

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

Case No. HERC / PRO - 12 of 2011
Date of hearing: 20.09.2011

Case No. HERC / PRO - 20 of 2011
Date of hearing: 21.09.2011

Date of Order: 25/01/2012

IN THE MATTER OF

1. Petition filed by Haryana Power Generation Corporation Limited (HPGCL), Panchkula vide letter No. 781 / GMP - 321 dated 7th June, 2011 for determination of tariff for supply of electricity from 6.5 MW solar power project to be set up by HPGCL at Powerhouse - D, WYC Hydrel, Yamunanagar (Case No. HERC / PRO - 12 of 2011).

Respondents / Objectors:

- i) Uttar Haryana Bijli Vitran Nigam Limited (UHBVNL), Panchkula
 - ii) Dakshin Haryana Bijli Vitran Nigam Limited (DHBVNL), Hisar
 - iii) Haryana Vidyut Prasaran Nigam Limited (HVPNL), Panchkula
 - iv) Haryana Renewable Energy Development Agency (HAREDA), Chandigarh.
2. Suo motu petition for determination of levelled generic tariff of renewable energy projects to be commissioned during FY 2011-12.

Objectors:

- i) Uttar Haryana Bijli Vitran Nigam Limited (UHBVNL), Panchkula
- ii) Dakshin Haryana Bijli Vitran Nigam Limited (DHBVNL), Hisar
- iii) Haryana Vidyut Prasaran Nigam Limited (HVPNL), Panchkula

- iv) Haryana Renewable Energy Development Agency (HAREDA), Chandigarh.
- v) M/S Starwire (India) Limited, New Delhi
- vi) M/S Sri Jyoti Renewable Energy Private Limited, Srikakulam (AP)
- vii) M/S Puri Oil Mills Limited, New Delhi.

Coram

Shri Rohtash Dahiya, Member

Shri Ram Pal, Member

ORDER

The Commission observes that both the above petitions pertain to determination of tariff from renewable energy sources in Haryana. Thus the Commission is of the considered view that both the aforesaid cases can be disposed of vide a common order. Accordingly in the instant order the Commission has taken up the petitions relating to determination of tariff for supply of power to the distribution licensee from the renewable energy projects including solar to be set up in Haryana. The two petitions have been dealt with separately as under:

1. Case No. HERC / PRO - 12 of 2011:

Petition filed by Haryana Power Generation Corporation Limited (HPGCL), Panchkula for determination of tariff for supply of electricity from the proposed 6.5 MW solar power project to be set up by it at Power House - D, WYC Hydel, Yamunanagar.

This petition has been filed by HPGCL under section 62 (1) (a) of the Electricity Act, 2003 and HERC (Terms and conditions for determination of tariff for renewable energy sources, renewable purchase obligation and renewable energy certificate) Regulations, 2010 for determination of tariff for supply of electricity to the distribution licensees in Haryana from 6.5 MW solar power project to be set up by it at Power House - D, WYC Hydel, Yamunanagar. HPGCL has proposed a tariff of Rs. 17.90 / kWh in accordance with the norms specified by the Commission in its RE

regulations. HPGCL has further proposed to sell power to the distribution licensees in Haryana and has accordingly enclosed a draft Power Purchase Agreement (PPA) with the petition for approval of the Commission.

In order to have the benefit of the views of the stakeholders the Commission issued a public notice vide letter no. HERC / Tariff / Renewable / Solar / 849 dated 29th June, 2011 inviting objections / suggestions on the petition filed by HPGCL. A copy of the public notice was sent to the Government of Haryana and Haryana Power Utilities vide letter no. HERC / Tariff / Renewable / Solar / 850-53 dated 29th June, 2011. As per the public notice the last date for submission of objections / suggestions was 22nd July, 2011. The last date for submission of reply to the objections / suggestion by the petitioner was 5th August, 2011 and the last date for submission of rejoinder by the respondents/interveners, if any, was 19th August, 2011.

In response to the aforesaid public notice issued by the Commission objections / suggestions were submitted by the distribution licensees in Haryana i.e. UHBVNL and DHBVNL. The petitioner HPGCL submitted their reply to the issues raised by the objectors.

A brief summary of objections / suggestions of distribution licensee and reply of HPGCL thereto are presented below:-

Solar RPO: The distribution licensees submitted that HERC regulations provides for solar RPO as 0.25% of the overall RPO as such they shall purchase a minimum of 1.69 MUs of solar power for which they have already entered into PPA with 9 solar power producers for a capacity of 8.8 MW expected to be commissioned in September / October, 2011. These projects would generate 14.64 MUs per annum. Thus the requisite RPO has already been met for the current year as well as for the ensuing year. Thus the obligation to purchase any extra solar power would add to financial burden of the Discoms as the same is very expensive and in turn it would add to the cost of delivered energy to the consumers.

Reply of HPGCL: HPGCL in their reply, on the issue of Solar RPO, submitted that the observations of distribution licensees relating to HERC RE regulations is correct but there is a provision of 25% of annual escalation in the same and it is not clear as to whether the increase is with respect to overall RPO or total consumption of energy. This needs further clarity and discussion. Additionally, HERC regulations are not in line with Tariff Policy which provides for solar RPO of 0.25% of the total energy consumption of the distribution licensee and this fact has also been acknowledged by HAREDA while requesting the Commission vide their letter dated 25.03.2011 for fixing solar RPO at 0.25% of total consumption of energy instead of 0.25% of the total RPO.

Additionally it was submitted by the petitioner that as per draft amendment proposed by the Commission solar RPO for FY 2012-13 and 2013-14 shall be 0.25% of the total energy consumption with an annual increase of 25%. Therefore, if the energy consumption for FY 2012 - 13 is assumed at 39,682 million units then solar RPO would work out to 99 MUs for which about 59.60 MW solar power generation capacities will be required. Accordingly the proposal of HPGCL is well within the prescribed RPO for FY 2012-13.

Notwithstanding the weak financial position of the Discoms, they are under obligation to purchase energy in accordance with RPO regulations and it is in their own interest to source the same from HPGCL. Further, conventional energy fuels are fast depleting and also environment unfriendly hence there is a need to promote renewable energy sources including solar which is also a national agenda.

Discounting factor: Discoms have submitted that the discounting rate of 14.84% considered by HPGCL for arriving at the proposed levellised tariff is unacceptable and the same should be 15.7% for arriving at the levellised tariff for the entire life of the project.

Reply of HPGCL: In their reply HPGCL agreed to the observation of the Discoms on the issue of the rate of discounting and submitted that the discount factor should be 15.7% instead of 14.83% as proposed by them in their petition under consideration. HPGCL further submitted that after applying 15.7% discount factor the levelled tariff works out to Rs. 18.10 / kWh for the first year.

Project cost: The Discoms have submitted that as per HERC RE regulations per MW project cost of solar PV project is Rs. 17.00 crores whereas as per DPR of the petitioner the project cost has been considered as Rs. 98.28 crores which works out to almost Rs. 15.12 crores per MW. It was further submitted by the Discoms that the project cost of Rs. 17 crores per MW is valid only if the PPA is signed on or before 31st march, 2011 and the entire capacity is commissioned on or before, March 2012. The CERC in its order dated 9th November, 2010 for determination of generic tariff considered per MW capital cost of Rs. 14.42 crores. Hence capital cost norm may be accordingly reduced for project specific case under consideration of the Commission.

Reply of HPGCL: As per HERC regulations per MW capital cost of solar PV project is Rs. 17 crores for the year 2010-11 which has not been revised by HERC due to which HPGCL has not yet finalised EPC contractor. HPGCL has considered capital cost as per HERC regulations. HPGCL has requested the Commission to finalise the bench mark capital cost for FY 2011-12.

Interest and finance charges (term loan and working capital loan): Discoms have submitted that the interest on term loan has been calculated on higher side by HPGCL and requested for providing detailed calculations.

Reply of HPGCL: HPGCL has submitted that interest calculations have been made by taking repayments on half yearly basis. Requisite calculations have also been provided by HPGCL to the Discoms.

Public Proceeding:

In view of the rival contentions the Commission considered it appropriate to have the benefit of the views of the stakeholders and any other interested parties. Thus the Commission decided to afford an opportunity of hearing to the petitioner and the respondents. Accordingly the Commission scheduled a hearing on 20th September, 2011. Notice of hearing was issued to the petitioner, UHBVNL, DHBVNL, HAREDA and HPPC vide letter No. 1785-89 / HERC dated 8th September, 2011 issued. The hearing was held on the scheduled date and was attended by the representatives of all the parties, except DHBVNL. HPGCL made a presentation highlighting the main parameters of their petition for determination of tariff. In its presentation HPGCL reiterated the issues raised in the petition and also replied to the queries raised by the Commission as well as the respondents. HPGCL requested the Commission to determine a levelled tariff of Rs. 18.10 per unit for their 6.5 MW solar power project. UHBVNL reiterated its written submissions and requested the Commission to retain RPO as specified in the RE regulation of the Commission which they feel has rightly been fixed in accordance with the Tariff Policy. UHBVNL further highlighted the relevant provision of clause 6.4 of the Tariff Policy which provides that RPO should be specified keeping in view the availability of renewable energy in the region as well as its impact on the retail tariff. UHBVNL submitted that in case solar RPO is increased then it would not only burden the consumers by corresponding increase in retail tariffs but also adversely affect their already weak financial position.

While responding to the issues raised by UHBVNL, HPGCL submitted that as per clause 6.4 of Tariff Policy the solar RPO should be 0.25% of total consumption and not a percentage of overall RPO. HAREDA also supported the submission of HPGCL on this issue and prayed that solar RPO ought to be considered as a percentage of total consumption. The Commission, however, observed that the solar RPO was specified keeping in view the solar

generation available or likely to be available in Haryana in FY 2010-11 to 2013-14. The solar RPO can be reviewed if more solar power projects are established / expected to be set up in the State.

The Commission has considered the written as well as oral submissions of the parties and has dealt with the issues raised by them at the relevant places of this order while finalising the norms / parameters for determining the tariff and other issues related to solar power projects.

2. Suo motu proceedings for determination of levelled generic tariff, in accordance with the provisions of regulation 7 of the HERC (Terms and conditions for determination of tariff for renewable energy sources, renewable purchase obligation and renewable energy certificate) Regulations, 2010, in respect of renewable energy projects to be commissioned during FY 2011-12.

Brief Background:

Regulation 7 of HERC (Terms and Conditions for determination of Tariff from Renewable Energy sources, Renewable Purchase Obligation and Renewable Energy Certificate) Regulations, 2010 provides for determination of generic tariff for renewable energy projects in Haryana. The relevant provision is reproduced below:-

“Regulations 7: Petition and proceedings for determination of tariff. - (1) The Commission shall determine the generic tariff on the basis of Sou 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 addition to the above the State Nodal agency for promotion of renewable energy in Haryana i.e. HAREDA had also requested the Commission to determine generic tariff in accordance with the provisions of the HERC renewable energy regulations.

In line with the above and after taking into account the norms specified in its RE regulations and CERC order dated 9th November, 2010 for determining levellised generic tariff, the Commission estimated tentative levellised tariff for various renewable projects that are not covered under project specific cases . The Commission observes that CERC has determined generic tariff for renewable energy projects to be set up in FY 2011-12 vide order dated 09.11.2010. HERC norms are mostly consistent with the CERC except fuel cost of Bagasse and CUF of SHP etc. While working out generic tariff escalated capital cost, escalated O&M expenses and interest rates for term loan & working capital have been taken as per CERC tariff order. The norms and the calculations of levellised tariff considered by the Commission for inviting objections / comments are presented below:

Tentative Parameters & Levellised Generic Tariff for FY 2011-12

| Particulars | Wind (200-250 W/m ²) | Wind (250-300 W/m ²) | Wind (300-400 W/m ²) | Wind (>400 W/m ²) | SHP < 5 MW | SHP 5-25 MW | Biomass (water cooled) | Biomass (air cooled) | Cogen. | Solar PV | Solar Thermal |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-------------------------------|------------|-------------|------------------------|----------------------|--------|----------|---------------|
| 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 | 35 | 35 | 20 | 20 | 20 | 25 | 25 |
| Capital cost (₹ in Million / MW) | 49.25 | 49.25 | 49.25 | 49.25 | 52.6 | 47.8 | 42.60 | 42.60 | 42.13 | 144.20 | 150.00 |
| Residual value (10%) | 4.93 | 4.93 | 4.93 | 4.93 | 5.26 | 4.78 | 4.26 | 4.26 | 4.21 | 14.42 | 15.00 |
| Total depreciation | 44.33 | 44.33 | 44.33 | 44.33 | 47.34 | 43.02 | 38.34 | 38.34 | 37.92 | 129.78 | 135.00 |
| 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 (stabilisation) | 20% | 23% | 27% | 30% | 56% | 56% | 60% | 60% | 53% | 19% | 23% |
| CUF remaining period of 1st year | 20% | 23% | 27% | 30% | 56% | 56% | 70% | 70% | 53% | 19% | 23% |
| CUF 2nd year onwards | 20% | 23% | 27% | 30% | 56% | 56% | 80% | 80% | 53% | 19% | 23% |
| O&M (₹ Million / MW) | 0.73 | 0.73 | 0.73 | 0.73 | 1.90 | 1.34 | 2.26 | 2.26 | 1.49 | 1.01 | 1.45 |
| O&M escalation | 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 | 0.00% | 0.00% | 0.00% | 0.00% | 0% | 0% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| Interest on term loan | 13.25% | 13.25% | 13.25% | 13.25% | 13.25% | 13.25% | 13.25% | 13.25% | 13.25% | 13.25% | 13.25% |
| Interest on working capital | 12.75% | 12.75% | 12.75% | 12.75% | 12.75% | 12.75% | 12.75% | 12.75% | 12.75% | 12.75% | 12.75% |
| Auxiliary consumption | 0% | 0% | 0% | 0% | 1% | 1% | 10% | 10% | 8.5% | 0% | 10% |
| Fuel cost (₹ / MT) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2434 | 2434 | 630 | 0.00 | 0.00 |
| Fuel price escalation | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5% | 5% | 5% | 0.00 | 0.00 |
| Heat rate | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3800 | 3800 | 3600 | 0.00 | 0.00 |
| GCV | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3458 | 3458 | 2250 | 0.00 | 0.00 |
| Discount rate | 15.88% | 15.88% | 15.88% | 15.88% | 16.05% | 16.05% | 13.25% | 15.73% | 15.73% | 15.88% | 15.88% |
| Levellised tariff | 5.20 | 4.52 | 3.85 | 3.47 | 2.35 | 2.00 | 5.91 | 5.97 | 3.72 | 15.16 | 14.81 |

Public Proceedings:

For inviting objections / suggestions on suo motu petition initiated by the Commission for determining generic tariff for the renewable energy projects to be set up in Haryana during FY 2011-12 the Commission issued a public notice in order to finalise various parameters in the light of comments / objections / suggestions of the stakeholders on the norms mentioned in the above table,. The last date for submission of objections / suggestions was 1st

August, 2011. A copy of the public notice was also sent to Government of Haryana, HVPNL, HPGCL, UHBVNL, DHBVNL and HAREDA vide letter no. HERC / Tariff /Renewable / Generic - 1069-1074 dated 6th July 2011 for their consideration and feedback.

In response to the public notice issued by the Commission UHBVNL, DHBVNL, M/S Sri Jyoti Renewable Energy Pvt. Ltd., HAREDA and Starwire group of industries filed their objections / suggestions.

A Brief summary of the submission made by the objectors is presented below:

Objections / suggestions:

UHBVNL has submitted that life of Solar PV and Solar Thermal has not been mentioned in the table of parameters inviting objections. DHBVNL has submitted that CUF for Biomass based power projects has been mentioned as 70% during the first year whereas in the previous order of the Commission and existing order of CERC the same has been considered at 60% during the stabilization period and 70% thereafter. DHBVNL sought clarification as to whether CUF shall be 70% during the first year or any relaxation is to be provided during the stabilization period.

M/S Sri Jyoti Renewable Energy Private Limited has submitted the following points in respect of biomass projects for the consideration of the Commission:

a) The power project being established by them is likely to be commissioned in October, 2011; therefore, PLF should be 60% during stabilisation period of six months, 70% for 2nd year and 80% for the following years.

b) The Gross Calorific Value (GCV) of biomass fuel has been considered by the Commission as 3458 Kcal/kg which appears to be that of rice husk. He opined that rice husk has varied uses as well as the same is an expensive to

be used as fuel in biomass based power projects. Their power plant is located in the region where primary crop residue available that of mustard. As per HAREDA report GCV of mustard is in the region of 2995 Kcal/kg which may be considered so that they do not incur loss on account of the fuel cost which for all power projects ought to be a pass through cost.

c) Fuel cost of Rs. 2434 / MT considered by the Commission is lower than the prevailing market rate of Rs. 2800 / MT. Hence the same needs to be revised.

d) Project cost of Rs. 4.26 crores / MW has been considered by the Commission based on normative indexation of steel, cement and other indices whereas the actual project cost is much higher and is in the region of Rs. 4.80 crores / MW without considering Interest During Construction (IDC) and Rs. 5.08 crores / MW with IDC. Therefore, keeping in view these factors and various other factors that have added to the project cost the Commission may review the same.

e) The auxiliary consumption has been considered at 10% which does not take into consideration transformation losses of 2% in power plant of 5 MW and above capacity with 11KV / 132 KV step up before power evacuation. Thus they submitted that the Commission may consider auxiliary consumption @ 12% while determining tariff for biomass based renewable energy projects in Haryana.

f) Further it was argued that they have taken loans @ 14.5% from SBI which is equivalent to the prevalent market interest rate. CERC has considered 13.25% which is SBI PLR plus 150 basis points. They are small company and hence do not have the negotiating capacity with the lenders as large companies like NTPC etc may have. Therefore the interest rate may be considered @ 14.5% as per the prevalent interest rate.

g) It was further submitted that O&M expenses have been proposed @ Rs. 2.25 Million per MW whereas due to cost / price inflation the O&M expenses are expected to be around Rs. 2.50 Millions / MW. Relying on IREDA reports the respondent submitted that project equipments suffer frequent damages due to corrosion / erosion etc. as a variety of biomass fuels with varying characteristics is used. Thus O&M expenses in the range of 6% to 7% of the project cost should be considered for the purpose of tariff determination for biomass based renewable energy generation projects.

h) The objector further submitted that the discounting factor for arriving at the proposed levellised tariff has not been mentioned in the notice issued by the Commission for inviting objections / suggestions. In their view the same should be considered at 15.82% in line with CERC norms.

i) The respondent has submitted that wheeling charge of 2% should not be levied as metering is at the generating station and any costs involved in setting up the transmission / distribution lines for the purpose of evacuation of power from biomass based energy projects is recovered through ARR and tariff determined by the Commission for transmission / wheeling.

HAREDA has submitted that HERC has considered all the parameters as adopted by CERC in its order dated 09.11.2010 except CUF for small Hydro projects i.e. 56% against CERC 30% and fuel cost of bagasse based cogeneration projects as Rs. 630/- against Rs. 1584/- considered by CERC are appropriate and they do not have any objections to the same.

The Starwire group of companies have made similar observations as those of Sri Jyoti while commenting on the parameters for biomass tariff determination considered by the Commission as incorporated in the public notice issued by the Commission while inviting objections / suggestions. A brief summary of the same is given below:

a) Capital cost should be considered at Rs. 5.92 crores / MW.

- b) Depreciation should be 7.84% as considered by Chattisgarh Biomass Energy Developers Association and South Indian Sugar Mills Association).
- c) O&M expenses should be 7% of capital cost.
- d) Fuel Cost should be Rs. 3000 / MT with 10% annual escalation.
- d) Interest rate on term loan should be 13.5%.
- e) Interest on working capital should be considered at 14.5%.

In order to take the process forward the Commission considered it appropriate to hear the objectors and accordingly scheduled a hearing on 21st September, 2011. Notice for hearing was issued vide letter No. 1761-67 / HERC dated 8th September, 2011. The hearing was held on the scheduled date and was attended by representatives of UHBVNL, HVPNL, Starwire group of companies, Sri Jyoti Renewable Energy Pvt. Ltd., Puri Oil Mills, HPPC and HAREDA.

The representative of Starwire group of companies reiterated their written submission in the hearing held on 21/09/2011. The Commission enquired about the date of commissioning of their project and it was informed by them that the project is likely to be commissioned in FY 2012-13. In response to a query from the Commission, the representative of Starwire accepted that they will have to again appear before the Commission as and when notice for determination of generic tariff for the projects to be commissioned during FY 2012-13 is issued. He further submitted that even though their project is not coming up in FY 2011-12 they have put forth their views on various issues to strengthen their case for determination of generic tariff for their project to be commissioned in FY 2012-13.

The representative of M/S Sri jyoti Renewable Energy Pvt. Ltd. while reiterating their written submissions requested the Commission to consider GCV of mustard husk instead of GCV of blended fuels as considered by CERC. He submitted that they are required to procure biomass during the season and to store it for about nine months to provide for offseason requirement due to which GCV of the fuel deteriorates by about 15-20%. Unlike Punjab,

where there are quite a few varieties of crops are available across the state, in Haryana wheat and rice is not sown in the area where their plant is located and they are solely dependent on mustard husk. Due to pungent nature of mustard stalk and higher chemical content their equipments are subjected to accelerated deterioration. Hence in order to maintain the plant and machinery in an optimum manner a higher O&M cost ought to be considered by the Commission. On the issue of fuel cost he submitted that fuel is available at a rate of Rs. 2720 / MT and should not be less than 20% of the cost of crop and its indexation should not be less than 8%.

He further submitted that as has been done in case of solar power projects, levy of 2% of wheeling charges should be waived of because in their case too metering is done in the premises of the generator and cost of transmission line is recovered by the licensee through ARR. He also submitted that while working out tentative generic tariff, on which objections / suggestions have been invited, the cost of 2% wheeling charges have not been taken into account thus the same cannot be levied without factoring in the same in the cost of generation.

On the issue of auxiliary consumption he submitted that quality of ground water, in the area where there plant is located, is poor and treatment of which additional equipments are required to be installed which requires extra energy. He requested the Commission to allow 12% auxiliary power consumption in place of the proposed 10%.

Regarding project cost he submitted that CERC has considered cost of 33 KV switch yard for arriving at the project cost whereas they have, in accordance with the MOU signed with HAREDA (which has been approved by HVPNL), installed 132 KV switch yard. The Cost of 132 KV switch yard is much higher than that of 33 KV switch yard. He also submitted that cost of land in Haryana is much higher as compared to other parts of the country. In view of these he requested that capital cost of Rs. 5.20 / MW should be considered

by the Commission while determining generic tariff for biomass based power projects. According to him the other reason for seeking higher capital cost is the increase in interest rates which has been frequently revised and is currently hovering at around 18%.

In its presentation HAREDA submitted that fuel cost is between Rs. 1700 - 2600 per MT and capital cost of biomass based project with 132 KV line of 15 KM length is Rs. 4.56 crore / MW in Maharashtra and Rs. 4.90 crores / MW in Gujarat. Responding to the submissions of HAREDA representative of Starwire group of companies submitted that biomass project in Haryana is not viable at a project cost of less than Rs. 5.00 crores / MW.

The representative of HPPC submitted that the Commission has already determined tariff for five years in respect of power project of M/S Sri Jyoti Renewable Energy Pvt. Ltd. He further submitted that that land cost is not more than Rs. 10 Lakh / acre. Hence he requested the Commission to check land sale deeds for determining appropriate land cost to be factored in the project cost. Additionally he submitted that other fuels like wheat husk are also available in the area where the project of M/S Sri Jyoti Renewable Energy Pvt. Ltd is located. Responding to his submissions the representative of M/S Sri Jyoti Renewable Energy Pvt. Ltd submitted that as per State Government policy wheat husk cannot be used as fuel for power generation. HPPC representative submitted that Government policy for solar projects is different than other renewable energy projects; therefore, wheeling charges should continue to be levied at the rate determined by the Commission.

The representative of HVPNL submitted that they do not have any objection to the norms adopted by the Commission for determination of generic tariff. However, he requested the Commission that all the provisions and orders relating to renewable energy, which at present are scattered in different regulations / orders, needs to be consolidated under a common order.

Commission's Analysis and order:

1. Issue relating to solar RPO and purchase of renewable energy:

HPGCL has filed petition for determination of tariff for sale of energy to be generated from its 6.5 MW solar power plant to the distribution licensees of Haryana. The HPPC which procures power on behalf of the distribution licensees i.e. UHBVN and DHBVNL is reportedly reluctant to purchase said energy from HPGCL on the plea that as per provisions of HERC RE regulations they have already met the RPO for FY 2011-12. In reply to the refusal of HPPC, the generating company has submitted that the RPO determined by HERC is not as per Tariff Policy and should be 0.25% of total consumption and not a percentage of overall RPO. HAREDA has also supported the view point of HPGCL. The relevant provisions of the Electricity Act, 2003 and Tariff Policy as amended by Government of India vide notification dated 20th January, 2011, are reproduced below:

Section 86 (1) (e) of the Electricity Act, 2003: “(1) The State Commission shall discharge the following functions namely: -(e) promote cogeneration and generation of electricity from renewable sources of energy by providing suitable measures for connectivity with the grid and sale of electricity to any person, and also specify for purchase of electricity from such sources, a percentage of the total consumption of electricity in the area of a distribution licensee.”

Clause 6.4 of the Tariff Policy: Non-conventional and renewable sources of energy generation including co-generation.

(1) Pursuant to provisions of section 86 (1) (e) of the Act, the Appropriate Commission shall fix a minimum percentage of the total consumption of electricity in the area of a distribution licensee for purchase of energy from such sources taking into account availability of such resources in the region and its impact on retail tariffs. Such

percentage for purchase of energy should be made applicable for the tariffs to be determined by the SERCs latest by April, 2006.

(2) Within the percentage so made applicable, to start with, the SERCs shall also reserve a minimum percentage for purchase of solar energy from the date of notification in the Official Gazette with will go up to 0.25% by the end of 2012-13 and further up to to 3% by 2022

(3) It is desirable that purchase of energy from non-conventional sources of energy takes place more or less in the same proportion in different States. To achieve this objective in the current scenario of large availability of such resources only in certain parts of the country, an appropriate mechanism such as Renewable Energy Certificate (REC) would need to be evolved. Through such a mechanism, the renewable energy based generation companies can sell the electricity to local distribution licensee at the rate for conventional power and can recover the balance cost by selling certificate to other distribution companies and obligated entities enabling the latter to meet their renewable power purchase obligations in view of the comparatively higher cost of electricity from solar energy currently, the REC mechanism should also have a solar specific REC.

(4) It will take some time before non-conventional technologies can compete with conventional sources in terms of cost of electricity. Therefore, procurement by distribution companies shall be done at preferential tariffs determined by the Appropriate Commission.”

Regulation 64 of HERC (Terms and conditions for determination of tariff from renewable energy sources, renewable purchase obligation and renewable energy certificate) Regulations, 2010 provides as under:

(1) “Every obligated entity including distribution licensee, consumers owning captive power plant and long term open access consumers

in Haryana shall purchase from renewable energy sources under the Renewable Purchase Obligation (RPO) not less than 1.5% of its consumption of energy during each of the FYs 2010-11 and 2011-12, 2% for the FYs 2012-13 and 3% for the FY 2013-14.

- (2) *Solar RPO shall be 0.25% of the overall RPO as specified under sub regulations (1) above with an annual increase of 25%.*

Provided that solar renewable purchase obligation so specified shall be procured from generation based on solar renewable energy source only subject to availability of the solar power in the State of Haryana.

Provided further, such obligation to purchase renewable energy shall be inclusive of the purchases, if any, from renewable energy sources already being made by concerned obligated entity.

Provided also that the power purchases under the power purchase agreements for the purchase of renewable energy sources already entered into by the distribution licensee and consented by the Commission shall continue to be made till validity of the Power Purchase Agreement approved by the Commission, even if the total purchases under such agreements exceed the RPO as specified in these regulations.

- (3) *In case the renewable energy generating company offers to sell energy generated by it from its renewable energy generating station located in Haryana to the distribution licensee at the rates determined by the Commission, the distribution licensee shall not refuse to purchase power from such generating company, without prior approval of the Commission.*

A perusal of the above provisions of the Act makes it clear that it is statutory duty of the State Commission to specify a percentage of the total consumption of electricity in the area of a distribution licensee for purchase of energy from RE sources by the obligated entities. However Tariff Policy provides that such percentage shall be specified keeping in view the availability of such resources in the region and its impact on retail tariff (s). Although there is no such provision in this regard in the Act yet the Tariff policy also provides for specification of solar RPO. Further, as per above mentioned HERC RE regulations overall RPO and solar RPO have been specified keeping in view the availability of renewable energy resources in Haryana. In order to encourage renewable generation the Commission has specified that in case the renewable energy generating company offers to sell energy generated by it from its renewable energy generating station located in Haryana to the distribution licensee at the tariff determined by the Commission, **the distribution licensee shall not refuse to purchase power from such generating company, without prior approval of the Commission. The RPO (non solar) shall not be less than 1.5% in FY 2010-11, 2% in FY 2011-12 and 3% in FY 2013-14 of the total energy consumption. Further the solar RPO shall not be less than 0.05% in FY 2012-13 and 0.10% in FY 2013-14 of the total energy consumption.**

In case any distribution licensee or an obligated entity fail to meet the RPO there is a provision of purchasing of REC and in case REC is not available then there is a provision of setting aside amount equivalent to the value of requisite RECs in a separate fund. All these provisions have been made to ensure compliance of not only the provisions of the Act and Tariff Policy but also keeping in view the poor financial health of the distribution licensees in the State. The Commission had attempted to strike a balance between the impact of implementation of the provisions of Act, rules and regulations as well as the capacity of the distribution

licensee to bear the extra financial burden on this account. However, while doing so, the Commission cannot allow distribution licensees to refuse purchase of renewable energy generated within the State of Haryana if the same is offered to be sold to them by the generating company.

Consequently, in accordance with the provision of regulation 64 (3) of HERC (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 the distribution licensees are directed to purchase the solar power being generated in Haryana and offered to be sold to them by HPGCL and Others and offer their comments on the PPA enclosed by HPGCL with the petition. They shall ensure providing requisite information to HAREDA to enable them to submit the requisite information in accordance with the provisions of regulation 66 of HERC (Terms and conditions for determination of tariff from renewable energy sources, renewable purchase obligation and renewable energy certificate) Regulations, 2010. The distribution licensee shall also ensure strict compliance of the provisions of the regulations with regard to purchase of renewable energy in future.

2. Issue relating to implementation of HERC / CERC RE regulations: The Commission is already seized of this issue. As a matter of fact the norms specified by the Commission in its RE regulations, except for depreciation, biomass fuel cost and PLF of SHR etc., are mostly consistent with those specified by CERC in its RE regulations. The major difference in both the regulations is that while CERC RE regulations are applicable for the FY 2009-10 onwards whereas HERC RE regulations are applicable for the FY 2010-11 onwards. HERC has determined tariff for sale of renewable energy to the distribution licensee of Haryana vide order dated 15th May 2007 i.e. much before notification of HERC RE regulations 2010. However, the order

of the Commission was challenged by the project developers before Hon'ble APTEL and the same was remanded back on some issues. The subsequent orders of the Commission, which were issued as a consequence of orders of Hon'ble APTEL, are still being contested by the parties on some issues. In almost all its orders the Hon'ble APTEL has directed the Commission to determine tariff taking into consideration CERC norms. The last order in this chain was issued by the Commission on 27th May, 2011 against which DHBVNL has now filed a review petition seeking clarification as to why Commission is applying CERC norms despite the fact the HERC regulations and norms are already in place.

The observation of DHBVNL in the said review petition, which stands disposed of by the Commission vide a separate order, that tariffs would undergo a change if the same are determined by the Commission in accordance with its own RE regulations is but natural. Further, the question, as to why should CERC norms should be adopted when HERC has its own RE regulations in place, remains unanswered. The issue has been examined below in the light of statutory provisions.

The Commission observes that Para 6.4 (3) of the National Tariff Policy empowers CERC to lay down the guidelines for pricing of non - firm power. The Para 6.4(3) reads as under,

“(3) The Central Commission should lay down guidelines for pricing non - firm power, especially from non - conventional sources, to be followed in cases where procurement is not through competitive bidding”

Additionally the Commission further observes that as per section 61 (a) of the Electricity Act, 2003, the State Commission is to be guided by the principles and methodologies specified by the Central Commission for determination of tariff applicable to generating companies and transmission licensees. Similar provisions relating to operational norms have also been provided in the Tariff Policy laying emphasis for uniformity

of norms at national level. Further the Hon'ble APTEL also lays thrust on adoption of CERC norms in its various orders. It is true that tariff determination is one of the most important functions of a SERC and it has been so provided in the Act because it is the SERC which has the access to the data and better understanding to the conditions prevailing in the concerned State and determines tariff accordingly. However, at the same time the importance of uniformity of norms across the country cannot be ignored. Regarding deviation from norms provided in HERC RE regulations, there are certain enabling provisions which are reproduced below:

Regulation 68 of HERC (Terms and conditions for determination of tariff from renewable energy sources, renewable purchase obligation and renewable energy certificate) Regulations, 2010 provides that *“tariff for sale of electricity by the generating company may also be determined in deviation from the norms specified in these regulations subject to the condition that the levellised tariff over the useful life of the project on the basis of the norms in deviations does not exceed the average lifetime levellised generating cost calculated on the basis of the norms specified in these regulations.”*

Regulation 69 of these regulations provides that *“the Commission may by general or special order, for reasons to be recorded in writing and after giving an opportunity of hearing to the parties likely to be affected may suo motu relax any of the provisions of these regulations or on an application made before it by an interested.”*

It is a fact that order / decision of the Commission should necessarily conform to the statutory provisions. However, the statutes provide sufficient flexibility to incorporate ground realities emerging from the dynamic nature of the power sector specially new and renewable sources of power generation till such time that RE technologies matures enough to compete in the market. Thus a window is always available to the

Commission to deviate from the Regulations with sufficient and convincing reasoning to be incorporated in the relevant order itself.

In view of the foregoing discussions and also the fact that Commission has already adopted CERC tariff in case of solar power projects executed under JNNSM and also vide its order dated 27th May, 2011 in respect of the biomass based projects, we consider it appropriate to apply, wherever deemed appropriate, CERC norms for determination of tariff in respect of renewable energy projects to be established in Haryana.

The tariff(s) approved by the Commission, in line with the principles enunciated above, shall also be applicable to the projects commissioned prior to the instant order with prospective effect.

3. Issue relating to determination of generic levelled tariff in respect of energy to be generated by the renewable power projects to be commissioned in FY 2011-12.

Generic levelled tariff is determined in accordance with the norms prescribed in the RE regulations or approved norms and is in respect of different renewable energy sources available in the State. 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 the interveners i.e. M/s Star wire and M/s Sri Jyoti on the issues presented in the hearing and observe that the same are specific to their own proposed projects. 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 were specified in RE regulations with a view to take care of different situations relating to different renewable energy sources so that 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. Nonetheless, the Commission has taken into consideration the general scenario that emerges in the State, therefore, locational advantage / 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.

As far as the issue related to HERC Regulations versus CERC Regulations are concerned the Hon'ble APTEL has directed the Commission in many cases to re-determine tariff in light of CERC regulations. The stakeholders, including distribution licensees and HPGCL, have on number of occasions requested the Commission to adopt CERC norms for determination of tariff. As already observed in the above paragraphs, despite the fact that the HERC RE regulations are based on CERC norms and have been implemented for the FY 2010-11 onwards i.e. a year later than the implementation of CERC RE regulations, the Commission holds that it would be in the larger interests of the RE generating companies as well as the distribution licensees if the generic tariff is determined largely in light of the CERC norms and the approach adopted by the Commission in its order dated 27th May, 2011. By doing so the Commission will not only ensure compliance to the directives given by the Hon'ble APTEL but also allow the requests of the stakeholders made at different stages for adopting CERC norms.

In view of the above, the generic tariff applicable for the renewable energy projects to be established in Haryana during the FY 2011-12, shall be based on the parameters discussed below:-

**Solar PV Power Plant:
Project Cost:**

As per HERC RE Regulations the normative capital cost for setting up Solar Photovoltaic Power Project was pegged at Rs. 17.00 Crores/MW for FY 2010-11 as against Rs. 16.90/MW considered by CERC with a proviso that the Commission may deviate from above norm in case of project specific tariff determination.

The Commission observes that the single largest component of project cost in the case of Solar PV Power Plant is the cost of PV modules. The international prices are witnessing a sustained downward trend. As per the latest available retail Silicon Module Price movement (ref: PVsinsights.com) per Watt prices are hovering at an average of around USD 0.95 /Watt. Hence considering the current Rs/USD exchange rate at Rs. 52 to a USD the per MW module cost works out to Rs.4.94 Crore / MW which is being considered by the Commission for working out tariff for FY 2011-12.

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 considered as Rs. 4.90 Crore / MW as per the details presented below:-

| Sr. No | Particulars | Benchmark Cost Rs Crore /MW for FY 2011-12 |
|--------|---------------------------|--|
| 1 | PV Modules | 4.94 |
| 2 | Land Cost | 0.16 |
| 3 | Civil Works | 0.90 |
| 4 | Mounting Structures | 1 |
| 5 | Inverter | 1.04 |
| 6 | Cables, Transformers etc. | 1.00 |
| 7 | Pre - Operative Expenses | 0.8 |
| 8 | Total Project Cost | 9.84 |

The total Capital Cost as per details above has been considered at Rs. 9.84 Crore/MW for arriving at FY 2011-12 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.**

Capacity Utilisation Factor (CUF): The Capacity utilisation factor for Solar PV project as per HERC Re Regulations is 19%. The Commission observes that given the level of solar radiation in Haryana CUF of 19% is reasonable and hence retains the same.

Operation and Maintenance Expenses. - 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 2011-12 the O&M 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 was Rs. 13 lakh / MW for FY 2010-11 to be escalated @ of 5.72% per annum, hence the Commission has considered Rs. 13.70 lakhs/MW as O&M expenses for FY 2011-12.

Financial Parameters:

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.

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.

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.

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.

Interest on Working Capital. - (1) The Working Capital requirement in respect of wind energy projects, small hydro power, 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 accordance with the following clause:

- 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 the Commission finds no reasons to deviate from its RE Regulations and hence has retained the same for determining generic levellised tariff for FY 2011-12 in the case of all new and renewable fuel based power projects.

Small Hydro Power Project:

Project Cost: The normative capital cost for small hydro projects in FY 2010-11 as per HERC RE Regulations is as under:-

| Size of project | Capital Cost (Rs. Crore/MW) |
|-----------------|-----------------------------|
| Below 5 MW | 5.50 |
| 5 MW to 25 MW | 5.00 |

The capital cost as determined above for FY 2010-11 was subjected to indexation formula for the subsequent years as provided in the Regulation itself. Accordingly the Capital Cost considered for FY 2011-12 for project size below 5 MW is Rs. 5.26 Crore / MW and for project size of 5 MW to 25 MW the works out to Rs. 4.78 Crore/MW.

The Commission observes that the tariff for small hydro projects in Haryana determined vide order dated 15th May, 2007 currently in vogue, has been estimated on the basis of Rs. 10.2 Crore MW and CUF of 70% given the small hydro projects in Haryana are basically canal based having very low head and require substantial civil work. Whereas the benchmark capital cost as per CERC Regulations adopted by HERC is substantially lower than the capital cost considered by the Commission while determining generic tariff in 2007. Thus given the asymmetry the Commission is of the considered view that the potential for hydro power projects in Haryana is low and there could be significant variation in project cost as well as CUF at different locations. Hence the Commission would decide / review the tariff for small hydro projects in Haryana on a case to case basis after obtaining data on water flow as well as capital cost for the projects already commissioned in Haryana.

Biomass Projects (Rankine Cycle):

The Commission has passed a detailed order dated 27/05/2011 in the matter of the Hon'ble APTEL judgment dated 1st March, 2011 in appeal No. 16 & 117 of 2010 filed by the biomass based renewable power generators and distribution licensees respectively against the Commission's order dated 6th November, 2009 determining the tariff for sale of electricity by biomass based energy developers to the distribution licensees in the State of Haryana. The operative part of the said order is reproduced below:

“In view of the financial and technical parameters discussed above (order dated 27/05/2011), the Commission in compliance with the order of the Hon'ble APTEL, re - determines the tariff for biomass based generation projects as under:-

| | FY 2011-12 | FY 2012-13 | FY 2013-14 | FY 2014-15 | FY 2015-16 |
|-----------------|------------|------------|------------|------------|------------|
| Tariff (Rs/kWh) | 5.26 | 5.04 | 5.18 | 5.32 | 5.47 |

The tariff determined by the Commission includes tax liabilities as well as fuel and O&M escalation, hence no separate tariff escalation has been provided. It shall be valid for a period of five years beginning FY 2011-12. The Commission may review fuel cost after a period of three years, if necessary. For the projects that are commissioned after FY 2011-12 the tariff shall be arrived at after factoring in the project cost indexation mechanism approved by the Commission”.

In view of the above, the Commission is not discussing the technical / financial parameters which have already been dealt with at length in the aforesaid order. Thus the Commission retains the tariff for biomass projects commissioned in FY 2011-12 as set out in its order dated 27/05/2011.

However, after applying the discounting factor the levelled tariff has been indicated in the instant order.

In all other cases i.e. Wind, Co-generation and Solar Thermal Project the levelled Generic tariff for projects to be commissioned during FY 2011-12 has been estimated based on the norms specified in 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 after considering the recent trend in capital cost for solar thermal projects.

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.

The tariff approved by the Commission as per Annexure - A shall be applicable to the projects commissioned in FY 2011-12.

This order is signed, dated and issued by the Haryana Electricity Regulatory Commission on 25th January, 2012.

Date: 25/ 01 / 2012

Place: Panchkula.

Ram Pal
(Member)

Rohtash Dahiya
(Member)

ANNEXURE - A

| 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) | Cogeneration | Solar PV | Solar Thermal |
|--|----------------------------------|----------------------------------|----------------------------------|-------------------------------|------------------------|----------------------|--------------|----------|---------------|
| Capacity of the power plant (MW) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Life of the power plant (Years) | 25 | 25 | 25 | 25 | 20 | 20 | 20 | 25 | 25 |
| Capital cost (Rs in Million / MW) | 49.25 | 49.25 | 49.25 | 49.25 | 45 | 45 | 42.13 | 98.4 | 120 |
| Residual value (10%) | 4.93 | 4.93 | 4.93 | 4.93 | 4.50 | 4.50 | 4.21 | 9.84 | 12 |
| Total depreciation | 44.33 | 44.33 | 44.33 | 44.33 | 40.50 | 40.50 | 37.92 | 88.56 | 108 |
| Loan | 70% | 70% | 70% | 70% | 70% | 70% | 70% | 70% | 70% |
| Equity | 30% | 30% | 30% | 30% | 30% | 30% | 30% | 30% | 30% |
| CUF (stabilisation) | 20% | 25% | 30% | 32% | 60% | 60% | 53% | 19% | 23% |
| CUF 1st year | 20% | 25% | 30% | 32% | 70% | 70% | 53% | 19% | 23% |
| CUF 2nd year onwards | 20% | 25% | 30% | 32% | 80% | 80% | 53% | 19% | 23% |
| O&M (Rs. Million / MW) | 0.73 | 0.73 | 0.73 | 0.73 | 2.03 | 2.26 | 1.49 | 1.05 | 1.45 |
| O&M escalation | 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% |
| ROE (1st 10 years) | 19% | 19% | 19% | 19% | 19% | 19% | 19% | 19% | 19% |
| ROE (11th year onwards) | 24% | 24% | 24% | 24% | 24% | 24% | 24% | 24% | 24% |
| Income tax MAT | 19.93% | 19.93% | 19.93% | 19.93% | 19.93% | 19.93% | 19.93% | 19.93% | 19.93% |
| Interest on term loan | 13.75% | 13.75% | 13.75% | 13.75% | 11.00% | 11.00% | 13.75% | 13.75% | 13.75% |
| Interest on working capital | 13.50% | 13.50% | 13.50% | 13.50% | 14.50% | 14.50% | 13.50% | 13.50% | 13.50% |
| Auxiliary consumption | 0% | 0% | 0% | 0% | 10% | 10% | 8.5% | 0% | 10% |
| Fuel cost (Rs / MT) | 0.00 | 0.00 | 0.00 | 0.00 | 2434 | 2434 | 630 | 0.00 | 0.00 |
| Fuel price escalation | 0.00 | 0.00 | 0.00 | 0.00 | 5% | 5% | 5% | 0.00 | 0.00 |
| Station Heat Rate | 0.00 | 0.00 | 0.00 | 0.00 | 3800 | 3800 | 3600 | 0.00 | 0.00 |
| Gross Calorific Value | 0.00 | 0.00 | 0.00 | 0.00 | 3458 | 3458 | 2250 | 0.00 | 0.00 |
| 1st Year Tariff (2011-12) Rs/kWh | 6.86 | 5.49 | 4.57 | 4.29 | 5.26 | 5.65 | 3.69 | 13.39 | 15.11 |
| Levellised Tariff discounted @ 15.88% Rs/kWh | 5.68 | 4.56 | 3.80 | 3.56 | 5.92 | 6.04 | 3.74 | 10.69 | 12.16 |