

BEFORE THE UTTAR PRADESH ELECTRICITY REGULATORY COMMISSION LUCKNOW

Petition No. 679 of 2010

IN THE MATTER OF: Determination of tariff for grid connected Rooftop Solar PV and other Small Solar Power Generation in the State of U.P.

AND

IN THE MATTER OF:

U.P. New and Renewable Energy Development Agency (UPNEDA),  
Vibhuti Khand, Gomti Nagar, Lucknow.

The following were present:

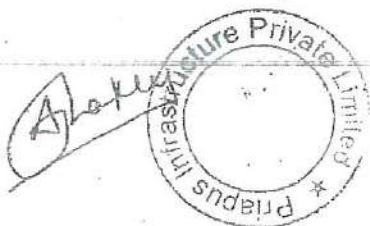
- (1) Sri A.S. Rakhra, Advocate, UPPCL.
- (2) Sri P. Chaturvedi, NTPC.
- (3) Sri Harinam Singh, UPNEDA.
- (4) Sri G.K. Verma, UPNEDA.
- (5) Sri M.P. Sharma

ORDER

(Date of Public Hearing - 10.5.10)

Director, UPNEDA, vide application dt 22.3.10, approached the Commission for fixing of tariff for grid connected Rooftop Solar PV and other Small Solar Power Generation connected to below 33 KV grid in the State of U.P. and also to review the Solar Tariff issued by the Commission under order dt. 9.9.09. As the issue was related to development of non-conventional energy, the Commission considered the application of UPNEDA as petition and held Public Hearing to obtain the comments/objections/suggestions in the matter.

The issue has been raised in view of Jawahar Lal Nehru National Solar Mission (JNNSM) announced by Ministry of New and Renewable Energy (MNRE) to promote solar energy in India. The Mission encourages grid-connected Rooftop Solar PV and other Small Solar Power Generation connected to 11 KV/0.4 KV grid and envisages as to set up 100 MW by 31<sup>st</sup> March, 2013 through a programme referred to as "Rooftop Solar PV and Small Solar Generation Programme (RPSSGP)". The projects have been divided in to two categories: One with proposed installed capacity of 100 KW to 2 MW with total installed capacity of 90 MW connected at below 33 KV (Category-1) and the other with less than 100 KW capacity with total installed capacity of 10 MW connected at LT level i.e. at 0.4 KV (Category-2). The issues related to grid integration, metering, measurement and energy accounting for projects to be connected at LT level with installed capacity lower than 100 KW is complex. As a result, MNRE has issued



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guidelines dated 16.6.10 applicable only for Category-1 projects with installed capacity of 100 KW to 2 MW.

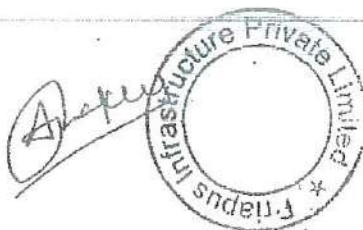
The key features of RPSSGP are as under:

- i. The project shall be designed for completion before March, 31, 2013.
- ii. The project shall be connected to HT below 33 KV.
- iii. The distribution licensee of the area will sign a Memorandum of Understanding ( MoU – 1) with the Generator (Project Proponent). The PPA would supersede MoU.
- iv. The tariff tenure shall be for 25 years on levelized basis.
- v. The distribution licensee of the area will have to sign a Memorandum of Understanding ( MoU – 2) with Indian Renewable Energy Development Agency (IREDA) who has been designated as 'Programme Administrator'. Generation Based Incentive (GBI) shall be paid to directly to distribution licensee of the area by IREDA for solar power purchased under the PPA.
- vi. The distribution licensee of the area will provide certificate of power purchased (including deemed purchase corresponding to captive consumption met from solar generation) from the project to IREDA on a monthly basis.
- vii. The GBI shall be equal to the difference between the tariff determined by the Central Electricity Regulatory Commission (CERC) and the base rate, which will be Rs. 5.50/kwh in the first fiscal year of the commissioning i.e. FY 2011-12 for projects registered in FY 2010-11. The base rate shall be escalated by 3% every year.
- viii. The base rate once determined for a particular project for the purpose of computation of GBI shall remain constant over duration of 25 years.

The GoUP has declared UPNEDA as the Competent Authority on 8.4.10 for administering the programme in the State. To encourage the RPSSGP in the State, UPNEDA has requested to fix tariff for grid connected Rooftop Solar PV and other Small Solar Power Generation connected to below 33 KV grid.

During the hearing, the Commission enquired that for promotion of solar power in the State whether any proposal for subsidy or financial assistance from the State Government has been sent by UPNEDA to GoUP which needs to be considered in the process of determination of tariff for grid connected Rooftop Solar PV and other Small Solar Power Generation connected to below 33 KV grid. Sri G.K. Verma, UPNEDA replied that no such proposal was pending with the Government. He stated that as soon as any subsidy or financial assistance is extended by the GoUP for the promotion of solar power generation in the State, it would be brought to the knowledge of the Commission.

The Commission expressed its concern over the development of solar power generation in the State. Despite being the first SERC to declare feed - in solar tariff for 20 years in India, the augmentation in capacity of solar generation has been dismal. The Commission has twice revised the tariff for solar power in the State to encourage



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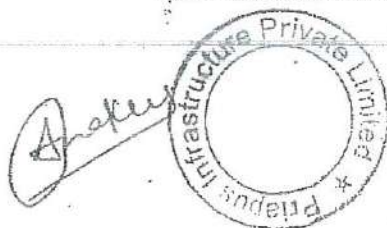




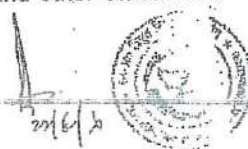
the addition in solar power generation but in vain. Hence, It is advised to UPNEDA to scrutinize the reasons as to why the state is lacking in augmentation of solar power generation capacity even though the State is having moderate solar incidence level and enough solar power generation potential.

UPNEDA has requested the Hon,ble Commission to review the Solar Tariff issued by the Commission under order dt. 9.9.09 for grid connected solar power generation. As for grid connected solar power, Central Government has proposed a mechanism of 'bundling' relatively expensive solar power with power from the cheaper unallocated quota of the Government of India (Ministry of Power) of NTPC coal based stations and selling this 'bundled' power to distribution utilities at CERC determined prices. NTPC Vidyut Vyapar Nigam Limited (NVVN) has been designated nodal agency for development of solar projects connected to grid at 33 KV and above for the next three years i.e. upto March, 2013. For each MW of installed capacity the Ministry of Power shall allocate to NVVN an equivalent amount of MW capacity (up to a maximum of 1000 MW) from the unallocated quota of NTPC coal based stations and NVVN will supply this 'bundled' power to distribution utilities. Up till now only one power purchase agreement has been entered in the State for a Solar Thermal Power Project of 10 MW capacity and that has been allowed migration to Central Government Scheme by the Commission. The UPERC has decided tariff applicable for 20 years for the projects commissioned upto 31.12.2011 for the solar power projects covered under Central Government incentive scheme as well as for those not covered under the Central Government incentive scheme. The notional tariff for solar power has been revised by CERC and is different from that taken in to consideration by the Commission in its order dated 9.9.09, but since, the Central Government has proposed to make 'bundled' power available to distribution utilities under the new incentive scheme through NVVN, it is inferred that at this juncture it would not be appropriate to further revise the tariff of solar power connected at 33 KV or above in the State.

For grid connected Rooftop Solar PV and other Small Solar Power Generation below 100 KW, MNRE has not proposed any scheme considering the technical difficulties in operation and measurement. In such a situation, the Commission opines that the tariff determination for these capacities would be taken up for consideration after MNRE finalizes a scheme for the same. Hence, the Commission decides to approve a tariff limited to the grid connected Rooftop Solar PV and other Small Solar Power Generation of capacity 100 KW to 2 MW under this order.



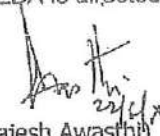
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The Commission firmly believes that a State like U.P. should not lag behind in contributing to the success of National Solar Mission as the State has enough potential for development of Solar Power Generation. Combined efforts by all the participating agencies are required for accomplishment of targets. MNRE has issued draft guidelines for promotion of solar power under RPSSGP which is applicable to Category-1 projects with installed capacity of 100 KW to 2 MW connected at below 33 KV. Under this, the base rate to be paid by distribution utilities has been proposed by the MNRE at Rs. 5.50 per unit with an escalation of 3% every year for a period of 25 years. The proposed base rate is higher than what has been allowed by the Commission in its orders for purchase of Solar PV power but to contribute to the success of National Solar Mission and to grab the benefits of incentive for the State, the Commission approves the tariff of Rs. 5.50 per unit with an escalation of 3% every year for a period of 25 years for grid connected Rooftop Solar PV and other Small Solar Power Generation of 100 KW to 2 MW projects registered in FY 2010-11 and commissioned in the FY 2011-12. Any subsidy or financial benefit subsequently provided by GoUP for promotion of solar power in the State would be considered for deduction from the base rate approved by the Commission. Projects commissioned after FY 2011-12 would get tariff equal to base rate determined for that year considering the escalation as above. The incentive, as determined by the Central Government, shall be paid over and above this tariff.

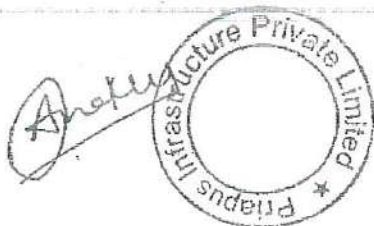
The tariff is approved to keep in tandem with Central Government scheme and to encourage the prospective generators by ensuring a reliable and complementing mechanism. The tariff would undergo a change if there is a change in the MNRE decided base rate and shall be with the approval of the Commission. In future, the Commission may differ from the base rate as decided by MNRE but it would not affect the tariff of already approved projects under the scheme. All other terms and conditions shall be as provided under guidelines of MNRE dated 16.6.10.

The Commission on suo-motu or on petition filed by UPNEDA or any other stakeholder may review the matter as and when required. UPNEDA is directed to keep the Commission informed regarding developments.

  
(Rajesh Awasthi)  
Chairman



Lucknow; Dated: 22<sup>nd</sup> June, 2010



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## Annexure-2

Requirements for Power Purchase Agreement (PPA) as per Rooftop and Other Small Solar Power Plants connected to distribution network of voltage level below 33 kV (RPSSGP)

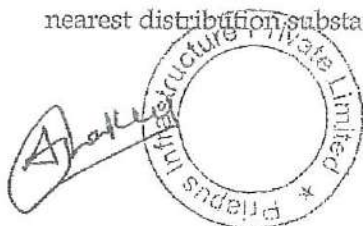
1. PPA shall mean Power Purchase Agreement to be entered into between Project Proponent and local Distribution Utility for sale/purchase of electricity generated from proposed Rooftop or Small Solar power project. The Power Purchase Agreement (PPA) would supersede MoU.
2. The local distribution utility in whose area the plant is located, would sign a Power Purchase Agreement (PPA) with the Project Proponent at a tariff determined by the appropriate State Electricity Regulatory Commission (SERC).
3. Generation Based Incentive (GBI) will be payable to the distribution utility for power purchased from solar power project selected under these guidelines, including captive consumption of Solar Power generated (to be measured on AC side of the inverter). The GBI shall be equal to the difference between the tariff determined by the Central Electricity Regulatory Commission (CERC) and the Base Rate, which will be Rs 5.50 per kWh (for Financial year 2010-11), which shall be escalated by 3% every year.




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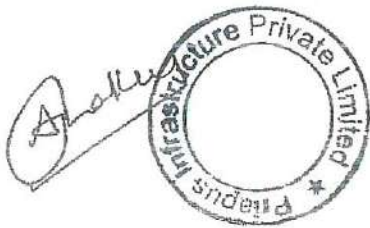


- a. Explanation: Base Rate of Rs 5.50/unit to be considered for the purpose of computation of GBI, shall remain constant over duration of 25 years. Thus, GBI determined for a project (which is the difference of CERC determined tariff and Base Rate) shall remain constant for entire duration of 25 years.
4. GBI shall be payable to the distribution utility by the Programme Administrator for period of 25 years from the date of commissioning of the project. Hence, PPA between the distribution utility and Project Proponent shall be executed for duration of minimum 25 years.
5. It may be noted that this scheme envisages purchase by the distribution utility of entire energy generated by the solar system (including deemed purchase corresponding to captive consumption met from solar generation).
6. Partly commissioned projects: In case of part commissioning of the project (not lower than 100 kW capacity) at the end of 6 months beyond the stipulated period of 12 months from the date of issuance of Registration Certificate (confirming applicability for GBI), the partly commissioned capacity shall be considered to be eligible for GBI subject to the condition that the Project Proponent shall have to ensure separate metering arrangement for the partly commissioned project capacity to be eligible to avail GBI.
- a. The un-commissioned part of the project shall however not be eligible for consideration for GBI.
7. The distribution utility will make payments for the power purchased (including deemed purchase corresponding to captive consumption met from solar generation) directly to the Project Proponent as per the terms and conditions of the Power Purchase Agreement.
8. The distribution utility shall provide necessary approvals and infrastructure for evacuation of the power generated. Further, the interconnections should be at the nearest distribution substation.



  
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9. The Project Proponent shall be responsible to operate the solar power plant as envisaged under PPA and to provide appropriate facility/instrumentation/metering arrangement to enable remote monitoring of generation.
10. The distribution utility shall provide certificate of power purchased (including deemed purchase corresponding to captive consumption met from solar generation) from the Project to the Programme Administrator on a monthly basis. The certificate shall be based on the joint meter reading taken by the Project Proponent and the distribution utility.
11. Metering arrangements shall be made by the Project Proponent in consultation with the distribution utility keeping in view guidelines/regulations notified by respective SERC's, if any. Meters shall comply with the requirements of CEA regulation on 'Installation and Operation of meters'.
12. Concerned distribution utility shall ensure that the project location as specified in MoU should remain same in PPA for the respective project.



*[Signature]*  
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CENTRAL ELECTRICITY REGULATORY COMMISSION  
NEW DELHI

Petition No. 256/2010 (*suo-motu*)

Coram: 1. Dr. Pramod Deo, Chairperson  
2. Shri S.Jayaraman, Member  
3. Shri V.S.Verma, Member  
4. Shri M. Deena Dayalan, Member

Date of hearing: 19.10.2010

Date of order: 09<sup>th</sup> November, 2010

**IN THE MATTER OF**

Determination of generic levellised generation tariff under Regulation 8 of the Central Electricity Regulatory Commission (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2009 and Central Electricity Regulatory Commission (Terms and Conditions for Tariff determination from Renewable Energy Sources) (First Amendment) Regulations, 2010.

**ORDER**

1. The Central Electricity Regulatory Commission (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2009, (hereinafter referred to as "the RE Tariff Regulations") provide for terms and conditions and the procedure for determination of tariff of the following categories of renewable energy generating stations:

- (a) Wind Power Project;
- (b) Small Hydro Projects;
- (c) Biomass Power Projects;
- (d) Non-fossil fuel-based co-generation Plants; and
- (e) Solar Photo Voltaic (PV) and Solar Thermal Power Projects.



depreciation as per Companies Act, 1956) has been compared with depreciation as per Income Tax rate i.e. 80% of the written down value method and depreciation for the first year has been calculated at the rate of 50% of 80% i.e. 40%, as project is capitalized during the second half of the financial year as per proviso (ii) to Regulation 22. Income tax benefits of accelerated depreciation, has been worked out as per normal tax rate on the net depreciation benefit. Per unit levelled accelerated depreciation benefit has been computed considering the weighted average cost of capital as discount factor.

52. In the light of the discussion made in the preceding paragraphs, the generic tariffs of the following RE projects for the financial year 2011-12 have been determined as under:

**RE Technologies as per CERC RE Tariff Regulations Norms for FY 2011-12**

Particular	Levelling Total Tariff (FY2011-12)	Benefit of Accelerated Depreciation (if availed)	Net Levelling Tariff (upon adjusting for Accelerated Depreciation benefit) (if availed)
	(₹ / kWh)	(₹/kWh)	(₹/kWh)
<b>Wind Energy</b>			
Wind Zone -1 (CUF 20%)	5.33	0.80	4.53
Wind Zone -2 (CUF 23%)	4.63	0.69	3.94
Wind Zone -3 (CUF 27%)	3.95	0.59	3.36
Wind Zone -4 (CUF 30%)	3.55	0.53	3.02
<b>Small Hydro Power Project</b>			
HP, Uttarakhand and NE States (Below 5MW)	3.78	0.47	3.31
HP, Uttarakhand and NE States (5MW to 25 MW)	3.22	0.42	2.80
Other States (Below 5 MW)	4.49	0.55	3.94
Other States (5 MW to 25 MW)	3.84	0.50	3.34

State	Levellised Fixed Cost	Variable Cost (FY 2011-12)	Applicable Tariff Rate (FY 2011-12)	Benefit of Accelerated Depreciation (if availed)	Net Levellised Tariff (upon adjusting for Accelerated Depreciation benefit) (if availed)
	(₹/kWh)	(₹/kWh)	(₹/kWh)	(₹/kWh)	(₹/kWh)
<b>Biomass Power Project</b>					
Andhra Pradesh	1.90	1.88	3.78	0.19	3.59
Haryana	1.99	2.97	4.97	0.19	4.77
Madhya Pradesh	1.88	1.70	3.59	0.19	3.40
Maharashtra	1.94	2.36	4.31	0.19	4.11
Punjab	1.99	2.94	4.94	0.19	4.74
Rajasthan	1.94	2.34	4.28	0.19	4.09
Tamil Nadu	1.96	2.62	4.58	0.19	4.39
Uttar Pradesh	1.92	2.13	4.06	0.19	3.86
Others	1.95	2.46	4.41	0.19	4.21
<b>Non-Fossil Fuel based Cogeneration</b>					
Andhra Pradesh	2.75	1.77	4.51	0.33	4.19
Haryana	2.44	2.77	5.21	0.28	4.94
Maharashtra	2.14	2.20	4.34	0.25	4.10
Madhya Pradesh	2.34	1.59	3.93	0.28	3.65
Punjab	2.44	2.74	5.19	0.28	4.91
Tamil Nadu	2.16	2.44	4.60	0.25	4.35
Uttar Pradesh	2.77	1.99	4.76	0.33	4.43
Others	2.40	2.28	4.68	0.28	4.41

State	Levellised Fixed Cost	Variable Cost (FY 2011-12)	Applicable Tariff Rate (FY 2011-12)	Benefit of Accelerated Depreciation (if availed)	Net Levellised Tariff (upon adjusting for Accelerated Depreciation benefit) (if availed)
	(₹/kWh)	(₹/kWh)	(₹/kWh)	(₹/kWh)	(₹kWh)

Solar Power Projects whose PPA signed on or before 31 <sup>st</sup> March 2011 Tariff determined for the year FY 10-11 shall be applicable during the FY 2011-12			
Particular	Levellised Total Tariff (FY2010- 11)	Benefit of Accelerated Depreciation (if availed)	Net Levellised Tariff (upon adjusting for Accelerated Depreciation benefit) (if availed)
	(₹ / kWh)	(₹/kWh)	(₹/kWh)
Solar PV	17.91	(2.96)	14.95
Solar Thermal	15.31	(2.46)	12.85

Solar Power Projects whose PPA signed after 31 <sup>st</sup> March 2011 Tariff determined for the year FY 2011-12 shall be applicable			
Particular	Levellised Total Tariff (FY2011-12)	Benefit of Accelerated Depreciation (if availed)	Net Levellised Tariff (upon adjusting for Accelerated Depreciation benefit) (if availed)
	(₹ / kWh)	(₹/kWh)	(₹/kWh)
Solar PV	15.39	(2.45)	12.94
Solar Thermal	15.04	(2.34)	12.69