

UTTARAKHAND ELECTRICITY REGULATORY COMMISSION

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Statement of Reasons for the “UERC (Tariff and other Terms for Supply of Electricity from Renewable Energy Sources and non-fossil fuel based Co-generating Stations) (Fifth Amendment) Regulations, 2016”

Statement of Reasons

INTRODUCTION

- (a) In exercise of powers conferred under Section 61(h), 86(1)(e) read with Section 181 (zp) of the Electricity Act, 2003, and all other powers enabling it in this behalf, and after previous publication, the Uttarakhand Electricity Regulatory Commission had issued 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 “Principal Regulations”) vide notification dated April 15th, 2013. Thereafter, the Commission had also issued four amendments to the Principal Regulations.
- (b) The Commission had proposed the draft fifth amendment Regulations based on the representations received for issuance of guidelines for implementation of grid connected Canal Bank PV power plants & Canal Top Solar PV power plants and also for implementation of power projects based on municipal solid waste. While issuing the draft amendment the Commission invited comments from all the stakeholders. The draft amendment primarily covered the norms regarding Canal Bank Solar PV power plants, Canal Top Solar PV power plants and power projects which use Municipal Solid Waste & Refuse Derived Fuel and are based on Rankine cycle technology.

Last date of submission of the comments/suggestions/objects was kept as 14.03.2016. The list of stakeholders who submitted comments is enclosed as **Annexure-I**. The Commission also held a hearing in the matter on 05.04.2016. The list of the participants is enclosed as **Annexure-II**.

- (c) The comments/suggestions/objections received from the stakeholders in respect of draft amendment and the views of the Commission on the same are discussed in subsequent paragraphs.

Comments / Suggestions / Objections of the stakeholders and Analysis & Decision of the Commission:

1. Amendment proposed by the Commission in Regulation 2 of the Principal Regulation (Scope and extent of application):

- a) First and Second provisos of Regulation 2(1) of the Principal Regulations was proposed to be substituted as under:

“Provided that in cases of Wind, Small Hydro projects, Biomass power based on Rankine cycle, Non-Fossil Fuel based cogeneration projects, Solar PV, Canal Bank & Canal Top solar PV, Solar Thermal power projects, Grid Interactive Roof Top and Small Solar PV plants, Biomass gasifier and Biogas, Municipal Solid Waste and Refuse Derived Fuel based power project these Regulations shall apply subject to the fulfillment of eligibility criteria specified in Regulation 4 of these Regulations.

Provided further that Regulations in Chapter 4 & 5 shall not be applicable for generating stations commissioned prior to coming into effect of these Regulations and their present tariffs shall continue to be applicable except the Fuel Cost (Variable Charges) specified in Regulation 29(1), Regulation 30(2), Regulation 31(2) and Regulation 32(2) of these Regulations shall be applicable to the corresponding generating plants. However, these generating plants shall have to make an application seeking applicability of relevant Regulations in this regard. However, provision of normative levelised tariff of 12 paise/unit, over and above the generic tariff, for solar thermal/PV generating stations as specified in Regulation 15(1)(b) shall also be applicable to such stations commissioned prior to coming into effect of these Regulations. Provisions other than those in Chapter 4 and 5 shall apply to other generating stations located in the State of Uttarakhand, which are based on Renewable Sources of Energy including non-fossil fuel based Co-generation and which transmit and/or supply electricity to any person other than the distribution licensee of the State utilizing State Transmission and/or Distribution System.”

Commission’s view

The following technology, namely “Canal Bank & Canal Top Solar PV Plants and Municipal Solid Waste and Refuse Derived Fuel based power project” were included in the draft amendment regulation. In addition, the Commission had also allowed fuel based RE generators commissioned prior to coming into force of Principal Regulations to recover fuel cost in accordance with the Principal Regulations. Since, no comments have been received from any stakeholder in this regard,

the Commission has decided to retain the same in the final amendment regulations as was proposed in the draft amendment.

b) Regulation 2(3) of Principal Regulations was proposed to be substituted as under:

“(3) The generic tariff specified for Solar PV, Canal Bank & Canal Top solar PV, 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.”

Comments received

UJVN Ltd. submitted that tariffs specified by the Commission for Grid Connected Solar PV Power plants on Canal Banks and Canal Top, under these Regulations shall be tariffs for procurement of power by distribution licensee. The distribution licensee shall enter into a PPA with the generator/ developer at the tariffs determined under these Regulations.

Commission’s view and decision

As per National Tariff Policy, 2016, one of the objectives is to ensure availability of electricity to consumers at reasonable and competitive rates and to promote competition, efficiency in operations and improvement in quality of supply. Since the tariffs specified vide the regulations is the generic tariff based on the benchmark norms which are expected to be improved with the passage of time, hence, considering the same as tariff for the sale/purchase of the power, the above mentioned objective of the tariff policy to provide electricity at competitive rate shall be defeated. Further, rates specified by the Commission are the ceiling rates and distribution licensee shall be allowed to enter into a PPA at the lower tariff discovered after following due process of competitive bidding. Hence, the suggestion put forth by UJVN Ltd. has not been accepted.

The Commission also noted that MNRE vide its notification dated 05.12.2014 specified the eligible organizations/companies for implementation of Canal Bank and Canal Top Solar PV Plants as follows:

*...“3.1 **Applicability:** All the States and Union Territories having Canal network will be eligible for benefits under the scheme. However, the Scheme may be availed by only those States which have either fulfilled their Solar RPOs or commit to do so within a given time frame.*

*3.2 **Eligibility:** State Power Generation Companies/ State Government Utilities/ any other State Government Organization/ PSUs/ Gol PSUs or Gol organizations, provided that they are operating in power sector or own canal systems, i.e. are into irrigation. Proposals from States in Project mode*

will also be acceptable on completion during 2014-15 or later.

3.3 Implementation agency: *The solar PV power plants will be developed by the State Power Generation Companies/ State Government Utilities/ any other State Government Organization/ PSUs/ Gol PSUs or Gol organizations, provided that they are operating in power sector or own canal systems, i.e. are into irrigation.*

...
"

As mentioned above, State Power Generating Companies/ State Government Utilities/ any other State organization/PSUs/ GOI PSUs shall be eligible for implementation of Canal Bank and Canal Top Solar PV Plants. In this regard, the Commission is of the view that implementation of these projects may also be done by the above mentioned eligible government organisations through tariff based bidding process subject to ceiling of the tariffs determined under the regulations. Hence, it can be envisaged that in such cases additional expenses related to officers/staff for monitoring of pre-development, development & running of the plant, to maintain land-ownership, billing & accounting, upkeep of all the records etc. shall be required to be incurred by the implementing eligible government organisations. So as to ensure compensation for all such expenses to the implementing organisations, PPA for sale of power from such plant, implemented through tariff based bidding process, shall be signed with distribution licensee at a tariff 10% higher than the tariff quoted by L-1 bidder for such plant.

Accordingly, in deviation to the draft amendment Regulations the Commission has decided to amend Regulation 2(3) of Principal Regulations as follows:

"(3) The generic tariff specified for Solar PV, 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.

Provided that implementation of Canal Bank and Canal Top Solar PV Plants by the eligible government organization (as specified by MNRE) may also be done through tariff based bidding process. In such cases PPA for sale of power from these plants, implemented through tariff based bidding process, shall be signed with distribution licensee at a tariff which shall be 10% higher than the tariff quoted by L-1 bidder.

Provided further that in no case PPA for purchase of power by the distribution licensee shall be executed at a tariff exceeding the ceiling tariff as specified by the Commission in accordance with the regulations. "

2. Amendment proposed by the Commission in Regulation 3 of the Principal Regulation (Definitions):

a) Following definition was proposed to substituted under Regulation 3(1)(v):

“(v) ‘Inter-connection Point’ in respect of all the RE based generating stations, except Grid interactive Roof Top and Small Solar PV Power Projects, shall mean interface point of renewable energy generating facility with the transmission system or distribution system which shall be line isolator on outgoing feeder on HV side of generator transformer;

However, in respect of Grid interactive Roof Top and Small Solar PV Power Projects, Inter-connection Point shall mean the interface of solar power generation facility under net metering arrangement with the network of licensee and shall normally be the point where export/import meter is installed to measure the energy transfer between the licensee and the eligible consumer.”

b) Following definition was proposed to be inserted after Regulation 3(1)(w) as under:

“(w1) ‘Municipal solid waste’ means and includes commercial and residential wastes generated in a municipal or notified areas in either solid or semi-solid form excluding industrial hazardous wastes but including treated bio-medical wastes.”

c) Following definition was proposed to be inserted after Regulation 3(1)(dd) as under:

“(ee1) ‘Refuse Derived Fuel’ means segregated combustible fraction of solid waste other than chlorinated plastics in the form of pellets or fluff produced by drying, de-stoning, shredding, dehydrating, and compacting combustible components of solid waste that can be used as fuel;”

d) Following definitions were proposed to be inserted after Regulation 3(1)(ii) as under:

“(ii1) ‘Solar PV power plants on Canal Bank’ means the Solar PV power plants installed on the banks of the canals.

(ii2) ‘Solar PV Power Plants on Canal Top’ means the Solar PV power plants installed on the top of the canals.”

e) Regulation 3(1)(nn) (ii) was proposed to be substituted as under:

“(ii) Municipal Solid Waste (MSW) and Refuse Derived Fuel (RDF) based power projects with rankine cycle technology. - 20 years”

f) Regulation 3(1)(nn) (v) was proposed to be substituted as under:

“(v) Solar PV/Solar thermal/grid interactive roof top and small Solar PV plants /Solar PV power plants on Canal bank/Canal top. - 25 years”.

Comments received

No comments have been submitted by any of the stakeholders except correction of clause no. 3(1)(nn) (v) pointed out by UJVN Ltd.

Commission's views and decision:

As no material comments/objections have been received on the above amendments, hence, the Commission has decided to retain the same as was proposed in the draft Regulation. However, clause no. as pointed out by UJVN Ltd. has been corrected in the final amendment regulation. In addition, the Commission also noted that the term "Biomass power project" was omitted from Regulation 3(1)(nn) (ii) of the draft amendment due to inadvertent error, however, the same has been included in final amendment regulations.

3. Amendment proposed by the Commission in Regulation 4 of the Principal Regulations (Eligibility Criteria for qualifying as Generating Station based on Non-Conventional/Renewable Energy Source):

a) Regulation 4(2)(c) of the Principal Regulations was proposed to be substituted as under:

"(c) Solar PV, Canal bank & Canal top Solar PV, Solar Thermal and Grid interactive Roof Top and Small Solar PV Power Projects – Based on Technologies approved by MNRE."

b) Following clause was proposed to be inserted after Regulation 4(2)(g) of Principal Regulations:

"(h) Municipal solid waste based power projects – The project shall qualify to be termed as a Municipal solid waste based power project, if it is using new plant and machinery based on Rankine cycle technology and using Municipal solid waste as fuel sources."

c) Following clause was proposed to be inserted after Regulation 4(2)(h) of Principal Regulations:

"(i) Refuse derived fuel based power projects – The project shall qualify to be termed as a Refuse derived fuel based power project, if it is using new plant and machinery based on Rankine cycle technology and using Refuse derived fuel as fuel sources."

Comments received

- i. M/s BSR Green Power India (P) Limited, in reference to the proposed Regulation 4(2)(h), submitted that "n" number of technologies are available to treat municipal solid waste and generate useful electricity that are not based on Rankine cycle. The stakeholder also submitted that they have got patented the technology based on Ultra High Temperature Hydrolysis (UHTH) which is different from Rankine cycle. This technology is a much advanced version

of Rankine cycle technology which has a higher conversion factor of generating waste into electricity. The stakeholder requested to consider new innovative UHTH technology along with Rankine cycle technology for Municipal Solid Waste based power projects.

- ii. State Infrastructure and Industrial Development Corporation of Uttarakhand Ltd. (SIDCUL) submitted that on the directions of the Chief Secretary, a committee was constituted having the experts from various departments to identify and propose a mechanism for solid and industrial waste management that can give sustainable solution and is also cost feasible. Based on the parameters suggested by the Committee, SIDCUL floated RfP for Waste to Energy Project and successful bidder, was a Swiss based technology which works on UHTH. LoI was issued to the successful bidder “M/s BSR Green Powers & New Centre Energy” with a tariff of Rs. 12 per unit. SIDCUL submitted that existing dump site land under Roorkee Municipal Corporation has been identified and selected for setting proposed waste to Energy project.
- iii. Urban Development Department, Uttarakhand submitted that Urban Local Bodies within the State of Uttarakhand is generating approx. 1500 metric tons of waste per date and approx. 400 Acres of land is required for a period upto 15 years to create/provide basis SWM infrastructure to ensure effective compliance with Municipal Solid Waste (Management and Handling) Rules, 2000. As per State’s action plan for municipal solid waste management, the State requires approx. Rs. 786 crore to implement good waste management practices and erect necessary SWM infrastructure. The stakeholder further submitted that Waste to Energy technology based on Ultra High Temperature Hydrolysis for Roorkee has extreme advantage over other traditional technologies as it requires limited land of less than 4 Hectare, waste volume reduces to almost 1% which is non-leachable, non harmful basalt rock which is suitable for road and other civil works, this technology is able to cater almost 1/3rd State. Further, the tentative tariff as indicated in the presentation made before the Chief Secretary, Govt of Uttarakhand, Dehradun was approx. Rs. 12 per unit.
- iv. UREDA, State Agency during the hearing submitted that there is no UHTH technology based running project of the M/s BSR Green India (P) Ltd in India. In counter reply M/s BSR Green (P) Ltd. admitted that there is no running projects in India based on UHTH technology but there are other projects running at lower level of technology. M/s BSR Green (P) Ltd. also submitted that projects based on similar technology are operational in different parts of the world.

Commission's views and decision:

The stakeholders have requested the Commission to incorporate UHTH based technology for municipal solid waste power plants. During the proceedings, the Commission asked the stakeholder under which Rules or Regulations or ruling of higher tribunal/courts UHTH based technology should be incorporated in the Regulations. In reply, instead of quoting the provision of regulations, M/s BSR Green Power India (P) Ltd. submitted that the Commission should include the above mentioned technology as this will provide social benefit.

In this regard, the Commission is of the view that the above mentioned technology has not been specified in the Principal Regulations, 2013. Further, Regulation 4 (3) of RE Regulation, 2013, provides that:

“(3) Any new source or technology would qualify as 'renewable energy', only after the technology for the same has been approved by MNRE approval. Further, the Commission shall determine tariffs separately for each technology after the approval of the technology by MNRE. “

It is apparent that any new source or technology would qualify as 'renewable energy', only after the technology has been approved by MNRE. Further, the Commission incorporates such technologies in its regulations subsequent to approval of the same by MNRE, only then, a separate tariff for each technology would be determined based on the norms specified under the regulations. Since UHTH technology, as proposed by the stakeholders, has not been approved by the MNRE, the question of including it in the regulations and determination of corresponding tariff does not arise. Accordingly, the Commission has decided not to include the above mentioned technology in the Regulations as submitted by stakeholders.

4. Amendment proposed by the Commission in Regulation 11 of the Principal Regulations (Control Period and Review Period):

First Proviso of Regulation 11(1) of Principal Regulations was proposed to be substituted as under:

“Provided that the benchmark capital cost of Solar PV, Canal Bank & Canal Top Solar PV, Solar Thermal, Municipal solid waste based power projects, Refuse Derived Fuel based power projects and Grid interactive Roof Top and Small Solar PV projects may be reviewed annually by the Commission.”

Comments received:

No Comments have been received from Stakeholders.

Commission’s views and decision:

Since, none of the stakeholder has raised any issue on the substitution proposed, hence, the Commission has decided to retain the proposed amendment in the final amendment Regulation.

5. Amendment in Regulation 19 of the Principal Regulations (Interest on Working Capital):

In 1st line of sub-Regulation (1) of Regulation 19 after the word “Solar PV” the following words were proposed to be inserted:

“Canal Bank & Canal Top Solar PV”

In 1st line of sub-Regulation (2) of Regulation 19 after the word “biomass power projects” the following words were proposed to be inserted:

“municipal solid waste based power projects, refuse derived fuel based power projects”

Comments received:

No Comments have been received from Stakeholders.

Commission’s view and decision:

Since no issues have been raised by any of the Stakeholders on inclusion of the above mentioned “Canal Bank & Canal Top Solar PV” and “municipal solid waste based power projects, refuse derived fuel based power projects” in the 1st line of sub-Regulation (1) and 1st line of Sub-Regulation (2) respectively of Regulation 19, accordingly, the Commission has decided to retain all the above proposed amendments in final amendment regulations.

6. Proposal for insertion of a new Regulation 33(A) after Regulation 33 of the Principal Regulations:

“33(A) Canal bank Solar PV Power Plants and Canal top Solar PV Power Plants

Norms for canal bank Solar PV Power Plants and canal top Solar PV Power Plants under these Regulations shall be applicable for grid connected PV systems that directly convert solar energy into electricity and are based on the technology specific parameters for determination of generic tariffs for such power projects shall be as below:

Projects Commissioned on or after date as mentioned sub-Regulation 1(2)

<i>Capital Cost (Rs. Lakh/MW)</i>	<i>O&M Expenses for year of commissioning (Rs. Lakh/MW)</i>	<i>Capacity utilization Factor</i>
600	11.63	19%

Comments received:

1. UJVN Ltd. submitted that the Grid Connected Solar PV power plants on Canal Bank and Canal Tops have more challenges as compared to Solar Power Plants regarding installation, commissioning and O&M expenses. UJVN Ltd.'s submissions in this regard are as follows:

A. Grid Connected Solar PV Power Plants on Canal Banks:

- (a) Grid Connected Solar PV Power Plants on Canal Banks are spread all along the length of canal. As such the land is available over a lengthy stretch. Further, due to various structures and encroachments on the banks in between, land is not available in continuity which leads to substantial cost to be incurred on civil work, water supply pipe line, fencing and O&M of the plants.
- (b) Due to long spread, cost towards power evacuation to the interconnection point shall be higher.

As per data available at the MNRE, GoI website as on 07.03.2016, 15 MW Grid Connected Solar PV Power Plants on Canal Bank in the State of Gujarat have been awarded on 03.12.2015 at the cost of Rs. 118.27 Crore. As per DPR for 19.24 MW Canal Bank Solar Power Plants of UJVN Ltd. on the Yamuna Canal estimated capital cost per MW is Rs. 6.34 Crore excluding cost of land and after including the cost of land the estimated capital cost per MW come out to Rs. 7.59 Crore.

Proposal of the Stakeholder based on bankable rates in DPR are as follows:

Capital Cost	O&M Expenses for year of commissioning	Capacity Utilization Factor
(Rs. Lakh/MW)	(Rs. Lakh/MW)	
759	11.63	19%

B. Grid Connected Solar PV Power Plants on Canal Top:

- (a) For these kinds of Power Plants steel structures are to be erected on complete span of the canal in the required length. Cost towards the steel structures is high and Indian Institute of Technology, Roorkee was requested for optimization of steel structures, which has been reduced to 21 tons per MW. Cost of Steel structure depends upon the span of canal which is 43.2 meters in case of Yamuna Canal.

As per data available at the MNRE, GoI website as on 07.03.2016, 10 MW Grid Connected Solar PV Power Plants on Canal Top in the State of Gujarat have been awarded on 03.12.2015 at the cost of Rs. 98.46 Crore. Further, 5 MW Grid connected Solar PV Power Plants on Canal Top has been awarded in the State of Punjab @ Rs. 7.03

per kWh (for 2.5 MW) on the Gaghar Branch Canal with a span width of 32 metre.

Proposal of the Stakeholder based on bankable rates in DPR are as follows:

Capital Cost	O&M Expenses for year of commissioning	Capacity Utilization Factor
(Rs. Lakh/MW)	(Rs. Lakh/MW)	
1046	11.63	19%

2. In addition, UJVN Ltd. vide its letter dated 08.04.2016 informed that it is in the process of implementation of Canal Bank Solar & Canal Top PV Plant on the Yamuna Canal between Dakpathar Barrage and Kulhal Power House. UJVN Ltd. submitted the levellised rates quoted by L-1 bidders for implementation of the above mentioned plants as follows:
 - a) 7.0 MW Canal Bank Solar PV Plant Rs. 6.25/kWh
 - b) 7.5 MW Canal Bank Solar PV Plant Rs. 6.25/kWh
 - c) 4.5 MW Canal Bank Solar PV Plant Rs. 6.54/kWh
 - d) 1.0 MW Canal Top Solar PV Plant Rs. 6.49/kWh
3. UREDA, submitted that the Commission has considered Canal Bank Solar PV Power Plants and Canal Top Solar PV Power Plants in the same category while determining the capital cost and tariff of the project. However, the capital cost of canal top solar PV plant is more than the capital cost of canal bank solar PV power plants. MNRE has sanctioned total 8 Canal Bank Solar PV Power Plants and 5 Canal Top Solar PV Power Plants to different States. As per the tender process carried out in several States, the average per MW cost of Canal Top Solar PV Power Plants is arrived at Rs. 8.54 Crore/MW whereas the average per MW cost of the Canal Bank Solar PV Power Plants is arrived at Rs. 7.00 Crore/MW. UREDA requested the Commission for considering separate cost of Canal Top Solar PV Power Plants and Canal Bank Solar PV Power Plants as Rs. 8.54 Crore/MW and Rs. 7.00 Crore/MW respectively.

Commission's views and decision

As per weekly progress report dated 28.03.2016, in respect of Canal Bank and Canal Top power projects, total 50 MW Canal Top power projects are to be developed in 8 States and out of these 8 states, award price of only three projects is available and based on the same average, the Capital Cost of the awarded projects works out to Rs. 8.58 Crore/MW. Further, 50 MW canal Bank power projects are to be developed in 5 States and the average per MW price works out to 7.00 Crore/MW.

Further, the Commission also noted that MNRE vide its notification dated 05.12.2014 sanctioned the Central Finance Assistance (CFA) for implementation of grid connected Solar PV

plants on Canal Banks & Canal Tops under pilot mode. Vide the said notification MNRE has specified subsidies as follows:

- (a) Rs. 3 Crore/MW or 30% of the project cost, whichever is lower, for Canal Top Solar PV projects.
- (b) Rs. 1.5 Crore/MW or 30% of the project cost, whichever is lower, for Canal Bank Solar PV projects.

Accordingly, different levels of subsidies are being sanctioned by MNRE for implementation of Canal Top & Canal Bank Solar PV plants respectively. Further, implementation of Solar PV Plants along the bank of canal and also on top of the canal is also apparently distinct from that of normal Solar PV Plants mainly on account of requirement of mounting structures and requirement of connectivity at different span of such plants. Hence, the Commission has decided to specify benchmark capital cost separately for each category of Solar PV Plant namely Canal Top Solar PV Plant and Canal Bank Solar PV Plant as follows:

Projects Commissioned on or after 01.04.2016

Type Solar PV Plant	Capital Cost	O&M Expenses for year of commissioning	Capacity utilization Factor
	(Rs. Lakh/MW)	(Rs. Lakh/MW)	
Canal Top Solar PV Plant	7.05	11.63	19%
Canal Bank Solar PV Plant	6.85	11.63	19%

7. Proposal of the Commission for insertion of a new Regulation 36(A) after Regulation 36 of the Principal Regulations:

“36(A) Municipal solid waste based projects

(1) The norms for tariff determination specified hereunder are for power projects which use municipal solid waste and refuse derived fuel and are based on Rankine cycle technology application, combustion or incineration, Bio-methanation, Pyrolysis and High end gasifier technologies. Norms regarding Capital Cost, Plant Load Factor, Auxiliary Consumption etc. shall be as below:

Projects Commissioned on or after date as mentioned sub-regulation 2(1)

Project	Capital Cost	O&M Expenses for year of commissioning	Plant Load Factor	Auxiliary Consumption	Station Heat Rate	Calorific value
	(Rs. Lakh/MW)	(Rs Lakh/MW)			kcal/kWh	kcal/kg
MSW	800	6% of the project cost for 1st year and shall be escalated @ 5.72% per annum	65% during stabilisation & first year.	10%	4200	-
			75% from second year onwards			
RDF	600	6% of the project cost for 1st year and shall be escalated @ 5.72% per annum	65% during stabilisation & first year.	10%	4200	2500
			75% from second year onwards			

NOTE:

(a) No fuel cost shall be considered for determination of tariff for the power projects using municipal solid waste.

(b) RDF Fuel Price (P) for the first year after notification of these amendment Regulations shall be taken as Rs. 1800/MT, which shall be indexed for different years of tariff period based on annual inflation rate for fuel handling (WPI), Indexed Energy Charge Component (IRC) and transportation cost (price for high speed diesel: Pd) with 20%, 60% and 20% respective weightages as per following formula:

$$P(n) = P(n-1) * \{0.2 * (WPI(n)/WPI(n-1)) + 0.6 * (1+IRC)(n-1) + 0.2 * (Pd(n)/Pd(n-1))\}$$

(c) However, as the indices for nth year would be known only after close of nth year, the generating company shall be allowed to raise fuel cost bills for nth year based on normative escalation factor of 5% on previous year's fuel cost, which shall be adjusted based on actual index for the nth year

(d) Alternatively, for each subsequent year of the Tariff Period, the normative escalation factor of 5% per annum shall be applicable at the option of the biomass project developer.

Provided that the generating company has to give his option for normative or indexed fuel cost to the distribution licensee at least 3 months in advance of date of commissioning or one month after the date of issuance of these Regulations, whichever is later. The option once exercised shall not be allowed to be changed during the validity period of the PPA.

(1) The fuel cost component of the tariff for nth year shall be calculated as follows:

$$\text{Rate of Variable Charge (Rs./kWh) } VC_n = \frac{\text{Gross Station Heat Rate (GSHR)} \times P_n \times 10}{\text{Gross Calorific Value (GCV)} \times (100 - \text{AUX})}$$

Comments received:

1. M/s BSR Green Power India (P) Limited, submitted that the Commission has considered only

MSW and RDF project based on Rankine cycle while determining the capital cost and corresponding tariff. The MSW project based on UHTH technology has not been considered by the Commission. The cost of MSW projects based on UHTH technology is Rs. 51.36 Crore per MW based on the DPR.

The stakeholder proposed to include the following norms for Municipal Solid Waste based power projects based on Ultra High Temperature Hydrolysis (UHTH) technology:

Project	Capital Cost	O&M Expenses for year of commissioning	Plant Load Factor	Auxiliary Consumption	Station Heat Rate	Calorific value
	(Rs. Lakh/MW)	(Rs Lakh/MW)			kcal/kWh	kcal/kg
MSW based on UHTH technology	5136.00	8% of the project cost for 1st year and shall be escalated @ 2% per annum	80% during stabilisation & first year.	20%	-	4000
			85% from second year onwards			

The stakeholder further submitted that the Commission has considered fuel cost of Rs. 1800/MT only for RDF projects based on Rankine cycle while determining the tariff of the project. The stakeholder requested the Commission to consider the fuel cost of MSW equivalent to transportation charges while determining the tariff of MSW projects based on UHTH technology and Rankine cycle technology.

2. UERDA, submitted that the Commission has adopted the norms specified by CERC for determination of tariff for Municipal Solid Waste (MSW) Project and Refuse Derived Fuel (RDF) Projects. As per CERC the capital cost for MSW and RDF are Rs. 1500 lakh/MW and Rs. 900 lakh/MW respectively. UERDA requested the Commission to take the capital cost and other norms as specified by CERC.

Commission’s view and decision:

As discussed above MSW project based on UHTH technology is not being considered by the Commission as the technology has not been approved by MNRE. Accordingly, the request of M/s BSR Green Power (P) Ltd. in the matter is not accepted by the Commission.

The Benchmark cost of MSW and RDF based projects and other related norms as specified by CERC are being adopted by the Commission. Hence, the Commission has decided to revise the norms specified in final amendment Regulations as follows:

“36(A) Municipal solid waste based projects

(1) The norms for tariff determination specified hereunder are for power projects which use municipal solid waste and refuse derived fuel and are based on Rankine cycle technology application, combustion or incineration, Bio-methanation, Pyrolysis and High end gasifier technologies. Norms regarding Capital Cost, Plant Load Factor, Auxiliary Consumption etc. shall be as below:

Projects Commissioned on or after date as mentioned sub-regulation 2(1)

Project	Capital Cost	O&M Expenses	Plant Load Factor	Auxiliary Consumption	Station Heat Rate	Calorific value
	(Rs. Lakh/MW)	for year of commissioning (Rs Lakh/MW)			kcal/kWh	kcal/kg
MSW	1500	6% of the project cost for 1st year and shall be escalated @ 5.72% per annum	65% during stabilisation & first year.	15%	4200	-
			75% from second year onwards			
RDF	900	6% of the project cost for 1st year and shall be escalated @ 5.72% per annum	65% during stabilisation & first year.	15%	4200	2500
			75% from second year onwards			

NOTE:

(a) No fuel cost shall be considered for determination of tariff for the power projects using municipal solid waste.

(b) RDF Fuel Price (P) for the first year after notification of these amendment Regulations shall be taken as Rs. 1800/MT, which shall be indexed for different years of tariff period based on annual inflation rate for fuel handling (WPI), Indexed Energy Charge Component (IRC) and transportation cost (price for high speed diesel: Pd) with 20%, 60% and 20% respective weightages as per following formula:

$$P(n) = P(n-1) * \{0.2 * (WPI(n)/WPI(n-1)) + 0.6 * (1+IRC)(n-1) + 0.2 * (Pd(n)/Pd(n-1))\}$$

(c) However, as the indices for nth year would be known only after close of nth year, the generating company shall be allowed to raise fuel cost bills for nth year based on normative escalation factor of 5% on previous year's fuel cost, which shall be adjusted based on actual index for the nth year

(d) Alternatively, for each subsequent year of the Tariff Period, the normative escalation factor of 5% per annum shall be applicable at the option of the biomass project developer.

Provided that the generating company has to give his option for normative or indexed fuel cost to the distribution licensee at least 3 months in advance of date of commissioning or one month after the date of issuance of these Regulations, whichever is later. The option once exercised shall not be allowed to be changed during the validity period of the PPA.

(1) The fuel cost component of the tariff for nth year shall be calculated as follows:

$$\text{Rate of Variable Charge (Rs./kWh) } VC_n = \text{Gross Station Heat Rate (GSHR)} \times P_n \times 10$$

8. Proposed amendment of Form 2.1 appended to the Principal Regulations

- a) Title of Form 2.1 appended to the Principal Regulations was proposed to be substituted as under:-

"Form-2.1: Form Template for (Biomass Power, municipal solid waste, refuse derived fuel or Non-fossil fuel based Cogen) Parameter Assumptions."

- b) Row 6 of Form 2.1 appended to the Principal Regulations was proposed to be substituted as under:-

Assumption Head	Sub-Head	Sub-Head (2)	Unit	Values
Fuel related assumptions	Station Heat Rate	During stabilization	kCal/kWh	
		Post stabilization	kCal/kWh	
	Fuel types & mix	Biomass fuel type-1	%	
		Biomass fuel type-2	%	
		Municipal Solid Waste fuel	%	
		Refuse Derived Fuel	%	
		Fossil fuel (coal)	%	
		GCV of Biomass fuel type-1	kCal/kg	
		GCV of Biomass fuel type-2	kCal/kg	
		GCV of fossil fuel (coal)	kCal/kg	
		Biomass Price (fuel type-1):yr-1	Rs./MT	
		Biomass Price (fuel type-2):yr-1	Rs./MT	
		Fossil fuel price (coal) : yr-1	Rs./MT	
		Fuel price escalation factor	% p.a.	

Comments received

No comment has been received in the above mentioned draft amendment.

Commission's view and decision

The Commission observed that proposed amendment in Form-2.1 was on account of amendment in provisions of Principal Regulations. Since, no comment has been received in the matter, accordingly, the Commission has decided to retain the same in the final amendment regulations.

9. Proposed amendment of Form 2.2 appended to the Principal Regulations:

- a) Title of Form 2.2 appended to the Principal Regulations was proposed to be substituted as under:-

"Form-2.2: Form Template for (Biomass Power, municipal solid waste, refuse derived fuel or Non-fossil fuel based Cogen: Determination of Tariff Components." :

b) Table for “Tariff Components (Variable Charge)” of Form 2.2 appended to the Principal Regulations was proposed to be substituted as under:-

Tariff Components (Variable charge)	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	26	27	28	29	30	31	32	33	34	35					
Biomass fuel type-1	Rs. Lakh																																								
Biomass fuel type-2	Rs. Lakh																																								
Municipal Solid Waste	Rs. Lakh																																								
Refuse Derived Fuel	Rs. Lakh																																								
Fossil fuel (coal)	Rs. Lakh																																								
Sub-total (Fuel Costs)	Rs. Lakh																																								
Fuel cost allocable to power	%																																								
Total Fuel Cost	Rs. Lakh																																								

Comments received:

No comment has been received in the above mentioned draft amendment.

Commission’s view and decision:

The Commission observed that proposed amendment in Form-2.2 was on account of amendment in provisions of Principal Regulations. Since, no comment has been received in the matter, accordingly, the Commission has decided to retain the same in the final amendment regulations.

10. Proposed amendment of Annexure-1 of the Principal Regulations:

(i) Insert S.No. 2A after S.No. 2 of Annexure-1 of Principal Regulation as following:

“2A. “Levelling Rate of Fixed Charges (RFC) in Rs./kWh for Municipal Solid Waste (MSW) based Power Projects:

<i>Particulars</i>	<i>Rate of Fixed Charges for MSW based projects (Rs./kWh)</i>
<i>Gross Tariff</i>	<i>3.60</i>
<i>Less : Acc. Dep. Benefit</i>	<i>0.20</i>
<i>Net Tariff</i>	<i>3.40</i>

(ii) Insert S.No. 2B after S.No. 2 of Annexure-1 of Principal Regulation as following:

“2B. “Levelling Rate of Fixed Charges (RFC) & Variable Charges in Rs./kWh for Refuse Derived Fuel (RDF) based Power Projects:

<i>Particulars</i>	<i>Rate of Fixed Charges for RDF based projects (Rs./kWh)</i>
<i>Gross Tariff</i>	<i>2.85</i>
<i>Less : Acc. Dep. Benefit</i>	<i>0.15</i>
<i>Net Tariff</i>	<i>2.70</i>

<i>Year</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<i>RDF: Rate of variable charges for year 1 as FY in which 5th amendment to the regulations is being notified with 5% normative escalation subsequently</i>	3.56	3.74	3.92	4.12	4.32	4.54	4.77	5.01	5.26	5.52	5.80	6.08	6.39	6.71	7.04	7.40	7.77	8.15	8.56	8.99

(iii) Insert S.No. 6A after S.No. 6 of Annexure-1 of Principal Regulation as following:

“6A. Levellised rate of Fixed Charges (RFC) for Canal Bank Solar PV and Canal Top Solar PV Power Projects:

<i>Particulars</i>	<i>Canal bank and Canal top Solar PV Power Plants (Rs./kWh)</i>
<i>Gross Tariff</i>	6.40
<i>Less : Acc. Dep. Benefit</i>	0.55
<i>Net Tariff</i>	5.85

Comments received

UJVN Ltd., submitted that on the basis of the submission against the proposed draft amendment, levellised Rate of Fixed Charge (RFC) including admissible CFA under “Pilot-cum-Demonstration Project for development of Grid Connected Solar PV Power Plants on Canal Bank and Canal Top” scheme notified by MNRE for Canal Bank Solar PV and Canal Top Solar PV Power Plants, are proposed for modifications as hereunder which are based on bankable rates in the DPR:

Particulars	Canal Bank Solar PV Power Plants (Rs./kWh)	Canal Top Solar PV Power Plants (Rs./kWh)
Gross Tariff	7.04	8.15

Commission’s views and decision

As discussed above, benchmark capital cost of the Canal Bank & Canal Top Solar PV Plants, MSW based plants, RDF based plants have been revised from that proposed in the draft amendment regulations, accordingly, generic tariffs of such plants are being specified as follows:

Amendment of Annexure-1 of the Principal Regulations:

(i) Insert S.No. 2A after S.No. 2 of Annexure-1 of Principal Regulation as following:

“2A. “Levellised Rate of Fixed Charges (RFC) in Rs./kWh for Municipal Solid Waste (MSW) based Power Projects:

<i>Particulars</i>	<i>Rate of Fixed Charges for MSW based projects (Rs./kWh)</i>
<i>Gross Tariff</i>	7.10
<i>Less : Acc. Dep. Benefit</i>	0.40
<i>Net Tariff</i>	6.70

(ii) Insert S.No. 2B after S.No. 2A of Annexure-1 of Principal Regulation as following:

“2B. “Levelling Rate of Fixed Charges (RFC) & Variable Charges in Rs./kWh for Refuse Derived Fuel (RDF) based Power Projects:

<i>Particulars</i>	<i>Rate of Fixed Charges for RDF based projects (Rs./kWh)</i>
<i>Gross Tariff</i>	4.35
<i>Less : Acc. Dep. Benefit</i>	0.25
<i>Net Tariff</i>	4.10

<i>Year</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<i>RDF: Rate of variable charges for year 1 as FY in which 5th amendment to the regulations is being notified with 5% normative escalation subsequently</i>	3.56	3.74	3.92	4.12	4.32	4.54	4.77	5.01	5.26	5.52	5.80	6.08	6.39	6.71	7.04	7.40	7.77	8.15	8.56	8.99

(iii) Insert S.No. 6A after S.No. 6 of Annexure-1 of Principal Regulation as following:

“6A. Levelling rate of Fixed Charges (RFC) for Canal Bank Solar PV and Canal Top Solar PV Power Projects:

<i>Particulars</i>	<i>Canal bank Solar PV Power Plants (Rs./kWh)</i>	<i>Canal top Solar PV Power Plants (Rs./kWh)</i>
<i>Gross Tariff</i>	7.35	8.45
<i>Less : Acc. Dep. Benefit</i>	0.65	0.80
<i>Net Tariff</i>	6.70	7.65
