
**TAMIL NADU ELECTRICITY REGULATORY COMMISSION
CHENNAI**

Present :

Thiru M. Chandrasekar Chairman
Thiru K. Venkatasamy Member (Legal)

Order No.1 of 2021, dated 29-01-2021

**Recomputation of parameters of Biomass Order No.3 of 2018 dated
28-03-2018**

**In the matter of : Recomputation of parameters of Biomass Tariff
Order No. 3 of 2018 dated 28-03-2018 based on Hon'ble APTEL
Order No.170 of 2016 dated 18-02-2020**

This Commission had determined the tariff for power procurement by Distribution Licensee from Biomass based Power Generating Plants for the FY 2016-17 and 2017-18 vide Order No.5 of 2016 on 31-03-2016. Aggrieved by the said order of the Commission, the Biomass Power Producers Association filed an appeal before the Hon'ble Appellate Tribunal for Electricity (Appeal No.170 of 2016) on the following counts:-

- (a) Incorrect process followed by the State Commission in passing the tariff order;
- (b) Determination of capital cost at Rs.5.50 Crores/MW;
- (c) Gross Calorific Value being fixed at 3200 kCal / Kg;

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- (d) Station Heat Rate determined at 3840 kCal / kWh
 - (e) Operation and Maintenance Expenses @ 4.5% of the Capital Cost;

The Hon'ble Appellate Tribunal for Electricity has made the following observations and orders on the aforesaid counts:

(a) Incorrect process followed by the State Commission in passing the tariff order:

As regards the allegation that no public hearing was held prior to the issue of the impugned order, the Commission clarified that there is no statutory requirement for holding such a public hearing either under the Act or any of the regulations made thereunder. In this connection, it is submitted that section 64 (3) of the Act requires only consideration of all suggestions and objections from the public. The Regulation 4(1)(b) of Power Procurement from New and Renewable Sources of Energy Regulations, 2008 only mandates the invitation of public response for determination of tariff. Comments received from the Appellant have been considered while finalising the Tariff. Further, clause 4 of the said 2008 Regulations, as it was originally notified had a provision for holding of public hearing in Regulation 4(1)(c). This provision was amended through the amendment regulation No.TNERC/NCES/16-4 dated 27-04-2009 whereby the requirement of public hearing was dispensed with. Thus the Commission has taken a conscious decision by exercise of its legislative power, to dispense with the process of

holding public hearings in tariff determination for power procurement from new and renewable sources of energy. This amendment is under challenge in W.P.No.312 of 2010 filed by Power Engineers' Society of Tamil Nadu before the High Court of Madras. As is well known, vires of Regulations can be challenged only under the power of Judicial Review by the High Court. Fourthly, this Tribunal has settled the issue vide its judgement dated 13-05-2015 in Appeal No.77 of 2014 wherein it has been held as follows:-

“18. The reply to the main contention of the Appellant has made by the Respondent No.2 is that Section 64 of the Electricity Act, 2003 provides that the Appropriate Commission has to consider the suggestions and objections received from the public while considering the tariff petition filed by the utility. There is no requirement specified in the Act for granting an opportunity of hearing to the stakeholders. Hearing as mandated under Section 64 to be given to the applicant in case the Commission decides to reject the tariff application. Hence, the manner of application of the principle of natural justice is already provided in Section 64 of the Act namely, in form of written suggestions / objections. The Act provides for calling of suggestions and objections from the public and such opportunity of hearing is not required to be given to individual customer for tariff determination. Providing for an opportunity of hearing is only required in case the tariff application is to be rejected and no public hearing is contemplated for determination of tariff. Hence, the Court is not required to

go beyond the express provision of the statute namely; Section 64 of the Electricity Act, 2003, dealing with the principle of natural justice”.

“As may be stated from the above, the issue is so larger res integra and there is no mandatory requirement under the Electricity Act to hold a public hearing.”

Order of the APTEL

(b) Determination of capital cost:

The Biomass Power Producers Association felt that the decided capital cost of Rs.5.50 crores per MW as extremely low and on the other hand, the Commission and Discoms justified the same on the ground that it is 24% more than the previous order. In this regard, it is relevant to note that the Central Commission in its order dated 31-03-2015 determining the tariff for biomass plants for FY 2015-16 has determined the capital cost for biomass plants using Rice Straw and Juliflora (Plantation) based projects with water cooled condensers, a capital cost of Rs.6.104 crores per MW has been specified. For such plants using Air-cooled condensers, the Central Commission has allowed a capital cost of Rs.6.518 crores per MW. It is further noticed that the Central Commission has based its determination of capital cost for various technology based biomass plants based on the actual data submitted by a Committee which studied the working of the actual biomass plants in the country and it further indexed the above capital cost

for the year 2015-16. We are not inclined to accept the arguments of learned counsel for the Respondent that the State Commission has to follow its own regulations and data base for arriving at various parameters to be allowed to the biomass plants. In fact, the determination of tariff has to be undertaken by the State Commission as per its own regulations but the various parameters influencing the capital cost have to be based on certain realistic data and its due analysis. Pending such collection of data and prudent analysis, the State Commission could make reference to the data and analysis of the Central Commission, which is referred to by almost all State Regulatory Commissions. It is further relevant to note that in view of the considerable difference in efficiency of various technology based power plants, a distinction has to be made by the State Commission whether the plant is based on the Air-cooled condensers or Water-cooled condensers. There cannot be a uniform capital cost for all the biomass plants using different technologies.

In view of the above facts, we opine that in the facts and circumstances of the case, the capital cost of Rs.6.10 crores per MW as determined by the Central Commission for Rice Straw and Juliflora (Plantation) based biomass plants with water cooled condensers, may also be considered for the power plant of the Appellant using same technology.

Order of the APTEL

(c) Gross Calorific Value:

The GCV determined by the State Commission is primarily based on the figures presumably adopted by it in its previous Orders. The State Commission has neither considered the figures adopted by the Central Commission as well as that decided by this Tribunal in its judgement dated 04-05-2016 in A.No.211 of 2015. In both these documents, the issue of GCV and associated problems like moisture content etc has been discussed at great length before recommending / deciding a figure of 3100 kCal per kg.

In view of these facts, we are of the opinion that the GCV of 3200 kCal per kg adopted by the State Commission is quite high and accordingly it appears justified to take into account the figures analysed and decided by the Central Commission as well as this Tribunal as 3100 kCal per kg.”

Order of the APTEL

(d) Station Heat Rate:

The State Commission has simply followed the SHR figure which was considered in its previous orders and also has made a cursory reference to the Orders of other State Commissions and also the CERC. In the facts and circumstances of the case and considering that SHR is dependent upon a number of uncontrollable factors like sand, moisture and ash contents, the State Commission ought to have adopted at least the figure decided by this

Tribunal in its judgement dated 04-05-2016 in A.No.211 of 2015. Accordingly, we are of the considered opinion that the SHR of 4200 kCal/kWh could have been considered by the State Commission as decided by this Tribunal in its judgement dated 04-05-2016 and the judgement is squarely applicable to the case in hand.

Order of the APTEL

(e) Operation and Maintenance Expenses:

The State Commission has allowed an O&M Expense of 5% on 85% of the capital cost with annual escalation of 5% considered earlier. In view of the inflation in the prices considering O&M Expenses as percentage of the capital cost (85%) cannot sustain in long run and the biomass power plants become non-viable due to their frequent break downs due to inadequate O&M Expenses. In such a scenario, we are of the opinion that the State Commission ought to have considered the O&M Expenses of a fixed amount per MW basis instead of percentage. While escalation of 5.72% p.a. as considered by the State Commission is fully justified, the base rate of O&M Expenses as 5% is considered inadequate. In other words, if we consider 5% of the capital cost of, say, Rs.6 crores, then the O&M Expenses as per the State Commission would work out to Rs.30 lacs per MW which is nowhere comparable with the figures decided by the Central Commission as Rs.40 lacs per MW for FY 2014-15 and Rs.44.71 lacs per MW for FY 2015-16.

In view of these facts, we opine that for FY 2015-16, the State Commission ought to have decided the O&M Expenses in the range of same as fixed by the Central Commission. If not allowing the exact figure. Accordingly, the State Commission is required to analyse the same afresh and decide the O&M Expenses considering the figures decided by the Central Commission.

The Commission preferred an appeal before the Hon'ble Supreme Court in Civil Appeal No.2918 of 2020 against the order of the APTEL on the following grounds:

- 1) APTEL directed to follow CERC orders and methodologies without considering that such a direction would amount to interfering with the jurisdiction of the Commission under section 86 of the Act, 2003.
- 2) APTEL while directing the Commission to follow CERC orders, principles and methodologies, has failed to consider that the Commission must be guided by the principles and methodologies of CERC and not follow the same ignoring its own regulations. The expression guided by cannot be interpreted as to mean that the Commission is bound by CERC determination which is a general in nature applicable across the country as against the determination made by the Commission keeping in view the ground realities prevalent in the State.

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- 3) APTEL directed the Commission to allow the Biomass Power Producers Association's Capital Cost in light of the determinations of CERC. APTEL failed to consider that the TNERC is guided by the CERC order but cannot be said to be bound by the same. Thus, the findings of the APTEL is wholly untenable.
 - 4) APTEL directed the Commission to follow the order of the CERC in deciding the O&M Expenses. The said direction goes against the basic object of setting up of the State Regulatory Commission and Regulations framed by it under section 61, 86 read with section 181 of the Act, 2003.
 - 5) APTEL failed to consider that the Commission is to be guided by the CERC orders and is not bound to adopt the same while determining the generic tariff. The direction of the APTEL is contrary to the provisions of the Act, 2003.
 - 6) APTEL failed to consider the scope and ambit of Section 61 of the Act, 2003. APTEL directed the Commission to follow the CERC Regulations without taking into consideration that Commission is not bound by the CERC but only guided by the principles and methodologies specified by CERC.

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- 7) APTEL directed the Commission to follow the CERC Regulation, whereas Section 61 of the Act, 2003 as well as Regulation 4(2) of the Commission's RE Tariff Regulations, 2008 provide that the State Commission must be guided by the same.
 - 8) APTEL order is against the settled principle of law that the Commission is the Appropriate Authority for determining tariff in the State of Tamil Nadu and the direction of the APTEL to follow the CERC Regulation interferes with the jurisdiction of the Commission conferred under Act, 2003.
 - 9) APTEL judgement is contrary to the objective of setting up of the State Regulatory Commission and against the Regulation framed by it under Section 61 read with Section 181 of the Act, 2003.

After hearing the parties, the full bench of the Hon'ble Supreme Court has passed the following order:

"Heard learned counsel for the appellant. We see no reason to interfere with the impugned order. The appeal is, accordingly, dismissed".

Consequent upon the same, the Commission recomputed certain parameters in the Biomass Tariff Order No.5 of 2016 dated 31-03-2016 and issued the recomputed Biomass Tariff Order No.12 of 2020 dated 10-12-2020.

Taking into consideration of the APTEL's Order, Biomass Tariff Order for 2020 was issued vide Order No.11 of 2020 dated 05-11-2020.

When Biomass Tariff Order 2016 and 2020 were issued based on APTEL's Order, the in between Biomass Tariff Order 2018 needs to be changed in order to maintain consistency and to follow the APTEL's Order in letter and spirit.

Therefore, the Commission re-fixed the capital cost at Rs.6.11 crore per MW for Rice Straw and Juliflora (Plantation) based biomass power plants with water cooled condensers for the power plant of the Biomass Power Producers Association using same technology and other three parameters as directed by Tribunal are re-fixed and tariff workings, based on APTEL's Suo motu Order dated 01-03-2018, are as follows:

1. Gross Calorific Value is re-fixed at 3100 kCal/kwh
2. Station Heat Rate is re-fixed at 4125 kCal/kwh
3. O&M charge is re-fixed as Rs.42.29 lakh/MW for FY 2018-19 with 5.72% escalation per annum.

Components of Biomass Tariff

| Sl.No. | PARAMETERS | As per Biomass Order dated 28-03-2018 | Recomputed as per APTEL Order dated 18-02-2020 |
|---------------|--------------------|--|---|
| 1 | Capital Investment | Rs.5.50 Cr/MW | Rs.6.11 Cr/MW |

| | | | |
|----|---|--|---|
| 2 | Plant Load Factor | 80% | 80% |
| 3 | Debt Equity Ratio | 70:30 | 70:30 |
| 4 | Term of Loan | 10 years with 1 year moratorium | 10 years with 1 year moratorium |
| 5 | Interest on Loan | 9.95% p.a. | 9.95% p.a. |
| 6 | Return on Equity | 17.56% (pre-tax) | 17.56% (pre-tax) |
| 7 | Life of the Plant | 20 years | 20 years |
| 8 | Depreciation | 4.5% p.a. on SLM on 85% of capital cost | 4.5% p.a. on SLM on 85% of capital cost |
| 9 | O & M Charges for Machinery on 85% of capital investment | 5% with escalation of 5.72% from 2 nd year onwards on 85% of capital cost. | Rs.42.29 Lakhs/MW with escalation of 5.72% from 2 nd year onwards. |
| | O & M charges for land and civil works on 15% of capital investment | 0.90% with escalation of 5.72% from 2 nd year onwards on 15% of capital cost. | |
| 10 | Station Heat Rate | 3840 kCal/kWh | 4125 kCal/kWh |
| 12 | Calorific Value of fuel | 3200 kCal/kg | 3100 kCal/kg |
| 13 | Specific fuel Consumption | 1.20kg/kWh | 1.33kg/kWh |
| 14 | Fuel Cost (Rs.) | 2967.35/MT with 5% escalation from 2 nd year onwards | 2967.35/MT with 5% escalation from 2 nd year onwards |
| 15 | Working capital components | One month fuel stock, one month O&M and two month receivables | One month fuel stock, one month O&M and two month receivables |
| 16 | Interest on | 10.95% p.a. | 10.95% p.a. |

| | | | |
|----|-----------------------|-----|-----|
| | working capital | | |
| 17 | Auxiliary consumption | 10% | 10% |

Tariff has been re-fixed based on the parameters directed by APTEL for the FY 2018-19:

Fixed Cost:

| Sl.No. | Components | Cost (in Rs.) |
|-------------------------|-----------------------------|--------------------|
| 1 | Interest on Loan | 42,55,615 |
| 2 | Return on Equity | 32,18,748 |
| 3 | Depreciation | 23,37,075 |
| 4 | O&M Expenses | 42,29,000 |
| 5 | Interest on Working Capital | 10,79,824 |
| Total Fixed Cost | | 1,51,20,262 |

Fixed Cost per unit: = Rs. 2.39

(15567514/6307200)

Fixed Cost Workings:

1) Interest on Loan :

Capital Cost: $\text{Rs.}61100000 \times 70\% = 42770000 \times 9.95\% = \text{Rs.}42,55,615.$

2) RoE :

Capital Cost: $\text{Rs.}6,11,00,000 \times 30\% = 1,83,30,000 \times 17.56\% = \text{Rs.}32,18,748$

3) Depreciation : $6,11,00,000 \times 85\% = 5,19,35,000 \times 4.5\% = \text{Rs.}23,37,075$

4) O&M Expenses : $\text{Rs.}42,29,000/\text{MW}$ for FY 2018-19

5) Interest on Working Capital : One month fuel stock, one month O&M and

two month receivables

$$\text{Fuel Cost} / 12 = 27657601/12 = 23,04,800$$

$$\text{O\&M } 4229000/12 = 3,52,417$$

$$\begin{aligned} \text{Receivables} &= [(\text{Fuel cost} + \text{Fixed cost})/12] \times 2 = \\ &[(27657601+151,11,947)/12] \times 2 = 71,28,258 \end{aligned}$$

$$\begin{aligned} \text{Total} &= 23,04,800+3,52,417+71,28,258 = \\ 97,85,475 \times 10.95\% &= \text{Rs.}10,71,509. \end{aligned}$$

Variable Cost Workings:

$$\begin{aligned} \text{Variable Cost} &= \text{Fuel Cost} \times \\ &(\text{Units generation} - \text{Auxiliary Consumption}) \end{aligned}$$

$$\begin{aligned} \text{Where Fuel Cost} &= (1000 \times 24 \text{ Hours} \times 365 \text{ days} \times \text{PLF} \times \\ &\text{Specific Fuel Consumption}) \times (\text{Rs.}2967.35/1000) = \text{Rs.}2,76,57,601 \end{aligned}$$

$$\begin{aligned} \text{Units Generation} &= 1000 \times 24 \text{ Hours} \times 365 \text{ days} \times \text{PLF} \times \\ &(\text{100\%}-\text{Auxiliary Consumption\%}) = 6307200 \end{aligned}$$

Variable Cost per unit:Rs.4.39

Tariff has been re-fixed based on the parameters directed by APTEL for the FY 2019-20:

Fixed Cost:

| Sl.No. | Components | Cost (in Rs.) |
|-------------------------|-----------------------------|--------------------|
| 1 | Interest on Loan | 42,55,615 |
| 2 | Return on Equity | 32,18,748 |
| 3 | Depreciation | 23,37,075 |
| 4 | O&M Expenses | 44,70,899 |
| 5 | Interest on Working Capital | 11,16,815 |
| Total Fixed Cost | | 1,53,99,152 |

Fixed Cost per unit: = Rs.2.44

(1,53,99,152/6307200)

Fixed Cost Workings:

1) Interest on Loan :

Capital Cost: Rs.61100000x70%=42770000x9.95%=Rs.42,55,615.

2) RoE :

Capital Cost: Rs.6,11,00,000x30%=1,83,30,000x17.56%=Rs.32,18,748

3) Depreciation : 6,11,00,000x85%=5,19,35,000x4.5%=Rs.23,37,075

4) O&M Expenses : Rs. 44,70,899/MW for FY 2019-20

5) Interest on Working Capital : One month fuel stock, one month O&M and two month receivables

Fuel Cost / 12 = 2,90,40,481/12 = 24,20,040

O&M 44,70,899/12 = 3,72,575

Receivables = [(Fuel cost + Fixed cost)/12]x2 =
[(29040481+15399152)/12]x2= 74,06,605

Total = 24,20,040+3,72,575+74,06,605 =
1,01,99,220x10.95%=Rs.11,16,815

Variable Cost Workings:

Variable Cost = Fuel Cost
(Units generation – Auxiliary Consumption)

Where Fuel Cost = (1000 x 24 Hours x 365 days x PLF x
Specific Fuel Consumption) x (Rs.2967.35*1.05))/1000
=Rs.2,90,40,481

Units Generation = 1000 x 24 Hours x 365 days x PLF x
(100%-Auxiliary Consumption%) = 6307200

Variable Cost per unit:Rs.4.60

Total cost for the FY 2019-20: Rs.7.04

| Year | Tariff as per APTEL directed parameters | | |
|---------|---|------------------------------------|-------------------------------------|
| | Fixed Cost (Rs./unit) (4) | Variable Cost (Rs./unit) (5) | Total Cost (Rs./unit) (6) |
| 2018-19 | 2.39 | 4.39 | 6.78 |
| 2019-20 | 2.44 | 4.60 | 7.04 |

With these modifications the Tariff for Biomass based power generating plants covered under Order No.3 of 2018 dated 28-03-2018 is re-fixed at Rs.6.78 per kwh & Rs.7.04/kWh for the FY 2018-19 & 2019-20 in the place of Rs.5.89 per kwh & Rs.6.11 per kWh fixed in the impugned Order with effect from 01.04.2018 for Rice Straw and Juliflora (Plantation) based biomass power plants with water cooled condensers for the power plant of the Biomass Power Producers Association using same technology. Detailed Tariff workings for the rest of the period are annexed.

-sd-
(K. Venkatasamy)
Member (Legal)

-sd-
(M. Chandrasekar)
Chairman

(By order of the Commission)

-sd-
(S. Chinnarajalu)
Secretary