

No. S/01/18

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

**Dated 16<sup>th</sup>, May, 2018**

**Present:**

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

**In the Matter of Determination of Generic Tariff for Wind Power Projects**

**Preamble:**

1. This Commission, as mandated under the Electricity Act, 2003 to promote generation of electricity from renewable sources of energy, has been determining periodically their generic tariff based on normative financial and operational parameters. To create a stable environment for investment in such projects, the generic tariff is fixed for all projects commissioned during a control period. Accordingly, the Commission, vide its Order dated 4<sup>th</sup> September, 2017, has determined the generic tariff for wind power projects, wherein a levelised tariff of Rs.3.74/unit has been determined for the life of the project, namely 25-years. The said Order was made applicable to

all new wind projects, for which PPAs are entered into and approved by the Commission after the date of issue of the said Order, subject to the quantum of maximum capacity addition as may be fixed by the Commission. The tariff determined was also made applicable for the projects, which have entered into PPAs with any ESCOM prior to the date of the Order that are not approved by the Commission, if they so opt. The tariff determined in the said Order was in force till 31st March, 2018.

2. Whereas, the new Tariff Policy dated 28.01.2016, envisages future procurement of renewable energy (except from waste to energy plants) only through competitive bidding, as per its notified bidding framework and pursuant to the same, the MNRE, Government of India, has issued the Bidding Guidelines on 8<sup>th</sup> December, 2017 for wind power projects. Consequent to the issue of the bidding guidelines, the Karnataka Electricity Regulatory Commission has passed Order on 08.02.2018, directing the Distribution Licensees in the State to make all future power procurement from grid connected Wind power Projects only through transparent process of bidding, in accordance with the aforesaid Bidding Guidelines.
3. Whereas, the Commission in some of its Orders has referred to applicability of RE Generic Tariff of the relevant year, as determined by the Commission, for

payment towards banked energy purchased by the distribution licensees and such other cases. Hence, Generic Tariff applicable for wind generators from 01.04.2018 onwards needs to be determined. Therefore, the Commission had issued a Discussion Paper to determine the tariff afresh for wind power projects specifying the proposed parameters for tariff determination and invited written comments, views and suggestions from the stakeholders. The Commission hosted the Discussion Paper on its website and also forwarded a copy of the Discussion Paper to the major stakeholders on 08.03.2018, mainly the wind power developers organizations, The Commission also held a public hearing on 25.04.2018, the notice for which was published in the Deccan Herald, The Indian Express, Udayavani and Vijaya Karnataka newspapers on 04.04.2018, in addition to hosting the notice on the Commission's website. Considering that a few stakeholders had sought deferment of the public hearing because of their other preoccupation another opportunity was given to all the stakeholders including those who attended the Public hearing on 25.04.2018 to file any submissions/additional submissions in writing before 30.04.2018 and hosting such decision on the Commission's website. At the Public Hearing held, the Commission declared that it is taking note of the communication dated 13.04.2018 of the Ministry of Power and New & Renewable Energy, Govt. of India to all SERCs that, they have to determine

the Feed-in-Tariff for wind power projects of less than 25MW and solar power projects of less than 5 MW capacities which are not covered under the competitive bidding guidelines and that accordingly the Commission is proceeding to determine the generic tariff for such wind power projects. The list of persons, who have submitted written comments/views/suggestions and the list of persons who made oral submissions in the public hearing, are enclosed as Annexure-1 and Annexure-2 respectively.

4. After considering the written and oral submissions received in the matter and in exercise of the powers conferred under Section 62(1) (a) read with Sections 64 and 86(1)(e) of the Electricity Act, 2003 and Regulation 9 of the KERC (Power Procurement from Renewable sources by Distribution Licensee and Renewable Energy Certificate Frame work) Regulations, 2011, and all other powers enabling it in this behalf, the Commission hereby proceeds as follows:

#### **ORDERS**

5. Before proceeding with the determination of tariff, the Commission has considered the objections, comments and the suggestions received from the stakeholders.
6. The comments, views and suggestions of the various stakeholders may be summed up as follows:

**(1) General:**

a) The Wind Power Project Developers have submitted as follows:

- (i) The tariff determined must act as ceiling tariff for bidding. The proposed tariff determination should also act as a benchmark for Open Access transactions and should not be limited to payment for the banked energy, 100% APPC tariff or average cost of conventional thermal power plants in the State could be considered.
- (ii) The State is not yet ready for competitive bidding for wind projects and the bidding documents are yet to be issued, thus creating vacuum during FY18. During FY 18 only 1800 MW wind capacity was added against 5000 MW addition in FY17, pan India basis. While bidding in Karnataka is welcome, it should not create vacuum for installation and commissioning of power projects for next one to two years' period and therefore, the existing tariff of Rs.3.74/unit should be continued till FY19.
- (iii) Arriving at parameters for Karnataka, based on SECI bid is not correct, as SECI projects have advantages of economies of scale, PGCIL evacuation, payment security mechanism, negotiating power on technology/ price and must run status. Whereas in Karnataka evacuation facility has to be arranged by the developers

and payments are being delayed by three to four months. So far, no project under SECI bid is commissioned. Considering the failure of implementation of most of the UMPPs, any price fixation based on SECI bids, may not attract investments. The fall in price is nowhere related to technology upgradation or reduced production cost and is only price race. Further, changing parameters to arrive at tariff close to bid tariff is not correct. The best option would be to have bidding in Karnataka and take that as benchmark for arriving at parameters for Karnataka.

- b) KPTCL has suggested that, the payment for banked energy could be linked to the least of the tariff already determined by the Commission or the latest price discovered in the competitive bidding process.
- c) The BESCOM has submitted that the TNERC has approved a levelised tariff of Rs. 2.86/unit without accelerated depreciation and Rs.2.80/unit with accelerated depreciation, which be adopted by the Commission.
- d) KASSIA while welcoming future procurement of RE through competitive bidding, has submitted that, the parameters mentioned and the standards indicated for different parameters seems appropriate.

**(2) Capital Cost:**

- a) The Wind Power Project Developers have submitted as follows:

The Capital cost should include land cost also, which is about Rs.10 lakhs/acre and 1(one) MW project would require about 4 acres of land.

Further, the capital cost would increase with adoption of new wind technologies and laying of long-distance evacuation lines from pooling stations. Also, installation of LVRT as per Grid Code, would cost additional Rs.25-30 lakhs/MW and the transportation cost is also increasing due to new technology WTGs. The Commission in its Order dated 04.09.2017 has approved Capital cost of Rs.620 Lakhs/MW and in the last six months there has not been any technological break-through for reducing the cost substantially. The Commission's proposed capital cost of Rs.5.50 Crs/MW is not supported by any details. Hence, the Commission may obtain data from KREDL. Capital cost at 80m hub-height is Rs.5.6 Crs., and at 120 m hub height it would be Rs.6.36 Crs. The cost/MW discovered in recent bids in Maharashtra is Rs.6.00 Crs/MW, where evacuation and land lease cost are cheaper. In view of the above, capital cost should be fixed in the range of Rs.5.97 Crs/MW to Rs.6.50Crs/MW.

- b) BESCO has submitted as in the TNERC's Order dated 13.04.2018, a capital cost of Rs.5.25 Crs/MW, with 85% attributable to machinery, 10% to civil works and 5% to land cost, may be adopted.

**(3) Capacity Utilisation Factor (CUF):**

- a) IWPA (Karnataka State Council) has submitted that the Commission had earlier adopted a CUF of 26.50% in its 2015-Tariff Order, based on data obtained by NIWE, KREDL and ESCOMs. Subsequently, it has been revised to 28%, in the Order dated 04.09.2017. Thus, the proposed CUF of 30% by increasing it from 28% within a period of six months is not justified and therefore, the Commission should obtain data from ESCOMs or KREDL.
  
- b) IWPA (Northern Region Council) has submitted that, as per NIWE, at hub-height of 100m, the CUF is between 20-22% and thus 30% CUF as proposed is not justified. SECI bid projects are in Gujarat & Tamilnadu, where CUF is about 30% and cannot be considered for Karnataka.
  
- c) RENEW power has submitted that the wind profile is different in different States and the projects which participated under national bids are located in Gujarat and Tamilnadu, which have higher wind power density unlike Karnataka. Therefore, CUF of 28% should be considered for Karnataka.



- d) DGEPL has submitted that for 80m hub heights, CUF should be 22 to 24%, as prime sites are not available and for hub-height at 120 m, CUF improves to plus 30%. The CUF discovered in recent bids in Maharashtra is 33%. Therefore, a CUF of 31% for Karnataka should be considered.
- e) BESCOM has submitted that CUF adopted by the CERC in its Order dated 17.04.2017 varies from 22% to 35% based on the annual mean wind power density at 100 m hub-height and that adopted by the TNERC in its Order dated 13.04.2018 is 29.15%. The CUF achieved by new wind projects during FY18 ranges from 25.26% to 35.92%. That except for one project (with CUF of 35.92%), the CUF of others is in the range of 25 to 27% and to achieve 30% CUF as proposed by the Commission the hub-height should be more than 72 m and the wind power density should be in the range of 330 to 440w/m<sup>2</sup>. Therefore, the hub-height and wind power density should be specified.

**(4) Interest rates:**

- a) DGEPL referring to PFC, IREDA and CERC's interest rates on term loan has suggested a rate of interest of 10.75% for Karnataka.
- b) RENEW power has suggested 9.97% as the interest rate in tune with the CERC's RE Tariff Regulations,2017.

- c) Hero Future Energies stating that, long term interest rate in the country is expected to increase, as the government bond yield & inflation is increasing, suggested for considering a realistic interest rate of 9.95%.
- d) BESCO has submitted that considering the present MCLR for one-year tenure of 7.95% and spread of 0.25, interest rate of 8.20% should be considered on term load for a loan tenure of 13 years. BESCO has further submitted that IWC is meant for 2 to 3 months and therefore, considering MCLR for 3 months' tenor of 7.85% and spread of 0.25, IWC should be considered at 8.10%.

**(5) Return of Equity (RoE):**

- a) Hero Future Energies has submitted that, the returns on investment in stocks would be in the range of 14.79% to 18.78% p.a and hence, RoE should be at 16% p.a.
- b) RENEW Power, while agreeing with the Commission views that market expectation of RoE has come down due to competition, has requested to gross up RoE by prevailing MAT rate for the first ten years [i.e. 17.58% RoE] and corporate tax for the next fifteen years [i.e. 21.41% RoE], instead of tax pass through.

**(6) Depreciation:**

BESCOM has submitted that the TNERC in its Order dated 13.04.2018, has approved depreciation rate of 3.6% per annum on 85% of capital cost for 25-years and the CERC in its Order dated 17.04.2017 has approved 3.28% per annum for first 13-years upto 90% of project cost. Therefore, a depreciation rate of 5.28% per annum should be adopted for first 13 years.

**(7) O & M expenses:**

BESCOM has submitted that considering the approach adopted by the TNERC in its Order dated 13.04.2018, O & M expenses of Rs.9.30 lakhs/MW should be considered, with an annual escalation of 5%.

**(8) Auxiliary consumption:**

BESCOM has submitted that as the CERC has not considered any auxiliary consumption, the Commission may also not consider the same.

7. After having considered the submissions made by the stakeholders and material available on record, the Commission proceeds to determine the generic tariff for wind power projects based on the following parameters:

**(1) Capital cost including evacuation system cost:**

- a) The Commission, in the Discussion Paper, had proposed a capital cost of Rs.5.50 Crs./MW, including the cost of evacuation. While the wind

developers have suggested a capital cost in the range of Rs.5.97 Crs/MW to Rs.6.50 Crs./MW, BESCO has suggested Rs.5.25 Crs/MW based on the TNERC's recent Order. The Commission notes that data obtained from the KREDL for FY 18 indicates that the new projects are adopting hub-heights in the range of 106 m to 120 m with DPR cost varying from Rs.6.00Crs/MW to Rs.7.00Crs. /MW.

- b) The Commission notes the following finding of the TNERC while arriving at the above cost in its Order:

*“6.2 Capital cost*

*6.2.1 The cost of wind turbines have considerably reduced over the years from 2010. One of the reasons widely reported for lower tariffs of Rs.3.46 per unit and Rs.2.64 per unit in the auctions conducted by SECI is the significant reduction in the price of wind turbines with advanced technologies and discounts offered by the wind turbine manufacturers. The cost of wind turbine with tall wind towers and advanced technology have reportedly come down by 20% in terms of cost per MW. Stakeholders have requested to adopt capital costs ranging from Rs.5 crores to Rs.7.5 crores and have requested to factor in land costs, evacuation, operation and maintenance costs, forecasting of wind power etc.*

*6.2.2 Commission adopted a capital cost of Rs.6.2 crores per MW in the wind tariff order of 2016. With the cost of the wind turbine that makes for 70% or more for a wind power project added with other*

*costs for installation, and considering the reduced prices of machinery, a capital cost of Rs.5.25 crores per MW is adopted. It is upto the developer to identify land, factor in various parameters that influence the performance of the plant. Based on the recommendation of MNRE, Commission in its tariff orders No.1 of 2009, order No.6 of 2012 and order No.3 of 2016, considered 85% of the capital cost as attributable to machinery cost, 10% for civil works and 5% for land cost. Commission decides to adopt the same percentage in this order also."*

- c) The Commission, while agreeing with the views of the TNERC, notes that, the introduction of competitive bidding for procurement of power from wind projects has had the positive effect of reduction in capital costs and higher productivity through better machine efficiency and increase in hub-height across the sector. Eventhough the capital costs as per the DPR, which are generally higher than the actuals, are above Rs.6.00Crs./MW, the Commission considers that with prudent procurement of WTG and other accessories, it would be possible to commission a wind power project at a capital cost of Rs.5.75 Crs/MW. **Thus, the Commission considers it reasonable to adopt a capital cost of Rs.5.75 Crs. /MW, including the cost of evacuation.**

**(2) Capacity Utilization Factor (CUF):**

- a) The Commission which approved a normative CUF of 28% in its Order dated 04.09. 2017 had proposed to adopt CUF at 30%, noting that more efficient turbines at higher hub-heights are being installed now.
- b) The Wind Developers have suggested CUF varying from 20% to 31%, which is not backed up by sufficient data. BESCO has submitted that the CUF is in the range of 25 to 27% and that to achieve 30% CUF as proposed by the Commission, the hub-height should be more than 72 m and the wind power density should be in the range of 330 to 440w/m<sup>2</sup>.
- c) The Commission notes that the TNERC in its recent Order has adopted a CUF of 29.15% and that based on the data furnished by BESCO, the weighted average CUF would be 29.06%. Thus, the Commission is of the view that by adopting efficient technologies it would be possible to achieve a CUF of 29% in the State and that a lower CUF is against the best interest of all the Stakeholders. **Hence, the Commission decides to adopt a CUF of 29%.**

**(3) Debt Equity Ratio:**

The Commission had proposed to continue the current debt equity ratio of 70:30, and it is not opposed by any of the stakeholders. **Therefore, the Commission decides to adopt debt: equity ratio of 70:30.**

**(4) Interest on term loan and tenure of loan:**

- a) The Commission had proposed to adopt interest rate on term loan at 9.23%. Stakeholders have suggested interest rates in the range of 8.20% to 10.75%.
- b) The Commission notes that, with effect from 22.01.2018, Indian Renewable Energy Development Agency (IREDA) has revised the interest rates, which varies from 9.55% to 10.75% for wind projects, with a reduction of 25, 20 and 15 base points for grades 1 to 3 respectively with external grading.
- c) Similarly, PFC has revised the rates of interest with effect from 17.04.2018, which varies from 9.60% to 10.00% for State Sector and 9.50% to 11.00% for private sector with rating IR-1 to IR-5 for RE sources other than Biomass Power Plants. For Biomass Power Plants it varies from 10.50% to 11.00% for State Sector and 11.00% to 12.00% for Private Sector.
- d) As per the latest data, with effect from 01.05.2018, the MCLR of SBI is ranging between 8.15% to 8.35% for loan tenure varying from one year to three years. Considering 200 bps above MCLR, the maximum interest rate would be 10.35%.
- e) The above facts indicate that the rate of interest on domestic loan for wind projects would be in the range of 9.50% to 11.00%, depending upon the credit ratings of the wind power generators and the average works

out to 10.25%. The CERC in its Order dated 28.03.2018 has considered interest on term loan at 9.97%.

**The Commission therefore, decides that an interest rate of 10.00% p.a. on term loans is reasonable for wind power projects. The tenure of debt is considered as 13 years in tune with the latest CERC Regulations, dated 17.04.2017.**

**(5) Depreciation:**

The Commission had proposed to continue the current depreciation rate at 5.38% for the first 13 years with the remaining depreciation spread over balance years of the useful life. This has not been opposed by the Wind Developers. In view of the debt servicing requirement, the Commission finds the BESCO's suggested depreciation rate of 5.28% to be unacceptable. **The Commission, therefore, decides to adopt depreciation rate at 5.38% on straight line method for the first 13 years, with remaining depreciation spread equally over the balance years of the useful life of the plants.**



**(6) Return on Equity:**

- a) The Commission had proposed to continue the current RoE of 14% per annum. While, one of the wind developers has requested for 16% RoE, the other has agreed with the Commission's views stating that market expectation of RoE has come down due to competition and has requested to gross up RoE by the prevailing MAT rate for the first ten years.
- b) As per the prevailing Tariff Policy, the RoE determined by the CERC for Generation has to be adopted by the SERCs. The CERC has specified RoE of 14% and hence, the same needs to be adopted.

**The Commission, therefore, decides to allow RoE at 14% on the Equity. Any tax paid on the RoE is allowed as a pass through which shall be claimed separately from the ESCOMs by furnishing proof of payments.**

**(7) Operation and Maintenance (O &M) Expenses:**

The Commission had proposed to continue the current O& M expense of Rs. 10 Lakhs/MW with escalation of 5.72% per annum. This is not opposed by any of the stakeholders. **The Commission, therefore, decides to adopt O& M expenses at Rs.10 Lakhs/MW with escalation of 5.72% per annum.**

**(8) Interest on working capital[IWC]:**

- a) The Commission had proposed to revise the interest rate on working capital to 11%, considering the easing of domestic interest rates in the recent months. While BESCO has suggested a rate of 8.10%, Wind developers have agreed with the rate of 11%.
- b) The Commission notes that the CERC in its recent Order dated 28.03.2018 has considered 10.97% as the Interest on Working Capital.

**The Commission, therefore, decides to adopt 11% p.a. as Interest on working Capital of two month's receivables.**

**(9) Auxiliary Consumption:**

The Commission had proposed auxiliary consumption of 0.5%. Referring to the CERC's Order, BESCO has requested to do away with auxiliary consumption. The Commission in its earlier Orders has allowed auxiliary consumption, considering that even wind farms have certain lighting and other auxiliary power requirements. **The Commission therefore, decides to allow auxiliary consumption of 0.5% of gross energy generated.**

(10) The summary of the existing and the newly determined parameters is indicated below:

Parameter	Existing as per Order dated 04.09.2017	Newly determined
Capital Cost-Rs.MW	6.20	5.75
Debt: Equity ratio	70:30	70:30
CUF in %	28	29
Interest on term loan p.a. in %	9.23	10.00
Tenure of loan-Yrs.	13	13
Working Capital [WC]	Two-Months' receivables	Two-Months' receivables
Interest on WC p.a. in %	11.50	11.00
Depreciation in %	5.38% for first 13 years and remaining depreciation spread over balance years of the useful life.	5.38% for first 13 years and remaining depreciation spread equally over balance twelve years of the useful life.
RoE in %	14	14
O & M Expenses-Rs. Lakhs/MW for FY 19	10.00	10.00
O & M expenses' escalation per annum	5.72%	5.72%
Auxiliary Consumption	0.5%	0.5%

Based on the above approved parameters, the tariff would work out to Rs.3.45/kWh as against the current Rs.3.74/kWh.

8. For the forgoing reasons, we pass the following:

**ORDER**

- (i) The Commission, hereby determines the generic tariff for wind power projects of less than 25MW capacity at Rs.3.45 [Three Rupees forty-five paise] only per unit;
- (ii) The above tariff shall be applicable to all such new wind power projects for which PPAs are entered into and approved by the Commission after the date of issue of this Order, that get commissioned on or after 01.04.2018;
- (iii) The tenure of the PPA, shall be for life of the wind power projects i.e., twenty-five (25) years;
- (iv) The generic tariff determined in this Order shall also be applicable for payment towards any banked energy purchased by the Distribution Licensees and in such other cases as specified in the relevant orders of the Commission; and
- v) This Order shall be in force with effect from 1<sup>st</sup> April, 2018 and till 31<sup>st</sup> March, 2019.

**This Order is signed and issued by the Karnataka Electricity Regulatory Commission on this 16<sup>th</sup> day of May, 2018.**

Sd/-

(M.K. SHANKARALINGE GOWDA)

**CHAIRMAN**

Sd/-

(H.D. ARUN KUMAR)

**MEMBER**

Sd/-

(D.B. MANIVAL RAJU)

**MEMBER**

**Annexure – 1**

**List of person who made written submissions**

1. Doddanavar Global Energy Pvt Ltd.
2. Renew Power Ventures Pvt Ltd.
3. Indian Wind Power Association (Northern Region Council)
4. Hero Future Energies Pvt Ltd.
5. KASSIA
6. IWPA (Karnataka State Council).

**Annexure – 2**

**List of person who made Oral submission during public hearing**

1. Smt Mangalajyothi , IWPA – Karnataka State Council.
2. Sri S.V. Nesargi, DGEPL.
3. Sri Rahul Srivatsava, IWPA, Northern Region Council.