

**Determination of the Authority in Case No. NEPRA/TRF-48/FPCDL-2006**

**Background**

Foundation Power Company (Daharki) Ltd. has been established for setting up a combined cycle thermal power plant based on low BTU gas at Daharki district Ghotki. The source of fuel for the power plant is low BTU gas from deep Mari Gas Fields at manifold of well no. 6. The electricity generated will be sold to Central Power Purchasing Agency (CPPA) within NTDC.

2. Foundation Power Company (Daharki) Ltd. submitted a tariff petition on 20-01-2006 for approval of generation tariff. This tariff petition was admitted for consideration by the Authority on 25-01-2006 and was assigned Case No. NEPRA/TRF-48/FPCDL-2006. Salient features of the petition were advertised in the newspapers to inform all the interested person/stakeholders and to invite participation in the tariff – setting proceedings through their comments or by becoming a party to the proceedings as intervener. Invitations were also sent to the concerned Federal and Provincial Government Ministries, Chambers of Commerce and Industries, representatives of professional bodies and experts, soliciting their views on the petition.
3. A public hearing on the petition was held on 14<sup>th</sup> March 2006, at NEPRA’s main office. The hearing was attended by the applicant, stakeholders, NTDC and Members of the General Public. FPCDL was directed to negotiate outstanding issues especially the project cost and other financial aspects with the power purchaser within 10 days and submit the revised project cost estimates after negotiation with the power purchaser for consideration by the Authority.
4. FPCDL through various letters demanded more time to negotiate and reach an agreement on project cost estimates with the Power Purchaser (CPPA).
5. However, the Authority was about to decide on tariff petition on 13.07.2006 on the basis of whatever information was available and provided by the petitioner, when FPCDL filed an application for extension in time of Authority’s determination in the matter under Rule 9(19) of the Tariff Standards and Procedure Rules 1998. FPCDL in their application requested that since the company has received bids from the EPC contractors and in view of negotiations with the EPC contractors it is

expected that the EPC and other project cost estimates shall reduce from the original estimates submitted at the time of filing tariff petition. FPCDL requested that they should be allowed to submit revised cost estimates for the project after final negotiations with the EPC Contractors. The Authority considered the request of the petitioner in its meeting held on 13.07.2006 and decided to extend the time for Authority's determination in the matter. FPCDL was advised to submit revised cost estimates within 10 days from the date of second hearing which was held on 30.08.2006 at main NEPRA Office and attended by the petitioner, the power purchaser and other representative bodies and stakeholders.

### **SUBMISSION OF FPCDL**

6. FPCDL in the tariff petition submitted that proposed site of the CCPP is located approximately 2.5 kilometer from khobar railway station on the main Lahore – Karachi line and between the Reti and Narli canals approximately 5 kilometer to the east of Daharki District Ghotki in the province of Sind. However, the petitioner at the time of submitting revised cost estimates and making presentation before the Authority in the hearing of the case intimated that the company has changed the site of the proposed plant. According to FPCDL the site previously selected and recommended in the feasibility report by the consultant was not suitable for underground water to be used for the plant. The new site now proposed by FPCDL is located in between Liberty Power Plant and Engro Fertilizer Plant (1-3 km from National Highway). However, according to the information provided by the petitioner the new proposed site has not yet been procured by FPCDL.
7. The power to the NTDC electrical system will be supplied through 220 kV grid station to be constructed at Rohri. FPCDL submitted that the proposed power plant is based on combined cycle technology with an installed capacity of approximately 202 MW at ISO conditions. The plant configuration consists of one gas turbine of 120 MW class units with independent Heat Recovery Steam Generator (HRSG) and Steam Turbine Driven Generator. The selected GT is suitable for operation on low BTU gas as the main fuel whereas distillate oil (HSD) is to be used as auxiliary/emergency fuel.

8. The estimated total capital cost of the project as provided in the tariff petition was US\$ 171.846 million. The EPC portion was US\$ 141 million. FPCDL requested a reference tariff as indicated in the following table.

PKR/kWh											
	Energy Price			Capacity Price						Total	
	Fuel	Variable O&M		Total	Shareholder's Return	Fixed O&M		Total Esclable	Non Esclable		Total
		Local	Foreign			Local	Foreign				
Average (Year 1-10)	1.439	0.0321	0.158	1.629	0.477	0.183	0.086	0.746	1.432	2.179	3.808
Average (Year 11-25)	1.439	0.0321	0.158	1.629	0.477	0.183	0.086	0.746		0.746	2.376
Average (Year 1-25)	1.439	0.0321	0.158	1.629	0.477	0.183	0.086	0.746	0.573	1.319	2.949
Levelized											3.345

9. FPCDL requested a two part tariff consisting of capacity purchase price (CPP) and energy purchase price (EPP) for 25 years. CPP comprises of i) escalable components ii) non-escalable components. Escalable component of tariff includes fixed O&M charges (foreign and local) insurance, Admin expenses and return on equity. Non-escalable component of tariff consist of principle repayment of loans and interest charges. The average capacity payments for the first 10 year period are proposed to be Rs. 954.40 per kW per month and Rs. 326.75 per kW per month for capacity payments during the remaining period of 15 years (from year 11 to 25).
10. The proposed energy component is Rs. 1.629 per kWh consisting of Rs. 1.439 per kWh as fuel component and Rs. 0.19 per kWh as variable O&M component. Fuel cost has been calculated on the basis of net on-site thermal efficiency of 48.63% on low Btu gas, which translates into net plant heat rate at bus bar of 7016 BTU per kWh (LHV) at full load on gas. The reference gas price is assumed at Rs. 185.19 per MMBTU (HHV) delivered at site and Rs. 205.11 per MMBTU (LHV) using conversion factor of 1.1075530.

### Fuel

11. FPCDL has submitted that the gas supplier will provide gas at a gross Calorific Value with in a range of 517-540 BTU/Scf. It has been indicated that gas supply of 60 MMCFD has been allocated by the supplier, while FPCDL has requested for additional gas supply of 10-15 MMCFD to run its plant at 100% load.

### O & M Variable Component

12. FPCDL has proposed variable O&M cost as USD 2.998 million per annum comprising US\$ 2.491 million as foreign and US\$ 507 million as local component. Major portion of variable O&M comprises maintenance of GT, which has been estimated as US\$ 4.5 per MWh at 60% plant load factor. This works out to USD 2.8 million per annum and includes the following:

- Long Term Service Agreements (LTSA) for the GT package, including regular inspection and maintenance of hot-gas paths, covering;
  - combustion chamber inspection
  - hot-gas path inspection
  - gas turbine major inspection
  - generator major inspection
  - spare parts
  - Amount for refurbishment/ rehabilitation of GT after about 100000-120000 operating hours
  - Insurance
  - Payments for duties, taxes, fees etc.

13. The cost for consumable has been estimated as US\$ 0.284 million per annum.

### Fixed O & M Costs

14. FPCDL has proposed US\$ 3.019 million per annum as fixed O&M expenses comprising US\$ 1.657 million local and US\$ 1.362 million as foreign component. This includes routine maintenance of plant, machinery, mechanical installations electrical, control & Instrumentation equipment, civil and administration costs.

### Insurance Cost

15. Insurance cost of US\$ 1.23 million has been proposed by the company. This has been based on 1% of EPC cost (US\$ 123 million) of the power plant. This cost would be subject to both US CPI inflation as well as to US\$/PKR adjustment/indexation.

Return on Equity

16. FPCDL has proposed return on equity of 15% (IRR) net of 7.5% withholding tax on dividends based on whole life of 25 years of the project.

Non-Escalable Component

17. Of the total project cost, 75% is being funded through debt. The entire debt is proposed to be funded in local currency. However FPCDL has mentioned in its tariff petition that incase foreign funding is availed it will be linked to LIBOR. The entire debt is to be paid in 10 years through six monthly installments. The interest rate taken by the company is KIBOR 9.08% plus 3% per annum.

Escalation/Indexation

18. FPCDL has submitted that following indexation/escalation are assumed to be available under the PPA accompanying the tariff table;

Fuel Cost Component

- The fuel component will be adjusted by performance/ageing and fouling and ambient degradation factors in order to compensate for the affects of performance degradation during the maintenance cycles. Efficiency decrease due to partial loading shall be compensated for all related degradation/adjustment curves from the gas turbine manufacturers.
- Incase of open cycle mode, heat rate and efficiency will be different accordingly energy component will be different.
- In case of 100% fuel fire (HSD) tariff and efficiency/degradation/adjustment will be different and will be negotiated.
- Proposed reference tariff for fuel is valid for operation on low btu gas only. Additional costs for gas turbine start-up, shutdown as well as part load operation with HSD or HSD admixture shall be compensated by factors

based on the data from the gas turbine manufacturers. Furthermore, a decrease in efficiency of CCPP during HSD use shall also be considered.

#### O & M Component

- Variable O&M-Local                      Local CPI
- Variable O&M – Foreign                United States CPI

#### Escalable Component

- EScalable Component-local            Local CPI
- Escalable Component-foreign        United States CPI

#### Non-Escalable Component

- Local financing would be indexed to changes in reference 6 months KIBOR rate, semi-annual
- No foreign debt assumed. If availed, would be indexed to PKR/USD exchange rate and LIBOR would be the base rate.

#### Currency Indexation Factors

- Variable O&M-Foreign                US\$/PKR indexation
- Escalable Component-Foreign        US\$/PKR indexation

#### Price Factors

- Changes in the price of gas and/or HSD maintaining the guaranteed Heat Rate.

#### Other General Assumptions

19. The following has been assumed while calculating the tariff. Changes to any of these assumptions will result in a change to the tariff.

- 5% custom duty on the import of plant and equipment as per power policy 2002 is included in the EPC and in the maintenance costs. Any variation in the Custom duties as per actual payment will be adjusted at COD.

- No tax on any income of the company including sales proceeds from NTDC. General Sales Tax and other taxes will be treated as pass through items.
- Withholding tax of 5% on local services is included in the CAPEX items, EPC, fuel and power connection.
- 100% local debt and local equity is assumed.
- NTDC shall be responsible for the construction of interconnection and Transmission facilities and all financing is to be borne by NTDC.
- No O&M reserve, Debt Service Reserve or additional security costs, if any, have been included in the tariff.
- No stand by LC or advance payment to gas supplier has been considered in tariff computation.
- Exchange gain/(loss) due to exchange rate fluctuations during construction on EPC payment is assumed to be pass through.
- Foreign Currency hedging costs have not been considered in the project cost.
- No cost of utilizing NTDC Telecom Media between Dadu & NPCC (Digital Microwave or Fibre Optic System) is assumed, if incurred will be pass through.
- Transmission Line and Interconnection charges, is responsibility of the power purchaser/NTDC as per clause 1.12 of “Guidelines for determination of Tariff for IPPs”. No cost on this account has been assumed / considered in computation of tariff.
- Project Financing is assumed in local currency. In case currency of funding is USD the currency indexation would apply.
- Exchange Rate (PKR/USD) is taken as 60.00. Final local debt amount at COD to be based on exchange rates prevailing on the date of payment.
- Financing rate is based on 6 months KIBOR (9.08%) and margin of 300 basis points over KIBOR. In case foreign financing is availed it will be linked to LIBOR.
- In the EPC and the item “fuel and water connection, access roads” contingencies in the range of about 5% are included.

### Determination Sought

20. Based on its submissions, FPCDL has sought determination of the Authority in respect of the following:

- (a) Reference Tariff to remain effective for a period of 25 years from date of Commercial Operation.
- (b) Approval of proposed escalation in tariff.

Revised Cost Estimates

- 21. Foundation Power Company (Daharki) Ltd submitted motion after close of evidence under Rule 9(19) of Tariff Standards and Procedure Rules 1998, whereby request has been made for submission of revised project cost estimates in view of final negotiations with their EPC Contractors. The Authority accepted the motion to reopen the case and decided to hold a hearing in the matter so that all the stakeholders could get an opportunity to hear the petitioner for the under lying reasons necessitating the revision of previous cost estimates. The hearing was held on 30.08.2006 in the presence of representatives of the power purchaser, concerned ministries and the petitioner.
- 22. FPCDL in its application for revised cost estimates has submitted that EPC cost in the original tariff petition was based on our Consultant's recommendation. However, two EPC contractors have submitted their EPC prices. After detail technical, commercial and financial analysis, the EPC Cost has been finalized. Thorough analysis of the bids and project development cost reveals that EPC and overall project cost has increased from the one submitted by FPCDL earlier. In view of this FPCDL is submitting herewith a revised cost of EPC, Project Development and Services
- 23. The comparison of revised cost estimates with the previous cost estimates submitted by FPCDL at the time of filling petition is given at the following page:

Description	Original	Revised	Variance
Gas Turbine	27.060	27.775	-0.715
Heat Recovery Steam Generator	13.530	10.536	2.994
Steam Turbine	12.300	14.736	-2.436
Water Cooling System	1.230	5.498	-4.268
Balance of Plant	25.830	13.622	12.208
Water and waste water system	2.500	15.857	-13.357
Electrical system	22.140	27.521	-5.381
C&I system	6.150	8.325	-2.175
Civil works and erection	14.760	24.111	-9.351
Training		1.264	-1.264
Consumables & special Equipment Tools		0.485	-0.485
<b>Total EPC Base Offer</b>	<b>125.500</b>	<b>149.730</b>	<b>-24.230</b>
Housing Colony		5.500	-5.500
Access Road	2.000	1.500	0.500
Setting up of Offices	1.500	0.000	1.500
Gas Pipeline Cost	12.000	0.000	12.000
<b>Total Infrastructure Cost</b>	<b>15.500</b>	<b>7.000</b>	<b>8.500</b>
<b>Total EPC Cost</b>	<b>141.000</b>	<b>156.730</b>	<b>-15.730</b>
EPC per kW US\$ Million	0.698	0.776	
Project Development			
Feasibility study & EPC Tendering & Evaluation	1.000	1.000	0.000
Design Review & Construction Supervision	2.500	2.100	0.400
Legal & Financial Advisor, LTSA, Permits etc.	1.500	1.500	0.000
Land acquisition & Fees	0.800	1.200	-0.400
<b>Total</b>	<b>5.800</b>	<b>5.800</b>	<b>0.000</b>
Services			
Construction Management	0.580	0.580	0.000
Fixed O&M Cost	1.224	1.224	0.000
Insurance during construction	1.230	1.502	-0.272
Utilities during construction	0.500	0.200	0.300
Fuel Cost during testing	0.548	3.000	-2.452
First fill of lubes, chemicals & diesel	0.500	0.500	0.000
Lenders Fee	1.230	1.502	-0.272
Working Capital, Stock of Spare parts	4.305	5.645	-1.340
<b>Total</b>	<b>10.117</b>	<b>14.153</b>	<b>-4.036</b>
<b>CAPEX</b>	<b>156.917</b>	<b>176.683</b>	<b>-19.766</b>
Financing Fee	1.279	1.506	-0.227
IDC	13.650	24.655	-11.005
<b>Total Project Cost</b>	<b>171.846</b>	<b>202.844</b>	<b>-30.998</b>
<b>Cost per kW US\$ million</b>	<b>0.851</b>	<b>1.004</b>	

24 The following rationale and justification for increase in the project cost over the original cost estimates has been provided by FPCDL.

### **Rationale for Increase in EPC Cost**

25. It is an established fact that a reliable, efficient and economical operation of a Combined Cycle Power Plant largely depends upon the following factors.

Water Quality  
 Fuel Quality  
 Other Factors

26. The first two factors have considerable impact on the Capital Expenditure as well as O&M cost of the plant, especially when these factors are unfavorable. Though, these factors can be controlled by today's technology but it will substantially increase the overall cost of the project.

### **Water Quality**

27. The quality of underground water along the Left hand side \*LHS) of the National Highway and particularly in the Daharki area is very saline in nature (Refer to Annex-2). Extensive field work was undertaken to ensure an economical source of water for the day to day requirement of the Power Plant. The studies carried out reveal the following facts:

- Canal water availability is limited to only four months of a calendar year
- Quality of underground water is normal when the canal is operational and deteriorates rapidly as the canal closure takes place.
- Conductivity of underground water while the canal is running ranges from 300-750 us/cm on canal bank and 1965 us/cm at project site. However, this range drastically increase to around 12,000 us/cm and 46,000 us/cm respectively during the period of canal closure.
- It is not economically viable to treat water of this high conductivity for the purpose of production of de-mineralized (demin) and clarified water for usage in the Power Plant.

28. The above results require a change in the design of the cooling water and demin water system of the plant. Previously only underground water system at site was proposed to meet the water requirement of the complex. Now, after the above results, the cooling water system design requires not only underground water but also canal water. Not to mention that the new design entails getting underground water from near by canal and not from the existing site, which would additional require laying a water pipeline along with power supply system up to a distance of 3-12 km. Following components would be added to the current design along with associated costs:

- Water-intake structure, clarification plant and mud disposal system requiring USD 1.85 million.

- De-mineralized water plant to handle water of high conductivity up to 3,500 us/cm requiring USD 0.4 million.
  - Tube wells with a capacity of 0.5-0.75 cusecs along the canal bank spanning around 3-4 km along with power supply and control system requires USD 2.5 million
  - Pumping underground water from above tube wells installed on Dahar Wah Upper which is approximately 10-km from Existing Project Site requires USD 6 million
29. The total cost of above design changes amounts to USD 10.75 million. All these costs are specific to Daharki Project.
30. As discussed, the present location of the plant entails costs due to the uncertain and varying nature of underground water, both at site and near by canals. There is no assurance that after having spent USD 6 million to transport underground water from canal, the conductivity level of this water will remain acceptable during canal closure period.
31. Therefore, site relocation study was conducted by FF. Details of site relocation and its cost impact is discussed in section 7 of this report.

### ***Fuel Quality***

32. Daharki Project has a 65 MMCFD low btu gas allocation granted by GoP. This gas has a low calorific value ranging from 517-540 MMbtu/SCF with a variable methane percentage from 42-45. Gas turbine efficiency largely depends upon a stoichiometric combustion process. In our case the CO<sub>2</sub> content of 40% makes the process very inefficient and difficult to handle. CO<sub>2</sub> gas retards the combustion process. Resultantly, the gas turbine design has to be modified for the following:
- Design of combustor baskets and fuel nozzles of gas turbine to handle double the volume of low btu gas as compared to a gas turbine which runs on pipeline quality gas.
  - Necessary changes in the software of the gas turbine to keep the mass flow of gasses in a specified range.
  - Necessary changes in the combustion process to efficiently burn a fuel having 40% of CO<sub>2</sub> content.
  - Due to the fuel specification it is not possible to install evaporative coolers which could have enhanced the output of the complex by 5% with corresponding decrease in heat rate. .
33. Some of the technical features of the power plant required further analysis and design changes. These points are summarized below:

- The use of liquid fuel (HSD) up to 75% of the GT out put which reduces the flexibility of the machine to operate on gaseous fuel at reduced loads due to high liquid fuel (HSD) cost.
  - The conversion of the complex to operate on open cycle when the complex load is reduced to 60%.
  - The net output of the complex of 180.1 MW with gaseous fuel having CO<sub>2</sub> content of 40% seemed to be excessive
  - To optimize and improve the net heat rate of the complex in order to reduce the fuel component cost which has a considerable impact on the merit order of the machine and thus to make the complex as the one of the highly efficient plant while operating with a fuel which makes the combustion process very complicated and non efficient. The area under consideration was design of HRSG, cooling towers, steam turbine and condenser, GT intake and many others, to enhance the net efficiency of the complex.
34. All these design changes have resulted in an increased efficiency from 48.63% to above 50%. In real terms the NPV of savings from increased efficiency are PKR 804.626 million and USD 13.410 million respectively.
35. The above factors make this gas turbine highly customized and expensive' compared to other gas turbines available in the market that are not suitable to burn low btu gas. GE Frame 9E is the only machine capable to burn low btu gas with high CO<sub>2</sub> content having a output range of 113 MW (at mean site conditions) with the highest guaranteed heat rate.
36. It is difficult to estimate the cost of these modifications but a general idea conceived during different discussions with the EPC Contractors revealed that the cost of 1xGE Frame 9E machine burning the specified low btu fuel with high CO<sub>2</sub> content is 30-40% higher than 1xGE Frame 9E burning normal gaseous fuel. The cost impact of these items is estimated at USD 8 million.
37. Presently the design of the complex *does not include gas pipeline and gas compressor station*. There is no operational evidence from Mari Deep Well No.6 of the specified fuel gas i.e. the pressure of fuel gas at Project Site cannot be predicted with 100% accuracy. Therefore, in the future if gas compressor station is required or the company is responsible to construct the gas pipeline this will add to the Project Cost along with fuel component adjustment and will subsequently increase the tariff of the Daharki Project. '

### ***Other Factors***

38. The following factors specific to this project bears immense influence on the EPC Cost of Daharki Project.
- Transmission Voltage at 220 kV
  - Evaporation Ponds
  - Access Road

- Residential Colony
- Camp Facility for EPC Contractor
- Geo-technical Impact
- GE Monopoly
- Limited participation by EPC Contractors
- Cost Escalation between Feasibility and EPC Figures
- Redundancy of Major Auxiliary Equipment

39. Impact of these factors on overall cost of the Project is elaborated in succeeding paragraphs.

#### **Transmission Voltage at 220 kV**

40. The station switch yard would be designed for 220 kV transmission system instead of 132 kV as compared to other ongoing power projects. The cost differential for engineering, equipment, testing and commissioning amounts to USD 2.5 million

#### **Evaporation Ponds**

41. Due to lengthy periods of canal closure and the restrictions imposed by the Irrigation Authorities in Sindh Province, Daharki Project cannot discharge cooling tower waste water, after necessary treatment, into the canal. It is estimated that company has to construct evaporation ponds to hold water up to a capacity of 120,000-140,000 tons. This will require not only extra land but also huge civil work along with necessary piping. The cost impact of this item is USD 2.5 million.

#### **Access Road**

42. The present site IS located about 14 km from LHS of National Highway. The access to the site is through a Kacha Road having two canal crossings, one railway crossing and two dozen culverts. These crossings and culverts will require substantial reinforcement and reconstruction to carry loads up to 250 tons. The cost impact of this item as quoted by the EPC contractor is USD 6 million. However, FF estimates that this work can be conducted at the new proposed site (Section 7) at a cost of USD 1.5 million.

#### **Residential Colony**

43. The present site is located away from the any major city of Pakistan in a remote area. Therefore, Daharki Project requires a residential colony with "all amenities to be provided to all the employees of the Power Plant. The plant location is in close proximity of ENGRO, FFC and Liberty Power and in order to attract and retain good human resource a compatible facility has to be constructed at FPCDL. The cost impact of this item is estimated at USD 5.5 million.

### **Camp Facility for EPC Contractor**

44. Due to remote location of the Project Site, EPC Contractor will have to build complete camp along with associated recreational, sports and medical facilities for its staff with necessary security arrangement around the clock. This includes satellite and microwave communication for speech and data transfer. The cost impact of this item is estimated at USD 2 million.

### **Geo-technical Impact**

45. Daharki area is located in saline belt with high concentration of sulphates in the underground water. The ground water in the area is encountered just at a depth of 1.5 meters which require extensive de-watering and piling structure with Sulphate Resistant Cement (SRC). The overall cost impact of geo-technical details along with change of horizontal acceleration from 0.1 to 0.2 g amounts to USD 2.5 million.

### **GE Monopoly and Global Power Business**

46. It is a well-known fact that presently all the gas turbines manufacturers are fully booked. This has created a supply-demand situation where manufacturers can dictate their terms and conditions, especially for a customized gas turbine where no other manufacturer is available to meet the specifications of the fuel gas from Mari Deep Well No.6. This puts GE in a monopolistic situation.

Other factors that impact cost of EPC in general are:

- Limited production capabilities of GT suppliers.
- EPC costs are increasing due to increasing credit costs and fuel costs.
- Material costs are increasing drastically (e.g. copper price has doubled within one year).

### **Limited participation by EPC Contractors**

47. Although an ICB process was followed to increase competition and participation of EPC Contractors, Daharki Project did not get a good response from EPC Contractors. The primary factors in this regard are:

- Safety and security of personnel in the Daharki Suburbs
- Overhead cost for insurance of EPC personnel

**Cost Escalation between Feasibility and EPC Figures.**

48. Feasibility study was conducted in the first quarter of 2005. All the cost figures have drastically changed over the period of around 18 months. The EPC Cost also incorporates the cost escalation in the international market due to increase in the price of commodity items such as copper, nickel and zinc. This has increased the EPC Cost in totality.

**EPC Cost Increase Rationale**

<b>EPC Cost Items in USD Million</b>	
Water Quality	4.750
Fuel Quality	8.000
Transmission Voltage at 220 kV	2.500
Evaporation Ponds	2.500
Access Road	1.500
Residential Colony	5.500
Camp Facility for EPC Contractor	2.000
Geo-technical Impact	2.500
<b>Total Relevant Costs</b>	<b>29.250</b>

49. Some of the key assumptions that are applicable to the revised tariff calculations and are materially different from the original tariff submitted to NEPRA are as follows:
- Customs duties are not included in the EPC Cost and are assumed to be pass through as per Schedule 1 of PPA.
  - Cost of the gas pipeline along with Right of Way (ROW) and gas compressor station (if any) is not included in the Project Cost and has been assumed to be borne by the gas supplier as per the recent directives of PPIB i.e. Letter No. 1 (102) PPIB-1015/06/PRJ dated July 29, 2006. Based on the ECC Decision, the gas pipeline including right of way and gas compression (if any) is the responsibility of the gas supplier.
  - Furthermore, we would like to emphasize that Return on Investment is based on Real IRR of 15% indexed to Local or foreign inflation, as the case may be.
  - IDC has been recalculated based on the Disbursement Schedule received from the EPC Contractors and the revised project cost.
  - Insurance cost during operation of the plant has increased from 1% to 1.35% based on revised quotes received from the Insurance Company.

<b>Project Cost – Revised (in USD 1000)</b>	
<b>Total EPC Cost</b>	<b>156,729</b>
Project Development	
Permit, Engineering etc.	4,600
Land acquisition inclusive of fees	1,200
<b>Total Project Development Cost</b>	<b>5,800</b>
Services	
Construction Management	580
Fixed O&M Cost of Plant	1,224
Insurance during construction	1,502
Utilities during construction	200
Fuel cost during testing	3,000
First fill of lubes, chemicals and diesel	500
Lender's fee	1,502
Working capital, stock of spare parts	5,645
<b>Total Cost of Services</b>	<b>14,154</b>
<b>Total CAPEX without IDC</b>	<b>176,683</b>
Financing fee	1,506
IDC	24,655
<b>Total Project Cost</b>	<b>202,844</b>

### Submissions of Commentators

50. Central Power Purchasing Agency has submitted their comments which are as follows;

### **EPC Cost**

51. In the original Petition filed by the Company to NEPRA for Tariff Determination the total EPC Cost of the Project was US\$ 141 million which includes US\$ 12 million for Gas Pipeline, now as per recommendations made by Ministry of Water and Power for ECC approval that responsibility to construct the gas pipeline should be borne by the Gas Company concerned therefore the Gas pipeline cost should be reduced from the EPC cost of the Project.

**Custom duty**

52. In the original Petition filed by the Company to NEPRA for Tariff Determination the Company has mentioned that EPC Cost of US\$ 141 million has included 5% Custom duty on import of plant and equipment now in the revised project cost the company has not included it in the project cost and taken as pass through item.

**Transmission voltage at 220 kV**

53. There is no change in voltage level (as already intimated to the Company) therefore increase of S\$ 2.5 million project cost by comparing the transmission system of 132 kV of others ongoing projects is not understood and also not justified.

**Working capital, Stock of spare parts**

54. As already explained that working capital amounting to US\$ 5.645 million has been considered as a part of capital expenditure of the Power Complex by the Company and has been capitalized for the tariff calculation. As per prudent accounting practice the working capital is not considered as the part of the project cost. However, power Purchaser is obliged to pay the financial charges of the working capital.

**Fuel Cost during Testing**

55. The Company has included the US\$ 2.5 million for construction of evaporation pond by taking the plea of lengthy periods of canal closure, whereas according to chapter-5 of the Feasibility study that canal remains closed for only one month and it is mentioned that somewhat large canal water is available more than 9 months in a year therefore Company's justification for increase of US\$ 2.5 million to hold water to a capacity of 120,000-140,000 tons in evaporation pond seems to be an after thought and should be rationalized.

**Fuel Quality/Output of Plant**

56. The Company has increased the Project Cost by US\$ 8.0 million just based on general idea conceived from EPC Contractor during different discussions for modifications of the gas turbines for burning of the specified low BTU gas and increase its plant efficiency from 48.63% to 50%, on the other hand the Company has reduced its plant output by 4 MW (from 184 MW to 180 MW) whereas by increasing the efficiency from 48.63% to 50%, the output of the plant should be increased rather than decreased therefore the company should consider it. However, increase in the Project Cost by US\$ 8.0 million due to increase in efficiency may be allowed.

**Geo – Technical Impact**

57. The Company has included US\$ 2.5 million on the plea that ground water in the area is encountered just at a depth of 1.5 meter which requires extensive de-watering etc. whereas detail given in this regard in chapter 5 of the Feasibility study does not justify the Company's view point, therefore, the Company should reconsider it.

**Site Relocation**

58. Site relocation of the proposed plant has not yet been finalized. The proposed site is subject to the acceptance of the Mari Gas Company Ltd., anyhow relocation of the site will require new geo-technical, hydrology studies and Environmental Impact Assessment. Subsequently Interconnection studies will have to be carried out according to new site. Therefore relocation of the site may be agreed if the Company is ready to carry out the above said studies according to new site.

**Project Cost**

59. In the Petition submitted by the Company to NEPRA for Tariff Determination the total cost of the project was US\$ 171.846 million. Now the Company has revised this Project cost as US\$ 202.844 million. It is submitted that instead of rationalizing/decreasing the project cost the Company has increased project cost by US\$ 31 million, which is not justified and should be reconsidered by the Company. However By considering above said facts the cost of the Project has been estimated by CPPA as under:-

**EPC Cost**

Equipment Cost including custom duty As per original Petition	108.00 M US\$
For Increase in Efficiency as per Company's revision	8.00 M US\$
Civil Works and Erection as per Original Petition	15.000 M US\$
Geo-Technical Impact as per Company's revision	2.500 M US\$

**Infrastructure cost**

Water Quality as per company's revision	4.750 M US\$
Evaporation Ponds cost as per company's revision	2.500 M US\$
Access Road as per company's revision	1.500 M US\$

Residential Colony	5.500 M US\$
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**Project Development**

Feasibility Study and EPC Tendering/Evaluation	1.000 M US\$
Design review and Construction supervision	2.500 M US\$
Land and Financial advisor, LTSA, Permits etc	1.500 M US\$
Land Acquisition and Fees	0.800 M US\$

**Services Costs**

Construction Management	0.580 M US\$
Fixed O&M Cost of Plant	1.224 M US\$
Insurance during construction	1.502 M US\$
Utilities during construction	0.200 M US\$
First fill of lubes, chemical and diesel	0.500 M US\$
Lender's fee	1.502 M US\$

<b>Total Project Cost with out IDC</b>	<b>159.058 M US\$</b>
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Note: services Costs are the same as claimed by the Company only Fuel cost during testing and Working capital, stock of spare parts are not allowed because Power Purchaser will pay the Company Fuel Cost component for the energy delivered before COD and Financial charges of the working capital.

**Power Dispersal Arrangement**

60. The power dispersal arrangement has been proposed on the basis of Load flow study carried out by the Planning Department of NTDC as follows:
  
61. For reinforcement of transmission network, a new 220 kV/132 kV grid station (Rohri New) with 2X160 MVA, 220/132 kV transformers has been proposed approx.5 km away from Rohri towards Khairpur with following infrastructure:-
  - i) 220 kV D/C transmission line 115 km long on twin bundled Rail conductor from the proposed CCPP at Daharki to Rohri New 220 kV grid station.
  - ii) 132 kV D/C transmission line approx. 1+1=2 km long on Lynx conductor for making In & Out of the existing 132 kV D/C line from Rohri to Khairpur/Gumbat at 220/132 kV Rohri New grid station.

## ISSUES ARISING OUT OF THE PROCEEDINGS

62. The following main issues have emerged from the tariff application, submissions of the commentators and proceedings in the case:

- a Net Contracted Capacity
- b Availability of gas
- c Capital Cost of the Project
- d Cost of Capital
- e Fixed O&M Cost
- f Insurance Cost
- g Working Capital
- h Fuel Cost
- i Variable O&M cost

a) NET CONTRACTED CAPACITY

63. The petitioner has indicated that it intends to install GE 9171 9(E) machine with one GT of 120 MW class, one steam turbine and a HRSG. FPCDL in its original tariff petition stated that gross ISO capacity of the Combined Cycle Power Plant would be about 202 MW and net on site capacity would be 180.1 MW. FPCDL based its capacity charge calculation on the same. The percentage reduction in net capacity of CCPP and the gross ISO capacity due to environmental factors and auxiliary consumption, based on above figures comes to 10.8%, (21.9MW). Now according to revised estimates the net capacity of the plant has been reduced from 180.1 MW to 171.483 MW. According to the petitioner the reduction in net capacity of the plant was not due to their fault but it has been reconsidered by the manufacturer (i.e GE) in view of high content of CO<sub>2</sub> in the fuel (Raw Mari Gas) which is a major contributing factor for reduction in net capacity of the plant. According to the petitioner the original estimates for net capacity were made by the consultant based on data provided by the manufacturer. However, the revised figure for net capacity has also been provided by the manufacturer after carrying out detailed analysis on the composition and quality of fuel data provided to the manufacturer. It may be noted that Star Power Limited which is to be constructed in the same area using the same fuel and technology, had estimated 133.5 MW Gross Capacity at ISO conditions and 125.84 MW Net at site conditions with a difference between gross and net of about 5.7%, which in the case of FPCDL comes

to 15.1%. If the same percentage as of Star Power Ltd is considered, the net capacity in case of FPCDL comes to be 190 MW instead of 171.483 MW as proposed by the petitioner. If this figure is considered the tariff per kWh shall reduce substantially. Since the petitioner has insisted that the figures for the net capacity have been carefully worked out by the manufacturers and agreed by the EPC contractors are, therefore, final figures for net capacity to be contracted by the petitioner. The Authority considers that the capacity payments shall be made on the basis of contracted capacity to be determined after IDC test at site. The Authority has, therefore, decided that for the purpose of capacity charge calculations the figure of 171.483 MW net on site capacity as the minimum capacity be adopted with the condition that capacity charge shall be adjusted based upon the net contracted capacity established through an IDC test at site in presence of the parties to the power purchase agreement. The relevant components of tariff shall be adjusted accordingly at COD based on IDC tests.

b) AVAILABILITY OF GAS

64. FPCDL has stated that 65 MMCFD of low BTU gas from Mari Deep Gas Fields has been allocated for this plant. We have also been informed that FPCDL has requested for additional gas allocation of 10-15 MMCFD. The petitioner has assumed availability of gas for whole life of the project (25 years) and based its fuel cost calculations on low Btu gas only. The petitioner has informed that after necessary modifications in the design, the machines are now capable of operating at lower loads on gas without any need for back up fuel, which in this case is HSD. The Authority considers that low Btu gas to be provided to FPCDL is dedicated supply of gas through out the life of the project. The plant therefore, would be operated on single fuel through out the year as a base load plant. Therefore, operation of the plant on a fuel other than low BTU gas from Mari is not allowed. The usage of HSD as an auxiliary/emergency fuel for start-up/shutdown assumed by the petitioner shall, however, be covered separately under the standard terms of the PPA to be signed with the power purchaser.

c) CAPITAL COST OF THE PROJECT

65. FPCDL in the initial estimates indicated its project cost as US\$ 171.846 million comprising US\$ 141 million as EPC Cost (including US\$ 18 million as Fuel Supply and Infrastructure cost & 5% Custom Duty on imported plant & machinery),

Development Cost of the plant as US\$ 5.8 million and Services Cost as US\$ 10.117 million, US\$ 1.279 million as Financing Fee and US\$ 13.650 million as IDC were further added, thus bringing the total at US\$ 171.846 million.

66. According to the revised cost estimates the total project cost has been increased from US\$ 171.846 million to US\$ 202.844 million. The major increase in cost has occurred in the EPC cost of the project which has been increased from US\$ 141 million to US\$ 156.730 million. As informed by the petitioner the revised EPC cost does not include gas pipeline charges estimated to be US\$ 6.4 million and US\$ 5.50 million (approx) as 5% custom duty on imported plant & machinery. The total EPC cost including gas pipeline and custom duty therefore comes out to be US\$ 168.63 million. The increase in the EPC cost has occurred due to change in the design of the plant in view of high content of CO<sub>2</sub> in the low BTU gas of Mari Gas fields. The reasons necessitating revision of cost estimates by FPCDL have already been discussed in the preceding pages. We have been informed by FPCDL that after a number of meetings with the power purchaser (CPPA), FPCDL has finally been able to mutually agree on US\$ 162.5 million as overall CAPEX for the proposed power plant. FPCDL has informed that they have also negotiated this price with the EPC contractors who have agreed to total CAPEX of US\$ 162.5 million (with EPC cost of US\$ 150.7 million). This does not include gas pipeline cost US\$ 6.4 million and Custom Duty estimated to be US\$ 5.5 million. After incorporating the above left out cost items the final EPC component comes out to be US\$ 162.6 million and total CAPEX as US\$ 174.4 million. The break up is given hereunder;

	<u>US\$ million</u>
EPC component	150.700
Gas pipeline cost	6.400
5% Custom Duty	<u>5.500</u>
Total EPC	<u>162.600</u>
Project Development	5.800
Services	<u>6.000</u>
CAPEX	<u>174.400</u>

67. FPCDL has proposed US\$ 1.506 million as Financing Fee and US\$ 24.655 million as Interest During Construction (IDC). The Financing Fee of US\$ 1.506 million as 1% of EPC assumed by FPCDL is in line with other similar projects and therefore, may be allowed. However, IDC based on above CAPEX works out US\$ 20.566

million. This is an estimated figure and shall be adjusted as per actual draw downs at COD. The overall project cost therefore, works out US\$ 196.472 million. The above project cost estimates include 5% custom duty on imported plant & machinery and 5% Withholding Tax on local services, which shall be adjusted on COD as per actual payment on production of documentary evidence.

68. Based on above estimated cost of the project, the per kW cost works out as US\$ 973 which is higher than comparable power plants for the same size and technology. The Authority is of the considered opinion that cost for this power plant should have been far less than what FPCDL has proposed in their revised cost estimates. However, due to non-availability of any documentary evidence, the Authority is constrained to accept US\$174.4 million CAPEX as the maximum cost, subject to downward adjustment on verification of project cost at COD through a detailed audit by an Auditor to be appointed by the regulator.

d) Cost of Capital

Project Financing

69. The petitioner has stated that 25% of its project cost would be funded by the sponsors and 75% through debt to be paid in 10 years time through semi-annual payments.

Cost of Debt

70. FPCDL has proposed a rate of 9.08% based on six months KIBOR plus 300 basis points. Any variation in KIBOR is proposed to be passed-through with the spread remaining the same. The present rate of KIBOR has increased, therefore, 10.4% plus 300 basis points in line with recent determination of the Authority is allowed in the instant case to work out debt servicing requirements of the company.

Cost of Equity

71. The petitioner has requested a net internal rate of return (IRR) of 15% (net of 7.5% withholding tax on dividends). The request is in line with the decision of the Authority in other similar cases, hence accepted.

e) Fixed O&M Costs

72. The total fixed O&M cost proposed by the petitioner is US\$ 3.019 million comprising US\$ 1.362 million as foreign component and US\$ 1.657 million as local component. The cost per unit requested by the petitioner based on 60% plant load factor is US cent 0.1511/kWh (Ps 9.066/kWh) for foreign and US cents 0.1838/kWh (Ps.11.03/kWh) for local component. The total per annum Fixed O&M costs of the company at 100% plant Load Factor comes out to be US\$ 5.0317 million, which is on the higher side compared to other such power plants. It is a fact that fixed cost does not change much with the size or technology of the plant. The fixed O&M cost per annum allowed to other IPPs was in the range of US\$ 3-3.5 million. Therefore, US\$ 3.5 million per annum is assessed a reasonable estimate for the annual fixed O&M cost of the company and is therefore, allowed. Based on total annual fixed O&M cost of US\$ 3.5 million, the tariff for fixed O&M part of capacity charge has been worked out as Paisa 13.98 per kW/hour.

73. The petitioner has proposed about 55% of Fixed O&M part of capacity charge to be indexed with local inflation. The Authority in its earlier decisions in the case of Orient Power Company and Star Energy has allowed local inflation indexation on 50% of the O&M part of the capacity charge. The same is proposed for FPCDL i.e. 50% of Fixed O&M part of capacity charge will be indexed with local inflation (WPI manufacturers) and 50% of Fixed O&M part of capacity charge will be indexed with US inflation as per GOP policy.

f) Insurance

74. FPCDL in its original submissions had requested insurance cost of US\$ 1.23 million which was based on 1% of EPC. In the revised cost estimates submitted by FPCDL it has proposed Insurance cost as 1.35% of the EPC According to the petitioner the estimate for insurance cost has been based on revised quotes received from the Insurance Company. The petitioner was asked to provide the documentary evidence to substantiate his case. FPCDL has failed to provide any documentary evidence in this case. Since Fauji Foundation which is a parent company of FPCDL is already in the power business and running a power generation plant and having a better financial strength compared to new IPPs, can negotiate at better terms with Insurance provider. The Authority therefore, considers that US\$ 1.437 million as

1% of revised EPC base price (US\$ 143.7 million) is a reasonable amount per annum which is being allowed to the petitioner.

g) Cost of Working Capital

75. FPCDL has requested US\$ 5.645 million as cost of essential spare parts and included in the project cost estimates. According to the petitioner these spare parts are not covered under the EPC Contract negotiated with the EPC Contractor. These spare parts are required to maintain an adequate inventory for use in emergency situations. The petitioner was asked to provide the details and rationale for this cost but nothing has been provided by FPCDL on this account to substantiate their case. However, the power purchaser in its comments has agreed to pay the financing cost on this account and requested to be treated as cost of working capital. Keeping in view the working capital requirement and as already recommended by the power purchaser the cost of working capital as Rs.0.0271 per kW per hour is allowed to the company. Adjustment with respect to reference KIBOR of 10.4% plus spread of 200 basis will be allowed on the basis of actual six- monthly KIBOR, while spread remaining the same

h) ENERGY CHARGE

Fuel Cost Component

76. FPCDL has calculated the fuel cost component of Rs.1.439 per kWh or US Cents 2.399 per kWh on the following basis and assumptions:

Plant Load Factor	100%
Net Heat Rate (BTU/kWh)	7016
Reference Gas Price (PKR/MMBTU) - HHV	185.19
LHV-HHV Factor	1.1075530
Reference Gas Price (PKR/MMBTU) - LHV	205.11
Rupee / Dollar Exchange Rate	Rs.60

77. FPCDL has assumed that any increase in fuel consumption cost as a result of the operation of the plant on lower Plant Load Factor, efficiency degradation due to aging and fouling and additional costs for start-up, shutdown and emergency use of HSD or HSD admixture will be duly compensated to it. The matter of compensation for PLAC and cost of start-ups would be addressed in the Power Purchase Agreement according to its standard terms.

78. The petitioner has indicated that sufficient gas would be available to run the plant at 100% plant load factor round the year on low BTU gas from Mari Gas Fields. The Authority considers that it will be in the interest of power purchaser to run the said plant on full load so that need for HSD use or HSD admixture during partial loading, as proposed by the petitioner, does not arise. The Authority therefore, decides that cost of HSD admixture or HSD for partial loading shall not be considered in this case.
79. Regarding reference gas price it is noted that the price for low BTU gas from Mari Gas fields is fixed by OGRA. Since low BTU gas because of its low heat content and more impurities can not be used for any other useful purpose, so the price of low BTU gas at the delivery point should be less than pipeline quality natural gas. Further, the sponsor has to incur extra cost for laying high quality gas pipe lines and infrastructure for gas connection at manifold of Mari gas fields to the location of the plant, which is not the case for power plants on pipeline quality gas.
80. We have been informed by the petitioner that gas price for low BTU gas from Mari Gas Fields is fixed by OGRA specifically for the project. It is therefore, envisaged that gas price specific to this project shall be fixed at a lower rate per MMBTU basis compared to pipeline quality gas. However, for the purpose of tariff for fuel cost component the latest price of gas as notified by OGRA effective 1<sup>st</sup> July 2006 as Rs. 264.87/MMBTU (HHV) adjusted for LHV by conversion factor of 1.107753 is being adopted which shall be adjustable on actual price determined by OGRA for the project and provisions of Gas Supply Agreement with the Supplier. The following reference numbers have been used for calculating fuel cost component:

Net thermal Efficiency at 100% Load	50%
Heat Rate	6824 BTUS
Gas Price (HHV)	RS. 264.87 Per MMBTU
Gas Price (LHV)	293.41 Per MMBTU
HHV-LHV Conversion factor	1.107753

i) Variable O&M Costs

81. Total Variable O&M cost per annum estimated in the feasibility report is US\$ 2.998 million comprising foreign component US\$ 2.491 million and US\$ 0.507 million as

local component. The petitioner has based its working on 60% plant load factor and requested for tariff of US cents 0.3167 (Ps. 19.00/kWh). When the annual O&M cost is translated in to 100% plant load factor it works out as US\$ 4.997 million. The annual O&M cost US\$ 4.997 proposed by the petitioner is on the higher side when compared with other power plants of the same technology. It is understood that variable O&M cost of a plant using low BTU gas is slightly higher compared to a power plant using purified natural gas. The petitioner did not provide sufficient details and justification in support of O&M costs, rather referred to the cost estimates given by their consultants M/S Fitchner in the feasibility report. In view of recommendations of our technical experts the Authority considers that US\$ 4.500 million per annum is a fair and reasonable estimate and is therefore, allowed. Considering that 83% of this is a foreign component, the per unit cost for local and foreign variable cost component of the energy purchase price works out as given hereunder:

<b>Variable O&amp;M Component</b>	<b><u>Rs.kWh</u></b>
O&M – Foreign	0.1492
O&M – Local	<u>0.0305</u>
Total	<u>0.1797</u>

82. The request of the petitioner for adjustment in foreign variable O&M cost component on account of US inflation and currency fluctuation is in line with Authority's earlier decisions and GOP policy therefore, may be accepted. However, local variable O&M cost component shall be adjusted with local inflation based on Whole sale price index as notified by the Federal Bureau of Statistics Government of Pakistan.

#### Interconnection for power dispersal

83. The power dispersal arrangement has been proposed on the basis of Load flow study carried out by the Planning Department of NTDC and provided in the feasibility report as given hereunder:

- For reinforcement of transmission network, as new 220 kV/132 kV grid station (Rohri New) with 2X160 MVA, 220/132 kV transformers has been

proposed approx.5 km away from Rohri towards Khairpur with following infrastructure:-

- (i) 220 kV D/C transmission line 115 km long on twin bundled Rail conductor from the proposed CCPP at Daharki to Rohri New 220 kV grid station.
  - (ii) 132 kV D/C transmission line approx. 1+1=2 km long on Lynx conductor for making In & Out of the existing 132 kV D/C line from Rohri to Khairpur/Gumbat at 220/132 kV Rohri New grid station.
84. However in view of proposed change in site of the plant, CPPA/NTDC may conduct a fresh study, if required, for power dispersal from the plant interconnection point to the designated grid station as deemed appropriate by the power purchaser and FPCDL.

#### Reference Tariff

85. After reviewing the evidence submitted during the proceedings and from information gained through other sources, the Authority has determined the reference tariff for FPCDL as indicated in the following table:

#### Reference Tariff

Tariff Components	Year 1 to 10	Year 11 to 25
Capacity Charge (PKR/kW/Hour)		
Fixed - O&M Foreign	0.0699	0.0699
Fixed – O&M Local	0.0699	0.0699
Insurance	0.0574	0.0574
Working Capital	0.0271	0.0271
Debt Service	1.0853	-
Return on Equity	0.2943	0.2943
ROE during Construction	0.0206	0.0206
<b>Total Capacity Charge</b>	<b>1.6245</b>	<b>0.5392</b>
Energy Charge Rs. / kWh		
Fuel Cost Component	2.0019	2.0019
Variable O&M – Foreign	0.1492	0.1492
Variable O&M – Local	0.0306	0.0306

Note:

- i) Capacity Charge Rs./kW/Hour is applicable to dependable capacity at the delivery point.
- ii) Dispatch criterion will be Energy Charge.
- iii) The above tariff is applicable for a period of 25 years commencing from the date of the Commercial Operation.
- iv) Component wise tariff is indicated at Annex-I

I) One Time Adjustment

a) Adjustment due to variation in net capacity

The reference tariff has been determined on the basis of minimum net capacity of 171.483 MW at delivery point at mean site conditions. All the tariff components except fuel cost component shall be adjustment at the time of COD based upon the IDC tests to be carried out for determination of contracted capacity. If the IDC is established higher than 171.483 MW, the adjustments shall be made according to the following formula:

i)	Revised Fixed O&M Foreign	=	0.0699/tested IDC x 171.483 MW
ii)	Revised Fixed O&M Local	=	0.0699/tested IDC x 171.483 MW
iii)	Insurance	=	0.0574/tested IDC x 171.483 MW
iv)	Working Capital	=	0.0271/tested IDC x 171.483 MW
v)	Debt Service	=	1.0853/tested IDC x 171.483 MW
vi)	Return on Equity	=	0.2943/tested IDC x 171.483 MW
vii)	ROE during Construction	=	0.0206/tested IDC x 171.483 MW
viii)	Variable O&M - Foreign	=	0.1492/tested IDC x 171.483 MW
ix)	Variable O&M – Local	=	0.0306/tested IDC x 171.483 MW

b) Adjustment due to custom duties and Interest during Construction

Debt Service, Return on Equity and ROE during construction shall be made on account of actual variation in customs duties and Interest During Construction with reference to the estimated figures of USD 5.500 million and USD 20.566 million respectively.

c) Adjustment in Insurance Component

Insurance component of reference tariff shall be adjusted as per actual subject to maximum of 1.35% Plant & Equipment Cost, on yearly basis upon production of authentic documentary evidence by FPCDL according to the following formula:

$$\text{Insurance (Revised)} = \text{AIC}/1\% \times \text{AP}^*$$

Where;

$$\text{AIC} = \text{Adjusted Insurance Component as per IDC Test}$$

$$\text{AP} = \text{Actual Premium}$$

\*Note: Actual Premium will be expressed in percentage subject to maximum of 1.35% of Plant & Equipment Cost determined at the time of COD.

II) Pass-Through Items

- .86. No provision for income tax has been accounted for in the tariff. If FPCDL is obligated to pay any tax on its income, the exact amount paid by the company may be reimbursed by NTDC to FPCDL on production of original receipts. This payment may be considered as pass-through (as Rs./kW/Hour) monthly payment spread over a 12 months period in addition to the capacity purchase price proposed in the Reference Tariff. Furthermore, in such a scenario, FPCDL may also submit to NTDC details of any tax shield savings and NTDC may deduct the amount of these savings from its payment to FPCDL on account of taxation.
87. Withholding Tax is also a pass through item just like other taxes as indicated in the government guidelines for determination of tariff for new IPPs. Withholding tax shall be allowed @7.5% (or applicable rate) of the return on equity. CPPA (NTDC) shall make payment on account of withholding tax at the time of actual payment of dividend subject to maximum of 7.5% (or applicable rate) of 15% equity according to the following formula:

$$\text{Withholding Tax Payable} = [15\% * (E_{(\text{REF})} + \text{ROEDC}_{(\text{Ref})})] * 7.5\% \text{ (or applicable rate)}$$

Where:

$$E_{(\text{REF})} = \text{Reference Equity (US\$ 49.1180 million x 60)}$$

$$\text{ROEDC}_{(\text{REF})} = \text{Reference Return on Equity During Construction}$$

Note: In case of foreign equity withholding tax calculated according to the above formula shall be adjusted for variation in currency (US\$ to Rupee). The adjustment on account of variation in exchange rate (US\$/PKR) shall also be applicable on the Foreign component of the equity.

88. In case Company does not declare a dividend in a particular year or only declares a partial dividend, then the difference in the withholding tax amount (between what is paid in that year and the total entitlement as per the Net Return on Equity) would be carried forward and accumulated so that the Company is able to recover the same as a pass through from the Power Purchaser in future on the basis of the total dividend pay out.

### III) Indexations

89. The following indexations shall be applicable to reference tariff.

#### Indexation applicable to O&M

90. In future the Local component of Fixed O&M part of Capacity Charge will be adjusted on account of local Inflation (WPI) and Foreign component on account of US CPI and dollar/Rupee exchange rate. WPI and US CPI adjustment for inflation will be made twice a year on January 01 and July 01 (semi-annual), on the basis of WPI as notified by the Federal Bureau of Statistics (FBS) and Bureau of Labour Statistics for the month of November & May respectively. Indexation for variation in dollar/rupee exchange rate will be made on January 01 & July 01 on the basis of revised TT & OD selling rate of US Dollar as notified by the National Bank of Pakistan. The mode of indexation will be as under:

#### (i) Fixed O&M

$$F O\&M_{(LREV)} = \text{Rs. } 0.0699 / \text{kW} / \text{Hour} * WPI_{(REV)} / 117.80$$

$$F O\&M_{(FREY)} = \text{Rs. } 0.0699 / \text{kW} / \text{Hour} * US CPI_{(REV)} / 199.8 * ER_{(REV)} / 60$$

Where:

$F O\&M_{(LREV)}$  = The revised applicable Fixed O&M Local Component of the Capacity Charge indexed with WPI

$F O\&M_{(FREV)}$  = The revised applicable Fixed O&M Foreign Component of the Capacity Charge indexed with US CPI and Exchange rate variations.

$WPI_{(REV)}$  = The revised wholesale Price Index (manufacturers)

Reference WPI = 117.80 wholesale price index (manufacturers) of April 2006 notified by Federal Bureau of Statistics

$US\ CPI_{(REV)}$  = The revised US CPI (All Urban Consumers)

$US\ CPI_{(REF)}$  = 199.8 US CPI (All Urban Consumers) for the month of March 2006 as notified by the US Bureau of Labour and Statistics

$ER_{(REV)}$  = The revised TT & OD selling rate of US dollar as notified by the National Bank of Pakistan

Note: The reference numbers indicated above shall be replaced by the revised numbers after incorporating the required adjustments at COD.

## (ii) Variable O&M

The formula of indexation for variable O & M component will be as under:

$V\ O\&M_{(FREV)}$  = Rs. 0.1492 per kWh \*  $US\ CPI_{(REV)}/199.8$  \*  $ER_{(REV)} / 60$

$V\ O\&M_{(LREV)}$  = Rs. 0.0306 per kWh \*  $WPI_{(REV)}/117.80$

Where:

$V\ O\&M_{(FREV)}$  = The revised applicable Variable O&M Component of the Energy Charge indexed with US CPI and Exchange rate variations.

$V\ O\ \&\ M_{(LREV)}$  = The revised applicable local variable O&M component indexed with the revised whole sale price index

- US CPI<sub>(REV)</sub> = The revised US CPI (All Urban Consumers)  
 US CPI<sub>(REF)</sub> = 199.8 US CPI (All Urban Consumers) for the month of March 2006 as notified by the US Bureau of Labour Statistics.  
 ER(REV) = The revised TT & OD selling rate of US dollar as notified by the National Bank of Pakistan.

Note: The reference VO&M indicated above shall be replaced with the revised number at COD after incorporating the required adjustment based upon the IDC Test.

(IV) Adjustment for KIBOR variation

91. The interest part of fixed charge component will remain unchanged throughout the term except for the adjustment due to variations in interest rate as a result of variation in KIBOR on six-monthly basis according to the following formula:

$$\Delta I = P_{(REV)} * (KIBOR_{(REV)} - 10.4\%) / 2$$

Where:

$\Delta I$  = The variation in interest charges applicable corresponding to variation in KIBOR.  $\Delta I$  can be positive or negative depending upon whether KIBOR REV is > or < 10.4%. The interest payment obligation will be enhanced or reduced to the extent of  $\Delta I$  for each six-monthly adjustment.

$P_{(REV)}$  = is the outstanding principal (as indicated in the attached debt service schedule to this order) on a six-monthly basis on the relevant six-monthly calculations date. Period I shall commence on the date on which the 1<sup>st</sup> installment is due after availing the grace period.

Cost of working capital component of tariff will be adjusted on quarterly basis after COD for any variation in six-monthly KIBOR (Reference 10.4% plus 200 basis points).

V) Fuel Price Variation

92. The Variable Charge Part of the tariff relating to fuel cost shall be adjusted on account of the fuel price variations as and when notified by the relevant authority, which in the instant case is the Oil & Gas Regulatory Authority (OGRA). In this

regard, the variation in FPCDL's allowed rate relating to fuel cost shall be revised according to the following formula:

$$\text{FC (Rev)} = \text{Rs.2.0019 per kWh} * \text{FP(Rev)} / \text{Rs. 293.41 per MMBTU}$$

Where:

FC (Rev) = Revised fuel cost component of Variable Charge on low BTU gas.

FP (Rev) = The new price of gas as notified by the relevant Authority per MMBTU of fuel adjusted for LHV-HHV factor.

93. Adjustment on account of local inflation, foreign inflation, foreign exchange variation, KIBOR variation and fuel price variation will be approved and announced by the Authority for immediate application within seven working days after receipt of FPCDL's request for adjustment in accordance with the requisite indexation mechanism stipulated herein.

#### VI) Terms and Conditions of Tariff

- 1) Use of Low BTU Gas from Mari is allowed as single fuel for operation of the plant.
  - 2) All new equipment will be installed and the plant will be of standard configuration.
  - 3) General assumptions of FPCDL which are not covered in this determination may be dealt with in the PPA according to its standard terms.
94. The above terms and conditions be incorporated as the specific tariff approved by the Authority pursuant to Rule 6 of the Licencing (Generation) Rules, in a power Purchase Agreement between FPCDL and CPPA.
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**ORDER**

95. Pursuant to Rule 6 of the NEPRA Licensing (Generation) Rules 2000, Foundation Power Company (Daharki) limited (FPCDL) is allowed to charge, subject to adjustment of Capacity Purchase Price on account of net dependable capacity as determined by test jointly carried out by Central Power Purchasing Agency (CPPA) and the petitioner, the following tariff for delivery of electricity to CPPA of NTDC for procurement on behalf of EX-WAPDA Distribution Companies.

## Reference Tariff

Tariff Components	Year 1 to 10	Year 11 to 25
Capacity Charge (PKR/kW/Hour)		
Fixed - O&M Foreign	0.0699	0.0699
Fixed – O&M Local	0.0699	0.0699
Insurance	0.0574	0.0574
Working Capital	0.0271	0.0271
Debt Service	1.0853	-
Return on Equity	0.2943	0.2943
ROE during Construction	0.0206	0.0206
Total Capacity Charge	1.6245	0.5392
Energy Charge Rs. / kWh		
Fuel Cost Component	2.0019	2.0019
Variable O&M – Foreign	0.1492	0.1492
Variable O&M – Local	0.0306	0.0306

Note:

- i) Capacity Charge Rs./kW/Hour is applicable to dependable capacity at the delivery point.
- ii) Dispatch criterion will be Energy Charge.
- iii) The above tariff is applicable for a period of 25 years commencing from the date of the Commercial Operation.

iv) Component wise tariff is indicated at Annex-I

I) One Time Adjustment

a) Adjustment due to variation in net capacity

The reference tariff has been determined on the basis of minimum net capacity of 171.483 MW at delivery point at mean site conditions. All the tariff components except fuel cost component shall be adjustment at the time of COD based upon the IDC tests to be carried out for determination of contracted capacity. If the IDC is established higher than 171.483 MW, the adjustments shall be made according to the following formula:

i)	Revised Fixed O&M Foreign	=	0.0699/tested IDC x 171.483 MW
ii)	Revised Fixed O&M Local	=	0.0699/tested IDC x 171.483 MW
iii)	Insurance	=	0.0574/tested IDC x 171.483 MW
iv)	Working Capital	=	0.0271/tested IDC x 171.483 MW
v)	Debt Service	=	1.0853/tested IDC x 171.483 MW
vi)	Return on Equity	=	0.2943/tested IDC x 171.483 MW
vii)	ROE during Construction	=	0.0206/tested IDC x 171.483 MW
viii)	Variable O&M - Foreign	=	0.1492/tested IDC x 171.483 MW
ix)	Variable O&M – Local	=	0.0306/tested IDC x 171.483 MW

b) Adjustment due to custom duties and Interest during Construction

Debt Service, Return on Equity and ROE during construction shall be made on account of actual variation in customs duties and Interest During Construction with reference to the estimated figures of USD 5.500 million and USD 20.566 million respectively.

c) Adjustment in Insurance Component

Insurance component of reference tariff shall be adjusted as per actual subject to maximum of 1.35% of Plant & Equipment Cost, on yearly basis upon production of authentic documentary evidence by FPCDL according to the following formula:

$$\text{Insurance (Revised)} = \text{AIC}/1\% \times \text{AP}^*$$

Where;

AIC = Adjusted Insurance Component as per IDC Test

AP = Actual Premium

\*Note: Actual Premium will be expressed in percentage subject to maximum of 1.35% of Plant & Equipment cost determined at the time of COD.

## II) Pass-Through Items

No provision for income tax has been accounted for in the tariff. If FPCDL is obligated to pay any tax on its income, the exact amount paid by the company may be reimbursed by NTDC to FPCDL on production of original receipts. This payment may be considered as pass-through (as Rs./kW/Hour) monthly payment spread over a 12 months period in addition to the capacity purchase price proposed in the Reference Tariff. Furthermore, in such a scenario, FPCDL may also submit to NTDC details of any tax shield savings and NTDC may deduct the amount of these savings from its payment to FPCDL on account of taxation.

Withholding Tax is also a pass through item just like other taxes as indicated in the government guidelines for determination of tariff for new IPPs. Withholding tax shall be allowed @7.5% (or applicable rate) of the return on equity. CPPA (NTDC) shall make payment on account of withholding tax at the time of actual payment of dividend subject to maximum of 7.5% (or applicable rate) of 15% equity according to the following formula:

$$\text{Withholding Tax Payable} = [15\% * (E_{(\text{REF})} + \text{ROEDC}_{(\text{Ref})})] * 7.5\% \text{ (or applicable rate)}$$

Where:

$E_{(\text{REF})}$  = Reference Equity (US\$ 49.1180 million x 60)

$\text{ROEDC}_{(\text{REF})}$  = Reference Return on Equity During Construction

Note: In case of foreign equity withholding tax calculated according to the above formula shall be adjusted for variation in currency (US\$ to Rupee). The adjustment

on account of variation in exchange rate (US\$/PKR) shall also be applicable on the Foreign component of the equity.

In case Company does not declare a dividend in a particular year or only declares a partial dividend, then the difference in the withholding tax amount (between what is paid in that year and the total entitlement as per the Net Return on Equity) would be carried forward and accumulated so that the Company is able to recover the same as a pass through from the Power Purchaser in future on the basis of the total dividend pay out.

### III) Indexations

The following indexations shall be applicable to reference tariff.

#### Indexation applicable to O&M

In future the Local component of Fixed O&M part of Capacity Charge will be adjusted on account of local Inflation (WPI) and Foreign component on account of US CPI and dollar/Rupee exchange rate. WPI and US CPI adjustment for inflation will be made twice a year on January 01 and July 01 (semi-annual), on the basis of WPI as notified by the Federal Bureau of Statistics (FBS) and Bureau of Labour Statistics for the month of November & May respectively. Indexation for variation in dollar/rupee exchange rate will be made on January 01 & July 01 on the basis of revised TT & OD selling rate of US Dollar as notified by the National Bank of Pakistan. The mode of indexation will be as under:

#### (i) Fixed O&M

$$F O\&M_{(LREV)} = \text{Rs. } 0.0699 / \text{kW} / \text{Hour} * WPI_{(REV)} / 117.80$$

$$F O\&M_{(FREX)} = \text{Rs. } 0.0699 / \text{kW} / \text{Hour} * US\text{CPI}_{(REV)} / 199.8 * ER_{(REV)} / 60$$

Where:

$$F O\&M_{(LREV)} = \text{The revised applicable Fixed O\&M Local Component of the Capacity Charge indexed with WPI}$$

$F O\&M_{(FREV)}$	=	The revised applicable Fixed O&M Foreign Component of the Capacity Charge indexed with US CPI and Exchange rate variations.
$WPI_{(REV)}$	=	The revised wholesale Price Index (manufacturers)
Reference WPI	=	117.80 wholesale price index (manufacturers) of April 2006 notified by Federal Bureau of Statistics
$US\ CPI_{(REV)}$	=	The revised US CPI (All Urban Consumers)
$US\ CPI_{(REF)}$	=	199.8 US CPI (All Urban Consumers) for the month of March 2006 as notified by the US Bureau of Labour and Statistics
$ER_{(REV)}$	=	The revised TT & OD selling rate of US dollar as notified by the National Bank of Pakistan

Note: The reference numbers indicated above shall be replaced by the revised numbers after incorporating the required adjustments at COD.

(ii) Variable O&M

The formula of indexation for variable O & M component will be as under:

$$V\ O\&M_{(FREV)} = Rs.\ 0.1492\ \text{per kWh} * US\ CPI_{(REV)}/199.8 * ER_{(REV)} / 60$$

$$V\ O\&M_{(LREV)} = Rs.\ 0.0306\ \text{per kWh} * WPI_{(REV)}/117.80$$

Where:

$V\ O\&M_{(FREV)}$  = The revised applicable Variable O&M Component of the Energy Charge indexed with US CPI and Exchange rate variations.

$V\ O\ \&\ M_{(LREV)}$  = The revised applicable local variable O&M component indexed with the revised whole sale price index

$US\ CPI_{(REV)}$  = The revised US CPI (All Urban Consumers)

US CPI<sub>(REF)</sub> = 199.8 US CPI (All Urban Consumers ) for the month of March 2006 as notified by the US Bureau of Labour Statistics.

ER(REV) = The revised TT & OD selling rate of US dollar as notified by the National Bank of Pakistan.

Note: The reference VO&M indicated above shall be replaced with the revised number at COD after incorporating the required adjustment based upon the IDC Test.

V) Adjustment for KIBOR variation

The interest part of fixed charge component will remain unchanged throughout the term except for the adjustment due to variations in interest rate as a result of variation in KIBOR on six-monthly basis according to the following formula:

$$\Delta I = P_{(REV)} * (KIBOR_{(REV)} - 10.4\%) / 2$$

Where:

$\Delta I$  = The variation in interest charges applicable corresponding to variation in KIBOR.  $\Delta I$  can be positive or negative depending upon whether KIBOR REV is > or < 10.4%. The interest payment obligation will be enhanced or reduced to the extent of  $\Delta I$  for each 6 semi-annual adjustment.

$P_{(REV)}$  = is the outstanding principal (as indicated in the attached debt service schedule to this order) on a six-monthly basis on the relevant six-monthly calculations date. Period I shall commence on the date on which the 1<sup>st</sup> installment is due after availing the grace period.

Cost of working capital component of tariff will be adjusted on quarterly basis after COD for any variation in six-monthly KIBOR (Reference 10.4% plus 200 basis points).

V) Fuel Price Variation

The Variable Charge Part of the tariff relating to fuel cost shall be adjusted on account of the fuel price variations as and when notified by the relevant authority, which in the instant case is the Oil & Gas Regulatory Authority (OGRA). In this

regard, the variation in FPCDL's allowed rate relating to fuel cost shall be revised according to the following formula:

$$\text{FC (Rev)} = \text{Rs.2.0019 per kWh} * \text{FP(Rev)} / \text{Rs. 293.41 per MMBTU}$$

Where:

FC (Rev) = Revised fuel cost component of Variable Charge on low BTU gas.

FP (Rev) = The new price of gas as notified by the relevant Authority per MMBTU of fuel adjusted for LHV-HHV factor.

Adjustment on account of local inflation, foreign inflation, foreign exchange variation, KIBOR variation and fuel price variation will be approved and announced by the Authority for immediate application within seven working days after receipt of FPCDL's request for adjustment in accordance with the requisite indexation mechanism stipulated herein.

#### VI) Terms and Conditions of Tariff

- Use of Low BTU Gas from Mari is allowed as single fuel for operation of the plant.
- All new equipment will be installed and the plant will be of standard configuration.
- General assumptions of FPCDL which are not covered in this determination may be dealt with in the PPA according to its standard terms.

The above terms and conditions be incorporated as the specific tariff approved by the Authority pursuant to Rule 6 of the Licencing (Generation) Rules, in a power Purchase Agreement between FPCDL and CPPA.

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**FOUNDATION POWER COMPANY (DAHARKI) Ltd**  
**Specified Tariff**

Year	Variable Charge (PKR/kWh)				Capacity Charge (PKR/kW/Hour)										Total	
	Fuel	Variable O&M Local	Variable O&M Foreign	Total	Fixed O&M Foreign	Fixed O&M Local	Insurance	Financing Cost on Working Capital	Return on Equity	Return on Equity for Construction Period	Withholding Tax @7.5%	Loan Repayment	Interest Charges	Total	Fixed Cost at 60% Plant Factor Rs./kWh	Cents/kWh
1	2.0019	0.0306	0.1492	2.1816	0.0699	0.0699	0.0574	0.0271	0.2943	0.0206	0.0236	0.3066	0.7787	1.6481	4.9284	8.2140
2	2.0019	0.0306	0.1492	2.1816	0.0699	0.0699	0.0574	0.0271	0.2943	0.0206	0.0236	0.3491	0.7363	1.6481	4.9284	8.2140
3	2.0019	0.0306	0.1492	2.1816	0.0699	0.0699	0.0574	0.0271	0.2943	0.0206	0.0236	0.3974	0.6879	1.6481	4.9284	8.2140
4	2.0019	0.0306	0.1492	2.1816	0.0699	0.0699	0.0574	0.0271	0.2943	0.0206	0.0236	0.4525	0.6329	1.6481	4.9284	8.2140
5	2.0019	0.0306	0.1492	2.1816	0.0699	0.0699	0.0574	0.0271	0.2943	0.0206	0.0236	0.5151	0.5702	1.6481	4.9284	8.2140
6	2.0019	0.0306	0.1492	2.1816	0.0699	0.0699	0.0574	0.0271	0.2943	0.0206	0.0236	0.5865	0.4989	1.6481	4.9284	8.2140
7	2.0019	0.0306	0.1492	2.1816	0.0699	0.0699	0.0574	0.0271	0.2943	0.0206	0.0236	0.6677	0.4177	1.6481	4.9284	8.2140
8	2.0019	0.0306	0.1492	2.1816	0.0699	0.0699	0.0574	0.0271	0.2943	0.0206	0.0236	0.7601	0.3252	1.6481	4.9284	8.2140
9	2.0019	0.0306	0.1492	2.1816	0.0699	0.0699	0.0574	0.0271	0.2943	0.0206	0.0236	0.8654	0.2199	1.6481	4.9284	8.2140
10	2.0019	0.0306	0.1492	2.1816	0.0699	0.0699	0.0574	0.0271	0.2943	0.0206	0.0236	0.9852	0.1001	1.6481	4.9284	8.2140
11	2.0019	0.0306	0.1492	2.1816	0.0699	0.0699	0.0574	0.0271	0.2943	0.0206	0.0236			0.5627	3.1195	5.1992
12	2.0019	0.0306	0.1492	2.1816	0.0699	0.0699	0.0574	0.0271	0.2943	0.0206	0.0236			0.5627	3.1195	5.1992
13	2.0019	0.0306	0.1492	2.1816	0.0699	0.0699	0.0574	0.0271	0.2943	0.0206	0.0236			0.5627	3.1195	5.1992
14	2.0019	0.0306	0.1492	2.1816	0.0699	0.0699	0.0574	0.0271	0.2943	0.0206	0.0236			0.5627	3.1195	5.1992
15	2.0019	0.0306	0.1492	2.1816	0.0699	0.0699	0.0574	0.0271	0.2943	0.0206	0.0236			0.5627	3.1195	5.1992
16	2.0019	0.0306	0.1492	2.1816	0.0699	0.0699	0.0574	0.0271	0.2943	0.0206	0.0236			0.5627	3.1195	5.1992
17	2.0019	0.0306	0.1492	2.1816	0.0699	0.0699	0.0574	0.0271	0.2943	0.0206	0.0236			0.5627	3.1195	5.1992
18	2.0019	0.0306	0.1492	2.1816	0.0699	0.0699	0.0574	0.0271	0.2943	0.0206	0.0236			0.5627	3.1195	5.1992
19	2.0019	0.0306	0.1492	2.1816	0.0699	0.0699	0.0574	0.0271	0.2943	0.0206	0.0236			0.5627	3.1195	5.1992
20	2.0019	0.0306	0.1492	2.1816	0.0699	0.0699	0.0574	0.0271	0.2943	0.0206	0.0236			0.5627	3.1195	5.1992
21	2.0019	0.0306	0.1492	2.1816	0.0699	0.0699	0.0574	0.0271	0.2943	0.0206	0.0236			0.5627	3.1195	5.1992
22	2.0019	0.0306	0.1492	2.1816	0.0699	0.0699	0.0574	0.0271	0.2943	0.0206	0.0236			0.5627	3.1195	5.1992
23	2.0019	0.0306	0.1492	2.1816	0.0699	0.0699	0.0574	0.0271	0.2943	0.0206	0.0236			0.5627	3.1195	5.1992
24	2.0019	0.0306	0.1492	2.1816	0.0699	0.0699	0.0574	0.0271	0.2943	0.0206	0.0236			0.5627	3.1195	5.1992
25	2.0019	0.0306	0.1492	2.1816	0.0699	0.0699	0.0574	0.0271	0.2943	0.0206	0.0236			0.5627	3.1195	5.1992
<b>Levelized Tariff (1-25 Years)</b>				<b>2.1816</b>	<b>0.0699</b>	<b>0.0699</b>	<b>0.0574</b>	<b>0.0271</b>	<b>0.2943</b>	<b>0.0206</b>	<b>0.0236</b>	<b>0.3602</b>	<b>0.3745</b>	<b>1.2974</b>	<b>4.3440</b>	<b>7.2400</b>