

BEFORE THE KARNATAKA ELECTRICITY REGULATORY COMMISSION, BANGALORE

Dated 10th July, 2014

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

OP No.18/2013

BETWEEN :

Haveri Bio Energy Pvt. Ltd.,
H-984, 985, Palam Extension,
Ramphal Chowk, Sector 7,
Dwaraka,
NEW DELHI – 110 075

..

PETITIONER

[Represented by M/s. Nayak and Srikumar, Advocates]

AND:

- 1) State of Karnataka,
Represented by its Addl. Chief Secretary to Govt.,
Energy Department,
Vikasa Soudha,
BANGALORE – 560 001
- 2) Karnataka Power Transmission Corporation Ltd.,
Cauveri Bhavan,
K.G. Road,
BANGALORE – 560 001
- 3) Karnataka Renewable Energy Development Ltd.,
No.39, "Shanthi Gruha",
Palace Road,
BANGALORE – 560 001.
- 4) Hubli Electricity Supply Company Limited,
Navanagar, P.B. Road,
HUBLI – 580 025

.. **RESPONDENTS**

[Respondents 2 and 4 represented by M/s. Justlaw, Advocates]

1. The Petitioner is a Special Purpose Vehicle (SPV) formed by M/s Orange Power Gen Pvt. Ltd. to develop a 10 MW Biomass power plant with Air cooled

Condenser at Haveri, Karnataka. The Petitioner has filed this petition before the Commission under Sections 61, 62, 64 read with Section 86 (1)(a) of the Electricity Act, 2003 read with Regulation 9(1) of the KERC (Power Procurement from Renewable Sources by Distribution Licensee and Renewable Energy Certificate Framework) Regulations, 2011 and Regulation 11 of the KERC (G&C of Proceedings) Regulations, 2000.

2. The petitioner has prayed for determination of Tariff applicable to Air Cooled Condenser based biomass projects at Rs.5.90 per kWh for the financial year 2013-14 with an annual escalation of 6% and pass any other order/s in the interest of justice and equity, indicating the revision required in the technical and financial parameters as adopted in the KERC Tariff Order dated 11.12.2009 in so far as it relates to bio mass based power generation projects as below.

SL. NO.	PARAMETER	VALUE AS PER ORDER OF THIS COMMISSION DTD. 11.12.2009	REQUESTED IN THIS PETITION
1.	Capital cost	Rs.4.87 Crores / MW	Rs.5.50 Crores / MW
2.	Station heat rate	3700 kcal / kwh	4300 kcal/kwh
3.	Calorific value of fuel	3200 kcal/kg	3200 / kcal/kg
4.	Specific fuel consumption	1.16 kg / kwh	1.31 kg / kwh
5.	Cost of bio-mass	Rs.1555 / Tonne	Rs.2500 / Tonne
6.	Annual escalation	5%	6%
7.	Auxiliary consumption	9%	10%
8.	O & M expenses	4% of capex (Rs.19.48 lakhs / MW)	Rs.25.00 lakhs/MW with escalation of 5.72% / annum.
9.	Interest on term loan	11.75%	13.25%
10.	Interest on working capital	13.25%	-----

3. Section 62(1) of the Electricity Act, 2003 empowers the Commission to determine the tariff for supply of electricity by a Generating Company to a Distribution Licensee in accordance with the provisions of the said Act. Section 61 of the said Act further provides that, the Commission shall specify the terms and conditions for determination of tariff and in doing so, shall be guided by the principles specified in sub sections (a) to (i) of the said Section. Accordingly, and in pursuance of Section 86(1)(e) read with Section 181 of

the Electricity Act, 2003, the Commission has issued KERC (Power Procurement from Renewable Sources by Distribution Licensee) Regulations, 2004 vide Notification No. S/03/1 dated 27th September 2004. These Regulations were amended vide Notification dated 23rd January 2008.

4. The KERC (Power Procurement from Renewable Sources by Distribution Licensee and Renewable Energy Certificate Framework) Regulations, 2011 have repealed the 2004 Regulations. Clause 9 of the said Regulations deals with determination of tariff for electricity from renewable sources of energy and reads as follows:

“9. Determination of tariff for electricity from renewable sources of energy:

- (1) The Commission may determine at any time tariff for purchase of electricity from Renewable Sources of energy by Distribution Licensees either suo-motu or on an application either by Generator or by Distribution Licensees;*

Provided that the tariff approved by the Commission including the PPA deemed to have been approved under Sub-section (2) of Section 27 of the Karnataka Electricity Reforms Act, 1999, prior to the coming into force of these Regulations shall continue to apply for such period as mentioned in those PPAs”.

A reading of Clause 9.1 shows that the Commission has the power to determine tariff at any time for purchase of energy from Renewable Sources by Distribution Licensees either suo-motu or on an application by a Generator or by Distribution Licensees. In the light of the above provisions the petition is admitted and the Commission has proceeded to determine the tariff as discussed in this Order.

5. The Commission had a preliminary hearing on 25.7.2013 and heard the petitioner. On issuance of notice to Respondents, the 4th respondent, a distribution licensee entered appearance and filed the objections.

- a. **Hubli Electricity Supply Company Limited (HESCOM)** in its Statement of Objections has stated as follows:

- i. The capital cost claimed by the Petitioner by placing reliance on the highest capital cost determined in the Country is without justification. It has stated that the Maharashtra Electricity Regulatory Commission (MERC) has considered capital cost of Rs.4.71 Crore per MW and KERC in its Order dated 11.12.2009 had considered capital cost of Rs.4.85 Crores. Therefore, there is no need for revision of capital cost.
- ii. Order dated 11.12.2009 of KERC was affirmed by the Hon'ble ATE in its judgment dated 05.04.2011 in respect of the tariff fixed for Cogeneration plants. As the fuel used in Biomass plants is similar to Co-gen plants, the judgment of Hon'ble ATE affirming the fuel cost would apply to Biomass plants also. Therefore, the tariff norms already adopted cannot be a subject matter of dispute.
- iii. As per a study conducted by the Indian Institute of Science, Bangalore, the average calorific value of the Biomass with 30% moisture content is 2,700 Kcal/kg and the Station Heat Rate for Power Plants of 6 to 8 MW capacity is about 4,100 Kcal/kWh. The cost of fuel could be between Rs.2,000 to Rs.2,500 per M.T.
- iv. HESCOM cannot afford to pay Rs.5.90 per unit for this energy as claimed by the Petitioner as its average cost of supply is only Rs.4.96 per unit.

b. Karnataka Renewable Energy Development Limited (KREDL):

KREDL has stated that, India generates 120 to 150 Million Tons of Agro residues which could sustain Power Projects of 15 to 20 GW generating 75 to 100 Billion Units of electricity annually. Further it has stated that, the tariff determined by KERC is far below the tariff of Rs.5.80 per unit fixed by CERC, Rs.5.87 per unit fixed by MERC and Rs.5.72 per unit fixed by Bihar SERC. Hence, KREDL has stated that KERC tariff for bio-mass units needs upward revision to promote such Projects.

6. The Commission noted that, this project being first of its kind in the State and the Commission is determining tariff on a generic basis applicable for all bio mass based power plants using air cooled condensers, it was necessary to

obtain inputs from various stakeholders through a public hearing. The petitioner was directed to publish an abridged version of the petition inviting comments from the stake holders in newspapers. Accordingly the Petitioner has published the abridged version of the petition in Deccan Herald, Vijaya Karnataka and Samyuktha Karnataka newspapers on 1st May, 2014. Further, the Commission has also published a Public hearing notice in Deccan Herald, The Hindu, Times of India, Vijaya Karnataka, Samyuktha Karnataka and Vijaya Vani News Papers on 8th May, 2014 informing that the Public Hearing would be held on 15th May, 2014 at 11.30 AM, inviting interested persons to submit their views in the matter.

7. In response to the publication of abridged version of the petition, the Commission has received written views and objections from several stakeholders and other persons which are summarised below:

a. **Shri N.H. Konaraddi, Hon'ble M.L.A. Navalgund Constituency:**

Shri N.H.Konaraddi, Hon'ble Member of the State Legislature, has in his letter requested the Commission to fix a reasonable tariff for Bio mass generation plants in line with the market conditions to enable the industry to function round the clock. He has also stated that such power plants generate additional employment in rural areas.

b. **Shri Rudrappa Manappa Lamani, Hon'ble M.L.A, Haveri Constituency:**

Shri Rudrappa M Lamani, Hon'ble Member of the State Legislature has stated that, the 10 MW Plant of the Petitioner would benefit people in rural areas. Further, he has stated that, such projects would provide relief to overloaded grid and improve the rural economy. Hence, he has urged for fixing an attractive tariff for the power procured from for such power plants.

c. **Advantage Karnataka:**

M/s Advantage Karnataka, a non-Governmental Organisation, has stated that, Biomass power has the ability to generate large scale rural employment – above 2 man days per ton of Biomass collected from local

firms and supplied to the nearby Biomass Plant. Each 10 MW Plant will therefore, create more than 2 lakh man days of employment per annum. The prevailing tariff for bio-mass based energy generation in the State is not adequate to make bio-mass based generation of electricity viable. The organisation has therefore requested the Commission to revise the tariff to ensure viability of bio-mass based generation units.

d. Empergy Power and Infrastructure Pvt Ltd :

It has stated that, in Karnataka, Agro residue of 8 to 10 Million Tons per year would generate 800 to 1000 MW of power and generate employment of about 20,000 man days per annum per MW. It has stated that biomass has to be collected from a radius of 25 to 50 KMs from the generating unit resulting in a cost of about Rs.2,500/- per ton. It has requested the Commission to fix a tariff of Rs.6 per unit, so that power production in the State is increased without relying on imported coal.

e. Shri Dinesh J. Kagathi:

He has stated that there is an urgent need to revise the parameters fixed by the Commission in its 2009 Tariff Order. The parameters proposed by the Petitioner are reasonable and can be accepted by the Commission. He has suggested the fuel cost to be considered at Rs.2,500 per ton. He has also suggested that Biomass based RPO obligation should be separately specified.

f. Jana Swarajya Party:

It has stated that Haveri Bio Energy Pvt. Ltd., has created employment in a rural area and has avoided migration of many farmers to urban areas. It has also improved the farmers' income. In the light of the above, they have requested to determine a reasonable tariff for Haveri Bio Energy Pvt. Ltd.

g. Shri Lakshmi Narsimha Green Energy Private Limited:

It has stated that:

- i. The cost of Rice husk/Biomass is more than Rs.2.50 per Kg throughout the year. This year it has risen to Rs.3.80 per Kg. So, it is very essential that this factor be considered while determining the power tariff for biomass units.
- ii. A detailed survey of all the Biomass based power Generating Units in Karnataka was conducted and it was found that the Biomass Units are not viable at tariff below Rs.7.00. It is essential that the tariff be revised looking to the vast potential with the surplus Biomass available as Karnataka has the potential to generate more than 600 MW from Biomass.
- iii. The specific fuel consumption is also high for Rice husk which costs Rs.1.80 per Kg to Rs.2.00 per Kg. The actual cost of generation works out to be Rs.6.90/Kwh but the feed in tariff is only Rs.3.25. The price realised in open access sale is also low at about Rs.5.50. So, it is essential that the buyback power tariff be fixed at more than Rs.7.00 per Kwh.

h. Cogeneration Association of India:

- i. It has stated that, a huge quantity of Agri-residues is wasted every year in the Country, which can be effectively utilised to generate environment friendly renewable power, while creating hundreds of jobs in the local places.
- ii. It has stated that, the CERC constituted Committee has recommended the following parameters for setting the tariff:

Capital Cost: Rs.6.30 Crores per MW for Air-cooled condenser based system.

O&M Cost	: Rs.40 lakhs per MW
Station Heat Rate	: 4,000 K cal/KwHr.
Auxiliary Consumption	: 12 %
GCV of Biomass fuel	: 3100 K cal/kg.

- iii. It has stated that, the CERC has considered some of the recommendations of the Committee and subsequently recommended the following tariff for various States.

SI No.	State	CERC Recommendation Rs/KWh
1	Andhra Pradesh	5.91
2	Haryana	6.45
3	Maharashtra	6.55
4	Punjab	6.65
5	Rajasthan	5.88
6	Tamil Nadu	5.85
7	Uttar Pradesh	5.97
8	Others	5.80

- iv. It has urged the KERC to be cognizant of the State's power requirements, the need for reducing import of coal, and the urgent need for alignment of Biomass tariff to market price of Biomass and capital cost of equipment.
8. The public hearing was held on the Tariff Petition filed by the Petitioner on 15th May, 2014 and the following Stakeholders have attended the Public Hearing and submitted their views, which are as detailed below:
- i. **Sri Pradeep Nayak**, Advocate, representing the Petitioner has stated that, the Petitioner's 10 MW capacity Biomass Power Plant is ready to be commissioned and they are willing to sell power to HESCOM. While highlighting the importance of Biomass power in the State of Karnataka, he has stated that, Biomass power can be utilised locally resulting in reduction in distribution and transmission losses and associated infrastructure cost. Further, the Biomass energy is firm power. The Biomass energy Project uses agricultural waste, which would have been otherwise burnt as waste. It also generates local employment in rural areas, contributing to the economy. Such Projects provide energy security to the local people and reduce outgo of foreign exchange on the import of coal.

He has further stated that, though about 63 Projects have been sanctioned in the State, only 13 Projects have been commissioned out of which only two Projects are selling power to the grid. He attributed this to the unviable feed in tariff and increase in the cost of fuel and labour.

- ii. **Sri Gopinath P.V.** from M/s. Orange Power Gen, New Delhi, who is also one of the Directors of M/s. Haveri Bio Energy Pvt. Ltd., the Petitioner, requested the Commission to consider the following tariff parameters while determining the tariff:

SI No.	Tariff parameters	Value
1	Capital Cost	Rs. 6.20 Cr per MW
2	Heat rate	4300kCal/kg.
3	Specific fuel consumption	1.35 kg/ kwh
4	O&M cost	Rs.50 Lakh per MW per Annum
5	Auxiliary consumption	12%
6	Rate of Interest	13.5%
7	Annual escalation	5.72 %
8	Cost of Biomass fuel	Rs.2500 per tonne

He mentioned that the capital cost stated in the petition is Rs.5.5 Crores / MW but the same has gone up to Rs.6.2 Crores / MW owing to increase in civil works. Also as against the expected exemption of 12% of excise duty on plant and machinery, only 6% exemption has been given pushing up the project cost. He also mentioned that the O&M cost had increased to Rs.50 Lakhs/MW per annum. Further, the cost of fuel was working out to Rs.2500/ton and that the Generating Company bears the cost of transportation of about Rs.1000/ton.

- iii. **Sri Murali Subramanyam**, of the Petitioner Company has stated that, by adopting the Air Cooled Condenser Technology, the Company is saving about 90% of water when compared to Plants using Water Cooled Condensers. Thus, the company is contributing to water conservation. He stated that, the Petitioner had entered into a contract with M/s. Thermax at Rs.19 lakhs/Month for O&M. He has also submitted that, the Plant is expected to receive Rs.88 Lakhs as subsidy from the Government of India.

- iv. **Sri Shivappa Hottappanavar**, a farmer from Kurugunda, Haveri Taluk, who also supplies bio mass to the Petitioner's unit stated that, the Project promoted local employment and improved the economy of the farmers and urged the Commission to fix a reasonable Tariff. He mentioned that the farmers are being paid Rs.1800/ton to Rs.2000/ton including the cost of transportation for the fuel (Cotton/Maize stalks) delivered at the Generating Stations.
- v. **Sri Hanumanthappa Lamani**, Advocate and farmer, Rajivnagar, Haveri, requested the Commission to fix a reasonable tariff to the Bio Energy Project which is improving the economic condition of the farmers. Further, he informed that presently they are getting a price of Rs.1800 to Rs.1900 per ton for the fuel delivered at the premises of the Biomass Project.
- vi. **Prof.Koka K.N.** Bangalore, has urged the Commission to promote the Biomass Projects which are creating wealth out of waste. He further sought adequate tariff of over Rs.6 per kWh to encourage such Green Projects in the State and enable ESCOMs to meet the RPO.
- vii. **Sri Dinesh J Kagathi**, Advisor to the Petitioner on Biomass supply chain stated that, the cost of Biomass as fuel is far less compared to that of imported coal. Hence, he requested the Commission to encourage Biomass Projects by fixing the cost of fuel with reference to the price of coal of equal calorific value.
- viii. **Sri Shankar Kulkarni** of M/s. Thermax, supplier of the Boiler to the Project, has submitted that, the capacity of the Boiler is 45 tons and the guaranteed efficiency is 75% for such multi fuel Boilers. He has further stated that the project had run for 24 hours on 13th April, 2014 with an efficiency of 69 to 70% at 50 % load. He stated that, the O&M cost for maintenance of the Boiler was Rs.13.5 Lakhs /Month, and the boiler maintenance is undertaken by M/s. Thermax. The Generating Station employed about 60 workers (in all Shifts) for all operations including handling of fuel and ash.

- ix. **Sri Harischandra**, representing the Mangalore Electricity Supply Company (MESCOM) has stated that, the Capital Cost, Station Heat Rate and the specific fuel consumption of the Petitioner's plant are very high. The parameters adopted by the Gujarat Electricity Regulatory Commission (GERC) in respect of Capital Cost is only Rs.4.84 Crs. per MW. By adopting capital cost as approved by GERC at Rs.4.84 Crs, the Station Heat Rate as approved by Jharkhand Electricity Regulatory Commission (JERC), specific fuel consumption of 1.10 kg/ kWh, and taking interest rate at 11.75 %, the tariff can be fixed between Rs.4.00 - Rs.4.50 per kWh only.
- x. **Sri Krishnamurthy**, GM Tech, HESCOM while endorsing the views expressed by Sri Harischandra stated that, HESCOM is not in a position to enter into PPA for a Tariff beyond Rs.4.00 per kWh.
9. During the Public Hearing, the Commission directed the Petitioner to produce the breakup of O&M cost, Equipment cost, and the cost of civil works to substantiate the increase in capital cost and a copy of the Detailed Project Report (DPR) along with drawings. The Petitioner has submitted the details along with the DPR on 10.06.2014.
10. Having heard all the Stakeholders, the Commission notes that, the benefits of air cooled condenser technology are elimination of additional water usage from the condenser power cycle, flexibility in power plant site selection and reduced time required for commissioning. This has been considered by various SERCs in their tariff Orders to allow comparatively higher capital cost to projects with air cooled condensers. The Commission therefore considers it appropriate to determine a separate tariff for the biomass based power generation projects using air cooled condensers.
11. The Commission notes that the parameters and tariff determined in CERC and other SERCs for Biomass power Plants with Air Cooled Condensers are as follows:

PARAMETER	CERC (15.05.2014)	JSERC (20.10.2011)	GERC (08.08.2013)	RSERC (8.10.2013)
Capital cost	Rs.5.8 Crores / MW	Rs.5.34 Crores / MW	Rs. 4.98 Crores/ MW	Rs.5.57 Crores /MW
Station heat rate	4200 kcal/kwh	3800 kcal/kwh	3950 kcal/kwh	4440 Kcal/kwh
Calorific value of fuel	3100 / kcal/kg	3467 / kcal / kg	3400 / kcal / kg	3400/ kcal/kg
Specific fuel consumption	1.35 kg/ kwh	1.10 kg/kwh	1.16 kg/kwh	1.30 kg/kwh
Cost of bio-mass	To be decided annually by a Committee at State level	Rs.2080.25 / tonne	Rs.2726/ tonne	Rs.2018 / tonne
Annual escalation	5%	5%	5 %	5%
Auxiliary consumption	13% for 1 st Year and 12% for 2 nd year onwards	10%	10 %	12%
O & M expenses	Rs.40.00 lakhs / MW with escalation at 5.72%	Rs.24.03 lakhs / MW with escalation at 5.72%	Rs.24.9 lakhs / MW with escalation at 5.72%	Rs.35.68 Lakhs/MW with escalation at 5.72 %
Interest on term loan	12.70%	15.54%	12.86 %	13.00 %

12. After considering the pleadings, documents, suggestions/ views and comments received and the tariff parameters adopted in different States, the Commission decides on each of the tariff parameters as follows:

Tariff parameters:

i. Capital Cost:

In the Tariff Order on Renewable sources of energy dated 11.12.2009, the capital cost for Biomass Project was considered at Rs.4.87 Crores per MW on generic basis irrespective of the type of condensers used. The Petitioner has sought a capital cost of Rs.55 Crores for the project with air cooled condenser and having an installed capacity of 10 MW. The following is the breakup of Capital cost sought by the Petitioner:

Particulars	Amount in Rs. Crores
Land & Site development	2.0
Civil Works & Building	5.0
Indigenous Plant & machinery	36.50
Miscellaneous Fixed Assets	1.0
Transmission Costs	2.0
Preliminary, Preoperative, Project Development & Establishment expenses	2.25
Contingencies	1.0
Working Capital Margin	0.95
Interest during construction	3.05
Finance, Insurance & Misc. costs	1.25
Total	55.00

The above cost works out to Rs.5.50 Crores / MW. Further, the petitioner in his submission dated 10.06.2014 has requested to consider a capital cost of Rs.6.20 Crores per MW due to increase in cost of Civil works, Steel, Cement, Land and Site development and non-receipt of anticipated exemption in the Central Excise Duty.

The Petitioner in his pleadings dated 22nd May, 2014 has furnished the minutes of the consortium meeting with the Bank of India dated 20th March, 2014 which reveals that the petitioner had reported an increase in the capital cost of the project which was initially at Rs.550 Lakhs/MW to Rs.595 Lakhs/MW. As such the claims of the petitioner to allow revised cost of Rs.6.20 Crores / MW cannot be considered.

The Capital Cost adopted by other Regulatory Commissions for similar biomass plants is in the range of Rs.4.98 Crores to Rs.5.80 Crores per MW. The Commission notes that, CERC in its recent Tariff Order dated 15th May 2014 has considered capital cost of Rs.580 Lakhs/MW for biomass plants with air cooled condensers.

Considering the capital cost claimed by the petitioner and the capital cost adopted in CERC and other State Commissions, the Commission decides to adopt capital cost of Rs.580 lakhs per MW for determining tariff.

ii. Debt Equity Ratio (DE Ratio):

The equity norms as per the National Tariff Policy specify a debt equity ratio of 70:30. The Commission in its Regulations on determination of tariff for generation, transmission and distribution businesses has also specified debt equity in the ratio of 70:30. Hence, the Commission decides to adopt Debt Equity Ratio of 70:30 in the determination of Tariff for Bio-mass plants.

iii. Tenure of Loan repayment:

The Commission is of the view that, considering 10 years as the normative tenure for debt repayment will not only reduce the interest burden but also enable investors to recover their costs in a reasonable period. Hence, the tenure of debt repayment is considered as ten years.

iv. Interest on term loan:

Interest on term loans considered in the last Tariff Order dated 11.12.2009 was 11.75% for all Renewable Energy Projects. Now, the Petitioner has sought cost of debt at 13.25% as these Projects have greater risk associated with funding. The Commission notes that, the interest allowed on term loans by the other SERCs are in the range of 12.86% to 15.54 %. The base lending rate of SBI as on 1st April 2014 is 10%. Considering, the petitioner's submission supporting a higher rate of interest to mitigate the risk associated in funding such projects, the Commission decides to allow 12.50%, as cost of debt which is 250 basis points above the prevailing base lending rate.

iv. Depreciation:

As discussed in the preceding sections, the Commission has considered debt investment of 70% of the capital cost to be repaid in 10 years. The Depreciation allowed should be able to meet the loan repayment on an annual basis so that the entire debt recovery is envisaged within first ten years of operation. Hence, the Commission decides to allow 7% depreciation on straight line method during the first 10 years of the project.

v. Return on Equity (RoE):

In the earlier Tariff Order dated 11.12.2009, the Commission had fixed 16% as RoE and decided to allow Income tax as pass through. Keeping in view the objective of the National Tariff Policy, to encourage renewable energy generation in the State, the Commission has allowed 16% RoE. In the present Order also, the Commission decides to adopt the same norm.

vi. Plant Load Factor (PLF):

The Commission had approved a Plant Load Factor of 75% for Bio mass Projects in the Tariff Order dated 11.12.2009. CERC in its Order dated 15th May 2014, has considered a plant load factor of 60% during stabilization period (first 6 months), 70% during the remaining period of first year after stabilization and 80% from second year onwards. The plant load factors considered by other SERCs are in the range of 75% to 80%. Considering the above, the Commission decides to adopt a PLF of 75% for bio-mass plants with air cooled condensers.

vii. Operation and Maintenance Expenses:

Even though one of the Directors of the petitioner has stated that the O & M costs are as high as Rs.50 lakhs per MW/annum, the actual O & M expenses appear to be lower going by the facts disclosed during the public hearing. The Commission notes that, the Petitioner in his petition

has sought Rs.25.00 lakhs per MW with escalation of 5.72%/ annum. The O&M expenses allowed in the last Tariff Order dated 11.12.2009 were at 4% of the capital cost including insurance with annual escalation of 5%.

The Commission notes that, the O&M expenses allowed in the other SERCs are in the range of Rs.24.03 Lakhs/MW to Rs.40 Lakhs /MW with an annual escalation of 5.72%. O&M cost at 4% of the Capital cost amounts to Rs.23.20 lakhs / MW. Considering the claims of the petitioner which is Rs.25.00 lakhs / MW, the Commission is of the opinion that 4% of the capital cost is reasonable for O & M expenses. Hence the Commission decides to allow O & M expenses of Rs.23.20 lakhs / MW with an annual escalation of 5%.

viii. Interest on Working Capital:

The Interest on Working Capital as allowed in the Tariff Order dated 11.12.2009 was 13.25%. Considering that the present base lending rate of banks is 10% and the fact that working capital is a short-term financial requirement, the Commission decides to consider interest on working capital at 13.25%.

ix. Auxiliary Consumption:

The Commission had allowed an auxiliary consumption of 9% in respect of Biomass Projects in the Tariff Order dated 11.12.2009. The Petitioner has sought auxiliary consumption to be considered at 10%. The auxiliary consumption allowed by other SERCs in respect of this type of Project is in the range of 10% to 13%. Hence the Commission decides to consider auxiliary consumption at 10%.

x. Fuel Price:

The Biomass price allowed by other SERCs is in the range of Rs.2018/ton to Rs.2726/ton. During the Public Hearing, the Commission was informed by the Stakeholders that the Biomass price is in the range of Rs.1800/ton to

Rs.2000/ton including the cost of transportation. The Commission, therefore, decides to allow a Biomass price of Rs.2000/ton with 5% escalation per annum.

xi. Station Heat Rate (SHR)

In the Tariff Order dated 11th December 2009, the Station Heat Rate of 3700 Kcal/Kwh was fixed for Biomass Projects. The Petitioner has sought revision of Station Heat Rate to 4300Kcal/Kwh. The station heat rate as considered in other States for Biomass projects with Air Cooled Condensers is in the range of 3800Kcal/Kwh to 4440 Kcal/Kwh.

Even though the Commission in its earlier Orders had adopted a Station heat rate of 3700 kcal/kwh, keeping in view the variety of fuel used in biomass based plants and the norms adopted in other States, the Commission decides to adopt a station heat rate of 3900 kcal/kwh for biomass based power plants with air cooled condensers.

xii. Calorific Value of Fuel:

The Petitioner has sought assumption of Calorific value of fuel at 3200 Kcal /Kg. The Calorific value of fuel as allowed in the Tariff Order dated 11.12.2009 for Biomass Projects was 3200 Kcal/kg. The calorific value of fuel adopted by other Commissions is in the range of 3100 to 3467 Kcal/kg.

The petitioner has proposed to use biomass fuel in terms of cotton stalks, maize stalks and juliflora. Considering the varying mix of biomass fuel, the Commission decides to adopt calorific value of fuel as 3300 Kcal/Kg.

Considering the Station Heat Rate of 3900 Kcal/Kwh and Calorific value of fuel at 3300 Kcal/kg, the Commission adopts the fuel requirement at 1.18 kg /kWh.

xiii. Approved Tariff:

Considering the parameters as approved by the Commission in the preceding paragraphs, the Commission approves the following tariff for

Air Cooled Condenser based Biomass Projects with the year wise tariff as indicated below:

Year	Tariff Rs./Unit
1 st Year	5.15
2 nd Year	5.21
3 rd Year	5.29
4 th Year	5.37
5 th Year	5.46
6 th Year	5.55
7 th Year	5.66
8 th Year	5.78
9 th Year	5.90
10 th Year	6.04

xiv. The detailed calculation sheet showing the norms adopted for working out the tariff is appended as Annexure-1.

xv. Applicability of this Order:

The above tariff shall be applicable to all biomass based power projects using air cooled condensers, including the petitioner's project, achieving commercial operation in the period from 01.04.2014 to 31.03.2018.

17. With this Order, Petition OP No.18/2013 filed by M/s Haveri Bio Energy Pvt. Ltd. stands disposed of.

Sd/-
(M.R. SREENIVASA MURTHY)
CHAIRMAN

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

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

Determination of Tariff for Biomass Projects with Air Cooled Condenser - Annex to Tariff Order dated 10th July 2014

Financial Assumptions for Biomass

Cost/MW- Rs. Lakhs	580.00
Debt: Equity	70/30
Debt-Rs. Lakhs	406.00
Interest charges on Debt-%	12.50%
Debt Repayment in Yrs.	10.00
Tax for first 10 years	0.000
Plant Load Factor (PLF)	75.00%
Equity- Rs. lakhs	174.00
ROE-%	16.00%
Auxiliary Consumption	10.00%
O & M Expenses on capital cost	4.00%
O & M expenses in Rs. lakhs	23.20
O & M Escalation p.a.	5.00%
Working capital for 2 months in Rs. lakhs	50.73
% Interest on Working capital	0.1325
Depreciation per year	7.00%
Fuel cost in Rs	2000.00
Fuel Cost escalation	5.00%
Fuel Consumption - kg/unit	1.18

(Figures in Rs.
Lakhs)

Tariff Calculations

Particulars	1	2	3	4	5	6	7	8	9	10
Outstanding Debt	406.00	365.40	324.80	284.20	243.60	203.00	162.40	121.80	81.20	40.60
Equity	174.00	174.00	174.00	174.00	174.00	174.00	174.00	174.00	174.00	174.00
Interest charges on debt	50.75	45.68	40.60	35.53	30.45	25.38	20.30	15.23	10.15	5.07
ROE	27.84	27.84	27.84	27.84	27.84	27.84	27.84	27.84	27.84	27.84
O& M Cost	23.20	24.36	25.58	26.86	28.20	29.61	31.09	32.64	34.28	35.99

Depreciation	40.60	40.60	40.60	40.60	40.60	40.60	40.60	40.60	40.60	40.60
MAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on WC	6.72	6.72	6.72	6.72	6.72	6.72	6.72	6.72	6.72	6.72
Total Fixed cost	149.11	145.20	141.34	137.54	133.81	130.15	126.55	123.03	119.59	116.23
Gross generation @ normative PLF in lakh units	65.70	65.70	65.70	65.70	65.70	65.70	65.70	65.70	65.70	65.70
Auxiliary Consumption @ 10%	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57
Net exportable energy-lakh units	59.13	59.13	59.13	59.13	59.13	59.13	59.13	59.13	59.13	59.13
Fixed Cost/unit [net of auxiliary]-Rs/unit	2.52	2.46	2.39	2.33	2.26	2.20	2.14	2.08	2.02	1.97
MT of fuel requirement @ 1.18kg/unit	7764.55	7764.55	7764.55	7764.55	7764.55	7764.55	7764.55	7764.55	7764.55	7764.55
Fuel cost with 5% escalation	155.29	163.06	171.21	179.77	188.76	198.19	208.10	218.51	229.44	240.91
Variable cost/unit [net of auxiliary]-Rs/unit	2.63	2.76	2.90	3.04	3.19	3.35	3.52	3.70	3.88	4.07
Approved Tariff in Rs/ Unit	5.15	5.21	5.29	5.37	5.46	5.55	5.66	5.78	5.90	6.04
10 year average	5.54									