ASSAM ELECTRICITY REGULATORY COMMISSION

FILE NO. AERC. 355/2010 PETITION NO. 11/2012

ORDER SHEET

30.03.2013

Before the Assam Electricity Regulatory Commission

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

Petition No. 11 /2012

M/s Cleanopolis Energy Systems India Private Limited (CESIPL)

----- Petitioner

-Vs-

M/s. Assam Power Distribution Company Limited. (APDCL)

----- Respondent

In the matter of

Determination of tariff for sale of 2.4 MW (0.8 x 3) power from Bio-gas based Power Plant of CESIPL to APDCL to be set-up at Depota, Sonitpur district, Assam.

Order

1. Background

The Cleanopolis Energy Systems India Private Limited (CESIPL), Guwahati (hereinafter referred to as the 'petitioner'), filed a petition before the Commission on 06.12.2010 along with Detailed Project Report (DPR) (August, 2010) for determination of tariff for a 2.4 MW Bio-Methanation (bio-gas) plant to be set-up at Depota, Sonitpur district at a total capital cost of Rs. 27.26 Cr. The power was proposed to be transmitted at 11 KV from the project to a 33/11 KV sub-station at Depota of APDCL. A Power Purchase Agreement (PPA) was signed with Assam Power Distribution Company Limited (APDCL) on 24.02.2011 for supply of 2.4 MW power to APDCL at a ceiling rate of Rs. 3.20/KWh with a provision that the final tariff would be either as determined by AERC based on the tariff petition or the capped tariff for such projects as per the Gazette Notification of the Commission dated 03.07.2009.

A presentation was made before the Commission by the petitioner regarding the proposed project on 05.08.2011. Subsequently, as per the deliberations and advice of the Commission during the course of the presentation, the petitioner submitted a revised DPR (August, 2011) which incorporated the detailed techno-commercial matters including environment and CDM issues.

The bio-gas plant is based on Bio-Methanation technology and broadly has two main components – i) Bio-digester and ii) prime mover or the gas engine. As per the revised DPR, CESIPL has proposed to use 6 bio-digesters and one sludge holding tank at the plant which will undergo a variety of actions as a part of the processing system to produce bio-gas and fertilizer as a byproduct.

APDCL, respondent to the petition of CESIPL, submitted their comments on the petition vide letter dated 01.11.2011. The petitioner submitted their views and comments on the reply of the respondent vide letter dated 23.11.2011. The comments of CESIPL were forwarded to APDCL vide letter No. 355/2010/21 on 01.12.2011.

In the mean time, a preliminary hearing was held on 09.11.2011 which was attended by representatives from both the petitioner and respondent. During the hearing, the petitioner informed that although the power from the project was envisaged to be evacuated through 11 KV system earlier at Depota, the same would now be evacuated through 33 KV system of AEGCL's 132/33 KV substation at Balipara.

After hearing both the parties, the Commission issued an order on 23.12.2011. In this order, the Commission directed the petitioner to submit additional details along with relevant documents enclosing loan sanction letter from the financier indicating debt/equity ratio etc, copy of EPC order, if any, details of expenditure so far incurred, and receipt of project subsidy from Government of India, if any. The petitioner was also directed to submit detailed justification for taking loans from SBI instead of IREDA which offers various grants and subsidies under the GOI policies for promotion of NCE projects. The Commission further directed the petitioner to submit a confirmation letter from AEGCL/ APDCL concurring to the revised 33 KV evacuation system with suitable modification in the Power Purchase Agreement (PPA) signed between them.

The Commission vide letter dated 03.01.2012 directed CESIPL to submit the revised project cost, if any, on account of the proposed change of evacuation system. The detailed cost involvement for the change in evacuation system was submitted by CESIPL vide letter dated 03.04.2012. The Commission directed the petitioner vide letter dated 10.07.2012 to file an interlocutory petition in view of revision of project cost.

The petitioner, however, informed the Commission vide their e-mail dated 03.08.2012 that their revised proposal for evacuation of power at 33 KV level has been dropped due to substantial delay in registration of land lease Deed as the land in question was not transferred in favour of AIDC by the Government of Assam. The Commission was, therefore, requested to consider the petition dated 06.12.2010 as it is, as was submitted by the petitioner earlier.

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. <u>Hearing of the petition:</u>

The Commission admitted the petition on 26.09.2012 and registered it as Petition No. 11 of 2012. The date of hearing was fixed on 01.10.2012. Notifications in this regard were dispatched to the parties concerned and both the petitioner and respondent attended the hearing.

The Chairperson, AERC initiated the hearing with a brief background of the tariff petition and asked the respondent and petitioner to make oral submissions on the same, if any.

The respondent APDCL stated that they stand by their earlier submissions dated 01.11.2011 and requested that they may be allowed some time, preferably two weeks to submit a written reply to the Commission on the additional submissions made by the petitioner. The Commission granted 15 days time from the date of this order to the respondents to furnish their reply. APDCL, subsequently, submitted their reply vide their letter No. CGM(Com-T)/Bio-mass/CESIPL/2009/93 dated 19.10.2012.

The Commission stated that the petitioner needs to ensure the supply of fuel for the plant so as to guarantee sustainability of the plant. The Commission further stated that petitioner needs to firm up their estimates regarding their project so that tariff can be determined. The Commission also enquired about the present status of the project including the tentative date of its commissioning. The Commission then asked the petitioner to make their oral submissions on the above, if any.

The petitioner stated that availability of raw materials for the project would not be a problem as the petitioner plans to use a wide variety of bio-degradable feed stock including municipal waste for the plant. It was informed that the developers were considering collection of weeds from the unused campus area of around 70 bighas of the Central University at Tezpur. It was also informed that the petitioner was contemplating to enter into a mutual understanding with the campus authorities on the matter. The petitioner would be collecting the weeds that naturally grow in that area regularly and the University need not invest any resource in maintenance of that area. It was informed that although availability of fuel should not be a problem at least for the initial years of operation, escalation of the fuel price would certainly be one. The petitioner stated that garbage collection and disposal is an unorganized activity and is prone to escalation in labour wage rates, carriage etc. Keeping such unpredictable escalations in mind, the petitioner requested the Commission to determine the tariff and also permit Fuel Price Adjustment. The petitioner also requested the Commission for benchmarking of Biogas price with Natural Gas price in terms of calorific value.

On a query from the respondent as to why the petitioner choose to approach the SBI for loan even when Indian Renewable Energy Development Authority (IREDA) offers special concession to the promoter of such projects, it was informed that availing loans from IREDA is cumbersome and long process which requires constant monitoring and correspondence with IREDA in New Delhi. Since the entire process is time consuming, the SBI Loan was considered as a better option. Responding to this, the respondent contended that by availing loan from SBI, the project would be deprived of subsidy from the Ministry of New and Renewable Energy, Government of India.

The petitioner also informed that as foreign exchange rates are frequently undergoing changes, there has been an increase in the project cost by around Rs 40 lakh. However, the petitioner stated that this amount would be absorbed by the developer themselves and there would be no financial impact in the project cost of Rs 27.26 Cr. It was also clarified that their revised proposal for evacuation of power at 33 KV level stands withdrawn and power would now be evacuated at 11 KV level as proposed earlier.

It was informed by the petitioner that the project works were proceeding well and civil works were almost completed and the project should be ready for commissioning within the next six months tentatively by February- March 2013. Regarding the issue of availing CDM benefits, the petitioner informed that the necessary initiatives have already been taken for processing the matter since January, 2011 and the host country approval has just been received.

The Commission heard both the parties, their written and oral submissions and carefully examined the data and documents submitted and passed the following order on 06.11.2012.

1) The Commission directed that the technical issues that may arise involving evacuation of power at 11 KV line to 33 KV Substation of APDCL be discussed and settled among the petitioner and respondent including the issue of additional cost, if any and the outcome of these discussions be submitted to the Commission within 15 days from the date of this order.

2) Besides, the petitioner was directed to submit the detailed status of the progress of the project work along with recent photographs. The Commission also directed the petitioner to firm up all its data regarding the project including fuel price and submit these within 15 days from the date of this order.

As directed by the Commission in the hearing order dated 06.11.2012, CESPIL submitted their reply on 16.11.2012 wherein the petitioner requested the Commission to determine an appropriate tariff at the earliest based on similar national projects and guidelines stipulated by CERC and other state Commissions. They also forwarded some photographic evidences regarding the progress of work at the site. As mentioned above, the petitioner stated that the civil works are almost completed and the project is expected to be commissioned by March’13. The petitioner stated that the project activities are taken-up solely from equity contribution by the promoters and achievement of financial closure with lenders is subject to declaration of tariff.

The Commission however noted with concern the fact that the petitioner did not submit the outcome of the discussion to be held among the petitioner and Respondent as directed by the Commission in the hearing order dated 06.11.2012 regarding technical issues that may arise involving evacuation of power at 11 KV to 33 KV sub-station of APDCL including the issue of extra cost involvement, if any.

The petitioner also submitted their comments on the APDCL's Rejoinder dated 19.10.2012 vide their letter dated 17.11.2012.

The Commission stated that the tariff would be finalized only after prudent checking of all relevant documents and information submitted by the petitioner and respondent and as per the provisions of the Regulations, Electricity Act 2003 and Tariff Policy of Govt. of India.

4. Determination of tariff:

The petitioner has prayed before the Commission for determination of tariff as per guidelines of CERC and other state Commissions stipulated for renewable energy projects. The petitioner vide petition dated 06.12.2010 sought a levellised tariff of Rs. 4.46/kWh for 10 years.

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.355/2010//47 dated 28.12.2012 directed CESPIL to submit information in form no. 2.1 and 2.2. CESPIL accordingly submitted the required information in the specified formats 2.1 and 2.2 and prayed for a revised tariff of Rs. 6.32/kWh. It has been noted that the revised norms of capital cost @ Rs. 10.82 Cr./MW (i.e. 2596 lakh) and feed stock price of Rs. 1051.00 per MT are inter-alia adopted by CESPIL for calculating the revised tariff.

After careful scrutiny and analysis of the technical and financial data and information submitted by the petitioner as mentioned above, the Commission decided for determination of tariff as per terms and conditions of AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012.

5. Tariff structure:

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. 20 years as per Regulation 7.4 of AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012.

7. <u>Operational and financial norms and parameters:</u>

The Commission has decided to determine 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 79 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 90%.

The petitioner has also estimated PLF @ 90% as operating parameter vide their letter dated 22.01.2013.

The Commission considered the PLF of 90% as adopted in its AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 as mentioned above.

7.1.2 <u>Auxiliary energy consumption:</u>

The petitioner estimated auxiliary consumption as 10% based on guidelines of manufacturers vide their letter dated 17.11.2012. However, they subsequently quoted auxiliary consumption as 12% vide their letter dated 22.01.2013.

The normative auxiliary energy consumption as per Regulation 80 of AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 is 12%.

The Commission after careful consideration has approved auxiliary energy consumption at 10% as furnished by the manufacturer.

7.1.3 Specific fuel consumption:

The AERC vide Regulation 82 of AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 adopted the normative specific fuel consumption as 3 kg. of substrate mix per kWh which is in line with the CERC (Renewable Energy) Regulations, 2012.

The Commission has observed that Haryana Electricity Regulatory Commission in their bio-gas tariff order dated 05.07.2011 has considered the specific fuel consumption (bio-mass feed stock) as 3.79 Kg/kWh.

The Commission after careful examination has allowed the normative specific fuel consumption as 3Kg/kWh as per Regulation 82 of the AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 for calculation of fuel cost.

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. 11.00 Cr. per MW for bio-gas based power projects for the FY 2012-13 under Regulation 77.

The petitioner in its tariff petition dated 03.12.2010 prayed for cost of RS. 2724 lakh including interest during construction (Rs.11.35 Cr. per MW) as per their revised DPR dated 10.08.2011. The detailed break-up of capital cost was also furnished in the revised DPR.

The petitioner vide their letter dated 22.01.2013 further submitted the revised capital cost as Rs. 2596 lakh i.e. Rs. 10.82 Cr. per MW.

The petitioner in their various submissions stated that a limited global tender was floated by the petitioner and six bio-gas suppliers like Caterpiller, MWM etc. were shortlisted out of which the leading German Bio-gas Company MWM was selected. The petitioner tried to justify their estimated capital cost by stating that while the bio-gas plant in Ludhiana was commissioned at a cost of Rs. 13.50 Cr. per MW, the one in Satara was commissioned at Rs. 11.80 Cr. per MW.

The respondent APDCL in their submission dated 01.11.2011 stated that the capital cost as per the revised DPR seems to be on higher side. All the constituent items of the capital cost like plant and machinery, civil works, WIP are to be examined in a prudent way as certain capital expenditure like ED, custom duty etc are exempted for North Eastern region as per policy guidelines of Govt. of India. They further stated that the Commission may also adopt a standard per MW cost for such non conventional generating station based on cost of such projects which are already in operation in other states of the country.

The Commission has also observed that other SERCs like HERC and PERC have adopted capital cost for bio-gas based project as Rs. 10.90 Cr. per MW and Rs. 11.00 Cr. per MW during FY 2011-12 and FY 2012-13 respectively.

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 assessed on a uniform basis for tariff determination.

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. 2520 lakh (i.e. Rs. 10.50 Cr. per MW) for the proposed bio-gas project.

7.2.2 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 petitioner has estimated a capital subsidy of Rs. 770 lakh (Rs. 320 lakh/MW) vide their letter dated 22.01.2013 for calculating the net capital cost. The subsidy is expected from the Ministry of New and Renewable Energy (MNRE), GOI and from other sources as financial assistance.

The Commission under Regulation 77 of the AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 specified a net capital cost of Rs. 800 lakh/MW for the FY 2012-13 after taking into account of capital subsidy of Rs. 300 lakh/MW.

The Commission, after considering the above facts has deemed it appropriate for computing the net capital cost considering a capital subsidy of Rs. 768 lakh (Rs. 3.20 lakh/MW) as claimed by the petitioner.

7.2.3 Debt:Equity ratio:

The petitioner in its submission dated 22.01.2013 adopted a debt:equity ratio of 68:32.

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 the proposed Bio-gas based power project.

7.2.4 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 petitioner sought O&M expenses @ 5% of the project cost with 5% annual escalation vide their petition dated 06.12.2010. They however revised their O&M cost at Rs. 33 lakh per MW with 5% annual escalation vide their letter dated 22.01.2013.

The Regulation 81 of AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 provides normative O&M expenses as Rs. 40 lakh per MW for FY 2012-13 with annual escalation @ 5.72%.

The respondent APDCL in their submission dated 19.10.2012 stated that the Commission may kindly adopt norms on the basis of prevailing Regulations.

Commission's views:

The Commission is of the view that normative O&M expenses of Rs. 33 lakh per MW (3.13% of the project cost) as estimated by the petitioner 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% as annual escalation which will provide sufficient financial support to address the inflation aspect.

7.2.5 Interest on term loan:

The petitioner vide their petition dated 06.12.2010 sought interest on loan @ 12.50%. However, they sought revised rate of interest as 13.75% vide their letter dated 22.01.2013.

The respondent APDCL vide their submission dated 19.10.2012 stated that the Commission should consider the interest rate on loan offered by IREDA under MNRE against their financial assistance for renewable energy projects.

The Commission adopted interest rate on loan 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 noted that the average SBI Base rate prevalent during first six months of FY 2011-12 was 9.3%.

The Commission has, therefore, considered normative interest rate on loan as 12.30% for the FY 2012-13 as per the AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 for determination of tariff.

7.2.6 Interest on working capital:

The working capital requirements in respect of bio-gas based 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.

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 as 12.80% based on average SBI Base rate of 9.30% as mentioned above for the FY 2012-13 as provided in the AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 as mentioned above.

7.2.7 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)(f) of AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012. Accordingly, the bio-gas based power project developers/ Distribution Licensees who are willing to supply/ purchase power shall sign a Power Purchase Agreement (PPA) for a period of 20 years.

7.2.8 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 charges allowed by the Commission is mainly to facilitate 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 based on "Differential Depreciation Approach" Method.

7.2.9 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 has sought R.O.E. vide their letter dated 22.01.2013 as under:

First 10 years	=	13.92%
11th year onwards	=	18.34%

The respondent APDCL vide their submission dated 19.10.2012 requested the Commission to consider R.O.E. norms as per provision of present AERC Regulations.

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 bio-gas project 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-gas project.

The Commission has also observed that the other SERC's like Haryana Electricity Regulatory Commission vide bio-gas tariff order dated 05.07.2011 allowed ROE as per norms i.e. 19% for 1st 10 years and 24% from 11th year for the FY 2011-12.

After careful examination, the Commission has therefore approved the R.O.E. rate as per norms under AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 as mentioned above.

First 10 years	=	Pre-tax 20%
11th year onwards	=	Pre-tax 24%

7.2.10 Availability of fuel (Bio-mass Feed Stock)

As per the revised DPR, CESIPL has proposed to use the following bio-mass feed stock as fuel:

Bio-mass	Ton per day	% of use
Cow dung	90	25%
Pig manure	30	8%
Agricultural weeds	160	45%
Vegetable waste	80	22%

The Commission has noted that CESIPL is going to set-up the proposed bio-gas based power project which will be the first of its kind in the state of Assam. Therefore, the major concern for the Commission is the availability of bio-mass feed stock in an adequate and reliable manner to ensure sustainability of the plant.

The petitioner vide their oral submission in the Hearing dated 01.10.2012, informed the Commission that the availability of raw materials for the project would not be a problem as the petitioner plans to use a wide variety of bio-degradable feed stock including municipal waste for the plant. It was informed that the petitioner is considering collection of weeds from the unused campus area of around 70 bighas of the Central University at Tezpur. It was further informed that the petitioner is contemplating to enter into a mutual understanding with the campus authorities on the matter. The petitioner would be collecting the weeds that naturally grow in that area regularly.

The Commission has noted the above submission of the petitioner and expected that the generation from the plant should not be affected for want of fuel.

7.2.11 Price of fuel

The price of fuel used is dependent on various factors including but not limited to the nature of fuel used, its availability and transportation cost depending on the location of the plant, etc.

The petitioner vide their petition dated 06.12.2010 had sought the fuel (bio-mass feed stock) cost at Rs. 914/MT as per the revised DPR with 5% annual escalation. However, the petitioner subsequently sought Rs. 1051 per MT as revised fuel price vide their letter dated 22.01.2013 as under

Bio-mass		**Rs./MT**
Cow dung	___	1130
Pig manure	___	868
Agriculture weeds	___	1294
Vegetable waste	___	904
		1051

To justify their claim for fuel price, the petitioner vide their submission dated 23.11.2011 stated that garbage collection and its disposal is un-organized throughout urban areas of Assam and does not exist in rural areas.

It has to be collected by foraging and paying for cost of harvesting, cost of collection, cost of handling and cost of transportation. Often waste in rural areas has to be handled on multiple occasions (e.g. loaded/unloaded six times before it reaches a factory) and so is prone to escalations in labour wage rates and cost of carriage on account of fuel price increase.

The projections of the fuel price by the petitioner are based on an average cost of collection when waste is to be aggregated over a thirty, fifty and ninety kilometer radius. Petitioner conducted various field surveys, loading and harvesting trials besides commissioning a bio-mass assessment study by Amity University and Tezpur University to arrive at this average cost.

The respondent APDCL vide their rejoinder dated 01.11.2011 submitted that the fuel cost claimed by the petitioner is on higher side on the ground that the project would be the first of this kind in the state and as such it seems that there would be abundant raw materials of bio-gas fuel. Moreover, till absence of any other developer of same type of project, there would not be any competition which would lead to rise of fuel cost. Even considering that the fact the fuel is to be collected from an unorganized market the average cost should be around Rs. 600-800 per ton.

The Commission should therefore allow Rs. 700 per ton as cost of fuel with annual escalation @ 5% P.A.

Commission's views:

The Commission has noted that sale and transportation of biomass feed stock is in a highly unorganized sector. These prices are, therefore, influenced by various local factors and may vary widely. Also, there is no established mechanism to know the real price of biomass.

The Commission vide regulation 83 of the AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 has adopted the fuel (feed stock price) price during the FY 2012-13 as Rs. 990 per MT net of any cost recovery from digester effluent.

The Commission has noted the submission of the petitioner dated 23.11.2011 that the income from the sale of bio-fertilizer is calculated at Rs. 2.00 per Kg ex-factory rate on a cash and carry basis for 34.78 million Kg produced annually by the plant under additional income and they form a part of the financial projections.

The Commission feels that there is no established mechanism with the Commission to verify the cost of recovery from sale of the compost. The Commission, therefore, directs the petitioner to submit details of actual recovery of cost from the sale of compost after commissioning of the plant.

Considering all the facts carefully as mentioned above, the Commission deemed it appropriate to allow the landed price of bio-mass feed stock as Rs. 800 per MT net of any cost necessary from digester effluent with 5% annual escalation for the determination of fuel cost.

8. Determination of tariff

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	Submitted by the petitioner vide letter 22.1.13	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	1082	1100	1050
2.	Less: capital subsidy	-DO-	320	300	320
3.	Total capex	-DO-	762	800	730
Operational and financial norms:					
4.	PLF	%	90	90	90
5.	Auxiliary energy consumption	%	12	12	10
6.	Specific fuel consumption	Kg/kWh		3	3
7.	Debt: Equity ratio		68:32	70:30	70:30
8.	Interest on loan (tenure 12 years)	%	13.75	12.30	12.30
9.	O&M cost	Rs. in Lakh/MW	33	40	33
10.	Escalation on O&M	%	5	5.72	5
11.	Depreciation	%	5.72 upto 12th yr. 3.92 from 13th yr. onwards.	5.83 upto 12th yr. 2.5 from 13th yr. onwards.	5.83 upto 12th yr. 2.5 from 13th yr. onwards.
12.	ROE	%	13.92 -1st 10 yrs. 18.34 from 11th yr. onwards.	Pre-tax 20% – 1st 10 yrs. Pre-tax 24% – 11th yr. onwards.	Pre-tax 20% – 1st 10 yrs. Pre-tax 24% – 11th yr. onwards.
13.	Project useful life	years	20	20	20
14.	Interest on working capital	%	14.50	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 (feed stock) fuel net of any recovery from digester effluent with 5% escalation from 2nd year onwards	Rs./MT	1051 (excluding any recovery of cost from digester effluent)	990	800

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	2.63	2.67	5.30
2nd	2.63	2.80	5.43
3rd	2.63	2.94	5.57
4th	2.63	3.09	5.72
5th	2.63	3.24	5.87

9. The Commission calculated the tariff for the entire period of useful life of 20 years from the date of commercial operation.

Considering the likelihood of uncertainty in availability and price of bio-mass feed stock for the bio-gas project, the Commission has abstained from announcing the tariff for the tariff period from 6th to 20th 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 <u>Scheduling</u>:

The bio-gas based power plant of CESIPL shall be subjected to scheduling and despatch code as specified under Regulation 12.1 of AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012. The station thus shall be treated as “Must Run” station.

10.4 <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.

10.5 Power Purchase Agreement

The Commission has observed that a Power Purchase Agreement (PPA) was signed on 24th Feb.’2011 between CESIPL & APDCL for supply of 2.4 MW of power @ Rs. 3.20 kWh (maximum). As stated in the tariff provisions of the PPA, the final tariff would be either as determined by AERC or cap tariff fixed by AERC for such project as per Co-generation and Renewable Energy Regulations, 2009 of AERC.

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 has been repealed with immediate effect.

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

10.6 Evacuation of power:

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 CESIPL.

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