

# **GOVERNMENT OF PAKISTAN**



## **MINISTRY OF WATER & POWER**

### **Guidelines for Determination of Tariff For Wind Power Generation**

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## **GUIDELINES FOR DETERMINATION OF TARIFF FOR WIND POWER GENERATION**

These guidelines are being issued by the Government of Pakistan under Section 7(6) of the Regulation of Generation, Transmission and Distribution of Electric Power act (XL of) 1997 (NEPRA Act) for determination of tariff for sale of electricity by Wind Power Generators (IPPs). The guidelines may be changed from time to time by GoP. However, contracts made under the prevalent guidelines at the time of the contracts will not be reopened.

### **1 Objectives of Tariff for Wind Power Generation:**

To promote private sector investment in development of wind power.

### **2 Principles for determination of tariff for Wind Power Generation:**

**2.1 Dispatch:** It will be compulsory for the power purchaser to buy all the electricity generated by Wind Power Generator (IPP) and dispatch it in the system.

#### **2.2 Incorporation of a Company:**

Each Wind Power Producer (IPP) will be required to form a company in accordance with Pakistani Law for the specific purpose of wind power generation.

#### **2.3 Lock-in Period:**

The “Main Sponsor” (defined as the individual or a group who will hold at least 20% equity) together with other initial shareholders must hold 51% of the equity for a period of six years, from Commercial Operation Date (COD).

#### **2.4 Power off take Point and Voltage:**

The Wind Power Generator (IPP) will deliver power to the power purchaser at the outgoing bus of 132 Kv grid station. Up-gradation of generation voltage upto 132 Kv will be the responsibility of the Wind Power Generator (IPP). If a number of wind farms are clustered in an area, the Wind Power Generators (IPP) running these farms may mutually club together, construct a joint 132Kv grid and deliver power to the power purchaser. They will, in such a case, be required to form one entity (may be a joint venture). The power purchaser will, however, have one PPA with a joint entity formed

by the Wind Power Generators (IPPs). This entity will be responsible to deliver the contracted power. The power purchaser will not deal with the individual Wind Power Generators (IPPs) in such an arrangement.

Option for delivering power at lower voltage levels (e.g. 11 Kv) will also be available subject to mutual agreement with purchaser. However, the tariff for purchase of energy will be reduced correspondingly.

## **2.5 Type of Contracts:**

The wind power projects will be implemented on the basis of BOO or BOOT.

## **2.6 Compliance with the GoP Policies:**

NEPRA should fully comply with Government Policies and guidelines as modified, supplemented and revised from time to time by the Government.

**3. Wind Risk:** Wind risk is defined as the risk of variability of Wind speed. The power purchaser will absorb this risk. For judicious assessment of this risk, “Benchmark Wind Speed” based on monthly “mean of means” of wind speed will be determined from the available wind data (Monthly “Mean of Means” is the mean of means of velocities of the wind for a given month over a number of years for which reliable data is available.). This will entail determining wind speed benchmark from the data collected at a certain height (say 30 metres) and its extrapolation by standard formula to the proposed mast height for the proposed wind farm. Energy production corresponding to the benchmark wind will be called “Benchmark Energy Production” and the corresponding plant capacity will be called “Benchmark Capacity”.

In practice the actual energy production and capacity may vary from the benchmark levels due to:-

- (a) *Variation of wind from the benchmark (a factor beyond the control of Wind Power Generator (IPP)).*
- (b) *Availability of the plant (within the control of Wind Power Generator (IPP)).*

The principle to be adopted is that the Wind Power Generator (IPP) will be made immune to the factor which is beyond its control (i.e. variability of wind). However, it will be fully responsible for the factor in its control (i.e. the availability of the plant). Accordingly following matrix for allocation of wind risk will be followed:-

## WIND RISK ALLOCATION MATRIX

S. No.	Wind Variation	Availability Status*	Risk mitigation
a.	Wind speed less than the Benchmark Wind Speed.	<p>(a1) Capacity of the Wind Power Generator (IPP) is available equal to the Benchmark Capacity level.</p> <p>(a2) Capacity of the Wind Power Generator (IPP) is not available wholly or partially (i.e. not equal to Benchmark Capacity. )</p>	<p>(a1) Wind Power Generator (IPP) will be paid for energy generation corresponding to Benchmark Wind Speed (i.e. the power purchaser absorbs the loss).</p> <p>(a2) Wind Power Generator (IPP) is not paid to the extent that the capacity is not available.</p>
b.	Wind speed more than the Benchmark Wind Speed.	<p>(b1) Capacity of the Wind Power Generator (IPP) is available equal to the Benchmark Capacity level.</p> <p>(b2) Capacity of the Wind Power Generator (IPP)'s is not available equal to Benchmark Capacity wholly or Partially.</p>	<p>(b1) Wind Power Generator (IPP) will be paid for energy generation corresponding to benchmarkplus ( Benchmark Energy Production) plus 10% of the value of energy generated above the benchmark as <b>production bonus</b> (i.e. if the tariff is Rs. x/kwh then the production up to the Benchmark Energy Production level will be paid at the rate Rs. x/kwh. Any additional production will be paid at the rate of 1/10<sup>th</sup> of the Rs. x/kwh so that power purchaser gets the benefit of increased production).</p> <p>(b2) Wind Power Generator (IPP) is paid equal to the actual energy generation upto the Benchmark Energy Production. If the actual energy production is more than the benchmark then it will be entitled to a price</p>

			<p>equal to 10% of the value of the energy generation above the benchmark Production i.e. if the tariff is Rs. x/kwh then the production up to the Benchmark Energy Production level will be paid at the rate Rs. x/kwh. Any additional production will be paid at the rate of 1/10<sup>th</sup> of the Rs. x/kwh so that power purchaser gets the benefit of increased production).</p>
c.	<p>Wind speed equal to the benchmark.</p>	<p>(c1) Wind Power Generator (IPP) is available equal to the Benchmark Capacity level.</p> <p>(c2) Wind Power Generator (IPP)'s Benchmark Capacity wholly or partially is not available.</p>	<p>(c1) Wind Power Generator(IPP) will be paid for the energy generation corresponding to the Benchmark Energy Production.</p> <p>(c2) Wind Power Generator (IPP) is paid equal to the actual energy generation upto the Benchmark Energy Production. If the actual energy production is more than the benchmark then it will be entitled to a price equal to 10% of the value of the energy generation above the benchmark Production i.e. if the tariff is Rs. x/kwh then the production up to the Benchmark Energy Production level will be paid at the rate Rs. x/kwh. Any additional production will be paid at the rate of 1/10<sup>th</sup> of the Rs. x/kwh so that power purchaser gets the benefit of increased production).</p>

\* Availability status will be confirmed from the electronic record of each machine and the relationship of the energy generation with the variation from the Benchmark Wind Speed will be ascertained at the time of PPA.

### **3.1 Wind Speed Monitoring:**

To enable monitoring of wind speed independently, monitoring masts will be set up with properly calibrated automatic computerized wind speed recording meters at the same height as that of the Wind Power Generators (IPPs) machines in the wind farm. The monitoring masts will be sited at the locations where maximum wind is available (without the tempering effect of "Wake").

### **4. Tariff Options:**

The tariff for sale/purchase of electricity can be arrived through:

- (1) Competitive bidding (Solicited proposals)
- (2) Negotiations (unsolicited proposals)
- (3) Up-front tariff-setting

#### **4.1 Tariff Through Competitive Bidding (Solicitation of Proposals):**

This would entail determination of tariff on the basis of competition in accordance with the Power Policy 2002.

The bidding process may be structured along either of the following two options:

- (a) Bidders may be required to submit their competitive proposals for the tariff.
- (b) Offering an up-front benchmark tariff and bidders to quote a discount on the benchmark price.

It is proposed that once a tariff has been arrived at through competitive biddings based on either of the processes mentioned above, it should not be subjected to further review by NEPRA. The bidding process be structured and administered by AEDB in consultation with the power purchaser, Ministry of Finance, PPIB and NEPRA. The bidding documents (including various formula, formats, etc.), alongwith evaluation criteria, be also finalized by AEDB in consultation with the same agencies. The lowest evaluated levelized tariff would be recommended to the GOP for acceptance.

## **4.2 Unsolicited Proposals:**

### **4.2.1 Avoidance of Multiplicity of Entities and Stages of Negotiations.**

If a Wind Power Generator (IPP) wishes to submit an un-solicited bid according to power policy of 2002 and wants to settle tariff through negotiations, NEPRA should determine the tariff in consultation with the Wind Power Generator (IPP), the power purchasers and other stakeholders.

### **4.2.2 Parameters for Determination of Up-front OR Negotiated Tariff.**

#### **Technical Parameters:**

The net energy available for sale from a given wind farm will be determined after taking into account wake effect, Electrical efficiency and auxiliary load and transformation efficiency etc. and a judicious plant factor. Plant factor should be determined judiciously while taking in to account suitable provisions for un-availability or forced outages.

Once a contract has been entered then the parameters as adopted at the time of the contract will not be changed for that contract.

#### **Financial Parameters:**

It is proposed that the following parameters/assumptions may be adopted for calculation of benchmark tariff:-

(a) **Debt: Equity Ratio**

For the purpose of determination of tariff, equity equal to 20% of the total cost of the project would be the benchmark.

(b) **Internal Rate of Return/ROE**

It is proposed that following principles be adopted:

- i) Tariff should be determined allowing reasonable Internal Rate of Returns (IRR) on equity investment while taking in to account the carbon credit which the IPP may get.



- ii) IRR be calculated over the life of the implementation agreement starting from the date of construction start ( i.e. start of payments to contractors).
- iii) IRR should be equal to long term interest rates based on auction of ten year PIB held during the last six months plus a premium of 'X' % to be determined by NEPRA.
- iv) For BOOT projects the investor's equity be allowed to be redeemed after completion of debt servicing. The redemption in equity be in equal installments from the time debt servicing has been completed till the end of the concessions period. Effect of exchange rate variation be compensated for equity redemption. The projects be transferred to GoP at the end of concession period at a notional cost of Rs. 1.
- v) For BOO projects there should be no redemption of equity.

(c) **Interest on Loans:**

For unsolicited proposals the tariff is a two step procedure. Initially tariff is estimated at the time of award of LOS so as to enable a Wind Power Generator (IPP) to achieve Financial Close. At this stage interest rate ceilings can be indicated with incentive for the Wind Power Generator (IPP) to arrange better terms of financing. After the financial close the tariff has to be finally fixed such that debt service component is equal to the actual debt servicing plus the incentive. The same methodology applies to upfront tariff for determination of tariff by NEPRA at the LOS stage (i.e. before financial close) for the fiscal year 2005-2006, the ceiling for rate of interest on local loans be taken as KIBOR plus 300 basis points for a 10 year loan plus 2 year grace as has been

agreed in recent negotiations. For foreign loans the ceiling rate may be taken as LIBOR plus a suitable spread for 10 year loan plus 2 year grace period. The Wind Power Generators (IPPs) be given an incentive to arrange better terms of debt financing. If the Wind Power Generators (IPPs) arrange better terms by the time of financial close, the overall impact of reduction in debt servicing be shared on yearly basis in the following ratio:  
Power Purchaser/Govt: Wind Power Generator (IPP)  
= 60:40

Wherever floating interest rate regime is adopted, local loans may be indexed to changes in benchmark interest rate, such as KIBOR, etc. Likewise, foreign loans may be indexed to changes in benchmark interest rate, such as LIBOR, etc., and variation in Pakistan Rupee to US\$.

Loans will be arranged by Wind Power Generators (IPPs) without GoP guarantee.

(d) **Capital Cost:**

Estimate of Capital Cost for determination of tariff for Wind Power Producer (IPP) for unsolicited/negotiation based proposals or up-front tariff is a challenging task. NEPRA should determine it after thorough market research and accessing information from both equipment suppliers and owners of wind farms elsewhere and the evidence provided by the Wind Power Generator (IPP).

(e) **O&M Cost:**

The O&M cost comprises of fixed and variable components of costs. NEPRA should access information

from the same sources as mentioned above to arrive at judicious levels of O&M costs, both fixed and variable.

(f) **Other Fiscal & Financial Incentives**

All fiscal and financial incentives as given under the “ Policy for Power Generation Projects – Year 2002 “ for power generation (Annex-I) and specifically amended for Wind Power Production will be applicable for Wind Power Generator (IPPs).

5. **Structure of Tariff:**

Tariff will be denominated in Pakistan Rs./Kwh. Tariff will be determined on the basis of the principles and parameters given above. The tariff will be based on energy charge (since the tariff on Rs./Kwh will be arrived at by providing for full cost and appropriate ROE alongwith full protection for wind risk as noted above, the tariff will enable the Wind Power Generator (IPP) to meet its revenue requirements. The tariff is not being broken down into capacity cost and energy cost because it is difficult for Wind Power Generators (IPPs) to guarantee capacity availability and that the Power Purchaser is fully covering the Wind risk).

The energy based tariff in Rs/Kwh will be broken down in two component:

(a) **Non-escalable Energy Component**

This will be based on non-escalable costs divided by the energy (Kwh) sold. The non-escalable costs comprise of

- Debt service
- ROE

(b) **Escalable Energy Component**

This component will be based on the following costs divided by the electricity sold:

- fixed O&M costs
- variable O&M costs.

**5.1 Indexations:**

Indexation of various components of tariff and adjustment for foreign exchange rates (true up) be automatic based on pre-determined formula and reference parameters. Wind Power Generators (IPPs) should not have to approach NEPRA frequently for tariff indexation. Only yearly submissions may be required.

Various components of costs will be indexed as follows:

<u>Item</u>	<u>Index</u>
Nonescalable Energy Component:	
Debt Service	- floating interest rates. - Variation in exchange rate for US\$ with respect to the benchmark currency rate for FEC.
ROE	Variation in exchange rate for US\$ with respect to the benchmark currency rate for FEC of equity.
Escalable Component	
- Fixed O & M Cost	Indexed with WPI w.e.f. COD
- Variable O&M	Indexed with WPI w.e.f COD.

**5.2 Benchmark Currency Rate:**

The reference rate with the interbank rate prevailing 30 days before the required date of submission of bids. For unsolicited proposals or up-front tariff, it be the interbank lending rate as on the date of signing of the Engineering Procurement Contract(EPC) by the Wind Power Generator (IPP).

**6. Evaluation of Tariffs:**

Based upon above guidelines detailed tariff tables will be prepared. Tariff will be evaluated on the basis of levelized cost, levelized over the life of the project taken as at least 20 years.

**7. Transparency and Visibility of Calculation of Tariff:**

It is proposed that NEPRA should provide complete soft and hard copies of its assumption, inputs and calculation of tariffs alongwith tariff model while announcing determinations to the concerned Wind Power Generators (IPPs). This would enable better understanding of tariff decision.

**8. Transmission and Interconnection:**

It is proposed that the construction of transmission line should be the responsibility of the power purchaser unless the Wind Power Generator (IPP), at its own choice, wants to undertake it on mutually agreed transmission charge with the power purchaser.

**9. Applicability of Guidelines**

The guidelines would be applicable for the projects with a ceiling of aggregated capacity of 300 MW, which shall reach financial closure within two years from the announcement of the guidelines.

## **FINANCIAL AND FISCAL REGIME**

### ***Financial Regime***

This policy offers the following set of financial incentives:-

- (a) Permission for power generation companies to issue corporate registered bonds.
- (b) Permission to issue shares at discounted prices to enable venture capitalists to be provided higher rates of return proportionate to the risk.
- (c) Permission for foreign banks to underwrite the issue of shares and bonds by private power companies ( IPPs) to the extent allowed under the laws of Pakistan.
- (d) Non-residents are allowed to purchase securities issued by Pakistani companies without the State Bank of Pakistan's permissions and subject to the prescribed rules and regulations.
- (e) Abolition of 5% limit on investment of equity in associated undertakings.
- (f) Independent rating agencies are operating in Pakistan to facilitate investors in making informed decisions about the risk and profitability of the project company's Bonds/TFCs.

### ***Fiscal Regime.***

This policy offers the following set of fiscal incentives:-

- (a) Customs duty at the rate of 5% on the import of plant and equipment not manufactured locally ( to be read along with S.R.O (I)/2005 ..... Annex-II)
- (b) No levy of sales tax on such plant, machinery and equipment, as the same will be used in production of taxable electricity.
- (c) Exemption is already available from income tax including turnover rate tax and withholding tax on imports; provided that no exemption of income tax on oil-fired power plant.
- (d) Repatriation of equity along with dividends is freely allowed, subject to the prescribed rules and regulations.
- (e) Parties may raise local and foreign finance in accordance with regulations applicable to industry in general. GOP approval may be required in accordance with such regulations.
- (f) Maximum indigenization shall be promoted in accordance with GOP policy.
- (g) Non-Muslims and Non-residents shall be exempted from payment of Zakat on dividends paid by the company.

The above incentives will be equally applicable to private, public-private and public sector Wind Power projects.