

Before the
MAHARASHTRA ELECTRICITY REGULATORY COMMISSION
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Case No. 83 of 2008

In the matter of
Petition filed by Maharashtra Biomass Energy Developers Association seeking review of
variable charge component of the Cost of Generation determined under Orders dated
August 8, 2005 (Case No. 37 of 2003) and July 19, 2006 (Case No. 37 of 2005).

Shri. V. P. Raja, Chairman
Shri S. B. Kulkarni, Member
Shri V. L. Sonavane, Member

Maharashtra Biomass Energy Developers Association
Plot No. 30A, Road No. 1,
Film Nagar, Jubilee Hills,
Hyderabad 500 033

... Petitioner

Vs.

Maharashtra Energy Development Agency
MHADA Commercial Complex
Opp. Tridal Nagar,
Yerwada, Pune 411 006

... Respondent

ORDER

14th December, 2009

The Maharashtra Biomass Energy Developers Association (MBEDA) filed a Petition under affidavit before the Commission on September 23, 2008, inter alia seeking review of



the Commission's Order dated August 8, 2005 in Case No. 37 of 2003 and Order dated July 19, 2006 in Case No. 37 of 2005.

2. In the context of 'Review of Variable Charge Component of the Tariff', under Para 2.3 of the Commission's Biomass Tariff Order in Case 37 of 2003 dated August 8, 2005, the Commission had ruled as under:

"2.3 Commission's Ruling

The Commission notes that determining tariff on a long term basis considering current fossil fuel prices may not be the best way to address fuel price risk from either the Project holder or the Licensee's point of view. The Commission also understands the apprehension that, since crop residue-based fuel resources are highly unorganised at present; the fuel prices assumed for the purpose of tariff determination may expose the resource owners to exploitation on the one hand, or may expose Project holders to price manipulation by other agencies who could form cartels to artificially increase bio-mass prices, or result in unpredictable price increases as a result of new market demand from Projects.

The Commission believes that the key issue to be addressed in this context is whether fuel prices and the variable charge are to be firm for the entire EPA tenure in order to ensure regulatory certainty, or whether some review mechanism after 3 to 5 years (as suggested by one of the Licensees) is to be built into the dispensation. In this context, the Commission notes that APERC, in its tariff Order for biomass based projects, has determined the variable charge for a period of 5 years after a considerable exercise.

*Considering the concerns expressed by some Licensees, and owing to the absence of historical cost information for biomass fuels, the Commission has decided that, although the Tariff Rate and Structure shall be firm and not vary on account of changes in exchange rate, or in law, taxes, fuel prices, etc., **it would be reviewed after around 5 years (i.e. after 31st March, 2010).** Any revision in the variable charge component would also be applicable to Projects which would have been commissioned by then. **An earlier review of the variable charge component may be***



undertaken only in exceptional circumstances, if the Commission is approached formally with adequate supporting material justifying the need for premature review. While undertaking the review, the Commission would also take into consideration the information furnished by Project holders in the Monthly Statements, and the records maintained by MEDA and or the Licensees in this respect.” (emphasis added)

3. Accordingly, the Commission vide its Order dated January 23, 2009 in this matter directed the Petitioner to submit the following information and ruled that the matter would be considered for admission after the Petitioner submits the following documents, data and information:-

(i) Detailed information for each commissioned biomass power project of members of the MBEDA outlining (a) capacity addition (b) commercial operation date (COD) (c) month-wise actual energy generation in MU from COD till date (d) month-wise quantum of energy sale to each distribution licensee within the State from COD till date (e) month-wise revenue in Rs Lakh, from COD till date. **(Ref. clause (d), Page 7 of MERC Biomass Tariff Order dated August 8, 2005)**

(ii) Project-wise details of requisite information as required to be maintained by Project Developers in accordance with Cost Accounting Records (Electricity Industry) Rules, 2001, prescribed by GOI vide notification dated 21st December 2001 **(Ref. clause (e), Page 8 of MERC Biomass Tariff Order dated August 8, 2005)**

(iii) Project-wise compliance report regarding the monitoring mechanism for usage of fossil fuels as per directions under Clause 2.2 of Biomass Tariff Order. **(Ref. clause (i), Page 8 of MERC Biomass Tariff Order dated August 8, 2005)**

(iv) Project-wise Monthly Fuel Usage Statement since the Project COD (as per Appendix-4, Template 1.1 and 1.2) duly certified by its Auditor or Chartered Accountant. **(Ref. clause 2.2(a), Page 16 of MERC Biomass Tariff Order dated August 8, 2005)**



(v) Project-wise Monthly Fuel Procurement Statement since the Project COD (as per Appendix-4, Template 2.1 and 2.2) duly certified by its Auditor or Chartered Accountant. **(Ref. clause 2.2(b), Page 17 of MERC Biomass Tariff Order dated August 8, 2005)**

4. The Petitioner submitted certain information in respect of four biomass power projects namely, (i) Shalivahana Projects Ltd., (ii) Saradambika Power Plant Pvt. Ltd., (iii) Rake Power Ltd., and (iv) GAPS Power and Infrastructure Pvt. Ltd., vide affidavit dated February 20, 2009, and subsequently, the Commission issued an Order on March 25, 2009, in which the Commission ruled that **the variable charge component for biomass power projects based on rankine cycle in the State of Maharashtra shall be Rs. 2.58/kWh on interim basis (subject to adjustment based on the final dispensation in the matter). Further, the fixed charge component of the tariff shall continue to be applicable as per the decision under Biomass Tariff Order in Case No. 37 of 2003. Thus, for the biomass power projects in the first year of its operation as on date, the total Tariff worked out to Rs. 4.28/kWh (i.e., variable charge component at Rs. 2.58/kWh and fixed charge component at Rs. 1.70/kWh).**

5. In the above-referred Order dated March 25, 2009, the Commission directed MBEDA and Maharashtra Energy Development Agency (MEDA) to address various queries raised during the Hearing and also directed MBEDA, MEDA and MSEDCL to submit a detailed compliance report within four weeks from date of issuance of said Order. The relevant extract of said Order is as under:

“25. For the purpose of final dispensation, the Commission directs the Petitioner and MEDA to address the queries raised by the Commission during the hearing on 17.03.2008 as summarized under Para 10 of this Order. Further, the Commission directs the Petitioner and MEDA to substantiate the claim about non-availability of biomass and future plans/arrangements for procurement of biomass in the long-term. In this context, the Commission would like to draw the attention of the Petitioner/MEDA/MSEDCL to Para 7.4 and Para 2.21 of the Biomass Tariff Order in Case 37 of 2003 as under:



7.4 Plant Design and Capacity

....

....

2.21 Capacity Limit and harnessing of biomass resource:

.....

.....

Accordingly, the Commission hereby directs the Petitioner, MEDA and MSEDCL to submit detailed compliance report confirming that above conditions have been adhered to in respect of the biomass power projects already commissioned or for which Energy Purchase Agreements (EPAs) have been signed.”

6. While MBEDA and MSEDCL are yet to address the queries and are yet to furnish the compliance report as directed above, MEDA submitted that it has initiated a study and engaged the services of M/s Gokhale Institute of Politics & Economics, Pune. MEDA submitted that the findings of the study would be available only by Feb 2010.

7. MBEDA filed its affidavit on June 11, 2009, wherein MBEDA submitted that since the cost of biomass had increased substantially, the adhoc tariff fixed by the Commission is also not sufficient. MBEDA requested that the total tariff rate of Rs 5.91/kWh, comprising of Rs 1.70/kWh of Fixed Charge and Rs 4.21/kWh of Variable Charges may be allowed. MBEDA submitted that it was, therefore, placing more information and documents on record to substantiate its claim for fixation of higher variable charge. MBEDA further submitted that the prices of the fuel were already much higher than that prevailing at the time of the earlier submissions filed vide affidavit dated February 20, 2009. MBEDA added that while determining the variable charge on interim basis, the Commission had used the prices as per the Cost Accounting records, which reflects the average prices applicable for the whole financial year, and is not reflective of the present prices, since the rates were much lower earlier as compared to the recent escalation in fuel prices. Therefore, analysis based on historical data may not be appropriate. Hence, MBEDA has taken the most recent data from March 2009 to work out the cost impact and viable rate. MBEDA submitted that using the same methodology as used by the Commission in its Order dated March 25, 2009, MBEDA



has derived the weighted average cost of fuel of Rs. 2682 per MT incurred by the four biomass power projects for March 2009.

8. As regards the Station Heat Rate (SHR), MBEDA submitted that the SHR should be based on actual operating data obtained from the operational plants or the technical study report of Central Electricity Authority (CEA). Further, MBEDA submitted that the biomass plants use various types of fuels having different calorific values, hence, the Specific Fuel Consumption (SFC) changes from one type of fuel to another. MBEDA added that the Calorific Value (CV) and moisture content of most biomass fuels undergo unpredictable changes due to degradation in storage. A multi-fuel boiler inherently suffers from performance efficiency deterioration whenever secondary fuels are used with or without being mixed with the primary fuel. As such, a theoretical design efficiency range can perhaps be fixed for one of these fuels but not for all the fuels used at different times by a biomass fired boiler. Moreover, due to Ash Fusion characteristics present in certain biomass fuels, the operating temperature and pressure of the boiler are kept at safe margins, i.e., in the range of 450-460 degree Celsius to avoid fouling of super heater tubes and consequential failure. Thus, lower temperature and pressure results in lower heat cycle efficiency and consequential higher consumption of fuel and higher SHR. The large variations taking place in SFC every day have a direct bearing on the SHR achieved. MBEDA submitted that it would therefore, be unfair to predefine the SHR and fix SFC for the purpose of determining the variable costs and tariff. Therefore, actual fuel consumption data collected over a period of time should be considered as a base parameter to arrive at the SHR while determining the variable Cost of Generation (COG).

9. MBEDA submitted that in April 2005, the Ministry of Power (MoP), directed CEA to conduct a technical study and to submit its report and make necessary recommendations. CEA collected operating data from various sources and recommended that SHR of 4500 kcal/kWh should be considered for the biomass plants. Further, vide two different Judgments dated September 7, 2006 and May 14, 2007, in Appeal No. 20 of 2006 and Appeal No. 129 of 2005, respectively, the ATE has re-endorsed the parameters recommended by the CEA to be followed by the Commissions. The interim rate of Rs. 4.28/kWh considered by the Commission falls significantly short of the rate, which would have allowed the projects to service their fixed costs after apportioning funds for variable costs. MBEDA also submitted



the provisional cost accounting records upto March 31, 2009 (Exhibit-A), copies of self declaration of fuel usage/fuel procurement statement (Exhibit-B), month-wise generation and revenue statement (Exhibit-C), Statement/invoices of fuel procurement charges (Exhibit-D), project-wise loan status (Exhibit-E), Statement showing Generation revenue, EMI and Cash flow data (Exhibit-F) in respect of four biomass power projects out of eight commissioned biomass power projects.

10. MBEDA submitted that while ensuring long-term arrangements for sourcing biomass fuel, the following problems are encountered:

- i. Availability season for most of the biomass types are highly limited lasting from one month to a few months;
- ii. Due to frequent changes in the cropping pattern, it is neither feasible nor profitable for any trader or supplier to make any long-term arrangement for procurement and selling of the agricultural residue;
- iii. Short-term contracts for supply are without any binding conditions like committed quantity, etc.
- iv. Increased usage of biomass residue was not envisaged earlier;
- v. During every season, the local conditions pose different challenges in terms of organising large number of labour and other infrastructure to work in the fields;
- vi. Biomass has to be uprooted from the fields and taken to the collection areas for further processing before transportation to the power plants and thus, involves large number of farmers and labourers;
- vii. Due to requirement of biomass in other industries, the traders, middlemen and farmers sell it to the highest bidder of the day rather than committing it to any one for a long term.

11. MBEDA submitted that on account of the above mentioned reasons, it is not feasible to establish a fuel management chain with appropriate commercial arrangements' on a long term basis.



12. MBEDA submitted that all the plants were structured, designed and sized according to the biomass availability assessment as mentioned in their Detailed Project Reports (DPRs). MBEDA added that these assessments were more conservative as compared to the independent availability assessment submitted to MEDA and MSEDCL, before signing the Agreement with them. The assessment provided for sufficient margins for scarcity of biomass due to deficient rains and seasonal vagaries, etc.

13. MBEDA submitted that it has considered Equivalent Heat Value pricing for determining the variable COG and claimed that the plants have incurred an average coal price of Rs. 3899 per MT in March 2009, and an average coal calorific value of 3384 kcal/kg to arrive at an average fuel price per Equivalent Heat Value of Rs. 1152 per Mkal. Based on this Equivalent Heat Value and considering average calorific value of 3250 kcal/kg for main biomass, 2900 kcal/kg for supplementary biomass and 3384 kcal/kg for fossil fuel, SHR of 3650 kcal/kWh and auxiliary consumption at 10% as assumed by the Commission, the variable COG works out to **Rs. 4.63 per kWh**. MBEDA added that if the SHR of 4500 kcal/kWh is considered, the Variable COG works out to **Rs. 5.70 per kWh**.

14. MBEDA submitted that on the basis of weighted average fuel price of Rs. 1063 per MT assumed in the Order dated August 8, 2005, the corresponding variable charge component worked out to Rs. 1.34 per kWh. MBEDA added that if the SHR of 3650 kcal/kWh is considered in accordance with the above mentioned Order and the weighted average fuel rate of **Rs. 2682 per MT** is considered, the variable COG works out to **Rs. 3.42 per kWh**. Further, if SHR of 4500 kcal/kWh as per CEA recommendations is considered, the variable COG works out to Rs. 4.21 per kWh. MBEDA hence, prayed that the revised variable rate of **Rs. 4.21 per kWh** be fixed with effect from March 2009, and other reliefs be granted.

15. In response to MBEDA's submissions, MEDA filed an affidavit on August 17, 2009, and submitted that in the Order dated March 25, 2009, the Commission directed MEDA to assess the future plans/arrangements for procurement of biomass in the long-term and to substantiate the claim about the non-availability of biomass for the biomass projects, besides other issues mentioned under Para 9 of the said Order. In this context, MEDA submitted that it has taken necessary steps to undertake the study through Gokhale Institute of Politics and



Economics, Pune, and the draft Report is expected in February 2010. Further, MEDA submitted that sizing of biomass projects has been decided based on the data on surplus biomass availability submitted by the project holders in the DPRs and district-wise potential given in ORG-Marg study conducted by the Ministry of New & Renewable Energy (MNRE), Government of India. Further, MEDA added that the increase in the price of biomass is due to fuel shift in other industries and demand for biomass from other activities, viz., brick kiln, sugar factory co-generation, process industries, briquette manufacturers, etc., and this effect could not be anticipated at the time of conceiving the project. The prices of biomass cannot be controlled since the local farmers are either reluctant or unfamiliar with any long-term contractual agreements. **Further, out of eight commissioned projects, only four projects have submitted their audited data in the prescribed templates, while others have still not submitted the same.** However, MEDA assumed that as per Clause 2.2 (a) of the Order dated August 8, 2005, the commissioned projects must be submitting the certified monthly fuel usage statement to the licensee along with their monthly energy bills for verification.

16. MEDA submitted that the average SHR obtained from the cost sheets submitted by these projects is 4605 kcal/kWh and the weighted average cost of biomass and other fuel for the last quarter of FY 2008-09 as submitted by the four power projects amounts to **Rs. 2521 per MT**. Assuming the ratio of 85:15 for biomass:coal and considering the fuel price assumption and corresponding variable charge component of Rs. 1.34 per kWh as stipulated in the earlier Order dated August 8, 2005, the present variable charge component works out to **Rs. 3.94 per kWh**, which considers SHR as 4500 kcal/kWh as recommended by CEA and the actual auxiliary consumption of 15% (since the average auxiliary power consumption of the four power projects amounts to 15.4%). Further, looking at the trend in increase of cost of biomass, it is proposed that the variable charge component maybe determined and declared after every three years instead of making it applicable for five years.

17. MEDA proposed that for monitoring the functional biomass power projects and evaluating their field data for providing necessary details during revision of tariff, the Commission may allow MEDA to receive monitoring charges of Rs. 0.01 per unit from the variable charge component. The monitoring charges will enable MEDA to hire the required expertise and manpower for undertaking the field study and examining the operational



parameters. MEDA proposed that the monitoring charges can be deducted from the monthly energy bills of the project and released by MSEDCL to MEDA.

18. Further, MEDA submitted that since the draft report will be available to MEDA in February 2010 and the tariff structure is to be revised for the period after March 31, 2010, the Commission may revise the interim tariff against information furnished by MBEDA and MEDA for the period up to March 31, 2010. The regular tariff may be declared after March 31, 2010, as decided by the Commission.

19. MSEDCL filed its reply on affidavit dated September 2, 2009, wherein MSEDCL submitted that in order to promote RE generation; MSEDCL has no objection to the increase in the variable charge component as proposed by MBEDA. MSEDCL added that the rate proposed by MBEDA may be vetted by MEDA, and these amounts may be allowed as direct pass through in MSEDCL's Aggregate Revenue Requirement (ARR). MSEDCL added that the Commission may decide the rate in line with the assessment of MEDA so as to ensure financial viability of the generators and availability of renewable power for MSEDCL.

20. Further hearing in the matter was held on October 1, 2009. Shri. Sharan Jagtiyani, Advocate, appearing for MBEDA submitted that MBEDA filed a Petition on November 2008 for review of variable COG for biomass projects and the Order was passed on March 25, 2009, but the project developers faced a steep hike of 25% in the weighted average fuel prices in three months, which had necessitated review of variable charge as submitted by MBEDA on June 11, 2009, under Section 94 (f) of the EA 2003.

21. Shri. Sharan Jagtiyani submitted that SHR of 3650 kcal/kWh requires to be reconsidered by the Commission, since actual SHR realised by the project developers is 4650 kcal/kWh, which was not considered by the Commission in the review Order dated March 25, 2009. There is an in-built mechanism for review of tariff provided in the earlier Tariff Order dated August 8, 2005. The Commission acknowledged the fact that there will be variation in the cost of fuel due to demand-supply gap and seasonal variations. Further, the Commission enquired about the establishment of Agriculture Produce Market Committee (APMC) mechanism for administering agricultural residue movement in the State. Mr. S.A. Patil



representing MEDA, submitted that except fodder, remaining biomass procured by the project developers is not administered through APMC mechanism.

22. Shri. Sumeet Nindrajog, representing GAPS Power & Infrastructure Pvt Ltd., submitted that the biomass sector is completely unorganised. The farmers prefer to burn the biomass in their fields since they cannot afford to pay the labourers for uprooting the agricultural residue from the field. Therefore, the project developers have to provide labourers to the farmers for uprooting the agricultural residue. Further, the price of the biomass is also increasing because of the unavailability of the biomass fuels.

23. The Commission observed that it had already directed MEDA to assure biomass availability at the site of the project. The Commission observed that it cannot proceed further until all the directions given in the Tariff Order dated August 8, 2005, are complied with, and directed MEDA to ensure detailed compliance with the directions given in the above mentioned Tariff Order. MEDA submitted that it has taken the necessary steps to undertake the study through Gokhale Institute of Politics and Economics, Pune to comply with the given directions in the Biomass Tariff Order, MEDA.

24. Shri. Sumeet Nindrajog submitted that before commissioning of the project, the developers did a survey of biomass availability around a radius of 100 km and submitted the report to MEDA. He added that the project developers need resources to reach out to farmers and to collect the stock from the fields. Further, he submitted that the price of bagasse has gone up to Rs. 3000 per MT.

25. Shri. Sharan Jagtiyani emphasised that the review is being sought for getting the basic minimum tariff required for survival and sustenance of the biomass power projects, since the projects developers have to procure fuel at the present prices and the weighted average cost of fuel procured for the month of March 2009 is Rs. 2682 per MT and the weighted average cost of fuel for the period from January 2009 to June 2009 is Rs. 2605 per MT. Using the weighted average cost of fuel for the period from January 2009 to June 2009, the variable COG works out to Rs. 3.28 per kWh and thus, the total COG works out to Rs. 4.98 per kWh (Variable Charge of Rs. 3.28 + Fixed charge of Rs. 1.70 per kWh). If the recommendations



of CEA regarding SHR are also considered, then the variable works out to Rs. 3.90 per kWh and total COG works out to Rs. 5.60 per kWh.

26. In response to the Commission's query regarding cash losses incurred by the project developers, MBEDA submitted that they will provide the data in due course of time. MBEDA further submitted that the projects are on the verge of shutting down and the project developers are unable to repay the loans and make interest payments.

27. On analysis of the SHR and the gross calorific value from the data submitted by the four biomass projects, the Commission observed that due to lower efficiency of the plants, the fuel consumption is higher than that mentioned in the DPR. The Commission observed that the conversion cycle efficiency is as low as 15%-20% from the data of the four projects as submitted by MBEDA. In response, Shri. Sharan Jagtiyani submitted that the lower efficiency (or higher value of SHR) and lower gross calorific value is due to the intrinsic value of the fuel used. The quality of fuel was not considered when the DPRs were proposed and at no time in the past has the Commission reconsidered the value of SHR.

28. The Commission observed that the variation in the biomass price between Rs. 1801 per MT as suggested by the Central Electricity Regulatory Commission (CERC) in its Tariff Regulation for Renewable Energy Sources and Rs. 2682 per MT as submitted by MBEDA is very high and in the absence of the report from Gokhale Institute of Politics & Economics, Pune, there is no basis for validation of the data submitted by MBEDA.

29. Shri. Arvind Karandikar representing Gokhale Institute of Politics and Economics, Pune, submitted that study of 10 DPRs is being done, out of which 8 projects have been commissioned and 2 projects are yet to be commissioned. The study team comprises Director of the Institute, Energy Specialist, Economist and Agriculturist. The study will include interviewing 50 farmers from 5 villages, i.e., 10 farmers from each village.

30. The Commission's Regulatory Expert, Shri. Ajit Pandit, submitted that the value of SFC varies from 1.05 to 1.14 kg/kWh in the DPR. However, the project developers in their submission had asked for SFC of 1.55 kg/kWh. Shri. Pandit added that the fuel mix proposed



in the DPRs and actual fuels being used in the power plants, for which the increase in the fuel price is being sought, is different.

31. Having heard the Parties and upon scrutiny of the submissions placed on record, the Commission observes that the revision in variable charge component on account of revision in biomass fuel prices will have to be undertaken strictly in accordance with the provisions as outlined under the Biomass Tariff Order dated August 8, 2005, in Case No. 37 of 2003 and upon undertaking due regulatory process as per provisions of EA 2003 and MERC (Conduct of Business) Regulations, 2004. However, in order to ensure that biomass power projects continue to operate and inject power into the grid, which is the need of the hour considering power shortage and load shedding prevalent within State, the Commission is of the view that a further Order is necessary, till such time the comprehensive review of the entire RE sector being undertaken by the Commission arrives at a conclusion.

32. The Commission has proceeded to analyse MBEDA's submission and other materials placed on record by MEDA in this context, while formulating the Order.

33. Table-I below shows the comparison between various submissions by different entities with the assumptions made in the Biomass Tariff Order (Case No. 37 of 2003) dated August 8, 2005 (considered as Base Case), for the Variable COG related components:

- i. **Station Heat Rate:** In the Tariff Order dated August 8, 2005, the Commission has considered Station Heat Rate of 3650 kcal/kWh while determining the tariff for biomass power projects. However, MBEDA has submitted that SHR of 4500 kcal/kWh should be considered while determining the tariff.
- ii. **Gross Calorific Value:** In the Tariff Order dated August 8, 2005, the Commission has considered has considered GCV of 3200 kcal/kg for determining the tariff. However, MBEDA has submitted that GCV of 2963 kcal/kg should be considered while determining the tariff.



- iii. **Sp. Fuel Consumption:** In the Tariff Order, the Commission has considered SFC of 1.14 kg/kWh. However, MBEDA has submitted that the actual SFC is 1.55 kg/kWh.

- iv. **Wt. Avg. Biomass Fuel Price:** For determination of tariff for biomass projects, the Commission considered a weighted average biomass price of Rs. 1057 per MT and considered an escalation rate of 5% p.a. However, in the Interim Order dated March 25, 2009, the Commission has considered a weighted average biomass price of Rs. 2045 per MT for determination of Interim Tariff. However, MBEDA in its submission dated June 11, 2009, has submitted that the project developers have incurred a weighted average biomass price of Rs. 2682 per MT in the month of March 2009.

- v. **Aux. Consumption:** While determining the tariff, the Commission has considered an auxiliary consumption of 10%. However, MBEDA requested the Commission to consider auxiliary consumption of 15% while determining the tariffs.

Table I: Comparison of various tariff related parameters



Item Description	Units	Biomass Tariff Order (Case 37 of 2003) (08.08.2005)	Interim order (25.03.2009)	MBEDA Case (11.06.2009)	MEDA Case (17.08.2009)	Considering Only Fuel Price change	Impact assessment for each Performance Parameter separately			Impact of all Parameters incl. Fuel Price change
							SHR change	GCV change	ACF change	
		Base Case	Case-1	Case-2	Case-3	Case-4	Case-5	Case-6	Case-7	Case-8
Station Heat Rate (Kcal/kWh)	(a)	3650	3650	4594	4500	3650	4594	4594	4594	4594
Gross Calorific Value, (kCal/kg)	(b)	3200	3200	2963	3389	3200	3200	2963	2963	2963
Sp. Fuel Consumption, (kg / kWh)	(c)=(a)/(b)	1.14	1.14	1.55	1.33	1.14	1.44	1.55	1.55	1.55
Wt. Avg. Biomass Fuel Price, (Rs/ tonne)	(d)	1057	2045	2682	2521	2682	1057	1057	1057	2682
Variable COG (Rs/kWh)	(e)=(c)x(d)/1000	1.21	2.33	4.16	3.35	3.06	1.52	1.64	1.64	4.16
Aux. Consumption, (%)	(f)	10%	10%	15%	15%	10%	10%	10%	15%	15%
Variable Component of Tariff, (Rs/kWh)	(g)=(e)/(1-f)	1.34	2.58	4.89	3.94	3.40	1.69	1.82	1.93	4.89
Difference from Base Case		Base Case	1.24	3.55	2.60	2.06	0.35	0.48	0.59	3.55
% Increase over Base Case	(h)		93%	265%	194%	154%	26%	36%	44%	265%
Var. Charge proposed by MBEDA	(i)			4.21						
Yr-1 : Fixed Component of Tariff, (Rs/kWh)	(j)	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
Total Tariff (Fixed for Yr-1 + Variable Charge)	(k)=(g)+(j)	3.04	4.28	5.91	5.64	5.10	3.39	3.52	3.63	6.59

34. The Table shows that if we consider all the values for the variable component as submitted by MBEDA in its submissions dated June 11, 2009, the variable COG works out to be Rs. 4.89 per kWh, which amounts to an increase of 265% over the base variable component of tariff, i.e., variable COG of Rs. 1.34 per kWh as considered by the Commission in its Tariff Order dated August 8, 2005.

35. Further, from the Table-I shown above, it can be seen that in the Interim Order dated March 25, 2009, the Commission has increased the variable COG by 93% over the base variable COG. Further, variable COG of Rs. 4.21 per kWh as proposed by MBEDA will amount to an increase of 214.17% over the base variable COG of Rs 1.34 per kWh. Further, a tariff rate of Rs. 5.91 per kWh (variable component of Rs. 4.21 per kWh + fixed component of 1.70 per kWh) as proposed by MBEDA amounts to an increase of 174% over the base tariff of Rs. 3.05 per kWh.

36. MEDA, in its submissions, has proposed a variable component of Rs. 3.94 per kWh, which amounts to an increase of 194% over the base variable component of Rs 1.34 per kWh. Further, a tariff rate of Rs. 5.64 per kWh (variable component of Rs. 3.94 per kWh + fixed



component of 1.70) as proposed by MEDA amounts to an increase of 125% over the base tariff.

37. Further, on analysis of the DPR of Rake Power Ltd, it was observed that all the fuels proposed by the developer, i.e., cotton stalk, red gram stalk, soya bean stalk, rice husk and woody biomass, were not considered during the financial calculations, instead only cotton stalk, red gram, woody biomass and coal were considered in the calculations.

38. On comparison of the data of the four power projects vis-a-vis their DPRs as shown in **Annexure-I**, the Commission observes that the biomass fuel used by projects for which fuel price revision is sought, are different from the fuel mix proposed by the developers in the DPRs.

39. On analysis of the DPRs of various projects, as shown in **Annexure I and II**, the Commission observes as under:

- i. Specific Fuel Consumption (SFC) as referred under DPR is in the range of 1 kg/kWh to 1.25 kg/kWh. However, MBEDA under affidavit dated June 11, 2009, submitted that the actual SFC of the four projects is in the range of 1.50 kg/kWh to 1.70 kg/kWh;
- ii. The auxiliary power consumption in the DPRs is in the range of 10% to 14% whereas, MBEDA under the above mentioned affidavit submitted that the actual auxiliary consumption for the four projects is in the range of 13% to 15.30%;

40. MBEDA further submitted that the SHR is in the range of 4550 kcal/kWh to 4850 kcal/kWh, as against 3650 kcal/kWh as considered by the Commission in its Tariff Order dated August 8, 2005.

41. Further, the Commission notes the discrepancies in the certified data (ref. data templates for fuel usage and fuel procurement) submitted for the same period (i.e., Apr-08 to Dec-08) under affidavits dated February 20, 2009, and June 11, 2009, of M/s Shalivahana



Project Limited for fuel procurement costs as shown in **Annexure III and IV**. The Tables shows that the total delivered cost for Rice Husk is reported to be higher by Rs. 53.94 Lakh, cost for Bamboo Dust is reported to be higher by Rs. 6.79 Lakh and that for bagasse is reported to be higher by Rs. 20.29 Lakh for the same period on month-to-month basis from Apr-08 to Dec-08. Thus, the certified fuel cost data submitted on June 11, 2009 for Shalivahana Power Ltd for the period April 2008 to December 2008 is higher by 8.77% over the previous certified fuel cost data submitted on February 20, 2009 for the same period. Thus, the reliability of the data considered for interim tariff is questionable.

42. Similarly, **Annexure V and VI** show difference in fuel cost when calculated by taking data submitted in the Cost Accounting Records and data submitted in the Data Template on fuel usage and fuel procurement in respect of all four biomass power projects for which information has been furnished by the Petitioner. Weighted average fuel cost (Rs./MT) as submitted in Cost Accounting Records Information (Apr-2008 to March 2009) works out to **Rs. 2075.61 per MT** and Weighted average fuel cost as submitted in the Data Templates (Apr-2008 to March 2009), works out to **Rs. 1860.44 per MT**.

43. MBEDA, vide affidavits dated October 23, 2009, November 6, 2009, and November 9, 2009, submitted additional information for the period from April 2009 to June 2009, in respect of four Biomass Power Stations, namely, M/s Rake Power Ltd, M/s Shalivahana Projects Ltd, M/s Saradambika Power Plant Pvt Ltd and M/s GAPS Power & Infrastructure Pvt Ltd., for which fuel cost information was earlier furnished only up to March 2009. Upon detailed scrutiny of the submissions, the Commission observes that the information under Cost Accounting Record (Electricity Industry) Rules, 2001, for biomass power generation project comprises of two parts, viz., Part-I (Quantitative information) such as plant capacity, availability, outages during period, electricity generation, plant load factor, auxiliary consumption, etc., and Part-II (Cost information) such as biomass fuel cost, consumables, spare parts, R&M expense, depreciation, insurance, A&G expense, overheads, etc. For the purpose of fuel cost analysis, Part-II (Cost Information) is most relevant. The Commission notes that the Petitioner has furnished Cost Information (Part-II) for the period Apr-2009 to June-2009 **only in respect of one project**, namely M/s Sardambika Power Plant Pvt Ltd and Quantitative information (Part-I) has been furnished in respect of all four biomass power



projects. Further, the Petitioner has furnished 'replacement fuel cost data' in respect of all four biomass power projects for the period (Apr-09 to Jun-2009)

44. In this context, the Petitioner has submitted as under:

- a. *"Although, as per Cost Accounting Records (Electricity Industry) Rules, 2001 these projects would be required to file their cost records only after completion of the current financial year, however, to comply with the requirements of the Hon'ble Commission the said projects have compiled these documents on provisional basis. The delay in filing is due to account auditing which had to be completed before compiling the cost accounts.*
- b. *In addition, the Petitioner takes liberty to file 'Replacement Cost Account Records' for the period April 2009 to June 2009 for the four representative projects. It may be appreciated that, in view of the most volatile and unprecedented escalation in cost of fuels experienced recently, the true picture of the prevailing variable cost affecting the said projects can only come out with the help of Replacement Cost data. Therefore, the Hon'ble Commission is urged to give due consideration to the replacement cost of fuels rather than historical costs based on average stock values. For this purpose, the Petitioner has also prepared Replacement Cost Accounts based on the fuel costs incurred during the Period of April 2009 to June 2009."*

45. A summary of delivered cost of biomass fuels in respect of four biomass power projects for different periods and under various submissions as per Cost Accounting Records, Certified Data Templates for Fuel Usage and Fuel Procurement Statements and Replacement Cost Data, as furnished by MBEDA is presented in the following Table:

Table-II : Summary of Biomass fuel prices for different time periods (MBEDA submission)



Biomass Fuel Prices (Rs/MT)	Interim Order dt. 25th Mar 2009	Period-1 (MBEDA submissions dt. 11th Jun-09)		Period-2 (MBEDA submissions dt. 9th Nov-09)		Period-3 (MBEDA submissions dt. 23rd Oct-09)	
	Apr-08 to Dec-08	Apr-08 to Mar-09		Apr-09 to Jun-09		Jan-09 to Jun-09	
Project Description		As per Cost Accounting Information	As per Data Templates (Fuel Usage & Fuel Procurement)	As per Replacement Cost Information	As per Data Templates (Fuel Usage & Fuel Procurement)	As per Cost Accounting Information	As per Data Templates (Fuel Usage & Fuel Procurement)
Rake Power Ltd	1940	1956	1976	2860	2713	na	2668
Shalivahana Projects Ltd	2030	2022	2019	2618	2615	na	2603
Sardambika Power Plant Pvt Ltd	2123	2154	1894	2496	2502	2390	2411
GAPS power & Infrastructure Pvt. Lt	2289	2338	1522	3167	3167	na	2893
Wt. Avg. Fuel Cost for 4 projects	2045	2076	1860	2785	2678		2605

46. It is evident from above table that the weighted average biomass price as considered for the purpose of Interim Order dated March 25, 2009 is Rs 2045/MT and corresponding variable charge component of the tariff was Rs 2.58 per kWh. The weighted average biomass fuel price was based on information available/furnished at that time till Dec 2008. Subsequently, there has been significant rise in the fuel cost on account of factors enumerated by the Petitioner in its submissions from time to time.

47. It is also observed that the weighted average biomass fuel prices during FY 2008-09 was around Rs 2045/MT (based on Apr-08 to Dec-08) or Rs 2076/MT (based on Apr-08 to Mar-09) based on information furnished by Petitioner as per Cost Accounting Records. However, during FY 2009-10 (Apr-09 to Jun-09) or Calendar year (Jan-09 to Jun-09), i.e., since last data considered for Interim Order dated March 25, 2009, the weighted average biomass fuel price has increased significantly to Rs 2605/MT or Rs 2678/MT as per certified Fuel Usage and Fuel Procurement Statements furnished by the Petitioner; even though the discrepancies noted in earlier paragraphs raises questions about reliability of the data. However, the Commission also notes that pending availability of audited Cost Accounting Record information; (which can only be available at the end of the financial year), the scope for further scrutiny is limited. Further, provisional Cost Accounting Record information has been furnished only for one project (viz. M/s Sardambika Power Plant Pvt Ltd).

48. Thus, the Commission has proceeded to consider submissions made by Petitioner under certified Data Templates for Fuel Cost Usage and Fuel Procurement Statement and accordingly considered **weighted average biomass fuel price as Rs 2605/MT** for the



purpose of this order. The Commission has noted the Petitioner's submission that present circumstances are exceptional and due to scarcity of fuel availability. The Commission has noted MSEDCL's submission that it has no objection to the proposed revision in variable charge component for biomass based power projects and generation from such renewable energy sources needs to be promoted. The Commission also notes that the detailed investigations and findings of the study report from M/s Gokhale Institute of Economics & Politics, Pune shall be available by February 2010. Thus, present Order and biomass fuel price considered for the purpose of tariff determination shall be valid only till March 2010.

49. The Commission has already initiated process for comprehensive review of renewable energy sources for the new Control Period envisaged to be put in place with effect from April 2010. A draft Discussion Paper on the subject has proposed a biomass fuel price indexation mechanism and formula thereof, which can be firmed up after undertaking due regulatory process thereof.

50. As regards the issues of Station Heat Rate, auxiliary power consumption, etc., the Commission is of the view that these are performance parameters for which norms have been stipulated. Any modification in the same will amount to a review, which is not the subject matter of the present matter. Hence, in this Order, revision in variable charge component of the Tariff only on account of fuel price variation has been dealt with.

51. Based on the submissions of Petitioner, for this order, the Commission has determined variable charge component as Rs 3.28/kWh (i.e., Approved variable charge component as per Interim Tariff Order dated 25.03.09 (Rs 2.58/kWh) x Revised weighted avg. Biomass fuel price (Rs 2605/MT) / Weighted avg. Biomass fuel price as per Interim Tariff Order dated 25.03.2009 (Rs 2045/MT) = Rs 2.58/kWh x Rs 2605/MT / Rs 2045/MT). The fixed charge component of tariff shall continue to remain the same, as determined under the Biomass Tariff Order linked to year of operation of the biomass power project, i.e., for biomass power project in its first year of operation, fixed charge component of Rs 1.70/kWh shall be applicable and for second year of operation Rs 1.67/kWh shall be applicable, and so on.



52. Thus, with effect from the date of this Order till March 31, 2010, the variable charge component for the biomass power projects based on Rankine Cycle in the State of Maharashtra shall be Rs 3.28/kWh. Further, the fixed charge component of the tariff



53. shall continue to be applicable as per dispensation outlined under Biomass Tariff Order in Case No. 37 of 2003. Thus, for the biomass power project in the first year of its operation as on date, the total Tariff works out to Rs 4.98/kWh (i.e., variable charge component at Rs 3.28/kWh and fixed charge component at Rs 1.70/kWh).

54. Further, during the regulatory process of issuance of this Order, the Commission observed that, discrepancies and reliability of data was a major issue in arriving at certain necessary conclusions. Consistency and reliability in data is required to be maintained. Hence, the Commission hereby directs that MEDA, being the State Nodal Agency for Energy Development, should maintain such data, which includes the technical and commercial details of Biomass projects in the State and should periodically make the data available in the public domain for ease of access and for necessary analysis/verifications to be done on related matters, and not vet data submitted by Developers on a post facto basis. Also, MSEDCL as a distribution licensee should ensure that the power purchase rates are reasonable and kept to the bare minimum so that the interests of consumers are protected.

With these observations and rulings, the Commission hereby issues the above order.

(V. L. Sonavane)
Member

(S.B. Kulkarni)
Member

(V. P. Raja)
Chairman



(Sanjay Sethi)
Secretary, MERC

Annexure-I: Comparison of proposed fuel mix and auxiliary consumption with fuel mix and auxiliary consumption claimed now

S.No.	Name of the Project	Capacity (MW)	As Proposed in the DPRs		As mentioned in submissions			
			Fuel Mix	Auxiliary consumption	Fuel Mix	Sp. Fuel consumption	Auxiliary consumption	SHR
1	M/s Rake Power Ltd	10	Cotton Stalk	12%	Rice Husk	1.52	13%	4560
			Red Gram Stalk		Gram stalk			
			Soya bean Stalk		Bagasse			
			Rice Husk		Coal			
			Woody Biomass					
2	M/s Shalivahana Projects Ltd	10	Cotton Stalk	12%	Rice Husk	1.49	15.30%	4430
			Red Gram Stalk		Bamboo			
			wood chips		Bagasse			
					Coal			
3	M/s GAPS Power & Infrastructure Pvt. Ltd	13	Cotton stalk	10%	Cotton stalk	1.59	15.30%	4587
			Maize stalk		Maize stalk			
			sugarcane Stalk		Maize Bhutta			
			Juliflora		Juliflora			
			Other agri residues		Bagasse			
4	M/s Sardambika Power plant Pvt. Ltd.	10	Cotton Stalk	12%	Rice Husk	1.68	14.80%	4845
			Red Gram Stalk		Juliflora			
			Rice Husk		Twigs			

S.No.	Name of the Project	Capacity (MW)	As Proposed in the DPRs		As mentioned in submissions			
			Fuel Mix	Auxiliary consumption	Fuel Mix	Sp. Fuel consumption	Auxiliary consumption	SHR
					Soya bean			
					Husk			
					Coal			

Annexure-II: Summary of data as submitted in DPRs

S.No.	Name of the Project	Capacity (MW)	As Proposed in the DPRs		
			Fuel Mix	Sp. Fuel consumption	Auxiliary consumption
1	Ind Barath Power Project	20	Rice Husk	1.02	10%
			Cotton Stalk		
2	Gayatri Power Project	8	Rice Husk	1.25	10%
			Juliflora		
			Red Gram		
3	Varam Power Project	10	Rice Husk	1.22	12.00%
			Pulses		
			Coal		
4	ASN power Projects	7.5	Rice Husk	1.23	12%
			Pulses		
			Coal		
5	BGR Enterprises Ltd.	7.5	Cotton Stalk	1.14	12%
			Wood Chips		
			Coal		
6	Dhreeu Powergen Pvt. Ltd.	7.5	Rice Husk	1.25	12%
			Various Crop Residue		
			Coal		
7	Mangalam Bio-Energy Pvt. Ltd.	7.5	Rice Husk	1.25	12%
			Various Crop Residue		
			Coal		
8	Vayunanda Power Ltd.	8	Firewood	1.07	12%
			Rice Husk		
			Coal		
9	Bhuvana Bio Energy Ltd.	10	Cotton Stalk	1.02	12%
			Red Gram		
			Coal		
10	MSM Energy Ltd.	10	Cotton Stalk	1.01	14%
			Red Gram		
			Coal		

11	Armstrong Power Project	6			
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Annexure III: Difference in the Submissions under affidavits February 20, 2009 and June 11, 2009

Shalivahana Power Project										
Sr. No.	Month	Total Delivered cost of Fuel (in Rs. Lakh)								
		Biomass Fuel -1 (Rice Husk)			Biomass Fuel -2 (Bamboo dust)			Biomass Fuel -3 (Bagasse and Others)		
		As submitted under affidavit dated June 11, 2009	As submitted under affidavit dated Feb 20, 2009	Difference in the submissions	As submitted under affidavit dated June 11, 2009	As submitted under affidavit dated Feb 20, 2009	Difference in the submissions	As submitted under affidavit dated June 11, 2009	As submitted under affidavit dated Feb 20, 2009	Difference in the submissions
1	April	68.27	63.39	4.88	7.05	5.62	1.43	8.13	6.60	1.53
2	May	63.17	58.66	4.51	0.00		0.00	17.34	14.05	3.29
3	June	85.56	79.45	6.11	6.88	5.49	1.39	17.31	14.02	3.29
4	July	80.82	74.72	6.10	1.66	1.31	0.35	29.34	23.77	5.57
5	August	52.32	48.24	4.08	6.28	4.91	1.37	11.87	9.66	2.21
6	September	89.36	82.40	6.96	5.56	4.35	1.21	34.00	27.67	6.33
7	October	92.55	85.34	7.21	2.16	1.69	0.47	56.69	46.14	10.55
8	November	93.96	86.64	7.32	1.57	1.22	0.35	50.24	69.21	-18.97
9	December	87.00	80.22	6.78	1.00	0.78	0.22	34.85	28.36	6.49

	TOTAL	713.00	659.06	53.94	32.16	25.37	6.79	259.77	239.48	20.29
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Annexure IV: Difference in the Submissions for delivered cost of fuel

Shalivahana Power Projects									
Month	Biomass fuel-1			Biomass fuel-2			Biomass fuel-3		
	Delivered cost of fuel in (Rs./Ton) as per submission dt. Jun 11, 2009	Delivered cost of fuel in (Rs./Ton) As in submission dated Feb 20, 2009	Difference in the submissions	Delivered cost of fuel in (Rs./Ton) as per submission dt. Jun 11, 2009	Delivered cost of fuel in (Rs./Ton) As in submission dated Feb 20, 2009	Difference in the submissions	Delivered cost of fuel in (Rs./Ton) as per submission dt. Jun 11, 2009	Delivered cost of fuel in (Rs./Ton) As in submission dated Feb 20, 2009	Difference in the submissions
April	1723.00	1600.00	123.00	1831.00	1460.00	371.00	1604.00	1300.00	304.00
May	1723.00	1600.00	123.00	1831.00	1460.00	371.00	1604.00	1300.00	304.00
June	1723.00	1600.00	123.00	1831.00	1460.00	371.00	1604.00	1300.00	304.00
July	1947.00	1800.00	147.00	2103.00	1660.00	443.00	1604.00	1300.00	304.00
August	2169.00	2000.00	169.00	2377.00	1860.00	517.00	1843.00	1500.00	343.00
September	2169.00	2000.00	169.00	2377.00	1860.00	517.00	1843.00	1500.00	343.00
October	2169.00	2000.00	169.00	2377.00	1860.00	517.00	1843.00	1500.00	343.00
November	2169.00	2000.00	169.00	2377.00	1860.00	517.00	1843.00	1500.00	343.00

December	2169.00	2000.00	169.00	2377.00	1860.00	517.00	1843.00	1500.00	343.00
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Annexure V: Details of Fuel Cost

S.No.	Material/ fuel Cost	Rake Power Limited						Shalivahana Projects Ltd.					
		As submitted in Cost Accounting Records			As submitted in certified data Templates for fuel usage & procurement			As submitted in Cost Accounting Records			As submitted in certified data Templates for fuel usage & procurement		
		Quantity (in MT)	Cost of Fuel (in Rs.)	Fuel Cost (Rs/MT)	Quantity (in MT)	Cost of Fuel (in Rs.)	Fuel Cost (Rs/MT)	Quantity (in MT)	Cost of Fuel (in Rs.)	Fuel Cost (Rs/MT)	Quantity (in MT)	Cost of Fuel (in Rs.)	Fuel Cost (Rs/MT)
(A)	Rice Husk	27821.9	58473844	2101.72	28850.06	60634841.15	2101.72	37477	76639341	2044.97	41267.07	84390005.50	2044.97
(B)	Bamboo				383.60	624794.50	1628.77	2041	4282263	2098.12	1554.69	3262808.55	2098.69
(C)	Soyabean Husk												
(D)	Coal	383	1414059	3692.06	1047.00	3865584.00	3692.06	553	1921913	3475.43	530.00	1841980.00	3475.43
(E)	Bagasse	17537.9	29591874	1687.31	18002.75	30303429.39	1683.27	15239	29006552	1903.44	17237.72	32810971.64	1903.44
(F)	Cotton Stalk												
(G)	Maize Bhutta												
(H)	Maize Stalk												
(I)	Juliflora Twigs												
(J)	Total Fuel	45742.8	89479777	1956.15	48283.41	95428649.04	1976.43	55310	111850069	2022.24	60589.48	122305765.69	2018.60

Cost													
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Annexure -VI: Details of Fuel Cost

S.No.	Material/ fuel Cost	Saradambika Power Plant Pvt. Ltd.						GAPS Power & Infrastructure Pvt. Ltd.					
		As submitted in Cost Accounting Records			As submitted in Certified Data Templates for Fuel usage & procurement			As submitted in Cost Accounting Records			As submitted in certified Data Templates for Fuel usage & procurement		
		Quantity (in MT)	Cost of Fuel (in Rs.)	Fuel Cost (Rs/MT)	Quantity (in MT)	Cost of Fuel (in Rs.)	Fuel Cost (Rs/MT)	Quantity (in MT)	Cost of Fuel (in Rs.)	Fuel Cost (Rs/MT)	Quantity (in MT)	Cost of Fuel (in Rs.)	Fuel Cost (Rs/MT)
(A)	Rice Husk	37463.64	78505806.89	2095.52	30736.69	54023832.76	1757.63						
(B)	Bamboo												
(C)	Soyabean Husk	4276.489	9228577.73	2157.98	5836.92	10124317.50	1734.53						
(D)	Coal	592.56	2340523.12	3949.85	3249.21	10928718.58	3363.50	205	976153.81	4761.73	453.76	2162000	4764.63
(E)	Bagasse							15318.50	35133045.01	2293.50	21244.31	19702000	927.40
(F)	Cotton Stalk							961	2299322.23	2392.63	9157.14	20083000	2193.15
(G)	Maize Bhutta							866	2171690.39	2507.73	6653.61	12036000	1808.94
(H)	Maize Stalk							519	1284623.03	2475.19	2892.41	5769000	1994.53

(I)	Juliflora Twigs	2972.439	7534300.58	2534.72	3974.66	7894113.65	1986.11	603	1320308.08	2189.57	8808.23	15127000	1717.37
(J)	Total Fuel Cost	45305.13	97609208.32	2154.48	43797.47	82970982.5	1894.42	18472.50	43185142.6	2337.81	49209.46	74879000	1521.64