 :2016 subclause	Description	Unit	Schedule A	Schedule B
M.1		General information on the modules			
M.1.1		Supplier's name		xxxxxxxxxx	
M.1.2		Manufacturer's name		xxxxxxxxxx	
M.1.3		Country of origin of module		xxxxxxxxxx	
M.1.4		Manufacturer's product code and designation		xxxxxxxxxx	
M.1.5		Type or model number		xxxxxxxxxx	
M.1.6		Polarity of terminals		xxxxxxxxxx	
M.1.7		Polarity of terminals or leads (colour coding is acceptable)		xxxxxxxxxx	
M.1.8		Maximum system voltage which module is suitable for		xxxxxxxxxx	
M.1.9		Safety class		xxxxxxxxxx	
M.1.10		Date and place of manufacture on label or traceable from serial number		xxxxxxxxxx	
M.1.11		Tender document number		xxxxxxxxxx	
M.2	4.2.1	PV material/cells			
M.2.1	4.2.1.1.1	PV Module Type		Crystalline silicon technology, monofacial or bifacial.	

CONTROLLED DISCLOSURE

	4.2.1.1.2	Supplier, model designation, of PV module		xxxxxxxxxx	
M.2.2	4.2.1.1.2	Manufacturer compliance of PV modules		<p>PV module manufacturer shall be on the Bloomberg New Energy Finance (BNEF) PV Module Tier 1 list as of the date of publishing of the tender documents</p> <p>The bidder shall provide a PV module datasheet indicating the Tier 1 manufacturer name and a letter from the manufacturer stating the PV module relevant track record information.</p>	
M.2.3	4.2.1.4	Number of cells in series		36 if conventional monocrystalline or polycrystalline	
M.3		Mechanical and electrical features			
M.3.1	3.1.1.1	Performance in accordance with the requirements of SANS 61215, SANS 61646, SANS 61140 & SANS 61204. (or approved similar standard) regarding the following;		xxxxxxxxxx	xxxxxxxxxx
		a) Visual defects		Yes	
		b) Insulation		Yes	
		c) Temperature coefficients of current and voltage		Yes	
		d) Robustness of terminations		Yes	
		e) Ability to withstand torsional stress, mechanical loads, outdoor exposure, Ingress protection (IP67) (as defined in EN 60529)		Yes	

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		f) Ability to withstand impact of hailstones. The PV modules shall be capable of operating in the most extreme climatic and environmental conditions on site		Yes	
	3.1.1.2	g) PV Modules and Solar Cables Lifetime according to IEC 60216-2		25 Years	
	3.1.1.3	State fill factor of the module	%	xxxxxxxxxx	
M.4		Electrical performance at STCa			
M.4.1		Rated watt-peak power	W	xxxxxxxxxx	
M.4.2		Current at maximum power	A	xxxxxxxxxx	
M.4.3		Voltage at maximum power	V	xxxxxxxxxx	
M.4.4		Short-circuit current	A	xxxxxxxxxx	
M.4.5		Open-circuit voltage	V	xxxxxxxxxx	
M.4.5		Daily energy output	Wh	xxxxxxxxxx	
M.4.5		Charge	Ah	xxxxxxxxxx	
M.4.6		Temperature coefficient of voltage at maximum power	V/°C	xxxxxxxxxx	
		Module efficiency	%	≥ 20	
		Bifaciality Factor (if applicable) where:			
		Minimum Bifaciality factor for p-type bifacial module	%	≥70 ±5	
		Minimum Bifaciality factor for n-type bifacial module	%	≥85 ±5	
		Minimum cell temperature	°C	-40	
		Operating temperature	°C	between -40 and 85	
		PV Module design lifetime	Years	≥25	
		Temperature coefficient	°C/%	≥0.37	
		Guaranteed light induced degradation	%	≤2	

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		PV modules minimum guarantees from the manufacturer are:			
		Guaranteed minimum power output during the first year of operation.	%	98	
		Linear maximum degradation coefficient guarantee per year from year 2 to year 25	%	0.55	
		Guaranteed minimum output of the nominal power after 10 years of operation	%	90	
		Guaranteed minimum output of the nominal power after 25 years of operation	%	80	
M.5	4.2.1.4	Electrical performance at higher temperatures			
M.5.1	4.2.1.4.1	Number of cells offered per panel		xxxxxxxxxx	
M.5.2		Nominal Module Operating Temperature (NMOT)	°C	≤44 ±2 @800 W/m ² , 20 °C, AM 1.5, Wind speed 1 m/s	
M.5.3		Maximum-power current at NOCT	A	xxxxxxxxxx	
M.5.4		Maximum-power voltage at NOCT	V	xxxxxxxxxx	
M.5.5		Open circuit voltage at NOCT	V	xxxxxxxxxx	
	4.2.1.3.2	Temperature coefficient of current	A/°C	xxxxxxxxxx	
	4.2.1.3.2	Temperature coefficient of voltage	V/°C	xxxxxxxxxx	
M.5.6		Output power under cell temperature of 80 °C, irradiance 1 000 W/m ²	W	> 93 % of P _{max} at STC	
M.5.7		Output maximum power voltage under cell temperature of 80°C, Irradiance 1 000 W/m ²	V	> 13,8 V	

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		Are M.5.6 and M.5.7 calculated or measured?		xxxxxxxxxx	
	EN 60529),	Cable connectors rating		at least IP67 rated	
		Resistance to a suction pressure	Pa	2400 Pa	
		Increased distributed mechanical load	Pa	5400 Pa	
		Is MPPT intended to be used?		Yes	
a STC: Standard test conditions of 1 000 W/m-2 irradiance, air mass 1,5, cell temperature 25 °C.					
b NOCT: Normal operating cell temperature, in conditions 800 W/m-2 irradiance, ambient temperature 20 °C, wind speed 1 ms-1.					
M.6	4.2.2	Diodes and junction box			
M.6.1		Integral by-pass diodes used?		at least 3 by-pass diodes	
		Fly leads fitted with IP67 rated pin type "multi-Contact" connectors or equivalent with a clear indication of polarity for the connections		Yes	
M.6.2		Weather-proof module connection box?		Yes	
M.6.3		Terminal type and method of attaching cable?		xxxxxxxxxx	
TOTAL					
I hereby confirm that the list above, is a true reflection of the specification the material to be manufactured and supplied by my company.					
Name:					
Signature:					
Date					

CONTROLLED DISCLOSURE

TECHNICAL SCHEDULES A AND B FOR BATTERIES

Technical Schedules A and B for BATTERIES					
Schedule A: Purchasers specific requirements					
Schedule B: Guarantees and technical particulars of equipment offered					
1	2	3	4	5	6
Item	SANS 959-1 :2016 subclause	Description	Unit	Schedule A	Schedule B
B.1	4.3.1	General information on batteries			
B.1.1		Supplier's name		XXXXXXXXXX	
B.1.2		Country of origin of batteries		XXXXXXXXXX	
B.1.3		Manufacturer's name		XXXXXXXXXX	
B.1.4		Manufacturer's product code and designation		XXXXXXXXXX	
B.1.5		Nominal voltage of battery bank	V	XXXXXXXXXX	
B.1.6		Nominal voltage of battery unit	V	XXXXXXXXXX	
B.2	4.3.2	Battery type and physical data			
B.2.5		Lithium-ion		XXXXXXXXXX	
B.2.6		Dimensions (height, length, width)	mm	XXXXXXXXXX	
B.2.7		Casing colour (translucent) and material		XXXXXXXXXX	
B.2.8		Terminal type, size and material		XXXXXXXXXX	
B.2.9		Are connectors suitable for 4 mm ² cable supplied with the battery?		Yes/No	
B.3	4.3.4.2	Storage and maintenance requirements			
B.3.1		Actual charge retained	%	≥ 82	
B.3.2	4.3.4.2	Capacity at discharge rate of:		XXXXXXXXXX	XXXXXXXXXX
		a) C120 at 20 °C		Ah	
		b) C20 at 20 °C		Ah	

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		c) C10 at 20 °C		Ah	
	4.3.4.2	Values at rated capacity at C20 and a discharge time <i>t</i> of 20 h		xxxxxxxxxx	
	4.3.4.2	Storage and maintenance requirements		xxxxxxxxxx	
B.4	4.3.4.3	Endurance in cycles			
B.4.1		Actual endurance in cycles for different daily DOD at 20 °C –see SANS 959-2-2 c (provide characteristic curve)	DOD %, N	xxxxxxxxxx	
B.4.2		Estimated cycle life of the battery (under simulated field conditions)	Years	≥ 3c	
<i>c Higher cycle life preferred.</i>					
B.5		Top of charge regulation			
B.5.1		Boost charge	V	xxxxxxxxxx	
B.5.2		Float charge at 20 °C	V	xxxxxxxxxx	
B.5.3		Float charge at 30 °C	V	xxxxxxxxxx	
B.5.4		Float charge at 40 °C	V	xxxxxxxxxx	
B.5.5	4.5.2.6	Load-shed regulation	V	xxxxxxxxxx	
B.5.6		Load-shed at C120, 20 °C, 80 % DOD	V	xxxxxxxxxx	
B.5.7		Load-shed at C120, 20 °C, 60 % DOD	V	xxxxxxxxxx	
B.5.8		Load-shed at C20, 20 °C, 80 % DOD	V	xxxxxxxxxx	
B.5.9		Load-shed at C20, 20 °C, 60 % DOD	V	xxxxxxxxxx	
B.6	4.3.4.5	Charge retention			
B.6.1		State actual charge (CR) retained by battery		xxxxxxxxxx	
B.6.2	4.3.5.3	Recommended maximum system DOD		xxxxxxxxxx	
B.7	4.3.6.1	Required labelling on battery			
B.7.1		Nominal voltage	V	Yes	
B.7.2		Manufacturer's or supplier's type reference		Yes	

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B.7.3		Ampere-hour capacity with rate of discharge and end (final) voltage	Ah, V	Yes	
B.7.4		Positive and negative terminals permanently marked		Yes	
B.7.5	4.5.2.6	Date of manufacture (month, year)		Yes	
B.7.6		Unique serial number		Preferred	
Eskom document: - 240-170000103 LITHIUM IRON PHOSPHATE BATTERIES STANDARD					
B.8					
B.8.1		Battery management system (BMS) provided		Yes	
B.8.2		Battery racks/cabinets provided		Yes	
B.8.3		Expected life	Yrs	15	
B.8.4		End of life capacity	%	80	
B.8.5		Deterioration rate / capacity loss	%Ah/yr	xxxxxxxxxx	
B.8.6		Number of cycles to 80%		xxxxxxxxxx	
B.8.7		28-day storage capacity	%	≥85	
B.8.8		Charge recovery value	%	≥90	
B.8.9		Short-circuit current (ISC)	kA	xxxxxxxxxx	
B.8.10		Internal resistance (Rdc)	Ω	xxxxxxxxxx	
B.8.11		LFP cells min voltage	V	2.5	
B.8.12		LFP cells max voltage	V	4.2	
TOTAL					
I hereby confirm that the list above, is a true reflection of the specification the material to be manufactured and supplied by my company.					
Name:	(Company Owner)				
Signature:	(Company Owner)				
Date					

CONTROLLED DISCLOSURE

TECHNICAL SCHEDULES A AND B FOR BATTERY ENCLOSURE

Technical Schedules A and B for BATTERY ENCLOSURE					
Schedule A: Purchasers specific requirements					
Schedule B: Guarantees and technical particulars of equipment offered					
1	2	3	4	5	6
Item	SANS 959-1 :2016 subclause	Description	Unit	Schedule A	Schedule B
E.1	4.4.2	Enclosure for the battery			
E.1.1		Statement of compliance with SANS 959-1 4.4.2		Yes	
E.2	4.4.3	Battery enclosure: ventilation design			
E.2.1		Natural or mechanical ventilation design?	V	Yes	
TOTAL					
I hereby confirm that the list above is a true reflection of the specification the material to be manufactured and supplied by my company.					
Name:		(Company Owner)			
Signature:		(Company Owner)			
Date					

CONTROLLED DISCLOSURE

TECHNICAL SCHEDULES A AND B FOR REGULATOR, CHARGE CONTROLLER AND MPPT

Technical Schedules A and B for REGULATOR, CHARGE CONTROLLER AND MPPT					
Schedule A: Purchasers specific requirements					
Schedule B: Guarantees and technical particulars of equipment offered					
1	2	3	4	5	6
Item	SANS 959-1 :2016 subclause	Description	Unit	Schedule A	Schedule B
R0.10	4.5.1	General			
R.1.1		Type of regulator (hysteresis, PWM, linear, other)		xxxxxxxxxx	
R.1.2		MPPT function included		Yes/No	
R.1.3		Manufacturer		xxxxxxxxxx	
R.1.4		Model designation		xxxxxxxxxx	
R.1.5		Charge regulation method		Series/Shunt	
R0.20	4.5.2	Electrical parameters			
R.2.1	4.5.2	Battery operating input voltage	V	xxxxxxxxxx	
R.2.2	4.5.2.2	Maximum battery input current rating	A	≥ 10	
R.2.3	4.5.2.2	Maximum array operating voltage	V	xxxxxxxxxx	
R.2.4	4.5.2.2	Maximum array operating power	Wp	xxxxxxxxxx	
R.2.5	4.5.2.3	Quiescent operating current consumption as a percentage of the array short-circuit at STC	%	< 1	
R.2.6	4.5.2.3	MPPT input/output energy efficiency	%	> 95	

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R.2.7	4.5.2.4	Voltage drop across regulator (between battery input and output to load)	V	≤ 0,5	
R.2.8	4.5.2.4	Voltage drop across regulator (between PV array input and output to battery)	V	≤ 0.7	
R.2.9	4.5.2.5	Supply definition of output behaviour in the case of no battery connection.		xxxxxxxxxx	
R0.30		Set points (at a charge of /50, a discharge rate of /120 at 25 °C)			
R.3.1	4.5.2.6	Set points as by battery manufacturer's formal recommendation (option A of 4.5.2.6.2) or as for option B:		xxxxxxxxxx	xxxxxxxxxx
R.3.2		a) hysteresis type regulator		xxxxxxxxxx	xxxxxxxxxx
R.3.2.1		1) boost charge	V	xxxxxxxxxx	
R.3.2.2		2) float charge disconnect	V	xxxxxxxxxx	
R.3.2.3		3) float charge reconnect	V	xxxxxxxxxx	
R.3.2.4		4) boost charge activation	V	xxxxxxxxxx	
R.3.3		b) PWM or linear regulator		xxxxxxxxxx	xxxxxxxxxx
R.3.3.1		1) boost charge	V	xxxxxxxxxx	
R.3.3.2		2) float charge	V	xxxxxxxxxx	
R.3.3.3		3) boost charge activation	V	xxxxxxxxxx	
R.3.4		c) all types of regulator:		xxxxxxxxxx	xxxxxxxxxx
R.3.4.1		1) load-shed	V	xxxxxxxxxx	
R.3.4.2		2) load reconnect	V	xxxxxxxxxx	
R.3.5	4.5.2.6.5	Compensation coefficients for temperature:		xxxxxxxxxx	xxxxxxxxxx
R.3.5.1		a) Charge voltage, β	mV/°C/cell	xxxxxxxxxx	
R.3.5.2		b) Discharge voltage, β	mV/°C/cell	xxxxxxxxxx	
R.3.6		Type of battery voltage sensor		xxxxxxxxxx	

CONTROLLED DISCLOSURE

R.3.7		Type and location of the temperature sensor		xxxxxxxxxx	
R0.40	4.5.5	Construction			
R.4.1		Degree of protection (IP rating)		≥ 32	
R0.50	4.5.6	SOC/System indicators status			
R.5.1		Alternative graphical symbols to indicate battery SOC		xxxxxxxxxx	
TOTAL					
I hereby confirm that the list above, is a true reflection of the specification the material to be manufactured and supplied by my company.					
Name:		(Company Owner)			
Signature:		(Company Owner)			
Date					

CONTROLLED DISCLOSURE

TECHNICAL SCHEDULES A AND B FOR INVERTER

Technical Schedules A and B for INVERTER					
Schedule A: Purchasers specific requirements					
Schedule B: Guarantees and technical particulars of equipment offered					
1	2	3	4	5	6
Item	SANS 959-1 :2016 subclause	Description	Unit	Schedule A	Schedule B
I.1	4.6.1	General information on inverters			
I.1.1		Supplier's name		xxxxxxxxxx	
I.1.2		Country of origin of inverter		xxxxxxxxxx	
I.1.3		Manufacturer's name		xxxxxxxxxx	
I.1.4		Manufacturer's product code and designation		xxxxxxxxxx	
I.1.5		Principle of operation		xxxxxxxxxx	
I.2	4.6.2	Electrical parameters			
I.2.1		Nominal input voltage of inverter	V	xxxxxxxxxx	
I.2.2		Rated output voltage	VRMS	230	
I.2.3		Output frequency	Hz	50	
I.2.4	4.6.2.3	Continuous rated capacity at ambient temperature of 0 °C to 35 °C	W	> 150	
I.2.5	4.6.2.4	Wave-form shape		Pure sine wave	
I.2.6		Minimum input voltage	V	< 90 % Vnom	
I.2.7		Maximum input voltage	V	> 125 % Vnom	
I.2.8		Maximum peak-to-peak output voltage	V	xxxxxxxxxx	
I.2.9		Total harmonic distortion at full load (THD)	%	≤3	
I.2.10	4.6.2.6	Peak-to-peak output voltage	V	xxxxxxxxxx	

CONTROLLED DISCLOSURE

I.2.11		Switching in and out of stand-by		xxxxxxxxxx	
I.2.12		Minimum load required to <i>activate</i> ON mode	W or A	xxxxxxxxxx	
I.2.13		Minimum load required to <i>maintain</i> ON mode	W or A	xxxxxxxxxx	
I.2.14		Current drawn in stand-by mode (at nominal input voltage)	mA	xxxxxxxxxx	
I.2.15		Load-shed control internal, or by external regulator, or relay		xxxxxxxxxx	
I.2.15.1		Load-shed voltage	V	xxxxxxxxxx	
I.2.15.2		Reconnect voltage	V	xxxxxxxxxx	
I.2.15.3		Time delay	s	xxxxxxxxxx	
I.3	4.6.3	Electrical protection			
I.3.1		Auto-reset after overload or short circuit (provided that fault and/or load have been removed)		Yes/No	
I.3.2		Protected against reverse polarity connection		Yes	
I.3.3		Protection against overcurrent and short circuit		Yes	
I.3.4		Is output winding of the inverter galvanically isolated?		Yes	
I.3.5	4.6.3.5	Protection features in addition to those Specified available		Yes/No	
I.4	4.6.5	Electrical performance			
		Number of MPPTs per inverter		At least one	
		Minimum European efficiency of 98%	%	98	

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		Maximum system DC voltage	VDC	1,500	
		IP Protection rating		least IP54 in case of central inverters, and	
				IP65 for string inverters,	
I.4.1		Efficiency at resistive loads of 50 % to 100 % of rated capacity.	%	≥ 80	
I.4.2		Overload (surge) capacity (duration of 1 s) (Power)	%	> 200	
I.4.3		Overload (surge) capacity (duration of 10 s) (Power)	%	> 150	
I.4.4		Overload (surge) capacity (duration of 60 s) (Power)	%	> 120	
I.5	4.6.6	Construction			
I.5.1		Dimensions (supply drawing)	mm	xxxxxxxxxx	
I.5.2		Mass	kg	xxxxxxxxxx	
I.5.3		IP rating of enclosure (if supplied with enclosure)		xxxxxxxxxx	
I.5.4		Operating temperature range (at rated power)	°C	0 to +45	
I.5.5		Storage temperature	°C	-10 to 55	
I.5.6		Tolerance to humidity: storage (Relative humidity)		0 % to 100 %	
I.5.7		Tolerance to humidity: operation (Relative humidity)		0 % to 90 %	
I.5.8		Electronic printed circuit boards and other components protected against corrosion?		Yes	
I.5.9		Serial number permanently marked on inverter.		Yes	

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I.5.10		All terminals clearly marked		Yes	
I.5.11		Visual indicators provided in addition to those specified.		Yes/No	
I.6	4.6.8	Expected lifetime			
I.6.1		State expected lifetime	Years	≥ 7	
I.7	4.6.10	Certification, warranty and testing			
I.5.1		Standards to which manufacturer complies		xxxxxxxxxx	
I.5.2		Does manufacturer's quality control comply with the SANS 9001?		Yes	
TOTAL					
I hereby confirm that the list above, is a true reflection of the specification the material to be manufactured and supplied by my company.					
Name:		(Company Owner)			
Signature:		(Company Owner)			
Date					

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ANNEXURE E – TEST SCHEDULE FOR SOLAR PV AND BESS

Test schedule				
The tests required are based on:				
a. The SANS standards included in the table below, or				
b. Other relevant standards, or				
c. In-house related test methods.				
1	2	3	4	5
Item	Components	Test Properties	Specification	Report Number
PV modules (solar panels)				
1	PV modules (solar panels)	Visual inspection	SANS 959-2-1:2017 (CL 4.2)	
2	PV modules (solar panels)	Performance standard at test conditions (STC)	SANS 61215-1.	
3	PV modules (solar panels)	Insulation	SANS 959-2-1:2017 (CL 4.4)	
4	PV modules (solar panels)	Temperature coefficients	SANS 959-2-1:2017 (CL 4.5)	
5	PV modules (solar panels)	Normal operating cell temperature (NOCT)	SANS 959-2-1:2017 (CL 4.6)	
6	PV modules (solar panels)	Performance at NOCT	SANS 959-2-1:2017 (CL 4.7)	
7	PV modules (solar panels)	Terminations	SANS 959-2-1:2017 (CL 4.8)	
8	PV modules (solar panels)	Mechanical load	SANS 959-2-1:2017 (CL 4.9)	
9	PV modules (solar panels)	Light soaking (<i>not applicable for crystalline modules</i>)	SANS 959-2-1:2017 (CL 4.10)	
10	PV modules (solar panels)	Hail	SANS 959-2-1:2017 (CL 4.12)	
Batteries				
11	Batteries	Charge retention	SANS 959-2-2:2016 (CL 4.5)	

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12	Batteries	Cycle endurance	SANS 959-2-2:2016 (CL 4.6)	
13	Batteries	Charge efficiency	SANS 959-2-2:2016 (CL 4.7)	
14	Batteries	Visual inspection	SANS 959-2-2:2016 (CL 4.8)	
15	Batteries	Capacity	SANS 959-2-2:2016 (CL 4.9)	
16	Batteries	Mechanical endurance	SANS 959-2-2:2016 (CL 4.10)	
17	Batteries	Cycle endurance in extreme PV applications	SANS 959-2-2:2016 (CL 4.11)	
Regulators, charge controllers and MPPTs				
18	Regulators and charge controllers	Voltage drop test	SANS 959-2-3:2016 (CL 4.7.3)	
		<i>(Not applicable for MPPTs)</i>		
19	Regulators, charge controllers and MPPTs	Reverse polarity connection test	SANS 959-2-3:2016 (CL 4.7.4)	
20	Regulators, charge controllers and MPPTs	Overload protection	SANS 959-2-3:2016 (CL 4.7.5)	
21	Regulators, charge controllers and MPPTs	Protection against reverse current	SANS 959-2-3:2016 (CL 4.7.6)	
22	Regulators, charge controllers and MPPTs	Protection against overcurrent at the PV array input	SANS 959-2-3:2016 (CL 4.7.7)	
23	Regulators, charge controllers and MPPTs	Regulator protection and load protection against high PV voltages	SANS 959-2-3:2016 (CL 4.7.8)	
24	Regulators and charge controllers	Loss measurements (quiescent operating current consumption) <i>(Not applicable for MPPTs)</i>	SANS 959-2-3:2016 (CL 4.7.8)	

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25	Regulators, charge controllers and MPPTs	Acoustic, electromagnetic and electrostatic emissions and susceptibility	SANS 959-2-3:2016 (CL 4.9)	
Inverters				
26	Inverters	Short-circuit survival	SANS 959-2-4:2017 (CL 4.9)	
27	Inverters	Loss measurements	SANS 959-2-4:2017 (CL 4.10)	
28	Inverters	Acoustic noise emission	SANS 959-2-4:2017 (CL 4.11)	
29	Inverters	Electromagnetic interference	SANS 959-2-4:2017 (CL 4.12)	
30	Inverters	Radiated susceptibility	SANS 959-2-4:2017 (CL 4.13)	
31	Inverters	Electrostatic discharge	SANS 959-2-4:2017 (CL 4.14)	
32	Inverters	Load	SANS 959-2-4:2017 (CL 4.18)	
33	Inverters	Mechanical	SANS 959-2-4:2017 (CL 4.19)	
TOTAL				
I hereby confirm that the list above, is a true reflection of the test reports of material to be manufactured and supplied by my company.				
Name:		(Company Owner)		
Signature:		(Company Owner)		
Date				

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SUPPLIER SIGNATURES		
Name (Print)		
Company Name		
Sign		
Date		

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ANNEXURE G – SOFTWARE CONCESSION LETTER

Company Name:			
Electrical Design Softwares			
Item No.	Software Name	Supplier Name	Licence Number
1	Retic Master		
2	Power Office		
3	MicroStation		
4	Homer pro		
5	Pvsyst		
Civil Design Softwares			
6	Any Computer Aided Design (CAD) Softwares, e.g. AutoCAD, Bentley Openroads softwares.		
<p>Declaration 1: I hereby confirm that the list above is a true reflection of softwares owned by the company for the development of designs for this enquiry.</p> <p>Declaration 2: I hereby confirm that the company will use the above-mentioned softwares to produce designs for this enquiry.</p> <p>Declaration 3: I hereby confirm that designs produced by the above-mentioned softwares will be in DWG format.</p>			
Name:		(Company Owner / CEO)	
Signature:		(Company Owner / CEO)	
Date:			

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