

ODISHA ELECTRICITY REGULATORY COMMISSION

WHEREAS the Odisha Electricity Regulatory Commission have published in the Odisha Government Gazette on different dates the following, namely:-

Rajasthan Electricity Regulatory Commission (Rerc), (Net Metering/Bi-Directional Metering & Their Connectivity With Respect To Rooftop Solar Pv Projects On The Rooftop Of Government/Psu Owned Buildings) Order, 2014
(Notification No. : OERC-Engg. 02/2010/(Vol-III)/1597(A), Dated: 26.11.2014)

A. (Net Metering/Bi-Directional Metering & Their Connectivity With Respect To Rooftop Solar Pv Projects On The Rooftop Of Government/Psu Owned Buildings) Order, 2014, (First amendment), 2015
(Notification No. : OERC-Engg. 02/2010/(Vol-IV)/618, Dated: 18.05.2015)

B. (Net Metering/Bi-Directional Metering & Their Connectivity With Respect To Rooftop Solar Pv Projects On The Rooftop Of Government/Psu Owned Buildings) Order, 2014, (Second amendment), 2015
(Notification No. : OERC-Engg. 02/2010/(Vol-IV)/1157, Dated: 16.09.2015)

- Inserted/ Replaced matter is shown as []^A at appropriate place; wordings inserted/ replaced shown within square brackets;
- In both of above cases; -^A ; superscript A implies that change is caused by Amendment '1'.

ODISHA ELECTRICITY REGULATORY COMMISSION BIDYUT NIYAMAK BHAVAN, UNIT – VIII, BHUBANESWAR – 751012

ORDER

No. OERC-Engg. 02/2010/(Vol-III)/1597(A)

Dated : 26.11.2014

ON NET METERING/BI-DIRECTIONAL METERING & THEIR CONNECTIVITY WITH RESPECT TO ROOFTOP SOLAR PV PROJECTS ON THE ROOFTOP OF GOVERNMENT/PSU OWNED BUILDINGS

1. Introduction:

The Government of Odisha has been earnestly exploring different sources of clean energy to meet its increasing energy requirements, diversify sources of energy, and address potential climate change issues. The state of Odisha has fairly good potential for solar power generation with 280-300 days of sunshine in a year and Global Horizontal Irradiance of about 4.5-5.0 kWh/m²/day. Setting up of large solar power projects require huge land space whereas availability of land is a major constraint in major cities of Odisha. The prevailing scenario of declining trend in solar tariff and increasing retail tariff across consumer categories like residential, commercial and industrial consumers would encourage consumers to install roof top solar systems. Therefore, roof top solar is set to witness appreciable scaling of capacities in Odisha in years to come.

The Commission is mandated to promote Co-generation and Generation of electricity from Renewable Sources of Energy by providing suitable measures for connectivity with

the Grid and sale of electricity to any person under Section 86 (e) of the Electricity Act, 2003. Keeping this in view, the Commission have decided to issue this order on Net-metering/ Bi-directional metering for roof top solar generation project including its LT connectivity for Government/ PSU owned buildings only.

^{A1} *The order dated 26.11.2014 on Net Metering / Bi-directional Metering and their connectivity with respect to Rooftop Solar PV Projects on the rooftop of Government/ PSU owned buildings shall now be extended to rooftop of all other buildings also.*^A

2. Definitions:

- (a) **“Net-Meter”** means a consumer meter which is a bi-directional energy meter for measuring the quanta of electricity flowing in opposite directions and the net quantum of electricity either consumed by the consumer or injected into the distribution system of the licensee in kWh; which shall be an integral part of the net metering system.
- (b) **“Bi-directional Meter”** means a consumer meter for measuring, indicating and recording quanta of electricity flowing in opposite directions (export to the licensee’s distribution system and import by the consumer from distribution system) in Kwh including any other quantity as per the requirement. The net quantum of electricity either injected to the distribution system or imported by the consumer in Kwh is derived by arithmetical means. In case the meter is fixed with HT consumers the power factor will be based on the import of energy only.
- (c) **Eligible consumers for Net-metering/ Bi-directional Metering:** “Eligible Consumer” means a consumer of electricity in the area of supply of the distribution licensee, who uses a rooftop solar system installed in the consumer premises, to offset part or all of the consumer's own electrical energy requirements, given that such systems can be self-owned or third party owned. Both the existing and new Solar rooftop/Solar systems which comply with this order are eligible for Net-metering/ bi-directional metering.
- (d) **“Settlement period for energy accounting”** means the period ending 31st March of the relevant financial year.

3. Net-metering/ Bi-directional Metering based rooftop Solar PV Project:

The net metering/bi-directional metering based rooftop solar projects facilitates self-consumption of electricity generated by the rooftop project and allows for feeding the surplus energy into the network of the distribution licensee. In the context of the state of Odisha the following may be the ownership arrangements for installation of such net metering based rooftop solar systems:

- Self-owned arrangement wherein rooftop owner also owns the PV system.
- Third party ownership in which a developer owns the PV system and also enters into a lease/commercial arrangement with the rooftop owner.

^{A2} *In case of defective net metering/ bi-directional metering, the followings shall apply:*

- (a) *If the solar net-metering facility has been in service for more than 12 months:*
The active energy import, active energy export and active energy net import readings of the corresponding period of the previous year will be taken for billing purpose by the DISCOMs.
- (b) *If the solar net-metering facility has been in service for less than 12 months:*

¹ Inserted text at the end of the clause 1, vide First amendment (A), 2015.

² Inserted text at the end of the clause 3, vide First amendment (A), 2015.

The net active energy to be billed by DISCSOM per month = (Average energy consumption (imported active energy) during the last three billing cycles prior to the installation of the bi-directional/ net meter) - KWP of Solar PV generator x 124.^A

4. Self-owned, net metering/ bi-directional based rooftop Solar PV Project:

In a self owned, net metering/ bi-directional metering based rooftop PV model, the rooftop owner, who is also the electricity consumer for the utility installs the rooftop solar system at his own cost. The electricity generated by the system is first used to service consumer's captive load within the rooftop owner's premises. The solar power generated in excess of the owner's electricity consumption is fed into the grid through a net-meter/ bi-directional meter. This net-generation is then credited to the owner's account and adjusted subsequently against imports from the grid in the manner specified in this order.

5. Third party owned Rooftop PV net metering/ Bi-directional metering:

In the third party owned rooftop PV net metering/ bi-directional metering model, the developers or intermediaries lease out solar PV systems to interested rooftop owners. In this arrangement, the turnkey installers lease rooftop systems to individual owners of the building. Alternatively, the installers can also offer an integrated service of leasing, commissioning and maintaining the systems to owners and guaranteeing standards of performance. The electricity generated from such a system is used to meet the rooftop owner's internal electricity needs while the excess generation is fed into the grid on net metering/bi-directional metering basis.

^{A3}Third party sale of the power generated from the Rooftop Solar PV is not permitted. The power generated shall be utilized for self consumption of the consumer and surplus power shall be injected into the Grid. The banking of electricity is also not allowed.^A

6. Capacity Limits:

The capacity of an individual rooftop PV system would be the available capacity of the service line connection, i.e. the sanctioned load of the consumer. The installation of net metered bi-directional metered rooftop solar systems on consumer premises will utilize the same service line and installation which is currently being used by the consumer for drawal of power from utility network for injection of excess power into the Grid. An overview of basic grid interactive photovoltaic system is placed at Annexure-I.

^{A4}The cumulative Grid injection is capped at 30% of the distribution transformer capacity.^A

7. Interconnection arrangements:

Net-metering/bi-directional metering facility shall be extended to the solar power system installed in consumer premises. These consumers are the "eligible consumers" for the purpose of net-metering/ bi-directional metering. Interconnection framework for net-metering shall address parameters including connecting voltage level, minimum technical standards for interconnection as would be indicated by the Commission from time to time under relevant regulations and orders including Orissa Electricity Regulatory Commission Distribution (Conditions of Supply) Code, 2004 and amendments thereto and as per technical standards for Connectivity of Distributed Generation resources Regulations 2013 and amendments thereto notified by Central Electricity Authority.

³ Inserted text at the end of the clause 5, vide First amendment (A), 2015.

⁴ Inserted text at the end of the clause 6, vide First amendment (A), 2015.

8. Application:

The consumer shall make an application in the prescribed format (Annexure – II) to the distribution utility along with a fee of INR 500/- (Indian Rupees Five hundred Only). The consumer can download the solar net-metering / bi-directional metering rooftop application form from the website of the distribution utility. It can also be obtained from concerned sub-division office. Before availing the permission for solar net metering / bi-direction metering of rooftop solar PV project the consumer is to enter into an agreement with the distribution licensee in the Standard Agreement Form. Permission will be normally issued within 15 days from the date of submission of the application to the distribution utility in their Division offices provided there is feasibility for connectivity and fulfilment of other documentary requirements as per Regulations in force.

9. Restrictions on level of overall or local grid penetration:

To address technical, safety and grid security issues arising out of possible reverse flow of electricity in the local grids, the distribution licensee shall provide net metering/ bi-directional metering arrangement to all eligible consumers as long as the cumulative capacity to be allowed for a particular distribution transformer shall not exceed 30% of the capacity of the distribution transformer.

The quantum of electricity consumed by an eligible consumer, who is not defined as an obligated entity from the rooftop solar system under net-metering / bi-directional metering arrangement shall qualify as deemed Renewable Purchase Obligation (RPO) for the distribution licensee/bulk supplier.

10. Metering Arrangement:

Two meters would have to be installed by the solar power generator. One is for measuring solar generation and the other one is for Import/Export measurement. The first meter, the solar generation meter, has to be installed at the generator end after the inverter at the ground floor of the premises to facilitate easy access for meter reading. The second meter is a net meter / bi-directional meters (single phase or three phase as per requirement) capable of recording import and export of power in kWh and shall be accepted for commercial settlements. These meters should be MRI and AMR compliant. If the consumer wishes to have a record of the reading taken, he shall be allowed to do so by the licensee. The second meter have to be installed at the same location where the present meter for consumption is installed and the present meter for drawal of power from distribution utility shall be removed. The meter rent remaining unpaid at the time of installation of new meters if any shall be waived by the distribution utility.

Provided that till the BIS and CEA standards are available the following standards shall be followed. Once the standards are available, all the net meter / bi-directional meter to be installed shall follow the relevant guideline. The existing net meter / bi-directional meter already installed before the publication of standards shall be allowed to continue.

Provided that for HT connections (11kV and above), the applicable meter can be a bidirectional meter (Category-B) and complying with the existing IS-14697 and IS 15959 standards.

^A~~5~~ ~~Provided that for LT connections (below 11kV), the applicable meter shall comply with the existing meter standards IS 13779 with additional requirement of~~

⁵ Omitted and inserted 3rd proviso of para 10 “Metering Arrangements”, vide Second amendment (B), 2015.

~~two registers, as Import and Export register, to record the import and export of electricity.~~

Provided that for LT connections (below 11kV), the applicable meter shall comply with the existing meter standards IS 14697 for CT operated static watt-hour meters and IS-13779 for ac static watt hour meters with additional requirement of two registers, as Import and Export register, to record the import and export of electricity.]^A

Provided further that all the meters should also comply with IS-15959 (Indian Standards for Data Exchange for electricity meters). There shall be a separate Solar Generation Meter to record the total solar generation in the consumer premises after the power conditioning unit.

- (a) The meters shall adhere to the standards for consumers specified by the Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006 and Central Electricity Authority (Installation and Operation of meters) Amendment Regulations, 2010 as amended from time to time.
- (b) The Distribution Licensee shall host the list of approved manufacturers of such meters in their website.
- (c) Check meter shall be installed for the solar energy system having capacity more than 20kW and for the solar energy system of capacity less than or equal to 20 kW, the check meter would be optional.
- (d) The cost of meters, cost of connectivity and all other related cost for setting up the meters etc. have to be borne by the eligible consumers under guidance of the concerned distribution licensee. Either consumer or distribution licensee shall procure the meter. The distribution licensee shall test and install the same.
- (e) The meters installed shall be jointly inspected and sealed by the Licensee on behalf of both the parties. It shall be tested by the licensee and installed in the presence of the representatives of the consumer or himself and the distribution licensee with due acknowledgement. In case desired by the consumer the licensee shall allow the presence of the same during testing by intimating test date and time in advance. Position & sealing of meters will be guided by the same provisions as applicable to consumer meters in the Central electricity Authority's Metering Regulations/Supply Code.
- (f) The meter reading, both net meter and solar generation meter shall be taken by the distribution licensee and shall form the basis for commercial settlement. The copy of the meter reading statement shall be handed over to the consumer as soon as meter reading is taken.

11. Energy Accounting:

- (a) Electricity generated from a Solar rooftop PV project shall be capped cumulatively at 90% of the electricity consumption by the eligible consumer at the end of a settlement period which ends with the financial year to allow for seasonality in generation. In case of the financial year where Commercial Operation Date (COD) occurs, the 90% capping shall be on the energy consumed by the consumer from the date of COD to the end of the financial year.
- (b) The carry forward of excess energy generation will be allowed from one billing cycle to the next billing cycle till the end of the same financial year. Any excess generation (above 90 per cent) at the end of the financial year would be considered as free energy and shall not be offset against the consumer's consumption. There shall not be any carry forward of energy to the next financial year.

- (c) The imported energy shall be eligible for normal ToD benefit as per the order of the Commission prevailing at that time.

12. Billing and Payment:

- (a) The consumer shall receive a monthly net import/export bill indicating either net export to the Grid or net import from the Grid.
- (b) In case of net import bill, i.e. if any electricity is supplied by the distribution licensee to the consumer, the distribution licensee shall raise invoice for the net electricity imported after taking into account any carry forward of energy from previous billing periods in the same financial year. The net energy imported has to be billed by the Distribution Licensee as per the tariff in force applicable to that category of consumers.
- (c) In case of export of energy in excess of the consumption of the consumer in a billing cycle shall be carried forward to the next billing cycle for adjustment against next month's import bill if any. No interest will be payable on this carry forward energy amount.

13. LT Connectivity:

- (a) The Technical Standards for connectivity shall be as specified in the CEA's (Technical Standards for connectivity of the Distributed Generating Resources) Regulations, 2013 and as amended from time to time.
- (b) The maximum capacity for interconnection with the distribution licensee's system at a specific voltage level shall be limited to the contract demand of the consumer as per his agreement with the distribution licensee subject to maximum 1 MW for a single net / bi-directional metering point.
- (c) The important clauses related to the technical and interconnection requirements are provided below:

Parameter	Reference	Requirement
Overall conditions of service	OERC Distribution (Conditions of Supply) Code, 2004 and amendments thereto	Reference to regulations
Overall Grid Standards	CEA (Grid Standard) Regulations, 2010	Reference to regulations
Equipment	BIS / IEC / IEEE	Reference to regulations
Meters	CEA (Installation & operation of meters) Regulation 2006 and amendment thereto	Reference to regulations and additional conditions issued by OERC
Safety and supply	CEA (Measures relating to Safety and Electricity Supply) Regulations, 2010	Reference to regulations
Harmonic Current	IEEE 519 CEA (Technical Standards for Connectivity of the Distributed Generation Resources) Regulations, 2013	Harmonic current injections from a generating station shall not exceed the limits specified in IEEE 519

Synchronization	IEEE 519 CEA (Technical Standards for Connectivity of the Distributed Generation Resources) Regulations, 2013	Photovoltaic system must be equipped with a grid frequency synchronization device. Every time the generating station is synchronized to the electricity system it shall not cause voltage fluctuation greater than +/- 5% at point of connection.
Voltage	IEEE 519 CEA (Technical Standards for Connectivity of the Distributed Generation Resources) Regulations, 2013	The voltage-operating window should minimize nuisance tripping and should be under operating range of 80% to 110% of the nominal connected voltage. Beyond a clearing time of 2 second, the photovoltaic system must isolate itself from the grid.
Flicker	IEEE 519 CEA (Technical Standards for Connectivity of the Distributed Generation Resources) Regulations, 2013	Operation of Photovoltaic system should not cause voltage flicker in excess of the limits stated in IEC 61000 standards or other equivalent Indian standards, if any
Frequency	IEEE 519 CEA (Technical Standards for Connectivity of the Distributed Generation Resources) Regulations, 2013	When the Distribution system frequency deviates outside the specified conditions (50.5 Hz on upper side and 47.5 Hz on lower side), There should be over and under frequency trip functions with a clearing time of 0.2 seconds.
DC injection	IEEE 519 CEA (Technical Standards for Connectivity of the Distributed Generation Resources) Regulations, 2013	Photovoltaic system should not inject DC power more than 0.5% of full rated output at the interconnection point or 1% of rated inverter output current into distribution system under any operating conditions.
Power Factor	IEEE 519 CEA (Technical Standards for Connectivity of the Distributed Generation Resources) Regulations, 2013	While the output of the inverter is greater than 50%, a lagging power factor of greater than 0.9 should operate.
Islanding and Disconnection	IEEE 519 CEA (Technical Standards for Connectivity of the Distributed Generation Resources) Regulations, 2013	The photovoltaic system in the event of fault, voltage or frequency variations must island/disconnect itself within IEC standard on stipulated period.
Overload and Overheat	IEEE 519 CEA (Technical Standards for Connectivity of the Distributed	The inverter should have the facility to automatically switch off in case of overload or overheating and should restart when normal

	Generation Resources) Regulations, 2013	conditions are restored.
Paralleling Device	IEEE 519 CEA (Technical Standards for Connectivity of the Distributed Generation Resources) Regulations, 2013	Paralleling device of photovoltaic system shall be capable of withstanding 220% of the normal voltage at the interconnection point.

14. Operation and Maintenance

- (a) The solar rooftop PV projects shall comply with the relevant standards and guidelines specified by the MNRE / BIS and CEA. The responsibility of operation and maintenance of the solar rooftop PV projects including all its accessories and apparatuses lies with the consumer. The design and installation of the solar rooftop PV project should be equipped with appropriately rated protective devices to sense any abnormality in the system and carry out automatic isolation of the solar rooftop PV project from the network of the Distribution Licensee. The inverters used should meet the necessary quality requirements as specified and checked by the Supply Engineer before putting into service. The protection logics should be tested before commissioning of the plant. The installation shall meet all safety standards and safety certificates for the installations should be obtained from the appropriate authorities.
- (b) The automatic isolation or islanding protection of solar rooftop PV projects should be ensured for, no grid supply, low or over voltage conditions and within the required response time. Fuses and fast acting circuit breakers of adequate rating on input and output side of the inverters and disconnect / isolating switches to isolate DC and AC system for maintenance shall be provided. The consumer should provide for all internal safety and protective mechanism for earthing, surge, DC ground fault, transients etc. as per the CEA regulation/standards.
- (c) To prevent back feeding and possible accidents when there is no supply from distribution licensee's side, Double pole /Triple pole isolating disconnect switches which can be locked by distribution licensee personnel should be provided by the consumer. This is in addition to automatic sensing and isolating on grid supply failure etc and also in addition to internal disconnect switches. In the event of distribution licensee's supply failure, the consumer has to ensure that there will not be any solar power being fed to the system of distribution licensee. The consumer is solely responsible for any accident to human beings /animals whatsoever (fatal /non-fatal / departmental /non-departmental) that may occur due to back feeding from the solar rooftop PV projects when there is supply failure from distribution licensee's side. Distribution licensee reserves the right to disconnect the installation at any time in the event of damage to its grid, meter, etc. or to prevent further accident or damage.
- (d) The consumer shall abide by all the codes and regulations issued by the CEA/OERC to the extent applicable and in force from time to time. The consumer shall comply with CEA/IEGC/OGC/OERC/distribution licensee's requirements with respect to safe, secure and reliable function of the Solar rooftop PV projects. The power injected into the distribution licensee's system shall be of the required quality in respect of wave shape, frequency, harmonic standard and absence of DC components etc.

- (e) The Solar rooftop PV projects shall restrict the harmonic generation within the limit specified in the agreement or specified by the Central Electricity Authority by regulation.
- (f) The Solar rooftop PV projects established under net metering/ bi-directional metering procedure may have also battery backup.

When the consumer prefers LT connectivity with battery backup (full load backup/partial load backup), the inverter shall have separate backup wiring to prevent the battery/DG power from flowing into the grid in the absence of grid supply and manual isolation switch shall also be provided. The manual isolation switch shall have locking facilities to enable distribution licensee personnel to keep it switched off and locked during maintenance works.
- (g) The inverter standard shall be such that it should not allow solar power/battery power/DG power to extend to distribution licensee's supply system on failure of distribution licensee's grid supply, irrespective of the LT connectivity options.
- (h) The inverter should be a sine wave inverter. Harmonic standards shall be as per IEEE 519. To avoid DC injection into the grid and to ensure other power quality parameters, the AC output of the inverter shall be connected through an Isolation Transformer to the distribution licensee's system.
- (i) Application for rooftop Solar PV Project connectivity shall be submitted to the concerned section officer along with application fee specified in this order.
- (j) The net-metering / bi-directional metering connection agreement is furnished in Annexure-III

15. Applicability of Renewable Energy Certificates and RPO

Solar Energy generated by Net-metering/ bi-directional metering project is not eligible for Renewable Energy Certificate (REC). The energy generated by an eligible consumer, who is not defined as an obligated entity from the rooftop solar PV projects under net-metering arrangement shall qualify as deemed Renewable Purchase Obligation (RPO) for the distribution licensee/ bulk supply licensee. The Distribution Licensee shall furnish a copy of solar energy generated by the eligible consumer to GRIDCO.

By Order of the Commission

Sd/-

SECRETARY