

TECHNICAL SPECIFICATION

SUPPLY, INSTALLATION AND COMMISSIONING OF A SOLAR PHOTOVOLTAIC (PV) SYSTEM

MAMELODI EAST PREVOCATIONAL SCHOOL

1. INTRODUCTION AND BACKGROUND

Mamelodi East Prevocational School intends to procure a **solar photovoltaic (PV) energy system** to support teaching and learning activities, administrative operations, outdoor security lighting, and information and communication technology (ICT) infrastructure.

The school experiences intermittent electricity supply disruptions which negatively impact curriculum delivery, administration, and network availability. The installation of a solar PV system forms part of the Department of Basic Education's objective to improve **infrastructure resilience, energy efficiency, and continuity of learning** in public schools.

2. END USER

- **Employer:** School Governing Body
- **End User:** Mamelodi East Prevocational School
- **Site Location:** Mamelodi East, City of Tshwane, Gauteng

3. SCOPE OF WORK

The appointed service provider shall be responsible for the **design, supply, installation, testing, commissioning, and handover** of a complete and fully operational solar PV system.

The scope shall include, but not be limited to:

- Solar PV panels and mounting structures
- Hybrid inverter system
- Battery energy storage system
- DC and AC protection equipment
- Electrical integration with existing school infrastructure
- Dedicated power supply for ICT and network infrastructure
- System monitoring solution
- Training, documentation, and warranties

4. DESCRIPTION OF LOADS TO BE SUPPORTED

4.1 Classrooms

The system shall provide power to **sixteen (16) classrooms**, supporting:

- LED lighting
- Educator computer or laptop
- Projector, smart board, or display
- General-purpose plug points for teaching equipment

All classrooms shall be capable of **simultaneous operation during school hours**.

4.2 Administration Block

The system shall support lighting and power requirements for the administration block, including:

- LED lighting for offices and corridors
- Desktop computers and laptops
- Printers and small office equipment
- Internet and networking equipment

4.3 Outdoor Lighting

The system shall supply power to **five (5) outdoor lights** for:

- Walkways
- Entrances
- Security and perimeter areas

Outdoor lights shall:

- Be energy-efficient LED luminaires
- Operate automatically from dusk to dawn or via timers/photocells

4.4 ICT and Network Infrastructure (Critical Loads)

The system shall ensure uninterrupted power supply to critical ICT infrastructure, including:

- Network rack
- Core network switch
- Router and firewall
- Wireless networking equipment (where applicable)

Critical loads must remain operational during:

- Load shedding
- Grid outages
- Power changeover events

5. TECHNICAL REQUIREMENTS

5.1 Solar PV Modules

- PV modules shall be new, unused, and of reputable manufacture
- Modules shall be suitable for South African environmental conditions
- Panels shall be installed on approved roof or ground-mounted structures
- Mounting structures shall be corrosion-resistant and securely anchored

5.2 Inverter System

- A hybrid inverter solution shall be provided
- Inverter(s) must:
 - Supply loads from solar, battery, and grid
 - Automatically switch during grid failure
 - Prioritise critical loads where required
- Equipment shall be compliant with relevant SANS and NRS standards

5.3 Battery Energy Storage System

- Lithium-ion battery technology is preferred
- Battery capacity shall be sufficient to:
 - Support critical loads for a minimum school day
 - Sustain ICT infrastructure during extended outages
- Battery system shall include an integrated Battery Management System (BMS)

5.4 Electrical Integration and Distribution

- The system shall integrate with existing distribution boards
- Clear separation shall be provided between:
 - Critical loads
 - General loads
- All electrical work shall comply with:
 - SANS 10142-1
 - Occupational Health and Safety Act
 - Local authority and utility requirements

6. MONITORING AND PERFORMANCE REPORTING

The system shall include a monitoring solution that provides:

- Real-time visibility of solar generation
- Battery charge and discharge status
- Load consumption data
- Fault and alarm notifications

Monitoring shall be accessible via web portal and/or mobile application.

7. SAFETY, QUALITY, AND COMPLIANCE

The contractor shall ensure:

- Proper earthing and lightning protection
- DC and AC isolation
- Surge protection devices
- Clearly labelled equipment and circuits

All work shall be carried out in accordance with:

- Applicable SANS standards
- DBE infrastructure guidelines
- Occupational Health and Safety requirements

8. TRAINING AND HANDOVER

The service provider shall:

- Provide basic operational training to nominated school staff
- Supply system manuals, drawings, and as-built documentation
- Hand over all warranty certificates and compliance documentation

9. WARRANTIES AND MAINTENANCE

Minimum warranty requirements:

- Solar PV modules: **minimum 10 years**
- Inverters: **minimum 5 years**
- Batteries: **minimum 5 years or specified cycle life**
- Workmanship: **minimum 12 months**

10. FUTURE EXPANSION

The system shall be designed to allow for:

- Additional PV panels
- Increased battery capacity
- Future load growth

11. ACCEPTANCE AND COMPLETION

Final acceptance shall be subject to:

- Successful commissioning and testing
- Demonstration of automatic changeover
- Submission of compliance certificates

- Completion of training and handover documentation

12. EVALUATION CRITERIA

Bids will be evaluated in accordance with **public sector procurement principles**, based on **functionality (technical compliance), price, and preference**, where applicable.

12.1 Stage 1: Administrative Compliance (Mandatory)

Bidders must submit **all mandatory returnable documents** listed in Section 13. Failure to submit any mandatory document may result in **disqualification**.

12.2 Stage 2: Technical Functionality Evaluation

Only bids that are administratively compliant will be evaluated for **technical functionality**.

Technical Evaluation Criteria

No.	Evaluation Criterion	Description	Weight (%)
1	Understanding of Scope	Demonstrated understanding of school environment, loads, and operational requirements	15
2	System Design & Technical Solution	Appropriateness of PV system design, inverter, battery capacity, and load segregation	30
3	Compliance with Standards	Compliance with SANS, OHS Act, DBE infrastructure guidelines	15
4	Experience & Track Record	Proven experience in similar public or educational solar PV installations	15
5	Monitoring, Training & Handover	Quality of monitoring solution, training plan, and documentation	10
6	Warranties & After-Sales Support	Warranty periods, maintenance support, and response times	15
Total			100

Minimum Technical Threshold

- Bidders must achieve a **minimum score of 70%** for technical functionality to proceed to financial evaluation.

12.3 Stage 3: Financial Evaluation

Bidders who meet the minimum technical threshold will be evaluated on:

- **Price**
- **Preference points** (where applicable, in accordance with prevailing procurement legislation)

13. MANDATORY RETURNABLE DOCUMENTS

Bidders must submit the following documents as part of their proposal.
Failure to submit any mandatory document may result in disqualification.

13.1 Administrative Documents

- Completed and signed **Bid / RFQ Response Form**
- Valid **Tax Compliance Status (TCS) PIN**
- **CSD registration report** (Central Supplier Database)
- Certified copy of company **registration documents**
- Proof of **business address**
- Certified copies of **identity documents** of directors/members

13.2 Technical Documentation

- **Technical proposal** describing the proposed solar PV system
- **System design overview**, including:
 - PV panel capacity
 - Inverter type and rating
 - Battery technology and capacity
- **Load segregation strategy** (critical vs non-critical loads)
- **Single-line diagram** (preliminary)
- Product **datasheets** for:
 - Solar panels
 - Inverters
 - Batteries
- Description of **monitoring platform**

13.3 Compliance and Safety Documents

- Commitment to comply with:
 - SANS 10142-1
 - Occupational Health and Safety Act
- Proof of **registered electrician / electrical contractor**
- Letter confirming that a **Certificate of Compliance (CoC)** will be issued upon completion

13.4 Experience and Capacity

- Company profile
- **Minimum three (3) reference projects** of similar nature
- Reference letters or contactable references
- CVs or profiles of key technical personnel

13.5 Training, Warranties and Support

- Proposed **training plan** for school staff
- Warranty certificates or warranty statements for:
 - Solar PV modules
 - Inverters
 - Batteries
- Maintenance and after-sales support plan

13.6 Pricing and Financial Submission

- Completed **pricing schedule / bill of quantities**
- Breakdown of:
 - Equipment costs
 - Installation and commissioning
 - Training and documentation
- Confirmation that pricing includes **all costs** necessary for a fully operational system

14. GENERAL CONDITIONS

- Site inspection is recommended prior to submission
- The Employer reserves the right to:
 - Accept or reject any bid
 - Request clarification
 - Cancel the procurement process without obligation
- All equipment supplied shall be new and unused

ANNEXURE B

PRICING SCHEDULE / BILL OF QUANTITIES (BOQ)

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IMPORTANT NOTE TO BIDDERS

- Prices must be quoted in **South African Rand (ZAR)**, VAT inclusive or exclusive as specified in the bid conditions.
- The pricing must cover **all costs** necessary to deliver a **fully operational system**.
- No additional claims will be entertained for items not specifically priced.
- Quantities are indicative; bidders remain responsible for system performance.

1. PRELIMINARIES AND GENERAL

Item No.	Description	Unit	Qty	Rate (R)	Amount (R)
1.1	Site inspection, project planning and design	Sum	1		
1.2	Health and Safety compliance and site establishment	Sum	1		
1.3	Transport, delivery and handling of equipment	Sum	1		
Subtotal Section 1					

2. SOLAR PV MODULES AND MOUNTING

Item No.	Description	Unit	Qty	Rate (R)	Amount (R)
2.1	Solar PV modules (specify wattage and manufacturer)	No.			
2.2	Mounting structures (roof or ground mounted)	Set	1		
2.3	Fixings, brackets and structural accessories	Sum	1		
Subtotal Section 2					

3. INVERTER SYSTEM

Item No.	Description	Unit	Qty	Rate (R)	Amount (R)
3.1	Hybrid inverter(s) (specify rating and make)	No.			
3.2	Inverter accessories and enclosures	Sum	1		
Subtotal Section 3					

4. BATTERY ENERGY STORAGE SYSTEM

Item No.	Description	Unit	Qty	Rate (R)	Amount (R)
4.1	Lithium battery modules (specify capacity and make)	No.			
4.2	Battery rack / cabinet	Set	1		

Item No.	Description	Unit	Qty	Rate (R)	Amount (R)
4.3	Battery Management System (if separate)	Sum	1		
Subtotal Section 4					

5. DC AND AC ELECTRICAL EQUIPMENT

Item No.	Description	Unit	Qty	Rate (R)	Amount (R)
5.1	DC combiner boxes and isolators	No.			
5.2	AC distribution boards	No.			
5.3	Surge protection devices	No.			
5.4	Earthing and lightning protection	Sum	1		
Subtotal Section 5					

6. LOAD INTEGRATION AND DISTRIBUTION

Item No.	Description	Unit	Qty	Rate (R)	Amount (R)
6.1	Classroom load integration (16 classrooms)	Sum	1		
6.2	Administration block load integration	Sum	1		
6.3	Outdoor lighting integration (5 lights)	Sum	1		
6.4	Critical ICT and network load segregation	Sum	1		
Subtotal Section 6					

7. MONITORING AND CONTROL SYSTEM

Item No.	Description	Unit	Qty	Rate (R)	Amount (R)
7.1	Monitoring hardware and software	Sum	1		
7.2	Web / mobile access configuration	Sum	1		
Subtotal Section 7					

8. INSTALLATION, TESTING AND COMMISSIONING

Item No.	Description	Unit	Qty	Rate (R)	Amount (R)
8.1	Electrical installation and cabling	Sum	1		
8.2	Testing and commissioning	Sum	1		
8.3	Certificate of Compliance (CoC)	Sum	1		
Subtotal Section 8					

9. TRAINING, DOCUMENTATION AND HANDOVER

Item No.	Description	Unit	Qty	Rate (R)	Amount (R)
9.1	User training for school staff	Sum	1		
9.2	As-built drawings and manuals	Sum	1		
9.3	Warranty documentation and handover	Sum	1		
Subtotal Section 9					

10. SUMMARY OF PRICING

Description	Amount (R)
Subtotal (Sections 1–9)	
VAT (if applicable)	
TOTAL BID PRICE	

DECLARATION BY BIDDER

I/We hereby declare that the above prices are **true and correct**, and that the total bid price includes **all costs** necessary to deliver a fully functional solar PV system in accordance with the technical specification.

Bidder Name: _____

Signature: _____

Date: _____