

ORDER
BEFORE THE GUJARAT ELECTRICITY REGULATORY COMMISSION
AHMEDABAD

Order No. 2 of 2007

In the matter of:

Determination of Price for Procurement of Power by the Distribution Licensees in Gujarat from Biomass Gasification based Generation Projects.

CORAM

Shri G. Subba Rao, Chairman

Shri K.P. Gupta Member

Dr. Man Mohan, Member

ORDER

In exercise of the powers conferred under section 181 read with sections 61(h), 62(a) and 86(1)(e) of the Electricity Act, 2003 (Act 36 of 2003) and all other powers enabling it in this behalf, the Gujarat Electricity Regulatory Commission (the Commission) has determined the price for procurement of power by distribution licensees in Gujarat from biomass gasification based generation projects

M/s Davaria Brothers has filed a petition (No. 887/2006) before the Commission under sections 61 and 62 of Electricity Act, 2003 for determination of price for procurement of power by distribution licensee in Gujarat from power generation through biomass gasification projects.

The Commission vide its oral order dated 13.10.2006 decided to upload petition filed by M/s Davaria Brothers on the website of the Commission for inviting suggestions/ objections from the stakeholders. The Commission while disposing the abovementioned petition vide order



dated 29.6.2007 decided that the Commission will separately issue order regarding generation tariff for the biomass gasification project

The said petition was placed on the website of the Commission on 26.10.2006 for inviting comments / suggestions. The last date for filing objections/comments on the discussion paper was fixed as 30.11.2006. The list of those who have communicated their views is given in Annexure -I.

The Commission has considered the views of the stakeholders and also perused the operation norms for biomass based (direct combustion, cogeneration) power plants by Central Electricity Authority. The salient features of tariff as determined by the Commission are discussed below.

1. Plant Load Factor (PLF)

Detailed Project Report (DPR) submitted by the petitioner mentions operation of the power plant at 90% PLF.

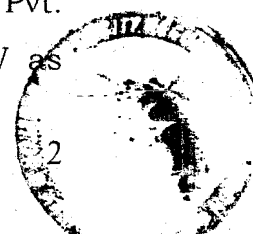
The PLF norm for biomass based power plants as recommended by the CEA is 80%

Accordingly, for tariff determination purpose, the Commission considered PLF of 80% for Biomass Gasification based Generation Projects

2. Capital Cost of Project

The project cost as expressed by the Petitioner M/s Davaria Brothers is around Rs. 3.03 Crores per MW.

Shri Ankur Jain of M/s Ankur Scientific Energy Technologies Pvt. Ltd submitted that the project cost of Rs. 3 Crores per MW as



submitted by the Petitioner is inclusive of cost of gasifier, gas cooling and cleaning system. The cost of land, civil works power evacuation equipment had been left out by mistake by the petitioner. He further submitted that the project cost comes around Rs. 4.5 Crores per MW.

GUVNL suggested that Capital Financial Assistance (CFA) given by Ministry of Non- Conventional Energy Sources, Government of India (GOI) should be considered for determination of net capital cost of project

Shri Ankur Jain submitted that subsidy should not be considered as it is being phased out and will be further reduced in the next year according to MNRE guidelines

The Commission has confirmed from the Ministry of New and Renewable Energy (MNRE), Government of India that the cost of the plant and machinery for grid connected biomass gasifier system for power generation sanctioned so far by the Ministry comes to Rs. 3.25 crore to 3.50 crore per MW and development charges including grid interface according to the site conditions

Considering the plant and machinery cost as submitted by the Petitioner M/s Davaria Brothers which is Rs. 3.03 Crores per MW, the Commission has considered the plant and machinery cost Rs. 3.25 Crores per MW and Rs. 0.25 crore per MW as development charges including grid interface charges for evacuation arrangements. Therefore, the total project cost considered at Rs 3.5 crore per MW.



It is to be noted that the Central Financial Assistance (CFA) of Rs. 15 lakhs per 100 kWe is available under the Biomass Gasifier Programme Scheme of MNRE to grid interactive MW level power project with 100% producer gas engine. Such CFA will reduce the capital cost of project correspondingly.

For determination of tariff, considering the CFA of about Rs. 1.5 crore per MW available to such project, net capital cost of project allowed at Rs. 2.0 crore per MW.

3. Project Life / Power Purchase Agreement (PPA)

The petitioner has proposed to sign a Power Purchase Agreements (PPA), for a period of at least 20 years.

During the hearing, Shri Ankur Jain of M/s Ankur Scientific Energy Technologies Pvt. Ltd submitted that project life and PPA should be 10 years. He further submitted that though the gasifier has life of 20 years, the gas engine needs major overhauls after ten (10) years and cost of overhauls is almost equivalent to a new engine price.

The Commission considered the life of the biomass gasification based generation project at 20 years for tariff determination purpose as well as for the term of the PPA to be entered into between GUVNL/Distribution licensee and project developer.

4. O&M Expenses

The Petitioner has, in its DPR, shown Man power and R&M cost at around 10% of the project cost



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GUVNL suggested that O & M expenses should be considered at 2% of project cost with escalation of 4% per annum. Shri Ankur Jain submitted that this project involves additional cost for sizing and drying the biomass.

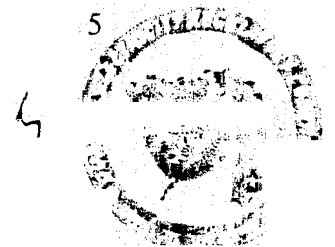
Commission has also looked at the O & M cost norm as recommended by CEA (for direct combustion, cogeneration power plants) where in O & M expenses including insurance to be 7% of the cost of capital with annual escalation at the rate of 5%.

The CEA in its said report under clause 9.5.2 observed as under:

"9.5.2 Coal fired power plants allow an O&M expenditure of 2.5% of the capital cost. The fired power plants are generally of large capacity and therefore it may not be proper to compare the O&M cost of the biomass plant with that of a coal fired plant. A biomass plant is highly labour oriented, mainly in the fuel collection, fuel transportation, fuel preparation and fuel feeding etc.....Percentage of salaries and administrative expenses will be higher for these plants.....Maintenance requirements of biomass plants, specifically in the boiler and fuel preparation side etc. are comparatively higher than that of coal fired plants and hence the repair and maintenance percentage will also be higher....."

It appears from the above that the biomass based generation plant is highly labour oriented and more man power is required in the collection, fuel transportation, fuel preparation and fuel feeding.

In view of the above, the Commission deems it fit to take O&M expenses at 7 % of total capital cost of project with escalation of 5% per annum considering the unit capacity of biomass gasifier system are up to 500 kW.



5. Specific Fuel Consumption and Station Heat Rate

Petitioner in its DPR mentions that fuel wood or woody biomass required would be around 1 to 1.3 kg/kWh

GUVNL suggested that SHR of 2400 kcal/kWh should be considered

The Commission collected data/information about similar technology of units (i.e. 100% producer gas) working elsewhere. The Commission has also considered the norms recommended by CEA for direct combustion, cogeneration power plants. In the light of above, the Commission considers that Specific Fuel Consumption at 1.30 kg/kwh and calorific value of fuel at 3300 kCal/kg (SHR at 4290 kCal/kWh) would be reasonable for the purpose of tariff determination for biomass gasification based power projects.

6. Fuel cost

Petitioner submitted that biomass can be obtained in two forms, one in un-cut form and other is in ready to use form. In the later form the cost of manpower required for cutting is included in the final cost of the biomass. For the techno-economic analysis, the Petitioner in its DPR mentioned that woody biomass is available in 'ready to use' form at the rate of Rs.1500/ton including cost of cutting and for the subsequent year at the rate of 5% escalation.

The PGVCL suggested that cost of biomass may not be higher than bagasse

For determination of economical cost of biomass, the Commission adopted equivalent heat value of coal approach as it appears more

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scientific. The Commission considered the pit head price of coal having equivalent calorific value of biomass @ 3300 kCal/kg. Since, element of transportation of biomass is involved the Commission has considered it separately

The Useful Heat Value (UHV) of the 'F' grade coal ranges between 2400 to 3360 kcal/kg. The Coal India Limited has fixed the basic price of 'F' grade coal at the Pit-head for WCL Collieries at Rs. 710 per MT. Considering the statutory levies like: Royalty, Stowing Excise Duty, CST, the Commission therefore considers average rate of Rs. 800/ MT as a reasonable and fair price for Biomass.

Commission has also considered the transportation cost of biomass from the nearby areas to the project site at around Rs. 200/ MT.

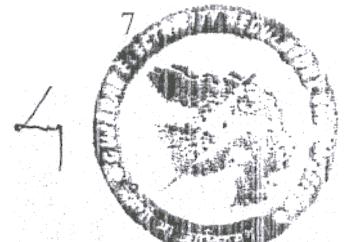
Taking into account of the cost of the biomass and transportation cost of such biomass from the nearby areas, the Commission considers fuel cost at Rs. 1000/ton (including transportation cost) with 5% annual escalation. It may also be noted that higher O&M cost is allowed in view of the man-power requirement for fuel processing.

7 Auxiliary Consumption

GUVNL suggested auxiliary consumption at 8%.

The CEA recommended that auxiliary power consumption to be taken as 10% for direct combustion, cogeneration power plants. Considering the same the Commission has considered auxiliary consumption at 10%.

8. Depreciation Rate



The Commission considered depreciation on Straight Line Method as specified in the CERC Terms and Conditions of Tariff; which lay down that asset life is to be depreciated up to 90% of its initial value i.e. net project cost (considering residual value of 10% of its initial value) over the entire asset life (which is 20 years).

9. Debt : Equity ratio

The debt-equity ratio for such Project IS considered as 70:30.

10. Interest on long term debt, Loan tenure and Loan repayment schedule

GUVNL suggested that interest on loan may be considered at 9 to 9.5% per annum. Shri Ankur Jain submitted that cost of capital will be higher as the investment in most of such plants will be carried out by small companies/investors.

As it is well known, recently there has been an upward trend in the interest rates. The Prime Lending Rate of some of the Banks is in range of 12-13%. Taking into account of the same, the Commission considers the interest rate at 12% on long term debt for tariff determination purposes. The Commission considered loan tenure of 10 years, with quarterly repayment in equal installments.

11. Interest on working capital

Commission has considered the interest on working capital based on

- (i) Cost of fuel for one and half months;
- (ii) O&M expenses for one month;
- (iii) Receivables equivalent to two month's charges for sale of electricity calculated; and



(iv) Maintenance spares at of the Capital cost escalated 6 per annum

The Commission considered the rate of interest on working capital at the rate of 10.75% for determination of tariff

12. Return on Equity (RoE)

The Commission considered the return on equity at 4%

13. Tariff Rate

Based on the various parameters as discussed above the cost of generation including RoE, works out as under

Year	1	2	3	4	5
Cost of generation Rs./kWh	2.46	2.53	2.60	2.67	2.76
Year	6	7	8	9	10
Cost of generation Rs./kWh	2.84	2.93	3.03	3.14	3.25
Year	11	12	13	14	15
Cost of generation Rs./kWh	3.41	3.56	3.72	3.89	4.06
Year	16	17	18	19	20
Cost of generation Rs./kWh	4.25	4.44	4.65	4.86	4.77

The levelised cost of generation including RoE using discounting rate as determined by CERC for bid evaluation vide notification dated April 4, 2007 i.e. 11.10 %, works out to Rs. 3.08 per KWh

As shown in the above table, the strict application of cost plus approach would lead tariff rates go on changing (increasing) from year to year over the 20 years period. Instead of thus changing the tariff from year to year the Commission has considered levelised cost and opted for a fixed tariff for 20 years The Commission also

believes that such a tariff will provide reasonable incentive to developers as it gives stable tariff over a longer period.

The Commission has determined the tariff for procurement of power from biomass gasification based generation project at Rs. 3.08 (constant) for its entire project life of 20 years i.e. from the first year to the twentieth year.

This tariff rate shall be applicable for purchase of renewable energy by Distribution Licensees for complying with the purchase obligation that may be specified by the Commission from time to time.

14. Control period

The Commission decides that the initial control period should be three years. The tariff decided in this order shall apply to all projects that come up within the control period for their 20 years of project life. Moreover, this tariff shall continue to be applicable till it is revised or till a new control period regime comes into force.

15. Transmission/Wheeling Charges and wheeling loss:

GUVNL suggested that open access for wheeling of power to recipient unit or third party be allowed on payment of applicable transmission charges, transmission losses, wheeling charges and wheeling losses, cross-subsidy charge as determined by the Commission from time to time.

For those projects who opt for sale to the distribution licensee, wheeling charge and loss will not be applicable as GUVNL/distribution licensee will purchase the same on Ex-basis.



The existing policy of Government of Gujarat, on biomass based generation projects, provides for levy of wheeling charge of 4% of energy injected in the grid inclusive of the losses in kind.

Considering the above, the Commission decides that the same provision of policy will be applicable.

16. Sharing of benefits from Clean Development Mechanism (CDM)

The proceeds of the carbon credits will accrue to the biomass based cogeneration projects and will reduce costs correspondingly. Therefore the Commission, in line with the Commission's Order No.2 on wind energy tariff, decides to pass on 25% of the gross CDM benefit to the Distribution Licensee.

17. Applicability of Intra-State ABT

GUVNL submitted that generation from biomass projects can be controlled and monitored like any other conventional power projects. GUVNL further suggested that it can be brought within the ambit of Intra-State ABT.

The Intra State ABT leads to liabilities in case of deviation from declared schedules of energy generation. Biomass gasification based power plant sizes are typically between 250 kW to 2 MW and feed the grid at 11 kV. Considering the small size of the plants, the Commission has kept the biomass gasification based generation projects, out of the purview of the Intra State ABT.

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The GUVNL/Distribution licensee shall enter into PPA with biomass gasification based generation projects. Energy accounting and commercial settlement will be carried out at the concerned distribution licensee level

To summarise the decisions of the Commission on Tariff for procurement of power from biomass gasification based generation projects are as under:

The Commission has determined the tariff for procurement of power from biomass gasification based generation project at Rs. 3.08 (constant) for its entire project life of 20 years i.e. from the first year to the twentieth year.

This tariff rate shall be applicable for purchase of such energy by Distribution Licensees for complying with the purchase obligation that may be specified by the Commission from time to time


Sd/-
(G.Subba Rao)
Chairman

Sd/-
(K.P. Gupta)
Member

(Dr. Man Mohan)
Member

Place: Ahmedabad

Date: 17/8/2007


(P.S. Shah)
Secretary



Annexure – I

1.	Gujarat Uraja Vikas Nigam Ltd. (GUVNL)	
2.	M/s Ankur Scientific Energy Technologies Pvt. Ltd	
3.	Paschim Gujarat Vij Company limited (PGVCL)	
4.	M/s Davaria Brothers	