Annexure – I

Controlled Power Conditioning and Conversion System

I. Application:

Faithful integration of the Bioenergy generated from the biomass generator, having fluctuation in frequency with the existing Solar PV system, Battery Bank, Utility Grid and Three Phase Motor Load. The detailed specification of the overall system is mentioned below.

II. Salient Features: -

1) Solar PV Capacity: 15 kW (Rated Power), Allowable Input Power: 20 kW or higher
2) Nominal voltage of battery bank = 48VDC (VRLA)
3) Charging Current of Battery: Adjustable 10A-200A or wider range
4) Compatible with battery bank made from Solar Tubular Flooded Lead Acid batteries
5) Three Phase load of rated capacity of at least 14 kW or higher
6) Biomass generator integration capacity of at least 15kW
7) Transformer-less Power Converter and Conditioning System
8) Remote monitoring capability of system parameters must be provided. The remote monitoring unit must satisfy at least the following requirements.
    a) LAN/WiFi/GSM SIM card based data transfer to server.
    b) Web portal based data access by user.
    c) Data to be recorded at sampling period of 15 minutes or less.
    d) At least last 30 days of data must be accessible and downloadable (in CSV format) from web portal.
    e) Parameters to be recorded: - Voltage, Current and Power of Solar PV, Battery Bank, Diesel Generator (all three phases), Utility Grid (all three phases), Load (all three phases). The parameters which are specific to each of Independent Three Phase Standalone units and common parameters for the complete system must be recorded.
9) The system offered must be modular, scalable and capable of supporting increase of loads in future. The system must allow addition of more number of Independent Three Phase Standalone units to the already existing units. The system should be scalable to increase the power capacities (in future) of different components as following :
    a) Solar PV integration capacity of at least up to 100kWp
    b) Three phase load of rated capacity of at least up to 80kW
    c) Biomass generator integration capacity of at least up to 80kW
10) The system offered must be capable to perform following functionalities.
    a) Operational capability for On and Off grid conditions.
    b) Seamless transition of power from one source to another.
    c) Configurable control functions to set the usage priority of different sources. Default setting must give highest priority to Solar PV for supplying load power and battery bank is to be charged with excess solar power.

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d) Remote start/stop of Biomass generator (with Automatic Mains Failure control panel) based on the battery bank charge levels.
e) Option to enable/disable charging of battery bank from diesel generator and utility grid (only one of either diesel generator or utility grid will be used at a time).
f) Provision of export of excess solar power to grid must also be provided.

III. Detailed Specification: -

Solar PV:-

1) Maximum allowable PV input DC voltage ≥ 900VDC
2) MPPT voltage range = Minimum value ≤ 410V & Maximum Value ≥ 750V
3) Start-up voltage ≤ 330V
4) Initial feed-in voltage ≤ 360V
5) Number of independent MPPT channels ≥ 2Nos.
6) Number of PV input pair per MPPT channel ≥ 2Nos.
7) Maximum allowed input current per MPPT channel ≥ 18A
8) Maximum PV input power ≥ 20kW

Battery Bank:-

1) Nominal voltage = 48VDC
2) Battery type = Solar Tubular Flooded Lead Acid Battery
3) Maximum battery charging current (Range: 10A-250A or higher), Bulk and Float voltage values must be Adjustable.

Biomass Generator And Utility Grid: -

1) Three phase four wire connection
2) Nominal AC input voltage = 3 Phase, 4 Wire, 400 V, 230V/phase
3) Acceptable AC input voltage range for proper operation = Minimum value ≤ 180V/phase & Maximum Value ≥ 270V/phase
4) Nominal input frequency = 50Hz
5) Input frequency tolerance for proper operation ≥ ± 4%
6) Frequency Tolerance via generator input: ≥ ± 20%

Output Load: -

1) Load Type: 3 Phase Inductive
2) Rated load power ≥ 14kW
3) Nominal Output Current: ≥ 21A
4) Nominal AC output voltage per phase = 230V
5) Nominal output frequency = 50Hz
6) Permissible unbalanced phase to phase load = 100%

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.

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

Environmental & General Requirements:-

1) Operating ambient temperature range = Maximum Value ≥ 50°C
2) No derating of output power is allowed below 45°C and above that at a maximum rate of 1% per degree
3) Ingress Protection ≥ IP21
4) Warranty ≥ 2 years
5) Wall mountable

User Interface & Remote Monitoring:-

1) Graphical display for control & monitoring
2) Remote monitoring capability as mentioned above
3) Communication provision for parallel operation with other similar units

Scope of Supply & Incidental Services:-

1. Supplier must supply the complete system fulfilling all the technical requirements at the site i.e. CSIR-CMERI Durgapur, West Bengal
2. Supplier must also provide support for successful 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.

Acceptance Test: -

After delivery of the necessary components of the system, supplier must also provide support for successful installation & commissioning of the system by means of deputing trained engineers at the site location.

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 15kW or above to any of Government/Private Sector organizations, during last two years. Relevant purchase order copies from end users are to be attached with the technical bid as documentary evidence.

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