

No.: N/19/16

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

Dated : 20th June, 2017

Present:

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

OP No.15 / 2016

BETWEEN:

Biomass Energy for Rural India(BERI) Project / Society,
Karnataka State Bioenergy Development Board,
RD & PR Department,
Government of Karnataka,
#116, 8th Cross, Railway Parallel Road,
Kumara Park West,
Bengaluru – 560 020.

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PETITIONER

[Represented by its Managing Director]

AND:

- 1) The Additional Chief Secretary,
Energy Department,
Government of Karnataka,
Vikasa Soudha,
Bengaluru- 560 001.
- 2) Karnataka Power Transmission Corporation Limited,
Cauvery Bhavan,
K.G. Road,
Bengaluru.
- 3) Karnataka Renewable Energy Development Limited,
No.39, "SHANTHIGRUHA"
Bharath Scouts & Guides Building,
Palace Road,
Bengaluru – 560 001

OP No.15/2016

- 4) Bangalore Electricity Supply Company Limited,
K.R. Circle,
Bengaluru- 560001.

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RESPONDENTS

[Respondent No.4 represented by Just Law, Advocates]

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ORDERS

- 1) The petitioner has filed this Petition under the Section 62(1)(a) read with Sections 64 and 86(1)(e) of the Electricity Act, 2003 praying the Commission:

- (i) To review KERC orders dated 10th July 2014 / 1st January 2015 and to fix the power purchase tariff for a 10 years period at fixed tariff of Rs. 8.76/kWh in respect of the power generated by the BERI project at Tumakuru District.

- (ii) Pass any other order/s in the interest of justice and equity.

- 2) The petitioner has made the following submissions in support of its prayers:

- (i) That BERI project is a unique project focusing on decentralized power generation using biomass gasification technology and was implemented between 2001 and 2012 with the support of Global Environment Facility (GEF), the United Nations Development Programme (UNDP), the Indo-Canada Environment Facility(ICEF), the GOK and the GOI.

- (ii) That the unique aspects of the projects were that it ensured continuous supply of biomass through dedicated plantation, strengthened grid interaction at tailend with 11kv line to the rural area and established operational bench-marks for sub-megawatt biomass based power plants.
- (iii) That the Commission while fixing generic tariff for biomass plants has not considered the differences between technology parameters for biomass power plants based on the Rankine cycle and those based on Otto-cycle. That, further, the difference in economic viability for 10MW biomass power plant used as base load and 200/250 kW gasifier plant of BERI essentially supplying during peak period has also not been considered.
- (iv) That review of the following tariff parameters is therefore warranted:
- (a) **Operation and Maintenance (O&M) expenses:** That the Commission has determined O&M expenses at Rs. 30 lakhs/MW for Rankine cycle power plant, whereas CERC in its order dated 03.03.2015 has determined the O&M expenses at Rs.47.26 lakhs/MW for gasifier power projects. That the actual O&M cost of the Petitioner's 200 kW biomass gasifier plant is Rs.69 lakhs/MW with PLF of 40% and auxiliary consumption of 15%. That therefore, O&M expenses be fixed at least at Rs.60 lakhs/MW per year for 200 kW Biomass Gasifier Power Plant.

- (b) **Specific Fuel Consumption (SFC):** That the Commission has fixed SFC of 1.21kg/unit considering Station Heat Rate (SHR) of 4000 kcal/kWh and Gross Calorific Value (GCV) of 3300 kcal/kg, which pertains to biomass power plant working on Rankine cycle with agricultural residues being the biomass fuel and having unit rating of 8 to 10 MW and therefore it would not be applicable to gasifier power plant running on woody biomass with below 15% moisture. That as per a study conducted by the Indian Institute of Science Bengaluru (IISc), the average calorific value of woody biomass is 15 MJ (3583 kcal)/kg and the specific fuel consumption for 100 to 250 kW plant is 1.36 kg/kWh, which is in line with the norms adopted by the CERC in its Order dated 03.03.2015. That therefore, SFC be fixed at 1.36 kg/kWh.
- (c) **Fuel price:** That the Commission has considered a fuel price of Rs. 2100/tonne, as against CERC norm of Rs. 3144.80/tonne fixed in its Order dated 03.03.2015. That the actual fuel cost incurred by the Petitioner is more than Rs.4000/metric tonne and therefore fuel price for the Petitioner's 400 kW power plant be considered at Rs.4000/metric tonne.
- (d) **Levelling Tariff:** That a levelling tariff of Rs. 8.76/unit for 10 years be fixed for the Petitioner's 400 kW plant so that the Petitioner's project of a total capacity of 1 MW which is ready for

commissioning can be operated and the costs already incurred recouped.

- (v) That purchase of one MU of biomass power from BERI would not have impact on BESCO's consumer tariff.
 - (vi) That Decentralized Distributed Generation based on biomass gasifier whose cost is lower than Solar PV Plant with battery storage needs to be supported as use of processed agro/forest waste results in effective utilization of resources, generation of employment in rural areas and increase in farmers' income; the power generated would help in meeting peak demand. That such plants can also generate heat energy from exhaust and jacket water (for which end use systems are being developed) and the residue of the gasifier can be used as Bio-char for increasing farm yields.
- 3) On issuance of Notice to the Respondents, the Respondent No.4 (Bangalore Electricity Supply Company Limited) through its counsel has made the following submissions opposing the petition:
- (i) That the Petition is not maintainable in law and deserves to be rejected with costs, as the petitioner has filed for review of the Orders of the Commission dated 10th July, 2014 and 1st January,2015. That the Petitioner's request for review of the Order dated 10th July,2014 is not

- maintainable, as the said Order pertains to Air Cooled Condenser based power plant which is completely different from the Petitioner's bio-gas fire based plants and also the Petitioner was not party to the proceedings in the matter. Similarly, the Order dated 01.01.2015 has reached finality and it is not open for the Petitioner now to seek a review.
- (ii) That the Petitioner has failed to participate in the public hearing process so as to apprise the Commission about the difference in technology between Rankine cycle and Otto cycle based biomass power plants.
- (iii) That the petitioner had commissioned 0.5 MW power plant in the year 2007 and other two plants of 0.25 MW each in the year 2008 and had executed an MOU with the Respondent for supply of power at Rs.2.80 per unit. That, subsequently, three PPA's were executed with the Respondent keeping in view the Commission's Order dated 11.12.2009 with a tariff of Rs.2.85 per unit with 2% escalation per annum on the base tariff and the term of PPA being 20 years. That however, the Petitioner has not adhered to the terms of PPA and was unable to export power at the agreed PLF of 85%. That the 0.5 MW power plant stopped generation from 2012-13 and the other two plants have failed to adhere to the output levels from the beginning.
- (iv) That the Petitioner's request to consider revision of certain parameters is liable to be rejected for the following reasons:

- (a) **O&M Expenses:** That the Commission has in its Order dated 01.01.2015, approved O&M expenses of Rs.30 Lakhs per MW with escalation of 5.72% p.a. considering auxiliary consumption of 10% and PLF of 75% for Rankine cycle based power plant, whereas CERC, in its Order dated 31.03.2015, has approved O&M expenses of Rs.47.26 Lakhs per MW considering auxiliary consumption of 10% and PLF of 85% for bio gasifier based plants. That the Petitioner who has claimed an O&M expenses of Rs.69 Lakhs per MW for its plant considering an auxiliary consumption of 15% and PLF of 40%, has failed to place any material on record to substantiate its request.
- (b) **Specific Fuel Consumption:** That SFC of 1.21 Kg per unit approved by the Commission squarely applies to the Petitioner who has not placed any material on record to indicate that the SFC is 1.36 Kg per unit. The report of IISc purportedly of year 2011, cannot be considered now.
- (c) **Fuel price:** That Fuel price of Rs.4000/tonne sought by the Petitioner which is more than the price determined by this Commission at Rs.2100/tonne and the CERC at Rs.3144.80/tonne is not justified and is a self-serving statement.

- (d) **Levelling tariff for 10 years:** That power at present is available in the Indian Energy Exchange at an average price of Rs. 2.24/unit and the peak price in the market is Rs.2.49/unit. That further, the maximum clearing price in the Exchange is Rs.2.96/unit. That thus, the tariff proposed is extremely high when compared to rate in Exchange or the tariff of about Rs.5/unit for power procured from mega thermal power plants like Kudigi power plant, Yeramaras thermal plant or the BTPS unit-3. That the non-solar REC rate is Rs.1.50/unit which is far lower than the tariff sought by the Petitioner. That any tariff paid by the respondent has to be ultimately borne by the consumer of the State and the high unviable tariff proposed by the Petitioner is not in the interest of the consumers.
- 4) The Petitioner countered the submissions made by the Respondent contending:
- (a) That the O & M costs, SFC and fuel price norms applicable to Rankine Cycle Power Plants reiterated by the Respondent do not apply to the Petitioner's power plant based on Otto Cycle. That the Petitioner is seeking a fixed tariff for 10-years and not specific O&M costs.

- (b) That ESCOMs are obligated to promote RE irrespective of the rates prevailing in Exchange or rates of bigger plants and even solar power plants were provided with higher tariff during their initial period.
 - (c) That the Respondent has not contested the benefits of decentralized energy generation and that proposed tariff will have a very negligible impact on consumer tariff.
 - (d) That the Petitioner's plant is not functioning due to uneconomical tariff and with the advancement of bio-gasification technology and availability of local fuel, the tariffs are likely to be lower than solar power stored in batteries.
- 5) We had also given an opportunity to interested persons other than the Respondents to submit their Comments and Objections to the Petition. Pursuant to the same, general submissions on the same lines as the Petitioner's submissions were made without any specific input useful for tariff determination of the Petitioner's plant.
- 6) We have perused the records and heard the parties. The following issues would arise for our decision:

- (1) Whether there are sufficient grounds and material details for determination of tariff for the Petitioner's plant?
- (2) What is the tariff applicable to the Petitioner's power plant if there is no case for specific tariff determination for the Petitioner's plant?
- (3) What Order?

7) We proceed to answer these issues as follows:

8) **Issue No (1):** *Whether there are sufficient grounds and material details for determination of tariff for the Petitioner's plant?*

(a) We find that, the Petitioner has not furnished necessary relevant data and documents regarding capital cost, debt-equity ratio, rate of interest, rate of RoE, depreciation rate, PLF, auxiliary consumption, calorific value of the fuel, heat rate, fuel cost and O&M cost in support of its request for a tariff of Rs.8.76/kWh for the power generated from its units. Further, the Petitioner has sought the same tariff for units already commissioned and units yet to be commissioned. Since, the capital cost and other financial parameters (which form the basis for determination of tariff) would depend upon the date of commissioning of the unit, unit-wise details ought to have been furnished by the Petitioner along with the dates of commissioning.

- (b) We also find that, a statement filed by the Petitioner in support of its claim on O&M cost and Fuel cost, is not supported by any Audited Account statement, corresponding invoices or Certificates issued by a Chartered Accountant. Apart from general references to CERC norms and also societal and environmental benefits of the Petitioner's plant, no case has been made out by the Petitioner to justify its claim for adoption of CERC norms for determining tariff for its units especially when auxiliary consumption and PLF considered by the CERC and those obtaining in the Petitioner's case are different.
- (c) We note that the IISc Study Report sought to be relied on by the Petitioner states that a specific fuel consumption of 1.36 kg/kWh of the 120 kWe producer gas engine of the Petitioner's plant is slightly higher than the average SFC recorded on similar engines at 1.2 kg/kWh using wood chips. The Report has attributed the lower efficiency of the engine to lower average loading which it felt needs further investigation. The Report also identifies other reasons for lower efficiency as being high ash content of the fuel and grid failures apart from certain process related inefficiencies. We note that the Petitioner has not furnished the details of any investigation conducted about lower average load of the engine which has resulted in its inefficiency and the details of the action taken to increase engine efficiency. Similarly, the details of corrective action to overcome higher ash content of the fuel and grid failures are not forthcoming. While Specific Fuel Consumption is one of the major

parameters reckoned in determination of tariff of a power plant, in the absence of details of other parameters such tariff determination is not possible. The Specific Fuel Consumption of the Petitioner's plant is higher because of certain identified reasons, which the Petitioner has not proved to be insurmountable and therefore (such SFC) needs to be adopted in tariff determination for its plant. Hence, we are of the considered opinion that in the absence of complete details of relevant parameters necessary for determination of tariff for the Petitioner's plant, we are unable to accede to the Petitioner's request for such determination.

- (d) Admittedly the Petitioner's project was intended to demonstrate the capability of small biomass based power generation system and as IISc's Report indicates that such capability has been demonstrated while also identifying the limitations in its efficiency. We also note that the IISc Report recognizes the conversion efficiency from biomass to electricity in a gasifier system is higher in larger capacities (the efficiency of about 500 kWe is in the range of 25 to 30% as compared to $18 \pm 1.5\%$ of Petitioner's 100 kWe engine). Thus, we do not find any justification to accept sub-optimal parameters for the purpose of tariff determination for the Petitioner's plant, which admittedly lacks efficiency.
- (e) For the above reasons, we answer Issue No. (1) in the negative.

- 9) **Issue No.2:** *What is the tariff applicable to the Petitioner's power plant if there is no case for specific tariff determination for the Petitioner's plant?*
- (a) The Petitioner has submitted that its units totally of 400 kW (1X200 kW+2X100 kW) capacity are already commissioned and 2 units of 250 kW capacity each are yet to be commissioned.
- (b) However, as per Respondent No.4 BESCO, the Petitioner's 500 kW power plant at Kabbigere was commissioned in the year 2007 and 250 kW power plant at Seebinayanapalya and 250 kW power plant at Boregunte village were commissioned in the year 2008 for which the Respondent No.4, BESCO has entered into PPAs on 30.4.2010. Respondent No 4 has also contended that the Petitioner's plant at Kabbigere has stopped generation from 2012-13 onwards and the other two plants of 250 kW each which failed to generate the required output, stopped generation from 2010-11 onwards. The Petitioner has not denied any of the contentions of Respondent No.4.
- (c) Perusal of available records indicate that the PPA for the Petitioner's 500 kW Biomass power project at Kabbigere was approved on 29-04-2008 by this Commission with modifications, as per which the Petitioner had agreed to sell power to the Respondent No.4 BESCO at a rate of Rs.2.85/unit (which was the tariff fixed by this Commission for the biomass

based power plants in its Order dated 18.01.2005) with an annual escalation of 5.7 paise/unit for 10 years from the commercial operation date and from the 11th year onwards at the rate determined by the Commission. Similarly, the PPAs for 250 kW plant each at Boregunte Village and Seebinayanapalya were approved with modifications on 09.05.2008 with the tariff terms being the same as mentioned above for Kabbigere plant. Thus, the Petitioner's plant is not covered by the tariff determined in this Commission's Orders dated 10.07.2014. or 01.01.2015 and there is no case for review of such orders as prayed for by the Petitioner.

- (d) We note that contrary to the Petitioner's submission that its two units of 250 kW each are yet to be commissioned, the Respondent No.4 has contended which is not denied by the Petitioner, that these plants have injected power during the years 2008-09 and 2009-10 (after being commissioned). Further, neither the Petitioner nor the Respondent No.4 has pleaded that above PPAs have been terminated. Thus such PPAs are still valid and their terms and conditions including the applicable tariff are binding on both the parties. Further, the revision tariff for the existing biomass power generation plants having PPAs with ESCOMs made by this Commission in its Order dated 22.01.2015 considering the fuel cost would also apply to the Petitioner's plant.

- (e) Thus we hold that, in terms of the Commission's Order dated 22.01.2015, the Petitioner would be eligible for a tariff of Rs.4.84/unit for any power generated and supplied from its plant during the financial year 2017-18 and for the later years as may be determined by this Commission in its subsequent orders. Therefore, we answer Issue No.2 accordingly.

10) **Issue No.3:** *What Order?*

For the forgoing reasons, we pass the following:

ORDER

- (1) The Petitioner's plea for determination of tariff specifically for its project is rejected.
- (2) The Petitioner is entitled for a tariff of Rs.4.84 (Rupees Four and Paise Eighty Four) only per unit for any power generated and supplied from its biomass based plant to Respondent No.4 during the financial year 2017-18 and at the rates as may be determined by this Commission in respect of similar plants for the later years.

Sd/-
(M.K. SHANKARALINGE GOWDA)
CHAIRMAN

Sd/-
(H.D. ARUN KUMAR)
MEMBER

Sd/-
(D.B. MANIVAL RAJU)
MEMBER