ANDHRA PRADESH ELECTRICITY REGULATORY COMMISSION

4th & 5th Floors, Singareni Bhavan, Red Hills, Hyderabad-500 004

Dated 15-11-2012

Present

Sri A.Raghotham Rao, Chairman
Sri C.R.Sekhar Reddy, Member
Sri R.Ashoka Chari, Member

O.P. No.13 of 2012

ORDER

In the matter of determination of Wind Power Generation Tariff under Section 61 (h), 62, 86(1) (a), 86 (1) (b) and 86 (1) (e) of the Electricity Act, 2003.

M/s. Indian Wind Energy Association (InWEA) … Petitioner

AND

1. Central Power Distribution Company of Andhra Pradesh Limited
2. Eastern Power Distribution Company of Andhra Pradesh Limited
3. Northern Power Distribution Company of Andhra Pradesh Limited
4. Southern Power Distribution Company of Andhra Pradesh Limited

…Respondents

CHAPTER – I

FILING OF InWEA

The petitioner filed this petition under section 94(1)(f) of Electricity Act, 2003 seeking to limit the control period of Wind Tariff Order 2009 and for Determination of Tariff for future Wind Power Projects in Andhra Pradesh as per Section 61(h) and 86(1)(e) of Electricity Act, 2003, Clause 5.12.1 and 5.12.2 of National Electricity Policy and clause 6.4 of National Tariff Policy for promotion of renewable energy generation by harnessing RE potential within the state.

2. The case of the petitioner is briefly as follows:

(i) The Indian Wind Energy Association (InWEA) is an association registered at New Delhi to represent the interests of various stakeholders in the wind energy sector across various States in India.

(ii) The State Electricity Regulatory Commissions are empowered to take necessary measures under Section 86(1)(e) of Electricity Act, 2003 for promotion of renewable energy based generation in the State.

(iii) The Tariff Policy (TP) notified by the Central Government in pursuance of Section 3 of the Electricity Act, 2003 has stipulated that Appropriate Commission may determine 'preferential tariffs' for procurement of power by Distribution licensees from non-conventional energy sources.

(iv) In line with the provisions mentioned in Electricity Act, 2003 and National Tariff Policy, the Commission has specified the enabling framework for development of renewable energy based projects in the State. Some of the measures taken by the Commission are:

a. Issuance of Tariff Order for Non-conventional Energy Projects vide its Order (R.P.No.84 / 2003 in O.P.No.1075 / 2000) dated March 20, 2004.

b. Specifying the Minimum purchase from renewable energy sources under its RPPO Order (O. P. No. 9 of 2005) dated September 27, 2005.

c. Issuance of Tariff Order for Wind Energy Projects vide its Order (in O.P.No.6 of 2009 & O.P.No.7 of 2009) dated May 1, 2009.

(v) As per recent studies carried out by Centre for Wind Energy Technology (C-WET) to determine wind potential assessment at 80 meter hub height, Andhra Pradesh is bestowed with wind power potential of 14497 MW (source CWET website). The estimated potential is second highest amongst all States, even higher than Tamil Nadu, the state with largest installation of Wind energy projects. However despite such, huge wind energy potential, the installed wind power capacity in the state stands at meager 199.2 MW. Further, there has hardly been any investment in the wind sector in the State

during the last 6-7 years since issuance of the Wind Tariff Order and notification of regulations for mandatory renewable energy purchase obligations.

(vi) InWEA has strived to analyse the reasons for such lukewarm response of the investors for wind energy projects in Andhra Pradesh, despite such huge potential. Even after the Commission specified a tariff of Rs.3.50/unit for Wind Energy Generator, it has failed to attract large investment into the wind energy sector in the State. With the present tariff, the investors are finding it difficult to get reasonable return on investment, and are heading to other states offering better tariffs. There is an urgent need to address certain key aspects for enabling conducive regulatory framework for wind energy development in the State including the following:

(vii) ***"Curtailment of Control Period for existing wind Tariff Order 2009.***

a. Existing APERC Wind Tariff Order (O.P.No. 6 of 2009 and O.P.No. 7 of 2009) dated May 1, 2009 stipulates the control period as 5 years.

b. The Commission would appreciate that there has been significant changes in the underlying cost parameters such as capital cost, interest rates, financing costs etc., since the date of issuance of the last Wind Tariff Order during May 2009 by the Commission. Under the cost plus regime for preferential tariff determination, it would be appropriate that the underlying cost and performance parameters are truly representative of the ground realities.

c. Hence, it would be necessary to revisit the validity of assumptions/ normative parameters considered for determination of wind tariff in view of significant variation in the economic parameters, inflationary pressures and change in interest rate regime resulting in untenable financial burden thereby affecting the viability of wind power projects at the existing tariffs. Hence, it would be appropriate to curtail the said Control Period, which is upto 31st March 2014, and limit the same to December 2011.

Hence, we humbly request Hon'ble Commission to kindly limit the Control Period of existing Wind Tariff Order to December, 2011 instead of March 2014 and undertake re-determination of Wind Tariff for next control period as per the parameters outlined below.

(viii) *Specification of adequate preferential tariff by adopting equitable and appropriate principles for tariff determination for future wind projects."*

a. The applicant would like to reiterate one of the most important provisions in the Electricity Act, 2003 (EA 2003), in the context of renewable / non-conventional energy generation that has been reproduced below, for ease of reference:

   Section 61(h) envisages the promotion of co-generation and generation of electricity from renewable sources of energy…

b. Further, the Tariff Policy itself stipulates that the appropriate Commission will have to determine the Preferential Tariff for procurement of RE power by distribution licensees under RE Obligations as envisaged under Section 86(1)(e) of Electricity Act, 2003. Thus, it is envisaged that the Commission will have to determine preferential tariff for procurement of power for each type of renewable energy source.

c. In pursuance of the above provisions, the Commission has issued Wind Tariff order 2004 and in 2009. The primary reason why state has been unable to attract wind sector investors is because the industry finds the wind tariff inadequate to enable them to recover its cost. The promotional tariff specified by the Commission is not sufficient enough to ensure adequate returns, as a result of which it has not been able to encourage renewable energy sector in the state. The growth of wind energy sector in the neighbouring state of Karnataka and Tamil Nadu is a result of adequate compensation being offered to investors in these states. The renewable energy sector in Andhra Pradesh has failed to match the growth prospects offered by the conducive policy regimes in these states.

d. The Hon'ble CERC carried out a detailed and comprehensive exercise to examine and study various parameters involved in renewable energy generation in order to evolve guiding principles for tariff determination from renewable energy source. These principles were result of an elaborate consultative process involving inputs from all the stakeholders at central and state level, which was notified as the CERC (Terms and Conditions for tariff determination from Renewable Energy Sources) Regulations, 2009. These guiding principles, even though not binding on States, have been appreciated and adopted by many State Electricity Regulatory Commissions.

e. The Commission, while devising the tariff under earlier NCEs tariff order, had specified that it intends to determine the tariff on cost-plus basis for each of the technology. Under 'cost-plus' regime, it is important to ascertain that the underlying assumptions considered for determination of tariff remain valid during the control period when a particular tariff regime is under operation. Clearly, the tariff determined for wind energy projects under said NCEs order was not reflective of the underlying costs and hence, hardly any wind energy capacity addition has taken place in Andhra Pradesh since issuance of the said Tariff Order.

(ix) InWEA humbly sought relief under Section 94(1)(f) of Electricity Act, 2003 to the extent of limiting the control period of said Wind Tariff Order. The Commission is empowered to review its decision / order under section 94(1)(f) of the Electricity Act, 2003.

(x) The Commission is empowered to promote harnessing of renewable potential in the state by way of specifying preferential tariff as per section 61(h) of Electricity Act, 2003 and Clause 6.4 of National Tariff Policy. Unless, Wind Tariff is determined with due cognizance of underlying revision in cost and performance parameters, harnessing of wind potential within the state would not be accomplished.

(xi) The request for limiting the Control Period has arisen due to factors beyond the reasonable control of the petitioner. The reference to old Wind Tariff Order is made only to the extent of curtailing the control period of the earlier Wind Tariff to December 2011. The determination of tariff is sought with perspective effect for future wind energy projects and not as a review of tariff with retrospective effect for existing / already commissioned wind energy projects. Thus, it is not review of the existing Wind Tariff Order, but only seeking removal of difficulty to the extent of limiting the control period under the said Wind Tariff Order 2009.

(xii) The Hon'ble Appellate Tribunal in its order dated 03-05-2011 in Appeal No. 194 of 2009 (M/s. Guttaseema Wind Energy Company Pvt. Ltd., V/s APERC and Others), has also held that the tariff determined by the State Commission is inadequate and has therefore directed the Commission to determine the tariff afresh.

(xiii) Preferential tariff determination on cost-plus basis:

a. The Electricity Act, 2003 vide Section 61(d) specifies that the Appropriate Commission while specifying the enabling framework for tariff determination shall ensure the promotion of generation of electricity from renewable energy sources. The relevant text of Section 61(h) is reproduced below;

> *"The appropriate Commission shall, subject to the provisions of this Act, specify the terms and conditions for the determination of tariff, and in doing so, shall be guided by the following, namely:- the promotion of co-generation and generation of electricity from renewable sources of energy,…….."*

b. Further, National Tariff Policy (NTP) vide Clause 6.4 specifies that the Appropriate Commission shall determine the preferential tariff for power procurement by the Distribution Licensee from renewable energy sources.

c. It is evident from the provisions of NTP that preferential tariff for renewable energy is to be determined by the Appropriate

Commission, in accordance with the Section 61 of Electricity Act, 2003.

d. While determining the tariff it is necessary to ascertain whether the benchmark costs and underlying assumptions thereof, which have formed the basis for determination of tariff, remain valid during the period for which the tariff has been specified. In this section InWEA has given their views on the assumptions that may be considered, wherever applicable, keeping in mind the ground realities and the need to encourage wind energy projects in the state.

(xiv) **PROJECT COST**

a. The Commission has considered a capital cost of 4.70 Cr per MW (including evacuation cost) which is very low considering the fact that in Andhra Pradesh, the Wind Energy generators are also responsible for creation of the evacuation infrastructure even beyond the pooling Substation. The project cost considered for tariff determination of tariff is very low when compared to other Commission's orders on wind energy tariff. For e.g. TNERC has considered project cost of 5.35 Crores per MW (excluding evacuation cost) in its Tariff order in 2009-10. CERC has determined the project cost for FY 2011-12 as 492.52 Lakh per MW (Evacuation cost considered only upto interconnection point within project boundary). The project cost as approved by the other Regulatory Commissions in India have varied between Rs.4.90 and Rs.5.60 Crore/MW; varying basically because of difference in the civil cost. In most of the states, the Wind Tariff Order has been issued before 2010, and thereafter, there has been considerable increase in project cost mainly due to the substantial increase in raw material cost like cement, steel and copper cost which in turn has increased the equipment cost of Wind Energy Generators.

b. A few Central Public Sector Companies have procured/purchased Wind Turbines through a tendering / bidding process. The average cost of the wind turbines which have been awarded through such tendering process in the year 2010-11 is about Rs.5.78 Crores/MW.

c. InWEA requests the Commission to consider the base assumption of Rs.5.75 Crores per MW for capital cost of wind power projects (excluding transmission and evacuation costs).

(Xv) CAPACITY UTLISATION FACTOR (CUF)

a The Commission in its order dated May, 01 2010 while determining the tariff discussed the matter of varying CUF across the various sites in the State and finally assumed it as 24.5%. With the availability of CUF data for last 8-9 years for the existing wind projects, an average CUF which is representative sample of all sites can easily be worked out.

b The Wind Zones as specified as per the CERC Regulations are as under:

Wind Zones	CUF
Wind Zone 1	20%
Wind Zone 2	23%
Wind Zone 3	27%
Wind Zone 4	30%

c It is requested that the Commission for tariff determination of Wind power projects for the next Control Period, the CUF corresponding to wind zone 2 may be adopted for the state of Andhra Pradesh as it is the most appropriate zone representing the average CUF of the whole state.

(Xvi) DEPRECIATION

a The Commission may consider depreciation at the rate of 4.5% for first 10 years and 3% 11th year onwards for the remaining life of the project for the purpose of determination of tariff for wind energy projects.

(Xvii) OPERATION AND MAINTENANCE EXPENSES

a InWEA urges the Commission to consider O & M Charges @ Rs.7.25 Lakh/MW as prescribed in the CERC RE Tariff regulations with suitable indexing and an escalation factor of 5.27% per annum for the next control period.

(Xviii) INTEREST ON DEBT AND INTEREST ON WORKING CAPITAL

a InWEA requests the Commission to consider the interest rate on loan as 13.75% p.a. and interest on Working Capital as 13.25% for the purpose of tariff determination for wind energy projects.

(Xix) TERM OF LOAN

a Loans are assumed to be available for 10 years with a moratorium of 1 year. InWEA requests the Commission to consider this assumption of loan tenure while determining the tariff for wind energy projects.

(Xx) RETURN ON EQUITY

a The Central Commission under its RE Tariff Regulations 2009 has allowed the ROE as 19% pre-tax per annum upto 10 years and 24% pre-tax per annum 11th year onwards. InWEA requests the Commission to consider the ROE of 19% pre-tax for first 10 years and 24% pre-tax 11th year onwards for tariff determination of wind energy project to attract investment in the sector.

(Xxi) PROPOSED TARIFF

a InWEA request the Commission to determine tariff for future wind power projects to be commissioned within Andhra Pradesh in line with the guiding principles as prescribed under Regulation 8 of the CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2009 and CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) (First Amendment) Regulations, 2010. A summary of the assumptions made in the said order is given below for reference:

Parameters	Value / Assumption	Remarks
Capital cost for FY 2011-12	Rs.575 Lakh per MW	Based on the capital cost of public sector tendering process.
Capacity Utilization Factor	23%	CUF of Wind Zone -2 as specified by CERC
Useful life	25	As per CERC RE Tariff Regulations, 2009
Debt-Equity ratio	70:30	As standard practice
Term of Loan	10	As per CERC RE Tariff Regulations, 2009
Interest on Loan	13.75%	Weighted Avg. SBI PLR (12.25%) plus 1.5%.
Return on Equity	19% (for 1st 10 years) 24% (from 11th year onwards)	As specified by CERC
Depreciation rate	4.5% (for 1st 10 years) 3% (from 11th year onwards)	In order to address cash flow related concerns, the higher depreciation rate of 4.5% per annum for first 10 years has been specified.
O & M Expenses	Rs.7.26 Lakh/MW with an annual escalation of 5.72%	O & M as specified by CERC for FY 2011-12
Interest on Working Capital	13.25%	Weighted Avg. SBI PLR (12.25%) plus 1.%.

b Based on the above assumptions the levelised tariff for wind power projects works out to be Rs.4.92 / unit.

(Xxii) It is therefore prayed that the Commission may pleased to pass an order:

a To admit this petition and grant an opportunity in person before Commission during the hearing on the above matter.

b To limit the Control period of existing Wind Tariff Order dated 01-05-2009 to December 2011 instead of March, 2014.

c To determine the ‘preferential tariff’ for future wind energy projects as per cost-plus regime as outlined under this petition.

d Condone any inadvertent omissions/errors/shortcomings and permit InWEA to add/change/modify/alter this filing and make further submissions as may be required at a future date.

CHAPTER – II

PUBLIC HEARING

3. After receiving the petition, the Commission issued a public notice through a paper publication dated 23-04-2012, inviting comments / objections / suggestions from stakeholders within two weeks from the date of publication and intimating that public hearing would be held in the matter on 10-05-2012. The Commission held public hearings in the matter on 15.05.2012, 29-05-2012, 28-06-2012 and 12-07-2012 respectively. During the public hearing, many stakeholders represented their views before the Commission, which are summarized in the paras below.

4. In response to the public notice, the respondents (i.e **DISCOMs**) filed their counter/views. The averments contained in the counter/views are briefly as follows:

(i) The contention of the Indian Wind Energy Association is untenable as the Centre for Wind Energy Technology (C-WET) assessed the potential at 80 meters head recently. Based on the NREDCAP sanctions, anticipated wind power capacity addition during 12th year plan 2012-17 is about 5000 MW in different areas of A.P. and from various developers. Out of which for about 3150 MW anticipated up to 2014, the scheme is under study by the PGCIL. Further, after the announcement of tariff of Rs.3.50 per unit by Commission for wind power projects Enercon / Suzlon developers approached DISCOMs no.of times without referring to the tariff and requested for early approvals of power evacuation for commissioning of the projects. Except one wind developer M/s. Guttaseema Wind Energy, no one else approached Appellate Tribunal for electricity challenging the APERC order dated 01-05-2009. In the said case the APTEL in Appeal No. 194 of 2009 with a clear direction remanded back the case to Commission to revise the tariff on the following parameters:

(a). Capital Cost and capital cost indexation

(b). Zone-wise tariff duly considering Zone-wise Capacity Utilisation Factor (CUF) (c). Return on Equity

(d). Interest on Working Capital.

(ii) Commission has issued notice and scheduled for hearing case on 30-06-2012. Further it is the responsibility of the Commission to balance the interest of both the wind developers and general public without burdening the later, as the NCE power is always costly and it is being procured on long-term basis.

(iii) The Commission has passed regulation No.1 of 2012 dated 21-03-2012, determining RPPO (Compliance with purchase of renewable energy certificates) Regulation 2012, where in it is specified that every Energy Distribution Licensee of A.P., shall purchase not less than 5% of the total purchases from RE sources. It is also provided in the above regulation that the developers can enter into PPA with APDISCOMs at pooled cost of power purchase approved by APERC from time to time to encourage RE generators. There by making the RE generators eligible to get RECs which can be traded in the power exchange, apart from the pooled cost. The energy purchased at pooled cost cannot be accounted for RPPO of DISCOMs, where by the RECs have to be purchased at the trading price at power exchange to fulfill the RPPO of DISCOMs in addition to the pooled cost.

(iv) Any developer / generator can generate and sell energy to licensees or any consumer under open access. As such, there is no obligation for APDISCOMs to purchase any particular category of energy.

(v) After announcement of tariff Rs.3.50 per unit for Wind power projects by Commission a large no. of developers have been taken up the projects and some of them have commissioned their projects. As such, developer cannot say that the commissioning of the projects is at low pace.

(vi) The determination of tariff by Commission is yet to be taken up in the case as remanded by APTEL in Appeal No. 194 of 2009. At this stage, the curtailment of the control period cannot be accepted.

(vii) The above order of the Commission dated 01-05-2009 has attained finality, and has been in force since then and implemented for more than three years already.

(viii) The Commission has issued notice and scheduled for hearing the case on 30-06-2012, as remanded by APTEL in Appeal No. 194 of 2009.

(ix) As per clause 6.4(2) of NTP, NCE procurement by distribution licensees for future requirement shall be done as far as possible, through competitive bidding process under section 63 of E.Act, 2003 within suppliers offering energy from same type of NCE sources. In the long-term, these technologies would lead to compete with other sources in terms of full costs.

(x) On the issue of capital cost, it is to submit that the petitioners requested very high capital cost during 2009 proceedings, which was rejected by the Commission and the capital cost fixed by various states subsequent to the APERC order dated 01-05-2009 is tabulated below:

Name of the State	**TAMIL NADU ERC**		**KERALA ERC**		**MADHYA PRADESH ERC**		**GUJARAT ERC**	
	2009	2011	2006	2010	2007	2010	2006	2010
Capital Cost in Crs/MW	5.35	5.35	4.4	4.56	4.6	4.67	4.65	5.0

(xi) Further, APTEL vide its order in Appeal No. 194 of 2009 kept aside the capital cost arrived by the APERC, on the ground that the data considered by Commission is the old data i.e., of 2006/2007. But even the data of 2010 tabulated above clearly shows that the APERC arrived capital cost is much higher than other states. The developers submitted the data of purchased cost of the wind turbines by the Central public sector companies through tendering / bidding process. The Commission should not consider the same, as it will not reflect actual cost of the wind turbines. The GoAP vide letter dated 09-08-2011 requested the Commission to revisit the tariff for Wind Power Projects as per CERC Regulations FY 2011-12, the capital cost considered is Rs.4.92 Cr/MW. The Gujarat ERC in the regulations 2012-

13 considered the capita cost of Rs.5.30 Cr/MW. As such, presently APDISCOMs are requesting to consider the capital cost @ Rs.5.30 Cr/MW with appropriate capital indexation mechanism for the future wind power projects.

(xii) The petitioner themselves requested for a CUF of 24.5%. MNRE vide letter dated 26-09-2011 & 01-08-2011 informed that due to the new technologies in the market the developers can achieve a higher PLF and finally informed that there is no need to fix the zone-wise tariff. As such, the 24.5% CUF considered by the Commission on the developers earlier request, may be retained.

(xiii) The petitioners and NREDCAP requested for depreciation of 4.5 % per annum for a period of 20 years under Straight Line Method (SLM). The same was considered by APERC in its order dated 01-05-2009. Further, the same was not challenged by any developer or even by M/s. Guttaseema Wind Energy Company Pvt. Ltd. As the petitioners requested for depreciation of 4.5% per annum for first 10 years and 3% from 11th year onwards to the remaining period of project life of 25 years under SLM, the same may be considered.

(a) The O & M cost of Rs.7.26 lakhs/MW with 5.72% escalation may be considered as the petitioners requested the same.

(b) The interest on debt 12.30% may be considered as per the CERC 2012-13 regulations.

(c) The petitioner requested for RoE as per CERC regulations. APERC allowed RoE as 15.5% pre-tax in order dated 01-05-2009. Further, APTEL while remanding back the APERC order dated 01-05-2009 in Appeal No. 194 of 2009 clearly directed that the RoE should not be less than the RoE allowed for conventional projects. As such, APDISCOMs propose RoE of 19% pre-tax and 24% from 11th year onwards as requested by the petitioner.

(d) The petitioners proposed tariff of Rs.4.92/unit is on very high side. The said tariff will burden the APDISCOMs and ultimately the end consumers.

(e) The Commission in the order dated 01-05-2009 has given provision of CDM benefit sharing @ 90:10 between developer and DISCOMs as an encouragement for wind power industry in A.P. The sharing of CDM benefits may be considered as per CERC Regulations.

(xiv) The respondents, APDISCOMs, therefore, prays that

a). The Commission may be pleased to consider the issue of tariff, with the normative parameters specified hereunder for future wind power projects.

Sl.No	Normative Parameters	Value
1	Capital cost	Rs.5.3 Crs per MW
2	Capacity Utilization Factor	24.5%
3	Return on Equity	19% pre-tax and 24% pre-tax from 11th year onwards
4	O & M Expenses	Rs.7.26 Lakh/MW
5	O & M escalation	5.72%
6	Interest on Working Capital	12.8%
7	Depreciation	4.5% for 1st 10 years and 3% from 11th year onwards
8	Interest on debt	12.30% per annum
9	Debt equity ratio	70:30
10	Discount rate	10.62%

b). The sharing of CDM benefits may be considered as per CERC Regulations.

c). As all reasonable costs and returns are being allowed to be recovered through this proposed tariff, any policy support by way of Capital subsidy/Capital Finance Assistance (CFA), Higher Depreciation Benefit or General Based Incentives (GBI) by the GoI/GoAP, which becomes available to the developer / generator, may be passed on to the DISCOMs.

d). To pass orders that the tariff terms decided in these proceedings shall be made applicable only to newly coming projects and shall not be applicable to the existing projects or which have already entered PPAs.

5. However, during the public hearings, the DISCOMs expressed their willingness for revision of tariff.

6. In response to the Public Notice, **M/s.Vayu Urja Bharat (pvt) Ltd.**, one of the stakeholders filed a petition in line with the main petition filed by the petitioner in the above said OP narrating all the grounds mentioned by the petitioner in OP but with different rates and requested the Commission to consider the (a) capital cost at Rs.6.25crs / MW, (b) CUF at 22%, (c) ROE at 16%, (d) Interest rate at 14% which are in tune with the guidelines of CERC and also the actual cost inputs. He claimed that this is also in accordance with the National Electricity Policy and requested the Commission to fix the cost of unit at Rs.5.35 per unit. M/s.Vayu Urja Bharat (Pvt) Ltd., also filed a detailed rejoinder to the counter filed by the respondents, claiming the capital cost at Rs.6.32 crs/MW as reasonable, CUF as 22% as it is very realistic and pragmatic while revisiting the issue due to the changed circumstances. Having regard to the practicality, it will be more appropriate if depreciation is considered at 5.62% for the first ten years and 4% from 11th year onwards. It is also reasonable to fix O&M cost at Rs.8.58 lakhs / MW / year with 6% escalation every year. The reasonable interest rates should be 14.75% to 15% p.a. When the above said parameters along with indexation mechanism are taken into consideration the reasonable tariff would be about Rs.5.32 per unit.

7. In response to the Public Notice, **the Indian Wind Power Association (IWPA)** filed a petition submitting that the Commission has also a ceiling price of Rs.5.50 per unit for the short-term power purchases. They claimed that the contention of the DISCOMs that there is no obligation to purchase increases by 1% on yearly basis to encourage and to promote Renewable energy sources is misleading and against the National Policy i.e., National Action Plan on Climate Change (NAPCC). The

project cost per MW is Rs.5.65 Crs at Rekulakunta and Rs.5.91 Crs at Kondameedapalli. So, it is evident that the average project cost per MW excluding the land and other infrastructure costs is Rs.5.78 Crs/MW. Hence, it is requested to consider the project cost at Rs.600 lakhs / MW.

8. During the public hearing, the **Wind Power Association** requested the Commission to consider the right parameters for determination of tariff which will facilitate investments, into the wind sector for the said projects and would also fulfill ever growing energy needs. They have also requested the data submitted for consideration while determining the tariff.

9. On behalf of **M/s.Elcon Green Gen India (P) Ltd.,** Sri A.Bharat Reddy requested the Commission to provide tariff for future wind projects in the State as per CERC's order titled "Determination of generic levelised generation tariff under Regulation 8 of the CERC (Terms and Conditions for Tariff Determination from Renewable Energy Sources) Regulations, 2012 dated 27.03.2012. He has also furnished the data of other units in other states showing the capital costs and other parameters. He has further requested to provide tariff for future wind projects as per the CERC Regulation, 2012, dated 06-02-2012.

10. **New & Renewable Energy Development Corporation of AP Ltd (Nredcap)** made the following suggestions during the public hearing:

- NREDCAP had purchased 22,67,940 kWh at Rs.3.50 per unit.
- APERC passed orders on 01.05.2009, fixing a tariff of Rs 3.50/kWh, with control period up to 31.03.2014. Tariff of Rs 3.50/kWh may not be viable for the sites in AP state, which are having wind power density in the range of **200-250** Watts/Sq. Mtr. Wind Power projects so far commissioned in the state have come up in the high wind potential zones, with wind power density of 300 W/Sq. Mtr. Moreover, project costs have gone up in the recent years due to escalation in costs of various components. Tariff revision may be considered based on the CERC regulations and for a period of 20/25 years from the date of signing of PPAs as being followed in most of the wind power potential states.

- Consent may be given to the incentives announced by the State Govt for utilization of power for captive use/third party sale.

- Wind power tariff is lower in AP state vis-à-vis the expected PLFs, compared to the other potential states in the country and the project sites are also in difficult terrain compared to the sites in the other states, which results in additional cost for building the required infrastructure.

- Hon'ble ATE issued orders dated 03.05.2011 to APERC to re-determine the tariff based on the actual project cost and to ensure RoE for Wind Power shall be higher than the RoE for conventional power projects. Apart from this, GoAP also requested APERC, vide Lr No 7688/RES-1/2010-5; dated: 09.08.2011, to revisit the issue of tariff, keeping in mind the need for augmentation of wind power capacity in the state, matching the resource potential available and issue order in public interest.

11. **M/s. Acciona Energy India Pvt Ltd** made the following suggestions during the public hearing:

- Presently Capital cost of five major wind turbine manufacturers is min of Rs 6 Cr per MW, excluding the evacuation cost. Hence, consider Rs 6.25 Cr per MW as Capital cost, including evacuation cost, instead of Rs 4.70 Cr per MW as mentioned in OP No 7 of 2009.

- Consider 2.5% of capital cost as O&M cost, inclusive of Insurance cost, along with annual escalation of 6%.

- Regarding the rates of depreciation for the first 12 years and later on, consider the rates suggested by CERC in its Order dated 27-03-2012, instead of 4.5% per annum, as mentioned in OP No 7 of 2009.

- Regarding the RoE, for the first 10 years and later on, consider the rates suggested by CERC, instead of 15.5% (pre-tax), as mentioned in OP No 7 of 2009

- Consider the prevailing rates of interest on debts in the range of 13.50% to 14.50%, instead of 12% per annum, as mentioned in OP No 7 of 2009.

- Tariff period should be 20 years, instead of 10 years.

- Wind energy projects should not be compelled to share any of the revenue obtained from the CDM benefits between the developer and the DISCOM, as mentioned in OP No 7 of 2009.

12. **M/s. Orient Green Power Company Ltd** made the following suggestions during the public hearing:

- New tariff, to be fixed by the Commission, shall be given effect to all the machines commissioned on or after 01-01-2012.
- Project cost should be kept at Rs 6.75 Cr per MW, including transmission and evacuation cost.
- O&M cost should be Rs 12 Lakh/MW including taxes and escalation @ 5% per annum.
- Depreciation should be @4.5% for 1st year to 10th year and @3% from 11th year.
- Tariff should be fixed at Rs 5.75 per unit.

13. **M/s. Core Carbon X Solutions Pvt Ltd** made the following suggestions during the public hearing:

- FOR recommended concessional transmission/wheeling charges for RE based may be followed. Electricity Act also mandates that preferential treatment be given to RE Generators, Hence, as mentioned in the petition of InWEA, Commission may determine tariff afresh in respect of Wind Generators. Moreover, GoAP also allowed third party sale of wind power at concessional wheeling charges, subject to approval of APERC.
- Commission may permit the facility of banking of energy for duration of 1 year and the surplus energy at the end of the year may be treated as sold to utility at 85% of the tariff specified by the Commission.

14. **M/s. Manjeera Hotels & Resorts Ltd** made the following suggestions during the public hearing:

- Allow Open Access at concessional charges of 5% (in kind) and to permit banking of energy to wind energy generator.

15. **M/s. Greenergy Renewables Pvt. Ltd** made the following suggestions during the public hearing:

- Control period may be limited to 2 years only and consider useful life period of a Wind power project as 20 years. In case Commission specifies tariff period as 10 years, PPA period may also be limited to 10 years.
- Wind Farm projects in India have significant impact on the increase of commodity price. Project cost may be specified higher than Rs.575 Lakh/MW for FY 2012-13 as specified by CERC.
- Commission is requested to specify wind zone certification procedure in case the wind zone based tariff is adopted.
- Consider RoE on pre-tax basis, with prevailing MAT and corporate tax rate. Normative return on equity of 20% per annum for the first 10 years may be stipulated considering 16% post tax return on equity grossed up with prevailing MAT rate of 20% and 24% per annum from 11^{th} year onwards considering prevailing corporate tax rate of 32.445%.
- Higher depreciation rate of 7% during the initial 10 years may be specified in order to address debt service coverage/cash flow related concerns and balance 2% from 11th year onwards.
- Consider interest on loan by 50 base points higher than that considered by CERC since wind sector in AP has not yet achieved maturity level.
- Interest rate on working capital may be specified higher than the interest rate on long term loan as cost of short term borrowing is expected to be higher than long term loan.
- In line with the CERC's order, O&M cost may be specified as Rs 9 Lakh/MW for FY 2012-13, with annual escalation of 5.72%.

16. **M/s. Vestas Wind Technology India Pvt Ltd** made the following suggestions during the public hearing:

- Capital cost proposed by AERC is quite lower compared with the capital cost of Rs 5.75 Cr per MW considered by CERC.
- RoE should be in parity at least with other states in India.
- Capacity Utilization Factor (CUF) considered by APERC is higher than CUF for both zones 1 & 2. Moreover, CERC's tariff for Zone-3 (25% CUF) is Rs 4.77 per unit, which is higher than the tariff determined by APERC.
- With MNRE having removed the criterion of 200 W/m2 as the min level for setting up of wind power plant, CERC specified tariffs for new wind zones as well. APERC may emulate this example as well.

17. **M.Venugopala Rao, Sr. Journalist, Hyderabad** made the following suggestions during the public hearing:

- Commission is giving undue priority to the petition of InWEA which has no urgency and is patently barred by the limitation of time. Hence, the petition should be rejected as 90 days' time limit is already crossed.
- Petitioner relied on the ATE's order, dated 03-05-2011, issued by Hon'ble ATE, which pertains to M/s Guttaseema Wind Energy Pvt Ltd. But, the subject petition is connected with the petition of M/s Guttaseema and hence the petition need not be entertained on the grounds of Hon'ble ATE's orders.

18. **Sri. M Thimma Reddy, Convenor, People's Monitoring Group on Electricity Regulation** made the following suggestions during the public hearing:

- Though we filed a petition in the Commission on the orders issued in respect of BPL project. But, no action is taken on the same and whereas the petition filed by InWEA has come for a hearing.
- Since the petition is a time-barred petition, the same may be rejected.
- InWEA claims that significant changes have taken place since Commission's order issued on 01-05-2009. But, it used the same information which was used in its filings in 2008-09
- NEDCAP may be directed to come out with the clear picture of wind energy

potential in the state.

- Though Tamil Nadu offered a lower tariff than many other states, it could add more new wind power projects. Hence, APERC along with NEDCAP may conduct a study to examine the factors that are coming in the way to tap the wind power potential in the state.
- Near monopoly condition in the wind turbine manufacturing and lack of transparency is coming in the way of arriving at reliable estimates. For example, M/s SUZLON hiked the cost of a wind power plant by Rs 2 Cr per MW within a span of 3 months
- As the proposed tariff is for the new wind power projects, competitive bidding route may be taken up to select the Developers, which would help to have transparency and as well as to bring down tariffs.

CHAPTER – III

COMMISSION'S ANALYSIS

19. From the filings made in this case and submissions made during public hearing, the following issues arise for consideration in the instant case:

- **(i).** Curtailment of Control Period prescribed in the 01-05-2009 order
- **(ii).** Tariff Period and Useful life
- **(iii).** Capital Cost for determination of tariff
- **(iv).** Capital Cost Indexation mechanism
- **(v).** Operation and Maintenance Expenses and the escalation thereon
- **(vi).** Depreciation
- **(vii).** Capacity Utilization Factor
- **(viii).** Return on Equity
- **(ix).** Interest on Debt and Working Capital loan
- **(x).** Debt Equity Ratio

20. The points raised during the public hearing and the filings on respective issues are discussed below:

(i) Curtailment of Control Period prescribed in the 01-05-2009 order:

In the order of the Commission dated 01-05-2009, the Commission has fixed the control period as 5 years i.e., the period commencing from 01-05-2009 upto 31-03-2014. Therefore, as per the 01-05-2009 order, for all the units that enter into PPA during the said control period, the applicable tariff is Rs 3.50 per unit. The Petitioner has requested the Commission to curtail the control period prescribed in the 01-05-2009 order, upto December 2011, considering significant changes in underlying assumptions so that a new tariff could be determined for units entering PPA w.e.f January 2012, to encourage setting up of new Wind Power Projects in the state of Andhra Pradesh.

Suggestions of Stakeholder/Objectors:

Some of the stakeholders requested that the duration of the control period be curtailed upto the end of December 2011, considering significant changes in cost parameters and non-availability of high wind sites. Many stakeholders made written and oral submissions that the benchmark costs and underlying assumptions which have been used to determine preferential tariffs in the earlier order have changed significantly. The stakeholders requested the Commission to consider the present ground realities and determine tariff to encourage wind energy projects in the State.

They have also stated that currently only low wind sites are available for development and hence have to rely on higher hub-height machines, which are expensive when compared to the estimates used by the Commission in Wind Tariff Order 2009. They have also suggested that after 2009, there has been significant increase in the project cost mainly on account of substantial increase in raw material cost like cement, steel and copper cost which in turn has increased the equipment cost of Wind Energy Generators.

Some of the stakeholders requested the Commission to limit the control period to 2-3 years instead of 5 years so that the tariff parameters could be revisited frequently. On the other hand, some of the objectors submitted that undertaking a re-determination exercise would be tantamount to making a review and modification of Wind Tariff Order 2009 which should be rejected.

Commission's Analysis:

The Commission has examined various suggestions and objections regarding the curtailment of control period prescribed in the 2009 order.

The Commission is of the view, that the provision of a preferential tariff of Rs.3.50 per unit in the 2009 order, is not presently attracting investment in the wind power sector in Andhra Pradesh, though some capacity addition took place initially. The current installed capacity (230 MW as on 31-03-2012) shows disappointing capacity addition, especially when compared with the potential available in the State and the progress witnessed in other states.

The Commission has observed that there have been substantial increases in costs involved in developing wind power projects. The Commission has also taken into consideration the inputs provided by NREDCAP which is the nodal agency entrusted with the task of ensuring smooth implementation of renewable projects in Andhra Pradesh. As per NREDCAP, most of the sites presently available in the State are falling in the Wind Power Density (WPD) range of 200-250 watts/sq.m. which requires higher hub-height machines to have reasonable capacity utilization factors.

Considering the context of power deficit in the state and the wind energy potential available which is yet to be harnessed, and the statutory responsibility vested in the Commission under section 86(1)(e) of the Electricity Act, 2003 to promote and encourage the harnessing of renewable energy, the Commission considers it appropriate to issue a fresh Wind Power Tariff order prescribing a fresh tariff pattern applicable to units which are going to enter into PPA after the commencement of this order. The Commission proposes to curtail the control period prescribed in the 01-05-2009 order upto a day prior to the issue of the present fresh order.

Since the tariff pattern being prescribed in the present order is proposed to be applicable only to units which are going to enter into PPA after the commencement of this order i.e., the date of issue of the present order, and will not be applicable for projects already entered into PPA by the date of issue of this order, and the tariff pattern prescribed in the 01-05-2009 order will continue to govern the tariff structure of units which have already entered into PPA before the date of issue of this order, the curtailment of the control period prescribed in the 01-05-2009 order upto the date of issue of the present order will not be tantamount to a review of the previous wind power tariff order dated 01-05-2009. The curtailment of the control period prescribed in the 01-05-2009 order is only to enable the units that are likely to enter PPA after the date of issue of this order to become eligible for the tariff pattern being prescribed in the present order and will have no effect on the tariff rate pattern applicable to the units who have entered PPA in terms of the order dated 01-05-2009, prior to the date of issue of the present order. Since such units will continue to be governed by the earlier tariff pattern, the curtailment of the control period will not amount to a revision of the 01-05-2009 order.

(ii) **<u>Tariff Period:</u>**

The earlier order of the Commission dated 01-05-2009, states that the tariff is set for a period of 10 years from Commercial operation Date (CoD).

Suggestions of Stakeholder/Objectors:

Some of the stakeholders have suggested that Tariff Period should be 20 years instead of 10 years. They have also stated that the tariff visibility beyond 10 years is required not only for financing of the project but also for promoters to know their returns as the levelized tariff applicable for the entire tariff period would provide the required returns assumed by the Commission. Considering the useful life of power plant as 20 years, they requested the Commission to specify the tariff and PPA period same as 20 years. The petitioner has assumed the project life as 25 years.

Fixation of Tariff Period in CERC's Order and in State E R C's Orders:

The order considers the tariff period for wind power projects as 13 years and the useful life as 25 years. However, for determining the levelized tariff the period considered is 25 years with a discount factor of 10.62%.

GERC has determined tariff for 25 years in line with the useful life of the plant. The levelized tariff too is determined based on the useful life of 25 years at a discount factor which is same as CERC at 10.62%.

TNERC has determined tariff period as 20 years by considering the useful life of wind plants as 20 years.

RERC has considered useful life of wind plants as 25 years. The levelized tariff has been determined for the useful life of the wind power projects i.e., for 25 years based on discount rate of 13.41%.

Commission's Analysis:

Keeping in view the suggestions made above and the patterns followed by the CERC and the other State ERC's mentioned above, the Commission considers a tariff period of 25 years as appropriate since the useful life of a typical wind power plant can be reckoned as 25 years from CoD of the plant. Hence, the Commission considers it appropriate to determine the tariff for a period of 25 years on a levelised basis arrived at based on a discount rate of 10.62%.

(iii) **Capital Cost:**

The earlier order of the Commission dated 01-05-2009, assumed the capital cost for tariff determination at Rs.4.7 crore/MW (including evacuation cost).

Suggestions of Stakeholder/Objectors:

Some of the stakeholders stated that the capital cost (excluding evacuation cost) of five major wind turbine manufacturers (with a market share of more than 90%) is Rs. 6 Cr/MW. They suggested considering a capital cost of Rs 6.25 Cr/MW including evacuation cost instead of Rs. 4.70 Crs as mentioned in order dated 01-05-2009.

Certain other stakeholders have also submitted that a few Central Public Sector Companies have procured/purchased wind turbines through a tendering/bidding process and that the average cost of the wind turbines which have been awarded through such tendering process in the year 2010-11 was about 5.78 Cr/MW. The petitioner (InWEA) requested the Commission to consider Rs.5.75 Cr/MW for capital cost of wind power projects.

Other parties suggested that as technology improves and higher hub heights are harnessed, the cost of machines increases. In addition, they have submitted that the price of commodities like steel, cement, copper etc., have also risen since the last tariff order by the Commission dated 01-05-2009. Also, some important components (like gearbox, control systems, yaw mechanisms etc.) have to be imported and hence impacted by the exchange rate Rupee-Euro which has also worsened. They contended that this has resulted in significant increases in capital cost which needs to be considered in tariff setting process.

Certain other stakeholders contended that capital cost assumption was the major impediment in tariff fixation. They also suggested considering the procedure adopted by CERC which has come up with an indexation mechanism for determining the capital cost for each year of the control period. As the capital cost has increased significantly between 2010 and 2011 due to steep increase in material and equipment costs, they requested the Commission to consider these factors while fixing the tariff for Wind Energy that will meet the actual capital cost at Rs.6.25 Crs/MW. The capital cost mentioned by the stakeholders was within a range of Rs. 5.75 cr / MW to Rs. 6.75 cr /MW.

Certain other stakeholders in response to the DISCOMs submissions, contended that capital cost determination of Kerala and Madhya Pradesh will not provide the appropriate benchmark for capital costs and they are far from realistic project costs. They claimed that such an inference was supported by the fact that these states have so far commissioned only 35.1 MW and 376.4 MW respectively.

NREDCAP:

NREDCAP presented that the capital cost for two projects developed by it in AP was Rs.5.91 Cr./MW and Rs.5.65 Cr./MW. NREDCAP pointed out that prices of commodities have increased leading to increase in machine costs. They also contended that the project cost is exclusive of land cost and additional cost towards arranging the standby meter as per the directions of CPDCL.

Fixation of Capital Cost in CERC's Order and in State E R C's Orders:

CERC has included wind turbine generator, its auxiliaries, land cost, site development charges and other civil works, transportation charges, evacuation cost up to inter-connection point, financing charges and IDC in the capital cost for wind energy projects. The normative capital cost for wind energy projects considered by CERC is Rs.5.75 Cr/MW for FY 2012-13. CERC has revised the capacity factors by considering higher hub-height machines. CERC has modified the capital cost assuming higher hub-height machines stating that capacity factors and capital costs are interlinked.

In MERC order, the indexed capital cost for wind energy projects to be commissioned during FY 2012-13 worked out to Rs. 5.17 Cr/MW. Capital indexation mechanism similar to CERC is used to specify normative capital cost for each year. The Capital cost considered by MERC includes evacuation cost but has not considered higher hub-height machines in line with CERC. Therefore, the capital cost assumed pertains to 50 mtr hub-height machines and the capacity factors are also assumed accordingly. The Commission also stated that the licensee shall be responsible for development of evacuation infrastructure beyond the inter-connection point while developer/ generating company will have to develop evacuation infrastructure from generation facility up to the interconnection point at its own expense.

GERC has adopted the benchmark capital cost of Rs 5.68 Cr / MW (excluding the power evacuation cost from wind farm substation to STU substation) for determination of tariff for the wind power projects to be commissioned in the control period starting from 11 August 2012. For evacuation cost, GERC has considered Rs. 38 Lakh/MW towards constructing the evacuation line up to 100 km length stating that evacuation facility beyond this limit shall be the responsibility of GETCO (the state transmission utility). GERC has stated that this expenditure will be considered over and above the approved capital cost. Therefore, the total capital cost, including evacuation, considered by GERC works out to Rs. 6.06 Cr./MW.

TNERC has adopted CERC's recommendation and considered Rs. 5.75 Cr/MW as capital cost for wind projects for the year 2012-13, which includes evacuation cost up to interconnection point.

RERC has determined Capital cost of Rs 5.30 Cr/MW including connectivity charges (of 2 Lacs/MW) and cost of evacuation network (15 Lacs/MW) for FY 2012-13.

AP DISCOMs:

APDISCOMs requested the Commission to consider the capital cost of Rs.5.30 Cr/MW with appropriate capital indexation mechanism for the future wind power projects. The DISCOMs provided the following details of capital costs adopted by various ERC's for tariff calculation. Further, they have referred to GERC regulations for 2012-13 where the Commission has considered a capital cost of Rs 5.30 Crores per MW.

Name of the State	Tamil Nadu ERC		Kerala ERC		Madhya Pradesh ERC		Gujarat ERC	
	2009	2011	2006	2010	2007	2010	2006	2010
Capital Cost Rs. Cr./MW	5.35	5.35	4.4	4.56	4.6	4.67	4.65	5.0

Commission's Analysis:

The Commission has examined the submissions made by various stakeholders, DISCOMs, NREDCAP and also analyzed approaches followed by various Commissions in determining the project cost. The APDISCOMs have submitted approved capital cost of various states like Tamil Nadu, Kerala, Madhya Pradesh and Gujarat. However, the Commission considers it appropriate to compare with Tamil Nadu and Gujarat given similar wind potentials. Further, both Tamil Nadu and Gujarat have issued orders recently for 2012-13, whereas, other two states have issued orders around 2010 which may not be relevant for the current exercise. The Commission has also analyzed Rajasthan order which has issued new wind tariff for 2012-13.

The Tamil Nadu Commission has adopted a capital cost of Rs.5.75 Cr/MW including evacuation infrastructure for FY 2012-13. Gujarat Commission has increased the capital cost fixed in their earlier drafts/regulations to Rs.6.06 Cr/MW including evacuation infrastructure (Rs.5.68 Cr/MW excluding evacuation infrastructure) from Rs.5.30 Cr/MW as referred by AP DISCOMs. The Commission has noted that the capital cost considered by RERC (Rajasthan) is Rs.5.30 crore/MW. However, in Rajasthan, land is given on lease with minimal cost to the developer for developing wind projects. As a result, very minimal cost was considered towards land cost within the capital cost in Rajasthan. In Rajasthan, the developer has to build the evacuation line up to the pooling substation and not up to the STU interconnection point. The tariff order dated 18-05-2012 of Rajasthan specifies that the responsibility of building evacuation infrastructure from pooling substation to interconnection point of the utility, is that of the transmission utility and not of the developer. On the other hand, in Andhra Pradesh, the Commission in its order in O.P.No.40 of 2010 dated 30-03-2010 in the matter of approval of format for Power Purchase Agreement and Guidelines on Power evacuation from Wind Projects has directed that the evacuation costs beyond the pooling substation/metering point should be borne by the developer only and not the STU.

After taking into account the points mentioned by the different stakeholders in the context of the urgent need to exploit the available potential of about 14,497 MW out of which only a miniscule capacity of 230 MW only has been harnessed as on 31st March, 2012, and after analyzing the wind power tariff fixation orders passed recently by different Commissions, the Commission is of the view that a capital cost fixation (including cost of evacuation upto the Grid Substation) of Rs.5.75 crore/MW is reasonable and appropriate for determination of tariff.

(iv) **<u>Capital Cost Indexation Mechanism:</u>**

The earlier order of the Commission dated 01-05-2009, did not have provision for capital cost indexation mechanism.

Suggestions of Stakeholders / Objectors:

Some of the stakeholders suggested that the capital cost considered should be based on indexation mechanism such that it should reflect the appropriate project development costs for a particular year. As the capital cost has increased significantly between 2010 and 2011 due to steep increase in material and equipment costs the objectors suggested consideration of these factors while fixing the tariff for Wind Energy that will meet the actual capital cost.

APDISCOMs:

The APDISCOMs were agreeable to include the indexation mechanism for capital cost calculation for every year as it was more reflective of the costs incurred for the present year.

Fixation of Capital Indexation Mechanism in CERC, MERC and GERC Orders:

Capital indexation mechanism is used to specify normative capital cost for each year. The indexation formula as mentioned in the order is:

$$CC(n) = P\&M(n)^{*} \ (1+F_1+F_2+F_3)$$

$$P\&M(n) = P\&M(0) * (1+d(n))$$

$$d(n) = [a^{*}\{(SI(n-1)/SI(0))- 1\} + b^{*}\{(EI(n-1)/EI(0)) - 1\}]/(a+b)$$

Where,

CC (n) = Capital Cost for n^{th} year

P&M (n) = Plant and Machinery Cost for n^{th} year

P&M (0) = Plant and Machinery Cost for the base year

d (n) = Capital Cost escalation factor for year (n) of Control Period

SI (n-1) = Average WPI Steel Index prevalent for calendar year (n-1) of the Control Period

SI (0) = Average WPI Steel Index prevalent for calendar year (0) at the beginning of the Control Period i.e., January 2012 to December 2012

EI (n-1) = Average WPI Electrical Machinery Index prevalent for calendar year (n-1) of the Control Period

EI(0) = Average WPI Electrical and Machinery Index prevalent for calendar year (0) at the beginning of the Control Period i.e. January 2012 to December 2012

a = Constant to be determined by Commission from time to time, (for weightage to Steel Index)

b = Constant to be determined by Commission from time to time, (for weightage to Electrical Machinery Index)

F1 = Factor for Land and Civil Works

F2 = Factor for Erection and Commissioning

F3 = Factor for IDC and Financing Cost

The default values of the factors for various RE technologies as stipulated under the said RE Regulations, for wind energy are summarized below;

a=0.6, b=0.4, F1=0.08, F2=0.07, F3=0.1"

Source for WPI (electrical & machinery and iron and steel), WPI (all commodities), WPI

(Price of HSD): Office of Economic Advisor, Ministry of Commerce & Industry (www.eaindustry.nic.in)

• *Source for IRC (Average Annual Inflation rate for indexed energy charge component in case of captive coal mine source): CERC (www.cercind.gov.in)*

Other Commissions like MERC have relied on CERC formula for calculation of indexation of capital cost.

GERC have adopted the benchmark capital cost of Rs 6.06 Cr/MW for determination of tariff for the wind power projects to be commissioned in the control period starting from 11 August 2012 and ending on 31 March 2016. Instead of revising the capital cost for each year of the control period, GERC has preferred to arrive at the above benchmark capital cost by considering an appropriate escalation factor for the entire control period.

Commission's Analysis:

The earlier wind tariff order dated 01-05-2009, had considered a capital cost of Rs.4.70 Crs/MW including evacuation costs. Now, the commission is proposing to fix the capital cost at Rs.5.75 Crs/MW, which is 22.3% higher compared to Rs.4.70 Crs/MW fixed in the earlier order. This Capital Cost is being proposed only for a period of little over two (2) years i.e., from date of issue of this order till 31 March 2015. Hence, the Commission sees no reason to prescribe any escalation / indexation for the capital cost.

(v) O&M Cost:

The earlier order of the Commission dated 01-05-2009, states that the Operation & Maintenance costs for the purpose of determination of tariff would be considered as 1.25% of the project cost with an escalation of 5% per annum thereafter. The Operation & Maintenance expenses comprise of manpower expenses, insurance expenses, spares and repairs, consumables and other expenses (statutory fees etc). O&M cost is inclusive of insurance expenses.

Suggestions of Stakeholders / Objectors:

Some of the stakeholders suggested that the O&M expenses need to take into consideration the insurance cost to the extent of 0.3% to 0.5% additionally depending on site considerations. InWEA suggested to the Commission to consider O&M charges @ Rs 7.25 Lakh/MW as prescribed in the CERC RE tariff regulations with suitable indexing and an escalation factor of 5.72% per annum for the next control period.

Other developers like M/s. Orient Green Power Company Ltd., suggested that the O&M cost should be considered as Rs.12 Lakh /MW including taxes and escalated at 5% per annum. M/s. Acciona Energy India Pvt. Ltd., suggested O&M expenses should be considered as 2.5% of project cost with 6% annual escalation. Other parties suggested following CERC regulations for O&M expenses.

Fixation of O & M Cost in CERC's Order and in State E R C's Orders:

The normative O&M expenses considered by CERC for the first year of the control period (i.e., 2012-13) is Rs. 9 Lakh per MW to be escalated at the rate of 5.72% per annum over the tariff period for determination of the levelised tariff.

The normative O&M expenses for wind energy projects for FY 2010-11 is Rs 6.87 Lakh/MW, to be escalated at the rate of 5.72% per annum over the Tariff Period for determination of the levelised tariff. MERC has considered O&M expense norm for wind energy projects as Rs 7.68 Lakh/MW for FY 2012-13.

Noting that the O&M cost of Rs.6.5 Lakhs/MW considered in its wind tariff order dated 30 January 2010 works out to Rs.7.5 Lakhs/MW for FY 2012-13 after providing an annual escalation of 5%, and considering the wind forecasting requirements in future, GERC fixed O&M cost as Rs.8.00 Lakhs/MW for the new control period starting from 11-08-2012.

TNERC has adopted O&M expenses of 1.1% on 85% of the capital investment and 0.22% on 15% of the capital investment and escalation factor of 5% from second year onwards. The 85% of the capital cost refers to the plant and machinery cost and 15% refers to the land and civil works. (At a capital cost of Rs.5.75 crore/MW this works out to Rs.5.566 Lakhs/MW). TNERC decided to club the insurance expenditure with O&M expenses at the rate specified above; i.e., no separate insurance expenditure other than ones mentioned above is allowed.

O&M expenses have been taken as 1.25% of capital cost for power plant and 3% of cost of transmission line in accordance with Regulation 83 (6)(b)(iv) of RERC Tariff Regulations,2009.

AP DISCOMs:

After hearing the petitioners, the DISCOMs submitted that they were agreeable to consider an O&M cost of Rs.7.26 Lakhs/MW with 5.72% escalation.

Commission's Analysis:

The Commission is of the view that the previous approach adopted by the Commission for fixation of O & M cost at 1.25% of the capital cost is appropriate. At this percentage, the O & M cost for the capital cost proposed now i.e., Rs.5.75 Cr./MW, comes to a figure Rs.7.20 lakhs/MW. However, keeping in view the possible increases in O & M over a long period and the rates fixed by other SERC's, the Commission considers it appropriate and reasonable to fix the O & M cost at Rs.7.40 Lakhs per MW with an O & M escalation of 5% every year thereon.

(vi) **Depreciation:**

The earlier order of the Commission dated 01-05-2009, has provided depreciation at 4.5% per annum considering 20 years of useful life for the wind energy generators.

Suggestions of Stakeholders / Objectors:

Some of the stakeholders referred to CERC RE tariff Regulations 2009 where 'Differential Depreciation Approach' was adopted for allowing the depreciation, to the extent of 90% of the capital cost. Considering the project life of 25 years a higher depreciation rate was provided during debt repayment period to address the cash flow concerns during initial years. InWEA and M/s. Orient Green Power Company Ltd., (OGPL) requested the Commission to consider depreciation at the rate of 4.5% for first 10 years and 3% from 11th year onwards for the remaining life of the project for the purpose of determination of tariff for wind energy projects.

M/s.Greenenergy Renewables Pvt. Ltd., suggested that the Commission may consider a depreciation rate of 7% for first 10 years in order to address debt service coverage/cash flow related concerns and 2% from 11th year onwards.

Fixation of Depreciation Rate in CERC's Order and in State E R C's Orders:
CERC RE tariff regulations 2012-13 specify the depreciation of 5.83% per year for first 12 years and 1.54% per year after 12 years. The CERC regulation has provided for Depreciation upto 90% of the asset on a straight line basis and 10% as salvage value.

In MERC order, for Wind Energy Projects, depreciation rate is 7% for the first 10 years, and 1.33% thereafter, for the remaining useful period of 15 years.

As a promotional measure and to facilitate the loan repayment, GERC has provided depreciation rate at 6% per annum during the loan repayment period of 10 years and 2% from 11th year to 25th year for the purpose of tariff determination for the new control period starting from 11 August 2012.

TNERC in its latest order has retained the rate of 4.5% per annum for depreciation on 85% of the capital investment, which represents the cost of plant and machinery.

RERC in its recent order has adopted the depreciation at the rate of 5.28% on the total project cost for the first 12 years and remaining depreciable value has been spread over the balance useful life of the power project and transmission system.

AP DISCOMs:
The APDISCOMs have stated that the petitioner's request for depreciation of 4.5% per annum for first 10 years and 3 % from 11th year onwards to the remaining

period of project life of 25 years under Straight Line Method (SLM), may be accepted.

Commission's Analysis:

The respondents i.e., APDISCOMs have accepted the proposals of the petitioner i.e., InWEA on allowable depreciation at the rate of 4.5% per annum for first 10 years and 3% from 11th year onwards for the remaining project period of 15 years. The Commission has noted that the above mentioned depreciation rates were not challenged by any developer including M/s. Guttaseema Wind Energy Company Pvt. Ltd., before Hon'ble ATE. The Commission considers that it would be appropriate to allow depreciation of 4.5% per annum for first 10 years and 3% from 11th year onwards for the remaining project period of 15 years. This would enable a total depreciation of 90% of capital cost in the 25 year project period leaving 10% towards salvage value.

(vii) **Capacity Utilisation Factor:**

In the earlier order of the Commission dated 01-05-2009, Commission had considered capacity utilization factor as 24.5% for the purpose of tariff determination based on the petition filed by InWEA at that time.

Suggestions of Stakeholder/Objectors:

InWEA submitted that the Commission may analyze the operating wind farm data for the last 8-9 years in Andhra Pradesh and assess appropriate CUFs. They also suggested that the Commission may adopt Wind Zone 2 with a CUF of 22% on the lines of the CERC final order for determining tariff.

Some of the stakeholders suggested that the Commission should consider wind power density map provided by CERC and classify wind sites according to the WPD criteria and thereby multiple CUFs should be applicable. In addition, they referred to the C-WET wind maps and requested the Commission to use the C-WET mapping for specifying CUF for Andhra Pradesh (AP). Their contention was that WPD for AP at 80 meters hub-height is about 200-250 Watts/sq.mtr which converts to a CUF of 22%. Some of the objectors presented the actual capacity utilization factor of existing projects, based on which, the maximum CUF attained is about 23%.

NREDCAP:

NREDCAP suggested that a CUF of 23% is appropriate for Andhra Pradesh where most of the wind sites lie in the Wind Power Density of 200-250 Watts /sq.m.

Fixation of CUF of in CERC Tariff Order:

CERC tariff regulations 2012-13 specify the norms for Capacity Utilization Factor CUF)/Plant Load Factor (PLF) in respect of the Wind Energy as follows:

Renewable Energy Projects	CUF
Annual Mean Wind Power Density (W/m2)	
Wind zone - 1 (Up to 200)	20%
Wind zone - 2 (201 - 250)	22%
Wind zone - 3 (251 - 300)	25%
Wind zone - 4 (301 - 400)	30%
Wind zone - 5 (Above 400)	32%

The hub height considered by CERC is 80 meters as specified in the discussion paper on tariff regulations based on which the capital cost was determined.

Fixation of CUF of in MERC Tariff Order:

MERC tariff regulations 2012-13 specify the norms for Capacity Utilization Factor CUF)/Plant Load Factor (PLF) in respect of the Wind Energy as follows:

Renewable Energy Projects	CUF
Annual Mean Wind Power Density (W/m2)	
Wind zone-1 (Above 200 and <=250)	20%
Wind zone-2 (Above 250 and <=300)	23%
Wind zone-3 (Above 300 and <=-400)	27%
Wind zone-4 (Above 400)	30%

The hub height considered by MERC for determining the capital cost is 50 meters, as specified in the tariff order. The order also mentions that after the wind studies are complete, the commission will switch to CUF corresponding to 80 meters hub height and will accordingly modify the tariff parameters.

Fixation of CUF of in GERC Tariff Order:

GERC, in their order, stated that preferential tariff should encourage deployment of better technology and optimum site selection and also stated that they did not find any reason to consider the suggestion for lowering of CUF. While determining CUF, GERC analyzed the performance of existing wind farms which ranged from 21% to 32% in the State of Gujarat. GERC specified a normative CUF of 24% for determination of tariff during the control period starting from 11 August 2012.

Fixation of CUF of in TNERC Tariff Order:

In their latest "comprehensive tariff order on wind energy" dated 31-07-2012, TNERC has continued to adopt the CUF of 27.15% earlier prescribed in their order No.1 of 2009 dated 20-03-2009 on tariff for wind energy.

Fixation of CUF of in RERC Tariff Regulations:

RERC, in their 2012-13 tariff order for wind energy, has continued the CUF rates earlier prescribed in their Tariff Regulations of 2009 which had provided for CUF of 21% for Jaisalmer, Jodhpur and Barmer districts and 20% for other districts. In their 2012-13 tariff order, the RERC also continued the earlier prescribed de-ration rates of 1.25% from 6th ,10th, 14th & 18th year in the above CUFs.

AP DISCOMs:

The APDISCOMs have requested for a CUF of 24.5% stating that with the availability of new technologies in the market, the developers can achieve a higher PLF and further submitted that there is no need to fix the Zone wise tariff.

Commission's Analysis:

The Commission after careful examination of written and oral submissions made by the stakeholders and NREDCAP, is of the view that only low-wind density sites are presently available in the state and hence higher hub-height machines have to be considered in the context of setting up of fresh capacity in the wind power sector.

It may be noted that CERC had earlier considered wind power density (WPD) maps at 50 meters hub-height for the purpose of CUFs. Subsequently the wind power density map at 80 meter hub height was considered by CERC. The CUFs at 50 meter and 80 meter hub heights are as follows:

Annual Mean Wind Power Density (Watts/sq.m)	CUF- 80m hub height	CUF- 50m hub height
Wind zone - 1 (Up to 200)	20%	
Wind zone - 2 (201 - 250)	22%	20%
Wind zone - 3 (251 - 300)	25%	23%
Wind zone - 4 (301 - 400)	30%	27%
Wind zone - 5 (Above 400)	32%	30%

From the above table, it is evident that because of using higher hub-height machines there is an approximate increase of 2-3% in the CUFs and increase of wind class by one level. In addition to the NREDCAP submissions, it is evident from the C-WET (50 meter) map that the wind density in the state of AP is in the range of below 200 Watts/sq.m for most of the wind sites. So, for 80 meter hub-height it is expected that most of the sites would fall in the range of 200-250 Watts/sq.m for most of the sites. This was also the submission made by NREDCAP. The CUF corresponding to this wind density of 200-250 Watts/sq.m (at 80 meter hub height) is 22%. A closer look of the C-WET (80 meter) map also shows that most of the sites in AP are available in the range of 200-250 Watts/sq.m. Further, it is also evident that Gujarat is slightly better than Andhra Pradesh as per the C-WET 80 meter wind map.

The Commission was also directed by the ATE in appeal No.194 of 2009 to determine the CUF after considering the wind power density map prepared by the Centre for Wind Energy Technology (C-WET)/Ministry of New & Renewable Energy. To encourage efficiency and optimal selection of sites, the Commission proposes to adopt 23% as CUF. The Commission feels that with the advancement of technology, higher hub heights of 80 meters and above, larger rotor-diameter machines can be installed and CUF of 23% should be achievable. Hence, the Commission considers that a CUF of 23% will be appropriate for the purpose of determination of generic tariff for all the wind power projects that are going to enter into PPA from the date of issuance of this order till 31-03-2015. The Commission considers that the above approach will encourage optimal selection of sites and balance the interests of all the stakeholders.

(viii) **<u>Return on Equity (RoE):</u>**

The earlier order of the Commission dated 01-05-2009, states that the Return on Equity would be 15.5% pre-tax for the purpose of determination of the tariff from wind energy which means that the developers were supposed to manage their tax liability within this allowed return.

Suggestions of Stakeholder/Objectors:

The Central Commission under its RE Tariff Regulations 2009 has allowed the ROE as 19% pre-tax per annum up to 10 years and 24% pre-tax per annum 11^{th} year onwards. The Rate of return specified by the different ERCs for wind energy projects varies from 14% to 16%, post-tax basis. InWEA requested the Commission to consider the RoE of 19% pre-tax for first 10 years and 24% pre-tax 11^{th} year onwards for tariff determination of wind energy projects to attract investment in the Sector.

Other petitioners have requested the commission to consider RoE as per CERC norms. As per CERC tariff order of 2012-13 RoE is as follows (a) 20% (pre-tax) per annum for the first 10 years, and (b) 24% (pre-tax) per annum from the 11th year onwards. They suggested RoE should be considered as recommended by CERC instead of 15.5% (Pre-Tax) as mentioned in O.P.No.7 of 2009. Some of the objectors have also requested for an RoE of 21% pre-tax for the life of the project.

Fixation of RoE in CERC and State E R C's Orders:

In CERC order, the normative Return on Equity (ROE) has been prescribed for 2012-13 as hereunder:

(a) Pre-tax 20% per annum for the first 10 years, and
(b) Pre-tax 24% per annum from the 11th year onwards.

According to MERC regulations, the normative Return on Equity (RoE) is as under:

(a) Pre-tax 19% per annum for the first 10 years, and
(b) Pre-tax 24% per annum from the 11^{th} year onwards.

GERC has followed the principle of allowing 14% RoE plus the applicable tax payment for conventional and renewable power projects. GERC has considered RoE of 14% and the tax payment of MAT at the rate of 20.008% per annum for first 10 years and corporate tax at the rate of 32.445% per annum for the next 15 years while computing the tariff for the new control period starting from 11 August 2012.

Both in their 20-03-2009 order as well as the in their 31-07-2012 order, TNERC has allowed 19.85% pre-tax return on equity.

RERC, in their order dated 18-05-2012 has computed Return on equity by grossing up the base rate of 16% with tax rate equivalent to Minimum alternate Tax (MAT) for first 10 years from COD and normal tax rate for remaining years of the project life. The MAT rate of 20.01% (= 18.50% MAT rate+5% surcharge + 3% education cess) has been considered for first year and a MAT rate of 19.06% (= 18.5% MAT rate + 3% education cess) has been considered for remaining 9 years of the first 10 years. For remaining 15 years of project life (also equal to useful life), the normal tax rate of 30.90% (= 30% tax rate + 3% education cess) has been applied for grossing up of Return on Equity.

AP DISCOMs:

The AP DISCOMs stated during the public hearing that they were agreeable to the RoE for renewable projects being at least equal to RoE of conventional energy projects. APDISCOMs proposed RoE of 19% pre-tax upto 10 years and 24% pre-tax from 11th year onwards as requested by the petitioner.

Commission's Analysis:

The Commission has noted that Hon'ble ATE had remanded back the APERC order in Appeal No. 194 of 2009 stating that the RoE for renewable energy projects should not be less than RoE allowed for conventional projects. In accordance with the order of the Hon'ble ATE mentioned above and to encourage renewable and wind generation in the state, the Commission considers that an RoE of 20% pre-tax for the first 10 years followed by 24% pre-tax for 11th year onwards on the lines of CERC orders, would be appropriate.

(ix) **<u>Interest Cost on Debt:</u>**

The previous order of the Commission dated 01-05-2009, states that the interest cost on debt would be 12% per annum for the purpose of determination of the tariff for wind energy.

Suggestions of Stakeholder/Objectors:

InWEA submitted that loans are assumed to be available for 10 years with a moratorium of 1 year and requested the Commission to consider this assumption of loan tenure while determining the tariff for wind energy projects.

Certain other stakeholders stated that due to prevailing economic slowdown, debt has become extremely costly as the banks have been increasing interest rates in response to directives by Reserve bank of India to curb inflation. The interest rates have increased significantly and the current Prime Lending Rate (PLR) of most banks/Financial Institutions ranges around 14% to 15%. They stated that CERC in its Suo-Motu order in the matter of determination of generic levelised tariff for the FY 2011-12 has considered the interest on debt at 13.25% and interest on working capital at 12.75%. InWEA requested the Commission to consider the interest rate on loan as 13.75% p.a. for the purpose of tariff determination for wind energy projects.

Certain other stakeholders submitted that the Commission may determine the interest rate based on prevailing interest rates, which are based on SBI PLR for non-recourse finance, instead of 12% per annum as mentioned in O.P.No.7 of 2009. They have suggested loan repayment tenures between 10 to 12 years. While M/s. Orient Green Power Company Ltd., suggested an interest rate of 14%, M/s.Green Energy Renewables Pvt. Ltd., suggested that the Commission should consider an interest rate higher than that considered by CERC as the wind sector had not achieved maturity level in Andhra Pradesh. M/s.Vayu Urja Bharat Pvt. Ltd., also suggested an interest rate of 350 basis points above SBI base rate.

Fixation of interest rate on Debt in CERC's Order and in State E R C's Orders:

CERC RE Regulations provides that the loan tenure of 12 years is to be considered for the purpose of determination of tariff for RE projects. The computations of interest on loan carried out for determination of tariff in respect of the RE projects treating the value base of loan as 70% of the capital cost and the weighted average of SBI Base rate (Source: State Bank of India (www.statebankofindia.com)) prevalent during the first six months of the year (i.e., 9.30%) plus 300 basis points (equivalent to interest rate of 12.30%).

The MERC RE Tariff Regulations specify that for FY 2012-13, a loan tenure of 10 years with an interest rate of 13.73% p.a. for a loan amount of 70% of project cost, is to be considered for the purpose of determination of generic tariff for Wind Energy Projects.

GERC has fixed normative interest on term loan as 13% and the loan tenure as 10 years for repayment of term loan for the purpose of tariff determination for the new control period starting from 11 August 2012.

TNERC had considered 12% interest rate in their 20-03-2009 order. In their order dated 31-07-2012 TNERC has considered an interest rate of 12.25% for FY 2012-13. Term of the loan has been considered as 10 years with a moratorium of 1 year.

In RERC order, the interest rate on long term loans has been taken as 300 basis points higher than the average SBI base rate prevalent during first six months of FY 2011-12. The average SBI base rate for first six months during FY 2011-12 works out to be 9.30%. Accordingly, the interest rate of 12.30% (= 9.30% + 3.00%) has been taken for long term loans.

AP DISCOMs:

The AP DISCOMs stated during the public hearing that they were agreeable to the interest on debt of 12.30% as per the CERC 2012-13 regulations.

Commission's Analysis:

The Commission is of the view that, as suggested by DISCOMs, an interest rate of 12.30% on debt, can be adopted on the lines of the CERC regulations.

(x) <u>Interest on Working Capital:</u>

In the previous order of the Commission dated 01-05-2009, working capital interest was not considered as a parameter in determination of tariff from wind energy.

Suggestions of Stakeholder/Objectors:

Some of the stakeholders suggested that due to prevailing economic slowdown, debt has become extremely costly as the banks have been increasing interest rates in response to directives by Reserve bank of India to curb inflation. The interest rates have increased significantly and the current Prime Lending rate (PLR) of most banks/Financial Institutions ranges around 14% to 15%. CERC in its Suo-Motu order in the matter of Determination of generic levelised tariff for the FY 2011-12 has considered the interest debt at 13.25% and interest on working capital at 12.75%. InWEA requested the Commission to consider the interest rate on working capital as 13.25% p.a. for the purpose of tariff determination for wind energy projects.

Certain other stakeholders suggested that the commission should include working capital interest for determination of tariff with the interest rate on working capital loan based on SBI PLR.

Fixation of interest on Working Capital in CERC Tariff Order and State E R C's Regulations:

CERC tariff regulations for 2012-13 prescribe the interest rate on working capital as 12.8% p.a.

In the MERC tariff order for 2012-13, a normative interest rate of 13.23% on working capital, has been prescribed for third year of the Control Period (i.e., FY 2012-13) for computation of levelised tariff for RE technologies, by continuing the rate applicable for second year of the Control Period (i.e., FY 2011-12).

GERC has fixed the interest on working capital as 12% for the determination of tariff for the new control period starting from 11 August, 2012.

In RERC order, the interest on working capital for wind power plants has been taken as 250 basis points higher than the average SBI base rate prevalent during first six months of FY 2011-12, which works out to be 11.80% (9.30%+2.50%) and an interest rate of 11.80% has been prescribed for working capital requirements.

AP DISCOMs:

AP DISCOMs have suggested that the interest rate on working capital may be fixed in line with CERC regulations at 12.8% per annum.

AP DISCOMs have suggested that the following components may be considered for purpose of working capital.

i) O&M expenses for 1 month.

ii) Receivables for 2 Months.

iii) Spares @ 15% of 0&M expenses for 1 month.

Commission's Analysis:

The Commission is of the view that, as suggested by DISCOMs, an interest rate of 12.8% p.a, on working capital can be adopted on the lines of the CERC regulations. The working capital requirement shall be considered as 1 month of O&M cost, 15% of O&M cost towards maintenance spares and 2 months of receivables for debtors.

(xi) **Debt Equity Ratio:**

The previous order of the Commission dated May 01, 2009, states that the debt equity ratio for the purpose of determination of tariff from wind energy would be 70:30 as per the normal regulatory practice followed for infrastructure projects.

Suggestions of Stakeholder/Objectors:

The petitioner, the respondent and the various stakeholders have all expressed that a debt equity ratio of 70:30 would be appropriate as per current financial scenario.

Debt Equity Ratio as per CERC's Order and in State E R C's Orders:

CERC RE Tariff Regulations provides that the debt-equity ratio of 70:30 is to be considered for determination of generic tariff. Certain other State E R C's such as MERC, GERC, TNERC and RERC have also provided debt-equity ratio of 70:30 in their regulations.

Commission's Analysis:

The Commission is of the view that a debt equity ratio of 70:30 is appropriate for financing of wind projects.

CHAPTER - IV

DETERMINATION OF GENERIC TARIFF FOR WIND POWER PROJECTS

(For Units That Enter Into PPA Between 15 -11-2012 and 31-03-2015)

21. The Commission, having perused the record and after careful examination of the various contentions made in the written and oral submissions of Petitioner, Respondents and other parties involved, and cognizing the views of the representative of the NREDCAP and the Government of Andhra Pradesh, and keeping in view the relevant orders of Hon'ble ATE, and in accordance with the Commission's views indicated in earlier chapter, hereby determines the values to be ascribed to key parameters in the context of determination of tariff for new wind power projects in the State of Andhra Pradesh that enter PPA during the period from the date of issue of this order to 31-03-2015, as indicated in the table below.

	Parameter	Value
a	Tariff Period	25 years
b	Useful Life	25 years
c	Capital Cost	Rs.5.75 Cr/MW (including evacuation cost
d	O&M Cost	Rs.7.4 Lakh / MW with escalation of 5% per annum
e	Depreciation	4.5% for 1st 10 years and 3% from 11th year onwards on straight line basis.
f	Capacity Utilisation Factor (CUF)	23%
g	Return on Equity	20% pre-tax for first 10 years and 24% pre-tax from 11th year onwards
h	Interest Cost on Debts	12.30% per annum
i	Tenure of Loan	10 years
j	Interest on Working Capital	12.80% per annum
k	Debt Equity Ratio	70:30
l	Discount Rate	10.62%

22. Based on the above parameters and considering the useful life of a wind power plant as 25 years, the levelised preferential generic tariff for a 25 year period, works out to Rs.4.6995 per unit or say Rs.4.70 per unit. The Commission accordingly, considers it reasonable to fix the preferential levelised generic tariff

in this order at Rs.4.70 per unit for all the units that will enter PPA between the date of this order and 31-03-2015.

The Commission, accordingly, in exercise of the powers conferred on the Commission under Section 61(h), 62, 86(1) (a), 86 (1) (b) and 86 (1) (e) of the Electricity Act, 2003, hereby determines the preferential generic levelised tariff over 25 years for wind power generation projects in the State of Andhra Pradesh which enter into PPAs between the date of issue of this order and 31-03-2015 as Rs.4.70 per unit.

23. The above preferential generic levelised tariff determination is subject to the following terms and conditions:

(i) The preferential generic levelised tariff fixed in para 22 above shall be operative for a period of twenty five (25) years from the Commercial Operation Date (COD).

(ii) The DISCOMs shall have the first right of refusal on Power Purchase, if the Plant continues to operate after the 25th year of operation from the COD. The tariff beyond 25th year shall be as mutually agreed by both the parties and consented by the Commission.

(iii) The Wind Power generators shall bear the entire cost of power evacuation upto the Grid Substation.

(iv) Wind power generators will be entitled to dispatch 100% of the available capacity without reference to the Merit Order Dispatch, subject however, to any system constraints.

(v) The wind power generators shall abide by the orders, rules, regulations and terms and conditions as approved by the Commission from time to time.

(vi) The CDM benefits shall be shared in the ratio of 90:10 between the generator and the DISCOM.

(vii) The WEGs installed should be new and match the specifications issued by C-WET from time to time.

(viii) Minimum Turbine capacity of WEGs proposed for installation should not be less than 225 KW.

(ix) The licensees and the generators shall enter into PPAs as per the provisions of this Order and the relevant Regulations of the APERC and obtain the consent of the Commission in terms of Section 21 (4) (b) of the A.P.E.R. Act 1998 and 86 (1) (b) of Electricity Act 2003.

CHAPTER – V

CURTAILMENT OF CONTROL PERIOD

(Prescribed In Order Dated 01-05-2009 IN O.P.No.06 of 2009 and O.P.No.07 of 2009)

24. In view of the detailed discussion against issue No.1 in Chapter III, the Commission hereby directs that the following substitution be made in the order dated 01-05-2009 in O.P.No.06 of 2009 and O.P.No.07 of 2009:

> "The date **'31-03-2014'** appearing in para 8(i) of the order dated 01-05-2009 in O.P.No.06 of 2009 and O.P.No.07 of 2009 shall be substituted by the date '**14 -11-2012'**."

This order is signed on this 15th day of November, 2012

Sd/-	Sd/-	Sd/-
(R.Ashoka Chari)	**(C.R.Sekhar Reddy)**	**(A.Raghotham Rao)**
Member	Member	Chairman

ANNEXURE

List of Objectors

Sl.	Objector's Name & Address
1	Sri Glen Reccani, Managing Director, M/s Acciona Energy India Pvt. Ltd., C1-001, Tower C, Ground Floor, The Millenia, No.1 & 2, Murphy Road, Ulsoor, Bangalore 560 008. Phone No. (080)41557100 Fax No. (080)41557110
2	M/s Prasad Rao Vemulapalli, Advocate, M/s Vayu Urja Bharat Pvt. Ltd., I-10A (2-2-20/B/3), Durgabai Deshmukh Colony, Bagh Amberpet, Hyd. 500 013. Phone No. (040)27423232 email: vprasadrao@gmail.com
3	Sri M.Venugopala Rao, Senior Journalist, H.No.7-1-408 to 413, F 203, Sri Saidarsan Residency, Balkampet Road, Ameerpet, Hyderabad 500 016.
4	M/s Orient Green Power Company Ltd., 'Sigapi Achi Building', 4th Floor, 18/3 Rukmani Lakshmipathi Raod, Egmore, Chennai 600 008. Phone No. (044)49015678 Fax No. (044)49015655
5	Sri L.Krishna Sankar, Director, M/s Elcon Greengen India Pvt. Ltd., 201, Snowdrop Building, 6-3-1112/7, Kirtilal Jewellers' Lane, Begumpet, Hyderabad 500 016. Phone No. (040)40068127 Fax No. (040)40068128
6	Sri Sandeep Kota, M/s Core Carbon X Solutions Pvt. Ltd., 6-3-903/A/4/1, Vani Nilayam, Surya Nagar Colony, Raj Bhavan Road, Somajiguda, Hyderabad 500 082. Phone No. (040)23410367
7	Sri V.B.Malleswara Rao, Vice President, M/s Manjeera Hotels & Resorts Ltd., #304, Aditya Trade Centre, Aditya Enclave Road, Ameerpet, Hyderabad 500 038. Phone Nos. (040)23735194, 23730231, 23743017 Fax No.(040)23733763 email:info@manjeera.com
8	Sri Ashish Tiwari, Vice President, Project Development, M/s Greenergy Renewables Pvt. Ltd., A-001 Ground Floor, Neelam Centre, Hind Cycle Road, Worli, Mumbai 400 025. Phone No. (022)61473000 Fax No. (022)61473030
9	Sri M.Thimma Reddy, Convener, People's Monitoring Group on Electricity Regulation, First Floor, 1-9-291/6/1, Vidyanagar, Hyderabad 500 044.
10	Ms. Shruti Bhatia, General Manager, Policy and Government Relations/ Asia Pacific, M/s Vestas Wind Technology India Pvt. Ltd., 298, Rajiv Gandhi Salai, Sholinganallur, Chennai 600 119. Phone No. (098)71392572 email: shrbh@vestas.com
11	Sri S.S.Murali, Secretary, Indian Wind Power Association (IWPA), AP Chapter, 6-2-1012, TGV Mansion, Khairatabad, Hyderabad 500 004. Phone Nos.(040)23312842, 66665676 Fax No.(040)23313875 email: iwpaap@gmail.com
12	M/s Ecoren Energy India Pvt. Ltd., Plot No.481, 4th Floor, 36th Square, Road No.36 Jubilee Hills, Hyderabad 500 033.
13	Sri Sridhar Prabhu, Advocate, M/s Gamesha Wind Turbines Pvt. Ltd., No.103, II level, Prestige Poseidon, 139, Residency Road, Bangalore 560 025.