

M.P. Electricity Regulatory Commission

**Tariff Order
for procurement of power from
Wind Electric Generators**

November 2007

LEGISLATIVE PROVISIONS

- 1.1 Section 86(1) (e) of the Electricity Act 2003, mandates the State Electricity Regulatory Commissions to promote co-generation and generation of electricity from renewable sources of energy by providing suitable measures for connectivity with the grid and sale of electricity to any person. The Regulatory Commissions are also required to specify, for the purchase of electricity from such sources, a percentage of the total consumption of electricity in the area of a distribution Licensee. Further the Act, under Section 62, empowers the Commissions to determine the tariff for the supply of electricity by a generating company to a distribution Licensee in accordance with the provisions of the Act. Also, Section 61 provides that the Commissions specify the terms and conditions for the determination of tariff and, in so doing, be guided by the principles listed in Clauses (a) to (i) of that Section.
- 1.2 As per the Proviso 6, of section 6.4 of National Tariff Policy, it has been recognised that it will take some time for the non-conventional energy sources to compete with conventional sources of energy, hence its procurement shall be done at preferential tariffs to be determined by the Commissions and states as under:

(2) Such procurement by Distribution Licensees for future requirements shall be done, as far as possible, through competitive bidding process under Section 63 of the Act within suppliers offering energy from same type of non-conventional sources. In the long-term, these technologies would need to compete with other sources in terms of full costs.

(3) The Central Commission should lay down guidelines within three months for pricing non-firm power, especially from non-conventional sources, to be followed in cases where such procurement is not through competitive bidding.

Although the Central Electricity Regulatory Commission has issued a concept paper, it has not issued the guidelines so far.

- 1.3 Hence, in exercise of the powers vested in it under Section 86(1)(a), (b) and (c) read with (e), and Section 62(1) of the Electricity Act, 2003 (EA, 2003) and all other powers enabling it in this behalf, the Madhya Pradesh Electricity Regulatory Commission (Commission), through this order, determines the tariff, procurement process and related dispensation for the purchase of power by Licensees in Madhya Pradesh from wind electric generators in the State.

2. PROCEDURAL HISTORY

2.1 Earlier, the Commission had issued a tariff order for procurement of power from wind electric generators on 11.6.2004. The control period was for three years which ended on 31.3.07. Thereafter, the Commission vide order dated 23.4.2007 issued a direction that the same provisions of tariff order dated 11.6.04 shall continue till the issue of tariff order for the next control period. The State Government has also issued a notification no. 6591-F.18-10-thirteen-93 dated 17.10.06 notifying the policy for promotion of electricity generation from Non-conventional Energy Sources (Solar, wind, Bio-mass etc.).

3. REGULATORY PROCESS FOR NEXT CONTROL PERIOD

3.1 The Commission had issued a public notice on 12.5.07 to invite comments/suggestions from all stakeholders by 31.5.07, which was subsequently extended to 15.6.07. Further, a Public hearing was held on 20.7.07 at the Commission's Office. The following organisations had participated in the hearing and gave their comments:

Serial Number	Name of organisation
1	M.P Electricity Consumers Society , Indore
2	M.P. Windfarms Limited, Bhopal
3	Indian Wind Energy Association, New Delhi
4	Indian Wind Power Association, Chennai
5	Cepco Industries Private Limited, New Delhi
6	Manganese Ore (India) Limited, Nagpur
7	Enercon (India) Limited, Bhopal
8	M.P. Power Transmission Company Limited, Jabalpur
9	M.P. Paschim Kshetra Vidyut Vitran Co. Ltd. ,Indore
10	M.P. Power Trading Company Ltd., Jabalpur
11	M.P.Urja Vikas Nigam Limited, Bhopal
12	Suzlon Energy Limited, Indore

- 3.2 The Commission has analysed the tariff orders issued by other State Electricity Regulatory Commissions, comments/objections from different stakeholders, facts on wind electric generation from various sources, Policy issued by the Government of M.P. for the determination of tariff for procurement of power from renewable energy sources. Accordingly, the Commission issues the following order to meet the requirements of the Electricity Act, 2003.

4. APPLICABILITY OF THE ORDER

- 4.1 This tariff Order issued by the Commission will be applicable to all wind electric generation projects in the State of Madhya Pradesh commissioned on or after the date of issue of this order and intended for sale of electricity to the distribution licensees within Madhya Pradesh.
- 4.2 It is made mandatory for the Licensees to submit to the Commission quarterly progress reports on the capacity addition, purchase of energy and other relevant details in respect of wind electric generation projects commissioned in their licensed area, and also post them on their websites on a regular basis.

5. TARIFF REVIEW PERIOD/CONTROL PERIOD

- 5.1 The control period will start from the date of issue of this order and will close at the end of FY11-12 i.e. 31.3.2012. The tariff decided in a particular control period shall apply to all projects which come up within that control period and the tariff determined for a project shall remain in effect for the whole project life of 20 years from the date of grid connectivity.

6. MECHANISM FOR TARIFF DETERMINATION

- 6.1 The Commission has adopted a hybrid approach to determine tariff for procurement of power from wind electric generator as elaborated in para 6.9.
- 6.2 For determining the cost on a hybrid approach, the Commission has considered the benchmarking of costs as detailed below.

Benchmarking

- 6.3 This approach generally requires evaluation, detailed scrutiny and determination of each cost parameter for each Project separately. There will be considerable diversity in the value of parameters across the Projects, such as in respect of plant capacity, location, project cost, financing plan etc.
- 6.4 In absence of availability of such extensive data in Madhya Pradesh, the approach for benchmarking was done by following means:

- a) Analysis of tariff orders issued by various State Electricity Regulatory Commissions.
 - b) Analysis of responses from stakeholders on procurement of electricity from wind electric generators..
 - c) Policies and guidelines issued by Indian Renewable Energy Development Agency, Ministry of New and Renewable Energy Sources.
- 6.5 Regulatory clarity and certainty in Tariff setting is necessary from the perspective of the developers, investors and lenders, in order to support investments in renewable sources of energy projects, which are still at the nascent stage of growth in Madhya Pradesh. Thus, while there is merit in setting a uniform tariff level for the wind electric power Projects, it is also necessary to set out clearly its premises and rationale. A 'Benchmark Tariff Determination' has been made by the Commission and the cost of generation on benchmark performance norms has been arrived at by the Commission.

Single Part vs. Two Part Tariff

- 6.6 Normally, two part tariff is applied in order to recover fixed and variable costs through the fixed and variable components of tariff separately. This is specially useful in a scenario of merit order dispatch.
- 6.7 Since wind power is not amenable to merit order dispatch principles because of infirm nature and almost all the costs of wind electric generators are fixed in nature, **single part tariff appears best suited** for the wind electric generators.

Project Specific or Generalized Tariff

- 6.8 A Generalized tariff mechanism would provide an incentive to the investors for use of most efficient equipment to maximize returns and for selecting the most efficient site. The process of project specific tariff fixation will be cumbersome and time consuming. It is proposed to use one single part tariff for all the wind electric power projects using common benchmark technique.

Front Loaded or Back Loaded tariff

- 6.9 In case tariff is front loaded the developer can switch to third party sale etc. after enjoying the benefits of front loading. In a back loaded tariff, the developer may not be able to meet his loan liability. The Commission, therefore, decides to adopt a hybrid approach towards tariff determination so as to balance the requirement of various stakeholders.

7. TARIFF DESIGN

7.1 In a cost plus approach, the key elements that influence the determination of tariffs are mentioned below :

- Capital Cost
- Capacity Utilization Factor
- Operation & Maintenance Cost
- Plant life
- Depreciation
- Return on Equity
- Interest Cost on debts
- Debt-Equity Ratio

Capital Cost (including cost of infrastructure)

7.2 Various stakeholders have submitted following views:

- a) Indian Wind Energy Association, M.P. Electricity Consumer's Society and Manganese Ore (India)Ltd. stated that the Capital cost shall be Rs. 5 Crs./ MW
- b) Indian Wind Power Association suggested capital cost of Rs. 5.25 Crs./ MW
- c) Enercon (India) Ltd. suggested Rs. 4.75 Crs./MW.
- d) M.P.Pashchim Kshetra Vidyut Vitaran Co. Ltd. suggested that it should be less than Rs. 4.5 Crs./MW.
- e) M.P.Windfarms Ltd. suggested that it should be 15-20 % more than Rs. 4.5 Crs./MW.

7.3 As per incentive policy for encouraging generation of power in Madhya Pradesh through Non-conventional Energy sources (solar, wind, bio-energy etc.) issued vide notification dated 17.10.06 by the Government of Madhya Pradesh, the power evacuation will be an integral part of the project and all expenses for power evacuation facility shall be borne by the unit.

7.4 As per M.P. Urja Vikas Nigam Ltd., the cost of infrastructure has to be included in the cost of project itself under the new policy of the State Government.

Commission's views

- 7.5 The project cost varies on account of various factors including location of the project, capacity, technology etc. and therefore, a reasonable project cost shall have to be considered on a uniform basis for all wind projects for tariff determination.
- 7.6 The Commission has considered the estimates and inputs received from various stakeholders during the public hearing. The Commission notes that as per the information published by MNRE, there is significant progress in development of technology in respect of wind energy that has resulted in higher capacity machines with large rotor diameter and higher hub height. MNRE has stated that the cost could fall as a result of economies of scale due to expansion of market. The Commission, therefore, is of the view that it would be reasonable to adopt a project cost of Rs. 4.60 Crs. per MW including infrastructure cost (cost of transmission/distribution lines etc.) for determination of tariff.

8. OPERATING PARAMETERS

Capacity Utilization Factor

- 8.1 The capacity utilization factor depends on several factors such as wind regime of the site, quality, capacity and age of machines installed, height of the hub, length of blade (swift area) etc. Various stakeholders have, however, suggested following uniform capacity utilization factor for the full life of the plant :--
- a) Indian Wind Energy Association, M.P.Electricity Consumers Society, Manganese Ore (India) Limited and Enercon (India) Limited have suggested 22.5 % .
 - b) Indian Wind Power Association suggested 20 %.
 - c) M.P.Windfarms Limited represents that 22.5% is high, it should be lower.
 - d) M.P.Pashchim Kshetra Vidyut Vitaran Company Limited represented that the capacity utilization factor may be derived on power curve etc.

Commission's views

- 8.2 As the capacity utilization factor depends on various variable factors, it would be difficult to compute it specifically for each machine and each site. In view of this and after duly considering the respondents' opinion during the public hearing, the Commission has taken a capacity utilization factor of 22.5% without derating as a reasonable estimate for new projects.

O & M expenses

- 8.3 The operation and maintenance expenses comprise of manpower expenses, insurance expenses, spares and repairs, consumables and other expenses (statutory fees etc.). Various stakeholders have suggested operation and maintenance expenses within the range of 1 % to 2 % with an escalation of 5% per year.

Commission's views

- 8.4 Considering various factors, the Commission has decided that it would be appropriate to charge 1 % of the capital cost of the project as O&M expenses for the first five years and increased thereafter with a simple escalation of 5% per year.

Plant Life

- 8.5 Various stakeholders have suggested plant life for 20 years. Other Commissions like Andhra Pradesh, Maharashtra and Tamil Nadu too have also considered plant life to be 20 years. International experience also suggests the expected project life for a wind energy project to be 20 years.

Commission's views

- 8.6 Based on these inputs, the Commission considers the plant life as 20 years for wind power generation units for tariff determination purposes.

9. FINANCIAL PARAMETERS

Depreciation

- 9.1 Various stakeholders have suggested depreciation rates ranging from 4.5 % p.a. on a straight line method to 7.5 % p.a. for first 10 years.
- 9.2 Central Electricity Authority has recommended depreciation at the rate of 7.84% p.a. until the debt is repaid. Beyond that balance is to be spread over the remaining life of the plants.

Commission's views

- 9.3 The Commission has decided that for the purpose of tariff determination, it would be prudent to assume depreciation @ 7% per annum for the first 10 years so that the debt is repaid and balance 20 % is to be depreciated @ 2% per annum in the next 10 years so that the asset is depreciated to a residual value of 10 % of its initial value over 20 years.

Return on equity

9.4 During the public hearing, various stakeholders have suggested return on equity as 16 % pre-tax.

Commission's views

9.5 Most of the Commissions have allowed higher returns to encourage investment in renewable sources and have given the freedom to investors to manage their tax liability within this allowed return. The Commission has allowed rate of return @ **16% pre-tax.**

Interest on Debt

9.6 Various stakeholders have suggested following annual rate of interest on debt:--

- | | | |
|---|-----|---------|
| (i) Indian Wind Energy Association, New Delhi | --- | 12 % |
| (ii) Indian Wind Power Association , Chennai | --- | 11.5 %. |
| (iii) M.P.Windfarms Ltd., Bhopal | --- | 13 % |
| (iv) Manganese Ore (India) Ltd., Nagpur | --- | 10.25 % |
| (v) Enercon (India) Ltd., Bhopal | --- | 10.5 % |

9.7 Other Commissions have adopted the following annual rate of interest on debt :--

- | | | |
|----------------------|------|---------|
| (i) Uttar Pradesh | ---- | 10.25 % |
| (ii) Karnataka | ---- | 11.00 % |
| (iii) Andhra Pradesh | ---- | 12.00 % |
| (iv) Tamil Nadu | ---- | 9.00 % |

Commission's views

9.8 The Commission fixes the annual interest rate on debt at 11 % for tariff determination purposes. The investor is allowed the freedom to take a cheaper loan and any benefits may be retained.

Debt - Equity Ratio

9.9 Various stakeholders have suggested 70:30 ratio.

Commission's views

9.10 The Commission has considered a debt-equity ratio of 70: 30.

10. COMMISSION'S ORDER: TARIFF RATE

Determination of Tariff

10.1 Considering the above parameters, the Commission sets the tariff for generation from 1 MW new wind energy project to be commissioned after issue of this order for its project life of 20 years in the manner shown below :

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Tariff (Rs/unit)	4.03	3.86	3.69	3.52	3.36	3.36	3.36	3.36	3.36	3.36
	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Tariff (Rs/unit)	3.36	3.36	3.36	3.36	3.36	3.36	3.36	3.36	3.36	3.36

11. TARIFF FOR EXISTING WIND ELECTRIC GENERATION PROJECTS

11.1 Existing projects are those, which have their date of commissioning before the date on which this current order comes into effect. These projects were set up under the guidelines existing at the time of such investments.

11.2 The price payable to this group of projects for sale to the licensees shall be governed under the same terms and conditions applicable at the time of such investments. Accordingly, the Commission indicates the following tariffs for the existing wind electric generators :--

- (i) For those commissioned before 11.6.04 and whose earlier agreement period is not over ---- As per agreement in force.
- (ii) For those commissioned before 11.6.04 whose earlier agreement period is over and who want to continue to supply to Discoms for remaining life of the project ---- Rs. 2.87 per unit .
- (iii) For those commissioned on 11.6.04 or thereafter and who have executed an agreement with the Discom/ MP Power Trading Co. Ltd. ---- As per agreement in force.
- (iv) For those commissioned on 11.6.04 or thereafter but prior to the date of issue of this order and who want to supply to Discom now after supplying to third party/ captive use for some years ---- Based on yearly tariff fixed by order dated

1.3.06 on the basis of number of years elapsed from the date of commissioning of the unit.

- (v) For inadvertent flow of energy into the system either by captive user or third party supplier (for projects commissioned after 11.6.04) ----- Rs. 2.90 per unit

11.3 These tariffs and applicable conditions would remain constant for the remaining period of operation of the project considering the life of project as 20 years. However, wheeling charges as per provisions made in the incentive policy of the Government of Madhya Pradesh dated 17.10.2006 will be applicable to such sale.

11.4 The Discom if found technically feasible, will continue to allow existing wind electric generator to supply power through an existing feeder subject to recovery of monthly line rent @ 0.5 % of the cost of line at the current schedule of rates reviewed at the start of every financial year. If number of units are connected through the same line, line rent shall be charged on proportionate basis to the Mega watt capacity of the projects.

12. OTHER TERMS AND CONDITIONS

12.1 The Tariff Rate for the licensee is inclusive of all charges (tax liabilities included).

12.2 An earlier review of the Tariff Rate before the control period may be undertaken under exceptional circumstances, if the need for such review is clearly demonstrated with adequate supporting material.

12.3 The Tariff Rates shall be firm for the project life and will not vary with fluctuations in exchange rate or on account of changes in law or in taxes.

Power Purchase Agreement and Tenure

12.4 As majority of the wind energy generating units are located in West Discom area, the licensee had been repeatedly requesting the Commission to allocate the energy generated to the other Discoms as well and the Commission finds merit in the submissions of the West Discom. Hence to obviate the difficulties experienced by the Discoms having to procure bulk of the energy generated by the wind units and other Discoms not finding enough units in their areas for procurement, the Commission directs that the energy generated by the wind generating units will be procured centrally by the M.P. Power Trading Co. Ltd. at the rates specified in this order. The energy so procured will be allocated by M.P. Power Trading Co. Ltd. to the three distribution licensees on the basis of actual energy input in previous financial year. Accordingly, the Power Purchase Agreements will be signed between

the developer and the M.P.Power Trading Co. Ltd. The M.P. Power Trading Company Limited, Jabalpur in turn will have back to back power supply agreement with the Discoms. The agreements will be for exclusive sale of electricity for a period of 20 years from the date of commissioning of plant or for a shorter period in case the developer opts to supply to the licensees after consuming the electricity for self use/ third party sale for some years. The M.P. Power Trading Company Limited, Jabalpur is directed to submit to the Commission a model agreement within two months from the date of the order.

- 12.5 The developers are required to get all the required statutory consents before entering into agreement with the licensees.

Scheduling

- 12.6 The wind electric generation projects are out of the purview of 'scheduling' and 'merit order dispatch principles' as the generated power is infirm in nature.

Reactive Power Supply

- 12.7 The Wind Electric Generators would be deemed to be the generating station of a generating company and all functions, obligations and duties assigned to such stations under the Electricity Act 2003 would apply to these power stations. These stations would be required to abide by all applicable codes.
- 12.8 The Commission determines the charges for KVARh consumption from the grid as 27 paise/unit i.e. the rate which is already prevalent in the State and which may be revised as and when necessary.
- 12.9 Reactive energy charges would be paid by the developer to the Distribution Licensees in whose territorial area the Wind Electric Generator Unit is located.

Wheeling charges

- 12.10 Wheeling charges and applicable surcharge on wheeling charges shall be levied as determined by the Commission from time to time for third party sale/captive consumption. Wheeling charges shall be payable to the Discom where the energy is consumed irrespective of the point of injection. No wheeling charges are payable for sale to M.P. Power Trading Co. Ltd. on behalf of Discoms.

12.11 Till such time the wheeling charges are determined by the Commission for third party sale/ captive consumption, the Distribution Company in whose area the energy is consumed (irrespective of the point of injection) shall deduct 2% of the energy injected towards provisional wheeling charges in terms of units. The M.P. Power Trading Company Limited shall also claim subsidy from the State Government towards wheeling charges @ 4% of the energy injected at the rate of prevailing energy charges for the user in terms of provisions made in the Government of M.P. incentive policy for encouraging generation of power in M.P. through Non-conventional Energy Sources notified on 17.10.06. This amount of subsidy shall then be passed on to the Discom/ Discoms in whose area the energy is consumed on the basis of allocation indicated by the generator in the agreement executed.

Metering & Billing

12.12 The metering arrangement is to be done at site as per the provisions of the Government of M.P. incentive policy for encouraging generation of power in M.P. through Non-conventional Energy Sources notified on 17.10.06.

12.13 Billing of the metered energy will be carried out on a monthly basis.

12.14 The meter reading will be carried out by the respective Discom where the energy is injected into the system.

Payment Mechanism

12.15 The Commission prescribes that a settlement period of 30 days from the date of submission of the bill to the concerned Discom where the power is injected, should be followed in order to ensure that the developer has an assurance of cash inflow for the energy, which he delivers to the grid.

12.16 The bills shall be submitted to the concerned distribution licensee in whose area the power is injected. The distribution licensee shall then verify the bills and send the same within 7 days of receipt of bills to the M.P. Power Trading Company Limited, Jabalpur for making payment to the developer. The M.P. Power Trading Company Limited in turn, would raise the bills on the distribution licensees on the basis of allocation.

12.17 In case of delay beyond the 30 days payment period, the M.P. Trading Co. Ltd. will pay penal interest on outstanding amount at the rate of 5% p.a. over and above the short term lending rate of the State Bank of India (known as Prime Lending Rate) prevailing on the first day of the month when payment becomes due. In case the M.P. Trading Co. Ltd. makes the payment within 15 days from the date of submission of bill by developer, a rebate of 1 % billed amount shall be allowed by the developer. The penal interest/rebate will also be passed on to the Discoms by the M.P. Power Trading Co. Ltd.

Default Provisions – Third Party Sale or sale to utility

- 12.18 In case of default in payment for more than three months continuously by the M.P. Power Trading Company Limited, the developer can sell power to the third party.
- 12.19 Where the developer has an existing arrangement for third party supply or for captive consumption and in case the developer desires to terminate the agreement with third party and to supply to the utility, the utility with the prior permission of the Commission, will purchase the power at the rate as determined by the Commission in Para 10 or 11.2 as the case may be, in which case the developers are required to execute the Power Purchase Agreement with the licensee for the remaining period of project life of 20 years.

Drawing of Power during Shutdown

- 12.20 The plant would be entitled to draw power from the Distribution Licensee's network during shutdown period of its plant or during other emergencies. The energy consumed would be billed at the temporary rate applicable to HT Industrial category. The drawal by the Plant would not normally be expected to exceed 10% of the MW capacity it delivers to the Distribution licensee.

Other applicable conditions

- 12.21 All statutory clearances and necessary approvals, if any, are to be obtained by the developer for setting up of project through Department of Non-conventional Energy Sources. The developer is also responsible for their compliance and their renewals as may be required from time to time.
- 12.22 The developer would ensure that the proposed location of the plant is in accordance with the policy guidelines of the Union/the State Government.

Minimum Purchase Requirements

- 12.23 Section 86(1)(e) of the Electricity Act, 2003 states that the State Commission shall specify a percentage of the total consumption of electricity in the area of a distribution licensee for purchase of electricity from renewable sources.
- 12.24 The Commission, therefore, fixes a target for each licensee @ 10% of his annual consumption (including third party sale and own use) in his area of supply, subject to availability, as the minimum purchase requirement from all Non-conventional Sources of Energy including Bio-mass, wind, small hydro, co-generation etc. for the distribution licensees. The inter-se allocation between the various non-conventional sources of energy will be specified by the Commission based on the installed capacity of each source in the course of annual retail tariff determination.

12.25 If the Distribution Licensee fulfils the minimum purchase requirements and still has offers from the renewable energy generators, then either the Distribution Licensee or the developers can approach the Commission for approval of such procurement offers. The Commission is presently not inclined to prescribe the maximum limit, as it does not foresee that in the immediate future, there would be offers from investors in renewable sources exceeding the prescribed minimum limit.

12.26 The condition of minimum purchase requirement for the Distribution Licensee would not be applicable under Force Majeure Conditions such as war, strike, lockout, riots, acts of God or natural calamity etc. so as to enable the Distribution Licensee to maintain the supply to its consumers and public services under emergency conditions.

Banking

12.27 Banking in respect of captive generator and third party suppliers shall be allowed in terms of provisions made in the Government of M.P. incentive policy for encouraging generation of power in M.P. through Non-conventional Energy Sources notified on 17.10.06. The distribution licensees are directed to submit a proposal to the Commission on the methodology of banking within three months from the date of the order.

Reduction in contract demand

12.28 Reduction in contract demand by consumers of the distribution licensees shall be allowed in terms of provisions made in the Government of M.P. incentive policy for encouraging generation of power in M.P. through Non-conventional Energy Sources notified on 17.10.06.

Power to amend

12.29 The Commission reserves the right to alter, modify or amend any provisions of this order at any time. The Commission feels that this provision is necessary so that any fact which has been over-looked can be incorporated subsequently or any new situation emerges due to experience gained during the operation of the order can be suitably addressed in the interest of the stakeholders.

Ordered accordingly.

Sd/-

(R.Natarajan)
Member(Econ.)

Sd/-

(D.Roybardhan)
Member(Engg.)

Sd/-

(Dr. J.L.Bose)
Chairman

Place : Bhopal

Date : 21st November, 2007