

GOVERNMENT OF ODISHA
SCIENCE AND TECHNOLOGY DEPARTMENT

No....., Bhubaneswar

Dated.....

RESOLUTION

Subject: “Odisha Solar Policy- 2013”

Preamble

It has been established that conventional sources of energy like oil, gas, coal etc. will not be able to provide the desired levels of energy security to mankind in foreseeable future. Preparedness being the key to successful governance, the State must prepare itself to combat energy insecurity and continue with its development goals uninterrupted. Such preparedness against energy insecurity largely rests on exploitation of alternate sources of energy besides energy conservation and energy efficiency. Amongst alternative sources of energy, renewables sources like solar, wind, biomass, hydro, tidal, wave, geothermal, ocean thermal etc. have become favourite world across, as use of these resources does not endanger the environment with threats like global warming and climate change.

Global warming is referred to the increase in temperature near the earth's surface. It happens because of the trapping of solar radiation in the earth's atmosphere due to over accumulation of greenhouse gases resulting from human activities such as burning of fossil fuels, industrial emissions etc.

Government of India has announced the National Solar Mission that aims at an installed capacity of 20,000 MW by the end of the 13th Five Year Plan in 2022. The mission has also introduced several enabling mechanism to meet this steep challenge.

Odisha by virtue of its position on the globe has almost all the aforementioned renewable energy resources. Some rough assessments indicate odisha's gross renewable energy potential as 53,820 MW. With detailed resources assessment studies and technological advancements the state's renewable energy capacity is expected to increase further.

Of the few renewable energy resources that are fast advancing towards grid parity solar energy no doubt is the frontrunner. Odisha receives an average solar radiation of 5.5 kWh/ Sqm area with around 300 clear sunny days every year. The feasible potential for power generation in the Solar Photovoltaic and the Solar thermal routes have been roughly estimated as 8000 MW and 2000 MW respectively.

Knowing the importance of promoting solar power generation Government of India has launched the National Solar Mission as the first of the eight National Missions that form the core initiatives under the National action Plan on Climate Change.

1. Title and Enforcement

- 1.1 This Policy will be known as Odisha Solar Policy, **2013**
- 1.2 The Policy will come into operation with effect from the date of resolution and will supersede the Policy Guidelines for power generation from Non conventional Energy Sources -2005 with respect to the content related to solar power generation.
- 1.3 State Government may undertake review of this Policy as and when the need arises in view of any technological breakthrough or to remove any inconsistency with Electricity Act 2003, Rules & Regulation made thereof or any Government of India Policy/State Electricity Regulatory Commission's order.

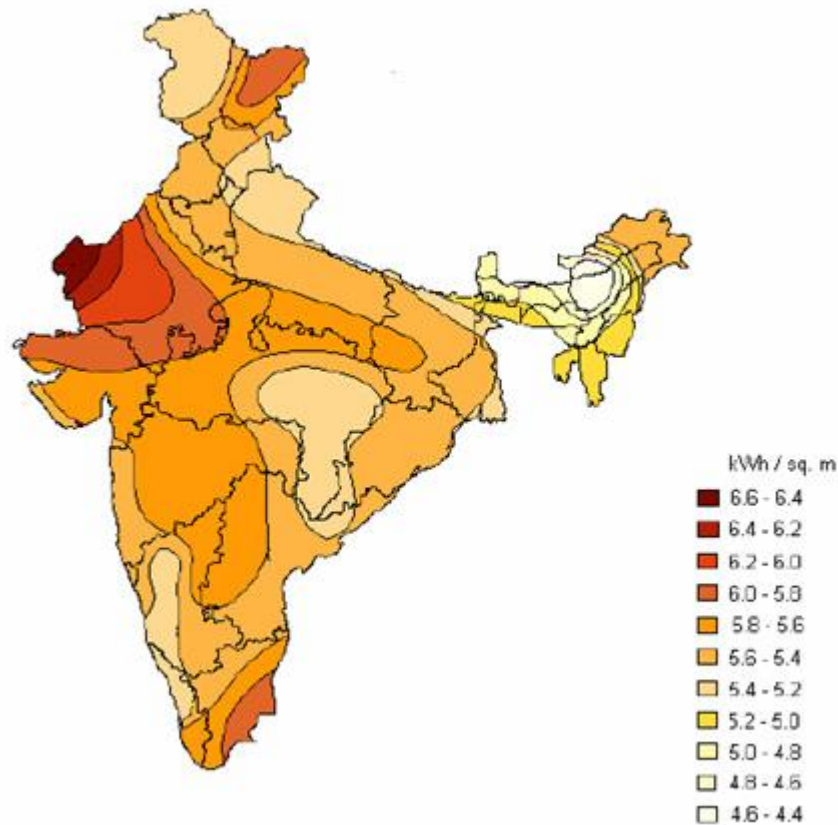
2. Objective

The principal objective of the policy is to promote the use of solar energy in the state to support development and address the problem of energy security. Other objectives are

- 2.1 Contributing to long term energy security of the State as well as ecological security by reduction in carbon emissions.
- 2.2 Providing a long term sustainable solution for meeting energy needs and reducing dependence on depleting fossil fuel resources like coal.
- 2.3 Productive use of wastelands, thereby utilizing the non-industrialized areas that receive abundant sunshine for creation of solar power hubs.
- 2.4 Creating favourable conditions to solar manufacturing capabilities by providing fiscal incentives.
- 2.5 Generating direct and indirect employment opportunities in solar and allied industries like glass, metals, heavy industrial equipments etc.
- 2.7 Creation of skilled and semi-skilled manpower resources through promotion of technical and other related training facilities.
- 2.8 Creating an R&D hub for innovation in application of solar power technologies and solar based hybrid co-generation technologies which will focus on improving efficiency in existing application and reducing cost of balance of system. For achieving the above objectives in collaboration with other technology institutions, it endeavours to create a Solar Centre of Excellence at OREDA which would work towards applied research including use of locally available raw material for manufacturing solar cells and other components and commercialization of technologies in order to achieve grid parity in terms of both cost and technical requirements.
- 2.9 Creation of a performance testing facility in OREDA for different types solar PV and Solar thermal systems as well as their various components and sub components.

3. Advantages of Solar Energy:

- 3.1 Abundantly available throughout the state.
- 3.2 No cost involved for mining and processing
- 3.3 Efficient technologies are available to harness solar energy.
- 3.4 Solar power projects can range from a few kilowatts to several megawatts.
- 3.5 Solar power projects can be installed in decentralized manner over small patches of land or even on rooftops.
- 3.6 Power projects can be installed right at the load centres thereby reducing the transmission and distribution losses to almost zero.
- 3.7 Cost of solar power is fast approaching grid parity.
- 3.8 Technologies are evolving rapidly resulting in increased CUF, storage of solar power for night time use, etc.
- 3.9 Solar power plants can work in tandem with grid power and thereby provide more reliability.
- 3.10 Apart from power generation, solar energy can also be used for a variety of application such as producing hot water and hot air for domestic, institutional and industrial usage.



4. Solar Energy Resource in Odisha

Odisha being located at 17° 49' North - 22° 34' North Latitude & 81° 29' East-87° 29' East Longitude receives good amount of sunshine for over 300 days a year. As per solar radiation map of India the daily average solar radiation incident on Odisha ranges between 5.4 to 5.6 KWh per Sqm. The district wise solar radiation data calculated over the mid coordinates of each district on the basis of NASA data (Annexure I) shows the daily average solar radiation of around 5 kWh per sqm for almost all the districts. From the current performance of commissioned mega scale solar power projects it can be concluded that the NASA data hold fairly well for Odisha and the daily average solar radiation of around 5 kWh per sqm is very suitable for commercial exploitation.

5. Scope of harnessing solar power in Odisha:

In the present context the scope for harnessing solar power in Odisha exists in the following major areas;

5.1 Generation and supply of power to State Grid through PPA

- 5.2 Generation and sale of power through open access.
- 5.3 Setting up solar power project under REC mechanism
- 5.4 On grid/off-grid Roof top solar power plants.
- 5.5 Solar Water Heating for domestic use and industrial processes
- 5.6 Solar air heating for industrial processes
- 5.7 Solar cooking
- 5.8 Solar pumping
- 5.9 Solar refrigeration
- 5.10 Triple effect and tri-generation
- 5.11 Other innovative solar energy applications like sterling engine application etc.

6 Present capacity addition requirement

The present capacity addition requirement has been calculated on the basis of the Solar Purchase Obligation of GRIDCO and other Obligated Entities in the state as indentified under the OERC- RCPO Regulation -2010. As per the said regulation the capacity addition requirement till 2015-16 is given below.

Solar Purchase Obligations from FY 2011-12 to FY 2015-16

Year-wise target	Consumption (Grid + captive sources) in MU	Minimum quantum of Solar Energy to be purchased in % of total Energy consumption in the State	Quantum of solar power to be harnessed in MU	Cumulative capacity addition in MW
2011-	44000	0.10	44	28
2012-	51000	0.15	76.5	49
2013-	58000	0.20	116	74
2014-	64000	0.25	160	102
2015-	70000	0.30	210	135

Besides the above obligated capacity, developers are free to set up solar power plants of any capacity under the REC mechanism, for captive consumption, for sale outside the state through open access and for sale to GRIDCO and DISCOMs on PPA basis provided there is demand for solar power by these entities beyond their mandated capacities under the Renewable and Cogeneration Purchase Obligation Regulation-2010 and its subsequent

amendments, if any. All such capacity addition shall be over and above the RPO mandated by OERC.

7. Solar PV Systems

Solar photovoltaic systems convert the light energy of sun in to electrical energy that can be either used directly during day time or stored in batteries for use when sunshine is not available.

Basing on their applications, Solar Photo Voltaic Systems, under these policy guidelines, are categorised in to two broad categories namely on-grid and off-grid. Systems

7.A. On-grid PV Projects

Grid tied Solar PV Power Projects, both land based and rooftop, that supply their entire generated power minus auxiliary consumption to the grid are included under this category. Such projects are further divided into the following categories:

7.A.1 Projects set up through tariff based bidding for supplying power to GRIDCO/ DISCOMs

For setting up of solar PV power projects for generation and supply of power to the State grid, under normal circumstances, developers will be selected though tariff based competitive bidding process only. For this purpose OREDA will invite 'Request for Selection' from time to time depending on the demand for solar power. Selected developers, if needed, may approach the Single window provided under these policy guidelines for land, water, power evacuation, statutory clearances etc.

7.A.2 Projects set up under the REC mechanism

Setting up of solar power projects of unlimited capacity under the REC mechanism by IPPs shall be promoted under these policy guidelines. After approval in STC as per the laid down procedure the Solar Power Producers will have to apply through the online application procedure as provided under the REC mechanism at [www.http://recregistryindia.in](http://recregistryindia.in). After due verification of the application and other documents as per the laid down procedure the State Agency (OREDA) shall accredit the projects and issue necessary certificate of accreditation and recommend the same for registration with the Central Agency

(NLDC). Issuance of Solar Certificates will be done by the Central Agency basing on the injection reports of SLDC. The Power generated from these power projects shall be purchased by GRIDCO/DISCOMs at Average Pooled Power Cost as determined by the OERC from time to time. The Solar Power Producers will sell RE (Solar) Certificates as per the regulations/orders of appropriate Commission.

7.A.3 Projects set up for supply/sale of power outside the state using open access.

Project Developers interested to sell power outside the state through open access have to submit their applications along with Detailed Project Reports to OREDA. All such projects will be examined by the STC on case to case basis. At this stage the developers, if needed, may approach the Single window provided under these policy guidelines for land, water, power evacuation, statutory clearances etc. After due clearance of the projects by the STC the developers will approach OERC for determination of wheeling charges etc. Thereafter OREDA shall execute implementation agreements with the Developer and allow the project developer to go ahead with implementation of the projects.

However, in case of failure to sell power in the open access for whatsoever reasons the developers may sell the power generated from the solar power plant to GRIDCO/DISCOM or to any third party within the state at mutually agreed tariff rates subject to approval of the same by OERC.

7.A.4 IPPs for selling Solar Power to other obligated entities through mutual tariff agreements, or to any other entity

Independent Power Producers interested to set up solar power projects for supplying the entire power from their respective projects to an obligated entity within the state so as to enable the entity to fulfil its own solar purchase obligation are encouraged under these policy guidelines, and also for supply of power to any other entity. Such sale of solar power can be made at mutually agreed tariff rates subject to approval of the same by OERC. The developers, if needed, may approach the Single window provided under these policy guidelines for land, water, power evacuation, statutory clearances etc. After due clearance of the projects by the STC the developers will approach OERC for determination of wheeling charges, if applicable.

However, in case of failure to sell the power to the obligated entity or other entities within the state with whom PPA were executed for whatsoever reasons the developers may sell the power generated from the solar power plant to bulk customers outside through open access with prior approval of OERC.

7.A.5 CPPs for meeting obligation by the obligated entities or for normal consumption

Obligated Entities under RCPO-Regulation-2010, if so desire, can under these policy guidelines set up captive Solar Power projects solely for the purpose of fulfilling their own obligations. CPPs are also encouraged for normal consumption of solar power. Such entities if needed may approach the Single window provided under these policy guidelines for land, water, power evacuation, statutory clearances etc. After due clearance of the projects by the STC the entities may approach OERC for determination of wheeling charges, if applicable.

7.B. Off-grid PV Projects

The State will promote decentralized and off-grid solar applications including hybrid system as per guidelines issued by MNRE to meet various electrical and thermal energy requirements.

The following types of projects shall be encouraged under the off-grid applications of solar PV technology:

7.B.1 Rooftop Solar PV Power Plants

With the objective of shaving day time peak power requirement, reducing AT&C loss and improve voltage Small Grid Interactive roof top solar power projects connected to LT Grid with individual capacities ranging from 0.5 KW to 500KW as well as completely stand alone projects with storage batteries to cater to power requirements during day as well as night time will be promoted under these policy guidelines for different Government, semi Government and Non Government institutes as well as private households. The primary objective of these projects would be to use the solar power within the institution/household during the day in tandem with grid power and export excess power, if any, or the power generated during holidays and other off days to the grid at tariffs determined by OERC.

For above, necessary incentives from MNRE and State Government as applicable from time to time may be availed

The targets set under this scheme is as follows

S/N	Year	Capacity in MW
1	2013-14	2
2	2014-15	5
3	2015-16	10
4	2016-17	15
5	2017-18	20

7.B.2 Decentralized Distributed Generation for Electrification of Un-electrified Villages, Power augmentation in Electrified Villages etc.

Decentralized Distributed Generation (DDG) is a scheme under MoP which aims at identifying such developers, who will be able to meet the village / hamlet electricity requirements on a sustainable basis for a period of 5 years and the selection of the developers will be on basis of least viability gap funding. Though the scheme is open to all renewable energy resources including power generation from Diesel Generators and Hybrid power stations, in view of sustainable availability of resources solar PV often stands as the best choice. Solar Power Plants of suitable capacities so as to provide minimum power of one unit per household per day as merit good can be installed under this schemes through OREDA, NGO and entrepreneur will be encouraged to utilise the scheme.

7.B.3 Solar PV Pumps for Micro Irrigation, Drinking Water Supply, Sewage Treatment Plant and lift irrigation

Solar PV pumps run on electricity generated by photovoltaics. The operation of solar powered pumps is more economical and has much less environmental impact as compared to pumps powered by an internal combustion engine (ICE). Solar pumps are useful where grid electricity is unavailable. The capacity of the pumps vary as per the expected discharge. These pumps can be effectively used for micro irrigation, drinking water supply, Sewage Treatment Plants and Lift irrigation for ayacut area of 50 hectare and above. These pumps have the potential to enhance agricultural productivity specially in rainfed and remote areas and thereby contribute to economic welfare of farming communities. In order to encourage the use of such pumps and make them affordable to small and marginal farmers government will provide suitable capital subsidy to farmers.

The targets set under this scheme is as follows

S/N	Item	Target				
		2013-14	2014-15	2015-16	2016-17	2017-18
1	Solar PV Pump for micro irrigation (Nos)	50	100	150	200	250
2	Solar PV Pump for drinking water supply (MW)	0.5	5	10	20	25
3	Solar PV Pump for drinking water supply (MW)	1	5	10	15	20
4	Solar PV Pump for Sewage Treatment Plants (MW)	.0.2	1	2	4	5
5	Solar PV Pump for lift irrigation (Ha)*	1000	5000	10000	15000	20000

***1 hectare is equivalent to 1.2 Kw**

7.B.4 Other solar PV applications such as solar lanterns, home-lights, street lights etc for use in stand-alone mode by individuals and communities.

The off grid photovoltaic applications include smaller solar PV systems like CFL/LED based lanterns, Home lighting systems, street lighting systems of different capacities, garden lights, gate lights, small power packs for powering Radios, audio Systems, TVs, Computers, insect traps, charging stations for charging lanterns and mobile phones, police stations, Small powered looms, solar inverter, solar PV pumps, water purifiers, Small milk chilling plants, refrigeration for medicine in primary health centres and Hybrid systems Powering telecom towers, auto rickshaws, cycles etc The off-grid solar applications shall be promoted for replacement of kerosene and diesel based generators sets. Guidelines and incentives provided by MNRE from time to time shall be followed in State for promotion of decentralized and off-grid solar applications.

The State will also consider incentives for promotion of decentralized and off grid Solar applications for general use as well as under the remote village electrification / access to energy programme.

Necessary support, under these policy guidelines, will also be provided for increasing the reach of such systems to the customers through effective marketing and distribution networks. Capital subsidies will also be considered

wherever such systems /devices are supplied, installed, commissioned and maintained in project mode. Extending effective service facilities being key to successful adaptation of such systems support will be provided for training of service personnel through different engineering colleges, ITCs etc. Support will also be provided to youths for opening solar service centres as means of self employment.

7.B.5 Solar PV powered Hoardings, Signage & mobile towers

Advertisement Hoardings and signages often consume a sizable quantity of conventional power. Such hoardings often glow throughout the night even when there is no one on the road to take notice of the advertisement. Mobile towers require good amount of electricity which is currently drawn from diesel generating sets which result in huge pollution. All the advertisement hoardings, commercial signages and mobile towers should be covered under solar systems by 2017-18. Instead of consuming conventional power, it is advisable to use solar power for illuminating hoardings. Mostly these will be stand alone solar power packs either mounted on the hoarding itself or installed on large roofs where the hoardings are installed. Use of solar power for hoardings, bill boards, glow signs boards, illuminated sign boards, garden lights, lights in parks and public places, gate lights is being made mandatory under these policy guidelines. Suitable penal provision will also be instituted under these policy guidelines for non compliance to the above mandatory provision.

8. Solar Thermal Systems

Unlike solar photovoltaic systems, solar thermal systems use the heat of the sun to produce useful energy for various purposes such as power generation, generation of heat for different applications like water heating, air heating, drying, roasting, cooking etc. Like Solar Photo Voltaic Systems, solar thermal systems, under these policy guidelines, are categorised in to two broad categories namely on-grid and off-grid. Systems

8.A. On-grid solar thermal Projects

Grid tied Solar thermal Power Projects, that supply their entire generated power minus auxiliary consumption to the grid are included under this category. Such projects are further divided into the following categories:

8.A.1 Projects set up through tariff based bidding for supplying power to GRIDCO/ DISCOMs

For setting up of solar PV power projects for generation and supply of power to the State grid, under normal circumstances, developers will be selected through tariff based competitive bidding process only. For this purpose OREDA will invite 'Request for Selection' from time to time depending on the demand for solar power. Selected developers, if needed, may approach the Single window provided under these policy guidelines for land, water, power evacuation, statutory clearances etc.

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Obligated Entities under RCPO-Regulation-2010, if so desire, can under these policy guidelines set up captive Solar Power projects solely for the purpose of fulfilling their own obligations. CPPs are also encouraged for normal consumption of solar power. Such entities if needed may approach the Single window provided under these policy guidelines for land, water, power evacuation, statutory clearances etc. After due clearance of the projects by the STC the entities may approach OERC for determination of wheeling charges, if applicable.

8.B. Off-grid Solar thermal applications:

Some of the major applications of solar thermal technologies include solar water heating, solar air heating, solar drying, solar cooking, steam cooking, power generation using sterling engine etc. The state under these policy guidelines shall promote extensive use of such devices wherever applicable in order to reduce the consumption of biomass, kerosene, diesel etc. for such purposes. Solar cooking systems (both direct and steam cooking systems) shall be put to extensive use in schools under the mid day meal program. Similarly solar water heating systems will be provided to hostels, dispensaries, primary / community health centres etc.

8.B.1 Solar Water Heating System (SWHS):

The State will promote Solar Water heating system by adopting the key strategy of making necessary policy changes for mandatory use of solar water heating system (SWHS) in the following potential categories:

- i) All Industrial buildings where hot water is required for processing.
- ii) All Government/Private Hospitals and Nursing homes.
- iii) All Hotels, Resorts, Motels, Banquet halls, Catering Units and Industrial Canteens.
- iv) Residential buildings built up on a plot size of 500 sq yard and above within the limits of Municipal Board/Council/Corporations including Housing Complexes set up by Group Housing Societies/Housing Boards.
- v) Hostels in educational institutions/Pvt. Hostels, Testing Labs/Laboratories of Educational Institutes/Hospitals
- vi) Barracks of Police, Paramilitary Forces and Jails.
- vii) Private/Government Guest Houses, Govt. Tourist Hotels, Dak Bungalow, Circuit House and retiring rooms of Railways.
- viii) Health Centres, Sports Complex.
- ix) All weather swimming pools.

For the above solar thermal applications the following targets are fixed

S/N	Item	Target				
		2013-14	2014-15	2015-16	2016-17	2017-18
1	Collector Area in Sqm	5000	15000	25000	35000	50000
2	No. of households	2000	3000	4000	5000	6000
3	No. of Government /Private buildings	50	100	150	200	250
4	No. of Institutions	100	200	300	400	500

8.B.2 Solar Steam Systems:

The State will promote the use of solar steam systems for wider applications such as the following

- i) Community cooking in residential institutions/ industrial mess/Hotels /Barracks/ Mid day meal program/Hospitals etc.
- ii) Industrial application of steam in process industries such as Textile/Food industry etc.
- iii) Laundries
- iv) Space conditioning using Vapour Absorption Machines (VAM's).

8.B.3 Industrial Applications:

The State will also promote the use of Solar Water Heating System (SWHS), Solar Steam Systems etc for Industrial applications such as:

- i) Process requirements of hot water.
- ii) Process requirements of steam.
- iii) Pre-heating applications in variety of Industries.
- iv) Drying applications.
- v) Steam press and laundry units
- vi) Space conditioning using Vapour Absorption Machines.
- vii) Solar steam cooking applications in industrial mess/hotels etc.

In order to promote solar applications, need based state subsidy will be provided from state budget in addition to subsidy from MNRE, GOI during the 12th plan period.

9. Development of Solar Parks in State:

The State will develop Solar Parks by following two different models. In the first model suitable waste land will be identified for setting up solar power project and the same will be sold to selected development as per provisions of IPR, government of Odisha.

In the second model OREDA will own the land where it will develop infrastructural facilities like approach roads, boundary wall, water, auxiliary power, power evacuation facility, etc. and provide the land to selected developers on 30 years' lease basis at predetermined lease rent. Depending upon the technical and operational feasibility OREDA may develop such parks through IDCO or through PPP mode.

10. Registration of Solar Power Project:

Every solar power project proposed to be set up in the state (excluding those set up through competitive bidding process) has to be registered with OREDA as per the procedure detailed below:

- 10.1. OREDA from time to time will invite application for setting up solar power plants in the state under different categories such as projects for captive consumption, projects under REC mechanism, projects for third party sale of power within the state, projects for sale of power outside the state through open access etc.
- 10.2 In response to the same intending Solar Power Producers under different categories shall submit their application to OREDA in the format prescribed by the later along with the required documents and fees as mentioned therein.

10.3 OREDA will separate the applications under various categories and after due scrutiny shall place shortlisted proposals before the State Technical Committee. Following due approval of the STC the proposals will be registered.

11. Single Window Clearance of Projects:

OREDA will act as Nodal Agency for single window clearance of the projects for following activities:

11.1 Registration of projects.

11.2. Approval of capacity of projects.

11.3 Loans from IREDA/PFC/REC/Financial Institutions/Commercial Banks.

11.4 Allotment of land in the solar park. (The developers, if they so wish can also set up their projects outside the solar park for which they have arranged the land themselves.

11.5 For Solar Thermal Power Plants, water allocation from concerned department.

11.6 Approval of power evacuation plan and allocation of bays etc.

11.7 Arranging other statutory clearances/approvals.

11.8 Execution of PPA with GRIDCO/DISCOMs

11.9 Co-ordination with MNRE/NVVN/and other State Agencies.

11.10 Accreditation and recommending the solar power project for registration with Central Agency under REC mechanism.

12. List of clearances required for setting up a solar Power Projects

12.1. Capacity allocation by STC

12.2 Pollution Control Board

12.3 MoEF Clearance

12.4 Forest Clearance

12.5 Water drawl Permission

12.6 Airport authority clearance

12.7 Mining clearance

13. State Technical Committee (STC):

The State Level Screening Committee (STC) consisting of the followings will be constituted for in principle clearance of projects particularly those interested to sell power through open access and under the REC mechanism. The STC shall comprise of the following members.

- 13.1 Principal Secretary/Secretary, S&T Department, Government of Odisha-
Chairperson
- 13.2 Principal Secretary/Secretary, Energy Department, Government of Odisha –
member
- 13.3 Principal Secretary/Secretary, Industry Department, Government of Odisha –
Member .
- 13.4 Engineer –in Chief (Electricity) –cum- Chief Electrical inspector- Member
- 13.5 Managing Directors of concerned DISCOMs – Member
- 13.6 Regional Project Officer , MNRE Regional Office – Member
- 13.7 Concerned Divisional Head of OREDA – Member
- 13.8 Chief Executive , OREDA – Member convener

14. Creation of Odisha Renewable Energy Infrastructure Development Fund:

State Government will create a separate Odisha Renewable Energy Infrastructure Development Fund for accelerated development of solar/renewable energy in The state. The resources mobilized by collection of development charges will be credited to the said fund.

The State Government will evolve other suitable mechanism for generating financial resources for further strengthening of this fund. This fund will be utilized for creation of infrastructure such as transmission network, roads etc. for accelerated development of renewable energy as per the guidelines issued by State Government in this regard.

15. Forecasting and Scheduling

The Solar energy generated for sale will not be covered under scheduling procedure for Intra-State ABT. However, the actual solar energy injected in the grid during particular time block of 15 minutes shall be post-facto considered in drawl schedule for sale of power to licensee/third party or for giving set-off against the consumption of recipient unit in case of wheeling. However, total available Solar Power Plant generating capacity shall be intimated to GRIDCO/DISCOMs for next day.

16. Metering of Power from Solar Power Plants, Rooftop and Small Solar Power Plants

Metering arrangement shall be made as per Central Electricity Authority (Installation & Operation of Meters) Regulations, 2006, the grid code, the

metering code and other relevant regulations issued by OERC/CERC in this regard.

17. Grid Interfacing

The grid interfacing arrangements for power using Solar as Renewable Energy Sources will be made by Solar Power Producer/OPTCL/DISCOMs as detailed in following clauses.

18. Generating Plant Sub-Station:

The Generating Plant Sub-station shall be developed and maintained by the Solar Power Producer as per the Grid Code applicable from time to time and the entire cost for this will be borne by them. Plant should be integrated by installing RTUs (Remote Terminal Units) by solar power producers so that the fed power can be monitored at receiving Sub-station by the SLDC on real time basis.

The Solar Power Producer shall furnish the requisite (i) Steady State Load Flow studies and (ii) Short circuit studies etc. for seeking connectivity with the Grid in reference to the provisions of the clause no. 6 "General Connectivity Conditions" of the Central Electricity Authority's "Technical Standards for Connectivity to the Grid Regulation, 2007."

Solar Power producers shall ensure that average power factor during 15 minutes interval measured at metering point of the solar power plant is maintained as per requirements of State Load Dispatch Centre conveyed to them from time to time. Solar PV Power Producers shall ensure such average power factor of 0.95 (lagging) to 1.0 power factor.

19. Receiving Sub-station:

19.1 33kV and above Grid Connected Solar Power Plants:

GRIDCO/OPTCL shall finalize the location of receiving Sub-station in consultation with OREDA on which the electricity generated will be received at minimum 33 kV level of 132/33 kV Sub-station or 400/220/132/33 kV Sub-station.

19.2 11kV Grid Connected Solar Power Plants:

Concerned DISCOMs shall finalize the location of receiving station for small solar power plant in consultation with OREDA on which the electricity generated will be received at minimum 11 kV level of 33/11 kV Sub-station.

19.3 LT connected Solar Power Plants:

Concerned DISCOMs shall allow interconnections of solar power plants connected to LT voltage level as per standard /norms fixed by Central Electricity Authority/ guidelines of MNRE/ relevant OERC order.

19.4 Grid Connectivity:

For creation of proper facility for receiving power, the Solar Power Producer shall pay Grid Connectivity charges as finalized by OREDA from time to time to DISCOMs /GRIDCO as applicable. These charges will be paid by the Solar Power Producer to GRIDCO/DISCOMs within 3 months of final approval of project. These charges include cost of complete line bay (including civil works) and its interconnection with existing electrical system. Line Bay includes breakers, CT(Current Transformer),CVT(Constant Voltage Transformer)/ PT(Potential Transformer), isolators, protection and metering equipments, bus bar material and other allied materials as applicable.

In case line bay and grid connectivity has been made by OPTCL at a particular System Voltage (say 33 kV) and Solar Power Producer at a later date wants to supply the power on higher voltage (say 132 kV), on feasibility the requisite modification, viz. addition of line bay on higher voltage, interconnection with main bus etc. shall be done by OPTCL as a deposit work on behalf of the Power Producer. In case power evacuation from any solar power plant is made through temporary arrangement due to incomplete approved evacuation system, no charges will be payable by Solar Power Producer for shifting to the approved evacuation system.

In case Power Producer first connects his feeder to Discom's substation and later on wants to connect his feeder to OPTCL's Sub-station, the additional line shall be constructed by Power Producer and the addition of line bay in OPTCL substation shall be done by OPTCL as deposit work on behalf of Power Producer.

For grid connectivity/construction of line to be arranged by OPTCL/ DISCOMs, the Solar Power Producer shall submit time-frame for construction of their plant along with Bank Guarantee equivalent to the cost of bay and transmission/distribution line with an undertaking to use the system within prescribed period. In case there is any delay in utilization of system, a penalty @ 12% per annum for the period of delay on the amount of Bank Guarantee will be levied by OPTCL/ DISCOMs. The Bank Guarantee shall be returned to the Solar Power Producer after commissioning of the project on depositing amount of penalty, if any on account of delay in the utilization of the system.

19.5 Transmission and Distribution Network Augmentation:

Grid Interfacing, required to connect the generating units, will have to be constructed by the Developers/Promoters, all at their cost. Scheme for the proposed interconnecting lines and Substation to the nearest 33/11 KV Substation or 132/220/33 KV Grid Substation will require the approval of GRIDCO/DISTCOS and should be included in the DPR.

Interconnection lines and Substation are to be constructed and maintained by the Developer. GRIDCO/DISTCOS may also maintain the same by mutual agreement on payment of annual charges as per the rules and regulations of GRIDCO/DISTCOS.

The main and check meters should be installed by the developer at the interconnection point of GRIDCO/DISTCOS Substation after due testing by GRIDCO/DISTCOS or by the Standard Testing Laboratory under the Chief Electrical Inspector, Government of Orissa and duly sealed in the presence of both the parties. The type of meter is to be chosen in consultation with GRIDCO/DISTCOSs

The meter rent/charges does not arise. The required protective devices, as approved by GRIDCO/DISTCOS and as per prudent practices, should be incorporated. GRIDCO/DISTCOS shall not be liable for any compensation or any damage to the Developer's equipment due to abnormal Grid conditions. The developer should provide required protection facilities to safeguard his equipment against abnormal Grid conditions.

19.6 WHEELING

A Generating Company, intending to set-up a NRSE Plant, does not need a licence or prior approval or consent from any authority as envisaged in Section 7 of the Electricity Act, 2003. A Developer may utilise the Power generated through the Power Plant for Captive use at the place of generation or open access to seek transmission/distribution system of GRIDCO/DISTCOS to carry the power to the destination of its use subject to Technical Feasibility on payment of transmission/distribution and Wheeling as approved by OERC, as required under Section 9 of the Act, 2003. Transmission capacity permitting, a Developer or a Generating Company shall be allowed to transmit energy outside the State on payment of transmission/wheeling charges to be determined by the OERC in accordance to Section 62 (1) (a) of the Act, 2003. Inside the State the Developer

or Generating Company may supply Energy to anyone or any area not served by the Licensees. No licence is necessary if a person generates and distributes electricity in Rural Areas to be notified by the State Government as per Section 14 of the Act, 2003.

19.7 SALE OF POWER

While the Developer does not acquire the right to sell Energy to Bulk Suppliers/Distribution Licensees, he may be allowed to do so, on a basis of a Power Purchase Agreement (PPA) with the Licensees to be approved by OERC.

Energy from the Captive Power Plant, not utilised during the year by the Developer for his captive use will be treated as sold to GRIDCO/ DISTCOS at the price to be negotiated with them and approved by OERC.

19.8 POWER BANKING

Banking of Energy generated through a Captive Solar Power Plant shall be allowed on Annual basis. The financial year shall be reckoned for the purpose. Unutilised Energy during the year may be paid as per the rates to be negotiated between GRIDCO/DISCOM and the developer. Banking charges as applicable and approved by OERC will be charged.

19.9 INCENTIVES

In pursuance to the decision taken by all the States and Union Territories regarding reforms in Sales Tax, the Government have decided that no Sales Tax incentives will be extended to the Industrial Units in the State.

The following incentives as per IPR 2001 as amended from time to time would apply:

19.9.1 A power plant Generating Power from Non-conventional Sources set up after the effective date shall be deemed to be a new industrial unit. These plants will not be liable to pay Electricity duty.

19.9.2 Government land earmarked for Industry under the "Land Bank" scheme and other Government land wherever applicable will be allotted for units generating power from Nonconventional Sources.

20. Change in City Bye laws

Urban city centres being major users of energy there is an urgent need for adoption of conservation and efficiency in its use of conventional energy and at the same time switch over to renewable energy wherever applicable.

In order to facilitate the extensive use of solar roof top PV systems, solar water heating systems, solar PV street lights, traffic signal, Advertisement hoardings etc. city bye laws have to be modified/ amended. This necessitates critical identification of various applications where renewable energy can be effectively used and then make use of renewable energy legally binding for the said applications.

Housing and Urban Development Department will take appropriate steps for change of city bye laws

The aspects of identification of renewable energy applications and building up a legal frame work for adoption of the same will be supported under these policy guidelines through provision of technical inputs. All Urban Local Bodies in the state will be encouraged to adopt model bye laws under these policy guidelines.

Indicative table for adoption of renewable energy in different segments of urban city centres.

S/N	Segment	Deployment of solar PV /Thermal systems		
		PV Power plant (Watt)	Water heating systems(LPD)	Street lighting system
1	Individual households	500 with floor area more than 300 Sqm	100LPD with floor area more than 200 Sqm	-
2	Hotels 5- star and above Other Hotels	10000 5000	15 LPD per bed 10 LPD per bed	As per requirement
3	Commercial Buildings with floor area more than 5000 Sft	2000	200 LPD	As per requirement
4	Hospitals	As per requirement	10 LPD per bed	As per requirement
5	Major city roads	-	-	10% of all street lights by 2020.
6	Advertisement Hoardings	10% of all Hoardings by 2020 as per requirement of th3e respective hoardings	-	-
7	Mobile Tower	25% of all towers by 2020 as per requirement of the towers.	-	-

21. Development of solar Cities

Development of solar cities as per MNRE guidelines will be promoted under these policy guidelines. Incorporation of solar PV and thermal applications wherever possible shall be a part of the city development plan. Various fiscal and financial incentives under these policy guidelines will be extended to solar cities on priority basis.

22. Setting up of Solar Power PV manufacturing facilities in the State:

The state under these policies will promote manufacturing facilities for manufacturing PV Cells, PV Modules as well as other components for exclusive use in SPV power projects. Such promotion will be done under the IPR and MSME policy guidelines of the State Government in vogue.

23. Research, Development and Innovation

Under these policy guidelines research and development in the field of solar technologies and applications in the context of the state using local material and intellectual resources will be encouraged. Individuals , academic institutes will be encouraged to take up such research and development activities under these policy guidelines..

24. Applications of Innovative Solar technologies :

OREDA will take up innovative solar applications in the following areas on trial basis and also as part of research program in solar before they are launched for application in Individual Household/Community .

24.1 Triple effect

24.2 Sterling Engines

24.3 Solar Air conditioning

24.4 Hybrid systems

For initial promotion of innovative applications based on viability gap budgetary support will be provided on case to case basis.

Note:

The above solar policy should be read along with the general power policies of the state since pertinent provisions under the said policies shall be applicable.

Abbreviation

ABT: *Availability Based Tariff*

AT & C: Aggregate Technical and Commercial Losses

CFL: *compact fluorescent lamp*

CPP: Captive Power Plant

CST: Central Sales Tax

CT: Current Transformer

CUF: Capacity Utilisation Factor

CVT: Constant Voltage Transformer

DDG: Decentralised Distributed Generation

DISCOM: Distribution Company

DPR: Detailed Project Report

ED: Excise Duty

GOI: Government of India

GRIDCO: Grid Corporation of Odisha

ICE: Internal Combustion Engine

IDCO: Industrial Infrastructure Development Corporation

IPP: Independent Power Producer

IPR: Industrial Policy Resolution

IREDA: Indian Renewable Energy development Agency

ITC: Information Technology Center

kWh: Kilo Watt Hour

LED: *Light-Emitting Diode*

LT: Low Tension

MNRE: Ministry of New and Renewable Energy

MoEF: Ministry of Environment and Forest

MoP: Ministry of Power

MSME: Micro Small and Medium Enterprise

MU: Million Units

MW: Megawatt

NASA: *National Aeronautics and Space Administration (NASA)*

NGO: Non Government Organisation

NLDC: National Load Despatch Center

NRSE: New and Renewable Sources of Energy

NVVN: NTPC Vidyut Vyapar Nigam Limited

OERC: Odisha Electricity Regulatory Commission

OPTCL: Odisha Power Transmission Corporation Limited

OREDA: Odisha Renewable Energy Development Agency

ORSAC: Odisha Space Applications Centre

PFC: Power Finance Corporation

PPA: Power Purchase Agreement

PPP: Public Private Partnership

PT: Potential Transformer

PV: Photo voltaic

R & D: Research and Development

RCPO: Renewable and Co-generation Purchase Obligation

RE: Renewable Energy

REC: Renewable Energy Certificate

RPO: Renewable Purchase Obligation

RTU: Remote Terminal Units

SLDC: State Load Despatch Center

SPV: Solar Photo Voltaic

Sq.m: Square meter

STC: State Technical Committee

SWHS: Solar Water Heating System

VAM: Vapour Absorption Machines

VAT: Value Added Tax

Annexure I

Solar Insolation Data of 30 Districts of Orissa

Sl.No.	DISTRICT	Solar Insolation average (kWh/m ² /day) as per NASA data	Waste land available In Acers as per ORSAC	10% of land if available for Solar Power Plants in Acers	Installed Capacity that can be achieved with 10% available land in (MW)
1	BALESHWAR	4.78	40041	4004	801
2	BHADRAK	4.71	11424	1142	228
3	BOLANGIR	5.025	134759	13476	2695
4	SONEPUR	4.98	98728	9873	1975
5	CUTTACK	4.88	87974	8797	1759
6	JAJAPUR	4.71	73823	7382	1476
7	KENDRAPADA	4.71	36485	3649	730
8	JAGATSingHPUR	4.71	31190	3119	624
9	DHENKANAL	4.71	79212	7921	1584
10	ANUGUL	4.97	95242	9524	1905
11	GANJAM	4.82	300715	30071	6014
12	GAJAPATI	4.82	277885	27788	5558
13	KALAHANDI	4.86	214295	21429	4286
14	NUAPADA	5	163114	16311	3262
15	KEONJHAR	4.82	178069	17807	3561
16	KORAPUT	4.92	276479	27648	5530
17	MALKANGIRI	4.92	464155	46416	9283
18	RAYAGADA	4.86	225540	22554	4511
19	NABARANGAPUR	4.93	160675	16068	3214
20	MAYURBHANJ	4.68	118373	11837	2367
21	PHULBANI	4.89	408680	40868	8174
22	BOUDH	4.979	138554	13855	2771
23	PURI	4.96	28622	2862	572
24	NAYAGARH	4.89	229939	22994	4599
25	KHORDHA	4.82	128611	12861	2572
26	SAMBALPUR	4.93	137571	13757	2751
27	BARGARH	5.0025	171377	17138	3428
28	DEOGARH	4.93	238439	23844	4769
29	JHARSUGUDA	4.93	68853	6885	1377
30	SUNDERGARH	4.9	125495	12549	2510
	TOTAL	5	4744322	474432	94886

Odisha Solar Policy at a glance

