



**SUPPLY, INSTALL AND COMMISSIONING OF SOLAR PV SYSTEM
AT
IKWEZI, INHLANZANE AND LANGLAATE STATIONS.**

SCOPE, SPECIFICATIONS AND SCHEDULE OF QUANTITIES

1. INTRODUCTION

The works is: Appointment of a contractor for the scope of works entails supply, installation and commissioning of 5KVA, 5000 watts PV solar system at Ikwezi, Inhlanzane and Langlaagte.

2. BACKGROUND OF PROJECT

Metrorail substation that supply the langlaagte station is without power was completely vandalised. The installation of the 5 KVA, 5000 Watts will provide the ticket office with sufficient power supply as well as lighting on platforms. Thus, turning the ticket office into functional state.

Ikwezi and inhlanzane station the installation of the 5 KVA this will allow the ticket office to operate during power cut / loadshedding.

3. DETAILS OF PREFERED SOLUTION

The preferred solution is to procure a service provider to supply, installation and commission the Solar PV system.

4. AREAS TARGETED FOR THIS PRODUCTS OR WORK OR SERVICE REQUIRED

- Ikwezi Station
- Inhlanzane Station
- Langlaagte Station

5. SCOPE OF WORK

The scope of works entails supply, installation, and commissioning of 5KVA solar PV system at Ikwezi, Inhlanzane and Langlaagte train station. The high-level scope of work to be executed under this project will include, but not be limited to the following:

Ikwezi, Inhlanzane and Langlaagte Train Station : Ticket office.

- 5.1 Supply of a complete 5KVA Solar PV Systems.
- 5.2 Installation of a complete 5KVA Solar PV system according to SANS 10142.
- 5.3 Commissioning of a complete 5KVA Solar PV system

6. SPECIFICATION

ELECTRICAL WORKS

- 5000-Watt off Hybrid inverter. Nominal DC 48V. Output voltage 230VAC 50Hz at 5000 Watts.
- 24V 100AH deep cycle Lithium-Ion battery pack, stand and side covers Include all relevant cables, bracket, lugs and ferrules as per manufacturer's specifications.
- 160 Amp battery disconnect.
- 32 Amp AC Switch with a 63 Amp Change over Switch and Box.
- Sundries (Trunking and Clips, Lugs and Ferrules plus Nitto tape.)
- Heavy duty lockable battery cabinet
- Battery fuse and holder
- PV Surge arrestor device
- 12-way surface mount distribution board. Complete as stipulated in the BOQ.

SOLAR PANELS

- Peak power 455 Watts each PV modules to be fitted on top of galvanized stand (priced elsewhere) such that maximum solar radiation is absorbed by solar panel. Include all brackets, antivandal claps, cables, lugs and ferrules as per manufacturer's specifications (Portrait Install)
- Mounting Kits suitable for Corrugated Roof
- DC Combiner DC 600V Box 2 In 2 Out
- Earth spike and cabling (Sans 60613) Regulations
- PV cable 6mm Red and Black Cable from Combiner box and Panels
- Sundries (Trunking, MC 4 Connectors, Hazard Stickers)

SOLAR PANEL STAND

- Design, supply and install 10m high above the ground heavy duty galvanized solar panel stand on 30Mpa/20mm concrete footings including pv structure and brackets with all above solar panels completely mounted. NB: drawing to be submitted for approval before installation.
- 450mm razor barbed wire mounted on top of fencing.

- Razor spikes

7. WARRANTY

The repaired components must be supplied with a 12-month warranty from the date of fitment for work that was carried out.

8. COMPLIANCE

8.1 Non-conformances (NCR) must be returned within 10 working days.

8.2 All components, once tested and certified, shall be issued with a compliance certificate.

8.3 All components must have a quality assurance label indicating the name of the organization, date, card tested by.

8.4 All components should be SABS approved.

9. PRICE ADJUSTMENTS

Prices will be fixed for the duration of this contract.

10. PENALTIES

11.1 Should the Contractor fail to deliver on or before the agreed date, a penalty of 1% per day will be charged on the total value of the Purchase order (PO) but shall not exceed 10 percent of the total value of the PO.

11.2 PRASA CRES reserves the right to test the product at any given time during the contract period for compliance. The Contractor will be held liable with costs for any deviations in the specifications which may have resulted in damages and downtime to Rolling Stock equipment. A meeting will be convened by both parties to discuss the outcome of the investigation and the costs incurred.

11. GENERAL INFORMATION

- The contract shall be registered with the ECB as laid down in the Electrical Installation Regulations of the Occupational Health and Safety Act 85/1993, clause.
- The electrical contractor shall be or have in his employment an accredited person. Proof must be supplied of the above requirements: PV Green Card Holder
- All materials/components shall be of high standard (SABS approved)
- All components/materials supplied and installed shall be new and will be capable to provide specified power at 380V.
- Contractor: Successful tender who is appointed by PRASA-CRES and will be responsible to carry out the works as per this specification.
- The Contractor shall at all-times be responsible for supervision of the work and for follow-up instructions to monitor that the work is being done to specification. He shall immediately take appropriate remedial action, in areas where the specified standards are not achieved.
- The Contractor shall allow PRASA representatives to visit plant workshop sites anytime to monitor/inspect construction process and ticket office facilities.
- The PRASA Maintenance engineering department shall at any time during Contract period carry out inspection of the contractor's performance methods and procedures.
- The contractor shall provide transport, equipment, tools, consumables, supervision, protection, and labor necessary to successfully complete the contract.

12. MEASUREMENT AND PAYMENTS.

Completed work will be inspected and Invoices will be submitted to finance department after passing the inspection and testing. Any rejected and incomplete work will not be paid for until it is rectified.

13. DEMOLITION

The contractor is responsible for the demolition of the existing equipment and the transportation of the existing equipment to langlaagte.

14. OVERALL STAFFING AND KEY PROFESSIONAL STAFF.

A contractor shall provide qualified and experienced professional staff for the following.

- Project manager
- Site supervisor
- Electrician /millwright /electro mech
- Construction health and safety officer.

16. MINIMUM QUALIFICATION OF KEY PROFESSIONAL STAFF

- Team leader/ Project manager
- Heavy Current Electrical qualification (Degree, Diploma or N-level certificate)
- Minimum 5 years post experience in Electrical building.

17. ELECTRICIAN /MILLWRIGHTER /ELECTRO MECH

Minimum 5 years' experience as electrician /millwright / electro mech

18. CONSTRUCTION AND HEALTH AND SAFETY OFFICER

The desired minimum qualification for the Construction Health and Safety Officer are as follows: Minimum of 3 years industry experience as a health and safety officer.

19. PRICING SCHEDULE

- Prices must be quoted in South African Rand, inclusive of all applicable taxes.
- The price offer is firm and clearly indicate the basis thereof.
- Pricing Bill of Quantity is completed in line with schedule if applicable.
- Cost breakdown must be indicated.
- Price escalation basis and formula must be indicated.
- To facilitate like-for-like comparison bidders must submit pricing strictly in accordance with this price schedule and not utilize a different format. Deviation from this pricing schedule could result in a bid being declared non-responsive.
- PRASA CRES is not obligated to appoint the lowest bidder.

20. GENERAL

A contractor is not allowed to sub-contract without a permission of the Prasa project manager.

21. SECURITY

The contractor shall provide on-site security for personnel and material stock and should ensure that patrols are in place at the section handed over to Prasa. No claims of material or loses shall be lodge with the client for stolen goods during the construction before the completed work is handed over to PRASA.

22. COMMISSION TEST AND COMPLETION

Designated PRASA personnel, in conjunction with the Contractor shall carry out the final commissioning test. The Contractor shall carry out any remedial work, if necessary.

23. HANDING OVER

The handovers shall be for each portion of the work when the Electrical System is tested and commissioned to the satisfaction of the Project Manager, in accordance with the details as set out in the handing over documentation of PRASA.

24. BILL OF QUANTITIES

BILL OF QUANTITIES

IKWEZI STATION.

SCHEDULE OF QUANTITIES AND RATES / PRICE (S)

Item No.	Description	Unit	Qty	Rate/unit (Excl VAT)	Total Price (Excl VAT)
1.	Preliminary and General				
1.1	All Preliminary and General applicable to this project	No.	4	R	R
	Occupational Health and safety				
1.2	Compliance with Occupational Health and Safety Act (Act 85 of 1993) and its regulations and with the Employers Health and Safety	No.	38	R	R
	<u>ELECTRICAL WORKS</u>				
	<u>TICKET OFFICE</u>				
1.3	Supply and fit Minimum: 5000-Watt off Hybrid inverter. Nominal DC 48V. Output voltage 230VAC 50Hz at 5000 Watts. Include all relevant cables, lugs, and ferrules as per manufacturer's specifications	Sum	1	R	R
1.4	Supply and fit 24V 100AH deep cycle Lithium-Ion battery pack, stand and side covers Include all relevant cables, bracket, lugs, and ferrules as per manufacturer's specifications	Sum	2	R	R
1.5	Supply of 160Amp battery disconnect.	Sum	1	R	R
1.6	Supply of 32 Amp AC Switch with a 63 Amp Change over Switch and Box.	Sum	1	R	R
1.7	Sundries (Trunking and Clips, Lugs and Ferrules	Sum	1	R	R

	plus Nitto tape.)				
1.8	Connect above system to DB.	Sum	1	R	R
1.9	Supply and connect of Cable Run from DB to Inverter	M	50	R	R
1.10	Supply and connect of Cable from Battery to Inverter	M	5	R	R
1.11	Heavy duty lockable battery cabinet	Sum	1	R	R
1.12	Battery fuse and holder	Sum	4	R	R
1.13	PV Surge arrestor device	Sum	4	R	R
1.14	Supply and fit 12-way surface mount distribution board. 63 Amps Earth leakage for AC protection, 20 Amp circuit breaker for plug socket protection x 2. PV modules isolator 20 Amps x 10. 3 x 63 Amps circuit breaker for batteries. Surge protection (SPD). Include all relevant cables, lugs, and ferrules as per manufacturer's specifications	Sum	1	R	R
1.15	Battery fuse and holder	Sum	4	R	R
	<u>SOLAR</u>				
1.16	Supply and fit PV Modules. Minimum: Peak power 455 Watts each PV modules to be fitted on top of galvanized stand (priced elsewhere) such that maximum solar radiation is absorbed by solar panel. Include all brackets, antivandal claps, cables, lugs, and ferrules as per manufacturer's specifications (Portrait Install)	Sum	8	R	R
1.17	Supply and install of mounting Kits suitable for Corrugated Roof	Sum	1	R	R
1.18	Supply and install DC Combiner DC 600V Box 2 In 2 Out	Sum	1	R	R

1.19	Supply of earth spike and cabling (Sans 60613) Regulations	Sum	1	R	R
1.20	Supply of PV cable 6mm Red and Black Cable from Combiner box and Panels.	M	350	R	R
1.21	Sundries (Trucking, MC 4 Connectors, Hazard Stickers)	Sum	1	R	R
1.22	Supply and connect of Cable Run from DB to Inverter	M	50	R	R
1.23	Connect above system to Invertor.	Sum	1	R	R
	<u>EARTHING</u>				
1.24	Earth bonding for all the buildings as per SANS 10142 and the specification including 1.2 Earth spike x 6.	Sum	1	R	R
	<u>ELECTRICAL COMPLIANCE</u>				
	All work to comply to SANS 10142 Compliance certificate to be provided on completion. Pricing to include all necessary complete connection				
1.25	Certificate of compliance and all other testing required including 12 months guarantee	Item	1	R	R
	CARRIED TO SUMMARY				
	SUB-TOTAL TOTAL			R	R

25. BILL OF QUANTITIES

INHLANZANE STATION.

SCHEDULE OF QUANTITIES AND RATES / PRICE (S)					
ITEM NO	Description	Unit	Qty	Rate/unit (Excl VAT)	Total Price (Excl VAT)
	SECTION 2				
	Preliminary and General				
2.1	All Preliminary and General applicable to this project	Sum	4	R	R
	Occupational Health and safety			R	R
2.2	Compliance with Occupational Health and Safety Act (Act 85 of 1993) and its regulations and with the Employers Health and Safety	Sum	38	R	R
	<u>ELECTRICAL WORKS</u>				
	<u>TICKET OFFICE</u>				
2.2	Supply and fit Minimum: 5000-Watt off Hybrid inverter. Nominal DC 48V. Output voltage 230VAC 50Hz at 5000 Watts. Include all relevant cables, lugs, and ferrules as per manufacturer's specifications	Sum	1	R	R
2.3	Supply and fit 24V 100AH deep cycle Lithium-Ion battery pack, stand and side covers Include all relevant cables, bracket, lugs, and ferrules as per manufacturer's specifications	Sum	2	R	R
2.4	Supply of 160Amp battery disconnect.	Sum	1	R	R
2.5	Supply of 32 Amp AC Switch with a 63 Amp Change over Switch and Box.	Sum	1	R	R
2.6	Sundries (Trunking and Clips, Lugs and Ferrules	Sum	1	R	R

	plus Nitto tape.)				
2.7	Connect above system to DB.	Sum	1	R	R
2.8	Supply and connect of Cable Run from DB to Inverter	M	50	R	R
2.9	Supply and connect of Cable from Battery to Inverter	M	5	R	R
2.10	Heavy duty lockable battery cabinet	Sum	1	R	R
2.11	Battery fuse and holder	Sum	4	R	R
2.12	PV Surge arrestor device	Sum	4	R	R
2.13	Supply and fit 12-way surface mount distribution board. 63 Amps Earth leakage for AC protection, 20 Amp circuit breaker for plug socket protection x 2. PV modules isolator 20 Amps x 10. 3 x 63 Amps circuit breaker for batteries. Surge protection (SPD). Include all relevant cables, lugs, and ferrules as per manufacturer's specifications	Sum	1	R	R
2.14	Battery fuse and holder	Sum	4	R	R
	<u>SOLAR</u>				
2.15	Supply and fit PV Modules. Minimum: Peak power 455 Watts each PV modules to be fitted on top of galvanized stand (priced elsewhere) such that maximum solar radiation is absorbed by solar panel. Include all brackets, antivandal claps, cables, lugs, and ferrules as per manufacturer's specifications (Portrait Install)	Sum	8	R -	R -
2.16	Supply and install of mounting Kits suitable for Corrugated Roof	Sum	1	R -	R -
2.17	Supply and install DC Combiner DC 600V Box 2 In 2 Out	Sum	1	R	R
2.18	Supply of earth spike and cabling (Sans 60613) Regulations	Sum	1	R	R

2.19	Supply of PV cable 6mm Red and Black Cable from Combiner box and Panels.	M	350	R	R
2.20	Sundries (Trunking, MC 4 Connectors, Hazard Stickers)	Sum	1	R	R
2.21	Supply and connect of Cable Run from DB to Inverter	M	50	R	R
2.22	Connect above system to Invertor.	Sum	1	R	R
	<u>EAR THING</u>				
2.23	Earth bonding for all the buildings as per SANS 10142 and the specification including 1.2 Earth spike x 6.	Sum	1	R	R
	<u>ELECTRICAL COMPLIANCE</u>				
	All work to comply to SANS 10142 Compliance certificate to be provided on completion. Pricing to include all necessary complete connection				
2.24	Certificate of compliance and all other testing required including 12 months guarantee	Item	1	R	R
	CARRIED TO SUMMARY				
	SUB-TOTAL TOTAL			R	R

26. BILL OF QUANTITIES

LANGLAAGTE STATION.

SCHEDULE OF QUANTITIES AND RATES / PRICE (S)

Item No.	Description	Unit	Qty	Rate/unit (Excl VAT)	Total Price (Excl VAT)
	Section 3				
	Preliminary and General				
3.1	All Preliminary and General applicable to this project	Sum	4	R	R
	Occupational Health and safety			R	R
3.2	Compliance with Occupational Health and Safety Act (Act 85 of 1993) and its regulations and with the Employers Health and Safety		38	R	R
	<u>ELECTRICAL WORKS</u>				
	<u>TICKET OFFICE</u>				
	Supply and fit Minimum: 5000-Watt off Hybrid inverter. Nominal DC 48V. Output voltage 230VAC 50Hz at 5000 Watts. Include all relevant cables, lugs, and ferrules as per manufacturer's specifications.	Sum		R	R
	Supply and fit 24V 100AH deep cycle Lithium-Ion battery pack, stand and side covers Include all relevant cables, bracket, lugs, and ferrules as per manufacturer's specifications	Sum		R	R
	Supply of 160Amp battery disconnect.	Sum		R	R
	Supply of 32 Amp AC Switch with a 63 Amp Change over Switch and Box.	Sum	1	R	R
	Sundries (Trunking and Clips, Lugs and Ferrules	Sum	1	R	R

	plus Nitto tape.)				
	Connect above system to DB.	Sum	1	R	R
	Supply and connect of Cable Run from DB to Inverter	M	50	R	R
	Supply and connect of Cable from Battery to Inverter	M	5	R	R
	Heavy duty lockable battery cabinet	Sum	1	R	R
	Battery fuse and holder	Sum	4	R	R
	PV Surge arrestor device	Sum	4	R	R
	Supply and fit 12-way surface mount distribution board. 63 Amps Earth leakage for AC protection, 20 Amp circuit breaker for plug socket protection x 2. PV modules isolator 20 Amps x 10. 3 x 63 Amps circuit breaker for batteries. Surge protection (SPD). Include all relevant cables, lugs, and ferrules as per manufacturer's specifications	Sum	1	R	R
	Battery fuse and holder	Sum	4	R	R
	<u>SOLAR</u>				
	Supply and fit PV Modules. Minimum: Peak power 455 Watts each PV modules to be fitted on top of galvanized stand (priced elsewhere) such that maximum solar radiation is absorbed by solar panel. Include all brackets, antivandal claps, cables, lugs, and ferrules as per manufacturer's specifications (Portrait Install)	Sum	8	R	R
	Supply and install of mounting Kits suitable for Corrugated Roof	Sum	1	R	R
	Supply and install DC Combiner DC 600V Box 2 In 2 Out	No.	1	R	R
	Supply of earth spike and cabling (Sans 60613) Regulations	Sum	1	R	R
	Supply of PV cable 6mm Red and Black Cable from	M	350	R	R

	Combiner box and Panels.				
	Sundries (Trunking, MC 4 Connectors, Hazard Stickers)	Sum	1	R	R
	Supply and connect of Cable Run from DB to Inverter	M	50	R	R
	Connect above system to Invertor.	Sum	1	R	R
	<u>EAR THING</u>				
	Earth bonding for all the buildings as per SANS 10142 and the specification including 1.2 Earth spike x 6.	Sum	1	R	R
	<u>ELECTRICAL COMPLIANCE</u>				
	All work to comply to SANS 10142 Compliance certificate to be provided on completion. Pricing to include all necessary complete connection				
	Certificate of compliance and all other testing required including 12 months guarantee	Item	1	R	R
	CARRIED TO SUMMARY				
	SUB-TOTAL TOTAL			R	R

<u>STATION</u>		<u>AMOUNT</u>
IKWEZI		R
INHLANZANE		R
LANGLAAGTE		R
	<u>SUBTOTAL</u>	R
	<u>VAT @ 15%</u>	R
	<u>GRAND TOTAL</u>	R