**ANNEXURE TB: TECHNICAL PARAMTERS OF BESS**

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Description** | **Details to be furnished** |
| **A** | **Battery** |  |
| 1 | Make/Manufacturer |  |
| 2 | Type/Chemistry |  |
| 3 | Design capacity of battery in terms of KWh |  |
| 4 | Self-Discharge rate |  |
| 5 | DoD |  |
| 6 | Life cycle of battery |  |
| 7 | Round trip efficiency |  |
| 8 | Dimensions and weight of battery |  |
| 9 | Test certificate available for battery cell/module (IEC Standards |  |
| 10 | Number of series & parallel connected cells and modules |  |
| 11 | Power/energy rating cells and modules |  |
| 12 | BESS favorable operating temperature |  |

|  |  |  |
| --- | --- | --- |
| **B** | **Power Conditioning Unit** |  |
| 1 | Make/manufacturer |  |
| 2 | Type of charge controller (DC-DC converter) |  |
| 3 | Inverter -power rating & efficiency |  |
| 4 | Inverter minimum response time |  |
| 5 | Test certificate available (IEC Standards) |  |
| **C** | **Measurement and control Devices** |  |
| 1 | Sensors |  |
| 2 | Sensitivity Type/Make |  |
| 3 | Accuracy/Precision |  |

**BATTERY STATIC PARAMETERS:**

|  |  |
| --- | --- |
| **DETAILS** | **TECHNICAL REQUIREMENT** |
| **AC RATINGS** | |
| Total rated output power to load@ nominal voltage(charge) MW to (discharge) MW |  |
| Apparent power @nominalvoltage |  |
| No of units |  |
| Rate output power of each unit |  |
| Real and reactive power control accuracy (%) |  |
| Voltage range |  |
| Type of output |  |
| Frequency (Nominal Frequency and the tolerance band) |  |
| VAR production (full MVAR production at rated Voltage) |  |
| Harmonics (asper CEA standards) |  |
| **DC INPUT RATINGS** | |
| Voltage range |  |
| Ripple voltage |  |
| Ripple current (% of full current peak to Peak) |  |
| **ENVIRONMENTAL RATINGS** | |
| Operating temperature |  |
| Humidity |  |
| **FUNCTIONS/ FEATURES** | |
| Power flow operation (Support four -quadrant control) | Yes /NO |
| Real power control (Positive and negative) | Yes /NO |
| Reactive power control (capacitive and inductive) | Yes /NO |
| Combination of real and reactive power control (priority real power) | Yes /NO |
| Load following (renewable smoothing) | Yes /NO |
| Low-voltage & High Voltage ride through compliance | Yes/NO |
| Synchro-check and Remote synchronization function | Yes/NO |
| **OPERATION MODES** | |
| Black start enabled (external command) | Yes /NO |
| Commanded power (external command) | Yes /NO |
| Commanded VAR (external command) | Yes /NO |
| Frequency regulation | Yes /NO |
| Frequency response (Automatic) | Yes /NO |
| Islanding | Yes /NO |
| Renewable smoothing (if applicable, automatic) | Yes /NO |
| Scheduled power (preconfigured time/date of work power profiles | Yes /NO |
| Voltage regulation | Yes /NO |
| Response time of PCS to the command received (Milli seconds) |  |
| **COMMUNICATIONS** | |
| Communications with LDC (main/standby) | Yes /NO |
| **BATTERY TECHNOLOGIES** | |
| Battery technologies supported (Ex Li-Ion etc..) |  |
| Battery Cycle life | >4,000at20-80%SOC |
| Voltage Regulation (%) |  |
| Reactive Power Regulation (Var flow level Range +/-example+/-5%)) |  |
| Frequency Regulation(+/\_cycle/second) |  |
| Capacity (Ah) |  |
| Power factor |  |
| Battery temperature(average/extreme) |  |
| Overload capability (%) and Switching frequency (in kHz)  State of Charge (SOC) |  |
| **PROTECTION SYSTEM** | |
| Under/overvoltage (DC and AC) |  |
| Under/over frequency |  |
| Overcurrent protection |  |
| Ground fault protection |  |
| Overheat protection |  |
| Surge protection (DC and AC) |  |
| Automatic AC & DC open circuit when fault detection |  |

**Signature of Authorized Representative**

**(not below the rank of Assistant General Manager or equivalent)**

**Date:**

**Place:**