

# Supplier Enlistment Process under IDCOL Solar Mini-Grid and Rooftop Projects



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A 2 phase enlistment procedure must be followed by any entity willing to be enlisted under IDCOL Solar Mini-Grid and Rooftop program as a supplier/EPC

### Phase 1

Will mainly focus on the company documents & experience in the relevant field.  
Documents to be submitted by enlisting company as follows:

1. Memorandum of Association of the Company/ Proprietorship
2. Trade license, TAX & VAT certificate of the company
3. Audited financial report for last 1 year / bank statement of a minimum of 5,000,000 BDT for at least 1 year.
4. Experience of the company/ technical personnel associated with the company in related field.

### Phase 2

Upon successful scrutiny of the phase 1 documents, suppliers require to submit following official papers

1. Memorandum of Understanding/Agreement/Contract between the supplier & manufacturer.
2. Warranty documents from the manufacturer in favor of the supplier for major components i.e. PV Modules, Solar Inverters, Charge Controllers and Generators.
3. Technical catalogues of all equipment.
4. Test report of PV Modules, Solar Inverters, Charge Controllers and Generators from IDCOL accredited testing centers.

### List of tests required for approval of different equipment

Equipment	No.	Name of the tests
<b>Grid-Tied Inverters</b>	1	Nominal output voltage
	2	Frequency
	3	MPPT Option
	4	Maximum input voltage(DC)
	5	Power factor at rated power
	6	Maximum efficiency
	7	Ground fault monitoring
	8	DC reverse polarity protection
	9	AC short circuit current protection
	10	Total harmonic distortion at full load
	11	Communication
<b>Bidirectional Inverters</b>	1	Rated Grid Voltage
	2	AC Voltage Change
	3	Rated Grid Frequency
	4	AC Frequency Range
	5	Total Harmonic Distortion (THD)
	6	Rated DC Input Voltage
	7	Self-consumption Without Load

	8	DC reverse polarity protection
	9	AC short circuit current protection
	10	AC Overload Protection
	11	Battery Temperature Data Acquisition
<b>Charge Controller</b>	1	MPPT Option
	2	Battery Size Rated Voltage
	3	Battery Type
	4	Maximum Efficiency
	5	Protection (PV/Battery)
	6	DC Reverse Polarity
	7	Short Circuit Current Protection
	8	Overload Protection
<b>Battery</b>	1	Battery Capacity
	2	Number of Positive and Negative Plates
	3	Dimension of Positive and Negative Plates



## Technical Specification for Equipment for IDCOL Solar Mini-Grid, Solar Rooftop and Solar Grid-tied Projects

### PV Module

The following are applicable standards for PV modules:

- International Electrotechnical Committee (IEC) 61215:2005: Crystalline Silicon Terrestrial PV Modules Design Qualification and Type Approval
- IEC 61646: Thin Film Silicon Terrestrial PV Modules Design Qualification and Type Approval
- IEC 61701 Ed 2.0: Salt mist corrosion testing of PV Modules.
- IEC 61730 for safety equipment.
- PID test certificate (IEC 62804 or equivalent)
- ✓ The photovoltaic module should have a peak power output of at least 250Wp.
- ✓ All modules must be product tested and certified from IEC accredited laboratories. IEC 61215 (Or IEC 61646, whichever applicable) and IEC 61730 are mandatory for PV modules. IEC 61701 will be applicable for PV module installation in coastal areas.
- ✓ Each module must be factory equipped IP65 junction box with terminal strip that allows safe and long lasting wiring connection to the module. Where applicable, protective diodes should be used to avoid the effect of partial shading. Factory test report of the PV module must be provided during supply of product
- ✓ Each module must have permanent labeling indicating at a minimum: Manufacturer, Model Number, Serial Number, Peak Watt Rating, Voltage and Current at peak power, Open Circuit Voltage, Short Circuit Current and Cell Efficiency of each module.
- ✓ Power tolerance must be positive for each of the PV modules.
- ✓ Module Efficiency ( $\eta$  %) should be minimum 15% at STC.
- ✓ Fill Factor (FF) should be more than 70%.
- ✓ Power tolerance must be positive



## **Warranty:**

### **A. Ten (10) Year Limited PV Module Warranty**

PV Modules(s) should be warranted to be free from the defects and/or failures specified below for a period not exceeding ten (10) years from the date of sale to the original customer:

- 1) Defects and /or failures due to manufacturing;
- 2) Defects and/or failures due to materials;
- 3) Cracking of the front glass surface due to foreign objects inside the glass; or
- 4) Non-conformity with specifications due to faulty manufacturing and/or inspection processes.

If the PV Module(s) fails to conform to this warranty, PV module(s) should be immediately replaced.

### **B. Limited Power Output Warranty**

Any power loss is due solely to defects in materials or workmanship; IDCOL demands the warranty of the power output of each type of PV Modules(s) as follows:

IDCOL demands that if, (a) within the first ten (10) years from the date of sale to the Customer, the PV Modules(s) exhibits a power output of less than ninety percent (90%) of the original minimum rated power specified at the time of sale, or (b) within twenty (20) years from the date of less than eighty percent (80%) of the original minimum rated power specified at the time of sale, manufacturer will repair, fix ( by putting additional panel) or replace the PV Modules(s) at their own cost or refund the Purchase Price taking into account a yearly depreciation of five percent (5%) of the panel price. In case of the refund of the depreciated price of the panel, the panel will remain with the user and company will not take it from him/her. The period of power output warranty for these replaced modules(s) will be equal to the remaining warranty period of the originally supplied module(s).

### **Final test before installation:**

A TSC approved solar panel should again be tested before installation.

1. A minimum of 10 PV panels must be tested in case of the total PV capacity of the proposed project is more than 10kWp by an individual supplier and the test results will be averaged.
  2. If the PV capacity is less than or equal to 10kWp, 1 PV panel/kWp of total PV capacity should be tested.
  3. In case of any deficiency between the test results and the rated power output of the PV panel:
    - The suppliers are required to provide additional PV panels to compensate the deficiency in the rated power output of the PV panels for the total PV capacity or;
    - In case the supplier is unable to provide additional PV panels due to constraints associated with system design & integration with other equipment, the deficiency in the power output might be balanced by deducting from the disbursement of the supplier. Cost per Wp of PV panels as submitted by the suppliers during the evaluation of quotations will be considered as the base of deduction.
1. Sampling will be done by IDCOL.

### Batteries

- i) The battery must be a low maintenance lead acid type battery.
- ii) Allowable depth of discharge (DOD) is 50% at discharging rate of 10 hours.
- iii) Battery capacity will not be less than 80% of the rated capacity over the period for seven years.
- iv) The battery capacity cannot be less than the rated capacity.
- v) The battery cannot be overdesigned by more than 15%.

## Grid-Tied Inverters

Test	IDCOL Standard
Nominal output voltage	AC 230 V/400 V
Frequency	50 Hz $\pm 2\%$
MPPT Option	Must be available
Maximum input voltage (DC)	1000 V
Power factor at rated power	$>0.95$
Maximum Efficiency	$\geq 92\%$ at full load
DC Surge arrester	Type II arrester must be integrated (even if LPS-Lightning protection system is there)
DC side disconnection device	Must be available
Ground fault monitoring	Must be available
DC reverse polarity protection	Must be available
AC short circuit current protection	Must be available
Degree of protection	IP 65 (outdoor) /IP 31 (indoor)
Operative temperature range	$-20^{\circ}\text{C}$ to $60^{\circ}\text{C}$
Noise Emission	$<60$ dB (Equivalent to a noise created by a large transformer at 100 ft.)
Total Harmonic Distortion at full load	$<5\%$
Maximum relative humidity	100%
Warrantee	Minimum of 5 years
Designed Lifetime	Minimum of 20 years



<b>Communication</b>	Communication should be available through RS485, USB or any other communication port.
<b>Data Access</b>	Voltage, current, power, frequency and other basic information must be accessible either by a LCD Display with power saving mode or wireless communication.
<b>Others</b>	Must be scalable (Provision for further expansion)

### Bidirectional Inverter

Aspect	Proposed requirement
<b>Rated Grid voltage</b>	230 V/400V
<b>AC voltage range</b>	200 V-250 V
<b>Rated grid frequency</b>	50 Hz
<b>AC frequency range</b>	50 Hz $\pm 2\%$
<b>Total harmonic distortion (THD)</b>	<5%
<b>Rated DC input voltage</b>	Minimum of 48 V
<b>Battery type</b>	FLA/VRLA/Lithium Ion/Gel/AGM
<b>Maximum efficiency</b>	Minimum of 90%
<b>Self-consumption without load</b>	<30 Watt
<b>Protection</b>	
<b>AC short circuit protection</b>	Yes
<b>AC overload protection</b>	Yes
<b>Reverse polarity protection</b>	Yes
<b>Operating temperature range</b>	-20°C to +60°C

<b>Maximum Relative Humidity</b>	100%			
<b>Degree of protection</b>	IP 65 (outdoor) /IP 31 (indoor)			
<b>Battery end voltage range</b>		High Voltage Disconnect	Low Voltage Disconnect	Reconnect Voltage
	12V	14.3±0.2 V	11.6±0.2V	12.6±0.2V
	24V	28.6±0.4 V	23.2±0.4V	25.2±0.4V
	48V	57.2±0.8 V	46.4±0.8V	50.4±0.2V
<b>Provision of state of charge (SOC)/full charge/equalization data</b>	Yes			
<b>Provision of generator support</b>	Yes			
<b>Battery temperature data acquisition</b>	Yes			
<b>Warranty</b>	Minimum of five years			
<b>Data Access</b>	Voltage, current, power, frequency and other basic information must be accessible either by a LCD Display with power saving mode or wireless communication.			
<b>Others</b>	Must be scalable (Provision for further expansion)			

Charge Controller	
Aspect	Proposed requirement
<b>MPPT Option</b>	Must be available
<b>Battery side rated voltage</b>	Minimum of 48V
<b>Battery type</b>	VRLA/FLA/GEL/others
<b>Maximum Efficiency</b>	Minimum of 95%
<b>Protection (PV/Battery)</b>	
<b>DC reverse polarity</b>	Yes
<b>Short circuit current protection</b>	Yes
<b>Overload protection</b>	Yes
<b>Over and under voltage protection</b>	Yes
<b>Over and under temperature protection</b>	Yes
<b>Degree of protection</b>	IP 65 (outdoor)/IP 31 (indoor)
<b>Operating temperature range</b>	-20°C to 60°C
<b>Self-consumption</b>	<5 Watt
<b>Warranty</b>	Minimum of five years
<b>Data Access</b>	Voltage, current, power and other basic information must be accessible either by a LCD Display with power saving mode or wireless communication.

## Generator Specification

Aspect	Requirement
<b>Fuel</b>	Diesel /Biogas
<b>Rated output voltage</b>	AC 230V/400V
<b>Rated Frequency</b>	50 Hz.
<b>Governor</b>	Electric Type
<b>Starting voltage</b>	12V DC
<b>Insulation class</b>	H
<b>Cooling system</b>	Mandatory, water cooled
<b>Circuit breaker type</b>	3 Pole MCCB
<b>Canopy</b>	Residential type silencer should be installed with the system
<b>Noise level</b>	Should be less than 70 dB at a distance of 1 meter
<b>Digital control interface</b>	Digital control interface must be available to be compatible with inverter operation.
<b>Ingress protection rating</b>	IP 23
<b>Total Harmonic Content</b>	<5%
<b>Synchronization</b>	Synchronization with the grid will be required when necessary
<b>Power Factor</b>	0.8
<b>Short Circuit Capability</b>	300% of rated
<b>Overheat sensor</b>	
<b>Fuel Sensor</b>	Generator oil meter should be connected to a meter so that the oil intake by the engine may be measured

## Cable Specification

Copper or aluminum conductors can be applied according to the current requirement of the plant. The conductors or cables must have following:

- i) Proper insulation (1000 V insulation for 0.4 kV line and 11 kV insulation for 11 kV line). However, availability of higher insulation than 1000V can also be explored.
- ii) Allowable voltage drop inclusive of voltage losses in both plant and distribution system side is 5%.
- iii) Resistance must be tested according to the rated capacity. If the resistance is greater than the specified value (with temperature correction), the cable can't be considered for project.