

No.N/26/16/

BEFORE THE KARNATAKA ELECTRICITY REGULATORY COMMISSION

BANGALORE

Dated this 19th September, 2016

Sri M.K. Shankaralinge Gowda	Chairman
Sri H.D. Arun Kumar	Member
Sri D.B. Manival Raju	Member

In the matter of:

Determination of tariff from Municipal Solid Waste based Power Plants.

ORDER

I. Preamble:

- a) Bengaluru MSW Ltd., (BMSWL) a company incorporated under the Companies Act, 1956 is setting up 11.50 MW power plant using Municipal Solid Waste (MSW) as fuel at Giddenahalli Village, Bengaluru. The Bruhat Bangalore Mahanagara Palike (BBMP) has executed an agreement with BMSWL on 14th August, 2015 for establishment of 600 Tons Per Day MSW treatment plant and to generate electricity.
- b) BMSWL has filed an application before the Commission on 1st March, 2016 for determination of tariff for power supply from the said project to ESCOMs vide OP No.20/2016 (BMSWL Vs BESCO & others).
- c) BMSWL has requested to fix a tariff of Rs.7.78 per unit for 20 years from the date of commissioning of the said plant.

- d) BMSWL has also furnished, along with the petition, the details of cost and other particulars related to the project in order to determine the tariff.
2. After hearing the petition, the petitioner was directed to publish a summary of the tariff application in the news-papers as required under the provisions of the KERC (Tariff) Regulations 2000, calling for objections from interested persons/stakeholders. The petitioner has published a notice on 30th May, 2016, in the following news-papers:
- a) Deccan Herald
 - b) Vijaya Karnataka
 - c) Samyuktha Karnataka
3. No objections were filed by the stakeholders on the summary of tariff applications published in the news-papers.
4. The Commission held a public hearing in the matter on 24th August, 2016. During the public hearing, the petitioner highlighted the features of the plant and the grounds in support of tariff. The BESCO, in its written submission filed has agreed to buy power generated by BMSWL at Rs.4.15 per unit- the average cost of NCE sources. No other stakeholder had participated in the public hearing except BESCO, who reiterated the written submission. Subsequently, GESCOM vide its letter dated 6th September, 2016 has submitted that BMSWL is demanding higher tariff which is not economically viable. If it has to purchase the energy at that rate, the Commission has to increase the retail tariff. However, if the GESCOM is required to purchase the power from BMSWL, it is willing to purchase the power at the rate average power purchase cost (APPC), as approved by the Commission. Other ESCOMs have not furnished any comments on the tariff application.
5. During the course of the public hearing, the Commission had directed the petitioner to submit information on any other income like, tipping fee paid by the BBMP, consideration from sale of compost, etc., for factoring the same in the tariff determination. BMSWL in its letter dated

6th September, 2016 has informed that it is not getting any other revenue / grant, other than the revenue from the sale of power.

6. The Additional Chief Secretary to Government, Urban Development Department, in his letter dated 2nd September, 2016 has requested the Commission to fix tariff for power generated from Municipal Solid Waste by the proposed six new facilities and up-gradation of one facility, in and around Bengaluru.
7. As per the para 6.4 (1)(ii) of the Tariff Policy notified by the Government of India on 28th January, 2016, Distribution Licensee shall compulsorily procure 100% power produced from all the Waste to Energy plants in the State, in the ratio of their procurement of power from all sources including their own, at the tariff determined by the Commission, under Section 62 of the Electricity Act, 2003 (the Act).
8. Section 86 1(e) of the Act mandates promotion of co-generation and generation of electricity from renewable sources of energy by providing suitable measures for connectivity with the grid. Section 61(h) of the Act provides that, while specifying the terms and conditions of determination of tariff, the Commission shall be guided by the objective of promotion of co-generation and generation of electricity from renewable sources of energy. Section 62 of the Act provides for determination of tariff for supply of electricity by a generating company to a distribution licensee.
9. Considering the petition of BMSWL in OP No.20/2016 and the request of the Urban Development Department of Government of Karnataka, the Commission hereby decides and proceeds to determine the tariff in respect of electricity generated from MSW as fuel by issuing a generic tariff order.
10. The Commission, in its earlier Order dated 21st July, 2006 had decided on the approach for determination of tariff for Waste to Energy projects using Municipal Solid Waste supplied by Urban Local Bodies. It is

observed that, no project has been commissioned in the State based on the approach laid down in the said Order. Hence, the Commission now decides to determine tariff for MSW based projects independent of the said approach stated in its Order dated 21st July, 2006.

10. Determination of Tariff

Following technical and financial parameters have been considered for Determination of Tariff for the Power Plants using MSW:

a) Technical Parameters:

1. Useful life of the Plant
2. Plant Load Factor
3. Auxiliary Consumption

b) Financial Parameters:

1. Capital Cost
2. Debt Equity Ratio
3. O&M Expenses
4. Depreciation
5. Interest on Loan
6. Interest on Working Capital
7. Return on Equity
8. Discount Rate
9. Other Income

The Commission's decision on the above parameters are discussed as follows:

i) Useful life of the plant:

BMSWL have projected the useful life of the plant as 20 years. The CERC in its order dated 7th October, 2015, has considered the useful life of MSW plant as 20 years. Considering the proposal of BMSWL and the life of similar plants as considered by the CERC, the Commission decides to adopt the useful life of plant as 20 years.

ii) Plant Load Factor (PLF):

BMSWL in their petition, have proposed a PLF of 60% in the first year after stabilization and 85.62% from second year onwards. The CERC in its order dated 7th October, 2015 had considered 65% in the first year and 75% for the balance period of useful life. As the Commission has endeavored to determine tariff on generic basis, the Commission decides to adopt 65% in the first year and 75% for the balance period of useful life as the PLF, as per the CERC order dated 7th October, 2015.

iii) Auxiliary consumption:

BMSWL in its petition has proposed auxiliary consumption at 16% of generation per annum considering the equipments / systems necessary for handling MSW with high moisture and low calorific value as compared to conventional bio-mass or coal based thermal power plants. CERC, in its order dated 7th October, 2015 after deliberating on the issue in detail has considered auxiliary consumption of 15%.

In its Order dated 1st January, 2015 in the matter of determination of tariff in respect of renewable sources of energy, the Commission has allowed 10% auxiliary consumption for biomass and 9% for Co-generation.

Considering the issue of the quality of fuel to be handled in MSW plants, the Commission decides to allow 12% auxiliary consumption.

iv) Capital Cost:

BMSWL has indicated the capital cost of the project as Rs.233.07 Crores for the proposed plant with an installed capacity of 11.5 MW as detailed below:

PARTICULARS	Amount in Rs. Lakhs
Civil Works	
Building and civil cost	3000.00
Engineering expenses	700.00
Plant & Machinery	12874.00
Ash disposal Plant	200.00
Transmission cost	780.00
Land fill	1500.00
Contingency expenses	571.62
Other soft cost including project management, consultancy and financing	1116.89
Interest during construction	2373.53
Pre-operative expenses	190.54
Total Cost	23306.58

As per the above the capital cost per MW works to Rs.20.27 Crores. However, the capital cost considered by CERC for MSW plants is Rs.15.00 Crores / MW, the Telangana SERC has considered capital cost of Rs.14.00 Crores / MW and the GERC in its order dated 4th August, 2015 has considered capital cost of Rs.17.78 Crores / MW.

The Commission is of the view that the capital cost projected by BMSWL appears to be on a higher side as compared to the cost assumed by other SERCs and CERC. The capital cost of 15.00 Crores per MW considered by the CERC vide its Order dated 7th October, 2015 is applicable for FY16. Since the Commission is fixing tariff to be determined in this Order for the period ending FY18, the Commission decides to allow a capital cost of Rs.17.00 Crores / MW.

v) Debt Equity:

The Commission has considered a debt equity ratio of 70:30 for tariff determination of power plants using other renewable energy resources and is of the view that there is no reason to adopt a different norm in this case. Accordingly, the Commission decides to allow the normative debt equity ratio of 70:30 for the MSW based projects.

vi) O & M Expenses:

BMSWL have projected O & M expenses at 6.21%% of the capital cost escalated at 5.72% annually. Keeping in view the nature of the fuel used in this plant, which is labour intensive, the Commission is of the view that, O & M expenses of 6% of the capital cost escalable at 5.72% annually, are reasonable and accordingly decides to allow the same.

vii) Depreciation:

BMSWL has proposed depreciation at the rate of 5.83% per annum for the first 12 years and 2.50% for the balance eight years of the plant life. The Commission decides to allow repayment of loan in a tenure of 12 years. The amount of loan repayment annually at 5.83% per year for 12 years would be equal to 70% of the capital cost of the project. Accordingly, the Commission decides to adopt depreciation of 5.83% for the first 12 years and 2.50% for the balance period of 8 years.

viii) Tenure of Loan Repayment:

BMSWL has proposed loan repayment period of 12 years on the capital invested. As discussed in the preceding para, the Commission decides to allow depreciation equivalent to loan repayment during the first 12 years of the plant life. Accordingly, the Commission decides to consider loan repayment period of 12 years without moratorium.

ix) Interest on Loan:

BMSWL has claimed interest on loans at a rate of 11.80% per annum. The Commission while determining tariff for solar rooftop power plants has considered the rate of interest as 12%. Considering the present SBI base rate in the range of 8.95 to 9.70% effective from 22nd April, 2016, the Commission decides to allow 12% as interest on loan which is 230 basis points more than the present base rate to cover the additional rate that investors of MSW based power projects may have to bear.

x) Working Capital and Interest on Working Capital:

In view of the complexity of handling the fuel process plant / power plant, the Commission is of the view that adequate working capital has to be provided for the developer to perform as per the objectives of the project without any financial constraints.

BMSWL has claimed working capital equivalent to sum of fuel cost for four months equivalent to normative PLF, two months receivables, one month's O & M expenses and 15% of O&M expenses towards maintenance spares.

The Commission notes that, the working capital projected by BMSWL is in on a higher side compared to the allowable working capital as per the CERC Order dated 7th October, 2015. The Commission, in its current Tariff Orders, for certain other renewable energy sources which do not involve purchase of fuel has considered working capital equivalent to two months receivables. MSW based power projects would not incur fuel cost. Accordingly, the Commission decides to consider working capital equivalent to two months receivables for MSW based power plants also. Considering, the prevailing interest on short- term loans, the Commission decides to allow interest on such working capital at 12.50% per annum.

xi) Return on Equity:

As considered for other renewable sources of energy, the Commission decides to continue with the RoE of 16%. Any tax paid on the RoE is allowed as a pass through, limited to the amount of equity considered in this Order, which shall be claimed separately from the distribution licensees, duly furnishing proof of payment of such tax.

xii) Discount Rate:

The Commission has allowed the cost of debt at 12% and Return on equity at 16%. Accordingly, the weighted average cost of capital (WACC) is determined as follows:

WACC = Cost of Debt + Cost of Equity

Where,

Cost of Debt = 0.70 (Market Rate of Interest)

Cost of Equity= 0.30 (Rate of Return on Equity)

Particulars	WACC
Cost of debt	
0.7 * 12%	8.40%
Cost of Equity	
0.3 * 16%	4.80%
Weighted Average cost of capital	13.20%

Accordingly, the Commission considers a discount factor of 13.20% for the purpose of computing the levelized tariff.

xiii) Other Income:

BMSWL in its petition, has informed that it would receive revenue on account of tipping fee paid by BBMP. The BBMP has agreed to pay tipping fee of Rs.279/tonne with an escalation of 10% for every three years. The revenue factored by BMSWL ranges from Rs.519 lakhs in the first year to Rs.920 lakhs in the 20th year.

The Commission notes that the tipping fee paid by BBMP varies according to the weight of MSW handed over to the MSW power plant. As the Commission is determining tariff on a generic basis, factoring in tipping fee on an uniform basis is not feasible. Hence, the Commission decides to allow any revenue towards tipping fee received by the MSW plant on a monthly basis is to be passed on to the consumers of the ESCOMs. As such, the ESCOMs are directed to adjust the revenue received on account of tipping fee and any other revenue of the MSW plant against its monthly energy bills. The MSW plants have to furnish the details of revenue received from the BBMP and other ULBs and any other sources while submitting their monthly energy bills to the ESCOMs.

xiv) Sharing of Clean Development Mechanism (CDM) benefits:

The Commission in its Order for other NCE sources has decided to adopt the following mechanism for sharing of CDM benefits:

- a) 100% of gross proceeds on account of CDM benefit are to be retained by project developer in the first year after the date of commercial operation of the generating station,
- b) In the second year, the share of beneficiaries shall be 10% which shall be progressively increased by 10% every year till it reaches 50%, where after, the proceeds shall be shared in equal proportion by the generating companies and the beneficiaries.

The Commission decides to adopt the same mechanism for sharing of CDM benefits for the MSW based power plants also. The Commission, however, has not considered the CDM benefits for tariff determination. Thereby the CDM benefit remains an additional incentive to the project developer. However, the ESCOMs shall share the CDM benefits with its consumers by accounting the same as other income in their ARR.

11. Approved Parameters and Tariff:

SL. NO.	PARTICULARS	AS APPROVED BY THE COMMISSION
1	Plant Load Factor	65% during first year and 75% for remaining plant life period
2	Auxiliary consumption for power plant in %age of total generation	12% for the integrated plant and power plant
3	Useful life of the plant in years from the date of CoD	20
4	Capital cost in Rs. Lakhs per MW	1700.00
5	Debt Equity ratio	70:30
6	Loan repayment tenure in years	12
7	Interest on loan in %age per annum	12%
8	Working capital	Equivalent to 2 months receivables
9	Interest on working capital in %age per annum	12.5%
10	O & M expenses	6% of the capital cost escalated at 5.72% per annum
11	Depreciation	5.83% for first 12 years and

		2.50% for balance 8 years
12	Return on Equity	16% per annum
13	Discount rate in %age	13.20 (WACC based on 70% debt at 12% and 30% equity at 16%)
14	Other Income	Income from tipping fee and other revenue as per the monthly receipts from BBMP and other Urban local bodies and other sources passable to ESCOMs.

Considering the above parameters, the Commission hereby decides to approve a levelised tariff of **Rs.7.08 per unit** for a period of 20 years from the date of achieving commercial operation as per the computations annexed to this Order.

12. Commission's Order:

- i) The tariff determined by the Commission is Rs.7.08 per unit for the purchase of power by ESCOMs from MSW based power plants for a period of twenty years from the date of Commercial Operation.
- ii) This Order is effective from the date of issue and will be in force till 31st March, 2018.
- iii) This Order will be applicable to all MSW based power plants which are commissioned during the effective period of this Order.
- iv) The OP No.20/2016 is disposed off accordingly.
- v) This Order is signed dated and issued by the Karnataka Electricity Regulatory Commission this day, the 19th September, 2016.

Sd/-	Sd/-	Sd/-
(M.K.Shankaralinge Gowda) Chairman	(H.D. Arun Kumar) Member	(D.B. Manival Raju) Member