TAMIL NADU ELECTRICITY REGULATORY COMMISSION

Comprehensive Tariff Order for Biomass based Power Plants

Order No. 8 of 2012 dated 31 - 07 - 2012
(effective from 01-08-2012)

TAMIL NADU ELECTRICITY REGULATORY COMMISSION

(Constituted under section 82 (1) of Electricity Act 2003)

(Central Act 36 of 2003)

PRESENT : Thiru. K. Venugopal – Member

Thiru. S. Nagalsamy – Member

Order No. 8 of 2012, dated 31-07-2012

In the matter of: Power procurement by Distribution Licensee from Biomass based Power generating plants and allied issues relating to captive use and third party sale

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In exercise of power conferred by Section 181 read with Section 61 (h) and 86 (1) (e) of the Electricity Act 2003, (Central Act 36 of 2003), and after taking into account the stipulations in the National Electricity Policy and the Tariff Policy and in accordance with the Power Procurement from New and Renewable Energy Sources Regulations, 2008 of the Commission and after examining the comments received from the stakeholders, after considering the views of the State Advisory Committee meeting held on 29-03-2012 in accordance with section 88 of Electricity Act 2003, after examining the comments received from the stakeholders during the stakeholder's meeting held on 08-06-2012 as per Section 64 of Electricity Act 2003, the Tamil Nadu Electricity Regulatory Commission, hereby, passes this order to determine the power procurement by Distribution Licensee from Biomass based Power Generating Plants and allied issues relating to captive use and third party sale.

This Order shall take effect on and from the 01st August, 2012.

-sd-
(S. Nagalsamy)
Member

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(K. Venugopal)
Member

/By order of the Commission/

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S. Gunasekaran
Secretary

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ORDER ON POWER PROCUREMENT BY DISTRIBUTION LICENSEE FROM BIOMASS BASED POWER PLANTS AND ALLIED ISSUES RELATING TO CAPTIVE USE AND THIRD PARTY SALE

1.0 Introduction

The State of Tamil Nadu has good potential for harnessing Non-Conventional Energy Sources (NCES). Biomass based generation is one such source. Therefore, the Commission has analyzed various issues of determination of tariff for Biomass based generation in great depth before finalizing this third Tariff Order.

1.1 Commission's Regulation on New and Renewable Energy Source

Section 61 of the Electricity Act 2003 (Central Act 36 of 2003) stipulates that the State Electricity Regulatory Commissions shall specify the terms and conditions for the determination of tariff. In accordance with the above stipulation, the Commission notified the "Power Procurement from New and Renewable Sources of Energy Regulations 2008" on 08-02-2008. It has been specified in the above Regulation that the tariff determined by the Commission shall be applicable for a period of twenty years and the control period may ordinarily be two years.

1.2 Commission's order on Non Conventional Energy Sources (NCES) based generation and allied Issues

1.2.1. The Commission issued Order No. 3 of 2006 on "Power purchase and allied issues in respect of Non-Conventional Energy Sources based Generating Plants and Non–Conventional Energy Sources based Co-Generation Plants" on 15-5-2006. The said Order stipulates tariff rates for power procurement by the distribution licensee from Wind Energy Generators (WEGs), Biomass based generators and Bagasse based co-generators. This was the first Order issued by the Commission on NCES based power plants.

1.2.2. Subsequently, the Commission issued Order No. 2 of 2009 dated 27-04-2009 on **"Comprehensive Tariff Order for Biomass based Power Plants".** This Order covered tariff rates for power procurement by the distribution licensee from Biomass based generators. In the said Order the Commission fixed validity upto 31-03-2011. The said Order was extended upto 31-12-2011 by Tariff Order No. 2 of 2011 dated 12-04-2011. It was again extended for a further period of six months i.e. upto 30-06-2012 by Tariff Order No. 5 of 2011 dated 21-12-2011. The validity of the Order was further extended upto 31-07-2012 by Tariff Order No.5 of 2012 dated 30-06-2012.

1.3 Commission's initiative on tariff revision for Biomass based generation

The Commission issued a Public Notice on 03-05-2011 for inviting views / suggestions from the stakeholders by 31-05-2011. The Public Notice is in **Annexure I**. Some of the stakeholders like MNRE, TEDA etc. have not responded within the due date. Hence, the last date for submission of comments by the stakeholders was extended upto 15-07-2011. In response to the above public notice, many stakeholders have offered their comments. The list of the stakeholders who submitted their written comments is placed in **Annexure II.** The State Advisory Committee (SAC) meeting was held on 29-03-2012 to elicit their views. The list of members who participated in the SAC meeting is in **Annexure III.** A Stakeholders' Hearing was also held on 08-06-2012 at The Institution of Engineers (India) building at Chennai. The list of Stakeholders' who presented their views in the hearing is placed in **Annexure IV** and the list of participants of the same hearing is in **Annexure V.** Taking into account the views of the various stakeholders and the views of the SAC, the Commission issues this Comprehensive Tariff Order on Biomass based Power generation.

2. Biomass based Power Scenario in Tamil Nadu

The installed capacity of Biomass based Power Plants in Tamil Nadu is 169 MW as on 31-03-2012. The year-wise capacity addition in Tamil Nadu over the past 10 years is furnished below:

Year	Capacity Addition in MW
upto 2002	18.00
2002-03	1.60
2003-04	0.00
2004-05	1.50
2005-06	7.75
2006-07	17.50
2007-08	26.50
2008-09	36.70
2009-10	27.50
2010-11	6.95
2011-12	25.00
Total as on 31-03-2012	**169.00**

Note:- It is understood that out of the 169 MW with PPA to supply power to TANGEDCO, 163.15 MW was allowed to exit the PPA and 5.85 MW are still supplying power to TANGEDCO as on 31-03-2012.

3. Legal Provisions

3.1 Related Provisions of the Electricity Act, 2003:

3.1.1. The Commission is guided by the following provisions of Section 61 of the Act which are relevant to this Order:

3.1.2. Section 61 - *"The Appropriate Commission shall, subject to the provisions of this Act, specify the terms and conditions for the determination of tariff, and in doing so, shall be guided by the following, namely:-*

(a) the principles and methodologies specified by the Central Commission for determination of the tariff applicable to generating companies and transmission licensees;

(b) the generation, transmission, distribution and supply of electricity are conducted on commercial principles;

(c) the factors which would encourage competition, efficiency, economical use of the resources, good performance and optimum investments;

(d) safeguarding of consumers' interest and at the same time, recovery of the cost of electricity in a reasonable manner;

(e) the principles rewarding efficiency in performance;

(f) multi year tariff principles;

(g) that the tariff progressively reflects the cost of supply of electricity and also reduces cross-subsidies in the manner specified by the Appropriate Commission;

*(h) the promotion of co-generation and generation of electricity from renewable sources of energy**;***

(i) the National Electricity Policy and Tariff Policy:"

3.1.3. Section 86 stipulates the following among other functions of the State Commission.

3.1.4. Section 86(1)(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;"*

3.2 Related Provisions of the National Electricity Policy:

3.2.1. The guidelines stipulated in the National Electricity Policy on NCES, which are relevant to this Order are reproduced below:

3.2.2. Clause 5.2.20: *"Feasible potential of non-conventional energy resources, mainly small hydro, wind and bio-mass would also need to be exploited fully to create additional power generation capacity. With a view to increase the overall share of non-conventional energy sources in the electricity mix, efforts will be made to encourage private sector participation through suitable promotional measures."*

3.2.3. Clause 5.12.1: *"Non-conventional sources of energy being the most environment friendly, there is an urgent need to promote generation of electricity based on such sources of energy. For this purpose, efforts need to be made to reduce the capital cost of projects based on non-conventional and renewable sources of energy. Cost of energy can also be reduced by promoting competition within such projects. At the same time, adequate promotional measures would also have to be taken for development of technologies and a sustained growth of these sources."*

3.2.4. Clause 5.12.2: *"The Electricity Act 2003 provides that power and generation of electricity from non-conventional sources would be promoted by the SERCs by providing suitable measures for connectivity with grid and sale of electricity to any person and also by specifying, for purchase of electricity from such sources, a percentage of the total consumption of electricity in the area of a distribution licensee. Such percentage for purchase of power from non-conventional sources should be made applicable for the tariffs to be determined by the SERCs at the earliest. Progressively the share of electricity from non-conventional sources would need to be increased as prescribed by State Electricity Regulatory Commissions. Such purchase by distribution companies shall be through competitive bidding process. 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."*

3.3 Related Provisions in the National Tariff Policy

3.3.1. The Commission is also guided by the following specific provisions of the Tariff Policy of Government of India (Ministry of Power) relating to NCES:

3.3.2. Clause 5(3) (i): *"Tariff fixation for all electricity projects (generation, transmission and distribution) that result in lower Green House Gas (GHG) emissions than the relevant base line should take into account the benefits obtained from the Clean Development Mechanism (CDM) into consideration, in a manner so as to provide adequate incentive to the project developers."*

3.3.3. Clause 6.0: *"Accelerated growth of the generation capacity sector is essential to meet the estimated growth in demand. Adequacy of generation is also essential for efficient functioning of power markets. At the same time, it is to be ensured that new capacity addition should deliver electricity at most efficient rates to protect the interests of consumers. This policy stipulates the following for meeting these objectives."*

3.3.4. Clause 6.4(1): *"Pursuant to provisions of section 86(1)(e) of the Act, the appropriate Commission shall fix a minimum percentage 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 1, 2006.*

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."

3.3.5. Clause 6.4(2): *"Such procurement by distribution licensees for future requirements shall be done, as far as possible, through competitive bidding process under Section 63 of the Act within suppliers offering energy from*

same type of non-conventional sources. In the long-term, these technologies would need to compete with other sources in terms of full costs."

4. Promotion of New and Renewable Source of Energy

In order to promote the New and Renewable source of energy, the Commission has prescribed minimum percentage of electrical energy which each obligated entity shall purchase from new and renewable sources generators. The obligated entity shall comply with this provision as stipulated in the Commission's Renewable Purchase Obligations Regulations, 2010, and as amended from time to time. 'Obligated entity' is a subject matter of a Writ Petition in the Hon'ble High Court of Madras.

5. Applicability of this Order

The Tariff Order No.2 of 2009 dated 27-04-2009 for Biomass based Power Plants was valid till 31-03-2011 and its validity was extended upto 31-12-2011 by Tariff Order No. 2 of 2011 dated 12-04-2011. It was again extended for a further period of six months i.e. upto 30-06-2012 by Tariff Order No. 5 of 2011 dated 21-12-2011. It was further extended upto 31-07-2012 by Tariff Order No. 5 of 2012 dated 30-06-2012. Many stake holders have requested for retrospective application of the tariff order since the Commission has extended the validity of the previous tariff order beyond 31-3-2011. This issue was examined by the Commission. This Order contains many provisions not only relating to tariff but also relating to other terms and conditions. Since changes are made in various provisions of the previous tariff order, the Commission considers it appropriate to give effect to all the provisions contained in this tariff order only prospectively.

This Order shall come into effect from 01-08-2012. The agreement between the generators and the distribution licensee in relation to all plants commissioned on or after 01-08-2012 shall be in conformity with this order. The existing Energy Purchase Agreements (EPA) between the generators and the distribution licensee in relation to the tariff shall continue to be valid.

6. Tariff Determination Process

6.1. With regard to tariff determination, the relevant portions of regulation 4 of the Power Procurement from New and Renewable Sources of Energy Regulation, 2008, are reproduced below:

(1) "The Commission shall follow the process mentioned below for the determination of tariff for the power from new and renewable sources based generators, namely:-

(a) "initiating the process of fixing the tariff either suo motu on expiry of control period and on expiry of the extended validity period of the earlier order or on an application filed by the distribution licensee or by the generator."

(b) "inviting public response on the suo motu proceedings or on the application filed by the distribution licensee or by the generator."

(c) …(omitted)

(d) "issuing general / specific tariff Order for purchase of power from new and renewable sources based generators."

7. Tariff / Pricing Methodology

The relevant portion of Tariff / Pricing Methodology as specified in Regulation 4 of the Power Procurement from New and Renewable Sources of Energy Regulation, 2008, is reproduced below:

"(2) While deciding the tariff for power purchase by distribution licensee from new and renewable sources based generators, the Commission shall, as far as possible, be guided by the principles and methodologies specified by:

(a) Central Electricity Regulatory Commission

(b) National Electricity Policy

(c) Tariff Policy

(d) Rural Electrification Policy

(e) Forum of Regulators (FOR)

(f) Central and State Governments

(3) The Commission shall, by a general or specific Order, determine the tariff for the purchase of power from each kind of new and renewable sources based generators by the distribution licensee.

Provided where the tariff has been determined by following transparent process of bidding in accordance with the guidelines issued by the Central Government, as provided under section 63 of the Act, the Commission shall adopt such tariff.

(4) While determining the tariff, the Commission may, to the extent possible consider to permit an allowance / disincentive based on technology, fuel, market risk, environmental benefits and social impact etc., of each type of new and renewable source.

(5) While determining the tariff, the Commission shall adopt appropriate financial and operational parameters.

(6) While determining the tariff, the Commission may adopt appropriate tariff methodology".

7.1 Market Determined Pricing

In a free market, where there is adequate competition among various players, the price is determined by the market mechanism. This price could be obtained for a long, medium or short term. Wherever market is not developed, performance based bench mark system of pricing as notified by the Commission by way of tariff regulations are applicable. The issue of competitively procuring

power from renewable energy sources in the absence of Guidelines of Government of India for competitive bidding for procurement of NCES power is a subject matter of an appeal before the Hon'ble Supreme Court. In view of this, the Commission continues with the Cost Plus Tariff determination in this Order.

7.2 Cost-Plus Tariff Determination

Cost-Plus Tariff Determination is not the best method and it discourages competition and efficiency. However, to encourage the Biomass based power generation plants and till competitive bidding is introduced Cost-Plus method is followed. As it can be easily designed to provide adequate return to the investor, the Commission adopts Cost-Plus Tariff approach in this order.

7.3 Single Part vs. Two Part Tariff

7.3.1. In the Commission's Order No. 2 of 2009 dated 27-04-2009, the Commission adopted the **"Cost Plus Two Part Tariff".** Generally, the two part tariff is adopted when the fuel cost varies from time to time and the fuel cost is considered as a pass through. The variable component of tariff would take care of such price escalation.

7.3.2. The stakeholders have expressed the view that the two part tariff is convenient to accommodate the fuel cost escalation appropriately and therefore a two part tariff is adopted in this order.

8.0 Issues Relating to Tariff and allied matters:

8.1 Tariff Components

The Power Procurement from New and Renewable Sources Energy Regulation, 2008, of the Commission specifies that while determining the tariff, the Commission shall adopt appropriate financial and operational parameters for the tariff determined in a cost-plus scenario. The Commission has carried out a detailed analysis of the existing policies/procedures and commercial mechanisms

in respect of Biomass based power plants. The following important factors have been considered to arrive at the tariff and other related issues for Biomass based power plants.

1. Capital cost per MW
2. Plant Load Factor (PLF)
3. Debt – Equity ratio
4. Term of loan
5. Interest rate for the loan
6. Return on Equity
7. Life of plant and machinery
8. Depreciation
9. O & M Expenses
10. Station Heat rate
11. Gross calorific value of the fuel
12. Specific fuel consumption
13. Fuel cost
14. Components of working capital
15. Interest on working capital
16. Auxiliary consumption

The issue-wise suggestions of the stakeholders and Commission's decisions are discussed below:

8.1.1. Capital Cost :

8.1.1.1. The Commission assumed Rs.4.87 Crores / MW as the Capital Cost in Order No. 2 of 2009 dated 27-04-2009. The details of capital cost furnished by various agencies are discussed below:-

8.1.1.2. Empee Distilleries has suggested to adopt Rs.5 Crores / MW towards Capital Cost. IOT Mabagas has stated that the fluctuations and higher cost of basic metals like Steel, Copper has put pressure on the cost of the capital

equipments like boilers and turbine for power projects. Air cooled condensers, need of the day, as there is shortage of water in many parts of the country has increased the project Plant & Machinery cost substantially. The total project cost/MW of biomass projects are close to INR 6 Crores/MW with all the costs involved including finance cost.

8.1.1.3. TANGEDCO has suggested to adopt the capital cost of Rs.4.0 Crore per MW.

8.1.1.4. IREDA has stated that the Capital Cost of the projects are site/project specific and depends upon type of technology/systems being employed, length and capacity of transmission line etc. As per the report prepared by MITCON for IREDA, the cost ceiling benchmark for Biomass project ranges from Rs.5-6 Crore/MW depending upon boiler pressure configuration. Further, the cost may be increased by 4 to 5%, if the project is using air-cooled condensers.

8.1.1.5. During the Stakeholders' Hearing on 8-6-2012 on Determination of Tariff and Allied issues on Non-Conventional Energy Sources, the Biomass Power Producers Association has stated that based on the current prevailing costs of the Plant and Machinery and also with the escalation in cement and steel on the plant construction site, Rs. 487 lac per MW would not even cater the Engineering, Procurement and Construction costs. The project developers have to spend a minimum of 20% extra on Preoperative and Interest during construction, apart from the transmission line including the Right of Way issues currently faced by all the power projects and the rising interest burden during the inordinate delays during execution of the projects. They requested the Commission to consider a capital cost of Rs. 580 Lac per MW.

8.1.1.6. The Central Electricity Regulatory Commission (CERC) in its Terms and Conditions for Tariff determination from Renewable Energy Sources

Regulations, 2012 has specified a Capital Cost of Rs.4.45 Crs. /MW for Biomass Plants.

8.1.1.7. The Commission feels that it is prudent to adopt the Capital Cost specified by CERC. Therefore, the Commission approves the capital cost of Rs. 4.45 Crores / MW for tariff calculation. The capital cost includes evacuation cost up to inter-connection point. The Commission apportions the capital cost on machineries, land and civil works at 85% and 15% respectively.

8.1.2. Plant Load Factor:

8.1.2.1. The plant load factor of a Biomass based power generation depends on number of factors like availability of fuel, vintage of the plant, etc. The Commission adopted a Plant Load Factor of 80% in order No. 2 of 2009 dated 27-04-2009. Normative values of PLF of Biomass based power projects adopted/furnished by various agencies are discussed below:-

8.1.2.2. Empee Distilleries has suggested to adopt a PLF of 80%.

8.1.2.3. TANGEDCO has suggested to adopt the Plant load factor of 80% as per TNERC Order No.2 of 2009.

8.1.2.4. IREDA has suggested to adopt the Plant Load Factor of 75%-80%.

8.1.2.5. During the Stakeholders' Hearing on 8-6-2012 on Determination of Tariff and Allied issues on Non-Conventional Energy Sources, the Biomass Power Producers Association has stated that as mentioned in the previous order, the Plant Load Factor (PLF) of a biomass based power plant is a function of fuel availability, moisture content of the fuel, mechanical efficiency, and age of the machine, steam pressure, heat rate and calorific value of the biofuel. Current data available from the operating plants reveals and also as observed by the Commission that the poor capacity utilization of the biomass plants is mainly

attributable to the exorbitant fuel cost. Other users of biomass fuel have been procuring biofuels at a much higher price making it unviable for biomass based power plants. Although the Commission retained the Plant Load Factor of 80%, which is physically achievable, most of the Biomass Power Plants currently in operation had achieved only 70% as yearly capacity utilization. Hence, they requested the Commission to have this as the benchmark and to retain the Plant Load Factor at 70%.

8.1.2.6. Since the fuel price is being revised from time to time, the Commission decides to retain the existing PLF of 80%.

8.1.3. Debt – Equity Ratio:

8.1.3.1. Debt - Equity ratio is mainly prescribed by IREDA / financial institutions. They have generally adopted debt-equity ratio of 70: 30. The Commission adopted Debt - Equity of ratio of 70: 30 in order No. 2 of 2009 dated 27-04-2009. The details of Debt-Equity Ratio furnished by various agencies are discussed below:-

8.1.3.2. Empee Distilleries has suggested to adopt the Debt Equity Ratio is 61: 39. IOT Mabagas has stated that with the present trend in the financial sectors, there is a strict norm from lending agencies on equity participation from the developers. Even nationalized banks are expecting around 30 to 35% equity from promoters, which increases the cost of equity for the project.

8.1.3.3. TANGEDCO has suggested to adopt Debt Equity Ratio as 70:30 as per TNERC Order No.2 of 2009.

8.1.3.4. IREDA has suggested to adopt Debt-Equity Ratio as 70:30.

8.1.3.5. During the Stakeholders' Hearing on 8-6-2012 on Determination of Tariff and Allied issues on Non-Conventional Energy Sources, the Biomass Power Producers Association has stated that being a standard financial

requirement, the Association accepts the recommended ratio of 70:30 as laid down by the Tariff Policy and as adopted in the Tariff Regulations 2005 as well as in Order No. 3 dated 15-5-2006.

8.1.3.6. Based on the above, the Commission decides to retain the existing Debt-Equity ratio of 70:30.

8.1.4. Term of loan

8.1.4.1. The Commission has adopted in Order No. 2 of 2009 dated 27-04-2009, the Term of Loan as ten years with a moratorium of one year. The details of Term of loan furnished by various agencies are discussed below:-

8.1.4.2. Empee Distilleries has suggested to adopt Term of Loan as 10 years. IOT Mabagas has stated that as the market has not seen many successful biomass combustion projects in the recent times (due to various reasons attributable), lenders are not comfortable with long-term debt period for smaller projects. They are expecting around 7 to 8 years repayment period instead of a 10 years to 12 years repayment. Biomass Power Producers Association has stated that the Commission fixed the tenure of term loan as ten years with moratorium of one year in the earlier Order and also in the Order No.3 dated 15-05-2006 on the consideration that term loans sanctioned by IREDA, which they also suggest to be retained for the proposed tenure also.

8.1.4.3. TANGEDCO has suggested to adopt Term of Loan of 10 years with one year moratorium period as per TNERC Order No.2 of 2009.

8.1.4.4. IREDA has suggested to adopt Term of loan as 10 years with 1 year grace period after commissioning.

8.1.4.5. During the Stakeholders' Hearing on 8-6-2012 on Determination of Tariff and Allied issues on Non-Conventional Energy Sources, the Biomass Power Producers Association has stated that the tenure of term loan as ten years

with moratorium of one year in Order No. 3 dated 15-5-2006 on the consideration that term loans sanctioned by IREDA stipulated this tenure. No change is suggested on the tenure.

8.1.4.6. Considering the fact that term loans sanctioned by financial institutions are generally for a period of 10 years, the Commission decides to retain the existing tenure of ten years with a moratorium of one year for this order also.

8.1.5. Interest rate for the loan

8.1.5.1. The Commission adopted in Order No. 2 of 2009 dated 27-04-2009, the interest rate for the Term Loan as 12% p.a. The details of Interest rate for the Term loan furnished by various agencies are discussed below:-

8.1.5.2. Empee Distilleries has suggested to adopt Interest rate for the loan at 15.25%. IOT Mabagas has stated that the financial situation in the market is very difficult. Liquidity in the market is minimal and interest rates have shot up very high. Even strong nationalized banks like SBI has raised the interest upto 12% and above. For a normal investor with 30% equity contribution into the project, the interest rates offered are close to 13 – 14% in the market.

8.1.5.3. TANGEDCO has suggested to adopt the interest rate for the loan of 10%.

8.1.5.4. IREDA has suggested to adopt Interest rate for the loan may be linked to SBI Base rate + 3 to 5%. However, in their website, IREDA has tabulated the interest rates applicable from 16-08-2011 to various sectors. As per the said report, the interest rate applicable to Biomass generators is in the range of 11.75% to 12.50%.

8.1.5.5. During the Stakeholders' Hearing on 8-6-2012 on Determination of Tariff and Allied issues on Non-Conventional Energy Sources, the Biomass

Power Producers Association has stated that the upcoming power plants in biomass sector are getting term loan mostly from the banks or the financial institutions and the interest rates for Term loan is in the range of 15.5% to 17% and for working capital between 15% and 17%. Hence, the interest rate specified by TNERC at 12% is not at all feasible for the Biomass Power Sector and requested the Commission to fix the prevailing rate of 15.5% - 17%.

8.1.5.6. CERC in its Suo Motu Tariff Order for Renewable Energy Sources dated 27-03-2012 have stated that the computations of interest on loan carried out for determination of tariff in respect of the RE projects treating the value base of loan as 70% of the capital cost and the weighted average of Base rate prevalent during the first six months plus 300 basis points works out to an equivalent interest rate of 12.30%.

8.1.5.7. Considering the stakeholder's views and present market conditions, the Commission decides that the current interest rate of 11.75% to 12.50% as mentioned by IREDA in its website is reasonable and considered an interest rate of 12.25% p.a. and this interest rate would be adopted on the loan amount outstanding.

8.1.6. Return on Equity

8.1.6.1. The Commission adopted in Order No. 2 of 2009 dated 27-04-2009, the ROE at 19.85% (pre-tax). The details of Return on Equity furnished by various agencies are discussed below:-

8.1.6.2. TANGEDCO has suggested to adopt the Return on Equity of 14%.

8.1.6.3. IOT Mabagas has stated that in today's competitive corporate world, the ROE expectations from shareholders are very high. A minimum ROE of 18 to 19% (post tax) is what is considered to be a comfortable investment return. Biomass Power Producers Association has stated that in the earlier

Order, the Commission had fixed that 19.85% (pre-tax) Return on Equity may be allowed for the biomass projects. Considering the present viability of the biomass power plants, it is suggested that post tax return of 16% can be fixed for the proposed control period.

8.1.6.4. IREDA has suggested to adopt Return on Equity as 16% (after tax).

8.1.6.5. The Commission decides to retain the existing Return on Equity at 19.85% (pre-tax).

8.1.7. Life of plant and machinery

8.1.7.1. Generally the project life of a plant is considered as 20 years for tariff determination process. The Commission adopted in Order No. 2 of 2009 dated 27-04-2009, the Life of Plant and Machinery as 20 years. The details of life of plant and machinery furnished by various agencies are discussed below:

8.1.7.2. Empee Distilleries has suggested to adopt Life of Plant and Machinery as 20 years. Biomass Power Producers Association has stated that the Commission has considered a plant life of 20 years in the Order No.3 dated 15-5-2006 and also in the earlier Order No.2 of 2009. The Biomass Power Producers Association proposes to have the useful life of Biomass based Power plants as 25 years as against the indicated period of 20 years.

8.1.7.3. TANGEDCO has suggested to adopt the life of Plant and Machinery of 20 years as per TNERC Order No.2 of 2009.

8.1.7.4. IREDA has suggested to adopt the life of Plant and Machinery as 20 years.

8.1.7.5. The Commission decides to retain the existing Plant life of 20 years for Biomass based power projects for tariff determination.

8.1.8. Depreciation

8.1.8.1. The Commission adopted in Order No. 2 of 2009 dated 27-04-2009, the rate of Depreciation as 4.50% p.a. under Straight Line Method. 85% of the capital cost shall be reckoned as the cost of plant and machinery and therefore, depreciation shall be calculated with reference to this value. The accumulated depreciation shall be limited to 90% of the plant and machinery. The details of depreciation furnished by various agencies are discussed below:

8.1.8.2. TANGEDCO has suggested to adopt the Depreciation of 4.5% per annum on SLM as per TNERC Order No.2 of 2009.

8.1.8.3. Empee Distilleries has suggested to adopt Depreciation at 6.37% p.a. Biomass Power Producers Association has stated that assuming a life period of 20 years and residual value of 10%, the Commission adopted a rate of 4.5% per annum for biomass plants. Due to the suggested useful life of the biomass power plants as 25 years and assuming that 85% of the capital cost shall be reckoned as the cost of the plant and machinery, it is proposed to have the realistic value of 5.84% as depreciation rate per annum.

8.1.8.4. IREDA has suggested to adopt the Depreciation as

(a) 5.28% p.a. for equipment and

(b) 10% p.a. for others.

8.1.8.5. The Commission decides to continue with the existing practice of 4.5% p.a. SLM on Plant and Machinery by reckoning 85% of the capital cost. The accumulated depreciation shall be limited to 90% of the plant and machinery.

8.1.9. Operation and Maintenance Expenses

8.1.9.1. The Commission in its Order No. 2 of 2009 dated 27-04-2009, allowed operation and maintenance expenses at 4.5% p.a. on plant and

machinery cost with 5% annual escalation from second year. With regard to maintenance of land and civil works, which constitutes 15% of capital investment, 0.90% of 15% was allowed every year with annual escalation of 5% as O&M expenses. The details of Operation and Maintenance Expenses furnished by various agencies are discussed below:

8.1.9.2. Empee Distilleries has suggested to adopt Operation & Maintenance expenses of Rs.324 lakhs p.a. IOT Mabagas has stated that the average inflation in the cost of manpower, spares used to be around 7.5% to 8% per year until 2009. Present inflation in manpower cost is above 15% and spares and maintenance costs have shot up by almost 12 to 14% per year. The average variable cost increase in a project is more than 9 to 12% per year wherein the tariff Order, the cost escalation to variable cost is considered as 5% only.

8.1.9.3. TANGEDCO has suggested to adopt the O & M expenses per year of 4.5% with escalation of 5% from 2nd year onwards as per TNERC Order No.2 of 2009.

8.1.9.4. IREDA has suggested to adopt Operation and Maintenance expenses as 5% of project cost with 5% escalation.

8.1.9.5. During the Stakeholders' Hearing on 8-6-2012 on Determination of Tariff and Allied issues on Non-Conventional Energy Sources, the Biomass Power Producers Association has stated that almost all the Biomass Power Plants are located in remote areas and for the plants to be operated, they require minimum O&M infrastructure for operation and due to the locational disadvantages, the salaries of skilled manpower, wages of labour and additional O&M expenses for fuel processing and feeding are comparatively higher than that of any other industry located in rural areas. Currently, the Biomass Power Plants are spending over Rs.40 lacs per month and this clearly indicates that the O&M expenses at current level are ranging from Rs.40 lacs to Rs.45 lacs per

MW as against 4.5% of the capital cost with 5% increase from the second year as per the old order which is equal to Rs.21.915 lacs per MW. Hence, they requested the Commission to consider this as Rs.45 lacs per MW since the Operation and Maintenance expenditure is the critical parameter as far as the Biomass Power Plants are concerned.

8.1.9.6. The Commission in Order No. 2 of 2009 dated 27-04-2009 has allowed insurance charges at 0.75% of the machinery cost for the first year to be reduced by half a percent of the previous year's insurance cost every year thereafter.

8.1.9.7. Empee Distilleries has suggested to adopt Insurance expenditure of Rs.6.00 lakhs p.a. Biomass Power Producers Association has stated that the Commission had proposed 0.75% for the first year and to be reduced by half a percent reduction every year thereafter as the insurance expenditure with reference to 85% of the capital investment on the cost of plant and machinery. The Biomass Association requests the provision in the existing Order may please be retained.

8.1.9.8. TANGEDCO has stated that many State ERC's have not considered the insurance expenditure as one of the component for fixation of power purchase tariff. In the above lines, they have suggested that the same may not be separately allowed.

8.1.9.9. Normally the insurance expenditure will form part of the operation and maintenance expenses. Other Commissions have also clubbed the insurance expenditure with O & M expenses. Gujarat ERC in its Order dated 07-02-2011 has stated that O & M expenses will be 5% of the project cost including insurance cost in the first year with 5% escalation thereafter. Karnataka ERC in its Order dated 11-12-2009 has stated that O & M expenses will be 4% of capital cost including insurance, with annual escalation at 5%. Andhra Pradesh ERC in its Order dated 20-03-2004 & 31-03-2009 has stated that O & M expenses will be

4% including insurance expenses. Madhya Pradesh ERC in its Order dated 02-03-2012 has stated that O & M expenses including insurance will be 4% of the capital cost of the project in the first year with an escalation of 5.72% for each year thereafter.

In view of the foregoings, the Commission decides to club the insurance expenditure with the O & M expenses.

8.1.9.10. The Commission decides to allow Operation and Maintenance expenditure including insurance at 4.5% with annual escalation of 5% (from second year) on plant and machinery by reckoning 85% of the capital cost as the cost of plant and machinery. With regard to land and civil works, which constitutes 15% of capital investment, 0.90% of 15% shall be allowed as Operation and Maintenance expenditure every year with annual escalation of 5%.

8.1.10. Station Heat Rate

8.1.10.1. The Commission in Order No. 2 of 2009 dated 27-04-2009 has adopted station heat rate of 3840 kcal / kwhr. The details of Station Heat Rate furnished by various agencies are discussed below:

8.1.10.2. Station Heat Rate of the Biomass Power Plant is a major critical factor for proving the efficiency of the operation and it depends on a lot of other factors like Boiler Design, Operating efficiency of the boiler, Turbine efficiency and not exclusively on the fuel Characteristics alone.

8.1.10.3. Empee Distilleries has suggested to adopt Station Heat Rate as 4250 Kcals/Kwhr.

8.1.10.4. TANGEDCO has suggested to adopt Station Heat Rate as 2,450 Kcal/Kwhr.

8.1.10.5. During the Stakeholders' Hearing on 8-6-2012 on Determination of Tariff and Allied issues on Non-Conventional Energy Sources, the Biomass Power Producers Association has stated that the Commission adopted a specific fuel consumption of 1.20 kg per kwhr, Station Heat Rate of 3840 kcal per kwhr and calorific value of 3200 kcal per kg in the last order. Currently, for availing the capital subsidy from MNRE, all the Biomass Power Plants had undertaken a trial for 72 hours at peak operating condition and had been declared by National Productivity Council that the Station Heat Rate of the Biomass Power Plants operating in the State are at the level of 4200 to 4500 Kcals/Kwhr as against the Commission's recommendation of 3840 Kcals/Kwhr. The multi fuel operation of the Biomass Power Plants are being operated with variations in the Station Heat Rate most of the days in a year due to the seasonal influence which affects the fuel characteristics due to moisture and also the availability of unsized fuel. These variations in the Station Heat Rate are between 4000 Kcals/Kwhr and 5000 Kcals/Kwhr. Hence, the Station Heat Rate as 4000 Kcals/Kwhr not be logical and TNERC should consider the Station Heat Rate of 4500 Kcals/Kwhr.

8.1.10.6. Considering the various views expressed by the stakeholders, the Commission decides to retain the station heat rate of 3840 Kcal / Kwhr as fixed in the previous Order No. 2 of 2009 dated 27-04-2009.

8.1.11. Gross Calorific Value of the fuel

8.1.11.1. The Commission in Order No. 2 of 2009 dated 27-04-2009 has adopted Gross Calorific Value of 3200 Kcal / kg. The details of Gross Calorific Value of the fuel furnished by various agencies are discussed below:

8.1.11.2. Empee Distilleries has suggested to adopt Calorific Value of the Fuel as 2800 Kcals/Kg.

8.1.11.3. TANGEDCO has suggested to adopt Calorific value of the fuel as 3467 Kcal/Kg.

8.1.11.4. During the Stakeholders' Hearing on 8-6-2012 on Determination of Tariff and Allied issues on Non-Conventional Energy Sources, the Biomass Power Producers Association has stated that the most important property of biomass feed stocks with regard to combustion – and to the other thermo-chemical processes – is the moisture content, which influences the energy content of the fuel and also the efficiency, fuel consumption and also the viability of the Biomass Power Plant. Because of the mix of the various kind of Biomass Fuels sourced from the Agro wastes, the average calorific value remains only in the range of 2000 – 2200 Kcals/kg. Hence, they requested the Commission to carefully consider the Calorific Value of the Fuel as 2200 Kcals/Kg as against the value of 3200 Kcals/Kg assumed in the old order.

8.1.11.5. Considering the various views expressed by the stakeholders, the Commission decides to continue with the existing Gross calorific value of 3200 Kcal/Kg as fixed in the previous Order No. 2 of 2009 dated 27-04-2009.

8.1.12. Specific Fuel Consumption

8.1.12.1. Non-conventional power projects should improve their operational efficiency, notwithstanding the preference shown for them. The burden of higher fuel consumption by the power projects resulting in higher costs should not be passed on to the consumers.

8.1.12.2. The Commission in Order No. 2 of 2009 dated 27-04-2009 has adopted Specific Fuel Consumption of 1.20 Kg / kWhr. The details of Specific Fuel Consumption furnished by various agencies are discussed below:

8.1.12.3. Empee Distilleries has suggested to adopt Specific Fuel Consumption as 1.6 Kg/unit.

8.1.12.4. TANGEDCO has suggested to adopt Specific Fuel Consumption as 1.20 Kg/Kwhr as per TNERC Order No.2 of 2009.

8.1.12.5. IREDA has suggested to adopt Specific Fuel Consumption as in the range of 1.2 to 1.4 Kg/kWhr depending upon the calorific value of fuel.

8.1.12.6. During the Stakeholders' Hearing on 8-6-2012 on Determination of Tariff and Allied issues on Non-Conventional Energy Sources, the Biomass Power Producers Association has stated that as per the current Order based on the GCV of 3200 Kcals/kg and with the Station Heat Rate of 3840 Kcals/kwhr, the Specific Fuel Consumption has been arrived at 1.20 Kg/kwhr, which is highly theoretical and never achieved in the Operating Biomass Power Plants in Tamil Nadu. The main reason being the predominant availability of solid biomass from the agro wastes, thus sourced / collected with some inherent moisture and also with surface moisture. Only upon processing, the biomass can be converted into dry form. But because of the inadequate supply, competition from the other users and also due to the restricted seasonal sourcing, the biomass power producers are compelled to buy the Biomass from the agro wastes and use them in 'as is where is' condition. Due to limited storage facilities available with Biomass Power Generators, the inventory of Biomass for carrying out the sun drying is also not available. In this context and also based on the Station Heat Rate of 4200 Kcals/Kwhr and with calorific value of 2200 Kcals/Kg, the realistic Specific Fuel Consumption is 1.80 – 1.90 Kg/Kwhr. Hence, they requested the Commission to consider and revise the tariff accordingly based on the above Specific Fuel Consumption of 1.8 Kg/Kwhr.

8.1.12.7. Specific fuel consumption is the resultant of Station Heat Rate and Gross Calorific Value of fuel. As stated above, the Commission adopts the Station Heat Rate of 3840 Kcal / kWhr and fuel calorific value of 3200 Kcal / Kg, which corresponds to a fuel consumption of 1.20 Kg / kWhr.

8.1.13. Fuel Cost:

8.1.13.1. The Commission in Order No. 2 of 2009 dated 27-04-2009 has adopted Fuel cost at Rs.2000/MT with 5% escalation p.a. during the control

period. The details of Fuel Cost furnished by various agencies are discussed below:

8.1.13.2. TANGEDCO has suggested to adopt Fuel cost of Rs.2000/- per MT as per TNERC Order No.2 of 2009.

8.1.13.3. Empee Distilleries has suggested to adopt Fuel cost of Rs.3200/MT. IOT Mabagas has stated that the average fuel cost per MT of biomass (like rice husk, rice straw, bagasse) is above Rs.2200 to Rs.2500/MT today. With the present increase in the prices of Diesel & Petrol by the Central Government has increased the logistic costs to a very high level. The average cost of transporting a MT of feedstock from a distance of 10 KM has doubled in the recent one-year period.

8.1.13.4. IREDA has suggested to adopt the Average fuel cost of Rs.2000/MT with 5% annual escalation.

8.1.13.5. During the Stakeholders' Hearing on 8-6-2012 on Determination of Tariff and Allied issues on Non-Conventional Energy Sources, the Biomass Power Producers Association has stated that there is volatility in the fuel price, if correct fuel prices are not given, the developer would struggle and plant would stop as is happening in the Country. The Biomass Fuel Adjustment Mechanism (FAM) should consider the base price, preparation and also the transportation cost on "**as fired basis**" rather than "**as received**". The cost of biomass materials "**at source"** of biomass generation is as follows:

Sl. No.	Material	Cost (Rs./MT)	
		Minimum (Rs.)	Maximum (Rs.)
1.	Coconut frond	800	1700
2.	Sugarcane trash & tops	200	300
3.	Groundnut shell	2000	2500
4.	Casuarinas	2000	-
5.	Rice husk	2000	2500

8.1.13.6. Apart from the base price, the loading and unloading charges, processing (Baling, Shredding and Chipping) charges are required before the biomass can be used in the power plant boiler, in addition to the transportation charges which always spirals based on ever increasing diesel prices. Also, the moisture content of biomass as generated varies from minimum 45% to a maximum 55% resulting in a GCV as received at 2200 Kcal/Kg only. In addition to the above, the Government of Tamil Nadu has imposed a ban on the use of coconut husks for the use in the Biomass Power Plants which has also been incorporated in the Energy Purchase Agreement signed with TANGEDCO. Being the low cost Biomass Fuel, this ban necessitates the use of other higher cost biomass in the day-to-day operations, and the Bagasse availability has also been reserved for the Sugar mills and almost all the sugar mills are in the process of putting up their own co-generation facilities. With the additional cost of chipping and shredding, the average Biomass cost is Rs. 2500 per MT. Hence, they requested the Commission to revise the Biomass Fuel Cost for the tariff calculation as Rs. 2500 per MT.

8.1.13.7. The CERC in its Terms and Conditions for Tariff determination from Renewable Energy Sources Regulations, 2012 has specified Fuel Cost of Rs. 2,277/MT with 5% escalation in price for Biomass in respect of Tamil Nadu.

8.1.13.8. Considering the various views of the Stakeholders, the Commission considers it prudent to adopt the CERC rate of Rs.2,277/MT with 5% escalation including the cost of transportation.

8.1.14. Components of Working Capital

8.1.14.1. As per Order No. 2 dated 27-04-2009, the Working Capital is based on the following norms:

- Fuel stock – one month
- O & M Expenses – one month
- Receivables - one month

8.1.14.2. The details of Components of Working Capital furnished by various agencies are discussed below:

8.1.14.3. Empee Distilleries has suggested to adopt the Raw Material as Rs.2.50 Crores and Stock & Debtors as Rs.2.50 Crores and the Total as Rs.5.00 Crores.

8.1.14.4. TANGEDCO has suggested to adopt the Working Capital Components as per TNERC Order No.2 of 2009 as under:-

1. Fuel stock – one month
2. O&M – one month
3. Receivables – one month

8.1.14.5. IREDA has suggested to adopt the Components of Working Capital as one month of receivables and one month of fuel stock and expenses.

8.1.14.6. Considering the processing period of power generation and the contractual billing and payment period, the Commission decides to continue with the existing components for Working Capital i.e.

1. Fuel stock – one month
2. O&M expenses – one month
3. Receivables – one month

8.1.15. Interest on Working Capital

8.1.15.1. The Commission in Order No. 2 of 2009 dated 27-04-2009 has adopted Interest on Working Capital at 12%. The details of Interest on Working Capital furnished by various agencies are discussed below:

8.1.15.2. Empee Distilleries has suggested to adopt the Interest on Working Capital at 15%. IOT Mabagas has stated that first of all lenders are reluctant to consider the capitalization of interest during construction and working

capital during moratorium period. As biomass projects needs more stabilization period as compared to conventional coal power plants, working capital requirements are higher in biomass combustion projects. Interest rates for WC loans are above 13% today.

8.1.15.3. TANGEDCO has suggested to adopt the Interest on Working Capital at 10.25%.

8.1.15.4. During the Stakeholders' Hearing on 8-6-2012 on Determination of Tariff and Allied issues on Non-Conventional Energy Sources, the Biomass Power Producers Association has stated that the present order provides for an interest rate of 11% for working capital. No power plant in biomass sector is getting term loan at the rates mentioned in the regulations. The interest rates for Term loan are in the range of 15.5% to 17% and for Working Capital from 15% to 17%. Hence, they requested TNERC to consider atleast 15.5% as the interest rate for Term Loan and Working Capital.

8.1.15.5. IREDA in their website has tabulated the interest rates applicable from 16-08-2011 to various sectors. As per the said report, the interest rate applicable to Biomass generators is in the range of 11.75% to 12.50%.

8.1.15.6. CERC in its Suo Motu Tariff Order for Renewable Energy Sources dated 27-03-2012 has stated that interest rate for working capital is considered as weighted average of State Bank of India Base Rate prevalent during the first six months of the previous year plus 350 basis points. This is equivalent to interest rate of 12.80%.

8.1.15.7. Considering the present market conditions, lending pattern of financial institutions and the short term nature of working capital, the Commission decides to fix the Interest rate at the upper limit of the interest charged by IREDA. Therefore, an interest rate of 12.50% would be adopted for the working capital.

8.1.16. Auxiliary Consumption

8.1.16.1. The Commission in Order No. 2 of 2009 dated 27-04-2009 has adopted Auxiliary Consumption at 10%. The details of Auxiliary Consumption furnished by various agencies are discussed below:

8.1.16.2. Empee Distilleries has suggested to adopt Auxiliary consumption at 10%.

8.1.16.3. TANGEDCO has suggested to adopt Auxiliary consumption at 8.5%.

8.1.16.4. IREDA has suggested to adopt the Auxiliary Consumption as 10%-12%.

8.1.16.5. During the Stakeholders' Hearing on 8-6-2012 on Determination of Tariff and Allied issues on Non-Conventional Energy Sources, the Biomass Power Producers Association has stated that the Auxiliary Power Consumption is taken as 10%. This is not achievable in air-cooled technology as Air-cooled technology utilizes more power. The auxiliary consumption in air-cooled technology is not less than 12%. In Juliflora based plant, there is huge electricity requirement for running Wood Chippers and Wood Shredder and the auxiliary consumption is 13%. Currently, most of the Biomass Power Plants are being incorporated with Air Cooled Condenser (ACC) and mandatory auxiliary consumption of 10% is not achievable since ACC technology utilizes more power. The auxiliary consumption with ACC is not less than 12% and with additional equipments for the fuel preparation and feeding, there is additional electricity requirement for running wood chippers and wood shredder and the auxiliary consumption is almost 13-14%. Apart from this, installation of additional fields in the Electrostatic Precipitator due to the stringent norms on the Flue Gas, Installation of Dust Control systems in the fuel preparation area are also adding the auxiliary power consumption considerably. Hence, 12% would be the actual and ideal auxiliary consumption to be factored.

8.1.16.6. The Commission decides to retain the Auxiliary Consumption at 10% during the control period.

8.2 Related issues

The following are the issues related to power generation, transmission, wheeling and consumption from Biomass based power plants:

1. Transmission and wheeling charges
2. Cross subsidy surcharge
3. CDM benefits
4. Reactive power charges
5. Grid availability charges
6. Adjustment of energy generated
7. Scheduling and system operation charges
8. Application fees and Agreement fees
9. Billing and payments
10. Payment security and Security deposit
11. Power factor
12. Metering
13. Connectivity and Evacuation of power
14. Energy Purchase and Wheeling Agreement
15. Scheduling of Power
16. Tariff Review Period / Control Period

The above charges / terms are applicable to all biomass based power generating plants irrespective of their year of installation. These are discussed in detail in the following paragraphs.

8.2.1 Transmission & Wheeling Charges and line losses

8.2.1.1. The Commission in its Order No. 2 dated 27-04-2009 has adopted transmission and wheeling charges including line losses at 5% for HT / EHT and 7.5% for LT services.

8.2.1.2. Empee Distilleries has stated that the assumption of Commission is agreed.

8.2.1.3. During the Stakeholders' Hearing on 8-6-2012 on Determination of Tariff and Allied issues on Non-Conventional Energy Sources, the Biomass Power Producers Association has stated that TNERC in its Order No. 2 dated 30-3-2012 had increased the transmission charges from Rs.2781/day/MW to Rs.6483/day/MW which is exorbitantly high and affects the economic viability of the Biomass based power plants badly. Further, the transmission charges are recovered on the installed capacity of the power plants though, as mentioned earlier, the achievable PLF of biomass power generator is only 70%. Hence, they requested the Commission to fix a reasonable transmission tariff based on the actual energy injected to the Grid i.e. PLF (70%) adjusted transmission charges.

8.2.1.4. TANGEDCO has stated that at present, the transmission and distribution loss of the TANGEDCO is 18%. Hence, the Transmission and Wheeling Charges of 18% may be considered.

8.2.1.5. Currently, the Commission in its Order No. 1 of 2012 for TANGEDCO while approving the retail tariff and in Tariff Order No.2 of 2012 for TANTRANSCO has fixed the Wheeling Charges of 23.27 paise / kWh and Transmission Charges of Rs.6483 /MW / day. Now that TNEB has been unbundled, charging in kind as Transmission and Wheeling Charges will not serve its purpose. Therefore, it has been decided to fix the Transmission and Wheeling Charges in terms of rupees / paise as in the case of conventional power.

8.2.1.6. As a promotional measure under section 86 (1) (e) of the Electricity Act 2003, the Commission decides to adopt 50% of the transmission and 50% of the wheeling charges of conventional power to the Non-conventional energy sources power. Apart from these charges, actual line losses in kind as specified in the respective Order of the Commission and as amended from time to time are also payable for the captive use and third party sale.

8.2.1.7. For generators who are availing Renewable Energy Certificate (REC), Normal Transmission Charges, Wheeling Charges and Line Losses will apply.

8.2.2 Cross Subsidy Surcharge

8.2.2.1. Commission in its order No. 1, 2 and 3 of 2009 fixed 50% of the Cross Subsidy Surcharge for wind, biomass and bagasse based generators as a promotional measure for renewable energy.

8.2.2.2. Empee Distilleries has stated that no cross subsidy surcharge should be levied like in Maharashtra, Uttar Pradesh, Andhra Pradesh and Gujarat.

8.2.2.3. During the Stakeholders' Hearing on 8-6-2012 on Determination of Tariff and Allied issues on Non-Conventional Energy Sources, the Biomass Power Producers Association has stated that the State Electricity Regulatory Commission of Maharashtra, Uttar Pradesh, Karnataka and Andhra Pradesh have done away with Cross Subsidy Surcharge altogether. Gujarat State Electricity Regulatory Commission has exempted renewable energy sources from Cross Subsidy Surcharge. Hence, they requested the Commission to exempt renewable energy sources from Cross Subsidy Charges.

8.2.2.4. TANGEDCO has stated that the Cross Subsidy Surcharges as fixed by this TNERC in its Order No.2 of 2006 shall be adopted.

8.2.2.5. Cross Subsidy Surcharge shall be leviable as per the provisions of the Act, Rules and Regulations made thereunder. The Commission in its Order No. 1, 2 and 3 of 2009 fixed 50% of the cross subsidy surcharge for wind, biomass and bagasse based generators as a promotional measure for renewable energy. On similar lines, Commission decides to continue to adopt 50% of the applicable Cross Subsidy Surcharge for Biomass based Power Generating Projects.

8.2.3 CDM Benefits

8.2.3.1. IOT Mabagas has stated that there is a greater uncertainty in the CDM markets for future projects. If India accepts sanctions and EUs do not consider India as a developing market for CDM anymore, projects, which are coming up in 2011 or 2012, will suffer heavily on the revenues. Also, in addition to that the commission is asking the investor to share the revenue of CDM benefits with the state distribution company, which adds to the pressure. It shall be considered by the commission NOT to share the CDM revenues (if at all the investors successfully registers the projects with UNFCCC and finds a credible buyer, and Kyoto Protocol extends). Empee Distilleries has stated that the assumption of Commission is agreed.

8.2.3.2. TANGEDCO has stated that CDM benefits and sharing of CDM benefits as specified by the TNERC in its Order No.2 of 2009 may be adopted.

8.2.3.3. During the Stakeholders' Hearing on 8-6-2012 on Determination of Tariff and Allied issues on Non-Conventional Energy Sources, the Biomass Power Producers Association has stated that the entire CDM benefits should accrue to the promoter as it requires a lot of efforts to secure the same. Further, the developer has to incur huge expenditure, irrespective of the capacity, for Consultancy, DOE and other related issues. The Commission had ordered that 100% CDM benefits should go to the Developer in the first year and thereafter reducing by 10% every year till sharing becomes 50:50 between the Developer

and the Consumer in the sixth year. This negates the very purpose of introduction of CDM benefits. Rather, CDM benefits come to the rescue of the Developer during the period of losses. Hence, they requested the Commission to allow the Developer of the Biomass Power Plants to redeem the entire (100%) CDM benefits considering the above facts.

8.2.3.4. The Forum of Regulators has recommended that CDM benefits should be shared on gross basis starting from 100% to developers in the first year and thereafter reducing by 10% every year till the sharing becomes equal (50:50) between the developer and the consumer in the sixth year. Thereafter, the sharing of CDM benefits will remain equal till such time the benefits accrue. The Commission adopted this formula in its order Nos. 1, 2 and 3 of 2009.

8.2.3.5. Therefore, in line with the formula recommended by Forum of Regulators (FOR), the Commission decides to adopt the same formula for Biomass based power projects. Distribution Licensee shall account for the CDM receipts in the next ARR filing.

8.2.4 Reactive Power Charges

8.2.4.1. Empee Distilleries has stated that the assumption of Commission is agreed.

8.2.4.2. During the Stakeholders' Hearing on 8-6-2012 on Determination of Tariff and Allied issues on Non-Conventional Energy Sources, the Biomass Power Producers Association has stated that the Commission has levied/compensated the Reactive Energy Charges at the rate of 10 paise/kVARh for 2012-13 escalated at 0.5 paise/kVARh annually in subsequent years. Hence, they requested the Commission to ensure efficient reactive energy management by the DISCOMs.

8.2.4.3. The Commission in its Order in 2 of 2012 dated 30-03-2012 has fixed Reactive Power Charges at 10 Ps/kVARh for 2012-13 and escalated at 0.5

paise/kVARh annually. The Commission decides that the Reactive Power Charges shall be as per the above Orders of the Commission, as amended from time to time.

8.2.5. Grid Availability Charges

8.2.5.1. Empee Distilleries has stated that the assumption of Commission is agreed. Biomass Power Producers Association has stated that at present, the biomass power plants are being treated at par with fossil fuel based power plants for levy of grid availability charges, start up power, demand charges and energy charges as per Order No.2 dated 15-5-2006 of the Commission. The Commission had also retained the same charges for the existing Order also. With the view to provide certain relief to the biomass power generators, the members of the Association request the Commission to consider the grid availability charges at the same tariff which the TNEB is charging from the HT consumers, since Biomass Power plants are drawing power only when they face outages/shut downs.

8.2.5.2. TANGEDCO has stated that the Grid availability charges as fixed by the TNERC in its Order No.2 of 2006 may be adopted.

8.2.5.3. In this regard, the Commission rules as follows :

a) Start up power

If a generator is an open access customer, the startup power shall be provided by the Distribution Licensee for a maximum period of 42 days in a year, subject to the limitation of demand not exceeding 15% of the capacity of the generator. The generator shall pay the distribution licensee at the rate applicable for temporary supply of that voltage category.

b) Stand by power

If adequate generation does not materialize or if drawal by the captive / third party consumer exceeds generation, the energy charges and demand charges shall be regulated as follows:

i) Energy charges

As on date there is only one Distribution Licensee in this State. If the captive user or the third party user is a consumer of the Distribution Licensee, the captive or third party consumer shall be liable to pay the Distribution Licensee the tariff applicable to that category of the consumer for the net energy consumption subject to the terms and conditions of supply. If the captive user / third party user is not a consumer of the Distribution Licensee, the user shall pay the charges as applicable to the temporary supply of that voltage category.

ii) Demand charges

Demand charges are governed by the provisions of Supply Code, Distribution Code and the applicable Tariff Order issued by the Commission from time to time. Sections 9 and 42 of the Electricity Act, 2003, enables consumption of electricity form the captive generating plant. Proviso to Section 42 envisages that surcharge shall not be leviable in case open access is provided to a person who has established captive generation plant for carrying the electricity to the destination of his own use. This is also reflected in the note to Regulation 9 (2) which is reproduced below:-

> *"Provided that such surcharge was not be levied in case transmission access is provided to a person who has established a captive generation plant carrying the electricity to the destination of his own use."*

In the Tariff Order issued by the Commission in 2006 and 2009 the concept of deemed demand was introduced with a view to reduce the demand charges. This is opposed by the TANGEDCO as they are unable to recover the full demand charges relating to providing all the infrastructure facilities as well as tying up of the generation capacity. This matter was examined in detail. The Commission observes that

a) When the captive power plant is not generating power, the licensee is obliged to provide power supply to the consumer. During this period no wheeling charge is recoverable as the captive generator is not injecting any power. The fixed charges payable to other generating stations or procurement of power from the market to meet such contingency will devolve on the licensee.

b) If the captive generator is generating throughout the year, he could always reduce the sanctioned demand and control his demand charges for the supply to be made only by the licensee.

c) Since the open access regulation cast a duty on the licensee to provide electricity to all open access customers, whether captive or otherwise, in case of non-generation by such generator, the fixed charge is getting shifted to the licensee.

d) Keeping in view the above, the Commission decides to withdraw the deemed demand concept followed so far. The Commission also observes that such deemed demand concept is not prevalent in many other states in India.

8.2.6 Adjustment of generated energy

8.2.6.1. Empee Distilleries has stated that the Captive Consumption will be permitted for LT and HT service. The minimum limit of 1 MW for intra-state open access has already been lifted. Biomass Power Producers Association has

stated that section 9 (2) of the Electricity Act 2003, confers on the captive generator the right to open access for the purpose of carrying electricity from the captive plant to the destination of his use. Therefore, a renewable energy generator shall be entitled to adjust the generated energy for captive consumption whether as a LT or a HT consumer. However, the members of the Association requested the Commission to consider adjustment of the energy.

8.2.6.2. TANGEDCO has stated that adjustment of energy generated as specified in the TNERC Order No.2 of 2009 may be adopted.

8.2.6.3. The Commission decides that the adjustment of generated energy shall be as per the Commission's Open access Regulations in force.

8.2.7 Scheduling and system operation charges

8.2.7.1. Empee Distilleries has stated that the assumption of Commission is agreed. Biomass Power Producers Association has stated that the scheduling and system operation charges have been prescribed in Order No.2 dated 15-5-2006 of the Commission. The prescribed charges are Rs.1000/day irrespective of capacity. With a view to incentivize renewable energy project, the Commission, by an amendment to the Order No.2, prescribed charges of Rs.1000/ day per 1.65 MW and above. For capacity less than 1.65 MW, proportionate charges were prescribed. However, the TNEB is prescribing Rs. 500/Day/Transaction for short term customers. The same may continue to apply for biomass generators also.

8.2.7.2. TANGEDCO has stated that the scheduling and system operation charges of Rs.300/- per 1.65 MW and above per day, may be enhanced to Rs.1000/-.

8.2.7.3. During the Stakeholders' Hearing on 8-6-2012 on Determination of Tariff and Allied issues on Non-Conventional Energy Sources, the Biomass Power Producers Association has stated that the Commission had fixed a

composite Scheduling and System Operation Charges of Rs.2000/- per day with effect from 1-4-2012, which is doubled from Rs.1000/- per day. This is exorbitant and additional burden for the biomass power plants. Hence, they requested the Commission to fix a uniform Scheduling and System Operation Charges of Rs.300 per day irrespective of the capacity of the plant.

8.2.7.4. The Commission decides that the Scheduling and system operation charges shall be as per the Commission's Order issued on Open access charges from time to time. Presently, it is Rs.2000/day irrespective of the capacity as per Commission's Tariff Order 2 of 2012 dated 30-03-2012.

8.2.8 Application fees and agreement fees

8.2.8.1. Empee Distilleries has stated that the assumption of Commission is agreed.

8.2.8.2. TANGEDCO has stated that the fees for registration of open access application may be enhanced from Rs.200/MW to Rs.1000/MW and the wheeling agreement fees may be enhanced from Rs.2,000/MW to Rs.10,000/MW.

8.2.8.3. During the Stakeholders' Hearing on 8-6-2012 on Determination of Tariff and Allied issues on Non-Conventional Energy Sources, the Biomass Power Producers Association has stated that they requested the Commission to retain the existing fee structure.

8.2.8.4. The application fees and agreement fees for the Energy Purchase and Energy Wheeling Agreements shall be as specified in the Commission's Intra State Open Access Regulations 2005 and Fees and Fines Regulations 2004 in force. The fees for EPA shall be collected by the licensee and passed on to the Commission. Whenever the Commission revises the above fees, the revised fees shall be payable by the Biomass based Power Generators.

8.2.8.5. Whenever there is change in the usage of energy from Biomass based Power Generators or a change in the drawl point etc, there will be extra work to the licensee. Therefore, an additional fees equivalent to the application fees and agreement fees shall be leviable by the licensee on the generator.

8.2.9 Billing and Payment

8.2.9.1. IOT Mabagas has stated that as the investors face lot of problems in cash flows, there is a heavy pressure on the distribution companies also on cash flows. Being Govt. organizations, the payments for bills gets delayed invariably for some reasons and this adds up the working capital pressure on the investors. This point also needs to be considered while fixing a tariff for biomass projects. Empee Distilleries has stated that the power supplied to TANGEDCO is currently being paid with a period of around 6 months (180 days). This may be factored while considering the tariff since the interest cost on borrowed funds is 15%.

8.2.9.2. TANGEDCO have sought for waiver of payment of penalty of 1% per month for delayed payment towards power purchase bills beyond 30 days considering the precarious financial position of TANGEDCO.

8.2.9.3. During the Stakeholders' Hearing on 8-6-2012 on Determination of Tariff and Allied issues on Non-Conventional Energy Sources, the Biomass Power Producers Association has stated that there has been inordinate delay in payments from the State Utilities which affects the normal day-to-day operations of the Biomass Power plants. Hence, they requested the Commission to ensure the payments by the State Utilities before the due dates to enable the generator to continue his operations. In the absence of timely payments, interest rate at 1.5% per month should be paid to the Developer.

8.2.9.4. The Commission decides that when a renewable energy generator sells power to the distribution licensee, the generator will raise a bill every month for the net energy sold after deducting the charges for start up

power and reactive power. As the interest at 12.5% has already been allowed for one month receivables in the working capital, the bill amount is due only after one month. Hence, if the distribution licensee makes the payment within a period of one month of presentation of bills by a generating company, a rebate of 1% shall be allowed. Any delayed payment beyond 30 days is liable for interest at the rate of 1% per month.

8.2.9.5. The Commission also decides that if a Biomass based generator utilizes the power for captive use or if he sells it to a third party, the distribution licensee shall raise the bill at the end of the month for the net energy supplied. The licensee should record the generation and consumption on the same day as far as possible. While preparing the bill, peak hour generation shall be adjusted against peak hour consumption. Off peak generation shall be adjusted against off peak consumption. Normal generation shall be adjusted against normal consumption. Peak, off-peak and normal hours shall be as defined in the Terms and Conditions for Determination of Tariff Regulation, 2005 as amended from time to time. Presently as per Clause 11 (2) of the Terms and Conditions for determination of Tariff Regulations, 2005 defines Peak hour as "*the time between 0600 hrs and 0900 hrs and between 1800 hrs and 2100 hours."* Clause 11 (3) of the Terms and Conditions for determination of Tariff Regulations, 2005 defines Off-peak hour as "the *duration between 2200 hours and 0500 hrs.* Balance hours are normal hours.

8.2.9.6. The Commission also decides that the peak hour generation and normal hour generation can be adjusted against lower slot consumption. Excess consumption will be charged at the tariff applicable to the consumer as per the Regulations / Orders of the Commission in force. Appropriate Transmission and wheeling charges, scheduling and system operation charges and cross subsidy surcharge, wherever applicable, shall be recovered from the consumer. The net amount recoverable from the consumer shall be raised in the bill as per their normal billing schedule.

8.2.10 Payment Security and Security Deposit

8.2.10.1. IREDA has stated that some bankable security mechanism like Letter of Credit towards the bills raised is proposed and the lenders may be given a lien on the same.

8.2.10.2. Biomass Power Producers Association has stated that the National Tariff Policy calls for adequate and bankable security arrangements to the generating companies. Order No.3 dated 15-5-2006 of the Commission stipulates a bankable security in favour of generator. This mechanism has been found impractical, as there is more number of generators and the monolith distribution licensee is unable to offer security for such numbers. The members of the Association requested the Commission that the payment security can be assured for prompt payment by way of providing LC, for the billing of the preceding month. Alternatively interest at 1.5% per month can be added as part of Bill by generator to TANGEDCO. Empee Distilleries has stated that eventhough they have no security deposit with the distribution licensee, the distribution licensee i.e. TANGEDCO does not pay them any penalty for delayed payment.

8.2.10.3. TANGEDCO has stated that Payment security and security deposit as specified in the TNERC Order No.2 of 2009 may be adopted.

8.2.10.4. During the Stakeholders' Hearing on 8-6-2012 on Determination of Tariff and Allied issues on Non-Conventional Energy Sources, the Biomass Power Producers Association has stated that the existing provisions should continue.

8.2.10.5. The National Tariff Policy calls for adequate and bankable security arrangements to the generating companies. This mechanism has been found impractical, as there is more number of generators and distribution licensee is unable to offer security for such numbers. Therefore, the Commission believes that interest for the delayed payment @ 1% per month by the licensee

would serve the ends of justice as adopted in the Order No.2 of 2009 dated 27-04-2009.

8.2.10.6. As regards the security deposit of the consumer, the Commission decides to retain the present arrangements. i.e. two times the maximum net energy supplied by the distribution licensee in any month in the preceding financial year shall be taken as the basis for the payment of security deposit by the consumers.

8.2.11 Power factor

8.2.11.1. Empee Distilleries has stated that the assumption of Commission is agreed.

8.2.11.2. TANGEDCO has stated that Power factor incentive/disincentive as specified in the TNERC Order No.2 of 2009 may be adopted.

8.2.11.3. During the Stakeholders' Hearing on 8-6-2012 on Determination of Tariff and Allied issues on Non-Conventional Energy Sources, the Biomass Power Producers Association has stated that the existing formula should be retained.

8.2.11.4. As per the Retail Tariff Order in force, Power Factor disincentive is applicable to a consumer as a percentage of current consumption charges. The average power factor recorded by the meter shall be the reference for calculation of disincentive. On the same analogy, captive / third party consumers of Biomass Plants shall be liable for disincentive based on the average power factor recorded by the meter. This system may change if KVAh billing is introduced.

8.2.12 Metering

8.2.12.1. Empee Distilleries has stated that the assumption of Commission is agreed.

8.2.12.2. TANGEDCO has stated that Metering provisions as specified in the TNERC Order No.2 of 2009 may be adopted.

8.2.12.3. During the Stakeholders' Hearing on 8-6-2012 on Determination of Tariff and Allied issues on Non-Conventional Energy Sources, the Biomass Power Producers Association has stated that the existing provision may be continued. In case of any change, adequate, reasonable and practicable time should be given.

8.2.12.4. The Commission decides that the metering and communication arrangements shall be in accordance with the following:

(1) Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006.
(2) Tamil Nadu Electricity Distribution Code, 2004.
(3) Tamil Nadu Electricity Grid Code, 2004.
(4) Tamil Nadu Electricity Intra State Open Access Regulations in force.

8.2.13 Connectivity and Evacuation of power

8.2.13.1. Biomass Power Producers Association has stated that Section 39(2)(c) of the Act states that the State Transmission Utility shall ensure development of an efficient, co-ordinated and economical system of Intra State Transmission lines for smooth flow of electricity from a generating station to the load centres. Section 40 of the Act stipulates that it shall be the duty of the transmission licensee to build, maintain and operate an efficient, co-ordinated and economical system of Intra State transmission and to provide non-discriminatory open access to its transmission system for use by any licensee or generating company on payment of the transmission charges or any consumer as and when such open access is provided by the State Commission under section 42(2) on payment of the transmission charges and a surcharge thereon, as may be specified by the State Commission. Section 42 of the Act states that it shall be the duty of the distribution licensee to develop and maintain an efficient,

co-ordinated and economical distribution system in his area of supply. The Association requested the Commission to encourage evacuation of renewable energy and consider costs of interfacing lines to be borne by STU/Distribution Licensee irrespective of whether the energy is being supplied to the STU or Open Access consumers. Empee Distilleries has stated that the assumption of Commission is agreed.

8.2.13.2. TANGEDCO has stated that it is suggested that the entire cost of power evacuation may be borne by the generating companies in the case of entire energy sale to the TANGEDCO, since the TANTRANSCO / TANGEDCO has to incur huge expenditure for providing the transmission system required for evacuation of power from the interfacing sub-station to all over the State in addition to the cost of interfacing lines. The earlier practice of bearing the entire cost of power evacuation as per the provisions made in the TNERC Order No.3 of 2006, may be restored.

8.2.13.3. During the Stakeholders' Hearing on 8-6-2012 on Determination of Tariff and Allied issues on Non-Conventional Energy Sources, the Biomass Power Producers Association has stated that the evacuation facilities need to be improved and STU should be made to develop additional development of transmission lines to ensure an efficient, co-ordinated and economical system of Intra State grid for smooth flow of electricity from a generating station to the load centres as mandated by the Electricity Act, 2003. Hence, they suggested that as most of the Biomass Power Plants are located in rural areas and the transmissions lines are unusually longer and as such the transmission cost has to be shared between the Developer and the State Utility.

8.2.13.4. The Commission rules that connectivity and power evacuation system shall be provided as per the Act, Codes, Regulations and Orders in force.

8.2.14 Energy Purchase and Wheeling Agreement

8.2.14.1. Empee Distilleries has stated that the assumption of Commission is agreed.

8.2.14.2. TANGEDCO has stated the following provisions may be made in the EPA:

a) The entire cost of power evacuation may be borne by the generating companies, in the case of entire energy sale to the TANGEDCO.

b) Imposing penalty of interest at the rate of 1% per month for delayed payment made by the distribution licensee towards power purchase bills, beyond 30 days as specified in the TNERC Order No.2 of 2009, may be waived.

8.2.14.3. The format of the Energy Purchase Agreement (EPA) shall be evolved as specified in the Commission's New and Renewable Sources of Energy Regulation in force. The agreement shall be valid for a minimum period of 20 years. The distribution licensee shall execute the Energy Purchase Agreement within a month of receipt of application from the generator. The parties to the agreement shall be given the option of exiting in case of violation after serving a three months notice to the other party.

8.2.14.4. The format of the Energy Wheeling Agreement (EWA) shall be evolved as specified in the Commission's New and Renewable Sources of Energy Regulation in force. The period of agreement and other terms and conditions shall be as per the terms of Open Access Regulations issued by the Commission.

8.2.15. Scheduling of Power Generation

8.2.15.1. Empee Distilleries has stated that the assumption of Commission is agreed.

8.2.15.2. TANGEDCO has stated that daily schedule of power generation in terms of MW may be given by the generating companies to the distribution licensee, in order to have a better grid management.

8.2.15.3. The Commission decides that the generator shall follow the scheduling procedure as specified in Indian Electricity Grid Code and Tamil Nadu Electricity Grid Code and other Regulations, Codes and Orders of the Commission.

8.2.16 Tariff Review Period / Control Period

8.2.16.1. During the Stakeholders' Hearing on 8-6-2012 on Determination of Tariff and Allied issues on Non-Conventional Energy Sources, the Biomass Power Producers Association has stated that as already ordered by the Commission, the control period fixed at 2 years should be continued. As such, the new tariff shall be made effective from 1-4-2011.

8.2.16.2. Clause 6 of the Power Procurement from New and Renewable Sources of Energy Regulations, 2008 of the Commission specifies that the tariff as determined by the Commission shall remain in force for such period as specified by the Commission in such tariff orders and the control period may ordinarily be two years. Hence, the Commission decides that the control period of this Order shall be two years from 01-08-2012 and the tariff period is for 20 years.

9. Tariff

9.1. With the adoption of above financial and operational parameters the **tariff rate for the new plants** works out as follows:

9.1.1. Fixed costs

(Amount in Rs./unit)

Year	FCC		Year	FCC
1	1.658		11	1.327
2	1.675		12	1.295
3	1.633		13	1.324
4	1.591		14	1.356
5	1.550		15	1.389
6	1.510		16	1.423
7	1.471		17	1.460
8	1.433		18	1.498
9	1.397		19	1.538
10	1.361		20	1.580

9.1.2. Variable Costs

9.1.2.1 The variable cost for the financial year 2012-13 will be Rs.3.036 per unit and for the financial year 2013-14 will be Rs. 3.188 per unit.

9.1.2.2. The fixed capacity charges will be applicable with reference to the date of commissioning of the plant and the variable cost will be applicable with reference to the financial year. The Fixed capacity charges specified above will be continued to be applicable to the entire agreement period of 20 years.

9.1.2.3. The fixed charges specified in this Order will be applicable to the plants commissioned on or after 01-08-2012 and the variable cost specified in this Order will apply to all plants commissioned on or after 15-05-2006.

10. Tariff for the plants commissioned before 15-05-2006

10.1. Chief Engineer, NCES, TANGEDCO filed P.P.A.P. No. 3/2011 with a prayer to fix the tariff applicable to Bagasse based co-generation power plants and Biomass based power plants and biomass plants commissioned before 15-05-2006 and PPA entered before 15-05-2006 for the period from 01-04-2010. The petition was heard by the Commission on 11-07-2011 and TANGEDCO was directed to file separate petition for Bagasse based co-generation power plants

and biomass based power plants individually. The Commission further directed the Bagasse based co-generators and Biomass based power producers and TANGEDCO to file their views / comments before 31-07-2011. Accordingly, the TANGEDCO filed a petition for Biomass based power plants in P.P.A.P. No. 9 of 2012.

10.2. TANGEDCO reported that the plants commissioned prior to 1999 have recovered the entire fixed cost and the only allowable cost is variable cost. On the other hand, the Biomass plants have sought 5% escalation per annum on the existing Tariff as on 31-03-2010.

10.3. The data relating to financial parameters were not furnished either by TANGEDCO or by the respective Biomass plants. Hence, it is proposed to determine the tariff to the plants commissioned prior to 15-05-2006 under petition-PPAP 9 of 2012 after separate hearing.

11. Acknowledgement

11.1. The Commission acknowledges with gratitude the contribution of the officers and staff of the Commission, the active participation and advice of the Members of the State Advisory Committee and the pains taken by the stakeholders in offering their suggestions. The Commission also recognises the input of the Tamil Nadu Generation and Distribution Corporation Ltd., Tamil Nadu Transmission Corporation Ltd., Indian Renewable Energy Development Agency and the Ministry of New and Renewable Energy Sources, Government of India.

-sd-
(S. Nagalsamy)
Member

-sd-
(K. Venugopal)
Member

(By Order of the Commission)

-sd-
(S. GUNASEKARAN)
SECRETARY

Annexure-I

PUBLIC NOTICE

The Commission proposes to revise the Comprehensive Tariff Order on biomass based power generation plants, Order No.2 of 2009 dated 27-04-2009. The Commission invites the views / suggestions of stakeholders on the following parameters:-

1. Capital cost per MW
2. Plant Load Factor (PLF)
3. Debt – Equity ratio
4. Term of loan
5. Interest rate for the loan
6. Return on Equity
7. Life of plant and machinery
8. Depreciation
9. O & M Expenses per year
10. Insurance expenditure per year
11. Heat rate
12. Gross calorific value of the fuel
13. Specific fuel consumption
14. fuel cost per MT
15. Components of working capital
16. Interest on working capital
17. Auxiliary consumption
18. Transmission and wheeling charges
19. Cross subsidy surcharge
20. CDM benefits and sharing of CDM benefits
21. Reactive power charges
22. Grid availability charges
23. Adjustment of energy generated
24. Scheduling and system operation charges
25. Application fees and agreement fees
26. Billing and payments
27. Payment security and security deposit

28. Power factor
29. Metering
30. Evacuation of energy
31. Energy purchase and wheeling agreement
32. Renewable energy purchase obligation
33. scheduling of power generation
34. Any other issues.

The stakeholders are requested to furnish their views / suggestions by 31-05-2011.

(R.V.RAJAH)
Secretary

Annexure-II

LIST OF STAKEHOLDERS WHO OFFERED COMMENTS ON

PUBLIC NOTICE

1. Tamil Nadu Generation and Distribution Company Limited (TANGEDCO)
2. The Indian Renewable Energy Development Agency (IREDA)
3. Empee Distilleries
4. Biomass Power Producers Association
5. IOT Mabagas

Annexure-III

LIST OF MEMBERS PARTICIPATED IN THE STATE ADVISORY COMMITTEE MEETING HELD ON 29-03-2012

Members Present :

1. Thiru. K. Venugopal, Member, TNERC.
2. Thiru. S. Nagalsamy, Member, TNERC.
3. Thiru. S. Gunasekaran, Secretary, TNERC.
4. Thiru. Rajeev Ranjan, CMD, TNEB Ltd. & TANGEDCO Ltd. and Chairman, TANTRANSCO Ltd.
5. Thiru. Sudeep Jain, CMD, TEDA.
6. Tmt. M.P. Nirmala, Secretary to Government, Co-operation, Food & Consumer Protection Department, GoTN.
7. Thiru. M.C. Murali, Chief Electrical Engineer, Southern Railways.
8. Thiru. K.R. Thangaraj, Member, SAC.
9. Thiru. K. Kathirmathiyon, Member, SAC.
10. Thiru. N.K. Ranganath, Member, SAC.
11. Thiru. K. Alagu, Member, SAC.
12. Thiru. K. Kasthurirangaian, Member, SAC.
13. Thiru. R. Desikan, Member, SAC.

Special Invitee :

1. Thiru. Prashant M. Wadnere, Deputy Secretary to Government, Finance Department, GoTN.

Annexure-IV

LIST OF STAKEHOLDERS' WHO PRESENTED THEIR VIEWS IN THE STAKEHOLDERS' HEARING

1. Thiru A. Ponnambalam, Biomass Power Producers Association of Tamil Nadu.
2. Thiru R. Sivakumar, Sivasugam Consultancy.
3. Thiru Akshay Kumar, Director (Transmission Projects) TANTRANSCO / Director (Generation) i/c TANGEDCO.

Annexure-V

The list of participants at the hearing held on 08-06-2012 at the Institution of Engineers (India) at Chennai.

1. Mr. P. Ravishankar, IOTMabagas Ltd.,Nahur, Mumbai.
2. Mr. C.S. Sathyanarayanan, Terra Energy Ltd.,112, Nungambakkam High Road, Eldorado, Chennai 34.
3. Mr. D.P. Kumaresan, Century Casting Group
4. Mr. R. Palaniappan
5. Mr. K.N. Rathinavelu,The South India Sugar Mills Association .
6. Mr. J.S. Sivasubramanian, Sakthi Sugars.
7. Mr. M. Silvester,President – Operations, Kothari Sugars, 115, Mahatma Gandhi Salai, Chennai – 34
8. Mr. Kulothungan, OGPC / Chennai
9. Mr. K.B. Shoba, General Manager (Fin –Mrgt), ETA PowerGen P Ltd.,Buhari Town , 6th Floor, Moores Road, Chennai - 6
10. Mr. S. Balagurunathan, Director, RE & Carbon NORDIC India Solutions, Chennai 600 032.
11. Mr. P.T. Vijayan, Auromira Senergy P Ltd., 11, Thousand Lights, Chennai 6

Annexure-VI

Components of Biomass Tariff

Sl. No.	Parameters	Values
1	Capital Investment	Rs.4.45 Crores / MW
2	Plant load factor (PLF)	80%
3	Debt Equity Ratio	70:30
4	Term of Loan	10 years with one year moratorium period
5	Interest on Loan	12.25% p.a.
6	Return on Equity (RoE)	19.85% (Pre-tax)
7	Life of the Plant	20 years
8	Depreciation on 85% of capital investment	4.5% p.a on SLM
9	O & M Charges for Machinery on 85% of Capital investment	4.50% wih escalation of 5% from 2nd year
10	O & M Charges for land and civil works on 15% of Capital investment	0.90% with escalation of 5% from 2nd year
11	Station Heat Rate	3840 Kcal / Kwhr.
12	Calorific value of fuel	3200 Kcal/Kg
13	Specific fuel consumption (Kg/kWh)	1.20
14	Fuel Cost	Rs. 2,277/MT
15	Working Capital Components	Fuel stock - one month, O & M - one month and Receivables - one month
16	Interest on working capital	12.50% p.a
17	Auxiliary consumption	10.00%

Annexure-VII

Working sheet of Tariff computation for the projects commissioned on or after 01-08-2012

Year	O & M charges at 4.5% for machinery on 85% of capital investment and at 0.90% for land and civil works on 15% of capital investment with 5% escalation from 2nd year	Interest on loan @ 12.25 % p.a.	Depreciation at 4.5% on 85% of capital investment	Working Capital					Return on Equity @ 19.85% p.a.	Total fixed cost	Fuel Cost @ Rs.2277 per MT with 5% annual escalation	Net Units generated for one MW @ 80% PLF with 10% Auxiliary Consumption	Fixed cost per unit	Variable cost per unit	Total cost per unit
				One month O&M Expenses	One month Fuel stock	One month receivables	Total	Interest @ 12.50% p.a.							
	(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Units)	(Rs.)	(Rs.)	(Rs.)
1	1762200	3815875	1702125	146850	1595722	2467087	4209659	526207	2649975	10456382	19148664	6307200	1.658	3.036	4.694
2	1850310	3815875	1702125	154193	1675508	2556050	4385751	548219	2649975	10566504	20106096	6307200	1.675	3.188	4.863
3	1942826	3434288	1702125	161902	1759283	2617327	4538512	567314	2649975	10296528	21111396	6307200	1.633		
4	2039967	3052700	1702125	169997	1847247	2683275	4700519	587565	2649975	10032332	22166964	6307200	1.591		
5	2141965	2671113	1702125	178497	1939610	2754127	4872234	609029	2649975	9774207	23275320	6307200	1.550		
6	2249063	2289525	1702125	187422	2036590	2830128	5054140	631768	2649975	9522456	24439080	6307200	1.510		
7	2361517	1907938	1702125	196793	2138420	2911536	5246749	655844	2649975	9277399	25661040	6307200	1.471		
8	2479592	1526350	1702125	206633	2245341	2998621	5450595	681324	2649975	9039366	26944092	6307200	1.433		
9	2603572	1144763	1702125	216964	2357608	3091667	5666239	708280	2649975	8808715	28291296	6307200	1.397		
10	2733751	763175	1702125	227813	2475488	3190972	5894273	736784	2649975	8585810	29705856	6307200	1.361		
11	2870438	381588	1702125	239203	2599262	3296849	6135314	766914	2649975	8371040	31191144	6307200	1.327		
12	3013960		1702125	251163	2729225	3409626	6390014	798752	2649975	8164812	32750700	6307200	1.295		
13	3164658		1702125	263722	2865687	3561783	6691192	836399	2649975	8353157	34388244	6307200	1.324		
14	3322891		1702125	276908	3008971	3721548	7007427	875928	2649975	8550919	36107652	6307200	1.356		
15	3489035		1702125	290753	3159420	3889300	7339473	917434	2649975	8758569	37913040	6307200	1.389		
16	3663487		1702125	305291	3317391	4065441	7688123	961015	2649975	8976602	39808692	6307200	1.423		
17	3846662		1702125	320555	3483260	4250388	8054203	1006775	2649975	9205537	41799120	6307200	1.460		
18	4038995		1702125	336583	3657423	4444583	8438589	1054824	2649975	9445919	43889076	6307200	1.498		
19	4240944		1702125	353412	3840294	4648488	8842194	1105274	2649975	9698318	46083528	6307200	1.538		
20	4452992		1702125	371083	4032309	4862587	9265979	1158247	2649975	9963339	48387708	6307200	1.580		