



Techno Commercial Proposal for Capex
1000.45KWp Solar PV Grid Connected Project
At
"Boond Renewable Energy Private Limited"
Delhi, India

Prepared By:
Boond Engineering and Development Pvt. Ltd.

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Boond Engineering & Development (P) Ltd.

Boond is a leading name in solar rooftop who has crossed installation of more than 2000+ rooftops successfully across India. From its initial journey as a social enterprise, it covered a long way to venture into the commercial solar projects and made phenomenal progress in both Capex & Opex fields across Northern India. Boond is gradually expanding its base to Eastern & Northeast India for both Government & private sector. The international presence is felt with the footprint in Bangladesh & Singapore, where the company has order book of nearly 20 MW for execution in coming days. The company also provides array of Consultancy in various domains of solar projects in African countries from its representative office in Canada

Boond Solar is also driven by its social mission to serve the underserved. At Boond Solar, we realize how energy access can catalyze India's cohesive and inclusive development. As of August 31, 2019, Boond has powered more than 12,000 rural households, small businesses, schools and health care centers across Uttar Pradesh, Rajasthan and Delhi NCR and other Northern States of India and now expanding its base in the Eastern and North-Eastern states of the country. Boond has won a number of awards in India and abroad like the Economic Times Power of Ideas (2010), UN Foundation Award (2011), Nokia DLD Challenge (2012), Echoing Green Fellowship (2013) etc. The company has also been profiled in the popular media a number of times, with CEO of Boond having been covered by the 'Amazing Indian's', Times Now and 'CNBC Young Turk', CNBC and many more.

In government sector we are associated with SECI (Solar Energy Corporation of India), APEDA (Arunachal Pradesh Energy Development agency), MNRE (Ministry of New and Renewable Energy – (Govt of India), and UPNEDA (Uttar Pradesh New & Renewable Energy Development Agency).

Following are the working domain for us:

- **Grid connected Solar Rooftop System**
- **Grid connected Ground mounted solar system**
- **Off grid solutions (hybrid and stand-alone)**
- **Solar Micro-grids**
- **Solar Grid DG Solutions**
- **Solar Home Solutions**
- **Solar powered irrigation pumps**

Yours Truly,
Ankit Malhotra
Sr. Vice President
Boond Engineering & Development Pvt Ltd
Email: ankit.malhotra@boond.net

Partners/Associates & Affiliations



AWARDS



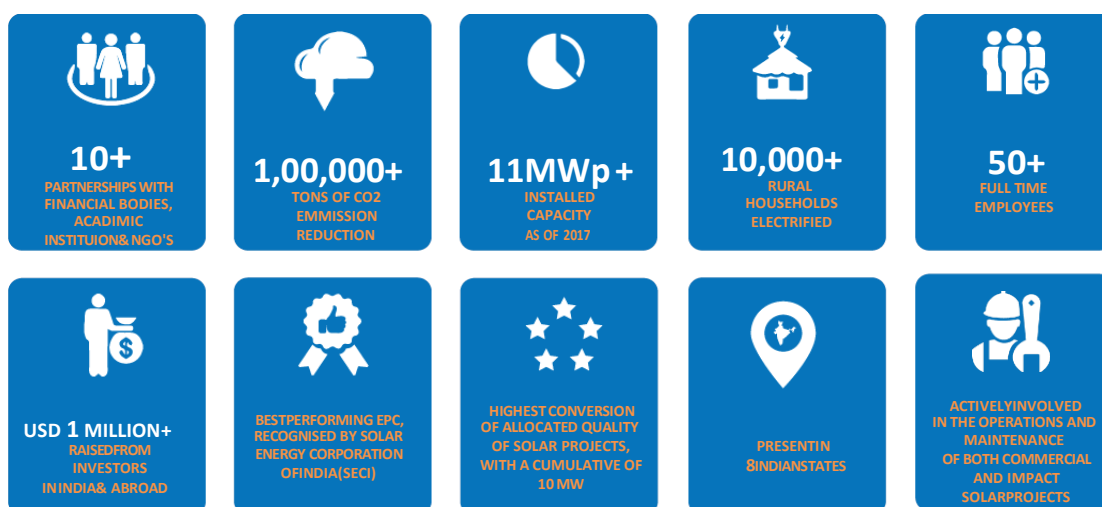
Also in Association with



23

22

OUR ACHIEVEMENTS



Introduction

A grid connected solar photovoltaic system uses solar modules as the power generation source. The power produced is fed into an inverter, which changes the DC power output of the solar array to AC power compatible with Indian standard power grid. Some designs for these systems allow for any onsite loads to be powered by a combination of power generated by the PV system and power drawn from the mains power grid.

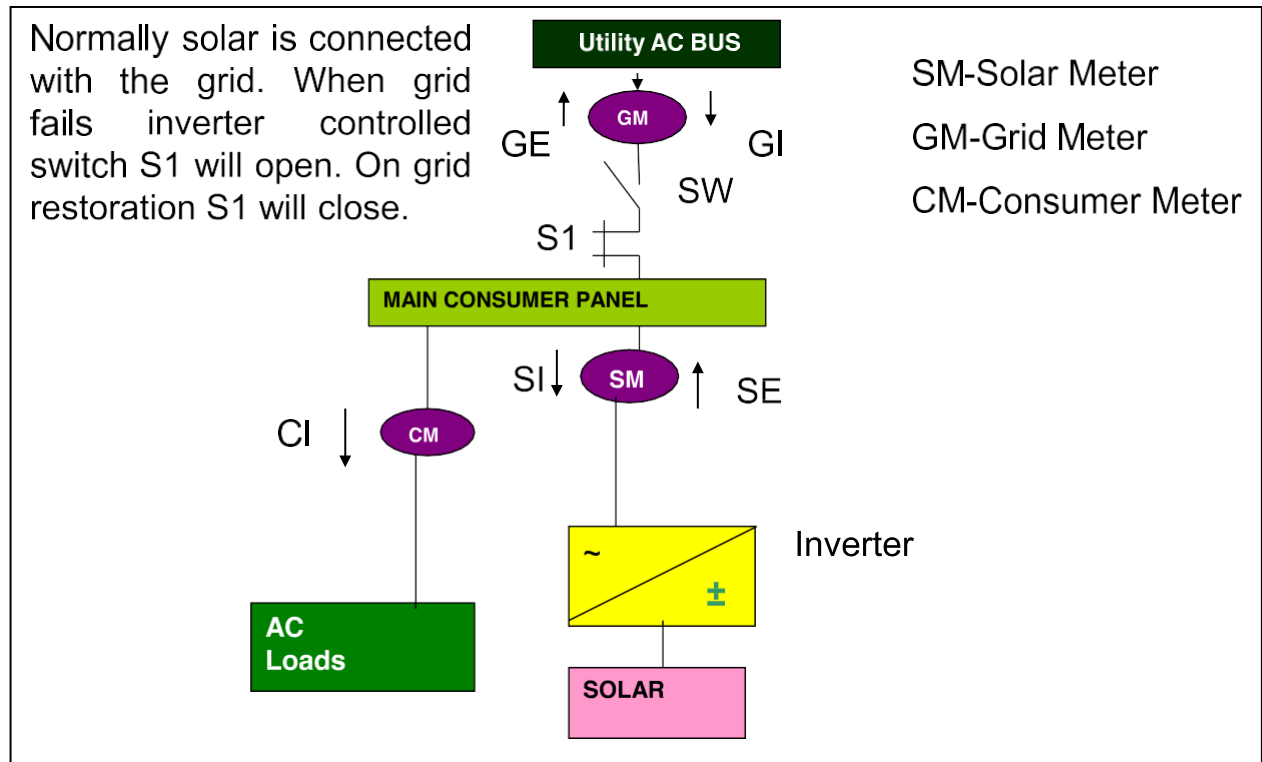


Figure: Grid Connected PVSystem

Project Implementation Schedule

(As per the Capacity of the Plant)

10 Days	15 Days	30 Days	90 Days	5 Days Buffer
Site Survey & Feasibility Analysis				
	Detailed Engineering Design and submission of NOC from Discom and other documents for approvals			
		Procurement of components, delivery, and site preparation		
			Installation & Commissioning	
				Inspection & handover project to client

- This schedule is indicative and might change during the actual execution. Completion of the project will depend upon prompt payment.
- Client has to procure the net meter directly from the manufacturer which will be facilitated by us.
- CEIG and any other approval required is in client scope, contractor will support with all require documentation

Techno-Commercial Offer

	Client	Rico Auto Industries Ltd		
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Equipment Required for Setting up a Solar Power Plant

S.No.	Item	Capacity (Watt)	Amount (INR)	GST (%)	GST (INR)	Total (INR)	EPC
1	Solar Panel	1000450	1,50,06,750	12%	18,00,810	1,68,07,560	Boond
2	Inverter	1000450	29,51,328	12%	3,54,159	33,05,487	Boond
3	Structure	1000450	32,01,440	18%	5,76,259	37,77,699	Boond
4	AC Cables	1000450	18,00,810	18%	3,24,146	21,24,956	Boond
5	Lifelines	1000450	9,50,428	18%	1,71,077	11,21,504	Boond
6	DC Cables	1000450	17,00,765	18%	3,06,138	20,06,903	Boond
7	LT Panel	1000450	33,01,485	18%	5,94,267	38,95,752	Boond
8	Walkway	1000450	18,00,810	18%	3,24,146	21,24,956	Boond
9	Installation & commissioning	1000450	27,81,251	18%	5,00,625	32,81,876	Boond
10	Project Management, Govt Liasing and misc	1000450	43,01,935	18%	7,74,348	50,76,283	Boond
					Project cost	4,35,22,977	

Note:

1. Project cost variation is subjective to Solar Panel price, hence validity of Proposal is not More than 30 days.
2. Tax Extra as actual.
3. Statuary Approval if required, charges will be as actual.
4. For solar module cleaning arrangement of water till the proposed sites will be under client Scope.
5. Land/Rooftop clearance and levelized land to be provide by client.
6. Rooftop Accessibility with proper ladder before installation is in client

Scope Terms and Conditions

1. Time Schedule

The handover of the successfully commissioned plant would be in 100-150 days from the date of release of work order and transfer of advance.

2. Payment Terms

The terms of payments for the Contract shall be as detailed hereunder.

- i. 40% Advance, 50% before dispatch of Material, 10% after Commissioning of Plant.

3. Effective Date of Contract

The effective date of Contract shall be the date of **Advance**. The Contract shall be in force till successful handover of Solar On-grid

4. Defect Liability Period

- a. The Contractor warrants that the Works or any part thereof shall be free from defects in design, materials, and workmanship for a period of 1 year from the date of successful commissioning, unless specified otherwise in the contract.
- b. PV modules from used at the site shall be warranted for linear performance as per table is given below:

Year	Warranty for Output upto
1-10	90%
11-25	80%

- c. Contractor accepts no liability for defects caused by improper use or unauthorized operation of the delivery item by Owner or its third parties. The same principle applies for non-adherence to operating rules, installation regulations or generally accepted engineering standards, such as the use of unsuitable equipment and facilities, negligent handling, excessive loads, etc., by the Owner or its third parties, for normal wear and tear, or for chemical, electrochemical or electrical influences that were not foreseeable. If Owner or third parties perform repair work or modifications of the delivery item, no warranty claims may be lodged for these or for their consequences.

5. Confidentiality

Each of the parties shall not disclose the terms hereof to any person/ party. Provided however, either party may disclose the existence of the transaction to its legal counsel, accountants, lenders, engineers, architects, interior designers, investors, vendors, suppliers, and other persons who need to be aware of the existence of the transaction. Further, either party may disclose the existence of the transaction to the extent that law or court order requires such disclosure, but in such case the other party must be first provided with a written notice thereof.

6. Termination

Once the PO is released the contract can be terminated by a written notice at least 10 days before commencement of work on the site. In this case, the contractor shall receive payment of material furnished and ordered up to the withdraw date.

7. Dispute Resolution

- a. In the case of any dispute arising out of or in connection with the terms of the PO regarding its performance, existence, validity or termination, the parties shall first attempt to reach an amicable settlement through mutual consultations and negotiations. If the parties are unable to reach an amicable settlement within 30, (thirty) days from the date on which the dispute arose, any of the party may make a reference to arbitration in accordance with the following by giving a notice to the other in

this regard.

- b. The arbitration proceeding shall be conducted in accordance with the Arbitration and Conciliation Act, 1996 and any statutory re-enactment or modification thereof and the place of arbitration shall be Delhi. The arbitration shall be conducted by an arbitral tribunal consisting of 3 (three) arbitrators. Each of the party shall appoint 1 (One) arbitrator and the third arbitrator/umpire shall be appointed by the two arbitrators. The language of the arbitration shall be English. The parties agree that they shall be bound by the arbitral award.

8. Governing Law

This PO shall be governed by the Indian Laws and rules as amended from time to time. The Courts of Delhi Shall have exclusive jurisdiction in all matters arising under this PO.

9. General Terms and Conditions

This Purchase Order is subject to Force Majeure conditions. All guarantees, warranties, representations, and obligations under this Order shall be upon timely payment as per the payment schedule as contained in the PO. Any claim for damages or unpaid payments that is available to you under law arising pursuant to this Purchase Order shall survive even in case of the termination of this Work Order.

Annexures

Quality Certification, Standards and Testing for Grid-connected Rooftop Solar PV Systems/Power Plants

Quality certification and standards for grid-connected rooftop solar PV systems are essential for the successful mass-scale implementation of this technology. It is also imperative to put in place an efficient and rigorous monitoring mechanism, adherence to these standards. Hence, all components of grid-connected rooftop solar PV system/ plant must conform to the relevant standards and certifications given below:

Solar PV Modules/Panels	
IEC 61215/ IS 14286	Design Qualification and Type Approval for Crystalline Silicon Terrestrial Photovoltaic (PV) Modules
IEC 61701	Salt Mist Corrosion Testing of Photovoltaic (PV) Modules
IEC 61853-Part 1/ IS 16170: Part 1	Photovoltaic (PV) module performance testing and energy rating –: Irradiance and temperature performance measurements, and power rating
IEC 62716	Photovoltaic (PV) Modules– Ammonia (NH ₃) Corrosion Testing (As per the site condition like dairies, toilets)
IEC 61730-1,2	Photovoltaic (PV) Module Safety Qualification – Part 1: Requirements for Construction, Part 2: Requirements for Testing
IEC 62804	Photovoltaic (PV) modules - Test methods for the detection of potential-induced degradation. IEC TS62804-1: Part 1: Crystalline silicon (Mandatory for applications where the system voltage is > 600 VDC and advisory for installations where the system voltage is < 600 VDC)
IEC 62759-1	Photovoltaic (PV) modules – Transportation testing, Part 1: Transportation and shipping of module package units
Solar PV Inverters	
IEC 62109-1, IEC 62109-2	Safety of power converters for use in photovoltaic power systems – Part 1: General requirements, and Safety of power converters for use in photovoltaic power systems Part 2: Requirements for inverters. Safety compliance (Protection degree IP 65 for outdoor mounting, IP 54 for indoor mounting)
IEC/IS 61683 (as applicable)	Photovoltaic Systems – Power conditioners: Procedure for Measuring Efficiency (10%, 25%, 50%, 75% & 90-100% Loading Conditions)
BS EN 50530 (as applicable)	Overall efficiency of grid-connected photovoltaic inverters: This European Standard provides a procedure for the measurement of the accuracy of the maximum power point tracking (MPPT) of inverters, which are used in grid-connected photovoltaic systems. In that case the inverter energizes a low voltage grid of stable AC voltage And constant frequency. Both the static and dynamic MPPT efficiency is considered.
IEC 62116/UL1741/ IEEE 1547 (as applicable)	Utility-interconnected Photovoltaic Inverters - Test Procedure of Islanding Prevention Measures
IEC 60255-27	Measuring relays and protection equipment– Part 27: Product safety requirements
IEC 60068-2 (1, 2, 14, 27, 30 & 64)	Environmental Testing of PV System – Power Conditioners and Inverters a) IEC 60068-2-1: Environmental testing - Part 2-1: Tests - Test A: Cold b) IEC 60068-2-2: Environmental testing - Part 2-2: Tests - Test B: Dry heat c) IEC 60068-2-14: Environmental testing - Part 2-14: Tests - Test N: Change of temperature d) IEC 60068-2-27: Environmental testing - Part 2-27: Tests - Test Ea. and guidance: Shock e) IEC 60068-2-30: Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle) f) IEC 60068-2-64: Environmental testing - Part 2-64: Tests - Test Fh: Vibration, broadband random and guidance

IEC 61000–2,3,5 (as applicable)	Electromagnetic Interference (EMI) and Electromagnetic Compatibility (EMC) testing of PV Inverters
Fuses	
IS/IEC 60947 (Part 1, 2 & 3), EN 50521	General safety requirements for connectors, switches, circuit breakers (AC/DC): a) Low-voltage Switchgear and Control-gear, Part 1: General rules b) Low-Voltage Switchgear and Control-gear, Part 2: Circuit Breakers c) Low-voltage switchgear and Control-gear, Part 3: Switches, disconnectors, switch-disconnectors, and fuse-combination units d) EN 50521: Connectors for photovoltaic systems – Safety requirements and tests
IEC 60269-6	Low-voltage fuses - Part 6: Supplementary requirements for fuse-links for the protection of solar photovoltaic energy systems
Surge Arrestors	
IEC 62305-4	Lightening Protection Standard
IEC 60364-5-53/ IS 15086-5 (SPD)	Electrical installations of buildings - Part 5-53: Selection and erection of electrical equipment - Isolation, switching and control
IEC 61643-11:2011	Low-voltage surge protective devices - Part 11: Surge protective devices connected to low-voltage power systems - Requirements and test methods
Cables	
IEC 60227/IS694, IEC 60502/IS1554 (Part 1 & 2)/ IEC69947	General test and measuring method for PVC (Polyvinyl chloride) insulated cables (for working voltages up to and including 1100 V, and UV resistant for outdoor installation)
BSEN 50618	Electric cables for photovoltaic systems (BT (DE/NOT) 258), mainly for DC Cables
Earthing /Lightning	
IEC 62561 Series (Chemical earthing)	IEC 62561-1 Lightning protection system components (LPSC) - Part 1: Requirements for connection components IEC 62561-2 Lightning protection system components (LPSC) - Part 2: Requirements for conductors and earth electrodes IEC 62561-7 Lightning protection system components (LPSC) - Part 7: Requirements for earthing enhancing compounds
Junction Boxes	
IEC 60529	Junction boxes and solar panel terminal boxes shall be of the thermo-plastic type with IP 65 protection for outdoor use, and IP 54 protection for indoor use
Energy Meter	
IS 16444 or as specified by the DISCOMs	A.C. Static direct connected watt-hour Smart Meter Class 1 and 2 — Specification (with Import & Export/Net energy measurements)
Solar PV Roof Mounting Structure	
IS 2062/IS 4759	Material for the structure mounting Structure with a coating red oxide & enameled paint

Note: - Equivalent standards may be used for different system components of the plants. In case of clarification following person/agencies may be contacted.

BOM SHEET

Technical Specification for roof top solar Power project at **Boond Renewable Energy Private Limited (1000.45 kWp Capacity of Module)**

S. No	Particulars	Make	Specification	Guarantee/Warranty
1	PV MODULE	Rayzon/equivalent	Positive tolerance 0-5 %, Mon crystalline silicon module, 550Wp and above, preferably twin bus anodized aluminum frame IP65, Efficiency-19%, Should fulfill IEC and IS norms, Manufacturer's certificate on quality and efficiency.	12 years Product Warranty 25 Years Performance Warranty
2	MODULE STRUCTURE	TATA/ Jindal/ SAIL or equivalent	Corrosion Resistant, high salt mist and ammonia resistant, Metallurgy certificate required from NABL Accredited Laboratory	Minimum 25 years
3	Walk ways	Reputed	FRP	As per manufacturer warranty
4	INVERTERS	Solis	String type inverter, need to fulfill ingress protection and per IS, islanding protection, MPPT controller with Peak efficiency minimum-98 %, should fulfill IEC and IEEE norms with minimum harmonics.	As per manufacturer warranty
5	AC CABLE	Polycab, Finolex , KEI, Universal, Havells, Eqt	XLPE Armoured, LT cable of 1.1 KV voltage grade, Fire retardant.	As per manufacturer warranty
6	DC cable ,communication cable	Lapp, KEI, (betaflam) LEONI/APAR or Reputed Brand	XLPO electrobeam cable, UV resistant TUV certified with Copper Conductor, CAT -6, fire retardant	As per manufacturer warranty
7	CONNECTOR -	ELMEX ,Connectwell, fin energy, Eqt	multicontact ring type compatible with module, flame retardant	As per manufacturer warranty
8	EARTHING	Reputed make	HOT Dipped GI strip for Chemical compound earthing	As per manufacturer warranty
9	DATALOGGER MONITORING	Reputed make	DATALOGGER with Auto generated report facility: License version. With load shedding arrangement, operation and Troubleshooting	As per manufacturer warranty
10	LT PANEL	ABB /LS Power/Eqt	With PU gasket on door ,sheet steel of 2.5MM with reputed LV switchgears	As per manufacturer warranty
11	SENSOR	Reputed make	individual solar irradiance and temperature sensor	As per manufacturer warranty

12	CABLE TRAY	Reputed make	Perforated cable tray with hot dipped GI	As per manufacturer warranty
13	CONDUITS	Reputed make	Heat resistant ,long life	As per manufacturer warranty
14	EARTHING PROTECTION/LIGHTNING PROTECTION	Indelec/Erico/Oblum/Vrinda/Eqvt	As per IS,ARRESTOR (Conventional Mess type) ,grid Earthing	As per manufacturer warranty
15	Weather Station	Reputed make	Weather monitoring with forecast and scheduling data	As per manufacturer warranty