

Before

UTTARAKHAND ELECTRICITY REGULATORY COMMISSION

Petition No. 9 of 2015 (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 2015-16 and onwards till reviewed/revised by the Commission.

CORAM

Shri Subhash Kumar Chairman

Shri C.S. Sharma Member

Date of Order: July 23, 2015

- 1 The Commission in exercise of powers vested in it under Section 61(h), 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 15.04.2013.
- 2 In accordance with the first proviso of Regulation 11 of the aforesaid Regulations the Commission issued a draft order dated 28.04.2015 on a suo-motu Petition no. 9 of 2015 filed 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 01.04.2015 but on or before 31.03.2016.
- 3 The draft order dated 28.04.2015 was also posted on the Commission's website seeking comments from stakeholders on the same latest by 18.05.2015 which was further extended

till 18.06.2015. In response total 10 stakeholders have submitted comments on the draft order as listed in enclosed 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 23.06.2015. List of stakeholders present during the hearing is listed as enclosed Annexure-2.

- 4 The Commission through this order is determining the generic tariff for solar power plants on Suo-Motu basis based on the parameters specified in the Regulations duly taking note of the suggestion/comments made by stakeholders on the draft order circulated. The present regulatory exercise is limited to the determination of benchmark capital cost and determination of generic tariff for Solar PV, Solar Thermal power plants and Grid Interactive Rooftop & Small Solar PV Plants on the parameters specified in the RE Tariff Regulations, 2013. The comments/suggestions of the stakeholders on the parameters, such as Discount Rate, Interest on Loan, CUF, 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 stakeholders and the Commission's analysis & decision on the same have discussed in the following Paras. As far as possible, the Commission has given due consideration to the issues raised by stakeholders/developers in deciding the project cost & corresponding tariffs. Views & decisions given in respect of common issues such as revision in CUF or methodology in computation of interest rate etc. discussed under a solar project category shall be equally applicable in other solar projects categories also.

6 Solar PV Based Projects

6.1 Capital Cost

The Commission vide the draft order dated 28.04.2015 proposed to revise the capital cost of Solar PV Based Projects. While doing so, the Commission had adopted the cost specified in draft order (Suo-Moto) dated 03.03.2015 of CERC.

6.1.1 Comments of the Stakeholders

UPCL, the State distribution licensee, has submitted that according to a survey published in the newspaper, the capital cost of Solar PV based project has decreased to Rs. 3.50 Crore/MW – Rs 3.90 Crore/MW. UPCL expressed its acceptance on the revised capital

cost proposed by the Commission.

UREDA submitted that it had selected 12 developers for procurement of 30 MW Solar PV power projects through Tariff Based Competitive Bidding Process under Type-I of "Uttarakhand Solar Power Policy 2013" and the Commission had, vide Order dated 20.03.2015, directed that the benchmark capital cost and generic tariffs thereof as ceiling tariffs, as provided in RE Regulations, 2013 shall remain applicable for these 12 developers of Solar PV Plants during FY 2015-16 and the tariff quoted by them shall apply subject to the condition that: (a) They execute their PPA with UPCL by 31.03.2015, and (b) They commission their projects on or before 31.03.2016. UREDA requested the Commission not to repeal the Order dated 20.03.2015 while finalizing this Order. UREDA also referred to MNRE's order no. F.No.32/8/2014-15/GSP dated 12.08.2014 wherein, a scheme for setting up 90 MW Grid Connected Solar PV Power Plants on Canal Banks/Canal Tops and under this scheme MNRE had allotted 20 MW Solar PV power plant on Canal Banks/Canal Tops to Uttarakhand to be installed on the canals of UJVN Ltd. UREDA requested the Commission to direct UPCL to procure power from solar power projects sanctioned by MNRE under its various schemes as each scheme had different implementation & power procurement mode.

M/s Ujjas submitted that CERC has considered and finalized the bench mark capital cost of Rs. 605 Lakh per MW and not Rs. 587 Lakh per MW as considered by the Commission in the draft order.

Sh. Rajkumar, a stakeholder, submitted that while fixing capital cost of Solar PV projects the Commission has considered the cost of land as Rs. 25 Lakh/MW in the draft order, however, for implementation of Solar PV Plant of 1 MW land area of about 5 Acre would be required and present cost of the same was around Rs. 125 Lakh. Accordingly, Sh. Rajkumar requested the Commission for considering the land cost as Rs. 125 Lakh/MW. M/s Dwij Energy Solution submitted that land is a scarce resource in Uttarakhand and rigid national standard of Rs. 25 Lakh/MW was not applicable in the hilly State of Uttarakhand. The respondent submitted that land cost should be revised and brought to a realistic range of Rs. 125-140 Lakh/MW. M/s Hindustan EPC Company Ltd. (M/s. HECL) referred to land cost considered by Gujarat Power Corporation Limited (GPCL) for setting up a power plant in Solar Park, Charanka,

Gujarat as Rs. 1.05 Crore/MW. It also submitted that the cost of land development considered by MNRE & Rajasthan was Rs. 0.90 Crore/MW & Rs. 0.70 Crore/MW respectively over and above the minimum land cost of Rs. 25 Lakh/MW. The respondent, accordingly, requested the Commission for considering the land cost of Rs. 1.05 Crore/MW.

M/s Dwij submitted that price of PV module should be considered as 0.70 US\$/Wp and inland transportation cost should also be considered under this head. M/s. HECL submitted that the capital cost of Solar PV Plants is largely based on the CERC's Draft Order for FY 2015-16, however, it should be based on the State specific constraints/requirements. The respondent also submitted that the Module cost considered by CERC is based on lowest module cost in the market which might lead to compromise with quality of the same and also increased O&M cost resulting in lower revenue realization etc. M/s HECL requested the Commission for considering average cost of Module as Rs. 383.50 Lakh/MW.

M/s HECL submitted that the Commission in the draft Order dated 28.04.2015 had proposed the Cost of civil & general works and cost of mounting structure as Rs. 50 Lakh/MW each, and has requested the Commission for considering the same in final order. In respect of power conditioning unit, the respondent submitted that the inverter also comprised of transformer, iron parts and copper wires which has shown increasing cost trend and also the depreciation of Rupee has further increased the cost of inverters. Therefore, considering the depreciation of Rupee, escalation of metal prices and the need for replacement of inverters after 12/13 years, the cost towards Power Conditioning Unit for the FY 2015-16 may be considered as at least Rs. 65 Lakh/MW.

In respect of cost of cables & transformers, M/s HECL submitted that the prices of cables and transformers have increased and are also dependent on the Steel and Electrical Machinery and Wholesale Price Indices which have an increasing trend. It requested the Commission to consider reasonable Evacuation Cost up to Inter-connection Point (Cables & Transformers) as Rs. 66 Lakh/MW, i.e. an escalation of 5% from previous year 2014-15.

M/s Dwij submitted that Preliminary and Pre-operative expenses such as IDC etc.

is mostly project related financing. Therefore, reduction in this head should have been around 15% in correspondence to a capital cost reduction of 15.01% (691.09 vs. 587.33), however, in the proposed capital structure it has been reduced by a whopping 42.02% (69 Vs 40). M/s HECL submitted that the two components of this head (i.e. financing cost & project management cost and Pre-operative cost) are independent of Capital Cost and thus, have to be considered in absolute terms instead of as a percentage of capital cost. The Respondent submitted that CERC had addressed this issue by increasing the percentage from 7.5% in 2012-13 to 10% in 2013-14. It requested the Commission to consider at least 10% of capital cost as Preliminary and Pre-Operative Expenses including IDC and Contingency expenses, which work out to Rs. 78 Lakh/MW.

6.1.2 Commission's Views and Decisions

A) Cost of Solar PV Module

The Commission in its draft Order had considered the cost of Solar PV Module as Rs. 327.33 Lakh/MW based on the prevailing module cost which was in the range of 0.52 US\$/Wp for FY 2015-16 and also provided by CERC in its draft Order dated 03.03.2015. The Commission had proposed these rates on the assumption that module prices would decline in future years.

In its Order dated 31.03.2015, CERC observed that the cost of Solar PV module has witnessed a declining trend and that it had considered all relevant factors including the competing and counter-balancing demands dictated by the available prices trends and concerns of stakeholders about future trends and had retained the module cost of 0.52 US\$/Wp for determination of benchmark capital cost of Solar PV for FY 2015-16 which was inclusive of custom clearing charges, transportation and unloading, and cost towards quality compliance.

As regards considering exchange rate, it would be relevant to state that the currency future market is linked to speculations which lead to uncertainty in currency exchange rates. CERC also considers average currency exchange rate of past six months for arriving at the module cost instead of considering the rate based on currency future market data. Accordingly, the Commission decides to continue to take average of daily exchange rates prevailing in the last six months immediately preceding the date of this

order for determination of module cost in terms of Rs./Wp. Average rate for Rs./US\$ for past six months (19.01.2015 to 18.07.2015) as per RBI is Rs. 62.955/US\$. The Commission has decided to take this rate for FY 2015-16. Considering the exchange rate at Rs. 62.955/US\$ and considering PV Module cost at US \$ 0.52/Wp, the price of Solar PV module works out to Rs. 327.37 Lakh/MW. The Commission has considered this cost in determination of capital cost for Solar PV power plants in this order for FY 2015 -16.

In addition, the Central Commission also observed that normally manufacturers provide a guarantee with a definite margin of safety and design purpose, therefore, a degradation percentage (lower than that guaranteed) can be employed. The quality of module is of immense importance. It is found that the length of warranty period is continuously increasing, indicating increase in confidence among manufacturers, as they realize durable quality of their products, due to technology improvements and quality assurance practices. The Central Commission based on the above analysis considered reasonable compensation for degradation due to ageing while determining generic tariff for FY 2015-16 as an additional 0.5% of the modules cost every year after 4th year on notional basis. Since the RE Tariff Regulations did not provide norms for degradation, the Central Commission decided to consider module degradation as allowed in the past on notional basis based on the study carried out by it as Rs 9.69 Lakh/MW.

Based on the approach of the Central Commission for arriving at the total module cost, the Commission has determined the total module cost as Rs. 337.06 Lakh/MW including the additional module degradation cost.

B) Land Cost

The Commission observes that CERC has vide its Order dated 31.03.2015 determined the Capital Cost of Solar PV Plants. CERC while deciding the capital cost has considered land cost of Rs. 25 Lakh/MW. In this regard, project developers have submitted that it should be in the range of Rs. 125 Lakh/MW to Rs. 140 Lakh/MW. UREDA (State Agency) during the hearing also submitted that land cost should be taken as Rs. 150 Lakh/MW in determination of project cost of Solar PV Plants.

CERC had proposed the land requirement of 5 Acre/MW for crystalline PV project and its cost was considered as Rs. 25 Lakh/MW. CERC was of the opinion that

the land acquired for setting up solar power projects would be mostly arid/barren or of no commercial use. However, factoring in the increase in land cost and with due regard to the diversity in land prices in different States, and with increase in the average module efficiency, the land required for the crystalline PV project has reduced. Therefore, CERC decided to retain the proposed land cost at Rs. 25 Lakh/MW (Rs. 5 Lakh/Acre * 5 Acre/MW) for Solar PV projects.

The Commission is of the view that land cost should be decided considering ground realities in the State and the same cannot be adopted as specified by CERC. Moreover, price of land is relatively higher in the State due to scarcity of the same. The Commission is of the opinion that the land requirement of 5 Acre/MW for setting up solar crystalline PV project would be reasonable which translates into 25 Bighas. Considering the land cost of Rs. 5 Lakh/Bigha, the Commission has considered the land cost of Rs. 125 Lakh/MW against the land cost of Rs. 25 Lakh/MW proposed in the draft Order.

C) Civil & General Works And Mounting Structure Cost

None of the developer/stakeholder except M/s HECL has submitted any comments on these two heads of capital cost. M/s HECL has submitted that based on its own experience Rs. 50 Lakh/MW each for Civil & General Works and Mounting Structure Cost are reasonable and requested the Commission that the same may be considered in final order. The Commission is of the view that CERC has also finalized capital cost of Solar PV Plants considering the same expenses under the above mentioned heads and, accordingly, no change is required against the proposed expenses.

D) Power Conditioning Unit/Inverter

The Commission observes that M/s HECL relying on budgetary offer made by some firm in January, 2015 arrived at a cost of power conditioning unit/inverter as Rs. 60 Lakh/MW. However, the same cannot be considered as a basis for determination of benchmark capital cost of any component of Solar based plants. Moreover, expenses on installation for power conditioning unit, as submitted by the stakeholder, cannot be considered on a standalone basis. It has also been submitted that Inverter life is around 12-15 years which requires cost of replacement to be borne by the developer, hence, Rs.

65 Lakh/MW should be allowed. In this regard, the Commission observes that CERC has vide order dated 31.03.2015 while approving cost of power condition unit also considered cost of major overhaul of the as following:

“.....

Considering the comments received as well as taking cognizance of the cost of inverter available in the country, the Commission has decided to retain the proposed cost of power conditioning unit as Rs. 45 Lakhs/MW including all taxes & duties and major overhaul cost in the 12th - 14th year of operation. “

From above, it is apparent that CERC has not only considered the cost of power conditioning unit/inverters available across the country but has also given due consideration for expenses on major overhaul in the mid life of the plant. Accordingly, the Commission has decided to continue with the cost of Rs. 45 Lakh/MW as proposed in draft Order dated 28.04.2015.

E) Cables & Transformers

This expenditure includes costs towards DC cabling between Solar PV panels & Inverters including junction boxes, AC cabling between Inverter & sub-station, LT panels, HT panels, earthing arrangements, step up outdoor type transformer, breaker, current transformers, potential transformers, auxiliary transformers control cables, isolators, lightning arrestors, protection relays and Time of Day (ToD) meters / tariff meters, peripheral lighting, telemetry system for real time monitoring etc.

M/s HECL has submitted that Rs. 66 Lakh/MW may be considered towards evacuation infrastructure upto inter-connection point. However, the Commission, in accordance with the approved CERC cost of Rs. 55 Lakh/MW for cables & transformer has decided to approve Rs. 55 Lakh/MW as cost for cables & transformer against Rs. 50 Lakh/MW included in the draft order dated 28.04.2015.

F) Preliminary & Preoperative Expenses

In respect of preliminary & preoperative expenses, M/s Dwij has submitted that such expenses are mostly project related financing expenses and, therefore, reduction in this should be around 15% corresponding to the capital cost reduction of 15%. M/s HECL has submitted that this head is independent of capital cost and should be

considered in absolute terms instead of percentage of capital cost. However, on this issue, stakeholders/developers have not submitted any analysis or documentary evidence in support of their claim. The Commission has taken reference of Order dated 31.03.2015 of CERC, wherein, Central Commission has elaborated its finding and has clarified that:

“PV has made remarkable progress in reducing costs with a focused, forward looking and innovative fiscal and financial policies adopted by Ministry of New and Renewable Energy, Government of India and various State Governments. With these fiscal and financial policies, the soft cost related with PV power plant has reduced significantly. The preliminary/pre-operating expenses include transportation of equipment, storage of equipment at site, insurance, contingency, taxes and duties, IDC and finance charges etc. Detailed breakup of Preliminary and Pre-operative expenses and financing cost, lump sum in percentage of total capital cost is as under:

- i. Insurance Cost: 0.5 %*
- ii. Contingency: 0.5%*
- iii. Interest during Construction (IDC): 5%*
- iv. Financing cost: 1%*
- v. Project management cost: 0.5%*
- vi. Pre-operative Cost: 0.5% “*

From above, it is apparent that majority of sub-heads of Preliminary & Pre-operative expenses are related to capital cost of the project. Further, gestation period of a solar PV project is less than a year. Hence, the IDC of 5% would be reasonable even assuming a rate of interest of 13% p.a. since gestation period for commissioning of the solar PV plant is less than one year.

CERC has considered 8% of the capital cost under this head. This Commission is of the view that Preliminary & Preoperative Expenses to the extent of 8% of capital cost would be reasonable. Accordingly, considering the componentwise capital costs, as discussed above, the Commission has approved preliminary & preoperative expenses of Rs. 57.57 Lakh/MW @ 8% of the total capital cost.

UREDA has requested the Commission not to repeal the Commission’s Order dated 20.03.2015, wherein, tariff and timeline of signing of PPA alongwith commissioning of projects in respect of 12 projects selected through bidding process was

specified. Further, UREDA has also requested the Commission for allowing UPCL to procure power from solar power projects sanctioned from MNRE under its various schemes as each scheme have different implementation & power procurement mode. In this regard, the Commission is of the view that the instant regulatory process is explicitly held in accordance with provisions of the principal RE Regulations, 2013 wherein the Commission has not considered any review or repeal of the aforesaid Commission's Order referred by UREDA. Hence, any finding or decision taken by the Commission in the aforesaid order shall remain unaffected. Further, UREDA's request for allowing procurement of power by UPCL from upcoming Solar based project under various schemes notified by MNRE shall be dealt with at the time of implementation of such scheme in the State.

In view of the above discussions & analysis, the Commission has approved the cost of Solar PV based Plant for FY 2015-16 as follows:

Table: Capital Cost of Solar PV Plants for FY 2015-16 (Rs. Lakh/MW)

S. No.	Particulars	Proposed Capital Cost Norm	Approved Capital Cost Norm
1	PV Modules inc. degradation	327.33	337.06
2	Land Cost	25.00	125.00
3	Civil and General Works	50.00	50.00
4	Mounting Structures	50.00	50.00
5	Power Conditioning Unit	45.00	45.00
6	Cables and Transformers	50.00	55.00
7	Preliminary and Pre-operative expenses IDC etc.	40.00	57.57
	Total Capital Cost	587.33	719.63

6.2 Tariff for Solar PV Plants

Based on the benchmark capital cost for Solar PV Plants, the Commission in its draft order dated 28.04.2015 had proposed a tariff of Rs. 7.20/kWh as ceiling rates and had clarified that the procurement of power by the distribution licensee shall be done only through competitive bidding route. The comments of the stakeholder/developers on the draft Order are being discussed herein below:

6.2.1 Comments of the Stakeholders

A) Tariff in other States

UPCL submitted that tariff specified by other ERCs namely MERC & CERC in respect of FY 2013-14 were lesser than that of tariff specified by UERC.

M/s Ujjas submitted that the applicable tariffs for the projects commissioned in FY 2014-15 specified by MERC, RERC, UPERC & BERC are Rs. 7.20/kWh, Rs. 7.20/kWh, Rs. 8.64/kWh & Rs. 7.69/kWh respectively.

B) Ceiling of Tariff

M/s HECL has submitted that the capital cost and tariff determined by the Commission is considered as prudent cost/tariff in the wisdom of the Commission and then keeping it as ceiling tariff is somehow inappropriate. The developer has also submitted that the distribution licensee may be directed to procure solar power at the generic tariff determined by the Commission. Moreover, tariff determined under Section 61/62 of the Electricity Act, 2003 and tariff discovered/adopted under section 63 are mutually exclusive and thus cannot be clubbed together. The Respondent while referring to the Judgment of Hon'ble Supreme Court in the case of BSES Limited vs Tata Power Limited, (2004) 1 SCC 195 has submitted that once the Commission has notified preferential tariff for purchase of RE by a licensee under section 62 of the Electricity Act, 2003, which is applicable to all projects of same technology, there cannot be any other tariff whether mutually negotiated or discovered through bidding. It has further referred to study report of CRISIL and submitted that most of the projects bid under JNNSM Phase-II are not viable and their risk is more due to non-availability of cheap funds. Thus, the bidding route at present has inherent risks of inferior quality of projects or the very possibility of implementation of unviable projects.

C) Computation of Interest on Loan

M/s HECL has submitted that in line with the CERC's approach, the Commission allows interest on loan based on opening as well as closing balance of the year, whereas, repayment of loan is done either on quarterly or half-yearly basis as per terms of the lender. Generally, it is on quarterly basis with repayment at the end of each quarter. The Respondent submitted an illustration depicting average loan based on yearly, half yearly

and quarterly repayment of loan as 95.83%, 97.92% & 96.88% respectively and has requested the Commission for considering that average loan and interest thereon by using quarterly opening loans for arriving at yearly average loan.

D) Capacity Utilization Factor (CUF)

M/s HECL submitted that CERC has considered CUF of 19% based on PAN India norm. The Global Horizontal Irradiation (GHI) data from different sources suggests a much lower CUF in State of Uttarakhand. Maximum value of GHI is 5.83 kWh/m²/day for the station at Bhavnagar located in Gujarat, whereas, GERC instead of adopting CERC's suppositions has considered CUF of 18% for the State of Gujarat where, for average GHI of 5.521 kWh/ m²/day the computed CUF also works out to 18% (19% x 5.521/5.83). This is not only pragmatic but also supported by the actual data of its Solar PV projects based in Gujarat, whose CUF comes out to be around 18-18.5%. M/s HECL also submitted that average solar insolation is 5.521 kWh/m²/Day for the State of Uttarakhand and has requested the Commission for considering CUF of 16.76 %.

E) Levelisation of Tariff and Discounting Factor

M/s HECL has submitted that there should be separate Discount Factors for each year of operation of plant and these different Discount Factors need to be used for levelisation so as to arrive at correct Levelised Tariff if Cost of Money is different in different years. The developer has submitted that the Commission has considered only one Discount Factor, i.e. for the first year to be applicable to all the years and, hence, the levelisation would yield incorrect present values.

6.2.2 Commission's Views & Analysis

A) Tariff in other States

The Commission is of the view that 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 2015-16 excepting those covered by Commission's earlier order dated 20.03.2015 as discussed above. Based on the revised capital cost, tariff has strictly been worked out in accordance with the tariff principles stipulated in RE Regulations,

2013.

Further, in respect of tariffs mentioned by the developer, as above, it is to clarify that only CERC & RERC have issued final tariff order for FY 2015-16. CERC has vide Order dated 31.03.2015 determined the tariff of Solar PV based plants as Rs. 7.04/kWh, whereas, RERC has vide its Order dated 19.06.2015 specified tariff of Rs. 6.74/kWh for Solar PV Plants including Grid-connected Small Solar Plants.

B) Ceiling of Tariff

In respect of M/s HECL's comments that the preferential tariff determined under the regulations should not be considered as ceiling tariff and distribution licensee should be directed for procurement of solar power at the generic tariffs only. In this regard, the Commission is of the view that generic tariffs are being determined in accordance with the RE Regulations, 2013, wherein, regulation 2(3) provides that:

“(3) The generic tariff specified for Solar PV and Solar Thermal power projects under these Regulations shall be the maximum tariff and the distribution licensee shall invite bids from generators/developers for procurement of power from these generators/ developers. The distribution licensee shall enter into a PPA with the generators/ developers bidding lower tariff.”

The Regulations provides that the generic tariff specified shall be the ceiling/maximum tariff in accordance with the above mentioned provision of the RE Regulations, 2013 and that the distribution licensee shall enter into a PPA with the generators/developers at rates obtained through competitive bidding. Modification, if any, in the existing provision of the Regulations cannot be carried out in the current regulatory process and the Commission is bound by the Subordinate legislation.

C) Computation of Interest on Loan

Regulation 16 of the RE Regulations, 2013 specifies as under:

“16. Interest on loan capital

(1) The loans arrived at in the manner indicated in Regulation 15(2) shall be considered as gross normative loan for calculation of interest on loan. The normative loan outstanding as on 1st April of every year shall be worked out by deducting the

cumulative repayment up to 31st March of previous year from the gross normative loan.

(2) For the purpose of computation of generic tariff, the normative interest rate shall be considered as average State Bank of India (SBI) Base Rate prevalent during the first six months of the previous year plus 300 basis points.

For the purpose of computation of project specific tariff, interest rate shall be considered as lower of the actual interest payable to the financial institutions or the average State Bank of India (SBI) Base Rate prevalent during the first six months of the previous year plus 300 basis points

(3) Notwithstanding any moratorium period availed by the generating company, the repayment of loan is being considered from the first year of commercial operation of the project and shall be equal to the annual depreciation allowed.

While calculating project specific tariff, notwithstanding any moratorium period availed by the generating company, the repayment of loan shall be considered from the first year of commercial operation of the project and shall be equal to the annual depreciation allowed or actual repayment made, whichever is higher.

(4) Normative period of loan repayment shall be taken as 12 years."

Reiterating its earlier views, the Commission is bound by its own regulations which stipulates that for computation of generic tariff, repayment of the loan is to be considered equivalent to annual depreciation allowed. Further, depreciation is also computed on annual basis as provided in RE Regulations, 2013. Accordingly, for computation of interest on loan based on the average of opening & closing balances as stipulated under the Regulations is being done by the Commission. Hence, average loan and interest thereon by using quarterly opening loans for arriving at yearly average loan as submitted by M/s HECL cannot be considered.

Further, in respect of interest on loans, Regulation 16 reproduced above provides that for the purpose of computation of generic tariff, the normative interest rate shall be considered as average State Bank of India (SBI) Base Rate prevalent during the first six months of the previous year plus 300 basis points, i.e. for FY 2015-16 it would be the average SBI Base Rate prevalent during the period 01.04.2014 to 30.09.2014 plus 300 basis points, accordingly, the same works out to

13%. Similarly, the rate of interest on working capital has been considered as 13.50%.

D) Capacity Utilization Factor (CUF)

The instant process has been initiated in accordance with provision of the RE Regulations, 2013 with limited issue of reviewing the benchmark capital cost and deriving of the tariffs of Solar based projects on the basis of Tariff Principles laid down in RE Regulations, 2013. These Regulations provide for computation of generic tariff based on a normative CUF of 19% in respect of both Solar PV Plants and Grid-connected Rooftop & Small Solar PV Plants.

The instant regulatory process is being conducted for the limited purpose of review of benchmark capital cost and corresponding tariffs in respect of solar based projects in accordance with the Tariff Principles/norms provided in RE Regulations, 2013. The normative CUF specified in the regulations has to be adopted as such until the same has been modified/changed following due regulatory process. Hence, the Commission does not find any merit in comments of UREDA and project developers for reduction in CUF for the purpose of computation of tariffs. Accordingly, the Commission is continuing with the CUF of 19% for tariff purposes.

E) Levelisation of Tariff and Discounting Factor

The Commission agrees with the comment of M/s HECL that there should be n Discount Factors one for each year and these different Discount Factors needs to be used for levelisation so as to arrive at correct Levelised Tariff. However, the contention of the Respondent is denied that the Commission has considered only one Discount Factor.

In this regard, Regulation 14(6) of RE Regulations, 2013 is reproduced hereunder:

“For the purpose of levelised tariff computation, the discount factor equivalent to weighted average cost of capital shall be considered. For determination of weighted average cost of capital, the pre-tax return on equity would be adjusted for tax at the applicable rates.”

The weighted average cost of capital is also dependent on the capital structure which undergoes change with the change in loan balances. In the initial years, when the loan overweighs the equity as debt-equity ratio is 70:30 and the weighted average cost of capital is slightly higher than the cost of loan but less than the post-tax return on equity. However, as the loan gets repaid, the weighted average cost of capital increases each year and once the loan is entirely repaid, the weighted average cost of capital is equal to the post-tax return on equity.

Hence, no change is required on this account as suggested by the Respondent. However, the Commission has considered the MAT rate and Corporate Tax rate alongwith the applicable surcharges and education cess as approved for FY 2015-16.

In view of the above discussion, the Commission has determined the gross tariff of Rs. 8.25/kWh for Solar PV sources commissioned on or after 01.04.2015 as depicted in Annexure-I except for the solar PV projects who have been allowed time for commissioning till 31.03.2016 vide Commission's Order dated 20.03.2015. 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 Connected Rooftop Solar PV & Small Solar PV Based Projects

7.1 Capital Cost

In line with the RE Regulations, 2013 capital cost of Grid Connected Rooftop Solar PV & Small Solar PV based projects was proposed as 2.50% higher than the capital cost of Solar PV based Plants in the draft order dated 28.04.2015. Accordingly, capital cost of such projects was considered as Rs. 615 Lakh/MW.

7.1.1 Comments of the Stakeholders

UREDA has submitted that it had empanelled seven firms for "Design, manufacture, supply, erection, testing and commissioning including warranty, operation & maintenance for 5 years for rooftop and small solar PV power plant of various capacities (up to 10 kWp to 500 kWp) in the state of Uttarakhand" for a period of One year (subject to extension) on 29th January, 2015 at competitive prices ranging from INR 78,000/- per kW to 79,930/- per kW. UREDA submitted that the prices shall be

applicable for projects commissioned on or before 28.01.2016. UREDA requested the Commission to consider the benchmark capital cost at which firms have been empanelled to promote the installations in the State and also upheld the interest of the project developers.

M/s Ujjas has submitted that the basic difference in the ground mounted and rooftop solar PV power plant is the requirement of domestic made solar PV modules and there is a minimum difference of 20% between the cost of domestic modules and imported modules. M/s Ujjas further submitted that CERC while determining the benchmark capital cost of the solar PV power plant has considered the price of imported modules. The developer has submitted that while determining the benchmark capital cost for the rooftop solar PV power plant the MNRE has considered a price of Rs. 79/Wp for FY 2015-16 amounting to Rs. 790 Lakh/ MW.

M/s S.K. Solar & M/s S.R. Solar Energy Park have submitted that as per approved rates by UREDA, Engineering, Procurement & Construction (EPC), cost of 500 kW system is Rs. 390 Lakh/MW without civil & transmission works which is about Rs. 45 Lakh/MW. Shri Sanjeev Singh has submitted that UREDA has fixed the rate of Rs. 7.85 Lakh/ MW and provided a list of approved vendors. However, UREDA has not mentioned any quality control check or guarantee in production or life of the material. UREDA has ensured 5 years for maintenance. However, no degradation limits or penalty conditions have been included in the empanelment award by UREDA in case of dissatisfactory performance of EPC vendor including the equipment provided by such vendor.

M/s Amplus, M/s Avant Garde, M/s Rishabh Energy have submitted that UREDA has issued list of EPC vendors on 16.01.2015 for implementation of various capacity of projects. They have submitted that since 16.01.2015, when the EPC rates were notified by UREDA, INR has devaluated significantly against the USD. Solar cells and inverters constitute about 60% of the project cost and since both these items are imported, INR devaluation has a direct impact on the prices. However, in any case, the rates fixed as per UREDA's press release remain unchanged, i.e. the same rates will apply to projects that were completed before 31.03.2015 and those that are being constructed now. The developers have further submitted that effectively, there is no change in the construction

cost for projects constructed before 31.03.2015 and those that will be undertaken later as the same rates (as set out in UREDA's press release dated 16.01.2015) will be applicable for both.

7.1.2 Commission's Views and Decisions

The Commission observes that since beginning CERC is following practice of determination of capital cost & corresponding tariffs in respect of Solar PV Plants. However, the Central Commission does not carry out separate determination for Grid Connected Rooftop Solar PV & Small Solar PV Projects. Similarly, RERC also specifies the same tariffs for both types of the Solar PV based projects i.e. Solar PV plants and Grid connected Rooftop/Small Solar PV plants.

However, this Commission has been determining separate benchmark capital cost and corresponding tariffs thereof under the provisions of RE Regulations applicable in the State for both the above types of Solar PV based plants.

So far as UREDA's submissions for consideration of same cost as accepted by it while selecting EPC vendors, i.e. in the range of Rs. 780.00 Lakh/MW to Rs. 799.30 Lakh/MW for implementation of projects till 28.01.2016 is concerned, the Commission would like to draw attention to its Order dated 07.11.2014, wherein, on UREDA's request applicability of benchmark capital cost & corresponding tariffs of Solar based projects have already been extended till 31.03.2015. The Commission, hereby, clarifies that further extension of benchmark capital cost & corresponding tariffs, for reasons whatsoever submitted by the stakeholders/developers, shall not be allowed. The Commission is bound to review the benchmark capital cost in accordance with the RE Regulations applicable in the State.

The stakeholders have submitted about the requirement of use of indigenous module for implementations of rooftop based solar PV plants and relatively higher cost for the same. The Commission appreciates the requirement of indigenous components / technologies for implementations of such projects and relatively higher cost as compared with Solar PV Plants. The Commission also understand that Rooftop Solar PV Plants shall be implemented by Eligible Consumer or Third Party only under net-metering mechanism, as provided in the RE Regulations, 2013 as amended from time to time.

Accordingly, it cannot be denied that such projects shall be implemented either on the rooftop/and/or waste land of the Eligible Consumers (i.e. by the owner of the premises itself) or by a Third Party under lease agreement. In addition, the Commission also noted that based on past experience and prevailing market trend, the major differences affecting the normalized cost of kilowatt-scale photovoltaic power plants compared to megawatt-scale plants is the cost of inverters and other equipment and accessories which are found to be on the higher side. The Commission is of the view that so far as cost of module is concerned there is no difference between the Solar PV Plants & Rooftop Solar PV Plants. Hence, module cost of Rooftop Solar Plant shall be same as that of Solar PV Plants as approved above. In respect of cost of power conditioning equipment including inverter, mounting structure and evacuation facility, the Commission has decided to allow higher cost for such components. Considering the fact that overall cost of such components in kW scale plants is higher than that of MW scale Plants, the Commission has decided to allow 35% higher cost of above mentioned components for Rooftop Solar Plants as compared to the Solar PV Plants. In respect of cost of land, it is apparent that for such plants cost of land shall not be to the tune of cost as approved above for Solar PV Plants. Further, in such cases the cost implication shall only be the lease cost/expenditure incurred by Third Party for acquiring of rooftop and/or waste land of the Eligible Consumer i.e. owner of the premises. Accordingly, the Commission has decided to keep same cost of land and civil works related expenses as proposed in draft order.

In view of the above discussions & analysis, the Commission has approved the cost of Grid-Connected Rooftop Solar PV based Plant for FY 2015-16 as follows:

Table: Capital Cost of Grid connected Rooftop Solar PV Plants for FY 2015-16 (Rs. Lakh/MW)

S. No.	Particulars	Approved Capital Cost Norm
1	PV Modules inc. degradation	337.06
2	Land Cost, Civil and General Works	75.00
3	Mounting Structures	67.50
4	Power Conditioning Unit	60.75
5	Cables and Transformers	74.25
6	Preliminary and Pre-operative expenses IDC etc.	53.44
	Total Capital Cost	668.00

Accordingly, the Commission approves capital cost of Rooftop Solar PV Plants as Rs. 668.00 Lakh/MW against the proposed cost of Rs. 615 Lakh/MW providing sufficient cushion for the generators to cover their expenses. Similar issue has also been raised by projects developers for considering cost as determined through empanelled vendors by UREDA. In this regard, the Commission is of the view that cost determined through competitive bidding by State Agency cannot be termed as benchmark cost for the purpose of determination of generic tariff under the regulations. It may be noted that the Commission has to determine the cost of such projects in accordance with proposition adopted in the RE Regulations, 2013. Hence, all such issues raised by developers are answered accordingly.

The Commission observes that UREDA has empanelled certain vendors for implementation of Rooftop Solar PV & Small Solar PV projects. UREDA has informed that the same has been done in accordance with the MNRE's sanction letter dated 31.12.2013, wherein, it has been stated that the cost of such projects should be firmed up through open competitive bidding.

It has also come to the notice of the Commission that project developers are being compelled for implementation of their projects from the above mentioned empanelled vendors only, else, they may lose central subsidy. In this regard, the Commission observes that in accordance with the above mentioned sanction letter dated 31.12.2013 of MNRE, cost of such project was required to be firmed up through competitive biddings and 30% of cost arrived through competitive bidding or the cost as proposed (benchmark cost of MNRE for the purpose of Central Finance Assistance (CFA), whichever is lower, would be considered as CFA for such projects and necessary releases would be made as per scheme norms. However, at no place requirement of implementation of projects only from vendors empanelled by UREDA was mandated by MNRE for the purpose of release of CFA. It appears that UREDA, being the nodal agency in the State, has transgressed its authority in this regard. The rates at which the suppliers have been empanelled by it also appear high considering the cost at which solar projects are being commissioned across the country. Still the small project developers are being forced to get their project implemented by certain vendors even if they do not desire to do so and have the wherewithal to install their projects at a lower cost than that quoted by the empanelled

suppliers. The Commission is of the view that such practices are unethical & inappropriate in the eyes of law and cannot be allowed to continue. Hence, officials responsible for implementation of such projects are, hereby, cautioned to refrain themselves from any such undue activity, failing which they may be liable for appropriate punitive action under the Act. It is made abundantly clear that project developers are free to source their plant and machinery from anywhere so long as they meet the required technical specification. UREDA is directed to communicate this to each developer separately within 7 days of this order.

7.2 Capacity Utilization Factor (CUF)

The Commission has considered CUF of 19% while proposing tariff of Grid interactive Rooftop and Small Solar PV Plant.

7.2.1 Comments of the Stakeholders

UREDA submitted that CERC has adopted average CUF of 19% taking all India average. The CUF level varies from state to state depending upon their geographical location. UREDA further submitted that it has carried out analysis of the solar power generation in the month of April, 2015 through 5 Rooftop projects commissioned at various places within the State with installed capacity of 12 kW, 100 kW and 500 kW. The CUF calculated based on the data comes out to be in the range of 6.75% to 16.19% for the month of April, 2015 which is considered to have good solar irradiance. UREDA has requested the Commission for consideration of the CUF level of 16.00% based on the above analysis and considering lower generation can be achieved in the months of December to February following ambient conditions of temperature and fog.

Sh. Rajkumar has submitted that in the State of Uttarakhand such plants have demonstrated CUF of 15%-16%, hence, the same should be considered by the Commission.

7.2.2 Commission's Views and Decisions

As already discussed in sub-Para 6.2.2(D) above, CUF of 19% shall be considered for the purpose of computation of tariff.

7.3 Subsidy

The Commission has considered level of subsidy of 30% which shall be admissible in respect of Grid-Connected Rooftop/Small Solar PV Plants to be provided from central funds. Accordingly, the same has been considered for the purpose of determination of tariff as provided in the RE Regulations, 2013.

7.3.1 Comments of the Stakeholders

UREDA has submitted that the subsidy for the installation of rooftop solar power project is under revision and is likely to be reduced by MNRE upto 15% from the present level of 30%. UREDA requested that separate tariffs may be determined for rooftop and small solar PV power plants by considering following central subsidy:

- I. MNRE will provide 15% central subsidy.
- II. MNRE will not provide any central subsidy.

7.3.2 The Commission's Views & Decision

The Commission observes that the existing level of subsidy is 30% in respect of Grid-Connected Rooftop and Small Solar PV Plants and reduction in level of subsidy from 30% to 15% by MNRE as submitted by UREDA has not been supported by any documentary evidence. In the absence of any notification by MNRE in this regard, the Commission decides to continue with the same level of subsidy as considered earlier i.e. 30%.

However, considering the submission of UREDA that MNRE is considering revision of subsidy from 30% to 15%, the Commission has also determined an indicative tariff with 15% subsidy. However, the same shall not become applicable till notification of revision of subsidy from 30% to 15% is issued by MNRE.

7.4 Tariff for Grid Connected Rooftop and Small Solar PV Plants.

In respect of Grid-Connected Rooftop and Small Solar PV Plants tariff of Rs. 6.05/kWh was proposed in the draft order dated 28.04.2015.

7.4.1 Comments of the Stakeholders

UPCL has submitted that tariff specified by MERC in FY 2013-14 for Grid-Connected Rooftop and Small Solar PV plants was lesser than that of UERC.

M/s Ujjas has submitted that while calculating the gross tariff for the small and rooftop solar PV power plant the Commission had considered a 2.5% higher benchmark capital cost for the rooftop and small solar PV power plant. Hence, by any calculation if the benchmark capital cost is increased by 2.5%, the gross tariff cannot go down rather it will go up in the same proportion.

M/s S.K. Solar Power & M/s S.R. Solar Energy Park have submitted that they were bound to execute their respective projects by 31.03.2015, however, due to formalities related with banks, land use conversion etc. the same could not be executed. Both the developers have requested the Commission for extending applicability of tariff of Rs. 9.20/kWh till 31.08.2015. Similarly, Sh. Rajkumar, a stakeholder, has submitted that delay in signing of PPA was on account of UPCL and he is not responsible for the same. He also requested the Commission for extending applicability of tariff of Rs. 9.20/kWh till 31.08.2015. Similarly, Sh. Sanjeev Singh, a stakeholder, has requested for extension of tariff of Rs. 9.20/kWh for three months.

M/s Amplus, M/s Avant Garde, M/s Rishabh Energy have requested for extension/ continuation of the existing tariff of Rs. 9.20 per kWh prescribed under the RE Regulations, 2013 for Rooftop Grid Connected Solar PV Plants established under the Third Party Model. They have submitted that the Commission has already extended the existing tariffs in the context of large solar PV plants till 31.03.2016 vide its Order dated 20.03.2015. Hence, similar view on extension of the existing tariff for Rooftop Solar Plants may be considered by the Commission so as to have uniform policy for all the solar based projects and also for Solar RPO compliances. They have further submitted that denial of the extension/continuation of the existing tariff will tantamount to treating equals in an unequal manner, which is a clear violation of Article 14 of the Constitution. While referring to rulings of the higher court, they have submitted that the Commission has a legal obligation to comply with the mandate of Article 14 by giving the same treatment while treating equals. These developers have also submitted that they are entitled to have a preference over other conventional generators as their generation is based on RE sources.

7.4.2 Commission's Views and Decision

The Commission had in RE Regulations, 2013 determined the tariffs in accordance with the norms specified by CERC. In accordance with the same practice, tariff for FY 2015-16 is also being determined in the present proceeding based on the discussions in the preceding Paras.

M/s Ujjas has stated that since the capital cost for Rooftop Solar PV Plant have been considered 2.50% higher than the cost of Solar PV Plants, hence, corresponding tariff of Rooftop Solar PV Plant should not be lower than Solar PV Plants. In this regard, it is hereby clarified that Regulation 24 of RE Regulations, 2013 provides for considering 75% of the capital subsidy for the financial year of the commissioning as per the applicable scheme of MNRE. In accordance with sub-Regulation 15(3) of the RE Regulations, 2013 subsidy available from MNRE is required to be considered as pre-payment of debt leaving balance loan for determination of tariff. Similarly, Regulation 17 of the RE Regulations, 2013 also provides for computation of depreciation after reducing 75% of capital subsidy from capital cost. Since MNRE provides capital subsidy in respect of Rooftop Solar PV projects only and not for Solar PV Plants, hence, corresponding adjustment is made in accordance with the above mentioned provisions of RE Regulations, 2013 for the purpose of determination of tariff of Rooftop Solar PV Plants. Whereas, in case of Solar PV Plants provision of generation based incentive (GBI) is applicable which cannot be considered in a similar fashion as being considered for rooftop Solar PV Plants for the purpose of tariff determination. Hence, tariff of Rooftop Solar PV Plants works out to be lower than that of tariff of Solar PV Plant.

The developers have submitted that since PPA could not be signed with UPCL, hence, existing tariff of Rs. 9.20/kWh may also be extended till 31.08.2015. In this regard, the Commission, hereby, clarifies that RE Regulations, 2013 stipulates review of benchmark cost of Solar based plants in each financial year. However, the same has not been done since notification of RE Regulations, 2013. The Commission is bound to review the capital cost of solar based plants & corresponding tariffs so as to provide benefits of development of cost effective technologies to the end user of electricity. The Commission, as discussed above, had already extended the applicability of tariffs till 31.03.2015, and the same cannot be extended any further. The developers have also referred to the Order

dated 20.03.2015 vide which the Commission has extended existing tariff till 31.03.2016. The developers have submitted that it would tantamount to inequality if similar extension of tariff is not allowed to them. In this regard, the Commission is of the view that circumstances under which extension of benchmark capital cost & corresponding tariff was allowed to 12 stakeholders needs to be considered vis-à-vis circumstances in which extension of tariffs by the developers are being requested now. The relevant extract of the Commission's Order dated 20.03.2015 has been reproduced below:

"3.3 UREDA based on tariff quoted in tender, selected 12 project developers and allotted the Solar PV based projects as listed in Para 2.2.1 above. It is apparent that the tariff claimed by the project developers for sale of power to UPCL are lower than that of the generic tariff specified in RE Regulations, 2013 for such projects. Further, as submitted by Petitioner, the Commission has also noted the fact, that being a licensee UPCL is required to comply with Solar-RPO and the solar power being generated in the state is estimated to be much less than required to meet the RPO prescribed due to inadequate development of such plants in the State.

3.4 In view of the facts and circumstances as discussed above, the Commission has decided to relax the stipulation made in Regulation 11(1) as reproduced above as the LoA was issued to the successful bidders in January 2015 and the gestation period for commissioning of a solar PV plant is atleast a year, hence, expecting them to commission the project by 31.03.2015 would not be practicable. The Commission therefore decides that the benchmark capital cost and generic tariffs thereof as ceiling tariffs, as provided in RE Regulations, 2013 shall remain applicable for these 12 developers of Solar PV Plants during FY 2015-16 and the tariff quoted by them shall apply subject to the condition that:

- (a) They execute their PPA with UPCL by 31.03.2015, and*
- (b) They commission their projects on or before 31.03.2016.*

Provided if these developers do not comply with the above conditions (a) & (b) both, tariff incorporated in the PPA entered into by UPCL & such project developers shall not be applicable, and in such cases rate of sale of power from such projects to the licensee shall be as may be determined by the Commission after reviewing the benchmark capital cost for Solar PV Plants as provided for in the RE Regulations, 2013 if such notified rates are lower than the tariffs agreed in the PPA. The proceedings for reviewing of the benchmark

capital cost for solar plants are underway in the Commission. Accordingly, UPCL is directed to provide in clause 2.1 of the draft PPA that rate of sale of power shall be applicable on such developers who commission their plants on or before 31.03.2016, however if the plant is commissioned after 31.03.2016, the rate of sale of power would be as determined by the Commission for the year of commissioning if such rates are lower than the tariffs agreed to in the PPA otherwise tariffs agreed in the PPA shall continue."

It is apparent that circumstance at that point of time were different on two aspects: (a) The LoA were awarded to the project developers for implementation of projects for supplying of power at a tariff lower than the prevailing generic tariff; (b) UPCL, being a distribution licensee had submitted that their shortfall in Solar-RPO compliances was on account of less development of solar projects in the State. Accordingly, the Commission had allowed extension of benchmark capital cost & corresponding tariff in respect of the above mentioned projects with the condition that they sign the PPA with UPCL by 31.03.2015 & the projects should be commissioned by 31.03.2016, failing which the rate of sale of power would be as determined by the Commission for the year of commissioning if such rates are lower than the tariffs agreed to in the PPA otherwise the tariffs agreed in the PPA shall continue. On the other hand, the developers in their comments on the draft Order have requested for extension of existing tariff of Rs. 9.20/kWh which is impracticable considering the fact that the capital cost of these projects have reduced substantially in light of which the extension of the old tariffs would not be justified. Hence, the claim of the developers that it would tantamount to inequality if existing tariff is not extended upto 31.08.2015 is not acceptable.

Moreover, the RE Regulations, 2013 offers an option to the developers to seek determination of project specific tariff. Hence, if any Grid Interactive Rooftop and Small Solar PV project developer is of the view that its actual capital costs exceeds the normative capital cost fixed by the Commission, it can approach the Commission for determination of project specific tariff for its project, based on the actual capital cost and in accordance with the norms specified in the RE Regulations, 2013.

Accordingly, as discussed above, the Commission has determined the gross tariff of such plants as Rs. 6.35/kWh & Rs. 7.05/kWh, considering the extent of capital subsidy from MNRE as 30% & 15% respectively as depicted in Annexure II-A and II-B.

However, applicability of tariff corresponding to central subsidy of 15% would be applicable as discussed in Para 7.3.2 above.

8 Solar Thermal Projects

8.1 Capital Cost

In line with the RE Regulations, 2013 the Commission had proposed benchmark cost of Solar Thermal Plants of Rs. 1200.00 Lakh/MW as proposed by CERC in its draft order.

The Commission observes that no comment/objection on the proposed capital cost has been submitted by any of the developers or stakeholders. Further, CERC has also vide Order dated 31.03.2015 decided to continue with benchmark capital cost of Rs. 1200 Lakh/MW, hence, the same is being considered by the Commission for FY 2015-16.

8.2 Tariff

The Commission had proposed tariff in respect of Solar Thermal Plants as Rs. 12.55/kWh.

Based on the approved capital cost and in accordance with the norms specified in RE Regulations, 2013 the applicable gross tariff for FY 2015-16 has been determined as Rs. 12.55/kWh as depicted in Annexure-III enclosed.

9 Generic Tariffs

Based on the revised capital cost, as proposed above, the Commission has determined the generic tariffs to be applicable for projects to be commissioned in FY 2015-16 which is as follows:

Particulars	Solar PV Plant (Rs./kWh)		Solar Thermal Plant (Rs./kWh)		Grid connected Rooftop & Small Solar PV Plants (Rs./kWh)	
	Existing	Approved for FY 2015-16	Existing	Approved for FY 2015-16	Existing	Approved for FY 2015-16
Gross Tariff	11.10	8.25	13.30	12.55	9.20	6.35
Less : Acc Dep Benefit	0.95	0.65	1.15	1.05	1.05	0.65
Net Tariff	10.15	7.60	12.15	11.50	8.15	5.70

The above tariff shall be applicable on the projects commissioned on or after 01.04.2015 and will be applicable till reviewed by the Commission.

10 As mentioned in para 7.1, UREDA is directed to convey to the developers, within a week of this order, that procurement of plant, machinery and services from so called empanelled vendors is not required and that the developers are free to procure these from anywhere subject to meeting required specifications. Compliance be reported by 04.08.2015.

(C.S. Sharma)
Member

(Subhash Kumar)
Chairman

List of Respondents

Sr. No.	Name	Designation	Organisation	Address
1.	Sh. Ashu Gupta	Vice President (Corporate)	M/s Ujaas Energy Ltd.	701-A, NRK Business Park, Block B-1, PU-4, Sc. No. 74, Vijay Nagar Square, Indore, Madhya Pradesh
2.	Sh. A.K. Tyagi	Chief Project Officer	Uttarakhand Renewable Energy Development Agency	Urja Park Campus, Industrial Area, Patel Nagar, Dehradun
3.	Sh. S.K. Tamta	Chief Engineer Level-1 (Comml.)	Uttarakhand Power Corporation Ltd.	Victoria Cross Vijeta Gabar Singh Bhawan, Kanwali Road, Dehradun.
4.	Sh. Sushil Kumar	-	M/s S.K. Solar Power	Vill.-Kuwa Khera, Laksar, Haridwar
5.	Sh. Kuldeep Tomar	-	M/s S.R. Solar Energy Park	House No. 193, Ganeshpur, Roorkee, Haridwar
6.	Sh. Rajkumar, S/o Nepal Singh	-	M/s USA Solar Systems	Vill.-Libberhedi, PO-Mangalore, Distt. Haridwar
7.	Sh. Piyush Kumar	Engineering Head	M/s Dwij Renewable Energy Solutions	-
8.	M/s Amplus Infrastructure Developers Pvt. Ltd.	-	-	130, Aspen Green, Nirvana Country, Sector-50, Gurgaon-122018 Haryana
	M/s Avant Garde Power Solutions Pvt. Ltd.	-	-	C-2/39, Chitrakoot Nagar, Jaipur - 302021.
	M/s Rishabh Renergy Pvt. Ltd.	-	-	Village-Bhakaswagaj, Tehsil-Roorkee, Haridwar.
9.	Sh. Sanjeev Singh	-	M/s Mindvalley Consulting Pvt. Ltd.	622K, Station Chowk, Kiratpur Road, Near Karan Hospital, Bijnaur, Uttar Pradesh
10.	Sh. Pankaj Prakash	Associate Vice President (Regulatory Affairs)	M/s Hindustan EPC Company Ltd.	239, Okhla Industrial Estate, New Delhi-110020

List of Participants

Sr. No.	Name	Designation	Organisation	Address
1.	Sh. Abhijeet Kumar	-	M/s Indian Energy Regulatory Services	T-44, Karampura, New Delhi
2.	Sh. Sushil Kumar	Head	M/s S.K. Solar Power	Vill.-Kuwa Khera, Laksar, Haridwar
3.	Sh. Sanjeev Singh	Head	M/s Mind Valley Consulting Pvt. Ltd.	622K, Station Chowk, Kiratpur Road, Near Karan Hospital, Bijnaur, Uttar Pradesh
4.	Sh. Kuldeep Tomar	Head	M/s S.R. Solar Energy Park	House No. 193, Ganeshpur, Roorkee, Haridwar
5.	Sh. Apoorv	Area Manager	M/s Waare Energies	1, Prince Chowk, Dehradun
6.	Sh. Ashu Gupta	Vice President (Corporate)	M/s Ujaas Energy Ltd.	701-A, NRK Business Park, Block B-1, PU-4, Sc. No. 74, Vijay Nagar Square, Indore, Madhya Pradesh
7.	Sh. Piyush Kumar	Engineering Head	M/s Dwij Renewable Energy Solutions	206, Indira Nagar, Dehradun
8.	Sh. A.K. Tyagi	Chief Project Officer	Uttarakhand Renewable Energy Development Agency	Urja Park Campus, Industrial Area, Patel Nagar, Dehradun

TARIFF DETERMINATION FOR SOLAR PV POWER PLANTS OF UTTARAKHAND FOR FY 2015-16

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		2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55
Interest on term loan	Rs. Crore		3.13	2.86	2.59	2.32	2.04	1.77	1.50	1.23	0.95	0.68	0.41	0.14	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		0.20	0.20	0.19	0.19	0.18	0.18	0.18	0.17	0.17	0.17	0.17	0.17	0.13	0.14	0.14	0.15	0.15	0.15	0.16	0.16	0.17	0.18	0.18	0.19	0.19
Return on Equity	Rs. Crore		2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59
Total Cost of generation	Rs. Crore		8.18	7.93	7.69	7.45	7.21	6.98	6.75	6.52	6.29	6.06	6.29	6.07	4.41	4.48	4.55	4.63	4.71	4.80	4.89	4.98	5.08	5.19	5.30	5.42	5.55
Per unit Cost of generation	Rs./kWh		9.82	9.53	9.24	8.95	8.67	8.39	8.11	7.83	7.56	7.29	7.55	7.29	5.30	5.38	5.47	5.56	5.66	5.76	5.87	5.99	6.11	6.24	6.37	6.52	6.67

Levelised Tariff	8.25
Accelerated Depreciation	0.65
Net Tariff	7.60

TARIFF DETERMINATION FOR ROOFTOP SOLAR PV PLANTS OF UTTARAKHAND FOR FY 2015-16

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		1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Interest on term loan	Rs. Crore		1.94	1.69	1.43	1.18	0.92	0.67	0.42	0.16	0.02	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		0.16	0.15	0.15	0.15	0.14	0.14	0.14	0.13	0.13	0.13	0.15	0.15	0.13	0.13	0.13	0.14	0.14	0.15	0.15	0.16	0.16	0.17	0.17	0.18	0.19
Return on Equity	Rs. Crore		2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41
Total Cost of generation	Rs. Crore		6.20	5.98	5.75	5.53	5.31	5.10	4.89	4.67	4.58	4.61	5.08	5.14	4.07	4.14	4.21	4.29	4.37	4.45	4.54	4.64	4.74	4.85	4.96	5.08	5.20
Per unit Cost of generation	Rs. /kWh		7.45	7.18	6.91	6.65	6.39	6.13	5.87	5.62	5.50	5.54	6.11	6.18	4.89	4.97	5.06	5.15	5.25	5.35	5.46	5.57	5.70	5.82	5.96	6.10	6.25

Levelised Tariff	6.35
Accelerated Depreciation	0.65
Net Tariff	5.70

TARIFF DETERMINATION FOR ROOFTOP SOLAR PV PLANTS OF UTTARAKHAND FOR FY 2015-16

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		1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
Interest on term loan	Rs. Crore		2.43	2.18	1.92	1.67	1.41	1.16	0.91	0.65	0.40	0.15	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
Interest on working Capital	Rs. Crore		0.17	0.17	0.17	0.16	0.16	0.16	0.15	0.15	0.15	0.14	0.15	0.15	0.13	0.13	0.14	0.14	0.14	0.15	0.15	0.16	0.16	0.17	0.18	0.18	0.19
Return on Equity	Rs. Crore		2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41
Total Cost of generation	Rs. Crore		6.93	6.70	6.48	6.26	6.04	5.82	5.61	5.40	5.19	4.99	5.32	5.37	4.13	4.20	4.27	4.35	4.43	4.51	4.60	4.70	4.80	4.91	5.02	5.14	5.26
Per unit Cost of generation	Rs./kWh		8.32	8.05	7.78	7.52	7.26	7.00	6.74	6.49	6.24	5.99	6.39	6.45	4.96	5.04	5.13	5.22	5.32	5.42	5.53	5.65	5.77	5.89	6.03	6.17	6.33

Levelised Tariff	7.05
Accelerated Depreciation	0.65
Net Tariff	6.40

TARIFF DETERMINATION FOR SOLAR THERMAL POWER PLANTS OF UTTARAKHAND FOR FY 2015-16

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		0.89	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	3.19	3.37
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		5.23	4.78	4.32	3.87	3.41	2.96	2.50	2.05	1.59	1.14	0.68	0.23	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		0.33	0.33	0.32	0.31	0.30	0.30	0.29	0.28	0.28	0.27	0.28	0.28	0.22	0.22	0.23	0.23	0.24	0.25	0.25	0.26	0.27	0.28	0.29	0.30	0.31
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		13.55	13.14	12.73	12.33	11.92	11.52	11.13	10.74	10.35	9.97	10.33	9.96	7.19	7.29	7.40	7.52	7.64	7.77	7.91	8.05	8.21	8.37	8.54	8.73	8.92
Per unit Cost of generation	Rs./kWh		14.95	14.49	14.04	13.59	13.15	12.71	12.28	11.84	11.42	11.00	11.39	10.98	7.93	8.04	8.16	8.29	8.43	8.57	8.72	8.88	9.05	9.23	9.42	9.62	9.84

Levelised Tariff	12.55
Accelerated Depreciation	1.05
Net Tariff	11.50