P.S.R. ENGINEERING COLLEGE

(An Autonomous Institution, Affiliated to Anna University, Chennai)
Sevalpatti (P.O), Sivakasi - 626140.

(Project Code: DST/TMD/AMEST/2022/74(G) dated 23/05/2025)

Under

"Modeling, Testing and Optimizing Battery Management System for Sodium-Ion Battery Pack"

DST, Govt of India

Notice Inviting Quotations

Sealed quotations are invited from *bonafide* suppliers for supply of the following items.

Items

1. 48 V Sodium Ion Battery Pack (3kW) Setup	**– 3 Nos.**
2. 48 V Sodium Ion Battery Pack (8kW) Setup	**– 2 Nos.**
3. Battery Test Chamber (100 L Environmental Test chamber)	**– 1 No.**
4. 8kW DC Charger	**– 1 No.**
5. BMS Tester (24 channel Cell Simulator)	**– 1 No.**
6. 30 kW Solar power plant and charge battery pack with battery holder	**– 1 No.**
7. 3 – Wheeler Load Testing Equipment	**– 1 No.**

Bidding documents may be downloaded from the website (www.psr.edu.in) and bidders can submit quotations as per instructions in the document.

Last date of submission of bid is 10 days after publications up to **4.00 pm.**

24/9/25

Principal

PRINCIPAL
P.S.R.ENGINEERING COLLEGE
SIVAKASI-626 140.

(A. Code .....)

SECTION-I: General Conditions and Important Instructions for Bidders

1. Bidders are to submit the original tender documents with technical specifications and price details in sealed envelope to **The Principal, P.S.R. Engineering College (PSREC), Sevalpatti, Sivakasi – 626140, Tamil Nadu.**

2. Bidders are to submit Price Bid with Technical Specifications in a sealed envelope.

a) PRICE BID - giving full Prices in Indian Rupees (For items no 1,2,3) for

(a) Main Item/Equipment.

(b) Essential Accessories & Spares.

The contents of the envelope (Technical Bid / Price Bid) should be mentioned on its top. All the sealed envelopes should be placed in a common sealed envelope, superscripted with the Ref. Advertisement No. and date along with the bidder's name and address. Any deviation from the said process will result in disqualification of the particular bidder.

b) TECHNICAL BID – giving Detailed Specifications, International Standards, Catalogues, List of users & Technical Details / Operating Parameters, Pre – Installation, Requirements, payment terms, warranty, etc.

3. Bidders are to submit this tender document in original after accepting the terms and conditions.

4. Preference will be given to reputed indigenous manufacturers having proven track record with service and maintenance capability in Sivakasi, Tamil Nadu, India. Vendors are requested to visit the site to evaluate the appropriate costing.

5. Last date of receipt of tender by PSREC is 10 days after publications at 4.00 pm. Tenders received after 06.10.2025 04.00 PM will not be accepted under any circumstances. Tenders will be opened in the office of Principal, PSREC, Sivakasi – 626 140 on a date and time to be notified to the vendor. In case the college remains closed on the said date, tenders will be opened on next working day at 3.10 pm.

6. The Price Bid should clearly mention the price including the following:

- Ex Works Price Packing and Forwarding Charges, if any
- Freight and insurance, up to P.S.R. Engineering College, Tamil Nadu including loading and unloading charges.
- All taxes, duties, levies applicable, in INR

7. The manufacturer selected shall provide Training in operation and application of the Instrument for the funded project work to user at PSREC.

8. The equipments/items are to be supplied at the PSREC, Sivakasi, Tamil Nadu between 8.30 am and 4.30 pm from Monday to Friday except holidays. The bidders will be responsible for any breakage, damage or defect in the equipment detected subsequently.

9. For Indian purchase (This clause is applicable only for Indian purchase and not applicable for foreign purchase):

   All bills are to be accompanied by Order copies and Challan Receipt. The Order Number is to be noted on both the Challan and the Bill. Payment will be made on submission of Proper Bills, Challans etc., through the PFMS portal and no cash payment will be made under any circumstances.

10. All payments are subjected to statutory deductions as and when applicable.

11. For all items the warranty/ guarantee period should be at least 36 months from the date of commissioning. Warranty/ Guarantee for all the items supplied will be on 'all comprehensive' basis, i.e., including repairs, replacements, maintenance etc.
    Calibration / Test Certificate must accompany along with the equipment.
    Supply of equipment shall include installation, commissioning and demonstration.

12. The vendors quoting against this tender should have a proper track record internationally and should have supplied similar instruments to National Institute of repute (Document to be attached)

13. P.S.R. Engineering College, Sevalpatti, Sivakasi, reserves the right to accept/reject all or any of the tenders without assigning any reason whatsoever.

I/We accept the above terms and conditions. Signature of the Bidders with date and seal

SECTION – II: Technical Specifications

Technical Specifications

1) **Sodium Ion Battery Pack setup**

a. Performance Tester

Power supply	AC voltage 220V ± 10%,
Frequency	50Hz ± 10%;
Ambient temperature	10 ~ 45 ºC
Open circuit voltage 1	10 – 100V
Open circuit voltage 2	10 – 100V
AC internal resistance test	0 – 1000mΩ
Starting voltage	0 – 100V
End voltage	0 – 100V
Discharge current	0.1 – 60A
Discharge time	0 – 60 s
Over discharge current	4 – 200A
Overcurrent Delay	0 – 20 s
Short circuit protection delay	0 – 9999 μs
Starting voltage	10 – 100 V
End voltage	10 – 100 V
Charging current	0.1A – 20 A
Charging time	0 – 60 s
Charging overcurrent	4 – 20 A
Charging delay	0 – 20 s
NTC ID	0 -1000 kΩ
Sustainable output power	2 kW
Sustainable load power	10 kW
Serial Communication, Test Data	RS232, Excel

b. Sodium ion pack cells – 48V, 60 Ah, 3KWh – 3 Nos.

Nominal Voltage of the Pack	48 V
Nominal Capacity of the Pack	60 Ah
Dimension of the Pack (L×W×H)	460 × 330 × 175 mm
Pack Configuration	16s6p
No. of Cells	96
No. of Cells in series	16
No. of Cells in parallel	6
Nominal Voltage of the cell	3 V
Nominal Capacity of the cell	10 Ah
Cell Type	32140 cylindrical
Diameter of the cell	33.2±0.2 mm
Height of the cell	140.0±0.3mm

c. Sodium ion pack cells – 48V, 160Ah, 8KWh – 2 Nos.

Nominal Voltage of the Pack	48 V
Nominal Capacity of the Pack	160 Ah
Pack Configuration	16s1p
No. of Cells	256
No. of Cells in series	16
No. of Cells in parallel	1
Nominal Voltage of the cell	3 V
Nominal Capacity of the cell	10 Ah
Cell Type	32140 cylindrical
Diameter of the cell	33.2±0.2 mm
Height of the cell	140.0±0.3mm

d. AC Charger – 15 Amps 12 CH charger with charging BMS set

2) **Battery Test Chamber**

Chamber Construction	
Internal Dimensions (H × W × D)	**1100 × 800 × 800 mm** (0.704 m³)
Outer Dimensions	Approx. as per OEM design
Material	SS 304 inner, powder-coated outer
Insulation	High-density PU, 100 mm
Door	Single, front-opening, gasket-sealed, with observation window
Specimen Tray	Removable, SS, with **leakage collection tray**
Temperature System	
Range	–20 °C to +120 °C
Control Accuracy	±1 °C
Uniformity	±2 °C
Ramp Rate	5 °C/min (with 20 kg load)
Heating	Dry heater
Cooling	CFC-free, single-stage, semi-hermetic Bitzer compressor
Air Circulation	Forced air circulation
Alarms	High/low deviation alarm, over-temperature protection
Humidity System	
Control Range	10 – 95 % RH
Control Accuracy	±3 % RH
Humidification	Steam generator / ultrasonic
Dehumidification	Refrigeration-based
Control & Instrumentation	
Controller	Eurotherm microprocessor – based PID programmable controller
Display	Digital, 0.1 °C resolution
Programs	≥ 50 steps (ramp/soak)
Data Logging	USB/Ethernet export
Indicators	Tower lamp + hooter
Interlocks	Door interlock, over-temp shutdown

Electrical	
Power Supply	420 V, 50 Hz, 3-phase
Phase Protection	Minilec preventor
Safety	MCB, E-stop, earth leakage protection
Safety & Monitoring (Battery-Specific Upgrades)	
Feedthroughs (Power)	High-current copper bus bar / cable glands, rated ≥ **300 A, 100 V DC**
Feedthroughs (Signal)	Multi-pin sealed connectors for CAN, Ethernet, thermocouples, voltage sense
Gas Exhaust	SS duct port Ø150–200 mm, connected to **blower ≥1000 m³/hr**, vented to safe area
Overpressure Relief	Safety panel, 5 – 20 mbar
Gas Detection	H_2, CO, O_2 depletion sensors with alarm and chamber shutdown
Fire Suppression	Clean agent (Novec 1230 / CO_2) or external ducting
Camera System	Internal CCTV with external monitoring
Observation Window	Multi-layer, explosion-resistant glass
Specimen Tray	Leak-proof, with drip collection
Standards Compliance	IEC 62619, IEC 62133, UL 9540A (as applicable)
Certification & Calibration	
• Calibration certificate with **traceability to NABL standards**. • Safety compliance report as per IEC/UL battery testing standards.	

3) **DC Charger**

Input Voltage	170 – 280 V
Maximum Input Current Voltage	4.34 A @ 230 V AC
Input Voltage	47 – 53 Hz
Efficiency	> 90% @ 230 V AC
Power Factor	> 0.98 @ 230 V AC
THD	< 5% @ full load
Inrush Current	< 40 A @ 300 V AC
Output Voltage	40 – 60 V
Maximum Output Voltage	60 V
Output Current	15 A
Rated Power	900 W
Output Connector	Anderson/IEC/Type 2/ Higo / Chagori, etc.,
Communications	Standard (CAN 2.0 A/B)/1939
Dimensions	212 × 117 × 73 mm
Weight	2 kg
Warranty	12 Months or 20000 hrs whichever is earlier (As per agreed warranty terms/conditions)
Input Cable	1.5 sq.mm, 16 A, 250 V Power chord with length of 1 meter
Output Cable	2.5 sq.mm, 50 A, 600 V Anderson Connector
Earth Leakage Current	< 3.5 mA

4) **BMS Tester:**

No. of Channels	24
Channel voltage	5 V
Channel current	10 A
Input power	3 phase AC 380 V ± 10% /50 Hz/single – phase AC 220 V ± 10% /50 Hz
Maximum Input power	1 kW
Charging voltage range	0 V to 5 V
Discharging voltage range	0.8 V to 5 V
Voltage resolution	16 bit AD, DA
Accuracy	± (0.05%RD + 0.05%FS)
Current range	0 A to 10 A
Minimum current range	0.02 A
Current resolution	16 bit AD, DA
Accuracy	± (0.05%RD + 0.05%FS)
Maximum output power for a single channel	50 W
Charge modes	CC, CV, CCCV, CP, CR
Discharge modes	CC, CP, CR
Communication interface	RJ 145, 10M 1000 M adaptive

5) **30 kW Solar Plant and Inverter:**

System Capacity	30 kW (30,000 Watts)
Panel Type	Monocrystalline (preferred for higher efficiency)
Panel Wattage	550W or 600W per panel (common sizes in 2024-2025)
No. of Panels	~50 to 55 panels (e.g., 55 × 550W = 30.25kW)
Efficiency	20% to 22%
Voltage at Max Power (V_{mp})	40 – 48V
Current at Max Power (I_{mp})	11 – 13A
Open Circuit Voltage (V_{oc})	48 – 55V
Short Circuit Current (I_{sc})	12 – 14A
Temperature Coefficient	-0.35% to -0.4% / °C
Panel Dimensions	~2279 × 1134 × 35 mm
Weight	~28 kg per panel
Mounting	Ground or roof-mounted (tilted or tracking optional)
Lifespan	25–30 years (performance warranty)
Inverter	
Inverter Type	String inverter
Rated AC Output	30kW (3-phase, 400V)
Max DC Input Voltage	~1100V DC
MPPT Inputs	2 – 3 MPPTs with multiple strings
Max Efficiency	≥ 98.5%
Cooling	Natural / Fan / Smart cooling
Protection Features	Anti-islanding, ground fault, surge, etc.
Communication	Wi-Fi / RS485 / Ethernet / App
Certifications	IEC 61727, IEC 62116, CE, ISO
Other Components	

Mounting Structure	Aluminum / GI for roof/ground mount
Cabling	DC solar cable (4 – 6 mm²), AC cable
Protection Devices	DC MCB, SPD, MCCB, AC isolators
Combiner Box	DC string combiner box
Monitoring System	Integrated with inverter or external data logger
Battery Bank (optional)	For off – grid/hybrid (e.g., Lithium or Lead – acid)
System Requirements	
Total System Size	30,000W (30kW)
Panels Used	550W × 55 units
Inverter	30kW, 3-phase, string inverter
MPPT Inputs	2 – 3
Energy Output/Day	~120 to 150 kWh/day (based on 4 – 5 peak sun hours)