Eskom	Report	Distribution

Title: **PROJECT SPECIFIC TECHNICAL REQUEST FOR INFORMATION FOR DESIGN, SUPPLY, DELIVERY, INSTALLATION AND COMMISSIONING OF A SOLAR PV MICROGRID**

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Content

1. Introduction

Eskom Holding SOC Ltd (from herein referred as “Eskom Distribution Division” invites all interested parties to submit a response (hard copy and soft copy) to this Request for Information (RFI). Eskom Distribution requests information and capability statements from suitably qualified and experienced service providers for the Design, Supply, Delivery, Installation, and Commissioning of Solar Photovoltaic (PV) Microgrid Systems across several designated sites in South Africa.

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Eskom Distribution aims to build a strong pipeline of partners who can provide turnkey solar PV microgrid solutions with capacities ranging from 16kW to 1MW as part of Eskom's strategic mandate to modernize the electricity distribution network, improve grid resilience, and increase access to sustainable energy. These microgrids are intended to operate either in islanded (off-grid) mode, hybrid mode, or interconnected mode depending on the site-specific requirements.

This RFI strictly seeks to gain knowledge of services and supplies available with an estimate of their related costs. The goal is to evaluate the market's operational, financial, and technological capability to develop decentralized renewable energy systems. The RFI is not an intent, commitment, or promise to acquire services or solutions offered. Eskom Distribution is not obliged to contract or pay for any requested information, nor is it liable for any costs incurred by interested parties.

This initiative aligns with Eskom's Distribution commitment to support South Africa's Just Energy Transition, drive rural and remote electrification, and bolster energy security through innovative, distributed generation assets. Emphasis will be placed on modularity, system robustness, lifecycle cost optimization, and long-term maintainability.

2. Supporting clauses

2.1 Scope

The objective of this RFI is to:

- Develop an understanding of the supplier's technology (including their related experience), products and/or functionality available for Solar PV Microgrid.
- Obtain pricing. Costs must be provided in ZAR excluding VAT. If costs are subject to exchange rate changes, the foreign portion and exchange rates used must be provided.

Service providers will be expected to demonstrate capability in end-to-end delivery of solar PV microgrid systems including (but not limited to):

- Detailed system design and engineering.
- Procurement and supply of all microgrid components (including PV modules, inverters, energy storage systems, enclosure / housing / container / building, etc.
- Transportation and delivery to sites including remote and challenging terrains.
- Civil, structural, and electrical installation works (Demonstrate knowledge of buildings and fire regulations governing the installation of electrical equipment and battery energy storage.)
- System commissioning, performance validation, and handover to Eskom standards.
- Detailed Maintenance Engineering strategy based on Failure Mode and Effects / Criticality Analysis (FMECA) principles, that will direct all maintenance aspects during the life cycle of the asset, inclusive of all Task Manuals and related artifacts.
- Operation and maintenance proposals for post-commissioning periods including trainings.

2.1.1 Purpose

The purpose of this report is to define the technical and operational scope for microgrid solutions required under the RFI to ensure clear, consistent, and compliant responses from service providers.

2.1.2 Applicability

This document shall apply throughout Eskom Holdings Limited Distribution Division.

2.2 Normative/informative references

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

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2.2.1 Normative

[1] ISO 9001 Quality Management Systems.

[2] 240-134438470, Maintenance Standard for Small Scale Embedded Generators (SSEG). Eskom (2024)

[3] 240-171000338, SSEG Safety Considerations. Eskom (2023)

[4] 240-170000897, MES for Small Scale Embedded Generation (SSEG). Eskom (2023)

[5] 240-171000201, Site Acceptance Testing And Commissioning Of The Containerised Microgrid System. Eskom (2025)

[6] 240-130615754 MV and LV Distribution System Earthing

[7] 240-138065940 Additional Anti-Intrusion Measurements for Equipment Container at AC- Powered Sites

[8] 240-139282493 Security Lighting for Eskom Applications

2.2.2 Informative

[9] Eskom. (2023). *Microgrids planning standard (Rev 1)*.

2.3 Definitions

2.3.1 General

Definition	Description
Cycle of Battery	Sequence of a discharge followed by a charge, or a charge followed by a discharge under specified conditions
Microgrid	A group of interconnected loads and distributed energy resources with defined electrical boundaries that acts as a single controllable entity and is able to operate in both grid-connected and island mode.

2.3.2 Disclosure classification

Confidential: the classification given to information that may be used by malicious/opposing/hostile elements to **harm** the objectives and functions of Eskom Holdings Limited.

2.4 Abbreviations

Abbreviation	Description
AC	Alternating Current
BESS	Battery Energy Storage System
DC	Direct Current
FMECA	Failure Mode and Effects / Criticality Analysis
kW	Kilowatt
SANS	South African National Standards
SHEQ	Safety, Health, Environmental, and Quality
PV	Photovoltaic
VAT	Value Added Tax
ZAR	South African Rand

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2.5 Roles and responsibilities

Not applicable.

2.6 Process for monitoring

Not applicable.

2.7 Related/supporting documents

Not applicable.

3. Request for Information for Microgrids Design, Supply, Delivery, Installation, and Commissioning.

3.1 Background

Eskom Distribution, a division of Eskom Holdings SOC Ltd, is committed to expanding energy access, improving network resilience, and supporting South Africa's Just Energy Transition through the deployment of distributed renewable energy solutions. As part of this strategy, Eskom is seeking to implement standard sizes available of Solar Photovoltaic (PV) Microgrid Systems across selected sites within South Africa.

A **microgrid** is defined as a group of interconnected loads and distributed energy resources within clearly defined electrical boundaries, acting as a single controllable entity that can operate in both grid-connected and islanded (off-grid) modes.

Microgrids in Eskom are primarily applied in areas where conventional grid connection is either technically impractical, economically unjustifiable or for grid support (grid tied or hybrid installation). To identify suitable sites for microgrid deployment, the following criteria are applied: [9].

- Areas located far from existing conventional networks.
- Farm-dweller houses where overhead lines disrupt farming operations.
- Sites with access challenges such as lack of bridges or roads.
- Locations situated in valleys or on mountaintops, where conventional network construction and maintenance are difficult.
- Areas requiring costly infrastructure such as new substations or extensive line upgrades.
- Constrained networks where a grid-tied microgrid solution is viable.
- Improvement of quality/reliability of supply to existing customers.
- Projects with a higher cost per connection compared to the norm.
- Environmentally sensitive areas where large infrastructure could impact wildlife, plants, or scenic value.
- Sites prone to land acquisition and servitude challenges for conventional network expansion.
- Areas with a lower and manageable risk of vandalism.
- Sites where a microgrid presents the least lifecycle cost compared to conventional supply solutions.

The existing Eskom Microgrid platform currently being deployed serves as the conceptual foundation for this initiative. However, the new projects aim to refine and optimize this design into more modular, transportable, compact, and cost-effective systems, specifically engineered to operate efficiently in challenging terrains and isolated regions.

Furthermore, the design must prioritize reductions in physical footprint and enhancements in energy efficiency, directly resulting in significant cost savings and improved operational performance. This approach will enable Eskom to meet pressing energy access challenges with innovative, scalable, and sustainable microgrid technologies tailored to South Africa's diverse landscape and evolving energy needs.

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3.2 Engineering Requirements

The scope of this RFI encompasses the full turnkey delivery of Solar PV Microgrid Systems across selected sites in South Africa, of the standard available sizes. The respondents shall provide costing for the design, supply, delivery, installation, commissioning, and handover of fully operational microgrid systems, inclusive of options to maintain and operate these assets over a specified time periods prior to handover. The Solar PV Microgrid Systems must meet the following engineering requirements to ensure technical excellence, operational reliability, and lifecycle cost efficiency:

Please ensure that design information is provided for the following system sizes:

- 16 kW / 32 kWh
- 25 kW / 50 kWh
- 30 kW / 60 kWh
- 50 kW / 100 kWh
- 100 kW / 200 kWh
- 150 kW / 300 kWh
- 200 kW / 400 kWh
- 250 kW / 500 kWh

3.2.1 General System Requirements:

- The microgrid must have the capability to operate in islanded (off-grid), hybrid, and grid-connected modes, with seamless transition between modes as needed.
- The design must prioritize modularity, scalability, and transportability, enabling deployment across diverse and challenging terrains.
- Systems must be designed for a operational life of 20 years, with major components sized and selected for longevity, maintainability, and resilience. Typical replacement periods for components such as BESS and inverters must be stated where possible.
- The microgrid architecture must minimize physical footprint and optimize land use, particularly in sensitive and remote areas.
- Energy efficiency and system performance optimization must be core design principles. The respondents must provide the accompanying system design and performance parameters.
- The microgrid system shall consist of, at minimum, the following integrated components: Photovoltaic (PV), Battery Energy Storage System (BESS), Inverters and Power Conversion Equipment, Microgrid Controller (MGCS), Protection and Safety Systems, Physical security measures – to be determined by the respondent.
- Suitable communication for remote monitoring and load data acquisition.
- Specify required earthing and lightning protection for the microgrids. To comply with local, international standards or both.
- All components and accessories required for the completion and successful operation a microgrid, either specified in detail or not, shall be supplied as necessary.
- The design must be cost-effective, compliant with generally accepted professional engineering industry best practices – these must be listed.
- The microgrid equipment should be housed within an enclosure tailored to meet spatial, safety, and OEM-specific requirements. This enclosure may take the form of a container, a custom-built unit, a brick-and-mortar structure, or any suitable alternative that aligns with industry best practices. Provide the specifications and fire protection requirements for the enclosures.

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- It is imperative that the lifespan and operational requirements for each major component be detailed. i.e. for batteries the number of cycles must be specified or the kWh throughput. In addition, the sizes of each component must be clearly indicated and shown in alignment with their timescale.

The major equipment includes the following:

a) Hybrid Inverters

b) Battery banks (BESS)

c) Solar Panels

d) SCADA System

e) AC Distribution Board

f) PV Combiner Board

g) DC Distribution Board

h) Physical Security System

i) Fire Detection and Suppression System

3.2.2 Compliance and Standards

- The supplier shall provide list of all standards (local and/or international) that the products supplied comply with in terms of:

    - Earthing
    - Civil design
    - Safety
    - Fire suppression
    - Electrical fault protection
    - Security
    - Cabling

- All equipment and systems must comply with relevant South African standards (SANS), Eskom internal specifications, or applicable international standards (such as IEC, IEEE, etc).
- All designs must account for environmental compliance, including environmental impact assessments where necessary.
- Safety, Health, Environmental, and Quality (SHEQ) requirements must be integrated.

3.2.3 Maintenance and Supportability

- Systems must be designed with some remote monitoring capability features wherever possible.
- Spare parts strategy with timelines, and local service support must be considered in the design and costing.
- Component Lifing: Include expected replacement schedules and the strategy for batteries (e.g., 8-12 years), inverters (15 years), etc in alignment to the capacity requirement.

Note: Suppliers are allowed to recommend system requirement changes to attain efficient microgrid both operationally and financially. Such requirement changes are subject to official acceptance and sign-off by Eskom Distribution.

3.3 Key Deliverables

Over and above the requirements for the microgrid design the following must be delivered in a clear, concise, and structured format:

1. A report describing the conceptual design and covering all the capabilities outlined above and more if applicable.
2. All cost estimates for implementation of the design.
3. Bill of materials (BoM)

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4. Single line diagrams (SLDs) for the proposed designs.
5. Scope of work for implementation of the project.
6. Schedule of guarantee / warrantee periods and conditions for each of the asset classes utilised in the designs. E.g. for batteries, the proposed chemistries should be specified and detailed guarantees provided, such as charge / discharge cycles guaranteed, and / or MWhr throughput over the guarantee periods, etc.

The conceptual design can follow one of the architectural examples given in figure 1 below. But it must be stressed however, that figure 1 only serves as an example and any architectural design that differs from figure 1, but satisfies the stipulated requirements, will be considered.

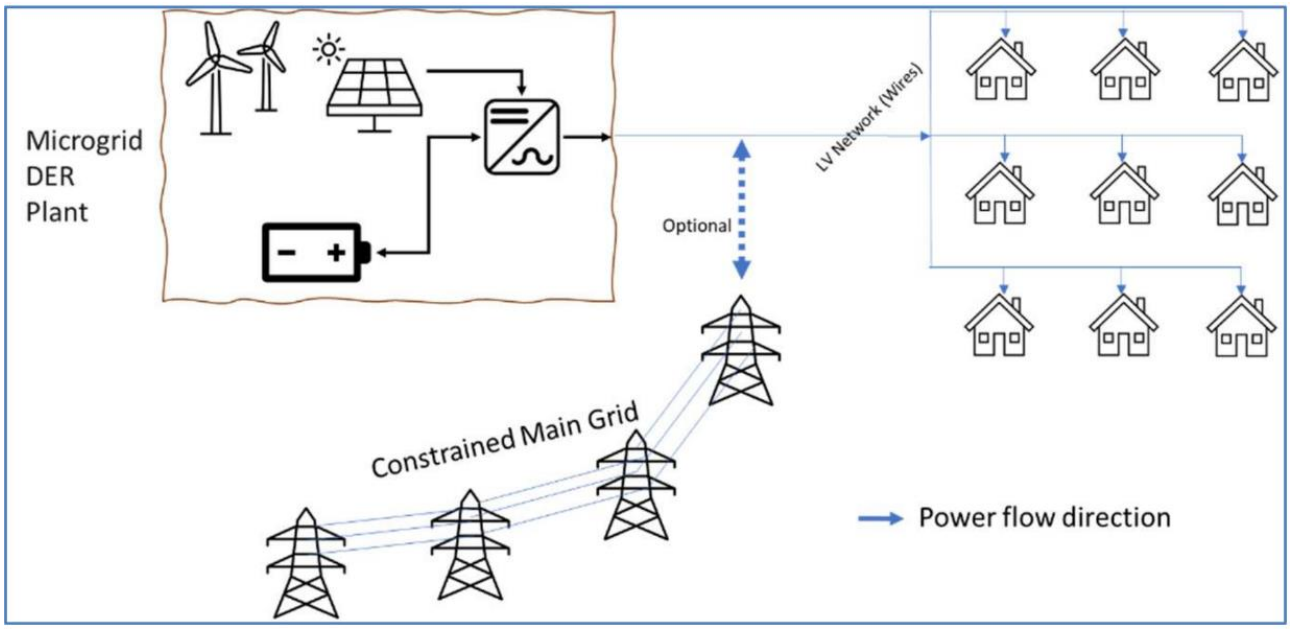

Figure 1: Microgrid architectures [9]

3.4 Project Requirements

3.4.1 Indicative Pricing

Provide costing while using the following breakdown as a guide. Certain functionalities may be integrated into the core microgrid system, while others may be provided through additional or optional system components. Service providers must clearly specify whether the required functionalities are included in the base microgrid components or if separate add-on components are necessary. Respondents must also indicate the pricing for all optional modules or components proposed.

Please ensure that detailed costing information is provided for the following system sizes:

- 16 kW / 32 kWh
- 25 kW / 50 kWh
- 30 kW / 60 kWh
- 50 kW / 100 kWh
- 100 kW / 200 kWh
- 150 kW / 300 kWh
- 200 kW / 400 kWh
- 250 kW / 500 kWh

Clearly indicate any volume discounts and other relevant information. Costs should be provided in ZAR, excluding VAT for the local portion. The foreign portion should be indicated in the foreign currency.

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Table 1:Outline of the Indicative Pricing Required

1.	**Project EPC**
1.1.	Engineering Design
1.2.	Procurement
1.3.	Transportation (typical ZAR per km or per 100km)
1.4.	Construction
1.5.	Commissioning
1.6.	Maintenance (Specify service duration)
2.	**Environments**
3.	**Training**
	Specialised training (Train the trainer)
	Basic Training
	Other (Specify)

3.4.2 Training Offered

Provide details on the trainings to be offered.

The Supplier shall ensure that the following training requirements are provided:

I. Users to be trained to access and use all Microgrid system components functionalities as per their user-defined roles (basic training)
II. Eskom support and maintenance staff to be trained to enable them to deliver at least level 1 and 2-system support and maintenance (specialised training)
III. Training activities and training material shall be supplied and provided by the supplier in English.

3.4.3 Additional Information

Provide information on challenges, additional functionalities, or improvements to Microgrid Systems, that you have identified as being beneficial or crucial based on your implementation experience. Align additional responses to the section titles above. Note that this is not limited to points raised above.

3.4.4 Skills and Support

How many employees are employed by the company locally in South Africa?

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I. Engineering management

II. Engineering design

III. Technical support

IV. Quality

V. Production

VI. Installation & commissioning

VII. Finance

3.4.5 Industry Experience

Information Schedule:

I. Give a brief summary of your present range of equipment and services available.

II. Briefly describe the nature of your resources in the Republic of South Africa e.g. workshop; design; equipment development; testing; and production facilities etc.

III. If not already detailed in your answers to the above questions, state what experience you have had with projects involving the implementation of Renewable Energy Microgrid Systems.

IV. Supplier's comparable sized project experience references.
   a) State the customer names that you have delivered services to during the past five (5) years.
   b) List and describe the number of projects that are currently in progress and/planned to start through 2025/26.
   c) Where applicable provide the major reasons for project completion delays, where handover was delayed for more than six (6) months from the original schedule.

V. State your level of adherence to International Engineering Standards as well as Eskom Standards where applicable.

4. Authorization

This document has been seen and accepted by:

Name and surname	Designation
Monde Soni	Chief Engineer: Network Planning
Rachel Sebola	

5. Revisions

Date	Rev.	Compiler	Remarks
April 2025	1	V Mabodi	Document required for RFI.

6. Development team

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

- Vincent Mabodi
- Fhatuwani Thahale

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7. Acknowledgements

Not applicable.

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