

**BEFORE THE NATIONAL ELECTRIC  
POWER REGULATORY AUTHORITY**

**PETITION FOR TARIFF DETERMINATION**

**ON BEHALF OF**

**WARDA POWER GENERATION (PRIVATE) LIMITED**

**FOR A POWER PROJECT OF APPROXIMATELY 200 MW**

**AT**

**TEHSIL MURIDKE, DISTRICT SHEIKHUPURA  
NEAR LAHORE**

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**Submitted On:  
January 10, 2007**

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**WARDA Power Generation (Private) Limited  
113-A Sindhi Muslim Cooperative Housing Society  
P.O. Box 7482, Main Shabrae Faisal  
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## A. Glossary

<b>CEO</b>	<b>Chief Executive Officer</b>
<b>CPI</b>	<b>Consumer Price Index</b>
<b>CPP</b>	<b>Capacity Purchase Price</b>
<b>CPPA</b>	<b>Central Power Purchasing Agency of NTDC</b>
<b>EPC</b>	<b>Engineering Procurement and Construction</b>
<b>EPR</b>	<b>Energy Purchase Risk</b>
<b>FSA</b>	<b>Fuel Supply Agreement</b>
<b>IA</b>	<b>Implementation Agreement</b>
<b>IMF</b>	<b>International Monetary Fund</b>
<b>IPP</b>	<b>Independent Power Producer</b>
<b>IRR</b>	<b>Internal Rate of Return</b>
<b>ISO</b>	<b>International Standards Organization</b>
<b>KIBOR</b>	<b>Karachi Inter Bank Offered Rate</b>
<b>KV</b>	<b>Kilovolt</b>
<b>kW</b>	<b>Kilowatt</b>
<b>kWh</b>	<b>Kilowatt Per Hour</b>
<b>L/C</b>	<b>Letter of Credit</b>
<b>LFO</b>	<b>Light Fuel Oil (High Speed Diesel)</b>
<b>LHV</b>	<b>Lower Heating Value</b>
<b>LIBOR</b>	<b>London Inter Bank Offered Rate</b>
<b>LOI</b>	<b>Letter of Interest</b>
<b>LOS</b>	<b>Letter of Support</b>
<b>MW</b>	<b>Megawatt</b>
<b>MWh</b>	<b>Megawatt per hour</b>
<b>NEPRA</b>	<b>National Electric Power Regulatory Authority</b>
<b>NTDC</b>	<b>National Transmission and Dispatch Company Limited</b>
<b>O&amp;M</b>	<b>Operation and Maintenance</b>
<b>OMC</b>	<b>Oil Marketing Company</b>
<b>Pak. Rs.</b>	<b>Pakistani Rupees</b>
<b>POE</b>	<b>Panel of Experts of PPIB</b>
<b>PPA</b>	<b>Power Purchase Agreement</b>
<b>PPIB</b>	<b>The Private Power &amp; Infrastructure Board</b>
<b>Project</b>	<b>WARDA Power's proposed independent power project of approximately 200MW capacity based on reciprocating engine single fuel RFO fired technology near Muridke in the Punjab province.</b>
<b>RFO</b>	<b>Residual Fuel Oil</b>
<b>ROE</b>	<b>Return on Equity</b>
<b>Ton</b>	<b>Metric Tonne i.e. 1000 kg</b>
<b>USD</b>	<b>United State Dollars</b>
<b>WAPDA</b>	<b>Water And Power Development Authority</b>
<b>WARDA Power</b>	<b>WARDA Power Generation (Private) Limited</b>
<b>WARDA Investments</b>	<b>WARDA Investments International LLP</b>
<b>WPPO</b>	<b>Wapda Power Privatization Organization</b>

## **B. Introductory Remarks:**

- This Tariff Petition is being filed before NEPRA pursuant to Rule 6(1)(a) of the NEPRA Licensing (Generation) Rules, 2000, and Rule 3 of the NEPRA (Tariff Standards and Procedure) Rules, 1998, read with paragraph 1.3 of Guidelines for Determination of Tariff for Independent Power Producers issued by the Government of Pakistan in November 2005 and the applicable provisions of the Government of Pakistan's Policy for Power Generation Projects, 2002 (the "**2002 Power Policy**").
- WARDA Power's sponsors submitted a proposal to the PPIB on August 31, 2005, for the installation of an approximately 200MW capacity RFO fired power generation plant near Muridke in the Punjab province in terms of the 2002 Power Policy. In this context, WARDA Power, which is filing this Tariff Petition, was incorporated as a private limited company under the Companies Ordinance, 1984, on April 6, 2006.
- In response to Prequalification Notice No. NPQ No. 1 (102) PPP-1030/05/PRJ issued by PPIB on December 8, 2005, WARDA Power's sponsors submitted the requisite Performance Guarantee in the sum of USD 200,000/- (at the rate of USD 1,000/- per MW) issued by National Bank of Pakistan, Head Office, Karachi, on January 14, 2006 (the amount whereof was subsequently doubled to USD 400,000/-). Accordingly, the PPIB issued to WARDA Power's sponsors a Letter of Interest No. 1(102) PPIB-1030/06/PRJ dated February 3, 2006, the term whereof was subsequently extended by the PPIB up to November 3, 2006, vide its letter No. 1(102) PPIB-1030/06/PRJ dated August 9, 2006 and its letter No. 1(102) PPIB-1030/06/PRJ dated September 7, 2006.
- The details of the Project are already incorporated in the Feasibility Study relating to the Project, which has been submitted to NEPRA along with WARDA Power's application for a generation licence on November 22, 2006, while the other relevant details required for determination of tariff are contained in the subsequent pages of this Tariff Petition.
- The financial package for the Project is based on a standard debt and equity ratio comprised of seventy percent (70%) debt (of which 75% is foreign and 25% is local debt) and thirty percent (30%) equity. This financial structure is allowed under the Infrastructure Project Guidelines issued by State Bank of Pakistan and the Guidelines for Determination of Tariff for Independent Power Producers issued by the Government of Pakistan in 2005.
- In case NEPRA requires any further information, clarification or explanation from WARDA Power during its evaluation process, WARDA Power would be pleased to provide it as quickly as possible.

## C. Particulars of Petition:

### 1. DETAILS OF THE PETITIONER

#### Name and Registered Office

WARDA Power Generation (Private) Limited  
113-A Sindhi Muslim Cooperative Housing Society  
P.O. Box 7482  
Main Shahrae Faisal  
Karachi 74400

Representatives of WARDA Power Generation (Private) Limited

- |      |                            |                      |
|------|----------------------------|----------------------|
| i.   | Mr. Muhammad Ashraf Bhatti | Technical Consultant |
| ii.  | Mr. Fernando Moraes Melo   | Project Manager      |
| iii. | Mr. Mauro Braga Passini    | Chief Executive      |

### 2. BACKGROUND

- 2.1 Under the Regulation of Generation, Transmission and Distribution of Electric Power Act (Act No. XL) of 1997 (the “**NEPRA Act**”), NEPRA is the authority *inter alia* competent to determine tariffs and other terms and conditions for the supply of electricity through generation, transmission and distribution. NEPRA is also the competent authority for determining the process and procedures for reviewing tariffs and recommending tariff adjustments.
- 2.2 WARDA Power is a private limited company incorporated and existing under the Companies Ordinance, 1984.
- 2.3 In accordance with the requirements of the NEPRA Act and the rules and regulations made thereunder, WARDA Power hereby submits this Petition under the NEPRA (Tariff Standards and Procedure) Rules 1998, for tariff determination in respect of its power generation facility situated in Tehsil Muridke, District Sheikhpura, near Lahore in the Punjab province.

### 3. INTRODUCTION

- 3.1 On February 3, 2006, the PPIB issued a Letter of Interest No. 1(102) PPIB-1030/06/PRJ, the term whereof was extended vide a letter No. 1(102) PPIB-1030/06/PRJ dated August 9, 2006 and a letter No. 1(102) PPIB-1030/06/PRJ dated September 7, 2006 (copies of all these letters are attached hereto, and the said Letter of Interest, as so amended, is hereinafter referred to as the “**LOI**”) to WARDA Investments LLP in respect of an approximately 200 MW RFO fired power plant to be implemented in accordance with the 2002 Power Policy. Consequently, WARDA Investments LLP established WARDA Power Generation (Private) Limited for establishing and managing the proposed power plant.

- 3.2 Pursuant to the LOI, WARDA Power's Feasibility Study for the Project (the "**Feasibility Study**") was completed on September 28, 2006 by Wisdom Associates and CECEX Energy Consultants of Canada and Brazil respectively, and was submitted to PPIB in its final form on November 2, 2006 after incorporation of all comments from the Panel of Experts appointed by the PPIB. After approval of the Feasibility Study on November 27, 2006, PPIB notified WARDA Power, vide letter No. 1(102)PPIB-1030/06/PRJ dated December 1, 2006 (copy attached hereto), and further advised WARDA Power to follow up with NEPRA for tariff determination and issuance of Generation Licence.
- 3.3 In compliance with the PPIB's aforesaid letter No. 1(102) PPIB-1030/06/PRJ dated December 1, 2006, WARDA Power approached the power purchaser to conduct negotiations with WPPO. The CPPA (Centre Power Purchasing Agency of NTDC) applied to NEPRA for permission to procure electric power from WARDA Power, which was very kindly granted by NEPRA vide letter No. NEPRA/R/PAR-13/CPA-2006/7688-90 dated November 29, 2006 (copy attached hereto).
- 3.4 Hence, this Tariff Petition is now submitted in accordance with the provisions of the NEPRA Act, Rule 6(1)(a) of the NEPRA Licensing (Generation) Rules, 2000, and Rule 3 of the NEPRA (Tariff Standards and Procedure) Rules, 1998, read with paragraph 1.3 of Guidelines for Determination of Tariff for Independent Power Producers issued by the Government of Pakistan in 2005 and the applicable provisions of the 2002 Power Policy. It is therefore requested that this Tariff Petition may kindly be processed accordingly. WARDA Power has submitted to NEPRA an application for a Generation Licence in respect of the Project for which a hearing was held in accordance with applicable law on December 21, 2006.
- 3.5 The tariff agreement will be finalized among the parties, *i.e.* WARDA Power and NTDC, subject to NEPRA's approval of a 25 year tariff acceptable to WARDA Power. It will be a two-part tariff, comprising capacity and energy charges. This tariff will be integrated into the Power Purchase Agreement (the "**PPA**") to be entered into between WARDA Power and NTDC, and shall be based on the format of the standardized PPA proposed by the PPIB. We respectfully request NEPRA to kindly ensure consistency between the adjustment formulae and indexations to be applied to the referenced tariff normally conveyed to the Petitioner in NEPRA's tariff determination Order since these formulae and indexation also form part of Schedule 1 to the PPA. Consistency must therefore be maintained between NEPRA's tariff determination Order and Schedule 1 to the PPA, a copy whereof is attached hereto for ready reference.
- 3.6 All pertinent information about the Project, including its technical description, and a copy of the Environmental Impact Assessment Report relating thereto, have been included in WARDA Power's application for a generation licence in respect of the Project submitted to NEPRA on November 22, 2006.

3.7 Additional information, if any, shall be submitted by WARDA Power, as and when required by NEPRA.

3.8 **Investment**

The investment cost estimate of the Project is presented below in US dollars (“USD”). The Engineering, Procurement and Construction (“EPC”) price is fixed at Euros 133,475,000.00 (667.04 Euros/kW) and, converted at the reference exchange rate of 1.20 USD/Euro, this price will be USD 160,170,000 (800.45 USD/kW). At this time we have assumed total EPC cost in foreign exchange.

	<b>Project Costs</b>	<b>USD</b>
1	EPC Cost	160,170,000
2	Taxes & Duties	8,009,000
3	Emergency spare parts	2,403,000
4	Mobilization Costs	2,860,000
5	Land purchase, fees and infrastructure	2,190,000
6	Development costs	2,670,000
7	Insurance costs	2,161,000
8	Stamp Duties	1,450,000
9	Structure Fee (SBL)	4,120,000
	<b>Total capital Cost</b>	<b>186,033,000</b>
8	Financing Fees & Charges	3,215,000
9	Interest During Construction (IDC)	14,420,000
	<b>Total project Cost</b>	<b>203,668,000</b>

3.9 **Itemized Explanation of Investment**

3.9.1 “EPC Cost” covers power generation sets together with all the necessary auxiliary machinery, equipment and systems including the erection and commissioning of the equipment and construction of buildings. Our stated EPC cost includes cost of the fuel tank storage that means three tanks of 10,000 m3 for RFO and one tank of 2,000 m3 for HSD, along with fuel loading, fuel unloading pumping system with all heating and piping’s as well as the fire containment area of about 7200 m2. This turnkey price of the power plant is based on a firm proposal but based on the above referenced exchange rate.

3.9.2 “Taxes & Duties” covers all import taxes and duties as per the 2002 Power Policy said to be 5% of EPC cost.

3.9.3 “Emergency spare parts” covers the costs of standard lot of spare parts aimed to reduce as much as possible the stop times for maintenance of the plant, *i.e.* instead of taking a component out and testing it, exchanging and replacing the component so that the removed component is tested and used as a spare for the next checking time. These are estimated at 1.5% of EPC costs.

- 3.9.4 “Mobilization Costs” covers the expenses of WARDA Power and O&M Contractor personnel, *i.e.* hiring local personnel for operation and maintenance, training at manufacturer’s factory on diesel engine and auxiliaries, etc. costs of trips and courses, selection of an expatriate to carry out the operation and management.
- 3.9.5 “Land purchase, fees and infrastructure” covers the purchase of land, together with stamp duty and registration fees, the fees of the broker and the lawyers, as well as the cost of fill to levelize the site with the access road, and construction of the boundary wall.
- 3.9.6 “Development Costs” includes sponsors’ development costs and delay in start-up insurance. These include costs of environmental studies, geological and hydrological studies, and load flow and short circuit assessments, fees of engineering consultants, lawyers in Pakistan as well as from abroad (those of lenders), guarantees furnished to PPIB and fees paid to NEPRA.
- 3.9.7 “Insurance Costs” covers the costs during construction of the insurance of the assets, incurred prior to the Commercial Operations Date (the “COD”). This is estimated at 1.35% of EPC costs.
- 3.9.8 “Stamp Duties” covers the costs of the registration of the loan and is assumed to be 1% of the loan.
- 3.9.9 “Structure Fee” includes the cost of the adviser and arranger of the lead financing institution.
- 3.9.10 “Financing Fees & Charges” includes the up-front cost of financing the Project.
- 3.9.11 “Interest During Construction” is calculated on the basis of anticipated interest rates, equity injections, and the construction payment schedule. It may kindly be noted that WARDA Power’s COD is based on a period of 20 months corresponding to March 31, 2009.

### 3.10 **Financial Analysis**

The financial calculations for the Project are based on the:

- (a) Investment cost estimate, including a firm turnkey price.
- (b) Power plant operating costs (including long-term O&M contract and life-time heat rate).
- (c) Financing, taxation, depreciation and other obligations and terms regulated by the law or lending institutions.
- (d) Proposed 25-year tariff, based on real life-time costs. WARDA Power’s model is based upon the BOO or Build-Own-Operate concept.

- (e) Assumption that the Project will qualify for tax incentives as per the 2002 Power Policy, including an exemption from corporate income taxes as well as turnover and withholding tax on imports.

### 3.11 **Capital Structure**

3.11.1 The capital structure of the Project is as follows:

<u>In USD</u>	
Equity	61,100,000
Total debt	142,568,000
Total Capital Cost (excl IDC)	203,668,000
Debt Equity Ratio	70:30

Note: The investment costs and capital structure indicated herein shall prevail if different from those indicated in the Feasibility Study

### 3.12 **Other Considerations**

- 3.12.1 The Feasibility Study indicates that, during normal economic growth, the electricity demand at the national level will double in the next ten years. This means that by 2016 some 15,000 MW capacity will be needed.
- 3.12.2 Additionally, some of the old thermal generation plants need to be replaced. In such circumstances, the need for new capacity will be in the range of 2,000 MW per year.
- 3.12.3 The Project would offer significant relief locally in the transmission system of Lahore, as it would bypass long transmission lines and potential step-down transformer bottlenecks. There is currently no significant power generation inside this area. The plant generation would be consumed very close to the generation site, thus also reducing substantial transmission losses. The Project could be finalized and commissioned on a fast-track basis within 20 months as a power generation plant based on reciprocating engine single fuel RFO fired technology.
- 3.12.4 A range of technologies was reviewed to utilize RFO: conventional steam plant, gas turbines and diesel engines, either in single cycle or combined cycle modes, as well as 4-stroke or 2-stroke engine configurations. Four-stroke diesel engines were selected, as the primary objective of the plant is to convert the available indigenous RFO into electrical energy. Engines are well proven to use this type of fuel. Gas turbine based concepts were rejected as the main gas turbine manufacturers expressed their concerns that use of RFO in gas turbines would mean considerable de-rating both in power generating capacity as well as in efficiency from the nameplate capacities due to extensive fouling.

3.12.5 After thorough examination of all available technologies and engine manufacturers, it became clear that the plant configuration discussed hereinafter would offer the best and most economical performance for WARDA Power. The proposed plant concept is based on a 200.1 MW (ISO) power plant single fuel RFO diesel engines in combined cycle. The main components of the plant are eleven proven engine generators sets of type 18V46 manufactured by Wartsila of Finland and eleven heat recovery steam generators (HRSG) to provide steam to one condensing steam turbine and for in-house use. When all the engines and the steam turbine run in parallel, the plant will generate a net output of 196 MW.

Note: WARDA Power's indicated net output of 196 MW is to be considered the reference net output for purposes of capacity charge calculations and adjustment formulas, accepting, however, that net contracted capacity will be established after IDC tests. WARDA Power also reserves the right to replace the afore-said Wartsila engines with "MAN" engines of different gross and net output as well as costs that may necessitate a modification in the tariff structure.

3.12.6 Based on the requirement of the Project for full load factor, a total of about 945 tons of RFO per day will be transported by approximately 24 tank lorries of 40 tons each to the site. The LFO needs are difficult to estimate but no more than 3 tank lorries of 40 tons each per month will be needed.

The RFO shall be stored in three storage tanks within the plant with a combined capacity of 30,000 tons. This storage capacity is dimensioned for 30 days of full power operation of all the engines. The RFO from the storage tanks will be transferred into the buffer tank, with a capacity of 200 tons, and then moved to the day tank which has a capacity equal to 16 hours of full power operation of all the engines, *i.e.* 700 tons. Diesel oil shall be stored in one Diesel oil tank with a capacity of 2,000 tons.

There is a need for transportation of RFO, Lube Oil and Diesel for plant operation and maintenance. In Pakistan there are several operational OMCs that are capable of supplying these fuel products. For the purpose of this study, the following companies were considered as potential suppliers.

Pakistan State Oil  
SHELL Pakistan  
TOTAL (PARCO)

Although Pakistan Railways can carry out the transportation of equipment and fuel, tank lorries are the most suitable means of transportation of all fuels to the plant. All the roads are wide and metalled to support fuel supplies on regular day to day basis. The Muridke-Sheikhupura road is 110 feet wide in rural areas and 65

feet wide in the vicinity of towns. Out of this whole width, about 20 feet portion is metalled and being used for vehicular transportation. The Lahore-Sheikhupura and Lahore-Gujranwala segments of the G.T. Roads are four lane carpeted roads that support all kind of heavy loads. The Sheikhupura-Gujranwala link road is similar to the Muridke- Sheikhupura Road. The motorway is three lanes one way carpeted road and can support all kinds of loads for fuel or machinery transportation. The Lahore-Multan segment of the G.T. Road is four lane carpeted road and suitable for all kind of traffic.

- 3.12.7 The strategic location of the Project provides a unique opportunity for interconnection for power dispersal, since detailed power flow studies have been conducted by NTDC and a 10 km long double line to the 132 kV existing transmission line between Kala Shah Kaku and Attabad substations is required. No right of way issues are expected, *i.e.* the line can be built within the same time schedule as the Project itself.
- 3.12.8 Based on a thorough analysis of the national electricity generation structure and the Project, as well as NTDC's load flow study conclusions, we are confident in stating that the Project will be one of the most competitive electricity producers using RFO.

#### 4. TARIFF SUMMARY

- 4.1 The proposed tariff figures appended hereinbelow are the result of a detailed financial analysis together with the Feasibility Study conducted by Wisdom Associates and Cecex Energy Consultants on WARDA Power's 200.1 MW (Gross at ISO) capacity plant. Technical, economical, financial, legal and fiscal aspects have been considered in the evaluation of WARDA Power's financial performance. The financial analysis is based on a notional 60% load factor as per the PPIB's instructions, and a 25-year PPA.
- 4.2 Based on the RFO (LHV) price of Pak Rs. 23,247.07 per M Ton. (RFO Price excluding transportation as per Annex-II of Revised Upfront Tariff for Reciprocating Engine Technology issued by NEPRA on 14 September 2006), output of 196 MW (net at site conditions) and detailed financial analysis, the following tariff has been established.

	Capacity Charge US Cents/kWh	Energy Charge US Cents/kWh	Total tariff US Cents/kWh	Total tariff Pak Rs. /kWh
<b>Levelized tariff</b>	3.2279	8.7721	11.9955	7.1973
<b>Average tariff</b>	2.6650	8.7721	11.3871	6.8323

Average (1-10 years) :	US cents 12.7051 /kWh (or Pak Rs.7.6231 /kWh)
Average (11-25 years) :	US cents 10.5085 /kWh (or Pak Rs.6.3051 /kWh)
Average (1-25 years) :	US cents 11.3871 /kWh (or Pak Rs.6.8323 /kWh)
Levelized (1-25 years) :	US cents 11.9955 /kWh (or Pak Rs.7.1973 /kWh)

## TARIFF TABLE

	Rs/kWh	US¢/kWh
Average (1-10)	7.6231	12.7051
Average (11-25)	6.3051	10.5085
Average (1-25)	6.8323	11.3871
Levelized Tariff (1-25)	7.1973	11.9955

Year	Capacity Charge Rs/kW - h										Capacity Charge Rs/KWh @ 60%		Total		
	Energy Charge (Rs/KWh)					Escalable Capacity (Rs/kW - h)					Non-Escalable Capacity (Rs/kWh)		Total Capacity Charge	Rs/kWh	US ¢ per kWh
	Fuel	Variable O&M	Total	Fixed O&M	Insurance	W. C. Finance Cost	ROE for Construction Period	Return on Equity	Withholding Tax @7.5%	Loan Repayment	Interest Charges				
1	4.7593	0.5040	5.2633	0.1326	0.0760	0.0362	0.0234	0.3304	0.0265	0.3130	0.4778	1.4159	2.3598	7.6231	12.7051
2	4.7593	0.5040	5.2633	0.1326	0.0760	0.0362	0.0234	0.3304	0.0265	0.3443	0.4465	1.4159	2.3598	7.6231	12.7051
3	4.7593	0.5040	5.2633	0.1326	0.0760	0.0362	0.0234	0.3304	0.0265	0.3786	0.4122	1.4159	2.3598	7.6231	12.7051
4	4.7593	0.5040	5.2633	0.1326	0.0760	0.0362	0.0234	0.3304	0.0265	0.4163	0.3744	1.4159	2.3598	7.6231	12.7051
5	4.7593	0.5040	5.2633	0.1326	0.0760	0.0362	0.0234	0.3304	0.0265	0.4579	0.3329	1.4159	2.3598	7.6231	12.7051
6	4.7593	0.5040	5.2633	0.1326	0.0760	0.0362	0.0234	0.3304	0.0265	0.5036	0.2872	1.4159	2.3598	7.6231	12.7051
7	4.7593	0.5040	5.2633	0.1326	0.0760	0.0362	0.0234	0.3304	0.0265	0.5538	0.2370	1.4159	2.3598	7.6231	12.7051
8	4.7593	0.5040	5.2633	0.1326	0.0760	0.0362	0.0234	0.3304	0.0265	0.6090	0.1818	1.4159	2.3598	7.6231	12.7051
9	4.7593	0.5040	5.2633	0.1326	0.0760	0.0362	0.0234	0.3304	0.0265	0.6698	0.1210	1.4159	2.3598	7.6231	12.7051
10	4.7593	0.5040	5.2633	0.1326	0.0760	0.0362	0.0234	0.3304	0.0265	0.7366	0.0542	1.4159	2.3598	7.6231	12.7051
11	4.7593	0.5040	5.2633	0.1326	0.0760	0.0362	0.0234	0.3304	0.0265			0.6251	1.0418	6.3051	10.5085
12	4.7593	0.5040	5.2633	0.1326	0.0760	0.0362	0.0234	0.3304	0.0265			0.6251	1.0418	6.3051	10.5085
13	4.7593	0.5040	5.2633	0.1326	0.0760	0.0362	0.0234	0.3304	0.0265			0.6251	1.0418	6.3051	10.5085
14	4.7593	0.5040	5.2633	0.1326	0.0760	0.0362	0.0234	0.3304	0.0265			0.6251	1.0418	6.3051	10.5085
15	4.7593	0.5040	5.2633	0.1326	0.0760	0.0362	0.0234	0.3304	0.0265			0.6251	1.0418	6.3051	10.5085
16	4.7593	0.5040	5.2633	0.1326	0.0760	0.0362	0.0234	0.3304	0.0265			0.6251	1.0418	6.3051	10.5085
17	4.7593	0.5040	5.2633	0.1326	0.0760	0.0362	0.0234	0.3304	0.0265			0.6251	1.0418	6.3051	10.5085
18	4.7593	0.5040	5.2633	0.1326	0.0760	0.0362	0.0234	0.3304	0.0265			0.6251	1.0418	6.3051	10.5085
19	4.7593	0.5040	5.2633	0.1326	0.0760	0.0362	0.0234	0.3304	0.0265			0.6251	1.0418	6.3051	10.5085
20	4.7593	0.5040	5.2633	0.1326	0.0760	0.0362	0.0234	0.3304	0.0265			0.6251	1.0418	6.3051	10.5085
21	4.7593	0.5040	5.2633	0.1326	0.0760	0.0362	0.0234	0.3304	0.0265			0.6251	1.0418	6.3051	10.5085
22	4.7593	0.5040	5.2633	0.1326	0.0760	0.0362	0.0234	0.3304	0.0265			0.6251	1.0418	6.3051	10.5085
23	4.7593	0.5040	5.2633	0.1326	0.0760	0.0362	0.0234	0.3304	0.0265			0.6251	1.0418	6.3051	10.5085
24	4.7593	0.5040	5.2633	0.1326	0.0760	0.0362	0.0234	0.3304	0.0265			0.6251	1.0418	6.3051	10.5085
25	4.7593	0.5040	5.2633	0.1326	0.0760	0.0362	0.0234	0.3304	0.0265			0.6251	1.0418	6.3051	10.5085
<b>Levelized Tariff (1-25 Years)</b>			<b>5.2633</b>	<b>0.1326</b>	<b>0.0760</b>	<b>0.0362</b>	<b>0.0234</b>	<b>0.3304</b>	<b>0.0265</b>	<b>0.3132</b>	<b>0.2221</b>	<b>1.1604</b>	<b>1.9340</b>	<b>7.1973</b>	<b>11.9955</b>

## 5. **ENERGY CHARGES**

- 5.1 The tariff has a typical two-part structure with an energy charge for the *energy actually dispatched* and a capacity charge based on the available capacity. The energy charge is based on the actual kWh off-take, and consists of the fuel component and the variable O&M component.
- 5.2 The generation sets being proposed for the Project are advanced technology machines providing high thermal efficiencies. After factoring the impact of fuel cleaning, average plant aging, and a notional 60% plant load factor, this translates to approximately 45% net site efficiency, running on RFO.
- 5.3 A summary of the energy price is provided in the table below:

Period	Energy Purchase Price (EPP) Pak Rs./kWh			Total
	Fuel	Variable O&M (Foreign)	Variable O&M (Local)	
Years 1–25	4.7593	0.4284	0.0756	5.2633

### 5.4 **Fuel Component**

This component represents the fuel consumption at a guaranteed efficiency level for the plant based on a notional 60% capacity factor. Consequently, this tariff subsumes the efficiency risk being borne by WARDA Power. The main assumptions used to derive this price are:

(a)	RFO Price (LHV):	Rs. 23,247 per ton excluding transport (as per Annex-II of Revised Upfront Tariff for Reciprocating Engine Technology issued by NEPRA on September 14, 2006).
(b)	Thermal efficiency net:	47% (at site conditions)
(c)	Thermal efficiency, inclusive of ageing and cleaning:	45.0% (life-cycle net at site conditions)
(d)	Output:	196 MW (net at site conditions)
(e)	Heat Rate:	8,000 kJ/kWh (LHV)
(f)	LHV of RFO	39,087 kJ/kg (37,047 BTU/kg)
(g)	Partial Loading:	Heat Rate Curves from generation sets manufacturers to be used for partial load heat rate calculation and payment in case the plant load falls below 40%.

### 5.5 Local Variable O&M

This component includes the cost of lubricant consumption, which is directly related to the electricity actually generated. The rate will be indexed to the prevailing Pakistan Wholesale Price Index (“WPI”).

### 5.6 Foreign Variable O&M

This component primarily includes imported spare parts to be changed on normal scheduled maintenance and unscheduled maintenance. Also, it includes chemicals, as well as specialized technical services from manufacturer, during maintenance of the plant. The generation sets and associated equipment have manufacturer-recommended overhauling schedules that are based on actual running hours. The actual timing of the Major Overhaul depends on the actual dispatch provided to the plant. The labor for the Variable O&M is on Fixed O&M.

As the manufacturer is European so the spare parts will be supplied from Europe as well as the specialized technical services. Based on that, the variable O&M foreign component will be indexed to the European CPI. This tariff component will also be adjusted by variations in the USD/ Euro exchange rate through the 25 year life of the Project on an annual basis.

## 6. CAPACITY CHARGES

6.1 The capacity charge for the Project is payable on the basis of the contract capacity as tested at the COD, and periodically thereafter. This payment is calculated on a Pak Rs./kWh basis of capacity and, in order to calculate a unit rate in Pak Rs./kWh, a notional 60% capacity factor has been utilized.

6.2 The key assumptions factored in the capacity charge are the total capital cost of the Project, the debt-equity ratio, the cost of funding and currency thereof, together with the exchange rate. The following are the assumptions used on the reference dates:

- (a) Total Capital Cost: USD 186,033,000 (including fixed turnkey EPC price of 133,475,000 Euros)
- (b) Debt-Equity Ratio: 70:30
- (c) Exchange Rates: 1 USD = 60.0 Rupees; 1 Euro = 1.20 USD
- (d) Funding: Debt: Foreign Funding 75%; and  
Local Funding 25%.  
Equity: 30% all Foreign.
- (e) Taxes:
  - Customs Duty at 5% on imported machinery as per 2002 Power Policy.

- Dividend Withholding Tax of 7.5%.
- Customs Duty at 10% on imported spare parts.
- 0% Corporate Tax Rate.
- 0% Minimum Turnover Tax Rate.

- 6.3 At the time of Financial Closing, the tariff figures shall be updated for the various base figures (e.g. fuel price, EPC, O&M and Insurance prices, adjusted by actual exchange rates compared to the Reference Exchange Rates (Pak Rs./USD = 60.00, Pak Rs./Euro = 72.00, and USD/Euro = 1.20), and Interest During Construction adjusted by prevailing LIBOR and KIBOR, to arrive at the reference tariff table to be used in the PPA.
- 6.4 At the COD, the tariff figures will be updated on the basis of actual interest incurred during construction and variations in the Reference Exchange Rates during construction.
- 6.5 Any modifications or additions required by the power purchaser that are not considered in the Project shall be treated as pass-through.
- 6.6 The capacity charge is further broken down into two components:

6.6.1 **Escalable Capacity Payment**

6.6.1.1 This component represents all the fixed costs of the plant and the return on equity. Since there is no recovery of the original equity capital invested, the plant remains the property of WARDA Power after the 25 year contract period and may operate as a merchant plant. A summary of the charges is provided below:

	Escalable Capacity Payment						
Period	Fixed O&M	Insurance	Cost of WC	ROEDC	ROE	Withholding Tax	Total
Years 1-25	0.1326	0.0760	0.0362	0.0234	0.3304	0.0265	0.6251

6.6.1.2 The Fixed O&M component of the escalable capacity payment represents the fixed costs of all the staff for O&M, plant administration, security, transportation, overheads, office costs, professional fees such as audit, tax and legal, as well as some minor fixed operational costs such as environmental monitoring, that do not change with dispatch levels.

6.6.1.3 The Insurance component consists of all-risk insurance/re-insurance for the Project, as well as business-interruption insurance (which is a lender-stipulated requirement).

- 6.6.1.4 The return on equity (“**ROE**”) component includes a return on invested equity giving an internal rate of return (“**IRR**”) of 15% net after deduction of withholding tax.
- 6.6.1.5 Additionally, this component also includes the cost impact of a working capital loan.

The escalable component is based on the following parameters:

- (a) Equity Amount: USD 61,100,000 (30% of total capital cost plus equity portion of IDC).
- (b) IRR: 16.2 % gross and 15% after dividend withholding tax of 7.5%.
- (c) Repayment of Equity: None
- (d) Currency of Funding: Pak Rs. And USD
- (e) Working Capital Loan and cost of working capital: A working capital loan facility of approximately USD 8,312,000 equivalent in Pak Rs. is assumed in order to finance the net accounts receivables and working capital impact of 15% sales tax. The interest rate for this working capital loan is 6 months KIBOR (10.45%) less 1% + 3% premium = 12.45% total.
- (f) Cost of Foreign Debt: 6 months LIBOR (5%) + 3% premium + 2% commitment fee and L/C charges.
- (g) Cost of Local Debt: 6 months KIBOR (10.45%) + 3% premium + 3% commitment fee and L/C charge.
- (h) Corporate Tax Rate: 0%
- (i) Minimum Turnover Tax: 0%
- (j) Indexation: Fixed O&M shall be indexed to the following:
- A. European CPI (50% of component)
  - B. Pakistani WPI (50% of component)
- Insurance** shall be indexed to the following:
- A. Pak Rs./USD exchange rate
  - B. U.S. inflation

ROE shall be indexed to the following:

- A. Pak Rs./USD exchange rate
- B. U.S. inflation/ Pakistan inflation

### 6.6.2 Non-Escalable Capacity Payment

6.6.2.1 The following table provides a summary of the Non-Escalable Component:

Period	Non-Escalable Component (Pak Rs./kWh)		
	Loan Repayment	Interest Charges	Total
Year 1	0.3130	0.4778	0.7908
Year 2	0.3443	0.4465	0.7908
Year 3	0.3786	0.4122	0.7908
Year 4	0.4163	0.3744	0.7908
Year 5	0.4579	0.3329	0.7908
Year 6	0.5036	0.2872	0.7908
Year 7	0.5538	0.2370	0.7908
Year 8	0.6090	0.1818	0.7908
Year 9	0.6698	0.1210	0.7908
Year 10	0.7366	0.0542	0.7908
Years 11–30	0.00	0.00	0.00

6.6.2.2 It is apparent that there is no charge under this category after 10 years as all the debt would be repaid by the end of the 10th year. The assumptions used in calculation of the above are:

- (a) Amount of Debt: USD 142,568,000 (70% of total Project cost + portion of IDC), being 75% foreign and 25% local
- (b) Term of Loan: 20 months of grace period (construction) + six months grace + 10 years of semi-annual equal debt service after the COD
- (c) Interest Rates: Foreign: 6 months LIBOR (5%) + 3% premium.  
Local: 6 months KIBOR (10.45%) + 3% premium
- (d) Currencies: USD and Pak. Rs.
- (e) Indexation: Funding in USD: interest component would be indexed to 6 month LIBOR rate and foreign currency exchange rate.  
Funding in PKR: interest component would be indexed to the 6 month KIBOR rate.

## 7. ESCALATIONS AND INDEXATIONS

After the COD the tariff tables provided will be indexed to factors as described above and the Reference Exchange Rates being 72.0 Pak Rs./Euro 60.0 Pak Rs./USD and 1.20 USD/Euro. On the Financial Closing date, the Reference Tariff Table will be updated by the then-prevailing indices, exchange rates and base numbers. The details are provided hereinbelow:

### 7.1 Inflation Factors

The following components are subject to inflation factors:

Variable O&M – Local: Pakistan WPI

Variable O&M – Foreign: European CPI

Escalable Capacity Payment:

Fixed O&M 50% European CPI and  
50% Pakistan WPI

Insurance U.S. CPI

ROE U.S. CPI for the foreign component. and Pakistan  
WPI for the local component.

### 7.2 Currency Indexation

The following components are subject to exchange rate indexation. The Reference Exchange Rates are 72.0Pak Rs./Euro. 60.0 Pak Rs./USD and 1.20 USD/Euro.

Variable O&M – Foreign: Pak Rs./Euro exchange rate

**Escalable Capacity Payment:**

Fixed O&M 50% Pak Rs./Euro exchange rate

Insurance Pak Rs./USD exchange rate

ROE Pak Rs./USD exchange rate

**Non-Escalable Capacity Payment – Foreign Loan**

The Interest During Construction as well as the Non-Escalable Charges shall be adjusted according to the prevailing relevant interest rate (+ spread) and foreign currency exchange rate.



## 8. **ASSUMPTIONS**

The following have been assumed while calculating the tariff. Changes in any of these assumptions will result in changes in the tariff:

- 8.1 Anticipated average site conditions that have been used in calculation of the net output and heat rate are an altitude of 214 m above sea level, ambient temperature of 30°C, charge air coolant temperature of 40°C and 60% relative humidity.
- 8.2 Internal consumption (including air-cooled condenser) has been assumed to be approximately 4.1 MW.
- 8.3 Annual Unscheduled Outages (MWh) up to 500 hours x Available Capacity (MW) shall be without any liquidated damages. Liquidated damages for Unscheduled Outages in excess thereof, and their computation shall be in accordance with the 2006 standardized PPA.
- 8.4 Scheduled Outage periods shall be 23 Days per unit in any Year, except in any Year in which a Major Overhaul is required, in which case Scheduled Outage periods shall be 37 Days per unit.
- 8.5 A constant ROE is assumed, which results in an IRR of 15% over 25 years.
- 8.6 No hedging cost has been assumed for exchange rate fluctuations during construction.
- 8.7 NTDC is assumed to be responsible for financing and constructing the interconnection to the grid.
- 8.8 All invoicing and payment terms are assumed to be in accordance with the 2006 standardized PPA.
- 8.9 The tariff is calculated on the basis of a notional 60% plant load factor.
- 8.10 Tolerance of +/- 1.5% in Dispatch is assumed.
- 8.11 The tariff table shall be further updated at COD of the Project in order to correct the tariff according to the prevailing KIBOR LIBOR and exchange rates (Pak Rs./USD and Pak Rs./Euro).
- 8.12 All fuel during plant tests after synchronization are assumed to be paid for by the power purchaser.
- 8.13 Working capital has been financed by a separate working capital loan, and is not included in the Project cost.
- 8.14 Project contingency/debt service/maintenance reserves are not included in tariff calculations. If required by lenders, these will be adjusted accordingly in the tariff.

8.15 All other assumptions not expressly stated herein are based upon the 2006 standardized PPA. Consequently any change in any such assumption may lead to change in the tariff.

**PART III – CORRESPONDENCE BETWEEN  
WARDA POWER, THE PPIB,  
NEPRA AND THE POWER  
PURCHASER, AND A COPY OF  
SCHEDULE 1 TO THE PPA**