BEFORE THE HARYANA ELECTRICITY REGULATORY COMMISSION
BAYS 33-36, SECTOR - 4, PANCHKULA - 134 112 HARYANA

Case No. HERC / PRO - 15 of 2013 (Suo Motu)
Date of Hearing : 23.07.2013
Date of Order : 20.11.2013

IN THE MATTER OF

Determination of levellised generic tariff for renewable energy projects to be commissioned during FY 2013-14 under regulation 7 of the Haryana Electricity Regulatory Commission (Terms and Conditions for Tariff Determination from Renewable Energy Sources) Regulations, 2010.

QUORUM: **Shri R.N. Prasher, Chairman**
Shri Rohtash Dahiya, Member

Objectors:

i) Haryana Power Purchase Centre (HPPC) on behalf of Uttar Haryana Bijli Vitran Nigam Limited (UHBVNL), Panchkula and Dakshin Haryana Bijli Vitran Nigam Limited (DHBVNL), Hisar
ii) Haryana Renewable Energy Development Agency (HAREDA), Chandigarh.
iii) M/s Starwire (India) Limited, New Delhi.
iv) M/s Kamsolar Energy Consultant, Gurgaon, Haryana.
v) M/s Saraswati Sugar Mills, Yamuna Nagar, Haryana.

ORDER

1. **Brief Background**:

The Commission had initiated the present suo motu proceedings in view of Regulation No. HERC/23/2010 notified on 3rd February, 2011 i.e. Haryana Electricity Regulatory Commission (Terms and Conditions for determination of Tariff from Renewable Energy Sources, Renewable Purchase Obligation and Renewable Energy Certificate) Regulations, 2010 (hereinafter referred to as "RE regulations, 2010".

Regulation 7 of the RE regulations, 2010 provide for determination of generic tariff for renewable energy projects in Haryana. The relevant provision of the said Regulation is reproduced below:-

"Regulations 7: Petition and proceedings for determination of tariff. –

(1) The Commission shall determine the generic tariff on the basis of Suo motu petition at least six months in advance at the beginning of each year of the control period for renewable energy technologies for which norms have been specified under the regulations.

(2) Notwithstanding anything contained in these regulations, a) the generic tariff determined for Solar PV projects based on the capital cost and other norms applicable for the year 2010-11 shall also apply for such projects during the year 2011-12; and b) the generic tariff determined for Solar thermal projects based on the capital cost and other norms for the year 2010-11 shall also apply for such projects during the years 2011-12 and 2012-13, provided that (i) 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 (ii) 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."

In line with the above and after taking into account the norms specified in its RE regulations, 2010 the Commission determined tentative norms and sought comments / objections from the stakeholders.

In order to ensure wide participation from the stakeholders / interested parties, a public notice for inviting objections / suggestions as well as for the date of hearing on the suo motu petition for determination of levellised generic tariff in respect of renewable energy projects to be commissioned during FY 2013-14, was published in the following Newspapers:

a) Hindustan Times (English), Chandigarh Edition for circulation in Haryana.

b) Dainik Bhaskar (Hindi) (Haryana Edition).

The details of the norms/assumptions as appearing in the public notice were also posted on the official website of the Commission i.e. www.herc.gov.in.

The last date of filing objections/suggestions was 30th April, 2013 and the hearing was scheduled for 23rd July, 2013.

The tentative norms on which objections/suggestions were invited from the stakeholders are reproduced below:

Summary of Technical & Financial Norms										
Particulars	Wind (200-250 W/m^2)	Wind (250-300 W/m^2)	Wind (300-400 W/m^2)	Wind (>400 W/m^2)	Biomass (water cooled)	Biomass (air cooled)	Cogen.	Solar PV Crystalline	Solar PV Thin Film	Solar Thermal
Capacity of the power plant (MW)	1	1	1	1	1	1	1	1	1	1
Life of the power plant (Years)	25	25	25	25	20	20	20	25	25	25
Capital cost (Rs in Million / MW)	57.50	57.50	57.50	57.50	44.5	47.5	42.13	89.4	86.3	130.00
Residual value	5.75	5.75	5.75	5.75	4.45	4.75	4.21	8.94	8.63	13.00

(10%)										
Total depreciation	51.75	51.75	51.75	51.75	40.05	42.75	37.92	80.46	77.67	117.00
Loan component	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%
Equity component	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
CUF (stabilization)	20%	25%	30%	32%	60%	60%	53%	19%	19%	23%
CUF 1st year	20%	25%	30%	32%	70%	70%	53%	19%	19%	23%
CUF 2nd year onwards	20%	25%	30%	32%	80%	80%	53%	19%	19%	23%
O&M (Rs Million / MW)	0.77	0.77	0.77	0.77	2.14	2.14	1.41	0.95	0.95	1.30
O&M escalation	5.72%	5.72%	5.72%	5.72%	5.72%	5.72%	5.72%	5.72%	5.72%	5.72%
Depreciation (1st 10 years)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
ROE (1st 10 years)	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%
ROE (11th year onwards)	24%	24%	24%	24%	24%	24%	24%	24%	24%	24%
Income tax/MAT	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%
Interest on term loan	13.25%	13.25%	13.25%	13.25%	13.25%	13.25%	13.25%	13.25%	13.25%	13.25%
Interest on working capital	14.50%	14.50%	14.50%	14.50%	14.50%	14.50%	14.50%	14.50%	14.50%	14.50%
Auxiliary consumption	0%	0%	0%	0%	10%	10%	8.5%	0%	0%	10%
Fuel cost (Rs / MT)	0.00	0.00	0.00	0.00	2556	2556	662	0.00	0.00	0.00
Fuel price escalation	0.00	0.00	0.00	0.00	5%	5%	5%	0.00	0.00	0.00
Heat rate	0.00	0.00	0.00	0.00	3800	3800	3600	0.00	0.00	0.00
GCV	0.00	0.00	0.00	0.00	3458	3458	2250	0.00	0.00	0.00

2. Public Proceedings:

In response to the public notice issued by the Commission comments / suggestions / objections were received from the following stakeholders:

i) Haryana Power Purchase Centre (HPPC) on behalf of the Distribtuion Licensees i.e. Uttar Haryana Bijli Vitran Nigam (UHBVN) and Dakshin Haryana Bijli Vitran Nigam (DHBVN).

ii) Haryana Renewable Energy Development Agency.

iii) Starwire (India) Vidyut Private Limited, New Delhi.

iv) Saraswati Sugar Mills, Yamuna Nagar

v) KamSolar Energy Consultants, Gurgaon.

A brief summary of the objections / comments filed by the objectors is presented below:

2.1 Haryana Power Purchase Centre (HPPC):

HPPC vide their memo dated 23.07.2013 filed their comments/suggestions and the same are briefly reproduced below:

2.1.1 Objecting to the Capital Cost of Wind Energy based power projects, HPPC had submitted that the Capital Cost is higher in the State of Haryana as compared to other states and submitted that the same may not to be escalated any further. Additionally HPPC had submitted that the existing Capital Cost to be considered for determining generic tariff for FY 2013-14 should also take into consideration the tariff determined by CERC for FY 2013-14.

2.1.2 With regard to Capital Cost of solar power projects, HPPC had submitted that the same was gradually reducing and as per the latest available retail Solar Module Price movement (ref: pvinsights.com) per Watt price has reduced from previous year and is hovering at an average of around USD 0.70/Watt in the case of Crystalline and USD 0.62/Watt in the case of Thin Film technology. Hence this should be reckoned with while determining tariff for solar power projects to be commissioned in Haryana in FY 2013-14.

2.1.3 With regard to Biomass & Cogeneration power projects, HPPC had submitted that as per the suo motu petition these projects are being allowed a higher return on equity as compared to other States and further submitted that the levellised tariff for FY 2013-14 ought to be in line with the tariff determined by the CERC vide its order dated 28.02.2013 in petition no.

243/SM/2012 (Suo-motu) and may not exceed the tariff determined by the CERC for FY 2013-14.

2.1.4 Additionally, HPPC vide their memo no. Ch – 19 / HPPC / SE/C&R-I PPA – 132 dated 19.09.2013 submitted that they were receiving offers from the power project developers whose projects would be using in – house available bagasse during the cane - crushing season and for the remaining days (off season) the same would be using biomass purchased from outside. Since the tariff approved by the Commission has no provision for renewable energy power projects using multiple fuels, the same may be included in the Generic Tariff order for FY 2013-14.

3.0 Starwire (India) Vidyut Private Limited:

Shri Ajay Padia, CEO, M/s Star Wire (India) Vidyut Pvt. Ltd. filed objections/ suggestions vide letter no. SWIVPL/10/2013-14/01 dated 29th April, 2013.

A synopsis of the same is given below:

3.1 On the issue of Project Cost of biomass based Power Projects with water cooled type boilers, he submitted that the Commission may consider the same in line with the actual completed cost of similar projects in Haryana. The completed cost in their case (for 9.9 MW) is Rs. 59.51 Crore i.e. Rs. 6 Crore / MW which needs to be considered rather than the normative project cost of Rs. 4.45 Crore / MW considered by the Commission for FY 2012-13 or Rs. 4.5 Crore / MW as per RE Regulations,2010 . The project specific reasons leading to cost escalation cited by the objector are as under:

a) Irrigation Department is not committing to supply uninterrupted water therefore the developers will have to make provision for weekly water storage requiring extra expenditure for water pond with connected piping and equipment.

b) Irrigation Department will be charging normal rates + 50% surcharge to supply water to cover cost of lift canal and other incidental charges.

c) Delay in obtaining connectivity, erection of power evacuation line, signing of PPA etc. have added to the project cost due to annual price escalation of 10% per annum.

d) As the connectivity is at 132 kV there is extra cost burden on account of 132 kV step – up sub – station involving 132 kV switchyard, 11/132 kV transformer and the associated equipments. This extra cost, which is of the order of Rs. 10 Crore, needs to be factored in while computing the project cost.

3.2 On the issue of Interest on Term Loan the intervener had suggested that a minimum interest rate of 13.75% may be considered as against 13.25% considered by the Commission in its order dated 03.09.2012.

3.3 On the issue of Working Capital, the Intervener submitted that in their area i.e. Mahendragarh there is only one crop and therefore fuel is available for only about 3 months. Consequently, it is necessary for them to maintain a fuel stock for about 9 months. Further, actual realisation of payments for electricity sold to the power utilities is about 90 days from the date of power generation. Consequently, the Commission may consider allowing receivables for a period of minimum 3 months as part of working capital requirement as against 2 months of fixed and variable charges being allowed by the Commission. Additionally, given the market conditions the rate of interest on working capital loans should be allowed at 14.5% in line with the Commission's order dated 03.09.2012.

3.4 On the issue of Return on Equity (ROE) the intervener had submitted that this Commission in its order dated 03.09.2012 allowed Return on Equity at the rate of 19% for the first 10 years and 24% thereafter while the CERC allows 20% ROE in the first ten years. Hence the Commission may allow ROE for the first ten years in line with CERC order dated 06.02.2012

3.5 On the issue of PLF, Auxiliary Power Consumption, Station Heat Rate, GCV, O&M expenses, Biomass Fuel Prices and Fuel Price Indexation the intervener has prayed for the following to be considered while determining biomass based generic tariff for FY 2013-14:

3.5.1 PLF of 70% (1s year) and 80% thereafter considered by the Commission is not realistic hence it should be reduced to 60% and 70% respectively taking into consideration fuel availability, frequent grid failures / system break downs etc.

3.5.2 Due to pre – processing of fuel requirement, power requirement for multiple pumps, 2% extra power consumption in the step-up transformer, the auxiliary power consumption needs to be pegged at 12 to 14% as against 10% considered by the Commission.

3.5.3 In view of the fact that their project is based mainly on mustard crop residue, the intervener had submitted that SHR should be considered at 4400 kCal/kWh instead of 3800 kCal/kWh.

3.5.4 In line with recommendations of CEA the intervener suggested that minimum 7% of the project cost ought to be considered as O&M expenses while calculating generic tariff for biomass based power projects in Haryana.

3.5.5 GCV, according to the intervener, cannot be generalised. Hence it was suggested that the same ought to be considered after getting necessary tests done. A very reasonable / practical GCV suggested by them was in the range of 3100 – 3200 kCal/Kg for biomass power projects in Haryana as against 3458 Kcal / Kg considered by this Commission in its RE regulations,2010 and generic tariff order dated 03.09.2012.

3.5.6 A realistic level of biomass fuel price in Haryana as per the intervener is Rs. 3400/MT as being paid by them which ought to be considered by the Commission while determining generic tariff for biomass based power projects in Haryana and the same needs to be escalated by 10% per annum.

3.6 In addition to the above, the intervener raised the following issues:

- A policy to restrict fuel catchment area.
- Waiver of 2% wheeling charges in line with the solar power projects.

4.0 HAREDA:

4.1 The Haryana Renewable Energy Development Agency (HAREDA) vide their Memo No. 776 dated 04 07. 2013 submitted that as per this Commission's order dated 03.09.2012 HAREDA had to invite proposal on the basis of competitive bidding and evaluate the same on the basis of discounts on the tariff determined by this Commission offered by the bidders. Consequently the Discoms / HPPC may consider signing PPA based on the tariff discovered through competitive bidding. As the commissioning of a project takes around 18 months, HAREDA has requested that the Commission may make the tariff determined for the RE power projects FY 2013-14 applicable for at least two years i.e. for the projects commissioned up to 31.03.2015.

4.2 In addition to the above, HAREDA has submitted that MNRE has launched a new scheme vide which Grid connected Roof Top SPV power projects shall be promoted by providing capital subsidy of 30% of the cost of the project. The prerequisites of the same are as under:

4.2.1 Feed in tariff: The grid interactive rooftop and small solar power plants have an impact on the revenue earning of the Discoms, accordingly, the tariff should be such that it is attractive for the rooftop owner and does not put too much burden on the Discoms. Therefore regulators have to come up with feed in tariff for rooftops with and without MNRE subsidy.

4.2.2 Central Electricity Authority (CEA) has formulated draft "CEA (Technical Standards for Connectivity of the Distributed Generation Resources) Regulations, 2012 which is expected to be notified by the Ministry of Power shortly. This would provide guidance to the Discoms and shall also provide the transparency in the process.

4.2.3 The availability of electricity grid near the solar installation is an essential component which needs to be provided by the agencies concerned.

4.2.4 Eligible capacity limit needs to be specified in order to avoid grid congestion by very small capacity solar power plants.

5.0 Saraswati Sugar Mills Ltd. (SSML) :

5.1 Shri S.K. Sachdeva, CEO of the Saraswati Sugar Mills Ltd. Yamuna Nagar, vide their letter dated 29.04.2013 filed their objections / suggestions. The same are briefly reproduced below:

5.2 On the issue of cost of bagasse for tariff determination for baggase based co-generation projects, SSML has submitted that the same considered by this Commission is un – realistically low. In FY 2012-13 the market price of bagasse according to SSML was Rs. 1500 / MT (crushing season) as against Rs. 662/MT considered by this Commission. Further they submitted that this Commission had considered Rs. 900 / MT as cost of bagasse in FY 2007-08 and the same was lowered to Rs. 662 /in FY 2012-13, this lacks any justification. They further argued that considering bye – product bagasse as waste by this Commission is erroneous and resultantly assigning low cost to bagasse while determining tariff will not only make the co – generation projects economically unviable but will also act as a deterrent for future co – generation projects instead of the policy of encouraging the same.

5.2.1 In view of the above SSML submitted that huge amount of money is spent on improving efficiency of steam producing machinery as well as the steam consuming machinery. Hence the opportunity cost of baggase was in the range of Rs. 1500 to Rs. Rs. 1600 / MT in FY 2012-13. The same was considered by the CERC for FY 2012-

13 at Rs. 1859 / MT with an escalation of 10% for FY 2013-14. Thus the same may be considered by this Commission for the purpose of tariff determination.

5.3 SSML further submitted that Rs. 30 lac per MW per year may be considered for working out O&M charges.

5.4 The rate of interest on working capital loan may be pegged at 15% per annum.

5.5 In addition to the above, SSML suggested that bagasse prices may be assessed annually and its impact may be passed through in the tariff every year. Further carbon credit and RECs may also be allowed and rate of inflation may be considered as 8% in line with the WPI. Lastly SSML brought to the notice of this Commission that CERC in its order dated 24.03.2012 has determined Rs. 5.73 / kWh as the tariff for bagasse based co – generation projects in Haryana.

6.0 Kamsolar Energy Consultants:

6.1 Shri Narender Kumar of Kamsolar Energy Consultants, Gurgaon filed their comments / view vide their latter dated 30.04.2013. A brief summary of the same is presented below:

6.2 The intervener has submitted that the total cost of solar power project including land, site development, EPC contract, contingencies & Insurance and Interest during Construction (IDC) may be considered as Rs. 8 Crore / MW. The O&M expenses may be considered as Rs. 0.0950 Crore / MW with an annual escalation of 5.72%. The annual insolation may be considered as 5.5 hour / day along with annual derating of solar panel of 1%.

7.0 Public Hearing:

In order to take the process forward the Commission considered it appropriate to hear the objectors and accordingly scheduled a hearing on 23.07.2013. The stakeholders / interveners mostly reiterated their written submission which has already been considered by the Commission in the preceding paragraphs. Hence the same is not being repeated here for the sake of brevity.

8.0 Commission's Analysis and order:

8.1 At the outset the Commission would like to make it clear that HERC RE Regulations, as amended from time to time, specify the tariff control period, RPO, CDM sharing, REC trading etc. Further, these also provide base capital cost subject to indexation, fuel price (except biomass which has been reconsidered as per APTEL's judgment), GCV, SHR, PLF/CUF, ROE along with other normative financial and technical parameters. The review of the same is not the subject matter of the present proceedings initiated suo motu by the Commission as this is limited to determination of generic tariff for the RE power projects to be commissioned in FY 2013 - 14.

8.1.1 The Commission observes that the issues raised by M/s Starwire including PLF, GCV, SHR and auxiliary energy consumption are mostly covered in the HERC (Terms and Conditions for determination of Tariff from Renewable Energy sources, Renewable Purchase Obligation and Renewable Energy Certificate) Regulations, 2010 notified by the Commission on 3rd February, 2011. Hence at this stage, when the Commission is taking up a limited exercise of determining tariff for the projects to be commissioned in FY 2013-14, it is not necessary to go into the details of each and every parameter unless there is any convincing reasons to deviate from the norms specified in the RE regulations, 2010.

With regard to the submission of HAREDA on the issue of specifying eligible capacity limit of very small capacity solar power plants in order to avoid grid congestion, the Commission feels that any step which may discourage widely distributed generation in not desirable as the penetration level is very low. Moreover, the issue mentioned is such for which necessary technical solution can be formulated.

As far as fuel catchment area is concerned, the Commission agrees that a policy intervention specifying the area in which a second biomass based power project may not be setup is desirable. However, the Commission feels that this is an area in which some more deliberations are required. Hence the Commission will take up this issue separately.

Further, since the Commission determines tariff under RE Regulations for the power sold to the Discoms in Haryana, thus the question of 'third party sale' does not arise except as agreed upon in the concluded PPA between the parties. As a corollary to this the tariff for purchase of such power by the Discoms is at a 'preferential tariff', and to this extent their renewable purchase obligation is met. Hence the developers who have signed PPA with the Discoms at the tariff determined by this Commission do not qualify to get the benefit of renewable energy certificate which can be traded by them.

The issue of waiver of 2% wheeling charges in line with Solar power projects has been deliberated by this Commission in the past too. It is reiterated that the waiver was granted for the solar power projects as the Government of India policy i.e. JNNSM under which these projects were set – up in Haryana provided for the same. Hence the same cannot be generalised as the said policy provided for substantial subsidy from the Central Government to the buyers of such power.

The Commission has considered the submissions of HPPC regarding CERC determined project cost and tariff for renewable energy power project and observes that the RE regulations, 2010 provide the details of capital cost including indexation mechanism, hence it is appropriate for this Commission to follow its own regulations while determining generic tariff applicable for the projects to be commissioned in Haryana in FY 2013-14 unless there is any order of Hon'ble Supreme Court or Hon'ble APTLEL to the contrary.

The interveners, in the hearing held on 23.07.2013, made reference to the tariffs determined by different SERC's. A comparative table of tariffs approved by a few SERCs and CERC is presented below:

Renewable Energy Based Power Projects: Comparative Tariffs (Rs/kWh)				
State	Biomass	Co-generation (Baggase)	Solar PV	Wind
Punjab	6.24	5.70	8.75	6.29
Rajasthan	5.52 (Water Cooled Condenser) 5.05 (Air Cooled Condenser)	-	9.63	5.73
Uttar Pradesh	5.26	4.95	15.0	3.21
Madhya Pradesh	5.64	6.28	10.44	5.92
Maharashtra	5.87	5.81	8.98	5.81
Gujarat	5.32 (Air Cooled Condenser) 5.16 (Water Cooled Condenser)	4.71	9.64	4.61
CERC (for Haryana vide order dated 28.02.2013)	6.05	6.13	10.84	6.27

Source: www.ireed.org (MNRE, GoI)

8.2 The Commission has determined the Generic tariff for the power projects based on renewable energy sources in the State to be commissioned in FY 2013-14 in accordance with the norms prescribed in the RE regulations or approved norms. It is applicable to all such projects to be established in the State of Haryana irrespective of location, size, type of fuel used etc. The Commission has taken note of the views of M/s Star wire and M/s Saraswati Sugar Mills and observes that the same are specific to their own projects and hence cannot be generalised as such for determining generic tariff for the projects to be set up in Haryana. The Commission is of the view that different projects will have different land costs, interest costs, fuel costs, GCV of fuel, depending upon type of fuel and location of the project, which in turn will translate into different project specific tariff. The norms specified in RE regulations were with a view to take care of different situations relating to different renewable energy sources so that a uniform tariff is determined for the projects based on same source of renewable energy. It is not feasible for the Commission while determining Generic Tariff to take into consideration project specific parameters as availability of fuel, cost of land, cost of capital etc. may vary depending on the location of a particular project. Nevertheless, the Commission has taken into consideration the general scenario that emerges in the State and therefore, location specific advantages / disadvantages cannot be avoided. The Commission expects that the project developers would take into consideration all the pros and cons while working out the viability of their project and hence ought not to seek any project specific relief.

In view of the above, the generic tariff applicable for the renewable energy projects to be commissioned in Haryana during the FY 2013-14, shall be based on the norms discussed below:-

9.0 Solar Power Project:

9.1 Project Cost:

9.1.1 As per HERC RE Regulations,2010 the normative capital cost for setting up Solar Photovoltaic Power Project was pegged at Rs. 9.84 Crores/MW for FY 2011-12 and for the projects to be commissioned in FY 2012 – 13 the project cost was considered as Rs. 8.63 Crore (Thin film), Rs. 8.94 Crore (Crystaline) and Rs. 13 Crore (Solar thermal) with a proviso that the same shall be reviewed annually.

9.1.2 The Commission has taken into account the details of projects cost suggested by Kamsolar i.e. Rs. 8.0 Crore / MW and submissions of HPPC that as per retail Solar Module Price (ref: pvinsights.com) per Watt has further reduced from previous year and is hovering at an average of around USD 0.70/Watts in the case of Crystalline and USD 0.62/Watt in the case of Thin Film.

The Commission further observes that as per latest available data the solar PV manufacturers are selling crystalline module in India at a price below USD 0.60 / Watt. Apart from this single largest component of project cost in the case of Solar PV Power Plant i.e. the cost of PV modules there are also non – module cost . Further there is some difference in the project cost of two different technologies i.e crystalline PV and thin film that are being used by the solar power project developers as well as cost of land which is not applicable for rooftop solar power projects. Hence the Commission considers it appropriate to determine technology specific generic tariff.

9.1.3 Additionally, the Commission is of the view that given the high cost of land in Haryana and limited availability of waste land and the fact that setting up solar power projects on land by diverting the same from Agriculture may be counter – productive in the long – term in Haryana. This is primarily due to the fact that the high cost of land would lead to a comparatively higher tariff in Haryana thereby making the solar power projects unviable vis – a vis such projects being set up in a few other states where cost of land is significantly lower and from where the Discoms have the option of purchasing solar power to meet their RPO. Further by diverting land from Agriculture use to solar power projects in effect would mean switching over from an efficient use of land i.e. production of crops which is also a form of energy trapped in food grain or commercial crops to a comparatively lesser efficient form of energy generation i.e. solar power projects which is clearly un-desirable. Thus the only viable option left for solar power projects is the use of un-productive / waste land and / or solar rooftop projects both grid connected as well as off – gird.

9.1.4 The Commission observes that due to sustained decline in the international prices of the solar grade polysilicon i.e. the main raw material for solar photo – voltaic panels, the price of solar PV modules have also witnessed a downward trend. As per the latest available retail Solar Module Price movement (ref: pvinsights.com) per Watt prices are hovering at an average of around USD 0.70 /Watt in the case of Crystalline and USD 0.60/Watt in the case of solar thin film module. However, as the long term price trend is declining the Commission considers it appropriate to take into consideration the lower value i.e. USD 0.55 / Watt and USD 0.49 / Watt. Hence considering the Rs/USD average exchange rate of Rs. 60, the per MW solar module cost works out to Rs.3.30 Crore / MW (Crystalline) and Rs. 2.94 Crore / MW (thin film) for working out tariff for FY 2013-14. The Commission, in line with the study report on "Concentrated Solar Power" has considered the project cost of solar thermal power project at Rs. 12 Crore / MW.

9.1.5 In addition to the above the cost of Solar PV Power Plant also includes non – module cost component. This primarily includes cost of inverter, land, civil works including module mounting structures, cable, transformers, evacuation system and other pre – operating expenditure. The benchmark cost for determination of non – module cost of Solar Power Plant has been arrived at after taking into consideration the feedback available from PV project EPC contractors. The details are presented below:-

Benchmark Cost Rs. Crore /MW for FY 2013-14

Sr. No	Particulars	**Crystalline**	**Thin Film**	**Rooftop SPV***
1	PV Modules	3.30	2.94	2.94
2	Land Cost #	0.05	0.05	0
3	Site Development, Civil Cost including mounting structures, Inverter, cables, transformers and pre – operative expenses including IDC.	2.70	2.70	2.70
8	Total Project Cost	6.05	5.69	5.64

cost of waste / non – productive agriculture land.
* Discoms shall have no obligation to purchase.

The total Capital Cost as per details above has been considered for arriving at FY 2013-14 tariffs. As the prices of Silicon Module as well as Thin Film Module and Power Conditioning Unit are showing a downward trend, **the same shall be reviewed annually by the Commission based on the current cost and the prevalent Rs/USD exchange rate. In this case no indexation shall be applicable.**

9.1.6 In addition to the project cost, one of the interveners i.e Kamsolar submitted that annual derating of solar panel of 1% may also be allowed. The Commission has considered the submission and is of the view that with the maturing of technology the solar module manufacturers are not only guaranteeing lifelong efficiency of the solar panels but also undertaking replacement of the same during the useful life of the modules supplied by them. Hence this Commission is not inclined to allow any additional cost / margin for derating as the efficiency considered by this Commission is on an average basis. Further, the RE regulations of this Commission also make no provisions for considering degradation in generation.

9.2 Capacity Utilisation Factor (CUF): On the issue of The Capacity utilisation factor for Solar PV projects the intervener i.e. Kamsolar submitted that annual insolation may be considered as 5.5 hour / day. The Commission has considered the submissions and observes that 5.5 hours / day would roughly translate into a CUF of 23% as against 19% provided in HERC RE regulations. The Commission observes that given the level of average solar radiation in Haryana CUF of 19% is reasonable and hence retains the same for the purpose of determining tariff for FY 2013-14.

9.3 Operation and Maintenance (O&M) Expenses: On the issue of O&M expenses Kamsolar had submitted that the same should be considered as Rs. 0.0950 Crore / MW with an annual escalation of 5.72%. The O&M Expenses as per HERC RE Regulations is Rs. 9 Lakhs/MW for the 1st year of operation and the same is to be escalated at the rate of 5.72% per annum. Hence for FY 2013-14 the O&M expenses of Rs. 9.51 lakh / MW has been considered with an annual escalation of 5.72% over the tariff period. In the case of solar thermal projects O&M expenses as per HERC RE Regulations is Rs. 13 lakh / MW for first year of operation to be escalated @ of 5.72% per annum, hence the Commission has considered Rs. 13.70 lakhs/MW as O&M expenses for FY 2013-14.

10.0 Biomass / Bagasse based power projects :

10.1 The Commission has considered the objections and suggestions of M/s Star Wire and Saraswati Sugar Mills on the issue of cost of biomass / baggase as well as project cost, PLF, GCV of biomass / bagasse based generation projects and observe as under.

The Commission observes that the fact that in the area, consciously decided by the intervener, the fuel availability i.e. mustard stalk, reportedly is for 3 months only. This may not be true for other areas and other fuels in Haryana; hence the location specific issue cannot form the benchmark for deciding a generic tariff for the entire state. Further, the terms and conditions for payments are mutually agreed upon by the parties in line with HERC RE Regulations while signing the Power Purchase Agreement which also has delayed payment penalty as well as rebate for timely payment to mitigate financial risks. Hence granting any relaxation in estimating working capital requirement is not appropriate. As far as interest rate on Working Capital is considered the same shall be considered in line with HERC RE Regulations after appropriate adjustments if the market conditions so require.

While determining generic tariff it is appropriate to adopt the normative project cost as per RE Regulations,2010 notified by the Commission. On a case to case basis the direct as well as incidental costs may vary from project to project depending upon the location and other project specific requirements. Any extra or incidental cost arising out of action of any authority i.e. Irrigation Department cannot be factored in to modify the normative project cost. As far as connectivity is concerned the HERC (Terms and Conditions for Grant of Connectivity and Open Access for Intra – State Transmission and Distribution System) Regulations, 2012 provides that for less than 10 MW capacity the connectivity shall be at 33 kV and below. Consequently, any project to be commissioned in FY 2013-14 i.e. after coming into force of the RE Regulations shall be governed accordingly. Hence any extra expenditure that the intervener may have incurred due to availing connectivity at a higher voltage cannot be considered as part of the project cost.

10.2 Further as the Commission is undertaking a limited exercise of determining tariff for the renewable power projects to be commissioned in FY 2013-14 the technical parameters for all renewable power projects to be commissioned in FY 2013-14 shall be as per the Haryana Electricity Regulatory Commission (Terms and Conditions for determination of Tariff from Renewable Energy Sources, Renewable Purchase Obligation and Renewable Energy Certificate) Regulations, 2010 as amended from time to time.

10.3 **Fuel Cost (Biomass & Baggase):**

Star Wire had submitted that a realistic level of biomass fuel price would be Rs. 3400/MT as being paid by them which ought to be considered by the Commission while determining generic tariff for biomass based power projects in Haryana and the same needs to be escalated by 10% per annum. While Saraswari Sugar Mills Ltd. Had proposed that this Commission, for bagasse should consider CERC determined price of Rs. 1859 per MT for FY 2012-13 and for FY 2013-14 the same should be escalated at the rate of 10%.

The Commission observes that regulation 43 of RE regulations, 2010 lays down the benchmark cost for biomass mix, which is Rs. 1906 / MT for the first year of the control period i.e. FY 2010-11 and is subject to indexation formula / normative escalation of 5% at the option of the project developers. The Commission has considered the above provision of the RE regulations and is of the view that the same in the absence of any organised market has witnessed wide fluctuation. Hence a view needs to be taken afresh. As per average fuel price of biomass estimated by HAREDA as of June, 2013 and submitted to the Commission in the hearing, the same ranges from Rs. 2286/MT to Rs. 3026 / MT. Hence the Commission for the purpose of determination of tariff has considered an average rate of Rs. 2656 / MT and further 5% i.e. Rs. 133 / MT has been considered as cost of transportation, handling and some loss of fuel weight due to moisture. Consequently, biomass fuel cost has been considered as Rs. 2789 / MT.

As far as cost of bagasse is concerned no data was submitted by the nodal agency i.e. HAREDA. The Commission reiterates that bagasse is available on site for co – generation. Hence no additional expenses are incurred in collection, storing, handling etc. The Commission had considered Rs. 662 / MT as cost of bagasse for FY 2012-13. Hence after considering an escalation factor of 5% as per regulation 52 of RE regulations, 2010, the bagasse cost for FY 2013-14 has been pegged at Rs. 695 / MT for the purpose of tariff determination for the projects to be commissioned in FY 2013-14.

As the Commission is conducting a limited exercise of determining Generic Levellised Tariff for the projects to be commissioned in FY 2013-14, the other objections raised by the interveners i.e. GCV, SHR shall be in accordance with the HERC RE regulations, 2010.

10.4 Multiple Fuel Generation Projects:

The Commission has considered the submission of HPPC that they are receiving offers from the power project developers whose projects would be using in – house available bagasse during the cane - crushing season and for the remaining days (off season) the same would be using biomass purchased from outside. Since the tariff approved by the Commission has no provision for renewable energy power projects using multiple fuels, the same may be included in the Generic Tariff order for FY 2013-14.

On the above submission the Commission is of the view that project cost of biomass based projects and co-generation projects are not significantly different. However, fuel cost, GCV, SHR is considerably different in two cases thus the tariff in the case of co-generation projects vis – a – vis biomass project is considerably lower. Consequently, subject to regulation 41 of RE regulations, 2010, beyond the sugarcane crushing period, HPPC at their own discretion and in order to meet their RPO obligation, may procure power from co-generation projects at the tariff determined for biomass fuel based generation projects in Haryana. In such cases the generating company shall certify and HPPC / Discoms shall verify that the generation is from biomass and not bagasse. However, it is made clear that procuring such power shall not be binding on HPPC / Discoms.

11.0 Financial Parameters:

11.1 Debt Equity Ratio. - The debt equity ratio shall be 70:30, in case the equity actually deployed is more than 30% of the capital cost, equity in excess of 30% shall be treated as normative loan. Provided that where equity actually deployed is less than 30% of the capital cost, the actual equity shall be considered for determination of tariff. Provided further that the equity invested in foreign currency shall be designated in Indian rupees on the date of each investment.

Additionally, it is clarified that the mandatory equity to be deployed by the developer as a percentage of the project cost may fall short of the mandatory requirement of 30%, however, if it becomes a recurring feature, the Commission may declare the PPA signed by HPPC / Discoms with such developer as invalid.

11.2 Loan and Finance Charges. - (1) For the purpose of determination of tariff, loan tenure of 10 years shall be considered. The loans arrived at in the manner indicated above shall be considered as gross normative loan for calculation for interest on loan. The normative loan outstanding as on April 1st of every year shall be worked out by deducting the cumulative repayment up to March 31st of previous year from the gross normative loan. For the purpose of computation of tariff, the normative interest rate shall be considered as average long term prime lending rate (LTPLR) / Base Rate of State Bank of India (SBI) prevalent during the previous year. 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.

The Commission observes that as per HERC RE Regulations the admissible interest rate on term loan as well as working capital loan shall be average long term prime lending rate / Short term PLR of SBI during the previous year. The interveners have proposed interest rate on term loan of 13.75% per annum. The Commission notes that the average benchmark prime lending rate of SBI in the previous year i.e. FY 2012-13 hovered in the range of 13.25% to 14.45% hence an average rate of 13.75% per annum as submitted by the intervener shall be considered for determination of tariff in FY 2013-14.

The interest on working capital loan has been proposed by the interveners ranging from 13.75% to 14.5%. The Commission observes that the benchmark prime interest rate on short term / working capital loan is about 4% above the base rate. Since the average base rate during the previous year was 10%, the interest rate on working capital loan, for the purpose of tariff computation, has been considered at 14% in FY 2013-14.

11.3 Depreciation. - (1) The value base for the purpose of depreciation shall be the Capital Cost of the asset admitted by the Commission. The Salvage value of the asset shall be considered as 10% and depreciation shall be allowed up to maximum of 90% of the Capital Cost of the asset. Depreciation per annum shall be based on 'Differential Depreciation Approach' over loan tenure and period beyond loan tenure over useful life computed on 'Straight Line Method'. The depreciation rate for the first 10 years of the Tariff Period shall be 7% per annum and the remaining depreciation shall be spread over the remaining useful life of the project from 11th year onwards. Depreciation shall be chargeable from the first year of commercial operation. Provided that in case of commercial operation of the asset for part of the year, depreciation shall be charged on *pro rata* basis.

11.4 Return on Equity. - (1) The value base for the equity shall be 30% of the capital cost or actual equity (in case of project specific tariff determination) in accordance with HERC RE Regulations.

The normative Return on Equity shall be:

a) Pre-tax 19% per annum for the first 10 years.
b) Pre-tax 24% per annum 11th years onwards.

It is clarified that till last year the Commission had allowed Income Tax / MAT over and above the pre – tax ROE. Though this ran contrary to the common sense meaning of pre – tax. This was followed because the Commission was permitting the same for conventional generation. Subsequently the Commission has introduced Multi – Year Tariff (MYT) regulations for conventional fuel based generation projects where it has been made explicit that the permitted ceiling of ROE includes Income Tax / MAT component. The Commission now has to adopt the same construction on ROE in the renewable energy sector, therefore, the term "pre – tax shall be construed as its normal corporate law meaning, which is that this income for the RE generator shall be "before income tax" and the Income Tax / MAT, if any, shall have to be paid by him out of the amount received on account of the stated ROE.

11.5 Interest on Working Capital. - (1) The Working Capital requirement in respect of Wind energy projects, Solar PV and Solar thermal power projects shall be computed in accordance with the following :

a) Operation & Maintenance expenses for one month;
b) Receivables equivalent to 2 (Two) months of energy charges for sale of electricity calculated on the normative CUF;
c) Maintenance spare @ 15% of operation and maintenance expenses.

(2) The Working Capital requirement in respect of biomass power projects and non-fossil fuel based co-generation projects shall be computed in the following manner:

a) Fuel costs for four months at normative PLF;

b) Operation & Maintenance expense for one month;
c) Receivables equivalent to 2 (two) months of fixed and variable charges for sale of electricity calculated on the target PLF;
d) Maintenance spare @ 15% of operation and maintenance expenses.

(3) Interest on Working Capital shall be at interest rate equivalent to average State Bank of India short term PLR / Base Rate during the previous year.

While fixing the above financial parameters including fuel cost and GCV of fuel in the case of biomass based power projects and baggase based co-generation projects the Commission finds no reasons to deviate from its RE Regulations and hence has retained the same for determining generic tariff for FY 2013-14 in the case of all new and renewable fuel based power projects to be commissioned in FY 2013-14..

Any carbon credit earned by the project developer shall be shared in the ratio of 25:75 i.e. 25% to the distribution licensee and 75% shall be retained by the project developer. The benefits of carbon credit passed on to the distribution licensee shall be utilized to reduce their power purchase cost.

In line with the judgment of Hon'ble APTEL dated 1/03/2011 in Appeal No. 16 & 117 of 2010 setting aside prohibition of sale of power to third party, the Commission orders that RE Power Project developers, who have not already signed PPA with HPPC/Discoms, may sell power to a third party.

12.0 Capital Subsidy:

12.1 The Commission, while considering project cost / capital cost for the renewable energy power projects, has not taken into account any capital subsidy that may be available to the project developers. The Commission, while determining preferential tariff, gives the benefit of higher depreciation, enhanced ROE etc. to the renewable power project developers, the developers shall pass on to the Discoms any subsidy / financial assistance received from Central / State Government agencies on actual disbursement basis.

13.0 The tariff determined by the Commission shall be the ceiling tariff and depending on the RPO of the obligated entity in Haryana, as determined by the Commission, HAREDA may invite bids and evaluate the same on the basis of discounts offered by the bidders on the tariff determined by the Commission. Consequently the Discoms / HPPC may consider signing PPA based on tariff discovered through competitive bidding. However, the tariff discovered through competitive bidding shall be submitted for adoption by the Commission and subject to the condition that the energy procured in such cases would go towards meeting the Solar and Non - Solar RPO of the Discoms. Further as per Electricity Act, 2003 generation including those from renewable energy sources is a delicensed activity. Hence an IPP, if they desire and subject to any other statutory clearances, may set up a power plant on a self identified site i.e. a site other than those identified by HAREDA. However, in case they desire to sell the power generated to the distribution licensee(s) in Haryana the same shall be at the tariff approved by the Commission or the tariff adopted by the Commission discovered through a process of transparent competitive bidding.

The tariff approved by the Commission as per Annexure – A shall be applicable for the projects commissioned in FY 2013-14.

This order is signed, dated and issued by the Haryana Electricity Regulatory Commission on 20th November, 2013.

Date : 20.11.2013
Place : Panchkula.

(Rohtash Dahiya)	(R.N.Prasher)
Member	Chairman

Annexure – A
Generic Tariff for Renewable Energy Based Power Projects to be Commissioned in FY 2013-14

Particulars	Wind (200-250 W/m^2)	Wind (250-300 W/m^2)	Wind (300-400 W/m^2)	Wind (>400 W/m^2)	Biomass (water cooled)	Biomass (air cooled)	Cogen. (bagasse)	Solar PV Crystalline	Solar PV Thin Film	Solar Thermal	Solar Rooftop
Capacity of the power plant (MW)	1	1	1	1	1	1	1	1	1	1	1
Life of the power plant (Years)	25	25	25	25	20	20	20	25	25	25	25
Project Cost (Rs Million / MW)	53.54	53.54	53.54	53.54	46.778	49.38	46.258	60.50	56.9	120.00	56.4
Residual value (10%)	5.35	5.35	5.35	5.35	4.68	4.94	4.63	6.05	5.69	12	5.64
Total depreciation	48.18	48.18	48.18	48.18	42.10	44.44	41.63	54.45	51.21	108	50.76
Loan component	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%
Equity component	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
CUF (stabilization)	20%	25%	30%	32%	60%	60%	53%	19%	19%	23%	19%
CUF 1st year	20%	25%	30%	32%	70%	70%	53%	19%	19%	23%	19%
CUF 2nd year onwards	20%	25%	30%	32%	80%	80%	53%	19%	19%	23%	19%
O&M (Rs Million / MW)	0.77	0.77	0.77	0.77	2.39	2.39	1.58	0.11	0.1063	1.54	0.1063
O&M escalation (2nd year onwards)	5.72%	5.72%	5.72%	5.72%	5.72%	5.72%	5.72%	5.72%	5.72%	5.72%	5.72%
Depreciation (1st 10 years)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
ROE (1st 10 years)	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%
ROE (11th year onwards)	24%	24%	24%	24%	24%	24%	24%	24%	24%	24%	24%
Income tax / (MAT)	0	0	0	0	0	0	0	0	0	0	0
Interest on term loan	13.75%	13.75%	13.75%	13.75%	13.75%	13.55%	13.75%	13.75%	13.75%	13.75%	13.75%
Interest on working capital	14.00%	14.00%	14.00%	14.00%	14.00%	14.50%	14.00%	14.00%	14.00%	14.00%	14.00%
Auxiliary consumption	0%	0%	0%	0%	10%	10%	8.5%	0%	0%	10%	0%
Fuel cost (Rs / MT)	0.00	0.00	0.00	0.00	2789	2789	695	0.00	0.00	0.00	0.00
Fuel price escalation	0.00	0.00	0.00	0.00	5%	5%	5%	0.00	0.00	0.00	0.00
Heat rate	0.00	0.00	0.00	0.00	3800	3800	3600	0.00	0.00	0.00	0.00
GCV	0.00	0.00	0.00	0.00	3458	3458	2250	0.00	0.00	0.00	0.00
Tariff FY 2013-14	7.08	5.66	4.72	4.42	5.98	6.23	4.05	7.94	7.47	15.22	7.40
Tariff FY 2014-15	6.81	5.44	4.54	4.25	5.83	5.88	4.03	7.58	7.14	14.62	7.07
Tariff FY 2015-16	6.53	5.23	4.35	4.08	5.97	6.03	4.02	7.23	6.80	14.03	6.74
Levellised tariff at 10.95% Discount Rate	**5.44**	**4.35**	**3.62**	**3.40**	**6.97**	**7.05**	**4.15**	**5.70**	**5.36**	**11.60**	**5.32**