

Executive Summary

of

Tariff Petition for 750 TPD MSW based waste processing plant located at Pune Filed by Pune Bio Energy Systems Pvt Limited (Case no 162 of 2019)

1. Pune Bio Energy Systems Pvt Limited (PBESPL) is in the process of developing a Waste to Energy plant in Ramtekdi, Pune for processing up to 750 Tons per Day (TPD) (with minimum of 600 TPD) of waste of Pune city and converting it into electricity, which shall be sold to Maharashtra State Electricity Distribution Company Limited in line with the clause 6.4 (1) (ii) of National Tariff Policy, 2016 which states that Distribution Licensees have to compulsorily procure 100% of the power produced from all Waste to Energy plants in the State¹.
2. PBESPL has filed the petition for the determination of Project specific tariff from the above project to Maharashtra Electricity Regulatory Commission on 15th July 2019. The tariff estimated considering the project specific features and regulatory norms is **INR 9.92 /kwh** on Levelized basis. The salient features of the project are provided in the table below:

Sl. No.	Particulars	Details
1.	Gross Electric Power Generation capacity	13.19 MW
2.	Waste processing Technology	Reciprocating grate technology
3.	Useful life of project (for Tariff calculation purpose)	20 Years
4.	Total capital cost	INR 29,611.29 Lakh
5.	Capital cost/MW	INR 2,244.98 Lakh
6.	Avg NCV of MSW after preprocessing	1,644 kcal/kg
7.	COD	01/10/2022 (Expected)

3. Aspirify Environment Pvt Ltd. had acquired a controlling stake in the project SPV PBESPL on 1st February 2016 and had entered into a concession agreement with Pune Municipal Corporation (PMC) for handling 500 TPD of MSW which was subsequently enhanced to 750 TPD on 28th June 2018. The concession agreement has been signed for 15 years (extendable by 15 years on mutual consent). The land allotted by PMC for the project is 10 acres. As per the concession agreement, PMC would need to supply waste free of building/construction debris, hazardous waste, e-waste and bio-medical waste. These would be excluded at the collection point by PMC.
4. The above Waste processing plant shall be equipped with sophisticated technology for pre-processing and power generation to ensure rated output with minimum down time. The plant shall be robust enough to handle any seasonal variations in the supply of MSW. Moreover, supplementary

¹ Since MSEDCL shall compulsorily procure 100% power produced from the present Project as per the National Tariff Policy, 2016, entering into an EPA with MSEDCL is not required.

fuel (biomass) shall be used to the extent of 10% of MSW usage in order to compensate for low calorific value of MSW (especially in the rainy season) and to ensure rated output.

5. PBESPL has taken extreme care of the fact that the well-being of general public, especially the local residents is not affected by the plant operations. This is to be ensured through measures like:
 - a. Completely enclosing the plant to prevent odour and dust escaping from the plant
 - b. Equipping the odor control system of the plant with both online (working when the plant is running) and offline (working when the plant is not running) odour control equipment to prevent odour from affecting the residents staying in the vicinity of the plant
 - c. No leachate discharge to the ground
 - d. Complete recycling of water to reduce raw water feed
 - e. Creating a buffer zone around the plant and developing this zone into a mini forest area with the use of a unique 'Miyawaki Technique'. This technique enables 30 times more density of forests as compared to conventional plantations.
 - f. Creating an experience centre for the plant where the general public can see the process of converting waste into energy through the naked eye. This will create awareness among the general public about the importance of MSW processing & operations of WtE plants and also reduce the public discomfort towards such plants as they witness the measures taken to safeguard the environment.
6. The Levelised cost of generation is determined based on the provisions of the Electricity Act (EA), 2003 and MERC (Renewable Energy Tariff) Regulations, 2019.
7. The fixed cost of the project shall comprise of O&M expenses, Depreciation, Interest on Term Loan, Interest on Working Capital, Terminal cost, Return on Equity and Taxes thereon. The variable cost shall comprise of the Supplementary Fuel cost. The tipping fee provided by PMC as per the concession agreement (at the rate of Rs. 360/Ton) shall be the only Non-Tariff income while seeking tariff. Moreover, in the submitted petition, PBESPL has requested for the provision of passing on the benefits of the CFA to the tariff, if and when received.
8. The detailed methodology and computation of the levelized tariff is provided in the submitted petition. The complete petition is available on the MERC website (www.merc.gov.in) and on the website of the parent company of PBESPL - Aspirify Environment Private Limited (www.aspirifyenvironment.com).
9. With regards to plant connectivity, PBESPL has approached MSETCL for providing evacuation facility for the plant. MSETCL has confirmed availability of power evacuation facility at 132 kV vide Phursungi Substation. The substation is 8.78 km away from the plant. The region around the plant is populated with localities of Hadapsar area. Moreover, the route from the plant to the substation passes through densely populated areas and a railway Crossover. On account of the above, MSETCL has recommended an underground transmission line to connect the plant to the substation and the same has been considered by PBESPL for determining tariff.
10. In addition to the above, PMC has agreed to compensate PBESPL with Rs. 89.95 Crores towards capital cost increase owing to shifting of project location and Change in Law. The original location of the project was Phursungi, however, due to opposition of villagers, the location of the project was changed to Ramtekdi on 29th June, 2018, post approval of the Municipal Commissioner. Moreover,

the SWM Rules, 2016 were introduced post signing of the concession agreement which had in impact on the project cost (change in law).

11. The Capital Cost Break-up for plant (considering compensation by PMC on account of shifting of the project location and Change in Law), the key parameters and assumptions, and the cost components for the determination of tariff are provided in the tables below:

Table 1: Capital Cost Break-up for proposed 750 TPD MSW Project at Pune (Rs Lakh)

S. No.	Project Cost	Amount
1.	EPC packages excl. taxes	13,525.00
2.	Taxes	1,401.37
3.	Misc. Fixed Assets	255.80
4.	Transmission line (incl. taxes) less PMC compensation	1,696.65
	Total Plant & Machinery	16,878.82
5.	Building & Civil Cost (Inc. land preparation)	4,300.00
6.	Transmission line Civil cost (incl. taxes)	2,618.38
	Total Hard Cost	23,797.20
7.	Contingency Cost	713.92
8.	Consultancy charges	594.93
9.	PMC charges	356.96
10.	Preoperative expenses	237.97
11.	Financing cost	475.94
12.	ROW (transmission soft cost)	1,000.00
13.	IDC	2,434.37
	Total soft costs	5,814.09
	Total capital cost	29,611.29

Table 2: Key Parameters and Assumptions

#	Assumption Head	Sub-Head	Sub-Head (2)	Value	Unit
1	Power Generation				
		Capacity	Installed Power Generation Capacity	13.19	MW
			Capacity Utilization Factor (first year)	65	%
			Capacity Utilization Factor (remaining period)	80	%
			Commercial Operation Date	01/10/2022	(Expected)
			Useful Life	20	Years
2	Project Cost				
		Capital Cost/ MW	Normative Capital Cost	2,244.98	INR Lakh/MW
			Capital Cost	29,611.29	INR Lakh
			Capital Subsidy	-	
			Net Capital Cost	29,611.29	INR Lakh
3	Financial Assumptions				
			Tariff Period	20	Years
		Debt: Equity	Debt	70	%
			Equity	30	%
			Total Debt Amount	20,727.90	INR Lakh
			Total Equity Amount	8,883.39	INR Lakh
		Debt Amount	Loan Amount	20,727.90	INR Lakh
			Moratorium Period	-	Years
			Repayment Period (incl Moratorium Period)	12	Years
			Interest Rate	10.14	%
		Equity Amount	Equity Amount	8,883.39	INR Lakh
			Return on Equity for first 10 years	16.00	%
			Return on Equity 11th year onwards	16.00	%
			Discount Rate	9.83	%
		Depreciation	Depreciation Rate for first 12 years	5.83	%
			Depreciation Rate 13 th year onwards	2.50	%
		Other Income	Tipping Fee received from Corporation	360.00	INR/ton
			Annual Increment	8.00	%
4	Operation and Maintenance				
			O&M Expense (first year)	2,222.1	INR Lakh
			Additional O&M for periodic maintenance (5,10,15,20 year)	1,050	INR Lakh
			Escalation factor for O&M expense	5.52	%

#	Assumption Head	Sub-Head	Sub-Head (2)	Value	Unit
5	Working Capital				
		O&M Expense		1.00	Months
		Maintenance Spare	(%O&M expense)	15	%
		Receivables		6	Months
		Fuel Stock		4	Months
		Interest on Working Capital		9.64	%

Table 3: Determination of Tariff

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Net Energy Sold (Lakh kWh)	597.53	751.28	751.28	751.28	751.28	751.28	751.28	751.28	751.28	751.28	751.28	751.28	751.28	751.28	751.28	751.28	751.28	751.28	751.28	751.28
Costs (Rs Lakh)																				
Supplementary Fuel Cost	200.64	246.94	246.94	246.94	246.94	246.94	246.94	246.94	246.94	246.94	246.94	246.94	246.94	246.94	246.94	246.94	246.94	246.94	246.94	246.94
O&M	2,222.13	2,344.79	2,474.22	2,610.80	4,092.55	2,906.94	3,067.38	3,236.68	3,415.32	5,307.95	3,802.74	4,012.63	4,234.11	4,467.82	6,885.41	4,974.65	5,249.24	5,538.99	5,844.73	8,933.10
Depreciation (SLM)	1,727.33	1,727.33	1,727.33	1,727.33	1,727.33	1,727.33	1,727.33	1,727.33	1,727.33	1,727.33	1,727.33	1,727.33	740.28	740.28	740.28	740.28	740.28	740.28	740.28	740.28
Interest on Term Loan	2,013.74	1,838.63	1,663.52	1,488.41	1,313.31	1,138.20	963.09	787.98	612.88	437.77	262.66	87.55	-	-	-	-	-	-	-	-
Interest on Working Capital	345.33	423.35	426.53	429.90	463.54	437.22	441.20	445.41	449.86	492.89	459.55	464.82	470.39	476.28	531.34	489.11	496.09	503.47	511.29	581.75
Return on Equity	1,421.34	1,421.34	1,421.34	1,421.34	1,421.34	1,421.34	1,421.34	1,421.34	1,421.34	1,421.34	1,421.34	1,421.34	1,421.34	1,421.34	1,421.34	1,421.34	1,421.34	1,421.34	1,421.34	1,421.34
Tax on Return on Equity	413.89	413.89	413.89	413.89	413.89	413.89	413.89	413.89	413.89	413.89	413.89	413.89	413.89	413.89	413.89	413.89	413.89	413.89	413.89	413.89
Terminal Cost	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,961.13
Total Cost	8,344.39	8,416.27	8,373.78	8,338.61	9,678.90	8,291.86	8,281.18	8,279.58	8,287.56	10,048.11	8,334.45	8,374.50	7,526.96	7,766.56	10,239.21	8,286.22	8,567.79	8,864.92	9,178.48	15,298.44
Less: Income from tipping fee	788.40	851.47	919.59	993.16	1,072.61	1,158.42	1,251.09	1,351.18	1,459.27	1,576.02	1,702.10	1,838.26	1,985.33	2,144.15	2,315.68	2,500.94	2,701.01	2,917.09	3,150.46	3,402.50
Net Cost	7,555.99	7,564.80	7,454.19	7,345.46	8,606.29	7,133.44	7,030.08	6,928.40	6,828.29	8,472.10	6,632.36	6,536.24	5,541.63	5,622.41	7,923.53	5,785.28	5,866.77	5,947.82	6,028.01	11,895.94
Gross Tariff (Rs/kWh)	13.96	11.20	11.15	11.10	12.88	11.04	11.02	11.02	11.03	13.37	11.09	11.15	10.02	10.34	13.63	11.03	11.40	11.80	12.22	20.36
Net Tariff (Rs/kWh)	12.65	10.07	9.92	9.78	11.46	9.50	9.36	9.22	9.09	11.28	8.83	8.70	7.38	7.48	10.55	7.70	7.81	7.92	8.02	15.83
Levelized Tariff for 20 years (Rs/kWh)	9.92																			