



Ref No: IIT/EE/SMART CITY/HYBRID INVERTER AND BATTERY SET/2016/01

To,

**INVITATION FOR QUOTATIONS FOR SUPPLY OF THE FOLLOWING ITEMS
REQUIRED FOR SMART CITY PILOT PROJECT AT IIT KANPUR**

S.No.	Brief Description of the Goods	Specifications	Qty.	Delivery Period	Place of Delivery	Installation Requirement if any
1.	Hybrid Inverter 5kVA	Mentioned below	4	6 Weeks	Department of Electrical Engineering IIT Kanpur 208016	Installation & integration with DB, is in the scope of bidder
2.	Battery Set (For continuous backup of 4 hrs equivalent to 22,222Wh.)	Mentioned below	4			

SYSTEM DESCRIPTION:

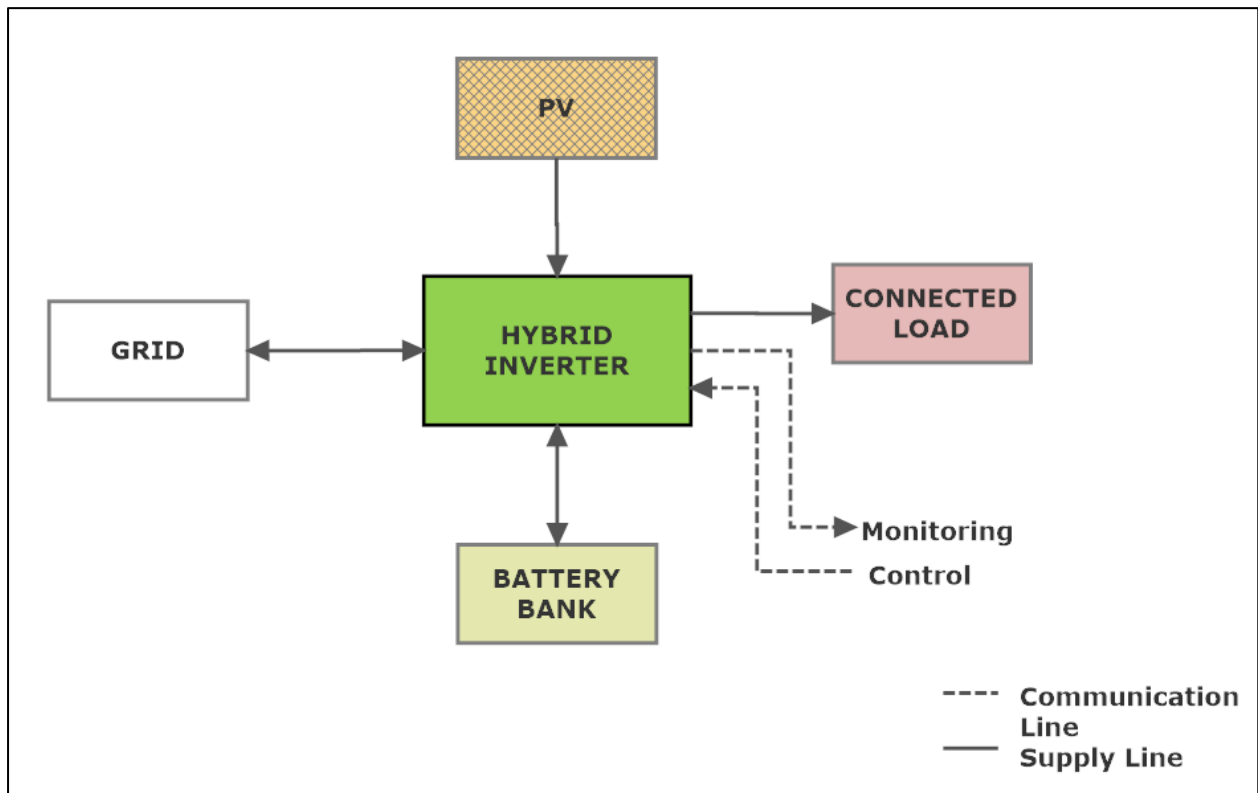


Fig 1: System Architecture

The Fig 1 shows the system components and their possible connections. Following are the possible Power transfer modes:

1. Grid to Load:
Power is fed from Grid to the connected AC loads.
2. Grid to Battery:
If the battery is discharged and grid is available, battery to be charged from grid. This mode should be allowed to enable/disable using software command.
3. Battery to load:
On occurrence of grid failure/unavailability, battery bank feeds power to the connected AC loads.
4. Battery to Grid:
In this mode battery bank feeds power to grid through Inverter based on the software command. Availability of selectable power level would be preferred.



5. PV to Battery:

If battery charge is low, and solar PV is available, battery should be charged from solar PV.

6. PV to Grid:

In this mode PV power is fed to the grid. In case grid is not available, excess PV power is to be supplied to the loads.

Local and Remote Monitoring, and control command is to be provided through the communication interface. The communication interface communicates and send command to inverter to control Battery discharge/charge.

DETAILED SPECIFICATIONS OF HYBRID INVERTER AND BATTERY SET

The Technical Specifications are tabulated below:

Table 1: Inverter Specifications

Item	Unit	Specification	Remarks
Input (Power drawn from the PV)			
Max. Power	W	5000	
MPPT Range	V	195-450	
Max. DC Voltage	V	500	
Max. DC Current	A	10 x 2	
MPPT Tracker		1 or more	
Input (Power drawn from the grid)			
Nominal Voltage	V	230	
Frequency	Hz	50 ± 5	
Voltage Range	V	205-260	
THDi	%	≤5%	THD of current drawn by the inverter to charge the battery
Power Factor		>0.95	Power factor of current drawn by the inverter to charge the battery
Input (Battery Discharging)			
Nominal Battery Voltage	V	48/96	
Output (Battery Charging)			
Nominal Voltage	V	48/96	
Max. Charging Current (from PV)	A	≥100A for 48Vnom ≥50A for 96Vnom	
Max. Charging Current (from AC)	A	≥50A for 48Vnom ≥25A for 96Vnom	



Temp. Compensation		Required	
Charging Method		Should ensure long battery life	
Output (Power supplied to the load)			
Continuous Power	W	5000	
Voltage	V	220/230	
Nominal Frequency	Hz	50	
Frequency Range	Hz	50 ± 0.5	For battery supplying to loads
Max. Continuous Current	A	>=22	
THDV (Linear Load)	%	<=5	
Load Power Factor		0-1, lagging or leading	
Air Conditioner Operation		Able to start and continuously run air conditioner of 1.5 ton	
Overload Cap. & Time		115%, 60 Seconds	
		150%, 30 Seconds	
		200%, 10 Seconds	
Output (Power fed to the grid)			
Grid Voltage Range	V	205-260	
Current Waveform		Pure Sinusoidal	
THDi	%	<=5%	THD of the current when power is supplied to the grid from PV and/or battery
Power Factor		>0.95	Power factor of the current when power is supplied to the grid from PV and/or battery
Efficiency			
Peak Conversion η (PV to grid)	%	>=95	
Peak Conversion η (BAT to grid)	%	>=90	
Peak Conversion η (BAT to load)		>=90	
Peak Conversion η (PV to Load)		>=95	
Peak Conversion η (PV to BAT)		>=90	
Peak Conversion η (Grid to BAT)		>=90	
Transfer Time (Grid<->Battery)	ms	<15	
Standby Power	W	<15	
Protection			
AC Output Overcurrent		Battery Overcurrent	
Battery Reverse Polarity		Deep Discharge	
Overload		PV Reverse Polarity	



Design Regulation			
Enclosure		IP20 or higher	
Display			
Display Type		LCD or equivalent	
Display Information		Instant frequency, load and PV power	
Communication			
Ports		Ethernet/LAN/Wi-Fi	
Monitoring		Local as well as Web based remote monitoring and control	
Control		Control of charge/discharge of battery supply to/from grid	
Software		Monitoring and Control Software to be provided by supplier	Compatible to Windows or Android
Monitoring Information		Daily Energy (Consumed and Supplied), Battery SoC, Load Power, Grid voltage and frequency, mode of operation of Inverter	
General			
Ambient Temperature Range		0°C-55°C	
Alarms		Overload, battery discharged, fault	
Technology		DSP/micro-controller based controller IGBT/MOSFET based power stage	
Acoustic Noise	dB	<50	
Warranty	Years	≥3	Inverter must have replacement warranty for a minimum period of 3 years . Warranty should include labor, component, transport and other charges.



Table 2: Battery Specifications

Total Backup time	4 Hrs. at least
Total Watt Hour Required	22,222.00
Battery AH and voltage	(The rating and number of batteries may vary keeping the total Watt Hour requirement, backup time and other details same.)
Battery type	Sealed Maintenance Free (SMF) Battery (comply C10 ratings)
Preferred battery make	Exide, Quanta, Panasonic, Amaron, Amara Raja
Mechanical Structure	Metal Stand/Rack required to house batteries is within the scope of bidder
Warranty	Batteries must have replacement warranty for a minimum period of 3 years. Warranty should include labor, component, transport and other charges.



2. General Terms & Condition

1. The scope includes:

- a) Supply of Inverter and Battery Set for smart home system under smart city pilot project at IIT Kanpur.
- b) Open source code availability for future modification for R&D and installation support services.
- c) Installation and commissioning of Hybrid Inverter at different node points and it must be considered while quoting.

2. Bid Price

- a) The contract shall be for the full quantity as described above. Corrections, if any, shall be made by crossing out, initialing, dating and re writing.
- b) All duties, taxes (including sales tax) and other levies payable on the raw materials and components shall be included in the total price, Except Central Excise Duty & CDEC (custom duty), as IIT Kanpur is exempted from this duty.
- c) The rates quoted by the bidder shall be fixed for the duration of the contract and shall not be subject to adjustment on any account.
- d) The Prices shall be quoted in Indian Rupees only.
- e) The service tax has not to be included into rate. It will be reimbursed by the institute as per reverse mechanism.

3. Each bidder shall submit only one quotation.

4. Criteria of Eligibility

- a) The supplier has turnover of 100% of the value for last 3 financial years.
- b) Authorization from manufacturer:
In the case of a bidder offering to supply goods under the contract which the bidder did not manufacture or otherwise produce, the bidder has been duly authorized by the goods manufacturer or producer to supply the goods in India.
- c) Details of the experience of supplying similar equipments during the last 2 years.

5. Validity of Quotation

Quotation shall remain valid for a period not less than 90 days after the deadline date specified for submission.

6. Evaluation of Quotations

Note: The bidder has to submit their quotation/offers in two envelopes.
One envelope will contain technical particular/technical bid (please see Table 1-2).
The second envelope will contain the quoted offers/financial bid (please see Table 3).



Quotations of bidders will be evaluated only if they:

- a) Are properly signed by the respective Authority.
- b) Conform to the terms and conditions, and specification.
(But mere claim compliance will not be considered for technical evaluation. Detailed technical datasheet/ product brochure must accompany each bid to be considered for technical evaluation.)

Vendors will be shortlisted for opening of their quoted offers/financial bid only if they meet the specification after the evaluation of technical bid.

7. Award of contract

1. The Purchaser will award the contract to the bidder whose quotation has been determined to be substantially responsive (includes technically suitable) and who has offered the lowest evaluated quotation price.
 - 7.1.1 Notwithstanding the above, the Purchaser reserves the right to accept or reject any quotations and to cancel the bidding process and reject all quotations at any time prior to the award of contract.
 - 7.1.2 The bidder whose bid is accepted will be notified of the award of contract by the Purchaser prior to expiration of the quotation validity period. The terms of the accepted offer shall be incorporated in the purchase order.
2. Payment shall be 75% against the delivery, 15% against the installation and 10% after final completion.
3. Delivery period should not be more than 6 Weeks and delivery should be at IIT Kanpur. The Penalty @1% per week or part there of subject to max 10% of the delivery price will be deducted from the balance payment, if supply is not completed within stipulated period.
4. You are requested to provide your offer latest by **3:00PM** on **10.09.2016**
5. Technical bid clarification date is scheduled on **16.09.2016** at **3:00 PM** in Dept. of Electrical Engineering meeting room, IIT Kanpur.
6. Technical bid will be opened on **13.09.2016** at **11.00 AM** in Dept. of Electrical Engineering meeting room, IIT Kanpur.
7. Financial bid opening is scheduled on **19.09.2016** at **03.00 PM** in Dept. of Electrical Engineering meeting room, IIT Kanpur.
8. We look forward to receiving your quotations/tender and thank you for your interest in this project.



Table: 3 FORMAT OF QUOTATION/TENDER

Sl. No.	Description Goods	Specifications	Qty.	Unit	Quoted Unit Rate in Rs.	Total Amount (in Rs.)	
						In Figures	In Words
1.	Hybrid Inverter 5kW	As per Table 1	4	No.			
2.	Battery Set (For continuous backup of 4 hrs equivalent to 22,222Wh.)	As per Table 2	4	No.			

Gross Total Cost: Rs

We agree to supply the above goods in accordance with the technical specifications for a total contract price of Rs..... (amount in figures) (Rs. amount in words) within the period specified in the Invitation for Quotations.

We also confirm that the normal commercial warranty/guarantee as mentioned in the specifications shall apply to the offered goods.

Signature of Supplier



Certificate

Certified that all the information/parameters indicated above shall stand all the standard tests and will be within the variation of current/voltage frequency and climatic conditions specified therein.

Signature

Bidder Name

Designation



SPECIAL DOCUMENTS

1) Authorization from Manufacturer

In the case of a Bidder offering to supply goods under the contract which the Bidder did not manufacture or otherwise produce, the Bidder has been duly authorized by the goods' Manufacturer or producer to supply the goods in India.

2) Proof of Manufacturing and past performance.

Details of experience and past performance of the bidder on equipment offered and on those of similar nature within the past one years and details of current contracts in hand and other commitments.

3) Details of last 3 years turnover of the bidder.