



# National Electric Power Regulatory Authority Islamic Republic of Pakistan

NEPRA Tower, Attaturk Avenue (East), G-5/1, Islamabad  
Ph: +92-51-9206500, Fax: +92-51-2600026  
Web: www.nepra.org.pk, E-mail: registrar@nepra.org.pk

No. NEPRA/TRF-311/KEPL-2015 /17525-17527  
December 9, 2015

**Subject: Determination of the Authority in the Matter of Tariff Petition filed by K-Energy (Pvt.) Ltd. (KEPL) for Determination of Tariff for 421.909 MW (Gross) Coal Conversion Project of Unit 3 & 4 of Bin Qasim Power Station – I at Bin Qasim, Karachi [Case # NEPRA/TRF-311/KEPL-2015]**

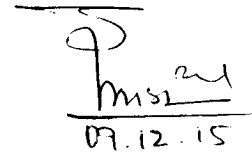
Dear Sir,

Please find enclosed herewith the subject Determination of the Authority along with Annex-I and Annex-II (43 pages) in Case No. NEPRA/TRF-311/KEPL-2015.

2. The Determination is being intimated to the Federal Government for the purpose of notification of the approved tariff in the official gazette pursuant to Section 31(4) of the Regulation of Generation, Transmission and Distribution of Electric Power Act (XL of 1997) and Rule 16(11) of the National Electric Power Regulatory Authority Tariff (Standards and Procedure) Rules, 1998.

3. Please note that Order of the Authority along with 2 Annexes (Annex-I & Annex-II) of the Determination needs to be notified in the official Gazette.

Enclosure: As above



07.12.15

( 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)

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Determination of the Authority

In the matter of Tariff Petition filed by K-Energy Private Limited (KEPL) for determination of tariff for 421.909MW (Gross) Coal Conversion Project of Unit 3 & 4 of Bin Qasim Power Station-I at Bin Qasim Karachi

December 09, 2015

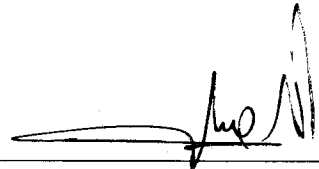
**Commentators:**


- i. Ministry of Planning, Development & Reforms
- ii. Whistleblower Pakistan
- iii. Mr. Anil Mumtaz
- iv. Mr. Arif Bilwani

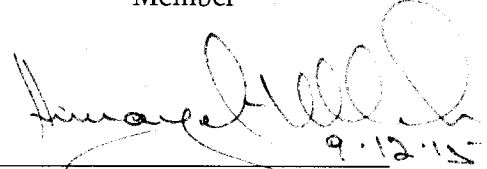
The Authority, in exercise of the powers conferred on it under Section 7(3) (a) read with Section 31 of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997, Tariff Standards and Procedure Rules, 1998 and all other powers enabling it in this behalf, and after taking into consideration all the submissions made by the parties, issues raised, evidence/ record produced during hearings, and all other relevant material, hereby issues this determination.

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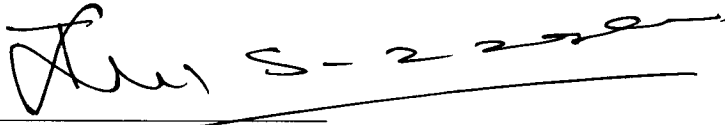
AUTHORITY

  
(Khawaja Muhammad Naeem)  
Member

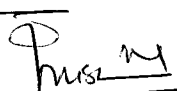
  
(Maj. (R) Haroon Rashid)  
Member

  
(Himayat Ullah Khan)  
Member

  
(Syed Masood ul Hassan Naqvi)  
Member

  
(Brig. (R) Tariq Saddozai)  
Chairman

9/12/15

  
09.12.15

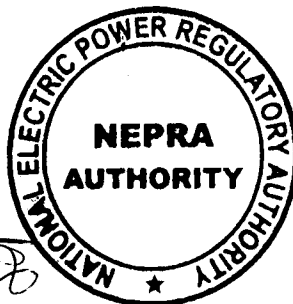


## INTRODUCTION

1. The Authority through its determination No. NEPRA/R/LAG- 05/3476-78, Dated April 03, 2014 approved a Licensee Proposed Modification (LPM) excluding two (02) units of BQPS-I (i.e. Unit No. 3 & 4) with a cumulative Installed Capacity of 420.00 MW from the above Generation Licence of K-Electric Limited (KEL). The said units were excluded from the Generation Licence of KEL for leasing the same to K-Energy (Pvt.) Limited (hereinafter referred to as "KEPL" or "the Petitioner") for Coal Conversion.
2. KEPL filed its tariff petition vide letter dated April 21, 2015 for determination of a reference generation tariff of KEPL's 421.90 MW (gross) power generation facility located at Bin Qasim Industrial Park, Port Qasim Karachi, Sindh, under Rule 3 of the NEPRA (Tariff Standard and Procedure) Rules 1998, (hereinafter referred to as the "Tariff rules 1998") read with the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 and the rules and Regulations made thereunder.

## PROJECT BRIEF

3. As per the Petitioner, the project envisages setting up a 421.90 MW Coal Fired Thermal Power Project under an "IPP structure" by incorporating a separate legal entity pursuant to Section 2 (xii) and Section 24 of NEPRA Act 1997. The Project will be set up within the existing facility of Bin Qasim Power Station - I (BQPS-I) in Karachi, Sindh by leasing out the existing Units 3 & 4 of BQPS-I of K-Electric which will be repaired/ upgraded/ overhauled under the EPC arrangements for the purpose of this Project, together with sufficient piece of land from within BQPS-I for the new construction requirements. The Petitioner will further invest in new boilers including chimney structure, installation of equipment such as crushers and pulverisers, coal storage and handling facilities, ash handling and disposal, electronic precipitator, new steam turbines (save outer casing) and all related ancillaries of Units 3 & 4 of BQPS-I through the EPC contract.
4. A brief summary of the projects related information as submitted by the Petitioner is as under;



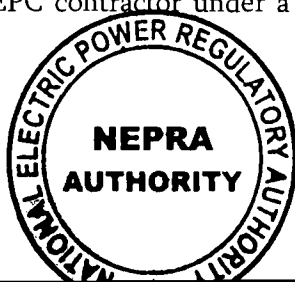
<b>Project Capacity</b>	<b>421.909 MW (Gross)</b> <b>372.256 MW (Net)</b>
<b>Auxiliary</b>	49.653 MW (12%)
<b>Efficiency</b>	38.1% LHV- Gross
<b>Plant Type</b>	Sub-Critical Steam Turbine
<b>Technology</b>	Sub-Critical pulverized lignite coal boiler; Harbin Electric Steam Turbine
<b>No. of Turbines</b>	Two (02)
<b>Capacity per Turbine</b>	210.955 MW
<b>Project Life</b>	20 Years from COD
<b>EPC Contractor</b>	Harbin Electric International
<b>Fuel Type</b>	Lignite Coal
<b>Energy Production</b>	100% dispatch: 3261 GWh 85% dispatch: 2772 GWh
<b>Construction Period</b>	28 Months for the first Unit and 32 months for the Complex after issuance of Notice to proceed

5. A break-up of the project cost of US \$ 624 Million, submitted by the Petitioner is as under;

<b>Project Cost</b>	<b>USD</b>
<b>New Investments</b>	
EPC Cost	288,800,000
LC Confirmation Charges	2,107,080
Taxes and Duties	18,194,400
Emergency and Safety Spare Parts	6,516,000
Non-EPC Cost	1,000,000
Land	5,245,716
Owner's Engineer, 3 <sup>rd</sup> Party Inspector and Independent Engineer Costs	10,517,015
Project Development Cost	11,982,798
O&M Mobilisation Cost	1,500,000
Project Commissioning	14,523,220
Pre-COD Insurance	5,073,800
Coal Primary Storage and Handling Infrastructure	15,182,073
Financial Fees and Charges	6,281,250
Interest During Construction	31,180,364
<i>Subtotal - New Investments</i>	418,103,716
Lease Assets from KEL	206,254,228
<b>Total Project Cost</b>	<b>624,357,944</b>

## PROJECT FINANCING

6. The petitioner has proposed a debt to equity ratio of 79:21. As per the Petitioner, the Equity of US \$ 130.0 Million would be injected by BEEG Investment Limited (BEEGIL), a British Virgin Islands based Investment Company, whereas debt amounting to approx. US \$ 150.4 million will be arranged from domestic financial institutions and US \$ 137.7 million will be made available by the EPC contractor under a deferred credit facility arrangement. Assets



worth US \$ 206.2 million will be obtained on lease from KEL. The table below shows the proposed financing structure of the project.

<b>Financing Plan</b>	Project Financing	<b>Percentage</b>	<b>USD</b>
	Equity	20.82%	130,000,000
	Debt	79.18%	
	Local Banks		150,403,716
	Deferred Credit		137,700,000
	Lease		206,254,228
	<b>Total Financing</b>	<b>100%</b>	<b>624,357,944</b>
<b>Local Bank Debt Financing Terms</b>	Loan period:	12.5 years (Inclusive of Grace Period)	
	Grace Period:	2.5 years	
	Repayment:	Quarterly	
	Interest Rate:	KIBOR (3 Months) + 3% p.a.	
	KIBOR:	10.18% p.a.	
<b>Deferred Credit Terms</b>	Credit period:	5.5 years (Inclusive of Grace Period)	
	Grace Period:	2.5 years	
	Repayment:	Quarterly	
	Installment:	USD 11.475 million per quarter	
<b>Lease Financing Terms</b>	Lease payments:	Quarterly	
	Lease rate:	KIBOR (3 Months) + 3% p.a.	
	KIBOR	10.18% p.a.	
	Lease period	20 years	

#### PROPOSED TARIFF

7. KEPL proposed the following two part levelized tariff.

<b>LEVELIZED TARIFF</b>		
<b>Capacity Charge</b>		
<b>Description</b>	<b>PKR/ kWh</b>	<b>Cents/ kWh</b>
Fixed O & M cost	0.5852	0.5978
Insurance	0.2006	0.2049
Cost of working capital	0.2113	0.2158
Return on equity	0.8381	0.8561
ROEDC	0.3275	0.3345
Withholding tax on dividend	0.0874	0.0893
Lease Payments	0.8821	0.9010
Deferred Payment	0.4025	0.4112
Principal	0.2947	0.3010
Interest	0.2965	0.3029
<b>Total CPP</b>	<b>4.1260</b>	<b>4.2145</b>



<b>Energy Charge</b>		
<b>Description</b>	<b>PKR/ kWh</b>	<b>Cents/ kWh</b>

Fuel Cost Component-FCC	4.7113	4.8123
Variable O & M	0.1676	0.1712
<b>Total EPP</b>	<b>4.8789</b>	<b>4.9836</b>
<b>Total Tariff @100%</b>	<b>9.0049</b>	<b>9.1981</b>
<b>Total Tariff @85%</b>	<b>9.7330</b>	<b>9.9418</b>

## ADMISSION OF THE TARIFF PETITION

8. The petition was admitted by the Authority on May 8, 2015. Pursuant to the admission of petition by the Authority, notice of admission, was published in the newspapers on May 29, 2015 under Rule 4(6) of the Tariff Rules 1998, whereby filing of Intervention Requests/ Comments by any interested/affected persons were sought within seven (7) days from the date of publication of this notice. The same was also uploaded on NEPRA's website along-with the tariff petition. Hearing in the matter was fixed for June 11, 2015.

## ISSUES FRAMED FOR THE PROCEEDINGS

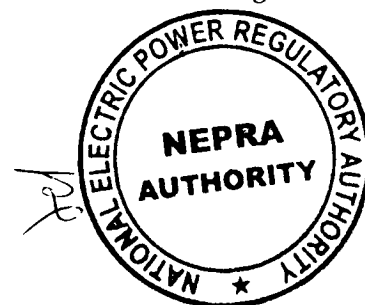
9. In accordance with the Rule 9(2) of Tariff Rules 1998 and based on the contents of the petition, following issues were framed for discussion during the hearing and for presenting written as well as oral evidence and arguments:
- Whether the total project cost of US\$ 624 Million i.e. new investment US\$ 418 Million and Lease Cost of US\$ 206 Million for Unit 3 & 4 of BQPS-I is justified?
  - Under the MYT regime of K-Electric, whether the lease cost of US\$ 206 Million be allowed to K-Energy and if so, whether this amount should be adjusted in K-Electric Tariff?
  - Whether the efficiency of 34.75% (HHV-Gross) is reasonable?
  - Whether auxiliary consumption of 49.653 MW (12%) after conversion is justified?
  - Whether the purchase of additional land and its development cost of US\$ 5.24 million is justified?
  - Whether the construction period of 28 months for the first Unit and 32 months for the Complex is justified?
  - Whether Upfront Payment of deferred credit cost in three years is justified?
  - Whether the return on equity @21% on IRR Basis (net of 7.5% WHT) is justified?
  - Whether the proposed two part tariff comprising Energy and Capacity Charge is justified.
  - Whether the requested variable O&M of Rs. 0.1676/kWh is justified?
  - Whether the fixed O&M cost of Rs. 0.5810/kWh is justified?
  - Whether the tariff indexation/ adjustment mechanism proposed by KEPL is justified?
  - Whether all aspects and procedural requirements regarding environmental issues have been fulfilled?



- xiv. Whether the tariff already determined by the Authority for other coal conversion cases i.e. Saba Power, Pakgen and Lalpir, if declared upfront Coal Conversion Tariff by the Authority, will be acceptable to KEPL?
10. The pleadings so available on record were examined by the Authority in term of Rule 9 of Tariff Rules, 1998 and in order to arrive at a just and informed decision, a hearing in the matter was held on June 11, 2015 at Marriot Hotel Karachi. During the hearing, the Petitioner was represented by Mr. Shaheryar Arshad Chishty, Chief Executive Officer along with his financial and technical team. Representative from NTDC/ CPPA, Fauji Fertilizer Power Company Limited (FPCL), Whistle Blower Pakistan and general public also participated in the hearing.

#### FILING OF COMMENTS

11. In response to the notice of hearing, written comments were received from the following, whereas Mr. Arif Bilwani made his submission during the hearing:
- i. Ministry of Planning, Development & Reforms
  - ii. Whistleblower Pakistan
  - iii. Mr. Anil Mumtaz



#### SUBMISSION MADE BY MR. ARIF BILWANI

12. Mr. Arif Bilwani submitted that this conversion project should have been taken up by K-Electric itself rather than by leasing out its own assets. He also mentioned that efficiency requested by KEPL is on the lower side as compared to what Authority has already allowed in the upfront coal tariff. Mr. Bilwani further mentioned that Authority has allowed IRR @ 17% in the upfront tariff for the new plants whereas K-Electric is requesting IRR of 21% and that too for the old plant. Mr. Bilwani proposed that Authority should consider allowing Tariff to KEPL on Take and Pay basis instead of Take or Pay basis.

#### MINISTRY OF PLANNING, DEVELOPMENT & REFORMS - COMMENTATOR

13. Ministry of Planning, Development & Reforms, GoP, vide its letter No. 42(10)Energy/PD/2015 dated 17<sup>th</sup> June, 2015 made the following comments:

Whether the total project cost of US\$ 624 million i.e. new investment US\$ 418 million and lease cost of US\$ 208 million for Unit 3 & 4 of BOPS-I is justified?

- i. NEPRA in its upfront Tariff for coal had determined US\$ 1.61 million/MW for 220 MW capacity. While determining coal conversion for Pak gen, NEPRA assumed standard cost estimates for boiler and other related equipment as about 46% of the capital cost of a new project. Accordingly if allowed 46% of US\$ 418 million capital cost (new investment) 1.16 US\$/MW, the cost works out to be US\$ 324.648/MW i.e. US\$ 0.771/MW on the basis of number given in petition.



- ii. In the generation license application of K-Energy (Pvt) Ltd. the project cost was as under:

Project cost	US\$ MILLION
EPC	275.6
Non-EPC cost	50.6
Land for Coal Yard	4.6
IDC	21
<b>Total</b>	<b>351.8</b>
Existing Assets	297.9
<b>Grand Total</b>	<b>559.7</b>

Under the MYT regime of K-Electric, whether the lease cost of US\$ 206 Million be allowed to K-Energy and if so, whether this amount should be adjusted in KEPL Tariff?

- iii. The amount of US\$ 206 million as a lease amount is paid by KEPL to K-Electric then it should be reflected in K-Electric's revenue stream and tariff should be adjusted accordingly.

Whether the efficiency of 34.75% (HHV-Gross) is reasonable?

- iv. The proposed efficiencies of 34.75% is considered to be low compared to the assumed efficiency in NEPRA's Upfront Tariff Determination.

Whether auxiliary consumption of 49.653 MW (12%) after conversion is justified?

- v. This should be 9% as approved by NEPRA under upfront Tariff.

Whether the construction period of 28 months for the first Unit and 32 months for the Complex is justified?

- vi. Construction period of 32 months having impact on IDC and return on equity during construction (ROEDC), needs to be rationalized.

Whether the return on equity @21% on IRR Basis (net of 7.5% WHT) is justified?

- vii. This should be as per NEPRA up front tariff.

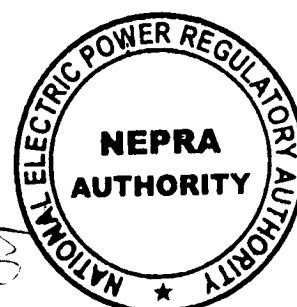
Whether the proposed two part tariff comprising Energy and Capacity Charge is justified.

- viii. Agreed.

Whether the requested variable O&M of Rs. 0.1676/kWh is justified?

- ix. The variable O&M cost components are divided into

Chemical US\$ 1,543,519



Other cost US\$ 4,040,000

- x. Under other cost Third party services of US\$ 450,000 and US\$ 990,000 for consumable which include chlorine, lab chemicals, cotton rags, printer etc. Besides this under chemicals head they are claiming US\$ 1,543,519. This should be looked into and rationalized.

Whether the fixed O&M cost of Rs. 0.5810/kWh is justified?

- xi. Details of fixed O&M cost reveals that it included third party services which includes engagement of expertise in coal shipment inspections, mechanized contractors, chemical laboratories, staff van, ISO act environment services. It is pointed out that the same services are also claimed under third party services for variable O&M. This is duplication and should be removed. No details of personnel for which US\$ 5,008,427 has been kept are given, details of miscellaneous US\$ 1,253,861 are also not given. The overall fixed O&M is on higher side and should be rationalized.

Whether the tariff indexation/ adjustment mechanism proposed by KEPL is justified?

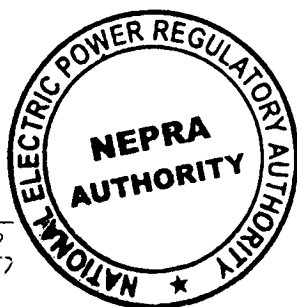
- xii. It should be at par with tariff allowed in other similar case.

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

- xiii. Authority may ask Sindh Environment Protection Agency (SEPA) to certify that all the measures have been taken to take care of environment as another 1200 MW Coal fired power plant is also established at Bin Qasim.

Whether the tariff already determined by the Authority for other coal conversion cases i.e. Saba Power, Pakgen and Lalpir, if declared upfront Coal Conversion Tariff by the Authority, will be acceptable to KEPL?

- xiv. Planning Commission supports the idea of declaring the tariff approved for Saba, Pakgen and Lalpir as upfront tariff for coal conversion.

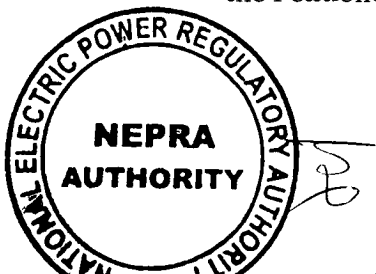


## WHISTLEBLOWER PAKISTAN - COMMENTATOR

14. A brief of the comments submitted by Syed Adil Gilani, Chairman Whistleblower Pakistan, is as under;
- The Authority, overruling the submissions of all the stakeholders, accepted the view point of the Licensee and the investor, and approved the LPM of K-Electric.
  - All the stakeholders, including Whistle Blower, opposed the grant of Generation License but again the Regulator accepted the view point of the investor and over-ruled the submission of the stakeholders and issued Generation License to K-Energy.
  - The tariff determination at hand threatens to significantly impact and cause a huge hike in the price of electricity in comparison to this investment being made prudently and wisely i.e. it may be suggested to the investors to make investment on new power plants, even with smaller capacity of 330 MW having an efficiency in the range of 39%, with high return of 20%, instead of investing in this old, in-efficient plant.
  - With change of boiler, NEPRA has extended the life of the power plant with old Turbine and generator for another 10-15 years; this extension is nothing but extending the life of in-efficiency i.e. if the old in-efficient plant (around 34% HHV efficiency) is required to be retired in 2020 then with extension, this old in-efficient plant will remain in the system, say, for next 10 years meaning thereby that consumer will take burden of 4-5% efficiency loss for additional 10-15 years.
15. Mr. **Anil Mumtaz** vide his letter No.AN/SCOP/15 (i)/2015/3 dated June 04, 2015 submitted his comments in Urdu. A brief of comments of Mr. Mumtaz relevant to the issue is as under;
- KEPL has availed the services of several other companies like K-Electric Limited, BEEG-Investment Limited (BEEGIL), Harbin Electric International, Lahmeyer International GmbH, NESPAK, Habib Bank Limited and Faysal Bank Limited, Grant Thornton Pakistan and Mohsin Tayebaly & Company for completion of this coal conversion project. These companies will not only charge the cost but will also include their profits which will increase the project cost.
  - KEPL has not yet leased out the Unit 3 & 4 from K-Electric but still it has been issued the generation license.
  - As per the KEPL application dated November 20, 2013, KEPL total project cost was US\$ 559.7 Million, whereas, in the instant tariff petition, it has quoted total cost as US\$ 624.3 Million.
  - KEPL has submitted that around 79% of the total cost is being arranged through loans which is to be paid in 10 years and no real investment is being made in the project.

## REJOINDER FROM THE PETITIONER

16. Comments filed by Ministry of Planning, Development & Reforms, Whistleblower Pakistan and Mr. Anil Mumtaz were sent to KEPL for representation. The Petitioner did not file any response/rejoinder against any of these comments. However, contents of the petition filed by the Petitioner addresses the following issues for supporting



17. Having considered the respective submission, perusal of evidence/record and after hearing the Petitioner, issue-wise findings of the Authority is given as under;

**Issues Related to Project Cost**

- i. Whether the total project cost of US\$ 624 million i.e. new investments US\$ 418 million and leased cost of US\$ 206 million for Unit 3&4 of BQPS is justified?
  - ii. Whether the purchase of additional land and its development cost of US\$ 5.24 million is justified?
  - iii. Whether tariff already determined by the Authority for other Coal conversion cases i.e. Saba Power, Pakgen & Lalpir, if declared upfront coal conversion tariff will be acceptable to KEPL?
  - iv. Whether the purchase of additional land and its development cost of US\$ 5.24 million is justified?
  - v. Whether the tariff already determined by the Authority for other coal conversion cases i.e. Saba Power, Pakgen and Lalpir, if declared upfront Coal Conversion Tariff by the Authority, will be acceptable to KEPL?
18. The petitioner submission on the project cost is hereunder:

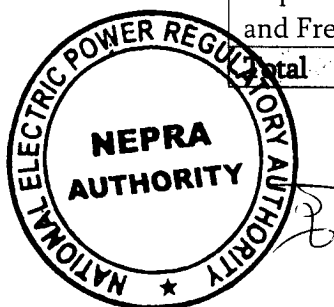
**EPC Cost**

19. According to the Petitioner it has signed the following contracts on 8<sup>th</sup> November 2013:
- a) (Equipment) Supply Contract with Harbin Electric International Company Limited - Contract Price being US\$ 259,920,000 (US Dollars Two Hundred Fifty Nine Million Nine Hundred Twenty Thousand only).
  - b) Services (Construction) Contract with Harbin Electric (HE) Corporation - Contract Price being US\$ 28,880,000 (US Dollars Twenty Eight Million Eight Hundred and Eighty Thousand only).
  - c) According to the Petitioner, Equipment Supply Contract requires the project company to provide a confirmed LC from reputable international bank(s) for payment against Supply of Plant and Equipment under the contract. These charges are assumed at 3% with adjustments at the time of COD based on actual.

**Taxes, Duties & Other Charges**

20. The EPC contract is divided into two parts namely Equipment Supply and Service (Construction) contracts. The duties and taxes on Equipment Supply Contract are therefore expected to be as follows with necessary adjustments at COD based on actual.

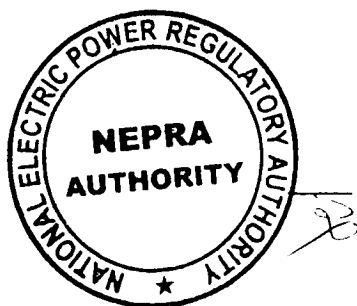
Taxes, Duties and Charges	US\$
Import duty, Sindh Tax, Port Handling and Freight for Equipment Supply Contract	18,194,400
<b>Total</b>	<b>18,194,400</b>



21. Service (Construction) Contract price includes 6% withholding tax. Any change in the rate of such withholding tax will be passed through to the Power Purchaser. However no other taxes like Sind Sales Tax have been catered for and shall be treated as pass through.

**Emergency & Safety Spare Parts**

22. To maintain the required availability of the power plant, the Petitioner stated that it is essential that the plant is maintained as per international standards and best utility practices. Therefore it is essential to source an inventory of the Emergency and Safety Spare Parts to meet the required availability demanded by the Power Purchaser. These emergency parts shall mainly pertain to the boilers, turbines, generators, coal conveyor system, RO Plant, switchyard and other auxiliaries and shall be kept at the Site for consumption on 'as and when required' basis so as to minimize the down time of the equipment / power plant as far as practicable. In this regard, the Petitioner requested emergency spare worth US\$ 6,516,000.



### Non-EPC Cost

23. Under this head, the Petitioner requested an amount of US\$ 1 million. The Petitioner stated that the project will incur this cost because it is a part of scope of EPC Contractor. The Petitioner further submitted non-EPC cost to include, the cost of fire tender, ambulance, site vehicles, site office and site accommodation for Owner and consultants including its running cost, billing and inventory management system, maintenance management system and metering for auxiliary power.

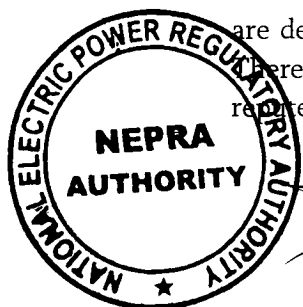
### Land Cost-Secondary Coal Yard

24. According to the Petitioner, the project requires a coal yard within its proximity to allow for storage of a minimum of 7 days requirement of coal. Due to space constraints within BQPS-I, an additional piece of land nearby (at a distance of about 500 meters) BQPS-I will be purchased from PQA and connected with the project through a conveyor system with transfer houses. For this secondary coal yard, the Petitioner required 50 acre of land east of BQPS-I for construction of the coal yard. Following is the break-up of requested land cost:

Land	US\$
Land Acquisition for coal yard (holding area for boiler feed)	2,553,626
Land for Construction of boiler island and ancillary equipment	1,000,000
Capital Value Tax	88,841
Stamp Duty	71,073
<b>Sub Total</b>	<b>3,713,540</b>
Land Filling and Levelling Cost	1,532,176
<b>Total</b>	<b>5,245,716</b>

### Owner's Engineer, 3rd Party Inspection And Independent Engineer Cost

25. **Owner's Engineer:** as per the Petitioner, an Owner's Engineer (OE) is essentially required for development and execution of this project. A number of internationally established and renowned companies were contacted with RFP for OE services. Companies that were contacted included RWE, Fichtner, Lahmeyer, Black & Veatch, Babcock Borsig, KWF, Scott Wilson, Mott MacDonald, Stone & Webster, Knight Piésold, OMS and Desein Engineering. Only 4 companies submitted their bid offers - these were OMS, Mott MacDonald, Lahmeyer and Desein Engineering. Based on the experience and knowledge, which is unmatched with other bidders, Lahmeyer International was selected for provision of OE services. In order to keep the services cost to a reasonable level, a joint venture between Lahmeyer and NESPAK has been formed whereby NESPAK would be taking up certain agreed assignments within the OE services. Under this head the Petitioner claimed a cost of US\$ 8.617 million.
26. **Third Party Inspectors:** Barring a few systems, the entire power plant including boilers and steam turbines shall be designed, fabricated, and tested in accordance with the Chinese (GB) standards. Without discounting the importance of other systems and machinery, Steam Turbines, Boilers, RO Plant and Coal Conveyor systems are critical areas of the Plant. For successful completion of the project, it is imperative that these critical systems / equipment are designed, fabricated, manufactured and tested in accordance with the agreed standards. Therefore, the project company shall be appointing third party inspectors of international repute to oversee and report the entire production cycle including material sourcing,

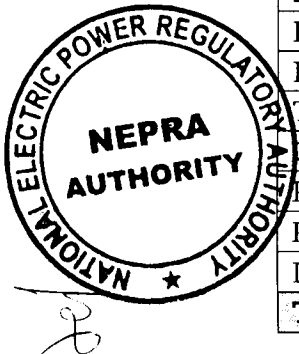


fabrication and testing processes at the respective factory levels related to the critical systems / equipment mentioned above so as to ensure compliance to the standards. Appointment of the third party inspectors will be finalised during design review stage of the project. Under this head the Petitioner claimed cost of US\$ 1.5 million.

27. **Independent Engineer:** The power producer, in accordance with the stipulations of the PPA, shall require the project company to appoint an Independent Engineer (IE) to monitor and conduct tests under the PPA and issue necessary certifications on testing of the Plant and achievement of the COD. The IE shall be appointed as per the requirements of the PPA for which the Petitioner claimed cost of US\$0.4 million

### **Project Development**

28. According to the Petitioner, it has been working for the last four years on development of the project and have incurred various costs in this regard. These include the actual costs incurred so far and the estimated costs to be incurred up to the Commercial Operations of the Project. According to the Petitioner it includes personnel, feasibility studies, general and administrative, travel and legal expenses. Few members of the team have already been engaged for project development while the remaining team members will be engaged at the time of Financial Close for execution of the project. The project development costs also cover cost for licenses and permits and Stand-By Letter of Credit required to be issued in favour of the Power Purchaser. Under this head the Petitioner claimed a cost of \$11.98 million in the following breakup:



<b>Project Development Cost</b>	<b>US\$</b>
Feasibility Studies	742,640
HR	6,786,320
Travel	1,049,242
Consultants	1,149,534
Project Administration / Management	1,492,563
Power Purchaser SBLC	562,500
License and Permits	200,000
<b>Total</b>	<b>11,982,799</b>

### **O&M Mobilization Cost**

29. The O&M contractor has to be mobilised at plant site at least six (06) months prior to the first Unit COD. This is essential to provide adequate onsite and offsite training at the manufacturers' factory to the O&M personnel, witness the tests at site for commissioning for acceptance to the Power Purchaser and a smooth takeover from EPC Contractor. This cost covers cost of O&M contractor personnel, tools and equipment, O&M personnel training and local assistance to O&M contractor.

### **Project Commissioning Cost**

30. In accordance with the EPC Contract, the project company shall be responsible for provision of fuel (Coal and LDO) to the EPC Contractor to facilitate pre and post-synchronisation tests and commissioning of the Units and Plant. The pre-synchronisation and pre-commissioning tests shall include extended periods of boiler and auxiliary operations without producing

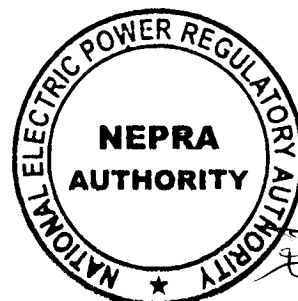
electricity in order to perform various checks including a number of start-ups on furnace oil and partial/full loads on coal. These costs, therefore, are not recovered from the Power Purchaser. The requirement of Coal and LDO during post-synchronisation tests will be covered through working capital and the costs shall be recovered from the Power Purchaser through regular invoices in accordance with the PPA.

31. Necessary adjustments to these costs will be made at COD based on actual rates per tonne of commissioning fuel consumed and actual number of start-ups.

#### **Pre-COD Insurance**

32. Pre COD Insurance head covers the cost of insurances of the Complex during the construction phase and up-to the COD. This is estimated at 1.35% of EPC Contract Price, which does not cover administrative surcharge, Federal Excise Duty, Federal Insurance Fee and any other taxes & duties, in each case relating to Pre-COD insurance. Therefore, the project company requests the Power Purchaser / NEPRA to allow adjustment on account of such taxes and duties on actual, at the time of COD.
33. The Petitioner, in view of the practices set by other IPPs in Pakistan in accordance with the requirements set out by the Lenders funding the Project, intends to procure the comprehensive insurance cover and include (but not limited to)
- ✓ Construction/Erection All Risk Insurance (CEAR)
  - ✓ Third Party Liability
  - ✓ CEAR Delay Start-Up Insurances
  - ✓ Terrorism Risk Insurance
  - ✓ All Risk Marine Cargo
  - ✓ Inland Transit
  - ✓ Marine Cargo and Inland Transit Delay Start-Up Insurances
34. In light of the peculiar requirement of this brown field coal conversion project, the project company, in addition to the above standard Insurances for the project, will also acquire the following insurances which shall bear an expense in addition to 1.35% of the EPC Contract price mentioned above:
- ✓ Surrounding Property Insurance to cover existing and operational Units of BQPS-I, which are adjacent to the project site (more specifically Units 2 and 5 of BQPS-I). The sum insured in aggregate will be US\$ 50 million. The insurance cost of surrounding property is assumed at 0.75% during the construction phase based on estimates; hence, the Authority is requested to allow a revision in the cost at COD based on actual.
  - ✓ Project Reversal Insurance covering a sum of US\$ 80 million in aggregate and assuming a premium of 1%. This is a new concept in IPP industry; hence, the Authority is requested to allow a variation in the cost at COD based on actual.

**Coal Primary Storage & Handling Infrastructure**





35. The proposed project is a base load plant for Karachi and as such requires smooth and efficient coal supply chain management. The project sponsors have therefore identified the availability of adequate coal logistics infrastructure at Port Qasim to be one of the critical key factors for the successful execution and sustained operations of the project. However, given the very basic nature of dockside unloading facilities at the port the project envisages the purchase of an additional 145 acres of land in Bin Qasim, in the vicinity of the project, for storage of up to 60 days inventory. This will be the primary storage area and will also have equipment for blending and stacking coal. The coal will be transported from this yard to the 50 acre plot adjacent to the project for feeding to the boilers.

<b>Coal Primary Storage and Handling Infrastructure</b>	<b>US\$</b>
Land Acquisition for Primary Coal Yard	7,405,516
Capital Value Tax	185,138
Stamp Duty	148,110
Land Filling and Levelling Cost	4,443,309
<b>Sub Total</b>	<b>12,182,073</b>
Equipment for Coal Handling at Primary Coal Yard	3,000,000
<b>Total</b>	<b>15,182,073</b>

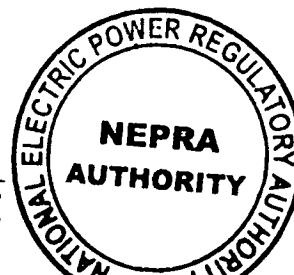
#### **Logistic Service Provider**

36. To further attain the primary objective of smooth fuel supply the project company has an understanding with a logistics service provider, namely, TransGlobal Ports & Infrastructure (Pvt.) Ltd ("TPI") for provision of coal logistics services with the objective of securing the supply chain comprising of the affreightment, port handling and transportation of coal to the plant.
37. For the purposes of meeting the coal handling needs of the current phase of the Project, it is proposed that the logistics service provider unloads the mother vessels carrying coal from Indonesia at the marginal wharf at PQA, which is a public berth. Once the infrastructure facilities of a marine coal-receiving terminal is developed, the mother vessels with a significantly deeper draft can be unloaded.
38. However, in both cases the coal will be transported to the primary coal storage and blending yard located on the waterfront of Gharo creek, described in 7.13 above, which is in the vicinity of the project site.

#### **Financing Fee and Charges**

<b>Financial Fees &amp; Charges</b>	<b>US\$</b>
Local debt financing fee and charges	4,891,250
Deferred credit facility financing fee and charges	1,390,000
<b>Total</b>	<b>6,281,250</b>

39. On the issue of project cost the Ministry of Planning, Development and Reform stated that the project should be allowed standard cost estimates for boiler and other related equipment as allowed to recent conversion project, which in the instant case works out to be 46% of green filed capex.

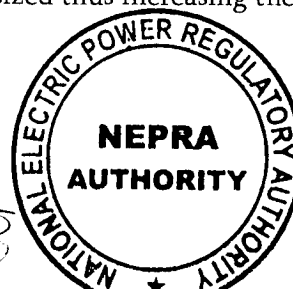


## AUTHORITY'S FINDINGS ON THE PROJECT COST RELATED ISSUES

40. While reviewing the claims of the Petitioner it was observed that the Petitioner relied on the US\$ to PKR exchange rate of 97.9 for computation of project cost and resultant tariff. For right comparison with the upfront coal tariff determination and also with recently approved coal conversion tariffs of Lalpir/PakGen and Saba, the Petitioner's project cost has been adjusted on the basis of PKR to US\$ exchange rate of 97.1 against 97.9 requested. Based on the referred exchange rate, the Petitioner requested Capex works out as US\$ 360.476 million or US\$ 0.854 million per MW on the basis of requested gross capacity of 421.91 MW.
41. The Authority noted that the above requested Capex of US\$ 0.854 million per MW is almost 1.5 times, the Capex of US\$ 0.57million per MW allowed to Lalpir and PakGen conversion project. The Petitioner was asked to justify the project cost vis-a-vis the conversion capex allowed by the Authority. Accordingly, the Petitioner submitted the following response:
- a. The EPC cost of US\$ 288 Million has been obtained after an extensive process which included:
- Detailed Feasibility Study and Bidding Documents prepared by a US based firm Knight Piesold and Co.;
  - A bidding process where 6 bids from leading international EPC Contractors were received - during the bidding process extensive site visits and pre/post bid meetings were conducted;
  - Detailed contract negotiations with the selected bidder, in the presence of Lahmeyer International, a top international power consultant.
42. The Petitioner further informed that the signed contract for coal conversion of BQPS-1 Unit 3 & 4 has already been provided to NEPRA. The Petitioner argued that the scope of the EPC for the coal conversion project is greater than the other conversion projects for which NEPRA has already provided its determination. According to the Petitioner, this project requires complete overhaul and rehabilitation of Steam turbine and BOP - (\$ 72 million additional scope) which is not under the Lalpir/Pakgen scope of work. And that overhaul and rehabilitation scope will increase the useful life of the Project for another 20 years for reliable operation. To argue in favour of the conversion, the Petitioner provided the following comparison:

Description	Current	Post Conversion Increase
Efficiency (actual)	34.1% (Gross LHV)	38.1% (Gross LHV)
Dependable Capacity	2 x 170 MW (Gross)	2 x 211 MW (Gross)

43. With regards to boiler cost, the Petitioner informed that being designed on lignite coal with 35% moisture, the Boiler and auxiliary sizes are bigger than those designed on higher CV coals as coal quantity required for lignite boiler is approx. 167% as compared to high CV coal boiler, as assumed in NEPRA's upfront coal determinations. The Petitioner further explained that in addition to boiler, all auxiliaries including fans, coal and ash handling facilities (conveyers, crushers, pulverizers, storages, silos) will be oversized thus increasing the cost by around 15% comparing with high CV coal plant.

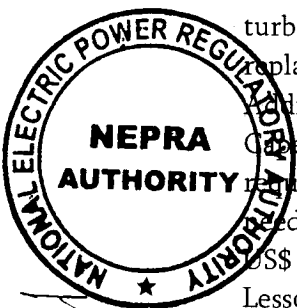


44. The Authority allowed coal conversion tariff to 365 MW AES' Pakgen project on March 31, 2015, wherein the Authority used a standard proposal module. Excerpt from the Lalpir coal conversion tariff determination is reproduced hereunder:

*"12.4.9 In order to assess the reasonable capital cost, the Authority considered a Standard Proposal Module. According to the cost breakup given in the proposal, Boiler including auxiliaries is 27.20% whereas coal handling and ash handling constitute about 5.22% and 2.83% respectively. Electrical work other than main plant constitutes cost of about 5.5% and approximately 5% for civil works. From the aforesaid, it is evident that the standard cost estimate for boiler and other related equipment is about 46% of the capital cost of a new project.*

*12.4.10 Accordingly, the Authority has decided that 46% of the capital cost of US\$ 1.16 million/MW allowed in the upfront tariff (excluding the cost for European boiler) is a reasonable estimate of cost of coal conversion and assessed US\$ 194.714 million (US\$ 0.533 million/MW) as capital cost of coal conversion for 365 MW Pakgen Power Limited"*

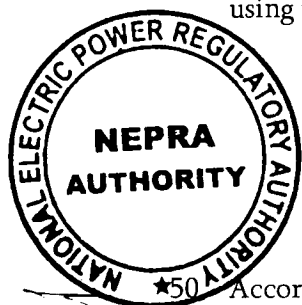
45. AES Lalpir and PakGen subsequently applied for motion for leave for review against the above mentioned decision of the Authority and the Authority after detailed deliberation decided to allow additional cost on account of erection & commissioning in the total CAPEX. As a result, the allowed Capex to conversion project now stands at US\$ 0.57 million per MW against US\$ 0.53 million per MW previously allowed.
46. The Authority carefully reviewed the submission of the petitioner and observed that in case of conversion projects of Pakgen and Lalpir, replacement of standard items like Boilers and direct auxiliaries coal unloading, storage and handling / ash handling and storage, Electricity and I&C, Flue gas treatment equipment and contingency etc. were required. However, while reviewing the EPC costs as requested by the Petitioner it was observed that the proposed conversion project seems to be a retrofitting / rehabilitation project instead of conversion project. As there is no requirement of (i) Steam turbine replacement/ overhauling/ rehabilitation (ii) installation of reverse osmosis water treatment plant with building containing lab (iii) replacement/overhauling/rehabilitation of existing plant equipment's etc. for the conversion project.
47. The Authority noted that the Petitioner may incur additional cost to be spent on steam turbine remaining life assessment and rehabilitation works and overhauling / rehabilitation / replacement of existing plant equipment and on reverse osmosis seawater treatment plant. Additionally, the Authority is also aware that AES's Lalpir and PakGen has already incurred Capex on some of the above referred activities and observed that the same had not been requested in their respective petitions. However, the Authority is of the opinion that the need for such additional requirement which, according to the petitioner would cost around US\$ 120 million, has arisen due to lack of proper maintenance by K-Electric, (which is the Lessor in the instant case). In the opinion of the Authority, this additional cost can't be passed on to the consumers and should, in principle, be borne by K-Electric.
48. To be consistent and fair with the sponsors of other conversion projects whereby the Authority has allowed a Capex equivalent to US\$ 0.57 million per MW, the Authority has also decided to allow a lump sum Capex of US\$ 0.57 million per MW to K-Energy project. In the instant case, based on the gross capacity of 421.909 MW Capex works out to be US\$ 240.645 million against US\$ 360.48 million requested (at exchange rate of 97.1). The Customs



duties and Cess of US\$ 9.558 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.

#### INTEREST DURING CONSTRUCTION (IDC)

49. The Petitioner requested an IDC of US\$ 31.2 million, which was based on the loan amount of US\$ 119.223 million. The Petitioner based its IDC using KIBOR of 10.18% + 3% margin and using the following debt drawdowns:



Draw down	Debt
1st Year of Construction Period	22.67%
2nd Year of Construction Period	58.80%
Last 8 Months of Construction	18.52%
	<b>100.00%</b>

According to the Petitioner, the interest accrued and paid during the construction period will add to the project cost. A better estimate will be available at the time of Financial Close based on the loan terms and conditions agreed with the local lenders with final adjustment at COD. The Petitioner informed that current estimates of IDC for local bank loans used for tariff calculation is around US\$ 31.2 million based on the current estimates of equity and debt injections and interest / mark-up rates.

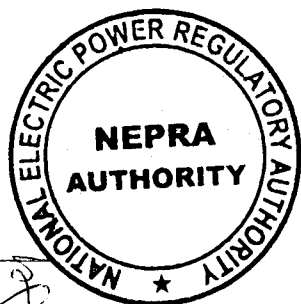
51. The Petitioner arranged a deferred credit facility to a maximum of US\$ 137.7 million from the EPC contractor which bear only US\$ 2.1 million cost that too only relates to issuance of stand-by letter of credit and its confirmation from reputable international bank(s). The petitioner informed that this is a lump sum amount and is to be repaid to the EPC Contractor in US\$ in 12 equal quarterly instalments starting from the end of 1st quarter after COD. Due to this facility, the actual debt in terms of percentage of total Capex is less than the usual debt portion which generally hovers around 70 to 80%. This has significantly reduced the IDC for the project for which the Petitioner's efforts are highly appreciated.
52. Based on the total debt amount US\$ 44.88 million, the basis of which is discussed in preceding paragraphs, to be drawn in the above mentioned requested percentages, while assuming base KIBOR of 11.91% with a spread of 3%, and construction period of 32 months, the total IDC works out to be US\$ 9.05 million and the same is therefore, being allowed to the petitioner. The IDC will be subject to adjustment based on actual drawdown, actual base KIBOR prevalent at the time of borrowing and actual spread over KIBOR which is allowed up to 3.5%.

#### FINANCING FEE & CHARGES

53. Under this head, the Petitioner claimed an amount of US\$ 8.388 million in the following breakup.

Financial Fees & Charges	US\$
Local debt financing fee and charges	4,891,250
Deferred credit facility financing fee and charges	1,390,000
LC Confirmation Charges	2,107,080
<b>Total</b>	<b>8,388,330</b>

54. Total financing fee and charges of US\$ 8.388 million works out to be 5.573 % of the requested debt of US\$ 150.500 million.
55. Based on the allowed debt of US\$ 44.88 million, while allowing financing fee and charges @ a benchmark ratio of 3.5% of total borrowing, the corresponding financing fee allowed to the Petitioner works out to be US\$ 1.57 million, as against US\$ 8.388 million requested.
56. The summary of the allowed project cost is as under:



Project Cost Breakup	US\$ million
Capex	240.645
Customs Duties & Cess	9.558
Financing Fees & Charges	1.571
Interest During Construction	9.054
<b>Total Project Cost</b>	<b>260.83</b>
<b>Project Cost US\$ million per MW</b>	<b>0.62</b>

Under the MYT regime of K-Electric, whether the lease cost of US\$ 206 million is allowed to K-Energy and if so, whether this amount should be adjusted in K-Electric Tariff?

57. According to K-Electric Limited (KEL), it will lease its existing Units 3 & 4 to the Petitioner for the project. For this purpose, Iqbal Nanji and Company was hired by KEL which conducted a valuation for these units, and valued these assets at US\$ 206.2 million. In support, a copy of the valuation report along with the preliminary Leasing documents was provided. Given below is the lease repayment schedule during the concession period of 20 years. The Petitioner assumed the lease rate at 3 months KIBOR plus 3% spread.

Lease Schedule	Year 1	Year 2	Year 3	Year 4	Year 5
	US\$				
Opening Outstanding	206,254,228	203,946,828	201,319,948	198,329,355	194,924,688
Principal	2,307,400	2,626,880	2,990,593	3,404,666	3,876,071
Interest	27,073,344	26,753,865	26,390,151	25,976,078	25,504,673
Instalment	29,380,745	29,380,745	29,380,745	29,380,745	29,380,745
<b>Closing Outstanding</b>	<b>203,946,828</b>	<b>201,319,948</b>	<b>198,329,355</b>	<b>194,924,688</b>	<b>191,048,617</b>

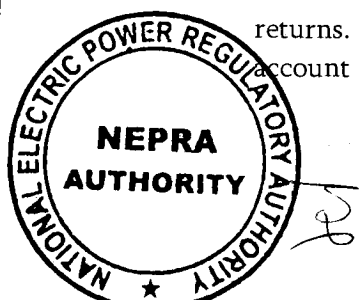
Lease Schedule	Year 6	Year 7	Year 8	Year 9	Year 10
	US\$				
Opening Outstanding	191,048,617	186,635,870	181,612,141	175,892,835	169,381,642
Principal	4,412,746	5,023,729	5,719,307	6,511,193	7,412,723
Interest	24,967,998	24,357,016	23,661,438	22,869,551	21,968,021
Instalment	29,380,745	29,380,745	29,380,745	29,380,745	29,380,745
<b>Closing Outstanding</b>	<b>186,635,870</b>	<b>181,612,141</b>	<b>175,892,835</b>	<b>169,381,642</b>	<b>161,968,919</b>

Lease Schedule	Year 11	Year 12	Year 13	Year 14	Year 15
	US\$				
Opening Outstanding	161,968,919	153,529,841	143,922,302	132,984,517	120,532,303

Principal	8,439,078	9,607,539	10,937,785	12,452,214	14,176,329
Interest	20,941,667	19,773,205	18,442,960	16,928,531	15,204,416
Instalment	29,380,745	29,380,745	29,380,745	29,380,745	29,380,745
<b>Closing Outstanding</b>	<b>153,529,841</b>	<b>143,922,302</b>	<b>132,984,517</b>	<b>120,532,303</b>	<b>106,355,974</b>

Lease Schedule	Year 16	Year 17	Year 18	Year 19	Year 20
	US\$				
Opening Outstanding	106,355,974	90,216,812	71,843,047	50,925,277	27,111,265
Principal	16,139,162	18,373,766	20,917,770	23,814,012	27,111,265
Interest	13,241,583	11,006,979	8,462,975	5,566,732	2,269,480
Instalment	29,380,745	29,380,745	29,380,745	29,380,745	29,380,745
<b>Closing Outstanding</b>	<b>90,216,812</b>	<b>71,843,047</b>	<b>50,925,277</b>	<b>27,111,265</b>	<b>-</b>

58. KEL accordingly submitted during the hearing that US\$ 206 million is a legitimate claim as it is the minimum return KEL would have earned had it converted the plant on its own. KEL argued that under its Multi-Year Tariff (MYT), KEL is not given fixed return on equity/asset. It can only improve returns if it improve its efficiency. Therefore, if KEL had done the conversion on its own, it would have allowed to retain all the efficiency gain with itself. But now this project is coming under the external purchases, therefore, it had to charge the Petitioner for use of its asset which can't be lend for free and that US\$ 206 million is essentially the opportunity cost of conversion.
59. On this issue, Ministry of Planning, Development and Reform submitted that the amount of US\$ 206 million as a lease amount is paid by K-Energy to K-Electric then it should be reflected in K-Electric revenue stream and tariff should be adjusted accordingly.
60. The Authority reviewed the arguments put forward by K-Electric (the owner of leased asset) in support of lease expense and observed that KEL claim for lease amount is not justified on several grounds. KEL claimed that lease amount is, essentially, the opportunity cost of not doing the conversion itself. When asked why KEL didn't do the conversion on its own, KEL responded that due to its overstretched balance sheet, no banks would lend loan for the conversion so, it had to ask the Petitioner (KEPL) to do the conversion. In the opinion of the Authority, the petitioner's inability to raise financing for the project - that would have enabled KEL to do the conversion, should not be passed on to the consumers. Additionally, had KEL done this project, it would have been more beneficial to its consumer than leasing out the project to another party. Consumers are already at disadvantaged because KEL is not doing the project on its own. The additional lease expense US\$ 206 million if allowed, will be an additional burden and will be unfair to the interest of consumers of Karachi.
61. The Authority also noted that the KEL has wrongfully assumed that lease revenue is the only incentive for KEL and that without lease revenues, KEL won't get financial gain from this transaction. The Authority wants to clarify that KEL's Multi Year Tariff is structured in a way that reward the company if more units are sold. These units after conversion are supposed to run at a base load of 80% plus factor from the current factor, which generally hover around 10 - 15%. All that generation will not only increase the units sold, but also reduce the average basket rate of KEL thus leading to improved performance and higher returns. It is to be noted that with the reduction of the generation cost, the KEL will gain on account of corresponding saving due to reduction in cost of per unit lost. The Authority



considers that in case of reduction in generation cost both KEL and consumer will be beneficiaries.

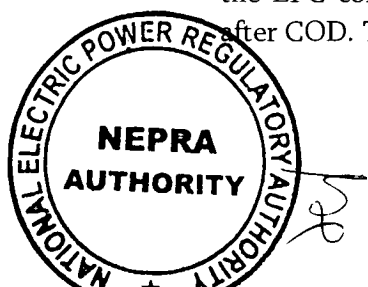
62. In view of the above arguments, that Authority has decided to exclude a lease cost of US\$ 206 million in the K-Energy project cost and direct KEL to not charge the same from the Petitioner.

**Whether Upfront Payment of deferred credit cost in three years is justified?**

63. According to the Petitioner, the project will be financed with a debt equity ratio of 79:21. The Equity for the project amounting to US\$ 130.0 Million would be injected by BEEGIL whereas the debt for the project amounting to approximately US\$ 150.4 million will be arranged from domestic financial institutions and US\$ 137.7 million will be made available by EPC contractor under deferred credit facility, whereas assets amounting to US\$ 206.2 Million will be obtained on lease from KEL. The table below shows the proposed financing structure of the project.

Project Financing	Percentage	US\$
Equity	20.82%	130,000,000
Debt	79.18%	
Local banks		150,403,716
Deferred credit		137,700,000
Lease		206,254,228
<b>Total Financing</b>	<b>100%</b>	<b>624,357,944</b>

64. **Equity:** According to the Petitioner, BEEGIL is the sponsor of the project. BEEGIL has secured investment commitments from its sponsors based in Indonesia, Hong Kong, Korea and China and will invest those funds as equity into the project company in the manner agreed with project lenders.
65. **Bank Loan:** The Petitioner informed that other than the lease amount of \$206.2 million, the project has a total debt requirement of \$288.1 million. The sponsors have only been able to arrange an amount of \$150.4 million from the local market, due to bank restrictions on the amount a single project of this size may borrow, and have therefore had to go offshore to arrange the balance requirement of \$137.7 million from the EPC contractor. The loan sources and profiles will be firmed up after the project company receives indicative tariff from NEPRA. For US\$ 150.4 million loan, the Petitioner assume debt tenor of 12.5 years, including 2.5 years of grace period, and repayment over a period of 10 years. Interest rate has been assumed at the rate of 3 months KIBOR + 3% spread. These terms and conditions will be finalised by local lenders after receiving the indicative tariff from NEPRA, hence the agreed terms and conditions with the lenders will be submitted at that time to NEPRA for adjustment in tariff accordingly.
66. **Deferred credit:** According to the Petitioner, it has also been able to negotiate a deferred credit facility in foreign currency with the EPC contractor (Equipment Supply Contractor) amounting to US\$ 137.7 million. This amount is a lump sum amount and is to be repaid to the EPC contractor in 12 equal quarterly instalments starting from the end of 1st quarter after COD. The quarterly instalment equals to US\$ 11.475 million.



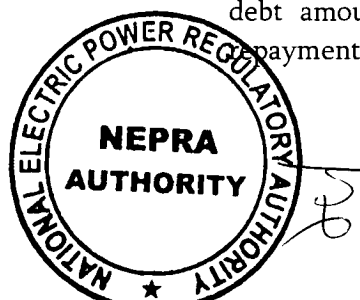
67. With regards to deferred credit facility, the Petitioner was told to provide the supporting document. In response, the Petitioner provided EPC contract wherein, Clause 22.1 (b) of the EPC contract indicates that the provision of this credit facility which is reproduced below:

*"US\$ 117.7 million of the contract price shall be paid by OWNER (Petitioner) to the supply contractor on deferred payment basis".*

68. However, the Petitioner stated in its petition and also during the hearing that the EPC contractor has agreed to commit this facility up to US\$ 137.7 million. The Petitioner has not asked for the financial cost of this facility, other than the US\$ 2.1 million related to LC confirmation charges. The Authority observed that the only downside related to deferred credit facility is that it has to be fully paid to the EPC contractor in 3 years, in 12 equal instalment.
69. The Authority noted that deferred credit constitutes more than half the total project cost which carries a minimum cost. This has not only reduced the IDC substantially, but also the overall debt repayment as the debt repayment has been calculated only at 17% of the total project cost against the normal debt ratio of 70 to 80% .
70. The total approved cost as indicated in the above is US\$ 260.83 million. The Authority noted that the overall reduction of about US\$ 367.7 million, which is mainly inflated due to disallowance of US\$ 206 million lease expense, from the proposed project cost of US\$ 624.53 million has significantly altered the proposed debt to equity ratio of 79:21.
71. At this stage, the Authority has decided to allow the full benefit of the deferred credit facility by 100% utilization of the US\$ 137.7 million amount as it is the cheapest among all the source of funds, capped the equity portion of project cost at maximum allowed benchmark of 30% of the project cost and parked the remaining balance under the debt as indicated in the following table:

Financing Plan	Share	US\$ million
Debt	17%	44.88
Deferred Credit	53%	137.700
Equity	30%	78.25
<b>Total Project Cost</b>	<b>100%</b>	<b>260.83</b>

72. The above ratio of sources of fund will be adjusted on actual at the time of COD as long as the debt equity ratio remains within the range of 70%:30% and 80%:20% as allowed to other projects.
73. The requested 3% spread over KIBOR, in addition to loan repayment period of 10 years is within the benchmark of 3.5% spread allowed in coal upfront tariff therefore, it is approved as such. It is important to note that the above-mentioned debt to equity has been used to calculate IDC and corresponding total returns for the project.
74. In view of the above, debt servicing component of Rs 0.2513 /kW/h is allowed based on total debt amount of Rs 4,357.80 million (US\$ 44.88 million × 97.1) while assuming loan repayment period of 10 years in equal quarterly instalments, with base KIBOR of 11.91% +





3% spread. The debt servicing component shall be subject to quarterly adjustment due to variation in 3 month KIBOR (or any other applicable benchmark). To avoid front loading of tariff in the initial years, deferred credit facility of US\$ 137.7 million or Rs 13,370.67 million on assumed PKR to US\$ exchange rate of 97.1, is allowed to be recovered in 5 years instead of 3 years requested. Accordingly DCF component works out to be RS 0.7951/kW/h and the same is being allowed to the Petitioner.

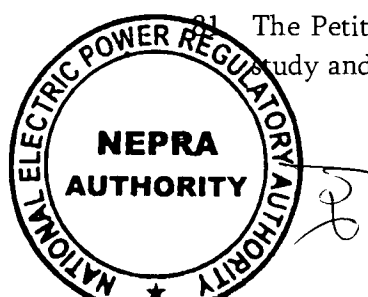
**Whether the construction period of 28 months for the first Unit and 32 months for the Complex is justified?**

75. KEPL has submitted that Construction Period for the Project is estimated to be 28 months for the first Unit and 32 months for the Complex after issuance of the Notice to Proceed.
76. KEPL further submitted that this construction period is based on the best estimates and judgment of their consultants i.e. Knight Peisold (USA) having extensive global experience and M/s Lahmeyer, Germany. Current time line has been well negotiated with the contractors. Further reduction in project timeline would significantly increase project costs. KEPL also submitted that construction period for a new coal-fired power project of similar size is typically around 40 months.
77. Ministry of Planning, Development & Reforms in its comments on the issue has mentioned that Construction period of 32 months would have an impact on IDC and return on equity during construction (ROEDC), therefore, needs to be rationalized.
78. The Authority, in its upfront coal determination, 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.
79. The scope of work submitted by KEPL is larger as compared to other conversion cases of Lalpir, Pakgen and Saba, primarily in terms of Steam Turbine remaining life assessment and re-habilitation works, Reverse Osmosis Sea Water Treatment Plant with building containing the Chemical Lab, and Overhauling / Rehabilitation / Replacement of existing plant equipment.
80. The Authority is aware that Capex related to additional scope of work has been disallowed in the petitioner's tariff and directed the K-Electric, the power purchaser in this case, to bear the cost. However, the Authority is of the opinion that KEPL genuinely will require additional time to carry out these additional works regardless of who bears the cost. Therefore, the Authority allowed the construction time period of 32 months in total for the implementation of its conversion plan as requested.

**Issues Related to Efficiency & Auxiliary Consumption**

- i. Whether the efficiency of 34.75% (HHV-Gross) is reasonable?
- ii. Whether auxiliary consumption of 49.653 MW (12%) after conversion is justified?

81. The Petitioner on the issue submitted that based on the analysis provided in the feasibility study and K-Electric's data, the Gross Plant Heat Rate ("GPHR") at HHV for Units 3 & 4 of



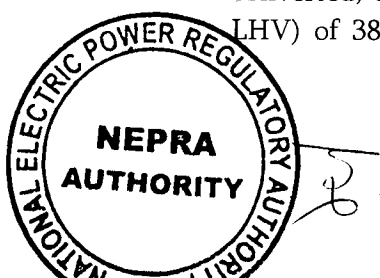
BQPS-I combined is currently around 10,650 Btu/kWh or 32.03% efficiency. Upon conversion, the EPC Contractor has guaranteed GPHR at HHV for Units 3 & 4 combined at 9,819 Btu/kWh or 34.75% efficiency. The Petitioner further mentioned that conversion shall increase the parasitic load by approximately 20 MW for the Plant, due to installation of additional equipment like crushers, pulverisers, conveyors, ash handling equipment, and various fans such as PA, OFA, and FD, ID etc. Hence the Net Plant Heat Rate (NPHR) for the converted units shall be higher than the furnace oil plant.

82. The Petitioner further submitted that EPC Contractor has guaranteed auxiliary consumption of 39,653 kW at 18 kV bus bar (which excludes the power transformer and insulated bus bar, and outgoing breaker losses) for the newly installed equipment of the Plant (Units 3 & 4) and another 10,000 kW consumption is anticipated for the existing equipment of the Plant, which will be refurbished by the EPC Contractor. However the EPC Contractor has not guaranteed the said consumption.
83. The Petitioner submitted the following comparison of Capacity and efficiency, post conversion.

S No.	Items for 2 units	Unit	Existing Parameters	After coal conversion
1	Gross Dependable Capacity	MW	2 x 170 = 340	2 x 210.955 = 421.909
2	Auxiliary load	MW	30	39.653+10 = 49.653
3	Net capacity	MW	310	372.256
4	Plant heat rate – Gross	BTU/kWh	10,650	9,819*
5	Plant heat rate - Net	BTU/kWh	11,500	11,128*
6	Plant availability factor	%	60	83.33

\*HHV

84. The Petitioner has submitted that the **Gross Efficiency** numbers post conversion are still comparable to NEPRA's benchmarks and close to the design numbers for these units and the net differential is due to the use of lignite coal.
85. The Petitioner in order to substantiate its stance, submitted through email dated July 27, 2015, that Units 3 & 4 of BQPS-1 were installed in the year 1989-1990, using sub critical technology. The capacity and efficiency of these units had severely de-rated due to lack of maintenance while under the GoP control. KEPL also mentioned that the actual average efficiencies calculated in the 90s were around 31% (net LHV) with average degradation of 25% during the decade for each unit. KEPL further explained that the Authority has allowed K-Electric a heat rate of 10,650 btu/kWh (Net HHV) for BQPS-I which translates into thermal efficiency of 32.05% with allowed auxiliary load of 6.1%, and Net LHV thermal efficiency of 33.65%, whereas the actual current Gross LHV efficiency is 34.1% with Actual auxiliary load of 7.7% and actual Net LHV efficiency of Units 3 and 4 is 31.47%.
86. It was further submitted by the Petitioner that with the current scope of work, once converted, these units are guaranteed, by the EPC Contractor, to run at efficiency (Gross LHV) of 38.1%, Auxiliary load (higher due to lignite coal) will be 11.7% and Net LHV



efficiency will be 33.65%. The Petitioner also mentioned that this Coal Conversion project is Brownfield in nature and has already undergone permanent loss of efficiency (due to degradation) which is why it can never be compared to a brand new coal fired power plant. Due to brown-field nature of the project, the EPC contractor has only guaranteed gross efficiency. The Coal conversion plant will be using lignite coal, which translates into handling of higher volumes of coal as compared to high CV coal (50 – 60 % more volume), hence the auxiliary consumption will naturally be higher as compared to a plant using high CV coal. Increase in auxiliary load is on account of bigger crushers, pulverisers, conveyors, ash handling, and various fans such as PA, OFA, FD, ID etc. EPC Contractor has guaranteed firm numbers for the incremental auxiliary power consumption only as they have declined to guarantee the existing auxiliaries.

87. In view of the foregoing, the Petitioner has requested the Authority to allow finalizing the net plant efficiency and auxiliary load after rehabilitation work is complete and commissioning tests are carried out at COD.
88. The Authority in order to have an analysis of the impact of use of higher grade coal on efficiency, asked the Petitioner to indicate the percentage gain in the thermal efficiency (net LHV), if sub bituminous coal of plus 5000 Kcal/kg CV is used.
89. The Petitioner in response submitted that auxiliary load will reduce by 10-11%, if sub bituminous coal (6300 GAR) is used for this Project and the Gross efficiency will increase by 0.5%-1% (absolute) due to increase in boiler efficiency. By using coal with CV of 5000 kcal coal (GAR), net improvements will be in the range of 0.2-0.4% (absolute), which will end up max at 34% net LHV from 33.65% net LHV.
90. The Petitioner was also asked to provide the efficiency numbers at different stages of its previous, current and proposed life cycle, which have been provided by the Petitioner as under:

**NEPRA approved thermal efficiency**

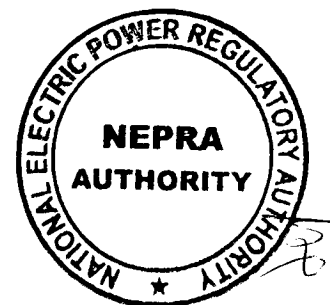
- a. Thermal efficiency is on a Net HHV basis.
- b. Heat rate of 10,650 btu/kWh (Net HHV) which translates into thermal efficiency of 32.05%;
- c. Auxiliary load is 6.1%
- d. Net LHV thermal efficiency of 33.65%

**Actual as of now**

- e. Gross LHV efficiency currently is 34.1%
- f. Auxiliary load is 7.7%
- g. Net LHV efficiency as of now for Units 3 and 4 is 31.47%

**After conversion**

- h. Gross LHV efficiency will be 38.1%
- i. Auxiliary load (higher due to lignite coal) will be 11.7%



j. Net LHV efficiency will be 33.65%

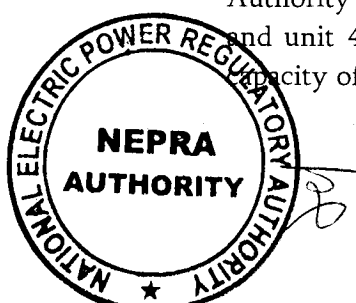
91. Ministry of Planning, Development & Reforms in its comments on the issue has mentioned that the proposed efficiencies of 34.75% is considered to be low compared to the assumed efficiency in NEPRA's Upfront Tariff Determination. The Ministry also submitted that Auxiliary consumption should be 9% as approved by NEPRA under upfront Tariff.
92. The Authority observed that as per the generation license issued to K-Energy the installed capacity (gross) of the complex is 421.909 MW whereas the Petitioner has proposed a net capacity of 372.256 MW after coal conversion on the basis of auxiliary consumption of 12%, based on increased consumption of lignite coal as compared to high CV coal & bigger size of auxiliary equipment.
93. To ascertain the claim of the Petitioner, a comparison of calorific values of various types of coal has been prepared as mentioned below:

Thar Coal As per Thar upfront tariff	Imported Coal as per Coal upfront tariff	Salt Range Coal as proposed by CMEC	Saba, Pakgen, Lalpir (Approved CV of Coal)	BQPS K-Energy (Proposed Value)	Local coal (Sub-Bituminous)	Indian Lignite Coal
Net LHV	Net LHV	Net LHV	Net LHV	Net LHV	Net LHV	Net LHV
Kcal/kg	Kcal/kg	Kcal/kg	Kcal/kg	Kcal/kg	Kcal/kg	Kcal/kg
2774	6440.5	4000	6440.5	3839	5556	2627-4127

94. The Authority understands the fact that lower or inferior quality coal having low calorific value due to higher ash, moisture and sulphur content etc. requires bigger size of auxiliary equipment to cater for the requirements and hence results in increased auxiliary consumption but while analysing the above table it is noted that the calorific value of Indonesian origin lignite coal as proposed by K-Energy is still better than Thar lignite coal and Indian lignite coal. The Authority in its Thar coal upfront tariff dated 9.07.2014 has approved auxiliary consumption @ 9% for a 330 MW power plant.
95. In addition to above, as per National Electricity Plan (2012) of Government of India, the standard benchmark for auxiliary consumption is as follows:

<i>Lignite based Units</i>	<i>Auxiliary consumption</i>
<i>Less than 200 MW</i>	<i>12%</i>
<i>More than 200 MW</i>	<i>9%</i>

96. While analysing the "Operation norms for thermal power stations for the tariff period 2014-2019" prepared by CERC Govt. of India, the Authority noted that Auxiliary consumption value for Lignite fired existing stations under general norms is 9%. Further, the report divulges that the auxiliary consumption for CFBC boilers is 0.7% to 1% higher than PC boiler based power plant.
97. The gross capacity of the instant conversion project is 421.909 MW, comprising of PC boiler based two units of 211 MW each, which will consume good calorific value lignite coal, therefore, the Authority feels that a lower value of auxiliary consumption is justified. The Authority therefore, considers that 9% auxiliary consumption value for both units i.e. unit 3 and unit 4 after conversion is justified which is hereby allowed, which will result in net capacity of 383.938 MW. The actual net capacity of the complex will be determined on the



basis of the Initial Dependable Capacity (IDC) Test at the time of COD and the relevant tariff components will be adjusted downward. However, no upward adjustment in tariff will be allowed if the IDC is established lower than the 383.938 MW.

**Availability:**

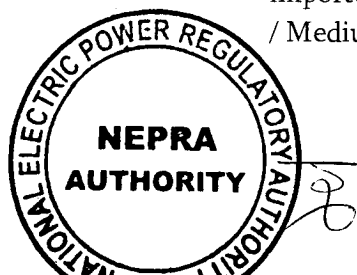
98. The Petitioner has proposed the annual plant availability of 83.33%. The Authority in other coal conversion cases of Pakgen and Lalpir power has approved the plant availability of 86.1% and for Saba power of 85%. In its upfront coal tariff determination dated 26<sup>th</sup> June 2014, the Authority has approved annual plant availability of 85%. Accordingly, for Unit 3 & 4 of BQPS-I annual plant availability, upon coal conversion, is allowed as 85%, being a base load plant having a higher plant factor.

**Thermal Efficiency:**

99. The Petitioner requested to allow 34.759% HHV Gross or 30.67% HHV net or 32.1364% LHV net thermal efficiency with compensation of degradation and partial loading adjustments.
100. The Authority while analysing the Revaluation report of Unit 3 & 4, provided by the Petitioner, noted that the designed thermal efficiency (LHV) of unit 3 and Unit 4 on Oil and Gas is 37.5% and 36% respectively. The Authority had earlier, in its Multi-year tariff determination of K-Electric dated December 23 2009, allowed BQPS-I the Net heat rate value of 10,650 Btu/kWh which comes out to be 32.04% net thermal efficiency.
101. While analysing the "Operation norms for thermal power stations for the tariff period 2014-2019" prepared by CERC Govt. of India, the Authority also noted that lignite fired units consuming inferior quality indigenous lignite coal still have better approved thermal efficiency values as compared to Indonesian origin lignite coal, proposed by K-Energy. The Thar coal upfront tariff also provides far better efficiency values than proposed by K-Energy.
102. For computation of thermal efficiency and for arriving at just and informed decision, the Heat Balance diagram of the conversion project and Performance guarantee values as provided by the Harbin Electric (EPC contractor) have also been analysed. In view of the foregoing, a net LHV thermal efficiency value of 34.00% flat (for the life cycle of the project) without compensation of degradation and partial loading adjustments is allowed to K-Energy.

**Whether the return on equity @ 21% on IRR Basis (net of 7.5% WHT) is justified?**

103. The Petitioner requested to consider the provision of 21% Return on IRR basis keeping in view the reasons described below:
- a) IRR of 20% is allowed for IPPs based on local Thar coal since it is in the interest of the country to facilitate faster development of coal fired projects based on both local and imported coal at least in the medium term. Therefore, similar incentives/returns contemplated for Thar/local coal fired power projects should also be extended to imported coal fired power projects envisaging commencement of operations in the Short / Medium term.



- b) Secondly, the boilers are also being designed to operate on lignite coal making it possible to use Thar coal once it is available and is economically viable.
- c) Finally, keeping in view the absence of a sovereign guarantee blanket (i.e., no Implementation Agreement) and Pakistan's current low sovereign risk rating, additional 1% return on equity has been taken, thus resulting in an overall return of 21% on IRR basis.

104. The Petitioner also requested withholding tax of 7.5 % on the dividends and considered it as pass through component in the tariff.

105. Having considered the reasons stated above by the petitioner for allowing 21% IRR, the Authority is of the opinion that the argument for asking such a high unprecedented return on the basis of short-term to medium term commencement of the project doesn't merit consideration. Further, the coal conversion has 32 months construction time, whereas new Greenfield power project are allowed construction time of 40 months. 8 months reduction is primarily due to lesser scope of work which doesn't justify the 3 % increase in the IRR as allowed for Greenfield projects that are on imported coal.

106. With regards to usage of Thar lignite coal, the Authority noted that the project boiler is designed to take Thar coal up to a maximum of 20% of total coal usage, which is a very low usage number to qualify for the 20% IRR allowed to Thar Coal. Also, 20% IRR is allowed to investors who undertake both mining + power generation of Thar Coal. A relevant excerpt of July 2014 determination of the Authority in the matter of Thar coal upfront tariff is reproduced hereunder:

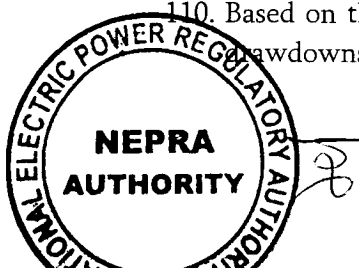
*"28. It is however, clarified that these returns will only be allowed for mine mouth based power plant. For projects utilizing Thar coal for non-mine mouth plants, RoE shall be of local coal, which in the instant case is 26.5% for 220MW (40 month construction period) and 29.5% for 660/1099 MW (48 month construction period)"*

107. It may be relevant to point out that in the case of Thar, the higher return is allowed for a limited period and for a limited capacity because of initial higher risk of mining and the generation project due to unknown factors which the project may come across. In view thereof, the grounds taken for asking high return having no solid ground are not accepted.

108. The Authority is aware that there is no sovereign guarantee available to this project. But K-Electric which is the buyer of the electricity, does have GOP stake in it. So this improves the K-Electric rating in terms of doing business. Further, the Authority considered that Pakistan market risk profile rating has recently been upgraded to B3 from Caal which is considered a stable outlook. Therefore, 1% additional increase in IRR due to instability of the Pakistani market is also not justified.

109. In view of the above, the petitioner's request for an IRR of 21% is rejected and the project is allowed an IRR of 17% as allowed to other power plants based on imported coal. With regards to the withholding tax on dividend, the Authority has already decided in principle not to allow this for the future projects.

110. Based on the imported coal IRR of 17%, with 32 month construction period and requested drawdowns of 50% for the first year, 38% for the second year, and 12% for the remaining 8



months, total return works out to be US\$ 17.24 million or Rs 0.4976/kW/h and the same is allowed to the Petitioner.

### Whether the fuel price adjustment mechanism is justified?

111. The Petitioner submitted the following adjustment mechanism:

#### a) FOB coal price

FOB Price is computed as follows:

$$\text{FOB Price per tonne (US\$)} = \text{Benchmark price} \times [(NCI \times K \times A) - (B + U)] + \text{Coal premium (5)}$$

Whereas:

Benchmark price is the benchmark price determined by the Formulae for Determining the Coal Benchmark Price issued by the DGoMCG, Ministry of Energy and Mineral Resources, Indonesia for Ecocoal category

$$NCI = \text{Newcastle Index (FOB GAR 6322)} \frac{\text{kcal}}{\text{kg}}$$

$$K = \frac{\text{GAR}}{6322}$$

GAR is the calorific Value of coal supplied by the coal supplier on a Gross as Received basis. Reference as per the Design Coal is 4212 kcal/kg

$$A = \frac{(100 - \text{Moisture Content})}{(100 - \frac{8}{FKA})}$$

$$FKA = \frac{\left( \left( \frac{100 - 8}{100 - \text{Moisture content}} \right) \times \text{Moisture content} \right) + (100 - 8)}{100}$$

$$B = (\text{Suplhur Content} - 0.8) \times 4$$

$$U = (\text{Ash Content} - 15) \times 0.4$$

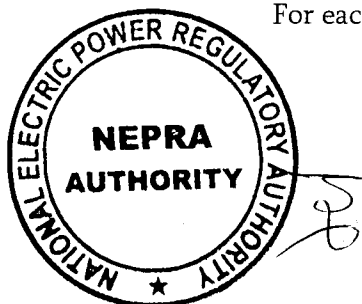
Coal Premium = \$5 as explained in section 11.1.1

#### b) Shipping freight and insurance

Shipping freight and insurance charges are bifurcated as follows:

$$\text{Shipping freight and insurance} = \text{Hire charge} + \text{Fuel (Bunker) charge} + \text{Insurance}$$

For each shipment, following is the computation / indexation mechanism:



Hire Charge per tonne fixed for every quarter (US\$) = \$9.10 + [(BSI-RouteS2<sub>REV</sub> - BSI-RouteS2<sub>REF</sub>) \* \$0.089 (such factor will be applied for every variation of \$100 in Daily Hire rate from the benchmark rate)]

BSI-RouteS2<sub>REV</sub> = For every following quarter, round average of last 1 calendar month of the previous quarter BSI-RouteS2.

Fuel Charge per tonne (US\$) = \$8.98 + [(IFO-180<sub>CSTREV</sub> - IFO-180<sub>CSTREF</sub>) \* \$0.0198]

IFO-180<sub>CSTREV</sub> = IFO-180<sub>cst</sub> on the date of relevant Bill of Lading

Insurance = Marine insurance is assumed to be fixed subject to actual variation in cost of such insurance

c) **Discharge Port and Local Handling Charges:**

Discharge Port and Local Handling Charges are bifurcated as follows:

*Discharge Port and Local Handling Charges = Discharge Port clearance and Local Handling Charges + Local Transportation Charges*

The computation / indexation mechanism is as follows:

**Local Handling Charges per tonne (US\$) = [(WPI<sub>REV</sub> / WPI<sub>REF</sub>) \* \$6.23]**

WPI<sub>REV</sub> = WPI in Pakistan over the month prior to the month for which calculation is made

**Local Transportation Charges per tonne (US\$) = [(PDP<sub>REV</sub> / PDP<sub>REF</sub>) \* \$4.16]**

PDP<sub>REV</sub> = Average PSO HSD Price over the month prior to the month for which calculation is made

d) **Custom Duty and Taxes**

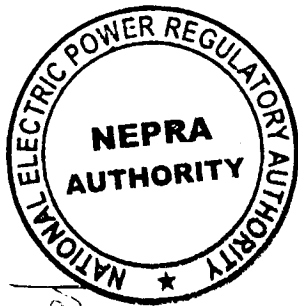
5% custom duty and 1% Sindh Infrastructure Cess is assumed on import of coal at CnF price of coal. Any change in the rates and / or incidence of custom duties and Sindh Infrastructure Cess or imposition of any other duties, taxes, levies, cess, impost, fees etc. on import of coal shall be treated as a "pass through".

e) **Coal Losses**

Coal losses to be taken at 3.0% between FOB weight and that delivered at Delivery Point of the project company.

f) **L/C Charges**

Coal payment to be made through L/C leading to L/C charges. Similarly, SBLC by the project company which equal to 45 days of supply in support of its commitments of off-take and pricing. These Costs will be catered for in the Coal pricing on actual basis.





g) Coal premium of 5\$

COAL PRICING	Unit	Value
Coal FOB Price (Benchmark McCloskey Newcastle)	US\$/Ton	63.48
Freight + Insurance	US\$/Ton	18.23
Coal Price CIF	US\$/Ton	81.71
<b>Discharge Port and Local Handling Charges:</b>		
Vessel Stevedoring and Local Handling	US\$/Ton	6.73
Superintendence, Supervision and Cargo Tally	US\$/Ton	1.71
Customs & Port Clearance and Government dues	US\$/Ton	1.95
<b>Total Discharge Port and Local Handling Charges</b>	<b>US\$/Ton</b>	<b>10.39</b>
Custom Duty and Sindh Infrastructure Cess	US\$/Ton	<b>3.38</b>
Unadjusted Coal Price CNF		95.48
Adjusted Coal Base Price FOB		38.14
Adjusted Coal Price CNF		70.14
Loss in Shipping and Coal Handling		3%
<b>Final Coal Price CnF</b>		<b>72.31</b>
Total Moisture (ar)	%	35.00
Sulphur (ar)	%	0.50
Ash (ar)	%	8.00
CV adj		0.67
Moisture adj		0.69
Sulphur adj (premium)	US\$/Ton	(1.20)
Ash Adj (premium)	US\$/Ton	(2.80)
FKA		1.42
NCI adjusted price before premium	US\$/Ton	33.14
Coal Premium	US\$/Ton	5.00
	US\$/Ton	38.14
GAR (GCV) (Argus McCloskey Publication)	4212	6322

112. The Petitioner provided fuel price mechanism was different than the approved for imported coal based power plants. The Petitioner was asked why it didn't choose the fuel price mechanism already approved by the Authority in the upfront coal tariff.

113. The Petitioner responded that its fuel price adjustment mechanism is similar to what is allowed by NEPRA under upfront tariff. The Petitioner further explained that there are quite a few FOB Pricing Mechanisms actually followed in the coal trading business internationally. Very well established pricing indices are available for high grade coal (Such as NCI, global COAL, API – 4/6, etc). These indices have been tracking shipments from various export hubs such as South Africa, Australia, etc. According to the Petitioner, Indonesian where the coal is going to be sourced has a relatively newer market as compared to other established coal export hubs. Indonesian government, a couple of years ago decided to come up with a

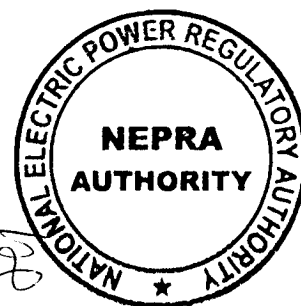


weighted average pricing mechanism that includes equal weights given to both domestic Indonesian indices and international indices – this pricing mechanism is known as HBA. Indonesian government has made HBA pricing mechanism mandatory as the minimum pricing mechanism. HBA pricing mechanism collectively provides an average pricing mechanism among different reputable coal indices in the pacific market. The Petitioner informed that its design coal matches the “Ecocoal” brand of HBA grades. Hence, Ecocoal Brand FOB pricing formula is suggested to arrive at K-Energy’s FOB coal price and future price adjustments in light of Formula for Determining the Coal Benchmark Price issued by the Directorate General of Minerals, Coal & Geothermal (“DGoMCG”), Ministry of Energy and Mineral Resources, Indonesia. However as a renowned market practice prevalent in Indonesia, McCloskey Newcastle coal Index (NCI) is utilized as Benchmark Index.

114. With regards to comparison of the approved vs requested pricing mechanism, the Petitioner responded that NEPRA upfront coal tariff does not provide any specific method for adjustment and indexation of different components of coal price. Instead in its upfront tariff Determination dated 26 June 2014, it allows IPPs to adopt different coal pricing mechanism for different cost components to be agreed with Power Purchaser in light of CSA to be entered. The coal pricing methodology the Petitioner used is the Indonesian Coal Price Reference (ICPR) also known as HBA which is the Ministry determined pricing formula for coal produced in Indonesia. This is a true reflection of the market value of Indonesian coal on an FOB basis.
115. According to the Petitioner, the upfront tariff formula, does not account for all the adjustments, which are necessary as per prevalent market norms and contracts, to arrive at the correct price for a particular CV of coal. The formula that the Authority has provided is for high grade coal. When pricing for lower grade lignite such as ours, it is important to adjust the FOB index price (Newcastle Index) for Calorific Value, Moisture, Sulfur and Ash Content as these factors play a key role in the price adjustment for a particular coal quality against the Benchmark index (all these elements are incorporated in HBA pricing mechanism as elaborated above and provided in the tariff petition and financial model submitted to NEPRA). These adjustments are standard and can be done in many ways.
116. It may also be noted that the Authority in its approved fuel price mechanism didn’t prescribed an index in order to assess the coal price of an IPP. The Authority however, only indicated Calorific Values (CV) of different sourcing countries. Following is the sourcing breakup along with corresponding CVs

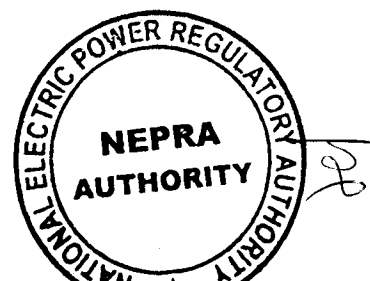
**Imported Coal (sub-bituminous)**

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 Calorific Values	
Imported Coal	25,555.98 BTU/Kg
Local Coal (sub-bituminous)	22,046.00 BTUs/Kg
Richard Bay (South Africa)-FOB	40% US\$93.40/M.Ton
Newcastle -Australia-FOB	20% US\$89.00/M.Ton
Newcastle -Indonesia-FOB	40% US\$87.55/M.Ton



<b>Weighted average FoB (6440 Kcal/kg)</b>	<b>US\$ 90.18</b>
Marine Freight	US\$20.00/M.Ton
Marine Insurance	0.10% of FOB price
Other Costs	10% of FOB price
<b>Weighted Average CIF Price</b>	<b>US\$119.60/M.Ton</b>

117. During numerous communications with various stakeholders including Argus Media, which is an independent media organization whose activities include publication of price assessments for physical energy and related commodities including coal. It came to the Authority's notice that the approved CV as indicated above demands a premium in the coal market. It was proposed to the Authority that there is need to fix an index for future coal price adjustment. After reviewing the proposal, the Authority noted that care needs to be taken when it comes to choosing index with High CV with actual coal imported that has lower CV. The reason is that when the difference in CV is high, it erroneously assesses the coal price on the higher side. The further away the underlying benchmark price is in terms of its calorific value from the coal that is used by the country's power producers, the greater will be the discrepancy between the market value of the coal and the calculated price of the coal. In the market, this is generally called "normalization error".
118. The Authority considered that this error can be minimized if a lower CV index is used and if not addressed in pricing formula normalization error can artificially increase the coal price up to US\$ 8 /ton, which carries a tariff impact of about 0.30 Cent/kWh and this increase would have no bearing on the actual fuel cost. Therefore, the Authority is of the considered opinion that choice of index is very crucial that needs to be further deliberated upon. In the instant case, K-Energy in its tariff Petitioner has used NCI index of 6322 kCal/kg (GAR) to assess the design coal CV of 4212 kCal/kg (GAR). There is a high probability that there may be an element of normalization error if this high NCI is used to assess the Petitioner designed coal.
119. The Authority is also aware that, when choosing an index it is also important that there is enough liquidity/supply in the market otherwise, suppliers will charge premium. The Authority is cognizant of the fact that power generation on coal is at nascent stage. Current coal import which merely hovers around in 4-6 million ton per annum is going to exponentially increase with additions of large coal fired power plant. And big chunk is going to be utilized in power generation through long-term PPAs. Coal price adjustment mechanism and its underlying dynamic is of critical importance as any over/under estimation of fuel price or wrong benchmarking may significantly affect the power industry that is destined at least, in the medium term, to be heavily relying on imported coal. An analysis indicates that US\$ 2 per ton over estimation in the fuel price could increase the project levelized tariff by Ps 12 /kWh or ~ US\$ 4 million per year in additional revenue for this project. The adjustment mechanism has very serious financial implications; therefore, the Authority will initiate separate proceeding for arriving at a judicious adjustment mechanism. For this tariff petition, the Authority provisionally approves the requested adjustment mechanism subject to adjustment/revision after the Authority decide about some of the issues related to the fuel price adjustment mechanism that have been discussed above.



120. In the instant case, for fuel price calculations, Indonesian Coal Index-3 coal price with CV of 5000Kcal/kg (Gross As Received) has been used. Thus giving final a Cnf price of US\$ 52.91 per ton against US\$ 72.31 per ton requested. It may be noted that Siddiqson Energy Limited (SEL) has also drafted Coal supply agreement based on ICI -3 Index (jointly published by Argus and Coalindo) for it 350 MW imported coal based power plant. The basis fuel price assessment is hereunder:

<b>COAL PRICING Assumptions</b>		<b>Value</b>
		<b>US\$/t</b>
ICI-3 index as of July 24, 2015		41.46
Freight		12
Insurance @ 0.1% of fob		0.04
Coal Price CIF		53.5
Other charges excluding transportation		9
Unadjusted Coal Price CNF		62.5
Adjusted Coal Base Price FOB		31.87
<b>Adjusted Coal Price CNF</b>		<b>52.91</b>
		<b>Design</b>
		<b>Coal</b>
Total Moisture (ar)	%	35
Sulphur (ar)	%	0.5
Ash (ar)	%	8
CV adj		0.84
Moisture adj		0.9
Sulphur adj (premium)		-0.4
Ash Adj (premium)		0
FKA		1.08
Adjusted price before premium		31.87
Coal Premium		0
		<b>31.87</b>
	<b>design</b>	<b>index</b>
GAR ICI-3 (kCal/kg)	4,212	5,000

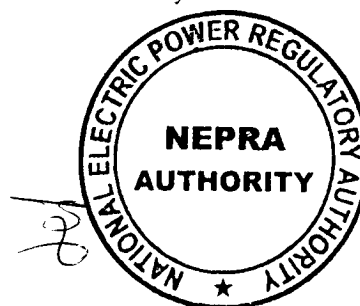
#### Issues Related to Operations & Maintenance Costs - Variable & Fixed

- i. Whether the requested variable O&M of Rs. 0.1676/kWh is justified?
- ii. Whether the fixed O&M cost of Rs. 0.5810/kWh is justified?

#### Variable O&M Cost

121. The Petitioner claimed an amount of US\$ 5,583,519 under Variable Operations and Maintenance (O&M) cost, which includes annual expenses related to:

- i. Chemicals – required for boiler water circuit, CCW, RO plant, condensate polishing unit, oil water separator, wastewater treatment, etc.
- ii. Water – required for RO feed water, potable water, stockyard fire control, coal dust control, service water etc.



- iii. Balance of Plant – reverse osmosis membrane, condensate polisher, H2 generation plant, etc.
- iv. Electrical – electric motor, switchgear, breakers, transformer, lighting etc.
- v. Coal handling system – coal conveyors, crushers, unloaders, rollers, hoppers etc.
- vi. Ash handling system – ESP maintenance, ash hoppers, ash piping replacements, pneumatic conveyors, valves etc.
- vii. Tapprogge ball clearing consumables
- viii. Third party services – coal shipment inspections, mechanical contractors, chemical laboratories, staff van, ISO and environmental services etc.
- ix. Consumables – chlorine, lab chemicals, cotton rags, UPS consumables, printer, miscellaneous maintenance.

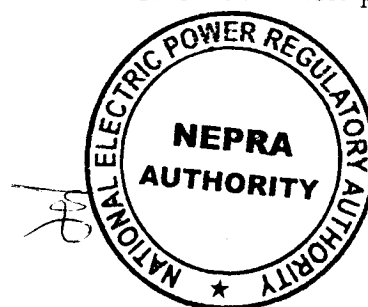
122. A break-up of the variable O&M cost (@100% plant factor) as provided by the petitioner is as follows:

Variable O & M	USD
<b>Chemicals</b>	
Chemicals for RO & Boiler	333,555
Polishing, Waste Water Treatment and Oil water Separator	989,964
Other Chemical and Resins	180,000
Fire fighting Chemicals	40,000
<b>Sub Total Chemicals</b>	<b>1,543,519</b>
<b>Other Costs</b>	
BOP maintenance	400,000
Electrical maintenance	680,000
Tapprogge Ball Cleaning Consumables	200,000
Coal Stacking and Piling System	685,000
Ash Disposal Expense	635,000
Third Party Services	450,000
Consumables	990,000
<b>Sub Total Other Costs</b>	<b>4,040,000</b>
<b>Total Annual Plant Variable O&amp;M Costs</b>	<b>5,583,519</b>

123. The Petitioner claimed that all these costs are based on feasibility study estimates and requested for a post facto adjustment as per the inputs from the EPC Contractor. The Petitioner requested to consider 75% of the variable O&M cost as local to be indexed with local WPI and the remaining 25% as the foreign to be indexed with US-CPI and Exchange Rate (PKR/US\$) variation. Based on the above, KEPL worked out its Variable O&M cost Component as Rs. 0.1676 / kWh at 83.33% plant factor.

#### FIXED O&M COST

124. The Petitioner claimed an amount of US\$ 19,493,452 under Fixed O&M cost per annum, which includes expenses related to:



- i. Boiler maintenance - boiler and boiler auxiliaries, feeders and pulverisers, pumps, fans and compressors;
- ii. Turbine and generator auxiliaries – main turbine, turbine valves, intake structure, condenser, generator, etc.
- iii. Major overhaul – a five years cycle with coverage of boiler, turbine, generator, condenser, auxiliaries, BOP etc.
- iv. Personnel – operation, maintenance, administrative and management personnel
- v. Technical advisory, Field services and Third party services – long term engagement of experts in coal fired technology essential for safe and optimum operations, field services, coal shipment inspections, mechanical contractors, chemical laboratories, staff van, ISO and environmental services etc.
- vi. O&M contractor – team of experts permanently based at the plant for overall supervision
- vii. Miscellaneous – safety, office & administrative, landscaping, permits and consents, training, land sub-lease etc.

125. Break-up of fixed O&M component (@100% plant factor) as provided by the Petitioner is as follows:

Fixed O & M	USD
Boiler maintenance	4,481,500
Turbine and generator auxiliaries maintenance	720,000
Major overhauls	1,660,000
Personnel	5,008,427
O&M fee	4,000,000
Technical advisory, Field services and other Third party services	2,369,663
Miscellaneous	1,253,862
<b>Total Annual Plant Fixed O&amp;M Costs</b>	<b>19,493,452</b>

126. The Petitioner mentioned that all these costs except "O&M fee" are based on feasibility study estimates and should be allowed post facto adjustment as per the inputs from the EPC and O&M Contractors. O&M fee has been based on initial estimates from KEPCO KPS (a Korean O&M Company), therefore it should be allowed post facto adjustment as per actual O & M agreement with the O&M contractor. The Petitioner has assumed 35% of its fixed O&M cost to be local to be indexed with local WPI whereas the remaining 65% as foreign to be indexed with US-CPI and Exchange Rate (PKR/US\$) variation. The Petitioner has claimed Fixed O&M cost Component as Rs. 0.7023/ kWh at 83.33% plant factor.

127. The Authority in its upfront coal tariff determination 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. In the Fixed O&M cost component, the Authority allowed Rs.0.3070 / kWh at 85% plant factor.

128. Total O&M cost allowed in the upfront tariff @ 85% plant factor is Rs.0.7852 / kWh including the Ash and lime stone charges. The same O&M was also approved by the Authority for the recent coal conversion projects as well. KEPL's total O&M cost component

at 85% plant factor works out to be Rs.0.8561/ kWh which is Rs. 0.0709/ kWh or about 9% higher than the Authority's allowed O&M cost in the upfront coal tariff. As KEPL will be using sea water for treatment of sulphur content in coal, instead of lime stone, therefore, for right comparison the approved total O&M cost without limestone component works out to be Rs 0.6952/kWh which comes to be around 23% lesser than the total O&M cost of Rs 0.8561/kWh proposed by KEPL.

129. The Authority in K-Electric's Multi Year Tariff (MYT) of December 2009, allowed O&M cost to K-Electric separately for its generation, transmission and distribution functions. The O&M cost allowed for the Generation function was on overall basis for all of the K-Electric's power plants without any specific break-up of O&M cost in terms of Unit 3 & 4 of BQPS-I. As now unit 3 & 4 of BQPS-I have been leased out to KEPL, therefore, one may argue that O&M cost for unit 3 & 4 should be allowed on marginal basis. That is O&M cost of a green field project minus O&M cost already incorporated in K-Electrics' MYT. The Authority observed that determining marginal O&M cost for this project will be a monumental exercise and if opted would be very time consuming. Moreover, K-Electric's MYT is going to expire in June 2016, well before conversion of unit 3 & 4 on coal, therefore, adjustment on account of O&M cost for these units in K-Electric's tariff would be deliberated in its upcoming MYT. In view thereof, the Authority, has decided to allow the O&M Costs as approved for upfront coal tariff i.e. variable O&M cost @ Rs. 0.114/kWh, with 40% local and 60% foreign component and Fixed O&M cost @ Rs. 0.3070/kW/h with 50% local and 50% foreign component. Similarly Ash disposal charges @ Rs. 0.22/ kWh is also allowed for KEPL, subject to its adjustment as per actual. Limestone charges are not being allowed to KEPL since it will be using the sea water for treatment of the Sulphur content instead of lime stone.

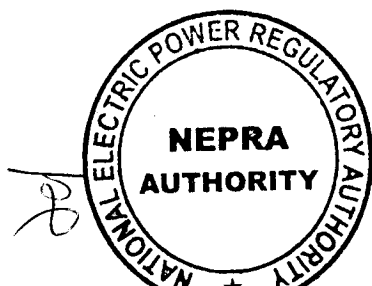
#### **WORKING CAPITAL FINANCING**

130. The Petitioner requested a working capital cost component of Rs. 0.2113/ kWh based on the following:

- i. Investment in 90 days coal inventory
- ii. Collection of 30 days energy invoices in arrears @ 83.33% load factor
- iii. Investment in 1000 tonnes inventory of LDO
- iv. Interest Rate - Kibor plus 2%

131. The Petitioner substantiated its claim for investment in coal for 90 days as follows:

- i. Payment is effected immediately upon shipment. The sea voyage takes around two weeks
- ii. The arrival at outer anchorage, then at port and unloading takes about another week to ten days
- iii. Six weeks strategic reserve and two weeks' buffer inventory to account for shipment delays etc. (to be kept in Primary Storage area)
- iv. One week inventory at Secondary coal yard (holding area for Boiler feed)



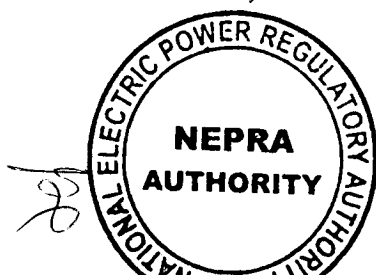
132. In addition to the above, the Petitioner submitted that the cost of bank guarantees, if any, required to be provided by the project company under the CSA and the PPA has not been catered for and shall be charged as per actual.
133. The Authority in its upfront coal determination has worked out the 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.
134. 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.
135. Similarly for other coal conversion cases, the Authority has also adopted the same mechanism. Accordingly, for the purpose of consistency, the Authority has decided to allow cost of working capital to KEPL based on coal Inventory equivalent to 90 days at 100% plant load and Receivables equivalent to one month of fuel charges at 100% plant load.

**Whether Insurance cost of Rs. 0.2361/kWh is justified?**

136. The Petitioner has requested for post COD insurance cost of Rs. 654,288,240/- p.a. worked out @ 1.35% of the EPC Contract Price and BOP Lease Assets, which turns out to be Rs.0.2361/ kWh at 83.33% plant factor to be indexed for PKR/US\$ variations in future. The Petitioner claimed that the Insurance will cover both breakdown and business interruption.
137. The Authority for the purpose of consistency has decided to allow the same Insurance cost as determined by the Authority in the upfront coal tariff and also allowed to the other recent coal conversion projects. Accordingly the Insurance cost component of tariff will be adjusted on the basis of actual insurance cost with maximum of 1% of the 70% of Capital Cost.

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

138. In this regards the Petitioner submitted that Environment Impact Analysis was carried out by Hagler Bailey and EMC. Primary data for site conditions was collected using testing equipment imported from UK. The Petitioner further informed that all requirements of Sindh Environmental Protection Agency (SEPA) were compiled with in consultation with the stakeholders, base line study and EMP. According to the Petitioner SEPA approval received on 20th June 2014.
139. On this issue Ministry of Planning, Development and Reform, requested that The Authority may ask Sindh Environment Protection Agency (SEPA) to certify that all the measures has been taken to take care of environment as another 1200 MW Coal fired power plant is also established at Bin Qasim.
140. The project has already received approval from competent agency which in the instant case is SEPA. Therefore, the Authority considers this issue as resolved.





## ORDER

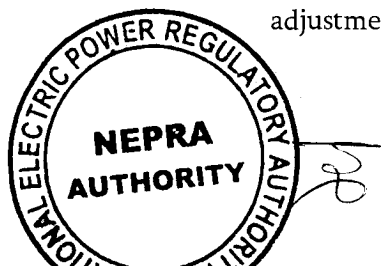
- I. The Authority hereby determines and approves the following coal tariff and adjustments/indexations for the proposed coal conversion project of **K-Energy Private Limited (KEPL)** for delivery of electricity to the power purchaser:

Tariff Components	1-10 Years	11-20 Years	Indexation
<b>Capacity Charges (Rs. /kW/hr.):</b>			
Fixed O&M (Local)	0.1535	0.1535	CPI (General)
Fixed O&M (Foreign)	0.1535	0.1535	US CPI & Rs./US\$
Insurance	0.0506	0.0506	Actual with subject to maximum limit
Cost of working capital	0.1732	0.1732	KIBOR & Weighted average cost of coal
ROE	0.4976	0.4976	Rs./US\$
Debt Servicing (1-10 Years only)	0.2513	-	KIBOR
Deferred Credit Payment	0.7951	-	(Only for 1 <sup>st</sup> 5 years) US CPI & Rs./US\$
<b>Total</b>	<b>1.6773</b>	<b>1.0284</b>	
<b>Energy Charge (Rs./kWh):</b>			
Fuel cost Component	3.2383	3.2383	As per the approved mechanism
Variable O&M (Local)	0.0456	0.0456	CPI (General)
Variable O&M (Foreign)	0.0684	0.0684	US CPI & Rs./US\$
Ash Handling	0.2200	0.2200	As per actual
Lime Stone	0.0900	0.0900	As per actual
<b>Total</b>	<b>3.5723</b>	<b>3.5723</b>	

- Note: i) Component wise proposed tariff is indicated at Annex-I.  
ii) Debt Servicing Schedule is attached as Annex-II.

## II. One Time Adjustment at COD

- Since the exact timing of payment to EPC contractor is not known at this point of time, therefore, an adjustment for relevant foreign currency fluctuation for the portion of payment in the relevant foreign currency will be made against the reference exchange rate of Rs. 97.1/US\$. In this regard the sponsor will be required to provide all the necessary relevant details along with documentary evidence. The adjustment shall be made only for the currency fluctuation against the reference parity values.
- The Customs Duties and Cess will be adjusted as per actual.
- The financing fees and charges will be adjusted as per actual with maximum of 3.5% of the debt amount.
- Interest during construction will be re-established at the time of COD on the basis of actual project financing, actual debt draw downs and actual LIBOR/KIBOR and applicable premiums not exceeding 3.5% in case of KIBOR based financing and 4.5% in case of LIBOR based financing.
- In case, export credit agency fee or Sinasure fee on foreign financing is payable, the benchmark established in the upfront coal tariff will be adopted and appropriate adjustment in the project cost will be made.



### III. Adjustment due to Variation in Net Capacity

The reference tariff has been determined on the basis of minimum net capacity of 383.94 MW at delivery point at mean site conditions. All the tariff components of capacity charge shall be adjusted at the time of COD based upon the Initial Dependable Capacity (IDC) tests to be carried out for determination of contracted capacity. Adjustment shall not be made if the net output is established less than 383.94 MW.

### IV. Adjustment in Insurance as per actual

The insurance component post existing PPA will be adjusted annually as per actual with maximum of US\$ 1.751 million on applicable exchange rate at the start of the coverage period each year post existing PPA. The adjustment mechanism is as under

AIC	=	$Ins_{(Ref)} / P_{(Ref)} * P_{(Act)}$
Where:		
AIC	=	Adjusted Insurance Component of Tariff
$Ins_{(Ref)}$	=	Reference Insurance Component of Tariff
$P_{(Ref)}$	=	Reference Premium Rs. 170.022 million.
$P_{(Act)}$	=	Actual Premium or US\$ 1.751 million on applicable exchange rate at the start of the coverage period each year post existing PPA whichever is lower

### V. Indexations:

The following indexations shall be applicable to the reference tariff;

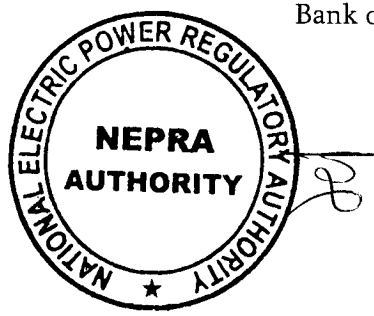
#### i) Indexation of Return on Equity (ROE)

After COD, ROE component of tariff will be quarterly indexed on account of variation in PKR/US\$ parity according to the following formula:

$ROE_{(Rev)}$	=	$ROE_{(Ref)} * ER_{(Rev)} / ER_{(Ref)}$
Where;		
$ROE_{(Rev)}$	=	Revised ROE Component of Tariff
$ROE_{(Ref)}$	=	ROE Component of Tariff established at the time of COD
$ER_{(Rev)}$	=	The revised TT & OD selling rate of US dollar as notified by the National Bank of Pakistan
$ER_{(Ref)}$	=	The reference TT & OD selling rate of RS. 97.1/US\$

#### ii) Indexation applicable to O&M

The O&M component of tariff will be adjusted on account of local Inflation (CPI) and foreign inflation (US CPI) and exchange rate quarterly on 1<sup>st</sup> July, 1<sup>st</sup> October, 1<sup>st</sup> January and 1<sup>st</sup> April based on the latest available information with respect to CPI notified by the Pakistan Bureau of Statistics (PBS), US CPI issued by US Bureau of Labor Statistics and revised TT & OD selling rate of US Dollar notified by the National Bank of Pakistan as per the following mechanism:



$L V O\&M_{(REV)}$	=	$L V O\&M_{(REF)} * CPI_{(REV)} / CPI_{(REF)}$
$L F O\&M_{(REV)}$	=	$L F O\&M_{(REF)} * CPI_{(REV)} / CPI_{(REF)}$
$F V O\&M_{(REV)}$	=	$F V O\&M_{(REF)} * US CPI_{(REV)} / US CPI_{(REF)} * ER_{(REV)} / ER_{(REF)}$
$F F O\&M_{(REV)}$	=	$F F O\&M_{(REF)} * US CPI_{(REV)} / US CPI_{(REF)} * ER_{(REV)} / ER_{(REF)}$
Where:		
$L V O\&M_{(REV)}$	=	The revised Local Variable O&M Component of tariff
$L F O\&M_{(REV)}$	=	The revised Local Fixed O&M Component of tariff
$F V O\&M_{(REV)}$	=	The revised Foreign Variable O&M Component of tariff
$F F O\&M_{(REV)}$	=	The revised Foreign Fixed O&M Component of tariff
$L V O\&M_{(REF)}$	=	The reference Local Variable O&M Component of tariff
$L F O\&M_{(REF)}$	=	The reference Local Fixed O&M Component of tariff
$F V O\&M_{(REF)}$	=	The reference Foreign Variable O&M Component of tariff
$F F O\&M_{(REF)}$	=	The reference Foreign Fixed O&M Component of tariff
$CPI_{(REV)}$	=	The revised Consumer Price Index (General) published by Pakistan Bureau of Statistics
$CPI_{(REF)}$	=	The reference Consumer Price Index (General) for the month of June 2014
$US CPI_{(REV)}$	=	The revised US CPI (All Urban Consumers) published by US Bureau of Labor Statistics
$US CPI_{(REF)}$	=	The reference US CPI (All Urban Consumers) for the month of June 2014
$ER_{(REV)}$	=	The revised TT & OD selling rate of US dollar published by National Bank of Pakistan
$ER_{(REF)}$	=	The reference TT & OD selling rate of RS. 97.1/US\$

iii) **Indexation for KIBOR Variation**

The interest part of fixed charge component will remain unchanged throughout the term except for the adjustment due to variation in interest rate as a result of variation in 3 months KIBOR (LIBOR in case of foreign financing) according to the following formula;

$\Delta I$	=	$P_{(REV)} * (KIBOR_{(REV)} - 11.91\%) / 4$
Where:		
$\Delta I$	=	the variation in interest charges applicable corresponding to variation in 3 months KIBOR. $\Delta I$ can be positive or negative depending upon whether $KIBOR_{(REV)}$ is > or < 11.91%. The interest payment obligation will be enhanced or reduced to the extent of $\Delta I$ for each quarter under adjustment applicable on quarterly basis.
$P_{(REV)}$	=	The outstanding principal (as indicated in the attached debt service schedule to this order) on a quarterly basis on the relevant quarterly calculation date. Period 1 shall commence on the date on which the 1 <sup>st</sup> instalment is due after availing the grace period.



**VI. Fuel Cost Adjustment**

A detailed coal price formula will be prescribed after the Authority' review of the existing fuel price adjustment mechanism.

**VII. Terms and Conditions of Tariff:**

The above tariff and terms and conditions, stipulated hereunder, shall be incorporated in the Power Purchase Agreement between the Power Purchaser and the Power Producer:

- i. Capacity Charge Rs./kW/hour applicable to dependable capacity at the delivery point.
- ii. The tariff is applicable for a period of 20 years commencing from the date of the Commercial Operation.
- iii. Dispatch criterion will be based on the Energy Charge.
- iv. For the new investment, all new equipment will be installed and the plant will be of standard configuration.
- v. Auxiliary consumption of 9% has been assumed.
- vi. No provision for income tax, workers profit participation fund and workers welfare fund, any other tax, excise duty, levy, charge, surcharge or other governmental impositions, payable on the generation, sales, exploration has been accounted for in the tariff. If the company is obligated to pay any tax relating to its generation business the exact amount will be reimbursed by CPPA/DISCO on production of original receipts.
- vii. 100% of debt has been assumed to be foreign provided however that in the event the Petitioner uses foreign loans or a mix of foreign and local loans, the actual cost shall be passed on to the Power Purchaser.
- viii. The minimum availability of the plant will be 85%.
- ix. General assumptions, which are not covered in this determination, may be dealt with as per the standard terms of the Power Purchase Agreement.

**VIII. The above Order of the Authority along with 2 Annexes will be notified in the Official Gazette in terms of Section 31(4) of the Regulations of Generation, Transmission and Distribution of Electric Power Act, 1997.**

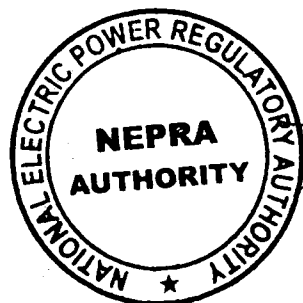


## K - ENERGY: 422 MW COAL CONVERSION POWER PROJECT

## Reference Tariff Table Post Coal Conversion

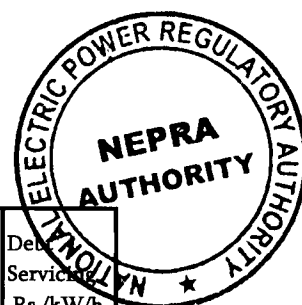
Year	Energy Purchase Price (Rs./kWh)					Capacity Purchase Price (PKR/kW/Hour)										Total	
	Fuel Component	Ash Disposal	Var. O&M		Total EPP	Fixed O&M		Cost of W/C	Insurance	ROE	Deferred Payment	Debt Repayment	Interest Charges	Total	Capacity Charge@ 85%	Total Tariff	Total Tariff
			Foreign	Local		Local	Foreign									Rs./kWh	Cents/kWh
1	3.2383	0.2200	0.0684	0.0456	3.5723	0.1535	0.1535	0.1732	0.0506	0.4976	0.7951	0.0615	0.1899	2.0748	2.4410	6.0133	6.1929
2	3.2383	0.2200	0.0684	0.0456	3.5723	0.1535	0.1535	0.1732	0.0506	0.4976	0.7951	0.0712	0.1802	2.0748	2.4410	6.0133	6.1929
3	3.2383	0.2200	0.0684	0.0456	3.5723	0.1535	0.1535	0.1732	0.0506	0.4976	0.7951	0.0824	0.1689	2.0748	2.4410	6.0133	6.1929
4	3.2383	0.2200	0.0684	0.0456	3.5723	0.1535	0.1535	0.1732	0.0506	0.4976	0.7951	0.0954	0.1560	2.0748	2.4410	6.0133	6.1929
5	3.2383	0.2200	0.0684	0.0456	3.5723	0.1535	0.1535	0.1732	0.0506	0.4976	0.7951	0.1104	0.1409	2.0748	2.4410	6.0133	6.1929
6	3.2383	0.2200	0.0684	0.0456	3.5723	0.1535	0.1535	0.1732	0.0506	0.4976		0.1278	0.1235	1.2797	1.5056	5.0779	5.2295
7	3.2383	0.2200	0.0684	0.0456	3.5723	0.1535	0.1535	0.1732	0.0506	0.4976		0.1480	0.1034	1.2797	1.5056	5.0779	5.2295
8	3.2383	0.2200	0.0684	0.0456	3.5723	0.1535	0.1535	0.1732	0.0506	0.4976		0.1713	0.0800	1.2797	1.5056	5.0779	5.2295
9	3.2383	0.2200	0.0684	0.0456	3.5723	0.1535	0.1535	0.1732	0.0506	0.4976		0.1983	0.0530	1.2797	1.5056	5.0779	5.2295
10	3.2383	0.2200	0.0684	0.0456	3.5723	0.1535	0.1535	0.1732	0.0506	0.4976		0.2295	0.0218	1.2797	1.5056	5.0779	5.2295
11	3.2383	0.2200	0.0684	0.0456	3.5723	0.1535	0.1535	0.1732	0.0506	0.4976		-	-	1.0284	1.2099	4.7822	4.9250
12	3.2383	0.2200	0.0684	0.0456	3.5723	0.1535	0.1535	0.1732	0.0506	0.4976		-	-	1.0284	1.2099	4.7822	4.9250
13	3.2383	0.2200	0.0684	0.0456	3.5723	0.1535	0.1535	0.1732	0.0506	0.4976		-	-	1.0284	1.2099	4.7822	4.9250
14	3.2383	0.2200	0.0684	0.0456	3.5723	0.1535	0.1535	0.1732	0.0506	0.4976		-	-	1.0284	1.2099	4.7822	4.9250
15	3.2383	0.2200	0.0684	0.0456	3.5723	0.1535	0.1535	0.1732	0.0506	0.4976		-	-	1.0284	1.2099	4.7822	4.9250
16	3.2383	0.2200	0.0684	0.0456	3.5723	0.1535	0.1535	0.1732	0.0506	0.4976		-	-	1.0284	1.2099	4.7822	4.9250
17	3.2383	0.2200	0.0684	0.0456	3.5723	0.1535	0.1535	0.1732	0.0506	0.4976		-	-	1.0284	1.2099	4.7822	4.9250
18	3.2383	0.2200	0.0684	0.0456	3.5723	0.1535	0.1535	0.1732	0.0506	0.4976		-	-	1.0284	1.2099	4.7822	4.9250
19	3.2383	0.2200	0.0684	0.0456	3.5723	0.1535	0.1535	0.1732	0.0506	0.4976		-	-	1.0284	1.2099	4.7822	4.9250
20	3.2383	0.2200	0.0684	0.0456	3.5723	0.1535	0.1535	0.1732	0.0506	0.4976		-	-	1.0284	1.2099	4.7822	4.9250
<b>Average</b>																	
1-10	3.2383	0.2200	0.0684	0.0456	3.5723	0.1535	0.1535	0.1732	0.0506	0.4976	0.7951	0.1296	0.1218	1.6773	1.9733	5.5456	5.7112
11-20	3.2383	0.2200	0.0684	0.0456	3.5723	0.1535	0.1535	0.1732	0.0506	0.4976		0.0000	0.0000	1.0284	1.2099	4.7822	4.9250
1-20	3.2383	0.2200	0.0684	0.0456	3.5723	0.1535	0.1535	0.1732	0.0506	0.4976	0.7951	0.0648	0.0609	1.3528	1.5916	5.1639	5.3181
<b>Levelized</b>																	
1-20	3.2383	0.2200	0.0684	0.0456	3.5723	0.1535	0.1535	0.1732	0.0506	0.4976	0.3540	0.0835	0.0979	1.5638	1.840	5.4121	5.5737

Levelized Tariff = 5.41 Rs./kWh 5.5737 Cents/kWh



## Debt Service Schedule

Gross Capacity	421.91	MWs	US\$/PKR Parity	97.10
Net Capacity	383.94	MWs	Equity	78.25 US\$ Million
KIBOR	11.91%		Debt	44.88 US\$ Million
Spread over KIBOR	3.00%		Debt in Pak Rupees	4,357.80 PKR Million
Total Interest Rate	14.91%			



Period	Principal Million \$	Principal Repayment Million \$	Interest Million \$	Balaance Million \$	Debt Service Million \$	Principal Repayment Rs./kW/hour	Interest Rs./kW/ Hour	Debt Service Rs./kW/h
1	44.88	0.50	1.67	44.38	2.18			
2	44.38	0.52	1.65	43.85	2.18			
3	43.85	0.54	1.63	43.31	2.18			
4	43.31	0.56	1.61	42.75	2.18	0.0615	0.1899	0.2513
1st Year		2.13	6.58		8.71			
5	42.75	0.58	1.59	42.17	2.18			
6	42.17	0.60	1.57	41.56	2.18			
7	41.56	0.63	1.55	40.94	2.18			
8	40.94	0.65	1.53	40.29	2.18	0.0712	0.1802	0.2513
2nd Year		2.46	6.24		8.71			
9	40.29	0.67	1.50	39.61	2.18			
10	39.61	0.70	1.48	38.91	2.18			
11	38.91	0.73	1.45	38.18	2.18			
12	38.18	0.75	1.42	37.43	2.18	0.0824	0.1689	0.2513
3rd Year		2.85	5.85		8.71			
13	37.43	0.78	1.40	36.65	2.18			
14	36.65	0.81	1.37	35.84	2.18			
15	35.84	0.84	1.34	35.00	2.18			
16	35.00	0.87	1.30	34.13	2.18	0.0954	0.1560	0.2513
4th Year		3.30	5.40		8.71			
17	34.13	0.90	1.27	33.22	2.18			
18	33.22	0.94	1.24	32.29	2.18			
19	32.29	0.97	1.20	31.31	2.18			
20	31.31	1.01	1.17	30.30	2.18	0.1104	0.1409	0.2513
5th Year		3.82	4.88		8.71			
21	30.30	1.05	1.13	29.26	2.18			
22	29.26	1.09	1.09	28.17	2.18			
23	28.17	1.13	1.05	27.05	2.18			
24	27.05	1.17	1.01	25.88	2.18	0.1278	0.1235	0.2513
6th Year		4.43	4.28		8.71			
25	25.88	1.21	0.96	24.67	2.18			
26	24.67	1.26	0.92	23.41	2.18			
27	23.41	1.30	0.87	22.10	2.18			
28	22.10	1.35	0.82	20.75	2.18	0.1480	0.1034	0.2513
7th Year		5.12	3.58		8.71			
29	20.75	1.40	0.77	19.35	2.18			
30	19.35	1.46	0.72	17.89	2.18			
31	17.89	1.51	0.67	16.38	2.18			
32	16.38	1.57	0.61	14.82	2.18	0.1713	0.0800	0.2513
8th Year		5.93	2.77		8.71			
33	14.82	1.62	0.55	13.20	2.18			
34	13.20	1.68	0.49	11.51	2.18			
35	11.51	1.75	0.43	9.76	2.18			
36	9.76	1.81	0.36	7.95	2.18	0.1983	0.0530	0.2513
9th Year		6.87	1.84		8.71			
37	7.95	1.88	0.30	6.07	2.18			
38	6.07	1.95	0.23	4.12	2.18			
39	4.12	2.02	0.15	2.10	2.18			
40	2.10	2.10	0.08	(0.00)	2.18	0.2295	0.0218	0.2513
10th Year		7.95	0.75		8.71			