Eskom	Standard	KZN OU

Title: **TECHNICAL EVALUATION CRITERIA FOR THE INSTALLATION OF ENKOVUKENI SOLAR HOME SYSTEM PROJECT**

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SCOT Study Committee Number/Name: **Small Scale Embedded Generators**

Content

Tables

1. Introduction

This document outlines the technical evaluation criteria that Eskom will use to assess tender submissions for the design, supply, installation, commissioning, and maintenance of a 5kW Solar Home System for the 54 households at eNkovukeni Village.

The purpose of this document is to provide tenderers with a comprehensive understanding of the technical standards and requirements against which their proposals will be evaluated. These criteria will form a critical part of Eskom's assessment process, ensuring that the proposed solutions meet the necessary specifications for performance, reliability, and long-term operational sustainability.

2. Supporting clauses

2.1 Scope

This document comprises the technical evaluation criteria and supporting documentation related to a commercial enquiry for the comprehensive scope of work involving the design, manufacturing, testing, documentation development, training, supply, delivery, off-loading, erection, commissioning, operation, and maintenance of a solar photovoltaic (PV) system, battery energy storage system (BESS), inverter and metering system.

The solution shall be designed to supply power to each of the 54 households at eNkovukeni Village within an island located in Northern KwaZulu Natal. The expected output of the solar PV is 5kW.

The scope shall consist of but not limited to:

- Design, manufacture and install a standalone carport structure using either galvanized steel or treated wooden poles, engineered to support the weight of solar panels, as well as accommodate the inverter and battery enclosure. The design must ensure that the maximum possible PV capacity is installed per household.
- Installation of solar PV modules with a combined output of up to 5kW, including a 3.6kW inverter and a 5kWh battery storage system, to ensure reliable standalone power supply.
- Provide a secure kiosk to house inverters, batteries, and other electrical components that can be mounted on the solar PV support structure.
- Install LV pole-top box, cabling, and smart metering as per Eskom standards.
- Recommended meter: BS Footprint Single Phase Smart Split Meter with CIU and External GSM Modem per household.

2.1.1 Purpose

The purpose of this document is to outline the technical evaluation criteria and requirements for the design, supply, installation, commissioning, and maintenance of a solar photovoltaic (PV) system at eNkovukeni Village, providing guidance for tenderers on the standards and expectations for the project.

This document serves as a detailed guide for tenderers and evaluators, outlining the expectations and technical requirements for ensuring the successful execution and lifecycle management of the system.

2.1.2 Applicability

This document is applicable exclusively to Eskom's Distribution Division within the Central East Cluster.

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] 240-48929482: Tender Technical Evaluation Procedure

[3] 32-1034: Eskom Procurement and Supply Chain Management Procedure

[4] KZN-EBC-0406-1037843: Network Engineering & Design Preliminary Report

[5] 240-75655504: Corrosion Protection Standard for New Indoor and Outdoor Eskom Equipment, Components, Materials and Structures Manufactured from Steel Standard

[6] 240-75655380: Low Voltage Services Section 1 – Electrification

[7] KZNMB202505: Functional Specification for Household Solar PV & Bess Installations – eNkovukeni Village

2.2.2 Informative

None.

2.3 Definitions

2.3.1 General

Definition	Description
Tender	A tender refers to an open or closed competitive request for quotations / prices against a clearly defined scope / specification.
Electrification	The process of connecting households and other consumers to the electricity grid.

2.3.2 Disclosure classification

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

2.4 Abbreviations

Abbreviation	Description
BESS	Battery Energy Storage System
FAT	Factory Acceptance Test
FC	Fully compliant
ILAC	International Laboratory Accreditation Cooperation
NC	Non-compliant (major deviation)
PC	Partially compliant (minor deviation)
PV	Photovoltaic
SANAS	South African National Accreditation System
SAT	Site Acceptance Test
SME	Subject Matter Expert
STC	Standard Test Conditions
TEC	Technical Evaluation Criteria

TET	Technical Evaluation Team

2.5 Roles and Responsibilities

All Eskom employees and/or appointed entities involved in the procurement of components and services for the electrification of households in eNkovukeni Village, Northern KwaZulu-Natal, through the deployment of a solar PV and battery energy storage technologies, must ensure that all deliverables comply with the specified technical evaluation criteria.

2.6 Process for Monitoring

The acceptance of the proposed solution will be based on a thorough evaluation of the fully compliant design review and documentation submission.

After the contract is awarded, the components procured by the successful bidder will be subjected to technical quality inspections prior to the installation of any of the proposed components as a solution to the project.

2.7 Related/Supporting Documents

Refer to clause 2.2 of this document.

3. Overview and Expectations of the Tender Technical Evaluation Process

Technical evaluations are a critical function carried out by engineers and technical specialists in alignment with the Eskom Procurement and Supply Chain Management Policy (32-1033) and the Eskom Procurement and Supply Management Procedure (32-1034). These evaluations play an essential role in ensuring that tender processes adhere to established procurement standards.

The Technical Evaluation Strategy will outline the following evaluation criteria:

- Mandatory Evaluation Criteria
- Functional Scoring Criteria

The process begins immediately after the receipt of tender submissions following the closing date, under the guidance of a Procurement Practitioner. Throughout the evaluation, if any indication of dishonesty or misrepresentation is found in a tenderer's submission, Eskom reserves the right to disqualify the tenderer and cancel any related contracts, if applicable.

By adhering to this structured and consistent approach, Eskom ensures that technical evaluations are conducted with the highest levels of integrity and professionalism.

The evaluation process will align with the Request for Proposal (RFP) commercial process, ensuring a thorough assessment of the proposed solutions. While considering the Tenderer's suggested solution, the equipment proposed must meet the requirements outlined in the Technical Schedules A and B, as well as comply with the relevant standards and regulations referenced within these schedules.

3.1 Technical Returnable Documents

3.1.1 The primary evaluation criterion is the submission of fully completed Technical Schedules A and B, submitted in PDF format.

3.1.2 The supporting documents shall include items such as datasheets, technical drawings, brochures, technical manuals, type test certificates, and test reports.

Note: Only type test certificates and test reports issued by accredited independent test laboratories (such as SANAS or ILAC) will be accepted.

3.1.3 Bidders may submit alternative test certifications or standards that demonstrate compliance with similar tests for the proposed equipment. These alternative certifications will be evaluated by the TET based

on the adequacy of the information provided. Bidders must clearly explain and justify the alternative tests by submitting detailed information about the tests performed and the outcomes achieved.

3.1.4 All supporting documents specifically compiled for the tender, such as site layout drawings, design calculations, and similar materials, must be submitted by the tender closing date.

3.1.5 No additional supporting evidence will be accepted after the tender submission deadline.

3.1.6 Bidders are encouraged to organize their submissions in a manner that helps the TET locate returnable and supporting documents.

3.1.7 When completing the "Schedule B (Compliance)" and "Reference / Statement (Supporting Evidence)" columns, the Tenderer is required to provide a clear and accurate statement of the compliance level for each clause that necessitates such a declaration in the "Schedule B (Compliance)" column. The following compliance options are available from the provided dropdown list in Schedule B:

a. Comply – Confirmation of full compliance with all clauses of the relevant section or clause of the Technical Standard. No deviations are permitted.

b. Non-compliant – Any non-response, partial compliance, unacceptable deviations or non-conformances will be considered non-compliant for the purposes of evaluation.

3.1.8 The Tenderer must list all deviations in the designated “Deviation Schedule” worksheet, providing clear reasons and any proposed alternatives. The document reference number, title, specific clause, and details of the deviation must also be clearly specified.

3.1.9 The verification of Schedule A and B responses provided by Tenderers will be carried out as follows, as specified in the schedules:

a. **Tenderer response accepted at face value:** For less critical functionality, Eskom will not verify these items during the tender evaluation. Compliance will instead be confirmed through a Technical Quality Inspection of the key components, namely the Inverter, Lithium Iron Phosphate Batteries, and PV Panels, prior to installation.

b. **Tenderer response verified through supporting documentation:** Responses will be cross-checked against the provided documentation to ensure accuracy and compliance.

3.2 Tender Evaluation Process

3.2.1 All tenders must meet the mandatory technical criteria. Any tender that fails to meet these criteria will be disqualified, deemed non-compliant, and considered non-responsive.

3.2.2 Tenders that successfully pass the mandatory phase will proceed to be evaluated against the functional criteria.

3.2.3 To be considered technically acceptable, a tender must achieve a minimum overall weighted final score of 80% in the functional evaluation.

3.2.4 If none of the tenders achieve the minimum overall weighted final score of 80%, the threshold may be lowered, provided that a supporting justification is submitted.

3.2.5 A negotiation phase will follow to finalize the remaining items.

Only tenderers who achieve a minimum score of 80% in the Functional Scoring Technical Evaluation Criteria will be eligible to provide further clarifications to ensure full compliance with Eskom’s technical requirements. This means that all technical requirements must ultimately be met at 100%.

Note: This process ensures that the product fully complies with the technical evaluation criteria, guaranteeing it meets Eskom’s standards before proceeding further.

3.2.6 Such post tender clarifications as required shall not be used to render a non-responsive tender responsive or to change the outcome of scoring or ranking. Clarifications shall not trigger changes in the price, scope, lead times or risk position of Eskom or the tenderer. The objective is to provide assurance to Eskom that any remaining ambiguities arising during the functional technical evaluation stage are resolved prior to contract award recommendation. During this stage of clarification that will be administered through the relevant appointed Procurement Practitioner, documents that are required to resolve outstanding matters for full compliance in support of the technical requirements shall be submitted by the tenderer. This is required prior to contract award recommendation.

3.2.7 After the contract is awarded, the components procured by the successful bidder will be subjected to technical quality inspections prior to the installation of any of the proposed components as a solution to the project.

3.3 Scoring

3.3.1 Each item will be evaluated by the TET based on the quality of the tendered response, verified where applicable (refer to Table 1). This applies to all items except for Technical Schedules A and B, which will be assessed based on the weight assigned to each item listed in the schedules.

3.3.2 Technical Schedules A and B will be assessed using weighted criteria, with each item allocated a percentage contributing to the overall score (100%). Items will be evaluated for compliance, with fully compliant items receiving the full score and non-compliant items receiving no score (zero).

3.3.3 Items with no supporting documentation (where required) will be scored as non-compliant (zero).

Table 1: Scoring of items in Technical Schedules A and B

Criteria	Abbreviation	Score
Does Not Comply	DNC	0
Compliant and Acceptable Response	CAR	1 x Criterion Weighted %

3.3.4 The TET will follow the guidelines in Table 2 to ensure consistent scoring across all tender responses.

Table 2: Guideline for Scoring of Items

Abbreviation	Guideline
DNC	NO information provided OR does not comply with the requirement
CAR	Compliant response with minimum required detail and clarity. "It's all there"

3.3.5 Items with no references to supporting documentation (where applicable) will be scored non-compliant (zero).

3.3.6 If a response claims "Comply" but is found partially or non-compliant during verification, a score of zero will be assigned.

3.3.7 Items with no response selected will automatically be scored as “Do Not Comply.” Technical Schedule A and B items for which no selection is provided shall automatically be scored as “Do Not Comply” regardless of the supporting evidence provided.

3.3.8 All responses will be assigned a score of either 0 or 100% of the criterion’s weighted percentage with exception to the Technical Schedules A and B which will be scored as per the points awarded evaluating the submitted Technical Schedule B document as per the scoring tool developed.

3.3.9 The scores for all items in the Technical Schedule A and B will be summed, and a percentage will be calculated based on the maximum possible score. This percentage will represent the score for each sub-system or standard section. These sub-system scores will then be weighted to calculate the overall score for the proposed solution.

3.4 Mandatory Evaluation Criteria

If a response of 'NO' is given for any criterion outlined in Table 3 below, the assessed tendered design will be automatically disqualified from advancing to the next stage of the Functional Evaluation process. This disqualification emphasizes the importance of meeting all specified requirements to ensure that the design is considered for further evaluation.

Note: *Only resources who are direct employees of the tendering company or employees of a subcontractor with a valid, documented agreement in place will be considered. Any information submitted for individuals who have no formal affiliation with the tendering entity will not be evaluated.*

Table 3: Mandatory Technical Evaluation Criteria

No.	Description of Mandatory Technical Criteria	Tender Returnable	Compliance (YES/NO)
1	**Resource Capability**		
1.1	**Skills Base**		
1.1.1	Electrical Design Engineer/Technologist	a) Qualifications b) ECSA registered Professional Engineer or Professional Technologist.	
1.1.2	Structural Design Engineer/Technologist	a) Qualifications b) ECSA registered Professional Engineer or Professional Technologist.	
1.1.3	Professional Quantity Surveyor	a) Qualifications b) Professional registration with the SA Council for the QS Profession (SACQSP)	
1.1.4	Installation Electrician (IE) or Electrical Tester for single phase applications.	a) IE card issued by the Department of Labour clearly showcasing the IE's registration number. **or** b) Electrical Tester for Single Phase registered with the Department of Labour (DOL).	
1.2	**Software and Tools**		
1.2.1	Design and simulation software for solar power systems.	Proof of a valid license/subscription.	
1.2.2	CAD software capable of *.DGN export.	Proof of a valid license/subscription.	

1.3	**Related Experience**		
1.3.1	Related Solar PV and BESS projects.	List of **at least three** previous roof top/ground or pole mounted solar PV projects that were designed, constructed, and commissioned, indicating installed PV, battery and inverter capacity, year of completion, location and client reference letter which shall include the client's contact details.	
2	**Documentation**		
2.1	Submission of Operating and Maintenance (O&M) training manuals.	Operating and Maintenance (O&M) training manuals for the entire Solar PV System.	
2.2	Submission of **completed and signed** deviation schedules.	a) Deviation Schedule: PV Module b) Deviation Schedule: Inverter c) Deviation Schedule: Lithium Iron Phosphate Batteries	
2.3	Submission of **completed and signed** Technical Schedules A and B.	a) Technical Schedule AB: PV Modules b) Technical Schedule AB: Inverter c) Technical Schedule AB: Lithium Iron Phosphate Batteries	
2.4	Submission of confirmation letters verifying adherence to testing and standards for the installation of solar PV and BESS, specifically for PV modules, inverters, the fire system and lithium iron phosphate batteries in the templates provided.	a) LTRINV_ESKENK_001 b) LTRPV_ESKENK_002 c) LTRLFP_ESKENK_003 d) LTRFPS_ESKENK_004	
2.5	Submission of all design reports, including the drawings specified in Technical Schedules A and B, for the required technologies.	a) Reports and drawings as specified in Section 4.1 of the Functional Evaluation Criteria. b) PV Panel: OEM drawing showcasing dimensions in metric units (include the drawing & revision number on the submission) c) LFP Batteries: OEM drawing showcasing dimensions in metric units (include the drawing & revision number on the submission)	

3.5 Functional Evaluation Criteria

Bids that satisfy all Mandatory Evaluation Criteria outlined in Table 3 will proceed to be assessed against the Functional Evaluation Criteria detailed in Table 4. The evaluation of these functional criteria will be based on the Bidder's level of compliance with the technical requirements set forth in Bid Technical Schedules A & B (Appendix A). Compliance levels are defined as follows:

- **Compliant and Acceptable Response:** Full compliance with all clauses of the relevant section of the Technical Standard, with no deviations.
- **Do Not Comply:** Non-compliance with all requirements in the specified section.

The Bidder is required to respond to each criterion, indicating the level of compliance. Where "compliance with reference" is necessary, the Bidder must provide the corresponding supporting documentation.

In cases where the response is "Partial Compliance" or "Do Not Comply," the Bidder must provide a list of deviations, reasons for these deviations, and any proposed alternatives. Deviations – those that, if accepted, would prevent the Bid from fulfilling its intended purpose – will result in technical rejection of the Bid.

Bids deemed substantially responsive under this process will be recommended from a technical standpoint. A substantially responsive Bid is one that meets the technical requirements without deviation, reservation, or omission.

Each item will be evaluated by the TET based on the quality of the tendered response, verified where applicable (refer to Table 1). This applies to all items except for Technical Schedules A and B, which will be assessed based on the weight assigned to each item listed in the schedules.

Technical Schedules A and B will be assessed using weighted criteria, with each item allocated a percentage contributing to the overall score (100%). Items will be evaluated for compliance, with fully compliant items receiving the full score and non-compliant items receiving no score (zero).

To reiterate: Following the post-evaluation clarification engagement, any shortfalls or non-compliant items shall be resolved to achieve 100% compliance with Eskom's requirements prior to contract award, ensuring the service provider fully meets Eskom standards. Service Providers will be granted a 14-day turnaround period to reach full compliance.

In order for LV works to be undertaken to connect the PV system to the specified households, the works need to be carried out by persons that are in possession of an LV Authorisation letter issued by Eskom. Should the service provider not have personnel currently employed at their company without LV Authorisation then such a service may be contracted in for the duration of this project.

The Prepaid Meter Training Certification is obtained from accredited training service providers. It's required that the service provider shall have a competent person employed at their company to install and commission a prepaid meter. Should the service provider not have personnel currently employed at their company without Prepaid Meter Training Certification then the services of a competent resource may be contracted in for the duration of this project.

Table 4: Functional Scoring Technical Evaluation Criteria

No.	Functional Technical Criteria Description	Tender Returnable	Weight
3	**General**		**14%**
3.1	Completed Tenderer Information Schedule	Tenderer Information Schedule	3%
3.2	Operating & Maintenance Training	Submit the facilitator's CV, including relevant qualifications and details of similar training sessions previously	3%

		conducted in line with the required installation.	
3.3	Quality Assurance	PV Green Card Certification	4%
3.4	One competent resource demonstrating Prepaid Meter Training employed at the tendering company during the tender period.	Training Certificates (OTO 06A, OTO 06C, OTO 06G), issued by Eskom or an accredited facilitator that is listed on Eskom's National Facilitators Database. **OR** If resource is contracted in: Names, ID numbers, and relevant certifications of the personnel deemed competent must be submitted.	2%
3.5	LV authorisation for a resource employed at the tendering company during the tender period.	A copy of the LV authorisation letter issued by Eskom to the relevant resource. **OR** If resource is contracted in: Names, ID numbers, and relevant authorisation letter of the personnel deemed competent must be submitted.	2%
4	**Design Reports**		**30%**
4.1	Design reports concerning the installation of household PV systems for 54 homes at eNkovukeni Village. ***Note:*** *All design reports must be signed off by a Professional Engineer or Technologist registered with ECSA, with expertise in the relevant discipline related to the proposed design, or by a specialist recognized by and registered with the ECSA.*	4.1.1 PV System Design Report	10%
		4.1.2 Household PV Design Drawings – Submit PV design drawings for various system types, tailored to suit the environmental conditions of eNkovukeni Village.	10%
		4.1.3 Structural and PV Mounting Design Report	10%
5	**Submission of Technical and Deviation Schedules**		**50%**
5.1	PV Modules	5.1.1 Technical Schedule A and B	13%
		5.1.2 Deviation Schedule	4%
5.2	Inverters	5.2.1 Technical Schedule A and B	13%
		5.2.2 Deviation Schedule	3%
5.3	Lithium Iron Phosphate Batteries	5.3.1 Technical Schedule A and B	13%
		5.3.2 Deviation Schedule	4%

6	**Maintenance**		**6%**
6.1	Preventative Maintenance Schedule	Submission of a maintenance schedule for all components that are to be installed.	2%
6.2	Corrective Maintenance	A letter, signed by the company's Director, confirming the tenderer's ability to provide corrective maintenance for two (2) years post-installation, including response times for repairs and replacements, must be submitted. If maintenance services are subcontracted, contracts must also be provided.	2%
6.3	Spare Parts List	Provide a detailed list of spare items and associated costs and quantities.	2%

4. Authorization

This document has been seen and accepted by:

Name and surname	Designation
Brenda Cebekhulu	Senior Manager: Asset Creation (KZN OU)
Eugene van Heerden	Network Planning Technologist
Neville Booyens	Senior Engineer: Standards Implementation (KZN OU)
Patric Kabaze	Senior Technologist: Standards Implementation (FS OU)
Nairob Mthembu	Manager: Network Engineering & Design (KZN OU)
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Rudi Kleinhans	Standards Implementation Manager (FS OU)
Yusuf Peer	Senior Engineer: Standards Implementation (KZN OU)
Yadev Harigen	Engineer: Standards Implementation (KZN OU)
Zanele Mhaule	Senior Engineer: Network Engineering & Design (KZN OU)

5. Revisions

Date	Rev.	Compiler	Remarks
July 2025	0	MY Bux	Draft technical evaluation criteria compiled for the installation of a household solar PV system at eNkovukeni Village.
August 2025	1	MY Bux	First issue.

6. Development team

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

- Mohammed Bux
- Riaz Asmal

- Zanele Mhaule
- Yadev Harigen
- Yusuf Peer

7. Acknowledgements

- None

Annex A – Tenderer Information Schedule

Schedule A: Purchasers specific requirements
Schedule B: Guarantees and technical particulars of equipment offered

1	2	3	4
Item	**Question**	**Response**	**Proof Submitted**
1	**Tenderer**		
1.1	Company name		
1.2	Company address		
1.3	Contact details		
1.4	Website adress		
1.5	Company organogram		
1.6	Does your company have ISO 9001:2015 or similar certification? If yes, what is the expiration date of such certification?		
1.7	Does your company have ISO 45001/OHSAS 18001 or similar certification? If yes, what is the expiration date of such certification?		
1.8	If other certifications exist, please state them here.		
1.9	Is there a formal agreement between your company and the manufacturer (OEM)?		
1.10	Have your staff been trained on the equipment been offered?		
1.11	Will your company be able to provide the following after sales support if and when required:		
1.11.1	Technical Support		
1.11.2	Installation		
1.11.3	Commissioning		
1.11.4	Maintenance		
1.12	Does your company have the capability to perform local faultfinding and repairs?		

BIDDER's SIGNATURE

Name (Print)	**Company Name**
Sign	**Date**

Annex B – Technical Schedules A and B for Inverters

Schedule A: Purchasers specific requirements
Schedule B: Guarantees and technical particulars of equipment offered

1	2	3	4	5	6
Item	**Description**	**Document Ref.**	**Parameters**	**Schedule A**	**Schedule B**
1	**Product Information**				
1.1	OEM		OEM Name	xxxxxxxxxx	
2	**Inverter Characteristics**				
2.1.1	Inverter type		Specify	Hybrid	
2.1.2	Maximum conversion efficiency	240-53114248 Cl. 3.2.19.4	%	≥ 95	
2.1.3	Operating temperature range (without derating within this range). Sunshade shall be installed. Concept shall be briefly explained in inverter concept within tender.	240-53114248 Cl. 3.1.1.2	°C	-15 to +60	
2.1.4	Connection phases	KZN-STM-1004-926987-0001 Cl. 5.2	Yes/No	Three-Phase	
2.1.5	Frequency	240-53114248 Cl. 3.1.2.3	Hz	50	
2.1.6	Total Harmonic Distortion	240-53114248 Cl. 3.2.1.34	%	≤ 10	
2.1.7	IP for inverter installed outdoor (EN 60529)	240-53114248 Cl. 3.4.9.2	Specify	≥IP65 or better	

2.1.8		Cooling concept		Specify	Designed for installation and operation in conditions such as high humidity and corrosive salt air.	
2.1.9		Controllability of inverter output per remote control/energy management system.		Specify	Dynamic adjustable	
2.1.10		Earthing concept		Specify	Earthing according to installation requirements of PV module OEM.	
2.1.11		Multiple MPPT functionality		Yes/No	Required	
2.1.12		String failure detection		Yes/No	Required	
2.1.13		DC overvoltage protection	240-53114248 Cl. 3.2.17.1	Yes/No	Required	
2.1.14		Surge protection	240-53114248 Cl. 3.2.22.1	Yes/No	Required	
2.2	•	**Product Warranty and Performance Guarantee**				
2.2.1		Product warranty	KZNMB202401 Cl. 3.5	Specify	10 Years	
3		**Documentation for Acceptance of the Proposed Inverter**				
3.1		Detailed technical specifications		Present documentation	Required	
3.2		Product information catalogue		Present documentation	Required	
3.3		Installation manual		Present documentation	Required	

3.4		Summary of the product's cleaning strategy		Present documentation	Required	
3.5		Calculations for ensuring electrical compatibility between the inverters and the modules		Present documentation	Required	
3.6		Operating and maintenance manual		Present documentation	Required	
3.7		Confirmation of Adherence to Testing and Standards for Solar PV and BESS Installation	Populate the letter titled "LTRINV_ESKENK_001."	Present documentation	Required	

BIDDER's SIGNATURE

Name (Print) | **Company Name**

Sign | **Date**

Annex C – Technical Schedules A and B for PV Modules

Schedule A: Purchasers specific requirements
Schedule B: Guarantees and technical particulars of equipment offered

1	2	3	4	5	6
Item	**Description**	**Reference Doc.**	**Parameters**	**Schedule A**	**Schedule B**
1	**Operating Environment**				
1.1	Altitude above sea level (e.g., 1000, 1600)		m	107m - 300m	
1.2	Extreme maximum temperature		ºC	50	
1.3	Extreme minimum temperature		ºC	-5	
1.4	Ambient air quality	DEAT: Air quality standards & objectives Cl. 3.1.7	Describe	Heavy	
1.5	Average humidity		%	10% - 85%	
1.6	Average daily sunshine hours		Hours	5	
2	**Product Information**				
2.1	• **PV Module Information and Characteristics**				
2.1.1	OEM		OEM Name	xxxxxxxxxx	
2.1.2	OEM's factory location		Factory Location	xxxxxxxxxx	

2.1.3		OEM's product code		Specify Code	xxxxxxxxxx	
2.1.4		OEM drawing showcasing dimensions in metric units (include the drawing & revision number on the submission)		Drawing	xxxxxxxxxx	
2.1.5		PV panel type	240-171000418 Cl. 3.4.1		Monocrystalline	
2.1.6		Module efficiency	240-171000418 Cl. 3.4.3		>19% (STC)	
2.1.7		Peak output power per panel	KZN-STM-1004-926987-0001 Cl. 5.1 and 5.1	Wp	≥ 550 Wp	
2.1.8		Temperature coefficient on MPP		- %/°C	≥ - 0.45%/°C	
2.1.9		Nominal power tolerances from manufacturer (used for acceptance to the module)		%	0% ≤Pnom ≤ +5%	
2.2	•	**Product Warranty and Performance Guarantee**				
2.2.1		Power output guaranteed during the first year of operation	240-171000418 Cl. 3.4.5	%	97%	
2.2.2		Linear degradation coefficient from year 2 to year 20	240-171000418 Cl. 3.4.6	%/year	0.8%/year	
2.2.3		Guaranteed output of the nominal power after 10 years	240-171000418 Cl. 3.4.7	%	≥90%	
2.2.4		Guaranteed output of the nominal power after 20 years	240-171000418 Cl. 3.4.8	%	≥80%	
2.2.5		Product performance warranty	KZNMB202401 Cl. 3.5	Years	25	
2.2.6		Product warranty against manufacturing defects	KZNMB202401 Cl. 3.5	Years	10	
3	**Documentation for Acceptance of PV Modules**					

3.1		Detailed technical specifications		Present documentation	Required	
3.2		Limited product and peak power warranty		Present documentation	Required	
3.3		Installation manual		Present documentation	Required	
3.4		Summary of the product's cleaning strategy		Present documentation	Required	
3.5		Product's recycling strategy		Present documentation	Required	
3.6		Operating and maintenance manual		Present documentation	Required	
3.7		Confirmation of Adherence to Testing and Standards for Solar PV and BESS Installation	Populate the letter titled "LTRPV_ESKENK_002"	Present documentation	Required	

BIDDER's SIGNATURE

Name (Print) | **Company Name**

Sign | **Date**

Annex D – Technical Schedules A and B Lithium Iron Phosphate Batteries

Schedule A: Purchasers specific requirements
Schedule B: Guarantees and technical particulars of equipment offered

1	2	3	4	5	6
Item	**Description**	**Reference Doc.**	**Parameters**	**Schedule A**	**Schedule B**
1	**Operating Environment**				
1.1	Altitude above sea level (e.g., 1000, 1600)	240-53114248 Cl. 3.4.1.1	m	2200	
1.2	Extreme maximum temperature	240-53114248 Cl. 3.4.1.3	ºC	50	
1.3	Extreme minimum temperature	240-53114248 Cl. 3.4.1.3	ºC	-5	
1.4	Ambient air quality	DEAT: Air quality standards & objectives Cl. 3.1.7	Describe	Heavy	
1.5	Lightning	240-53114248 Cl. 3.4.1.1	Describe	High	
1.6	Relative humidity	240-53114248 Cl. 3.4.1.1	%	10% - 85%	
2	**Product Information**				
2.1	• **LFP Information and Characteristics**				
2.1.1	OEM		OEM Name	xxxxxxxxxx	
2.1.2	OEM's factory location		Factory Location	xxxxxxxxxx	

2.1.3		OEM's product code		Specify Code	xxxxxxxxxx	
2.1.4		OEM drawing showcasing dimensions in metric units (include the drawing & revision number on the submission)		Drawing	xxxxxxxxxx	
2.1.5		Cell type		Specify	Prismatic	
2.1.6		Rated capacity	240-171000418 Cl. 3.5.3	Ah	Specify	
2.1.7		Wet weight mass	Specify	kg	OEM to indicate	
2.1.8		Discharge performance at +25 °C	240-170000103 Cl. 3.2.3	Specify	Refer to 240-170000103 Cl. 3.2.3	
2.1.9		Discharge performance at low temperature	240-170000103 Cl. 3.2.4	Specify	Refer to 240-170000103 Cl. 3.2.4	
2.1.10		High rate discharge permissible current	240-170000103 Cl. 3.2.5	Specify	Refer to 240-170000103 Cl. 3.2.5	
2.1.11		Fully charge state – under float		V	Specify	
2.1.12		Minimum voltage/LFP cell	240-170000103 Cl. 3.4.3.2	V	2.5	
2.1.13		Maximum voltage/LFP cell	240-170000103 Cl. 3.4.3.2	V	4.2	
2.1.14		Short-circuit current	240-53114248 Cl. 3.2.9	kA	OEM to indicate	
2.1.15		Internal resistance	240-53114248 Cl. 3.2.9	Ω	OEM to indicate	
2.1.16		Maximum allowable RMS ripple current and effect on battery life	240-53114248 Cl. 3.2.7	A	<5A/100Ah	

2.1.17		Maximum allowable RMS ripple voltage and effect on battery life	240-53114248 Cl. 3.2.6	mV	0.01 x Vnom	
2.2	•	**Product Warranty and Performance Guarantee**				
2.2.1		Expected life	KZNMB202401 Cl. 3.5	Specify	15 Years	
2.2.2		End-of-life (EOL) capacity	240-171000418 Cl. 3.5.3	%	80	
2.2.3		Capacity loss	240-171000418 Cl. 3.5.3	%Ah/Year	1.33	
2.2.4		Number of cycles to EOL	240-171000418 Cl. 3.5.3	Specify	5000	
2.3	•	**Battery Management System**				
2.3.1		Undervoltage disconnect		Yes/No	Required	
2.3.2		Overvoltage protection		Yes/No	Required	
2.3.3		Over temperature shutdown		Yes/No	Required	
2.3.4		Short circuit protection		Yes/No	Required	
2.3.5		Cell balancing		Yes/No	Required	
2.4	•	**Transportation and Disposal**				
2.4.1		What transport company will be used for deliveries?		Specify	xxxxxxxxxx	
2.4.2		Do they have the necessary licensing to operate as a dangerous goods transporter?		Yes/No	xxxxxxxxxx	
2.4.3		What procedures are in place to manage field failures and ensure that these are effectively and timeously addressed.?		Specify	xxxxxxxxxx	
2.4.4		What procedures are in place to manage field failures and ensure that these are effectively and timeously addressed.?		Specify	xxxxxxxxxx	

2.4.5		What recycling procedure is place to ensure that redundant equipment is recycled in an environmentally friendly manner?		Specify	xxxxxxxxxx	
3	**Documentation for Acceptance of LFP Batteries**					
3.1		Discharge test results		Present documentation	Required	
3.2		If not the OEM, a licensed OEM distributor agreement must be provided.		Present documentation	Required	
3.3		Installation manual		Present documentation	Required	
3.4		Product's recycling strategy		Present documentation	Required	
3.5		Operating and maintenance manual		Present documentation	Required	
3.6		Confirmation of Adherence to Testing and Standards for Solar PV and BESS Installation	Populate the letter titled "LTRLFP_ESKENK_003"	Present documentation	Required	

BIDDER's SIGNATURE

Name (Print) **Company Name**

Sign **Date**