PUNJAB STATE ELECTRICITY REGULATORY COMMISSION
SCO NO. 220-221, SECTOR 34-A, CHANDIGARH

Petition No.32 of 2010 (Suo Motu)
Date
of Order: 30.09.2010

In the matter of: Determination of generic levellised generation tariff for Renewable Energy Power Projects (other than Solar)

Present: Shri Jai Singh Gill, Chairman
Shri Satpal Singh Pall, Member
Shri Virinder Singh, Member

ORDER

1. The Punjab State Electricity Regulatory Commission (Commission) in its order dated 13.12.2007 determined tariffs for different types of New and Renewable Sources of Energy (NRSE) projects/technologies. Later, in September 2009, the Central Electricity Regulatory Commission (CERC) notified its Central Electricity Regulatory Commission (Terms & Conditions for Tariff Determination from Renewable Energy Sources) Regulations, 2009 (RE Regulations) which were subsequently amended in February 2010. Thereafter, CERC on the basis of suo motu petitions issued two orders on 3.12.2009 and 26.4.2010 for determination of generic levellised tariff for renewable energy (RE) technologies/power projects to be commissioned in FY 2009-10 (effective from the date of notification of RE Regulations) and FY 2010-11 respectively.

2. In view of the aforementioned developments, the Commission considered it appropriate to revisit the tariffs fixed in its order of 13.12.2007. Accordingly, a staff paper was put on the website of the Commission and a public notice was issued on 27.5.2010 inviting comments/suggestions. The staff paper proposed to adopt the CERC RE Regulations mutatis mutandis alongwith the State specific levellised generic tariffs for RE Projects as per CERC order dated 26.4.2010 applicable to projects to be commissioned in FY 2010-11.

3. The Commission notes that CERC carried out an exhaustive exercise and after following the due process issued the RE Regulations and subsequent orders for determination of State specific tariffs for different types of RE projects/technologies. In the circumstances, it was felt that undertaking the entire exercise afresh is not necessary. However, several comments and suggestions have been received pertaining mainly to capital and fuel cost for RE projects which merit consideration. Initially, responses were received to the public notice from A2Z Maintenance & Engineering Services Ltd. (A2Z), Malwa Power Pvt. Ltd. (MPL), Dee Development Engineers Ltd. (DDL), Universal Biomass Energy Pvt. Ltd. (UBL) and Green Planet Energy Pvt. Ltd. (GPL) who are either existing RE generators or prospective developers. Later, the Commission sought inputs and clarifications from other agencies such as the Punjab Energy Development Agency (PEDA), Indian Renewable Energy Development Agency (IREDA), Markfed, Milkfed, Sugarfed, Cane Commissioner and some sugar mills operating in the State. Besides observations on specific issues of costs, UBL and GPL have also submitted that the Commission cannot adopt CERC Regulations/Tariff but needs to undertake an independent study for determination of RE tariffs applicable in the State. All these issues and suggestions are discussed in the succeeding paragraphs.

A. Capital Cost

Suggestion of the Objectors:

(i) A2Z which is implementing three 15 MW co-generation projects on BOOT basis in the Morinda, Nakodar and Fazilka Cooperative Sugar Mills in association with Punjab State Federation of Cooperative Sugar Mills has submitted that the minimum project cost in the case of non-fossil fuel based co-generation projects comes to Rs.5.13 crore per MW as against Rs.3.8 crore per MW taken by CERC whereas the same in respect of biomass projects should be reckoned as Rs.5.0 crore per MW as against Rs.4.02 crore per MW determined by CERC. In subsequent filings, however, A2Z has stated that the average cost for non-fossil fuel based co-generation/biomass projects be taken as Rs.5.0 crore per MW.

(ii) UBL has pointed out that the total project cost of their 14.5 MW biomass based project worked out to Rs.74.91 crore (Rs.5.16 crore per MW) inclusive of the cost of the evacuation line which has not been taken into consideration

by CERC. Further, it is urged that the CERC in order dated 3.12.2009 has arrived at a capital cost of Rs.4.50 crore per MW (FY 2009-10) which should be applicable in their case as their project was commissioned on 31.10.2009.

(iii) GPL while not immediately reacting to the staff paper subsequently submitted that the estimated cost of their 6 MW biomass project, presently under construction, is expected to be Rs.6 crore per MW.

(iv) PEDA has suggested a capital cost of Rs.6.125 crore per MW based on the DPR cost of Viaton Energy Pvt. Ltd. which proposes to develop two biomass units of 10 MW each.

(v) IREDA has intimated the capital cost updated for 2008-09 which on an average comes to Rs.4.36 crore per MW for co-generation projects and Rs.5 crore per MW for biomass projects.

View of the Commission:

The Commission notes that as per inputs received, the cost per MW in respect of biomass projects ranges between Rs.4.68 crore to Rs.6.13 crore per MW whereas in the case of non-fossil fuel based co-generation projects the variation is between Rs.4.30 crore to Rs.5.86 crore per MW. As against this, CERC has determined capital cost as Rs.4.0254 crore and Rs.3.9807 crore per MW in the case of biomass and non-fossil fuel based co-generation projects respectively. It is also seen that CERC has, while determining capital cost in either case, primarily relied on data of actual project cost obtained from IREDA as well as inputs furnished by developers submitting applications for availing CDM benefits. On the other hand, there is no independent corroboration of the capital cost figures furnished by the objectors. It is relevant to note that IREDA is a Government of India (GoI) institution which helps in setting up of RE projects by making finance available and thus has access to project details and data that are relevant for a more accurate estimation of capital cost. As CERC has taken all such inputs into account in arriving at the capital cost of Rs.4.0254 crore and Rs.3.9807 crore per MW for biomass and non-fossil fuel based co-generation projects respectively, the Commission has no hesitation in accepting the same.

B. Fuel Cost and Gross Calorific Value

Suggestion of the Objectors:

(i) A2Z has submitted that owing to the limited crushing season in the State, additional biomass fuel will need to be sourced from the market. It has been suggested that the cost of such biomass could be taken as Rs.2600/- per MT and its calorific value as 3200 kCal/kg. As regards bagasse, its price was initially indicated as Rs.1159/- per MT and subsequently reported as Rs.2650/- per MT.

(ii) According to MPL, the biomass fuel price for the period April 2009 to December 2009 was Rs.2165/- per MT which increased to Rs.2469/- per MT in April - June 2010.

(iii) DDL has suggested that the average biomass fuel price for the period April 2009 to March 2010 was Rs.2530/- per MT and in subsequent filings it is reported to be Rs.2595/- per MT between April and June 2010.

(iv) UBL has indicated that the main biomass fuel used by them is cotton stalk and rice husk while other materials include paddy straw and cow dung. It has been further submitted that the procurement of biomass is undertaken in a short time span and involves interest & storage cost besides transportation and labour charges. In view of all these elements of cost, it is urged that the cost of biomass fuel may be considered as Rs.3200/- per MT. In subsequent filings, however, UBL has intimated that the biomass fuel price from November 2009 to July 2010 was Rs.2570/- per MT.

View of the Commission:

The Commission notes that the CERC did not find it expedient to rely on the price of fuel reported by any project developer owing to a wide variation in the prices quoted and for the purposes of determining fuel cost has adopted the 'equivalent heat value' approach based on the landed cost and calorific value of coal as approved by the respective State Electricity Regulatory Commissions while determining generation tariff of their State utilities. As most of the approved fuel prices available at that time pertain to 2008-09, the same were escalated by using the fuel indexation mechanism as stipulated in the CERC RE Regulations to arrive at the fuel cost for the year 2009-10. Based on this, biomass and bagasse price in 2010-11 has been determined as Rs.2159/- and Rs.1443/- per MT after once again applying the fuel price indexation mechanism upon the costs arrived at for the year 2009-10.

The Commission observes that the equivalent heat value approach does not truly reflect the actual cost of fuel that a developer might have paid and cannot for that reason be an accurate indicator of the costs being incurred by a developer. Since cost of fuel is a critical parameter in determining tariff, the Commission had also sought additional data from other stake holders and agencies such as Markfed, Milkfed, Sugarfed, IREDA, Cane Commissioner and some sugar mills located in the State. An appraisal of this data indicates that all RE generators presently operating in the State use a variety of fuels, the weighted average cost of which varied between Rs.2469/- per MT in the case of MPL to Rs.2845/- per MT as indicated by DDL. Apex cooperative institutions operating processing plants have indicated the price of paddy husk to be between Rs.2773/- to Rs.3070/- per MT. IREDA, on the other hand, has brought out the price of biomass fuel as Rs.1800-2000/- per MT. The price indicated by apex cooperative institutions could be on the higher side as they are for paddy husk only and it is entirely possible that a lower rate would result if a mix of different types of fuels was taken into consideration. The Commission notes that the weighted average cost of biomass quoted by developers of functional power plants and IREDA varies between Rs.1800/- to 2845/- per MT which on an average, works out to Rs.2446/- per MT. Taking this into consideration, the Commission is of the view that biomass fuel price for the year 2010-11 could appropriately be fixed at Rs.2500/- per MT.

Only A2Z had initially indicated the price of bagasse as Rs.1159/- per MT with a calorific value of 2250 kCal/kg. The same objector in subsequent filings has mentioned the bagasse cost as Rs.2650/- per MT while retaining the calorific value as brought out earlier. As against this, Sugarfed has provided data for the years 2007-08, 2008-09 and 2009-10 of bagasse cost of different sugar mills operating in the State. Taking the cumulative annual average rate of bagasse as reported by Sugarfed, the cost of bagasse comes to Rs.1448/- per MT while the CERC has adopted the price of Rs.1443/- per MT. It is noted that A2Z who has provided the data has neither commissioned any non-fossil fuel based power plant so far nor provided the basis of the price estimates. The variation between the figure first reported and subsequently submitted is also unexplained. On the other hand, the average cost of bagasse for 3 years based on the Sugarfed data is close to that arrived at by CERC. In the circumstances, the Commission is inclined to adopt the cost of Rs.1443/- per MT as determined by CERC.

A related issue concerns the Gross Calorific Value (GCV) of biomass fuel that is to be taken into reckoning. Inputs from developers and stake holders report GCV as varying from 3000 kCal/kg to 3411 kCal/kg. It is seen that CERC while giving its findings in this respect has relied on data provided by the Indian Institute of Science Bangalore which has taken into account the GCV of the weighted average of different biomass fuels available in a State after determining the GCV of each type. As against this, GCV data supplied by developers is not independently corroborated. The Commission is of the view that a GCV of 3368 kCal/kg for biomass and 2250 kCal/kg for bagasse which have been scientifically arrived at by CERC be adopted.

C. Fuel Cost Escalation

Suggestion of the Objectors:

UBL has submitted that there has been an unprecedented increase in fuel costs over the last two years and taking that and other related factors into account, annual increase in fuel cost could be pegged at 10%. GPL has by and large endorsed the submission.

View of the Commission:

The Commission observes that CERC RE Regulations provide that escalation in fuel cost could either be determined by applying the fuel price indexation mechanism as specified in Regulation 45 and 54 for biomass and non-fossil fuel based co-generation projects respectively or a normative escalation factor of 5% per annum could be adopted as per the choice of a developer. It is seen that of the two objectors, only UBL has a RE plant which is in operation. Data supplied by UBL on fuel cost in the years 2009-10 and 2010-11 indicates the same to be Rs.2570/- per MT in both years. In the circumstances, the Commission is unable to ascertain the basis on which a fuel escalation of 10% is being suggested. It is noted, on the other hand, that CERC has adopted a fuel cost escalation factor of 5% which appears to be reasonable and the Commission accepts the same. RE developers will, at the same time, have choice to opt for fuel price escalation based on CERC's fuel price indexation mechanism.

D. Control Period

Suggestion of the Objectors:

UBL has suggested that in the light of a quick changing economic scenario, the control period should be fixed as 2-3 years as against 13 years prescribed by CERC. It is mentioned in this respect that the control period determined by Gujarat Electricity Regulatory Commission is also 3 years. GPL has endorsed this suggestion.

View of the Commission:

The Commission observes that the issue raised by the objector has already been addressed in the CERC RE Regulations wherein a control period of 3 years has been prescribed. The objectors are apparently confusing the tariff period of 13 years as specified in Regulation 6 for the control period which is separately defined in Regulation 5.

E. Reservation of Area for Biomass Power Plants

Suggestion of the Objectors:

UBL has informed that the Government of Rajasthan has formulated a policy for promoting biomass based generation by reserving area for each plant with a view to avoiding unhealthy competition amongst different developers in the procurement of fuel. UBL has urged that a similar provision needs to be made in the case of Punjab as well. The same request has also been made by GPL.

View of the Commission:

The Commission notes that the 2006 NRSE Policy of the State Govt. already provides that only one biomass based project would be approved in a Tehsil of the State so as to provide each developer with a sufficient biomass command area. While this prescription may be adequate for the time being, the Commission observes that it also needs to take the location of non-fossil fuel based co-generation plants into account as these may also source biomass fuel in the off season. Moreover, given the biomass availability of the State, it might in the long run be more appropriate to reserve area based on the installed generation capacity of each project so that the optimal quantum of RE capacity can come up in the State. The Commission trusts that the State Govt. will give due consideration to this issue.

F. Other Issues:

A2Z and UBL have opposed the proposed reduction to the extent of 13 paise and 5 paise in the case of cooperative sugar mills and biomass based RE projects respectively. The Commission observes that reduction in tariff to the extent of subsidies given by the Central or State Governments has been specifically provided in Regulation 22 of the CERC RE Regulations. These Regulations, it is noted, aim to determine tariff on the basis of costs that are likely to be incurred by prospective developers and also include a reasonable rate of return. The Commission observes that it is only fair to take into account the subsidies if any granted and not normative costs alone. Accordingly, the Commission finds no merit in this objection. In this respect, it may also be clarified that the proposed reduction in tariff for different categories of RE generators only takes the capital subsidy offered by the GOI into account; and State Govt., the Commission is informed, does not provide incentives and subsidy that may have a significant impact on the cost of generation.

4. An important factor impinging on tariff determination in the case of non-fossil fuel based co-generation units is the normative PLF of such projects. The Commission notes that CERC RE Regulations assume that such units will work for 150 days in the crushing season and another 60 days in the off season. With operation of 210 days in a year, their PLF would work out to 53%. In the case of Punjab, data of crushing seasons made available by the Cane Commissioner indicates that it would be realistic only to assume that co-generation units would run for 110 days in the crushing season and another 45 days in the off season resulting thereby in further reduction of normative PLF of these plants. The Commission observes, however, that the methodology of determining PLF on this basis may not be realistic as it does not take into account the possibility that these plants could operate for the remaining portion of the year on other biomass fuel available in the State. In fact, one of the objectors has specifically referred to the need for separately determining fuel cost of biomass in the case of co-generation units so that cost of tariff during the crushing season and thereafter can be compositely determined. Given the availability of biomass in the State, the Commission sees no reason why co-generation units should not be able to achieve the normative PLF as applicable to biomass based units. Taking this into account, the Commission proposes also to adopt a PLF of 80% in the case of non-fossil fuel based co-generation plants with a

view to optimizing the generation from these units besides providing additional benefits for the developer. This implies that such units will work for a total of 292 days in a year of which 155 days would be bagasse based generation while the plants will operate in the remaining period utilizing biomass as fuel. Accordingly, tariff for non-fossil fuel based co-generation projects has been arrived at on the basis of weighted average of various parameters for bagasse and biomass.

5. Two of the objectors had urged that the Commission can not adopt CERC Regulations and is mandated, in accordance with the provisions of the Electricity Act 2003, to undertake an independent study for the determination of RE tariff. The Commission is unable to agree with the contention that either the Electricity Act or the Rules and Regulations framed thereunder in any way restrain the Commission from adopting CERC Regulations, principles or standards. Quite to the contrary, several of the Commission's own Regulations specifically provide for principles and methodologies of the CERC to be applied in the exercise of determining tariffs. Moreover, para 6.4(3) of the Tariff Policy specifically enjoins the CERC to lay down guidelines for the pricing of power from non-conventional sources when such procurement is not through competitive bidding. For these reasons, the Commission finds no merit in this contention of the objector. At the same time, the Commission observes that CERC Regulations are the result of an extensive study of the issue in question and it would be both unnecessary and time consuming for the Commission to separately launch upon an independent study. The Commission, therefore, proposes to adopt CERC RE Regulations as amended from time to time and RE tariffs determined by CERC with the modifications as brought out in paras 3B and 4 above.

6. On the basis of CERC RE Regulations alongwith modifications referred to above, tariff for biomass units and non-fossil fuel based co-generation projects has been reworked. The staff paper on revised RE tariffs also proposed fixation of such tariffs for small hydro projects. No objection or suggestion has been received in respect of these tariffs and the same are confirmed. The Commission observes that as per the Wind Power Density Map in the Indian Wind Atlas published by Centre for Wind Energy Technology in August 2010, there is no installable potential for wind energy in the State. However, in the event of such a project being established, tariff

for Wind Zone-1 as determined by CERC would be applicable. Accordingly, tariff for different types of RE projects will be as hereunder:

Biomass Power Projects				
Levellised Fixed Tariff	Variable Tariff (FY 2010-11)	Applicable Tariff Rate (FY 2010-11)	Benefit of Accelerated Depreciation (if availed)	Net Applicable Tariff (upon adjusting for Accelerated Depreciation benefit, if availed)
(Rs/kWh)	(Rs/kWh)	(Rs/kWh)	(Rs/kWh)	(Rs/kWh)
1.92	3.13	5.05	(0.19)	4.86
Non-Fossil Fuel based Co-Generation Projects				
1.73	2.84	4.57	(0.18)	4.39
Small Hydro Power Projects				
Particular	Levellised Total Tariff (FY 2010-11)		Benefit of Accelerated Depreciation (if availed)	Net Levellised Tariff (upon adjusting for Accelerated Depreciation benefit, if availed)
	(Rs/kWh)		(Rs/kWh)	(Rs/kWh)
Below 5 MW	4.26		(0.57)	3.69
5 to 25 MW	3.65		(0.51)	3.14
Wind Energy Power Projects				
Wind Zone-1	5.07		(0.78)	4.29

Note: These tariffs are subject to further reduction on account of subsidy for a period of ten (10) years, if availed by the developer(s).

7. As brought out in para 3F above, Regulation 22 of the RE Regulations stipulates that any incentive or subsidy offered by the Central or State Governments if availed by a RE developer is also to be taken into consideration while determining tariffs. Although, CERC has quantified the per unit reduction on account of accelerated depreciation benefit, reduction in tariff on account of other incentives and subsidies has not been specified. The Commission notes that MNRE has in its communication No.3/19/2006-CPG dated 28.4.2010 conveyed the sanction of GoI for incentives/subsidies in respect of Grid Interactive Biomass Power and Bagasse Co-generation projects commissioned during 2010-11 and

the remaining period of the 11th Five Year Plan. In the case of small hydro power projects (upto 25 MW capacity), incentives/subsidies have been indicated in MNRE No.14(1)/2008-SHP dated 11.12.2009. However, such assistance/subsidy cannot be generically determined and will have to be worked out separately on the basis of project capacity. Accordingly, the Commission directs that Punjab State Power Corporation Ltd. will, before signing the Power Purchase Agreement with the developer, work out the subsidy as per formulae indicated in MNRE communications referred to above and reduce the tariff to that extent for a period of ten years.

Sd/-	**Sd/-**	**Sd/-**
(Virinder Singh)	**(Satpal Singh Pall)**	**(Jai Singh Gill)**
Member	**Member**	**Chairman**

Chandigarh
Dated: 30.09.2010