

FRONTIER MEGA STRUCTURE & POWER (PRIVATE) LIMITED

2.4 MW GHANOOOL HYDROPOWER PROJECT

TARIFF PETITION

LETTER OF INTEREST (LOI) BY SARHAD HYDEL DEVELOPMENT
ORGANIZATON (SHYDO)

ATTACHMENT T - 1

TECHNICAL CONSULTANTS



RENCON

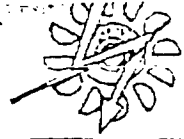
FINANCIAL CONSULTANTS

RAZ AHMAD & COMPANY

Chartered Accountants



MEXA



SHYDO

SARHAD HYDEL DEVELOPMENT ORGANIZATION
Government of N.W.F.P. Peshawar



No 207-09/SHYDO/DPP/Globez
Dated, Peshawar the 22/3/2010

To
✓ M/S GLOBEZ
179-A, Shiekh Maltoon Town,
Mardan, NWFP
Phone: 0937-868113

Subject: LETTER OF INTEREST (LOI) FOR DEVELOPMENT OF 1.40 MW
HYDEL POTENTIAL PROJECT AT RAW SITE AT GHANOOOL NALA,
NEAR BALAKOT, MANSEHRA
Registration No. SHYDO/PP/2009/Ghanool Nala-01 dated 6/7/2009

Reference this office NOC issued vide No 110-14/SHYDO/DPP/GLOBEZ dated 11/2/2010 and subsequently your submission of the said Bank Guarantee No. 62/04 dated 5/3/2010 amounting to Rs: 7,00,000/-

In terms of the provisions of the Provincial Policy for Power Generation Projects, 2006 (the "Policy"), the Government of NWFP hereby confirms its interest in your proposal for developing the raw site at GHANOOOL NALA near Balakot, Mansohra for power potential of 1.40 MW approximately (the "Project").

As per the policy, under clause 44, you are hereby issued the LOI for conducting the feasibility study for the subject project, at no risk and cost or any obligation on part of GoNWFP/SHYDO or any other agency, within maximum first twelve (12) months and subsequently construction / erection of power plant and bring it into power production within remaining maximum, twenty four (24) months of the total grace period of thirty six (36) months.

You will have to carry out the feasibility study according to the specific milestones / time schedule to be provided by you to SHYDO and submit the monthly progress report accordingly.

SHYDO will appoint a Panel of Expert (PoE) to monitor the feasibility study progress according to the agreed milestones and to ensure the implementation of the project consistent with time frame allotted for the stipulated total grace period of three years for the construction of the scheme as per Power Policy 2006.

Issuance of this LOI or the lapsing of its validity, or your conducting feasibility study there under, can not form the basis of any claim for compensation or damages by the sponsor or the project company or any party claiming through them against the GoNWFP/SHYDO or any of its agencies on any grounds whatsoever, during or after the

Subsequent to the approval of the feasibility study by PoE/SHYDO/Irrigation Department, you will be issued LOS of the construction of the project.

In case you fail to complete the feasibility study within prescribed period of issuance of this LOI according to the given milestones and other clauses of the GoNWFP Power Policy 2006. SHYDO may terminate this LOI and encash the Bank Guarantee.

This LOI has been issued in duplicate on date hereof, and it shall come into effect when one copy hereof is received by SHYDO after having been duly countersigned by you. Nevertheless, this LOI shall lapse if the countersigned copy is not received at SHYDO within thirty (30) days of its issuance.

For and on behalf of
(Name & Signature of Sponsor)



[Handwritten signature]

[Handwritten signature]
Managing Director

CC.

1. The Secretary, Energy & Power Department, Peshawar.
2. The Secretary, Irrigation Department, Peshawar.

[Handwritten signature]
Managing Director

FRONTIER MEGA STRUCTURE & POWER (PRIVATE) LIMITED

2.4 MW GHANOOI HYDROPOWER PROJECT

TARIFF PETITION

TRANSFER OF LETTER OF INTEREST (LOI) TO
FRONTIER MEGA STRUCTURE & POWER
(PRIVATE) LIMITED

ATTACHMENT T - 2

TECHNICAL CONSULTANTS



RENCON

FINANCIAL CONSULTANTS

RIAZ AHMAD & COMPANY

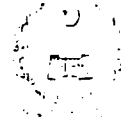
Chartered Accountants





SHYDO

SARHAD HYDEL DEVELOPMENT ORGANIZATION
Government of Khyber Pakhtunkhwa, Peshawar



No. 1264-65/SHYDO/DPP/Globez
Dated, Peshawar the 08 /12 /2010

To ✓

M/S GLOBEZ
179-A, Shiekh Maltoon Town,
Mardan, 23200 KPK
Phone 0937-881128

Subject: Ghanool Nala near Balakot (1.40 MW)

LOI No. 207/208/SHYDO/DPP/Globez dated 22.0.2010

With reference to your request vide letter No. nil dated 26.11.2010, Managing Director SHYDO has given approval for change of name from M/S Globez to M/S Frontier Mega Structure & Power (Pvt) Ltd, with the condition that the above referred LOI terms & conditions for subject project will remain intact. The bank guarantee already provided will be replaced with a new company name mentioned in your letter with same validity time period. Also you are to provide an undertaking, signed by both original owner/sponsors of the companies that newly submitted Bank Guarantee would be encashed if any terms & conditions of LOI are violated.

On providing the above, an addendum will be issued for change of company name and registration No. etc and the old Bank guarantee will be returned duly released.

Director
(Private Power)

C.C

PS to Managing Director SHYDO, Peshawar

Director
(Private Power)

07

FRONTIER MEGA STRUCTURE & POWER (PRIVATE) LIMITED

2.4 MW GHANOOOL HYDROPOWER PROJECT

TARIFF PETITION

**FEASIBILITY STUDY APPROVAL NOTIFICATION
FROM SHYDO**

ATTACHMENT T - 3

TECHNICAL CONSULTANTS



FINANCIAL CONSULTANTS

RIAZ AHMAD & COMPANY
Chartered Accountants



F7

SHYDO

SARHAD HYDEL DEVELOPMENT ORGANIZATION
Government of Khyber Pakhtunkhwa Peshawar



No. 523-28 SHYDO/DPP/FMSP
Dated Peshawar the 18/04/2011

M/S Globez (main company)

M/S Frontier Mega Structure & Power (Pvt) Ltd, (sister company of
Globez)
109 A Sheikh Ma tooh town
Mardan

**Subject: Approval of Feasibility Study for Ghanool Nala HPP (2.4 MW) at
Balakot**

Reference: Letter of Interest (LOI) No. 207-09/SHYDO/DPP/Globez dated
12/3/2010

Final feasibility study for the subject project was submitted vide
letter No. 6264 dated 8/3/2011

Dear Sir

SHYDO is pleased to communicate the following decisions taken
in the Panel of Experts (POE) meeting held on 24/3/2011 for monitoring
the progress of study for Ghanool Nala HPP (2.4 MW) at Balakot

The Feasibility Study has been completed by M/S FMSP (Pvt) Ltd
Mardan as per the milestones given in the Letter of Interest

Sponsors to clarify/justify the assumptions made regarding project costs
while submitting the tariff petition to NEPRA

POE certify only the completion of the Feasibility Study however due to
nature of data and resultant conclusions, Panel of Experts jointly and/or
individually will not be responsible for reliability of data contents and
conclusions given in the feasibility study

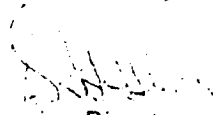
Sponsor to obtain the Environmental clearance certificate from the
Department of Environment Govt. of Khyber Pakhtunkhwa Peshawar

In accordance with the provisions of the Policy for Power Generation Projects 2006 Govt. of Khyber Pakhtunkhwa and its subsequent amendments upon the completion of the feasibility study by the POE the sponsors are required to approach NEPRA / PESCO for tariff negotiation and finalize their tariff within three months.

You are therefore requested to approach NEPRA / PESCO and file your tariff petition for the subject project within three (3) months starting from the date of receipt of this letter.

We appreciate your efforts for completion of the feasibility study and expect the same pace and spirit for negotiation and filing the tariff petition with NEPRA.

Yours Sincerely


Managing Director
SHYDO

Copy to

1. The General Manager (WPPO)
WAPDA House Lahore
2. Chief Executive PESCO
WAPDA House Peshawar
3. The Chairman NEPRA
OPF building G-5/1 Islamabad
4. PS to Secretary Energy & Power Department Govt. of Khyber
Pakhtunkhwa Peshawar.

FRONTIER MEGA STRUCTURE & POWER (PRIVATE) LIMITED

2.4 MW GHANOL HYDROPOWER PROJECT

TARIFF PETITION

NOC FOR TARIFF PETITION APPLICATION
FROM PESHAWAR ELECTRIC SUPPLY COMPANY (PESCO)

ATTACHMENT T - 4

TECHNICAL CONSULTANTS



RENCON

FINANCIAL CONSULTANTS

RIAZ AHMAD & COMPANY

Chartered Accountants



MEMBERS



PESHAWAR ELECTRIC SUPPLY COMPANY

PH# 091-9212334

Fax 091-9212024

No 647-49 / GhanoolM/s Frontier Mega Structure & Power (Pvt) Ltd.
179-A, Sheikh Maltoon Town, Mardan.OFFICE OF THE
CHIEF EXECUTIVE PESCO
WAPDA HOUSE, PESHAWAR
Dated: 28/05/2011.

Subject: Request for issuance of MOC for tariff application for 2.4 MW Ghanool Hydropower project in District Mardan, under "Policy for Hydropower Generation Projects-2006" GoKPK.

*Ref: your letter No. N7 dated: 28.03.2011.

PESCO intends to purchase power from 2.4 MW Ghanool Hydropower project Balakot subject to the following conditions:

- 1) If the tariff determined by NEPRA, is acceptable to PESCO.
- 2) Metering will be done at the 132kV GSS Balakot.
- 3) The inter connectivity and its cost will be decided later on.

If the above terms and conditions are acceptable to the firm, copy of tariff petition be submitted to this office before approaching the NEPRA for tariff determination.

(ENG) ABDUL HANAN
CE/CHIEF COMMERCIAL OFFICER,
PESCO PESHAWAR.

Copy to:

- 1) Chief Operating Officer (CPA) Lahore for information, please.
- 2) Managing Director, PPIB, 50-Nizamuddin Road, F-7/4, Islamabad for information, please.

FRONTIER MEGA STRUCTURE & POWER (PRIVATE) LIMITED

2.4 MW GIHANOOL HYDROPOWER PROJECT

TARIFF PETITION

NOC FROM ENVIRONMENTAL PROTECTION AGENCY

ATTACHMENT T - 5

TECHNICAL CONSULTANTS



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FINANCIAL CONSULTANTS

RIAZ AHMAD & COMPANY

Chartered Accountants



MEVA



Environmental Protection Agency
Environment Department
Government of Khyber Pakhtunkhwa

No. EPA/EE/General/962

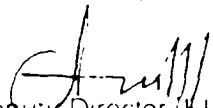
Date: 27-7-2011

To

Mr. Zeeshan Khanzada Khan,
Chief Executive,
Frontier Mega Structure & Power (Pvt) Limited
Mardan
Phone No. 0937-881128

Subject: ISSUANCE OF NOC FOR GHANOL HPP (2.4 MW) BALAKOT.

It is directed to enclose herewith Legal Environmental Approval/ Decision Note on EE of 2.4 MW Ghanool Hydro Power Project Balakot District Mardan for your information and further implementation, please


Deputy Director (EIA)

Office: EIA Section, Old Courts Building, 2.4 MW Ghanool Hydropower Project

3rd Floor, Old Courts Building, Khyber Road, Peshawar Cantt.

Tel: 92(91) 9210263-9210148, Fax: 92 (91) 9210280

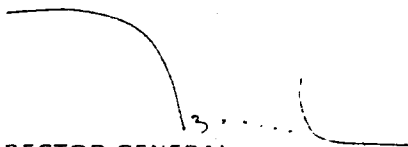
SCHEDULE-VI
Decision on IEE

1. **Name, address of proponent:** Zeeshan Khanzada Khan
Chief Executive
Frontier Mega Structure & Power
(Pvt) Ltd. FMSP.
Mardan
Phone No. 0092937881128
2. **Description of project.** Ghanool Hydro Power Project is proposed to be built on Ghanool Nullah at Ghanool village. The site is located 16 Km upstream of Balakot in Distt. Mansehra. The project is to operate on Run-off river basis. The flow in Ghanool Nullah shall be diverted downstream. The channel will run up to Dhamdar village where Forebay will be built. A steel penstock shall be installed to take water from Forebay to Power House. The water from Power House will be discharge into Ghanool Nullah.
3. **Location of project.** The project is located in Balakot District Mansehra.
4. **Date of filing of IEE.** 09-05-2011
(Ref. EPA Diary No. 376)
5. After careful review, the Environmental Protection Agency, Govt. of Khyber Pakhtunkhwa has decided to accord approval of the Initial Environmental Examination for Ghanool Hydro Power Project, Balakot, District Mansehra, in line with the guidelines issued by Pak. EPA and IEE/EIA Regulations, 2000 subject to the following terms & conditions:-
 - a) The proponent will adopt all precautionary and mitigatory measures identified in IEE report as well as any un-anticipated impacts during the construction and operation phases of project.
 - b) Land compensation agreement with land owners/houses and flour mill owner, should be provided to this Agency before starting activities on the site.
 - c) Debris/excavated material should be disposed off in designated areas.
 - d) Non technical jobs should be provided to the local community.
 - e) Compensation of the land should be paid on market rate/ as per govt. policy.
 - f) Afforestation programme should be planned and communicated to this Agency.
 - g) Regular discharge of water should be ensured for the use of present dependents on downstream river.

- h) Construction activity should not be carried out during the nesting/hatching season of wild animals.
 - i) Fish ladders should be constructed for the safety of fish population.
 - j) Explosives should be used after informing the local administration/community.
 - k) Health and safety measures (PPEs) should be provided to the staff during construction and operation stage.
6. The proponent shall be liable for correctness and validity of the information supplied by the environmental consultant.
 7. The proponent shall be liable for compliance of sections 13, 14, 17 and 18 of IEE/EIA Regulations, 2000, regarding approval, confirmation of compliance, entry, inspections and monitoring.
 8. This approval is accorded only for the installation/ construction phase of the project. The proponent will obtain approval for operation of the project in accordance with the Section 13 (2) (b) and Section 18 of the IEE/EIA Regulations, 2000.
 9. Any change in the approved project shall be communicated to EPA, Khyber Pakhtunkhwa and shall be commenced after obtaining the approval.
 10. This approval shall be treated as null and void if all or any of the conditions mentioned above is/are not complied with.
 11. This approval does not absolve the proponent of the duty to obtain any other approval or clearance that may be required under any law in force.
 12. There is no legal case pending in the courts against the project.
 13. In exercise of the power under Section 12 of the Pakistan Environmental Protection Act, 1997 the undersigned is pleased to approve the IEE Report for construction phase of the project with above mentioned terms and conditions.

Dated: Peshawar 07-7-2011

Tracking/File No. EPA/IEE/Construction HPP/ 462


DIRECTOR GENERAL
EPA, Khyber Pakhtunkhwa 31711
3rd Floor, SDU Building, Khyber Road,
Peshawar.

FRONTIER MEGA STRUCTURE & POWER (PRIVATE) LIMITED

2.4 MW GHANOL HYDROPOWER PROJECT

TARIFF PETITION

LETTER FROM NATIONAL ELECTRIC POWER REGULATORY
AUTHORITY (NEPRA)

ATTACHMENT T - 6

TECHNICAL CONSULTANTS



RENCON

FINANCIAL CONSULTANTS

RIAZ AHMAD & COMPANY



Chartered Accountants



National Electric Power Regulatory Authority
Islamic Republic of Pakistan

2nd Floor, OPF Building, G-5/2, Shahrah-e-Jamhuriat, Islamabad

Phone: 9207200, Fax: 9210215

Website: www.nepra.org.pk, Email: info@nepra.org.pk

REGISTRAR

✓ NEPRA/REG/30/FMSP/3235-86

May 06, 2011

M/s Frontier Mega Structure & Power (Pvt) Limited
179-A Sheikh Maltoon town, Mardan

Subject: APPROVAL OF FEASIBILITY STUDY FOR GHANOO NALA HPP (2.4 MW) AT BALAKOT

Please refer to letter No. 523-28 SHYDO/DDP/FMSP dated 15-04-2011 of Sarhad Hydrel Development Organization (SHYDO) addressed to M/s Frontier Mega Structure & Power (Pvt) Limited (FMSP) and a copy to NEPRA.

✓ In view of above referred letter of SHYDO, the FMSP has been advised to approach NEPRA for approval of tariff determination for the subject project. NEPRA's guidelines for submission of application for grant of Generation Licence and Petition for Determination of Tariff are detailed hereunder.

I. Generation Licence Application

Application for Generation Licence can be submitted pursuant to Section 15 of NEPRA Act and in accordance with the procedure set out in the Regulations¹ along with prescribed fee as per requirement of Regulation 3(2) of the Regulations. Copies of NEPRA Act & the Regulations are enclosed.

II. Tariff Petition

A petition for tariff determination can be filed as per Tariff Rules along with applicable fee, as per requirement of Rule 3(1) of Tariff Rules². Copy of Tariff Rules is enclosed.

✓ Please note that the Licence Application/Tariff Petition fees are linked with CPI revised on monthly basis. ✓ exact amount of applicable fee may be confirmed from this office at the time of filing Generation Licence application/Tariff Petition.

Encl: As above


(Syed Safer Hussain)

cc: Managing Director, SHYDO, 306-WAPDA House, Shami Road, Peshawar

FRONTIER MEGA STRUCTURE & POWER (PRIVATE) LIMITED

2.4 MW GHANOOOL HYDROPOWER PROJECT

TARIFF PETITION

LOCATION PLAN

ATTACHMENT T - 7

TECHNICAL CONSULTANTS



RENCON

FINANCIAL CONSULTANTS

RIAZ AHMAD & COMPANY

Chartered Accountants



MEMBERS

FRONTIER MEGA STRUCTURE & POWER (PRIVATE) LIMITED

2.4 MW GHANOOOL HYDROPOWER PROJECT

TARIFF PETITION

TARIFF PETITION

SECTION – 8

TECHNICAL CONSULTANTS



RENCON

FINANCIAL CONSULTANTS

RIAZ AHMAD & COMPANY

Chartered Accountants



Chartered Accountants



BEFORE THE NATIONAL ELECTRIC POWER
REGULATORY AUTHORITY

TARIFF PETITION

ON BEHALF OF

FRONTIER MEGA STRUCTURE & POWER (PRIVATE) LIMITED

FOR

DETERMINATION OF FEASIBILITY STAGE REFERENCE TARIFF FOR SUPPLY
OF ELECTRICITY POWER SERVICES
FROM 2.4 MW HYDROPOWER PROJECT AT GHANOL, DISTRICT MANSEHRA,
KHYBER PAKHTUNKHWA

BEFORE THE NATIONAL ELECTRIC POWER
REGULATORY AUTHORITY

TARIFF PETITION

ON BEHALF OF

FRONTIER MEGA STRUCTURE & POWER (PRIVATE) LIMITED

FOR

DETERMINATION OF FEASIBILITY STAGE REFERENCE TARIFF FOR SUPPLY
OF ELECTRICITY POWER SERVICES
FROM 2.4 MW HYDROPOWER PROJECT AT GHANOL, DISTRICT MANSEHRA,
KHYBER PAKHTUNKHWA

FRONTIER MEGA STRUCTURE & POWER (PRIVATE) LIMITED

House No. 179, Sector A
Street No. 4 Sheikh Maltoon Town
Mardan, Khyber Pakhtunkhwa

FRONTIER MEGA STRUCTURE & POWER (PRIVATE) LIMITED
2.4 MW GHANOOL HYDROPOWER PROJECT

TARIFF PETITION

DETAILS OF THE PETITIONER

1. Name and Address:

Frontier Mega Structure & Power (Private) Limited
House No. 179, Sector A
Street No. 4 Sheikh Maltoon Town,
Mardan, Khyber Pakhtunkhwa

Company Registration No. 0070319

Phone: 0937 - 881128
Fax: 0937 - 868113
Email: zkz@hotmail.com

2. Project Sponsors

- i. Mr. Zeeshan Khanzada
- ii. Ms. Amina Khanzada
- iii. Ms. Shaukat Khanzada

3. Authorized Representatives of the Petitioner

1. Mr. Zeeshan Khanzada
Chief Executive
Frontier Mega Structure & Power (Private) Limited
House No. 179, Sector A
Street No. 4 Sheikh Maltoon Town,
Mardan, Khyber Pakhtunkhwa
Phone : 0937 - 881128
Fax : 0937 - 868113
Email : zkz@hotmail.com
2. Mr. Muddassar Mehmood, ACA
Partner
Riaz Ahmad & Company
Chartered Accountants
2-A, ATS Centre, 30-West
Fazal-ul-Haq Road, Blue Area
Islamabad, Pakistan
Telephones : (92-51) 227 41 21-2
Mobile : (92-333) 425 41 49
Fax : (92-51) 227 88 59
Email : md@racopk.com

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FRONTIER MEGA STRUCTURE & POWER (PRIVATE) LIMITED
2.4 MW GHANOOOL HYDROPOWER PROJECT

TARIFF PETITION

3. Engr. Fazal Mahmood Qureshi Technical Consultant – Renewable Energy Consultants (RENCON)
4. Mr. Ammad Ahmed Financial Consultant – Riaz Ahmad & Company Chartered Accountants

GROUND FOR PETITION

4. Under the "Regulation of Generation, Transmission and Distribution of Electric Power Act (XL of 1997), hereinafter referred to as the NEPRA Act, NEPRA (the National Electric Power Regulatory Authority) is responsible, inter-alia, to determine tariffs, rates and other terms and conditions for the supply of electric power services by the generation, transmission and distribution companies and to recommend them to the Federal Government for notification. NEPRA is also responsible for determining the process and procedures for reviewing and approving tariffs and tariff adjustments, etc.

5. Frontier Mega Structure & Power (Private) Limited ("FMSPL") is a private limited company and registered under the Companies Ordinance, 1984. Sponsors of FMSPL intend to set up, on BOOT basis, a 2.4 MW Hydropower Project at about 16 Kms upstream of Balakot, over a narrow gorge of Ghanool Nullah (Katha) on Balakot-Naran road in the Khyber Pakhtunkhwa Province of Pakistan.

6. Feasibility report for the project has been approved by the SHYDO's Panel of Experts as conveyed by SHYDO vide letter No. 523-28/SHYDO DPP/FMSP dated April 15, 2011.

7. NOC from Peshawar Electric Supply Company vide letter No. 647-49 Ghanool dated 28 May 2011 has been received.

8. NOC from Environmental Protection Agency, Environment Department, Government of Khyber Pakhtunkhwa vide letter No. EPA/IEE/Ghanool/962 dated 27 July 2011 has also been obtained.

9. National Electric Power Regulatory Authority (NEPRA) vide letter no. NEPRA/R/LAG-30/FMSP/3285-86 dated 6 May 2011 has advised the management of Frontier Mega Structure & Power (Private) Limited to approach NEPRA for approval of tariff determination for the project.

10. In accordance with the policy of the Government of Khyber Pakhtunkhwa and Government of Pakistan, FMSPL is submitting this petition for determination of Feasibility Stage Reference Tariff for the Project based on the technical data and cost estimates given in the feasibility report in order to facilitate its financing and implementation. FMSPL has also submitted an application separately for grant of Generation License for the project.

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FRONTIER MEGA STRUCTURE & POWER (PRIVATE) LIMITED
2.4 MW GHANOOL HYDROPOWER PROJECT

TARIFF PETITION

11. In accordance with the requirements of NEPRA Act and Rules and Regulations made there under, FMSPL hereby submits this Petition, in accordance with the NEPRA (Tariff Standards and Procedure) Rules 1998, for determination approval of the Feasibility Stage Reference Tariff and its Adjustment / Indexation provisions and other terms and conditions for the project.

INTRODUCTION

12. The project sponsors as listed above have formed consortium comprising of Renewable Energy Consultants (RENCON) and Riaz Ahmad & Company, Chartered Accountants (RACO) to undertake the feasibility study of 2.4 MW Hydropower Project.

13. Project was offered by the SHYDO for implementation in the private sector pursuant to the Sarhad Hydel Development Organisation Policy 2006 and GOP's Policy for Power Generation Projects 2002 ("Policy").

14. The sponsors were pre qualified and a Letter of Interest (LOI) for conducting feasibility study of the said project was issued to M/s GLOBEZ (An associated undertaking) by SHYDO vide letter no. 207-09/SHYDO/DPP, Globez dated 22 March 2010 (Attachment T- 1). LOI was transferred in the name of M/s Frontier Mega Structure & Power (Private) Limited vide letter no. 1264-65/SHYDO/DPP, Gobeiz dated 8 December 2010 (Attachment T- 2) as special purpose company was formed for this project.

15. The work on feasibility study commenced in March 2010. The assignment included site investigations, environmental study, the collection and review of the previous studies and existing data, optimization of project parameters, cost estimates and economic and financial analysis. The consultants submitted reports on core activities of the study and gave presentations to the SHYDO's Panel of Experts (POE) from time to time. POE's valuable observations and comments were duly acknowledged, evaluated and suitably incorporated in the feasibility report. By the grace of Almighty Allah, the feasibility study of the project was completed within the stipulated period and the draft Feasibility report was submitted to SHYDO on March 08, 2011 and presentation thereon was given to POE on 24 March 2011. Feasibility report for the project has been approved by the SHYDO's Panel of Experts as conveyed by SHYDO vide letter No. 523-28/SHYDO/DPP/FMSP dated April 15, 2011.(Attachment T- 3)

16. NOC from Peshawar Electric Supply Company vide letter No.647-49 dated 28 May 2011 (Attachment T - 4) and NOC from Environmental Protection Agency, Environment Department, Government of Khyber Pakhtunkhwa vide letter no. EPA/IEE/Ghanool/962 dated 07 July 2011 (Attachment T - 5) has also been obtained.

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FRONTIER MEGA STRUCTURE & POWER (PRIVATE) LIMITED
2.4 MW GHANOOI HYDROPOWER PROJECT

TARIFF PETITION

17. National Electric Power Regulatory Authority (NEPRA) vide letter no. NEPRA/R/LAG-30/FMSP/3285-86 dated 6 May 2011 (Attachment T - 6) has advised the management of Frontier Mega Structure & Power (Private) Limited to approach NEPRA for approval of tariff determination for the project.

18. Pursuant to the directions of the SHYDO, this Tariff Petition has been prepared and filed by the management of Frontier Mega Structure & Power (Private) Limited in accordance with the requirements of the NEPRA Act and the rules framed thereunder. FMSPL is a new prospective Independent Power Producer (IPP), and is currently not a licensee under the NEPRA Act. FMSPL has, therefore, simultaneously filed a separate application with NEPRA for the grant of Generation License.

19. The Reference Tariff as determined by NEPRA pursuant to this Petition would become a part of the Power Purchase Agreement (PPA) to be executed between Frontier Mega Structure & Power (Private) Limited and the Power Purchaser i.e. CPPA/NTDC, based on the PPIB's standardized PPA format and as mutually agreed to by the parties to cover the project specific requirements.

20. All the pertinent information about the project i.e. sponsors information, technical description, the Environmental and Social Impact Assessment (ESIA) Report, tentative Interconnection arrangements with NTDC's Grid System, financial data, etc. are fully explained within or attached with this petition.

21. Management of Frontier Mega Structure & Power (Private) Limited will be pleased to submit any additional information as and when required by NEPRA.

PROJECT DESCRIPTION

22. The project envisages development, design, engineering, financing, construction, testing & commissioning, owning, operation, maintenance and transfer of 2.4 MW Run-of-River Hydropower Plant at 16 Km upstream of Balakot in the Khyber Pakhtunkhwa Province of Pakistan on Build, Own, Operate and Transfer (BOOT) basis in accordance with Sarhad Hydel Development Organisation Policy 2006 and GOP's Policy for Power Generation Projects 2002, as amended from time to time.

23. The Site is located at about 16 Kms upstream of Balakot, a steel truss bailey bridge over a narrow gorge of Ghanool Nullah (Katha) on Balakot-Naran road.

24. Ghanool nullah is one of the small but perennially flowing left bank tributaries of Kunhar River that has its confluence about 16 kms upstream of Balakot town. The confluence of Ghanool Nullah with Kunhar River is almost in front of Tangair Nullah, which is a major right bank tributary of Kunhar river. The Nullah flow originates from glacial melts off Makra and Mukhair peaks which are part of a prominent geo-climatological

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FRONTIER MEGA STRUCTURE & POWER (PRIVATE) LIMITED
2.4 MW GHANOOL HYDROPOWER PROJECT

TARIFF PETITION

11. In accordance with the requirements of NEPRA Act and Rules and Regulations made there under, FMSPL hereby submits this Petition, in accordance with the NEPRA (Tariff Standards and Procedure) Rules 1998, for determination approval of the Feasibility Stage Reference Tariff and its Adjustment, Indexation provisions and other terms and conditions for the project.

INTRODUCTION

12. The project sponsors as listed above have formed consortium comprising of Renewable Energy Consultants (RENCON) and Riaz Ahmad & Company, Chartered Accountants (RACO) to undertake the feasibility study of 2.4 MW Hydropower Project.

13. Project was offered by the SHYDO for implementation in the private sector pursuant to the Sarhad Hydel Development Organisation Policy 2006 and GOP's Policy for Power Generation Projects 2002 ("Policy").

14. The sponsors were pre qualified and a Letter of Interest (LOI) for conducting feasibility study of the said project was issued to M/s GLOBEZ (An associated undertaking) by SHYDO vide letter no. 207-09/SHYDO/DPP, GLOBEZ dated 22 March 2010 (**Attachment T- 1**). LOI was transferred in the name of M/s Frontier Mega Structure & Power (Private) Limited vide letter no. 1264-65/SHYDO/DPP, GLOBEZ dated 8 December 2010 (**Attachment T- 2**) as special purpose company was formed for this project.

15. The work on feasibility study commenced in March 2010. The assignment included site investigations, environmental study, the collection and review of the previous studies and existing data, optimization of project parameters, cost estimates and economic and financial analysis. The consultants submitted reports on core activities of the study and gave presentations to the SHYDO's Panel of Experts (POE) from time to time. POE's valuable observations and comments were duly acknowledged, evaluated and suitably incorporated in the feasibility report. By the grace of Almighty Allah, the feasibility study of the project was completed within the stipulated period and the draft Feasibility report was submitted to SHYDO on March 08, 2011 and presentation thereon was given to POE on 24 March 2011. Feasibility report for the project has been approved by the SHYDO's Panel of Experts as conveyed by SHYDO vide letter No. 523-28/SHYDO/DPP/FMSP dated April 15, 2011. (**Attachment T- 3**)

16. NOC from Peshawar Electric Supply Company vide letter No.647-49 dated 28 May 2011 (**Attachment T - 4**) and NOC from Environmental Protection Agency, Environment Department, Government of Khyber Pakhtunkhwa vide letter no. EPA/IEE/Ghanool/962 dated 07 July 2011 (**Attachment T - 5**) has also been obtained.

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17. National Electric Power Regulatory Authority (NEPRA) vide letter no. NEPRA/R/LAG-30/FMSP/3285-86 dated 6 May 2011 (Attachment T - 6) has advised the management of Frontier Mega Structure & Power (Private) Limited to approach NEPRA for approval of tariff determination for the project.

18. Pursuant to the directions of the SHYDO, this Tariff Petition has been prepared and filed by the management of Frontier Mega Structure & Power (Private) Limited in accordance with the requirements of the NEPRA Act and the rules framed thereunder. FMSPL is a new prospective Independent Power Producer (IPP), and is currently not a licensee under the NEPRA Act. FMSPL has, therefore, simultaneously filed a separate application with NEPRA for the grant of Generation License.

19. The Reference Tariff as determined by NEPRA pursuant to this Petition would become a part of the Power Purchase Agreement (PPA) to be executed between Frontier Mega Structure & Power (Private) Limited and the Power Purchaser i.e. CPPA/NTDC based on the PPIB's standardized PPA format and as mutually agreed to by the parties to cover the project specific requirements.

20. All the pertinent information about the project i.e. sponsors information, technical description, the Environmental and Social Impact Assessment (ESIA) Report, technical interconnection arrangements with NTDC's Grid System, financial data, etc. are either explained within or attached with this petition.

21. Management of Frontier Mega Structure & Power (Private) Limited will be pleased to submit any additional information as and when required by NEPRA.

PROJECT DESCRIPTION

22. The project envisages development, design, engineering, financing, construction, testing & commissioning, owning, operation, maintenance and transfer of 2.4 MW Run-of-River Hydropower Plant at 16 Km upstream of Balakot in the Khyber Pakhtunkhwa Province of Pakistan on Build, Own, Operate and Transfer (BOOT) basis in accordance with Sarhad Hydel Development Organisation Policy 2006 and GOP's Policy for Power Generation Projects 2002, as amended from time to time.

23. The Site is located at about 16 Kms upstream of Balakot, a steel truss bailey bridge over a narrow gorge of Ghanool Nullah (Katha) on Balakot-Naran road.

24. Ghanool nullah is one of the small but perennially flowing left bank tributaries of Kunhar River that has its confluence about 16 kms upstream of Balakot town. The confluence of Ghanool Nullah with Kunhar River is almost in front of Tangair Nullah, which is a major right bank tributary of Kunhar river. The Nullah flow originates from glacial melts off Makra and Mukhair peaks which are part of a prominent geo-climatological

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feature in the catchment. The flow is further contributed by a number of arterial seasonal / perennial streams as the nullah descends towards its confluence with Kunhar River. The confluence of Ghanoool Nullah with Kunhar River is at an approximate altitude of 1200 masl and the highest elevation of the nullah catchment is about 3800 masl.

25. From the confluence of nullah upstream, initial stretch of about 1000 meters is relatively narrow a gorge like. A bridge on the main Balakot - Naran highway is over a narrow gorge formed by the flow of Ghanoool nullah. From the confluence point until the bridge, physical movement through the narrow gorge is possible but not easy. Upstream of this bridge, the bed slope is relatively mild and the valley starts opening up and remains so until the outskirts of Ghanoool and neighbouring villages. Average bed slope from the intake down to power house location is about 8%. This average bed slope and availability of perennial flow offer favourable opportunities of development for a small run-off-river project. Although the surface geology at some of the places along the power channel does not appear to be stable, protective measures shall stabilize the slopes.

26. Pakistan is a water-rich country but, unfortunately, Pakistan's energy market investment in hydropower generation has been caught up in confusion and paradoxes for more than a decade, and no significant progress has been achieved so far. On the other hand, the Government is trying to facilitate private investors to promote hydel power generation in the country. Hydropower is a primary domestic source of energy. Pakistan is endowed with a hydel potential of more than 40,000 MW, most of which lies in the Khyber Pakhtunkhawa, Northern Areas, Azad Jammu and Kashmir and Punjab.

27. After the creation of Pakistan, the country faced numerous problems including dearth of electrical power. Hydropower development in the Indo- Pak subcontinent started in 1925, with the construction of the Renala 1 MW hydropower station. After a decade, the 1.7 MW Malakand-I hydropower station was built, which was later upgraded to a 20 MW capacity. Subsequently, in 1953, the 20 MW Dargai hydropower station was commissioned. At the time of independence, Pakistan inherited a very small power base of only 60 MW capacity for its 31.5 million people. At the time of creation of WAPDA in 1958, the country's total hydel potential capacity was enhanced to 119 MW. By the Indus Water Treaty in 1960, it was decided that Pakistan is entitled to 142 MAF (Indus 93, Jhelum 23 and Chenab 26) of water utilization. Subsequently, 240 MW Warsak, 1000 MW Mangla and 3478 MW Tarbela Hydropower Projects were constructed. The total installed capacity of the hydropower stations in the country is about 6595 MW, out of which 3767 MW is in NWFP, 1698 MW in Punjab, 1036 MW in AJK and 93 MW in the Northern Areas.

PROJECT LOCATION (Attachment T- 7)

28. As indicated in the feasibility report, various sites for the proposed project were evaluated using a combination of visual assessment, surface geological and topographical mapping, geomorphologic and geophysical analysis, sub-surface site investigations and cost-

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benefits based on estimated energy generation. Seismicity of the project area was also studied and taken into account for design of various structures.

29. Logistically, the project site is most conveniently accessible without any chances of interruption. Except for heavy spells of rains that cause slides along the main highway, the road is open throughout the year and project works can continue uninterrupted. Main logistical routes to the project site, which may be used during project development, are as under:

- Islamabad- Abbotabad - Balakot – Project Site 170 Kms
- Peshawar - Abbotabad – Balakot – Project Site: 240 Kms
- Islamabad – Muzaffarabad – Balakot – Project site: 185 Kms

30. Approximate time to travel to the Project Site for two types of vehicles from various locations is given in Table 1.1 as under

4 x 4 Pick up or SUV	<ul style="list-style-type: none"> ▪ Islamabad to Project site ▪ Peshawar to Project site ▪ Muzaffarabad to Project site <p>(with 15 minutes stopover on the way)</p>	<ul style="list-style-type: none"> ▪ 04.30 hrs. ▪ 06.00 hrs. ▪ 01.30 hrs.
Loaded Trucks	<ul style="list-style-type: none"> ▪ Islamabad to Project site ▪ Peshawar to Project site ▪ Muzaffarabad to Project site <p>(with two 30 minutes stopovers on the way)</p>	<ul style="list-style-type: none"> ▪ 07.30 hrs. ▪ 09.30 hrs. ▪ 03.00 hrs.

OPTIMIZATION OF INSTALLED CAPACITY

31. Since the project is to be developed as a Run-Off-River scheme, the optimization exercise starts with estimation of installed capacity and energy benefits at various design discharges. The costs and benefits of installed capacity are then computed for each of the design discharge. The installed capacity, costs and benefits are then plotted on a graph in order to establish the optimum point where the difference between benefits and cost over life of the project is maximum or in other words the NPV is maximum.

32. Project sizing and power potential have been computed on the basis of monthly mean flow data. The pattern of flow undergoes a cycle of lows and highs within a range of

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0.18 m³/s to 1.4 m³/s. The mean annual discharge available for power generation in Ghanool Katha is estimated to be 0.67 m³/s calculated at design discharge Q_d = 1.0 m³/s is given below.

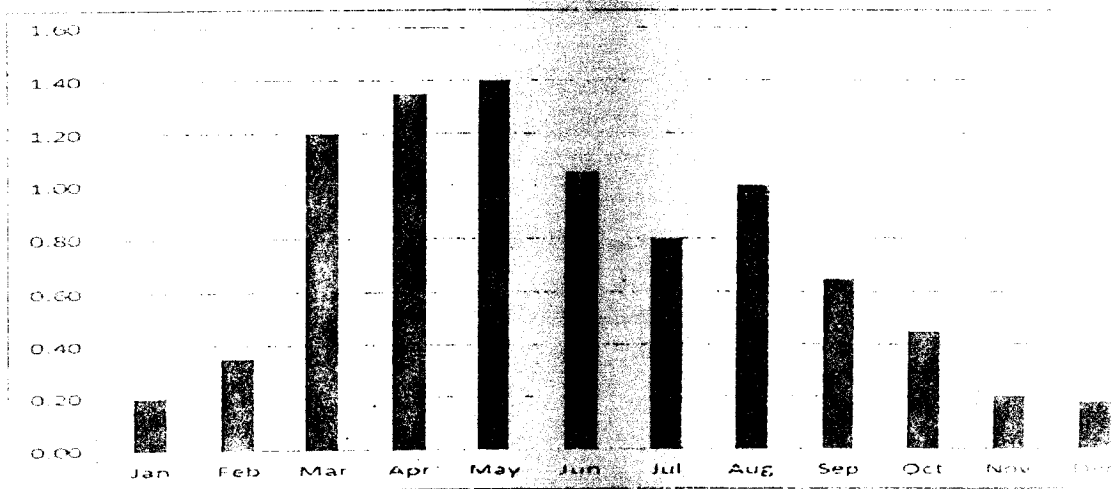
Month	Available Discharge (m ³ /s)	Water loss to seepage & local use	Diverted Discharge	Power	Energy
Jan	0.20	0.04	0.16	400	297,600
Feb	0.35	0.05	0.30	700	470,400
Mar	1.20	0.15	1.05	2400	1,785,600
Apr	1.35	0.15	1.20	2400	1,728,000
May	1.40	0.15	1.25	2400	1,785,600
Jun	1.05	0.10	0.95	2400	1,728,000
Jul	0.80	0.10	0.70	1600	1,190,400
Aug	1.00	0.10	0.90	2200	1,636,800
Sep	0.65	0.10	0.55	1400	1,008,000
Oct	0.45	0.05	0.40	650	483,600
Nov	0.30	0.04	0.26	400	288,000
Dec	0.18	0.04	0.14	350	260,400
Mean	0.74	0.09	0.66	1441.67	12,662,400
Annual Plant Factor (%)					60.23

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Mean monthly available flows for an average year of precipitation.



33. Selection of number of units is an important exercise in project layout. Although it is most cost effective to have a minimum number of units at a given installation, the choice of a multiple number of units may be necessary due to technical and economical reasons. The selection of number of units is made on the basis of minimum available discharge and acceptable turbine efficiency. The hydraulic turbines are designed to operate at their maximum efficiency at design discharge and rated head. With the variation of the design discharge the efficiency also gets affected. In case of Ghanool Project, the design discharge for each unit is $0.34 \text{ m}^3/\text{s}$. The efficiency of the turbine shall thus be affected as the discharge goes below this value. It has been observed in practice that the efficiency still remains within acceptable range if the available discharge is about 50% of the design discharge. The minimum available discharge in Ghanool Nullah is about $0.18 \text{ m}^3/\text{s}$, which is roughly 50% of the design discharge. It is thus convenient to conclude that a minimum number of three units of 800 kW shall be the best choice for the proposed layout. Other important considerations for this choice are.

- Convenience of transportation and handling at the project site. A lower capacity unit weighs less and is thus more easily transported, handled and operated.
- Operational flexibility. The units can be shut and operated with the load variation. In case of two units, the turbine shall be forced to operate at a discharge equivalent to only 25% of the design discharge that may affect the efficiency of the unit resulting in power de-rating.

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- Commercial benefits. With two or one unit, the power output may be affected due to low efficiency in low flow periods causing reduction in commercial returns.
- The power house structure is lighter with more units as light weight handling is involved.

34. The proposed powerhouse will be equipped with three (03) horizontal axis Pelton turbines of single jet. The rated power producing capacity will be 880 kW each. The proposed plant configuration gives maximum annual energy production of 12.66 GWh and an average annual plant factor of 60.23%. Each turbine is connected via an inlet valve to a common trifurcation branching off from the main penstock pipe. The spherical / butterfly inlet valves shall be firmly connected to the penstock pipe and the inlet of distributor of the turbine. In between the valve and the turbine inlet pipe, a removable pipe with flange at both ends should be provided which is capable of bearing small axial movement.

HYDROLOGICAL STUDIES

35. Detailed hydrological study is given in Section 5 "Technical Study - Volume 1" of feasibility study. In most of the smaller tributaries, the hydrological stations for maintaining long term records are not available. At best, the flow measurements of about 12 months duration could be made available during the course of studies. This information on flow pattern, however, is an estimate with possibilities of variations over longer stretch of time. The catchment area of Ghanool Katha comprise of southern slopes of Makra, Mukhair, Paya and Mali mountains. The estimated catchment area upto diversion weir is about 39 km². The flow in Ghanool Katha mostly originates from glacial melt atop peaks of 3500 masl and above in a trellis pattern. A number of arterial flows combine to form Ghanool Katha. The upper reaches of catchment are very steep, narrow and inaccessible. The valley starts widening in the lower reaches (below Ghanool village) where clusters of human dwellings can be seen right down to confluence of nullah with Kunhar River along both the banks. The flow in the Nullah is perennial with seasonal variations. The variation in estimated / measured flows may be upto $\pm 20\%$ for dry and wet periods.

36. The climatological cycle in the catchment area for any representative year is a multitude of average, dry and wet spells. Winter precipitation (October - March) caused by Westerly disturbances is the main source of snow deposits in upper reaches of catchment area. A prominent geographical feature in the catchment area is the mountain peak of Makra with an elevation of 3857 masl. Most of the mountains in the region above 2800 masl remain snow bound for about 5 months of the year. Melting of snow from these deposits starts in the month of March each year. In the lower reaches of catchment, the day temperature is above freezing even in the midst of winter season. Snow deposits in lower

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elevations, therefore, start melting as soon as the cloud cover thins out during or after the spell of snow / rains.

37. The melting process is complete by the end of May each year. During this period in March – May, there is steady increase in nullah flow with rise in ambient temperature at the upper catchment area. Between May and July, the flow is sustained by basin recharge. The flow exhibits a pattern of steady and progressive reduction in the month of June which is considered to be a relatively dry month. Occasionally, local convective storms cause heavy rains of short durations temporarily adding to the flow in the nullah.

38. The lower stretches of Kaghan valley lie within the influence of summer Monsoon caused by Easterly disturbances in the months of July and August. Mean annual rainfall recorded for Balakot town, which is at a crow flight of only a 5-6 Kms from the project site is 1718 mm. Bulk of this rainfall is in the months of July and August. The climate of the catchment area is very similar to Balakot town except that at higher elevations, the mean temperatures are a few degrees lower.

39. The flow in Ghanool Katha continues to recede beyond the month of June until summer Monsoons arrive. If the Monsoon season is wet, the flow in Ghanool Nullah shall also rise from that of June level and if it is relatively dry, the flow will be even lower than that of June. The flow in Ghanool Katha is, therefore, under influence of the hot Monsoon rains in the Months of July and August with a significant amount of sediment movement in the stream bed. Flash floods caused by sudden bursts of rains in these months are another prominent feature of Ghanool Nullah.

40. The climatological activities between September and middle of December is generally considered to be less prominent. The rain fall in this period of the year is far less compared to the other months. There are occasional bursts of rains due to local convective storms. At the end of October most of the farming activities also come to close as people prepare for the cold winters ahead. The flow starts declining from the end of August until it recedes to minimum in the months of December and January each year. This completes the climatic cycle in the catchment area. This climatic cycle is typical in lower stretches of catchment area of Kunhar River upto Kawai.

SEDIMENTATION STUDY

41. The confluence of Kunhar River and Jhelum Rivers is at Rarha, 12 kms downstream of Domel. From confluence downstream, the river traverses a distance of 100 kms before entering Mangla reservoir. Previous studies on sediment yield/transportation establishes following equations for:

$$\begin{aligned} \text{Neelum at Nauseri:} & \quad C = 0.0017 Q^2 \\ \text{Jhelum at Kohala:} & \quad C = 0.2036 Q^{1.733} \end{aligned}$$

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42. A relationship has been developed using the regional sediment yield analysis to estimate the sediment yield transportation for Ghanool nullah at intake. The values of estimated sediments (Suspended + Bed load) are listed in Table 4.21. These values have been given as follows.

Estimate of Sediment Transportation

River	Catchment area (Km ²)	Mean Annual Sediments (M.Tons)	Mean annual Inflow (m ³ /s)
Jhelum at Mangla	33500	54	
Neelum at Muzaffarabad	7194	14.8	360
Neelum at Dudhnial	4905	6.66	263
Neelum at Nausery	6682	14	388
Jhelum at Kohala	24890	40	809

43. An important parameter in determining the bed load transportation is resistance to acting shear stresses through available size and distribution of sediment grains. The armour layer of the riverbed in the mountainous region like the northern areas of Pakistan contains large cobbles and boulders of varying sizes. Subsurface material consists of mixture of gravel boulder sand and silt. The material on the surface is loose while in the subsurface, it is comparatively compact.

44. The flow in Ghanool nullah does not have the ability to move heavy bed load under ordinary conditions. It is only in heavy flood situation that bed load is transported downstream. Bed load measurements are, therefore, not available for Ghanool nullah. Nor the same is available for Garhi Habibullah, Muzaffarabad or Dudhnial stations. Since no bed load sampling is available either for Kunhar, Neelum or Jhelum rivers, a value of 30% has been assumed for the bed load on the previously available literature. Therefore additional 30% load is added to the sediment load based upon suspended sediment concentration.

45. Suspended sediments are particles of sand upto 0.2 mm thickness that can flow through the stream. No measurements for the flow of suspended sediments have been recorded for Ghanool nullah at various gauging stations. Rating curves, however, have been developed that can be used to roughly estimate the movement of suspended material in Ghanool Nullah. The applicable rating relationship is as under:

$$Y = 1.5426 X^{0.516}$$

46. Where Y is sediment concentration in ppm and X is the water discharge in m³/s. dividing the RHS of the equation by 1000, we get sediment concentration in kg/m³. For sediment load, the RHS is multiplied with water discharge to get the load in kg / sec. The equation for sediment load in kg/sec is as under:

$$y = 0.001543 X^{0.516}$$

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47. By using the above equation and the assessed mean annual flow, suspended sediment loads of Ghanool Katha can be estimated. The estimated suspended sediment load is 0.017 kg/s.

SEISMIC HAZARD EVALUATION

48. The project site is a run-off-river scheme (i.e. no poundage or reservoir). As such, the requirements for prescribing design specifications for a run-off-river structure is different from a reservoir based power station. Generally, a dam based power station with a large storage capacity is to be protected from failure as it would entail colossal loss of life and property. The design criteria for such projects are thus more stringent. The Peak Ground Acceleration (PGA) value for such projects usually adopted is "0.3" g as Operating Base Earthquake (OBE).

49. But in case of a run-off-river scheme, the failure of diversion weir or parts of power channel would not cause damage at the same scale as in case of a large reservoir based infrastructure. Moreover, if a higher value of PGA is adopted even for a run-off-river scheme, structural stability could not be ensured as the structures are built in overburden that might slip or slide under the affects of ground shaking. Attempts to stabilize the same structures through rich designs would be uneconomical. The values of ground acceleration used for the design of a run-off-river project thus have to be decided on the basis of site conditions and suitability.

50. For the proposed project site, the seismic hazard may result from within the movements caused by Main Boundary Thrust (MBT) with a magnitude 7.7 earthquake. However, there is a Maximum Credible Earthquake (MCE) with a PGA value of 0.48g. For a small sized power stations, the value of OBE is usually taken as half of the MCE. It is therefore quiet safe to recommend that the PGA value for structural design should not be above 0.24g.

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

51. As indicated in the feasibility report, the environmental and social impact Assessment (ESIA) study has been undertaken in accordance with Pakistan legislative standards. It focuses on the impacts resulting from the construction of the power channel, powerhouse and associated works. Both environmental and social impacts of the proposed scheme have been examined and discussed in the technical and economic feasibility study for the project.

52. The potential environmental impacts of the Project have been analyzed and the mitigation measures and residual impacts are discussed in the EIA Report. The nature and scope of the construction works and the environmental setting of the Project are such that

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there is no significant adverse environmental impact. No permanent adverse impact is anticipated in respect of sensitive habitat, wild life or cultural heritage.

53. The project will bring about significant positive social impacts in the area. Employment opportunity and training will be provided to a large number of unemployed youth. They will receive life-time benefit through skill training, capacity building and poverty alleviation. A large number of semi-skill and unskilled workers in the Project area will be hired during construction. Greater awareness about healthcare amongst the labour folk and the local community shall be created. At micro level, economic activities may reduce the cost of living down by making essential commodities available in greater bulks and at cheaper rates.

54. In conclusion, many positive economic and social impacts will appear in the quality of the lives of the people of the area due to implementation of the CI Link Hydropower project. These include generation of direct and indirect employment, business opportunities, infrastructure development, and improvement of living standards. Through adequate environmental management and mitigation measures, the project will have least adverse impact on the environment and the surrounding community. The implementation of the project will not thus result in any unacceptable impact on the environment either during construction or during subsequent operation of the project.

SCOPE OF WORK

55. The scope of work of the selected project encompasses the following:
- Power intake and sediment flushing facilities
 - A power station situated upstream from the existing 132/11 KV substation of Balakot
 - Tailrace channel discharging the water into the Kunhar River
 - 132/11 KV Substation for dispersal of generated power
 - Workshops and maintenance facilities
 - Staff Colony

INTER CONNECTION WITH NATIONAL GRID

56. Please refer to letter no. 647-49 / Ghanool dated 28 May 2011 of Peshawar Electric Supply Company (PESCO), (Attachment T - 4) whereby PESCO has mentioned that interconnectivity and its cost will be decided later on. Therefore Interconnection details will be mutually agreed with Peshawar Electric Supply Company (PESCO) at later stage.

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SALIENT FEATURES OF THE PROJECT

General		
1	Location of project	
	A : Diversion weir	About 500 meters downstream of Ghanool village
	B : Powerhouse	About 80 meters upstream of Confluence of Ghanool Nullah with Kunhar River.
2	Stream / Tributary	Ghanool Nullah is small left bank tributary of Kunhar river.
3	Point of confluence	About 16 kms upstream of Balakot town.
4	Access route to Site	
	a Islamabad – Abbottabad – Balakot – Site	170 kms
	b Islamabad - Muzaffarabad – Garhi Habibullah-Balakot - Site	185Kms
	c Peshawar-Hassan Abdal- Abbotabad-Balakot-Site	240 Kms
5	Approximate travel time	
	I Route 4.a	4 1/2 hrs
	II Route 4.b	4 hrs
	III Rout 4.c	6 hrs
6.	Surface Geological features	Salkhala, Panjal and Murree Formations
7.	Stream Hydrology	
	a Catchment area	39 km ²
	b Highest elevation in the catchment	
	c Average annual precipitation in catchment	1700 mm
	d Mean annual dry year precipitation in the catchment	1200 mm
	e Mean annual wet year precipitation in the catchment	2000 mm
	f Long term mean flow	1.2 m ³ /s
	g Flow available 50% of time (Q ₅₀)	1.0 m ³ /s
	h Flow available 70% of time (Q ₇₀)	0.5 m ³ /s
	Flow available 90% of time (Q ₉₀)	0.2 m ³ /s
	Minimum observed flow	0.18 m ³ /s

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8. Structural features		
Power channel		
a	X section (inside)	Rectangle
b	X section (Outside)	Rectangle
c	Bed Width (inside)	1.0 m
d	Bed width (outside)	1.76 m
e	Height above bed	1.1 m
f	Depth of water	0.9 m
g	Free board	0.2 m
h	Width of sections (Top)	0.15 m
i	Width of section bottom	0.15 m
j	Flow velocity	4 ft/s
k	Bed slope	1:500
l	Length of water channel	2270 m
m	Structure	RCC
Forebay		
a	Length of main forebay body	14.2 m
b	Max Depth of forebay	3.5 m
c	Overall width of forebay	4.8 m
d	Length of wasteway	3.0
e	Structure	RCC
Penstock		
a	No. of main Line	1
b	Outside diameter	0.80 - 0.70 - 0.45 m
c	Thickness	8 mm - 10 mm - 12 mm
d	Length of penstock	12 meters
e	No. of main anchor blocks	21
f	Dimensions of main anchor blocks	3 m x 3 x 3.1
g	No. of expansion joints	21
h	No. of reducer pipes	3
Power house		
a	Floor area	300 m ²

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b	No. of units	3
c	Span of gantry crane	11.5 m
d	Height of roof	12.465 m
e	Structure	RCC frame with stone / brick filler panels
Diversion weir		
a	Type	Tyrolean
b	Structure	RCC / PCC / Stone gabions combination structure
c	Length of main spur	25.695 m
d	Height of spur	3 m including 0.5 meters in foundation
Sand Trap		
a	Length	34.0 m
b	Width	3.0 m
c	Maximum Height	2.280
d	Structure	RCC
9	Electro-mechanical plant	
a	Type of turbine	Single jet Pelton Wheel
b	Runner diameter	-----
c	Shaft Power	870 kW
d	Number of units	3
e	Power at min. flow Q_2	400 kW
f	Voltage of generation	3300 V
g	Speed	600 RPM
h	Governor	3000 N-M
i	Type	Electro-pneumatic
j	Power transformers	3300 / 11000 volts, 1000 kVA
10	Plant Characteristics	
	Installed Capacity	2400 kW
a	Annual generation	12.662 mkWh
b	Plant factor	60.23%
c	Mode of operation	Grid interconnection
d	Interconnection Voltage	11000 volts
e	Length of interconnection	13 km
f	Operation at installed capacity	152 days

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IMPLEMENTATION METHODOLOGY

57. The project will be implemented preferably through an Engineering, Procurement and Construction (EPC) Turnkey contract arrangement. Feasibility study envisages construction through an EPC contract, involving a consortium of a main contractor, a consulting firm for detailed design and a supplier of hydropower related E&M equipment and requires that the contractors be pre qualified as a part of the international competitive bidding process. Alternatively, the project can be built by engaging two EPC contractors i.e. Engineering and Procurement (E&P) Contractors and a Construction contractor. The E&P contractors will be responsible for the engineering and procurement E&M plant and equipment and supply, supervision of erection, testing commissioning and guaranteeing Plant performance and construction contractor will be responsible for civil works, local transportation of imported plant and equipment, supply of local equipment and materials, erection testing commissioning of Plant under the supervision of E&P Contractor; The combined under the two contractors will result in a standard and fully functional Plant meeting required performance levels and all PPA requirements. In the latter case a coordination agreement will also be signed by the three parties i.e. Owner, F&P Contractor and Construction Contractor to delineate responsibilities of each party and thus satisfy the requirement of the project lenders and other stakeholders. Final decision in this regard will be taken at the time of finalization of bidding documents by the Consultants to be engaged for the purpose.

58. Keeping in view the scarcity of time available for EPC contractor(s) to carry out the additional investigations and develop the design of the project, it is envisaged that additional geotechnical investigations and hydraulic model studies for the confluence of the tail race channel and Kurhar River will be carried out to firm up the feasibility level design for inviting the EPC tenders.

CONSTRUCTION PERIOD/IMPLEMENTATION SCHEDULE

59. The construction plan for the project has been prepared for 30 months of construction period after completion of pre operating and preparatory works phase. Major activities to be undertaken and time to be dedicated for each of these are elaborated in Table as under:

SR.#	Activity	Days
1	Mobilization of plant, operating and supervisory staff to site	30
2	Erection of camps and temporary facilities	45
3	Confirmation of bench marks, topographical monuments and site layout	15
4	Excavation of forebay, intake, aqueducts and de-sanding pond area	90
5	Excavation of water channel	120

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FRONTIER MEGA STRUCTURE & POWER (PRIVATE) LIMITED
2.4 MW GHANOOL HYDROPOWER PROJECT

TARIFF PETITION

SR.#	Activity	Days
6	Permanent works for forebay, aqueducts, de-sanding pond and forebay	120
7	Excavation for power house	30
8	Permanent works for power channel	80
9	Permanent works for power house & tail race	120
10	Excavation for penstock anchors and supports	120
11	First phase of permanent works of penstock anchors and supports	60
12	Supply of penstock pipes	120
13	Penstock layout, welding, erection	120
14	Second phase of concrete works for penstock anchors	60
15	Excavation and permanent works for weir, conveyance channel	60
16	Delivery of E / M plant at site	30
17	11 kV interconnection	30
18	Erection and testing	60
19	Wet tests	30
	Total	1415

60. The dedicated time of 1415 days for the above listed activities is to be staged and shared and distributed in such a way that the projects works are executed, completed and commissioned within the period of 30 months. This task is to be achieved by adopting Critical Path Method (CPM) of construction management.

61. A schedule of activities spanning the entire project period of around 4 years and 6 months. The schedule of activities has been so proposed that the total envisaged time of 1430 days is compressed to 730 days. Important aspects, which have been taken into consideration, are as under:

COST ESTIMATES

62. The estimate of the capital cost of the project for the selected site prepared to cover the land acquisition, building and civil works, generation plant and equipment, office and other equipment, pre-operating and other expenses, contingencies and interest during construction is described in detail in Sections 6 of the feasibility report. The estimated cost of the civil works is based on the preliminary planning and design of the different components of the works. The quantities have been derived from the general arrangement and layout drawings of the structures developed as a part of the feasibility study. Project cost as estimated in the Feasibility report is given in Section 6.

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INTEREST RATES & INTEREST DURING CONSTRUCTION (IDC)

63. The consultants have taken KIBOR rates as of 22nd February 2011 in the tariff calculations. IDC and debt servicing have been computed at the said rates based on a construction period of 30 months.

Expenditure in Foreign Currencies Other than US Dollars

64. The Consultants have indicated the project costs in Rupees and US Dollars while the actual payments are likely to be made in other currencies as well. In this connection GOP has already decided that the IPPs would not be exposed to impact of exchange rate variation between US Dollars, Euros, Pound Sterling and Japanese Yen up to the Commercial Operations Date. Pursuant to this decision, the EPC price and other costs will be expressed in other currencies as applicable and NEPRA will be requested to allow indexation/adjustment at the EPC or COD stage.

TOTAL PROJECT COST

65. EPC cost and capital cost are estimated to be Rupees 468.214 million both in the feasibility report as well as in the cost estimates for this petition. Total project cost as per Feasibility report is Rupees 601.70 million. Summary of project cost is given below.

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FRONTIER MEGA STRUCTURE & POWER (PRIVATE) LIMITED
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TARIFF PETITION

SUMMARY OF PROJECT COST

PROJECT COST AND SOURCE OF FINANCE	
	Rupees in Millions
Freehold land	27.89
Building and Civil works	
Diversion weir	3.07
Approach Channel	6.91
Discharging / desilting chamber	6.79
Power Channel including protection works	65.19
Forebay & wasteway	7.87
Penstock anchors & Supports	18.54
Penstock steel pipes (Main & spillway)	44.43
Power House	20.02
Tunnage	3.27
Miscellaneous protection works	15.35
	190.35
Generation plant and equipments	
Hydro-Mechanical and Electrical equipment	125.89
11 kV transmission line to Balakot and switchgear	26.54
Miscellaneous steel works	1.00
Duties, port clearances, insurance, taxes, transportation	12.13
	171.56
Furniture and fixtures	2.00
Office equipments	2.50
Computers	2.50
Vehicles	3.00
	10.00
Pre-operating expenses	52.25
Legal charges	2.50
Debt arrangement fee	11.00
	45.75
Contingencies	22.89
Total cost of project excluding interest during construction	468.216
Interest during construction – IDC	133.48
Total cost	601.70
Equity	120.34
Debt	481.36
	601.70

* Project cost amounts to US\$ 6.99 Million. (At exchange rate of Rupees 86)

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TARIFF PETITION

REFERENCE TARIFF

66. The proposed Reference Tariff is a typical two-part tariff comprising an Energy Purchase Price (EPP) for the energy generated and delivered to the Power Purchaser and a Capacity Purchase Price (CPP) based on the hydrological data of Ghanool Nullah. Details of tariff components are as under:

a. Energy Purchase Price

67. Energy charge is the variable component of the tariff which depends on energy purchase price (EPP) and Net Electrical Output. The Energy Purchase Price indicates the price of a unit of electrical energy i.e. kWh. EPP is applied on the NEO produced during the period to calculate the energy charges of that period. EPP have further two components one is water use charges and other is variable O&M. Breakup of Energy Charge assumed for the purpose of tariff calculations is given as under:

Energy Charge	Rupees Per kWh
Water use charges	0.150
Variable O&M	0.168
Energy Purchase Price	<u>0.318</u>

i. Variable O&M Component

68. Variable O & M cost has been calculated based on the average annual net energy generation of 12.66 GWh worked out from the hydrological data of Ghanool Nullah based on plant factor of 60.23%. This component caters for the cost of O&M on a kWh basis for the day to day management of the hydropower plant. It includes replacement of spare parts on completion of their service life as well as replacement on account of premature failure of the parts.

69. For the purposes of tariff calculations, total operation and maintenance cost of the company will be Rupees 2.5 million per annum. 25% of the total operation and maintenance cost will be charged to the variable O&M cost and 75% of the total operation and maintenance cost will be charged to fixed O&M cost. Cost of stores, spares and loose tools consumed by the company will be Rupees 1.5 million per annum. Operation and maintenance cost per kWh is given as under:

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TARIFF PETITION

Variable O&M
Rupees / KWh*

Operation and maintenance	0.049
Stores, spares and loose tools	0.118
	0.168

70. *Calculated on the basis of net electric output i.e. 12,662,755 KWh.

71. Variable O&M is indexed with wholesale price index - manufacturers (WPI):

$$\text{Variable O\&M}_{\text{REV}} = 0.168 * \text{WPI}_{\text{REV}} / \text{WPI}_{\text{REF}}$$

Where:

- Variable O&M_{REV} = the revised applicable tariff component of variable O&M
- WPI_{REV} = the Revised Wholesale Price Index (Manufacturers) i.e. 2011 for the month of January 2011
- WPI_{REF} = The Wholesale Price Index (Manufacturers) as notified by Federal Bureau of Statistics for the month of December 2005 i.e. 200.05

ii. Water Use Charge

72. This component represents the Water Use Charge per unit of energy in kWh generated by the Plant and delivered to the Power Purchaser by using the water of Ghanool Nullah. Water use charges are payable to the Government of Khyber Pakhtunkhwa and are applicable to the energy generated using the water resources of the province. Water Use Charge will therefore, be subject to approval/ acceptance by the Government of Khyber Pakhtunkhwa. For the purpose of tariff calculation, water use charges are Rupees 0.150 per KWh.

b. Capacity Purchase Price

73. Capacity charge is a fixed component in the calculation of tariff and based on Capacity Purchase Price (CPP). Capacity charges are calculated by applying CPP on the NEO.

74. The Capacity Payment is based on optimal plant capacity determined in the feasibility report on the basis of the hydrology of Ghanool Nullah. The Capacity Purchase Price has been computed on the basis of the plant capacity and is expressed in Rs. / KWh based on 60.23% plant factor and is payable on the basis of available capacity as declared.

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FRONTIER MEGA STRUCTURE & POWER (PRIVATE) LIMITED
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Frontier Mega Structure & Power (Private) Limited. This is a fixed monthly payment payable to Frontier Mega Structure & Power (Private) Limited irrespective of the actual hydrology i.e. hydrological risk shall be borne by the Power Purchaser as per policy for hydropower generation projects 2006 and GOP's policy for power generation projects 2002.

75. CPP consists of different components used for the calculation of tariff which are explained as under:

Capacity Charge	Rupees Per KWh
Fixed O&M	1.000
Insurance	0.475
Debt Service	8.045
ROE during Construction	0.459
ROE	1.806
Withholding Tax	0.170
Capacity Purchase Price	<u>11.952</u>

Fixed O&M

76. This fixed O&M component represents the fixed costs of all the O&M staff including the remuneration to the staff and other administration costs including rents, utilities. It also includes costs such as NEPRA fees, audit fees, legal retainer-ship and consultancy fees, etc. This component is subject to local WPI indexation.

77. Fixed O&M is estimated to be Rupees 12.66 million per annum and Rupees 1 per KWh.

78. Fixed O&M is indexed with wholesale price index - manufacturers (WPI):

$$\text{Fixed O\&M}_{\text{REV}} = 1,000 \times \text{WPI}_{\text{REV}} / \text{WPI}_{\text{REF}}$$

Where,

- Fixed O&M_{REV} = the revised applicable tariff component of Fixed O&M
WPI_{REV} = the Revised Wholesale Price Index (Manufacturers) i.e. 201.97 for the month of January 2011
WPI_{REF} = the Reference Wholesale Price Index (Manufacturers) as notified by Federal Bureau of Statistics for the month of December 2010 i.e. 200.05

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Insurance

79. The insurance component consists of **all risk insurance/reinsurance** for the project, as well as **business-interruption insurance**, which are lenders' and PPA's stipulated requirements. Insurance policies are required to be maintained for the plant life as specified in the standardized PPA. The risks to be covered through insurance shall include machinery breakdown, natural calamities (like earthquake), sabotage and consequential business interruption, etc.

80. Insurance cost is estimated to be 1% of the total project cost and will be Rupees 6.07 million and Rupees 0.475 per KWh.

81. Insurance is indexed with TT&OD selling rates as notified by National Bank of Pakistan as under:

$$\text{Insurance}_{REV} = 0.475 * \text{TT\&OD}_{REV} / \text{TT\&OD}_{REF}$$

Where,

- Insurance_{REV} = the revised Insurance component
- TT&OD_{REV} = The revised TT&OD US\$/PKR selling rate i.e. Rupees 83.05/US\$ as notified by National Bank of Pakistan in February as notified by National Bank of Pakistan.
- TT&OD_{REF} = The reference TT&OD US\$/PKR selling rate i.e. Rupees 81.30/US\$ as notified by National Bank of Pakistan in December 2009 as notified by National Bank of Pakistan.

Debt Service

82. The long term loan will be obtained at markup rate of KIBOR plus 3% per annum. The loan will be repaid in 10 years in quarterly installments. Repayment will be made on completion of construction phase on the commencement of commercial operations. The debt portion is presently estimated as 80% of the project cost. The proposed financial structure is as under:

	Percentage	Rupees in Million
Project Cost		601.70
Debt	80%	481.36
Equity	20%	120.34

83. For tariff calculation purposes, annual debt service will amount to Rupees 100.54 million and Rupees 8.043/KWh.

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Return on Equity

84. The ROE component includes 19% return on the invested equity, net of withholding tax. 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 the debt servicing. The project on expiry of the concession period would be transferred to the government against notional cost as stipulated in the Policy for Power Generation Projects 2006.

85. The equity investment is expected to be a mix of local and foreign currencies. All the invested equity (both foreign and local) will be converted into equivalent US dollars at the reference exchange rate. This component would be subject to indexation both for Rs. /USD exchange rate variations as well as US CPI inflation.

86. The return on investment has been kept at 19% in dollar terms as currently the PIB (Pakistan Investment Bond) yield is 13.80 percent per annum for 30 years bonds. PIBs are considered as risk free investments in market. The investor investing in project always incorporate risk premium for investments. The hydro project has long gestation period, high risks and the investment is being made in current unpredicted political, severe economic conditions coupled with circular debt issues faced by the power sector. This justifies 19% dollar terms return. Also, the below mentioned risk factors are involved in the project:

1. Political and security problems
2. Terrorism
3. Economic conditions and financial crisis
4. Environmental & resettlement issues: people indulge in litigation resulting in prolonging the implementation period
5. Cost over-runs for various reason including unforeseen delays which cannot be quantified upfront
6. Higher risks during project construction and completion
7. Little experience world-wide regarding implementation of IPP hydropower projects
8. Lack of appropriate infrastructure
9. Problems associated with the project being in the remote areas
10. Longer gestation period
11. Circular debt issues

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87. Return on equity will be indexed with TT&OD US\$ / Pak Rupees selling rate as notified by National Bank of Pakistan as under.

$$ROE_{REV} = 1.806 * TT\&OD_{REV} / TT\&OD_{REF}$$

Where,

- ROE_{REV} = Revised Return on Equity
 TT&OD_{REV} = The revised TT&OD US\$/PKR selling rate i.e. Rupees 85.95 as on 15 February as notified by National Bank of Pakistan.
 TT&OD_{REF} = The reference TT&OD US\$/PKR selling rate i.e. Rupees 84.30 as on 15 December 2009 as notified by National Bank of Pakistan.

Return on Equity during Construction

88. Return on equity during construction is the return to the sponsor for the equity injected during construction period. The return is calculated at the rate of 19% per annum over a period of thirty years using the PMT formula. For the purposes of tariff calculation, return on equity during construction will be Rupees 0.459/kWh.

Withholding Tax

89. For the purpose of determination of tariff, withholding tax on return on equity during construction and return on equity will be 7.5% per annum i.e. Rupees 0.170/kWh.

Tariff Calculation Assumptions

Sr. No	Description	Assumptions
1	Plant Size	2.4 MW (Gross) 1.495 MW (Net)
	Debt: Equity Ratio	80:20
2	Equity Portion	Rupees 120.34 Million (USD 6.99 Million)
	Equity Funding	USD and/or Pak Rupees
	Loan Currency	Pakistan Rupees
3	Interest Rate	KIBOR @ 14.25% Plus 3%

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TARIFF PETITION

Sr. No	Description	Assumptions
4	Payment Schedule	Quarterly repayment including principal and interest starting from date of commercial operations.
5	Loan Tenure	10 years
6	Construction Period	30 months after pre operating phase and preparatory works phase.
7	NPV Discount Rate (For computing Levelized Tariff)	10% ^o
8	Fixed O&M Costs	Rupees 12.66 Million per annum
9	Variable O&M Costs	Rupees 2.13 Million per annum
10	Insurance	1% ^o of total project cost i.e. Rupees 6.02 Million per annum
11	Water Use Charge	Rs.0.15/kWh
12	PPA Term	30 years
13	Return on Equity	19% ^o per annum dollar terms.
14	Return on Equity during construction period	19% ^o over a period of 30 years.
15	Withholding Tax on Dividend	7.5% ^o
OPERATIONAL ASSUMPTIONS		
16	Estimated Annual Net Energy	12.66 GWh
17	Average Annual Plant Capacity Factor	60.23% ^o
18	Average Annual Plant Availability	Will be mutually agreed with the Power Purchaser during PPA negotiations
19	Annual scheduled outages	Will be mutually agreed with the Power Purchaser during PPA negotiations.
20	Annual Forced Outage allowance	Will be mutually agreed with the Power Purchaser during PPA negotiations

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Sr. No	Description	Assumptions
COST ADJUSTMENT, INDEXATION, AND ESCALATION ASSUMPTIONS		
21	Cost Adjustments	
	Cost variation in Civil Works, Hydraulic Steel Structure and M&E Works	Based on EPC Contract(s) Price
	Cost Variations of Civil Works due to Detailed Design	Item-wise variations in BOQs based on detailed design after EPC Contract(s)
	Civil Works' Cost Escalation	As per variation in escalable input cost rates
	Variation in Settlement Costs	On actual basis supported by documents
	Variation in Interconnection Voltage Level	On actual basis supported by documents
22	Currency Indexation Factor	
	Variable O&M, Foreign (if applicable)	Rs./USD Variation
	Fixed O&M, Foreign (if applicable)	Rs./USD Variation
	Insurance (if applicable)	Rs./USD Variation
	ROE, ROE(DC) & W. Tax	Rs./USD Variation
23	Inflation Factor	
	Variable O&M, Local	Pakistan WPI
	Water Use Charge	Pakistan WPI
	Fixed O&M, Local	Pakistan WPI
	Insurance	TT & OD USS/ PKR selling rates as notified by National Bank of Pakistan
	ROE, ROE(DC), W. Tax	TT & OD USS/ PKR selling rates as notified by National Bank of Pakistan

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Sr. No	Description	Assumptions
24	Interest Rate Adjustment/Indexation	
	IDC at COD & Debt Servicing after COD	Variation in KIBOR as applicable
	Reference Indexation Month for Pakistan WPI _{REV}	January 2011
	Reference Indexation Month for Pakistan WPI _{REF}	December 2010
	Reference Indexation Date for TT & OD _{REV} US\$/PKR selling rates as notified by National Bank of Pakistan	14 February 2011
	Reference Indexation Date for TT & OD _{REF} US\$/PKR selling rates as notified by National Bank of Pakistan	31 December 2009

Other General Assumptions

90. The proposed Reference Tariff is based on the following assumptions. Any change in any of these assumptions will necessitate a corresponding adjustment in the Reference Tariff:

- a) Project financing structure is based on 80:20 debt-equity ratio. If the lenders required an equity contribution higher than 20% the financing structure shall be adjusted to meet the lenders' requirement. In such an event, the Reference Tariff shall be adjusted at financial closing accordingly.
- b) Capacity Payment is calculated based on the net plant capacity determined in the feasibility report of the project i.e. 1.495 Mw by applying annual plant factor of 60.23%. Detail is given above under the caption "Reference Tariff".
- c) Hydrological risk shall be borne by the Power Purchaser.
- d) The construction period for the purpose of Reference Tariff calculations has been assumed as 30 months from the 'Notice to Proceed' to the EPC contractor. In case the completion of the project takes more than 30 months, IDC and ROEDC shall be adjusted based on the actual time taken for the completion of the project.
- e) No tax on any income of FMSPL including the sales proceeds from CPPA/NTDC

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TARIFF PETITION

is assumed. Corporate tax, General Sales Tax and all other taxes, excise duty, levies, fees etc. by any Govt. functionary including local bodies as and when imposed, shall be treated as a pass through item.

- f) Withholding tax @ 6% on local supplies/services by the Contractors/Consultants is included in the project cost. No withholding tax in respect of EPC/Offshore contractor is foreseen. In case there is any change in taxes etc., or if additional taxes, fees, excise duty, levies, etc. are imposed, the EPC/Project cost and the Reference Tariff will be adjusted accordingly.
- g) Power Purchaser shall make payments to FMSPL to cover all the energy delivered to the Grid during the pre-COD period on account of the trial runs and start-up, testing/retesting, commissioning of the Plant and during additional Commercial Operations Tests until COD is achieved. Payments will be invoiced to the Power Purchaser as per the EPP component of the Reference Tariff in accordance with the mechanism specified in the PPA. Similarly, the price of energy delivered during pre-COD testing shall be paid as per the EPP component of the Reference Tariff.
- h) The Power Purchaser shall be solely responsible for the financing, engineering, procurement, construction, testing and commissioning of the Interconnection and Transmission facilities. The Power Purchaser shall complete all activities and commission the Transmission facilities at least three months prior to the Scheduled commissioning of the first unit.
- i) No Debt Services Reserve Account (DSRA), Maintenance Reserve Account, Contingency Reserve Account or any other Reserve Account has been considered in the tariff model.
- j) During construction period, the timing of debt drawdown may vary from that estimated now; as such, the actual ('Interest During Construction' (IDC)) shall be updated at COD and the Reference Tariff table will be adjusted accordingly. Similarly, the adjustments for variations in the assumed benchmark interest rate shall be applied.
- k) Operation and Maintenance of the plant will be as per the OEM's recommendations in the O&M manuals.
- l) All generable energy from the plant shall be fully dispatched/accepted by the Power Purchaser or payment in lieu thereof shall be made by the Power Purchaser.
- m) Water Use Charge and its indexation shall be in accordance with policy for hydropower generation projects, 2006 and the Water Use Agreement signed between the Company and the provincial government.
- n) Withholding tax on dividends @ 7.5% as required under the Income Tax Ordinance, 2001 is assumed. Any change in the rate of the withholding tax would be pass-through to the Power Purchaser.

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- o) Zakat deduction on dividends (currently at 2.5%) as required under Zakat Ordinance is considered as a pass through.
- p) In case of any unintentional error or omissions, typographic errors, and any genuine assumption being overlooked, the same will be corrected / incorporated and advised to NEPRA as soon as FMSPL becomes aware of it.
- q) Any additional indexation or concession allowed by the GOP, NEPRA or another Govt. functionary to any IPP shall be allowed to FMSPL without any discrimination.
91. In order to provide an incentive for operating the plant effectively and efficiently, it is envisaged that in the event the annual energy production is more than the benchmark energy assumed for calculation of the Feasibility Stage Reference Tariff i.e. in excess of 12.66 GWh net electrical output in any Agreement Year, besides EPP, additional Capacity Payment shall be made @ 10% of the Levelized Capacity Purchase Price per kWh for the energy delivered beyond the benchmark energy of 12.66 GWh net electrical output in any Agreement Year. This is recommended by the consultants in the feasibility report and is also in line with the incentive already allowed by NEPRA to Malakand III Hydropower project.
92. The component-wise Reference Tariff for the project, based on the costs estimated in the feasibility report and the assumptions outlined above, applicable for a period of thirty (30) Agreement Years commencing from the Commercial Operations Date is placed at **Attachment T - 12** for consideration by the Authority (NEPRA) during tariff determination. The Debt Servicing Schedule is also placed at **Attachment T - 13**. A summary of Feasibility Stage Reference Tariff is given below:

Summary of Feasibility Stage			
Description	Reference Tariff		
	Year 1 – 10	Year 11 – 30	Levelized Year 1-30
	Rs. per kW	Rs. per kW	Rs. per kW
Capacity Purchase price			
Fixed O&M	1.000	1.000	1.000
Insurance	0.475	0.475	0.475
ROE	1.806	1.806	1.806
ROEDC	0.459	0.459	0.459
Withholding Tax @ 7.5%	0.170	0.170	0.170
Loan Repayment – Interest Charges	8.043	-	5.243
Total	11.952	3.909	9.152
Energy Purchase Price (EPP)			
Variable O&M	0.168	0.168	0.168

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Summary of Feasibility Stage			
Description	Reference Tariff		
	Year 1 – 10	Year 11 – 30	Levelized Year 1-30
	Rs. per kW	Rs. per kW	Rs. per kW
Water Use Charge	0.150	0.150	0.150
Total	0.318	0.318	0.318
Total Tariff (Rs./kWh)	12.270	4.227	9.469
CPP & EPP delivered beyond 12.66 GWh in any Agreement Year	(i) CPP equal to 10% of the levelized Capacity Purchase Price per kWh i.e. Rupees 0.915/KWh; and (ii) EPP i.e Rupees 0.318/KWh Total : Rupees 1.233/KWh or US Cents 1.433 / KWh at exchange rate of Rupees 86		

93. The Levelized Reference Tariff worked out in the Feasibility report is Rupees 9.469 / KWh or US Cents 11.010 / KWh at exchange rate of Rupees 86.

NEPRA MECHANISM FOR DETERMINATION OF TARIFF FOR HYDROPOWER PROJECTS

94. NEPRA's Mechanism for Determination of Tariff for Hydropower Projects dated July 18, 2008 requires determination/revision of tariff for hydropower projects at the following three stages:

- a. The first stage foreseen in the Mechanism is for a tariff based on the Feasibility Study of the Project. Feasibility Study is required to be complete, accurate and supported by relevant details including unit rates for various activities.
- b. The second stage envisaged in the Mechanism provides revision in the Feasibility Stage tariff on the basis of EPC Contract(s). Following adjustments are allowed at this stage:
 - i. **Cost Variation due to Geology in Tunnels:** The cost variations are allowed either due to escalation of rates or changes due to a different classification of rocks encountered during execution.
 - ii. **Civil Works Cost Escalation:** Adjustment in costs is allowed due to escalation in prices of Steel, Cement, Labour and Fuel.
 - iii. **Cost Variation in Hydraulic Steel Structure and M&E Works:** The cost variations are allowed due to escalation in prices of Steel, Cement, Labour and Fuel.

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Hydraulic Steel Structure and M&E Works are adjustable based on the costs in the EPC contract(s).

95. The third stage visualized in the Mechanism is the final revision in costs (arrived at after EPC contracts) allowed at COD. The adjustments include:

- i. **Cost Variation due to Geology in Tunnels;**
- ii. **Civil Works Cost Escalation;**
- iii. **Cost Variation in Hydraulic Steel Structure and M&E Works; and**
- iv. **Cost Variation due to Resettlement Cost.**

96. The adjustments on account of (i) and (ii) above are allowed in the same manner as at EPC stage up to the date the project is scheduled to achieve COD. The Cost Variation in Hydraulic Steel Structure and M&E Works (item (iii)) is allowed at EPC stage or alternatively at COD provided no adjustment is sought at EPC stage. As regards item (iv) above, variations in resettlement cost and land costs from those given in the Feasibility report are allowed provided the initial rates and variation in them are certified by the concerned provincial government and approved by NEPRA.

97. Feasibility Study of the project has been prepared by the renowned consultants. It is supported by the relevant details including unit rates for various activities. The Reference Tariff proposed for the project through this petition has been computed based on the cost estimates provided in the Feasibility report and the assumptions discussed in this Petition. The Feasibility Stage Reference Tariff initially determined pursuant to this Petition shall be subject to adjustment in accordance with NEPRA Mechanism for Determination of Tariff for Hydropower Projects as discussed below. Since no tunnel is involved in the proposed project, no adjustment would be required on account of 'Cost Variation due to Geology in Tunnels'. The adjustments would, therefore, be limited to the following:

- i. **Civil Works Cost Escalation;**
- ii. **Cost Variation in Hydraulic Steel Structure and M&E Works; and**
- iii. **Cost Variation due to Resettlement Cost.**

98. The adjustment would be sought at EPC and COD stage substantially in accordance with the provisions of the specified Mechanism. The methodology to be used for Civil Works Cost Escalation is discussed in detail in the following paragraph.

CIVIL WORKS COST ESCALATION

99. Total cost of Civil Works as estimated in the Feasibility report is Rupees 190.93 million. The prices of Civil Works will be revised/adjusted on the basis of the E11C Contract(s). These will then be subject to adjustment due to variation in BOQs based on detailed design and due to escalation in input costs from time to time. An item-wise summary of the BOQs for the Civil Works is given in Attachment ... Firm quantities for such items cannot be worked out at the feasibility stage. The quantities of the Civil Works

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FRONTIER MEGA STRUCTURE & POWER (PRIVATE) LIMITED
2.4 MW GHANOOL HYDROPOWER PROJECT

TARIFF PETITION

Items given in the Feasibility report and summarized in Attachment are, therefore, subject to variation on finalization of detailed design. The quantities of the respective items of Civil Works for the project will be determined and firm up at the detailed design stage after the EPC contract and will then be kept constant as per NEPRA Mechanism. FMSPL will submit necessary details along with documents-in-support to NEPRA for revision of the Feasibility stage quantities and costs and the Reference Tariff.

100. Base rates and sources of prices of the escalable input cost items of the Civil Works of the project i.e. Steel and Labour as given in the Feasibility report are as under:

Item	Unit Rate (Rupees.)	Source
Steel	120/Kg	As per feasibility study
Excavation – Bulk	425 / m ³	- do -
Excavation – Structural	705 / m ³	- do -

101. The cost of Civil Works will be subject to adjustment from time to time during construction for any variation in the base price of the above inputs i.e. Steel, Cement, Labour (both skilled and unskilled), etc. in accordance with NEPRA

102. Mechanism. The revised prices of the input cost items subject to escalation shall be as notified from time to time by the widely accepted relevant agencies. The escalation shall, however, be subject to agreement with the, EPC contractor.

COST VARIATION IN HYDRO-MECHANICAL AND ELECTRICAL EQUIPMENT

103. The costs of Hydro-Mechanical and Electrical equipment, including custom duty, are estimated as 125.59 million in the Feasibility report. These costs shall be subject to adjustment based on the actual prices in the EPC contract(s). FMSPL will request NEPRA for necessary adjustment at EPC stage or alternatively at COD provided no adjustment is sought at the EPC stage. FMSPL will submit necessary details along with documents-in-support to NEPRA for adjustment/enhancement of the Feasibility Stage Reference Tariff or alternatively EPC Stage Reference Tariff.

CARBON CREDITS

104. Hydropower is a clean form of electricity. The Project will reduce CO₂ emissions and would mitigate other pollutants, such as SO₂, NO_x and particulates associated with power generation from fossil fuels. Currently, only projects due to be completed till 2014 are being registered for carbon credits. However, carbon credits will be taken into account when applicable.

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FRONTIER MEGA STRUCTURE & POWER (PRIVATE) LIMITED
2.4 MW GHANOL HYDROPOWER PROJECT

TARIFF PETITION

SUMMARY OF THE PROJECT INFORMATION

Description	Data
Total base project cost	Rupees 601.70 Million (US\$ 6.99 Million)
Financing structure	
Debt	80%
Equity	20%
Construction period	30 months after notice to proceed
Project basis	BOOT
Type of turbine	Single jet Pelton wheel
No. of units	3
Generator rated capacity	800 KVA x 3
Estimated gross plant capacity	2.4 Mw
Auxiliary consumption	
Net plant capacity	1.45 Mw
Generation voltage	3.3 Volts
Annual gross energy generation	12.66 GWh
Average annual plant factor	60.23%
Feasibility Stage Reference Tariff	
Average tariff for years 1 to 10	Rupees 12.270 / KWh
Average tariff for years 11 to 20	Rupees 4.227 / KWh
Average tariff for years 21 to 30	Rupees 4.227 / KWh
Average tariff for years 1 to 30	Rupees 6.908 / KWh
Levelized tariff over 30 years at 10% discount rate	Rupees 9.469 / KWh
Capacity Purchase Price for energy delivered beyond 12.66 GWh in any agreement year.	Rupees 0.915 / KWh

VIABILITY OF THE PROJECT

105. Major advantages of hydropower plants are as under:

- a) Hydropower plants are economical on long-term basis. No fossil fuel is required; hence, operation cost is low. These advantages grow with the passage of time due to escalation of fuel cost and degradation of heat rate of thermal plants existing in the system. Tariff is thus sustainable on long term basis.
- b) These can be quickly synchronized and brought on full load within a few minutes.
- c) These are capable of responding to rapid variations in loads without loss of efficiency.
- d) The plant and associated civil structures have a long life.

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FRONTIER MEGA STRUCTURE & POWER (PRIVATE) LIMITED
2.4 MW GHANOOL HYDROPOWER PROJECT

TARIFF PETITION

- e) Maintenance requirements are lesser as compared to thermal and nuclear power plants.
- f) Hydropower plants are economical than other types in respect of capital cost and load of plant auxiliaries.
- g) Un-foreseen outages are less frequent.
- h) These facilitate thermal plants to operate in the most economical way.
 - i) Canal Fall/Run-of-River hydropower plants are better suited for base-load duty.
 - j) By taking fluctuations of all kinds, the hydropower plants improve the overall operational stability and reliability of the system.
 - k) They reduce energy-related CO₂ and other gaseous emissions and mitigate climate change/global warming.

106. A few disadvantages of the hydro power plants include high capital cost, long gestation period, and higher risks during construction besides environmental and resettlement issues. However, this project involves exceptionally minor resettlement. The operating capacity of the hydropower plants, being dependant on available water, varies throughout the year and considerably reduces during dry years. Nevertheless, the benefits of hydropower plants outweigh their disadvantages. In fact, the hydroelectric energy is the most viable mode of renewable energy available for utilization.

107. 2.4 MW Ghanool Hydropower Project at FMSPL has all the advantages enumerated above. The tariff being sought by the FMSPL is much lower than the present tariffs of various technology thermal power plants with their emissions adversely impacting the environment. The tariffs of thermal power plants are based on 60.23% plant capacity utilization factor and in case plant utilization is less than 60.23%, the actual tariff would be higher. Further, these tariffs would keep on increasing over time due to efficiency degradation and increasing price of the fuels. The proposed Levelized Reference Tariff of Rupees 9.469/kWh for the 2.4 Mw Hydropower Project at Ghanool will become cheaper than those of the thermal power plants with the passage of time as it will not be affected by any increase in the fuel price. It is also environmentally friendly. All the stakeholders including the Power Purchaser, the provincial government and the electricity consumers will indeed reap benefits on completion of this project. The 2.4 Mw Hydropower Project at Ghanool is, therefore, viable for implementation.

DETERMINATION SOUGHT

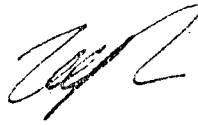
108. The Petitioner requests the National Electric Power Regulatory Authority (NEPRA) to kindly approve/determine the following:

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FRONTIER MEGA STRUCTURE & POWER (PRIVATE) LIMITED
2.4 MW GHANOOL HYDROPOWER PROJECT

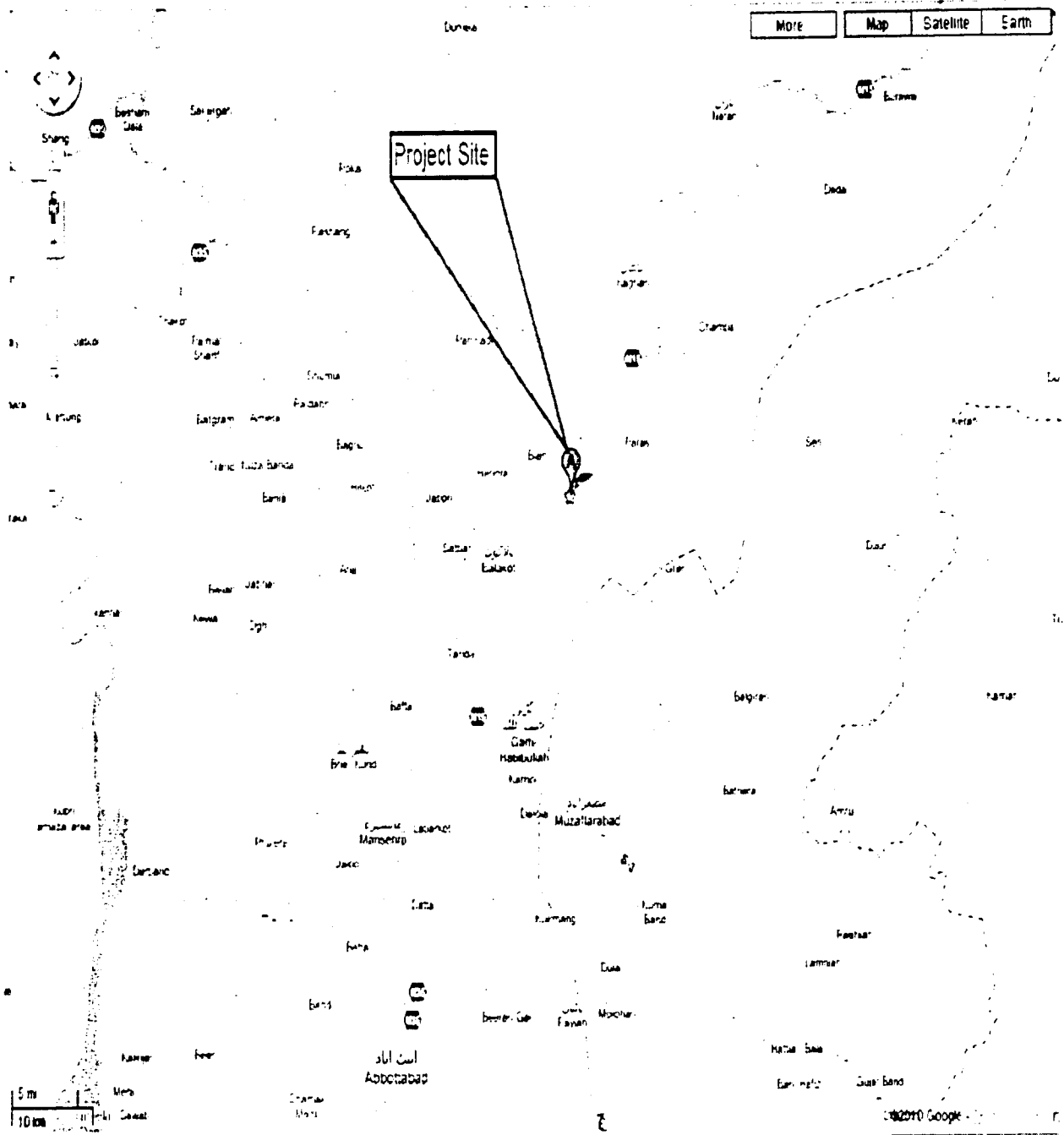
TARIFF PETITION

- a. Feasibility Stage Reference Tariff for the 2.4 Mw Hydropower Project at Ghanool for a period of thirty (30) Agreement Years from the Commercial Operations Date.
- b. Provisions for adjustment of Reference Tariff for EPC Cost as contracted and for the Cost Reopeners specific to hydropower projects; and Adjustment/indexation of the Reference Tariff components over the period of thirty (30) Agreement Years and approval of other salient terms and conditions of the Power Purchase Agreement.



FRONTIER MEGA STRUCTURE (PRIVATE) LIMITED
2.4 M.W GHANOOL HYDROPOWER PROJECT

LOCATION PLAN



FRONTIER MEGA STRUCTURE & POWER (PRIVATE) LIMITED

2.4 MW GHANOL HYDROPOWER PROJECT

TARIFF PETITION

ANNUAL ENERGY GENERATION

OF

THE PROJECT BASED ON HISTORICAL HYDROLOGICAL DATA

ATTACHMENT T - 8

TECHNICAL CONSULTANTS



RENCON

FINANCIAL CONSULTANTS

RIAZ AHMAD & COMPANY

Chartered Accountants



MEXA

FRONTIER MLGA STRUCTURE (PRIVATE) LIMITED
2.4 M.W GHANOOL HYDROPOWER PROJECT

ANNUAL ENERGY GENERATION BASED ON HISTORICAL HYDROLOGICAL DATE

Month	Available Discharge (m ³ /s)	Water loss to seepage & local use	Diverted Discharge	Power	Energy
Jan	0.20	0.04	0.16	400	297,600
Feb	0.35	0.05	0.30	700	470,400
Mar	1.20	0.15	1.05	2,400	1,785,600
Apr	1.35	0.15	1.20	2,400	1,728,000
May	1.40	0.15	1.25	2,400	1,785,600
Jun	1.05	0.10	0.95	2,400	1,728,000
Jul	0.80	0.10	0.70	1,600	1,190,400
Aug	1.00	0.10	0.90	2,200	1,636,800
Sep	0.65	0.10	0.55	1,400	1,008,000
Oct	0.45	0.05	0.40	650	483,600
Nov	0.30	0.04	0.26	400	288,000
Dec	0.18	0.04	0.14	350	260,400
Mean	0.74	0.09	0.66	1,441.67	12,662,400
Annual Plant Factor (%)					60.23

FRONTIER MEGA STRUCTURE & POWER (PRIVATE) LIMITED

2.4 MW GHANOOL HYDROPOWER PROJECT

TARIFF PETITION

PROPOSED ACTIVITY SCHEDULE

ATTACHMENT T - 9

TECHNICAL CONSULTANTS

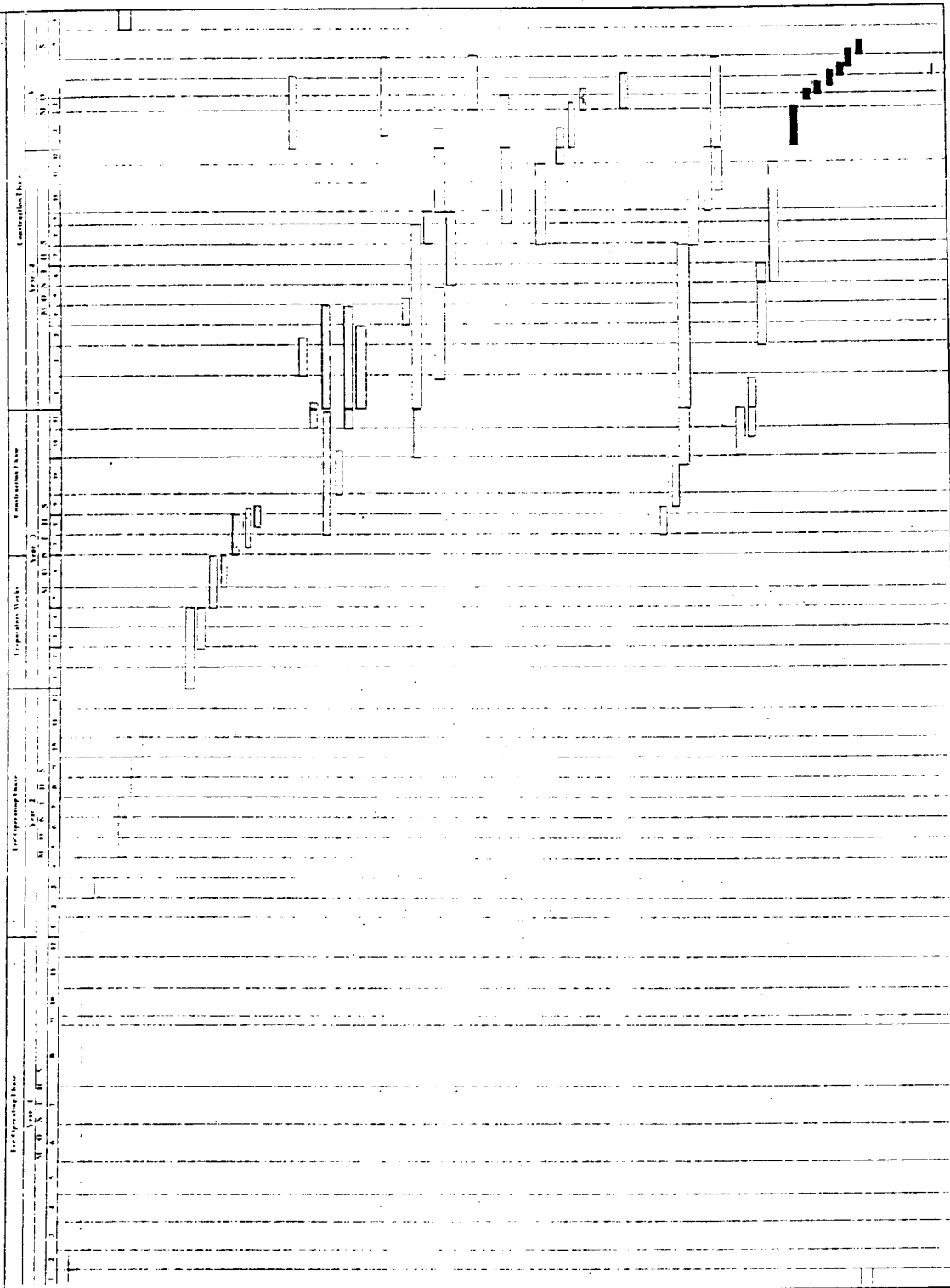


FINANCIAL CONSULTANTS

RIAZ AHMAD & COMPANY

Chartered Accountants





Activity

1. Site preparation & clearing
2. Excavation & foundation work
3. Structural steel erection
4. Concrete pouring
5. Mechanical, electrical & plumbing (MEP) installation
6. Insulation & cladding
7. Roofing & waterproofing
8. Finishing works
9. Commissioning & testing
10. Handover & close-out

Activity

1. Site preparation & clearing
2. Excavation & foundation work
3. Structural steel erection
4. Concrete pouring
5. Mechanical, electrical & plumbing (MEP) installation
6. Insulation & cladding
7. Roofing & waterproofing
8. Finishing works
9. Commissioning & testing
10. Handover & close-out

FRONTIER MEGA STRUCTURE & POWER (PRIVATE) LIMITED

2.4 MW GHANOOL HYDROPOWER PROJECT

TARIFF PETITION

**ESTIMATED PROJECT COST
AS PER FEASIBILITY REPORT**

ATTACHMENT T - 10

TECHNICAL CONSULTANTS



FINANCIAL CONSULTANTS

RIAZ AHMAD & COMPANY
Chartered Accountants



FRONTIER MEGA STRUCTURE & POWER (PRIVATE) LIMITED
2.4 MW GHANQOL HDROPOWER PROJECT

ESTIMATED COST AS PER FEASIBILITY REPORT

PROJECT COST AND SOURCE OF FINANCE	
	Rupees in Million
Freehold land	27.89
Building and Civil works	
Diversion weir	3.01
Approach Channel	6.01
Desanding / desilting chamber	6.74
Power Channel including protection works	65.79
Forebay & wasteway	7.82
Penstock anchors & Supports	18.54
Penstock steel pipes (Main & spillway)	44.43
Power House	20.02
Tailrace	3.23
Miscellaneous protection works	15.35
	190.93
Hydro-Mechanical and Electrical equipment	125.59
11 kV transmission line to Balakot and switchgear	26.54
Miscellaneous steel works	6.79
Duties, port clearances, insurance, taxes, transportation	12.43
	171.35
Furniture and fixtures	2.00
Office equipments	2.50
Computers	2.50
Vehicles	3.00
	10.00
Pre-operating expenses	32.25
Legal charges	2.50
Debt arrangement fee	11.00
	45.75
Contingencies	22.30
Total cost of project excluding interest during construction	468.216
Interest during construction – IDC	133.48
Total cost	601.70
Equity	120.34
Debt	481.36
	601.70

* Project cost amounts to US\$ 6.99 Million. (At exchange rate of Rupees 86)

FRONTIER MEGA STRUCTURE & POWER (PRIVATE) LIMITED
2.4 MW GHANOL HYDROPOWER PROJECT

TARIFF PETITION

COMPONENTWISE BILL OF QUANTITIES
AS PER FEASIBILITY REPORT

ATTACHMENT T - 11

TECHNICAL CONSULTANTS



RENCON

FINANCIAL CONSULTANTS

RIAZ AHMAD & COMPANY

Chartered Accountants



FRONTIER MEGA STRUCTURE (PRIVATE) LIMITED

2.4 MW GHANOOL HYDROPOWER PROJECT

COMPONENT - WISE BILL OF QUANTITIES AS PER FEASIBILITY REPORT

Work Item	Excavation		PCC Grade 14	RCC Grade 21	Stone /block masonry	Plaster 1:4	Structural steel	Miscellaneous protection works	Total amount
	Bulk	Structural							
	m ³	m ³	m ³	m ³	m ³	m ²	Kg	LS	M. Rs.
Diversion weir	400	360	0	75	220		170	0	3.010
Approach Channel	1635	500	1	233	7.25		230	0	6.011
Sand trap / de-silting basin	385	325	72	260			2150	0	6.738
Power Channel	28150	6200	475	2160			0	15.35	65.791
Forebay & wasteway	2200	205	10	128	0	0	1400	3.8	7.820
Penstock anchors & supports	3500	770	1910	0				0	18.535
Penstock pipes (main and wasteway)	0	0	0	0	0	0	317350	6.35	41.432
Power house	7522	3000	25	365	225	4000	1500	4.5	20.018
tailrace	345	125	30	130			0		3.226
Miscellaneous protection work									15.34
Total BOQs	44137	11485	2523	3351	452.25	4000	322800	30	
Unit Rate (Rs.)	423	705	8645	12595	4500	285	120		
Total amount	18.669	8.096	21.811	42.205	2.035	1.14	38.736	30	190.932

FRONTIER MEGA STRUCTURE (PRIVATE) LIMITED

2.4 MW GHANOOL HYDROPOWER PROJECT

COMPONENT - WISE BILL OF QUANTITIES AS PER FEASIBILITY REPORT

Break-Up of E / M Cost

Item	C&F	Duty	TPT	Erection	Cost/unit	Unit	Total
Inlet valve	0.765	0.038	0.038	0.038	0.880	3,000	2,639
Pelton turbine	9.500	0.475	0.038	0.024	10.037	3,000	30,111
Hydraulic Governor	2.680	0.134	0.134	0.134	3.082	3,000	9,246
Spear & Nozzle	2.870	0.144	0.144	0.144	3.301	3,000	9,902
AC Generator	9.400	0.470	0.470	0.470	10.810	3,000	32,430
3300 V unit switch board	5.565	0.278	0.278	0.278	6.400	2,000	12,800
3300/11000 I MVA Transformer	4.000	0.200	0.200	0.200	4.600	3,000	13,800
11000 volts switchgear	4.250	0.213	0.213	0.213	4.888	3,000	14,663
11 kV Interconnection							26,540
Miscellaneous steel works							6,791
Duties, port clearances, insurance & taxes.							12,428
	39.030	1.952	1.515	1.500	43.997		171,34

FRONTIER MEGA STRUCTURE & POWER (PRIVATE) LIMITED

2.4 MW GHANOL HYDROPOWER PROJECT

TARIFF PETITION

PROPOSED FEASIBILITY STAGE REFERENCE TARIFF

ATTACHMENT T - 12

TECHNICAL CONSULTANTS



FINANCIAL CONSULTANTS



Frontier Mega Structure (Private) Limited
24 MW Ghannool Hydropower Project
Feasibility Stage Reference Tariff

Year	Water Charges	Variable O&M	Total	Fixed O&M	Insurance	Debt Service	ROE during Construction	ROE	Withholding Tax	Total	Tariff
1	0.150	0.168	0.318	1.000	0.475	8.043	0.459	1.806	0.170	11.952	12.270
2	0.150	0.168	0.318	1.000	0.475	8.043	0.459	1.806	0.170	11.952	12.270
3	0.150	0.168	0.318	1.000	0.475	8.043	0.459	1.806	0.170	11.952	12.270
4	0.150	0.168	0.318	1.000	0.475	8.043	0.459	1.806	0.170	11.952	12.270
5	0.150	0.168	0.318	1.000	0.475	8.043	0.459	1.806	0.170	11.952	12.270
6	0.150	0.168	0.318	1.000	0.475	8.043	0.459	1.806	0.170	11.952	12.270
7	0.150	0.168	0.318	1.000	0.475	8.043	0.459	1.806	0.170	11.952	12.270
8	0.150	0.168	0.318	1.000	0.475	8.043	0.459	1.806	0.170	11.952	12.270
9	0.150	0.168	0.318	1.000	0.475	8.043	0.459	1.806	0.170	11.952	12.270
10	0.150	0.168	0.318	1.000	0.475	8.043	0.459	1.806	0.170	11.952	12.270
11	0.150	0.168	0.318	1.000	0.475	-	0.459	1.806	0.170	3.909	4.227
12	0.150	0.168	0.318	1.000	0.475	-	0.459	1.806	0.170	3.909	4.227
13	0.150	0.168	0.318	1.000	0.475	-	0.459	1.806	0.170	3.909	4.227
14	0.150	0.168	0.318	1.000	0.475	-	0.459	1.806	0.170	3.909	4.227
15	0.150	0.168	0.318	1.000	0.475	-	0.459	1.806	0.170	3.909	4.227
16	0.150	0.168	0.318	1.000	0.475	-	0.459	1.806	0.170	3.909	4.227
17	0.150	0.168	0.318	1.000	0.475	-	0.459	1.806	0.170	3.909	4.227
18	0.150	0.168	0.318	1.000	0.475	-	0.459	1.806	0.170	3.909	4.227
19	0.150	0.168	0.318	1.000	0.475	-	0.459	1.806	0.170	3.909	4.227
20	0.150	0.168	0.318	1.000	0.475	-	0.459	1.806	0.170	3.909	4.227
21	0.150	0.168	0.318	1.000	0.475	-	0.459	1.806	0.170	3.909	4.227
22	0.150	0.168	0.318	1.000	0.475	-	0.459	1.806	0.170	3.909	4.227
23	0.150	0.168	0.318	1.000	0.475	-	0.459	1.806	0.170	3.909	4.227
24	0.150	0.168	0.318	1.000	0.475	-	0.459	1.806	0.170	3.909	4.227
25	0.150	0.168	0.318	1.000	0.475	-	0.459	1.806	0.170	3.909	4.227
26	0.150	0.168	0.318	1.000	0.475	-	0.459	1.806	0.170	3.909	4.227
27	0.150	0.168	0.318	1.000	0.475	-	0.459	1.806	0.170	3.909	4.227
28	0.150	0.168	0.318	1.000	0.475	-	0.459	1.806	0.170	3.909	4.227
29	0.150	0.168	0.318	1.000	0.475	-	0.459	1.806	0.170	3.909	4.227
30	0.150	0.168	0.318	1.000	0.475	-	0.459	1.806	0.170	3.909	4.227

AVERAGE TARIFF											
Year	Water Charges	Variable O&M	Total	Fixed O&M	Insurance	Debt Service	ROE during Construction	ROE	Withholding Tax	Total	Tariff
01 to 10	0.150	0.168	0.318	1.000	0.475	8.043	0.459	1.806	0.170	11.952	12.270
11 to 20	0.150	0.168	0.318	1.000	0.475	-	0.459	1.806	0.170	3.909	4.227
21 to 30	0.150	0.168	0.318	1.000	0.475	-	0.459	1.806	0.170	3.909	4.227
1 to 30	0.150	0.168	0.318	1.000	0.475	2.681	0.459	1.806	0.170	6.590	6.908

LEVELLIZED TARIFF											
Water Charges	Variable O&M	Total	Fixed O&M	Insurance	Debt Service	ROE during Construction	ROE	Withholding Tax	Total	Tariff	
Rupees / KWh											
0.15	0.168	0.318	1.000	0.475	5.245	0.459	1.806	0.170	9.152	9.469	

FRONTIER MEGA STRUCTURE & POWER (PRIVATE) LIMITED

2.4 MW GHANOL HYDROPOWER PROJECT

TARIFF PETITION

DEBT SERVICING SCHEDULE

ATTACHMENT T - 13

TECHNICAL CONSULTANTS



FINANCIAL CONSULTANTS

RIAZ AHMAD & COMPANY
Chartered Accountants



Frontier Mega Structure & Power (Private) Limited

2.4 MW Ghanool Hydropower project

Debt Servicing Schedule

Period	Principal	Repayment	Mark - up	Balance	Debt Service
	Rupees in Million				
Quarter 1	481.357	4.704	20.759	476.653	25.462
Quarter 2	476.653	4.907	20.556	471.747	25.462
Quarter 3	471.747	5.118	20.344	466.629	25.462
Quarter 4	466.629	5.339	20.123	461.290	25.462
Year 1	481.357	20.067	81.782	461.290	101.849
Quarter 1	461.290	5.569	19.893	455.721	25.462
Quarter 2	455.721	5.809	19.653	449.911	25.462
Quarter 3	449.911	6.060	19.402	443.852	25.462
Quarter 4	443.852	6.321	19.141	437.530	25.462
Year 2	461.290	23.759	78.090	437.530	101.849
Quarter 1	437.530	6.594	18.868	430.937	25.462
Quarter 2	430.937	6.878	18.584	424.058	25.462
Quarter 3	424.058	7.175	18.288	416.884	25.462
Quarter 4	416.884	7.484	17.978	409.400	25.462
Year 3	437.530	28.131	73.718	409.400	101.849
Quarter 1	409.400	7.807	17.655	401.593	25.462
Quarter 2	401.593	8.144	17.319	393.449	25.462
Quarter 3	393.449	8.495	16.967	384.954	25.462
Quarter 4	384.954	8.861	16.601	376.093	25.462
Year 4	409.400	33.306	68.543	376.093	101.849
Quarter 1	376.093	9.243	16.219	366.850	25.462
Quarter 2	366.850	9.642	15.820	357.208	25.462
Quarter 3	357.208	10.058	15.405	347.150	25.462
Quarter 4	347.150	10.491	14.971	336.659	25.462
Year 5	376.093	39.434	62.415	336.659	101.849
Quarter 1	336.659	10.944	14.518	325.715	25.462
Quarter 2	325.715	11.416	14.046	314.299	25.462
Quarter 3	314.299	11.908	13.554	302.391	25.462
Quarter 4	302.391	12.422	13.041	289.970	25.462
Year 6	336.659	46.689	55.160	289.970	101.849
Quarter 1	289.970	12.957	12.505	277.012	25.462
Quarter 2	277.012	13.516	11.946	263.496	25.462
Quarter 3	263.496	14.099	11.363	249.397	25.462
Quarter 4	249.397	14.707	10.755	234.690	25.462
Year 7	289.970	55.279	46.570	234.690	101.849
Quarter 1	234.690	15.341	10.121	219.349	25.462
Quarter 2	219.349	16.003	9.459	203.346	25.462
Quarter 3	203.346	16.693	8.769	186.653	25.462
Quarter 4	186.653	17.413	8.049	169.240	25.462
Year 8	234.690	65.450	36.399	169.240	101.849
Quarter 1	169.240	18.164	7.298	151.076	25.462
Quarter 2	151.076	18.947	6.515	132.129	25.462
Quarter 3	132.129	19.764	5.698	112.365	25.462
Quarter 4	112.365	20.617	4.846	91.749	25.462
Year 9	169.240	77.492	24.357	91.749	101.849
Quarter 1	91.749	21.506	3.957	70.243	25.462
Quarter 2	70.243	22.433	3.029	47.810	25.462
Quarter 3	47.810	23.400	2.062	24.410	25.462
Quarter 4	24.410	24.410	1.053	0.000	25.462
Year 10	91.749	91.749	10.100	0.000	101.849



NATIONAL ELECTRIC POWER REGULATORY AUTHORITY

NOTICE OF ADMISSION / PUBLIC HEARING

PETITION FOR DETERMINATION OF GENERATION TARIFF FOR 2.4 MW GHANOOL HYDROPOWER PROJECT TO BE SETUP BY FRONTIER MEGA STRUCTURE & POWER (PVT.) LIMITED (FMSPL) AT GHANOOL NALA, BALAKOT, KHYBER PUKHTUNKHWA

All stakeholders, interested/affected persons and the general public are hereby notified that the Authority (NEPRA) has admitted the tariff petition filed by FRONTIER MEGA STRUCTURE & POWER (PVT.) LIMITED (FMSPL) for consideration.

~~FOR THE PURPOSES OF THE PETITION, THE PETITIONER HAS REQUESTED THAT THE PETITION BE ADMITTED FOR CONSIDERATION.~~

- The applicant has requested for determination of feasibility stage reference tariff for the 2.4 MW hydropower plant to be set up at Ghanool Nala, Balakot, Khyber Pukhtunkhwa, Pakistan on build, own, operate and transfer (BOOT) basis. The project, on completion, is expected to annually generate 12.66 GWh gross energy at 60.22% average annual plant capacity factor.
- The petitioner has proposed a total project cost of US\$ 6.9965 million (Rs. 601.70 million) with the proposed debt equity structure of 80:20.
- The proposed reference tariff is typical two part tariff comprising an Energy Purchase Price (EPP) for the energy generated and delivered to the power purchaser and a Capacity Purchase Price (CPP).
- The reference tariff proposed for the project has been based on 19% return on equity (IRR based).
- The petitioner has assumed that all lending for the project will be arranged locally for a tenure of 10 years plus 30 months grace period at interest rate of KIBOR plus 3%.
- Construction period of 30 months has been assumed.
- The summary of the proposed tariff is as under.

Tariff Component	Total Tariff	
	PKR/kWh	Cents/kWh*
Average tariff (1-10 years)	12.270	14.267
Average tariff (11-30 years)	4.227	4.915
Average tariff (1-30 years)	6.908	8.033
Levelized tariff over PPA term (30 years) at 10% discount rate	9.469	11.010

* PKR 86 = US \$ 1

- The breakup of project cost provided by the petitioner is given hereunder:

Description	Estimated cost (PKR Million)	Estimated cost (US\$ Million)
Freehold Land	27.89	0.3243
Building & Civil works	190.93	2.2201
Generation Plant & Equipments	158.92	1.8479
Duties, Taxes, Port Clearances, Insurance, Transportation	12.43	0.1445
Other Non-EPC Costs	10.00	0.1183
Pre-operating expenses	32.25	0.3750
Legal & Financial Charges	13.50	0.1570
Contingencies	22.30	0.2593
Total Project Cost (excluding IDC)	488.22	5.4444
Interest During Construction - IDC	133.48	1.5521
Total Project Cost	621.70	6.9965

- The Authority has decided to hold public hearing of the petition on the date, time and venue mentioned below:

Date: Wednesday, 19th October, 2011

Time: 10:30 a.m.

Venue: NEPRA, Main Office, 2nd Floor, OPF Building, Sector G-5/2, Islamabad, Pakistan

- You may participate in the proceedings of the tariff setting process in the following manner:

Any person or party, who intends to participate in the proceedings, may deliver to the Registrar a statement of comments alongwith evidence (if any). Comments should reach the office of the Registrar NEPRA within 7 days of publication of this notice. In case any person intends to participate as a party to the proceedings he may file an Intervention Request, for leave to intervene describing the manner in which such person is likely to be affected by the determination in the proceedings and present his argument for or against the petition along with a summary of evidence if any to support his case.

- Copies of the following documents, if desired, can be obtained on payment from the office of Registrar NEPRA:

Copy of Petition	Rs. 132/- per copy
Intervention Request Fee	Rs. 220/-
Photocopy of NEPRA Act	Rs. 30/-
NEPRA Tariff Rules	Rs. 30/-
Any other information	Rs. 3/- per page

All communications should be addressed to:

Registrar NEPRA

2nd Floor, OPF Building, Shahrah-e-Jamhuriat, G-5/2, Islamabad, Pakistan,

Ph: 051-920 7200 Fax: 051-921 0215, e-mail: office@nepra.org.pk

For further information and to download the tariff petition please visit our website. www.nepra.org.pk

