No.L-7/186(201)/2009-CERC
Central Electricity Regulatory Commission
New Delhi

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

Date: 27.4.2010

In the matter of

CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) (First Amendment) Regulations, 2010

Statement of Objects and Reasons

1. Introduction

1.1 The Electricity Act, 2003 (hereinafter referred to as "the Act") under Section 79 assigns the following functions to the Central Electricity Regulatory Commission (hereinafter referred to as the "Commission"), among others:

a) to regulate the tariff of generating companies owned or controlled by the Central Government;
b) to regulate the tariff of generating companies other than those owned or controlled by the Central Government specified in Clause(a), if such generating companies enter into or otherwise have a composite scheme for generation and sale of electricity in more than one state;

1.2 Section 61 of the Act empowers the Commission to specify, by regulations, the terms and conditions for the determination of tariff in accordance with the provisions of the said section and the National Electricity Policy and Tariff Policy. In terms of clause (s) of sub-section (2) of section 178 of the Act, the Commission has been vested with the powers to make regulations, by notification, on the terms and conditions of tariff under section 61. As per section 178(3) of the Act, the Commission is required to make previous publication before finalizing any regulation under the Act. Thus as per the provisions of the Act, the Central Commission is mandated to specify, through notification, the terms and conditions of tariff of the generating companies covered under clauses (a) ,and (b) of sub-section (1) of section 79 of the Act after previous publication.

1.3 In exercise of the powers vested under sections 61 and 178 (2) (s) of the Act and all other enabling powers and in compliance of the requirement under section 178 (3) of the Act, the Central Commission has notified vide public notice no. L-7/186(201)/2009-CERC dated 16th September, 2009 the Central Electricity Regulatory Commission (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2009 (hereinafter referred to as the RE Tariff Regulations).

1.4 Subsequently, the First Amendment to RE Tariff Regulations was proposed by the Commission vide public notice no. 1/3/2009-Reg. Affairs (RE Tariff-FY-2010-11) (i)/CERC dated 19th January, 2010 and comments from the various stakeholders were invited.

1.5 A public hearing was held on 10th February, 2010. The Commission after taking into consideration the views of the stakeholders have notified First Amendment to the RE Tariff Regulations vide public notice no. L-7/186(201)/2009-CERC dated 25th February, 2010.

2. Comments/Suggestions of the stakeholders and Commission's decision thereon

<u>Tariff Visibility for Solar PV and Solar Thermal Power Projects</u>

2.1 In the draft amendment to the RE Tariff Regulations, it was proposed that the generic tariff and benchmark capital cost norms and other norms with respect to the solar thermal power projects applicable for FY 2010-11 shall also apply for FY 2011-12. No change of applicability of generic tariff norms for Solar PV Power projects was proposed by the Commission.

2.2 Acciona Energy has suggested that the tariff visibility for minimum 2 years shall be given for Solar Photovoltaic (Solar PV) Power Projects. Tariff for FY 2012-13 onwards should be based on progress in MW installed and cost reduction trends.

2.3 Astonfield Renewable Resources Ltd. has submitted that the policy framework under Jawaharlal Nehru National Solar Mission (JNNSM) is being evolved; resulting in delay in signing of the PPA and subsequent commissioning of such projects after signing of PPA these projects will be commissioned only by middle of 2011-12. Thus, there will be no visibility on tariff for such project. Hence, the control period of 2 years for Solar PV Power Projects will be necessary to ensure the applicability of project tariff for solar projects when Engineering, Procurement and Construction (EPC) costs are committed.

2.4 Moser Baer Clean Energy Ltd. with regard to Solar PV Power Projects has suggested that the control period for the tariff order may be increased from 1 year to 3 years.

2.5 Sun Edison with regard to the Solar PV Power Project has submitted that given the requirement of signing a PPA, it will be important for developers to have some idea about the likely tariff up to March 2013. It is necessary to provide tariff visibility over the period of 3 years until 2013.

2.6 With regard to the applicability of tariff for Solar Thermal Power Projects, various stakeholders have submitted that it should be co-terminous with the first phase of JNNSM and accordingly the Commission may specify tariff for next 3 years instead of 2 years with respect to Solar Thermal Power Projects.

2.7 With regard to the tariff visibility for solar power projects, the Commission has carefully considered the views submitted by the various stakeholders. Based on submission made by various solar power project developers, the Commission understands that the development of solar power projects is linked with the recently evolved policy framework under the Jawaharlal Nehru National Solar Mission (JNNSM). Further, Ministry of New and Renewable Energy (MNRE) has issued draft guidelines for selection of projects under Phase – 1 of JNNSM wherein it is proposed that the commissioning of the projects from the date of signing of PPA shall be completed within 12 months for solar PV and within 28 months for Solar Thermal Power projects.

2.8 Taking into consideration the guidelines proposed by the MNRE, the commissioning of solar projects may extend beyond FY 2010-11 in case of Solar PV Power Projects and beyond FY 2011-12 with respect to the Solar Thermal Power Projects.

2.9 In such a case, the Commission is of the view that the applicable tariff rate needs to be known in advance, particularly in case of solar power projects, which are still at nascent stage of development. The Commission has also noted the concern expressed by various solar project developers that in the absence of such tariff visibility for solar power projects, the execution of PPA and achievement of financial closure may be difficult.

2.10 Accordingly, the Commission after giving due consideration to the views of the stakeholders has specified that

a) the generic tariff determined for Solar PV for 2010-11 based on the capital cost and other norms for the said period, shall also apply for the Solar PV projects commissioned during 2011-12;
b) the generic tariff for Solar thermal projects determined for 2010-11 based on the capital cost and other norms for the said period, shall also apply for the Solar thermal projects to be commissioned during 2011-12 and 2012-13;
c) However, the Power Purchase Agreements in respect of the Solar PV projects and Solar thermal projects as mentioned in this clause are signed on or before 31st March, 2011; and the entire capacity covered by the Power Purchase Agreements is commissioned on or before 31st March, 2012 in respect of Solar PV projects and on or before 31st March, 2013 in respect of Solar thermal projects.

Zone wise Capacity Utilisation Factor and applicable tariff

2.11 The Stakeholders have submitted that the regulations may provide for zone wise Capacity Utilisation Factor (CUF) and tariff. The stakeholders have further submitted that a range of CUF in correlation with capital cost may be specified.

2.12 The Commission observes that apart from factors such as technology, module efficiency etc., the CUF shall also depend upon insolation level which varies from State to State across various locations. The Commission understands that Solar Energy Centre, MNRE is in the process of developing solar energy atlas for India with relevant data across various States. In the absence of more scientific assessment of solar radiation data, it may not be appropriate to undertake zone-wise classification of CUF data across India at this stage, as has been undertaken in case of wind zone mapping based on wind energy atlas prepared by Centre for Wind Energy Technology (C-WET).

2.13 Besides, revision of above parameters is not the subject matter of present regulatory process. The Commission, under its order dated 25.2.2010 in Petition No. 13/2010 (Suo-Motu) has presented its detailed analysis and ruling in the subject matter. The review of above parameters under current regulatory process has not been undertaken by the Commission.

<u>Degradation of Solar Module</u>

2.14 Various Stakeholders have submitted that the RE Tariff Regulations may be amended for consideration of degradation of solar module.

2.15 With regard to the degradation of solar module, the Commission has presented its detailed analysis and ruling under its order dated 25.2.2010 in Petition No. 13/2010 (Suo-Motu). The Commission notes that the review of above performance parameters (such as CUF and degradation factor) is not the subject matter of present regulatory process.

Sd/-	**Sd/-**	**Sd/-**	**Sd/-**
[M DEENA DAYALAN]	**[V.S.VERMA]**	**[S. JAYARAMAN]**	**[Dr. PRAMOD DEO]**
MEMBER	**MEMBER**	**MEMBER**	**CHAIRPERSON**

Summary of Comments Received from Stakeholders

Applicability of Tariff

1. Tariff visibility for 2 years is a minimum. Tariff for FY 2012-2013 onwards should be formula based (Germany's example) based on progress in MW installed and cost reductions trends. ***(Acciona Energy)***
2. The policy framework under JNNSM is being evolved, resulting in delay in signing of the PPA and subsequent commissioning of such projects after signing of PPA these projects will be commissioned only by middle of 2011-12. Thus, there will be no visibility on tariff for such project. Hence the control period of 2 years will be necessary to ensure the applicability of project tariff for solar projects when EPC costs are committed. ***(Astonfield Renewable Resources Ltd.)***
3. The gestation period may be increased from 1 year to 3 years. ***(Moser Baer Clean Energy Limited)***
4. It will be difficult for any developer to enter into a MOU, sign the PPA, achieve financial closure, conduct a technical and financial evaluation of equipment, finalise the order and procure all the equipment and commission the project within one year. ***(Noesis Strategic Consulting Services)***
5. Given the requirement of signing a PPA, it will be important for developers to have some idea about the likely tariff up to March 2013. It is necessary to provide tariff visibility over the period of 3 years until 2013. ***(Sun Edison)***
6. To encourage the developers and financial institutions the time frame of 24 months may be considered. ***(Swiss Park Vanijia (P) Ltd., OPG Energy)***
7. Extend Phase I and specify the tariff for FY 2013/14 (up to March, 2014). Specify a penalty for projects started in Phase I but completed behind schedule. Specify the enforceable guarantee for payment, accepted by financial institutions. ***(Acciona Energy)***
8. The control period may be extended to FY2013. ***(Entegra Limited)***
9. The Capital Cost should be applicable to first 500 MW to be commissioned till 2012-13. ***(FAST)***
10. Moratorium period may be increased from 1 to 2 years since commissioning period is more than 24 months for 10MW and above capacity plant. ***(Kimaya Energy Limited)***
11. The benchmark capital cost and other norms may be fixed in such a way that the tariff norms are known to the developer for a project conceived today and shall be commissioned in approx. 36 months. ***(NTPC)***

12. In order to provide regulatory certainty and stability to investors & developers the amendment should stipulate that the control period for solar thermal projects be 2 years and benchmark and other norms shall be reviewed every two years from the base year. ***(TERI)***

Degradation of Solar Module

13. Solar PV panels have an annual derating factor ranging from 0.5% to 1%. Accordingly, the solar PV panels will perform at 80-85% of their original capacity by the end of their life at around 25 years. This should be factored into the calculations while deriving the generic tariff. ***(India Semiconductor Association, Reliance Industries Limited)***
14. There is year to year annual performance degradation in the solar farm of 0.5% to 1% each year. Annual degradation of 1% each year may be considered. ***(Lanco Solar Pvt. Ltd.)***
15. The degradation in the PLF may be considered at 1% per annum. ***(Moser Baer Clean Energy Limited)***
16. Annual degradation of 1% may be considered while determining the tariff. ***(Moser Baer Photovoltaic Limited)***
17. Permissible annual degradation of 0.5% and 0.8% may be considered for c-Si technology and a-Si & Cd-Te technologies respectively. ***(Sri Shakti)***
18. Degradation factor needs to be included at 0.5-0.6% per annum. ***(Sun Edison)***
19. A normative value of 14% degradation over useful life (25 years) may be considered. ***(TATA BP Solar India Ltd.)***

Global Solar Insolation and Capacity Utilisation Factor (CUF)

20. CUF of 19% p.a. is achievable at few places in States like Rajasthan and Gujarat. However, at all other places the CUF is below 19% p.a. ***(Astonfield Renewable Resources Ltd.)***
21. In the Indian conditions, the average PLF / CUF achieved in solar PV power projects is in the range of 15%-16%. This should be taken into account while calculating the generic tariff. ***(India Semiconductor Association, Reliance Industries Limited)***
22. The Capacity Utilisation Factor will be lower than 19%. A CUF of 18% may be considered. ***(Kimaya Energy Limited)***
23. The achievement of 19% CUF is unsustainable. CUF of 16%-17% is more realistic and the same may be considered. ***(Lanco Solar Pvt. Ltd.)***
24. Capacity utilisation factor (CUF) of 19%, as specified for Solar PV projects, may be available in North-West part of India and more than 70% of Indian locations would not be

able to achieve the assumed level. Thus, tariff determination guidelines shall appropriately consider the solar insolation as one of the key determinants/factors of tariff fixation. ***(Microsol International LL Fze)***

25. 16% PLF would be more appropriate for the Solar Projects as a general guideline. ***(Moser Baer Clean Energy Limited)***
26. A benchmark PLF of 16% may be considered for Solar PV projects. ***(Moser Baer Photovoltaic Limited)***
27. The site with lower global insolation may require higher cost of PV cells, Land, Civil Works etc. to produce same peak watt output. MW scale PV projects has not been in operation and insolation data is based on remote sensing/IMD data and impact of the site/region specific aspects are yet to be established. This uncertainty/risk is required to be considered in capital cost for initial 2-3 years of solar PV plant installations. In this regards 5% variation may be considered to account for insolation uncertainty. ***(Shri Shanti Prasad)***
28. Apart from capital cost, solar insolation level of the area where the plant is located is crucial in determining the tariff. Regional tariff for Solar PV programme may be considered to ensure equitable distribution of government resources through the country. ***(Shri SP Gon Chaudhuri, WBGEDCL)***
29. MNRE and IMP should map the solar potential sites and identify solar zones where solar installation is technically feasible. ***(Shyan Dakhera & Associate, Shri Gopal Somani)***
30. The unavailability of 19% CUF at the grid feed point affects ROI. ***(TATA BP Solar India Ltd.)***