

TECHNICAL SPECIFICATIONS AND OTHER ALLIED REQUIREMENTS

SI No.	Description of items	Quantity
PUR/196/ERT/CK/E/2021-22		
1	SUPPLY, INSTALLATION AND COMMISSIONING OF GRID FORMING CONVERTER SYSTEM FOR MICROGRID (DETAILED SPECIFICATION AS PER ANNEXURE – I)	1 No.

1. DELIVERY, INSTALLATION & COMMISSIONING :

- 1.1. The ordered goods are to be delivered, installed, commissioned, demonstrated at CSIR-CMERI, Durgapur within 08 (eight) weeks (56 days) of receipt of Purchase Order. Installation should be carried out only by expert engineers of Supplier / Manufacturer..

2. WARRANTY

- 2.1. The warranty shall be as mentioned in the Annex. – I effective from the date of successful installation and commissioning and acceptance of the ordered Goods / System.

3. PERFORMANCE SECURITY

- 3.1 03 % (three percent) of the Invoice value valid till 2 months beyond the warranty period.

4. PAYMENT TERM

- 4.1 **100%** Payment shall be released within 30 days of delivery, Installation & Commissioning, Demonstration and Acceptance of ordered goods and after submission of Performance Security.

5. Bid Securing Declaration (Form-4) is to be submitted by the Bidder as per the format prescribed in the tender document.
6. Optional items will not be considered for price evaluation.
7. Submission of Manufacturers Authorization Form (Form-2) in the prescribed format shall be mandatory for NON-OEM bidders.

Annexure – I

Grid Forming Converter System for Microgrid

I. Application:

A three phase Grid forming converter system to handle 75 kVA or more continuous load demand is required for operating an independent islanded/grid connected Microgrid. This system should have an integrated energy storage system with nominal capacity of at least 65kWH and form a three phase 50Hz, 415V pure sine wave local Microgrid. This system has to integrate with the existing 48.75 kWp On-Grid Solar PV plant and its On-Grid Inverters with a compatible communication and control system. Provision should be there for the extension of this existing solar PV capacity up to 100 kWp in future. Also the grid forming converter system has to integrate the other sources of energy like Diesel/Biogas generator in DC/AC coupling mode to the Microgrid. It should be tolerant to the fluctuations in output voltage or frequency of these generators to a certain permissible limit as mentioned in the detailed specification.

II. Salient Features: -

- 1) The System must be capable of supplying AC power to the household loads like Fans, Lights, Air Conditioners, Geysers, home electronic appliances, small capacity pumps (with rating up to 2 HP, max. 03 nos.), etc. upto a deliverable continuous load of 75 kVA or more in both On-Grid and Off-Grid modes of operation.
- 2) Integration with the existing 48.75 kWp Solar ON Grid System with a provision for integration of another 50 kWp Solar PV plant (Total:100 kWp, max.) in future.
- 3) On-Grid and Off-Grid mode of operations with provision for connecting an AC Generator (Diesel/Biodiesel/Biomass).
- 4) Compatible with battery bank made from Solar Tubular Lead Acid batteries.
- 5) Seamless switching between On-Off grid.
- 6) GUI based data monitoring/local display system with capability of data logging and display of at least 01 week of data.
- 7) Customized program control support to achieve the desired mode of operations and setting the priority of various energy sources, like PV, Grid, Battery, DG etc.
- 8) Modular and Plug & Play System.
- 9) All necessary inbuilt protection in DC & AC side with MCB's on battery side and MCCB's on AC side to discard the requirement of additional DCDB/ACDB.
- 10) Capable of handling fluctuations in voltage amplitude and frequency as mentioned in the detailed specification.
- 11) The supplied system must consist of minimum 02 nos. of power modules and must be able to operate with 01 power module in case of failure. The power modules must be modular and swappable type for case of replacement and maintenance.
- 12) The supplied system must have the capability to operate with 100% phase-phase imbalance continuously without tripping.
- 13) Indoor type installation with IP31 or better.

III. Detailed Specification: -

A. Integration of existing Solar PV System (Compatibility through proper communication system): -

- 1) Installed Capacity: 48.75 kWp, 150 x 325 Wp
- 2) Provision for extension of capacity: upto 100 kWp
- 3) No. of Independent MPPT: 03 or more
- 4) ON Grid Inverter: 50 kW, 3 Phase Solar On-Grid Inverter (Make: ABB, Model No: TRIO-50-TL)

B. Storage (Deliverable): -

- 1) Deliverable storage capacity: Minimum 65 kWh
- 2) Nominal Battery Voltage Range: 480VDC-528VDC
- 3) Operating Voltage Range: 450VDC-620VDC
- 4) Capacity: ≥ 60 Ah @ C 10
- 5) Battery type: Solar Tubular Flooded Lead Acid Battery
- 6) Maximum battery charging current: 40 Amp or more, Bulk and Float voltage values must be Adjustable.
- 7) Battery bank must be provided with suitable cables, connectors and other necessary accessories

C. Generator and Utility Grid (Compatibility): -

- 1) Three phase four wire connection
- 2) Nominal AC input voltage = 3 Phase, 4 Wire, 415 V, 230V/phase
- 3) Acceptable AC input voltage range for proper operation = Minimum value ≤ 180 V/phase & Maximum Value ≥ 270 V/phase
- 4) Nominal input frequency = 50Hz
- 5) Input frequency tolerance for proper operation $\geq \pm 4\%$ (minimum)
- 6) Frequency Tolerance via generator input: $\geq \pm 10\%$ (minimum)

D. Output Load (Compatibility): -

- 1) Output: Three Phase 4 Wire, 415V, 50Hz
- 2) Connected Load Types: 1 Phase or 3 Phase
- 3) Rated load power ≥ 75 kVA
- 4) Nominal AC output voltage per phase = 230V
- 5) Nominal output frequency = 50Hz
- 6) Permissible unbalanced phase to phase load = 100%

E. Protection:-

- 1) Overvoltage and Overcurrent protection at both AC & DC input and output sides.
- 2) Surge Protection Device (SPD) on each of MPPT channel input, utility grid and output load.

- 3) On-load disconnection with current protection on battery input via a Switch Fuse Unit (SFU).

F. Environmental & General Requirements: -

- 1) Operating ambient temperature range = Maximum Value $\geq 50^{\circ}\text{C}$
- 2) No derating of output power is allowed below 45°C and above that at a maximum rate of 1% per degree centigrade
- 3) Ingress Protection IP31 or better
- 4) Warranty: 05 Years or more
- 5) Wall mountable/Free standing panel

G. User Interface & Remote Monitoring: -

- 1) Graphical display for control & monitoring
- 2) Communication provision for parallel operation with other similar units

IV. Scope of Supply & Incidental Services: -

1. Supplier must supply the complete system (**Grid Forming Converter for Microgrid to handle 75 kVA or more load demand with integrated energy storage system of capacity 65 kWh (minimum), with all necessary interfacing cable and connectors required for converter and energy storage as per the detailed specification, and scope shown in Figure 1**) fulfilling all the technical requirements at the site i.e. CSIR-CMERI Durgapur, West Bengal
2. Supplier must also successfully perform the installation & commissioning of the system by means of deputing trained engineers at the site location.
3. Supplier must inform in advance, the requirements at site from client's side to ensure timely and successful installation & commissioning of system.

V. Acceptance Test: -

After delivery of the system, supplier must also successfully perform the installation & commissioning of the system by means of deputing trained engineers at the site location. Supplier must demonstrate the working of the installed system as per the desired features at the installation site.

VI. Qualification Criteria: -

1. Supplier must submit technical literature along with datasheets, explaining in detail how the required functionalities and specifications will be fulfilled by the proposed system.
2. Bid documents which merely provide compliance statements mentioning that all the required specifications and functionalities are fulfilled, without attaching proper supporting technical literature, will not be accepted.

3. Supplier must have supplied at least one system with similar functionalities at a power rating of 50kW or above to any of the Government/Private Sector organizations, during last three years. Relevant purchase order copies from end users are to be attached with the technical bid as documentary evidence.

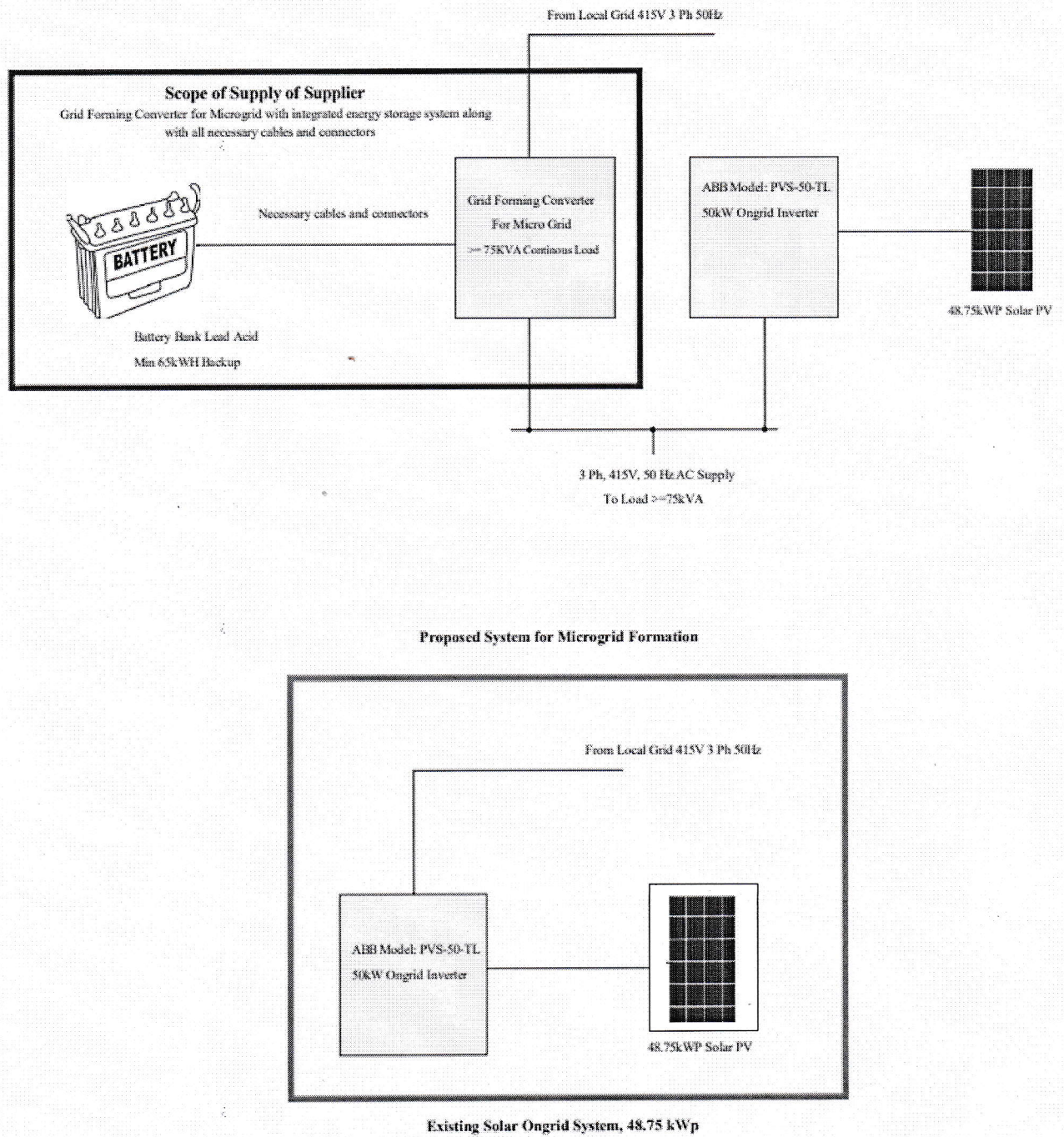


Figure 1. Scope of Supply