

Before

UTTARAKHAND ELECTRICITY REGULATORY COMMISSION

Petition No. 30 of 2017 (Suo-Motu)

Order

In the matter of:

Review of the Benchmark Capital Cost for Solar PV, Solar Thermal and Grid Interactive Rooftop & Small Solar PV Plants to be applicable for FY 2017-18 and onwards till reviewed/revised by the Commission.

CORAM

Shri Subhash Kumar Chairman

Date of Order: August 03, 2017

1. The Commission in exercise of powers vested in it under Section 61(h) and Section 86(1)(e) read with Section 181(2)(zd) of the Electricity Act, 2003, notified the UERC (Tariff and Other Terms for Supply of Electricity from Renewable Energy Sources and non-fossil fuel based Co-generating Stations) Regulations, 2013 (hereinafter referred to as "RE Regulations, 2013") on 15th April, 2013.
2. In accordance with the first proviso of Regulation 11 of the aforesaid Regulations, the Commission issued a draft order dated 17th May, 2017 on a Suo-Motu Petition no. 30 of 2017 in the matter of review of benchmark capital cost for Solar PV, Solar Thermal and Grid Interactive Rooftop & Small Solar PV Plants to be applicable for the projects commissioned on or after 1st April, 2017 but on or before 31st March, 2018.
3. The draft order was also posted on the Commission's website and comments were sought from the stakeholders on the same latest by 15th June, 2017. In response, total five stakeholders have submitted comments on the draft order as listed in **Annexure-1**. In order to have participation of all the stakeholders by way of direct interaction with the Commission, a public hearing was also held on 27th June 2017 and the stakeholders present during the hearing are listed in **Annexure-2**.
4. The Commission through this Order has determined the generic tariff for solar power

plants on Suo-Motu basis based on the norms specified in the Regulations duly taking into account the suggestions/comments made by the stakeholders on the draft Order. The present regulatory exercise is limited to the determination of benchmark capital cost and determination of generic tariff for Solar PV Power Plants, Solar Thermal Power Plants and Grid Interactive Rooftop & Small Solar PV Power Plants. The comments/suggestions of the stakeholders on the parameters, such as life of the project, which have already been specified in the said Regulations, are beyond the scope of the present proceedings as tariff determined herein is based on the Regulations presently in force.

5. Issue-wise submissions/comments of the stakeholders and the Commission's view, analysis & decision on the same have been discussed in the following paragraphs. As far as possible, the Commission has given due consideration to the issues raised by the stakeholders/ developers in deciding the project cost & corresponding tariff.

6. Solar PV Based Projects

6.1 Capital Cost

The Commission, vide its draft Order dated 17th May, 2017 proposed to revise the capital cost of Solar PV based Projects and while doing so the Commission had considered the average cost of Module at 0.345 USD/Wp and an exchange rate of Rs. 67.233/USD based on the average of last six months, i.e. from October, 2016 to March 2017. The cost of Solar Modules worked out to Rs. 231.95 Lakh/MW and had also considered a degradation of 0.5% on a yearly basis, which was then applied to module cost to arrive at yearly degradation cost, followed by discounting to arrive at the net present value of that degradation cost at Rs. 8.59 Lakh/MW. Thus, the total cost of module worked out to Rs. 240.55 Lakh/MW. The Commission had considered Rs. 125.00 Lakh/MW as cost of land for arriving at the capital cost of Solar PV projects for FY 2015-16 and FY 2016-17. The Commission had proposed the same land cost, i.e. Rs. 125.00 Lakh/MW for FY 2017-18. The costs of other components had been adopted in the same proportion in which the respective costs were considered at the time of finalization of capital cost for Solar PV power projects for FY 2016-17.

In light of the above discussion, the Commission had proposed the capital cost of Rs. 512.39 Lakh/MW for Solar PV projects to be commissioned on or after 01.04.2017.

6.1.1 Comments of the Stakeholders

UPCL, the distribution licensee, submitted that the rate of PV module with other accessories has been taken at an average national level and expressed its acceptance on the cost of PV module proposed by the Commission. However, UPCL submitted that the cost of land considered was on a higher side which was not in accordance with the market price. Actual Cost of land purchased by the generator should be considered and the price of land should be lower of the cost of purchase of land as reflected in the sale deed or the rate determined through the applicable circle rate. UPCL submitted the circle rates of agriculture land in Haridwar, Laksar, Bhagwanpur and Kashipur. UPCL further added that there are no available data to sustain that cost of land in Uttarakhand is 5 times more, i.e. Rs. 125 Lakh/MW than the land cost as proposed by CERC, i.e. Rs. 25 Lakh/MW. UPCL requested the Commission to consider the fact that the land value is escalating each year and the generator would be the owner of the land having very high market price after the expiry of the useful life of plant. Therefore, it requested that appreciation of the land as appropriately determined by the Commission should be the discount offered in the cost of the land determined for the purpose of tariff. UPCL further added that UREDA had conducted bidding in FY 2015-16 for cumulative capacity of 181 MW and the minimum allotted tariff was Rs. 5.57/kWh and maximum allotted tariff was Rs. 5.99/kWh which was much lower than the rate derived even for FY 2017-18 in the Draft Order.

UREDA submitted that the Government of India has introduced the Goods and Service Tax (GST) on Solar power plant devices which may affect the total cost of the Solar PV, Solar thermal and grid Interactive Rooftops & Small Solar PV plants. The rate for the goods (Solar power plants devices) is 5% as per GST.

Akshay Urja Association has submitted that with the implementation of GST, the cost of module will increase by 5% and most of the projects installed in Uttarakhand had domestic content requirement and according to industry calculation, Indian solar panels are costlier by 25-30% compared to the ones manufactured abroad. Akshay Urja Association further added that there was no reason that Land Cost, Civil & general work, mounting structure, evacuation cost and pre-operative expenses should reduce from last year. In fact plant cost except module & inverter has gone up. It also submitted that

considering difficult geographical conditions and terrain of Uttarakhand the project cost should be higher as compared to other part of the country.

Sh. Digamber Singh Bisht submitted that the cost incurred in hilly region is approximately 20-25% more than that in plain region due to the additional burden of transportation cost whereas in the plain region where the connectivity to the location either by Road or Railway is close thus, making the transportation cost of material less in comparison to hill region. He further added that a separate head for transportation charges should be provided in the breakup of capital cost specifically for plants situated in hilly region so as to make viable for the generator to recover the investment done by him in implementing the Solar plant. Sh. Digamber Singh Bisht submitted that proposed civil work rates are sufficient in plain region but in hilly region the same is not possible due to the tough terrain. Sh. Digamber Singh Bisht submitted that physically/climatically hill region are difficult as compare to plains, so the time taken to complete the project is longer than in plains. Therefore, it is requested to re-evaluate the time period aspect in the tariff structure for hill region before finalization of the order.

XPANZ Energy Solutions LLP submitted that PV modules and inverters will attract GTS. Hence, the same should be considered while finalizing the capital cost. Further, generally rooftop Solar PV plants installed by Residential and Institutional beneficiaries are in kW. Therefore, for small Rooftop Solar PV plants, MW size plants should not be the basis. XPANZ Energy Solutions LLP also submitted that generic tariff are proposed with accelerated depreciation benefit at different levels of subsidy, whereas, accelerated depreciation benefits are available only at zero subsidy to commercial establishment.

6.1.2 Commission's Views and Decision

A) Cost of Solar PV Module

The Commission in its draft order dated 17th May, 2017 had considered the cost of Solar PV Module as Rs. 240.55 Lakh/MW considering the exchange rate of Rs. 67.233/USD based on the average of last six months, i.e. October, 2016 to March, 2017 and module cost of 0.48 USD/Wp, and the cost of module worked out to Rs. 231.96 Lakh/MW. Further, compensation on account of degradation worked out to Rs. 8.59 Lakh/

MW. Accordingly, the Commission had proposed the module cost of Rs. 240.55 Lakh/MW.

UREDA, Akshay Urja Association and XPANZ Energy Solution LLP submitted that with the implementation of GST, solar modules will attract tax at the rate of 5%.

The Commission observed that prior to implementation of GST all the items of machinery required for setting of a solar power generation project or facility were exempted from excise as well as import duty, however, after the implementation of GST, solar modules will attract tax at the rate of 5%. Accordingly, considering 5% GST on the module cost and an average exchange rate of Rs. 65.73/USD for last six months, i.e. Jan, 2017 to June, 2017 and degradation cost of Rs. 8.59 Lakh/MW, the Commission has considered the solar PV module cost of Rs. 246.52 Lakh/MW for FY 2017-18.

B) Land Cost

The Commission in the draft order had retained the land cost as considered in the previous Order dated 16th June, 2016. Further, the Commission had opined in its previous Order dated 23rd July, 2015 that the land requirement of 5 Acre/MW for setting up solar crystalline PV project would be reasonable which translates into 25 Bighas and considering the land cost of Rs. 5 Lakh/Bigha, the Commission had considered the land cost of Rs. 125 Lakh/MW. The Commission has analysed the Circle rate related documents submitted by UPCL and observed that the average circle rate works out to Rs. 80,000/Bigha. Further, it must be noted that land deployed for these projects is typically barren in nature, hence, the cost of the land would be less than the cost of agriculture land. The Commission also recognizes that normally the market price of the land is higher price than the circle rate of the particular area. The Commission, accordingly, is of the view that since circle rate is working out to Rs. 80,000/Bigha, hence, the cost of Rs. 2 Lakh/Bigha would be reasonable for the acquisition of land. Accordingly, considering the land acquisition cost of Rs. 2 Lakh/Bigha, the cost of land works out to Rs. 50 Lakh based on the land requirement of 25 Bigha/MW.

However, it cannot be denied that the ownership of land after the life of the project would rest with the developer and the cost of land over the period of time appreciates in value. These regulations do not provide for treatment of anticipated benefits of land

ownership post life-cycle of the plant. Additionally, land cost has been stagnant over the last financial year. Moreover, it has been observed that most of the generators are taking land at lease from the owners and accordingly, lease rentals would be far less than the cost of land. Furthermore, with the advent of technologies the ratings of solar panels have also increased. Now panels of 300 Watts are available which will reduce the land requirement. Based on the above discussion, the Commission has decided to consider the land cost @ Rs. 50/MW for determination of capital cost and fixation of corresponding tariff in accordance with the existing RE Regulations, 2013.

C) Civil & General Works and Mounting Structure Cost, Cable & Transformers, Power Conditioning Units

The Commission had proposed the cost of Rs. 28.22 Lakh/MW each for 'Civil & General Works, Mounting Structure and Power Conditioning Unit and Rs. 35.48 Lakh/MW for Evacuation cost upto interconnection point (Cable and Transformer). Akshay Urja association has requested the Commission not to reduce the cost of civil & general works and mounting structures of solar PV Projects and further submitted that the plant cost except the module costs has gone up. The Stakeholder did not provide any supporting document that can prove that the cost of the other components has gone up. Further, Sh. Digamber Singh Bisht submitted that costs of civil works proposed in draft Order is viable and sufficient in plain region but in hilly region the same is not possible due to the tough terrain.

As far as cost of civil work is concerned for hilly region, the Commission is of the view that Land cost has already been considered twice the land cost considered by CERC and that cost will cover the additional cost to be incurred in hilly region due to tough terrain. Furthermore, with the advent of technologies since the panel ratings have increased there will be less requirement of civil works and mounting structures, etc. Accordingly, the Commission is of the view to consider the other components of the capital cost in the same proportion as determined by the Commission in its Order dated 16th June, 2016.

Accordingly, the Commission has considered the cost of Rs. 22.89 Lakh/MW each for 'Civil & General Works, Mounting Structure and Power Conditioning Unit and Rs.

28.78 Lakh/MW for Evacuation cost upto interconnection point (Cable and Transformer).

D) Preliminary and Pre-operative expenses

The Commission had proposed Rs. 26.71 Lakh/MW, i.e. 5.21% of the hard cost as the preliminary and pre-operative expenses in its draft Order dated 17th May, 2017. No comments have been received from any of the stakeholder on the Preliminary and Pre-operative expenses. Accordingly, the Commission is of the view to keep the same proportion, i.e. 5.50% of hard cost for the preliminary and pre-operative expenses.

In view of the above discussions & analysis, the Commission has approved the cost of Solar PV based Plant for FY 2017-18 as follows:

Table: Capital Cost of Solar PV Plants for FY 2017-18

S. No.	Particulars	Proposed Capital Cost Norm		Approved Capital Cost Norm	
		Rs. Lakh/MW	%	Rs. Lakh/MW	%
1	PV Modules	240.55	46.95	246.52	59.31
2	Land Cost	125.00	24.40	50.00	12.03
3	Civil and General Works	28.22	5.51	22.89	5.51
4	Mounting Structures	28.22	5.51	22.89	5.51
5	Power Conditioning Units	28.22	5.51	22.89	5.51
6	Evacuation Cost upto interconnection point (Cables and Transformer)	35.48	6.92	28.78	6.92
7	Preliminary and Pre-operative expenses	26.71	5.21	21.67	5.21
	Total Capital Cost	512.39	100.00	415.63	100.00

6.2 Tariff for Solar PV Plants

Based on the proposed benchmark capital cost for Solar PV Plants, the Commission in its draft Order dated 17th May, 2017 had proposed a gross tariff of Rs. 6.10/kWh and accelerated depreciation of Rs. 0.50/kWh.

The Commission is of the view that the present exercise has been initiated under the mandate of RE Regulations, 2013 which requires the Commission to review the benchmark capital cost in each financial year. In compliance with the same, the Commission has approved the benchmark capital cost of Solar PV Plants to be commissioned during FY 2017-18. Based on the revised capital cost, tariff has strictly been worked out in accordance with the tariff principles stipulated in RE Regulations, 2013.

In view of the above discussion, the Commission has determined the gross tariff of Rs. 5.15/kWh for Solar PV sources and accelerated depreciation of Rs. 0.40/kWh commissioned on or after 1st April, 2017 as depicted in Annexure-I. This tariff shall continue to be the maximum tariff and the distribution licensee shall invite bids from generators/developers for procurement of power from these generators/developers.

7. Grid Interactive Rooftop & Small Solar PV based Projects

7.1 Capital Cost

So far as cost of module is concerned there is no difference between Solar PV Plants and Solar Rooftop PV Plants. Hence, module cost of Rooftop Solar Plant has been kept as same as that approved for Solar PV plants. In case of Land, civil and general work, the Commission has proposed the same percent of the capital cost as approved in Order dated 16.06.2016. Further, in respect of cost of power conditioning equipment including inverter, mounting structure and evacuation facility, the Commission had proposed to allow 35% higher cost of the above mentioned components for the Rooftop Solar Plants as compared to the Solar PV Plants. Accordingly, the Commission had proposed the capital cost of Rs. 463.81 Lakh/MW in the draft Order dated 17th May, 2017.

7.1.1 Comments of Stakeholders

UPCL submitted that in draft Order, land cost had been considered for evaluating the tariff but in the Rooftop category the land or the roof is already of the consumer and should be excluded in total capital cost of such projects and if the land cost is to be included in capital cost in term of lease for Third Party Model, the cost proposed in the draft order is on the higher side. UPCL submitted that the Commission should take note of recent phenomena of several players entering into the field of solar rooftop power generation and the competition therein, which is likely to result in significant reduction in capital cost.

Akshay Urja Association submitted that the benchmark cost is proposed irrespective of the size of the project. It means Benchmark cost is same for 1 kW or 500 kW system, which seems unjustified and proposed the category wise Benchmark cost which is as follows:

Type	Category	Benchmark cost (INR per KWp)*
Grid connected rooftop Solar	Upto 10 kWp	70000
	>10-100 kWp	65000
	>100-500 kWp	60000

XPANZ Energy Solution LLP also submitted that proposed capital cost relates to projects in MW whereas Rooftop Solar PV Plants installed by Residential and Institutional Beneficiaries are in kW ranging from 5 kWp to 50/250 kWp and costing of the same is higher as compared to MW in size Solar PV plants. Therefore, for the small size Rooftop Solar PV Plants, MW size plants should not be the basis.

7.1.2 Commission's View and Analysis

A) Solar PV Module Cost

The Commission in its draft Order had proposed the Solar PV module cost equivalent to the cost proposed for Solar PV power plants which was Rs. 240.55 Lakh/MW. One of the stakeholders has submitted that most of the projects installed in the State had domestic content requirement and, accordingly, as per industry calculation, India solar panels are costlier by 25-30% compared to the ones manufactured abroad. The Commission is of the view that with spurt in the demand of Solar PV modules across the country due to GoI/MNRE policy initiatives on development of 100 GW solar power capacity by 2022 in the country, the manufacturer in the country are bound to operate at their maximum production capacity levels resulting in reduction of per unit (piece) cost of PV module on the basis of cost volume profit economic principle. Hence, the Commission does not find any valid reasons to differentiate between the cost of Solar PV Plants and Roof-top Solar PV Plants. Further, some of the stakeholders submitted that the GST will impact the price of the modules.

Accordingly, the revised PV module cost @ Rs. 246.52 Lakh/MW as considered in case of Solar PV Plants has also been considered for Roof-top Solar plants.

B) Land Cost and Civil & general works

The Commission in the draft order had retained the land cost and cost of Civil & General works as considered in the Order dated 16th June, 2016. It is apparent that for such plants cost of land shall not be the same as approved above for Solar PV Plants. Further, in such cases the cost implication shall only be the lease rental/expenditure

incurred by Third Party for developing the rooftop and/or waste land of Eligible Consumer, i.e. owner of the premises. It is also noted that separate civil cost has not been allowed for such plants and is included in the cost of land. Accordingly, the Commission has decided to keep the land cost including civil works cost at Rs. 50 Lakh/MW.

C) Mounting Structures cost

The Commission had proposed Mounting Structure cost of Rs. 38.10 Lakh/MW in its draft order. Akshay Urja Association has requested the Commission to consider the cost of Mounting Structure as Rs. 44.75 Lakh/MW. The Commission, based on the view taken in Order dated 16th June, 2016, has considered the cost of mounting structure as 35% higher than that considered for the Solar PV plants. Hence, Rs. 30.90 Lakh/MW has been considered in the final order.

D) Power Conditioning Units

The Commission had proposed Power Conditioning Units cost of Rs. 38.10 Lakh/MW in the draft order. Akshay Urja Association has requested the Commission to consider the cost of Power Conditioning Units as Rs. 50 Lakh/MW. The stakeholder has not provided any basis for considering Rs. 50 Lakh/MW. The Commission, based on the views taken in the Order dated 16th June, 2016, has considered the cost of Power Conditioning Units as 35% higher than the cost considered above in this Order w.r.t. Power Conditioning Units for Solar PV Plants. Accordingly, Rs. 30.90 Lakh/MW has been considered in the final order.

E) Evacuation Cost upto interconnection point (Cables and Transformer)

The Commission had proposed Rs. 35.48 Lakh/MW in the draft order. Akshay Urja Association has requested the Commission to consider the cost of Evacuation cost upto interconnection point as Rs. 50 Lakh/MW. The stakeholder has not provided any basis for considering the cost. The Commission, based on the view taken in the Order dated 16th June, 2016, has considered the evacuation cost upto interconnection points (Cables & Transformer) as 35% higher than the cost considered above in this Order w.r.t. Cables & Transformers for Solar PV plants. Accordingly, Rs. 38.85 Lakh/MW in the final Order.

F) Preliminary & Pre-operative expenses including IDC & contingency etc.

The Commission, in line with the previous Order dated 16th June, 2016, has

proposed Rs. 24.18 Lakh/MW, i.e. 5.50% of the hard cost as preliminary & Pre-operative expenses in the draft Order. Akshay Urja Association has requested the Commission to consider the preliminary & pre-operative expenses as Rs. 30.25 Lakh/MW. The Commission is of the view that 5.50% of the hard cost would be reasonable since gestation period for erection and commissioning of such plants is even less than 6 months and based on the phasing of expenditure, bulk of the amount would be required at the later stage when solar panels are required. The same has already been deliberated in the above Paras. Accordingly, the Commission has retained the proposed percentage of 5.50% for the preliminary & pre-operative expense which works out to Rs. 21.84 Lakh/MW.

G) Capital Cost Differentiation for 1 MW & 0.5 MW

In respect of stakeholders submission regarding size based category of capital cost and for considering higher cost of 500 kW plants as against per MW cost derived for 1 MW, the Commission is of the view that the cost of mounting structure, power conditioning unit and evacuation cost for such plants have already been considered on higher side as discussed above. Hence, average cost of such equipment for plants upto 500 kW capacity would be higher than the corresponding per MW cost derived for solar PV plants.

In view of the above discussions & analysis, the Commission has approved the cost of Roof-top & Small Solar PV based Plant for FY 2017-18 as follows:

Table: Capital Cost of Roof-top & Small Solar PV Plants for FY 2017-18

S. No.	Particulars	Proposed Capital Cost Norm		Approved Capital Cost Norm	
		Rs. Lakh/ MW	%	Rs. Lakh/MW	%
1	PV Modules	240.55	55.80	246.52	52.20
2	Land Cost and Civil & General Works	75.00	13.49	50.00	15.88
3	Mounting Structures	38.10	8.50	30.90	8.20
4	Power Conditioning Units	38.10	7.29	30.90	8.20
5	Evacuation Cost upto interconnection point (Cables and Transformer)	47.89	9.71	38.85	10.31
6	Preliminary and Pre-operative expenses	24.18	5.21	21.84	5.21
	Total Capital Cost	463.81	100	419.01	100

7.2 Tariff for Roof-top & Small Solar PV Plants

Based on the proposed benchmark capital cost for Solar PV Plants, the Commission in its

draft Order dated 17th May 2017 had proposed a gross tariff of Rs. 5.65/kWh and accelerated depreciation of Rs. 0.45/kW. The comments of the stakeholders/developers on the draft Order are being discussed herein below:

7.2.1 Comments of the Stakeholders

XPANZ Energy Solutions LLP submitted that the Commission has proposed generic tariff with accelerated depreciation benefit at different level of subsidy whereas accelerated depreciation benefits are available only at zero subsidy to commercial establishments and such benefits are not available at different levels of subsidy to residential and non-profit making institutes. Akshay Urja association has proposed generic tariff based on the requested capital cost. So far the accelerated depreciation benefit is concerned, the Commission issues the Gross generic tariff along with the Net generic tariff, i.e. after deducting accelerated depreciation benefit. In case the benefit of accelerated depreciation is not available to the generator, the generator will be eligible for the gross generic tariff and the generators availing the benefit of accelerated depreciation will be eligible for net generic tariff. Based on the above discussions and RE Tariff Regulations, 2013, the Commission has worked out tariffs for Grid connected Rooftop & Small Solar PV Plants considering level of subsidy ranging from 0% to 90%.

Accordingly, as discussed above, the Commission has determined the gross tariff of such plants as Rs. 5.20/kWh, Rs. 4.35/kWh, Rs. 3.40/kWh & Rs. 3.10/kWh, considering the capital subsidy as 0%, 30%, 70% & 90% respectively as depicted in Annexure II-A , Annexure II-B, Annexure II-C & Annexure II-D.

8. Solar Thermal Projects

8.1 Capital Cost

In line with RE Regulations, 2013, the Commission had proposed benchmark cost of Solar Thermal Plants of Rs. 1200.00 Lakh/MW.

The Commission has observed that no comments/objections on the proposed capital cost have been submitted by any of the developers or stakeholders, hence, the same has been considered by the Commission for the FY 2017-18.

8.2 Tariff

The Commission had proposed the tariff in respect of Solar Thermal Plants as Rs. 12.20/kWh in its draft Order dated 17th May, 2017.

Based on the approved capital cost and in accordance with the norms specified in RE Regulations, 2013, the applicable gross tariff for FY 2017-18 has been determined as Rs. 12.20/kWh as depicted in Annexure-III enclosed.

9. Other Comments

One of the stakeholders has raised issues regarding delay in laying of transmission lines by UPCL and lower additional tariff in case of construction of such line by project developers. In this regard, the Commission is of the view that additional tariff has been specified in the Regulations in case the developer opts to construct the evacuation line on its own expense, hence, no separate dispensation is required for the same under the current proceedings. Delay in laying of transmission lines, tripping in lines etc. attributable to UPCL, if any, may be represented before the Commission separately in accordance with the provisions of the Act/Regulations.

Stakeholder has also submitted that physically/Climatically hill region are different as compared to plains, so the time taken to complete the project in hilly region is longer than in plains, therefore, they requested the Commission to evaluate the time period aspect while in tariff structure for hill region before finalization of the order. The Commission is of the view that under the Regulations, there is no separate dispensation for hilly and plain region. Further, the tariffs specified are the ceiling tariffs and the projects are allotted based on the biddings. Hence, the Commission is not considering the issue in this proceeding. However, the stakeholder may bring this matter before the Commission at the time of finalization of RE Regulations for the next control period.

10. Generic Tariffs

Based on the revised capital cost, as proposed above, the Commission has determined the generic tariff to be applicable for projects to be commissioned in FY 2017-18 which is as follows:

Generic Tariff for Solar PV Plants and Solar Thermal Plants

Particulars	Solar PV Plant (Rs./kWh)		Solar Thermal Plants (Rs./kWh)	
	Approved for FY 2016-17	Approved for FY 2017-18	Approved for FY 2016-17	Approved for FY 2017-18
Gross Tariff	7.40	5.15	12.30	12.20
Less: Acc. Dep Benefit	0.60	0.40	1.10	1.10
Net Tariff	6.80	4.75	11.20	11.10

Generic Tariffs for Grid Interactive Rooftop & Small Solar PV Plants

Level of Subsidy	0%		30%		70%		90%	
Particular	Approved for FY 2016-17	Approved for FY 2017-18	Approved for FY 2016-17	Approved for FY 2017-18	Approved for FY 2016-17	Approved for FY 2017-18	Approved for FY 2016-17	Approved for FY 2017-18
Gross Tariff	6.90	5.20	5.70	4.35	4.35	3.40	3.95	3.10
Less: Acc. Dep Benefit	0.55	0.40	0.60	0.45	0.60	0.45	0.60	0.45
Net Tariff	6.35	4.80	5.10	3.90	3.75	2.95	3.35	2.65

The above ceiling tariff shall be applicable on the projects commissioned or to be commissioned on or after 1st April, 2017 and will remain applicable till further reviewed by the Commission.

(Subhash Kumar)
Chairman

List of Stakeholders

Sr. No.	Name	Designation	Organisation	Address
1.	Sh. A.K. Tyagi	Chief Project Officer	Uttarakhand Renewable Energy Development Agency	Urja Park Campus, Industrial Area, Patel Nagar, Dehradun
2.	Sh. R.K. Bahuguna	President	M/s Akshay Urja Association	47/1, Chakrata Road, Vasant Vihar, Dehradun--248006
3.	Digamber Singh Bisht	-	-	1148, Indira Nagar Colony, PO-New Forest, Dehradun
4.	Shiv Kumar Jain	-	M/s XPANZ Energy Solutions Llp	314, JOP Plaza, Sector-18, Noida-201301.
5.	Sh. Rajneesh Agarwal	Chief Engineer (Commercial)	Uttarakhand Power Corporation Ltd.	Victoria Cross Vijeta Gabar Singh Bhawan, Kanwali Road, Dehradun.

List of Participants

Sr. No.	Name	Designation	Organisation	Address
1.	Sh. A.K. Singh	Chief Engineer (Commercial & Projects)	Uttarakhand Power Corporation Ltd.	Victoria Cross Vijeta Gabar Singh Bhawan, Kanwali Road, Dehradun.
2.	Sh. Gaurav Sharma	Executive Engineer	Uttarakhand Power Corporation Ltd.	Victoria Cross Vijeta Gabar Singh Bhawan, Kanwali Road, Dehradun.
3.	Sh. Pravesh Kumar	Executive Engineer (Commercial)	Uttarakhand Power Corporation Ltd.	Victoria Cross Vijeta Gabar Singh Bhawan, Kanwali Road, Dehradun.
4.	Sh. A.K. Tyagi	Chief Project Officer	Uttarakhand Renewable Energy Development Agency	Urja Park Campus, Industrial Area, Patel Nagar, Dehradun
5.	Sh. Anurag Sharma	Advocate	Uttarakhand Power Corporation Ltd.	Victoria Cross Vijeta Gabar Singh Bhawan, Kanwali Road, Dehradun.
6.	Sh. Mahendra Kumar	Sr. Law Officer	Uttarakhand Power Corporation Ltd.	Victoria Cross Vijeta Gabar Singh Bhawan, Kanwali Road, Dehradun.
7.	Dr. Manish Karna	General Manager	M/s ACME Solar Pvt. Ltd.	Plot No.152, Sector-44, Gurugram -122 002, Haryana
8.	Sh. J.S. Bisht	Member	M/s Akshay Urja Association	47/1, Chakrata Road, Vasant Vihar, Dehradun-248006
9.	Sh. Manish Kathait	Member	M/s Akshay Urja Association	47/1, Chakrata Road, Vasant Vihar, Dehradun-248006
10.	Sh. D.S. Rawat	-	-	-
11.	Sh. Kavindra Singh Bisht	-	-	1148, Indira Nagar Colony, Dehradun

TARIFF DETERMINATION FOR SOLAR PV POWER PLANTS OF UTTARAKHAND FOR FY 2017-18

Units Generation	Unit	Year-->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Generation	MU		8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32
Aux Consumption	%		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Saleable Energy	MU		8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32

Cost of Generation	Unit	Year-->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
O&M Expenses	Rs. Crore		0.58	0.61	0.65	0.69	0.73	0.77	0.81	0.86	0.91	0.96	1.01	1.07	1.13	1.20	1.27	1.34	1.42	1.50	1.58	1.67	1.77	1.87	1.98	2.09	2.21
Depreciation	Rs. Crore		1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32
Interest on term loan	Rs. Crore		1.71	1.57	1.42	1.27	1.12	0.97	0.82	0.67	0.52	0.37	0.22	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on working Capital	Rs. Crore		0.12	0.12	0.12	0.12	0.12	0.11	0.11	0.11	0.11	0.11	0.12	0.12	0.10	0.10	0.11	0.11	0.11	0.12	0.12	0.13	0.13	0.14	0.14	0.15	0.16
Return on Equity	Rs. Crore		1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
Total Cost of generation	Rs. Crore		4.88	4.76	4.64	4.53	4.42	4.31	4.21	4.10	4.00	3.90	4.06	3.97	3.05	3.12	3.19	3.27	3.35	3.43	3.52	3.62	3.72	3.82	3.94	4.05	4.18
Per unit Cost of generation	Rs./kWh		5.86	5.72	5.58	5.44	5.31	5.18	5.05	4.93	4.81	4.69	4.88	4.77	3.66	3.75	3.83	3.92	4.02	4.12	4.23	4.35	4.47	4.59	4.73	4.87	5.02

Levelised Tariff	5.15
Accelerated Depreciation	0.40
Net Tariff	4.75

TARIFF DETERMINATION FOR ROOFTOP SOLAR PV PLANTS OF UTTARAKHAND FOR FY 2017-18

Units Generation	Unit	Year-->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Generation	MU		8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32
Aux Consumption	%		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Saleable Energy	MU		8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32

Cost of Generation	Unit	Year-->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
O&M Expenses	Rs. Crore		0.58	0.61	0.65	0.69	0.73	0.77	0.81	0.86	0.91	0.96	1.01	1.07	1.13	1.20	1.27	1.34	1.42	1.50	1.58	1.67	1.77	1.87	1.98	2.09	2.21	
Depreciation	Rs. Crore		1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32
Interest on term loan	Rs. Crore		1.73	1.58	1.43	1.28	1.13	0.98	0.83	0.68	0.53	0.38	0.23	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on working Capital	Rs. Crore		0.12	0.12	0.12	0.12	0.12	0.12	0.11	0.11	0.11	0.11	0.12	0.12	0.10	0.10	0.11	0.11	0.11	0.12	0.12	0.13	0.13	0.14	0.14	0.15	0.16	
Return on Equity	Rs. Crore		1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	
Total Cost of generation	Rs. Crore		4.91	4.79	4.68	4.56	4.45	4.34	4.23	4.13	4.03	3.93	4.09	4.00	3.06	3.13	3.20	3.28	3.36	3.45	3.54	3.63	3.73	3.84	3.95	4.07	4.20	
Per unit Cost of generation	Rs./kWh		5.90	5.76	5.62	5.48	5.35	5.21	5.09	4.96	4.84	4.72	4.91	4.80	3.68	3.76	3.85	3.94	4.04	4.14	4.25	4.36	4.48	4.61	4.75	4.89	5.04	

Levelised Tariff	5.20
Accelerated Depreciation	0.40
Net Tariff	4.80

TARIFF DETERMINATION FOR ROOFTOP SOLAR PV PLANTS OF UTTARAKHAND FOR FY 2017-18

Units Generation	Unit	Year-->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Generation	MU		8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32
Aux Consumption	%		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Saleable Energy	MU		8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32

Cost of Generation	Unit	Year-->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
O&M Expenses	Rs. Crore		0.58	0.61	0.65	0.69	0.73	0.77	0.81	0.86	0.91	0.96	1.01	1.07	1.13	1.20	1.27	1.34	1.42	1.50	1.58	1.67	1.77	1.87	1.98	2.09	2.21
Depreciation	Rs. Crore		0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Interest on term loan	Rs. Crore		1.15	1.00	0.85	0.70	0.55	0.40	0.25	0.10	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on working Capital	Rs. Crore		0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.11	0.11	0.10	0.10	0.11	0.11	0.12	0.12	0.13	0.13	0.14	0.14	0.15	0.15	0.15
Return on Equity	Rs. Crore		1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51
Total Cost of generation	Rs. Crore		4.04	3.92	3.80	3.69	3.58	3.47	3.36	3.25	3.22	3.26	3.58	3.64	2.99	3.06	3.13	3.21	3.29	3.37	3.46	3.56	3.66	3.76	3.88	4.00	4.12
Per unit Cost of generation	Rs./kWh		4.85	4.71	4.57	4.43	4.30	4.17	4.04	3.91	3.87	3.92	4.30	4.37	3.59	3.67	3.76	3.85	3.95	4.05	4.16	4.27	4.40	4.52	4.66	4.80	4.95

Levelised Tariff	4.35
Accelerated Depreciation	0.45
Net Tariff	3.90

TARIFF DETERMINATION FOR ROOFTOP SOLAR PV PLANTS OF UTTARAKHAND FOR FY 2016-17

Units Generation	Unit	Year-->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Generation	MU		8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32
Aux Consumption	%		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Saleable Energy	MU		8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32

Cost of Generation	Unit	Year-->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
O&M Expenses	Rs. Crore		0.58	0.61	0.65	0.69	0.73	0.77	0.81	0.86	0.91	0.96	1.01	1.07	1.13	1.20	1.27	1.34	1.42	1.50	1.58	1.67	1.77	1.87	1.98	2.09	2.21
Depreciation	Rs. Crore		0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Interest on term loan	Rs. Crore		0.38	0.23	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on working Capital	Rs. Crore		0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.09	0.09	0.10	0.10	0.10	0.10	0.10	0.11	0.11	0.11	0.12	0.12	0.13	0.13	0.14	0.15	0.15
Return on Equity	Rs. Crore		1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51
Total Cost of generation	Rs. Crore		2.87	2.75	2.64	2.60	2.64	2.69	2.73	2.78	2.83	2.89	3.20	3.26	2.89	2.96	3.03	3.11	3.19	3.27	3.36	3.46	3.56	3.67	3.78	3.90	4.02
Per unit Cost of generation	Rs./kWh		3.45	3.31	3.17	3.13	3.17	3.23	3.28	3.34	3.40	3.47	3.85	3.92	3.47	3.56	3.64	3.73	3.83	3.93	4.04	4.16	4.28	4.40	4.54	4.68	4.83

Levelised Tariff	3.40
Accelerated Depreciation	0.45
Net Tariff	2.95

TARIFF DETERMINATION FOR ROOFTOP SOLAR PV PLANTS OF UTTARAKHAND FOR FY 2017-18

Units Generation	Unit	Year-->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Generation	MU		8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32
Aux Consumption	%		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Saleable Energy	MU		8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32

Cost of Generation	Unit	Year-->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
O&M Expenses	Rs. Crore		0.58	0.61	0.65	0.69	0.73	0.77	0.81	0.86	0.91	0.96	1.01	1.07	1.13	1.20	1.27	1.34	1.42	1.50	1.58	1.67	1.77	1.87	1.98	2.09	2.21
Depreciation	Rs. Crore		0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Interest on term loan	Rs. Crore		0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on working Capital	Rs. Crore		0.07	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.09	0.09	0.10	0.09	0.10	0.10	0.11	0.11	0.11	0.12	0.12	0.13	0.13	0.14	0.14	0.15
Return on Equity	Rs. Crore		1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51
Total Cost of generation	Rs. Crore		2.34	2.34	2.37	2.41	2.45	2.50	2.54	2.59	2.65	2.70	3.01	3.08	2.84	2.91	2.98	3.06	3.14	3.22	3.31	3.41	3.51	3.62	3.73	3.85	3.97
Per unit Cost of generation	Rs./kWh		2.81	2.81	2.85	2.90	2.95	3.00	3.06	3.12	3.18	3.24	3.62	3.70	3.41	3.50	3.58	3.67	3.77	3.87	3.98	4.10	4.22	4.35	4.48	4.62	4.77

Levelised Tariff	3.10
Accelerated Depreciation	0.45
Net Tariff	2.65

TARIFF DETERMINATION FOR SOLAR THERMAL POWER PLANTS OF UTTARAKHAND FOR FY 2017-18

Units Generation	Unit	Year-->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Generation	MU		10.07	10.07	10.07	10.07	10.07	10.07	10.07	10.07	10.07	10.07	10.07	10.07	10.07	10.07	10.07	10.07	10.07	10.07	10.07	10.07	10.07	10.07	10.07	10.07	10.07
Aux Consumption	%		10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%
Saleable Energy	MU		9.07	9.07	9.07	9.07	9.07	9.07	9.07	9.07	9.07	9.07	9.07	9.07	9.07	9.07	9.07	9.07	9.07	9.07	9.07	9.07	9.07	9.07	9.07	9.07	9.07

Cost of Generation	Unit	Year-->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
O&M Expenses	Rs. Crore		0.79	0.84	0.89	0.94	0.99	1.05	1.11	1.17	1.24	1.31	1.38	1.46	1.55	1.63	1.73	1.83	1.93	2.04	2.16	2.28	2.41	2.55	2.70	2.85	3.01
Depreciation	Rs. Crore		3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Interest on term loan	Rs. Crore		4.95	4.52	4.09	3.66	3.23	2.80	2.37	1.94	1.51	1.08	0.65	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on working Capital	Rs. Crore		0.30	0.30	0.29	0.28	0.28	0.27	0.26	0.26	0.25	0.25	0.26	0.25	0.20	0.20	0.20	0.21	0.22	0.22	0.23	0.23	0.24	0.25	0.26	0.26	0.27
Return on Equity	Rs. Crore		3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	4.32	4.32	4.32	4.32	4.32	4.32	4.32	4.32	4.32	4.32	4.32	4.32	4.32	4.32	4.32
Total Cost of generation	Rs. Crore		13.15	12.76	12.37	11.98	11.60	11.22	10.84	10.47	10.10	9.73	10.11	9.75	6.98	7.08	7.18	7.28	7.39	7.51	7.63	7.76	7.90	8.04	8.19	8.36	8.53
Per unit Cost of generation	Rs./kWh		14.50	14.07	13.64	13.21	12.79	12.37	11.96	11.54	11.14	10.73	11.15	10.75	7.70	7.81	7.91	8.03	8.15	8.28	8.41	8.56	8.71	8.87	9.04	9.22	9.41

Levelised Tariff	12.20
Accelerated Depreciation	1.10
Net Tariff	11.10