# ASSAM ELECTRICITY REGULATORY COMMISSION

FILE NO. AERC. 259/2007/Pt-I PETITION NO. 09/2012

**ORDER SHEET**

13.03.2013

Before the Assam Electricity Regulatory Commission

ASEB Campus, Dwarandhar,
G. S. Road, Sixth Mile, Guwahati – 781 022

Petition No. 9 /2012

M/s Amrit Bio-Energy & Industries Limited (ABEIL)

—— Petitioner

-Vs-

M/s. Assam Power Distribution Co. Ltd. (APDCL)

With

M/s Assam Electricity Grid Corporation Limited (AEGCL)

—— Respondents

In the matter of

Petition filed by the Petitioner for redetermination of Tariff as per CERC order dated 27th March, 2012 for Sale of power from the 10 MW (Net) Biomass Based Power Plant of M/s ABEIL to be set up at Village Baghjap in Morigaon district of Assam.

**ORDER**

## 1. Background

On 09.08.2007, M/s Amrit Bio-Energy & Industries Limited had filed a petition before the Commission for fixation of tariff for sale of power to the Assam grid from its 10MW (Net) Biomass based renewable thermal power plant at Baghjap in Morigaon district. A tariff order in this regard was issued on 04.03.2008 approving tariff for a period of 5 years (without discounted factor and including tax) from the date of commercial operation of the plant as under:

| 1st year | 2nd year | 3rd year | 4th year | 5th year |
|---|---|---|---|---|
| 3.10 | 3.12 | 3.13 | 3.15 | 3.18 |

Both, M/s ABEIL and M/s ASEB (now APDCL) submitted review petitions (No.04/2008 and No. 05/2008 respectively) against the tariff order of AERC. M/s ABEIL vide their review petition, submitted a revised Detailed Project Report (DPR) in view of change in technology, higher loan interest rate etc. to the Commission for consideration. Although, the petitioner had mentioned in that review petition about change in boiler technology from AFBC type to Travelling Grate type and change in some of the performance parameters, based on which they revised the DPR (Revision-1), it was observed that the same technology and technical parameters were indicated as in the original DPR. M/s ABEIL had sought a revised levellised tariff of Rs. 4.00/unit based on revised financial parameters like capital cost of Rs. 4642 lakh and loan interest rate @ 14%. On the other hand, ASEB (APDCL) vide their review petition appealed to the Commission to cancel and review its order dated 04.03.2008 stating that the tariff fixed by the Commission was unreasonable.

Both the review petitions were heard by the Commission on 26.08.2008 and a reasoned Order was issued on 16.10.2008. In that Order, the Commission maintained its Order dated 04.03.2008. However, provision was included for reviewing the tariff at the time of C.O.D. (Date of Commercial Operation) based on submission of further data and information.

M/s. ABEIL subsequently submitted second review petition on 15.12.2008 which was rejected by the Commission vide order dated 17.02.2009 on the ground that it is not maintainable.

In this backdrop, a fresh petition was once again filed by M/s Amrit Bio-Energy & Industries Limited (ABEIL) on 06.10.2010 (along with a new DPR (Revision-2) with some revised technical and financial parameters) seeking a tariff of Rs. 4.50/kWh for the power generated from a plant with the same capacity and to be established in the same location. The major deviations in financial parameters include escalation in the capital cost to Rs 4679.50 lakh and fuel cost to Rs 1855/MT with 5% annual escalation and decrease in loan interest rate to 13.39%. After the initial formalities were carried out as per provisions in the AERC (Conduct of Business) Regulations 2004, the Commission took a preliminary hearing on 03.11.2011 for admitting the petition. Representatives from both the Petitioner and Respondent appeared in the hearing. The Commission heard both the parties and in its Order dated 18.11.2011 directed M/s. ABEIL to submit the following data and documents in order to consider admissibility of the tariff petition dated 06.10.2010.

i) Details regarding the issues faced by M/s. ABEIL while running their similar bio-mass plant in West Bengal as stated by them during the hearing.

ii) Details of tariff order issued by the West Bengal Electricity Regulatory Commission including that of revised tariff, if any, for their West Bengal plant.

iii) Details of techno-commercial deviation now proposed from the one which was originally envisaged in the tariff order dated 04.03.2008 of the Commission.

iv) Power Purchase Agreement (PPA) signed with APDCL.

v) Gross Calorific Value (GCV) of rice husk and coal proposed to be mixed along with justifications for the same. The petitioner was also directed to mention the price of the coal proposed to be mixed and source of supply.

vi) Data on the Station Heat Rate, Boiler & Turbine efficiency as certified by the manufacturers.

vii) Submission of a copy of the revised DPR to APDCL.

The responses of the petitioner on the above directions vide letter No. ABEIL/ED/AERC/12/14 dated 25.01.2012 are given below:

Sl. i) Not submitted.

Sl. ii) Details of tariff orders issued by the West Bengal Electricity Regulatory Commission were not submitted. Instead, the petitioner submitted the WBERC (Co-generation and Generation of Electricity from Renewable Sources of Energy) Regulations, 2010 which, inter-alia, approved a cap price of Rs. 4.36/kWh for bio-mass based projects.

Sl. iii) Submitted.

Sl. iv) Submitted.

Sl. v) Not submitted.

Sl. vi) Not submitted

Sl. vii) Submitted.

Deviations are observed basically only in financial parameters. While Depreciation, Interest on term loan, Fuel Cost etc. figures have been adopted by the petitioner as per norms of CERC (Renewable Energy) Tariff Order for FY 2010-11, the Project cost has been adopted from the CERC (Renewable Energy) Tariff Order for FY 2011-12.

The Commission directed M/s. ABEIL vide letter No. 259/2007/Pt I/20 dated 29.03.2012 to submit the incomplete information. The Commission vide a reminder No 259/2007/Pt I/22 on 11.06.2012 once again directed the petitioner to submit the required information.

The petitioners vide their letter No. ABEIL/SEC/AERC/12/71 dated 14/06.2012 furnished the information as under with a request to admit their petition and to fix a tariff of Rs 4.50/kWh as per the CERC Guidelines:

1) The petitioner submitted that rice husk price for their West Bengal bio-mass plant varied between Rs. 2179.68 /MT (min.) and Rs. 4708.25/ MT (max.) during the period w.e.f. April'2010 to March'2011. The petitioner quoted that State Government control is necessary in rice husk trading/marketing to ensure price stability.

2) The petitioner again submitted a copy of the WBERC (Co-generation and Generation of Electricity from Renewable Sources of Energy) Regulations, 2010 instead of the tariff order as per direction of AERC.

3) The following technical parameters were submitted by the petitioner: -

i. Gross Calorific Value (rice husk) (85%) = 3300 Kcal/Kg.

ii. Gross Calorific Value (Coal) (15%) = 3000 Kcal/Kg.

iii. Design Station Heat Rate (SHR) = 4000 Kcal/unit

iv. Boiler efficiency (Travelling Grate Type) = 72%

v. Turbine efficiency = 27%

It is observed that the figures quoted for Gross Calorific Value (GCV) of rice husk and SHR are as per the norms of CERC (Terms and Conditions for determination of Tariff from Renewable Sources) Regulations, 2012 fixed for the FY 2012-13. It has also been noted that the proposed percentage of the rice husk use is shown as 85%, whereas, in the DPR (Revision:2) submitted along with the petition, the rice husk potential was mentioned as 28% and the wood waste was proposed for the remaining 72% as bio-mass fuel. Fuel prices for rice husk and coal were not furnished. However, the price of bio-mass fuel was quoted as Rs. 1855 per MT in the DPR (Revision:2).

The petitioner vide their letter dated 27.09.2012 submitted some additional information and requested that the petition may be admitted and tariff may be fixed at Rs 5.42/kWh as per CERC Order dated 27.03.2012.

## 2. <u>Legal and Regulatory framework:</u>

**2.1** Section 86(1) (e) of the Electricity Act 2003, mandates the State Electricity Regulatory Commissions to promote co-generation 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.

**2.2** The clause 5.12.2 of the National Electricity Policy also provides inter-alia as under:

"Considering the fact that it will take some time before non-conventional technologies compete, in terms of cost, with conventional sources, the Commission may determine an appropriate differential in prices to promote these technologies".

**2.3** Section 6.4 of the National Tariff Policy dealing with renewable energy sources of energy generation including co-generation, inter-alia, provides as under:

"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."

**2.4** The Electricity Act, 2003 also requires that the Central Electricity Regulatory Commission (CERC) and State Electricity Regulatory Commissions (SERCs) shall be guided by the tariff policy in discharging their functions including framing the regulations under section 61 of the Act.

**2.5** Section 61 of the Act provides that State Regulatory Commissions shall be guided by the principles and methodologies specified by the Central Commission for determination of tariff applicable to generating companies and transmission licensees.

**2.6** The AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 was notified on 07.11.2012 which is in line with CERC (Terms and Conditions for tariff determination from Renewable Energy Sources) Regulations, 2012.

## 3. Hearing of the petition:

After careful consideration of the submissions made by M/s ABEIL, the Commission admitted the petition on 18.08.2012 and registered it as petition No. 9 of 2012. A hearing was fixed on 24.08.2012 and due notices were served to the petitioner and respondents. The petitioner vide their letter No ABEIL/SEC/AERC/12/109 dated 21.08.2012 expressed their inability to attend the hearing fixed on 24.08.2012 and requested for rescheduling the date of hearing. Accordingly, the hearing was rescheduled on 03.10.2012 and all parties were informed vide notice dated 24.09.2012.

Dr. B.K. De, Director and Shri K.G. Sinha, Chief Advisor (Technical), ABEIL appeared for the petitioner in the hearing.

Shri R.L. Barua, GM (Com-T), Shri M.K. Adhikary, DGM (Com) and Shri K. Goswami, AGM (Com-T), APDCL attended on behalf of the respondent.

There was no representation from AEGCL.

Chairperson, AERC initiated the hearing with a brief background of the petition. He then asked the petitioner to clarify its position regarding the type of fuel to be used and its availability as the viability of the project primarily depends on committed availability of the biomass fuel. The Chairperson, called upon the project developer to firm up the data regarding availability of fuel with reliable inputs so that the project can sustain generation according to its installed capacity without any element of uncertainty after its commissioning. Thereafter, the petitioner was directed to make their oral submission, if any.

The petitioner informed that volatility in the price of rice husk which has been considered as the main fuel source is a matter of concern for the project developer as they have experienced unprecedented price hike of rice husk for their similar project in West Bengal soon after commissioning of the project. They stated that the price of rice husk in the adjoining areas of the above project from where these raw materials were collected increased manifold from Rs 1700/ton to Rs 4700/ton within a period of just 5 months after commercial operation of the project. The petitioner apprehended that similar situation may occur in Assam after commissioning of the project when the demand for rice husk would increase in the vicinity of the project. Besides, transportation and other associated cost for collecting the rice husk has also increased substantially over the last couple of years. The petitioner mentioned that in absence of an organized rice husk trading mechanism in the state, the petitioner has no option but to claim increased tariff for electricity generated from the project. The petitioner requested the Commission that the proposed enhanced tariff as prayed for the 10 MW (Net) biomass based power plant be considered for approval so that the project can recover its costs and also make a mild return on investment.

Regarding progress in project works, the petitioner informed that land acquisition and its development including construction of boundary walls have been completed. Some progress has been made in construction of the project buildings, however, construction works were at a halt for last 2-3 months due to flood related problems. On a query from the Commission as to when they envisaged completion of the project, the petitioner informed that it would take about 18 months if the project works continued in full swing. The Commission asked the petitioner to provide some information regarding the status of project work in progress with photographic evidences in their next submission.

During the course of the hearing, the Commission advised the petitioner that they may consider use of other biomass fuel also like 'Jatropha', wild weeds, etc which are easily available in the State along with rice husk since sufficient availability of rice husk may be a problem and also, the price tends to go up once the demand for this raw material increases. This will provide the generator bargaining power with the rice husk suppliers and also result in sustainable production. The Commission suggested that in order to ensure availability of rice husk and other biomass fuel sources for the project, a fresh field survey may be conducted in and around the project site by an independent agency preferably government agency to supplement the fuel survey report submitted by the petitioner in the DPR.

The Commission then asked the respondent (APDCL) to make their counter submissions, if any. The respondent stated that the price of rice husk needs to be benchmarked with other sources of fuel like high quality coal and proposed that the petitioner may try to persuade the State Government to nominate an agency for collecting the rice husk for the project so as to provide the necessary fuel at a predetermined price. The respondent further stated that it would perhaps not be right to burden the consumer with increased tariff in apprehension of an unprecedented price hike of rice husk after commissioning of the project. A mechanism of administered pricing of rice husk needs to be developed by the petitioner with the State Government so as to avoid unscrupulous elements from taking advantage of the situation. The respondent stated that APDCL is willing to buy power from the proposed power plant and PPA was accordingly executed between the parties at the earlier determined tariff. The respondent insisted that although non conventional power plants are eligible for preferential tariff as per the provisions of the National Tariff Policy 2006, there must not be disproportionate enhancement of tariff because it is ultimately the consumer who will have to bear the burden of enhanced tariff. The respondent further stated that the revised DPR submitted by the petitioner has mentioned that the use of rice husk has been reduced to 28% and wood waste would be considered instead of rice husk. In the above circumstances, it was pointed out by the respondent that in view of lesser availability of rice husk, its increased price is not so much a matter of concern. Reacting to the above, the petitioner submitted that they proposed using bamboo dust from the nearby Hindustan Paper Corporation Limited (HPCL); however, as HPCL informed that they would not be able to provide the requisite bamboo dust, therefore, the proposal was no longer considered and only rice husk would be used as fuel. The respondent further contended that since the project is a renewable energy project, the mechanism regarding sharing of CDM and other benefits needs to be decided during the tariff determination.

The Commission heard both the parties, their written and oral submissions. The major concern for the Commission is the viability of the project which is mainly dependent on committed availability of Bio-mass fuel i.e. rice husk. Moreover, the project is still at a preliminary stage of implementation although it was proposed way back in 2007.

The Commission carefully examined the data and documents submitted and passed the following order on 20.10.2012.

1. **The petitioner is directed to expedite the process for implementation of the project and firm up all technical and financial parameters accordingly.**
2. **Although, experience relating to volatility of Rise Husk procurement prices for their similar plant in West Bengal was submitted vide letter of 14.06.2012, the petitioner is directed to submit to AERC an authentication statement reflecting quantity of fuel consumed for each fuel type during the month, actual gross energy generation during the month, opening fuel stock quantity for each type of fuel in the beginning of the month, receipt of fuel quantity for each fuel during the month with type wise fuel prices/MT in respect of their Bunkura plant during FY 2011-12 duly certified by a chartered accountant. The revised PPA, if any, also needs to be submitted.**
3. **Factual position in implementation of the project at site such as land acquisition details, orders placed on vendors for equipment, finalization of layout with site activities etc. be submitted along with visual presentation.**
4. **Price of coal to be assessed and submitted along with their source of supply.**
5. **Prices and proportion of rice husk and bamboo dust, if used, are to be submitted along with their calorific values.**

As directed by the Commission, M/s. ABEIL submitted the following information and documents vide their letter no. ABEIL/SEC/AERC/12/156 dated 09.10.2012:

(i) The proposal for use of bamboo waste due to high price of rice husk from HPCL was dropped due to non-availability of bamboo.

(ii) A techno-economic study of grid connected rice husk based biomass power plant in West Bengal indicating volatility of price of rice husk during FY 2010-11.

(iii) Revised PPA dated 01.08.2012 with WBSEDCL for sale of energy @ Rs. 4.00 (FY 2010-11) with levellised fixed tariff of Rs. 2.05 /kWh and variable tariff @ Rs.1.95/kWh with 5% annual escalation under the certain specific technical and financial norms and conditions.

(iv) Latest status on implementation of the project with some photographic evidences. The developer has acquired around 18.5 acres of land at Bagjhap in Morigaon district. The construction of boundary wall in progress.

**4. <u>Redetermination of Tariff:</u>**

The petitioner has prayed before the Commission for fixing a based tariff of Rs. 5.42/kWh vide their letter no. ABEIL/SEC/AERC/12/43 dated 27.09.2012 as per CERC Order dated 27.03.2012.

Meanwhile, under Regulations 9.3(a) of AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012, the Commission vide letter no. AERC.259/2007/Pt-I/47 dated 26.12.2012 directed ABEIL to submit information vide their letter No. ABEIL/SEC/AERC/12/05 dated 08.01.2013 in form no. 2.1 and 2.2. ABEIL accordingly submitted the required information in the specified formats 2.1 and 2.2 and prayed for a revised tariff of Rs. 5.83/kWh based on norms approved under the provisions of AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012. It has been noted that the revised norms of capital cost of Rs. 462.33 lakh/MW and bio-mass fuel price of Rs. 2676.00 per MT are inter-alia considered by ABEIL vide CERC order dated 25.10.2012 for calculating the revised tariff.

The Commission has noted with concern that the petitioner failed to submit the authenticated statement regarding information about fuel supply and consumption (both biomass and coal), gross and net generation etc. for the FY 2011-12 of their Bankura plant in West Bengal as directed by the Commission in the hearing order dated 20.10.2012.

After careful scrutiny and analysis of the technical and financial data and information submitted by the petitioner as mentioned above, the Commission decided for review of the earlier Tariff Order dated 04.03.2008 under section 94(f) of the Electricity Act, 2003 and redetermine the tariff as per terms and conditions of AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012.

**5. <u>Tariff structure:</u>**

A single part tariff with two components, fixed cost component and fuel cost component shall be determined as per Regulation 10 of AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012.

The working group constituted by the Forum of Regulators (FOR) for policies on Renewables has, in their recommendations also suggested that a cost-plus tariff based on reasonable norms should be adopted for Renewable Energy.

6. **Tariff Design:**

As per Regulation 8 of AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012, read with Regulation 11 of the same Regulations, a project specific tariff shall be determined having single part tariff with two components as under:

(i) Levellised fixed cost for the useful life considering the year of commissioning of the project.

(ii) Fuel cost with annual escalation on year of operation basis.

The levellised tariff shall be specified for the tariff period i.e. 13 years as per Regulation 7.1 of AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012.

7. **Operational and financial norms and parameters:**

The Commission has decided to redetermine the tariff on the basis of norms and provisions of the AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 which is in line with CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012.

**7.1 Operational norms:**

**7.1.1 Plant Load Factor:**

The Plant Load Factor (PLF) depends on several factors such as technology employed, capacity and age of machines installed, fuel used etc.

AERC under Regulation 37 of AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 specifies threshold Plant Load Factor for determining fixed charge component of Tariff as under:

a) During Stabilisation: 60%

b) During the remaining period of the first year (after stabilization) : 70%

c) From 2nd Year onwards: 80 %

The stabilization period shall not be more than 6 months from the date of commissioning of the project.

The Commission considered the PLF as adopted in its AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources)

Regulations, 2012 as mentioned above.

#### 7.1.2 Auxiliary energy consumption:

The Commission has considered auxiliary energy consumption at 10% as specified in the AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 (Regulation 38).

#### 7.1.3 Station Heat Rate (SHR):

Station Heat Rate (SHR) is a key performance parameter for a power plant. The SHR depends on several factors such as plant capacity, plant design and configuration, technology (boiler type and pressure levels etc.), plant operations and maintenance practices, and operational parameters under varying load conditions.

The petitioner submitted the designed SHR of 4000 Kcal/kWh vide their letter no. ABEIL/SEC/AERC/12/71 dated 14.06.2012.

The Commission approved SHR of 3760 Kcal/kWh in the earlier Tariff Order dated 04.03.2008 based on recommendation of the Boiler Manufacturer. M/s. Cethar Vessels (P) Ltd. as submitted by the petitioner.

The Commission in its AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 specified normative SHR of 4000 Kcal/kWh vide Regulation 39.

The Commission has observed that other SERCs have approved SHR of 3800 Kcal/Kg as per norms of CERC order for FY 2010-11 & FY 2011-12.

In view of the above and after careful consideration, the Commission approved SHR of 3800 Kcal/kg for computation of fuel cost on normative basis.

#### 7.1.4 Gross Calorific Value (GCV):

Regulation 44 of the AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 specified GCV as 3300 Kcal/Kg for determination of tariff.

The petitioners vide their letter no. ABEIL/SEC/AERC/12/71 dated 14.06.2012 also submitted GCV of rice husk as 3300 Kcal/kg.

Various SERCs in their orders have considered GCV varying from 3300 to 3612 Kcal/Kg, whereas CERC in its order dated 27.03.2012 considered the GCV of bio-mass for NE states as 3300 Kcal/Kg.

The Commission therefore considered the GCV of bio-mass at 3300 Kcal/Kg for determination of tariff.

### 7.2 Financial norms:

### 7.2.1 Capital cost:

The Capital Cost is the most critical element in tariff determination. This comprises of cost of land, plant and machinery, civil works, erection, commissioning, cost associated with power evacuation and other related charges.

The AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 has specified normative capital cost of Rs. 4.45 Cr./MW for bio-mass project for the FY 2012-13 vide Regulation 35.

The petitioner in its tariff petition dated 06.10.2010 sought a capital cost of Rs. 4679.50 lakh (Rs. 4.25 Cr./MW) as per the revised DPR (Rev.-2). After prudence check, it has been observed that the total capital cost also includes an amount of Rs. 230 lakh as working capital margin in the DPR. It is to be noted here that the interest on working capital is considered as one of the fixed cost component for determination of tariff. Therefore, the capital cost is worked out as Rs. 4449.52 lakh (Rs. 4.04 Cr./MW) for FY 2010-11 after excluding working capital margin of Rs. 230 lakh as referred to above. Considering annual escalation factors of 5.84% for FY 2011-12 and 4.46% for FY 2012-13 derived by CERC as per capital cost indexation formula (also adopted by AERC) vide their orders dated 09.11.2010 and 27.03.2012 respectively, the capital cost for FY 2012-13 is arrived at Rs. 4913 lakh i.e. Rs. 4.47 Cr./MW.

Meanwhile, ABEIL has sought revised capital cost of Rs. 4.62 Cr./MW as per CERC order dated 25.10.2012 vide their letter dated 08.01.2013 as mentioned above.

The Commission also observed that other SERCs have adopted capital cost for bio-mass projects in the range of Rs. 4.25 Cr./MW to Rs. 4.50 CR./MW during FY 2010-11 and FY 2011-12.

**Commission’s views:**

The project cost varies on account of various factors including location of the project, rating of the units, total capacity, technology, designed capacity utilization factor etc. and therefore, a reasonable project cost needs to be considered on a uniform basis for tariff determination.

The Commission had, in its order dated 04.03.2008 considered the capital cost at Rs. 4.31 Cr./MW.

Keeping in view of the above analysis of capital cost based on data available with the Commission, the Commission is of the view that it would be reasonable to adopt the capital cost of Rs. 4895 lakh as per the normative capital cost of Rs. 4.45 Cr./MW under the provisions of AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 for determination of tariff.

### 7.2.2 Debt-Equity Ratio:

In line with clause 5.3 (b) of tariff policy and Regulation 14 of AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012, the Commission has approved the Debt:Equity ratio of 70:30 for bio-mass based power project.

### 7.2.3 Operations & Maintenance (O&M) expenses:

Operation and Maintenance or 'O&M expenses' shall comprise of repair and maintenance (R&M), establishment including employee expenses, and administrative and general expenses. The Commission, in its earlier tariff order dated 04.03.2008 had allowed O&M expenditure as 4% of capital cost for the first year and thereafter an increase of 4% every year.

The petitioner sought O&M @ Rs. 24 lakh/MW with 5.72% annual escalation as per CERC order dated 27.03.2012.

The petitioner further sought revised O&M @ Rs. 25.37 lakh/MW with 5.72% annual escalation as per CERC order dated 25.10.2012 vide their letter dated 08.01.2013 as mentioned above.

The Regulation 40 of AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 provides normative O&M as Rs. 24 lakh per MW for FY 2012-13 with annual escalation @ 5.72%.

The various SERCs have adopted O&M expenditure varying between 4% to 5% in the FY 2010-11 and FY 2011-12.

**Commission's views:**

The Commission is of the view that normative O&M expenditure of Rs. 24 lakh /MW specified in the AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 should be considered to enable the developer to maintain the plant in proper condition during its life span in a remote location like Assam. Further, the Commission has decided to allow 5.72% as annual escalation which will provide sufficient financial support to address the inflation aspect.

### 7.2.4 Interest on term loan:

The petitioner is seeking normative rate of interest on loan at 12.30% as per CERC order dated 27.03.2012. The Commission has also adopted the same interest rate for FY 2012-13 under Regulation 15 of AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 based on average SBI base rate prevalent during first six months of the previous year plus 300 basis points. Loan tenure of 12 years is considered for the purpose of determination of tariff.

**Commission's view:**

The Commission has considered normative interest rate on loan at 12.30% as per the AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 for determination of tariff.

**7.2.5 Interest on working capital:**

The working capital requirements in respect of bio-mass power projects is computed in accordance with the following parameters under Regulation 18 of AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012.

a) Fuel costs for four months equivalent to 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

The interest on working capital shall be at interest rate equivalent to average State Bank of India Base rate during the first six months of the previous year plus 350 basis points i.e. 12.80%.

**Commission's views:**

The Commission has calculated requirement of working capital based on the norms against each element. The Commission has considered interest on working capital at 12.80% as provided in the AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 as mentioned above.

**7.2.6 Useful life of Plant and Machinery and Agreement period:**

The Commission decides to adopt an useful plant life of 20 years as per Regulation 3.1 (xxix)(b) of AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012. Accordingly, the biomass based power generation project developers/ Distribution Licensees who are willing to supply/ purchase power shall sign a Power Purchase Agreement (PPA) for a period of 20 years.

**7.2.7 Depreciation:**

AERC under Regulation 16.2 of the AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 adopted "Differential Depreciation Approach" over the loan tenure of 12 years and period beyond loan tenure over useful life computed on

'Straight Line Method' in line with CERC. Accordingly, the depreciation rate for the first 12 years of the Tariff Period shall be 5.83% per annum and the remaining depreciation shall be spread over the remaining useful life of the project from 13th year onwards @ 2.50%. Total depreciation has been allowed upto 90% of the capital cost of the asset in terms of Regulation 16.1 of the AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012.

**Commission's views:**

Provision of Depreciation provides for cash flow and thereby helps loan repayment. The loan repayment period is considered by the Commission as 12 years. Hence, the requirement of cash flow in the initial 12 years is more to match with the loan repayment. The Commission therefore has considered to allow 5.83% of the capital cost per annum of the plant as depreciation for initial 12 years and 2.5% per annum from 13th year onwards as per the AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012.

**7.2.8 Return on Equity (ROE):**

The Commission under Regulation 17 of AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 provided the normative ROE as under:

(a) Pre-tax 20% per annum for the first 10 years.

(b) Pre-tax 24% per annum 11th year onwards.

The petitioner is also seeking the same ROE as per CERC order dated 27.03.2012.

**Commission's views:**

Under Section 86(1)(e) of the Electricity Act, 2003, the state commissions shall promote generation of electricity from renewable energy sources. Further, Tariff Policy, 2006 provided for preferential tariff for renewable energy projects. 5.3(a) of tariff policy also specified that return on investment should attract at par with, if not in preference to, other sectors so that the electricity sector is able to create adequate capacity. The rate of return should be such that it allows generation of reasonable surplus for growth of the sector.

The Commission observed that as biomass developers take risk with respect to price of bio-mass and its seasonal nature, the reasonable return on equity shall be provided to ensure financial viability of the bio-mass project.

The Commission, therefore, considered it appropriate to approve the ROE rate as specified in the AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 as stated below:

(a) Pre-tax 20% per annum for the first 10 years.

(b) Pre-tax 24% per annum 11th year onwards

**Price of fuel:**

The price of fuel used is dependent on various factors including but not limited to the mix of fuel used, the nature of fuel used, its availability and transportation cost depending on the location of the plant, etc. The Commission in its earlier order dated 04.03.2008 had considered cost of bio-mass in the form of rice husk as Rs. 1216 per MT with 5% annual escalation.

The petitioner vide their petition dated 06.10.2010 had sought the fuel cost at Rs. 1855/MT with 5% annual escalation. However, the petitioner subsequently sought Rs. 2476 per MT as base price of fuel in line with CERC order dated 27.03.2012 vide their letter no. ABEIL/SEC/AERC/12/143 dated 27.09.2012 with 5% annual escalation.

They further sought revised fuel price of Rs. 2676 per MT as per CERC order dated 25.10.2012 vide their letter dated 08.01.2013 as mentioned above.

**Commission's views:**

The Commission has noted that sale and transportation of biomass is in a highly unorganized sector and the prices are therefore influenced by various local factors. These prices may vary in a wide range. Also, there is no established mechanism to know the real price of biomass. The Commission noted the volatility in the price of rice husk for their similar plant in West Bengal as stated by the Petitioner. The Commission further noted the suggestion of the respondent APDCL on the need for benchmarking of bio-mass fuel price with coal as mentioned in early part of this order.

The Commission has observed that various SERCs have adopted the price of bio-mass with 15% non-fossil fuel mix with 5% annual escalation as under:

| | | | |
|---|---|---|---|
| (i) | GERC | Rs. 1600 – bio-mass<br>Rs. 1775 – coal | FY 2010-11 |
| (ii) | MPERC | RS. 2100 (wt. ava.) | FY 2011-12 |
| (iii) | PERC | Rs. 2500 | FY 2010-11 |

The Commission under Regulation 45 of AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 has adopted Rs. 2476 per MT as bio-mass fuel price for FY 2012-13 with annual escalation as per indexation mechanism specifies in Regulation 46 or 5% at the option of project developer.

Considering all the facts carefully as mentioned above, the Commission deemed it appropriate to allow the landed cost of bio-mass (rice husk) including the cost of 15% fossil fuel with 5% annual escalation for the purpose of determination of tariff as under:

| | | |
|---|---|---|
| 1. Bio-mass (rice husk)(85%) (GCV – 3300) | = | Rs. 2100/MT |
| 2. Coal (15%) (G13 grade - GCV-3401 to 3700) | = | Rs. 2036/MT |
| 3. Wt. ava. Landed price of fuel | = | Rs. 2090/MT $\simeq$ Rs. 2100/MT |

It may be noted that the use of fossil fuel shall be limited to 15% of total fuel consumption in a year in line with guidelines of Ministry of New and Renewable energy, GOI and Regulation 42 of AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012.

**8. <u>Determination of tariff:</u>**

In view of the fore-going discussions, the various parameters considered by the Commission for determination of tariff are given in the table below:

| Sl. No. | Parameters | Unit | As per AERC (R.E.) Reg, 2012 | As adopted by the Commission |
|---|---|---|---|---|
| **Project cost:** | | | | |
| 1. | Capital cost including IDC and evacuation cost | Rs. in Lakh/MW | 445 | 445 |
| 2. | Less: capital financial assistance for bio-mass project of MNRE | | NIL | NIL |
| 3. | Total capex | | 445 | 445 |
| **Operational and financial norms:** | | | | |
| 4. | PLF | % | During Stabilisation: 60%<br>During the remaining period of the first year (after stabilization) : 70%<br>From 2nd Year onwards: 80 % | During Stabilisation: 60%<br>During the remaining period of the first year (after stabilization) : 70%<br>From 2nd Year onwards: 80 % |
| 5. | Auxiliary energy consumption | % | 10 | 10 |
| 6. | SHR | Kcal/kWh | 4000 | 3800 |
| 7. | GCV | Kcal/kWh | 3300 | 3300 |
| 8. | Debt: Equity ratio | | 70:30 | 70:30 |
| 9. | Interest on loan (tenure 12 years) | % | 12.30 | 12.30 |
| 10. | O&M cost | Rs. in Lakh/MW | 24 | 24 |

| | | | | |
|---|---|---|---|---|
| 11. | Escalation on O&M | % | 5.72 | 5.72 |
| 12. | Depreciation | % | 5.83 upto 12th yr.<br>2.5 from 13th yr. onwards. | 5.83 upto 12th yr.<br>2.5 from 13th yr. onwards. |
| 13. | Project useful life | years | 20 | 20 |
| 14. | Interest on working capital | % | 12.80 | 12.80 |
| (i) | Fuel cost for four months | | | |
| (ii) | O&M expenditure for one month | | | |
| (iii) | Receivables equivalent to 2(Two) months of fixed and variable charges for sale of electricity calculated on the target PLF | | | |
| (iv) | Maintenance spares @ 15% of O&M expenditure | | | |
| 15. | Price of bio-mass (rice husk) fuel with 5% escalation from 2nd year onwards | Rs./MT | 2476 | 2100 |
| 16. | Price of coal<br>(G13 grade-GCV-3401-3700) | | ____ | 2036 |
| 17. | Weighted average price of fuel (mix of 85% of rice husk and 15% coal) | | ____ | 2100 |

Considering the above parameters, the Commission has calculated the tariff based on the Discount Rate of 10.62% for FY 2012-13 and approves the following single part tariff for a period of five years from the initial date of commercial operation.

| Year | Fixed (levellised) | Variable | Total |
|---|---|---|---|
| 1st | 1.99 | 2.69 | 4.68 |
| 2nd | 1.99 | 2.82 | 4.81 |
| 3rd | 1.99 | 2.96 | 4.95 |
| 4th | 1.99 | 3.11 | 5.10 |
| 5th | 1.99 | 3.27 | 5.26 |

The copy of detailed calculation sheet is annexed herewith as Annexure-I.

**9.** The Commission calculated the tariff for the entire period of useful life of 20 years from the date of commercial operation. However, the major concern for the Commission is the viability of the project which depends primarily on committed availability of Bio-mass fuel i.e. rice husk. Moreover, the project is still at a preliminary stage of implementation although it was proposed way back in 2007 by the petitioner.

In this respect, the Commission directs the petitioner to conduct a fresh field survey in and around the project site by an independent agency preferably government agency to supplement the fuel survey report submitted by the petitioner in the DPR. This is required to ensure availability of fuel for the entire life of 20 years of the project.

Further, the Commission directs the petitioner to approach the Govt. of Assam with a request to initiate a process to develop and establish a mechanism of administered pricing of rice husk so as to avoid unscrupulous elements from taking advantage of the situation. The Commission, on its part shall also advise Govt. of Assam to take-up necessary measures in due course.

In view of the uncertainty in fuel price for the bio-mass project, the Commission has abstained from announcing the tariff for the tariff period from 6th to 13th year of the project as per the provisions in the Regulations and decided to limit the same for a control period of five years only. The project will be first of its kind in the state of Assam and it is expected that during these five years control period, there would be significant development in the field of Non Conventional Energy which will come to a stage of maturity from its present nascent stage.

**10. Other applicable conditions:**

**10.1** All statutory clearances and necessary approvals shall be obtained by the developer for setting up of the project. The developer is also responsible for their compliance and their renewals as may be required from time to time.

**10.2 Sharing of CDM benefit:**

The sharing of Clean Development Mechanism (CDM) benefits shall be as per the provision of AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 (Regulation 22) which is as under:

The proceeds of carbon credit from approved CDM project shall be shared between generating company and concerned beneficiaries in the following manner, namely

a) 100% of the gross proceeds on account of CDM benefit to be retained by the project developer in the first year after the date of commercial operation of the generating station ;

b) In the second year, the share of the beneficiaries shall be 10% which shall be progressively increased by 10% every year till it reaches 50%, where after the proceeds shall be shared in equal proportion, by the generating company and the beneficiaries.

**10.3 Monitoring mechanism for use of fossil fuel:**

The Regulation 43 of AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 specified that-

The Project developer shall furnish a monthly fuel usage statement and monthly fuel procurement statement duly certified by Chartered Accountant to the beneficiary (with a copy to appropriate agency appointed by the Commission for the purpose of monitoring the fossil and non-fossil fuel consumption) for each month, along with the monthly energy bill. The statement shall cover details such as -

a) Quantity of fuel (in tonnes) for each fuel type (biomass fuels and fossil fuels) consumed and procured during the month for power generation purposes,

b) Cumulative quantity (in tonnes) of each fuel type consumed and procured till the end of that month during the year,

c) Actual (gross and net) energy generation (denominated in units) during the month,

d) Cumulative actual (gross and net) energy generation (denominated in units) until the end of that month during the year,

e) Opening fuel stock quantity (in tonnes),

f) Receipt of fuel quantity (in tonnes) at the power plant site and

g) Closing fuel stock quantity (in tonnes) for each fuel type (biomass fuels and fossil fuels) available at the power plant site.

Non-compliance with the condition of fossil fuel usage by the project developer, during any financial year, shall result in withdrawal of applicability of tariff as per these Regulations for such biomass based power project.

**10.4 Scheduling:**

The bio-mass power plant of M/s. ABEIL shall be subjected to scheduling and despatch code as specified under Regulation 12.2 of AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012.

**10.5 Treatment of subsidy:**

The provisions under Regulation 23 of the AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 specified that the Commission shall take into consideration any incentive or subsidy offered by the Central or State Government while determining the tariff under these Regulations.

The Commission has noted that other SERCs like GERC and MPERC has not considered any capital subsidy while determining tariff for bio-mass projects. The Commission is also not aware about any grant or subsidy for renewable energy projects for FY 2012-13 by the Ministry of New and Renewable Energy (MNRE); GoI like granted for previous years. ABEIL has shown a subsidy amount of Rs. 69.73 lakh as capital subsidy in their tariff calculation submitted vide their letter dated 08.01.2013 without any reference to source of the subsidy grant.

Considering the above facts, the Commission has deemed it appropriate to calculate the tariff without considering any subsidy or incentive granted by MNRE, GOI or State Govt. etc. Any subsidy availed by the project developer under these provisions may be treated as debt repayment on completion of the project after certification by the concerned agencies and tariff may be readjusted accordingly while determining final tariff after commissioning of the plant.

### 10.6 <u>Accelerated Depreciation and Consequential Tariff</u>:

The Commission has determined the tariff for this project without considering accelerated depreciation benefit provided under the Income Tax Act, 1961 as per Regulation 23 of AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012, the Commission shall review the tariff considering the accelerated depreciation benefit, if availed by the project developer in future.

### 10.7 <u>Power Purchase Agreement</u>:

The Commission has observed that a Power Purchase Agreement (PPA) was signed on 1st Feb.'2011 between ABEIL & APDCL for supply of net 10 MW of power at a tariff as specified in clause 8.0 of the PPA as stated under:

"The tariff applicable for the energy to be supplied by the Developer at the delivery point shall be as approved by AERC from time to time subject to maximum cap fixed by the Commission in AERC (Co-generation and Generation of Electricity from Renewable Sources of Energy) Regulations, 2009 which is at present 400 paisa per unit."

The Commission would like to reiterate that after notification of AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 on 07.11.2012, the relevant clause regarding capping of tariff for various renewable energy technologies including bio-mass technology of the AERC (Co-generation and Generation of Electricity from Renewable Sources of Energy) Regulations, 2009 have been repealed with immediate effect.

In view of above, the Commission directed both the Petitioner & Respondent (APDCL) to revisit the PPA and accordingly revise the same incorporating the tariff as approved by the Commission herewith.

### 10.8 <u>Evacuation of power:</u>

Interconnection facilities and communication links are to be installed and maintained by the licensee at the interconnection points to enable evacuation of power from the project at the cost of M/s ABEIL.

With the above analysis, observations and decisions, the petition stands disposed of.

| | | |
|---|---|---|
| Sd/- | Sd/- | Sd/- |
| (T. Chatterjee) | (Dr. R. K. Gogoi) | (J. Barkakati) |
| Member, AERC | Member, AERC | Chairperson, AERC |