BEFORE THE KARNATAKA ELECTRICITY REGULATORY COMMISSION, BENGALURU

Dated 4th September, 2017

Present:

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

In the matter of "Revision of Generic Tariff for Wind Power Projects and mandatory procurement of wind Power through Competitive Bidding"

Preamble:

1) This Commission, as mandated under the Electricity Act, 2003, to promote generation of electricity from renewable sources of energy, has been periodically determining the generic tariff for Renewable Energy (RE) sources, based on applicable normative financial and operational parameters. To create an enabling stable environment for investment in RE projects, the generic tariff is fixed for all projects commissioned during a control period longer than one year unlike as done by the Central Electricity Regulatory Commission (CERC) and certain other State Electricity Regulatory Commissions (SERCs). Accordingly, the Commission, vide its Order dated 10th October, 2013 had for wind power projects, determined a levelized tariff of Rs.4.20/unit for the life of the projects, namely twenty-five years. Subsequently, such tariff was re-determined at Rs.4.50 per unit in the Commission's Order dated 24th February, 2015 pursuant to the Order of the Hon'ble Appellate Tribunal for Electricity (ATE) in the relevant appeals challenging the Commission's Order dated 10.10.2013. The said tariff was made applicable to all the new wind power projects which enter into power purchase agreements with the ESCOMs, during the five-year control period commencing from 10.10.2013. i.e. up to 09.10.2018.

2) Subsequently there have been developments that have a significant impact on the process and approach of determination of tariff and procurement of

renewable energy in the country. Periodic upward revision of tariff especially for wind power can no longer be taken as the norm for promoting the sector:

(a) The new Tariff Policy dated 28.01.2016 issued by the Central Government envisages procurement of renewable energy (except from waste to energy plants) in future, only through competitive bidding, as per its notified bidding framework.

(b) The CERC, which was hitherto determining the Generic Tariff annually for the wind projects, has not determined the same for the FY18, following its amended Regulations, wherein it has decided to determine project specific tariff for wind projects, in line with the Tariff Policy, 2016.

(c) The GERC, in its Order dated 30.08.2016, has revised the wind power tariff (net of AAD of 53 paise/unit) to Rs.4.19/unit from the earlier tariff of Rs. 4.23/unit [2012 Order] and the APERC has also reduced the wind power tariff from the existing Rs.4.70/unit [2012 Order] to Rs.4.25/unit, in its Order dated 26.03.2016. Further, in the bids called by the SECI for procurement of 1000 MW wind power, the lowest tariff quoted is Rs. 3.46/unit.

3) The above facts and developments indicate that subsequent to tariff determination for wind power by this Commission there has been substantial reduction in their Capital Cost and time is ripe for promoting competition in wind power sector too. They also call for a mid-term tariff revision to ensure that, the consumers get the benefit of lower cost of wind power generation and adoption of efficient and improved technology in wind power projects by investors is incentivised. Therefore, keeping in view the Tariff Policy, 2016, the extant wind power generation capacity created in the State and the contracted quantum of wind power by the distribution licensees to meet their Renewable Power Purchase Obligations (RPOs) vis-à-vis the general demand, the Commission issued a discussion paper titled *"Revision of Generic Tariff for Wind Power Projects and mandatory procurement of wind Power through*

Bidding" inviting comments/suggestions/views from interested persons. Apart from proposing all future wind power purchase by the distribution licensees only through competitive bidding, it was proposed to curtail the control period of the Tariff Order dated 10th October, 2013 to 31st August, 2017 and revise the tariff for wind power on fresh parameters. The Commission published the notices in the matter in The Indian Express, Deccan Herald, Udayavani and Vijaya Karnataka newspapers on 19.05.2017, in addition to hosting the same on the Commission's website. The Commission also held a public hearing on 20.07.2017, the notice for which was published in the Deccan Herald, The Times of India, Udayavani and Vijaya Karnataka newspapers on 01.07.2017, in addition to hosting the same on the Commission's Website. 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) The Commission appreciates the active participation of stakeholders in these proceedings.

5) 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 Section 64 and Section 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:

6) Before proceeding with the determination of tariff, the Commission has considered the objections, comments and the suggestions received from the stakeholders.

7) The Comments, views and Suggestions of the various Wind Power Project Developers and Wind Turbine Manufacturers may be summed up as follows:

(a) As per Section 63 of the Electricity Act, 2003 (the Act) the Commission has to adopt the tariff determined through bidding, as per the guidelines issued by the GOI. As per 6.4(2) of the Tariff Policy, 2016, procurement of power from RE sources has to be done through competitive bidding from the date to be notified by the Central Government and till such time such procurement may be done under Section 62 of the Act. Until issue of the final bidding guidelines by the Ministry of New and Renewable Energy (MNRE), bidding for Intra-State projects should not be proposed as it would affect the investments. Further, the bidding carried out in Tamil Nadu has been challenged before the Hon'ble High Court of Madras.

(b) The present proposal of the Commission to introduce bidding is not in tune with Section 63 of the Electricity Act and also against the Regulations issued by the Commission, which provide for determination of tariff on application made by the applicant. Even though the Tariff Policy envisages future procurement of Renewable Energy (RE) through bidding, the Statutory Regulations have over-riding effect over the policy.

(c) The new Tariff Policy has not made any provision for curtailment of existing tariff and control period. Section 62 read with 64, 86 and 94 of Electricity Act and the Regulations on procurement of renewable sources by DISCOMs, issued by the Commission in 2004 and 2011, puts embargo of the Commission to modify the Tariff Orders issued by it. Thus, the current proceedings are *ultra vires* of the Act and Regulations. The Order dated 24.02.2015, passed by the Commission, is consequent to the specific directions issued by the Hon'ble ATE in Appeal Nos. 84/2014 and 49/2014. Based on the said order, investments have been made on legitimate expectations and abruptly reducing the control period would financially affect the investors. Therefore, the existing tariff of Rs.4.50/unit should be continued for the specified control period without disturbing the existing control period and the proposals to revise the tariff and introduce competitive bidding could be adopted for the new control period after October, 2018. The projects commissioned before the issue of the discussion paper, should be allowed to sign PPAs at the existing rates. The Commission has already taken care of the public interest by determining the tariff of Rs.4.50/unit. The Commission has not furnished any analysis to show the impact on consumer tariff, if the wind power is purchased during the control period at the existing rate, which is not high when ESCOMS are selling power at Rs.8.55/unit plus taxes and Contract Demand Charges (CD).

(d) The Solar Energy Corporation India Ltd. (SECI) bid price cannot be taken as a bench mark as the projects are yet to be commissioned. Many projects under solar, which were aggressively bid, have not been taken up. The bidding route so far in India has failed in spurring rapid development in various cases like highway development, ultra-mega power projects, METRO rail etc.,

(e) Over reliance on SECI discovered price of Rs. 3.46 may turn out to be misplaced and therefore, the ceiling price may be done away with, as the market itself would determine the competitive price. If ceiling is kept as per the bids received in Central bidding, then large projects with advantageous funding and prime locations would become eligible and would prevent development of average and small projects, which is against Article 14 and 19 of the Constitution. The proposed tariff is not viable especially, for small projects and the tariff should be State specific.

(f) The bidders from Karnataka in the SECI bid have quoted Rs. 4.70/unit. Further, in the second round of bidding called by Central agencies of 1000 MW, the rate fixed is Rs.4/unit. SECI bid projects cannot be compared with projects in Karnataka as they have other hidden concessions in terms of waiver of Interstate Transmission System (ISTS) charges and losses and excludes trading margin, RLDC/SLDC charges, Scheduling and other charges. Further the Capacity Utilisation Factor (CUF) of the site under the SECI bid is more than 30% as compared to CUF of 24% of Karnataka, the tariff for which would be Rs.4.85/unit.

(g) Reduction of the PPA tenure to twenty years from twenty-five years would increase the risk factors for investors, as the DISCOMs may not agree to extend the PPA, even though the plant life is twenty-five years.

(h) With implementation of forecasting and scheduling, wind generators have to bear penalty in the range of 3 to 5% of revenue, which needs to be included in the tariff.

(i) De-rating factor should be considered while determining the wind tariff.

(j) The Generation Based incentive (GBI) and tax holiday have been removed from 01.04.2017. The GBI revenue loss is 50 Ps/unit subject to maximum of Rupees one crore/MW. The Commission has not factored the GBI of 50Ps/unit as per GOI circular dated 04.09.2013.

(k) The Renewable Power Purchase Obligation (RPO) is dynamic and in future years there may be requirement of renewable sources to meet the RPO and this aspect needs to be considered while approving the PPAs. The RPO is minimum and not a cap. Further, the RPO should be considered for the State as a whole.

(l) As per National Institute of Wind Energy (NIWE), the wind potential in Karnataka at 100 m height is 55,857 MW as against 15,783 MW specified. Considering the existing commissioned capacity of 3799 MW as on 31.03.2017, the existing policy and tariff need to be continued at least for the current control period, as huge potential is yet to be harnessed.

(m) As per the Load Generation Balance Report (LGBR) of the CEA for FY14 to FY16, there is regular power deficit in Karnataka during April to November period, and the energy banked by wind generator during such period is helping the ESCOMs.

(n) The Commissions of Maharashtra and Rajasthan have issued Orders after the price discovery by the SECI through competitive bid and the tariff determined in these States for wind is above Rs.5.0/unit.

8) The views and comments of the ESCOMs (Distribution Licensees) may be summed up as follows:

(i) Bangalore Electricity Supply Company Ltd.(BESCOM):

(a) Rate of Rs.3.46/unit includes other factors and hence Capital cost of Rs.4.50Crs/MW including evacuation cost has to be considered.

(b) Most of the windmill plants have actual CUF of 20% to 23% in Karnataka. The GERC has adopted 24.5% and APERC 23.50%. Therefore, CUF of 23% should be adopted.

(c) Interest on term-loan should be 10.05%, considering one-year Marginal Cost of Lending Rate (MCLR) plus 200 basis points.

(d) Interest on working capital should be 11.05% considering one-year MCLR plus 300 basis points.

(e) Depreciation should be 5.28% per annum for first 13 years and the remaining depreciation should be spread during the remaining useful life, in tune with the draft CERC (Terms & Conditions for tariff determination from RE sources) Regulations,2017.

(f) Return on Equity (RoE) should be fixed at 14% in tune with the draft CERC (Terms & Conditions for tariff determination from RE sources) Regulations,2017.

(g) O& M expenses should be fixed at Rs.9.06 Lakhs/MW with 5.72% p.a. escalation, as some of the petitions filed before the Commission indicate that overhauling is carried out after 10-years.

(h) Tenure of PPA may be twenty years.

(ii) Chamundeshwari Electricity Supply Company Ltd. (CESC)**:**
CESC has concurred with the proposals of future purchase of wind power only through competitive bidding, duly following the bidding guidelines notified by the Central Government, tariff of Rs.3.60/unit and for tenure of PPA as twenty years.

(iii) Hubli Electricity Supply Company Ltd.(HESCOM):
HESCOM has concurred with the discussion paper and the proposed tariff of Rs.3.61/unit.

9) The Commission has considered the above submissions made by the stakeholders and the decision of the Commission on each of the issues, are discussed in the following Paragraphs:

10) **Issue:** *What should be the mode of procurement of wind power in future*?

The issue of future procurement of wind power only through bidding will be dealt in a separate Order.

11) **Issue:** *Whether the proposed revision of generic tariff for wind power is legal and in order?*

(a) The Commission notes that, any material change in the circumstances and parameters affecting the generic tariff already determined is a ground for curtailment of the existing control period and re-determination of the generic tariff. The Commission has noted the circumstances necessitating the revision of the existing generic tariff for Wind Power Projects. Regulation 9 of the Karnataka Electricity Regulatory Commission (Procurement of Energy from Renewable Sources) Regulations, 2011, provides that, on an application made by a generator or the distribution licensee or *suo motu,* the Commission can, at any time, revise the generic tariff. Therefore, there is no merit in the contention that, the present proceedings are *ultra vires* the Act and the Regulations. The law on the powers of the Commission in the matter of determination of tariff is well settled and the present exercise undertaken by the Commission is well within given powers.

(b) The contentions of some Project Developers that, the curtailment of the Control Period would affect the investors who have invested on the Wind Power Projects, based on the prevailing generic tariff and that any abrupt curtailment of the Control Period and reduction in the tariff, would affect the financial viability of the Project and it is against the principles of "Legitimate Expectation", are not valid either in law or on facts.

(c) The Commission notes that, the generic tariff for the Renewable Energy sources determined by this Commission is in the nature of a standing offer to a Project Developer, intending to supply electricity generated to any ESCOM in the State. In case of need for purchase of Renewable Energy for complying RPO, an ESCOM can enter into a PPA with the developer at such rate and the approval for such PPA is normally granted by the Commission. Approval of the Commission for a ESCOM for other than complying RPO would be granted after consideration of the relevant facts. A PPA becomes an enforceable document only after approval of the Commission. Any developer acting on a PPA which is not approved by the Commission will be doing so at his own risk.

(d) Projects are generally undertaken by the respective developers with the objective of captive consumption, third party sale or supply to the State ESCOMs. If the developers seek to supply to the ESCOMS by entering into PPAs at the Commission determined tariff after their projects are commissioned or on the verge of commissioning, it can be safely assumed that such action is an afterthought considering the prevailing conditions which make supply to ESCOMs a more attractive proposition. Such opportunistic action cannot be treated as acts of legitimate expectation. Such developers at best can be extended any revised rate as may be determined in this Order, if they so opt, subject to approval of this Commission.

(e) The Commission is empowered to decide the control period or effective/ applicable period of its Generic Tariff Orders and also revise any control period before its expiration for valid reasons. There can be no estoppel against such exercise of powers by the Commission.

12) Tariff Parameters considered for tariff determination:

(i) Debt-Equity Ratio:

The Commission had proposed a debt-equity ratio of 70:30. The CERC in its latest Regulations has also specified debt-equity ratio of 70:30. None of the stakeholders have submitted any comments on this parameter. Therefore, the Commission decides to adopt debt-equity ratio of 70:30.

(ii) Capital Cost:

(a) Whereas the Commission in the discussion paper had proposed a capital cost of Rs.4.80Crs/ MW based on the SECI bid tariff of Rs.3.46/unit, the wind power project developers have contended that the above cost is not viable and that the actual cost is in the range of Rs.5.80 Crs to Rs.9.00 Crs/MW depending on technology and hub-height. BESCOM has requested to adopt the capital cost of Rs.4.50Crs/MW. The Commission notes that the stakeholders have not substantiated their claims with documentary proof to arrive at the present cost of wind projects.

(b) The Capital cost adopted by various Commissions is as below:

State	Date of Order	Rs. Crs./MW
Tamil Nadu	31.03.2016	6.20
Andhra Pradesh	26.03.2016	6.01
Gujarat	30.08.2016	6.15
Rajasthan	10.07.2017	5.25
Maharashtra	28.04.2017	5.94

Note: Excluding Maharashtra, the CUF considered is in the range of 20-27%, indicating that lower hub heights perhaps have been adopted.

(c) The Commission notes that the RERC and the MERC have issued their Orders after the first SECI bid for wind projects and the Capital Cost (CC) considered by them is less than Rs. 6.00 Crs/MW. The MERC has worked out the CC based on indexation and has reduced the same from Rs. 600.74 lakhs/MW to Rs. 594.41 Lakhs/MW, indicating a reduction of 1.05% in one year. On the other hand, the RERC has reduced the cost from Rs.565 lakhs/MW in FY15 to Rs.525 Lakhs/MW in FY18, indicating a negative CAGR (Compound Annual Growth Rate) of 2.42%. Further, the RERC has noted that Indexation mechanism being based on WPI (Wholesale Price Index) indices may not capture the impact of technological advancements such as high tower with increased rotor diameter, next generation towers, change in design etc., that have taken place in the recent past and that there exists a potential for reduction in the capital cost by consolidation of the supply chain and manufacturing process.

(d) In this context the Commission notes that the report of The International Energy Association (IRENA) indicates that internationally the wind projects costs have come down by 4 to 25% during the period 2010 to 2014. The report also states that India and China benefit from low cost local manufacturing base, policy support and low material and labour costs coupled with economies of scale. This fact is also supported by the report of 'livemint' (an electronic newspaper), which while commenting on SECI bids, has stated that the lower SECI bid price is due to falling costs of wind-turbine generators over the past five-years. This fact is further strengthened by the 'World Energy Resources 2016' Report of World Energy Council, which has stated that from 2007 to 2016, the cost of Chinese wind turbines fell by 37%. That a crash in commodity prices since the financial crisis, and increased competition among Original Equipment Manufacturers (OEMs) owing to added manufacturing capacity in China and India have contributed to the downward trend in turbine prices. This Report further states that Chinese market saw modest reduction in costs from 2010-2014 (about 12%), while costs in India declined by 6% between 2010 to 2015. The Commission notes that it is apparent that the benefit of this cost reduction has not been passed on to the consumers in the current regime of high promotion tariff and there is a need for immediate review.

(e) The Commission in its Tariff Order dated 24.02.2015 had approved a capital cost of 6.00 Crs/MW considering projects at hub-heights of 80 meters and above and a CUF of 26%. The analysis of data furnished by Karnataka Renewable Energy Development Ltd (KREDL) indicates that 75% of the projects allocated during FY16 and FY17, have hub-heights in the range of 90 to 100 meters and the average costs for these projects is Rs.6.67 Crs/MW and with CUF above 28%. The 'Power Line' magazine (a leading magazine covering power sector developments) in its edition of March, 2016 reports that for 20 to 30 meters' increase in hub height the cost of turbine would go up by Rs. 2.5 million to Rs. 5 million per MW and the power generation would increase by 10 to 20%. The Commission considering the recent trends in cost reduction on account of economies of scale, improvement in technology leading to increase in efficiency and capacity of the generators, higher hub-height, lower interest and liberal financing regime etc., is of the view that a capital cost of Rs.6.20 per MW would be reasonable for the projects at hub-heights of 90 meters and above. *Thus, considering the increased hub-height and CUF, the Commission decides to allow a capital cost of Rs. 6.20 Crs. / MW, including the evacuation costs.*

(iii) CUF:

(a) The Commission in the discussion paper had proposed a CUF of 26%. The BESCOM, while furnishing the data for FY16 and FY17, has requested for a CUF of 23%. The wind project developers have proposed a CUF of 24%.

(b) SERCs of wind rich States, for the purpose of tariff determination, have considered the following CUF:

State	Date of Order	% CUF
Tamil Nadu	31.03.2016	27.15
Andhra Pradesh	26.03.2016	23.50
Gujarat	30.08.2016	24.50
Rajasthan	10.07.2017	21% for Jaisalmer, Jodhpur and Barmer districts and 20% for other districts
Maharashtra	28.04.2017	22% to 32% depending on the Zone

(c) The Commission notes that, as per the data furnished by BESCOM, while about 46% of the wind generators have CUF of less than 20%, the average CUF of others is about 27%. The Commission notes that wind tariff being sensitive to CUF, any project with CUF lower than 20% would not be economically viable and would impact the tariff considerably. We note that NIWE while assessing the wind potential has also considered sites with CUF 20% and above. We do not find it prudent to promote projects with lower CUF which do not serve public interest. Future projects should necessarily adopt new technologies suitable for higher hub-heights, which would automatically improve the CUF. Thus, relying on historical data for CUF based on old technologies would not be appropriate for determination of tariff for new investment in wind power projects.

(d) The contention of wind power developers is that all prime sites in Karnataka have been already exploited. The Commission notes that, the NIWE has estimated a potential of 55,857 MW at 100-meter hub height with sites having CUF more than 20%, for which the data is also submitted by wind developers. Further, the estimates of NIWE is about 13,593 MW at 80 metres hub-height. The analysis carried out by the CERC in its explanatory memorandum to Draft RE tariff Regulations,2017, indicates that the CUF would improve by 2 to 3 percentage point as the hub-height is increased from 80 meters to 100 meters. Considering the installed capacity of 3840 MW in the State as on 31.07.2017, there is still a huge potential to be tapped, which is possible only with higher CUF at higher hub-heights.

(e) The issue of CUF and hub-heights while adopting latest technology has been elaborately discussed by this Commission in its Order dated 24.02.2015. The Commission notes that as per the data furnished by KREDL for the projects allocated during FY16 & FY17, 71% of the projects have a CUF in the range of 26% to 30%. The average value and the median value of the CUF for the projects allocated is about 28%. The data analysis also indicates that 75% of the projects allocated have hub-heights in the range of 90 to 100 meters, resulting in higher CUF for these projects. It would be logical that higher hub-heights would be the norm of the future which is in the general interest of all the stakeholders. Even otherwise only optimal investment in more efficient plants need to be promoted. The Tariff Policy 2016 stresses the need to encourage higher efficiency level of existing wind power generating plants through repowering and pursuant to the same the MNRE has also issued the Policy for Repowering. Thus, there can be no debate if we were to encourage only efficient plants at higher hub-heights.

In view of the above discussion, the Commission decides to adopt a CUF of 28% for the purpose of determining the tariff in this Order, having decided to approve capital cost of RS. 6.20 Crores /MW.

(iv) Interest on term loan and tenure of loan:

(a) The Commission had proposed 11% as the interest on term loan with a tenure of 12 years. The wind developers in general have requested to adopt interest rate of 12 to 13% with a tenure of 10 years, with one of them requesting tenure of 18 years to reduce the tariff. BESCOM has suggested interest rate of 10.05% considering one year MCLR plus 200 basis points.

(b) The SERCs of wind-rich States and the CERC, for the purpose of tariff determination, have considered the following interest rates for term-loan:

State	Date of Order	% interest
Tamil Nadu	31.03.2016	13.00
Andhra Pradesh	26.03.2016	12.76
Gujarat	30.08.2016	11.80
Rajasthan	10.07.2017	12.30% based on SBI base rate of 9.30% prevailing during first six months of FY17 plus 3.0%.
Maharashtra	28.04.2017	11% based on long-term interest rates applied by IREDA, PFC and REC for RE Projects
CERC	18.04.2017	10.66% i.e. 200 basis points above the average State Bank of India Marginal Cost of Funds based Lending Rate (MCLR) (one-year tenor) prevalent during the last available six months.

(c) The Commission notes that, with effect from 01.04.2017, Indian Renewable Energy Development Agency (IREDA) has revised the interest rates which varies from 9.80% to 11% for wind projects for Grade-1 to Grade-4 projects, with a reduction of 25, 20 and 15 base points for grades 1 to 3 respectively with external grading.

(d) Similarly, PFC has revised the rate of interest from 01.06.2017, which varies from 9.60% to 10.0% for State Sector and 9.75% to 11.00% for private sector with rating IR-1 to IR-5 respectively.

(e) As per the latest data for August, the MCLR of SBI is ranging between 8% to 8.15% for loan tenure varying from one year to three years. Considering 200 bps as per CERC, the maximum interest rate would be 10.15%.

(f) The above would indicate that the domestic loan would attract interest rate in the range of 9.60 to 11.00%, depending upon the credit ratings of the wind generators, with the average working out to 10.30%.

(g) We note that the loans that the developers may raise include foreign debts also. One of the wind developers has indicated an interest rate of 7 to 8% for foreign debt. Further, the report titled 'RE Sector Funding' by 'resurgentindia' (a leading investment bank in the sector), indicates that foreign currency loans would be available with interest rate in the range of 3% to 6% rate, External Commercial borrowings in the range of 3.5% to 5%, Project financing from Developments banks in the range of 4 to 6%, and EXIM banks at the rate of 3% to 5%. Thus as per the report, the foreign funding is available in the range of 3 to 6% rate, with a risk of exchange rate fluctuation. Considering, even the risk of exchange rate fluctuation, the Commission is of the view that, it would be reasonable to assume a rate of 6%, as the interest rate for international funding of the Wind Projects.

(h) Thus, for the purpose of generic tariff determination, the Commission decides to consider 75% of domestic loan component and 25% of foreign component. The average interest rate of domestic loan and foreign loan works out to 9.23%. *Therefore, interest rate of 9.23% is considered as reasonable for working out the tariff.*

(i) Regarding the loan tenure, the Commission decides to adopt 13 years instead of the proposed 12 years, in line with the latest CERC Renewable Energy Regulations.

(v) Depreciation:

(a) The Commission had proposed depreciation rate of 5.83% for the first Twelve (12) years and 1.54% for the remaining thirteen (13) years.

(b) The depreciation rate adopted by various Commissions are as indicated follows:

State	Date of Order	% depreciation
Tamil Nadu	31.03.2016	3.60% per annum
Andhra Pradesh	26.03.2016	7% (for the first 10 years) 1.33% (from 11 to 25 years)
Gujarat	30.08.2016	7% (for the first 10 years) 1.33% (from 11 to 25 years)
Rajasthan	10.07.2017	For the first 12 years at 5.83% of the capital cost per annum and from 13th year onwards, the remaining depreciable value has been spread over the balance useful life of the wind power plant and transmission system.

State	Date of Order	% depreciation
Maharashtra	28.04.2017	For the first 12 years of the Tariff Period at 5.83% per annum, and the remaining depreciation is spread over the balance useful Life of the Project from the 13th year onwards.
CERC	CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2017 dated 17th April 2017	Depreciation rate of 5.28% per annum for first 13 years and remaining depreciation to be spread during balance useful life of the RE projects considering the salvage value of the project as 10% of project cost

(c) The Commission has taken note of the different approaches adopted by other Commissions regarding the depreciation rates**.** Since the Commission has considered debt tenure as thirteen (13) years to cover the debt servicing at 70% of capital cost, *the Commission decides to consider the depreciation rate at 5.38% of the capital cost for the first thirteen years for recovery of debt, with remaining depreciation spread during balance useful life of the RE projects*. The depreciable asset cost is considered as 95% of the capital cost and 90% of the depreciable asset cost is considered for depreciation after accounting for salvage value of 10%.

(vi) Return on Equity:

(a) The Commission had proposed RoE of 16% based on the RoE approved in its earlier Orders.

(b) The RoE adopted by other SERCs and the CERC is indicated below:

State	Date of Order	% RoE
Tamil Nadu	31.03.2016	20% (pre-tax) per annum without linking it to MAT and IT
Andhra Pradesh	26.03.2016	16%
Gujarat	30.08.2016	14%
Rajasthan	10.07.2017	Grossing up the base rate of 16% with tax rate equivalent to Minimum Alternate Tax (MAT) for first 10-years and by corporate tax for next 15-years.
Maharashtra	28.04.2017	Grossing up the base rate of 16% with tax rate equivalent to Minimum Alternate Tax (MAT) for first 10-years and by normal tax rate for next 15-years.
CERC	CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2017 dated 17th April 2017	Normative Return on Equity shall be 14%, to be grossed up by prevailing Minimum Alternate Tax (MAT) as on 1st April of previous year for the entire useful life of the project

(c) The BESCOM has requested to adopt RoE of 14% as specified by the CERC.

(d) The Commission notes that the Tariff Policy,2016 at para 5.11(a) specifies that the CERC would notify the RoE for generation and Transmission, keeping in view the overall risk and prevalent capital cost, which shall be followed by the SERCs also. *Therefore, the Commission hereby decides to adopt a RoE of 14%.*

(vii) Income Tax:

The Income tax on RoE shall be claimed by the generators as per actuals as a pass through and shall be computed on the allowable RoE at the tax rate applicable to the relevant assessment year.

(viii) O & M Expenses:

(a) The Commission had proposed O&M Expenses at Rs.10 lakhs/MW for the base year, with an annual escalation at 5.72%.

(b) While one of the Wind Developers has stated that the proposed O & M expense is lower, the BESCOM has requested for O & M expenses of Rs.9.06 lakh/MW with escalation of 5.72% per annum.

(c) The Commission notes that the SERCs of wind rich States have considered the following O & M Expenses, for the purpose of tariff determination:

State	**Date of Order**	**O& M expenses**
Tamil Nadu	31.03.2016	1.1% on 85% of Capital investment and 0.22% on 15% of the Capital investment with an escalation of 5% i.e. 6.00 Lakhs/MW
Andhra Pradesh	26.03.2016	Rs.9.06 lakhs/MW with 5.72% escalation per annum
Gujarat	30.08.2016	Rs.9.90 lakhs/MW with 5.72% escalation per annum
Rajasthan	10.07.2017	Rs. 9.33 lakh/MW based on escalation of 5.85% per annum as per RERC Regulations on base year FY-15 expense of Rs. 7.87 Lakh/MW
Maharashtra	28.04.2017	Rs. 9.53 Lakh/MW with escalation of 4.85% per annum

(d) The Commission notes that the O & M expenses adopted by other Commissions except TNERC, is in the range of Rs. 9.06 to 9.90 Lakhs/MW. Therefore, the Commission decides to allow O & M expenses at Rs.10 Lakh/MW as proposed, with and escalation of 5.72% per annum.

(ix) Interest on Working capital:

(a) The Commission had proposed interest on Working Capital [IWC] at 12%.

(b) BESCOM has suggested IWC of 11.05%, i.e 300 basis points above State Bank of India one-year MCLR.

(c) The Commission notes that SERCs of wind rich states have adopted the following IWC:

State	Date of Order	Interest rates
Tamil Nadu	31.03.2016	13.50%
Andhra Pradesh	26.03.2016	13.26%
Gujarat	30.08.2016	11.80
Rajasthan	10.07.2017	11.80% i.e.250 basis points higher than the average of SBI Base rate prevalent during first six months of FY 2016-17
Maharashtra	28.04.2017	11.00%

(x) The Commission in its proposal had considered IWC at 100 basis points higher than the term loan on two month's receivable as working capital. The Commission decides to allow IWC at 11.50%.

(xi) Auxiliary Consumption:

The Commission in its earlier Order has considered an auxiliary consumption of 0.5% and decides to retain the same.

13) **Tariff:**

The summary of the existing parameters as per the Tariff Order 24.02.2015 and the approved parameters in this Order is as follows:

Parameter	Existing as per Order dated 24.02.2015	Approved
Capital Cost-Rs.Cr./MW	6.00	6.20
Debt: Equity ratio	70:30	70:30
CUF in %	26	28
Interest on term loan in %	12.50	9.23
Tenure of loan-Years.	12	13
Working Capital [WC]	Two-Months' receivables	Two-Months' receivables
Interest on WC in %	13.00	11.50
Depreciation in %	5.83% for first 12 years and afterwards 1.20% for 13 years	5.38% for first 13 years and remaining depreciation spread over balance years of the useful life.
RoE	16	14
O & M Expenses-Rs. Lakhs/MW	9.51	10.00
O & M escalation per annum	5.72%	5.72%
Auxiliary Consumption	0.5%	0.5%
WACC in %	13.55	10.66
Tariff in Rs./unit	4.50	3.74

Thus, based on the approved parameters, the tariff works out to Rs.3.74 /unit.

14) For the forgoing reasons, we pass the following:

ORDER

(i) The Commission in modification of its Order dated 24th February, 2015, hereby determines the tariff for wind power projects at Rs.3.74 [Three Rupees Seventy-four paise only] per unit.

(ii) The above tariff shall be applicable to all new wind projects, PPAs for which are entered into and approved by the Commission after the date of issue of this Order, subject to the quantum as may be fixed by the Commission separately.

(iii) The tenure of the PPA shall be twenty (20) years, with an option for the developer to extend it for another five (5) years, with the consent of the ESCOM concerned and the approval of the Commission.

(iv) The tariff determined in this Order shall also be applicable for the projects, which have entered into PPAs with any ESCOM prior to the date of this Order that are not approved by the Commission, if they so opt.

(v) It is clarified that for projects which have already entered into PPAs with any ESCOM, as per the tariff determined by the Commission in its Order dated 24.02.2015 and which are approved by the Commission prior to the date of issue of this Order, the tariff as per the Commission's Order dated 24.02.2015 would be applicable, provided the projects are commissioned within the time stipulated in those PPAs, failing which the tariff determined in this Order shall be applicable.

(vi) The tariff determined in this Order shall be in force till 31st March, 2018.

Sd/-	Sd/-	Sd/-
(M.K. SHANKARALINGE GOWDA) CHAIRMAN	(H.D. ARUN KUMAR) MEMBER	(D.B. MANIVAL RAJU) MEMBER

ANNEXURE -1

List of Persons who made written submissions :

i. BESCOM, Bengaluru

ii. CESC, Mysuru

iii. HESCOM, Hubballi

iv. GREENKO ENERGIES P.LTD

v. Doddanavar Global Energy Pvt. Ltd.

vi. KSHEMA POWER and Infrastructure Co. Pvt.Ltd.

vii. Hero Future Energies P.Ltd

viii. Inox Wind Ltd.

ix. Wind Energy-Independent Power Producers Association (WIPPA)

x. Mytrah Energy (India) P.Ltd.

xi. Indian Wind Power Association (IWPA)- Karnataka State Council

xii. Indian Wind Energy Association (in WEA)

xiii. Spring Energy Pvt. Ltd

xiv. Renew Power Ventures P.Ltd.

xv. Infinitas Energy P.Ltd.

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ANNEXURE – 2

List of Persons who made oral submission in the Public Hearing :

1. Indian Wind Energy Association and Wind Energy-Independent Power Producers Association, represented by Counsel Sri. Sridhar Prabhu:
2. Sri. Shankar Nesargi, representing DGEPL:
3. Sri. Venkatesh Sonti, INOX Wind;
4. Sri. D.V.Giri, IWTMA:
5. Sri. U.B.Reddy, ENERFRA
6. Sri.Ashish Nandan, Energreen Power

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