

List of Goods with minimum technical specifications

Delivery Schedule: Supply & Installation within 60 days from date of contract signing

1. Solar Panel 140 KWH Quantity 1 (for Lot 5)

	Item (Unit)	Technical Specifications	Estimated Quantity (No.)
1.1.	INVERTER 5 KW (Hybrid)	Nominal Output Power 5000 W	6
		Capacity Range (96% DoD) 5.7 / 11.4 kWh	
		IP Protection IP21	
		Warranty 5-Year	
		Max. input current (A)12X2 OR Above	
		Short circuit current (A) 14x2 OR Above	
		Max. Charge Current 100 A	
		Max. Discharge Current 100 A	
		Max. Charge/Discharge Power 5000 W	
		Rated Input/output Voltage 230 Vac	
		Minimum efficiency inversion: must be 95% MPPT	
		Grid Voltage Range 230 V (±2%)	
		Rated Frequency 50/60 Hz	
		Phase Backup Single-Phase/ Three-Phase	
		UPS Display LED & APP	
		Communication WiFi, RS485, CAN	
Humidity (No Condensing) 0% ~ 95%			
Pure sine wave			
1.2.	Inverter 110	Nominal Output Power 110000W	1
		Efficiency 98.2% to 98.6%	
		IP Protection IP21	
		Warranty 5 years	
		Max. Discharge Current 100 A	
		Rated Power 110kW	
		Operating voltage rang 200-1000V	
		Rated Input/output Voltage 1100V	
		Full-load MPPT voltage range 540-800V	
		Grid Voltage Range 380-440V	
		Rated Frequency 50-60Hz	
		Phase Backup Single-Phase/Three-Phase	
		Display (LED indicators, WLAN module + app, Bluetooth module + app, USB data cable + app)	
		Communication Wi-Fi, RS485, CAN	
		Humidity (No Condensing) 0% ~ 95%	
		Pure sine wave	
1.3.	POWER BACKUP	<u>BATTERY BANK SPECIFICATION</u>	06
		Compliance with Inverter have AC-Coupling with Built-in battery Modular design	
		Battery Type (Gel)	
		Module Capacity 5.4 kWh -5.7kWh	
		Usable Capacity 5.2 kWh or Above	
		Module Nominal Voltage Max. 48.0 V	
Short-circuit Current 200 A			
Cycle Life Max. 10 000 **			

		Charge/Discharge Current 56 A (105C)	
		External Battery Expansion 1 ~ 5 M4856-P / in parallel	BAT
		Warranty Minimum 5-Year	
		Certification UN38.3, IEC 62619 (Cell), IEC 62619 (Pack) or Equivalent	
1.4.	SOLAR PANEL (535 W)	SOLAR PANNEL FOR MINIMUM TIME SHIFT (5-6 HR) SUNLIGHT Cells Grade A+ ≥ 2.0mm Low NMOT: 42 ± 3 °C Low temperature coefficient (Pmax): -0.28 % / °C Shading tolerance with ±43% Minimum O/P Capacity PTC rating of up to: 93.13 % Heavy snow load 5000 Pa, Or Above wind load 2400 Pa* Or Above Heavy snow load up to 5400 Pa, wind load up to 3600 Pa* Cell Type mono-crystalline Cell Arrangement 144 [2 X (12 X 6)] Front Cover High transmissivity Low iron 3.2mm tempered glass Frame Anodized aluminum alloy, Cross bar enhanced J-Box IP68, Dual Efficiency with Absorption & reflection of dual band Material design , Connector T4 series Warranty 25-Year Certification ISO 9001:2015 / Quality management system ISO 14001:2015 / Standards for environmental management system UL 1703 / IEC 61215/IEC 61730 performance	262
1.5.	LOGGING / MONITORING MODULE Built in/Separate	DL-DMS (Logging and Monitoring) Ethernet with RJ-45 RS-485,RS-232 Modbus, USS, Sun Spec, Custom Protocols Irradiance and cell temperature sensors with RS-485 output. Energy meters/Multi-function meters with Modbus RTU protocol. Internet connectivity though GPRS. Portal connectivity with Wired LAN with internet connection if available. Supported Networks GSM/GPRS/2G/3G/4G.	1
1.6.	DISTRIBUTION PANNEL	AC/DC Power Distribution Panel Material Mild Steel IP Rating IP54 Phase Single Phase Voltage 230V Mounting Type Wall Mounted DC Breakers 5*50A AC Breakers 30*16A Phase Single Phase Input 1 Output 1 Short Circuit Protection Yes (For both inflow & Out Flow)	2
1.7.	PANNEL FRAMES	FRAME STRUCTURE Material GI (14 Gauge)/ C-Section (4*7.25)"/L-Section (4*4*3/4)" Weather Proof Rust free Size according to Solar Panels	262

		Mounting Accessories Galvanized/Stainless-steel (Bolts, Washers, Nuts) Frame Material and workmanship warranty 5 Years	
1.8.	ELECTRICAL CABLES	ELECTRICAL WIRES	
		Supply & Installation of 4mm Pure Copper 2 Core single PVC (Meter)	200 Meter
		Supply & Installation of 85mm Pure Copper 4 Core Wire	150 Meter
		Supply & Installation of 2.5mm Pure Copper 2 Core Single PVC (Meter)	300 Meter
		Supply & Installation of 10 mm Pure Copper Soft PVC (DC Cable) (Meter)	800 Meter
		Supply Earth Wire 6mm Copper with Silver Coating (Meter)	150 Meter
		Supply & Installation of 1.5mm Pure Copper 2 Core Single PVC (Meter)	250 Meter
1.9.	PVC	Mixed of Different Size (Ducts & Pipes) adamjee or eqv	840 Meter
1.10.	Earthing / Grounding	dimensions of 4" x 96" x 0.0625"	2 Jobs
		25-foot continuous length	
		6 AWG solid bare copper wire	
		ground plate is to be installed at depth of 15"	
		12" wide trench Copper Plate (Resistance <5 Ohm)	
		"recommended practice" of IEEE Standard 1100-1999	
		Power wiring (120 VAC or 240 VAC)	
1.11.	INSTALLATION SERVICES	SYSTEMIZATION	1 Job
		Installation, Testing & Commissioning of Solar Panel	
		Installation, Testing & Commissioning of Inverter With Backup & DMS Module	
		Installation, Testing & Commissioning of Distribution Panel	
1.12.		Delivery, Transportation, Residence & food As one unit Cost	1 job
1.13.	Civil Work	Solar Panel foundations etc. (wind speed 45 to 50 kmph i. Excavation in all type of soil (rates per M ³) ii. RCC concrete class (1:1.5:3) (rates per M ³) iii. Fabrication Steel G-40 (rates per Ton)	1 job
1.14.	Net meter	3 Phase	1 job

2. Solar Panel 40 KWH (Quantity 5) (for Lot 1-4 & 6)

Sr. No.	Item (Unit)	Technical Specifications	Estimated Quantity (No.)
2.1.	INVERTER 5 KW (Hybrid)	Nominal Output Power 5000 W	04
		Capacity Range (96% DoD) 5.7 / 11.4 kWh	
		IP Protection IP21	
		Warranty 5-Year	
		Max. input current (A)12X2 OR Above	
		Short circuit current (A) 14x2 OR Above	
		Max. Charge Current 100 A	
		Max. Discharge Current 100 A	
		Max. Charge/Discharge Power 5000 W	
		Rated Input/output Voltage 230 Vac	
		Minimum efficiency inversion: must be 95% MPPT	
		Grid Voltage Range 230 V (±2%)	
		Rated Frequency 50/60 Hz	
		Phase Backup Single-Phase/ Three-Phase	
		UPS Display LED & APP	
		Communication WiFi, RS485, CAN	
Humidity (No Condensing) 0% ~ 95%			

		Pure sine wave	
2.2.	20 KW	Nominal Output Power 110000W	01
		Efficiency 98.2% to 98.6%	
		IP Protection IP21	
		Warranty 5 years	
		Max. Discharge Current 100 A	
		Rated Power 110kW	
		Operating voltage rang 200-1000V	
		Rated Input/output Voltage 1100V	
		Full-load MPPT voltage range 540-800V	
		Grid Voltage Range 380-440V	
		Rated Frequency 50-60Hz	
		Phase Backup Single-Phase/Three-Phase	
		Display (LED indicators, WLAN module + app, Bluetooth module + app, USB data cable + app)	
		Communication Wi-Fi, RS485, CAN	
		Humidity (No Condensing) 0% ~ 95%	
Pure sine wave			
2.3.	POWER BACKUP	BATTERY BANK SPECIFICATION	04
		Compliance with Inverter have AC-Coupling with Built-in battery Modular design	
		Battery Type (Gel)	
		Module Capacity 5.4 kWh -5.7kWh	
		Usable Capacity 5.2 kWh or Above	
		Module Nominal Voltage Max. 48.0 V	
		Short-circuit Current 200 A	
		Cycle Life Max. 10 000 **	
		Charge/Discharge Current 56 A (105C)	
		External Battery Expansion 1 ~ 5 M4856-P / BAT in parallel	
		Warranty Minimum 5-Year	
		Certification UN38.3, IEC 62619 (Cell), IEC 62619 (Pack) or Equivalent	
2.4.	SOLAR PANEL (535 W)	SOLAR PANNEL FOR MINIMUM TIME SHIFT (5-6 HR) SUNLIGHT	75
		Cells Grade A+ $\geq 2.0\text{mm}$	
		Low NMOT: $42 \pm 3 \text{ }^\circ\text{C}$	
		Low temperature coefficient (Pmax): $-0.28 \text{ \% / }^\circ\text{C}$	
		Shading tolerance with $\pm 43\%$ Minimum O/P Capacity	
		PTC rating of up to: 93.13 %	
		Heavy snow load 5000 Pa, Or Above	
		wind load 2400 Pa* Or Above	
		Heavy snow load up to 5400 Pa, wind load up to 3600 Pa*	
		Cell Type mono-crystalline	
		Cell Arrangement 144 [2 X (12 X 6)]	
		Front Cover 3.2 mm tempered glass	
		Frame Anodized aluminum alloy,	
		Cross bar enhanced J-Box IP68,	
		Dual Efficiency with Absorption & reflection of dual band Material design , Connector T4 series	
		Warranty 25-Year	
Certification ISO 9001:2015 / Quality management system ISO 14001:2015 / Standards for environmental management system UL 1703 / IEC 61215 performance			

2.5.	LOGGING / MONITORING MODULE	DL-DMS (Logging and Monitoring)	2
		Ethernet with RJ-45	
		RS-485,RS-232	
		Modbus, USS, Sun Spec, Custom Protocols	
		Irradiance and cell temperature sensors with RS-485 output.	
		Energy meters/Multi-function meters with Modbus RTU protocol.	
		Internet connectivity though GPRS.	
		Portal connectivity with Wired LAN with internet connection if available.	
		Supported Networks GSM/GPRS/2G/3G/4G.	
2.6.	DISTRIBUTION PANNEL	AC/DC Power Distribution Panel	2
		Material Mild Steel	
		IP Rating IP54	
		Phase Single Phase	
		Voltage 230V	
		Mounting Type Wall Mounted	
		DC Breakers 5*50A AC Breakers 30*16A	
		Phase Single Phase	
		Input 1	
		Output 1	
		Short Circuit Protection Yes (For both inflow & Out Flow)	
2.7.	PANNEL FRAMES	FRAME STRUCTURE	75
		Material GI (14 Gauge)/ C-Section (4*7.25)"/L-Section (4*4*3/4)"	
		Weather Proof Rust free	
		Size according to Solar Panels	
		Mounting Accessories Galvanized/Stainless-steel (Bolts, Washers, Nuts) Frame Material and workmanship warranty 5 Years	
2.8.	ELECTRICAL CABLES	ELECTRICAL WIRES	
		Supply & Installation of 85mm Pure Copper 4 Core Wire	150 Meter
		Supply & Installation of 4mm Pure Copper 2 Core single PVC (Meter)	150 Meter
		Supply & Installation of 2.5mm Pure Copper 2 Core Single PVC (Meter)	225 Meter
		Supply & Installation of 10 mm Pure Copper Soft PVC (DC Cable) (Meter)	650 Meter
		Supply Earth Wire 6mm Copper with Silver Coating (Meter)	100 Meter
2.9.	PVC	Mixed of Different Size (Ducts & Pipes) adamjee or eqv	700 Meter
2.10.	Earthling / Grounding	dimensions of 4" x 96" x 0.0625"	1 Job
		25-foot continuous length	
		6 AWG solid bare copper wire	
		ground plate is to be installed at depth of 15"	
		12" wide trench Copper Plate (Resistance <5 Ohm)	
		"recommended practice" of IEEE Standard 1100-1999 Power wiring (120 VAC or 240 VAC)	
2.11.	INSTALLATION SERVICES	SYSTEMIZATION	1 Job
		Installation, Testing & Commissioning of Solar Panel	
		Installation, Testing & Commissioning of Inverter With Backup & DMS Module	
2.12.		Installation, Testing & Commissioning of Distribution Panel	
2.12.		Delivery, Transportation, Residence & food As one unit Cost	1 job
2.13.	Civil Work	Solar Panel foundations etc. (wind speed 45 to 50 kmph iv. Excavation in all type of soil (rates per M ³) v. RCC concrete class (1:1.5.3) (rates per M ³) i. Fabrication Steel G-40 (rates per Ton)	1 job
2.14.	Net meter	3 Phase	1 job

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Note:

1. *For Lot 5 Backup up to 30KW*
2. *For Lot 1-4 & 6 up to 20KW*

Required Certificates:

- 1) ISO certification
- 2) PEC codes:
 - a. BC-01 for steel frames
 - b. MR-06 for specialized fabrication and mechanical work
 - c. EE 04 for low voltage installation
 - d. CE 10 for general circuit work.
- 3) AEDB for solar system installer certification

Scope of work:

- i. Successful bidder is required to visit at site to locate suitable site for all installations.
- ii. Energy assessment.
- iii. Submission of complete set of drawing (Electrical, Civil, Mechanical)
- iv. Final BOQs on the basis of drawings
- v. Commissioning, installation as per approved BOQs
- vi. Uninterrupted Operations & Maintenance during a defect liability period.