



Registrar

National Electric Power Regulatory Authority
Islamic Republic of Pakistan

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No. NEPRA/PAR-146/KE(FPCL)-2015/18265-18267
December 29, 2015

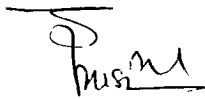
Subject: Decision of the Authority in the matter of granting Permission to K-Electric for Negotiation of Power Acquisition Contract (PAC) with FFBL Power Company Limited for Purchase of 52 MW Power [Case # PAR-146/KE(FPCL)-2015]

Dear Sir,

Please find enclosed herewith the subject Decision of the Authority along with Annex I & II (38 pages) in Case No. NEPRA/PAR-146/KE(FPCL)-2015.

2. The Decision is being intimated to the Federal Government for the purpose of notification in the official gazette in accordance with the provisions of Section 31(4) of the Regulation of Generation, Transmission and Distribution of Electric Power Act (XL of 1997).
3. Order of the Authority's Decision along with two Annexures (Annex-1 & II) needs to be notified in the official Gazette.

Enclosure: As above


29.12.15
(Syed Safer Hussain)

Secretary
Ministry of Water & Power
'A' Block, Pak Secretariat
Islamabad

CC:

1. Secretary, Cabinet Division, Cabinet Secretariat, Islamabad.
2. Secretary, Ministry of Finance, 'Q' Block, Pak Secretariat, Islamabad.



National Electric Power Regulatory Authority
(NEPRA)

DECISION OF THE AUTHORITY
IN THE MATTER OF
GRANTING PERMISSION TO K-ELECTRIC
FOR NEGOTIATING THE
POWER ACQUISITION REQUEST (PAR)
WITH
FFBL POWER COMPANY LIMITED
FOR
PURCHASE OF 52 MW POWER (COAL FIRED)

(NO: NEPR/PAR-146/KE(FPCL)-2015)

Islamabad



**Decision of the Authority in the matter of granting Permission to K-Electric for Negotiation of
Power Acquisition Contract (PAC) with FFBL Power Company Limited for purchase for purchase
of 52 MW power**

Case No. NEPRA/PAR-146/K-Electric (FPCL)- 2015

PETITIONER

KE House, 39-B, Sunset Boulevard, Phase-II, Defence Housing Authority, Karachi.

INTERVENER

Nil

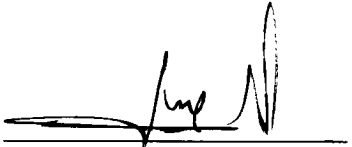
COMMENTATOR

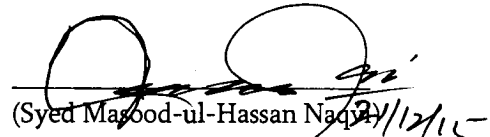
Whistleblower Pakistan

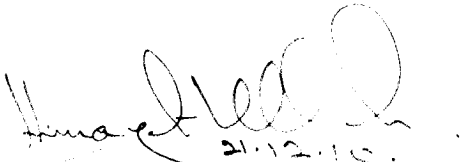


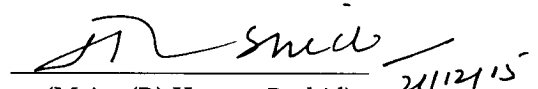
The Authority in exercise of the powers conferred on it under Section 7(3) (a) read with Section 31 of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997, Interim Power Procurement (Standards & Procedure) Regulations – 2005, and all other powers enabling it in this behalf, and after taking into considering all the submissions made by the parties, issues raised, evidence / record produced during hearing, and all other relevant material, hereby issues this decision.

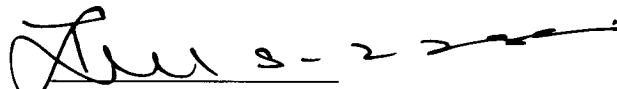
AUTHORITY

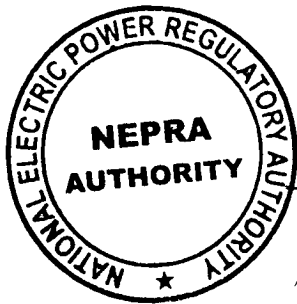

(Khawaja Muhammad Naeem)
Member



(Syed Masood-ul-Hassan Naqvi)
Member


(Himayat Ullah Khan)
Member


(Major (R) Haroon Rashid)
Vice Chairman


Brig (R) Tariq Saddozai
Chairman

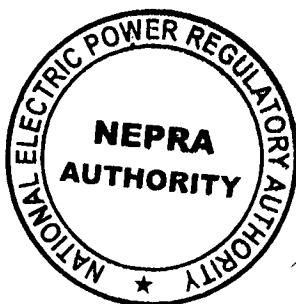



29.12.15



Brief History:

1. The K-Electric United (hereinafter referred to as the "K-Electric" or "KE" or "applicant" submitted the Power Acquisition Request (PAR) for purchase of 52 MW power from FFBL Power Company Limited under the Interim Power Procurement (Procedure & Standards) Regulations, 2005 (hereinafter "IPPR-2005"). The K-Electric, inter-alia, also submitted an Upfront receipt of the Power Sale proposal from FPCL along with its Power Acquisition Request (PAR) to NEPRA, in accordance with IPPR-2005 and requested the Authority to approve the following:
 - i) Proposed power acquisition from FPCL under IPPR-2005;
 - ii) Review the Power sale proposal, PAR and determine reference tariff;
 - iii) Assess the indexation, escalation and adjustment methodologies as described in the power sale proposal and reviewed in PAR;
 - iv) Necessary revision of reference tariff at the time of commercial operations date; and
 - v) Any other matters stated in the PAR.
2. While justifying the demand supply gap, K-Electric submitted that the Company has a customer base of 2.3 million connections across residential, commercial, industrial and agricultural sectors. K-Electric continues to receive applications for new connections on a daily basis. According to K-Electric, the peak demand is 2929 MW in June 2014, an increase by nearly 500 MW within the last six month period. Hence the demand of the electricity is exponentially increasing with the passage of time and calls for investment in generation capacities for reducing. According to K-Electric with improvement in economic outlook of the country, the demand for electricity is expected to increase annually in the range of 5-6%. Hence there is urgent need to develop coal fired power projects to improve power supply and reduce cost of generation.
3. While justifying the agreed rates K-Electric submitted that the decrease in gas supply to K-Electric has led to a higher consumption of furnace oil which has adversely impacted the consumer-end tariff and the working capital of the utility. Although the prices of furnace oil have come down in recent months, the historical wide spreads between furnace oil and coal prices suggests use of coal fired power generation. K-Electric submitted that given the acute shortage of power in the country and potential of this project in giving relief to the consumers, the Authority is requested to expedite this PAR under the IPPR-2005 so that K-Electric and FPCL proceed further and formalize the arrangements.
4. K-Electric further submitted that in view of the growing electricity demand in K-Electric's franchise area, its management of the K-Electric has decided to pursue the power sale proposal of FPCL for the following reasons:
 - i) The long term forecast for natural gas supply is not encouraging. This may affect full utilization of gas fired power generation capacity of K-Electric.
 - ii) Coal is very cheap when compared with furnace oil. Hence the supply should rationalize the consumer tariff.



- iii) Reduction in the GOP's subsidy payments and hence improvement in the circular debt situation.
- iv) FPCL is providing an expedited power generation option considering project is being implemented on a fast track basis with a construction period of 24 months after the financial close.
- v) Reliable base load supply 24 x 7.
- vi) Potential use of the Project as black start facility in case of widespread power outage.

5. **Introduction to the FFBL Power Company Limited (FPCL)**

5.1 FPCL (the Seller) is an unlisted public limited company incorporated to design, construct and operate a co-generation facility (the Complex) based on coal within Port Qasim Authority in Karachi, Sindh. The applicant is a subsidiary of Fauji Fertilizer Bin Qasim Limited (FFBL).

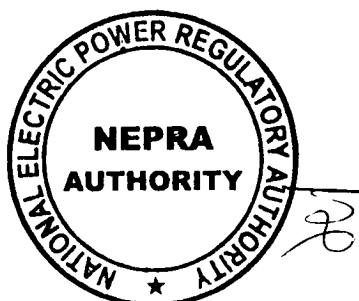
5.2 According to K-Electric, the Complex will mainly generate electricity and will supply power to K-Electric (50Hz) (the "Project") and FFBL at (60Hz). Further, this project will also supply limited amount of steam to FFBL to meet its operational requirement. The Project's supply of power to FFBL and K-Electric will provide reliable base load operation on cheaper fuel in the form of Coal. The applicant and K-Electric intend to enter into a Power Acquisition Contract ("PAC") as may be negotiated and mutually agreed between the parties. The total Project Cost of Specific items pertaining to either FFBL or K-Electric has been allocated specifically whereas cost of common items has been allocated on the basis of Steam (58.7% FFBL and 41.3% KE) and System utilization – for Cooling Water system (46% FFBL and 54% KE). Non EPC costs have been allocated on applicable Engineering, Procurement, Construction & Management Cost (EPCM) cost allocation basis (57% FFBL and 43% KE).

Common Equipment: Control System, Boiler Island, Equipment & Instrumentation, Coal, Lime stone (Sorbent) and Ash handling, cooling towers, etc. However, cost of cooling water system has been allocated on cooling water circulation basis instead of using steam as allocation basis.

Specific Equipment for K-Electric include: Grid System & Steam Turbine Generator (50Hz)

Specific Equipment for FFBL include: Steam Turbine Generator (60 Hz)

| Basic Project Cost (USD million) | Total | FFBL Steam & Power | K-Electric |
|---------------------------------------|-------|-----------------------|--------------|
| EPC/M COSTS | | | |
| Steam allocation basis % | | 58.7% | 41.3% |
| Civil Works & Erection | 36.6 | 21.5 | 15.1 |
| Boiler Island | 57.3 | 33.7 | 23.6 |
| Coal, Sorbent & Ash Handling | 23.7 | 13.9 | 9.8 |
| Electrical, Instrumentation & Control | 17.3 | 10.2 | 7.1 |
| Tie-ins and BOP Equipment | 9.5 | 5.6 | 3.9 |



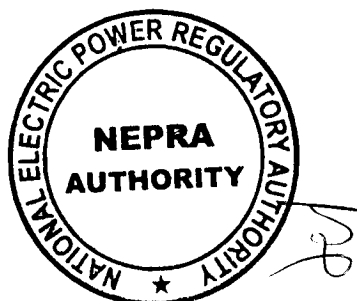


| | | | |
|--------------------------------------|--------------|---------------|---------------|
| Engineering & Consulting | 7.5 | 4.4 | 3.1 |
| Custom Duties and Taxes (Steam) | 8.3 | 4.9 | 3.4 |
| System use basis % | | 46.0% | 54.0% |
| Cooling Water System | 7.4 | 3.4 | 4.0 |
| Custom Duties and Taxes (System use) | 0.4 | 0.2 | 0.2 |
| K-Electric Specific | | 0.0% | 100.0% |
| Steam Turbine Gen (50Hz) | 16.1 | - | 16.1 |
| Grid System | 9.1 | - | 9.1 |
| Custom Duties and Taxes (KE) | 1.7 | - | 1.7 |
| FFBL Specific | | 100.0% | 0.0% |
| Steam Turbine Gen (60Hz) | 29.9 | 29.9 | - |
| Custom Duties and Taxes (FFBL) | 1.1 | 1.1 | - |
| TOTAL EPC/M COST | 225.9 | 128.7 | 97.1 |
| Allocated EPCM Cost (%age) | | 57.0% | 43.0% |
| Project Management | 7.0 | 4.0 | 3.0 |
| Financing Fees & Charges | 6.0 | 3.4 | 2.6 |
| Insurance during construction | 2.3 | 1.3 | 1.0 |
| Power and Fuel during testing | 2.2 | 1.3 | 1.0 |
| PROJECT COST (Pre IDC) | 243.4 | 138.7 | 104.7 |
| Interest during construction (IDC) | 21.6 | 12.3 | 9.3 |
| TOTAL PROJECT COST | 265.0 | 151.0 | 114.0 |

6. Summary of Sale Proposal

6.1 The summary of the sale proposal is as under:

| | |
|-------------------|--|
| Project Company | FFBL Power Company Limited (FPCL) |
| Major Sponsors | Fauji Fertilizer Bin Qasim Limited |
| Project Capacity | 52 MW (net) |
| Interconnectivity | 132 KVA |
| Project Location | Bin Qasim, Karachi, Sindh, Pakistan |
| Plant Technology | High Pressure Circulating Fluidized Bed (CFB) Technology |
| Project Lifecycle | 30 Years from COD |
| Power Purchaser | K-Electric Limited |
| Fuel Type | Coal |
| Plant Factor | 85% |
| Plant Efficiency | 29% |
| Energy Production | 455.520 GWh at 100% load factor |
| Energy Production | 387.192 GWh at 85% load factor |
| Project | US\$ |
| | EPC: 97.1 |
| | Project Management: 3.0 |





| | |
|----------------------|--|
| | Financing Fees & Charges: 2.6 Insurance during Construction: 1.0 Power & Fuel during Construction: 1.0 Interest During Construction: <u>9.3</u> Total 114 |
| Capital Structure | Project Financing: Equity: 25% = 28.5 Debt: 75% = 85.5 |
| Financing Terms | Loan period: 10 years Interest Rate: KIBOR + 3.5% p.a. KIBOR: 10.10% p.a. PKR 10.1554/kWh at 85% load factor |
| Concession Documents | Power Acquisition Contract |
| Construction Period | 24 months after financial close |
| Applicable Framework | Interim Power Procurement Regulations 2005 |

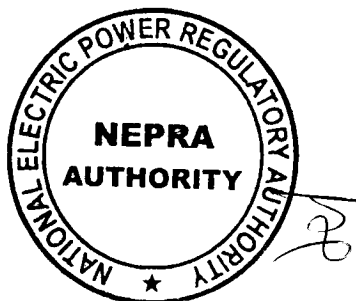
7. **Proposed Tariff:**

7.1 The proposed mutually agreed tariff between K-Electric and the FFBL Power Company Limited is as under:

| Tariff Inputs | At 100% | | PKR/kWh Levelized |
|----------------------------------|----------------|---------------|----------------------|
| | Year 1-10 | Year 11-30 | |
| Variable O&M Cost | | | |
| Fuel Cost | 4.3333 | 4.3333 | 4.3333 |
| Variable O&M (Foreign) | 0.0811 | 0.0811 | 0.0811 |
| Variable O&M (Local) | 0.1711 | 0.1711 | 0.1711 |
| Ash Disposal | 0.1753 | 0.1753 | 0.1753 |
| Limestone | 0.0897 | 0.0897 | 0.0897 |
| EPP: Operating Costs | 4.8505 | 4.8505 | 4.8505 |
| Fixed Operating Costs Rs./kW/hr | | | |
| Fixed O&M (Foreign) | 0.1963 | 0.1963 | 0.1963 |
| Fixed O&M (Local) | 0.2262 | 0.2262 | 0.2262 |
| Insurance | 0.2184 | 0.2184 | 0.2184 |
| Working Capital | 0.2000 | 0.2000 | 0.2000 |
| ROE | 1.3580 | 1.3580 | 1.3580 |
| Debt Servicing | 3.5445 | | 2.3103 |
| CPP: Capital Cost @85% - Rs./kWh | 6.7569 | 2.5869 | 5.3050 |
| Total Tariff - Rs./kWh | 11.6074 | 7.4374 | 10.1554 |

7.2 Assumptions of the above tariff are as under:

- PKR/US\$ 102.4 TT&OD rate notified by National Bank of Pakistan on November 7, 2014.
- Coal price FOB US\$ 63.38/Ton (Richards Bay (High CV – basis 6000 kc NAR) price as notified by HGS Energy McClosky Coal Report on November 7, 2014. Base fuel price is USD 63.38/MT for 6,000 kcal/kg NAR Coal (USD 62.59/MT as adjusted for calorific value of 5,925 kcal/kg NAR Coal), plus up to 2% coal handling/ transportation losses as



allowed by NEPRA will be at actuals. Mechanism for arriving at FOB price of lower CV coal (within the design specifications) will be finalized in due course as part of PPA negotiations. Marine Freight of USD 13.6/MT has been assumed whereas port clearing, handling charges, inland logistics (Inland Transportation) have been assumed at USD 8.28/MT based on quotations received for transport of coal from KPT at present. Marine freight and Inland Transportation will be charged at actuals.

- 3 month KIBOR 10.10% published by State Bank of Pakistan on November 7, 2014.
- Pakistan CPI (General) 198.80 of November 2014 published by Pakistan Bureau of Statistics in Monthly Review of Price Indices.
- US CPI (All Urban Consumers) of November 2014 as published by United States Bureau of Labor Statistics
- O&M cost is based upon the quotation for O&M Services as received from M/S OMS which includes cost of ash handling, limestone, and variable and fixed O&M. Breakup of O&M Charges is provided in the tariff table.
- Assumptions for working capital requirement include:
 - 90 days coal inventory
 - 30 days fuel payment
 - Interest rate: 3 month KIBOR + 2% Margin
- Assumptions for working capital requirement include:
 - Custom Duties and Taxes have been assumed at 7% on equipment supplies and 15% on offshore services.
 - All other taxes on the Project, EPCM Contracts as well as on the fuel, if applicable, will also be treated as a "pass through".

7.3 K-Electric also requested additional US\$ 2 million for interconnection facility which is not included in the above project cost.

8. Proceedings

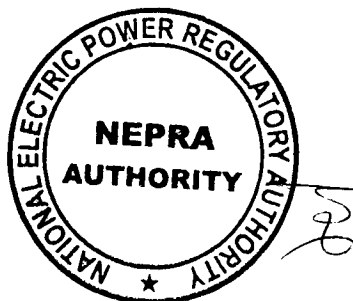
8.1 The PAR along with the mutual agreed tariff was submitted by the K-Electric for consideration / approval of the Authority in accordance with the provision of Regulation 3 of IPPR-2005.

8.2 The PAR was admitted as per regulation 4(1) of IPPR-2005 and in order to satisfy itself in respect of the prudence of the procurement and grant the power acquisition permission to K-Electric for negotiating a power acquisition contract, the Authority decided to conduct a hearing so that due input from the stakeholders is obtained. The decision was made with the view to ensure transparency in the process of granting permission to K-Electric for negotiation of PAC in respect of the subject project.

9. Issues

9.1 Based on the submissions of K-Electric and submitted comments following issues were framed for input of the stakeholders:

- i) Whether the efficiency of 29% is reasonable?
- ii) Whether the project cost of US\$ 114 million or US\$ million 1.97/MW is justified?



- iii) Whether the project cost allocation based on steam usage as requested by the applicant is justified?
- iv) Whether the proposed two part tariff comprising Energy and Capacity Charge is justified?
- v) Whether the tariff indexation / adjustment mechanism proposed by K-Electric is justified?
- vi) Whether the fixed O&M component of Rs. 0.42/kW/hr requested by K-Electric is justified?
- vii) Whether variable O&M cost Rs. 0.52/kWh requested by the applicant is justified?
- viii) Whether all aspects and procedural requirements regarding environmental issues have been fulfilled?
- ix) K-Electric to provide detailed explanation along with working in respect of the impact of this power purchase will have on the existing tariff of K-Electric
- x) Whether the interconnection cost requested by K-Electric is justified?

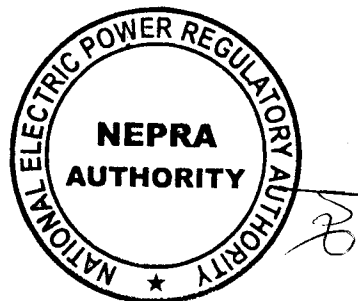
10. **Hearing**

For the purpose of transparency and for arriving at a just and informed decision, the Authority decided to hold a hearing on 12th June 2015. Accordingly notice of hearing indicating the salient features of the PAR was published in the newspapers of daily "Express" and daily "The News" on 4th & 5th June 2015. Individual letters were also sent to the stakeholders for input on the subject issue. In response to the advertisement Whistleblower Pakistan submitted their comments.

11. **Comments of WhistleBlower Pakistan**

11.1 Whistleblower submitted that K-Electric is a private, vertically integrated Utility which is engaged in the business of electricity generation transmission, distribution and sale in Karachi and its adjoining areas. K-Electric is performing the functions of electricity Generation, Transmission and Distribution under separate licenses issued by NEPRA but has no separate Tariff for each distinct function. K-Electric only has a multi-year consumer-end Tariff determined by NEPRA. K-Electric is only utility in Pakistan which is operating in a vertically integrated mode with a single Multi-year consumer-end tariff. The utility Company enjoys monopoly in the area of it's operation, there is always a chance that the utility may exploit the conditions to fulfill it's profit motives under various names and through various associated entities. Such profit-seeking entities do not even hesitate to realize their interest at the cost of disharmony among the Provincial / State Governments and the people. The role of the regulator becomes more and more important to monitor the situation in such a manner that the national economic efficiency and interest are not sacrificed through exploitation by the utility. The induction of low efficiency power plants on pipeline quality gas i.e. on an efficiency of 33-36% when plants of more than 60% are available in the commercial market, and allowing the 15-20 years old, in-efficient plants to convert their fuel from RFO to coal are two examples.

11.2 Since K-Electric is a vertically integrated Utility where the Power Purchaser and the Power Seller is the same with a common interest, extra care is needed to deal with them





situation. The rates for Power should be so competitive that it may not be worthwhile for any off-the-record deal between the Power Generator and the Power Buyer & Seller to maximize profit by unnecessarily burdening the consumers. After going through the Generation License granted by NEPRA to FFBL, available on NEPRA website, following comments have been submitted:

- i) FFBL is a Plant which has been setup for its' own use;
- ii) the expenses to be incurred and returns on the Investment to be made on this Plant will be recovered from the core business product of the Company; and
- iii) the efficiency of the Plant is too low.

11.3 Hence, the surplus power to be supplied by the company to K-Electric should not include those costs which in any case have to be incurred by the Company as a part of its' core business. Although the rate of Rs.10.1554/kWh is lower than the rates at which K-Electric is purchasing Power from the other Power Suppliers, when the proposed tariff is compared with the Upfront Coal tariff determined by NEPRA, it is quite high. From the consumers' perspective this is nothing but exploitation. In principle K-Electric, either by itself or by attracting other investors, is required to install most efficient state of the art Power Plants to provide cheap and affordable electricity to its' consumers. Unfortunately we are used to comparing new induction with the worst old-technology equipment commissioned in the system 20-30 years back and making ourselves happy that we are bringing a comparatively efficient Plant. NEPRA should discourage maximization of profit forcibly by not allowing the inefficiencies to continue. Hence Tariff above the Up-front Tariff for imported Coal should not be allowed to the company.

12. Issues – Wise Discussion & Findings

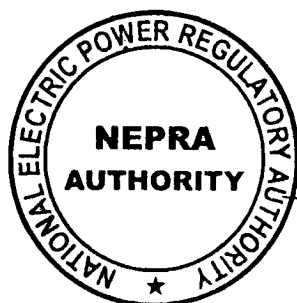
The issue-wise discussion is given hereunder:

13. Whether the efficiency of 29% is reasonable?

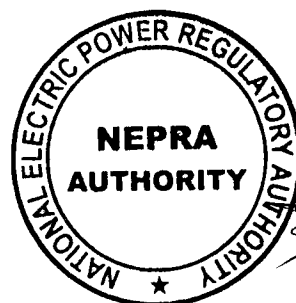
13.1 The Seller submitted that the efficiency of 29% is reasonable considering the size of the project. The Seller submitted the following comparison in this regard:

| Plant Name | Country | Capacity (MW) | Efficiency (%) |
|----------------------------|----------|--------------------|----------------|
| Rajghat Power House | India | 2 x 67.5 | 26.60 |
| Talcher | | 4 x 62.5 | 28.9 |
| Indraprashta power station | | 3 x 62.5 1 x 60 | 26.6 |
| Fatima Energy Ltd. | Pakistan | 2 x 60 | 29 |
| FPCL | | 1 x 60 | 29 |

13.2 The Seller submitted that while evaluating the size of the project, multiple factors were taken into consideration i.e. Water & Infrastructure, Sponsor Risk Appetite, GoP Incentives / Sovereign Guarantees, Local Expertise, Coal Import & Port Facilities, Technology, Reliable Equipment Suppliers and Power Purchasers/ etc. Following factors dictated the size of the Power Project thus limiting it to 118 MW.

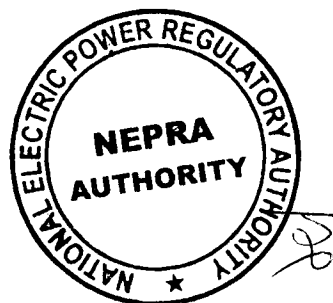


- i) Water availability
 - ii) Customer proximity
 - iii) Sovereign guarantee
 - iv) Limited appetite of risk
- 13.3 The Seller submitted that there is acute shortage of water in the Port-Qasim zone. Due to the limited water supply the project size was limited to 118 MW. The daily water requirement for the project is 1.9 million gallon per day. Project water requirement will be met through FFBL dedicated water infrastructure comprising of 7.7 KM water pipe line and reverse osmosis installed at the cost of Rs. 2.2 billion. Further in days of drought the blow down of FFBL cooling tower will be used.
- 13.4 According to the applicant, 52 MW electricity shall be provided to K-Electric at 50 Hz since the project lies in the service territory of the K-Electric. The project is approximately 500 Meter to 132 kV transmission line. In addition to that since no sovereign guarantee is available in the case of K-Electric therefore the project size has been kept to the extent of 52 MW in order to minimize the risk. The lenders were reluctant to fund a larger size plant without any political risk coverage and repayment risk. In absence of sovereign guarantee it was not conducive to go far the larger size project.
- 13.5 Regarding the selection of Sub Critical CFB Boiler Technology for the project, it was submitted that the said option was selected after detailed evaluation by the Engineering Consultant and the main factor was CFB technology's capability to burn variety of Coals. As overall coal requirements for the project is relatively low (- 471,000 Metric Tons Per Year). It was not feasible to have coal supply fixed from one Coal source and mine rather the coal supply that will be managed through contractual / spot buying from international coal suppliers market. As such CFB Technology provides the best option being able to cater a variety of coals. Moreover, CFB Boiler Design technology will also allow to procure coal at much better rates during tight market situations and even use of some local coal by co-mixing it with imported coal which would be beneficial for the off-takers of energy from the project in terms of increased availability/reliability of output. By way of clarification, it is submitted that the supercritical steam parameters based Steam Turbine Generators (STG) are not available in less than 100 MW frame size. Accordingly, the only option left for the applicant to select the subcritical based Boilers and Steam Turbine Generators. Keeping in view the aforesaid factors the subcritical, circulating fluidized bed (CFB) boilers were selected. The plant technology and type is given hereunder:
- (2 x 24 MW+ 1x10 MW 50 Hz Steam Turbines) +(1 x 60MW / 50 Hz Steam Turbine)
- 13.6 Regarding the lower Net Plant Efficiency of the proposed Coal based Generation Facility/Co-Generation Power Plant, it was stated by the Company that the project is based on Sub-Critical Technology. The steam pressure & temperature conditions are optimum considering the size of STGs. Consequently the net efficiency of 29% is justifiably reasonable.





- 13.7 The Authority in the case of Upfront Tariff for coal power project calculated the fuel cost component on the basis of 37-39% net efficiency depending upon the size of the project. The Seller intends setting up a Co-Generation Facility with an Installed Capacity of 118.00 MW [consisting of 2 x 24 MW (60 Hz) Steam Turbines + 1 x 10 MW (60 Hz) Steam Turbine and 1 x 60 MW (50 Hz) Steam Turbine]. The Project will be capable of generating 500 Metric Tons per Hour (MTPH) of Steam (at 515°C and 92 bar pressure) through two (02) CFB High-Pressure Coal Fired Boilers each with a capacity of 250 MTPH. The Seller requested to allow 29.00% net LHV flat thermal efficiency without compensation of degradation and partial loading adjustments.
- 13.8 The Authority is cognizant of the fact that the efficient machines need to be encouraged as pointed out by the commentator. In the instant case 29% efficiency is much less as compared to the 37% efficiency given in the Upfront Tariff for coal power project. The Authority is also cognizant of the fact that the efficiency being passed through them has a great impact on the generation tariff. For comparison of the thermal efficiency and for arriving at a just and informed decision, the Authority has analyzed the performance (steam turbine) table of the plant and calculations for heat rate as provided by the Company. Moreover, the parameters for subject capacity of the plant have been compared with Indian Standards norms. The Authority also considered the project sponsor's reasons of no sovereign guarantee of GOP due to which the lenders were reluctant to install a bigger size of power project. The Authority considers that this commercial decision by the investor has been taken keeping in view all risk factors including the aforementioned factors while investing in the specific sector.
- 13.9 Keeping in view the economic impact of the non-availability of the electricity, NEPRA considers that the investor should be encouraged for investment in the power sector with efficient power plants in order to minimize the demand supply gap. The Authority agrees with the Seller's comments with respect to no sovereign guarantee and limited water availability factor for selecting the small power plant. The smaller size and the efficiency indicated by the Seller have been compared across the world with the same size power plants. The plant efficiency of this size power plant indicated by the Seller is comparable with other countries. The Authority considers that the instant power plant is less efficient as compared to the efficient coal power plants; however, by rationalizing the project cost and keeping the per unit cost on a plant availability basis, the interest of the end-consumer can be protected.
- 13.10 Having considered the efficiency of the comparable size projects around the world and documentary evidence submitted by the Seller, the net LHV thermal efficiency value of 29.24% flat (for the life cycle of the project) at 100% loading without compensation of degradation and partial loading adjustment is considered reasonable when compared with these size of projects. In view thereof, the Authority has decided to calculate the fuel cost component on the basis of 29.24% flat net efficiency over the life cycle of the project.
14. Net Capacity and Auxiliary Consumption
- 14.1 The Seller intends to install gross capacity of 60 MW (at mean site condition is 58 MW) of the CFBC boiler based power plant. The K-Electric submitted that request for





procurement of 52 MW net from the Seller on take or pay basis. The proposed value in respect of auxiliary consumption is 6 MW or 10.3% of the 58 MW.

14.2 The Authority having considered the request of the Seller is of the opinion that the proposed plant is brand new and will consume a good calorific value of imported coal which will require smaller size of auxiliary equipment. The Authority considers that the 10.3% auxiliary consumption value as requested by the Seller for the plant seems reasonable. On the basis of this value net capacity comes out to be 52 MW. However, keeping in view the branded machines installed by the Seller, the net capacity may be established more than what has been requested. The Authority has therefore decided to allow the requested minimum net capacity of 52 MW with the condition that the Initial Dependable Capacity Test (IDC) will be carried out in the presence of the power purchaser at the time of Commercial Operation. In case of higher net capacity the relevant tariff components shall be adjusted however, no adjustment be allowed in case the net capacity turns out to be lower than 52 MW.

15. Whether the project cost is justified?

15.1 The Seller requested to allow the following project cost:

| Sr. No. | Description | Cost US\$ |
|---------|----------------------------------|-------------|
| 1. | EPC | 91.8 |
| 2. | Duties & Taxes | 5.3 |
| | Total | 97.1 |
| 3. | Project management | 3.0 |
| 4. | Financing Fees & Charges | 2.6 |
| 5. | Insurance During Construction | 1.0 |
| 6. | Power & Fuel During Construction | 1.0 |
| 7. | Interest During Construction | 9.3 |
| | Total | 114 |

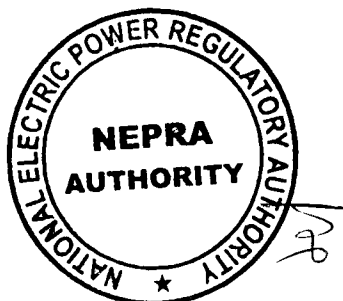
15.2 The Seller submitted the comparison of project cost with NEPRA approved project cost of Upfront Tariff which is as under:

| Description | FPCL | Approved by NEPRA | | | |
|-----------------------------|------|-------------------|------|------|------|
| Capacity - MW | 60 | 220 | 350 | 660 | 1099 |
| Per MW Cost in US\$ Million | 1.97 | 1.73 | 1.81 | 1.74 | 1.63 |

15.3 While justifying the high project cost, the applicant submitted the following comparison of boiler technology manufactured by Chinese and European manufacturers:

Boiler Prices

| Description | | Hyundai Industry | Heavy | Rafako |
|-----------------|-----------------|------------------|-------|------------|
| Country | | Korea | | Poland |
| Price (US\$) | | 57,000,000 | | 53,731,250 |
| Scope of Supply | Instrumentation | European | | Chinese |





| | | | |
|--|---------------|--------|-----------|
| | Electrical | Korean | Chinese |
| | Refractory | Korean | Pakistani |
| | ASME Stamping | Yes | No |

Steam Turbine Generators

| Description | General Electric | Hangzhuo Steam Turbine |
|------------------------------|------------------|------------------------|
| Country | France / Italy | China |
| Price (US\$) | 13,617,436 | 8,917,000 |
| Steam Consumption | 3.52 Ton/MW | 3.86 Ton/MW |
| Efficiency / Additional Opex | 91% | 84.7% (US\$ 1.86 M) |

- 15.4 According to the Seller, since it will be utilizing European/Korean boiler/turbine generator which is expensive than Chinese and are more reliable and efficient therefore, Capex will increase by US\$ 7.97 million. The Seller submitted that the cost of the technology is higher due to durability and reliability of the power plant. While justifying the project cost, the Seller submitted that for sustainable, reliable electricity, state of the art machinery from European & Korean origin has been selected. The project is managed through the package approach i.e. all engineering, procurement and construction activities are being taken by Pakistani engineers, thus developing key human resource and expertise for future coal power plants. The Seller submitted that the project has disadvantages due to smaller size and mainly based on European / Korean equipment therefore the cost of the project is higher than the large size power plants. (Specific cost: 1.9 US\$ / MW). According to Seller, the total Project Cost of Specific items pertaining to either applicant or K-Electric has been allocated specifically whereas cost of common items has been allocated on the basis of Steam (58.7% FFBL and 41.3% KE) and System utilization – for Cooling Water system (46% FFBL and 54% KE). Non-EPC costs have been allocated on applicable EPCM cost allocation basis (57% FFBL and 43% KE). In order to justify its claim, the Seller also provided the following list of project vendor / contractors:

| Sr.# | Package | Vendor | Origin |
|------|----------------------------------|---------------------------|----------------|
| 1. | Coal Fired Boilers | Hyundai Heavy Ind. (HHI) | Korea |
| 2. | Steam Turbine Generators | GE Oil & Gas | France & Italy |
| 3. | 132 kV Grid | Alstom | Switzerland |
| 4. | Cooling Tower | Hamon Thermal Europe SA | Belgium |
| 5. | Centrifugal Pumps with motors | Suzler | Spain |
| 6. | Side Steam Filtration | Sonitec Vortisand | Canada |
| 7. | Transformers for Substation | ABB / Schneider | Europe |
| 8. | MV & LV Swithgears /MCC | ABB / Schneider | Germany |
| 9. | Plant Control System (DCS) | ABB or Yokogawa | Europe / Japan |
| 10. | Power Cables (Greater than 6 kV) | Oman Cables & LS Cables | Europe / UAE |
| 11. | Air Compressor | Ingeroll Rand | Czech Republic |
| 12. | Emergency Diesel Generator | Caterpillar /Cummins /MAN | Europe |
| 13. | Control / Signal Cables | Belden / Halukabel | USA / Europe |
| 14. | Sorben & Ash Handling System | Clyde Bergmann thru NHI | China & Europe |



| | | | |
|-----|----------------------|---------------------------|-------|
| 15. | Coal Handling System | Northern Heavy Ind. Group | China |
|-----|----------------------|---------------------------|-------|

15.5 The list of the sub-vendors provided by the applicant are as under:

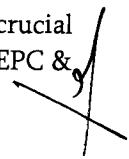
| Sr. No. | Item | Brand | Design Origin |
|---------|---|---------------------------|---------------|
| 1. | Crusher | SANDVIK | Sweden |
| 2. | Stacker & Reclaimer | Northern Heavy Industries | China |
| 3. | Motor | WEG | Brazil |
| 4. | Gear Box | SEW | Germany |
| 5. | Hydraulic System | ATOS | Italy |
| 6. | Lubrication System | LINCOLIN | USA |
| 7. | Fluid Coupling | TRANSFLUID | Italy |
| 8. | Limestone Pneumatic Conveying System & Ash Handling System | Clyde Bergemann | Germany & UK |
| 9. | Conveyor Belt | Goodyear | USA |
| 10. | Column Mill | Shen Xiang Changsha | China |
| 11. | Pump | Wilo | Germany |
| 12. | Metal Detector / Separator | Fushung Longi | China |
| 13. | Vibrating Feeder / Vibrating Screen / Rach & Pinion Gate / Rod Gate | Henan Weiming | China |
| 14. | Lighting | Philips | Netherland |
| 15. | Cleaner | TIPTOP | Germany |
| 16. | Slewing Bearing | ThyssenKrupp Rothe Erde | Germany |

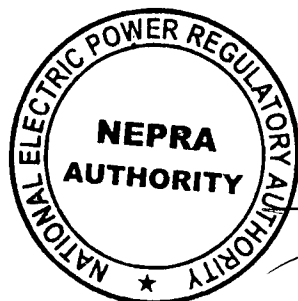
15.6 While reviewing the documents, it was noted that all the contracts were made with the FFBL instead of FPCL. When this point was raised with the seller, the following novation agreements were provided:

- i) Novation Agreement of detailed Engineering, Design and Supervisory Services for Coal based Co-generation Plant Project
- ii) Novation Agreement of the Architectural & Engineering Design and Construction Supervision of Civil Works Contract.
- iii) Novation Agreement of Engineering, Procurement, Supply and Supervision Contract for Boiler & Auxiliaries.

15.7 Since agreements have been novated in favour of the Seller therefore they are considered as valid agreements. The Seller is required to maintain its separate accounts required under the generation license of NEPRA.

15.8 The Authority considered the submissions of the commentator and the Seller. The Authority noted that the calculation of the Seller with respect to 220 MW NEPRA approved project cost is not correct since the per MW cost is US\$ 1.62 million instead of US\$ 1.73 million.

15.9 The Authority considers that project costs of the Seller are common which are crucial while calculating the project cost for K-Electric. Majority of the requested Capex (EPC & 





Non-EPC) is based on the steam allocation and water usage whereas only 26% is specific cost. Being custodian of the rights of the end-consumers and for the purpose of transparency, the adequate justification was required for the cost allocations. The Seller was directed to provide justifications for allocation of cost basis. The Seller was also directed to provide the impact of expected frequent tripping in K-Electric system due to the other Bulk Consumer i.e. FFBL.

- 15.10 Accordingly the Seller provided the technical details which were examined. The Authority observed that the information provided by the Seller was not sufficient to substantiate the project allocation basis to arrive at per MW project cost of 1.97 / MW. The Authority considers that the project cost is higher as against the available benchmarks. The main reason for higher cost is due to smaller size of the project and selection of the branded technology. The Authority also considered the submissions of the Seller wherein the project size is linked with higher risk due to non-availability of sovereign guarantees by GOP since the power purchaser is K-Electric. As discussed in the previous paragraphs, the construction of the power plant in K-Electric specific area without GOP policy is business decision wherein all factors have been accounted for. The Authority considers that this was a commercial decision of the power producer to construct the same without getting approval/Letter of Intent (LOI) from the relevant GOP agency Private Power & Infrastructure Board (PPIB). The power project which is constructed by the sponsors on its own cannot be compared with the power project which is initiated and completed under the Power Policy of the GOP. In view therefore, the power producer shall bear the risk associated to this project.
- 15.11 The Authority is cognizant of the fact that in today's life electricity is a basic necessity whereas due to ever increasing demand the country is facing acute power shortage. In such a scenario induction of additional MW in the system is important. The Seller during the hearing submitted that US\$ 50 million have been injected for completion of the power project. The Authority appreciates the commitment of the Seller for construction of coal power project which will enable the K-Electric to meet its consumer's requirement. Keeping in view the progress indicated by the Seller, the Authority considers that this will be the first coal power project in the area of K-Electric which will be completed in 2017. Furthermore, the addition of coal based power generation will also contribute in overcoming the load-shedding scenario in the area of K-Electric on cheaper price as compared to the furnace oil based power projects.
- 15.12 The Authority understands that the project cost of 60 MW cannot be compared with 220 MW category; in the instant case, therefore, project cost can be slightly higher than what has been allowed to 220 MW. The Authority considers that in order to rationalize the project cost and for making fair assessment, the 80 MW JDW project as more relevant. In the case of JDW power project the tariff was determined in 2010 on the basis of CAPEX of 1.19/MW. After adjusting the same on account of PPI, US CPI, Local CPI, the CAPEX in the instant case has been worked out as US\$ 84.68 million (1.46 * 58). Based thereon the comparison of the adjusted CAPEX with the Upfront Tariff for the projects upto 220 MW





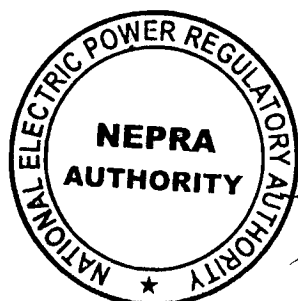
CAPEX with Upfront Tariff vis-à-vis the applicants requested and allowed is given hereunder:

| Description | Upfront | FPCL Requested | JDW | FFBL Power Company Limited Allowed |
|-------------|---------|----------------|-------|------------------------------------|
| MW | 220 | 58 | 80 | 58 |
| Capex-US\$M | 272 | 97 | 116.6 | 85 |
| US\$ Per MW | 1.24 | 1.67 | 1.46 | 1.46 |

- 15.13 The Customs duties and Cess of US\$ 3.36 million has been estimated @ 5.95% of 66.75% of the assessed capital cost and has also been included in the project cost which will be subject to adjustment on actual basis at the time of COD.
- 15.14 In line with the benchmark established in the upfront coal and solar tariff, financing fees and charges of US\$ 2.28 million @ 3% of the debt amount has been estimated. The financing fees and charges will be adjusted at the time of COD with maximum of 3% of the debt amount. The interest during construction of US\$ 11.16 million has been worked out on the basis of 2 years and assuming equal debt draw downs. The IDC shall be reestablished on the basis of actual draw downs at the time of COD. Based on the debt:equity structure of 75:25 the overall project cost has been assessed as US\$ 101.49 on exchange rate of US\$/PKR 102.4 wherein US\$ 76.11 million is debt and remaining US\$ 25.37 million is equity. The debt component shall be adjusted with the KIBOR + 3.5% interest rate whereas the equity portion shall be adjusted with the US\$ / PKR indexation. In case the Seller is able to negotiate the spread less than allowed rates, the benefit will be shared as 60:40 ratio between the power purchaser (ultimately the end-consumer) and the Seller. The adjustment on this regard will be made at the time of Commercial Operate Date by the K-Electric. The comparison of the project cost requested and allowed is as under:

| Description | FPCL Requested | Upfront | FPCL Allowed |
|-----------------------|----------------|---------|--------------|
| MW | 114 | 220 | 58 |
| Capex-US\$M | 97 | 272 | 85 |
| US\$ Per MW | 1.67 | 1.24 | 1.46 |
| Project Cost – US\$ M | 114 | 357 | 101.5 |
| Per MW Project Cost | 1.97 | 1.62 | 1.75 |

- 15.15 The commentator comments have been considered by the Authority. The factors mentioned by the commentator have already been taken care off in the Upfront decision and in the instant decision. Keeping in view the pollutive technology, the Authority kept cap of 1000 MW in the Upfront Tariff. As regards the project cost, as mentioned earlier, the project cost is higher due to smaller size and branded technology. Similarly the efficiency is also on lower side however keeping in view the same, the Authority has protected the interest of the end-consumers by rationalizing the project cost and keeping the project tariff on availability basis. The Authority considers that the project being on cheaper fuel shall be on full dispatch, thus the consumer shall be given electricity price on reasonable price. The K-Electric shall ensure that the power is procured strictly on





accordance with the merit order. Furthermore, the K-Electric shall be bound to procure power from the Seller in case the Power Project fall in the merit Order. In the event of non-dispatch if falling in the merit order, the seller shall be entitled for the Capacity Charge which shall not be passed on to the end-consumers and shall be borne by the K-Electric.

16. Whether the cost allocation indicated by K-Electric is justified?

16.1 According to the Seller, the Project will be capable of generating 500 Metric Tons per Hour (MTPH) steam through two (02) Circulating Fluidized Bed (CFB) high-pressure coal-fired boilers each with a capacity of 250 TPH with 5 MTPH as internal consumption of boilers. Out of the 495 MTPH net steam generated, ~291 MTPH steam would be utilized for power and steam supply to FFBL and ~204 MTPH of steam would be used to supply 52 MW (net) of power to K-Electric.

Common Equipment: Control System, Boiler Island, Equipment & Instrumentation, Coal, Lime stone (Sorbent) and Ash handling, cooling towers, etc. However, cost of cooling water system has been allocated on cooling water circulation basis instead of using steam on allocation basis.

Specific Equipment for K-Electric include: Grid System & Steam Turbine Generator (50Hz)

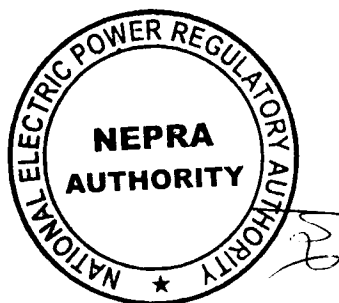
Specific Equipment for FFBL include: Steam Turbine Generator (60 Hz)

16.2 The Seller submitted that cost has been allocated on following basis:

| | | |
|----------------------------|------------------|---------------------------|
| Steam Usage: | Total Net Steam: | 495 |
| | i. K-Electric | 204.5 (41.3%) |
| | ii. FFBL | 290.5 (58.7%) |
| Cooling Water Circulation: | | 16,900 m ³ /hr |
| | iii. K-Electric | 9,125 m ³ /hr |
| | iv. FFBL | 7,775 m ³ /hr |

16.3 Accordingly out of US\$ 265 million US\$ 151 million has been allocated to FFBL and US\$ 114 million has been allocated to K-Electric.

16.4 The common systems are crucial while calculating the project cost. Being custodian of the rights of the end-consumers and for the purpose of transparency the adequate justification is required for the cost allocations. The project sponsor has given reasons for selecting small size project with such a low efficiency. The major reason for accepting the project of such lower efficiency is that the entire risk of dispatch is on the power producer as the Seller will receive payment on the basis of take & pay. The producer will only be able to sell its power to the K-Electric if it comes in the merit order. K-Electric is not bound to procure power from FFBL Power Company Limited if the power from other cheaper sources is available. As far as FFBL Power Company is cheaper, it will get dispatch; therefore the consumer will be benefited from the cheaper energy. The issue of project cost have been deliberated in the above paragraph of 15.12.



17. Whether the proposed two part tariff comprising Energy and Capacity Charge is justified?

17.1 According to the applicant, the tariff shall be two-part consisting of Energy and Capacity Charge. The applicant requested to allow the following tariff:

| Description | Rs./kWh |
|-------------------------|------------------|
| Energy Charge: | |
| • Fuel Cost Component | 4.33 |
| • Variable O&M | 0.52 |
| Total | 4.85 |
| Capacity Charge: | Rs./kW/hr |
| • Fixed O&M | 0.42 |
| • Insurance | 0.22 |
| • Working Capital | 0.20 |
| • ROE | 1.36 |
| • Debt | 3.54 |
| Total | 5.74 |

17.2 The Seller submitted that the Company is entitled for a fixed capacity payment based on the contract capacity which is in line with the upfront coal tariff since FPCL is undertaking the power export portion (50Hz) solely for K-Electric, through procurement of brand new equipment plus the capacity is dedicated exclusively for K-Electric for 30 years term. The above two part tariff based on contracted capacity payments and energy payment is essential to ensure the financial viability of the project and its bankability to the Lenders.

17.3 The Authority considered the submissions of the K-Electric and Power Producer, mutually agreed tariff on take or pay option. The system of FFBL and FPCL is common and frequent tripping on account of FFBL system may affect the provision of electricity to the K-Electric which ultimately shall affect the end-consumer on account of non-provision of electricity. The Authority considers that the project being a co-generation cannot be considered under the take or pay option as the Authority has also to keep in view the consumer's interest as well. Accordingly the Authority is of the view that the Seller under the availability basis shall ensure its plant's availability for most of the time. Since the plant is based on coal which means that the plant shall be dispatchable for most of the times enabling FFBL Power Company Limited to meet its financial obligation. In view thereof the request for allowing capacity payment on the basis of take or pay cannot be acceded to.

18. Whether the tariff indexation / adjustment mechanism proposed by K-Electric is justified?

18.1 K-Electric in the PAR requested to allow indexation of US\$ /PKR, local CPI, US CPI, 3 months KIBOR and actual costs of Ash, lime stone at the time of COD. According to FFBLFPCL the fuel cost component shall be indexed with the coal price.

18.2 The applicant is entitled for all the indexations allowed under the Power Policy and as per policy of NEPRA i.e. US\$/PKR indexation, fuel price adjustment, US CPI, local CPI, 3 months KIBOR etc. The fuel price shall be adjusted as per the allowed adjustment



mechanism in the preceding paragraphs. Since the Fuel Supply Agreement / Coal Supply Agreement of FFBL Power Company Limited is also not finalized, therefore, for the time being the mechanism given in Upfront Tariff has been opted for calculation of the fuel cost component which shall be subject to adjustment as per the mechanism approved by the Authority for coal based project as a result of consultative process initiated by NEPRA. The same has to be incorporated by the Seller and the power purchaser in their respective Coal Supply Agreement (CSA). The ash and lime stone shall be adjusted as per actual results.

19. Whether the fixed O&M component requested by K-Electric is justified?

19.1 The Seller requested to allow overall O&M cost of Rs. 0.94/kW/hr on account of O&M cost. While justifying the claim of O&M cost, the Seller submitted the following comparison in this regard:

| Particulars | Upfront Tariff | | | | FFBL Power Company |
|----------------------|----------------|---------|--------|--------|--------------------|
| | 1099 | 660 | 350 | 220 | |
| Project Cost US\$ | 1,677.5 | 1,080.9 | 597.5 | 357 | 114 |
| O&M Cost US\$ | 57.106 | 35.436 | 19.379 | 12.036 | 3.833 |
| %age of Project cost | 3.40% | 3.27% | 3.24% | 3.27% | 3.365 |

19.2 According to the Seller, the above table show that the O&M cost of the project as per parameters determined by NEPRA for similar projects are same even the Company is facing higher cost of water while other projects are using canal/sea water. The fixed and variable O&M have been discussed in detail in the following paragraphs:

Fixed O&M

19.3 FPCL requested to allow Rs. 0.42/kW/hr on account of fixed O&M. The fixed O&M cost component represents (a) fixed cost of staff for operation & maintenance of the plant (b) the cost of spares and services for routine maintenance and major overhaul (c) third party services (d) material handling costs (e) administrative cost and office expenditures. The administrative cost is the cost for head office personnel and other office costs and all other costs required for running of the plant. It includes professional fees, consultants' fees, administration and procurement costs, environmental monitoring costs, license and permits fees, bank charges, safety and security costs etc. According to Seller the management cost of water infrastructure has already been included in the fixed O&M. The Seller requested to allow the indexation of fixed O&M with CPI, US\$/PKR and US CPI indexation.

19.4 The Authority in the case of Upfront Tariff for the 220 MW power project allowed fixed O&M of Rs. 0.3070/kW/hr. This is known fact that the fixed cost does not have linear relationship and does not vary in direct proportion with the capacity. The smaller the size of the project, the higher per unit fixed O&M cost. However, in the applicant's project since 60% of the costs including fixed cost will be shared between FFBL and FPCL therefore, the O&M allowed in the case of Upfront Tariff should be sufficient to cater for the project needs. In view thereof, the Authority has decided to allow the fixed O&M of





Upfront Tariff. Accordingly the adjusted fixed O&M cost on account of US\$ and USCPI (US CPI of 236.15, US\$/PKR of 102.4 and local CPI of 198.80 for the month of November 2014) is as under:

| Fixed O&M Cost | Rs./kW/hr |
|----------------|-----------|
| Foreign | 0.1604 |
| Local | 0.1567 |
| Total | 0.3171 |

20. Whether variable O&M cost requested is justified?

20.1 The Seller requested to allow Rs. 0.52/kWh on account of variable O&M. The following breakup has been provided in this regard:

| Particulars | 220 MW | FPCL Requested |
|--------------|--------|----------------|
| Foreign | 0.068 | 0.081 |
| Local | 0.046 | 0.012 |
| Water Cost | - | 0.159 |
| Ash Disposal | 0.175 | 0.175 |
| Limestone | 0.09 | 0.09 |
| Total | 0.424 | 0.517 |

20.2 The Seller submitted that the variable O&M cost component includes the cost of consumables such as lubricant, chemicals, wear & tear parts, sand & limestone consumption, coal handling at plant site including stacking and piling, ash disposal by trucks and fresh water charges. The material handling includes coal, limestone and ash. Coal handling includes costs related to unloading equipment, weighing bridge, feeders, crane, stacker & re-claimer and stockyard maintenance. The coal handling process will be primarily coal unloading from trucks to stockyard, piling and feeding to underground hopper for conveying coal to boiler coal bunker. The costs associated with ash handling system include ash collection system, shifting to ash storage and then to ash disposal systems. FPCL requested to allow the following indexations:

- Local O&M Component: Pakistan Consumer Price Index
- Foreign O&M Component: United States Consumer Price Index and PKR/USD FX Rate
- The cost of limestone and ash disposal will be adjusted on actual basis at the time of COD.

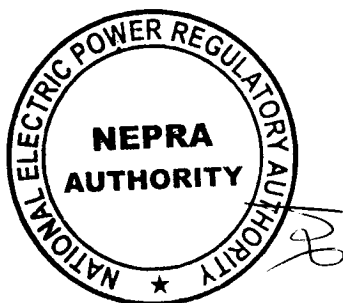
20.3 The Authority in its upfront coal tariff determination has allowed variable O&M cost Component @ Rs.0.114/ kWh plus Rs. 0.22/ kWh and Rs.0.0900/ kWh on account of Ash handling Charges and Lime Stone respectively.

20.4 The ash handling and lime stone cost is subject to adjustment as per actual. As against Rs. 0.22/kWh allowed in Upfront Tariff for Ash Handling, the Seller requested to allow Rs. 0.1753/kWh. Similarly as against variable O&M of Rs. 0.0456/kWh of local variable component, the Seller requested to allow Rs. 0.0121/kWh. The comparison of the requested and Upfront Tariff Variable O&M is as under:



| Variable O&M | Upfront Tariff Rs./kWh | Requested Rs./kWh |
|--------------|---------------------------|----------------------|
| Foreign | 0.0684 | 0.0811 |
| Local | 0.0456 | 0.0121 |
| Water Cost | - | 0.1590 |
| Ash Disposal | 0.2200 | 0.1753 |
| Limestone | 0.0900 | 0.0897 |
| Total | 0.4240 | 0.5171 |

- 20.5 The applicant also requested to allow Rs. 0.1590/kWh on account of water use charges. The applicant stated that the K-Electric is charged for the water and its treatment along with rental of water supply facility within the fixed O&M cost. Water requirement in the coal power plant is necessity.
- 20.6 The requested cost by the Seller on account of variable O&M other than water cost is lower than the allowed in Upfront Tariff. The Authority has therefore decided to allow the same to the Seller. The Authority also considered the request of the Seller for water use charges and is of the view that the same is genuine requirement in the area of Karachi. The Authority accordingly decided to allow the same to the Seller subject to provision of documentary evidence which substantiate the claims of the Seller. Based on the aforesaid, the requested amount of Rs. 0.5171/kWh on account of variable O&M is allowed to the applicant.
21. **Fuel Cost Component**
- 21.1 The Seller requested the Authority to allow Rs. 4.33/kWh on account of fuel cost component. According to the Seller the cost of fuel is a pass through item. The Fuel Cost Component is calculated using the delivered coal price at the coal yard, the heating value of coal and the plant heat rate. The Seller submitted that the mechanism for indexation of landed coal price will be firmed up during negotiation of the PPA but is expected that:
- FOB price of coal will be linked to internationally available coal indices, such as HBA, API – 6, API – 4, etc as the CFB Boiler technology has better fuel flexibility than PC Boiler.
 - The methodology and indexation structure for arriving at various components of Sea freight for coal supply will be firmed up later but will be linked to appropriate price drivers.
 - The indexation of Port clearing and handling charges, inland logistic will be linked to relevant cost drivers.
- 21.2 The Seller stated that the fuel cost component has been calculated on the basis of 29% plant efficiency. The Seller further submitted that base fuel price is USD 63.38/MT for 6,000 kcal/kg NAR Coal (USD 62.59/MT as adjusted for calorific value of 5,925 kcal/kg NAR Coal), plus up to 2% coal handling/ transportation losses as allowed by NEPRA will be at actuals. Marine Freight of USD 13.6/MT has been assumed whereas port clearing, handling charges, inland logistics (Inland Transportation) have been assumed at USD





- 8.28/MT based on quotations received for transport of coal from KPT at present. Marine freight and Inland Transportation will be charged at actuals. The overall coal price has been used for calculation of the fuel cost component is US\$ 84.47 /M.Ton.
- 21.3 The Authority in the case of Upfront Tariff calculated the fuel cost component on the basis of following assumptions;
- | | | |
|-------|------------------------------------|---------------------|
| i) | Richard Bay (South Africa) FOB 40% | US\$ 93.40/M.Ton |
| ii) | Newcastle – Australia – FOB 20% | US\$ 89.00/M.Ton |
| v) | Newcastle – Indonesia – FOB 40% | US\$ 87.55 / M.Ton |
| vi) | Marine Freight | US\$ 20.00/M.Ton |
| vii) | Marine Insurance | 0.10% of FOB price. |
| viii) | Other costs | 10% of FOB price |
| ix) | Weighted Average CIF Price | US\$ 119.60/M.Ton |
| x) | Cost of common Jetty facility | US\$ 9.46/M.Ton |
| xi) | Total imported Coal Price | US\$ 129.06/M.Ton |
- 21.4 The price assumed in the Upfront tariff is subject to adjustment as per actual. The Calorific Value of the coal has been taken as under:
- | | |
|------------------------------|------------------|
| South Africa (6,600 Kcal/Kg) | 26,190.91 Btu/Kg |
| Australia (6,000 Kcal/Kg) | 23,809.92 Btu/Kg |
| Indonesia (6,500 Kcal/Kg) | 25,794.08 Btu/Kg |
| Weighted Average CV | |
| Imported Coal | 25,555.98 Btu/Kg |
- 21.5 In the instant case the CV has been taken as 6,000 Kcal/Kg (Btu/Kg 23,820) adjusted from 5,925 Kcal/Kg NAR coal (Btu / Kg 23,512). Freight of US\$ 13.6 /M.Ton has been assumed whereas port clearing, handling charges, inland logistics (Inland transportation) have been assumed at US\$ 8.28/M.Ton based on quotation received to the Seller. Although LOI for Coal Supply Agreement (CSA) has been issued to the J.T. Boyd as stated by the applicant, however no firm CSA is submitted. In view thereof for the purpose of calculations for the time being and till the finaliation of the adjustment mechanism, the coal price has been taken as US\$ 84.47 /M.Ton comprising of coal price of US\$ 63.38/M.Ton, marine freight of US\$ 13.6/M.Ton, port clearing, handling charges, inland logistics (inland transportation) of US\$ 8.28/M.Ton. The CV submitted by the applicant has been taken as reference parameter for calculations fo the fuel cost component. In accordance with the decision of the Authority in Upfront Tariff the coal price and transportation shall be adjusted / allowed as per actual.
- 21.6 After taking into account the coal price of US\$ 84.47/M.Ton (Coal CV of 6,000 Kcal/Kg, Richard Bay price of US\$ 63.38/M.Ton (USD 62.59/MT as adjusted for calorific value of 5,925 kcal/kg NAR Coal), marine freight of USD 13.6/MT and transportation of US\$ 8.28/M.Ton) the fuel cost component has been worked out as Rs. 4.2939/kWh and the same is allowed to the applicant. The fuel price shall be adjusted according to the formula prescribed by the Authority in Upfront Tariff of coal power plants.



22. Transportation Losses

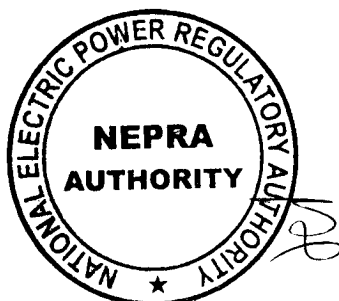
- 22.1 The Seller submitted that 2% coal handling / transportation losses have been allowed by the Authority in Upfront Tariff of Coal Power Projects and the same have been assumed without no financial impact.
- 22.2 The Authority has considered the FFBL Power Company Limited request and it is of the view that since the plant is near to the port-Qasim and the requested cost handling and transportation losses on imported coal seems higher. In the Authority's considered opinion the plant is located near to the port therefore 1% loss during inland transportation is not relevant in the instant case. The Authority accordingly considered the overall 1% coal handling, transportation losses are reasonable for imported / local coal in the instant case; therefore are allowed. The Authority further considers that if the Coal Supply Agreement caters for the transportation losses in the price then there will be no adjustment in coal pricing on account of transportation loss.

23. Working Capital

- 23.1 According to Seller, the working capital consists of investment in 90 days coal inventory and collection of one month's energy invoice in arrears. Borrowing rate of 3-month KIBOR plus 2.0% has been assumed as working capital cost. FPCL requested for indexation of Coal Price (in PKR as per prevailing USD/PKR parity) and 3 Month KIBOR.
- 23.2 The Authority in its upfront coal determination has worked out the interest cost of Working Capital requirement for imported coal in accordance with the following:
- a) Inventory equivalent to 90 days at 100% plant load.
 - b) Receivables equivalent to one month of fuel charges at 100% plant load.
- 23.3 Interest on Working Capital has been calculated on the basis of quarterly KIBOR plus 200 basis point, which will be adjusted for variation in quarterly-KIBOR and weighted average cost of coal inventory at the time of COD. Accordingly, based on the coal Inventory equivalent to 90 days at 100% plant load and Receivables equivalent to one month of fuel charges at 100% plant load, the cost of Working Capital at three months KIBOR plus 2% spread works out to be US\$ 0.8890 million i.e. Rs. 0.2351/kWh and the same is allowed to the applicant.

24. Insurance

- 24.1 According to FPCL, the insurance expenses include cost of insurance typical for plant & machinery/stock/inventory for such projects including all-risk, machinery breakdown, third party liability insurances including business interruption/consequential loss following such events. The annual cost of such insurances has been currently assumed at 1.0% of the engineering, procurement and construction cost of the project. FPCL requested US\$/PKR exchange rate variation in the insurance component.
- 24.2 The Authority has allowed insurance cost @ 1% of 70% of the Capital Cost in its upfront coal tariff. In the instant case the EPC cost is 90% of the CAPEX. Accordingly 1% of the





EPC cost of US\$ 80.68 million works out as US\$ 0.8068 million or Rs. 0.2134/kWh. The same is allowed to the applicant.

25. Construction Period

25.1 The Authority, in its upfront coal determination, has allowed a construction period ranging from 40 to 48 months for the green field projects of 200 MW to 1000 MW. In coal conversion cases, like Lalpir, Pakgen and Saba power, the construction period allowed by the Authority is 24 months.

25.2 In the instant case construction period of 24 month have been assumed for 118 MW power plant. Although the 60 MW steam turbine and generator will be separately developed for K-Electric system however, majority of the equipment is common therefore the construction period of 24 months is considered reasonable for developing smaller coal power project. In view thereof the Authority has decided to allow 24 months construction period to the FFBL Power Company Limited from the date of financial close or first payment of EPC contract whichever is earlier.

26. Interest During Construction

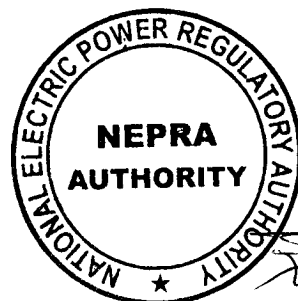
26.1 The Seller requested to allow US\$ 9.3 million on account of Interest During Construction based on the 24 months construction period.

26.2 The construction period of 24 months being reasonable in the instant case is accepted. It has been noted that the FPCL calculations of IDC are not correct. Based on 24 months construction period, the IDC has been worked out as US\$ 11.16 million. The IDC shall be adjusted at the time of COD based on the actual draw down from the date of financial close or first payment of EPC contract whichever is earlier.

27. Return on Equity

27.1 According to Seller, the return has been worked out on the basis of 18.38% IRR. The equity amount assumed by the FPCL in the instant case is US\$ 28.5 million. Accordingly ROE component of Rs. 1.3580/kW/hr has been requested. On the basis of 24 month construction period. The required return on equity represents the KE specific risks including but not limited to private ownership and non-availability of sovereign guarantee. FPCL also requested for indexation of the US\$/PKR exchange rate and US CPI.

27.2 The Authority in the case of Upfront Tariff allowed 17% IRR on imported coal and 18% IRR on local coal. In the instant case the Seller requested to allow US\$ 18.38% IRR on imported coal which is not in line with the Authority's earlier decisions. In view thereof 17% IRR as per previous practice is allowed in the instant case. Accordingly based on the adjusted project cost, the equity in the instant case has been worked out as US\$ 25.37 million or Rs. 1.3447/kWh and the same is allowed from the date of financial close or first payment of EPC contract whichever is earlier. The same shall be indexable with US\$/PKR exchange rate and US CPI.





28. Custom Duties & Taxes

- 28.1 The Seller submitted that the custom Duties and Taxes have been assumed at 7% on equipment supplies and 15% on offshore services. All other taxes on the Project, EPCM Contracts as well as on the fuel, if applicable, will also be treated as a "pass through".
- 28.2 The Authority in the case of Upfront Tariff allowed 5.95% taxes including Cess of Sindh Government on the EPC cost. In the instant case 7% and 15% on onshore and offshore have been assumed. Although taxes and duties are considered as pass through item however as a matter of consistency same 5.95% i.e. US\$ 3.36 million have been assumed on the EPC cost on account of custom duties & taxes for FPCL and the same is allowed to the applicant.

29. Financing Fees and Charges

- 29.1 The Seller assumed 3% financing fees and charges on the debt amount. FPCL requested to allow US\$ 2.55 million on this account.
- 29.2 The Authority in the case of Upfront Tariff allowed 3.5% on account of financing fees and charges. In the instant case 3% have been assumed on the debt amount. Accordingly based on 3%, the requested amount has been worked out as US\$ 2.28 million on the debt amount of US\$ 76.11 million and the same is allowed to the applicant.

30. Capital Structure

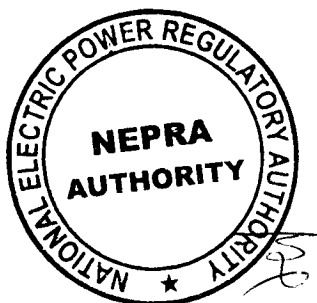
- 30.1 According to the Seller, the capital cost allocated for the Project to supply power to K-Electric is equivalent to 114 million USD, which will be financed with a debt to equity ratio of 75:25. The table below shows the proposed financing structure of the project portion being allocated to K-Electric:

| Project Financing | Percentage | USD |
|-------------------|------------|--------------|
| Debt | 75% | 85.5 million |
| Equity | 25% | 28.5 million |
| Total Financing | 100% | 114 million |

- 30.2 Based on the assessed project cost of US\$ 101.49 million, the debt equity ratio @ 75:25 works out as US\$ 76.11 and US\$ 25.37 million. The same capital structure has been assumed in the calculations of the generation tariff.

31. Plant Availability

- 31.1 The Seller requested to allow annual plant availability factor of 85%. The Seller submitted that the plant availability of coal is in line with the Authority's earlier decision in case of Upfront Tariff.
- 31.2 The Authority has decided to keep the plant availability as 85% which is in line with the earlier decision of coal based power plants. Accordingly the generation tariff has been worked out on the basis of 85% plant availability.



32. Whether all aspects and procedural requirements regarding environmental issues have been fulfilled?

32.1 The Seller submitted that EIA study was conducted through Hagler Bailey – Pakistan and NOC for the same was issued by Sindh EPA in Sep 2014. FPCL is highly committed towards minimizing the Environmental impacts. Rather than meeting the local NEQs the project has been designed to meet the more stringent World Bank guide lines. Brief comparison of local NEQs and WBG is as under:

| Parameter | Pakistan Standards | World Bank Guide Lines |
|--------------------|-------------------------|------------------------|
| Particulate Matter | 500 mg/Nm ³ | 50 mg/Nm ³ |
| Sulfur Oxides | 100-500 Tons per day | 100 Tons per day |
| Oxides of Nitrogen | 1200 mg/Nm ³ | 100 mg/Nm ³ |

32.2 In addition to above, company has spent additional Capex on the following to further safeguard the environment:

- Continuous Emission Monitoring System (CEMS) for effective monitoring and automatic corrective actions at a cost of 0.25 Million USD
 - Completely Covered Coal storage Yard (2.2 Million USD). Further extensive plantation is being carried out around the facility (within premises of ~ 50 acres)
- Note: All existing industry in Pakistan do not have completely covered coal storage facility.*

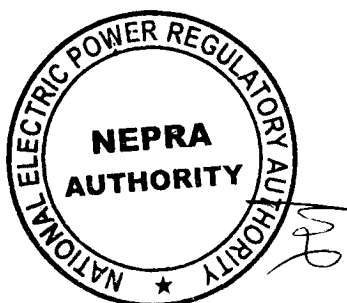
32.3 During the hearing the representative of the Seller stated that all cost on this account shall be borne by the FFBL and not passed on to the end-consumers. According to the details submitted by the Seller, it is evident that the Company has hired the Hagler Bailey for EIA study. Since the NOC from Sindh EPA has been issued in September 2014 and no cost is passed on to the end-consumer on this account therefore all aspect with respect to EIA has been fulfilled. Implementation of the particular clauses of EIA is pertaining to the Sindh EPA.

33. K-Electric to provide detailed explanation along with working in respect of the impact of this power purchase will have on the existing tariff of K-Electric?

33.1 While providing justification of the instant procurement from FPCL, K-Electric submitted that the following reasons:

- i) The long-term forecast for natural gas supply is not encouraging. This may affect full utilization of the gas fired power generation capacity of K-Electric.
- ii) Coal is very cheap when compared with the furnace oil. Hence the supply rationalized the consumer-end tariff.
- iii) Reduction in the GOP's subsidy payments and hence improvement in the circular debt situation.
- iv) Reliable base load supply 24 x 7.
- v) Potential use of the project as black start facility in case of widespread power outage.

33.2 The Authority considered the K-Electric's own generation, import from other IPPs and CPP-G and noted that the demand of K-Electric will increase in near future. The





Authority also considers that the gas price shall be increased in the coming years keeping in view the depleting sources of the gas. If gas price increases, then RFO and HSD is the only available option for the K-Electric other than CPPA. The increase in the generation on RFO shall increase the overall generation price of the K-Electric. Therefore addition of coal in the generation mix will bring sustainability and affordability to certain extent. In order to bring the generation cost on lower side K-Electric is also converting its own plant to coal. Keeping in view the above, the Authority considers that the Seller power plant shall play very vital role in meeting the demand growth of K-Electric vis-à-vis reduction in the electricity prices.

34. Whether the interconnection cost requested by K-Electric is justified?

34.1 K-Electric requested additional US\$ 2 million for interconnection facility which is not included in the above project cost. The cost is allocated towards the 132 kV double circuit line of approximate 0.8 Km which is needed to connect the existing 132 kV Dhabiji with the BOC 132 kV single circuit at the FFBL switchyard complex. The financial impact of additional investment of interconnection is US\$ 2 million or US Cents 0.0737/kWh.

34.2 The interconnection is the responsibility of the K-Electric for which already multi-year tariff is in place. Since the K-Electric have multi-year tariff therefore all investments have to be managed in accordance with the package accepted by the K-Electric in the form of multi-year tariff and the same cost in the instant case cannot be allowed.

35. Monitoring Mechanism for the use of coal fuel

35.1 The Power Producer shall furnish a monthly coal usage and coal procurement statement duly verified and certified by the Power Purchaser for each month, along with the monthly energy bill. The statement shall cover details such as:

- Quantity of fuel (tons) consumed and procured for each source along with heating value during the month for power generation purposes,
- Cumulative quantity (tons) of coal consumed and procured till the end of that month during the year source wise,
- Actual (gross and net) energy generation (denominated in units) during the month,
- Cumulative actual (gross and net) energy generation (denominated in units) until the end of that month during the year

36. Summary of the Tariff

36.1 The summary of the requested and allowed tariff is as under:

Levelized

| Description | Units | Requested | Allowed | Rs./kWh |
|---------------|-------|-----------|---------|---------------------|
| | | Rs./kWh | Rs./kWh | |
| Energy Charge | | | | |
| Variable O&M | | | | |
| • Fuel cost | | 4.3333 | 4.2939 | |
| • Foreign | | 0.0811 | 0.0811 | US\$ / PKR & US CPI |
| • Local | | 0.0121 | 0.0121 | Local CPI |

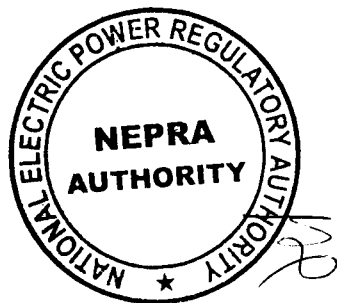




| | | | | |
|-------------------------------|---------|-----------------|----------------|---|
| • Water Cost | Rs./kWh | 0.1590 | 0.1590 | Subject to actual based on documentary evidence |
| • Ash Disposal | | 0.1753 | 0.1753 | Subject to actual |
| • Limestone | | 0.0897 | 0.0897 | |
| Total Energy Charge | | 4.8505 | 4.8111 | |
| Capacity Charge | | Rs./kW/h | Rs./kWh | |
| Fixed O&M: Foreign | | 0.1963 | 0.1844 | US\$ / PKR & US CPI |
| Local | | 0.2262 | 0.1887 | Local CPI |
| Working Capital | | 0.2000 | 0.2351 | KIBOR |
| Insurance | | 0.2184 | 0.2134 | |
| ROE | | 1.3580 | 1.3447 | US\$ /PKR |
| Debt Servicing | | 2.3103 | 2.4197 | KIBOR |
| @ 85% plant factor | | 5.3050 | 4.5859 | |
| Total Tariff Levelized | | 10.1554 | 9.3970 | |

36.2 The above tariff is based on the following assumptions:

| | |
|--------------------------------|--|
| PKR – USD Exchange Rate | 102.4 PKR/USD PKR/USD Selling TT&OD rate notified by National Bank of Pakistan on November 7, 2014 |
| Debt:Equity | 75:25 |
| KIBOR | 10.10% plus 3.5% and 2% for working capital |
| Project Cost | US\$ 101.49 million |
| Efficiency | 29.24% |
| Net Capacity | 52 MW minimum subject to adjustment as per actual. However, no lower adjustment shall be allowed. |
| Coal Price FOB | US\$ 63.38/M.Ton Richards Bay (High CV – basis 6,000kc NAR) price as notified by HIS Energy McClosky Coal Report on November 7, 2014 |
| Marine Freight | 13.38 US\$ /M.Ton |
| Transport and handling charges | 8.28 US\$ /M.Ton |
| Coal Price | US\$ 84.47 /M.Ton |
| 3 Month KIBOR | 10.10% 3 Month offer side KIBOR published by State Bank of Pakistan on November 7, 2014 |
| Pakistan CPI | 198.80 (Consumer Price Index (General) of November 2014 as published by Pakistan Bureau of Statistics in Monthly Review of Price Indices.) |
| US CPI | 236.151(Consumer Price Index – All Urban Consumers of November 2014 as published by United States Bureau of Labor Statistics.) |

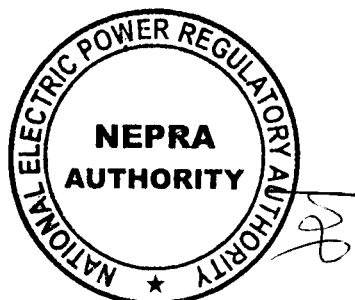


37. Decision

37.1 The Authority has decided to approve the Power Acquisition Request (PAR) and grant permission to K-Electric for negotiating the Power Acquisition Contract (PAC) for purchase of 52 MW power from the FFBL Power Company Limited along with the following tariff which shall be incorporated in the draft PAC:

| Description | Rs./kWh | | As per Power Policy |
|---|----------------|---------------|---|
| | 1-10 Years | 11-30 Years | |
| Energy Charge | | | Indexation / Adjustments |
| Variable O&MW | | | |
| • Fuel cost | 4.2939 | 4.2939 | Subject to fuel price variation |
| • Foreign | 0.0811 | 0.0811 | US\$ / PKR & US CPI |
| • Local | 0.0121 | 0.0121 | Local CPI |
| • Water Cost | 0.1590 | 0.1590 | Subject to actual based on documentary evidence |
| • Ash Disposal | 0.1753 | 0.1753 | Subject to actual |
| • Limestone | 0.0897 | 0.0897 | |
| Total Energy Charge | 4.8111 | 4.8111 | |
| Capacity Charge | | | |
| Fixed O&M: Foreign | 0.1844 | 0.1844 | US\$ / PKR & US CPI |
| Local | 0.1887 | 0.1887 | Local CPI |
| Working Capital | 0.2351 | 0.2351 | KIBOR + 2% |
| Insurance | 0.2134 | 0.2134 | |
| ROE | 1.3447 | 1.3447 | US\$ /PKR |
| Debt Servicing | 3.7122 | - | KIBOR |
| Total Capacity Charge @ 85% plant factor | 5.8785 | 2.5485 | |
| Total Tariff Levelized | 10.6896 | 6.9774 | |

- i) The tariff has been calculated on the basis of net capacity of 52 MW and annual generation @ 85% plant factor of 387.19 GWh. The net capacity is subject to adjustment at the time of COD as per IDC test. In case the net capacity is established higher than the minimum capacity, the relevant tariff components shall be adjusted accordingly. However, no adjustment is allowed in case the net capacity is established less than minimum net capacity of 52 MW.
- ii) The above tariff is applicable for the period of 30 years on BOO basis commencing from the date of Commercial Operate Date (COD)
- iii) Debt Service shall be paid in the first 10 years of commercial operation of the plant or 3871.92 GWh whichever is earlier.
- iv) The sole criterion for dispatch of all the coal based power plants shall be the "merit order dispatch". The Seller shall be entitled for the capacity charge in case it falls in the merit order and K-Electric did not procure power from the Seller. The Capacity Charge on this account shall be borne by the K-Electric.
- v) The coal based generation facility shall be subjected to scheduling and dispatch code as specified under NEPRA Grid Code.
- vi) Thermal efficiency has been taken as 29.24% flat over the project life.





vii) *The component-wise tariff is attached as Annex-I. The debt service schedule is attached as Annex-II.*

Note: The 1-10 years tariff in US Cents is 10.4390/kWh and for 11-30 years is US Cents 6.8138 /kWh. The levelized tariff in US Cents is 9.1768/kWh.

37.2 The following indexation shall be applicable to the tariff;

i) **One Time Adjustment**

The tariff has been calculated on the basis of net capacity of 52 MW and annual generation @ 85% plant factor of 387.19 GWh. The net capacity is subject to adjustment at the time of COD as per IDC test to be carried out for determination of the contracted capacity. In case the net capacity is established higher than the minimum capacity, the relevant tariff components shall be adjusted accordingly. However, no adjustment is allowed in case the net capacity is established less than minimum net capacity of 52 MW.

ii) **Cost of Debt**

The total amount has been assumed as 75% of the total project cost. Debt service component of tariff has been based on 100% local financing.

iii) **Interest During Construction**

Interest During Construction has been estimated as US\$ 11.16 million. This will be adjusted at COD on account of actual variation in interest on the basis of drawdown for the period of 24 months of project construction. The power producer shall submit the relevant documents to the K-Electric on onward submissions to NEPRA for adjustment of the relevant components.

iv) **Customs Duties, Cess and Withholding Tax**

Customs duties & cess @ 5.95% of the 66.75% of the capital cost has been assumed in the project cost which will be adjusted at the time of COD on actual basis. No withholding tax on local foreign contractors, sub-contractors, supervisory services and technical services provided by foreign (non-residents) entities has been assumed. Actual expenditure, if any, on this account will be included in the project cost at the time of COD by the K-Electric on the basis of verifiable documentary evidence.

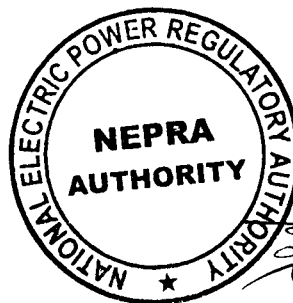
v) **Adjustment of Rupee / Dollar Parity**

The relevant tariff components shall be adjusted on account of actual variation of Rupee / US\$ parity over the reference Rs. 102.4 /US\$.

a.) **Adjustment in Insurance as per Actual**

The actual insurance cost for the minimum cover required under the contractual obligations with the Power Purchaser not exceeding 1% of the EPC cost will be treated as pass-through item. Insurance component of reference shall be adjusted as per actual on yearly basis upon production of authentic documentary evidence by the power producer according to the following formula:

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$$\text{Insurance (Adj)} = \text{AIC} / \text{P (Ref)} * \text{P (Act)} / 102.4 * \text{ER (Rev)}$$

Where:

- AIC = Adjusted insurance component (Rs./kWh) as per IDC test
P(Ref) = Reference premium US\$ 0.81 million
P (Act) = Actual premium or 1% of the adjusted EPC whichever is lower
ER (Rev) = The revised TT & OD selling rate of US\$ as notified by the National Bank of Pakistan at invoice date.

b) Return on Equity

The return on equity shall be adjusted on account of actual variation in PKR / US\$ parity at the time of COD according to the following formula:

$$\text{ROE (Rev)} = \text{ROE (Ref)} * \text{ER (Rev)} / 102.4$$

Where:

- ROE (Rev) = Revised ROE
ROE (Ref) = Reference ROE
ER (Rev) = The revised TT & OD selling rate of US\$ as notified by the National Bank of Pakistan at invoice date.

II. Pass Through Items

No provision for income tax, worker's profit participation fund and workers' welfare fund, any other tax, excise, duty, surcharge, charge or other governmental impositions payable on generation, sales, exploration has been accounted for in the tariff. If FFBL Power Company Limited is obligated to pay any tax purely on its generation, the exact amount paid by the Company shall be reimbursed by the Power Purchaser to the Company on production of original receipts.

III. Indexation

The following indexation shall be applicable to the tariff:

a) Indexation applicable to O&M

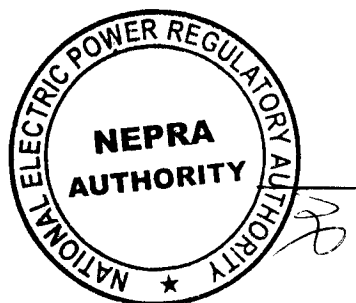
The foreign component of fixed O&M shall be adjusted with US CPI notified by US Bureau of Labour Statistics and revised TT & OD selling rate of US\$ rate notified by National Bank of Pakistan. The local component of fixed O&M shall be adjusted with local CPI notified by Pakistan Bureau of Statistics. The fixed O&M shall be adjusted on quarterly basis on 1st July, 1st October, 1st January & 1st April of the Financial Year on the basis of available information with respect to exchange rate, US CPI and local CPI. The mode of indexation will be as under:

Fixed O&M

$$\begin{aligned} \text{Fixed O\&M (FRev)} &= \text{Rs. } 0.1844/\text{kWh} * \text{US CPI (Rev)} / 236.15 * \text{ER (Rev)} / 102.4 \\ \text{Fixed O\&M (LRev)} &= \text{Rs. } 0.1887/\text{kWh} * \text{CPI (Rev)} / 198.80 \end{aligned}$$

Where:

$$\text{Fixed O\&M (FRev)} = \text{the revised fixed O\&M foreign component of tariff}$$



| | | |
|------------------|---|---|
| Fixed O&M (LRev) | = | the revised fixed O&M local component of tariff |
| CPI (Ref) | = | the reference CPI of 198.80 notified by Pakistan Bureau of Statistics for the month of November 2014 |
| CPI (Rev) | = | the revised CPI notified by Pakistan Bureau of Statistics |
| US CPI (Ref) | = | the reference US CPI of 236.15 notified by US Labour Bureau & Statistics (All Urban Consumers) for the month of November 2014 |
| US CPI (Rev) | = | the revised US CPI notified by US Labour Bureau & Statistics (All Urban Consumers) |
| ER (Ref) | = | PKR / US\$ exchange rate of 102.4 |
| ER (Rev) | = | The revised TT & OD selling rate of US\$ as notified by the National Bank of Pakistan at invoice date. |

Note: The reference numbers shall be revised based on the revised numbers after incorporating the required adjustment at COD.

Variable O&M

| | | |
|------------------|---|---|
| Fixed O&M (FRev) | = | Rs. 0.0811/kWh * US CPI (Rev) / 236.15 * ER (Rev) / 102.4 |
| Fixed O&M (LRev) | = | Rs. 0.0121/kWh * CPI (Rev) / 198.80 |

Where:

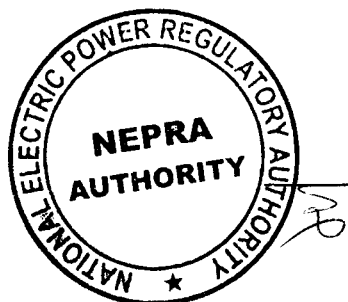
| | | |
|------------------|---|---|
| Fixed O&M (FRev) | = | the revised fixed O&M foreign component of tariff |
| Fixed O&M (LRev) | = | the revised fixed O&M local component of tariff |
| CPI (Ref) | = | the reference CPI of 198.80 notified by Pakistan Bureau of Statistics for the month of November 2014 |
| CPI (Rev) | = | the revised CPI notified by Pakistan Bureau of Statistics |
| US CPI (Ref) | = | the reference US CPI of 236.15 notified by US Labour Bureau & Statistics (All Urban Consumers) for the month of November 2014 |
| US CPI (Rev) | = | the revised US CPI notified by US Labour Bureau & Statistics (All Urban Consumers) |
| ER (Ref) | = | PKR / US\$ exchange rate of 102.4 |
| ER (Rev) | = | The revised TT & OD selling rate of US\$ as notified by the National Bank of Pakistan at invoice date. |

Note: The reference numbers shall be revised based on the revised numbers after incorporating the required adjustment at COD. The Ash, lime stone and water charges shall be adjusted as per actual.

Adjustment for KIBOR variation

The interest part of fixed charge component shall remain unchanged throughout the term except for the adjustment due to variation in interest rate as the result of variation in quarterly KIBOR according to the following formula:

$$\Delta I (I) = P (LRev) * (KIBOR (Rev) * 13.60\%) / 4$$





Where:

$\Delta I(L)$ = the variation in interest charges on local loan applicable corresponding to variation in quarterly KIBOR. $\Delta I(L)$ can be positive or negative depending upon whether KIBOR (Rev) > or < 13.60%. The interest payment obligation will be enhanced or reduced to the extent of $\Delta I(L)$ for each quarter under adjustment applicable on quarterly basis.

P (Rev) = In the outstanding principal (as indicated in the attached debt service schedule to this order) on a quarterly basis on the relevant quarterly calculations date. Period 1 shall commence on the date on which the 1st installment is due after availing the grace period.

IV. Fuel Price Variation

The cost of fuel is a pass through item and is variable with dispatch. The Fuel Cost Component is calculated using the delivered coal price at the coal yard, the heating value of coal and the plant heat rate. As a matter of reference the figures indicated by the FFBL Power Company Limited has been taken which are given hereunder:

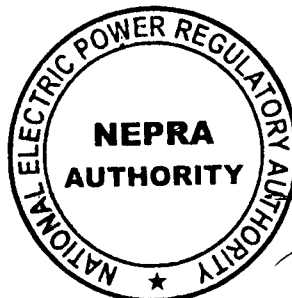
| | |
|--------------------------------|--|
| Coal Price FOB | USD 63.38/Ton Richards Bay (High CV – basis 6,000kc NAR) price as notified by HIS Energy McClosky Coal Report on November 7, 2014 |
| Marine Freight | 13.38 US\$ /M.Ton |
| Transport and handling charges | 8.28 US\$ /M.Ton |
| Coal Price | US\$ 84.47 /M.Ton |

During the tariff period the fuel cost shall be calculated according to the following formula on monthly basis:

$$FCC = \left(\left(\left(CP_{(RB)} + Ft_{(M)} + MI + OC \pm Premium/Discount \right) \times \frac{HR}{HV_{(RB)}} \times \frac{Q_{(RB)}}{Q_{(T)}} \right) \times FC_{(Over)} + Ft_{(Inland)} \right)$$

Where;

| | | |
|--------|---|--|
| CP(RB) | = | Actual Weighted Average Richard Bay (South Africa) coal prices on the basis of Opening Inventory of coal and purchases of coal till the month immediately preceding the invoice month indicated in the Global coal |
| Ft(M) | = | Actual Weighted Average Contracted Marine Freight per ton from South Africa |





| | | |
|----------|---|---|
| OC | = | Other cost Include Bunker Fuel, Port Charges & Insurance |
| HV(RB) | = | Actual Weighted Average Heating Value of the coal imported from South Africa |
| Q(RB) | = | Actual quantity of coal (Tons) purchased from South Africa during the month immediately preceding the invoice month |
| QT | = | Total quantity of coal purchased during the month immediately preceding the invoice month |
| FC(Exch) | = | PKR/\$ exchange rate average for the month |
| Ft(Inl) | = | Actual Inland Freight expressed in Rs./M.Ton |

V. Losses on Transportation of Coal

The power producer will be allowed losses on coal handling, transportation of imported / local coal up to 1% . If the Coal Supply Agreement caters for the transportation losses in the price, there will be no adjustment in coal pricing on account of transportation losses.

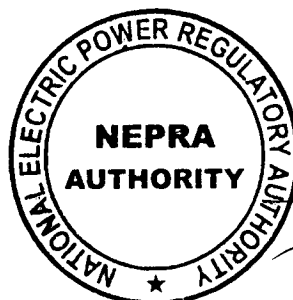
VI. Monitoring Mechanism for the use of coal fuel

The Power Producer shall furnish a monthly coal usage and coal procurement statement duly verified and certified by the power purchaser for each month, along with the monthly energy bill. The statement shall cover details such as –

- Quantity of fuel (tons) consumed and procured for each source along with heating value during the month for power generation purposes,
- Cumulative quantity (tons) of coal consumed and procured till the end of that month during the year source wise,
- Actual (gross and net) energy generation (denominated in units) during the month,
- Cumulative actual (gross and net) energy generation (denominated in units) until the end of that month during the year,
- Opening fuel stock quantity (tons),
- Receipt of fuel quantity (tons) at the power plant site and
- Closing fuel stock quantity (tons) for available at the power plant site.

VII. Definitions and Interpretations

- i. “Auxiliary energy consumption” means the quantum of energy consumed by auxiliary equipment of the generating facility, and transformer losses within the generating facility, expressed in Megawatts as well as in percentage of the sum of gross output at the generator terminals of all the units of the generating plant;
- ii. “Capital cost” means the cost of all capital work including plant and machinery, civil work, erection and commissioning and evacuation infrastructure up to inter-connection point;
- iii. “Design Coal” means the ideal type of coal or fuel that is selected to be used during performance testing of steam generators in power plant engineering;





-
- iv. "Grace Period" means a period equivalent to the construction period of the coal project.
- v. "Installed capacity" means the summation of the name plate capacities of all the units of the generating facility or the capacity of the generating facility (reckoned at the generator terminals), approved by the Authority from time to time as indicated in the generation license;
- vi. "Inter-connection Point" shall mean interface point of energy generating facility with the transmission system or distribution system, as the case may be:
- vii. "Operation and maintenance expenses" or 'O&M expenses' means the expenditure incurred on operation and maintenance of the project, or part thereof, and includes the expenditure on manpower, repairs, spares, consumables and overheads;
- viii. "Project" means a generating facility or the evacuation system up to inter-connection point;
- ix. "Tariff period" means the period for which the upfront tariff has been determined by the Authority on the basis of reference parameters which in the instant case is 30 years. The tariff period shall commence from the date of commercial operation.
- x. 'Useful Life' in relation to a unit of a generating facility including evacuation system shall mean the period during which the generating facility including evacuation system is expected to be usable for the purpose of generating electricity from the date of commercial operation (COD) of such generation facility, namely coal based power project is 30 years;
- xi. "Year" means a period of 12 months.
- VIII. The above order along with two Annexes will be notified in the official Gazette in accordance with the Section 31(4) of the NEPRA Act 1997. The same shall be incorporated in the Power Acquisition Contract (PAC) between the K-Electric and Seller i.e. FFBL Power Company Limited.
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FFBL Power Company Limited - 52 MW Coal Based Generation Power Plant

Annex - 1

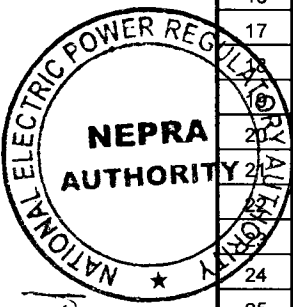
| Year | Energy Purchase Price (Rs./kWh) | | | | | | | Capacity Purchase Price (PKR/kWh) | | | | | | | Total Rs./kWh | Total Cents/kWh | |
|------|---------------------------------|-----------------|---------------|----------|--------|--------------|-----------|-----------------------------------|----------------|-----------|--------|-------------------|---------------------|--------------|------------------|--------------------|---------|
| | Fuel Component | Ash Disposal | Lime Stone | Var. O&M | | Total EPP | Fixed O&M | | Cost of W/C | Insurance | FOE | Debt Repayment | Interest Charges | Total CPP | | | |
| | | | | Foreign | Local | | Local | Foreign | | | | | | | | | |
| 1 | 4.2939 | 0.1753 | 0.0897 | 0.0811 | 0.0121 | 0.1590 | 4.8111 | 0.1887 | 0.1844 | 0.2351 | 0.2134 | 1.3447 | 1.0254 | 2.6868 | 5.8785 | 10.6896 | 10.4390 |
| 2 | 4.2939 | 0.1753 | 0.0897 | 0.0811 | 0.0121 | 0.1590 | 4.8111 | 0.1887 | 0.1844 | 0.2351 | 0.2134 | 1.3447 | 1.1721 | 2.5401 | 5.8785 | 10.6896 | 10.4390 |
| 3 | 4.2939 | 0.1753 | 0.0897 | 0.0811 | 0.0121 | 0.1590 | 4.8111 | 0.1887 | 0.1844 | 0.2351 | 0.2134 | 1.3447 | 1.3399 | 2.3724 | 5.8785 | 10.6896 | 10.4390 |
| 4 | 4.2939 | 0.1753 | 0.0897 | 0.0811 | 0.0121 | 0.1590 | 4.8111 | 0.1887 | 0.1844 | 0.2351 | 0.2134 | 1.3447 | 1.5316 | 2.1806 | 5.8785 | 10.6896 | 10.4390 |
| 5 | 4.2939 | 0.1753 | 0.0897 | 0.0811 | 0.0121 | 0.1590 | 4.8111 | 0.1887 | 0.1844 | 0.2351 | 0.2134 | 1.3447 | 1.7508 | 1.9615 | 5.8785 | 10.6896 | 10.4390 |
| 6 | 4.2939 | 0.1753 | 0.0897 | 0.0811 | 0.0121 | 0.1590 | 4.8111 | 0.1887 | 0.1844 | 0.2351 | 0.2134 | 1.3447 | 2.0013 | 1.7109 | 5.8785 | 10.6896 | 10.4390 |
| 7 | 4.2939 | 0.1753 | 0.0897 | 0.0811 | 0.0121 | 0.1590 | 4.8111 | 0.1887 | 0.1844 | 0.2351 | 0.2134 | 1.3447 | 2.2877 | 1.4246 | 5.8785 | 10.6896 | 10.4390 |
| 8 | 4.2939 | 0.1753 | 0.0897 | 0.0811 | 0.0121 | 0.1590 | 4.8111 | 0.1887 | 0.1844 | 0.2351 | 0.2134 | 1.3447 | 2.6150 | 1.0972 | 5.8785 | 10.6896 | 10.4390 |
| 9 | 4.2939 | 0.1753 | 0.0897 | 0.0811 | 0.0121 | 0.1590 | 4.8111 | 0.1887 | 0.1844 | 0.2351 | 0.2134 | 1.3447 | 2.9892 | 0.7230 | 5.8785 | 10.6896 | 10.4390 |
| 10 | 4.2939 | 0.1753 | 0.0897 | 0.0811 | 0.0121 | 0.1590 | 4.8111 | 0.1887 | 0.1844 | 0.2351 | 0.2134 | 1.3447 | 3.4169 | 0.2953 | 5.8785 | 10.6896 | 10.4390 |
| 11 | 4.2939 | 0.1753 | 0.0897 | 0.0811 | 0.0121 | 0.1590 | 4.8111 | 0.1887 | 0.1844 | 0.2351 | 0.2134 | 1.3447 | 0.0000 | 0.0000 | 2.1662 | 6.9774 | 6.8138 |
| 12 | 4.2939 | 0.1753 | 0.0897 | 0.0811 | 0.0121 | 0.1590 | 4.8111 | 0.1887 | 0.1844 | 0.2351 | 0.2134 | 1.3447 | 0.0000 | 0.0000 | 2.1662 | 6.9774 | 6.8138 |
| 13 | 4.2939 | 0.1753 | 0.0897 | 0.0811 | 0.0121 | 0.1590 | 4.8111 | 0.1887 | 0.1844 | 0.2351 | 0.2134 | 1.3447 | 0.0000 | 0.0000 | 2.1662 | 6.9774 | 6.8138 |
| 14 | 4.2939 | 0.1753 | 0.0897 | 0.0811 | 0.0121 | 0.1590 | 4.8111 | 0.1887 | 0.1844 | 0.2351 | 0.2134 | 1.3447 | 0.0000 | 0.0000 | 2.1662 | 6.9774 | 6.8138 |
| 15 | 4.2939 | 0.1753 | 0.0897 | 0.0811 | 0.0121 | 0.1590 | 4.8111 | 0.1887 | 0.1844 | 0.2351 | 0.2134 | 1.3447 | 0.0000 | 0.0000 | 2.1662 | 6.9774 | 6.8138 |
| 16 | 4.2939 | 0.1753 | 0.0897 | 0.0811 | 0.0121 | 0.1590 | 4.8111 | 0.1887 | 0.1844 | 0.2351 | 0.2134 | 1.3447 | 0.0000 | 0.0000 | 2.1662 | 6.9774 | 6.8138 |
| 17 | 4.2939 | 0.1753 | 0.0897 | 0.0811 | 0.0121 | 0.1590 | 4.8111 | 0.1887 | 0.1844 | 0.2351 | 0.2134 | 1.3447 | 0.0000 | 0.0000 | 2.1662 | 6.9774 | 6.8138 |
| 18 | 4.2939 | 0.1753 | 0.0897 | 0.0811 | 0.0121 | 0.1590 | 4.8111 | 0.1887 | 0.1844 | 0.2351 | 0.2134 | 1.3447 | 0.0000 | 0.0000 | 2.1662 | 6.9774 | 6.8138 |
| 19 | 4.2939 | 0.1753 | 0.0897 | 0.0811 | 0.0121 | 0.1590 | 4.8111 | 0.1887 | 0.1844 | 0.2351 | 0.2134 | 1.3447 | 0.0000 | 0.0000 | 2.1662 | 6.9774 | 6.8138 |
| 20 | 4.2939 | 0.1753 | 0.0897 | 0.0811 | 0.0121 | 0.1590 | 4.8111 | 0.1887 | 0.1844 | 0.2351 | 0.2134 | 1.3447 | 0.0000 | 0.0000 | 2.1662 | 6.9774 | 6.8138 |
| 21 | 4.2939 | 0.1753 | 0.0897 | 0.0811 | 0.0121 | 0.1590 | 4.8111 | 0.1887 | 0.1844 | 0.2351 | 0.2134 | 1.3447 | 0.0000 | 0.0000 | 2.1662 | 6.9774 | 6.8138 |
| 22 | 4.2939 | 0.1753 | 0.0897 | 0.0811 | 0.0121 | 0.1590 | 4.8111 | 0.1887 | 0.1844 | 0.2351 | 0.2134 | 1.3447 | 0.0000 | 0.0000 | 2.1662 | 6.9774 | 6.8138 |
| 23 | 4.2939 | 0.1753 | 0.0897 | 0.0811 | 0.0121 | 0.1590 | 4.8111 | 0.1887 | 0.1844 | 0.2351 | 0.2134 | 1.3447 | 0.0000 | 0.0000 | 2.1662 | 6.9774 | 6.8138 |
| 24 | 4.2939 | 0.1753 | 0.0897 | 0.0811 | 0.0121 | 0.1590 | 4.8111 | 0.1887 | 0.1844 | 0.2351 | 0.2134 | 1.3447 | 0.0000 | 0.0000 | 2.1662 | 6.9774 | 6.8138 |
| 25 | 4.2939 | 0.1753 | 0.0897 | 0.0811 | 0.0121 | 0.1590 | 4.8111 | 0.1887 | 0.1844 | 0.2351 | 0.2134 | 1.3447 | 0.0000 | 0.0000 | 2.1662 | 6.9774 | 6.8138 |
| 26 | 4.2939 | 0.1753 | 0.0897 | 0.0811 | 0.0121 | 0.1590 | 4.8111 | 0.1887 | 0.1844 | 0.2351 | 0.2134 | 1.3447 | 0.0000 | 0.0000 | 2.1662 | 6.9774 | 6.8138 |
| 27 | 4.2939 | 0.1753 | 0.0897 | 0.0811 | 0.0121 | 0.1590 | 4.8111 | 0.1887 | 0.1844 | 0.2351 | 0.2134 | 1.3447 | 0.0000 | 0.0000 | 2.1662 | 6.9774 | 6.8138 |
| 28 | 4.2939 | 0.1753 | 0.0897 | 0.0811 | 0.0121 | 0.1590 | 4.8111 | 0.1887 | 0.1844 | 0.2351 | 0.2134 | 1.3447 | 0.0000 | 0.0000 | 2.1662 | 6.9774 | 6.8138 |
| 29 | 4.2939 | 0.1753 | 0.0897 | 0.0811 | 0.0121 | 0.1590 | 4.8111 | 0.1887 | 0.1844 | 0.2351 | 0.2134 | 1.3447 | 0.0000 | 0.0000 | 2.1662 | 6.9774 | 6.8138 |
| 30 | 4.2939 | 0.1753 | 0.0897 | 0.0811 | 0.0121 | 0.1590 | 4.8111 | 0.1887 | 0.1844 | 0.2351 | 0.2134 | 1.3447 | 0.0000 | 0.0000 | 2.1662 | 6.9774 | 6.8138 |

Average

| | | | | | | | | | | | | | | | | | |
|-------|--------|--|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|
| 1-10 | 4.2939 | | | 0.0811 | 0.0121 | 0.1590 | 4.8111 | 0.1887 | 0.1844 | 0.2351 | 0.2134 | 1.3447 | 2.0130 | 1.6992 | 5.8785 | 10.6896 | 10.4390 |
| 11-30 | 4.2939 | | | 0.0811 | 0.0121 | 0.1590 | 4.8111 | 0.1887 | 0.1844 | 0.2351 | 0.2134 | 1.3447 | 0.0000 | 0.0000 | 2.1662 | 6.9774 | 6.8138 |
| 1-30 | 4.2939 | | | 0.0811 | 0.0121 | 0.1590 | 4.8111 | 0.1887 | 0.1844 | 0.2351 | 0.2134 | 1.3447 | 0.6710 | 0.5664 | 3.4036 | 8.2148 | 8.0222 |

Levelized

| | | | | | | | | | | | | | | | | | |
|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------------|---------------|
| 1-30 | 4.2939 | 0.1753 | 0.0897 | 0.0811 | 0.0121 | 0.1590 | 4.8111 | 0.1887 | 0.1844 | 0.2351 | 0.2134 | 1.3447 | 1.1827 | 1.2370 | 4.5859 | 9.3970 | 9.1768 |
|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------------|---------------|

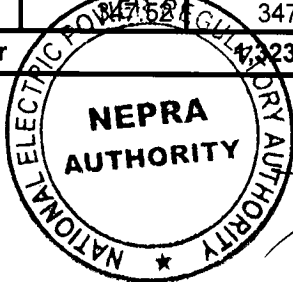


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FFBL Power Company Limited - 52 MW Coal Based Generation Power Plant

| | | | | |
|---------------------|--------|-----|--------------------|--------------------------|
| Gross Capacity | 58.000 | MWs | US\$/PKR Parity | 102.40 |
| Net Capacity | 52.000 | MWs | Equity | 25% 2,598.04 PKR Million |
| KIBOR | 10.10% | | Debt | 75% 76.11 US\$ Million |
| Spread over KIBOR | 3.50% | | Debt in Pak Rupees | 7,794.12 PKR Million |
| Total Interest Rate | 13.60% | | | |

| Period | Principal Million PKR | Principal Repayment Million PKR | Interest Million PKR | Balaaance Million PKR | Debt Service Million PKR | Principal Repayment Rs./kWh | Interest Rs./kWh | Debt Servicing Rs./kWh |
|------------------|-----------------------|---------------------------------|----------------------|-----------------------|--------------------------|-----------------------------|------------------|------------------------|
| 1 | 7,794.12 | 94.34 | 265.00 | 7,699.78 | 359.34 | | | |
| 2 | 7,699.78 | 97.54 | 261.79 | 7,602.24 | 359.34 | | | |
| 3 | 7,602.24 | 100.86 | 258.48 | 7,501.38 | 359.34 | | | |
| 4 | 7,501.38 | 104.29 | 255.05 | 7,397.09 | 359.34 | 1.0254 | 2.6868 | 3.7122 |
| 1st Year | | 397.03 | 1,040.32 | | 1,437.35 | | | |
| 5 | 7,397.09 | 107.84 | 251.50 | 7,289.25 | 359.34 | | | |
| 6 | 7,289.25 | 111.50 | 247.83 | 7,177.75 | 359.34 | | | |
| 7 | 7,177.75 | 115.29 | 244.04 | 7,062.46 | 359.34 | | | |
| 8 | 7,062.46 | 119.21 | 240.12 | 6,943.24 | 359.34 | 1.1721 | 2.5401 | 3.7122 |
| 2nd Year | | 453.84 | 983.50 | | 1,437.35 | | | |
| 9 | 6,943.24 | 123.27 | 236.07 | 6,819.98 | 359.34 | | | |
| 10 | 6,819.98 | 127.46 | 231.88 | 6,692.52 | 359.34 | | | |
| 11 | 6,692.52 | 131.79 | 227.55 | 6,560.73 | 359.34 | | | |
| 12 | 6,560.73 | 136.27 | 223.06 | 6,424.46 | 359.34 | 1.3399 | 2.3724 | 3.7122 |
| 3rd Year | | 518.79 | 918.56 | | 1,437.35 | | | |
| 13 | 6,424.46 | 140.90 | 218.43 | 6,283.55 | 359.34 | | | |
| 14 | 6,283.55 | 145.70 | 213.64 | 6,137.86 | 359.34 | | | |
| 15 | 6,137.86 | 150.65 | 208.69 | 5,987.21 | 359.34 | | | |
| 16 | 5,987.21 | 155.77 | 203.57 | 5,831.44 | 359.34 | 1.5316 | 2.1806 | 3.7122 |
| 4th Year | | 593.02 | 844.32 | | 1,437.35 | | | |
| 17 | 5,831.44 | 161.07 | 198.27 | 5,670.37 | 359.34 | | | |
| 18 | 5,670.37 | 166.54 | 192.79 | 5,503.82 | 359.34 | | | |
| 19 | 5,503.82 | 172.21 | 187.13 | 5,331.62 | 359.34 | | | |
| 20 | 5,331.62 | 178.06 | 181.27 | 5,153.56 | 359.34 | 1.7508 | 1.9615 | 3.7122 |
| 5th Year | | 677.88 | 759.47 | | 1,437.35 | | | |
| 21 | 5,153.56 | 184.12 | 175.22 | 4,969.44 | 359.34 | | | |
| 22 | 4,969.44 | 190.38 | 168.96 | 4,779.06 | 359.34 | | | |
| 23 | 4,779.06 | 196.85 | 162.49 | 4,582.22 | 359.34 | | | |
| 24 | 4,582.22 | 203.54 | 155.80 | 4,378.68 | 359.34 | 2.0013 | 1.7109 | 3.7122 |
| 6th Year | | 774.88 | 662.47 | | 1,437.35 | | | |
| 25 | 4,378.68 | 210.46 | 148.87 | 4,168.21 | 359.34 | | | |
| 26 | 4,168.21 | 217.62 | 141.72 | 3,950.60 | 359.34 | | | |
| 27 | 3,950.60 | 225.02 | 134.32 | 3,725.58 | 359.34 | | | |
| 28 | 3,725.58 | 232.67 | 126.67 | 3,492.91 | 359.34 | 2.2877 | 1.4246 | 3.7122 |
| 7th Year | | 885.76 | 551.58 | | 1,437.35 | | | |
| 29 | 3,492.91 | 240.58 | 118.76 | 3,252.34 | 359.34 | | | |
| 30 | 3,252.34 | 248.76 | 110.58 | 3,003.58 | 359.34 | | | |
| 31 | 3,003.58 | 257.21 | 102.12 | 2,746.36 | 359.34 | | | |
| 32 | 2,746.36 | 265.96 | 93.38 | 2,480.40 | 359.34 | 2.6150 | 1.0972 | 3.7122 |
| 8th Year | | 1,012.51 | 424.84 | | 1,437.35 | | | |
| 33 | 2,480.40 | 275.00 | 84.33 | 2,205.40 | 359.34 | | | |
| 34 | 2,205.40 | 284.35 | 74.98 | 1,921.05 | 359.34 | | | |
| 35 | 1,921.05 | 294.02 | 65.32 | 1,627.03 | 359.34 | | | |
| 36 | 1,627.03 | 304.02 | 55.32 | 1,323.01 | 359.34 | 2.9892 | 0.7230 | 3.7122 |
| 9th Year | | 1,157.39 | 279.95 | | 1,437.35 | | | |
| 37 | 1,323.01 | 314.35 | 44.98 | 1,008.66 | 359.34 | | | |
| 38 | 1,008.66 | 325.04 | 34.29 | 683.61 | 359.34 | | | |
| 39 | 683.61 | 336.09 | 23.24 | 347.52 | 359.34 | | | |
| 40 | 347.52 | 347.52 | 11.82 | (0.00) | 359.34 | 3.4169 | 0.2953 | 3.7122 |
| 10th Year | | 4,323.01 | 114.34 | | 1,437.35 | | | |



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