F/A

alkapower pvt ltd.

Alka Power (Pvt.) Ltd.
Office No. M-1, M-2, First Floor,
Bara Tower, Queen's Road,
Lahore, Pakistan

01 April, 2015

Registrar
Dy No. 3538
Dated 02-04-15

To,

The Registrar
NEPRA Tower,
Ataturk Avenue (East),
Sector G-5/1,
Islamabad.

For information & n/a pl.
— D/Reg-I/SAR
02.04.15
Cpy to:
— SA(Tech)
— SAT-I
— Dir(Lic)
— MIF
cc: Chairman
VC/M(Lic)
M(T)
M(CA)
M(M&E)

Subject: **Application for Determination of Tariff for 1.8 MW Hydel Power Project, RD-69, Jhang Branch Canal**

Received alongwith seven attachments

Dear Sir,

With reference to NEPRA's Letter No. NEPRA/TRF-221/APPL-2013/4874 recommending that "the Petitioner may file fresh Petition with all necessary information and documents in the manner prescribed in law", the following is a resubmission of the Petition for EPC-Stage Tariff Determination by Alka Power (Pvt.) Ltd, taking into consideration all of the Authority's observations and addressing the various stipulated requirements.

I, Zeeshan Azhar Malik, Chief Operating Officer, being a duly authorized representative of Alka Power Private Limited, Office No. M-1, M-2, First Floor, Bara Tower, Queens Road, Lahore, by virtue of a Company Board Resolution, hereby apply to the National Electric Power Regulatory Authority (NEPRA) for the approval of EPC-Stage Tariff for the 1.8 MW Hydel Project, RD-69, Jhang Branch Canal (NEPRA Generation Licence No. IGSPL/27/2010). The application is based on assumptions and conditions approved by NEPRA for Independent Power Producers (IPPs) on March 13, 2006 pursuant to the Guidelines for Determination of Tariff for IPPs November 2005 issued by Government of Pakistan; and is made under Rule 3 of the NEPRA (Standards and Procedure) Rules 1998.

Enclosed as part of the submission is the Submission Pack (containing the Principal Document, an affidavit and six other relevant attachments), as well as three additional copies of the Principal Document (The Petition).

ALKA POWER (PVT.) LTD.

011

alka power pvt ltd

A pay-order No. 11974440 for the sum of Rs. 270,944.00 (Two Hundred Seventy Thousand Nine Hundred and Forty Four) dated April 1, 2015 drawn from HBL in favour of NEPRA is attached with this application as the applicable Tariff Petition Fee.

The undersigned remains available for any further information or clarification that the Authority may wish to seek.

Alka Power looks forward to favourable consideration of the petition and reaffirms its commitment to serving the nation.

Sincerely,

Zeeshan Azhar Malik
Chief Operating Officer

For and on behalf of Alka Power (Pvt.) Ltd.

ALKA POWER (PVT.) LTD.

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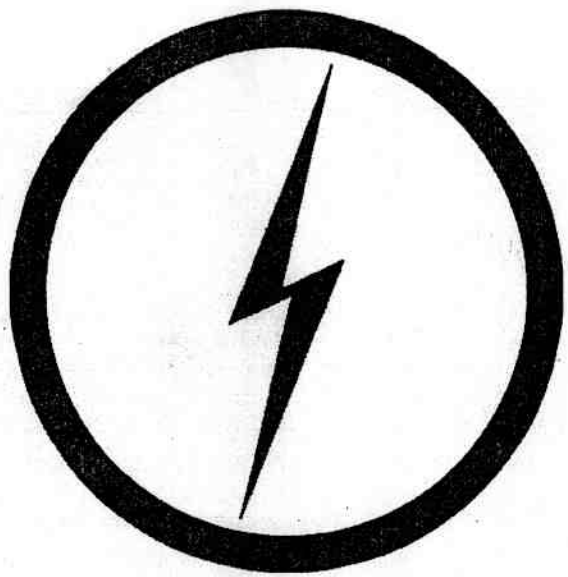
Tariff Petition



Principal Document

010

HBL HABIB BANK حبیب بینک

NOT NEGOTIABLE
A/C PAYEE ONLY

11974440

Banker's Cheque

This Banker's Cheque is valid for six months from date of issue

LAHORE-FATIMA JINNAH
COLLEGE LAHORE

1252

Cheque No. 11974440
Date 01/04/15

On Demand Pay
To The Order Of NEPRA

The Sum of: Pakistan Rupee TWO HUNDRED SEVENTY THOUSAND NINE HUNDRED AND FORTY-FOUR ONLY

PKR******270,944.00

For Habib Bank Limited

AUTHORISED SIGNATURE

AUTHORISED SIGNATURE

PA No.

PAYABLE AT ANY HBL BRANCH IN PAKISTAN
Centralised Cheque Payable Account
30019903902586

DO NOT WRITE BELOW THIS LINE

⑈11974440⑈054300⑆00300199039025866⑈010⑈ PA 17479

FLC

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Submission of Petition by Alka Power (Pvt.) Ltd. for the Determination of Tariff of the Jhang Branch Canal (RD 69) 1.8 MW Hydropower Project and all Relevant Attachments

This Petition is submitted by Mr. Zeeshan Azhar Malik, Chief Operating Officer of Alka Power (Pvt.) Ltd on behalf of the Company, before the National Electric Power Regulatory Authority (NEPRA) under Rule 3 of the Tariff Standards and Procedure Rules 1998. The Petition, along with its appended Attachments, comprises the entirety of this Submission and is listed as follows:

- **The Tariff Petition**
- **Attachment 1**: An Affidavit signed by the Petitioner
- **Attachment 2**: The EPC Contract, comprising of:
    - Memorandum of Agreement between Alka Power (Pvt.) Ltd and the EPC Contractor;
    - Legal Agreement with the Contractor dated 10 September 2012;
    - Legal Agreement with the Contractor dated 7 January 2014;
    - Memorandum of Understanding between the Contractor and the Vendor for Electro-Mechanical Equipment for the JBC Project;
    - Copy of Financial Offer from the Vendor for Machinery of the JBC Project;
    - Profile of the Vendor.
    - *(Attachments 6 and 7 also form part of the EPC Contract)*
- **Attachment 3**: Profile of the EPC Contractor
- **Attachment 4**: Documents Pertaining to the EPC Bidding for the JBC Project, which include:
    - Letters of Price Bid from Prospective Bidders
    - The Bid Evaluation Report
    - Minutes of the Meeting of the Steering Committee finalizing the Award of the EPC Contract to M/S SINACO Engineering (Pvt.) Ltd.
- **Attachment 5**: Part I – Bidding Procedures
- **Attachment 6**: Part II – Employer's Requirements
- **Attachment 7**: Part III – Conditions of Contract and Forms

A corresponding digital copy of the Petition and every Attachment can be found in the included CD.

With Compliments,

Zeeshan A. Malik
Chief Operating Officer

TABLE OF CONTENTS

LIST OF ABBREVIATIONS

Abbreviation	Name / Term	Abbreviation	Name / Term
APL	Alka Power (Pvt.) Ltd.	**PPIB**	Private Power and Infrastructure Board
COD	Commercial Operations Date	**FR**	Feasibility Report 2009
CPI	Consumer Price Index	**PRI**	Political Risk Insurance
CPP	Capacity Purchase Price	**p.a.**	Per Annum
ECC	Economic Coordination Committee	**ROE**	Return on Equity
EIA	Environmental Impact Assessment	**ROW**	Right of Way
EMP	Environmental Management Plan	**SBP**	State Bank of Pakistan
EPA	Environmental Protection Agency	**SECP**	Securities and Exchange Commission of Pakistan
EPC	Engineering, Procurement & Construction	**SOP**	Standard Operating Procedures
EPP	Energy Purchase Price	**LPC**	Late Payment Charges
FBR	Federal Board of Revenue	**LTSA**	Long Term Services Agreement
GoPb	Government of Punjab	**PPA**	Power Purchase Agreement
GOP	Government of Pakistan	**PPDB**	Punjab Power Development Board
GST	General Sales Tax	**KIBOR**	Karachi Inter-Bank Offered Rate
IA	Implementation Agreement	**LC or LoC**	Letter of Credit
IDC	Interest during Construction	**LDs**	Liquidated Damages
IEE	Initial Environmental Examination	**WPI**	Wholesale Price Index
IPPs	Independent Power Producers		
MoF	Ministry of Finance		
MWh	Mega Watt Hours		
NEO	Net Electrical Output		
NEPRA	National Electricity and Power Regulatory Authority		
NPCC	National Power Control Center		
NTDC	National Transmission & Dispatch Company Ltd.		
O&M	Operation & Maintenance		
OEM	Original Equipment Manufacturer		
PEPCO	Pakistan Electric Power Company (Private) Ltd.		

Mobile
F/K 0312-5123478

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PROJECT SUMMARY

1	Petitioner's Name Petitioner's Position	**Zeeshan Azhar Malik** Chief Operating Officer
2	Petitioner's Address	03002871192 Office No. M-1, M-2, First Floor, Bara Tower, 36 Queens Road, Near Mozang Chungi, Lahore. Tel: 042-36299534, Fax: 042-36299535 Email: info@alkapower.nl
3	Location	Jhang Branch Canal - Branch RD 69
-	Distance from Motorway, M-2	9 Km
-	Distance from Sheikhupura City	57 Km
-	Distance from Sargodha City	75 km
4	Project Cost (without IDC)	Rs. 695.12 million
5	Project Capacity / Design	
-	Capacity	1.8 MW
-	Head (Rated)	3.2 meters
-	Design Flow	90 m^3/s
-	Plant Factor	0.761
-	Average Annual Energy Generation	11.88 GWh
6	Tariff Proposed	
-	Levelised (1-30-Years, 10% discount)	Rs. 8.15
-	Levelised (1-10-Years, 10% discount)	Rs. 9.50
-	Levelised (11-30-Years, 10% discount)	Rs. 5.61
7	Technology	Pit Kaplan
8	Debt/Equity Ratio	80 : 20
9	Construction Period	18 months
10	Project Implementation Cost including IDC	Rs. 725.00 million
11	Expected Commercial Operation Date	December 2016

Consulting Firm: Asian Consulting Engineers (AsCE)

The firm is a consulting engineering firm registered with the Pakistan Engineering Council for rendering consulting services. AsCE is headed by Engr. M. Hanif Chaudhry, who holds a Bachelors Degree in Civil Engineering as well as a Masters in Environmental Engineering. The firm carries at its credit, extensive experience in civil and renewable energy projects including the following:

- Waste to Energy Project – Islamabad City Solid Waste Management.
- Waste to Energy for Intermediate Urban Areas under Punjab Municipal Services Improvement Project (financed by IBRD).
- Feasibility Studies as part of project formulation for Municipal Infrastructure including determination of Annual Charges to make the projects 'Sustainable'.
- Waste to Energy Project – Chichawatni City Solid Water Management.

Address: 251-A, HBFC, Faisal Town, Lahore
Tel: 042-35167973, 042-35167445 **Mob:** 0321/0330-9455299
Fax: 042-35167320
E-mail: hanif@asiancon.com
Web: www.asiancon.com

SECTION 1
GENERAL

1.1 General

Growing environmental concerns and stringent emission norms have brought about a global recognition that the generation of power from fossil fuel technology has become fundamentally unfeasible. The biggest advantage of SHP (Small Hydropower) is that it is a clean, sustainable and renewable source of energy available round the clock. It is also free from many issues and controversies (largely pertaining to environmental impact) that continue to surround large hydro projects. Other benefits of SHP are its user-friendliness, low cost, and short gestation period.

Factoring the above with Pakistan's enormous hydroelectric potential, the state of its economy and the ongoing energy crisis, hydropower (small, mini and micro) through a high-volume of generation facilities from private investment is a formula ideally-suited and optimal to our country.

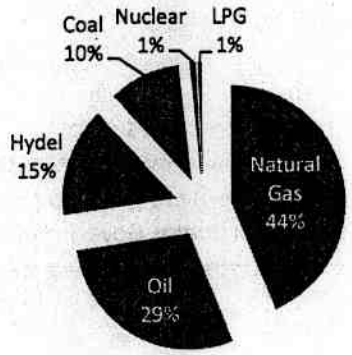
1.2 History of Hydropower in Pakistan

The first Small Hydropower (SHP) in the region was completed during 1925 at Renalakhurd, District Okara. Its capacity is about one Megawatt (MW). This is a small, low-head, run-of-the-river power station on the flows of the Lower Bari Doab canal, and has five units, rated at 22,000 watts production-capacity each.

The second SHP plant was put into operation in Malakand (NWFP) in July 1938. It initially had a capacity of 9.6 MW (3 x 3.2 MW), which was subsequently upgraded to 20 MW through the addition of two 5 MW units in October 1952 for coping with the increasing power load in the marketed area.

Since then, numerous Hydropower projects including larger ones like Warsak, Mangla, Tarbela, Nandipur and many small Hydropower plants have been commissioned. According to the Pakistan Statistical Yearbook 2010, the contribution of hydroelectricity in the country is about 15%. Here is the energy generation breakdown:

Electricity Production Sources in the Country
Source: PEPCO



It is noted from the above exhibit that hydroelectricity hardly accounts for 15% of total power generation in the country whereas natural gas and fossil oils account for about 44% and 29% respectively. Unfortunately, hydropower generation, which has proven long-term sustainability and is beneficial both economically as well as environmentally, has not nearly been exploited to its full potential.

1.3 Power Crisis in the Country

1.3.1 A Continuing Problem

The widening demand-supply gap for energy has resulted in regular load-shedding of eight to ten hours in urban areas and eighteen to twenty hours in rural areas. Rapid growth in domestic and industrial demand, high system losses, and inadequate generation capacity are primarily the cause for this huge gap. The low generation capacity can be attributed to seasonal reduction in the availability of hydropower, depletion of indigenous gas resources and excessive reliance on imported fuel oil for power generation. The unavailability of this fuel oil given the mounting circular debt problem has further exacerbated the problem.

1.3.2 Development of Low HEAD Hydro Projects

The energy crisis in the country demands immediate relief. This can only be done by injecting energy into the national grid in a prompt and efficient manner. To this end, hydropower is very promising for not just its cost and implementation time, but also for its minimal environmental impact.

"Low head" hydropower systems (such as the one being petitioned for by Alka Power) may theoretically be less economical than "high head" systems, but have the following distinct advantages:

- The time for planning and implementation is shorter and thus can be pushed to meet immediate needs.
- Project locations are nearer to the load centers, making for efficient transmission.
- Infrastructure in the form of existing civil works and national grid in the near vicinity reduces the main cost.
- Easier to maintain.

Projects like these also serve as a catalyst in the economic development of remote areas in the form of employment offered to the locals, utilization of the local materials available for construction as well as the potential for social development of local communities around sites with housing, schools and mosques.

1.4 Potential of Small Hydropower in Punjab

Article 157(2) of the Constitution of the Islamic Republic of Pakistan grants rights to the Provinces to establish power stations and construct support infrastructure (grid-systems, transmission and distribution network etc.) and even set the tariff for electricity that is consumed within the province. Provinces de-facto gave up this right at the time of the creation of the WAPDA monopoly by the Federal Government in the 1950s. However, with a deteriorating energy crisis and a steadily growing gap between demand and supply, the provinces have also decided to look for ways and means to assist the Federal Government in its efforts to address the challenges of energy shortage. As a consequence of the 18thAmendment to the Constitution, the Concurrent List (which

enumerated areas where both federal and provincial governments could legislate but federal law prevailed) was abolished and the domain of Electricity was shifted to the Provinces.

Following the 18th Amendment, which also devolved greater responsibilities on provincial governments in terms of delivery of basic services, the Punjab Government decided to play a more pro-active role in the energy sector to try and tackle the energy shortage in the province and its adverse impacts on the provincial economy and livelihoods. This has led to establishment of an independent Energy Department.

Some of main opportunities that can be exploited as a consequence include:

- One of the largest networks of contiguous river flow in the world, with potential for production of low head Hydropower equal to around 1,400 MW, if fully exploited;
- Potential for exploitation of latent co-generation potential on 45 sugar mills in the province through bagasse and other fuel mixes;
- Huge potential for biomass- and biogas-based power generation given the unutilized crop residues of around 174 million tons per annum as well as biogas projects using large livestock population;
- Potential for coal-based power generation using indigenous resources;
- Fast-evolving technologies for solar- and wind-based power generation technologies and availability of suitable sites for solar-based power generation.

Due to the limitations and financial constraints of the public sector, the Government of Pakistan announced its "Policy for Power Generation Projects 2002" package for both attracting overseas investment as well as facilitate the domestic capital market to raise financing for these power projects. The main characteristics of this package are internationally competitive terms, an attractive framework for domestic investors, simplification of procedures, and steps to create and encourage a domestic corporate debt securities market.

Under the medium term policy, exploitation of various sources (including hydropower) has been formulated. The hydropower generation has been estimated at about 1,056 MW. Among hydro, the two larger projects are Mahl Hydropower Project (600 MW), a joint site of Punjab and AJK on the River Jhelum, and Taunsa Hydropower Project (120 MW). The others are small hydropower plants proposed at various falls on irrigation canals. The private sector has been encouraged to get on-board with the installation of Small Hydropower plants on a "Build-Operate-Transfer" basis.

In Punjab, the Punjab Power Development Board was created in the Irrigation Department in 1995, for the promotion of hydropower generation on canal fall sites in Punjab. At different canals, numerous sites of medium and low head have been identified. In line with the Punjab Government's Policy to encourage private sector involvement, Alka Power Company received a Letter of Interest (LOI) for the implementation of a hydropower project on one such site, at RD 69+830 in Tehsil Pindi Bhattian, District Hafizabad of Punjab.

The Feasibility Report of the project has since been approved and all subsequent requisite phases of the project have been realised right up to the preparation and submission of the Tariff Petition.

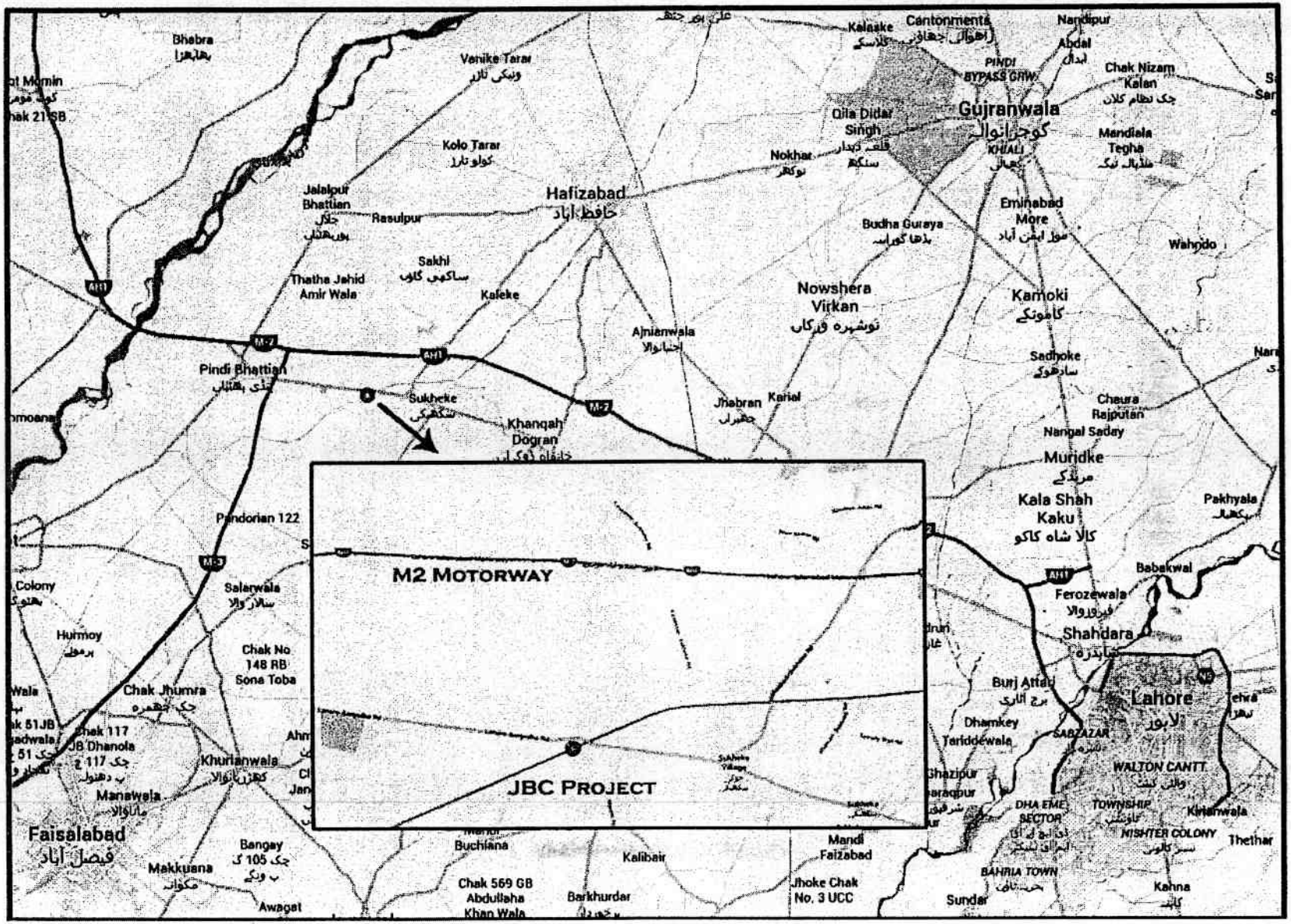
1.5 Project Location / Accessibility

The proposed project is located in the Hafizabad District of Punjab and would be developed on the Jhang Branch Canal. The canal branches off from Lower Chenab Canal that offtakes at Khanki Headworks across Chenab River. The project is situated at Longitude of 73° 26' East and Latitude of 310 52' North. The location of the project is exhibited.

The proposed Hydropower project can be accessed as follows:

- Motorway, M-2 9 km
- Sheikhupura 57 km
- Sargodha 75 km

1.5.1 Project Location (Map)



1.6 Technical Analysis

1.6.1 Site Selection

Jhang Canal offtakes from the Khanki Headworks, leading water from the Chenab River into a number of distributaries for irrigation purposes. The canal irrigates the cultivated areas on the left side of the river Chenab in Faisalabad and Jhang Districts. The canal is perennial and closed for annual maintenance from the last week of December to the end of January.

1.6.2 Hydrology

a) Feasibility Provisions

The main Lower Chenab Canal (LCC) has a length of 209.3 Km and its distributaries have a length of about 1317.9 Km. The main canal was commissioned along with Khanki Headworks in 1889 for a design discharge of 340 m^3/s. The Lower Chenab Canal presently off takes from Khanki Head works. With the proposed new Barrage at Khanki, the head regulator for the Lower Chenab Canal would be constructed and the canal upper-portion reaches would be realigned to connect it with the new Head regulator at Khanki barrage. Capacity of LCC at the head was later increased to 384 m^3/s as a result of extension of irrigation system till in 1966. Later on it was curtailed to 230 m^3/s, the difference of 154 m^3/s to be met from Qadirabad-Balloki (Q-B) Link Canal through the LCC Feeder.

The Lower Chenab Canal up to its crossing with Qadirabad-Balloki Link Canal (Q-B Link) is named as Lower Chenab Canal Upper and after that it becomes Lower Chenab Canal, and then bifurcates into the Gugera Canal and the Lower Chenab Canal Feeder. At RD 103+339 of the LCC Feeder, the canal further bifurcates into Main Canal, Jhang branch and Rakh Branch.

The gross head of fall at RD 68+830 for the design discharge varies from 2.0m to 3.4m. The existing design head water level at RD 68+830 will be kept constant as 202.72m. For discharge less than design, at least minimum head of 2.2 m would be available.

In the feasibility Report, the hydrology of the location was based on the data obtained from XEN, Irrigation Department for the period 1995-2008.This has since been updated in line with the available data up to December 2013.

b) Updating of Hydrological Data

i. General

In the Feasibility Report 2009, approved by NEPRA, the discharge data pertained to the period of 1995 to 2008. On account of delays in the preparation of this Petition, the discharge data has been updated to include the period of 2009 to 2013.

ii. Discharge Determinations in the Feasibility Report

In the collected period of data, the annual discharge varied from 61.2 m^3/s to 92.0 m^3/s including dry, medium and wet years. The average of 12 year period was 72.9 m^3/s at RD 68+830 of Jhang Canal. The average yearly flows remained in a normal range of 60 m^3/s to 85 m^3/s with less than 60 m^3/s during year 2001 and 2004, being dry years. Every year the canal remained close for about 30 days usually from last week of December to the 3rd week of January for the purpose of routine repair and maintenance. The canal had

been running at its full capacity during summer from May to September. In a dry year, flows in Jhang Canal can be reduced to a certain extent as experienced in year 2001 with annual flow as 58.25 m^3/s.

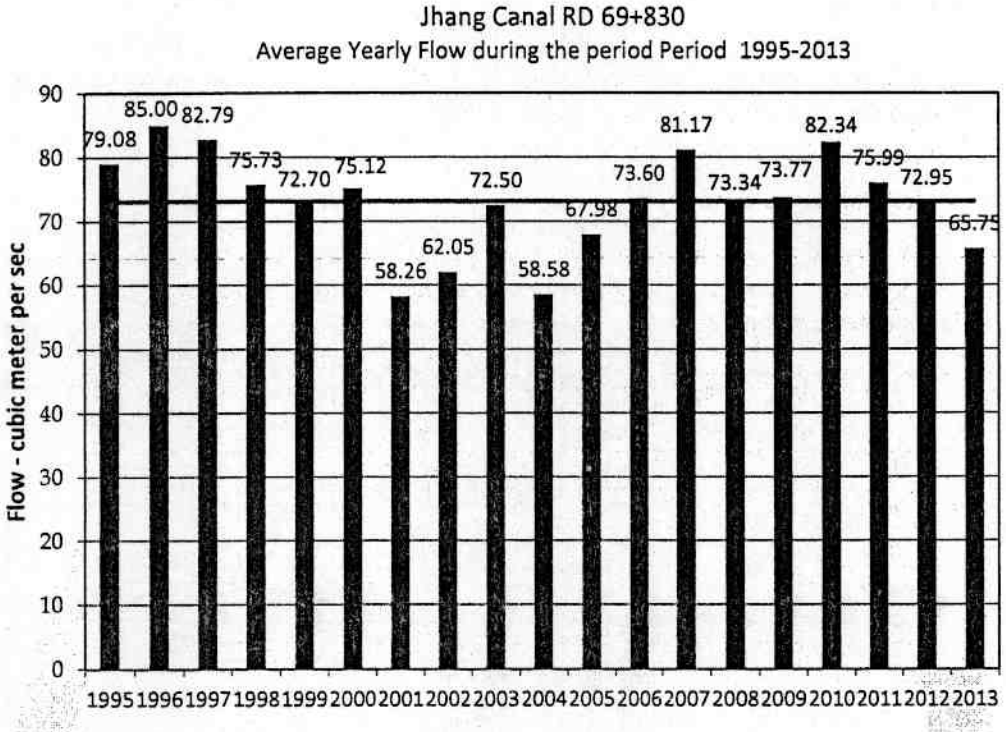
The flows in Jhang Canal during March and April 2001 was less than 15 m^3/s due to less availability of water. The flows in Jhang Canal during March and April 2001 are less than 15 m^3/s due to less availability of water.

iii. Updated Discharge Data

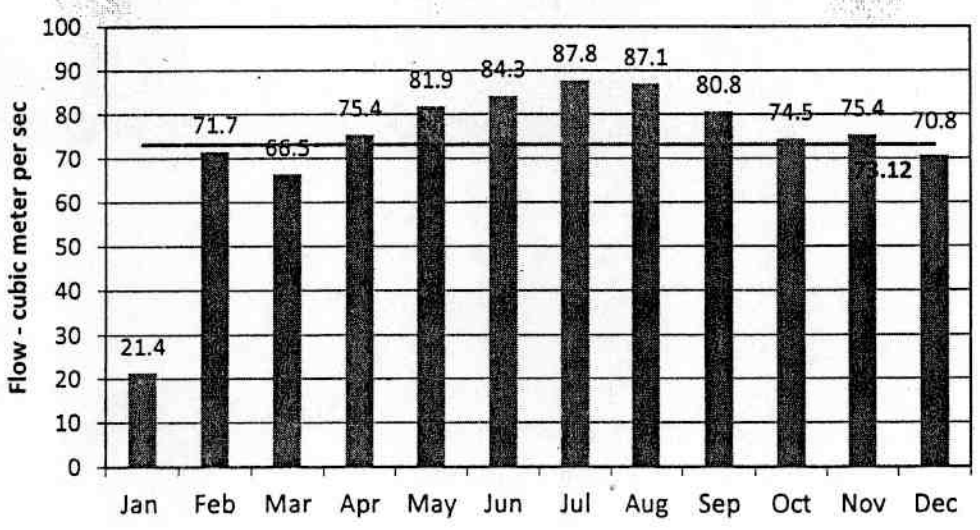
The official discharge data for the period of 2009-2013 has been obtained from the Irrigation Department website and collated with the data of 1995-2008. The overall situation is presented below:

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1995	0.0	74.9	86.1	91.3	89.4	93.2	84.2	80.7	90.6	90.6	92.4	75.5
1996	8.1	88.6	88.2	86.5	89.4	95.1	94.6	98.6	92.8	92.9	95.0	90.2
1997	38.8	90.2	91.1	90.2	90.0	90.2	90.1	98.6	89.9	63.6	90.5	70.3
1998	8.4	79.8	54.7	79.2	85.8	86.2	85.8	86.0	88.7	89.7	91.1	73.4
1999	0.0	55.5	82.1	85.9	87.2	88.6	89.8	90.9	89.8	90.8	44.9	66.9
2000	36.5	85.4	71.3	73.9	85.9	79.6	90.4	91.1	92.0	67.9	65.7	61.7
2001	25.5	73.5	10.3	13.6	46.3	72.8	86.8	88.1	90.1	60.2	69.1	62.8
2002	9.2	43.1	22.2	47.9	69.9	89.5	90.4	91.3	90.5	61.4	68.7	60.5
2003	21.4	64.8	43.8	69.6	83.7	86.4	89.8	88.8	90.1	86.9	84.8	59.9
2004	16.4	76.3	59.1	64.0	81.4	69.7	82.9	86.2	68.1	37.3	0.0	61.6
2005	15.6	25.9	64.7	87.2	82.0	87.8	87.7	93.4	77.3	46.4	80.9	66.8
2006	30.7	75.6	75.6	66.8	80.3	81.2	92.3	92.8	85.3	55.4	83.8	63.4
2007	38.8	91.1	91.1	90.2	90.0	90.2	90.1	87.0	65.7	78.7	90.8	70.3
2008	28.9	83.5	66.5	73.2	79.6	82.5	87.6	84.9				
2009	38.80	79.27	60.20	76.69	85.54	83.64	85.51	87.77	81.50	73.12	61.25	71.91
2010	88.76	80.03	65.96	86.83	83.29	84.67	85.47	77.58	83.20	84.15	83.25	84.94
2011	0.00	76.33	84.14	82.11	84.47	84.82	82.28	84.17	81.82	84.94	81.87	84.94
2012	0.00	74.97	74.57	82.69	77.19	70.39	86.20	86.35	88.02	87.66	83.75	63.66
2013	0.00	42.83	70.93	84.94	84.94	85.44	86.95	60.07	8.73	89.87	89.29	85.00
Average	21.36	71.66	66.45	75.41	81.91	84.31	87.84	87.07	80.79	74.53	75.39	70.76

Below is the graphical presentation of the above table:



It is noted from the above exhibit that discharge at the location follows a consistent pattern throughout the original data (1995-2008) and the new set (2009-2013). **The average yearly flow in the canal is determined as about 73 m^3/s.** The average monthly discharge for the period of 1995 to 2013 is included as follows:



It is noted from the exhibit that during the period of May-August, the discharge is above 80 m^3/s and approaches the mark at 90 m^3/s.

From a rudimentary reading alone of the updated data (2009-2013) it is evident that the flow pattern is consistent with the data for 1995-2008. As such, the design parameters adopted in the Feasibility report hold good and require no amendment whatsoever.

The updated discharge data for the period 2009-2013 has been included with the submission of the Tariff Petition.

1.6.3 Power Generation Capacity

The design discharge for powerhouse capacity is taken as 90 m^3/s and the turbine would have an overflow capacity of up to 15%. The designed head would be 3.20m. Three units each of 0.6 MW capacity are recommended for a total installed capacity of 1.8 MW.

1.7 Design Parameters

1.7.1 Civil Constructions

Rough dimensions of the civil constructions can be listed as included in *Table1*.

Table 1, Rough Dimensions of Civil Construction

Nr.	Description	Dimensions
1	Weir	20 m length, 5m (average) height
2	Headcare Channel	800 m length, 2.5m x 11/4m (cross-section)
3	Forebay Tank	5m x 3.5m (plan), 3-1/2m high
4	Penstock	2000mm (diameter), 700m length
5	Power House	8m x 15m (plan), 8m height

1.7.2 Electro-Mechanical Equipment

The electro-mechanical equipment includes:

<u>Turbines</u>

- Pit Type Turbines 3
- Head (max.) 4.5 m
- Head (rated) 3.2 m
- Head (min.) 2.9 m
- Efficiency (%) 92%
- Turbine rated output 0.60 each

<u>Generators</u>

- No. of units 3
- Capacity 0.75MVA each
- Power factor 0.80
- Voltage 3.3 kV
- Speed 992 rpm

E/H

alkapower pvt ltd.

Step Up Transformers

• No of Transformers	3
• Capacity	0.75MVA
• High voltage (secondary)	11 KV
• Low Voltage (primary)	3.3KV
• Frequency	50Hz
• Temperature rise	50-60 C
• Vector group	Yd 11
• Impedance	9% (approx.)
• Cooling	ONAF

Transmission System

• Line voltage	11 KV
• Frequency	50Hz
• Interconnection	Direct connection with 11/32kV Grid Station of Sukheki
• Type of line	Double Circuit
• Conductor	DOG, 6 km length

1.8 Design of the project

Basic design parameters of the project can be tabulated as follows:

• Project Capacity	1.8 MW
• Head Rated	3.2 m
• Design Flow	90m^3/s
• Plant Factor	76.1%
• Annual average energy generation	11.8GWh

1.9 Grounds for Petition

Alka Power (Pvt.) Ltd is a private limited company registered under the Companies Ordinance, 1984. APL has been established as a special purpose company to setup and operate power projects, including the one at Jhang Branch Canal, where the Company is seeking to develop, own and operate a 1.8 MW Small Hydropower Generation Project as an Independent Power Producer (IPP) in the province of Punjab.

Under the "Regulation of Generation, Transmission and Distribution of Electric Power Act (XL of) 1997, (hereinafter referred to as the "NEPRA Act"), the National Electric Power Regulatory Authority (NEPRA) is responsible inter alia, for determining tariffs and other terms and conditions for the supply of electricity by the generation, transmission and distribution companies and to recommend these to the Federal Government, subject to the need to comply with guidelines, and not inconsistent with the provisions of the NEPRA Act, laid down by the Federal Government.

NEPRA is also responsible for determining the process and procedures for reviewing tariffs and recommending tariff adjustments.

1.10 Facts and Grounds for the Petition

1.10.1 Rationale for Hydropower

With the rising prices of oil and gas across the globe, generating energy through conventional thermal sources is becoming very expensive and almost beyond reach for developing nations. The fluctuations in oil prices which reached up to a maximum of US$ 107 per barrel on April 5, 2012 underline the necessity to rollout a strategic plan aimed at curtailing dependence on imported fuel. The price of hydrocarbon fuels is linked to political events and in the long-run, remains unpredictable and unstable. This instability may compromise the economic growth, especially of the emerging markets.

Pakistan has increased its reliance on the electricity generated through thermal sources (fuel oil and natural gas) over the last decade. This, coupled with fluctuating oil prices, has adversely affected Pakistan's oil import bill. This poses not only an economic threat but also creates a political issue. We heavily rely on imported fuel, and any shortfall in fuel supply can further worsen the power crisis presently prevalent in the country.

The solution is to be found in long-term sustainable development - to generate energy through renewable sources such as water, wind, and sunlight. These are currently unevenly and inadequately exploited in the country. Although many of them are available in abundance with considerable economic potential, renewable sources of energy make a disappointingly small contribution to the country's overall gross energy consumption.

At present, the energy produced from renewable sources in the country is insignificant and comprises hardly a fraction of the total generation. However, there is a significant potential for clean energy; abstract from various sources is as under:

- Wind — 0.346 Million MW
- Solar — 2.9 Million MW
- Biomass power/cogeneration — 1,800 MW
- Waste to Power — 500 MW
- Mini and Small Hydro — 2,000 MW

Certain forms of renewable energy sources (such as solar, wind energy, small-hydro and biomass) have already taken off and strong private participation is seen in sectors like wind power, which is further expected to grow.

Keeping this in view, the Government of Pakistan (GOP) aims to generate 5% of electricity through renewable sources by 2030 which translates into a target generation of 9,700 MW. A huge potential of small hydropower projects, particularly at barrages and falls on irrigation canals, is available. The project in question forms part of the very vision to exploit this potential in the province.

SECTION 2
DEVELOPMENT OF TARIFF

2.1 Basic Assumptions

The proposed tariff bases its parameters on the following basic assumptions:

i. Anticipated average mean site conditions, used in calculation, for the net output are:

Installed Power Generation Capacity	*MW*	1.8
Plant Capacity Utilization Factor	*%*	76.1%
Auxiliary Consumption	*%*	1.0%
Net Generation (Annual)	*MU(GWh)*	11.88

ii. Construction period of 18 months has been assumed; against 30 months as envisaged in the Feasibility Report.

iii. Every maintenance cycle shall be as per manufacturer's recommendations.

iv. Output degradation curve from the manufacturer and EPC contractor shall be applied to adjust the Capacity Cost component of the tariff.

v. Power Purchaser shall be responsible for financing, constructing, operating and maintaining the interconnection to the grid and the electronic communication equipment. However the cost of transmission line has been included in the cost estimates based on information provided by EPC Contract.

vi. Reference exchange rate (PKR/US$) is taken PKR 98/US$.

vii. The tariff does not incorporate any escalation in various components including EPC cost, operation and maintenance cost, etc.

viii. No cost of utilizing NTDC telecom media is assumed. Any costs incurred with regards thereto shall be treated as 'pass through'.

ix. Main energy meter, CTs and PTs and electronic recorder for continuous recording of readings will be provided by NTDC at its own cost.

x. The Tariff shall be adjusted for the actual insurance costs.

xi. Payments from Power Purchaser have been assumed as follows:
- 70% of Capacity Payment will be paid on or before 30th day of the month following the day invoice is received by Power Purchaser.
- 30% of Capacity Payment will be invoiced on first day of next month and will be paid on or before 30th day following the day invoice is received by Power Purchaser.
- 100% of EPP and taxes will be paid on 24th day of subsequent month.
- All other pass-through items will be paid on or before 30th day following the day invoice is received by Power Purchaser.

xii. Project contingency/debt service/O&M/maintenance reserves are not included in tariff calculations. If required by lenders, these shall be adjusted in the tariff. It has been assumed that Lenders will accept letter of credit to satisfy debt service reserve requirement However, if the lenders would ultimately require cash to fulfill this requirement, the costs and tariff will be adjusted accordingly.

xiii. 7.5% withholding income tax has been assumed in the tariff calculations.

xiv. The withholding tax on payments to be made to the EPC contractor will be as per prevalent laws of the land.

xv. The tariff determination is based on use of local plant-equipment-machinery. Therefore custom duties are not part of the tariff calculations.

xvi. Sales Tax on purchase of materials and services after COD by the company has been assumed as fully adjustable against the sales tax on generation and sale of electricity by the Petitioner. If sales tax paid cannot be adjusted, it will be a pass-through to the Power Purchaser under the PPA. Sales Tax or any other taxes paid on services, equipment purchased or imported before COD has also not been assumed.

xvii. No tax has been assumed on in-house consumption of the electricity.

xviii. The tariff table shall be updated at COD in order to correct the tariff according to the prevailing CPI, WPI, and KIBOR.

xix. Actual equity investment profile will be used to update Return on Equity During Construction, at the time of COD.

xx. Actual IDC, using the actual spread above KIBOR and LIBOR, will be used to update the capital cost at COD. Any assumptions on commitment fees, upfront fees, arranger costs and similar charges assumed in the funding plan will be adjusted at financial close.

xxi. Funding cost of standby equity and debt has not been assumed. Any benefit / concession provided to any other IPP shall also be provided to the petitioner.

xxii. It is assumed that there will be no income tax, corporate or personal minimum tax or any local/provincial taxes / levies / surcharges etc. Any such taxes will be pass through. No payments on account of Workers Welfare Fund, Workers Profit Participation Fund, presumptive tax/ turnover tax, sales tax, excise duty or other duty, levy, charge, surcharge or other government imposition of a like nature (including without limitation, export tax, octroi) have been assumed and same shall be recovered as a Pass-Through Item whenever and wherever payable by the project within 30 days.

xxiii. Any change in applicable accounting standards which impact revenues, costs and equity IRR shall be reflected in tariff accordingly.

xxiv. Stamp duty and registration fee **@1%** has been assumed on principal amount of debt assuming that it will be registered in Islamabad and GOP will grant its consent to a consolidated **1%** cost. In case, GOP does not provide its consent for **1%** consolidated cost or it is required to be stamped and registered in the province of Punjab then all incremental costs will be a pass-through to the "Power Purchaser."

2.2 Tariff Period

The proposed tariff is sensitive to the term of the project i.e. length of the PPA. As in recent determinations made by NEPRA, typical power generation projects in Pakistan require long term PPAs. This is driven both by the needs of debt providers/lenders, and in recognition of NTDC's role as the purchaser of the project's electricity output.

The debt provider/lender's willingness to provide financing for power project is often conditional on repayment of the loan within 10 years. As this project has a lenders commitment for 80% debt financing over a ten year loan repayment term, this implies a higher fixed charge in the first 10 years of the project, as compared to the remaining 20 years after the loan has been repaid. NTDC may face higher tariffs in the earlier years

due to debt servicing (years 1-10), while the latter years (years 11-30), the fixed tariff will be reduced to reflect lower associated costs.

A 30-year PPA is therefore proposed for this project. The tariff during this period would specify different rates for the first 10 years and the remaining 20 years, in accordance with **Rule 6** of the **NEPRA Licensing (Generation) Rules, 2000**.

The useful life of the project has been determined as 30 years. The tariff period shall commence upon completion of the project which is anticipated by December 2016. Therefore, the tariff period commencing in 2016 shall end by 2046.

2.3 Hydrology of the Project

The Feasibility Report for the JBC Project, dated July 2009 made use of hydrological data collected for the period of 1995-2008. As explained above, this data was subsequently updated by the Irrigation Department to include results for the period of 2009-2013.

Accordingly, this Petition reflects these changes by relying on hydrological data for the collective period of 1995-2013.

2.4 Project Cost

2.4.1 Capital Cost

The cost of the project included in the approved Feasibility Report (FR) is Rs.624.24 million; the FR was approved during July 2009. On account of various administrative and technical delays, this Tariff Petition is being submitted to the Authority a considerable amount of time after the FR.

During the intervening period, the capital cost of the project has obviously increased on account of price escalation and other controlling factors. Moreover, cost of Electromechanical and Civil works at the feasibility stage cannot be determined precisely for hydropower projects, therefore NEPRA upon the advice from ECC; issued its "Mechanism for the Determination of Tariff for Hydropower Projects". The following are related excerpts from the Power Policy:

> **"COST VARIATIONS (ESCALATION, RESETTLEMENT AND GEOLOGICAL RISK)**
>
> ECC of the Cabinet, through its decision dated 23rd May 2007 had inter alia, decided that:
>
> **"NEPRA should stop the practice of accepting EPC costs on the basis of quotations etc. Instead, they should base their determination on firm (non-reopen able) competitive price duly initialed/ signed by the IPP/EPC contractors."**
>
> The Sponsors of Hydro Projects conveyed that it is difficult for them to obtain a firm and final cost for hydropower projects at the feasibility stage due to their site specific nature, geological risk, long construction period and environmental sensitivities, therefore, above mentioned ECC decision is not workable. In order to expedite the implementation of private sector hydropower projects, the ECC through its decision dated 22nd January 2008 decided as under:

"The above decision regarding firm cost may not be applicable to hydropower Projects" and that "Mechanism for determination of tariff for Hydropower Projects shall be issued by NEPRA."

NEPRA on 18th July 2008 has issued a "Mechanism for Determination of Tariff for Hydropower Projects" allowing the cost variations (Re-Openers) to be adjusted at EPC stage and/or at the Commercial Operation Date (COD). The Re-Openers allowed are as under:

Cost Variation due to geological conditions, limited to tunnel area; Civil works cost escalation, and; Resettlement costs."

Although experience and market exposure has been utilized to estimate the EPC Cost, it is assumed that the Cost variations on account of the variations mentioned above shall be accounted for at the EPC and at COD and the Tariff shall be adjusted accordingly.

In order to up-date the cost provisions of Feasibility Report, the Petitioner invited Bids from the perspective bidders for the award of EPC contract. Three bids to this effect had been received which are presented in *Table2*.

Table 2, List of EPC Bidders and Price

Sr. No.	Description	Amount, Rs.
1.	Sinaco Engineers (Pvt.) Ltd.	Rs.666,300,000
2.	ICC (Pvt.) Ltd.	Rs.1,311,394,289
3.	Etimaad Engineering (Pvt.) Ltd.	Rs.1,326,372,065
4.	SKB Engineering and Construction	Rs.1,861,217,054

The EPC cost for the case of lowest bidder for Rs.666.3 million is abstracted and included in *Table 3*.

Table 3, EPC Cost of the Project

Nr.	Description	Amount, million Rs.		
		Foreign	Local	Total
1	Civil Works	0.00	399.30	399.30
2	Electrical & Mechanical Equipment & Transmission	0.00	257.00	257.00
	Sub Total 'A'	0.00	656.30	656.30
3	Engineering Services	0.00	10.00	10.00
	Sub Total 'B'	0.00	10.00	10.00
	Total EPC Cost	**0.00**	**666.30**	**666.30**

The bid of the lowest Bidder for Rs.666.3 million has been accepted by the Petitioner.

The above acceptance of the cost is based on the following rationale:

- Estimates included in the Feasibility Report for Rs.624.4 million that has since been approved;
- Price Escalation during the intervening period i.e. 2009 to 2015 which are 32.5% (6.5% per year), a usual price escalation in the country for works;

The cost of implementation approved in the FR is escalated on the basis of above rationale and works out as Rs.645.62 million, *Table 4*.

Table 4, Base Capital Cost of the Project (Feasibility Report Provisions, Escalated)

Nr.	Description	Foreign	Local	Total	Escalated, 32.5%
	Direct Costs				
1	Civil Works		309.72	309.72	410.38
2	Electrical Equipment	61.36	15.99	77.35	102.49
3	Mechanical Equipment	98.28	23.19	121.47	160.95
4	Transmission Cost (6km)	0	6	6	7.95
5	Engineering Services	7.98	17.74	25.73	34.09
	Total Base Cost	167.62	372.64	540.27	715.86

The base cost of the project as such works out as Rs.715.86 against the EPC cost of Rs.666.30 million, a variation of about -6.92%, the EPC Contractor has agreed to accept the cost by way of reduction in overheads and profit. It is worth noting that for the project in this specific instance, there is no Foreign Exchange Component (as it was quoted in the Feasibility Report).

2.4.2 Adjustments after Finalization of EPC Cost

After the initialization of EPC, adjustment in EPC price shall be made as per the actual cost in accordance with the Mechanism for Determination of Tariff , mentioned at Para 2.4.1 above. The agreed cost shall be further adjusted for reopeners at the time of COD in accordance with the mechanism mentioned at Para above.

2.4.3 Cost of Implementation

The cost of implementation based on the EPC cost of Rs.666.30 million, works out as Rs.725.00 million; abstract is included in *Table 5*.

Table 5, Cost of Implementation

Nr.	Description	Amount, million Rs.		
		Foreign	Local	Total
	Direct Costs			
1	Civil Works	0	399.3	399.3
2	Electrical & Mechanical Equipment & Transmission	0	257	257
	Sub Total 'A'	0	656.3	656.3
4	Engineering Services	0	10	10
	Sub Total 'B'	0	10	10
5	Total EPC Cost	0	666.3	666.3
6	Insurance (equipment) 1.35%	0	6.563	6.563
7	Other Financing Fees and Charges 1%	0	2.57	2.57
8	Owner's Administration Charges			
	Administrative, 1.5%	0	9.84	9.84
	Supervision of Construction, 1.5%	0	9.84	9.84
	Sub Total 'C'	0	28.813	28.813
9	Grand Total without Interest during Construction(IDC)	0	695.113	695.113
	Interest During Construction			
10	Interest on Equity during Construction	0	30.13	30.13
11	Total Implementation Cost	0	725.00	725.00

The cost of implementation compares with provisions of FR as under:

- Implementation Cost(Based on FR 2009) Rs.624.4 million
- Implementation Cost (EPC-based) Rs.725.00 million
- Variation over the Period 16.11%

2.4.4 Adjustments at Commercial Operations Date (COD)

The total Project Cost shall be updated at the time of COD. The Debt service, Return on Equity and Return on Equity during Construction shall be adjusted on account of actual variation in debt and equity drawdown, actual interest during construction and financing costs/fees, actual custom duties and taxes and Insurance during Construction. Once adjusted, the Debt service, Return on Equity and Return on Equity during Construction shall be updated accordingly and the relevant Capacity Charges calculated thereon.

2.4.5 Modification / Additions to be Treated as Pass Through

The monetary impact of all or any modifications or additions required by the Power Purchaser that are not considered in the Project shall be treated as pass-through.

2.4.6 Escalations and Indexations

After the COD, the tariff tables provided will be indexed to factors as described above and the Reference Exchange Rates. The details are provided herein below:

The following components, *Table 6*, are subject to inflation factors:

Table 6, Escalation Factors

Nr.	Component	Applicable Inflation / Escalation Factors
1.	Water Use Charges	Local WPI
2.	ROE/ROEDC/Withholding Tax/O&M	Local WPI

2.5 Technical Data

2.5.1 Capacity Utilization Factor (CUF)

a) CUF for the Project

A CUF of 50-80% is the usual one for Hydropower Projects based on canal falls, and is adopted in the tariff determination. In the approved Feasibility Report, the CUF is 76.1% which is assumed for determination of tariff.

b) Reference CUF

The Capacity Utilization Factor (CUF) in respect of small hydropower generating stations in the country as determined in the petitions approved by NEPRA in the past is presented in *Table 7*.

Table 7, Reference CUFs

Hydropower Plant	Capacity (MW)	Annual Energy (GWh)	Plant Factor (%)
Deg Out Fall Sheikhupura	5	29.1	66
UC Canal Main Lower Chianwali GWA RD-128+000	5.4	32.7	69
Pakpattan Canal RD 112+350	3.2	22.7	80
Machai RD 68000	2.6	13.9	61
LBD Canal Okara RD-285+154	4	27.6	78
UC Canal Marala RD-000+000	7.2	48.5	76
K. Own	3	19.7	75

Source: Tariff Petition by Blue Star

It is noted from the above table that CUF is in the order of 61-80%. The determined CUF for the Tariff petition of 76.1% therefore conforms to the usual figure.

2.5.2 Technical Data

a) Capacity of Hydropower Project

The installed power capacity for the JBC Project has been down-regulated to 1.8MW since the FR for purely practical purposes on the basis of turbine unit capacity – 3 turbines of 0.6MW output each.

b) Auxiliary Power Consumption

The usual regulations stipulate the auxiliary power consumption factor as included in *Table 8*.

Table 8, Auxiliary Power Consumption

Description	Auxiliary Consumption Factor
Small Hydro	1.0%
Biomass	10.0%
Non-fossil fuel co-generation	8.5%
Solar Thermal	10.0%

A factor of 1% is adopted as auxiliary power consumption for the proposed project. The factor so adopted also conforms to the provisions of the approved Feasibility Report.

c) Service Life

The design-service life for small hydropower projects is usually in the order of 30-50 years; adopting 30 years period is common and also prescribed by NEPRA for Tariff determination.

In the petition, service life is assumed as 30 years and upon its expiry, the project will be handed over to the Government of Punjab at a token cost of Rs.1.

d) Energy Generation

Based on the technical data, the energy generation has been worked out and included in *Table 9*.

Table 9, Energy Generation

Capacity	**Installed Power Generation Capacity**	*MW*	1.8
	Plant Capacity Utilization Factor	%	76.1%
	Auxiliary Consumption	%	1.0%
	Net Generation-Yearly	*MU(GWh)*	11.88

It is noted that 11.88 GWh will be available for sale-connection to the National Grid.

2.6 Financial Data

Financial data for the project is presented in *Table 10.*

Table 10, Basic Assumptions – Financial Data

Tariff Period	Years	30
Debt	%	80%
Equity	%	20%
Total Debt Amount	million Rs.	580.00
Total Equity Amount	million Rs.	145.00
Loan Amount	million Rs.	580.00
Commitment Fee	%	0.5
Arrangement Fee	%	1.00
Repayment Period(incl. Moratorium)	years	10
KIBOR (6 months)	%	8.44%
Spread Admissible under NEPRA Rules	%	4.50%
Equity amount	million Rs.	145.00
Weighted average of ROE		17.00%
NVP Discount Rate (for levelised Tariff Computation)	% p.a	10.00%
Insurance	1.35%	
Water Charges	Rs.0.15/kWh	
Withholding Tax	7.50%	

2.7 Financial Parameters

The financial parameters specified hereunder shall be applicable for establishing the tariff.

2.7.1 Debt-Equity Ratio

For determination of generic tariff, the debt-equity ratio shall be 80:20.

Provided further that the equity invested in foreign currency, if any shall be denominated/ designated in Pak rupees on the date of each investment.

2.7.2 Loan and Finance Charges

a) Loan Tenure

For the purpose of determination of tariff, loan tenure of 10 years is considered.

b) Interest Rate

The loans arrived at in the manner indicated above shall be considered as gross normative loan for calculation of interest on loan. The NEPRA allows schedule for the interest rates included in *Table 11.*

Table 11, Basic Assumptions-Financial Data

Nr.	Description	Value
1	Financing cost on working capital	3 months KIBOR + 4.5%
2	Interest Charge Local Loan	6 months KIBOR + 4.5%

Based on the KIBOR March 2015 (3 months), the interest rate is 8.44% and when permutable spread of 4.5% is added, this works out as 12.94%.

An interest rate of 12.94% is adopted for the financial analysis. In addition, Commitment Fee of 0.5% and Arrangement Fee of 1% of loan is considered.

2.7.3 Interest during Construction (IDC)

The estimated cost towards IDC is Rs.30.13 million, *Table 12*. The interest rate used is 17%. The IDC figure shall be adjusted as per actual subject to provision of documentary evidence by the sponsors.

Table 12, Interest during Construction

Nr.	Description		Remarks
1	Interest during Construction, million Rs.	17%	36.98

2.7.4 Operational Data

The operational data for the project is presented in *Table 13*.

Table 13, Operational Data

Nr.	Description	Remarks
1	Estimated Annual Net Energy	11.88 GWh
2	Average Annual Plant Capacity Factor	76.1%
3	Average Annual Plant Availability	Will be mutually agreed with the Power Purchaser during PPA negotiations
4	Annual Scheduled Charges	Will be mutually agreed with the Power Purchaser during PPA negotiations
5	Annual Forced Outage Allowance	Will be mutually agreed with the Power Purchaser during PPA negotiations

2.7.5 Inter Connection with National Grid

The interconnection cost has been included in the Implementation Cost.

2.8 Capacity Components

2.8.1 Debt-Equity

The situation with respect to debt and equity is included in *Table 14*.

Table 14, Debt- Equity

Debt	%	80%
Equity	%	20%
Total Debt Amount	million Rs.	580.00
Total Equity Amount	million Rs.	145.00

It is noted that out of total capital cost of the project, the loan amount will be Rs. 580.00million whereas the equity amount is worked out as Rs. 145.00 million

2.8.2 Capacity Charges

This component represents the Fixed O&M costs, insurance, financing cost of working capital, return on equity, and return on equity during construction and withholding tax.

A summary of the Capacity charges is provided below:

a) Operation & Maintenance

The O&M expenses comprise:

i. The O&M expenses shall comprise repair and maintenance, establishment including employee expenses, and administrative and general expenses.
ii. The escalation in O&M during the life of the plant.

The O&M cost is either fixed or variable one, for Small Hydropower, the variable cost is minimal; the categories comprise:

- The operation and maintenance cost is usually assumed as 2% of the implementation cost; this percentage has been adopted in tariff determinations;

i. Fixed O&M

The fixed O&M component of the capacity payment represents the fixed costs of all the staff for O&M, Power Plant administration, security, transportation, overheads, office costs, professional fees such as audit, tax and legal, as well as some minor fixed operational costs such as environmental monitoring, that do not change with dispatch levels. This also includes the Insurance during operation period

The fixed operational cost includes provision for maintenance of the plant; insurance and administrative costs. It is determined on the basis of upfront capital costs and ongoing cost of debt and O&M costs associated with plant capacity and useful life; it is usually 80% of the total O&M cost.

ii. Variable O&M

This component primarily includes lubricant consumption, consumables, imported spare parts to be changed on normal scheduled maintenance and unscheduled maintenance. Also, it includes specialized technical services from manufacturer during maintenance of the Power Plant. The equipment has manufacturer-recommended overhauling schedules that are based on actual running hours. The actual timing of the major overhaul depends on the dispatch provided to the Power Plant. The turbines are expected to be made in HMC, Taxila; therefore, the spare parts and specialized technical services will be supplied from the organization. Based on the aforesaid, the variable O&M. This tariff component will also be adjusted for currency indexation on a quarterly basis.

Variable: Unlike thermal energy, hydraulic energy is capital intensive but there is no fuel component in the energy cost and hence the variable cost in minimal, about 20% of total O&M cost.

iii. Analysis of O&M Cost

The O&M cost component is worked out as under:

The Charge is based on the actual net electrical output measured in kWh, and is included in *Table 15*.

Table 15, Analysis of O&M Cost

O&M -% of Capital Cost per year	2.00%
Capital Cost-million Rs.	725.00
Amount of O&M , million Rs.	14.50
Allocation for Fixed O&M	80%
Amount of Fixed O&M, million Rs.	11.600
Amount of Fixed O&M, Rs./kWh	0.976
Allocation for Variable O&M	20%
Amount of Variable O&M, million Rs.	2.900
Amount of Variable O&M, Rs./kWh	0.244
Contract Capacity-kW	11,879,454

2.8.3 Return on Equity (ROE)

The equity is expected to be in local currency only. Therefore the equity in its totality will be subject to indexation as per CPI inflation. The return on investment is assumed as 17% so as to cover risk of the petitioner over this long period of 30 years. This rationale is justified on account of the following factors:

- Political and security problems
- Terrorism
- Economic conditions and financial crisis
- Environmental and re-settlement issues: people indulge in litigations resulting in prolonging the implementation period
- Cost overruns for various reasons including unforeseen delays which cannot be quantified upfront
- Inadequate experience world-wide regarding implementation of IPP hydropower projects
- Lack of appropriate infrastructure
- Longer gestation period
- Circular debts

Under the Policy for Power Generation Projects 2006, the hydropower project is to be constructed on Build, Own, Operate and Transfer (BOOT) basis. Pursuant to GoP's November 2005 Guidelines for Determination of Tariff for IPP, equity has been redeemed after completion of debt servicing. The project upon expiry of concession period would be transferred to the Government against notational cost as stipulated in the Policy for Power Generation Projects 2006.

The components of equity established under applicable norms and standards are as under:

- Return on Equity 1st year to 30th year 17.00%

The return of equity (ROE) is worked out hereunder in *Table 16*.

Table 16, ROE Analysis

Project Cost, Rs.	725,000,000
Equity	20%
Return on Equity(1-30Yrs)	17.0%
Output Power, Kw	11,879,454

Year	Equity Rs.	Repayment Rs.	Return on Equity Rs.	Balance Rs.	Annual Payment	Repayment Rs/KWh	Return Rs/KWh	Return+ Equity Repayment Rs/KWh
1	145,000,000		24,650,000	145,000,000	24,650,000	0	2.08	2.08
2	145,000,000		24,650,000	145,000,000	24,650,000	0	2.08	2.08
3	145,000,000		24,650,000	145,000,000	24,650,000	0	2.08	2.08
4	145,000,000		24,650,000	145,000,000	24,650,000	0	2.08	2.08
5	145,000,000		24,650,000	145,000,000	24,650,000	0	2.08	2.08
6	145,000,000		24,650,000	145,000,000	24,650,000	0	2.08	2.08
7	145,000,000		24,650,000	145,000,000	24,650,000	0	2.08	2.08
8	145,000,000		24,650,000	145,000,000	24,650,000	0	2.08	2.08
9	145,000,000		24,650,000	145,000,000	24,650,000	0	2.08	2.08
10	145,000,000		24,650,000	145,000,000	24,650,000	0	2.08	2.08
11	138,095,238	6,904,762	23,476,190	138,095,238	23,476,190	0.58	1.98	2.56
12	131,190,476	6,904,762	22,302,381	131,190,476	22,302,381	0.58	1.88	2.46
13	124,285,714	6,904,762	21,128,571	124,285,714	21,128,571	0.58	1.78	2.36
14	117,380,952	6,904,762	19,954,762	117,380,952	19,954,762	0.58	1.68	2.26
15	110,476,190	6,904,762	18,780,952	110,476,190	18,780,952	0.58	1.58	2.16
16	103,571,429	6,904,762	17,607,143	103,571,429	17,607,143	0.58	1.48	2.06
17	96,666,667	6,904,762	16,433,333	96,666,667	16,433,333	0.58	1.38	1.96
18	89,761,905	6,904,762	15,259,524	89,761,905	15,259,524	0.58	1.28	1.87
19	82,857,143	6,904,762	14,085,714	82,857,143	14,085,714	0.58	1.19	1.77
20	75,952,381	6,904,762	12,911,905	75,952,381	12,911,905	0.58	1.09	1.67
21	69,047,619	6,904,762	11,738,095	69,047,619	11,738,095	0.58	0.99	1.57
22	62,142,857	6,904,762	10,564,286	62,142,857	10,564,286	0.58	0.89	1.47
23	55,238,095	6,904,762	9,390,476	55,238,095	9,390,476	0.58	0.79	1.37
24	48,333,333	6,904,762	8,216,667	48,333,333	8,216,667	0.58	0.69	1.27
25	41,428,571	6,904,762	7,042,857	41,428,571	7,042,857	0.58	0.59	1.17
26	34,523,810	6,904,762	5,869,048	34,523,810	5,869,048	0.58	0.49	1.08
27	27,619,048	6,904,762	4,695,238	27,619,048	4,695,238	0.58	0.40	0.98
28	20,714,286	6,904,762	3,521,429	20,714,286	3,521,429	0.58	0.30	0.88
29	13,809,524	6,904,762	2,347,619	13,809,524	2,347,619	0.58	0.20	0.78
30	6,904,762	6,904,762	1,173,810	6,904,762	1,173,810	0.58	0.10	0.68

It is noted from the above table that ROE is constant for the period 1-10 years of Rs.2.08/kWh whereas subsequently it decrease to a level of Rs.0.68 during the 30th year.

2.9 Financial Analysis – Internal Rate of Return (FIRR)

The IRR has been determined on the basis of established tariff; the situation emerges as included in *Table 17*.

Table 17, Financial Internal Rate of Return

Sr.Nr.	Year	Yr.	Expenditure, million Rs.			Benefits, million Rs.			Cash flow	Cost, Present value million Rs.			Benefits Present value million Rs.		
			Capital	O&M	Total	Elect. Sale	CDM Benefits	Total	Million Rs.	10%	17%	20%	10%	17%	20%
1	Year-2016	0	217.50	0.000	217.50	0.00		0.00	-217.50	217.50	217.50	217.50	0.00	0.00	0.00
2	Year-2017	1	507.50	0	507.50	0.00	0.00	0.00	-507.50	461.36	433.76	422.92	0.00	0.00	0.00
3	Year-2018	2	0.00	11.600	11.60	96.80	21.74	118.54	106.94	9.59	8.47	8.06	97.97	86.60	82.32
4	Year-2019	3	0.00	11.600	11.60	96.80	21.74	118.54	106.94	8.72	7.24	6.71	89.06	74.02	68.60
5	Year-2020	4	0.00	11.600	11.60	96.80	21.74	118.54	106.94	7.92	6.19	5.59	80.97	63.26	57.17
6	Year-2021	5	0.00	11.600	11.60	96.80	21.74	118.54	106.94	7.20	5.29	4.66	73.61	54.07	47.64
7	Year-2022	6	0.00	11.600	11.600	96.80	21.74	118.54	106.94	6.55	4.52	3.88	66.91	46.21	39.70
8	Year-2023	7	0.00	11.600	11.600	96.80	21.74	118.54	106.94	5.95	3.87	3.24	60.83	39.50	33.08
9	Year-2024	8	0.00	11.600	11.600	96.80	21.74	118.54	106.94	5.41	3.30	2.70	55.30	33.76	27.57
10	Year-2025	9	0.00	11.600	11.600	96.80	21.74	118.54	106.94	4.92	2.82	2.25	50.27	28.85	22.97
11	Year-2026	10	0.00	11.600	11.600	96.80	21.74	118.54	106.94	4.47	2.41	1.87	45.70	24.66	19.15
12	Year-2027	11	0.00	11.600	11.600	96.80	21.74	118.54	106.94	4.07	2.06	1.56	41.55	21.08	15.95
13	Year-2028	12	0.00	11.600	11.600	96.80	21.74	118.54	106.94	3.70	1.76	1.30	37.77	18.02	13.30
14	Year-2029	13	0.00	11.600	11.600	96.80	21.74	118.54	106.94	3.36	1.51	1.08	34.34	15.40	11.08
15	Year-2030	14	0.00	11.600	11.600	96.80	21.74	118.54	106.94	3.05	1.29	0.90	31.22	13.16	9.23
16	Year-2031	15	0.00	11.600	11.600	96.80	21.74	118.54	106.94	2.78	1.10	0.75	28.38	11.25	7.69
17	Year-2032	16	0.00	11.600	11.600	96.80	21.74	118.54	106.94	2.52	0.94	0.63	25.80	9.61	6.41
18	Year-2033	17	0.00	11.600	11.600	96.80	21.74	118.54	106.94	2.29	0.80	0.52	23.45	8.22	5.34
19	Year-2034	18	0.00	11.600	11.600	96.80	21.74	118.54	106.94	2.09	0.69	0.44	21.32	7.02	4.45
20	Year-2035	19	0.00	11.600	11.600	96.80	21.74	118.54	106.94	1.90	0.59	0.36	19.38	6.00	3.71
21	Year-2036	20	0.00	11.600	11.600	96.80	21.74	118.54	106.94	1.72	0.50	0.30	17.62	5.13	3.09
22	Year-2037	21	0.00	11.600	11.600	96.80	21.74	118.54	106.94	1.57	0.43	0.25	16.02	4.39	2.58
23	Year-2038	22	0.00	11.600	11.600	96.80	21.74	118.54	106.94	1.43	0.37	0.21	14.56	3.75	2.15
24	Year-2039	23	0.00	11.600	11.600	96.80	21.74	118.54	106.94	1.30	0.31	0.18	13.24	3.20	1.79
25	Year-2040	24	0.00	11.600	11.600	96.80	21.74	118.54	106.94	1.18	0.27	0.15	12.04	2.74	1.49
26	Year-2041	25	0.00	11.600	11.600	96.80	21.74	118.54	106.94	1.07	0.23	0.12	10.94	2.34	1.24
27	Year-2042	26	0.00	11.600	11.600	96.80	21.74	118.54	106.94	0.97	0.20	0.10	9.95	2.00	1.04
28	Year-2043	27	0.00	11.600	11.600	96.80	21.74	118.54	106.94	0.88	0.17	0.08	9.04	1.71	0.86
29	Year-2044	28	0.00	11.600	11.600	96.80	21.74	118.54	106.94	0.80	0.14	0.07	8.22	1.46	0.72
30	Year-2045	29	0.00	11.600	11.600	96.80	21.74	118.54	106.94	0.73	0.12	0.06	7.47	1.25	0.60
31	Year-2046	30	0.00	11.600	11.600	96.80	21.74	118.54	106.94	0.66	0.10	0.05	6.79	1.07	0.50
	Total		725.00	336.40	1,061.40	2,807.31	630.46	3,437.77	2,376.37	777.67	708.97	688.51	1,009.73	589.72	491.43

Results @ 10% discount Rate	
Present Value of Cost (PVC)	777.67
Present value of Benefits	1009.73
Net Present Value (NPV)	232.06
Benefits Cost Ratio	1.30
Financial Internal Rate of Return	14%

The project IRR is determined as 14% over 30 years. Since the Project is a BOOT type project, the Equity injected shall be redeemed equally over the remaining life of the Project after payment of debt.

As per NEPRA Rule 17(3)(ii) of NEPRA (Tariff Standards & Procedure) Rules 1998, the rate of return on capital investment has to be commensurate to that earned by other investments of comparable risk. The IRR (based on net of withholding tax) for the project has been determined as 15%. Keeping in view the risk of execution of this kind of project, the premium allowed by NEPRA for a similar project (Blue Star) is 7.85. The IRR of 17% on equity has been worked out, the details of which are given hereunder:

- IRR 14%
- Other miscellaneous Risks on investment 3%
- Total 17%

Therefore, Petitioner requires approval of NEPRA for return on equity as 17% so that the risks on the investment are also covered. NEPRA, in the past has approved for similar projects, interest on rerun at the above rate of 17%.

2.9.1 Interest on Loan Capital

The term loan from the Bank is Rs. 580 million; interest on the loan will be as per applicable interest rate (8.44%+ 4.5%=12.94% assumed in the debt servicing) and is worked out as under:

- During 1st year of operation Rs. 37.53 million
- 10th Year Rs. 3.753 million
- 11th Year and Onwards Rs. 0.00

2.9.2 Insurance Cost

The cost on insurance consists of all risk insurance / re-insurance for the project, as well as business-interruption insurance, which is the lender's stipulated requirement. As a matter of business practice in Pakistan, such large projects are re-insured with foreign specialist companies. However, we are hopeful and in negotiations with local insurance companies whereby 100% risk retention will be insured locally. Hence, insurance cost as 1.35% of the total cost of Hydropower Generation Equipment. The insurance will cover against machinery breakdown, natural calamities (e.g. earthquakes), and business interruption. It is imperative that all aspects of the risks are covered adequately and no compromise is made in this respect. This cost would be a direct pass through to the purchaser.

The cost of insurance in the tariff determination is adopted as 1.35%; approved by NEPRA in the past as well. Any variation will be adjusted and the sponsors will provide documentary evidence in case of increase in the premium. The estimated insurance cost is Rs.9.78 million or Rs.0.824 per kWh; the calculation is presented in *Table 18*.

Table 18, Insurance Cost

Nr.	Insurance Premium -% of Implementation Cost	1.35%
1	Capital Cost million Rs.	725.00
2	Amount of insurance p.a- million Rs.	9.7875
3	Contract Capacity-kW	11,879,454
4	Insurance -Rs./kWh	0.824
5	Insurance -Rs./kW/month	593.21

2.9.3 Redemption of Equity

IPPs developed on BOOT basis are allowed equity redemption after the completion of debt servicing. The equity is redeemed in equal installments over the remaining term of the PPA.

The equity redemption is determined and included in *Table 19*.

Table 19, Equity Redemption

Equity Invested -Million Rs.	145.00
Redemption Period (Years)	20
Contract Capacity-KW	11.88
Annual Redemption-Million Rs.	6.905
Equity redemption -Rs /KWh	0.58

It is noted that equity redemption is Rs.0.58 per kWh.

2.9.4 Depreciation

Under the usual regulations for small Hydropower projects, the depreciation is worked out as under:

a. The value base for the purpose of depreciation is the capital cost of the asset admitted by the authority. The Salvage value of the asset is considered as 10% and depreciation is up to maximum of 90% of the capital cost of the asset.

b. Depreciation per annum is based on 'Differential Depreciation Approach' over loan tenure and period beyond loan tenure over useful life computed on 'Straight Line Method'. The depreciation rate for the first 10 years of the Tariff Period shall be 7% per annum and the remaining depreciation will be spread over the remaining useful life of the project from 11th year onwards.

c. Depreciation shall be chargeable from the first year of commercial operation.

Local situation towards debt facility does not permit application of depreciation, as such it has been assumed as zero.

2.9.5 Withholding Tax

It is charged at 7.5% of dividends.

2.10 Working Capital

2.10.1 Working Capital

The Working Capital requirement in respect of small hydropower projects is computed in accordance with the following:

- Operation & Maintenance expenses for one month;
- Receivables equivalent to 2 months of energy charges for sale of electricity calculated on the normative CUF;
- Maintenance @ 15% of operation and maintenance expenses

The Working Capital requirement in respect of the project is computed in accordance with provisions of *Table 20*.

Table 20, Working Capital

For Fixed Charges	O&M for one month	million Rs.	0.967
O&M Charges, Maintenance Spare	Routine O&M, 15% of O&M	million Rs.	1.740
For Variable Charges	Charges equal to 2 months receivable from Electricity	million Rs.	16.830
	Working Capital, million Rs.	million Rs.	19.537
	Contract Capacity-kW	Kwh	11,879,454
	Working Capital	Rs./kWh	1.645

The working capital as such works out as Rs. 19.537 million or Rs.1.65 per kWh.

2.10.2 Interest on Working Capital

The term loan from the Bank is Rs. 19.537 million; interest on the loan will be as per applicable interest rate and is worked out as included in *Table 21*.

Table 21, Interest on Working Capital

Interest on Working Capital	%	17.00%
	million Rs.	3.32

2.11 Debt Component

2.11.1 General

It covers repayment of the principal amount and the payment of interest charges. The debt is planned to be financed in local currency (PKR), with a tenor of 10 years and does not include any grace period. Hence, the debt service cost applies only in the first 10 years of the project's operation. For the remaining 20 years the debt service cost component would be zero.

The Debt component is calculated with the following assumptions:

- Debt is 80% of the Capital Cost of the Project (Including IDC).
- Repayment in six monthly installments.
- Grace period equal to the construction period (18 months after Financial Close).
- Total amount of debt to be arranged from institutions at the bench mark rate of KIBOR (8.44%) plus a spread of 4.5%.
- Debt to be repaid in 10 years from start of commercial operation.

In case there is any change in the assumptions, the debt service component and the Tariff shall be adjusted accordingly.

In case there is any change in the assumptions, the debt service component and the Tariff shall be adjusted accordingly. Moreover, a one-time adjustment in the capital price will also be required at the time of financial closing of the project, which will result in an update to the debt service cost and return on equity components as of the closing dates. Such concessions are already provided by NEPRA in Upfront Tariff of other power projects.

2.11.2 Debt Servicing

The long term debt will be obtained at mark-up rate of KIBOR plus 4.5% per annum. The loan period will be 10 years in bi-annual installments. The repayment will be made over a period of 10 years after the commencement of commercial operation date. The debt component is 80% of the implementation cost. The proposed financial structure is included in *Table 22*.

Table 22, Debt Servicing Calculations

Project Cost, Rs.		725,000,000
Debt		80%
Debt Interest		12.94%
Output Power, Kw		11,879,454

Bi-annual Payment	Debt Rs.	Repayment Rs.	Mark-Up Rs.	Balance Rs.	Debt Servicing Rs.	Annual Debt Servicing Rs.	Repayment Rs/KWh	Mark-up Rs/KWh	Mark-up & Debt Repayment Rs/KWh
1	580,000,000	29,000,000	37,526,000	551,000,000	66,526,000	131,175,700	2.44	3.16	5.60
2	551,000,000	29,000,000	35,649,700	522,000,000	64,649,700				
3	522,000,000	29,000,000	33,773,400	493,000,000	62,773,400	123,670,500	2.44	2.84	5.28
4	493,000,000	29,000,000	31,897,100	464,000,000	60,897,100				
5	464,000,000	29,000,000	30,020,800	435,000,000	59,020,800	116,165,300	2.44	2.53	4.97
6	435,000,000	29,000,000	28,144,500	406,000,000	57,144,500		2.44	2.53	4.97
7	406,000,000	29,000,000	26,268,200	377,000,000	55,268,200	108,660,100	2.44	2.21	4.65
8	377,000,000	29,000,000	24,391,900	348,000,000	53,391,900		2.44	2.21	4.65
9	348,000,000	29,000,000	22,515,600	319,000,000	51,515,600	101,154,900	2.44	1.90	4.34
10	319,000,000	29,000,000	20,639,300	290,000,000	49,639,300		2.44	1.90	4.34
11	290,000,000	29,000,000	18,763,000	261,000,000	47,763,000	93,649,700	2.44	1.58	4.02
12	261,000,000	29,000,000	16,886,700	232,000,000	45,886,700		2.44	1.58	4.02
13	232,000,000	29,000,000	15,010,400	203,000,000	44,010,400	86,144,500	2.44	1.26	3.70
14	203,000,000	29,000,000	13,134,100	174,000,000	42,134,100				3.70
15	174,000,000	29,000,000	11,257,800	145,000,000	40,257,800	78,639,300	2.44	0.95	3.39
16	145,000,000	29,000,000	9,381,500	116,000,000	38,381,500		2.44	0.95	3.39
17	116,000,000	29,000,000	7,505,200	87,000,000	36,505,200	71,134,100	2.44	0.63	3.07
18	87,000,000	29,000,000	5,628,900	58,000,000	34,628,900				
19	58,000,000	29,000,000	3,752,600	29,000,000	32,752,600	63,628,900	2.44	0.32	2.76
20	29,000,000	29,000,000	1,876,300	-	30,876,300				

For the purposes of the tariff calculation, the annual debt service will amount to Rs.5.60 - 2.76 per kWh over the 10-year period and by debt on a bi-annual basis.

2.11.3 Water Use Charge to be Paid to Punjab Government

The Federal Policy 2002 stipulates a water use charge of Rs 0.15/kWh payable to the government. This charge has been accounted for as a part of tariff calculated in the present analysis. However, arrangements might be made that the power purchaser may pay the Water Use Charge directly to the government, on behalf of the sponsor, to avoid incurring unnecessary accounting costs in handling this transaction. Nevertheless, the tariff should reflect the Water Use Charge in its formation.

2.12 Tariff Structure

2.12.1 Tariff Assumptions

The assumptions mentioned hereunder form the basis of the tariff, and may change between now and the financial close. The tariff will therefore have to be re-calculated to account for these adjustments at financial close:

- Financing terms are as yet based on the initial discussions with the financial institutions and hence are subject to final negotiations once tariff has been determined by NEPRA and the 1.8 MW Hydropower Plant Project, Jang Branch Canal. This will include mainly the debt-equity ratio, grace period and loan repayment term, base currency of the loan, benchmark index (KIBOR) and the spread margin for the financial institutions over KIBOR, depending upon the mix of the funding.
- Insurance cost has been assumed at 1.35% based on the indicative rates received from insurance companies. Currency for the premium payment has been assumed as Pakistani Rupee. Premium rate and base currency for the insurance arrangements will be finalised at the time of financial close.
- Base currency for the operations and maintenance costs (administrative costs and land lease rental which have been denominated in Pak Rupees. This, however, may be finalized when contracts will be signed with O&M operator

Any changes in the above terms will require automatic adjustment in the tariff without referring back to NEPRA.

The regulations elsewhere specify that the tariff for Mini/Micro Hydro Projects shall be higher by Rs 0.50/kWh over and above the tariff applicable for Small Hydro Projects with installed capacity more than 1 MW but up to and including 5 MW. However, since NEPRA does not permit this additional tariff, therefore this benefit is not being part of the proposed tariff.

2.12.2 Energy Purchase Price

The energy purchase price is the variable component of the tariff which depends on energy purchase price (EPP) and Net Electrical Output (NEO). The EPP indicates the price of a unit of electric energy i.e. kWh. The EPP is applied on the NEO produced during the period to calculate the energy charges of that period. The EPP has further two components, one is water charges and the other one is variable O&M cost. The break-up for energy charges in the tariff calculation is included in *Table 23*.

Table 23, Energy Purchase Price

Nr.	Capacity Charge	Rs. Per Kwh
1	O&M Variable	0.25
2	Water Charges	0.15
	Energy Purchase Price	0.40

2.12.3 Capacity Purchase Cost

The Capacity Purchase cost is based on the actual net electrical output measured in kWh, and consists of provisions in *Table 24*.

Table 24, Capacity Purchase Price (Average)

Nr.	Capacity Charge	Rs. Per Kwh
1	O&M Expenses-Fixed	0.98
2	Debt Servicing	4.07
3	Interest on working Capital	0.28
4	Return on Equity plus Equity Repayment	1.77
5	Equity Redemption	0.58
6	Insurance	0.82
7	Withholding Tax	0.64
	Capacity Purchase Price	9.15

2.13 Tariff Design

- The tariff shall be determined on levelised basis for the Tariff Period i.e. average for control period of 30 years.
- Levelisation shall be carried out for the 'useful life' of the Renewable Energy project while tariff shall be specified for the period equivalent to 'Tariff Period'. The levelised tariff will be determined for 30 years and at interest rate of 10%.

2.13.1 The Determined Tariff

The tariff has been determined and the situation emerges as under in *Table 25*:

Table 25, Determined Tariff

Nr.	Component	Average Tariff , Rs. per kWh		
		Year (1-10)	Year (11-30)	Year (1-30)
	Capacity Payments			
1	O&M Expenses-Fixed	0.976	0.976	0.976
2	Debt Servicing	4.074	0.000	1.358
3	Interest on working Capital	0.279	0.279	0.279
4	Return on Equity plus Equity Repayment	2.075	1.619	1.771
5	Equity Redemption	0.000	0.580	0.580
6	Insurance	0.824	0.824	0.824
7	Withholding Tax	0.643	0.643	0.643
	Total Capacity Payment	8.872	4.921	6.431
	Energy Payments			
1	Variable O&M	0.244	0.244	0.244
2	Water Use Charges	0.150	0.150	0.150
	Total Energy Payment	0.394	0.394	0.394

Average Tariff for Periods	
Rs./kWh (Year 1-30)	6.83
Rs./kWh (Year 1-10)	9.27
Rs./kWh (Year 11-30)	5.32
Levelised Tariff (10% return)	
Rs./kWh (Year 1-30)	**8.15**
Rs./kWh (Year 1-10)	**9.50**
Rs./kWh (Year 11-30)	**5.61**

2.14 Tariff For Hydropower Approved By NEPRA In The Past

NEPRA has approved for similar small Hydropower plants, tariff as under in *Table 26*.

Table 26, Reference Tariff

Rasul HPP (Jhelum)	Habib Rafiq (Private) Limited 06-K Block, Gulberg-III, Lahore	20m	MD.PPDB/H-20 /453/2007	Generation License granted, Tariff approved of Rs.4.7101
Punjnad HPP (Chenab)	Habib Rafiq (Private) Limited 06-K Block, Gulberg-III, Lahore	15m	MD.PPDB/H-20 /453/2007	Generation License granted, Tariff approved of Rs. 6.5971

The capital cost and subsequent tariff is water head-dependent; in case of 1.8MW project, the fall is about 3 meters whereas for the case of above Hydro projects, the fall is in the order of 15-20 meters.

The Tariff Petition by Blue Star Hydropower of capacity 3.2 MW with design head of 9.2 meters for Rs.7.906 per kWh is presently under considering with NEPRA. The proposed

tariff is for a design head of about 3 meters whereas for the reference petition it is above 9 meters; more heads result in economical generation of electricity and consequently lesser tariff. As such the proposed levelised tariff of Rs.8.15per kWh rationally matches with the one currently under consideration with NEPRA.

Therefore, considering the large difference in head/fall and intervening period of 5 years (the tariff was approved during Year-2007), the tariff compares reasonably with the determined unit rate of Rs. 8-15/kWh.

2.15 Proposed Tariff

The proposed Tariff is as under:

- Average Tariff during 1-30year period — Rs 6.83/ kWh
- Levelised Tariff during 1-30 year period — Rs.8.15 / kWh

2.16 Sharing of CDM Benefits

The proceeds of carbon credit from approved CDM projects shall be shared between generating company and concerned beneficiaries in the following manner:

- 100% of the gross proceeds on account of CDM benefit to be retained by the project developer in the first year after the date of commercial operation of the generating station;
- In the second year, the share of the beneficiaries shall be 10% which shall be progressively increased by 10% every year till it reaches 50%, where after the proceeds shall be shared in equal proportion between the generating company and the beneficiaries.

In the approved Feasibility Report, a sum of Rs.16.41 as CDM benefits is provided. This amount is proposed to be escalated by 32.5% (6.5% per year for 5 years) and for determination of IRR, this benefit is determined as Rs.21.74 million per year.

2.17 Implementation Methodology

The project will be implemented through an Engineering, Procurement and Construction (EPC) contract arrangement. The Feasibility Report envisages construction through EPC contract involving a consortium of:

- Contractor: construction of civil works, etc.
- Consulting firm: detailed designs and supervision-management of the contract.
- Supplier of E&M equipment: supply, installation, testing and commissioning of mechanical and electrical equipment.

Since use of local equipment is envisaged, functions and duties of the supplier are envisaged to include procurement through its local sources /authorized agents including erection, testing and commissioning. The machinery-equipment shall conform to the prescribed requirements included in Technical Specification under Employer's Requirement of EPC.

The combined efforts of three firms will result in successful execution and completion of the project that fulfills the requirements.

The completion of the project is scheduled for 18 months. This period although appears to be short, but through optimal planning, the success of the project is engaged in the planned period of 18 months.

2.18 Determination Sought

2.18.1 Basis of Entitlement for Tariff

a) General

Under the Regulation of Generation, Transmission and distribution of Electric Power Act (Act No. XL) of 1997 (the **"NEPRA Act"),** the Authority is mandated to determine tariffs and other terms and conditions for the supply of electricity through generation, transmission and distribution.

This Tariff Petition is being filed before National Electric Power Regulatory Authority (the **"NEPRA"** or the **"Authority")** pursuant to Rule 3 of the NEPRA (Tariff Standards and Procedure) Rules, 1998, read with paragraph 1.3 of the Guidelines for Determination of Tariff for Independent Power Producers issued by the Government of Pakistan in November 2005 and the applicable provisions of the Government of Pakistan's Policy for Power Generation Project, 2002 (**"the 2002 Power Policy"**) and any amendments as agreed with the Petitioner during detailed negotiations on the Power Purchase , Water use license and Implementation Agreements. The cost estimates presented in the Tariff Petition are based on the fact that the provisions of Mechanism for the Determination of Tariff for Hydropower Projects-2008 shall be applicable.

b) Submission

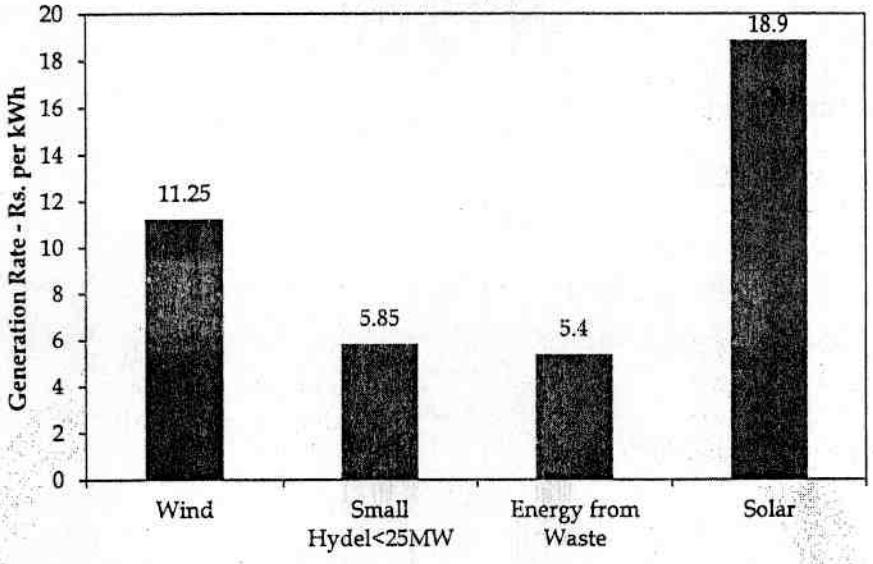
It is submitted that APL claim its entitlement to the above tariff on the basis of following NEPRA standards including:

i. Vide Rule 17, Sub Rule 131 (IV) of NEPRA (Tariff Standards & Procedure Rules 1998, it increases Efficiency. By feeding electricity locally at raid feeder length of the already existing 11KV feeder, APL will cause to save 100% of 132KV losses (5.1%) and most of other losses (24.87%). Proposed tariff' brings in efficiency by reducing losses, as required vide above rule.

ii. Vide Rule 17, Sub rule (5) of NEPRA (Tariff Standards and Procedure Rules 1998, it optimizes benefits to all effected: The tariff for Hydro source is almost the lowest of all technologies i.e. thermal, wind, solar etc. (Exhibit 1)and will lower cost borne by the consumer, as a result it optimizes benefits to all effected by the tariff.

F/B

Exhibit 1, Electricity Generation Rates
Source: AEDB, Pakistan



2.19 Determination Prayed

a) The Tariff proposed at Rs. 8.15 for the control period of 30 years is prayed to be approved. There is no component of Foreign Exchange (FE) and all tariffs are to be reimbursed in Pak Rupees.

b) The approval is prayed that Variable/ fixed O&M, Insurance, Return on Equity (ROE) and Return on Equity During Construction (ROEDC) be escalated equal to escalation of Wholesale Price Index (WPI) for manufacturing as notified by Federal Bureau of Statistics of GOP. Above escalation is prayed to be effective henceforth.

c) The approval is prayed for effectiveness of Tariff for a period of 30 years starting December 2016.

Determination of Tariff Component

Description					Fixed Cost, million Rs.								Fixed Cost, million Rs. Per kWh								Energy Purchase Price Rs./kWh		
Year	Units Generation	Installed Capacity	Net Generation GWh	Debt Amount million Rs	O&M Expenses-Fixed	Debt Servicing	Interest on working Capital	Return on Equity plus Equity Repayment	Equity Redemption	Insurance	Withholding Tax	Total Fixed Amount million Rs.	O&M Expenses-Fixed	Debt Servicing	Interest on working Capital	Return on Equity plus Equity Repayment	Equity Redemption	Insurance	Withholding Tax	Tariff Rs./kWh	O&M Variable	Water Charges	Total
-1.25	MW	1.8MW																					
1	MU		11.88	580.00	11.60	64.86	3.32	24.65		9.79	7.64	121.86	0.98	5.46	0.28	2.08		0.82	0.64	10.26	0.24	0.15	0.39
2	Unit		11.88	522.00	11.6	61.20	3.32	24.65		9.79	7.64	118.20	0.98	5.15	0.28	2.08		0.82	0.64	9.95	0.24	0.15	0.39
3	million Rs.		11.88	464.00	11.6	57.55	3.32	24.65		9.79	7.64	114.54	0.98	4.84	0.28	2.08		0.82	0.64	9.64	0.24	0.15	0.39
4	million Rs.		11.88	406.00	11.6	53.89	3.32	24.65		9.79	7.64	110.88	0.98	4.54	0.28	2.08		0.82	0.64	9.35	0.24	0.15	0.39
5	million Rs.		11.88	348.00	11.6	50.23	3.32	24.65		9.79	7.61	107.22	0.98	4.23	0.28	2.08		0.82	0.64	9.03	0.24	0.15	0.39
6	million Rs.		11.88	290.00	11.6	46.57	3.32	24.65		9.79	7.61	103.56	0.98	3.92	0.28	2.08		0.82	0.64	8.72	0.24	0.15	0.39
7	million Rs.		11.88	232.00	11.6	42.91	3.32	24.65		9.79	7.64	99.90	0.98	3.61	0.28	2.08		0.82	0.64	8.41	0.24	0.15	0.39
8	million Rs.		11.88	174.00	11.6	39.25	3.32	24.65		9.79	7.64	96.24	0.98	3.30	0.28	2.08		0.82	0.64	8.10	0.24	0.15	0.39
9	million Rs.		11.88	116.00	11.6	35.59	3.32	24.65		9.79	7.64	92.59	0.98	3.00	0.28	2.08		0.82	0.64	7.79	0.24	0.15	0.39
10	million Rs.		11.88	58.00	11.6	31.93	3.32	24.65		9.79	7.64	88.93	0.98	2.69	0.28	2.08		0.82	0.64	7.49	0.24	0.15	0.39
11			11.88	0.00	11.6	0.00	3.32	23.48	6.9	9.79	7.64	62.72	0.98	0.00	0.28	2.56	0.58	0.82	0.64	5.86	0.24	0.15	0.39
12			11.88	0.00	11.6	0.00	3.32	22.3	6.9	9.79	7.64	61.54	0.98	0.00	0.28	2.46	0.58	0.82	0.64	5.76	0.24	0.15	0.39
13			11.88	0.00	11.6	0.00	3.32	21.13	6.9	9.79	7.64	60.37	0.98	0.00	0.28	2.36	0.58	0.82	0.64	5.66	0.24	0.15	0.39
14			11.88	0.00	11.6	0.00	3.32	19.95	6.9	9.79	7.64	59.19	0.98	0.00	0.28	2.26	0.58	0.82	0.64	5.56	0.24	0.15	0.39
15			11.88	0.00	11.6	0.00	3.32	18.78	6.9	9.79	7.64	58.02	0.98	0.00	0.28	2.16	0.58	0.82	0.64	5.46	0.24	0.15	0.39
16			11.88	0.00	11.6	0.00	3.32	17.61	6.9	9.79	7.64	56.85	0.98	0.00	0.28	2.06	0.58	0.82	0.64	5.37	0.24	0.15	0.39
17			11.88	0.00	11.6	0.00	3.32	16.43	6.9	9.79	7.64	55.67	0.98	0.00	0.28	1.96	0.58	0.82	0.64	5.27	0.24	0.15	0.39
18			11.88	0.00	11.6	0.00	3.32	15.26	6.9	9.79	7.64	54.50	0.98	0.00	0.28	1.87	0.58	0.82	0.64	5.17	0.24	0.15	0.39
19			11.88	0.00	11.6	0.00	3.32	14.09	6.9	9.79	7.64	53.33	0.98	0.00	0.28	1.77	0.58	0.82	0.64	5.07	0.24	0.15	0.39
20			11.88	0.00	11.6	0.00	3.32	12.91	6.9	9.79	7.64	52.15	0.98	0.00	0.28	1.67	0.58	0.82	0.64	4.97	0.24	0.15	0.39
21			11.88	0.00	11.6	0.00	3.32	11.74	6.9	9.79	7.64	50.98	0.98	0.00	0.28	1.57	0.58	0.82	0.64	4.87	0.24	0.15	0.39
22			11.88	0.00	11.6	0.00	3.32	10.56	6.9	9.79	7.64	49.80	0.98	0.00	0.28	1.47	0.58	0.82	0.64	4.77	0.24	0.15	0.39
23			11.88	0.00	11.6	0.00	3.32	9.39	6.9	9.79	7.64	48.63	0.98	0.00	0.28	1.37	0.58	0.82	0.64	4.67	0.24	0.15	0.39
24			11.88	0.00	11.6	0.00	3.32	8.22	6.9	9.79	7.64	47.46	0.98	0.00	0.28	1.27	0.58	0.82	0.64	4.58	0.24	0.15	0.39
25			11.88	0.00	11.6	0.00	3.32	7.04	6.9	9.79	7.64	46.28	0.98	0.00	0.28	1.17	0.58	0.82	0.64	4.48	0.24	0.15	0.39
26			11.88	0.00	11.6	0.00	3.32	5.87	6.9	9.79	7.64	45.11	0.98	0.00	0.28	1.08	0.58	0.82	0.64	4.38	0.24	0.15	0.39
27			11.88	0.00	11.6	0.00	3.32	4.7	6.9	9.79	7.64	43.94	0.98	0.00	0.28	0.98	0.58	0.82	0.64	4.28	0.24	0.15	0.39
28			11.88	0.00	11.6	0.00	3.32	3.52	6.9	9.79	7.64	42.76	0.98	0.00	0.28	0.88	0.58	0.82	0.64	4.18	0.24	0.15	0.39
29			11.88	0.00	11.6	0.00	3.32	2.35	6.9	9.79	7.64	41.59	0.98	0.00	0.28	0.78	0.58	0.82	0.64	4.08	0.24	0.15	0.39
30			11.88	0.00	11.6	0.00	3.32	1.17	6.9	9.79	7.64	40.41	0.98	0.00	0.28	0.68	0.58	0.82	0.64	3.98	0.24	0.15	0.39
			Average										0.98	4.07	0.28	1.77	0.58	0.82	0.64	6.24	0.24	0.15	0.39

PETITION FOR TARIFF DETERMINATION

UNDER RULE 3 OF THE TARIFF RULES READ WITH PARAGRAPH 1.3 OF THE FEDERAL GOVERNMENT'S TARIFF GUIDELINES AND THE APPLICABLE PROVISIONS OF THE POWER POLICY

FOR A POWER PROJECT OF APPROX. 1.8 MW NEAR SUKHEKI IN THE PUNJAB PROVINCE
BY
ALKA POWER (PVT.) LTD

Affidavit of Mr. Zeeshan Azhar Malik, Chief Operating Officer, Alka Power (Pvt.) Limited, Office No. M-1-, M-2-, 1st Floor, Bara Tower, Queens Road, Lahore.

I, **Zeeshan Azhar Malik S/o Malik Azhar Ellahi**, CNIC 352019-883070-7, hereby solemnly affirm and declare on oath that the contents of the accompanying petition, including all attached documents-in-support are true and correct to the best of my knowledge and belief and that nothing has been concealed.

(Zeeshan Azhar Malik)
Chief Operating Officer

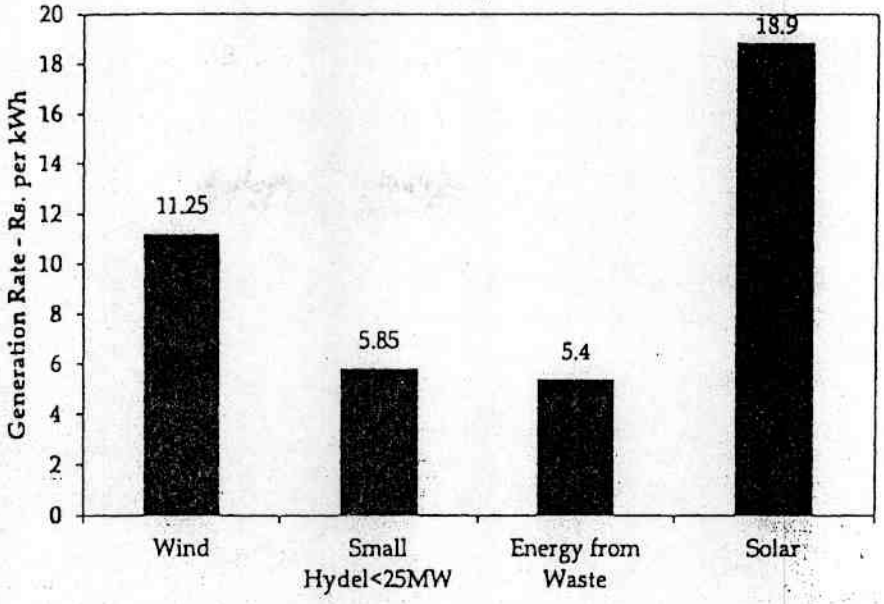
Verification

Verified on oath this 25th day of March, 2015 that what has been stated above is true and correct to the best of my knowledge and belief and nothing has been concealed therefrom.

056

F/A-2

Exhibit 1, Electricity Generation Rates
Source: AEDB, Pakistan



2.19 Determination Prayed

a) The Tariff proposed at Rs. 8.15 for the control period of 30 years is prayed to be approved. There is no component of Foreign Exchange (FE) and all tariffs are to be reimbursed in Pak Rupees.

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c) The approval is prayed for effectiveness of Tariff for a period of 30 years starting December 2016.

ALKA POWER (PVT) LTD

(Muhammad Asl
Alvi.
Chief Executive
officer)

F/C-1

HBL HABIB BANK حبیب بینک

NOT NEGOTIABLE
A/C PAYEE ONLY

12048171

Banker's Cheq

This Banker's Cheque is valid for six months from date of

Cheque No.
Date

On Demand Pay
To The Order Of NEPRA

The Sum of: Pakistan Rupee SIX HUNDRED And ETOH ONLY

608.00

For Habib Bank Limited

PAYABLE AT ANY HBL BRANCH IN PAKISTAN
Centralised Cheque Payable Account
30019903902586

AUTHORISED SIGNATURE

AUTHORISED SIGNATURE

DO NOT WRITE BELOW THIS LINE

Syed Ubaidur-Rehman
Manager Operations P.A # 12005
HBL FORTRESS STADIUM
BRANCH, LAHORE

PA No.

Sumaira Sheikh
P.A # 1
HBL FORTRESS ST
BRANCH, L

⑈ 1 2 0 4 8 1 7 1 ⑈ 0 5 4 3 0 0 1 1 : 0 0 3 0 0 1 9 9 0 3 9 0 2 5 8 6 ⑈ 0 1 0 ⑈

ALKA POWER
(PRIVATE) LIMITED

ALK
POWERING PAKISTAN, EMPOWERING THE NA

Registrar
NEPRA
Islamabad

Submission of Resolution

Dear Sir

With reference To Your Telephonic communique, we are Enclosing The Subject document as required.

Regard.

ADVOCATE 21/4/2015
(SH. MUHAMMAD MUBEEK)
Cell # 0312-5123478

For information &
n/a pl.

- D/Reg-I/SAR
- SAT-I
- M/F

20/04/15

Cc: M(T)

Registrar
Dy No. 4343
Dated 20-4-15

287-2, Y-Block, Street Number 13, Phase III, DHA, Lahore. - Pakistan, 54792
Fax: +92-42-35694710 Ph: +92-42-35745040 www.alkapower.com.pk

F/D

ALKA POWER
(Private) Limited

Board Resolution Passed by the Board of Directors of Alka Power (Private) Limited on March 03, 2015

"Resolved that the Company has to execute tariff petition of 1.8MW Hydel project at Jhang Branch Canal along-with necessary documents/annexures before the NEPRA for obtaining the levelized tariff for the period of 30 years.

"Resolved that Mr. Zeeshan Azhar Malik, Chief Operating Officer of the company be and are hereby authorized to sign and execute the above mentioned tariff petition along-with documents, carry out modifications or amendments thereto and affix the stamp of the Company, thereon (wherever necessary) in accordance with Article of the Association of the Company."

"Further Resolved that Mr. Omar Mukhtar, Company Secretary of the company be and are hereby authorized to record the resolution in the minutes book of the company in accordance with Articles of the Association of the Company."

The resolution was passed unanimously.

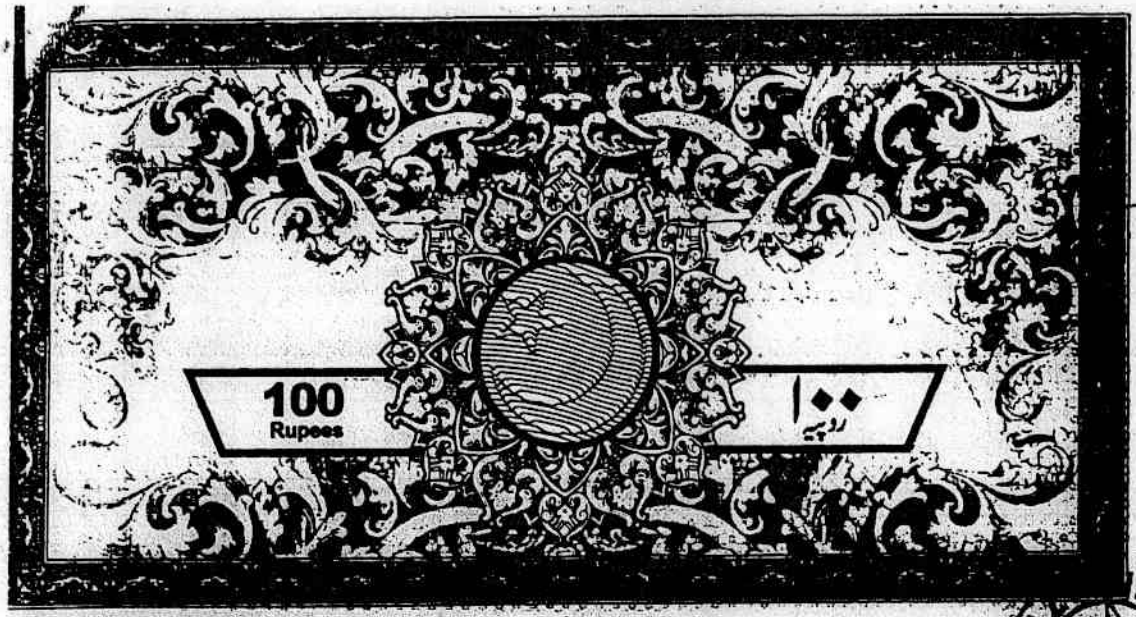
Certified True Copy

Omar Mukhtar
Company Secretary

ALKA POWER (PVT) LTD

Muhammad Arshad Alvi
Chief Executive Officer

Office No.M1-M2, First Floor, Bara Tower, Queens Road, Near Mozang Chungi, Lahore
Tel: 042-36299534, Fax:042-36299536 Email:alkapower...



F/E

Oath Commissioner Lahore
ADVOCATE

PETITION FOR TARIFF DETERMINATION

UNDER RULE 3 OF THE TARIFF RULES READ WITH PARAGRAPH 1.3 OF THE FEDERAL GOVERNMENT'S TARIFF GUIDELINES AND THE APPLICABLE PROVISIONS OF THE POWER POLICY

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ALKA POWER (PVT.) LTD

(Zeeshan Azhar Malik)
Chief Operating Officer

Verification

Verified on oath this 25th day of March, 2015 that what has been stated above is true and correct to the best of my knowledge and belief and nothing has been concealed therefrom.

ATTESTED
Mir Ashraf Advocate
Oath Commissioner Lhr