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Design, Supply, Installation and Commissioning of
Solar PV On grid Roof Top Power Generation
System of

60 Kw (DC) (Poly)

**M/S. AGRO FUTURES FARMERS PRODUCER
COMPANY LIMITED**

AT. POST. AJANDE BK, TALUKA. SHINDAKHEDA,
DISTRICT. DHULE, MAHARASHTRA - 425404. IN

By


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Basically, Solar PV Systems can be classified into two types. The first and the oldest is "Stand Alone" and the second which is rather new is "Grid Interactive".

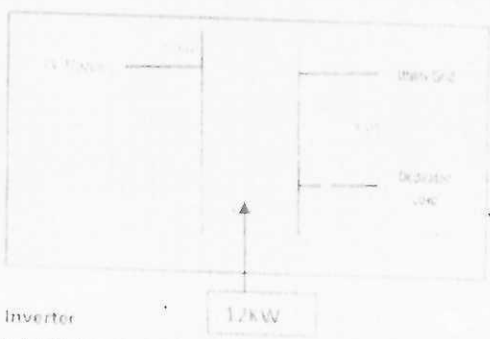
Common examples of Stand-Alone Systems are Solar Lantern, Street Lighting System, Home Lighting System and Small Solar Power Plant with Backup

Grid Interactive Solar Power Plant without Battery Backup This type of system only operates when the grid power is available. Since grid power outages are rare, this system will normally provide the greatest amount of bill savings to the customer against investment. However, in the event of an outage, the system is designed to shut down until utility power is restored. The inverter switches to "sleep mode" and awaits restoration of grid power. Once grid power restores the inverter synchronizes itself to grid. And starts feeding power to grid

PV Array is made up of PV panel which in turn has several PV modules. These PV modules have environmentally-sealed collections of PV Cells which converts sunlight to electricity.

Balance of System Equipment (BOS) BOS includes module mounting structures and electrical harness systems used to integrate the solar modules into the structural and electrical systems. The electrical wiring systems include Junction Boxes for paralleling, fuses/switches, surge suppressors for the dc side. The major components of the BOS are the Inverter and the Controllers. These form the brain of the system which does multi operation. Some of the major operations are conversion of Direct Current to Alternating Current and Grid Synchronization.

Module mounting system: The module mounting structure is designed for holding suitable number of modules in series. The frames and leg assemble of the array structures is made of Mild Steel hot dip galvanized of suitable sections of Angle, Channel, Tubes or any other sections conforming to IS:2062 for steel structure to meet design criteria. All nuts & bolts considered for fastening modules with this structure are of very good quality of Stainless Steel. The array structure is designed in such a way that it will occupy minimum space without sacrificing the output from SPV panels at the same time.



A Grid Tie Inverter

Like any other power source, a GTI takes DC input from the solar panels and converts it to AC electricity. When the sun is shining and your solar panels are generating power, the solar power inverter will return the power to your electric grid and/or to the grid.

Grid Tied Inverter Benefits to Homeowners There are two major benefits of a grid tie solar system to homeowners. A Grid Tie system is less expensive than a comparable system that uses a battery bank for electricity storage. As batteries are required for GTI, by using a GTI, you are able to reduce your overall cost of solar power.

Many states have net metering laws in place which allow homeowners to get credit for any electricity you send to the grid. The utility company is essentially paying you at market rates for the excess electricity you generate. This allows you to take full benefit of your solar power system.

Solar energy is one of the best renewable energy sources you can use to produce electricity for your home. In addition to using the solar power system at market rates, if your home solar power system uses a grid tie inverter (GTI), you can also sell any excess power you produce back to your utility company. Excess power can be sold as per NEC code.

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212

Proposal for Design, Supply, Installation and Commissioning of Solar PV
Grid Tie Power Generation System of 60 KW Solar PV MODULES

Proposal No.: 2020-2021/131405

DATE 10/11/2022

M/S. AGRO FUTURES FARMERS PRODUCER COMPANY LIMITED.,
AT. POST. AJANDE BK, TALUKA. SHINDAKHEDA,
DISTRICT. DHULE, MH - 425404. IN

1	New Balaji Enterprises
1	Drawings/Design of Solar Power Plant
2	Installation & Commissioning of Solar Power Plant
3	Detailed Site Survey & Feasibility assessment of the site & Plant Capacity.
4	Liaison with Discom- MSEDCL & CEIG for Approval of proposed Solar Plants. Metering & Grid Connectivity of the Rooftop PV system shall be in accordance with prevailing guidelines of the Discom.
5	Documentation (Permits & Approvals, Engineering Documents & drawings, Manual, Test Certificate) Training of Clients Staff on the O & M including Cleaning of Solar Panels Provide Remote monitoring of Power Generation. Four Quarterly Visit & Inspection of the plant during first Five Years Of operation. GST invoice at the time of claiming 10 % charging of inverters.
2.	Customer Scope
a.	South facing shadow free area
b.	Provide construction power, water & lighting arrangement on the roof & other location of Construction, free of cost.

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213

Provide Contact Details of Clint's Representatives who have the authority for approval of drawings, govt Approvals, Stores/ Materials unloading & storage Construction Coordination, submission of EPC invoices & payments to EPC within 2 days of this purchase order.

Provide all documents necessary for CEIG and MSEDCL approvals, on timely basis.

Approve the drawings & details submitted by EPC within 1 working days pf Submission: Array Layout drawing, Allocation of

> This offer shall stand valid up to: 30/11/2022

> Sanction load must be equal to or more than Project capacity.

Sanction load needs to increase to project capacity, then expenses for the same will be in your scope.

1. Expenses for Replacement of CT/PT, Transformer, Net meter with CT, Generation Meter with CT, all MSEB Receipts and other charges will be extra at actual plus GST.

2. All Fabrication Works with Tin Shad incline north- south (Height 10/12 Feet) with Civil works and staircase as drawing will be in customer scope

3. PAYMENT TERMS

- A) 20% of the order value with the Purchase order.
- B) 60% of the order value against The Pro-forma invoice.
- C) 10% of the order value after completion of the work.
- D) 10% of the order value after commissioning of the PV system

SCOPE OF USER

- > User has to provide shadow-free area as required.
- > User should give space to install Inverter & distribution board as required.
- > Changes in existing DISCOM setup. & All MSEDCL receipts, Load Extension, name change, etc.
- > Internal cabling for clubbing of meter will be in clients' scope.
- > Users should submit all the required forms for net metering.
- > User has to provide an internet connection for monitoring.
- > All the govt. Fees/liaisoning charges for net metering has to be paid by User. (will be informed at the time of implementation).
- > In case the synchronization of the solar Plant with DG set is required the additional cost has to borne by the User (in consultation of your DG supplier.).
- > Replacement of CTs/PTs

The validity of Technical & Commercial offer is subject to change without prior notice

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(214)

ACDB & Inverter, Earthing, Lighting Arrestor, Terminal point. Provide staircase access to the roof within 7 days of the purchase order. Solar panels cleaning kits, Provision of Panel Feeders to Receive the supply of Solar power: Canopy/Shade for Inverters, ACDB, other equipment as necessary, providing all the C class items such as Double meter box & Cable required for Net Metering.

Synchronization of solar PV system with DG sets. Provide Space for safe storage of Materials Supplied by EPC for the proposed plant, provide accommodation for EPC and their contractor persona within client's premises during the period of installation. However, food arrangement shall be made by EPC. Provide approval for working in late hours, if requested by EPC. Obtain insurance policy immediately after installation completion for fire & Machinery Breakdown (MBD) And loss of Profit (LOP of felt necessary by client) and renew the same on an annual basis to safeguard against force Majeure risks.

Registration charges and Load Ext. of MSEB. Any changes regarding transformer and other (CT Of Net Meter) and there testing fees. Net metering Approval Fees & Fees To CEIG.

Any infrastructure required for export of power to MSEDCL. Chang of Cubical & CT

	d.	
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3
SCHEDULE

DAY	Milestone
ZERO Date	Signing of this purchase order (Client & EPC) & Advance Payment 20%
1	Provide existing CEIG approval documents Metering Application with supporting document and (client)
5	Detailed site Survey Report & Exact Solar plant capacity KWP (EPC)
10	Detailed Engineering & Documentation (EPC) With 60 % advance
12	Approval for Detailed Engineering Documentation including location of equipment's -inverter, ACDB DCDB, Earthing, Lighting Arrestor, SLD, array layout diagram
8	Application to CEIG for Solar plant
25	Mobilization & construction start
70	Complete installation
75	Net Metering installation (By MSEDCL) & Synchronization.

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DC Cables

Sizes of cables between module to inverter shall be so selected to keep the voltage drop (Power loss) of the entire power plant to the minimum.

The bright annealed 99.97% pure bare copper conductors that offer low conductor resistance are used in the power Plant. They result in lower heating of the cable thereby increase in life of the cable and also reduction in Power Losses in the system. These cables are insulated with a special grade PVC Compound formulated for outdoor use. The skin coloration offers high insulation resistance and long Life.

Solar Cables from Module to Inverter: 1C X 4Sq. mm XLPE Insulated Cu cable are flexible and are used with annealed electrolytic grade copper conductors. They are suitable for outdoor and for 1100VDC Application.

AC Cabling:

All AC cables from inverter to ACDB panels are PVC insulated copper cable and cables from ACDB Panel to feeding point is PVC/XLPE insulated Al armored cable.

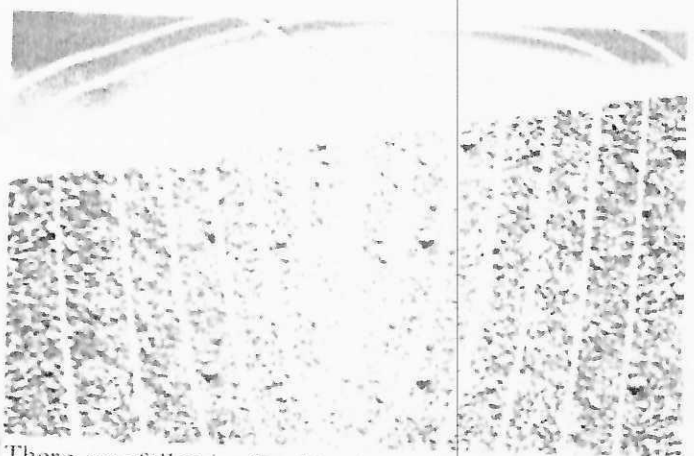
Cables from Inverter to ACDB Panel to feeding point: 4C X 35 Sq. mm XLPE insulated Cu, armored Cable

Metering & Grid Connection:

Inverter output is combined at ACDB panel The AC distribution boxes are dust and waterproof and Made of Thermo plastic/GI. Distribution box shall have all protections as required with suitable Arrangement for its connecting. The distribution box shall also have metering devices to calculate the Total energy generation from the plant. The distribution boxes also have to provide for arrangement for disconnection it form main LT panel of building at 415V @ 50Hz. All protection used are of Standard make with well-known companies.

Earthing System:

The first line of defense is to have an excellent grounding system with respect to all electrical Outlets. Earthing is of utmost importance for safety of Human Life as well as animal life and also Plant, equipment, property. All possible measures for protecting the system components will be incorporate ed.



There are following Earthing is provided in SPV plant as per the IS 3043:

- a. G.I Earthing (3mtr. Depth) for module structure
- b. G.I Earthing (3mtr. Depth) for lightning arrester.
- c. G.I Earthing (3mtr. Depth) for electrical equipment's of SPV plant.

Lightning Protection:

SPV power plant is provided with lightening and over voltage protection connect ed to earth pits. The main aim of over voltage protection is to reduce the overvoltage to a tolerable level before it reaches the PV or other sub components. The source of overvoltage can be lightning or other atmospheric disturbance. Lightening conductors used are earthed through flats and connected to earth pits as per applicable Indian standards. Each lightning conductor is fitted with individual earth pit as required.

SPV plant is protected with copper lightning arrester which protects the SPV plant from direct Lightning strikes. Lightning arrester is installed in such a manner that whole module area is lie Within the protection region of lightning arrester. Lightning arrester is properly earthed by Cu/A Earthing, as per the standard IS 3043.

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PRICE SCHEDULE -

SL. NO.	ITEM	DESCRIPTION	QNTY. / CAPACITY	UNIT	TOTAL AM. (INR)
1.	Solar PV Module 335 WP	Make: NOVASYS/RENEWSYS/POLYCAB/EC E/CITIZEN	179	60.0Kw	
2.	Grid Tie Inverter	Make: GROWATT/SOFAR/APS/Polycab 60 Kva	1	No	
3.	Cables & Other related accessories		Complete	Set	
4.	Module Mounting Structure Aluminum	Aluminum Rail 250*41*61MM on Incline Tin Roof (East-West Facing)	including		If extra height r will charge extr actual
5.	Junction Boxes, DCDB & Other Accessories as Per 60 KVA			Set	
6.	Earthing Set, LA and other Balance of System		Complete	Set	
7.	MSEB Charges	Security deposit & charges is in customer Scope.	Including		
Rate for Monocrystalline silicon panels 540 Wp (Total Qty. 111 No's) rate					28,70,031.
GST Amount (@ 13.8 %)					3,96,064.0
Annual Generation 60*4= 240 unit per day* 330 days= 76,800units					
1.	Installation & Commissioning(include)				
2.	Civil work of structure				Extra
TOTAL					32,66,095.0
Capacity variation: up to +/- 30 % acceptable based on detailed assessment					

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218

Total Area Required for Panel Mounting (approx.)	Approx.4,000 Sq. Ft.
Total Area Required for Inverter & Other	Approx.20
Average Daily Solar Insolation	+Sq. Ft. 5 hours. (Approx.)
Average annual sunny days Per Year	330 days (approx.)

Packing:	Packing shall be done as per New Balaji Enterprises standard. In case non-standard packaging, customer needs to pay extra. (Include)
Freight & Insurance:	Our offer includes freight charges. Insurance will be included in the price.
Supply	Supply of SPV Modules and Balance of System For supply
Terms of Payment:	20 % of the total order value as an advance along with purchase order / LOI 60% of the total order value After structure material received.10% Against Installation and 10 % after installation of net meter (within 1 months) Delivery at on site Completion shall be within 10 to 11 weeks from the date of receipt advance and PO
Warrantee:	Solar Module 05 Years Limited Warranty on Product and Workmanship 10 Years Limited Warranty on 90% Power Output 25 Years Limited Warranty on 80% Power Output For Balance of Materials 05 years Warranty Parts and Components, which are repaired or replaced during such period, are warranted for the original warranty period only and will not carry any extended Inverter: 5
Exclusions-	The warranty shall not apply to defects resulting from: i) Any materials, components, tools, design or software provided by Owner; ii) Negligence or willful misconduct of Owner; iii) Parts, accessories or attachments other than those supplied by Owner; iv) Improper service work, installation or alterations carried out by owner or third party without New Balaji Enterprises written consent; v) Any trial or experiment carried out by the Owner on the system without New Balaji Enterprises written consent; vi) Normal wear and tear; vii) Use of unsuitable material or consumables by Owner; OR viii) Any use, service or operation of any equipment, parts or components which not in conformity with manuals, instructions or specifications provided

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219

manufacturer or which is otherwise not in accordance with normal industry practice
New Balaji Enterprises liability in respect of any defect or failure of the equipment supplied or for annuity loss, injury, damage attributable thereto, is limited to making good by replacing or repairing defects which under proper use appear therein (provided the equipment is installed, operated, maintained as per New Balaji Enterprises instruction manual) and arise solely from faulty design, materials or workmanship within warranty period. At the termination of Warranty period, all liability on our part shall cease.

Title and Ownership: New Balaji Enterprises shall retain the right on equipment, materials or parts supplied by New Balaji Enterprises until full value thereof as New Balaji Enterprises invoice has been fully paid to New Balaji Enterprises as per terms and conditions.

Intellectual Property Rights: All intellectual property rights associated with design, drawings, material or information, documents or data provided by New Balaji Enterprises in connection with any equipment provided by New Balaji Enterprises shall remain New Balaji Enterprises property. New Balaji Enterprise share by grants to the Owner royalty-free, non-free, non-exclusive and non-transferable right to use the design and, drawings, transferable material or information, document or data delivered for operation, maintenance and use of the Equipment.

Confidentiality All information (whether technical, commercial or otherwise) shared by New Balaji Enterprises of any nature during tendering or execution of the contract or purchase order may be treated as confidential. The Confidentiality of New Balaji Enterprises offer should be maintained strictly and in no case without seeking New Balaji Enterprises written permission, New Balaji Enterprises offer or this do, document can be shared, disclosed, reproduced, copied or circulated. New Balaji Enterprises shall be under no liability if performance of contract by New Balaji Enterprises is prevented or delayed whether in whole or in part due to any of the causes beyond our reasonable control.

Force Majeure: Payment obligations of the Owner shall not be affected by Force Majeure conditions. New Balaji Enterprises shall not be held responsible for any delay, loss or damage arising from any cause, matter or thing beyond the New Balaji Enterprises reasonable control, including, without prejudice to 'strikes, lockouts, go-slow, riots, war or war like conditions, acts of nature or God such as go epidemics, floods, earthquakes, fires etc. whether such delay or impediment occurs before or during the time or extended time for dispatch or completion. In case the complete supply is affected by the force majeure conditions, New Balaji Enterprises shall intimate the Owner, within a reasonable time, of such occurrence and suitable extension to the delivery time shall be granted.

Governing Law: The laws of India and the Courts at Jalna shall have sole jurisdiction over all matters out of this contract

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8
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Payback period and other benefits (Accelerated Depreciation) Commercial Project.

- Payback period for Solar Rooftop against while considering only monthly electricity Billings will be 4 to 5 years after that it will absolutely Free. (Warranty period of Solar Panels 25 years)
- While adding Accelerated Depreciation benefits i.e. If your company was paying Rs.33 As tax on a profit of Rs.100 earlier, than by installing a Solar plant of Rs.100. you can claim A Depreciation expenses of Rs.80 (80%) in the first year, thus reducing your profits for tax Purpose to Rs.20. Now, you end up paying Rs.6.6 as tax .in other words. You end up saving Rs.26 on an investment of Rs.100 in Solar plant. Investor can set off their tax liability on the taxable income to the tune of 80% in the 1st year, and subsequently 20% in the 2nd year. (Section 32 of income tax Act.)

Impact


- Reducing the cost of the project to the extent of 26%
- Reducing the cost of Solar electricity by Rs.2/-per unit
- While adding Accelerated Depreciation benefits+ monthly electricity charge, Payback period of solar project limited to 3 to 4 years max.

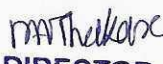
AMC benefits

- We will charge max.3%of project cost per annum(negotiable) after 5 years, this is payable as quarterly advance at the beginning of the quarter. (4 quarterly visits & unlimited visitsagainst Complaints.

Above quotation validity up to one month.
GST will applicable as per Govt. Rules.

Thanks & Kind Regards,
Bharat Bhutekar
(B. E.Mech)
Solar Designer & Service Egg.


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