



**ANDHRA PRADESH ELECTRICITY REGULATORY COMMISSION**  
11-4-660, 4<sup>th</sup> & 5<sup>th</sup> Floors, Singareni Bhavan, Red Hills, Hyderabad-500 004.

**ORDER**

**IN THE MATTER OF**

**Determination of Tariff / Power Purchase Price in respect of “New Wind Based  
Power Projects”**

**In case of O.P. No. 6 /2009 (limited to WIND PROJECTS only)**

**O.P.No.7 of 2009**

**FOR**

**PURCHASE OF POWER BY DISCOMS FROM “NEW WIND BASED PROJECTS”**

**Date: 1<sup>st</sup> MAY 2009.**

**ANDHRA PRADESH ELECTRICITY REGULATORY COMMISSION**  
11-4-660, 4<sup>th</sup> & 5<sup>th</sup> Floors, Singareni Bhavan, Red Hills, Hyderabad.

**Dated: 01-05-2009**

Present

A. Raghotham Rao, Chairman  
R. Radha Kishen, Member  
C.R. Sekhar Reddy, Member

**O.P. No. 6 of 2009 (limited to Wind Projects only)**

**O.P. No. 7 of 2009**

1. Fast depletion of fossil fuels, increasing demand for electricity, increasing green house emissions and global warming have necessitated the promotion of generation of energy through Renewable sources. Amongst the Renewable Energy (RE) sources Wind is an important source of energy.
2. As per the survey of the Center for Wind Energy Technology (C-WET), the Ministry of New and Renewable Energy (MNRE), Gol, the State of Andhra Pradesh is bestowed with a Wind potential of about 2100 MWs of Wind Energy. As against this vast potential, a meager capacity to the extent of 107 MWs only could so far be harnessed and the capacity that is sold to the Distribution Companies (DISCOMS) through Power Purchase Agreements is only to the tune of about 30 MWs (constituting only 1.43% of the potential). In the above backdrop, there is an urgent need to exploit the available potential, albeit gradually.
3. An important step in exploiting the available wind potential is the determination of tariff or power purchase price at which Discoms can buy from the Wind generators. Towards determination of tariff or power purchase price, certain initiatives have recently been undertaken, as detailed hereunder: (a) The Government of Andhra Pradesh (GoAP), came up with a Policy announcement vide G.O. Ms. No. 48, dt.11-04-2008 which was subsequently

amended by G.O. Ms. No. 99, dt. 09-09-2008 (b) The Indian Wind Energy Association filed a Petition for determination of Tariff for the future Wind Projects on 21-10- 2008.

4. As per the provisions of the Electricity Act 2003, the APER Commission initiated proceedings in O.P. No. 6 of 2009 (*Suo-motu*) towards the fixation of tariff/power purchase price in respect of the projects which are to be executed on or after 01-04-2009 or such other date as may be specified by the Commission, by giving a Public Notice on 04-02-2009 and also by drawing attention to the consultative paper placed in the official website of the Commission and inviting tariff proposals, views, comments, suggestions etc., to be submitted by 21-02-2009. The Wind Policy announced by the GoAP was also a part of the above consultative process. Further, the petition filed by the Indian Wind Energy Association for determination of tariff for future Wind Energy Projects was also taken on record by the Commission with O.P. No. 7 of 2009, and it was decided to tag this petition to the proceedings initiated by the Commission for tariff determination/fixation of purchase price through the above consultative process.

5. The salient features of the Policy of GoAP on Wind and the Petition filed by the Wind Energy Association, to the extent relevant to the determination of tariff (and other ancillary and incidental issues) in respect of Wind Projects are as follows:

(a) GoAP Policy: The GoAP Policy broadly covers three areas viz. (i) Tariff determination (ii) Allotment of potential sites (iii) Wheeling charges and allied issues. The salient features relevant to the determination of tariff and other related issues are as follows:

1. The operative period is 5 years.
2. The tariff for the upcoming Wind projects is firm at Rs. 3.50 per unit applicable for a period of 10 years from the Commercial Operation Date (COD), subject to approval of APERC.

3. The tariff for the period 11<sup>th</sup> year to 20<sup>th</sup> year shall be as fixed by the APERC.
4. The existing PPAs shall continue to be applicable to the existing wind power projects and they shall abide by the terms and conditions mentioned therein.
5. The PPAs may be for 20 years as per the present norm.
6. The Eligible Developer shall bear the entire cost of power evacuation facilities for interconnecting the Wind farms with the Grid and delivery of power.
7. The Eligible Developer shall abide by the orders, rules, regulations and terms and conditions as approved by the Commission from time to time for operation of Wind farms, power evacuation, transmission and wheeling of energy.
8. Sharing of Clean Development Mechanism (CDM) benefits in the ratio of 90:10 between the Developer and DISCOMS, subject to the APERC Order.

(b) The Petition filed by Indian Wind Energy Association (InWEA): The InWEA, in their petition worked out an estimated levelised cost of generation for the period of 20 years as Rs.4.41/Kwh, based on the following parameters:

1. Capital Cost (excluding transmission and evacuation): Rs.5.75 Cr./MW.
2. Capacity Utilization Factor (CUF): 24.5%
3. Depreciation: 4.5% on SLM basis.
4. Operation & Maintenance (O&M) Expenses: 1.25% of Project Cost.
5. Operation & Maintenance Escalation: 5% per annum.
6. Debt - Equity Ratio: 70:30
7. Interest on Debt: 12% per annum.
8. Term of Loan: 10 yrs with a moratorium of 1 year.
9. Return on Equity: 16% post tax.

However, considering the need for promoting wind generation and also to minimize the impact of such tariff on the consumers, they finally, proposed a tariff of Rs. 3.50/Kwh in the first year with 4% annual escalation till 10<sup>th</sup> year and fixed tariff of Rs. 5.50/Kwh from 11<sup>th</sup> year till 20<sup>th</sup> year of the project, stating that the levelised tariff for the above proposal works out to Rs. 4.37/Kwh.

6. The important objections and suggestions received from various stakeholders, pursuant to the Public Notice issued on 04-02-2009 referred to in para '4' above are as follows (only relevant issues in respect of wind Projects are covered):

- (a) APPCC on behalf of 4 Discoms: GoAP vide its amendment dated 9<sup>th</sup> September 2008 to the Wind Power Policy dated 11<sup>th</sup> April 2008, announced the tariff at Rs.3.50/Kwh for a period of 10 years from COD, subject to approval of Hon'ble Commission. The same tariff may be retained. Further for the period from 11<sup>th</sup> to 20<sup>th</sup> year the tariffs need to be fixed by the Hon'ble Commission.
  
- (b) NEDCAP: Requested to give consent to the tariff of Rs 3.50 per unit for the first ten (10) year period indicated in the policy announced by GoAP. This rate was suggested by NEDCAP considering the depreciation benefit, as against the levelised tariff for 20 years working to Rs 4.71 per unit with the assumptions of (a) Capital cost - Rs 5.25 Crs / MW-including Rs 10 laks / MW towards power evacuation charges (b) Interest on loan -12% (c) Return on equity - 15.5% (pre-tax)(d) Depreciation -4.5% (e) Insurance -1% (f) O & M expenses -1.5% with annual escalation of 5% (g) Loan repayment period -10 years (h) Capacity Utilization factor-22% (i) Generation deration- 1.5% from 6<sup>th</sup> year onwards.

- (c) Indian Wind Turbine Manufacturers Assn: Requested to adopt the policy directions issued by the Government of Andhra Pradesh.
- (d) Bar Association: Suggested that the wisdom of GOAP and APTRANSCO in fixing the power tariff (Rs 3.50 / unit) be respected and not to be guided by the semantics of pessimistic submissions.
- (e) M/s. Guttaseema Wind Energy Company (P) Ltd: Requested to consider the InWEA proposal for tariff setting norms.
- (f) Members of the general Public: Some of the members of the general public expressed the view that the rate announced by the GoAP is not final and that it is for the Hon'ble Commission to take a final decision. Certain others opined that the rate of Rs. 3.10 or the rate as per the orders of the APERC Order dated 20-03-2004 may be allowed with a provision for negotiation under RPP0.
- (g) Sharing of CDM benefits.: On the issue of sharing of CDM benefits, the developers were generally of the view that it cannot be shared with the DISCOMS but the members of the general public were of the opinion that it should be shared in the ratio of 50:50 between the developer and the DISCOMS.
- (h) Indian Wind Energy Association: by way of additional submissions also sought for a sharing of role in responsibility between the wind firm developer and transmission licensee as it relates to evacuation facilities.

7. The Commission has examined the various objections and suggestions regarding the tariff determination. The Commission has noted the acceptance of the GoAP policy by the Indian Wind Turbine Manufacturers Assn. In a cost plus approach, the key elements that influence the determination of tariffs are: (a) Capital Cost (b) Capacity Utilization Factor (c) Operation and Maintenance Cost

(d) Depreciation (e) Return on Equity (f) Interest cost on Debts (g) Debt Equity Ratio. The key elements are analyzed hereunder:

(a) Capital Cost: Indian Wind Energy Association through their Petition dated 21<sup>st</sup> October 2008, requested to consider the base assumption of Rs. 5.75 Crs./MW (excluding transmission and evacuation cost). NEDCAP suggested a figure of Rs.5.15 Crs./MW excluding power evacuation charges of Rs. 10 lakhs / MW. Tamilnadu Electricity Regulatory Commission (TNERC) vide its Order No.1 of 2009, dated 20-03-2009 had considered a capital cost of Rs.5.35 Crs/MW (excluding infrastructure development charges of Rs. 25lakhs). Kerala State Electricity Regulatory Commission while disposing the petitions filed against its original order dated 24.6.2006, had upheld the capital cost of Rs 4.4 crs / MW (inclusive of transmission cost of Rs 20 lakhs) in their orders dated 27<sup>th</sup> February 2008. Madhya Pradesh Electricity Regulatory Commission (MPERC) through their orders issued in November 2007 adopted a project cost of Rs. 4.60 Crs./MW including infrastructure cost (cost of transmission/distribution lines etc). The tariffs determined by the MPERC with the above capital cost are applicable up to 31-03-2012. Gujarath Electricity Regulatory Commission vide their order dated 11<sup>th</sup> August 2006 (valid up to 10<sup>th</sup> August 2009) considered a capital cost of Rs 4.65 crs / MW (inclusive of evacuation arrangement cost of Rs 30 lakhs). Based on the above, Commission is of the view that a capital cost of Rs.4.70 Crs. / MW (including evacuation cost) can appropriately be adopted for the purpose of tariff determination.

(b) Capacity Utilization Factor: Indian Wind energy Association through their petition stated that with the advancement of machine technology, the CUF of 22-25% could easily be achieved with the proper micro siting. Having stated thus, they requested to consider the maximum CUF of 24.5% for tariff determination of Wind power projects for the next control period. On the other hand NEDCAP assumed a CUF of 22%. The

Commission is inclined to accept CUF of 24.5% for the purpose of tariff determination.

- (c) Operation and Maintenance Cost: The Operation & Maintenance expenses comprise of manpower expenses, insurance expenses, spares and repairs, consumables and other expenses (statutory fees etc). Indian Wind Energy Assn., in their petition stated that the experience in operation of wind power projects in the country and abroad indicates that O&M expenses are around 1.0% to 1.2% of the project cost. Besides, O&M expenses should also include insurance cost to the extent of 0.3% to 0.5% depending on site considerations. Having stated thus, the association had urged to fix an O&M of 1.25% of the project cost with an escalation factor of 5% per annum. On the other hand, NEDCAP has assumed O&M expenses at 1.5% with annual escalation of 5%. Taking all factors into account, Commission is inclined to accept the O&M cost as 1.25% of the project cost with an escalation of 5% per annum thereafter for the purpose of tariff determination.
- (d) Depreciation: Indian Wind Energy Assn., in their petition stated that CERC in tariff regulations 2004, has adopted the straight-line method for allowing the depreciation, to the extent of 90% of the capital cost. Having stated thus, they requested that the rate of depreciation should be 4.5% per annum considering the 20 years useful life of the wind energy generators. NEDCAP also adopted the same figure. Commission is also inclined to accept the above figure of 4.5% per annum for the purpose of tariff determination.
- (e) Return on Equity: The Indian Wind Energy Assn., through their petition stated that in order to operationalise “preferential” treatment for tariff determination of renewable energy projects as envisaged in the tariff policy, it is important that the return on equity for wind energy projects is considered at higher rates (say, 16% per annum) than that considered for conventional fossil fuel based generation projects at 14% per annum.



Accordingly, they requested to consider ROE of 16% post tax to attract investment in the sector. On the other hand NEDCAP, the promoting agency, recommended a ROE of 15.5% (pre tax). Commission having recognized the need to promote wind energy is inclined to accept ROE of 15.5% pre tax suggested by NEDCAP, the promoting agency for the Renewable projects. The developers are to manage their tax liability within this allowed return. Commission is aware of the tax holiday available under section 80-1A of the Income tax Act and Income tax benefit through Accelerated depreciation also pointed out by NEDCAP.

- (f) Interest cost on Debts: Indian Wind Energy Assn., requested to consider the interest rate of 12% per annum. NEDCAP also adopted the same rate. Accordingly Commission is inclined to accept the same.
- (g) Debt Equity Ratio: Indian Wind Energy Assn., requested for approving debt equity mix of 70:30 as per the normal regulatory practice followed for infrastructure projects. NEDCAP also adopted the same norm. Commission also would like to adopt the same.

The tariff stream with the above key elements has been worked out by the Commission, for arriving at levelised cost using discount rate at weighted average cost of capital i.e 13.05 % which works out to a fixed tariff for 20 years at Rs 3.43 per unit. However, in view of the urgent need to exploit the available potential of about 2100 MWs, out of which only about 100 MWs has been harnessed as on date, the Commission has decided to fix the Single Part tariff for the first ten years at Rs 3.50 Per unit and the tariff for the next ten year period will be decided thereafter.

The above tariff has been determined in exercise of the powers conferred on the commission under Section 62, 86 (1) (a) and 86(1)(b) of the Electricity Act 2003.

- 8.** The above tariff determination is subject to the following terms and conditions:
- (i) The above tariff is applicable in respect of Wind Power Projects, which have entered into PPAs between 01-05-2009 and 31-03-2014.

- (ii) The tariff for the first ten (10) years shall be firm at Rs. 3.50/unit from the Commercial Operation Date (COD) and the tariff for the next 10 years will be determined thereafter.
- (iii) The DISCOMS shall have the first right of refusal on Power Purchase, if the Plant continues to operate after the 20<sup>th</sup> year of operation from the COD. The tariff beyond 20<sup>th</sup> year shall be as mutually agreed by both the parties and consented by the Commission.
- (iv) The eligible developer shall bear the entire cost of power evacuation facilities for interconnecting the Wind farms with the Grid and delivery of power.
- (v) Developers will be entitled to dispatch 100% of the available capacity without reference to the Merit Order Dispatch subject, however, to any system constraints.
- (vi) The eligible developer shall abide by the orders, rules, regulations and terms and conditions as approved by the Commission from time to time.
- (vii) The CDM benefits shall be shared in the ratio of 90:10 between the developer and the DISCOM.
- (viii) The WEGs installed should be new and match the specifications issued by C-WET from time to time.
- (ix) Minimum Turbine capacity of WEGs proposed for installation should not be less than 225 KW.
- (x) The licensees and the developers 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.

- (xi) As regards the terms and conditions governing Open access of Wind Power Projects (third party/captive), the existing provisions contained in relevant orders / regulations / codes issued by the Commission shall be applicable.

*This order is signed by the Andhra Pradesh Electricity Regulatory Commission on this 1<sup>st</sup> day of May 2009*

Sd/-  
(C.R. SEKHAR REDDY)  
MEMBER

Sd/-  
(R.RADHA KISHEN)  
MEMBER

Sd/-  
(A.RAGHOTHAM RAO)  
CHAIRMAN

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