

**BEFORE THE KARNATAKA ELECTRICITY REGULATORY COMMISSION,
BANGALORE**

Dated : 22nd January, 2015

In the matter of

“Revision of Fuel cost for the existing biomass power generation plants in Karnataka”

Present:

- | | |
|-------------------------------|----------|
| 1. Sri M.R. Sreenivasa Murthy | Chairman |
| 2. Sri H.D.Arun Kumar | Member |
| 3. Sri D.B.Manival Raju | Member |

I. Preamble:

1. The Karnataka Electricity Regulatory Commission had during 2012-13 noted that a majority of the biomass based power plants in Karnataka either had stopped generating power or were generating at a low PLF in the recent years. It was therefore considered necessary to have a study of the operation of biomass based generation stations in the State. The Commission had entrusted the Study to The Energy Research Institute (TERI), the report of which was available with the Commission in March, 2013.
2. Meanwhile M/s Koppal Green Power Ltd Karatagi, Koppal District and M/s Poweronicks Ltd., Siruguppa, Bellary District had filed petitions before this Commission which were admitted and heard vide Petition in O.P. No. 8 of 2013. In their petition, among other things the petitioners have requested the Commission to revise the cost of biomass fuel, including transportation, to Rs.3000/- per metric ton with 15% escalation annually. The Commission has disposed of the said petition vide its order dated 22.01.2015
3. In order to have wider consultations before taking a decision in the matter, the Commission issued a discussion paper titled “Revision of Fuel cost of the existing

biomass power generation plants in Karnataka" on 23-7-2014 inviting comments/ views/ suggestions from the Stakeholders and held public hearing in the matter on 25-9-2014 in the court hall of the Commission. The list of stakeholders who submitted their written comments is enclosed as annexure-1 and the list of persons who made oral submissions during the public hearing is enclosed as annexure-2 to this order. The suggestion/comments and views by the stakeholders and the Commission's decision on these issues are discussed in the subsequent paras of this order.

II. Issues before the Commission:

In the said Discussion Paper issued by the Commission, comments/views/suggestions from stakeholders were invited on the following issues:

- a. Whether the biomass fuel price needs to be revised upwards for all existing biomass power projects?
- b. If the price has to be revised, what should be the base price in FY15?
- c. Whether the existing annual escalation of 5% is to be continued or revised?
- d. Whether biomass fuel price has to be indexed as specified by CERC instead of giving a flat rate of annual escalation? If so, what parameters need to be considered for indexation?
- e. Whether the Tariff for Biomass power plants should be two part instead of existing single part tariff to account for variability in fuel cost?

In response to the discussion paper issued by the Commission, and during the public hearing held on 25.9.2014 various stakeholders have requested the Commission to consider revision of the fuel price of all the existing biomass power plants. However, one of the distribution licensees namely CESC, has opposed the revision of the fuel cost norms.

Price for fuel

In their written submissions and the statements made in the public hearing, several stakeholders have drawn the attention of the commission to a steep increase in the cost of biomass fuel, particularly during the last two years. M/s. Koppal Green Power

Ltd. have prayed for fuel price being fixed at Rs.3,000/MT with 15% escalation annually. M/s R.K.Powergen have sought the price to be revised to Rs.3,500/MT with an annual escalation of 10.5%. M/s. Karnataka State Rice Millers' Association and M/s. Raichur Rice Millers' Association have suggested a price of Rs.3,800 to Rs.4,300/MT. The Karnataka State Bio-fuel Development Board have suggested Rs.4,000/MT as the cost of biomass fuel after briquetting for their gasification based power plants. M/s. Konark Power Ltd., have suggested a price of Rs.3,600/MT. M/s. IREDA have suggested a price range of Rs.2,500 to Rs.3,000/MT with annual escalation of 8 to 10%. M/s. KREDL have suggested Rs.2,500 to Rs.3,500/MT plus transportation cost of Rs.1,000 to Rs.1,500/MT. Other developers and stakeholders have suggested a base price ranging between Rs.2,500 to Rs.4,225/MT while the distribution licensee BESCOM have suggested a price of only Rs.2,000/MT. The increase in biomass fuel cost during 2012-13 and 2013-14 is attributed by many to increase in transportation costs and general inflation.

Indexation of fuel price

M/s R.K. Powergen Pvt. Ltd., Karnataka State Bio-fuel Development Board and IREDA have proposed indexation of the price of biomass fuels as per CERC norms. Others have opined that it could be linked to the price of rice husk or coal. However, GESCOM has expressed that it is not in favour of indexation as the method is very complex. KPTCL has also suggested to adopt CERC indexation formula.

Single or Two Part tariff

M/s R.K. Powergen Pvt. Ltd., Karnataka State Bio-fuel Development Board, IREDA, Karnataka State Rice Millers Association, M/s Indira Power Energies Ltd., M/s Haveri Bio-energy Pvt. Ltd., M/s All Green Energy India Pvt. Ltd., KREDL and others have favoured a two part tariff. BESCOM has suggested to continue the single part tariff stating that, the annual escalation would take care of the fuel cost variation. KPTCL has stated that, with long-term PPAs, the RE generators will be able to get a fixed tariff for a long term. Further, KPTCL has stated that as there is no provision for backing down of RE generating stations, in the event of adoption of two part tariff,

the Commission will have to ensure that after the initial recovery of fixed costs, only variable charge and ROE with O & M expenses are allowed.

Commission's Views and Decision

As discussed in the Commission's Order dated 1st January 2015, regarding the determination of tariff for mini-hydel, bagasse based cogeneration and rankine cycle based biomass renewable energy projects, the Commission has over the last one year held more than one public hearing in which it had occasion to enquire about the price of biomass particularly crop residues which are commonly used by renewable energy units. As ascertained from farmers and other sources in these hearings, the delivered cost of various kinds of crop residues at the project site is found to be around Rs.2,000/MT. This is also supported by the findings of a Study by TERI where the price of various kinds of biomass is said to range between Rs.1,000 and Rs.3,000/MT in Karnataka, which is indicated below :

Type of Biomass	Price (Rs.per MT)
Rice Husk	2,200 to 2,800
Maize/Corn	2,400
Coffee Husk	3,000
Woodchips	1,500
Juliflora	< 1,000
Chilli Powder	1,400

While determining generic tariff for various renewable sources of energy for the period from 1.1.2015 to 31.3.2018, the Commission decided to adopt the two-part tariff system for biomass based RE projects as also bagasse based cogeneration projects. This was considered necessary in view of the fluctuations in the price of both biomass fuel and sugarcane bagasse from time to time depending upon various factors. This Commission has noted that the practice of adopting a two-part tariff system is supported by the CERC Regulations as also the tariff order issued by some other Commissions like Gujarat Electricity Regulatory Commission, Maharashtra Electricity Regulatory Commission, etc. Hon'ble APTEL in its judgment, in Appeal No.207/2013, has also made the following observations on the desirability of adopting a two-part tariff for RE sources which depend upon fuels like biomass:

“32.5 We further observe that substantial increase in the biomass fuel cost has affected the viability of the Appellant's cogeneration project necessitating positive intervention on the part of the State Commission because the fuel cost is an uncontrollable factor and variations in the fuel cost are beyond the control of the Appellant. The State Commission has the duty to incentivize the generation of electricity from renewable sources of energy and if the renewable energy projects like that of the Appellant are facing closure of the plants or generation is being affected appreciably on account of abnormal rise in the price of biomass fuel then the State Commission can revisit the fuel price to avert closure of such plants. However, in such an intervention, the State Commission has to balance the interest of the consumers as well as the generating company.....”

“32.8Therefore it would now be necessary to re-determine both fixed and variable component of the tariff of the Appellant's biomass based co-generation plant by the State Commission as per the provisions of the Electricity Act, 2003 for the remaining period of the PPA. The State Commission may now determine two part tariff (fixed and variable charges) taking into consideration the actual capital cost of the 12 MW generating plant and the operational and financial norms as per the Regulations. The price of fuel for old and new co-generation projects in the State are the same, therefore, the fuel cost should be considered same as applicable to the new projects as per the Regulations/tariff orders applicable to new co-generation projects.....”

In view of the above, the Commission considers it appropriate to adopt the two-part tariff system for the existing biomass based and bagasse based renewable energy units for which the Commission had earlier determined a single-part tariff. Also, since the existing biomass and bagasse based Renewable Energy plants have similar costs as the new units in procuring their fuels, the Commission considers it appropriate to adopt for these units the price of bagasse and biomass fuels as determined in the generic tariff order dated 1.1.2015. Based on the above decision,

the fuel cost norms for the existing bagasse based cogeneration units and biomass based units are determined as under:

Bagasse Based co-generation units

- i) Specific Fuel Consumption: 1.6 kg/kWh
- ii) Fuel Cost: Rs.1600/MT for FY15 as the base year
- iii) Annual Escalation at 5.72% on the base year price

Biomass based units with water cooled condensers

- i) Specific Fuel Consumption: 1.21 kg/kWh
- ii) Fuel Cost: Rs.2100/MT for FY15 as the base year
- iii) Annual Escalation at 5.72% on the base year price

Based on the above parameters the Commission now determines the variable cost as indicated below:

Year	Biomass Plants (Rs./unit)	Cogeneration Plants (Rs./unit)
2015	2.82	2.81
2016	2.98	2.97
2017	3.16	3.14
2018	3.34	3.32

The Commission, in its Order dated 11.12.2009 had approved fuel cost of Rs.1280/MT (providing 5% escalation on the fuel cost of Rs.1000/MT approved in 2005 order) with 5% annual escalation for biomass based units and Rs.1025/MT (providing 5% escalation on the fuel cost of Rs.800/MT approved in 2005 order) with 5% escalation in respect of cogeneration projects. Further the Commission, in the orders dated 18.01.2005 and 11.12.2009 had allowed a specific fuel consumption of 1.16 kg/kWhr for biomass based units and 1.60kg/kWhr for co-generation units and auxiliary consumption of 8% for cogeneration units and 9% for Biomass based units. Considering the above parameters, the variable cost for the period 2015 to 2018 would be as follows:

Year	Biomass Plants Rs./unit	Cogeneration Plants Rs./unit
2015	2.08	2.27
2016	2.18	2.38
2017	2.29	2.50
2018	2.40	2.62

The above variable costs which are included in the single part tariff being paid to the generators need to be substituted by the variable costs as determined in Tariff Order dated 1.1.2015. The newly determined variable costs have to be added to the fixed costs component of the existing biomass based and bagasse based units keeping in view the norms adopted by this Commission in its generic tariff order issued on 28.1.2005 and 11.12.2009. The following norms have been adopted for the biomass plants and cogeneration plants in the said orders :

Norms	Biomass		Cogeneration	
	2005 Order	2009 Order	2005 Order	2009 Order
Debt Equity	70 : 30	70 : 30	70 : 30	70 : 30
Interest on Term Loan	11 %	11.75 %	11 %	11.75 %
ROE	16 %	16 %	16 %	16 %
Depreciation	7 %	7 %	7 %	7 %
MAT	7.5 % on ROE	Tax on ROE pass through	Tax on ROE pass through	Tax on ROE pass through
Capital Costs (Rs.lakhs)	400	487	300	430*
PLF	75 %	75 %	60 %	60 %
O&M Expenses as % of capital cost	4	4	3	3
O&M escalation per annum	5 %	5 %	5 %	5 %
Interest on working capital on 2 months receivables	12.5 %	13.25 %	12.5 %	13.25 %
Auxiliary consumption	9 %	9 %	8 %	8 %

* Capital cost as revised vide this Commission's Order dated 29.3.2012

The average fixed costs for these units for the first ten years are worked out as follows :

Particulars	2005 (Rs./kWh)	2009 (Rs./kWh)
Biomass	1.50	1.81
Bagasse based Cogeneration	1.31	1.86

If the revised variable cost norms determined in our Order of 1.1.2015 are added to the average fixed cost component of the prevailing tariff for the existing units, the total tariff is worked out as follows :

(Rs./kWh)

Year	Biomass (for PPAs signed as per 2005 order and earlier)	Biomass (for PPAs signed as per 2009 order)	Bagasse based Cogeneration (for PPAs signed as per 2005 order and earlier)	Bagasse based Cogeneration (for PPAs signed as per 2009 order)
2014-15	4.32	4.63	4.12	4.67
2015-16	4.48	4.79	4.28	4.83
2016-17	4.66	4.97	4.45	5.00
2017-18	4.84	5.15	4.63	5.18

We have adopted the 2005 fixed cost norms for the units which were established prior to 2005 also since no tariff order was issued by this Commission in such cases. In cases where the two-part tariff worked out as above is lower than the tariff now applicable to the existing units, the existing tariff as per PPA shall continue to be applicable till such time the tariff as determined above exceeds the PPA tariff, after which the tariff as per the above formula shall be applicable to such units.

In the light of the above discussions, it is ordered as follows:

ORDER

1. The tariff for the existing rankine cycle based biomass projects is revised as indicated below:

(Rs./kWh)

Year	Biomass (with PPAs signed as per 2005 order and earlier)	Biomass (with PPAs signed as per 2009 order)
2014-15	4.32	4.63
2015-16	4.48	4.79
2016-17	4.66	4.97
2017-18	4.84	5.15

2. The tariff for the existing bagasse based cogeneration projects is revised as indicated below:

(Rs./kWh)

Year	Bagasse based Cogeneration (with PPAs signed as per 2005 order and earlier)	Bagasse based Cogeneration (with PPAs signed as per 2009 order)
2014-15	4.12	4.67
2015-16	4.28	4.83
2016-17	4.45	5.00
2017-18	4.63	5.18

3. Further, the fuel cost for the existing bagasse based cogeneration projects and rankine cycle based biomass projects with water cooled condenser, after 31st March, 2018 will be as may be determined by the Commission after taking into account the then prevailing fuel prices and other factors.
4. The above tariff shall be paid, with effect from 1.1.2015, by ESCOMs to the existing bagasse based cogeneration projects and rankine cycle based biomass projects, who have PPAs with the ESCOMs.
5. In cases where the existing tariff according to the PPA is higher than the tariff mentioned above, the tariff as per PPA shall continue to be applicable to such units till the tariff determined above exceeds the PPA tariff. Thereafter, the tariff as determined in this order shall be applicable to such units.
6. The terms of the PPAs shall be modified accordingly.
7. This Order shall not be applicable to the petitioners in OP No. 8/2012 for whom a separate order is issued.

Sd/-
(M.R.Sreenivasa Murthy)
Chairman

Sd/-
(H.D.Arun Kumar)
Member

Sd/-
(D.B.Manival Raju)
Member

Annexure -1

List of Stake Holders who submitted written Comments

1. Bangalore Electricity Supply Company.
2. Chamundeshwari Electricity Supply Corporation.
3. Karnataka Power Transmission Corporation Ltd.
4. Indian Renewable Energy Development Agency Ltd.
5. Karnataka Renewable Energy Development Ltd.
6. M/s Koppal Green Power Ltd.
7. M/s Powernicks Ltd.
8. M/s Pointec Pens and Energy Pvt Ltd.
9. M/s R.K. Power Gen Pvt Ltd.
10. Karnataka State Rice Millers' Association.
11. Raichur Rice Millers' Association.
12. Karnataka State Bio Fuel Development Board.
13. M/s Sri Indra Power Energies Ltd.
14. M/s Indian Cane Power Ltd.
15. M/s Dharwad Bio Energy Pvt Ltd.
16. M/s Haveri Bio Energy Pvt Ltd.
17. Sri Dinesh J. Kagathi, All Green Energy Pvt Ltd.
18. Sri Sandur Kumara Swamy, Jana Swarajya Party.
19. Sri Siddappa Adivappa Dirannavar, Navalagunda taluk.
20. Sri Umesh Kuri , Navalagunda taluk.
21. A.B. Shirasangi , Navalagunda taluk.
22. M/s Konark Power Projects Ltd.

Annexure-2

List of Persons who made oral submissions during the Public Hearing.

1. Just Law representing KPTCL
2. Sri A.K Monappa, Managing Director, Dr. B Ramakrishna and Sri Diwakar Rao representing Karnataka State Bio Fuel Development Board).
3. Sri. E. Satvak , M/s Konark Power Projects Ltd.
4. Sri Vinod Havangi, CESC