National Electric Power Regulatory Authority
Registrar Office
***

No. NEPRA/TRF-100/6097 April 22, 2015

Subject: **Petition for Determination of Tariff – 421.90 MW Coal Conversion Project of BQPS-1 at Bin Qasim, Karachi – K-Energy (Pvt.) Ltd. (KEPL)**

Enclosed please find herewith a copy of subject tariff petition filed by K-Energy (Pvt.) Ltd. (KEPL) vide letter dated 21.04.2015 for comments that whether the provided information / documents by KEPL are sufficient and satisfactory for admission of the instant petition or otherwise.

2. The deficient information in the tariff petition, if any, shall be classified that it is required under Rule 3(2) & (8) of NEPRA (Tariff Standards & Procedure) Rules, 1998 (Tariff Rules) (refer Minutes of ARM 13-280) or an additional information is required under Rule 4(2) of the Tariff Rules.

3. Being time bound case; the provision of requisite comments by 24.04.2015 shall be highly appreciated.

Encl: As above

22/4/15
(Iftikhar Ali Khan)
Deputy Registrar

1. Senior Advisor (Tech)
2. Senior Advisor (Tariff-I)
3. Legal Advisor (KIP)
4. Mr. Zain Ullah Shah, O.S [to update the status]
5. Mr. Rizwan Ali Piracha, O.A. [to scan the petition]

Senior Advisor Tariff-I
Dy. No: 3655
Date: 22-4-15

SAT-II 22/04/15
Dir-T-1
DDT-IV 24/4/15

CC:

1. Chairman
2. Vice Chairman / Member (CA)
3. Member (Tariff)
4. Member (M&E & Licensing)

Senior Advisor Tariff-II
Diary No: 2206
Date: 22-4-15

K-ENERGY (PRIVATE) LIMITED

F-50 Park Lane, Block-5 Kehkashan, Clifton, Karachi, Pakistan
Phone: +92-21-35157421 +92-21-35157422 +92-21-35157423 Fax: +92-21-3515-7424

Received Scanned Copy ~~through E-mail~~
~~Received through~~

For information & n/a
— DRg-I/SAF
Spl 10.
— SA(Tech)
— SAT-I
— M/F
21.04.15
cc: Chairman
VC/M(CA)
M(T)
M(M&E)

Dated: 21 April 2015

The Registrar
National Electric Power Regulatory Authority
NEPRA Tower,
Islamabad

Subject: Petition for Determination of Tariff - 421.90 MW Coal Conversion Project of BQPS-1 at Bin Qasim, Karachi

Dear Sir

The K-Energy (Private) Limited (KEPL) has been planning to setup 421.90 MW Coal Fired Power Project with debt equity ratio of 79.18:20.82. Consequently, KEPL developed tariff model for 20 years based on Technical Feasibility Report and EPC documentations. Please find enclosed following documents pursuant to Rule 3 of NEPRA (Tariff Standards and Procedure) Rules 1998 for approval / determination of under reviewed tariff from competent authority;

1. Affidavit on Judicial Paper under Rule 3(8) of the Tariff Rules
2. Board Resolution for Authorization to sign and file
3. Bank Draft No.03370319 dated 20 April 2015 drawn on SCB of Rs. 1,357,760/- for petition fee
4. Tariff Petition
5. Annexures to the Tariff Petition

I Shaheryar Arshad Chishty, Chief Executive, K-Energy (Private) Limited, hereby authorize following personnel as representatives of the company to act and deal on my behalf with all tariff petition related issues of submission, representation and perusal;

1. Mr. Jabran Saroia and Mr. Hassan Shah Abbas, Consultants
2. Mr. Athar Naseem Shaikh, Advisor
3. Mr. Ejaz Ahmed Raja, Technical Advisor
4. Mr. Abdul Basit Tola, Manager Project & Financial Analysis

Please direct all future correspondence of K-Energy (Private) Limited to the following address C/o El Paso Technology Pakistan (Pvt.) Limited:

Address: 3rd Floor, G.D. Arcade, 73-East, Fazal-ul-Haq Road, Blue Area Islamabad.

Thank you for your anticipated consideration and co-operation.

Sincerely yours,

[signature]

(Shaheryar Arshad Chishty)
Chief Executive
K-Energy (Private) Limited

Alongwith DD Rs. 1357760/-, (03) spiral binding and 02 copies

Registrar
Dy. No. 4435
Dated 21-4-15

Annexure A

Board of Director's Resolution

K-ENERGY (PRIVATE) LIMITED

F-60, Park Lane, Block-5, Kehkashan, Clifton, Karachi, Pakistan
Phone : +92-21-35157421, +92-21-35157422, +92-21-35157423 Fax: +92-21-3515-7432

Received Scanned Copy through E-mail

Received through

For information & n/a
— D/Reg-I/SAR
Cpy to:
— SA(Tech)
— SAT-I
— M/F

21.04.15
cc. Chairman
VC(M(CA))
M(T)
M(M&E)

Dated: 21 April 2015

The Registrar
National Electric Power Regulatory Authority
NEPRA Tower,
Islamabad

Subject: Petition for Determination of Tariff - 421.90 MW Coal Conversion Project of BQPS-1 at Bin Qasim, Karachi

Dear Sir

The K-Energy (Private) Limited (KEPL) has been planning to setup 421.90 MW Coal Fired Power Project with debt equity ratio of 79.18:20.82. Consequently, KEPL developed tariff model for 20 years based on Technical Feasibility Report and EPC documentations. Please find enclosed following documents pursuant to Rule 3 of NEPRA (Tariff Standards and Procedure) Rules 1998 for approval / determination of under reviewed tariff from competent authority;

1. Affidavit on Judicial Paper under Rule 3(8) of the Tariff Rules
2. Board Resolution for Authorization to sign and file
3. Bank Draft No.03370319 dated 20 April 2015 drawn on SCB of Rs. 1,357,760/- for petition fee
4. Tariff Petition
5. Annexures to the Tariff Petition

I Shaheryar Arshad Chishty, Chief Executive, K-Energy (Private) Limited, hereby authorize following personnel as representatives of the company to act and deal on my behalf with all tariff petition related issues of submission, representation and perusal;

1. Mr. Jabran Saroia and Mr. Hassan Shah Abbas, Consultants
2. Mr. Athar Naseem Shaikh, Advisor
3. Mr. Ejaz Ahmed Raja, Technical Advisor
4. Mr. Abdul Basit Tola, Manager Project & Financial Analysis

Please direct all future correspondence of K-Energy (Private) Limited to the following address C/o El Paso Technology Pakistan (Pvt.) Limited:

Address: 3rd Floor, G.D. Arcade, 73-East, Fazal-ul-Haq Road, Blue Area Islamabad.

Thank you for your anticipated consideration and co-operation.

Sincerely yours,

(Shaheryar Arshad Chishty)
Chief Executive
K-Energy (Private) Limited

Along with DD Rs. 1357760/-, (03) Spiral Bindings and 02 Copies

Registrar
Dy No. 4435
Dated 21-4-15

Annexure B

Affidavit of Signatory

500
Rupees

BEFORE THE NATIONAL ELETRIC POWER REGULATORY AUTHORITY [illegible]

APPLICATION FOR TARIFF DETERMINATION

[illegible] AVIT [illegible] Mr. Shahery[illegible] Rashid Chishty S/o Arshad [illegible] Ahmed Pakistan [illegible] [illegible]-[illegible]-[illegible]141-9 Chief Executive of K Energy (Private) Limited (the "KEPL")

I, the above-named Deponent do hereby solemnly affirm and declare as under -

1. I am Chief Executive and Principal authorized representative of KEPL
2. I have filed the accompanying Tariff Petition / Application together with supporting documents and annexures before the learned Authority and the contents of the same may kindly be [illegible] an integral part of this affidavit
3. The contents of the accompanying Tariff Petition are true and correct to the best of my knowledge, belief and information and that nothing has been concealed
4. All further documentation and information to be provided by me [illegible] the accompanying Tariff Petition shall be [illegible] of my knowledge [illegible]

De[illegible]

Verification

Verified on oath this_ _ day of March, 2015 that the contents of this affidavit are true and correct to the best of my knowledge and belief

[illegible]

Annexure H

Valuation Report & Leasing Arrangement

Annexure C

Tariff Petition Fee

Standard Chartered

Standard Chartered Bank (Pakistan) Limited

NOT TO EXCEED PKR 1,357,760.00/-
REF : DD06291504200655

Blue Area
PKR 03370319

03370319

20-04-2015

Pay

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
A/C M- ENERGY PVT LTD

PAKISTAN RUPEE ONE MILLION THREE HUNDRED
FIFTY-SEVEN THOUSAND SEVEN HUNDRED SIXTY ONLY.

A/C # 03-9016422-72
BILLS EAI SCB CONSUMER

PAYABLE AT ANY BRANCH IN PAKISTAN.

A/C PAYEE ONLY

Or Order

For Standard Chartered Bank (Pakistan) Limited

PKR 1,357,760.00

Authorised Signatory

Authorised Signatory

⑈03370319⑈038007⑈

⑈020⑈

Annexure D

Environmental Impact Assessment

Dated 2[illegible] June 2014

SUBJECT: DECISION ON ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

1.	**Name & Address of Proponent.**	Chief Executive Officer K-Energy (Private) Limited [illegible] Park Lane, Block-5, [illegible] Karachi
2.	**Description of Project:**	The Proposed Project includes conversion of [illegible] oil fired boilers to coal fired boilers and installation of two new generation units at BQPS-I.
3.	**Location of Project:**	Eastern Industrial Zone, PQA
4.	**Date of Filing of EIA:**	31-03-2014

5. After careful review of the Environmental Impact Assessment (EIA), the Sindh Environmental Protection Agency (SEPA) accords its approval subject to the following conditions:-

i) All mitigation measures recommended in EIA report should be complied [illegible] for achieving negligible impacts on physical, biological, environmental and socio-economic resources of the area. National Environmental Quality Standards (NEQS) for ambient air quality, noise, industrial emissions, wastewater and drinking water shall be followed in letter and spirit. [illegible] water treatment plant shall be installed for the treatment of waste water [illegible] coal storage and handling areas.

ii) All conflicting issues must be settled before commencing the project activities. The proponent shall adhere to the replies clarifications submitted in [illegible] the concerns of various stakeholders. Those shall be incorporated [illegible] Environmental Management Plan.

iii) The proponent shall engage Independent Environmental Monitoring Con[illegible] on the basis of clearly defined criteria including their experience [illegible] to ensure monitoring of the project's compliance with the EMP and to document the status of the project environment at end of every month starting from the inception of the project. These monitoring records may be used for compliance purposes as legal records of environmental performance. Monitoring firm's terms of reference will define a clear work plan [illegible] monitoring indicators, reporting structures and time lines. The firm [illegible]

[illegible] places. The [illegible] incident of the [illegible]
[illegible] proposed activity in the [illegible]
[illegible] the Environmental Management [illegible]
[illegible] implementation of EMP [illegible]
[illegible] mitigation measures [illegible]
[illegible] this purpose EMP should [illegible]
[illegible] irreversible resource [illegible]
[illegible] of the whole operation should [illegible]
[illegible]

[illegible] should be provided to local people [illegible] Skilled jobs shall be given to locals after providing [illegible] where minimum training is required. Local people [illegible] should be provided with community welfare schemes [illegible] educational programmes, and establishment of health [illegible] which should benefit them and develop mutual trust. Sustainability of these facilities should be ensured.

[illegible] A complete code of Health, Safety and Environment (HSE) shall be [illegible] which should include efficient parameters [illegible] purpose HSE setup should be established and [illegible] at the senior level with sufficient administrative [illegible] to perform the designated functions. Proponent will [illegible] instructions and emergency actions are made available [illegible] the site.

6. The proponent shall be liable for compliance of Section [illegible] of IEE/EIA regulation 2000, which direct for condition for approval, [illegible] compliance, [illegible] inspection and monitoring.

- The IEE report is meant only for proposed activities described [illegible] Proponent should submit separate environmental assessment along with [illegible] Management Plan for any consequent and subsequent activities [illegible] EPA [illegible]

[illegible] approval shall not absolve the proponent of the duty to obtain any other approval [illegible] consent that may be required under any law in force.

The approval shall stand null and void, in case of failure to comply [illegible] conditions.

Naeem Ahmed Mughal
Director General

Annexure E

Feasibility Study

K-ENERGY (PRIVATE) LIMITED

F 60, Park Lane Block 5 Kehkashan Clifton Karachi Pakistan

Phone +92 21 35167423 +92 21 35167424, +92 21 35167422, Fax +92 21 35167424

EXTRACT OF THE RESOLUTION PASSED BY THE BOARD OF DIRECTORS OF K-ENERGY (PRIVATE) LIMITED

The Board of Directors in their Meeting held on 17 March 2015, at registered office of K-Energy (Private) Limited (KEPL) has passed following resolution to authorize Mr Shaheryar Arshad Chishty, the Chief Executive Officer of K-Energy (Pvt.) Limited(KEPL) to file Tariff Petition of 421.90 MW Coal based thermal generation facility with NEPRA.

"Resolved that:

Mr. Shaheryar Arshad Chishty, the Chief Executive officer of K-Energy (Pvt.) Limited (KEPL) has been duly authorized to file Tariff Petition of 421.90 MW Coal Fired Power Project of KEPL with NEPRA for determination of Tariff". He is also authorized to make any amendment, alteration, addition, deletion, correction etc. as deem fit in the Tariff Petition and all other related documents "

Muhammad Shahid Jamal
Company Secretary

Annexure G

Scope of Balance of Plant

Balance of Plant (BOP) Lists

Turbine and Auxiliaries

S No	Equipment	Contractors Scope
1	Turbine	Replacement except the outer casing
2	Turbine valves	Replacement
3	Turbine lube oil pump and hydraulic booster pump	Replacement
4	Cold reheat check valve	Replacement
5	BFP (Skid) including min Flow valves	Complete replacement
6	Condensate pump	Complete replacement
7	Turbine sealing system	Replacement
8	Gland steam condenser skid	Replacement
9	LP heaters and Drain coolers	Replacement
10	Extraction steam system / operating mechanism	Overhaul and partial replacement
11	HP/LP bypass system skid	New bypass system installed in boiler area

Operations

S. No.	Equipment	Contractors Scope
1	Water treatment plant	New
2	Boiler feed water pumps	New feed water pumps installed in coal bunker bay
3	Steam leads to turbine	New pipelines
4	Instrument air system	New compressed air system for entire Unit 3, 4 and common systems
5	Station air system	New compressed air system for entire Unit 3, 4 and common systems
6	Open cooling system	Overhaul
7	HP/LP bypass system	New bypass system installed in boiler area
8	Fuel piping and electrical cables	Design in accordance with NFPA
9	Surface condenser	Overhaul, cleaning and re-tubing.
10	Condenser online tube cleaning system	Overhaul / replacement
11	Cooling water pump discharge valves	Replacement
12	Chlorination plant	New plant for Unit 3 and 4
13	Chemical laboratory	New laboratory
14	Condensate Polishing System	New plant

Electrical Considerations

S. No.	Equipment	Contractors Scope
1	Generator (Unit 3&4)	Generator #3 overhaul, Generator #4 rewinding and overhaul.
2	Generator hydrogen coolers (Unit 4)	Repair hydrogen coolers.
3	Generator excitation system (Unit 3)	Completely replace with same equipment as installed at Unit 4
4	Boiler feed water pump motors (Unit 3&4)	Replacement
5	Condensate pump motors (Unit 3&4)	Replacement
6	Cooling water pump motors (Unit 3&4)	Overhaul
7	220KV oil filled cable of Unit No.6 and start-up transformer No.3, LV cables and control cables	220kV oil filled cable will be replaced by XLPE cable. LV cables and control cables will be relocated as required.
8	Dry type transformers (6.6±2×2.5%/0.4kV)	New transformers will be erected for new designed equipment's.
9	Station inverters, batteries and chargers (Unit 3&4)	New batteries, chargers and UPS will be installed for new designed equipment's. Existing batteries, chargers and inverters for Unit 3&4 will be replaced.
10	6.6kV and 0.4kV Switchgears and Synchronization Panel (Unit 3&4)	New 6.6kV and 0.4kV Switchgears will be installed for new designed equipment's. Existing 6.6kV and 0.4kV switchgears will be maintained. Synchronization Panel will be replaced.
11	Diesel Generator (Unit 3&4)	Overhaul / New.

Instrumentation and Control

S No.	Equipment	Contractors Scope
1	Unit control system 0.4kv, 6kv switchgear and gen sync (Unit 3)	New
2	Integration of unit control system with boiler (Unit 4)	New
3	Turbine supervisory field instrumentation (Unit 3&4)	Replacement
4	Turbine lube oil system (Unit 3&4)	Replacement
5	EHC oil (for turbine MSVs, RSVs, CVs, and ICVs) (Unit 3&4)	Replacement
6	A. Turbine main steam valves, reheat stop valve, control valves and associated accessories B. Turbine protection (Unit 3&4)	Replacement
7	Turbine front standard (Unit 3&4)	Replacement
8	HP/LP heaters controls (Unit 3&4)	Replacement
9	1. Main steam 2. Feed water 3. Condensate 4. Drains (Unit 3&4)	Replacement
10	Sub-system Compressed air Debris filter CW pumps butterfly valves hydraulic skid HP/LP bypass hydraulic skids HP/LP bypass control Condenser ball cleaning Water treatment plant Generator H2/sealing oil Generator hydrogen purity	Replacement

K-Energy (Pvt.) Limited

PETITION FOR DETERMINATION OF GENERATION TARIFF

K-ENERGY (PRIVATE) LIMITED

421.90 MW COAL CONVERSION PROJECT

UNITS 3 & 4 OF BQPS-I KARACHI

APRIL 2015

TARIFF ADVISORS	TECHNICAL CONSULTANTS	LEGAL ADVISORS
GRANT THORNTON, PAKISTAN	KNIGHT PIESOLD, USA	MOHSIN TAYEBALY & CO

Glossary

BTU	British Thermal Unit
COD	Commercial Operation Date
Company	K - Energy (Pvt.) Limited
CPP	Capacity Purchase Price
CSA	Coal Supply Agreement
CV	Calorific Value
EIA	Environmental Impact Assessment
EPP	Energy Purchase Price
FCC	Fuel Cost Component
FSA	Fuel Supply Agreement
GOP	Government of Pakistan
HHV	Higher Heating Value
HR	Heat Rate
HSD	High Speed Diesel
IPP	Independent Power Producer
KEPL	K-Energy (Pvt.) Limited
KEL	K-Electric Limited
Kw	Kilowatt
kWh	Kilowatt hour
LDO	Light Diesel Oil
LHV	Lower Heating Value
LPM	Licensee Proposed Modification
MW	Mega Watt (1,000 kilowatts)
MWh	Mega Watt Hour
NEPRA/ Authority	National Electric Power Regulatory Authority
Power Purchaser	K-Electric Limited
O&M	Operation & Maintenance
OEM	Original Equipment Manufacturer
PKR/Rupees/Rs.	Pak Rupees, Legal Currency of Pakistan
PAR	Power Acquisition Request
PPA	Power Purchase Agreement
PSO	Pakistan State Oil
ROE	Return on Equity
Tonne	Metric Tonne i.e. 1000 Kg
US-CPI	United States Consumer Price Index
WPI	Wholesale Price Index

Contents

SECTION 1: Executive Summary

1. Petitioner/Project Company

K-Energy (Pvt.) Limited (**KEPL**) is a special purpose limited liability company, which has been incorporated under the laws of Pakistan and has been set up to undertake the Project (described below)

2. Project Summary:

Following approval of KEPL's reference generation tariff by NEPRA through this Tariff Petition, KEPL will convert a 421.90MW gas/RFO-fired electricity generation facility (comprising of Units 3 & 4 of Bin Qasim Power Station-I) into a coal-fired electricity generation, located at Bin Qasim Industrial Park at Port Qasim, Karachi, Sindh. For the foregoing purpose, KEPL will undertake the functions of development, financing, design, engineering, procurement, construction, installation, testing, commissioning, insuring, operation and maintenance (the **Project**).

Subject to the assumptions contained in this Tariff Petition, please find below a summary of the Project for NEPRA's reference:

Project Company	K-Energy (Private) Limited
Major Sponsors	BEEG - Investments Limited (BEEGIL)
Project Capacity	421,909 kW (Gross) 372,256 kW (Net) 49.65 MW
Interconnectivity	220 kV -- for evacuation of power
Project Location	Bin Qasim, Karachi, Sindh, Pakistan
Plant Type	Sub-critical Steam Turbine
Technology	Sub-critical pulverized lignite coal boiler; Harbin Electric steam turbine
No of Turbines	2
Capacity per Turbine	210,955 kW
Project Life	20 Years from Commercial Operations Date
Power Purchaser	K-Electric Limited
EPC Contractor	Harbin Electric International
Fuel Type	Lignite coal
Plant Factor for tariff purposes	85%
Energy Production	100% dispatch: 3,261 GWh 85% dispatch: 2,772 GWh

Project Cost	**Project Cost**		**USD**
	New Investments		
	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, 3rd Party Inspector and Independent Engineer Costs		10,517,015
	Project Developm. 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
	Subtotal - New Investments		**418,103,716**
	Lease Assets from KEI		206,254,228
	Total Project Cost		**624,357,944**
Financing Plan	Project Financing	**Percentage**	**USD**
	Equity	20.82%	130,000,000
	Debt	79.18%	
	Local Banks		150,403,715
	Deferred Credit		137,700,000
	Lease		206,254,228
	Total Financing	**100%**	**624,357,944**
Local Bank Debt Financing Terms	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.	
Deferred Credit Terms	Credit period:	5.5 years (Inclusive of Grace Period)	
	Grace Period.	2.5 years	
	Repayment:	Quarterly	
	Installment:	USD 11.475 million per quarter	
Lease Financing Terms	Lease payments:	Quarterly	
	Lease rate:	KIBOR (3 Months) + 3% p.a.	
	KIBOR	10.18% p.a.	
	Lease period	20 years	
Operation Costs	O & M Cost		USD
	Variable O & M		5,583,519
	Fixed O & M		19,493,452
	Total O & M		**25,076,971**
Feasibility Consultants	Knight Piesold – USA		

Owner's Engineer	Lahmeyer International GmbH and NESPAK
Financial Advisors	Habib Bank Limited / Faysal Bank Limited
Tariff Consultant	Grant Thornton Pakistan
Legal Advisors	Mohsin Tayebaly & Company and Kabraji & Talibuddin Law
Construction period	28 months for the first Unit and 32 months for the Complex after issuance of the Notice to Proceed

3. Key Strengths of and Considerations for the Project:

Amongst various other factors, the following are the key strengths of and considerations for undertaking the Project:

a. **Fast-Track and Lower Cost:**

The primary benefits of the Project are that:

i. The fresh investment associated with conversion on a per-mega watt basis is estimated to be lower than a green-field coal-fired power project of similar size - USD 0.99 Million per MW for coal conversion compared to USD 1.62 Million per MW as determined by the Authority for installation of coal based new power plants. This alone enables savings of approximately more than USD 250 Million for KEPL's 420MW project;

ii. The conversion/construction period is targeted as 28 months from the commencement of construction to commissioning of the first unit (and overall completion in 32 months for both units); whereas, the construction period for a new coal-fired power project of similar size is typically around 40 months.

b. **Ultimate Major Sponsor's Technical Know-how in coal-sector:**

Presently, the ultimate major shareholder of KEPL is Titan Group, which is one of Indonesia's leading coal mine operating companies. The group has a dedicated and specialized 'mining and energy division' whose main business and expertise range from obtaining mine sites, managing and operating mines, trading coal and producing briquette. Since there is a lack of technical know-how on coal-supply and usage in Pakistan, it is envisaged that KEPL is in a position to benefit from its ultimate sponsor's expertise and standing in the coal-supply sector.

c. **Dual-Sourced Coal Readiness:**

The sponsors are taking a long-term vision for the coal-source with the objective of supporting the economy of Pakistan. Although the plant is planned to be operated on imported coal, the boilers are being designed specifically on lignite coal out of Indonesia which has specifications close to Thar coal. This conscious decision will allow, upon availability of Thar coal, processing/blending of Thar coal with imported coal to achieve the design coal specification upon which the boiler shall be designed and operated. This decision not only is economically beneficial for Pakistan, it also mitigates the risk associated with single-source supplier by diversification of the Project coal supply chain.

K - Energy (Pvt.) Limited

d. **Lower Consumer Tariff and Reduction in GOP Subsidy:**
Owing to the unavailability of gas and higher reliance on furnace oil which resulted in generation of electricity at a higher cost, the Project, whereby the existing Units 3 & 4 of the Bin Qasim Power Station-I are proposed to be converted, has the ultimate aim of ensuring a lower consumer tariff and reduction in GOP subsidy.

4. Petition Background and Determination Sought:

In relation to this Project, since the power purchaser is a private entity, KEPL first made a proposal to KEL following which KEL sought a power acquisition permission by way of a Power Acquisition Request (**PAR**) under Interim Power Procurement (Procedures and Standards) Regulations 2005 (**IPPR 2005**) from NEPRA. The PAR was submitted for NEPRA's consideration on **March 29th, 2013** and thereafter filed revised PAR applications with the final submission on **February 25th, 2015** based on instructions and guidance provided by the Authority.

The Authority considered the PAR Application and decided to direct KEPL to submit the tariff petition for the Project under the the National Electric Power Regulatory Authority (Tariff Standards and Procedure) Rules, 1998 (the **Rules**), read in conjunction with the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997.

KEPL is therefore submitting this Tariff Petition with the Authority and requests the Authority to approve a Tariff which has been structured in the following manner:

LEVELIZED TARIFF		
Capacity Charge		
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
Total CPP	**4.1260**	**4.2145**

Description	PKR/ kWh	Cents/ kWh
Fuel Cost Component-FCC	4.7113	4.8123
Variable O & M	0.1676	0.1712
Total EPP	**4.8789**	**4.9836**
Total Tariff @100%	**9.0049**	**9.1981**
Total Tariff @85%	**9.7330**	**9.9418**

Details of the Project including all related costs and justifications have been provided in detail within the content of this Tariff Petition.

SECTION 1: PETITION SUMMARY

1.1 Details of the Petitioner

1.1.1 Contact Particulars:

K - Energy (Pvt.) Limited (KEPL)

Mailing Address:	3rd Floor, G.D. Arcade, 73-East, Fazal-ul-Haq Road, Blue Area, Islamabad.
Telephone	0092-51-2348462-63
Facsimile	0092-51-2348465
Registered Office	F-60, Park Lane, Block 5, Kehkashan, Clifton, Karachi, Sindh

1.1.2 Generation License

KEPL is the licensee of National Electric Power Regulatory Authority (NEPRA) and holds the Generation License bearing No. IGSPL/48/2015 dated March 13th, 2015. The Licence allows KEPL for its Imported/Indigenous Coal based Thermal Generation Facility to engage in generation business subject to and in accordance enunciated within the articles of the Generation Licence for a period of Twenty years starting from the COD of the Generation facility.

1.1.3 Representative of KEPL

The petition is being filed through Mr. Shaheryar Arshad Chishty, Chief Executive Officer of KEPL who has been duly authorized by Board of Directors vide resolution passed in its meeting held on March 17th, 2015 to sign and file the Tariff Petition for KEPL (Board resolution appended as **(Annexure-A)).**

The Tariff Petition is being submitted with assistance of the following, and who shall also represent the cause of KEPL before NEPRA during hearing:-

- Financial: Grant Thornton Consulting (Pvt.) Limited
- Legal: Mohsin Tayebaly & Co

The Affidavit of the signatory/ CEO is appended as **Annexure-B** and photocopy of the Bank Draft (tariff petition fees) as **Annexure-C.**

K - Energy (Pvt.) Limited

1.3 Project Introduction

1.3.1 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.

1.3.2 KEL shall lease existing Units 3 & 4 of BQPS-I 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 of KEPL

1.3.3 KEPL 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 turbine (save outer casing) and all related ancillaries of Units 3 & 4 of BQPS-I through an EPC contract.

1.3.4 Invitation to Bid (ITB) was prepared by Knight Piésold and was subsequently provided to various potential EPC Contractors. After technical and commercial evaluation, Harbin Electric International was selected for detailing the technical scope of works and final contract negotiation.

1.3.5 Upon commencement of commercial operations, the plant shall be operated on imported coal. The boilers shall be designed for specific design coal whose specs are closer to Thar coal. This conscious decision will allow, upon availability of Thar coal, blending of Thar coal with imported coal to achieve the design coal specification upon which the boiler shall be designed and operated.

1.3.6 The 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.

1.4 Determination Sought

Pursuant to the relevant provisions of the National Electric Power Regulatory Authority (Tariff Standards and Procedure) Rules, 1998, read with the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 and the rules and regulations made there under, and in light of the letter dated March 30th, 2015 issued by NEPRA pursuant to which, NEPRA has directed KEPL to file the instant petition, KEPL submits herewith for approval by NEPRA, the competent regulatory authority lawfully authorised to determine tariff for power generation companies, of a tariff petition for the reference generation tariff of KEPL's 421.90 MW (gross) power generation facility situated at Bin Qasim Industrial Park, Port Qasim Karachi, Sindh.

K - Energy (Pvt.) Limited

SECTION 2: LEGAL & REGULATORY FRAMEWORK

2.1 Since the Power Purchaser in the instant case is a private entity, KEPL first made a proposal to KE: following which the power purchaser had sought a power acquisition permission under IPPR 2005 from NEPRA and in this connection had submitted the PAR for NEPRA's consideration on March 29th, 2013 and thereafter filed revised Power Acquisition Request (PAR) applications with the final submission on February 25th, 2015 based on instructions and guidance provided by the Authority.

2.2 Subsequently, NEPRA vide letter No. NEPRA/ PAR-100/ 4400-4401 dated March 30th, 2015 communicated the decision of the Authority in the subject PAR and directed KEPL to submit the tariff petition pursuant to the procedure described in the NEPRA (Tariff Standards and Procedure) Rules 1998. The relevant direction of the NEPRA from the Letter is reproduced below:

> *"[..] to direct K-Energy to submit the petition for determination of generation tariff, following the Procedure given in NEPRA Tariff (Standards & Procedure) Rules, 1998, K-Energy may negotiate the Power Purchase Agreement (PPA) to be executed between K-Electric and K-Energy, subject to Tariff Determination to be made by the Authority in the matter."*

2.3 Accordingly, KEPL submits herewith for approval by NEPRA, the competent regulatory authority lawfully authorised to determine tariff for power generation companies under Section 7 of the Regulations of Generation, Transmission and Distribution of Electric Power Act (Act No XL) of 1997 (the **"NEPRA Act"**), of a tariff petition for the reference generation tariff of KEPL's 421.90 MW (gross) power generation facility situated at Bin Qasim Industrial Park, Port Qasim Karachi, Sindh.

SECTION 3: KEY CONSIDERATIONS FOR THIS COAL CONVERSION PROJECT

Various trends have shaped the power generation sector of Pakistan. There has been a heavy reliance on hydro, there was a rush to develop furnace oil fired assets pursuant to the 1994 Power Policy. Then the focus shifted to gas fired when the use of furnace oil was discouraged in the 2002 Policy. The nation now faces the consequence of such uncharted approach since natural gas is in short supply while furnace oil prices are significantly more expensive than the reference rate. This calls for a balanced planning for coal fired power projects.

Due to the lower cost and lower construction time, wider availability of coal and proven production technology, coal fired power projects are the best solution available to Pakistan to overcome the power crisis in the shortest possible time. Besides developing new coal fired power plants, an opportunity exists within the country to convert the existing furnace oil/gas fired steam generators to coal fired ones. Keeping in view the above, the coal conversion project is being undertaken, inter alia, on following considerations:

3.1 Pakistan is blessed with one of the largest coal reserves in Thar that is being targeted for development of mega power projects. However, Thar requires huge amounts of investment for the development of infrastructure and mines. Raising this investment locally and internationally will be an uphill task. This upfront investment in infrastructure and mines is, however, not required in case of imported coal where it is part of the power price. Thus, executing coal fired power projects on imported coal in the medium term reduces the overall investment size, and the resulting stability of economy will go a long way in supporting the development of Thar projects.

3.2 The country has substantial experience of thermal based power generation on oil and gas. Yet there is negligible experience on coal fired power generation. Therefore the country has to mount two sets of learning curves:

- Power generation on coal; and
- Power generation on local coal.

3.3 There has been a clear decline in the supply of natural gas to the power sector in Pakistan. The similar trend can be seen in SSGC's historical supplies to KEL, which has recently added about 1000 MW high efficiency gas fired power plants to its generation fleet. Most of the gas available to KEL is understandably consumed to operate these high-efficiency generating units.

3.4 Due to unavailability of Gas for BQPS-I plant, higher reliance on RFO significantly increases consumer end tariff as well as adds burden on the GOP with substantially higher amounts of subsidy payments.

3.5 The proposed conversion to coal is expected to result in an increase of Base load operations, which may ultimately lead to a higher economic dispatch and thus a lower cost of generation of electricity.

3.6 The Cost of using Coal is noticeably lower compared to using RFO as the source Fuel.

3.7 Shorter construction period for a brown field project such as this conversion project (scheduled for less than 3 years) compared to new coal fired power plant of similar size and capacity (around 4 years).

3.8 Substantially less cash investment requirement compared to a new coal fired power plant. Furthermore, the existing site for Project already has ar ..frastructure for example Power evacuation which will complement the Project.

3.9 Supply chain risks have been mitigated because of port proximity from site and sponsor's expertise in coal mining.

3.10 There are benefits associated with regards to supply power to KEL (lower consumer end tariff, les· subsidies, etc.).

3.11 Sindh Environmental protection Agency has given an NOC for the implementation of this Coal Conversion project to KEPL. The Environmental Impact Assessment is attached as **Annexure-D**. KEPL has been keenly involved in designing an Environmental compliance strategy to mitigate any environmental impact that may arise. KEPL will submit a certificate on bi-annual basis, confirming that the operation of its generation facility is in line with the environmental standards as prescribed by the relevant competent authority.

3.12 Successful conversion of Units 3 & 4 of BQPS-I in first phase of conversion will set a sound foundation for conversion of the remaining Units.

To conclude, the ul·.nate objective of this Project is to have a tariff that is relatively lower than for oil-fired power projects and that is relatively quicker to commission than 'green-field' coal-fired power projects.

K - Energy (Pvt.) Limited

SECTION 4: TRANSACTION OVERVIEW

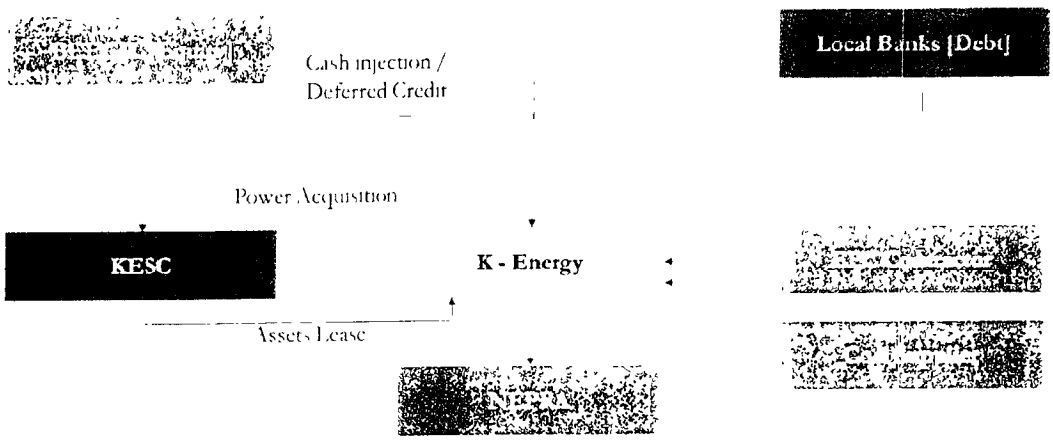
4.1 Transaction Brief

The project will be developed as an Independent Power Producer for which BEEG Investments Limited (BEEGIL), ultimate sponsors of the Project, has set up a Special Purpose Company (SPC) under the name of K-Energy (Pvt.) Limited.

KEL would provide assets of its existing Units 3 & 4 of BQPS-I, together with sufficient piece of land from within BQPS-I to KEPL for the new construction requirements of the Project. The Project is to be funded through debt and equity contributions, which are to be used for, inter alia, construction of boiler island, coal crushers and pulverisers, coal storage and handling facilities, ash handling and disposal facilities, various ancillaries, to acquire additional land outside BQPS-I for the coal yard, and to rehabilitate / overhaul / repair / upgrade the assets of BQPS-I Units 3 & 4.

The power generated from the Project will be sold to KEL under a Power Purchase Agreement (PPA) to be executed by and between KEPL and KEL.

Following is the proposed transaction structure, which reflects the understanding of the arrangements between the stakeholders.



4.2 Corporate Structure of KEPL and introduction of Sponsors

The figure below illustrates the corporate structure of KEPL and briefly gives an introduction of the sponsors:

The Titan Group is one of Indonesias leading coal mine operating companies The Group additionally has holdings in IT, Telecommunication, Energy, Property, and Agro Business

BEEGIL is a British Virgin Islands based Investment Company that has aligned itself with various other investors for the purpose of undertaking infrastructure investments in Pakistan commencing with the KEL project

Special Purpose Company (SPC) that has been incorporated to undertake 420 (2x210) MW Coal Power Project as an IPP Structure It is a fully owned subsidiary of BEEGIL

4.2.1 BEEG Investments Limited (BEEGIL)

BEEGIL is a British Virgin Islands based Investment Company that has aligned itself with various other investors for the purpose of undertaking infrastructure investments in Pakistan commencing with the KEL project. The BEEGIL consortium includes the following:

4.2.2 Titan Group

Titan is the major shareholder in BEEGIL Titan is one of the fast growing privately held IT, Telecommunication, Energy, Property, and Agro Business organizations in Indonesia. The Group owns or holds interests in companies ranging from IT system integration and distribution services, contact centre outsourcing, wire-line telecom development to coal and minerals mining, oil & gas upstream and downstream businesses.

Titan is broadly diversified and continually capturing new opportunities in mining, energy, oil and gas downstream storage and distribution, information technology communication (ICT) consulting, outsourcing, property and community development and in the field of agro business.

Titan is committed to build shareholders value by leveraging synergies among its core businesses and partners to deliver products, values and total solutions to its customers. Titan's extensive business background provides strategic natural advantages to position it securely to maintain its healthy performance.

Titan has developed strong ties with regional as well as national (Indonesian) authorities and strategically positioned itself to build mutually advantageous business alliances regionally and globally.

Titan mining and energy group is established to answer the challenge of ever increasing global and domestic energy demand. Ever since its inception, Titan mining and energy division has focused its business practices on the field of coal and minerals mining, oil and gas trader and operator. The energy division's main business ranges from obtaining mineable sites, managing and operating mines, trading coal and minerals, producing briquette, trading and operating oil and gas distribution.

The energy group's integrated logistics and efficient operation is aimed to ensure consistent quality, supply and pricing to valued customers.

Titan Mining Energy	Holding Company of Coal Mining and Energy
Titan Mining Indonesia	Coal and Minerals Miner, Producer, and Operator
Titan Daya Persada	Coal Trader and Briquette Producer
Titan Multi Daya	Oil and Gas Downstream Business
Multi Mineral Utama Nusantara	Nickel Mining

4.2.3 ASIAPAK

Asiapak is an investment holding company based out of Hong Kong. Asiapak has been invested in by a select group of institutional, corporate, family trusts and high net worth individuals from Hong Kong, Korea and China. Its focus is to channel investment funds from its Asian investor base into projects in Pakistan where it has a strong focus on transportation, energy and real estate investments. Asiapak will lead the overall development activities through its project Management experience to facilitate the Project including access to its domestic and International Funding networks to raise Debt for the Project.

4.2.4 Sprint Capital

Sprint Capital is a Hong Kong based private equity investment manager focused on the resources sector with current capital commitments of more than US$500m, sponsored by ultra-high net worth Chinese family LPs. Sprint Capital will also extend its Funding Network to raise Funding for the Project.

SECTION 5: TECHNICAL OVERVIEW OF PROJECT

5.1 Outline of the Existing Plant

Units 3 & 4 at BQPS-I are identical in design and name plate specifications. The boilers are of Babcock & Wilcox's El Paso type water tube units with single reheat. The steam turbines furnished with each unit are equipped for double inlet and exhaust type with multiple steam extractions to meet the needs of the 6 feed water heater arrangements. Condensers are rated for cooling through cooling water system with seawater A closed loop circulating water arrangement is provided for cooling of turbine bearings Generator windings are cooled by Hydrogen. Seawater is drawn through the intake channel and pumped using modified circulating water pumps (MWCP). Each unit is catered by its dedicated MWCP. 100 percent of the condensate is returned to the boiler as feed water after preheating and de-aerating. The two units were installed with Analogue Control and Excitation System connected to single control room dedicated for a single unit. Each unit has individual auxiliary transformer and power transformer to cater the requirement of each power island.

5.2 Feasibility Study

In order to embark upon conversion to coal project, Knight Piésold & Co. of USA ("Technical Consultants"), a reputed international consulting company, was engaged to conduct the technical feasibility study. The feasibility study is complete and confirms the technical viability of converting the existing units to coal fired power generation and is attached as **Annexure-E.**

The feasibility study has recommended conversion of Units 3 & 4 in Phase – I. The recommendation is based on both technical and commercial grounds. The technical and commercial considerations mainly revolve around the high usage of furnace oil in the Units 3 & 4 due to design limitation for operation on gas. Besides this, other issues include space constraints at BQPS and logistics for the Phase – II in future.

K - Energy (Pvt.) Limited

5.3 EPC Contract

Invitation to Bid (ITB) was prepared by Knight Piésold and was subsequently provided to various potential EPC Contractors. Bids were received from the following:

- Dongfang Electric Corporation Limited
- Shanghai Electric Corporation
- Sichuan Chuangou Boiler Co Ltd
- Harbin Electric International
- China National Chemical Engineering Co. Ltd
- Sinohydro Corporation Limited

After technical and commercial evaluation, Harbin Electric International was selected for detailing the technical scope of works and final contract negotiation. Subsequently, an (Equipment) Supply Contract and a Services (Construction) Contract was signed with Harbin Electric on 8th November 2013. Copies of these have been attached in **Annexure–F.**

5.4 Scope of Work for the Project

5.4.1 The project involves the engineering, procurement, construction, erection, interconnection, Overhauling & Rehabilitation (of existing equipment), supervision, training, pre-commissioning, commissioning of the Unit or Plant in accordance with the technical requirements of the project and more clearly defined in the Contract. The work will also include replacement of the inner capsule of the steam turbines and inspection/overhauling of the main generators besides inspection, overhauling, rehabilitation and/or replacement of the auxiliary systems. The works will include installation and erection of new coal unloading, coal handling and storage, covered conveyors, coal crusher building, truck unloading building, water treatment facilities, condensate polisher, MCC, Switchgear, PLC, fly ash handling conveyors, bottom ash handling conveyors, ash storage silos and relocation of water storage and pump stations.

5.4.2 The Project involves the engineering, procurement, construction, Remaining Life Assessment (RLA) of existing Units 3 & 4 of BQPS-I, remedial replacement / overhauling / rehabilitation from the findings of RLA, commissioning, and testing of two 210 MW (gross) capacity pulverized coal (PC) fired units. The works related to existing equipment includes RLA of the entire existing steam turbines auxiliaries, electrical generators, auxiliary systems and Balance of Plant (BOP), which are necessary to facilitate continuous performance as per the name plate ratings for a life of minimum 25 years from the converted Units 3 & 4. The scope of Balance of Plant is listed in **Annexure-G.**

K - Energy (Pvt.) Limited

5.4.3 The Works will also include construction of open coal storage area (located to the east of the BQPS plant in a land plot currently semi-submerged (which is to be purchased and reclaimed) conveyor hopper for delivery of coal to the bunker bay, coal handling equipment (covered conveyors, coal crusher, local conveyors in the open storage area, coal unloading area), water treatment facilities, condensate polishing equipment, chlorination plant, MCC, Switchgear, DCS, PLC, fly ash electrostatic precipitator(s) with ash handling conveyors, bottom ash handling conveyors, ash storage silo, ash pond with minimum two years of ash disposal capacity. All coal handling facilities will have dust prevention, fire monitoring and prevention facilities.

5.4.4 The Works will include all civil work, including: foundations and piles, site grading, buildings, above and below ground utilities, drainages, pipelines, and all other parts to assume fully converted and operational units. The Works will include the physical demolition of warehouse, existing water treatment building, hydrogen plant and raw water basin pump house and/or relocation of hydrogen plant, raw water basin pump house and any major existing plant facilities as required to accommodate the physical requirements of the new lignite coal boilers layouts.

5.4.5 New DCS system for each unit of modular design will be installed to operate, monitor, and control the units. The common systems shall be operable, monitored and controllable from either of the two (2) DCS systems.

5.4.6 The PC fired boiler shall be single reheat with BMCR 689 t/h, 145 bar, 535 degrees Celsius of main-steam generation capacity and will be fully integrated with the retrofitted/ overhauled/ rehabilitated turbine generator unit to achieve the nameplate generation or better. The boiler design shall conform to the NEQS requirements.

5.4.7 The Project shall meet local regulatory emissions limits. Also, dry low NOx burners (implemented in an overall low NOx combustion system) shall be installed in conformance with the local regulations for emission control.

5.4.8 Ash from the Project will be transported by truck to the ash disposal pond, located to the East of the plant site, across from the intake channel on the plant site's east border. Ash will be dumped in ash pond where adequate measures shall be taken to prevent ash dust dispersion during disposal operations. The bottom ash and fly ash generated by the operation of the Units will be used in land reclamation and filled in an area (ash pond) to be used for open coal storage and other purposes.

5.4.9 The steam cycle will be based on a constant pressure, single reheat steam turbine with a nominal (at least) 140 bar gage, 530°C operating pressure and temperature. Exhaust from the steam turbine will be condensed in a condenser operating with 0.0849 bar

5.4.10 Seawater based on reverse osmosis coupled with Electro Deionization for power cycle makeup will be provided.

5.4.11 Each steam turbine generator is connected to the local 220 kilo Volt (kV) system through a step-up transformer.

5.4.12 A new DCS shall be furnished for the plant control. Each unit will be furnished with a DCS system. The DCS shall interface with the package control systems provided with the turbine and generator, boiler and etc. Minimum signal exchange between DCS and PLC based system shall be foreseen, Start, Stop, and Status, etc. PLCs shall be provided for water treatment system, water & steam sampling and chemical dosing control system, ash handling system, sea water desalination system, compressor air system, waste water treatment control system, cooling water treatment control system, coal handling control system and continuous emissions monitoring system (CEMS). BOP operator stations shall be provided in a centralized control room located in the existing Unit 3 Turbine Hall annex building.

5.4.13 The battery limit of this project is the generator terminals of Units 3 & 4. The existing HV Switchgear and the transmission protections shall be verified and proof tested by the Power Purchaser prior to synchronisation of the Units with the Power Purchaser's grid system.

SECTION 6: TECHNICAL PARAMETERS OF PROJECT

6.1 New Boiler Islands

For each Unit, a single sub critical Pulverized Coal fired boiler shall be designed and installed for reliable performance. PC combustion is the most commonly used method of combustion in coal-fired power plants. It is a well proven, reliable, and cost-effective technology for power generation in utility-scale applications. The majority of the coal-fired power generation facilities use a sub critical steam cycle. Specific to this conversion project, boilers have to be in synchronization with existing steam turbines, which are sub-critical. Use of once re-heat, sub critical steam cycle and other design features will enable this plant to achieve good boiler efficiency based on the lower heating value of the fuel. State-of-the-art emission controls will be used to minimize emissions of potential air pollutants.

The coal burners and the boiler will be designed to avoid hot spots that could lead to excessive generation of NOx. The heat from the combustion of the coal will serve to generate steam at sub critical pressure and high temperature for increased cycle efficiency and lower relative emissions.

The boiler island will comprise of various systems including coal bunkers, coal feeders, pulverisers, burners, heat transfer surfaces, economizer, air heater, steam drum, steam re-heater, soot blowers, water washing, emission control system, particulate collection etc.

Keeping in view its potential future operation on Thar coal, the boilers are being designed on lignite coal out of Indonesia. Coal from Thar is not currently available, but can be utilized after some processing/dewatering when economically available at a later stage. Therefore, to allow for the immediate construction of the project, Indonesian coal, having specifications closer to Thar coal, is being sourced, and a long term CSA is being negotiated.

6.2 Coal Supply Considerations

The considerations pertaining to Coal and its supply are narrated below:

6.2.1 Unique Nature of Lignite Coal Supply

This brown field coal conversion project is the first of its kind in the country and peculiar in nature. The coal projects using low rank or lignite coal are unique in terms of their fuel supply as there is no one standard type of coal from a particular mine and each mine is different in composition. As compared to coal, the refining for RFO and Natural Gas ensures that standard specifications can be followed and one source of supply can be replaced with any supplier, which also complies with a standard specification of the fuel.

Coal supply, however, has different dynamics that requires the CSA to be structured in a manner to cater for the following:

- The coal mines remain available for the duration of the agreement;
- Coal sourced from these specific mines is blended to obtain a specific "design coal" on the basis of which the EPC contractor will design the boilers;
- Agreement on a fixed pricing mechanism as mentioned in section 11.1.1
- Provision of coal at the buyer's premises while subcontracting / outsourcing various supply chain steps to other parties leading to significant risk for the coal supplier; and
- Indexation of shipping and local charges.

6.2.2 Design Considerations

The coal chosen for this project is lignite coal of Indonesian origin. The reason for this selection mainly lies in non-availability of high CV coal for long term supply as per the terms and conditions required to ensure bankability of the overall documentation. High CV coal is usually available from South Africa and Australia and these countries have usually been in agreements to supply to Europe and Japan / Korea under lucrative pricing with very low country risks related to the country of origin of the power plant.

The boilers shall be designed for specific design coal from Indonesian mines whose specifications are closer to Thar coal. This conscious decision will at some future date allow blending of Thar coal with imported coal to achieve the design coal specifications upon which the boiler shall be designed and operated.

6.2.3 Coal Supplier and Country of origin

Detailed negotiations on a long term CSA is expected to commence soon with Northstar Capital Service Limited (the coal supplier). The coal supplier has mining interests in Indonesia at various locations. Under this arrangement, coal of various specifications shall be imported and stored at a location in close proximity to the project site where blending shall be undertaken before supply at the project site (Delivery Point). Please refer to section 6.4 and 7.13

Design coal specifications are provided hereunder:

No.	Items	Symbol	Unit		Design Coal
1	Total Moisture	Ar	%	ASTM D3172	35.00
	Moisture(air dry)	Adb	%	ASTM D3172	17.00
	Ash(air dry)	Adb	%	ASTM D3172	8.00
	Volatile Matter (air dry)	Adb	%	ASTM D3172	40.00
	Fix Carbon(air dry)	Adb	%	ASTM D3172	35.00
2	Carbon(air dry)	Cad	%	ASTM D5373	55.50
	Hydrogen (air dry)	Had	%	ASTM D5373	4.20
	Oxygen(air dry)	Oad	%	ASTM D3176	14.15
	Nitrogen (air dry)	Nad	%	ASTM D5373	0.65
	Sulphur(air dry)	Adb	%	ASTM D4239	0.50
3	**Gross Calorific Value**	**Ar**	kcal/kg	ASTM D1989	4212
	Net Calorific Value	Ar	kcal/kg	ASTM D1989	3839
4	Deformation	DT	°C		1,200
	Spherical	ST	°C		1,220
	Semi-spherical	HT	°C		1,230
	Flow	FT	°C		1,240
5	Silica	SiO_2	%		45 20
	Aluminium	Al_2O_3	%		18.50
	Ferric oxide	Fe_2O_3	%		10.20
	Calcium oxide	CaO	%		13.10
	Magnesia	MgO	%		1.10
	Sulphur trioxide	SO3	%		8.20
	Titanium	TiO_2	%		1.5
	Potassium	K_2O	%		0.3
	Sodium	Na_2O	%		0.6
	Phosphide	P_2O_5	%		0.6
6	**Hardgrove Grindability Index**	HGI		ISO 5074 / ASTM 409-93A	62
7	**True relative density of coal**		gr/cc		1.3
8	**Maximum Lump Size**	MLS	mm		50mm
	Percent of Maximum Lump Size	%	%		90%

K - Energy (Pvt.) Limited

6.2.4 Envisaged Coal Supply Arrangement

While details of the coal logistics are currently being worked out, it is envisaged that coal in blended and unblended form shall be imported from Indonesia. The project company is engaging with a logistics service provider to assist the project company in the import, transportation and blending/handling of coal. The concept of blending onshore in Pakistan will be gradually introduced to assure the consistency in quality of coal, which is the basis for the design of the subcritical pulverized coal boilers. Being the first large scale coal generation project in Pakistan the project sponsors would like to ensure that there is no adverse effects on plant operation due to any variation in the specified parameters of the design coal After unloading at Port Qasim, the logistics service provider will transport the coal to a Primary Storage area, which is being procured by the project in the Eastern Industrial Zone in Port Qasim. This area amounting to 145 acres will suffice to maintain an inventory of up to 60 days of coal. Transfer of blended coal from Primary Storage area to the Delivery Point of the project company where an inventory of another 7 days shall be maintained by the project company in its coal yard, could be (depending on the final logistic arrangements) through a closed conveyor system or through trucks.

6.2.5 Quality Assurance

Prior to acceptance of the coal at the Delivery Point located in the coal yard of the project company, the project company shall test the coal, preferably at the Primary Coal Yard after coal blending, to the design specifications and accept only the product that meets the specifications.

6.2.6 Risks and Lack of support from Government of Pakistan

In the absence of any plausible support from the Government of Pakistan to backstop the risks of the coal supply, the CSA shall be negotiated in a manner that most of the associated risks are expected to be passed on to the coal supplier. Other than the normal Force Majeure events, it is envisaged that the risks associated with coal mining, transportation in Indonesia, coal loading at the FOB port, coal shipping, coal shipping insurance, unloading and stevedoring, blending, and local transportation are foreseen to be passed on to the coal supplier through the CSA.

6.3 Coal Handling Facilities

Blended coal from the "Primary Storage" facility will be transferred to the coal yard of the project company. The coal yard at the project company is a part of the EPC scope of works. Bulldozers and wheel loaders will be used to create coal piles and/or underground hopper and coal conveyors will feed coal to Units 3 & 4 boiler coal bunkers. The maximum lump size of coal shall be less than 50 mm.

The coal handling system will be designed based on coal consumption for the new PC boilers. The underground hopper and belt feeders at active storage will load coal onto 2 x 100% conveyor belt that will transfer the coal to a transfer tower. The transfer tower will direct coal to the power plant coal crusher, active coal pile, and/or inactive coal pile NFPA standards will be applied for the fire-fighting system.

Auxiliary systems such as control, water spray & dust suppression, dust collection, ventilation, water sluicing, communication and fire-fighting will be provided for the coal handling system. The dust control system will consist of the dust suppression system and dust collection system. The dust collection system will be provided for transfer tower, crusher house, and coalbunkers. Wash down systems will be provided in transfer tower, crusher house, tunnels and trestles. Water spray & dust suppression systems will be provided in coal storage yard. Inventory Management System and Weighbridge will also be provided.

6.4 Coal Storage Facilities

While details of the coal logistics are currently being worked out, it is envisaged that coal in unblended form shall be imported from Indonesia. As further elaborated under sections 7.13 and 7.14 below the project company is engaging with a logistics service provider to assist the project company in the import, transportation and blending/handling of coal. The concept of blending onshore in Pakistanis gradually introduced to assure the consistency in quality of coal, which is the basis for the design of the subcritical pulverized coal boilers. Being the first large scale coal generation project in Pakistan the project sponsors would like to ensure that there is no degradation in thermal efficiency due to any variation in the specified parameters of the design coal. After unloading at Port Qasim, the logistics service provider will transport the coal to a Primary Storage area, which is being procured by the project company in the Eastern Industrial Zone in Port Qasim. This area amounting to 145 acres will suffice to maintain an inventory of up to 60 days of coal. Transfer of blended coal from Primary Storage area to the Delivery Point of the project company where an inventory of another 7 days shall be maintained by the project company in its coal yard, could be (depending on the final logistic arrangements) through a closed conveyor system or through trucks.

6.5 Bottom Ash Handling and Disposal

The bottom ash handling system shall provide for the collection and removal of bottom ash from the steam generator (pulverized coal type) furnaces. A completely dry type bottom ash removal system shall be provided.

Each boiler shall have one separate and identical bottom ash removal system.

Bottom ash handling system shall be compatible with the boiler design and the requirement to transport bottom ash by truck to ash storage area.

The cooled bottom ash will be smashed by crusher, and then crushed bottom ash drops into steel bottom ash silo for storage and concentration. Bottom ash will be transported from bottom ash silo to ash yard by trucks.

Each set of dry bottom ash removal system will include equipment as follow:

- One (1) set of dry bottom ash extractor is equipped for each set boiler, the normal capacity of the bottom ash extractor is selected as 2t/h, maximum capacity is 10t/h, and have adjustment ability in the range of 2t/h~10t/h.
- One (1) set of crusher is equipped for each boiler, the rated capacity of the crusher is about 10t/h. The bottom ash will be directly transferred to steel bottom ash silo through crusher by bottom ash extractor.

One steel bottom ash silo will be provided for each boiler. Each silo will be capable of storing bottom ash produced by each unit in 14 days when each boiler is burning design coal at BMCR condition.

The bottom ash silos will be provided with bag filters, the exhaust air will have emission level of 50 mg/Nm3. The bottom ash silo will also include feeder, pressure relief valve, level indicators and etc. There will be electromagnetic pulsator around the cone part of the bottom ash silo to prevent from blocking up and ensure the loading of bottom ash.

There will be two discharge outlets at the bottom of each bottom ash silo. One will be equipped with humidifying device to discharge wet bottom ash, and the humidified bottom ash will be transported to ash yard by dump trucks provided by the Contractor. The other one will be equipped with dry bottom ash unloader to discharge dry bottom ash.

6.6 Fly Ash Handling and Disposal

One (1) set of positive dense phase pneumatic fly ash conveyor system will be provided for each unit.

The system will be located under the electrostatic precipitators, hoppers economizer, ash hoppers and air-pre heater hoppers.

Fly ash from hoppers will drop into the ash transportation equipment and then be transported to the fly ash silos through pipes. The capacity of each set positive dense phase pneumatic conveyance system would meet 100% fly ash quantity, which is produced when boiler is burning design coal at BMCR condition.

Compressed air for fly ash conveying will be provided by new compressed air station. There will be two (2) concrete fly ash silos for two boilers, each fly ash silo will be capable of storing the fly ash produced in 14 days by one unit when boiler are burning design coal at BMCR condition

There are three (3) discharge outlets at the bottom of fly ash silo operation layer.

Two (2) outlets will be equipped with humidifying device to discharge wet fly ash, water will be spray into fly ash and mixed, and the humidified fly ash will be transported to ash yard by dump trucks.

The third outlet will be equipped with dry ash unloader, which will be used to for discharging dry ash. In order to prevent fly ash harden in fly ash silos, 3 fluidizing air blowers (2 operate and 1 standby) and 2 fluidizing air heaters will be provided for each fly ash silos.

The bottom ash and fly ash will be transported to ash yard from silos by dump trucks. Five (5) sets of dump trucks with 20 tonnes capacity each will be provided. Double shift operation will be considered in whole day for truck transporting. Each shift operation time will be about 6.5 h. Two trucks could meet bottom ash and fly ash transporting requirement for two units when two boilers is burning design coal at BMCR condition.

The control system shall utilize a programmable logic controller (PLC)-based system that shall be furnished by the contractor.

6.7 Environmental Compliance

The air emissions control system for the coal-fired boilers will be designed to meet NEQS requirements. Emissions control will be provided for the boiler and the coal and material handling systems.

- Dry Low- NOx burners will be used.
- Two (2) sets of Electrostatic Precipitators (ESP) each having 2 chambers, 5 fields, and having an efficiency of not less than 99.65%. ESP will be designed and be capable of operations in such a manner that emissions do not exceed the limit of 50 mg/Nm3 when firing design coal. While the design of the new coal fired boiler shall conform to the NEQS emission limits of SO2 during a wide range of boiler operational requirements, a flue gas desulphurization wet scrubber system is envisaged be installed in the future when Thar coal is consumed, to control emissions of SO2 and smaller amounts of acid gases.

The Project shall meet the environmental impact permit, and the Government of Pakistan emission limits as indicated below:

- **Air Quality Emissions:** Stack emissions from the plant shall be guaranteed to not exceed any of the limits shown in the table below. The emissions limits shall be met from minimum continuous operating load through maximum load for stable coal firing with fuel coal specified in the technical specifications of the contract.

  These guarantees shall be made for the full range of ambient conditions for the site

Pollutant	Emission Limit
Total Particulate Matter (PM10)	50 mg/Nm
Sulphur Dioxide (SO_2)	500 Tonnes per day as per Pakistan NEQS and EIA permit
Nitrogen Oxides (NO_X)	260 ng/J as per Pakistan NEQS and EIA permit
Opacity	As per Pakistan NEQS and Owner's EIA permit

Note: (1) International guidelines define normal conditions (Nm3) as 0°C and 1 atmosphere of pressure.

- **Liquid Discharge:** The Plant wastewater and seawater discharges shall not exceed values stated in the environmental permits All steam safety valve discharge pipes and controlled vent pipes shall be equipped with exhaust silencers.

- **Noise:** The Contractor shall follow the requirements of the EIA and NEQS for the ambient noise emissions. Equipment noise emissions shall be 85 dB(A) except for transformers, which are 92 dB(A) at 1 m distance and 1.2 m above floor. Equipment noise shall not expose operators to noise that exceed OSHA 8-hour limits, 90 dB(A). Compliance with these requirements shall be demonstrated at all reasonable operating conditions to the satisfaction of the Owner (excluding plant unsteady conditions, such as start-up, shutdown, and trip, and intermittent and/or emergency use equipment such as safety systems) and not during steam turbine bypass. In addition to the environmental noise requirements, the operation of the Project shall:
  - Assume the use of hearing protection equipment by operators in the interior and exterior operating areas are per relevant standards.
  - Result in the A-weighted sound pressure level (SPLA) noise levels less than 55 dB(A) in the control and electrical rooms.
  - Result in A-weighted SPLA noise meeting the following criteria at closest properly line site specific requirements.
  - Ambient air intake for FD fan of the boilers shall be equipped with inlet silencers.

6.8 Rehabilitation of Existing Equipment

The balance of plant (BOP) equipment that needs rehabilitation and replacement have been identified and finalised with the EPC Contractor. It is also expected that project shall be able to achieve higher dependable capacity and improved gross efficiency with increased plant reliability after carrying out these rehabilitation works in the power island.

6.9 Demolition and Relocation of Existing Facilities

As noted in previous sections, project needs relocation of some of the core facilities. The Works will include the physical demolition of warehouse, existing water treatment building, hydrogen plant and raw water basin pump house and relocation of hydrogen plant, raw water basin pump house and any major existing plant

facilities as required to accommodate the physical requirements of the new lignite coal boilers layouts. These facilities will be built first before demolition of existing facilities to minimize Unit downtime.

6.10 Expected Plant Performance Parameters after Conversion

Following are the expected performance changes in terms of dependable gross capacity, auxiliary power consumption and heat rates after the conversion from existing oil boiler plant to coal fired boiler plant. The EPC Contractor has guaranteed auxiliary consumption of 39,653 kW at 18 kV busbar (which excludes the power transformer and insulated busbar, and outgoing breaker losses) for the newly installed equipment of the Plant (Units 3 & 4). 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 and the Authority is thus requested to adjust the total auxiliary consumption at COD. The Net Electrical Output (Net Capacity) is expected to be 372.256 MW at the outgoing 220 kV busbar, which shall, however, be conclusively determined at the time of post-synchronisation tests in accordance with the requirements of the PPA. Hence Project Capacity (Net) and Heat Rate (Net) are subject to adjustments at the time of COD. Thus, the Authority is requested to allow a review of these parameters at the time of COD.

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

K - Energy (Pvt.) Limited

SECTION 7: PROJECT COST

7.1 Project Cost

The initial estimate of new investment in project costs is USD 418 Million whereas assets to be leased from KEL are valued at USD 206 Million resulting in a total project cost of USD 624 Million. The new project costs include the EPC costs as well as the Non-EPC costs, financing fee and charges, interest during construction and other related costs such as land acquisition, project development, commissioning, insurances, taxes & duties and coal primary storage and handling infrastructure.

Project Cost	USD
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, 3rd 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
Subtotal - New Investments	418,103,716
Lease Assets from KEL	206,254,228
Total Project Cost	**624,357,944**

7.2 Engineering, Procurement, and Construction ("EPC")

The project company has signed the following contracts on 8th November 2013:

- (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).
- 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).

7.3 LC Confirmation Charges

The 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.

7.4 Taxes, Duties and other Charges

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	USD
Import duty, Sindh Tax, Port Handling and Freight for Equipment Supply Contract	18,194,400
Total	**18,194,400**

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.

7.5 Emergency and Safety Spare Parts

To maintain the required availability of the power plant, 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.

It is important to note that the Emergency and Safety Spare Parts are long lead items which are not included as part of the EPC Contract scope. Additionally, Emergency and Safety Spare Parts shall not include spares for normal / routine operation and maintenance of the plant.

The Emergency and Safety Spare Parts list shall be finalized in consultation with the O&M Operator / EPC Contractor and the same shall be ratified by the Owner's Engineer prior to placement of the purchase orders. However, the Emergency and Safety Spare Parts should be made available at the time of COD

Since the Emergency and Safety Spare Parts list has not been finalised as yet, the Authority is requested to approve an initial estimate of US$ 6,516,000 under this head with a further request to allow adjustments based on the actual at the time of COD.

7.6 Non-EPC Costs

The project has other Non-EPC costs, which are not part of EPC Contractor scope of work pursuant to the EPC contracts. Such costs 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. Based on the technical input received so far, following cost has been assumed. These will be adjusted at COD based on actual.

Non-EPC Costs	USD
Non-EPC Costs	1,000,000
Total	**1,000,000**

7.7 Land

A coal yard, for holding blended coal for boiler feed, is a critical component for the construction and execution of a coal fired IPP. 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.

Initially the project company requested Port Qasim Authority (PQA) to allocate 50 acres of land east of BQPS-I for construction of the coal yard. PQA verbally confirmed availability of the land in year 2013 but the project company did not make any advance payment in respect of the land due to non-availability of advance tariff and non-issuance of the LPM to KEL. However, EPC costing and EPC contract was concluded based on this envisaged land. Meanwhile PQA had informed the project company that the land previously earmarked for the coal yard of the project company was allocated to the Government of Punjab, in partnership with the Government of Qatar, for its coal based power project. As a result PQA has now assigned another piece of land to the project company to construct the coal yard The shape and dimensions of this new land substantially varies from the coal yard land assumed during EPC negotiations and this may entail additional cost in terms of sheet piling works for underground coal channels. The project company along with the Owner's Engineer is currently evaluating the preliminary design of the coal yard and the cost effects, if any. The Authority is requested to allow variation in the contract price, if any, at the time of COD, owing to dimensional changes in the land now offered by PQA.

Additionally, the project company will sub-lease the land from KEL within BQPS-I premises for construction of the boiler island and other ancillary equipment.

Land	USD
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
Sub Total	**3,713,540**
Land Filling and Levelling Cost	1,532,176
Total	**5,245,716**

7.8 Owner's Engineer, 3rd Party Inspector and Independent Engineer Cost

- **Owner's Engineer:** An Owner's Engineer (OE) is essentially required for development and execution of this project. Since this is the first coal conversion project in Pakistan, expertise and experience of the potential OE in handling the coal projects was greatly focused and emphasised during the bidding and selection process. 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. Most of the companies either declined to work in Pakistan or did not respond to the RFP. Only 4 companies submitted their bid offers - these were OMS, Mott MacDonald, Lahmeyer and Desein Engineering. Based on the experience and knowledge base, 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.

- **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.

- **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

7.9 Project Development

The Sponsors have 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.

The project company will engage a team for project management functions including engineers, accountants, legal and commercial professionals. The cost 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.

7.10 O&M Mobilisation Cost

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 by 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.

7.11 Project Commissioning

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.

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.

K - Energy (Pvt.) Limited

7.12 Pre COD Insurance

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.

The Project Company 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

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 USD 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 USD 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.

7.13 Coal Primary Storage and Handling Infrastructure

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.

Coal Primary Storage and Handling Infrastructure	USD
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
Sub Total	**12,182,073**
Equipment for Coal Handling at Primary Coal Yard	3,000,000
Total	**15,182,073**

7.14 Logistics Service Provider

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.

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.

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.

7.15 Financial Fee and Charges

Financial charges include the costs related to the local debt financing of the Project and the deferred credit facility with EPC Contractor under Equipment Supply contract to the extent of SBLC issuance costs.

Local debt financing fee and charges include the upfront arrangement fee, financial advisory fee for advising on tariff, EPC contract negotiations, insurance and other project related matters, security trustee fee, lenders' monitoring fee, commitment fee, and opening and procurement charges on letters of credit. These costs will be incurred up to COD.

In addition to above fees, all charges, fees on account of local Lenders' consultants (technical, legal and insurance etc.) have been included in this cost item.

The Project Company has also negotiated a deferred credit facility with the EPC Contractor. This is a lump sum amount and is to be repaid to the EPC Contractor in USD in 12 equal quarterly instalments starting from the end of 1st quarter after COD.

Deferred credit facility fee and charges mainly represents issuance of stand-by letter of credit and its confirmation from reputable international bank(s).

The local lenders require indicative tariff from NEPRA for finalising financing terms and conditions for local debt financing as well as stand-by letter of credit to be provided to EPC contactor under deferred credit facility. Once these financing terms and conditions are firmed up based on indicative tariff received from NEPRA, the same will be submitted to NEPRA for adjustment of tariff accordingly.

Financial Fees & Charges	US$
Local debt financing fee and charges	4,891,250
Deferred credit facility financing fee and charges	1,390,000
Total	**6,281,250**

7.16 Interest During Construction (IDC)

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. Current estimate 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.

7.17 Interconnection with the Grid

The Units 3 & 4 of BQPS-I are already connected with the KEL grid. However, prior to commencement of the post-synchronisation tests of the respective Units, KEL shall completely test and verify the operational capability of HV Switchgear related to Units 3 & 4 to their handover to the project company in addition to proof testing of the transmission system protections.

K - Energy (Pvt.) Limited

SECTION 8: PROJECT FINANCING

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

Project Financing	Percentage	USD
Equity	20.82%	130,000,000
Debt	79.18%	
Local banks		150,403,716
Deferred credit		137,700,000
Lease		206,254,228
Total Financing	**100%**	**624,357,944**

8.1 Equity

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.

8.2 Long Term Debt

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. Given below is the debt repayment schedule of the project based on the indicative terms, which include 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

Debt Schedule	Year 1	Year 2	Year 3	Year 4	Year 5
Opening Outstanding	150,403,716	142,567,221	133,645,697	123,488,912	111,925,834
Principal	7,836,495	8,921,524	10,156,785	11,563,078	13,164,084
Interest	19,446,352	18,361,322	17,126,062	15,719,768	14,118,762
Instalment	27,282,847	27,282,847	27,282,847	27,282,847	27,282,847
Closing Outstanding	**142,567,221**	**133,645,697**	**123,488,912**	**111,925,834**	**98,761,749**

Debt Schedule	Year 6	Year 7	Year 8	Year 9	Year 10
Opening Outstanding	98,761,749	83,774,986	66,713,177	47,289,017	25,175,416
Principal	14,986,764	17,061,808	19,424,161	22,113,600	25,175,416
Interest	12,296,083	10,221,038	7,858,686	5,169,246	2,107,430
Instalment	27,282,847	27,282,847	27,282,847	27,282,847	27,282,847
Closing Outstanding	**83,774,986**	**66,713,177**	**47,289,017**	**25,175,416**	-

8.3 Deferred payment

The Project Company has also been able to negotiate a deferred credit facility in foreign currency with the EPC contractor (Equipment Supply Contractor) amounting to USD 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 USD 11.475 million.

8.4 Lease

KEL will lease its existing Units 3 & 4 to the project company for the project. For this purpose iqbal Nanji and Company has conducted a valuation for these units, and valued these assets at USD 206.2 million. A copy of the valuation report along with the preliminary Leasing documents has been provided in **Annexure-H**. Given below is the lease repayment schedule during the concession period of 20 years. The lease rate has been assumed at 3 months KIBOR plus 3% spread.

Lease Schedule	Year 1	Year 2	Year 3	Year 4	Year 5
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
Closing Outstanding	**203,946,828**	**201,319,948**	**198,329,355**	**194,924,688**	**191,048,617**

Lease Schedule	Year 6	Year 7	Year 8	Year 9	Year 10
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
Closing Outstanding	**186,635,870**	**181,612,141**	**175,892,835**	**169,381,642**	**161,968,919**

Lease Schedule	Year 11	Year 12	Year 13	Year 14	Year 15
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
Closing Outstanding	**153,529,841**	**143,922,302**	**132,984,517**	**120,532,303**	**106,355,974**

Lease Schedule	Year 16	Year 17	Year 18	Year 19	Year 20
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
Closing Outstanding	**90,216,812**	**71,843,047**	**50,925,277**	**27,111,265**	-

SECTION 9: GENERAL ASSUMPTIONS

In addition to the financial and technical parameters elaborated in this document, this tariff takes into account the following general assumptions:

9.1 Annual plant availability of 83.33% is assumed. Scheduled outage allowance of 40 days per Unit per annum, except in any year in which a major overhaul is required, the scheduled outage period shall be 80 days per Unit. Annual Unscheduled outages of 500 Complex hours shall be allowed. If the project company completes Scheduled maintenance in less time than allowed during any Agreement Year, 50% of the time saved from Scheduled outage allowance will be credited to unscheduled outages allowance of 500 Complex hours. Further, Maintenance outage hours shall be calculated equivalent to 50% of the actual Complex hours consumed during such maintenance.

9.2 Power Purchaser shall be responsible for procuring, financing, constructing, operating and maintenance of the Interconnection Facilities, transmission facilities and Metering System at Project site in accordance with the terms of PPA.

9.3 All costs incurred during plant tests after synchronization is assumed to be paid by the Power Purchaser in accordance with the terms of the PPA.

9.4 Actual equity investment and Debt drawdown profile will be used at the time of COD to update Return on Equity During Construction & Return on Equity Component and Interest During Construction respectively.

9.5 The local debt repayment is assumed to be 10 years with a grace period of 2-1/2 years.

9.6 A constant IRR of 21% is assumed net of 7.5% withholding tax on dividends over a period of 20 years.

9.7 KEPL will enter into long term coal supply contract(s) based on minimum take-or-pay obligation per annum. Any LDs levied by coal supplier(s) due to lower despatch by Power Purchaser will be fully passed on to the Power Purchaser under the PPA.

9.8 Boilers for the power plant are designed against a certain range of coal specifications, therefore KEPL Company has to enter into long term coal supply contract(s) to achieve fuel security as fully explained in section 11.1.1. Hence a premium of $5 per tonne of coal is assumed in the FOB coal price. Any change in the amount of premium and / or advance if required by the coal supplier shall be treated as "pass through" in the tariff.

9.9 Shipping charges including freight and insurance and port and local handling charges along with overall mechanism for indexation of shipping and port and local handling charges is subject to finalisation of the CSA and arrangements with the shipping and logistic agents.

9.10 Auxiliary power consumption for Units 3 & 4 is assumed to be approximately 50 MW. The Net Plant Heat Rate and Net Dependable Capacity shall be firmed up during post-synchronisation tests in accordance with the terms of the PPA.

9.11 US Dollar to Pak Rupee parity is assumed at Pak Rupees 97.9 equal to 1 US Dollar using March 31, 2014 as benchmark.

9.12 No hedging cost is assumed for exchange rate fluctuations during construction and all cost overruns resulting from changes in the exchange rate during constructions shall be included in the project cost. Adjustments should be at COD.

9.13 3 months KIBOR has been assumed at 10.18% per annum using March 31, 2014 as benchmark.

9.14 WPI in Pakistan is assumed at 211.66 and US-CPI is assumed at 236.293 using March 2014 as benchmark, unless stated otherwise.

9.15 There shall be no withholding tax on supply of plant and equipment in accordance with the existing policy for import of plant for the IPP. Only 6% Withholding Tax on onshore construction services and works has been assumed which is part of contract price. Any changes in the aforesaid tax assumptions shall be treated as a "Pass-through"

9.16 7.5% Withholding Tax on dividend is assumed. Any changes in the aforesaid Withholding Tax regime will be "pass through" to the Power Purchaser. General Sales Tax, Sindh Sales Tax, any corporate tax including turnover tax and all other taxes, levies, imposts, duties, charges, fees, deductions or withholdings of any nature whatsoever and by whomsoever imposed on the IPP, EPC Contracts as well as on the fuel, as applicable, will also be treated as a "pass through".

9.17 The 5% of the customs duties and 1% of the Sindh Infrastructure Cess on import of coal have been assumed for reference purposes only. No other taxes cess, levies, impost, fees etc. is assumed on import of coal. Any change in custom duties and Sindh Infrastructure Cess rates or imposition of any other duties, taxes, levies, cess, impost, fees etc. on import of coal shall be treated as a "pass through".

9.18 The 5% of the customs duties and 1% of the Sindh Infrastructure Cess on import of plant and equipment have been assumed for reference purposes only. No other tax including any Federal Excise Duty on the import of plant and equipment is assumed Any change in customs duties and / or cess rates or imposition of any other tax on the import of plant including Federal Excise Duty shall be adjusted at COD.

9.19 LC confirmation charges are assumed at 3%. Any change, based on actual, shall be adjusted at COD.

9.20 Any insurance premium for political and entity risk coverage should be treated as "pass through"

9.21 Additional Insurance Costs that may arise due to change in regulations, policies, legislation etc will be treated as "pass through"

9.22 Sino-sure fee or any other equivalent fee, if incurred, for Chinese / foreign financing will be treated as "pass through".

9.23 Annual degradations in Heat Rate over the life of project shall be adjusted in light of annual degradation curves to be provided by the EPC contractor and should be included in PPA.

9.24 Part load Heat Rate curves as per EPC Contract should be adopted for calculating fuel component of tariff if low despatch is given by the power purchaser.

9.25 Costs related to start-ups of the plant (cold, warm and hot) is not included in the Operations & Maintenance Costs and it is proposed to charge the start-up costs through supplemental invoices based on actual number of each type of start and in accordance with the price and mechanism in the PPA. Hence, these costs will be treated as "pass through".

9.26 Payments to Workers Welfare and Profit Participation Funds, is to be considered as "pass through".

9.27 The Zakat deduction on dividends, as required to be deducted under Zakat Ordinance, is to be considered as "pass through".

9.28 Any direct and indirect taxes, levies, imposts, duties, charges, fees, deductions or withholdings of any nature whatsoever and by whomsoever imposed and which are not factored in the tariff calculation shall be treated as pass through items, in terms of PPA

9.29 Financing terms including interest rates are on best estimates basis, hence are subject to final negotiations with the financial institutions once tariff has been determined by NEPRA and the PPA is signed. This will include mainly the debt-equity ratio grace period, loan repayment terms, benchmark index (KIBOR), the spread margin of the financial institutions and the rates of financing fee and charges for arranging these project loans and SBLC issuance for Deferred Credit facility with EPC Contractor. Lease rate on KEL's assets is assumed to be equal to long term debt rate which the project will be able to secure, and hence is subject to final rate agreed with local banks at the time of financial close.

9.30 Project contingency/debt service reserves are not included in tariff calculations. If required by the Lenders, these will be adjusted accordingly in the tariff

9.31 The tariff table shall be further updated at COD in order to adjust the tariff according to the actual KIBOR and exchange rates (PKR/USD, PKR/Euro) and other adjustments.

9.32 Any other assumptions that are not expressly stated herein but are based on the PPA draft negotiated by the Project Company with the Power Purchaser. Consequently any change in any such assumptions may lead to change in the Reference Generation Tariff.

SECTION 10: TARIFF STRUCTURE

10.1 The proposed tariff has a typical two-part structure comprising of Energy Purchase Price (EPP) and Capacity Purchase Price (CPP).

10.2 Energy Purchase Price (EPP) of the tariff consists of the following cost components;

- Fuel Cost Component
- Variable O&M Component.

10.3 Capacity Purchase Price (CPP) of the tariff consists of the following cost components;

- Fixed Operations and Maintenance Costs
- Insurance
- working capital
- Return on Equity
- Return on Equity during Construction
- Withholding Tax
- Lease Payments
- Deferred Credit Payments
- Debt Payments

SECTION 11 ENERGY PURCHASE PRICE

The Table below represents the levelized tariff component pertaining to EPP:

	Energy Charge	
Fuel Cost Component	4.7113	4 8123
Variable O & M	0.1676	0.1712
Total EPP	**4.8789**	**4.9836**

11.1 Fuel Cost Component

The cost of fuel is a pass through item and is variable with dispatch. The Fuel Cost Component ("FCC") is calculated using the delivered coal price at the coal yard, the gross heating value of coal and the Net Plant Heat Rate using gross heating value of coal.

$$Reference\ FCC = \left(\frac{Reference\ Coal\ Price\ per\ kg}{Reference\ Gross\ Calorific\ Value\ of\ Coal}\right) \times Reference\ Net\ Plant\ Heat\ Rate$$

Reference FCC = PKR 4.7113/kWh

Where:

Reference Coal Price per Kg = PKR 7.079 (US$ 72.31 per tonne) on delivered basis
Reference Gross Calorific Value of Coal = 16,722 Btu/kg on as received basis
Reference Net Plant Heat Rate (HHV) = 11,128 Btu/kWh

The reference FCC shall be indexed to changes in fuel price as explained in section 11.1.1

Reference Net Plant Heat Rate will be conclusively determined at the time of conduct of post-synchronisation tests as fully explained in section 11.1.2

It should be noted that the above Fuel Cost Component is based on preliminary negotiations with the coal supplier held so far. However, the CSA has yet to be finalised. Therefore, the final reference Fuel Cost Component is subject to adjustments upon finalisation of CSA mainly relating to shipping freight and port and local handling charges, Plant Net Dependable Capacity and Net Plant Heat Rate in accordance with the tests to be carried out at COD. We have also catered for taxes/duties on import of coal and fuel prices

11.1.1 Coal price:

The lignite coal specification of this project has been locked with the coal supplier and provided to the EPC Contractor for boiler design considerations.

The components of Coal Price are as follows

a) FOB coal price
b) Shipping freight and insurance
c) Discharge Port and Local Handling Charges
d) Custom Duty and Taxes
e) Coal Losses
f) L/C Charges

a) FOB coal price

It is envisaged that the FOB coal pricing shall be based on McCloskey Newcastle indices (Argus McCloskey Publication) as benchmark. The benchmark coal has calorific value of GAR 6322 kcal/kg. The McCloskey Newcastle prices will be adjusted for calorific value, moisture, sulphur and ash of the actual coal being supplied using the Formula for Determining the Coal Benchmark Price issued by the Directorate General of Minerals, Coal & Geothermal ("DGoMCG"), Ministry of Energy and Mineral Resources, Indonesia for Ecocoal category.

FOB Price linked to a benchmark price of NCI. Reference price used is **$63.48** per tonne and has been linked to NCI price of 31 October 2014.

FOB Price is computed as follows:

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

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

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

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

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

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

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

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

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

Coal Premium is the premium required by the coal supplier as fully explained below.

The project company is entering into a 20-year contract with the coal supplier. It is a well-known industry fact that no other feature of a long-term contract is as important from both the seller and buyer's perspective as the provision for the price to be paid for a long-term supply of coal. Every such provision comprises the agreement of the parties as to an acceptable allocation between them of the risk of fluctuations in the market price of similar specification coal during the life of the contract. The industry therefore uses a number of different pricing mechanisms and variations to allocate risk in coal supply agreements. Some of the most common price mechanisms incorporated in to long-term contracts used in recent history are:

- Base Price Plus Escalator Provisions (BPE):

  A typical BPE provision sets an initial "base" price for various components of the seller's cost of mining coal, such as labour, material, depreciation, etc. Over the term of the contract, some or all of these price components are escalated (or de-escalated) according to changes in the indices or costs However the BPE mechanism has found to be lacking as it does little to solve the problem of large short-run changes in the market value of coal caused by demand-side shocks such as trade embargoes or wars.

- Market related Pricing:

  This is a more deliberate effort to link the contract price directly to the market price of coal. While a number of mechanisms have evolved under market related pricing the most commonly used is that of developing index-based formulas which revise the contract price to reflect changes in the market during the term of the contract. Such indices are carefully selected to reflect changes in the market price of a certain coal rather than changes in the general economy. However, in actual practice it has been found that it is

often difficult to align market perceptions of both the seller and the buyer to reach a price nexus The market price to a utility buyer often means the price he would pay in the spot market for a type of coal that could be substituted in his boiler The seller, on the other hand, is not likely to agree that such price reflects the value of his specific, long-term supply agreement. While one solution is to include a market-price-reopener in the contract the guidelines and regulations adopted by many regulatory bodies have placed severe constraints upon a utility's ability to pass through fuel costs. Regulators are acutely aware of market information and can be counted upon to critically question long-term contract prices, especially during periods when the spot market is soft.

Therefore in the case of the K-Energy project the unique nature of coal supply coupled with long term supply agreement for 20 years, the FOB coal benchmark pricing formula as mentioned earlier does not fully cater for the risks associated with uniqueness and long term availability of the coal at the buyer's premises on top of inherent risks of long term agreement. Hence, upon commencement of price negotiations with the coal supplier a substantial premium was being demanded in the range of $10 - $12 per tonne to protect against downside risks. However, after various rounds of negotiations, the project company has been able to convince the envisaged coal supplier to restrict such premium to $5 per tonne.

There is also a need to understand that at present there is no long-term contractual pricing arrangement / market mechanism for coal imports into Pakistan, even in the lignite range of coal quality. To revert to a spot pricing mechanism is detrimental for the project, as it would not allow the project to plan for a sustainable supply of the design quality of coal over the life of the project.

b) Shipping freight and insurance

Shipping freight and insurance charges are bifurcated as follows:

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

Following is the reference for shipping freight and insurance for the period from December 2014 to February 2015:

- Charter cost (Hire charge) is a charge per tonne for a period of 3 calendar months of December 2014 to February 2015 to take care of hire cost of ships from the loading port to Port Qasim including all port dues and insurance. This charge is based on "Baltic Exchange Supramax Index - Route S2" at the rate of Daily Hire US$8,107 as of October 27, 2014 which corresponds to reference per tonne price of $9.10;

- Fuel charge (Bunker charge) is a variable charge calculated on per tonne basis and is linked to IFO-180cst based in Singapore The reference IFO-180cst is $480 using October 27, 2014 as benchmark and this corresponds to $8.98 per tonne; and

- Insurance cost for marine cargo from the loading port to Port Qasim is assumed to be $0.15 per tonne.

These estimates are based upon preliminary discussions and proposal from 3 shipping companies for 20 years shipping contract, and subject to change during the finalization of the contract.

Detailed mechanism for periodic review of pricing and indexation mechanism has been provided below.

Shipping market is extremely volatile in terms of price and availability of ships. In order to secure availability of ships for the Project Concession Period of 20 years from COD, the coal supplier will enter into shipping contract for a period of 20 years. Hence spot market or short-term contracts are not workable.

To secure such long term and sustainable availability of ships, a number of mechanisms have evolved under market related pricing the most commonly used is that of developing index-based formulas which revise the contract price to reflect changes in the market during the term of the contract. Such indices are carefully selected to reflect changes in the market price of Hire charge and Fuel charge.

Following are the common methods to deal with such price fluctuations in Hire charge and Fuel charge over a longer period of time:

- Hire charge to be fixed for a certain period i.e. for five (5) years out of the contract period and Fuel charge to be linked with IFO-180cst based on Singapore Platt's; and
- Hire charge linking with applicable index and Fuel charge to be linked with IFO-180cst based on Singapore Platt's.

Based on the 3 proposals obtained from market, option II is assumed for the pricing and indexation of the shipping freight as detailed in section 12.1.1.

In light of shipping market dynamics and volatility as explained above, project company and KEL agreed that three (3) to Six (6) months prior to the COD and thereafter three (3) to Six (6) months prior to completion of every five (5) years of the shipping contract starting from COD, the project company will review the shipping freight pricing and indexation mechanism in light of prevalent market parameters and condition. In case the revised base price as per above method and / or indexation mechanism currently envisaged and thereafter agreed in the shipping contract would have been materially inconsistent with the market

conditions prevalent at the time of review, these will be revised with mutual agreement

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

Discharge Port and Local Handling Charges: Discharge port and local handling charges starting from discharge port up to the coal yard (holding area for boiler feed) of the project company which mainly includes the following activities:

- Vessel Stevedoring;
- Delivery / loading from plinth:
- Receival, unloading and piling at port temporary storage;
- Delivery / loading from port temporary storage;
- Receival / unloading / piling at Primary coal yard;
- Delivery / loading for project secondary coal yard;
- Transportation from plinth to port temporary storage, port temporary storage to primary coal yard and primary coal yard to secondary coal yard (holding area for boiler feed);
- Port temporary storage;
- Weighment at PQA and primary coal yard;
- Tally and Cargo Supervision at port / berth, port temporary storage and primary coal yard;
- Surveys / stock control /planning;
- Allocation for vessels agency;
- Vessel / Cargo Superintendence;
- PQA labour / cess, wharfage and port dues; and
- Customs and port clearance

These discharge port and local handling charges are bifurcated and assumed as follows:

- Discharge Port clearance and Local Handling Charges are considered as fixed charge representing cost of stevedoring, superintendence, customs & port clearance and government & port dues having the reference price of $6.23 per tonne. The reference price is linked to WPI in Pakistan using October 2014 as benchmark which corresponds to WPI of 214.39;

- Local Transportation Charges are related to transportation of coal from Port Qasim to Project Company's coal yard and are linked to Diesel prices. Reference price of $4.16 per tonne has been linked to PSO Diesel prices of October 2014 which corresponds to HSD price of Rs. 107.39 per litre; and

- Sindh Sales Tax is not assumed on discharge port and local handling charges assuming it as adjustable against output Federal Sales Tax on energy invoices. Any change in such assumption shall be treated as "pass through".

- These estimates are based upon preliminary discussions and proposals from a local handling company and may vary during the finalization of the contract.

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.

Adjustment of the Price for Quality

The Coal Price shall be adjusted for changes in Sulphur and Ash contents of coal.

In the event that the Sulphur and Ash contents of the coal supplied by the coal supplier exceeds design specification for Sulphur and Ash but remain within the tolerance limits, the price of coal per tonne shall be reduced accordingly. Such reduction in coal price is under negotiation with the coal supplier and will be provided once CSA is finalised.

11.1.2 Plant Heat Rate

Based on the analysis provided in the feasibility study and KEL's data, the Gross Plant Heat Rate ("GPHR") at HHV for Units 3 & 4 combined is currently around 10,650 Btu/kWh or 32.03% efficiency. Upon conversion of the Units to coal, the EPC Contractor has guaranteed GPHR at HHV for Units 3 & 4 combined at 9,819 Btu/kWh or 34.75% efficiency.

The conversion of Units 3 & 4 of BQPS-I shall increase the parasitic load by approximately 20 MW for the Plant, as mentioned in section 6.10, due to installation of additional equipment like crushers, pulverisers, conveyors, ash handling equipment, and various fans such as PA, OFA, FD, ID etc. Hence the Net Plant Heat Rate (NPHR) for the converted units shall be higher than the furnace oil plant. Therefore, such increase in the parasitic load should be given due consideration in determining the NPHR. For detailed explanation, please refer to section 6.10.
The Authority is therefore requested to allow final adjustment of the Net Dependable Capacity and Net Plant Heat Rate based on the post-synchronisation tests in accordance with the PPA requirements.

11.2 Variable Operation and Maintenance Costs

The Variable Operations and Maintenance Costs include annual expenses related to:

- Chemicals – required for boiler water circuit, CCW, RO plant, condensate polishing unit, oil water separator, wastewater treatment, etc.
- Water – required for RO feed water, potable water, stockyard fire control, coal dust control, service water etc.
- Balance of Plant – reverse osmosis membrane, condensate polisher, H2 generation plant, etc
- Electrical – electric motor, switchgear, breakers, transformer, lighting etc.
- Coal handling system – coal conveyors, crushers, unloaders, rollers, hoppers etc.
- Ash handling system – ESP maintenance, ash hoppers, ash piping replacements, pneumatic conveyors, valves etc.
- Tapprogge ball clearing consumables
- Third party services – coal shipment inspections, mechanical contractors, chemical laboratories, staff van, ISO and environmental services etc.
- Consumables – chlorine, lab chemicals, cotton rags, UPS consumables, printer, miscellaneous maintenance.

The breakup of variable O&M component (@100% plant factor) is as follows:

Variable O & M	USD
Chemicals	
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
Sub Total Chemicals	**1,543,519**
Other Costs	
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
Sub Total Other Costs	**4,040,000**
Total Annual Plant Variable O&M Costs	**5,583,519**

All the above O & M costs are based on feasibility study estimates and should be allowed post facto adjustment as per the inputs from the EPC Contractor.

75% of variable operations and maintenance costs is assumed to be local and shall be indexed with local WPI whereas 25% to be foreign and shall be indexed with US-CPI and Exchange Rate (PKR/US$) variation

SECTION 12: CAPACITY PURCHASE PRICE

The Table below represents the levelized tariff component pertaining to CPP·

Capacity Charge		
Fixed O & M	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
Total CPP	**4.1260**	4.2145

12.1 Fixed Operations and Maintenance Costs

The Fixed Operations and Maintenance Costs include annual expenses related to:

- Boiler maintenance - boiler and boiler auxiliaries, feeders and pulverisers, pumps, fans and compressors;
- Turbine and generator auxiliaries - main turbine, turbine valves, intake structure, condenser, generator, etc.
- Major overhaul – a five years cycle with coverage of boiler, turbine, generator, condenser, auxiliaries, BOP etc.
- Personnel – operation, maintenance, administrative and management personnel
- 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.
- O&M contractor – team of experts permanently based at the plant for overall supervision
- Miscellaneous – safety, office & administrative, landscaping, permits and consents, training, land sub-lease etc.

The breakup of fixed O&M component (@100% plant factor) 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
Total Annual Plant Fixed O&M Costs	**19,493,452**

All the above O&M 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 is based on initial estimates from DEPCO KPS (a Korean O&M Company) and should be allowed post facto adjustment as per actual O & M agreement with the O&M contractor.

35% of fixed operations and maintenance costs is assumed to be local and shall be indexed with local WPI whereas 65% to be foreign and shall be indexed with US-CPI and Exchange Rate (PKR/US$) variation.

12.2 Insurance

Insurance cost is worked out using a rate of 1.35% of the EPC Contract Price and BOP lease assets insurance will cover both breakdown and business interruption. The insurance component will be indexed to PKR/US$ variations in future.

12.3 Cost of Working Capital

The working capital consists of:

- Investment in 90 days coal inventory
- Collection of 30 days energy invoices in arrears @83.33% load factor
- Investment in 1000 tonnes inventory of LDO

The basis for investment in coal for 90 days includes:

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

In addition to the above, 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.

12.4 Return on Equity

The Authority is requested to consider the provision of 21% Return on IRR Basis keeping in view the reasons described below:

- IRR of 20% is suggested for IPPs based on local 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.

- 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

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.

12.5 Return on Equity During Construction

As a component allowed by NEPRA, return on equity during construction has been assumed. The rate is at 21% on IRR basis.

12.6 Withholding Tax on Dividends

A withholding tax of 7.5 % has been assumed on the dividends and has been considered as a pass through component in the tariff.

12.7 Lease Payments

The lease payments have been taken into the tariff on the following terms:

Loan period:	20.0 years
Repayment:	Quarterly
Lease Rate:	KIBOR (3 Months) + 3% p.a
KIBOR:	10.18% p.a.

12.8 Deferred Credit

The deferred credit payments in foreign currency have been considered into the tariff on the following terms.

Credit period:	5.5 years
Grace Period:	2.5 years
Repayment:	Quarterly
Instalment:	USD 11.475 million (lump sum) per quarter

12.9 Debt Payments

The terms of the local project loan are assumed as follows. These rates/terms are subject to finalization and adjustment in accordance with negotiations with the project lenders once the indicative tariff for the project company is issued by NEPRA

Loan period:	12.5 years
Grace Period:	2.5 years
Repayment:	Quarterly
Interest Rate:	KIBOR (3 Months) + 3% p.a.
KIBOR:	10.18% p.a.

SECTION 13: INDEXATION, ESCALATIONS & COST ADJUSTMENTS

13.1 Indexation & Escalations

NEPRA is requested to allow indexation for the various Reference Generation Tariff components in the following manner.

13.1.1 Fuel Cost Component

The Fuel Cost Component shall be adjusted on account of Fuel Price variation of fuel consumed during operational period. Fuel consumed during testing period shall be recovered from the Power Purchaser at actual The Fuel Cost component shall be indexed based on the following formula:

$FC_{(Rev)}$ = Relevant Reference Generation Tariff Component * ($FP_{(Rev)}$ / $FP_{(Ref)}$)

Where:

$FC_{(Rev)}$ = Revised Fuel Cost Component
$FP_{(Ref)}$ = the reference Fuel Price of PKR 7.079 / kg (US$ 72.31 / tonne) on delivered basis
$FP_{(Rev)}$ = the revised Fuel Price in PKR / kg on delivered basis as mentioned in section 11.1.1.

The components of Revised Fuel (coal) price are as follows.

a) FOB coal price
b) Shipping freight and insurance
c) Discharge Port and Local Handling Charges
d) Custom Duty and Taxes
e) Coal Losses
f) L/C Charges

The computation / indexation of these components is mentioned below:

K - Energy (Pvt.) Limited

a) **FOB coal price**

FOB Price is computed as follows:

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

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

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

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

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

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

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

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

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

Coal Premium = $5 as explained in section 11.1.1

b) **Shipping freight and insurance**

Shipping freight and insurance charges are bifurcated as follows:

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

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

- Hire Charge per tonne fixed for every quarter (US$) = $9.10 + [(BSI-RouteS2$_{REV}$ - BSI-RouteS2$_{REF}$) * $0.089 (such factor will be applied for every variation of $100 in Daily Hire rate from the benchmark rate)]
- BSI-RouteS2$_{REV}$ = For every following quarter, round average of last 1 calendar month of the previous quarter BSI-RouteS2.

- Fuel Charge per tonne (US$) = $8.98 + [(IFO-180cst$_{REV}$ - IFO-180cst$_{REF}$) * $0.0198]

- IFO-180cst$_{REV}$ - IFO-180cst 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$) = [(WPI$_{REV}$ / WPI$_{REF}$) * $6.23]

  WPI$_{REV}$ = WPI in Pakistan over the month prior to the month for which calculation is made

- **Local Transportation Charges per tonne** (US$) = [(PDP$_{REV}$ / PDP$_{REF}$) * $4.16]

  PDP$_{REV}$ = 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.

Any changes or revisions in the above computations / indexation mechanism shall be submitted to the Authority as soon as shipping and logistics arrangements and other terms and conditions of the CSA are finalised with the coal supplier. In addition, heat rate correction factor shall also be finalised and submitted to the Authority upon receipt of information from the EPC Contractor.

13.1.2 Variable O&M Cost

The Variable O&M Cost of the Project comprises of local component and foreign components. Therefore, the local components shall be indexed to the WPI in Pakistan, as notified by the Pakistan Bureau of Statistics, and foreign components shall be indexed with foreign exchange variation and inflation. The Variable O&M cost shall be indexed quarterly based on the following formula

Local:

$VO\&M_{(Local\ Rev)}$ = Relevant Reference Generation Tariff Component $_{(Local\ Ref)}$ *$(WPI_{(Rev)}/WPI_{(Ref)})$

Where:

$VO\&M_{(Local\ Rev)}$ = the revised Variable O&M Cost Component applicable for the relevant quarter

$VO\&M_{(Local\ Ref)}$ = the value of the Local Variable Operation and Maintenance Costs component of the Reference Tariff per kWh in the relevant Year

$WPI_{(Rev)}$ = the revised WPI in Pakistan for the quarter prior to the quarter to which indexation is applicable, as notified by the Pakistan Bureau of statistics.

$WPI_{(Ref)}$ = the WPI in Pakistan prevalent in the month prior to the month of the Reference Date as notified by the Pakistan Bureau of statistics.

Foreign:

$VO\&M_{(Foreign\ Rev)}$ = Relevant Reference Generation Tariff Component $_{(Foreign\ Ref)}$* $(US\text{-}CPI_{(Rev)}/US\text{-}CPI_{(Ref)})$* $(Fx\text{-}Rate_{(Rev)}/Fx\text{-}Rate_{(Ref)})$

Where:

$VO\&M_{(Foreign\ Rev)}$ = the revised Foreign Variable O&M Cost Component applicable for the relevant quarter.

$VO\&M_{(Foreign\ Ref)}$ = the value of the Foreign Variable Operation and Maintenance Costs component of the Reference Tariff per kWh in the relevant Year

$US\text{-}CPI_{(Rev)}$ = the revised US-CPI for the quarter prior to the quarter to which indexation is applicable

$US\text{-}CPI_{(Ref)}$ = the US-CPI prevalent in the month prior to the month of the Reference Date.

$FX\text{-}Rate_{(Rev)}$ = the revised TT & OD selling rate of PKR/USD for the quarter prior to the quarter to which indexation is applicable, as notified by the National Bank of

Pakistan For calculating the revised quarterly rate, average of the last day of each month during that quarter is used

FX-Rate $_{(Ref)}$ = the TT & OD selling rate of PKR/USD as on the Reference Date, as notified by the National Bank of Pakistan.

13.1.3 Fixed O&M Cost

The Fixed O&M Cost of the Project also comprises of local and foreign components. Therefore, the local component shall also be indexed to the WPI in Pakistan, as notified by the Pakistan Bureau of Statistics and foreign components shall be indexed with foreign exchange variation and inflation. The Fixed O&M cost shall be indexed quarterly based on the following formula.

Local:

FO&M $_{(Local\ Rev)}$ = Relevant Reference Generation Tariff Component $_{(Local\ Ref)}$* (WPI $_{(Rev)}$/WPI $_{(Ref)}$)

Where:

FO&M $_{(Rev)}$ = the revised Fixed O&M Cost Component applicable for the relevant quarter

FO&M $_{(Local\ Ref)}$ = the value of the Local Fixed Operation and Maintenance Costs component of the Reference Tariff per kWh in the relevant Year

WPI $_{(Rev)}$ = the revised WPI in Pakistan for the quarter prior to the quarter to which indexation is applicable, as notified by the Pakistan Bureau of statistics.

WPI $_{(Ref)}$ = the WPI in Pakistan prevalent in the month prior to the month of the Reference Date as notified by the Pakistan Bureau of statistics.

Foreign:

FO&M $_{(Foreign\ Rev)}$ = Relevant Reference Generation Tariff Component $_{(Foreign\ Ref)}$ * (US-CPI $_{(Rev)}$/US-CPI $_{(Ref)}$)* (Fx-Rate $_{(Rev)}$/Fx-Rate $_{(Ref)}$)

Where:

FO&M $_{(Foreign\ Rev)}$ = the revised Foreign Fixed O&M Cost Component applicable for the relevant quarter.

FO&M $_{(Foreign\ Ref)}$ = the value of the Foreign Fixed Operation and Maintenance Costs component of the Reference Tariff per kWh in the relevant Year

US-CPI $_{(Rev)}$ = the revised US-CPI for the quarter prior to the quarter to which indexation is applicable.

US-CPI $_{(Ref)}$ = the US-CPI prevalent in the month prior to the month of the Reference Date.

FX-Rate $_{(Rev)}$ = the revised TT & OD selling rate of PKR/USD for the quarter prior to the quarter to which indexation is applicable, as notified by the National Bank of Pakistan. For calculating the revised quarterly rate, average of the last day of each month during that quarter is used.

FX-Rate $_{(Ref)}$ = the TT & OD selling rate of PKR/USD as on the Reference Date, as notified by the National Bank of Pakistan.

13.1.4 Insurance Cost

The Reference Insurance Cost Component shall be indexed to actual premium and PKR/USD exchange rate, based on the revised TT & OD selling rate of USD notified by the National Bank of Pakistan.

The Insurance cost component shall be indexed annually based on the following formula:

Insurance $_{(Rev)}$ = Relevant Reference Generation Tariff Component * (INS PR $_{(Rev)}$/ INS PR $_{(Ref)}$) * (FX USD $_{(Rev)}$/ 97.9)

Where:

Insurance $_{(Rev)}$ = the revised Insurance Cost Component applicable for the relevant period

INS PR $_{(Rev)}$ = the Actual Insurance Premium paid for any Agreement Year

INS PR $_{(Ref)}$ = the Reference Insurance component of the Reference Tariff per kWh in the relevant Year multiplied by Reference generation capacity used in the Reference Tariff

FX USD $_{(Rev)}$ = the revised TT & OD selling rate of PKR/USD as on the date on which indexation is applicable, as notified by the National Bank of Pakistan.

13.1.5 Cost of Working Capital (CWC)

The cost of working capital facility shall be indexed to quarterly changes in the 3-month KIBOR and in the working capital for fuel (coal and LDO) price variations, using the following formula:

CWC $_{(Rev)}$ = Relevant Reference Generation Tariff Component * (WC $_{(Rev)}$ / WC $_{(Ref)}$) * (KIBOR $_{(Rev)}$ + 2.00% / KIBOR $_{(Ref)}$ + 2.00%)

Where

$CWC_{(Rev)}$ = Revised Cost of Working Capital component
$WC_{(Rev)}$ = Revised Working Capital in PKR at the rates of fuel (coal and LDO) and energy invoice at the end of the quarter prior to the quarter to which indexation is applicable
$WC_{(Ref)}$ = Reference Working Capital of PKR [5,657.29 million] used in calculating Reference Tariff per kWh in the relevant Year
$Kibor_{(Rev)}$ = the revised 3-month KIBOR rate at the end of each quarter prior to the quarter to which indexation is applicable.
$Kibor_{(Ref)}$ = 3 months KIBOR rate prevailing on the date of Tariff determination.

13.1.6 Return on Equity (ROE)

In line with NEPRA's previous determinations for thermal IPPs, the ROE Component of the Reference Generation Tariff shall be indexed to the PKR/USD exchange rate, on a quarterly basis based on the revised TT & OD selling rate of USD notified by the National Bank of Pakistan. The applicable formula shall be as follows:

$ROE_{(Rev)}$ = Relevant Reference Generation Tariff Component * ($FX\ USD_{(Rev)}$/ 97.9)

Where

$ROE_{(Rev)}$ = the revised ROE Component applicable for the relevant quarter

$FX\ USD_{(Rev)}$ = the revised TT & OD selling rate of PKR/USD as on the last date of the quarter prior to the quarter to which indexation is applicable, as notified by the National Bank of Pakistan.

13.1.7 Return on Equity During Construction (ROEDC)

In line with NEPRA's previous determinations for thermal IPPs, the ROEDC Component of the Reference Generation Tariff shall be indexed to the PKR/USD exchange rate, on a quarterly basis based on the revised TT & OD selling rate of USD notified by the National Bank of Pakistan. The applicable formula shall be as follows:

$ROEDC_{(Rev)}$ = Relevant Reference Generation Tariff Component * ($FX\ USD_{(Rev)}$/ 97.9)

Where

$ROEDC_{(Rev)}$ = the revised ROEDC Component applicable for the relevant quarter

$FX\ USD_{(Rev)}$ = the revised TT & OD selling rate of PKR/USD as on the last date of the quarter prior to the quarter to which indexation is applicable, as notified by the National Bank of Pakistan.

13.1.8 Lease Payments

The cost of lease facility shall be indexed to quarterly changes in the 3- month KIBOR, using the following formula:

$LP_{(Rev)}$ = Relevant Reference Generation Tariff Component * ($Kibor_{(Rev)}$ + 3% p.a. / $Kibor_{(Ref)}$ + 3% p.a.)

Where:

$LP_{(Rev)}$ = Revised lease payments component
$Kibor_{(Rev)}$ = the revised 3-month KIBOR rate at the end of each quarter prior to the quarter to which indexation is applicable.
$Kibor_{(Ref)}$ = 3 months KIBOR rate prevailing on the date of Tariff determination

13.1.9 Deferred Credit (DC)

The Deferred Credit Component of the Reference Generation Tariff shall be indexed to the PKR/USD exchange rate, on a quarterly basis based on the revised TT & OD selling rate of USD notified by the National Bank of Pakistan. The applicable formula shall be as follows:

$DC_{(Rev)}$ = Relevant Reference Generation Tariff Component * ($FX\ USD_{(Rev)}$/ 97.9)

Where:

$DC_{(Rev)}$ = the revised Deferred Credit Component applicable for the relevant quarter

$FX\ USD_{(Rev)}$ = the revised TT & OD selling rate of PKR/USD as on the last date of the quarter prior to the quarter to which indexation is applicable, as notified by the National Bank of Pakistan.

13.1.10 Interest Charges

The Interest Charges part of the Reference local bank Debt Service Component shall be quarterly adjusted for variations in interest rate as a result of variation in 3 months KIBOR.

The Interest Charges of the Debt Service Component shall be indexed based on the following formula:

$I_{(Rev)}$ = Relevant Reference Generation Tariff Component * ($KIBOR_{(Rev)}$ + 3%) / ($KIBOR_{(Ref)}$ + 3%)
Where:
$I_{(Rev)}$ = the revised Interest Charge Component applicable for the relevant quarter

$KIBOR_{(Rev)}$ = the revised 3 months KIBOR rate at the end of each quarter prior to the quarter to which indexation is applicable

$KIBOR_{(Ref)}$ = 3 months KIBOR rate prevailing on the date of Tariff determination

13.2 Adjustments

13.2.1 Adjustments at COD

Except for costs associated with the EPC and Owner's Engineer contracts, both of which have been concluded, all other costs, taxes, net capacity and heat rates (net) are based on best estimates and therefore subject to confirmation at COD of the project. Therefore the Authority is requested to allow the adjustments to the Reference Generation Tariff components at the time of PPA and at COD for true up of all the costs

Authority is requested for following adjustments in the reference tariff at COD:

- EPC Cost (only Variation Orders)
- Commissioning Fuel
- Emergency and Safety Spare Parts
- Non-EPC Cost
- Pre COD insurance (only Surrounding property and Reverse Insurance)
- Advance for Coal Infrastructure
- Financing Fee and Charges
- Interest During Construction
- Debt Service Reserve Account
- Taxes and Duties
- Fuel Price especially relating to shipping freight and port and local handling charges
- Net Plant Heat Rate
- Net Dependable Capacity
- Heat Rate Correction / Degradation Factor
- Part load Heat Rate Correction
- Fixed and Variable O&M Costs
- ROEDC
- Working Capital
- Interest Rates
- Exchange Rates
- Workers Welfare Fund (WWF) Workers Profit Participation Fund (WPPF)

13.2.2 Adjustment at Financial Close

It is submitted that the Project Cost be adjusted at Financial Close for the Interest Component and Financing Fee and Charges Component of the Project Cost based on the signed Financing Agreements with local lenders

SECTION 14: REFERENCE TARIFF

The following Tariff is presented for the approval by the Authority on the basis of the above stated facts:

Year	Variable Charge (PKR/kWh)				Capacity Charge (PKR/kWh)											@ 100% Plant Factor		@ 85% Plant Factor	
	Fuel	Variable O & M		Total EPP	Fixed O & M	Insu-rance	W. Cap Financing Cost	ROE	BOE-DC	WHT	Lease Payments	Debt Principal	Debt Interest	Interest	Total CPP	PKR/kWh	Cents/kWh	PKR/kWh	Cents/kWh
1	4.7113	0.1257	0.0419	4.8789	0.2048	0.3804	0.2006	0.2113	0.8381	0.3275	0.0874	0.8821	1.3780	0.2293	0.5838	5.3294	10.2083	10.4272	11.1488	11.3879
2	4.7113	0.1257	0.0419	4.8789	0.2048	0.3804	0.2006	0.2113	0.8381	0.3275	0.0874	0.8821	1.3780	0.2678	0.5512	5.3294	10.2083	10.4272	11.1488	11.3879
3	4.7113	0.1257	0.0419	4.8789	0.2048	0.3804	0.2006	0.2113	0.8381	0.3275	0.0874	0.8821	1.3780	0.3049	0.5142	5.3294	10.2083	10.4272	11.1488	11.3879
4	4.7113	0.1257	0.0419	4.8789	0.2048	0.3804	0.2006	0.2113	0.8381	0.3275	0.0874	0.8821	-	0.3471	0.4719	3.9514	8.8303	9.0197	9.5276	9.7319
5	4.7113	0.1257	0.0419	4.8789	0.2048	0.3804	0.2006	0.2113	0.8381	0.3275	0.0874	0.8821	-	0.3952	0.4239	3.9514	8.8303	9.0197	9.5276	9.7319
6	4.7113	0.1257	0.0419	4.8789	0.2048	0.3804	0.2006	0.2113	0.8381	0.3275	0.0874	0.8821	-	0.4499	0.3692	3.9514	8.8303	9.0197	9.5276	9.7319
7	4.7113	0.1257	0.0419	4.8789	0.2048	0.3804	0.2006	0.2113	0.8381	0.3275	0.0874	0.8821	-	0.5122	0.3069	3.9514	8.8303	9.0197	9.5276	9.7319
8	4.7113	0.1257	0.0419	4.8789	0.2048	0.3804	0.2006	0.2113	0.8381	0.3275	0.0874	0.8821	-	0.5831	0.2359	3.9514	8.8303	9.0197	9.5276	9.7319
9	4.7113	0.1257	0.0419	4.8789	0.2048	0.3804	0.2006	0.2113	0.8381	0.3275	0.0874	0.8821	-	0.6639	0.1552	3.9514	8.8303	9.0197	9.5276	9.7319
10	4.7113	0.1257	0.0419	4.8789	0.2048	0.3804	0.2006	0.2113	0.8381	0.3275	0.0874	0.8821	-	0.7558	0.0633	3.9514	8.8303	9.0197	9.5276	9.7319
11	4.7113	0.1257	0.0419	4.8789	0.2048	0.3804	0.2006	0.2113	0.8381	0.3275	0.0874	0.8821	-	-	-	3.1323	8.0112	8.1830	8.5640	8.7477
12	4.7113	0.1257	0.0419	4.8789	0.2048	0.3804	0.2006	0.2113	0.8381	0.3275	0.0874	0.8821	-	-	-	3.1323	8.0112	8.1830	8.5640	8.7477
13	4.7113	0.1257	0.0419	4.8789	0.2048	0.3804	0.2006	0.2113	0.8381	0.3275	0.0874	0.8821	-	-	-	3.1323	8.0112	8.1830	8.5640	8.7477
14	4.7113	0.1257	0.0419	4.8789	0.2048	0.3804	0.2006	0.2113	0.8381	0.3275	0.0874	0.8821	-	-	-	3.1323	8.0112	8.1830	8.5640	8.7477
15	4.7113	0.1257	0.0419	4.8789	0.2048	0.3804	0.2006	0.2113	0.8381	0.3275	0.0874	0.8821	-	-	-	3.1323	8.0112	8.1830	8.5640	8.7477
16	4.7113	0.1257	0.0419	4.8789	0.2048	0.3804	0.2006	0.2113	0.8381	0.3275	0.0874	0.8821	-	-	-	3.1323	8.0112	8.1830	8.5640	8.7477
17	4.7113	0.1257	0.0419	4.8789	0.2048	0.3804	0.2006	0.2113	0.8381	0.3275	0.0874	0.8821	-	-	-	3.1323	8.0112	8.1830	8.5640	8.7477
18	4.7113	0.1257	0.0419	4.8789	0.2048	0.3804	0.2006	0.2113	0.8381	0.3275	0.0874	0.8821	-	-	-	3.1323	8.0112	8.1830	8.5640	8.7477
19	4.7113	0.1257	0.0419	4.8789	0.2048	0.3804	0.2006	0.2113	0.8381	0.3275	0.0874	0.8821	-	-	-	3.1323	8.0112	8.1830	8.5640	8.7477
20	4.7113	0.1257	0.0419	4.8789	0.2048	0.3804	0.2006	0.2113	0.8381	0.3275	0.0874	0.8821	-	-	-	3.1323	8.0112	8.1830	8.5640	8.7477
																	9.0049	**9.1980**	**9.7330**	**9.9418**

SECTION 15: DETERMINATION SOUGHT

15.1 The learned Authority is kindly requested to approve the KEPL's generation tariff, along-with the pertinent indexations, in accordance with the parameters & assumptions mentioned above. The Petitioner would be pleased to provide any further information, clarification, or explanation that may be required by the Authority during its evaluation process.