National Electric Power Regulatory Authority
Islamic Republic of Pakistan

Registrar

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No.NEPRA/TRF-229/PHYDO-2013/2447-2449
March 14, 2014

Subject: **Determination of the Authority in the matter of Tariff Petition filed by Pakhtunkhwa Hydel Development Organization for its Machai Hdropower Project** [Case No.NEPRA/TRF-229/PHYDO-2013]

Dear Sir,

Please find enclosed herewith the subject Determination of the Authority along with Annexure-I, II (34 pages) in Case No. NEPRA/TRF-229/PHYDO-2013.

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

3. Please note that Order of the Authority's Determination along with reference tariff table and debt service schedule as attached thereto needs to be notified in the official gazette.

Enclosure: As above

14.3.14

(Syed Safeer Hussain)

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

CC:

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

Determination of the Authority in the matter of tariff petition filed by Pakhtunkhwa Hydel Development Organization for its Machai Hydropower Project CASE NO. NEPRA/TRF-229/PHYDO-2013

1 BACKGROUND

1.1 Pakhtunkhwa Hydel Development Organization (hereinafter referred to as the "petitioner") filed a tariff petition (hereinafter referred to as the "petition") pursuant to Rule 3 of the National Electric Power Regulatory Authority (Tariff Standards and Procedures) Rules, 1998 (hereinafter referred to as the "tariff rules") on April 02, 2013 for determination of EPC stage generation tariff for its 2.60 MW Machai hydropower project (hereinafter referred to as the "project") being set up at Machai canal in district Mardan, Khyber Pakhtunkhwa.

1.2 In accordance with sub-rule 3 of rule 4 of the tariff rules, the petition was admitted for hearing by the Authority on June 26, 2013. Consequent to the admission, notice of admission/public hearing was published in the national newspapers on August 07, 2013 inviting thereby all the stakeholders, interested/affected persons or parties to participate in the tariff setting process through filing of comments / intervention requests. Further, in accordance with sub-rule 5 of rule 4 of the tariff rules, the Authority also gave directions for service of notices to the respondents and other parties which in the opinion of the Authority were likely to be affected or interested or may be of assistance to the Authority in arriving at a just and informed determination, for filing comments, replies or communications in opposition or in support of the petition. In accordance with section 7 (5) of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 the Authority also sought recommendations of the Government of Khyber Pakhtunkhwa on this petition. In response to the aforesaid notices, no intervention request was filed. However, comments were received from the Government of Khyber Pakhtunkhwa Energy and Power Department, Peshawar Electric Supply Company (hereinafter referred to as "PESCO") and Alternative Energy Development Board (hereinafter referred to as "AEDB") regarding project cost, project design, hydrological data, hydrological risk, interconnection arrangements, etc. which have been considered by the Authority and where appropriate have been discussed in relevant parts of this determination.

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1.3 Public hearing in this regard was held on August 21, 2013 at Islamabad, which was attended by the petitioner, representatives of PESCO, National Transmission & Despatch Company Limited (hereinafter referred to as "NTDC"), Water and Power Development Authority, Indus River System Authority and various other stakeholders. During the public hearing, the Authority expressed its reservations on certain technical and financial parameters of the project, and directed the petitioner to reconsider and revise some of these parameters. Further, PESCO being the proposed power purchaser was directed to provide detailed comments on the tariff petition. The petitioner vide letter no. 329/PHYDO/PM Machai/Tariff dated August 26, 2013 revised its earlier submissions. Moreover, PESCO submitted its comments vide letter no. 336/Machai HPP(2.6MW) dated October 22, 2013 which were responded to by the petitioner vide letter no. 460/PHYDO/PM Machai/22 dated November 26, 2013.

2 SUBMISSIONS OF THE PETITIONER AND SALIENT FEATURES OF THE PROJECT

2.1 Summary of the technical and financial information provided by the petitioner is as follows:

Type of the project	Low head run-of-the-canal hydropower project
Project location	Fall structure at RD 68+798 of Machai canal, Swat canal system, district Mardan, Khyber Pakhtunkhwa
Installed capacity	2.60 MW
Plant factor	As per tariff petition : 63.10 % Revised (1) : 70%
Auxiliary consumption	A per tariff petition : 0.078 MW i.e. 3% of gross installed capacity Revised (1) : 0.026 MW i.e. 1% of gross installed capacity
Gross annual generation	As per tariff petition : 14.37 GWh Revised (1) : 15.94 GWh
Net annual generation	As per tariff petition : 13.94 GWh Revised (1) : 15.78 GWh

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Turbine type	Kaplan	
Number of turbines	1	
Gross head	8.08 meters	
Head loss	0.20 meters	
Net head	7.88 meters	
Mean monthly discharge	24.6 m^3/s	
Annual average discharge	7,610 m^3/year	
Design discharge	40 m^3/s	
Construction period for computation of interest during construction	30 months	
Expected completion date of the project	December 31, 2013	
Concession period	As per tariff petition : 50 years from commercial operations date Revised [(1)] : 30 years from commercial operations date	
Financing structure	Foreign debt 80% - Equity 20%	
Lender	Asian Development Bank	
Interest rate	6 months LIBOR + 1.35% (including commitment charges)	
Debt repayment period	20 years after commercial operations date	
Debt repayment basis	Semi annual instalments	
Rate of return on equity	19.5% per annum IRR based net	
<u>Project cost</u>		<u>US$ in millions</u>
Total EPC cost		7.966
Total Non-EPC cost (including interest during construction)	As per tariff petition	5.059
	Revised [(1)]	4.456
Total project cost	As per tariff petition	13.025
	Revised [(1)]	12.422
<u>O&M costs per annum</u>		
Fixed O&M costs	As per tariff petition	1.103
	Revised [(1)]	1.061

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Variable O&M costs		0.046
Levelized tariff	As per tariff petition Rs. 15.7052/kWh US cents 16.1909/kWh	
	Revised [1] Rs. 14.4170/kWh US cents 14.8630/kWh	
Reference exchange rate	1 US$ = PKR 97 (For EPC contract price 1 US$ = PKR 86)	

1. Note : Subsequent to the filing of tariff petition, the petitioner revised its earlier submissions as detailed in paragraph 1.3 above.

2.2 The Authority has noted that the petitioner has reduced its levelized tariff claim in its revised submissions and has, therefore, decided to consider latest submissions of the petitioner for its tariff determination.

3 ISSUES

3.1 Based on the available information including but not limited to comments of the stakeholders, proceedings of the case and information submitted by the petitioner following main issues were framed for discussion and consideration by the Authority:

- Whether the capacity and annual generation claimed by the petitioner are justified?
- Whether the power purchaser will bear the hydrological risk?
- Whether the terms and conditions of debt claimed by the petitioner are justified?
- Whether construction period claimed by the petitioner is justified?
- Whether project cost claimed by the petitioner is justified?
- Whether return on equity claimed by the petitioner is justified?
- Whether O &M costs claimed by the petitioner are justified?

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- Whether insurance during operations claimed by the petitioner is justified?

The following paragraphs cover discussions and deliberations on above listed issues:

4. <u>Whether the capacity and annual generation claimed by the petitioner are justified?</u>

4.1 The petitioner has claimed following capacity and annual generation:

	As per tariff petition	Revised claim
Installed capacity	2.60 MW	2.60 MW
Auxiliary consumption	0.08 MW	0.03 MW
Net capacity	2.52 MW	2.57 MW
Annual plant factor	63.10%	70%
Annual saleable generation	13.94 Gwh.	15.78 Gwh.

4.2 PESCO in its comments has submitted that the hydrological data for 11 years has been used in the feasibility reports which is a relatively shorter time period. The petitioner in response to the aforesaid comments has submitted that Machai branch canal was remodelled in 1998-99 and only after that it became viable for power generation plants, that is why earlier data has not been included. PESCO has also submitted that the design discharge of 40 m^3/s has never been attained during the period 2005-2009, and that the plant factor works out to be 49.02% and 47.5% based on the data. The petitioner has denied the aforesaid submissions of PESCO.

4.3 The Authority observed that it had directed the petitioner during the public hearing, to rationalise the annual plant factor of the project by matching its maintenance schedule with the annual maintenance schedule of Machai canal. Further, the petitioner was required to revise its auxiliary consumption claim based on the benchmarks already established for hydropower projects. The petitioner subsequent to the aforesaid direction of the Authority, revised its claimed annual plant factor and auxiliary consumption to 70% and 1% respectively. The Authority considers that the annual plant factor of 70% as revised by the petitioner is acceptable. Further, the Authority after considering some of the regional benchmarks of auxiliary

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consumption, has decided to accept auxiliary consumption of 1% of gross installed capacity claimed by the petitioner.

4.4 In view of the discussion above, the revised claim of the petitioner detailed at paragraph 4.1 above is hereby allowed.

5. <u>Whether the power purchaser will bear the hydrological risk?</u>

5.1 PESCO in its comments on the tariff petition has suggested that the Authority may direct that the issue of hydrological risk and hydrology should be agreed between the power producer and power purchaser with mutual consent. The petitioner in response to the aforementioned comment of PESCO has submitted that the project cannot be financed unless hydrological risk is borne by the power purchaser. The Authority has noted that in comparable hydropower projects for which tariff has been determined by the Authority, hydrological risk is required to be borne by the power purchaser. The Authority has also noted that for run-of-the-canal hydropower projects, the issue of hydrological risk becomes complicated due to the fact that water flows in the canal are dependent not only on uncontrollable natural factors but also on human intervention i.e. a controllable factor. The Authority after due consideration has decided that in the instant case, the power purchaser will bear hydrological risk of the project.

6. <u>Whether the terms and conditions of debt claimed by the petitioner are justified?</u>

6.1 The petitioner has requested for allowing following terms for its 100% foreign debt:

Debt as a percentage of total project cost	80%
Debt servicing	Bi-annual
Interest rate	6 month LIBOR + 0.60%
Debt repayment period	20 years after commercial operations date (herein after referred to as "COD")

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6.2 The Authority has noted that the petitioner has requested for allowing indexation of its debt component with US$/PKR exchange rate parity, although the loan availed by the petitioner is denominated in Japanese Yens. On an inquiry, the petitioner vide its letter No. 489/PHYDO/Machai dated December 09, 2013 has clarified that:

- Indexation of US$/PKR exchange rate parity is being requested as EPC costs and other cost components are denominated in US $.

- The loan currently being drawn is converted to equivalent US $ while making payments to the EPC contractor and other eligible payments.

- The loan agreement provides that the currency of loan or a portion of the loan can be changed and it intends to approach Asian Development Bank to change currency of loan from Yen to US $.

The Authority after due consideration has decided to allow the indexation of debt component with US$/PKR exchange rate parity.

6.3 The Authority has also considered terms of debt claimed by the petitioner as detailed at paragraph 6.1 above and has noted that these terms compare favorably with the debt terms allowed to some other hydropower projects. The Authority has therefore decided to allow the debt terms detailed at paragraph 6.1 above to the petitioner.

7. <u>Whether construction period claimed by the petitioner is justified?</u>

7.1 The petitioner has requested for approval of 30 months construction period. The Authority has found that Addendum no. 3 of the EPC bidding documents specifies that bidders can assume 24 months as construction period. The Authority after considering the construction period allowed to a comparable project and timeframe considered reasonable for the construction of project, hereby allows the petitioner maximum project construction period of 30 months. The petitioner is directed to submit detail of any liquidated damages, penalties, etc. (by whatever name called), actually recoverable by the petitioner from the EPC contractor(s), pertaining to the construction period allowed by the Authority, for adjustment in the project cost, along with its application for allowing tariff adjustments at the COD. Further, the

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construction start date should be negotiated by the petitioner with the power purchaser and should be incorporated in the Power Purchase Agreement. The petitioner will be allowed adjustments at the COD for maximum project construction period of 30 months starting from the construction start date stipulated in the Power Purchase Agreement.

8. Whether project cost claimed by the petitioner is justified?

8.1 The petitioner has claimed following project cost:

	US $ in millions
EPC cost	
EPC contract price	7.956
Land cost	0.010
	7.966
Project development costs	1.025
Construction management cost	2.530
Spares	0.398
Insurance during construction	0.150
Financing fees	0.036
Interest during construction	0.317
	12.422

8.2 The aforementioned costs are discussed in the following paragraphs:

8.3 EPC contract price:

8.3.1 The petitioner has claimed this cost on the basis of signed EPC contract and has submitted that the EPC contract envisages that the price is firm and final other than

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the allowed variations stipulated in the contract. According to the information provided by the petitioner, it had executed the EPC contract with M/s Al-Fajr International & Shaheen (JV), Islamabad on June 28, 2011. The break-up of EPC cost provided by the petitioner is as follows:

	Local component Rs. in millions	Foreign component US$ in millions
Plant and mandatory spare parts supplied from abroad	33.811	2.348
Plant and mandatory spare parts supplied from within Pakistan	85.747	-
Design services	19.857	0.015
Civil works, installation and other services	295.199	0.540
	434.614	2.903

8.3.2 In support of its claim the petitioner has submitted a bids evaluation report prepared by a joint venture of Integration Environment & Energy GmbH, Germany and Electra Consultants, Pakistan. According to the bids evaluation report, invitation for bids was advertised in daily Urdu and English newspapers on June 08, 2010 and the bids were opened publically on August 26, 2010. Price proposals from the following bidders were received and opened:

a) Al Fajr & Shaheen (JV)
b) SGEIED - ATL (JV)
c) DESCON & Tried Consortium
d) GRC - Furthai Engg. Co. Consortium

On the basis of evaluation of bids, it was concluded that Al Fajar & Shaheen (JV) be awarded the EPC contract.

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8.3.3 The petitioner has claimed that their EPC contract is FIDIC based and thus not only provides transparency but is also in accordance with the best international practices providing a fair/win-win situation for the employer as well as the contractor.

Duties and taxes

8.3.4 The Authority has found that the EPC cost claimed by the petitioner includes an estimated amount of Rs. 33.811 million on account of duties and taxes. The Authority noted that the claimed duties and taxes work out to be about 17% of the total cost of plant and mandatory spare parts claimed to be supplied from abroad. The Authority, in similar cases, has estimated customs duties @ 5% of the cost of plant and machinery to be imported from abroad and has decided to allow duties and taxes to the petitioner on similar lines. Accordingly the duties and taxes allowed by the Authority work out to US $ 0.117 million, which will be subject to adjustment on actual at COD. The Authority has decided to exclude duties and taxes from the EPC contract price and to allow them separately. Adjustment of duties and taxes on actual at COD stage, will be allowed for only those duties and taxes which are imposed on the petitioner. Adjustment of taxes/duties payable on fees/charges, etc. of various third parties, not directly imposed on the petitioner, will not be allowed. The mechanism for adjustment of duties and taxes at actual on COD is detailed in paragraph (I) (b) of the order.

Price Escalation Mechanism of EPC Contract

8.3.5 As per the provisions of EPC contract, submitted by the petitioner, the price payable to the EPC contractor is escalable under a 'price escalation mechanism' (hereinafter referred to as the "mechanism"). The mechanism is applicable to three components of EPC price namely:

i. Civil works, installation and other services;
ii. Plant and mandatory spare parts supplied from abroad; and
iii. Plant and mandatory spare parts supplied from within Pakistan

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8.3.6 For the civil works, installation and other services, the mechanism specifies 20% of the cost as fixed, whereas the remaining 80% of the cost is classified as escalable. The weight age of each subcomponent of the civil works, installation and other services, its applicable index and reference value as per EPC contract are summarised below:

Component	Currency of index	Weight age	Published source of Index	Reference value
Fixed	-	20%	Not applicable	-
Labor				
- Local	Rupee	10%	Government of Pakistan (minimum wages for unskilled labor)	Rs. 250/day
- Expatriate	Foreign currency	3%	Proxy index	100
Fuel	Rupee	15%	Pakistan State Oil (cost of one liter of ordinary petrol plus five liters of high speed diesel)	425.85
Cement	Rupee	6%	State Cement Corporation, Federal Bureau of Statistics, Government of Pakistan (cost of one ton of standard port land cement - bagged for northern areas)	6,100
Reinforcing steel	Rupee	8%	Federal Bureau of Statistics, Government of Pakistan (cost of one ton of deformed grade 40 reinforcing steel bars	59,250

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			of number eight size - 25 mm diameter)	
Provision & maintenance of contractor's equipment & plant	Foreign currency	15%	Proxy index	100
Miscellaneous materials				
- local	Rupee	9%	General consumer price index published by Federal Bureau of Statistics	227.79
- imported	Foreign currency	14%	Proxy index	100
		100%		

The EPC contract provides that "Proxy index is proposed @ 2.50% per annum payable in US $ or in equivalent Pak Rs. at the exchange rate at the time of payment."

8.3.7 The Authority has considered the mechanism detailed in paragraph 8.3.6 above, and has noted that the 'Mechanism For Determination Of Tariff For Hydro Power Projects' only allows adjustment due to escalation in steel, cement, labor and fuel prices. The Authority has therefore decided not to allow adjustment of 'provision & maintenance of contractor's equipment & plant' and 'miscellaneous materials' as claimed by the petitioner. The Authority has also decided to allow the remaining price escalations at COD, as detailed in the order, according to the aforesaid mechanism, for a term not exceeding the construction period allowed by the Authority. Further, no price adjustment shall be allowed on the portion of the contract price paid to the contractor as an advance payment.

8.3.8 For the plant and mandatory spare parts, the mechanism specifies 40% of the cost as fixed, whereas the remaining 60% of the costs are classified as escalable. The

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Authority has noted that it normally allows foreign exchange rate variation for PKR/ US $ parity only, on actual basis, for the above mentioned costs. Further, the 'Mechanism For Determination Of Tariff For Hydro Power Projects' also does not envisage tariff adjustments for plant and mandatory spare parts as claimed by the petitioner. Moreover, ECC decision no. ECC-20/02/20808 dated January 22, 2008 regarding frame work for implementation of hydropower projects under Power Policy 2002 also does not consider that a reopener is required for the plant and mandatory spare parts. The Authority is of the considerate opinion that it would not be prudent to allow escalation of plant and mandatory spare parts prices for a hydropower project that has a construction period comparable to that of many thermal power projects. Keeping in view all the aforesaid facts, the Authority has decided not to allow escalations for plant and mandatory spare parts claimed by the petitioner. However, foreign exchange rate variation for PKR/ US $ parity on actual basis, based on authentic documentary evidence to be submitted by the petitioner, will be allowed at COD.

<u>Cost of Interconnection</u>

8.3.9 The Authority has found that the EPC contract price includes Rs. 45.00 million on account of grid system and connections (11 KV transmission line). In this regard, the petitioner vide its letter no. 460/PHYDO/PM Machai/22 dated November 26, 2013 has submitted that:

> *"As per Feasibility Review Report, the transmission voltage has been reduced to 11kV and it will be interconnected to Katlang Grid Station which is 12 km's from Machai Power House."*

8.3.10 PESCO has expressed reservations regarding transmission line of the project, which, as per PESCO, is not technically feasible at 11kV transmission voltage and also considering the demand factor of the area. In response, the petitioner has submitted that the arrangement of 11 kV transmission line is a proposal and PESCO can change the proposal after signing of the power purchase agreement.

8.3.11 The Authority has observed that the exact mechanics for the development of interconnection facilities should have been finalised between the power purchaser

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and the petitioner, however, both the NTDC and PESCO have not given any concrete comments regarding the interconnection arrangements and the associated costs. The Authority has therefore decided to exclude Rs. 45.00 million on account of cost of grid system and connections from the EPC contract price and to allow recovery of the interconnection cost incurred by the petitioner, if any, at the COD stage, after it submits a detailed plan duly endorsed by the power purchaser and authentic verifiable documents, to the satisfaction of the Authority, that these costs have been actually incurred in a prudent manner.

8.3.12 The Authority has noted that the EPC cost after making the adjustments detailed above works out to US $ 2.903 million and Rs. 355.803 million (i.e. US $ 6.571 million aggregate EPC cost or US $ 2.527 million per MW EPC cost based on reference exchange rate parity of Rs./US$ of 97). The Authority also observed that major part of the EPC cost is denominated in Pakistani rupee.

8.3.13 The Authority after due consideration allows US $ 2.903 million and Rs. 355.803 million as EPC cost to the petitioner with price escalations for civil works allowed as detailed in the order. Moreover, duties and taxes of US $ 0.117 million are allowed at this stage, which will be subject to adjustment at actual on COD as detailed in paragraph (I) (b) of the order.

8.4 Land cost:

8.4.1 The petitioner has claimed US $ 0.010 million on account of land cost. The Authority has found that the petitioner has claimed this cost on account of travelling related to land. The Authority has noted that expenses on account of travelling related to land are generally allowed as a part of project development costs, which are being separately allowed to the petitioner. Accordingly cost of travelling related to land amounting to US $ 0.010 million separately claimed by the petitioner is disallowed.

8.5 Project development costs:

8.5.1 The petitioner has claimed US $ 1.025 million on account of project development costs and has provided following break-up of its claim:

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	US $ in millions
SHYDO PMU (including SHYDO overheads charged at 1%)	0.465
EIA public hearing / NOC	0.002
Generation license fees	0.010
Tariff petition fees	0.035
IT hardware & accessories	0.034
Project vehicles	0.239
Annual generation license fee (for 3 years before COD)	0.006
Other permits	0.046
Authorized share cost	0.005
Rent of hired accommodation till COD	0.065
Stationery	0.002
Telephone	0.065
Miscellaneous	0.025
Inauguration	0.025
	1.025

8.5.2 The Authority has considered claim of the petitioner and has found that even the petitioner's claim regarding NEPRA fees are overstated. The Authority has also noted that charge of 1% overheads by the petitioner, in addition to return allowed on equity injected is unjustifiable. The Authority has also considered the project development costs allowed to comparable projects. After due deliberation, the Authority has decided to allow US$ 0.175 million as project development costs to the petitioner.

8.6 Construction management cost:

8.6.1 The petitioner has claimed US $ 2.530 million on account of this cost and has provided following break-up of this cost:

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	US $ in millions
Cost of owners' engineer - construction supervision	2.500
Cost of hiring of independent engineer as required under the standard PPA for 6 months prior to COD	0.030
	2.530

8.6.2 In support of its claim the petitioner has provided copy of its contract with consultants M/s. Integration Environment & Energy GmbH, Germany and M/s. Electra Consultants, Pakistan dated July 13, 2009 along with its addendum #2 dated May 30, 2013.

8.6.3 The Authority has noted that construction management cost claimed by the petitioner works to US $ 0.973 million per MW and more than 30% of its claimed EPC cost. The Authority considering the materiality of this claim required the petitioner to present further documents in support of its claim. In response the petitioner submitted its 'Report On Financial Evaluation And Ranking Of Proposals'. The Authority found that according to the aforementioned report, three bids were received, and the contractor ranked first quoted US$ 1.261 million as contract price. However, on award of another hydropower project of the petitioner to the contractor ranked first, it declined to accept the assignment for this project. Thereafter contract was awarded to M/s. Integration Environment & Energy GmbH, Germany and M/s. Electra Consultants, Pakistan at a ceiling of US $ 1.599 million which was later on enhanced to US $ 2.504 million (including taxes and duties) through addendum # 2 dated May 30, 2013. The Authority has considered the claim of the petitioner and the underlying documents submitted by it. The Authority noted that the petitioner is claiming US $ 2.504 million for a service which according to its own record was available for US $ 1.261 million. The Authority has also noted that delay in execution of the project is one of the contributing factors towards the high construction management cost claim. The Authority has considered the scope of work of the consultants, national and international benchmarks for such costs and after due

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consideration has decided to allow US $ 0.460 million to the petitioner for meeting all the construction management costs including the cost of hiring of independent engineer.

8.7 Spares:

8.7.1 The petitioner has claimed an amount of US $ 0.398 million i.e. 5% of its claimed EPC cost, on account of spares not covered under the EPC contract. The Authority has found that the EPC contract price includes the cost of mandatory spare parts. Further, a price list of recommended spare parts of US $ 0.214 million is also included in the EPC contract.

8.7.2 The Authority has noted that a certain spare parts inventory is necessary for smooth operations of the plant. The Authority has therefore decided to allow US $ 0.398 million as maximum ceiling for cost of spares on the basis of claim of the petitioner. This cost will be adjusted on actual basis at COD, not exceeding the maximum ceiling of US $ 0.398 million, on production of authentic documentary evidence by the petitioner. The cost of spare parts covered by the EPC contract will not be allowed under this cost head.

8.8 Insurance during construction:

8.8.1 The petitioner has claimed US $ 0.150 million on account of insurance during construction. The Authority has found that according to the EPC contract, the EPC contractor is required to obtain the insurances set forth in the contract at its own expense. Further, the petitioner has also not highlighted any additional insurance coverage required to be taken by it on its own expense during the construction period. In view of the aforementioned, the Authority has decided to disallow insurance during construction claimed by the petitioner.

8.9 Financing fees:

8.9.1 The petitioner has claimed US $ 0.036 million on account of financing fees and has submitted that cost claimed under this head reflects the cost of letters of credit

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Further, the petitioner has claimed commitment charges @ 0.75% of the undisbursed loan amount as a part of interest during construction.

8.9.2 The Authority has considered claim of the petitioner and has observed that the Authority normally allows commitment charges as a part of financial charges. In line with the established practice, the Authority has decided to consider commitment charges as a part of financial charges.

8.9.3 Based on the claim of the petitioner, the Authority has assessed US $ 0.070 million as financial charges. The Authority has further decided that these financial charges will be subject to adjustment at COD on the basis of actual expense, up to a maximum of 3% of the allowed debt (excluding the impact of interest during construction and financial charges), on production of authentic documentary evidence.

8.10 <u>Interest during construction:</u>

8.10.1 The petitioner has claimed interest during construction (hereinafter referred to as "IDC") of US $ 0.317 million, based on 30 months construction period and interest rate of LIBOR plus 1.35% spread. The Authority on scrutiny of the information, provided by the petitioner, has found that the applicable interest rate on debt is LIBOR plus 0.60 % spread, whereas commitment charges @ 0.75% of the undisbursed loan amount have also been claimed as IDC by the petitioner. The terms and conditions allowed by the Authority pertaining to the construction period, interest rate on debt and commitment charges are detailed in earlier parts of this determination. Based on the financing and other terms/conditions allowed to the petitioner, the Authority has assessed IDC as US $ 0.105 million. The IDC will be adjusted at COD on the basis of actual debt draw downs (within the overall debt allowed by the Authority at COD), actual PKR/US$ exchange rate variation and actual interest rates not exceeding the limit of 6 months LIBOR per annum plus 0.60%, during the project construction period allowed by the Authority.

9. Recapitulating the approved project cost of the petitioner under various cost heads is given hereunder:

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	Approved (US $ in millions)
EPC cost	
- Based in Rs.	3.668
- Based in US $	2.903
	6.571
Duties and taxes	0.117
Project development costs	0.175
Construction management cost	0.460
Spares	0.398
Financial charges	0.070
Interest during construction	0.105
	7.896

10. Whether return on equity claimed by the petitioner is justified?

10.1 The petitioner has requested for allowing 20.50% per annum rate of return on equity and an IRR of 19.5% per annum net after deduction of withholding tax on invested equity. The Authority has observed that it is allowing 17% rate of return on equity (IRR based) to hydro power generation sector. The Authority further observed that rate of return on equity allowed to hydro power generation sector is already higher by 2% than the rate of return on equity allowed to thermal power projects. The Authority finds no justification to increase the rate of return on equity of the petitioner and has decided to allow 17% (IRR based) rate of return on equity to the petitioner as has already been allowed to other hydro power projects.

10.2 The Authority has also observed that from some of the computations submitted by the petitioner it appears that it is claiming redemption of invested equity. The Authority observed that this project is being developed in the public sector and therefore it does not need to be transferred to anyone at the end of the tariff control period. In view of

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this fact, the Authority finds no justification to allow redemption of equity to the petitioner.

10.3 The Authority has assessed return on equity during construction (hereinafter referred to as "ROEDC") and return on equity after COD on the basis of terms and conditions allowed to the petitioner, as detailed in this determination and equity draw down schedule claimed by the petitioner. The ROEDC will be adjusted at COD on the basis of actual equity injections (within the overall equity allowed by the Authority at COD) during the project construction period allowed by the Authority.

11. Whether O &M costs claimed by the petitioner are justified?

11.1 The petitioner has claimed following O & M costs per annum, after COD, for the tariff control period:

	US$ in millions
Fixed O&M costs	1.061
Variable O & M costs	0.046
	1.107

11.2 The petitioner has submitted that fixed O&M costs represent the fixed costs of all the staff required for O&M, power plant administration, security, transportation, overheads, office costs, professional fees such as audit, tax and legal, as well as some minor fixed operational costs such as environmental monitoring.

11.3 The petitioner has further submitted that variable O&M costs primarily include costs of lubricants consumption, consumables and imported spare parts to be utilized in scheduled and unscheduled maintenance; as well as costs of specialized technical services from manufacturer during maintenance of the power plant.

11.4 The petitioner has requested for allowing indexation of its O & M costs as follows:

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Local	WPI
Foreign	European CPI/US CPI, Chinese indices, PKR/US $ and PKR/Euro

However, the petitioner has not provided breakup of its O&M cost claim into foreign component and local component.

11.5 The Authority after due consideration has decided to allow O & M costs to the petitioner @ 2% of its project cost, excluding interest during construction, assessed by the Authority through this determination. Further, the Authority has decided to consider 75% of the allowed O & M costs as fixed and 25% of the allowed O & M costs as variable. Moreover, the O & M costs have been further subdivided into foreign component and local component as follows:

	% of total allowed cost	
	Local	Foreign
Variable O & M costs	50	50
Fixed O & M costs	80	20

11.6 The Authority has also considered request of the petitioner for allowing indexation of its foreign O & M costs with European CPI, Chinese indices and PKR/Euro parity. The Authority has noted that the petitioner has not provided the exact percentage of its claimed O & M costs to which each of the aforesaid claimed indexations are requested to be applied. The Authority has also found that it is consistently allowing indexation of foreign component of O & M cost with US $ plus US CPI. The Authority therefore rejects the claim of the petitioner for allowing indexation of its foreign O & M costs with European CPI, Chinese indices and PKR/Euro parity.

12. <u>Whether insurance during operations claimed by the petitioner is justified?</u>

12.1 The petitioner has claimed US $ 0.150 million per annum as insurance cost in the post-COD 30 years of tariff control period. Moreover, the petitioner has requested for allowing indexation of US $ to PKR for this cost, on the basis of actual insurance

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payment. The Authority has found that the insurance cost claimed by the petitioner works out to be 1.88% of its claimed EPC cost.

12.2 The Authority has decided to allow to the petitioner, insurance during operations up to 1.35% of the allowed EPC cost, in accordance with the established benchmark. In case of insurance denominated in US $, insurance cost component of tariff will be adjusted on account of US$/PKR exchange rate variation on annual basis. Further, insurance component of the reference tariff will be adjusted as per actually incurred prudent costs, subject to maximum of 1.35% of the EPC cost, on annual basis upon production of authentic documentary evidence by the petitioner.

ORDER

Pursuant to Rule 6 of the National Electric Power Regulatory Authority Licensing (Generation) Rules, 2000, Pakhtunkhwa Hydel Development Organization (the petitioner) is allowed to charge, for its Machai Hydropower Project, the following specified/approved tariff for delivery of electricity to the power purchaser:

Tariff Components	Years 1-20 Rs./kWh	Years 21-30 Rs./kWh	Indexation
Fixed charges			
Fixed O & M			
- local	0.5746	0.5746	CPI - General
- foreign	0.1436	0.1436	US$/PKR & US CPI
Insurance	0.5452	0.5452	US$/PKR
Debt service	2.1678	-	US$/PKR & LIBOR
Return on equity	1.6499	1.6499	US$/PKR

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Return on equity during construction	0.3589	0.3589	US$/PKR
Variable charges Variable O & M - local	0.1197	0.1197	CPI - General
- foreign	0.1197	0.1197	US$/PKR & US CPI
Total	5.6794	3.5116	

i) The reference tariff has been calculated on the basis of net annual benchmark energy generation of 15.784 GWh, at annual plant capacity factor of 70%, for installed capacity of 2.60 MW.

ii) The above charges will be limited to the extent of net annual energy generation of 15.784 GWh. Net annual generation supplied to the power purchaser in a year, in excess of benchmark energy of 15.784 GWh will be charged at 10% of the prevalent approved tariff.

iii) Payment on account of hydrological risk shall be made by the power purchaser, on the basis of benchmark monthly energy generation, based on the average historic hydrology for that particular month.

iv) In the above tariff no adjustment for carbon emission reduction receipts, has been accounted for. However, upon actual realization of carbon emission reduction receipts, the same shall be distributed between the power purchaser and the petitioner in accordance with the approved mechanism given in the applicable government policy.

v) The reference PKR/dollar rate has been taken as 97.

vi) The above tariff is applicable for a period of thirty years commencing from the commercial operations date (COD).

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vii) The component wise tariff is indicated at Annex-I.

viii) Debt Servicing Schedule is attached as Annex-II.

I. <u>One Time Adjustments</u>

The following onetime adjustments shall be applicable to the reference tariff:

a. Civil works, installation and other services will be allowed price escalations at COD, for a term not exceeding the construction period allowed by the Authority. No price adjustment shall be payable on the portion of contract price paid to the contractor as an advance payment. The weight age of each subcomponent, its applicable index and reference value are summarised below:

Component	Currency of index	Weight age	Published source of Index	Reference value
Fixed	-	58%	Not applicable	-
Labor				
- Local	Rupee	10%	Government of Pakistan (minimum wages for unskilled labor)	Rs. 250/day
- Expatriate	Foreign currency	3%	Proxy index	100
Fuel	Rupee	15%	Pakistan State Oil (cost of one liter of ordinary petrol plus five liters of high speed diesel)	425.85
Cement	Rupee	6%	State Cement Corporation, Federal Bureau of Statistics, Government of Pakistan (cost of one	6,100

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			ton of standard port land cement - bagged for northern areas)	
Reinforcing steel	Rupee	8%	Federal Bureau of Statistics, Government of Pakistan (cost of one ton of deformed grade 40 reinforcing steel bars of number eight size - 25 mm diameter)	59,250
		100%		

The EPC contract provides that "Proxy index is proposed @ 2.50% per annum payable in US $ or in equivalent Pak Rs. at the exchange rate at the time of payment."

b. Duties and/or taxes, not being of refundable nature, imposed on the petitioner up to the commencement of its commercial operations will be subject to adjustment at actual on COD, as against US $ 0.117 million allowed now, upon production of verifiable documentary evidence to the satisfaction of the Authority.

c. Recovery of the interconnection cost incurred by the petitioner, if any, at the COD stage, will be allowed after it submits a detailed plan duly endorsed by the power purchaser and authentic verifiable documents, to the satisfaction of the Authority, that these costs have been actually incurred in a prudent manner.

d. Spares will be adjusted on actual basis at COD, not exceeding the maximum ceiling of US $ 0.398 million, on production of authentic documentary evidence by the petitioner.

e. Financial charges will be adjusted at COD on the basis of actual expense, up to a maximum of 3% of the total debt allowed (excluding the impact of interest during construction and financial charges), on production of authentic documentary evidence.

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f. The interest during construction will be adjusted at COD on the basis of actual debt draw downs (within the overall debt allowed by the Authority at COD), actual PKR/US$ exchange rate variation for foreign loan denominated in US $ and actual interest rates not exceeding the limit of 6 months LIBOR per annum plus 0.60%, during the project construction period allowed by the Authority.

g. The return on equity during construction will be adjusted at COD on the basis of actual equity injections (within the overall equity allowed by the Authority at COD), during the project construction period allowed by the Authority.

h. The return on equity (including return on equity during construction) will be adjusted at COD on the basis of PKR/US$ exchange rate variation.

i. At the COD for all project costs payable in PKR, the amounts allowed in US $ will be converted into PKR using the reference PKR/dollar rate of 97.

j. Any liquidated damages, penalties, etc. (by whatever name called), actually recoverable by the petitioner from the EPC contractor(s), pertaining to the construction period allowed by the Authority, will be adjusted in the project cost.

k. The reference tariff table shall be revised at COD while taking into account the above adjustments. The petitioner shall submit its request to the Authority within 90 days of COD for necessary adjustments in tariff.

II. <u>Pass-Through Items</u>

No provision for income tax has been accounted for in the tariff. If any tax is imposed on the petitioner, the exact amount paid by the petitioner shall be reimbursed by the power purchaser to the petitioner on production of original receipts. This payment will be considered as a pass-through payment spread over a 12 months period. Furthermore, in such a scenario, the petitioner shall also submit to the power purchaser details of any tax shield savings and the power purchaser shall deduct the amount of these savings from its payment to the petitioner on account of taxation.

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Withholding tax on dividends is also a pass through item just like other taxes as indicated in the government guidelines for determination of tariff for new IPPs. The power purchaser shall make payment on account of withholding tax at the time of actual payment of dividend, on production of original receipts, subject to maximum of 7.5% of 17% return on equity according to the following formula:

Withholding tax payable = $[\{17\% * (E_{(Ref)} - E_{(Red)})\} + ROEDC_{(Ref)}] \times 7.5\%$

Where:

$E_{(Ref)}$ = Adjusted reference equity at COD

$E_{(Red)}$ = Equity redeemed

$ROEDC_{(Ref)}$ = Reference return on equity during construction

In case the petitioner does not declare a dividend in a particular year or only declares a partial dividend, then the difference in the withholding tax amount (between what is paid in that year and the total entitlement as per the net return on equity) would be carried forward and accumulated so that the petitioner is able to recover the same as a pass through from the power purchaser in future on the basis of the total dividend payout.

III. Hydrological Risk

Hydrological risk will be borne by the power purchaser. The petitioner shall receive an assured minimum amount every month from the power purchaser to cover its fixed costs (fixed O&M, insurance, debt servicing, return on equity including return on equity during construction) in case the plant is available but sufficient water i.e. at least equal to the average historic hydrology for that particular month is not available to generate electricity. The power purchaser before signing the power purchase agreement should verify the month wise benchmark hydrology.

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IV. Indexations:

The following indexation shall be applicable to the reference tariff:

i) Indexation applicable to O&M

The local part of O&M cost will be adjusted on account of local inflation and O&M foreign component will be adjusted on account of variation in dollar/rupee exchange rate and US CPI. Quarterly adjustments for inflation and exchange rate variation will be made on 1st July, 1st October, 1st January and 1st April respectively on the basis of latest available information with respect to CPI - General (notified by the Pakistan Bureau of Statistics), US CPI (notified by US bureau of labor statistics) and revised TT & OD selling rate of US Dollar as notified by the National Bank of Pakistan. The mode of indexations will be as follows:

$$F\ O\&M_{(LREV)} = F\ O\&M_{(LREF)} * CPI - G_{(REV)} / CPI - G_{(REF)}$$

$$F\ O\&M_{(FREV)} = F\ O\&M_{(FREF)} * US\ CPI_{(REV)} / US\ CPI_{(REF)} * ER_{(REV)} / ER_{(REF)}$$

$$V\ O\&M_{(LREV)} = V\ O\&M_{(LREF)} * CPI - G_{(REV)} / CPI - G_{(REF)}$$

$$V\ O\&M_{(FREV)} = V\ O\&M_{(FREF)} * US\ CPI_{(REV)} / US\ CPI_{(REF)} * ER_{(REV)} / ER_{(REF)}$$

Where:

$F\ O\&M_{(LREV)}$	=	The revised applicable fixed O&M local component of tariff
$F\ O\&M_{(FREV)}$	=	The revised applicable fixed O&M foreign component of tariff
$V\ O\&M_{(LREV)}$	=	The revised applicable variable O&M local component of tariff
$V\ O\&M_{(FREV)}$	=	The revised applicable variable O&M foreign component of tariff
$F\ O\&M_{(LREF)}$	=	The reference fixed O&M local component of tariff

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		for the relevant period
F O&M (FREF)	=	The reference fixed O&M foreign component of tariff for the relevant period
V O&M (LREF)	=	The reference variable O&M local component of tariff for the relevant period
V O&M (FREF)	=	The reference variable O&M foreign component of tariff for the relevant period
CPI - G (REV)	=	The revised consumer price index (general)
CPI - G (REF)	=	179.94 consumer price index (general) of June 2013 notified by the Pakistan Bureau of Statistics
US CPI (REV)	=	The revised US CPI (all urban consumers)
US CPI (REF)	=	233.504 US CPI (all urban consumers) for the month of June 2013 as notified by the US Bureau of Labor Statistics
ER (REV)	=	The revised TT & OD selling rate of US dollar as notified by the National Bank of Pakistan
ER (REF)	=	The reference TT & OD selling rate of US dollar as notified by the National Bank of Pakistan - Current reference 97

ii) Adjustment of insurance component

In case of insurance denominated in US $, insurance cost component of tariff will be adjusted on account of US$/PKR exchange rate variation on annual basis. Further, insurance component of the reference tariff will be adjusted as per actually incurred prudent costs, subject to maximum of 1.35% of the EPC cost, on annual basis upon production of authentic documentary evidence by the petitioner.

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iii) Return on equity

The return on equity component of tariff including return on equity during construction will be adjusted on the basis of revised TT & OD selling rate of US Dollar as notified by the National Bank of Pakistan according to the following formula:

$$ROE_{(REV)} = ROE_{(REF)} \times ER_{(REV)} / ER_{(REF)}$$

$$ROEDC_{(REV)} = ROEDC_{(REF)} \times ER_{(REV)} / ER_{(REF)}$$

Where:

$ROE_{(REV)}$	=	Revised return on equity component of tariff expressed in Rs/kWh.
$ROE_{(REF)}$	=	Reference return on equity component of tariff expressed in Rs/kWh.
$ROEDC_{(REV)}$	=	Revised return on equity during construction component of tariff expressed in Rs/kWh.
$ROEDC_{(REF)}$	=	Reference return on equity during construction component of tariff expressed in Rs/kWh.
$ER_{(REV)}$	=	The revised TT & OD selling rate of US dollar as notified by the National Bank of Pakistan
$ER_{(REF)}$	=	The reference TT & OD selling rate of US dollar

iv) Adjustment for LIBOR variation

The interest part of debt service component will remain unchanged throughout the term except for the adjustment due to variation in 6 months US $ LIBOR, while spread of 0.60% on 6 months US $ LIBOR remaining the same, according to the following formula:

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ΔI = $P_{(REV)}$ * ($LIBOR_{(REV)}$ - 0.50%) / 2

Where:

ΔI = the variation in interest charges applicable corresponding to variation in 6 months US \$ LIBOR. ΔI can be positive or negative depending upon whether 6 months US \$ $LIBOR_{(Rev)}$ per annum > or < 0.50%. The interest payment obligation will be enhanced or reduced to the extent of ΔI for each half year under adjustment.

$P_{(REV)}$ = is the outstanding principal (as indicated in the attached debt service schedule to this order at Annex-II) on a bi-annual basis at the relevant calculations date.

<u>Note:</u>
Adjustments on account of inflation, foreign exchange rate variation, LIBOR variation and actual insurance will be approved and announced by the Authority within fifteen working days after receipt of the petitioner's request for adjustment in tariff in accordance with the requisite indexation mechanism stipulated herein.

V. Terms and Conditions of Tariff:

Design & Manufacturing Standards:

Hydro power generation system shall be designed, manufactured and tested in accordance with the latest IEC standards or other equivalent standards. All plant and equipment shall be new.

Emissions Trading/ Carbon Credits:

The petitioner shall process and obtain emissions/carbon credits expeditiously and credit the proceeds to the power purchaser as per the applicable government policy and the terms and conditions agreed between the petitioner and the power purchaser.

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Others:

i. The Authority has allowed/approved only those cost(s), term(s), condition(s), provision(s), etc. which have been specifically approved in this tariff determination. Any cost(s), term(s), condition(s), provision(s), etc. contained in the tariff petition or any other document which are not specifically allowed/approved in this tariff determination, should not be implied to be approved, if not adjudicated upon in this tariff determination.

ii. The above tariff and terms and conditions shall be incorporated as the specified tariff approved by the Authority pursuant to Rule 6 of the National Electric Power Regulatory Authority Licensing (Generation) Rules, 2000 in the power purchase agreement between the petitioner and the power purchaser.

iii. The order along with reference tariff table and debt service schedule as attached thereto are recommended for notification by the Federal Government in the official gazette in accordance with Section 31(4) of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997.

AUTHORITY

13/3/2014
(Habibullah Khilji)
Member

13/3/14
(Maj. (R) Haroon Rashid)
Member

12.3.14
(Khawaja Muhammad Naeem)
Vice Chairman

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14.03.14

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Annex-I

Pakhtunkhwa Hydel Development Organization
MACHAI HYDROPOWER PROJECT
REFERENCE TARIFF

Year	Variable O&M Local	Variable O&M Foreign	Fixed O&M Local	Fixed O&M Foreign	Insurance	Return on Equity (ROE)	ROE During Construction	Withholding Tax @7.5%	Loan Repayment	Interest Charges	Total Tariff
	Rs./kWh	Rs./kWh	Rs./kWh	Rs./kWh	Rs./kWh	Rs./kWh	Rs./kWh	Rs./kWh	Rs./kWh	Rs./kWh	Rs./kWh
1	0.1197	0.1197	0.5746	0.1436	0.5452	1.6499	0.3589	0.1507	1.7455	0.4223	5.8301
2	0.1197	0.1197	0.5746	0.1436	0.5452	1.6499	0.3589	0.1507	1.7648	0.4030	5.8301
3	0.1197	0.1197	0.5746	0.1436	0.5452	1.6499	0.3589	0.1507	1.7842	0.3835	5.8301
4	0.1197	0.1197	0.5746	0.1436	0.5452	1.6499	0.3589	0.1507	1.8039	0.3639	5.8301
5	0.1197	0.1197	0.5746	0.1436	0.5452	1.6499	0.3589	0.1507	1.8238	0.3440	5.8301
6	0.1197	0.1197	0.5746	0.1436	0.5452	1.6499	0.3589	0.1507	1.8439	0.3238	5.8301
7	0.1197	0.1197	0.5746	0.1436	0.5452	1.6499	0.3589	0.1507	1.8643	0.3035	5.8301
8	0.1197	0.1197	0.5746	0.1436	0.5452	1.6499	0.3589	0.1507	1.8848	0.2829	5.8301
9	0.1197	0.1197	0.5746	0.1436	0.5452	1.6499	0.3589	0.1507	1.9056	0.2622	5.8301
10	0.1197	0.1197	0.5746	0.1436	0.5452	1.6499	0.3589	0.1507	1.9266	0.2411	5.8301
11	0.1197	0.1197	0.5746	0.1436	0.5452	1.6499	0.3589	0.1507	1.9479	0.2199	5.8301
12	0.1197	0.1197	0.5746	0.1436	0.5452	1.6499	0.3589	0.1507	1.9694	0.1984	5.8301
13	0.1197	0.1197	0.5746	0.1436	0.5452	1.6499	0.3589	0.1507	1.9911	0.1767	5.8301
14	0.1197	0.1197	0.5746	0.1436	0.5452	1.6499	0.3589	0.1507	2.0131	0.1547	5.8301
15	0.1197	0.1197	0.5746	0.1436	0.5452	1.6499	0.3589	0.1507	2.0353	0.1325	5.8301
16	0.1197	0.1197	0.5746	0.1436	0.5452	1.6499	0.3589	0.1507	2.0577	0.1101	5.8301
17	0.1197	0.1197	0.5746	0.1436	0.5452	1.6499	0.3589	0.1507	2.0804	0.0874	5.8301
18	0.1197	0.1197	0.5746	0.1436	0.5452	1.6499	0.3589	0.1507	2.1034	0.0644	5.8301
19	0.1197	0.1197	0.5746	0.1436	0.5452	1.6499	0.3589	0.1507	2.1266	0.0412	5.8301
20	0.1197	0.1197	0.5746	0.1436	0.5452	1.6499	0.3589	0.1507	2.1500	0.0178	5.8301
21	0.1197	0.1197	0.5746	0.1436	0.5452	1.6499	0.3589	0.1507	-	-	3.6623
22	0.1197	0.1197	0.5746	0.1436	0.5452	1.6499	0.3589	0.1507	-	-	3.6623
23	0.1197	0.1197	0.5746	0.1436	0.5452	1.6499	0.3589	0.1507	-	-	3.6623
24	0.1197	0.1197	0.5746	0.1436	0.5452	1.6499	0.3589	0.1507	-	-	3.6623
25	0.1197	0.1197	0.5746	0.1436	0.5452	1.6499	0.3589	0.1507	-	-	3.6623
26	0.1197	0.1197	0.5746	0.1436	0.5452	1.6499	0.3589	0.1507	-	-	3.6623
27	0.1197	0.1197	0.5746	0.1436	0.5452	1.6499	0.3589	0.1507	-	-	3.6623
28	0.1197	0.1197	0.5746	0.1436	0.5452	1.6499	0.3589	0.1507	-	-	3.6623
29	0.1197	0.1197	0.5746	0.1436	0.5452	1.6499	0.3589	0.1507	-	-	3.6623
30	0.1197	0.1197	0.5746	0.1436	0.5452	1.6499	0.3589	0.1507	-	-	3.6623
Levelized Tariff	**0.1197**	**0.1197**	**0.5746**	**0.1436**	**0.5452**	**1.6499**	**0.3589**	**0.1507**	**1.6959**	**0.2618**	**5.6200**

The above charges will be limited to the extent of net annual energy generation of 15.784 GWh. Net annual generation supplied to the power purchaser in a year, in excess of benchmark energy of 15.784 GWh will be charged at 10% of the prevalent approved tariff.

Pakhtunkhwa Hydel Development Organization
MACHAI HYDROPOWER PROJECT
Debt Servicing Schedule

Annex-II

	Foreign Debt					Annual Principal Repayment Rs./kWh	Annual Interest Rs./kWh	Annual Debt Servicing Rs./kWh
Period	Principal Million US$	Repayment Million US$	Mark-Up Million US$	Balance Million US$	Debt Service Million US$			
	6.32	0.14	0.03	6.18	0.1764			
	6.18	0.14	0.03	6.03	0.1764			
1	6.32	0.28	0.07	6.03	0.3527	1.7455	0.4223	2.1678
	6.03	0.14	0.03	5.89	0.1764			
	5.89	0.14	0.03	5.75	0.1764			
2	6.03	0.29	0.07	5.75	0.3527	1.7648	0.4030	2.1678
	5.75	0.14	0.03	5.60	0.1764			
	5.60	0.15	0.03	5.46	0.1764			
3	5.75	0.29	0.06	5.46	0.3527	1.7842	0.3835	2.1678
	5.46	0.15	0.03	5.31	0.1764			
	5.31	0.15	0.03	5.16	0.1764			
4	5.46	0.29	0.06	5.16	0.3527	1.8039	0.3639	2.1678
	5.16	0.15	0.03	5.01	0.1764			
	5.01	0.15	0.03	4.87	0.1764			
5	5.16	0.30	0.06	4.87	0.3527	1.8238	0.3440	2.1678
	4.87	0.15	0.03	4.72	0.1764			
	4.72	0.15	0.03	4.57	0.1764			
6	4.87	0.30	0.05	4.57	0.3527	1.8439	0.3238	2.1678
	4.57	0.15	0.03	4.41	0.1764			
	4.41	0.15	0.02	4.26	0.1764			
7	4.57	0.30	0.05	4.26	0.3527	1.8643	0.3035	2.1678
	4.26	0.15	0.02	4.11	0.1764			
	4.11	0.15	0.02	3.96	0.1764			
8	4.26	0.31	0.05	3.96	0.3527	1.8848	0.2829	2.1678
	3.96	0.15	0.02	3.80	0.1764			
	3.80	0.16	0.02	3.65	0.1764			
9	3.96	0.31	0.04	3.65	0.3527	1.9056	0.2622	2.1678
	3.65	0.16	0.02	3.49	0.1764			
	3.49	0.16	0.02	3.33	0.1764			
10	3.65	0.31	0.04	3.33	0.3527	1.9266	0.2411	2.1678
	3.33	0.16	0.02	3.17	0.1764			
	3.17	0.16	0.02	3.01	0.1764			
11	3.33	0.32	0.04	3.01	0.3527	1.9479	0.2199	2.1678
	3.01	0.16	0.02	2.85	0.1764			
	2.85	0.16	0.02	2.69	0.1764			
12	3.01	0.32	0.03	2.69	0.3527	1.9694	0.1984	2.1678
	2.69	0.16	0.01	2.53	0.1764			
	2.53	0.16	0.01	2.37	0.1764			
13	2.69	0.32	0.03	2.37	0.3527	1.9911	0.1767	2.1678
	2.37	0.16	0.01	2.21	0.1764			
	2.21	0.16	0.01	2.04	0.1764			
14	2.37	0.33	0.03	2.04	0.3527	2.0131	0.1547	2.1678
	2.04	0.17	0.01	1.88	0.1764			
	1.88	0.17	0.01	1.71	0.1764			
15	2.04	0.33	0.02	1.71	0.3527	2.0353	0.1325	2.1678
	1.71	0.17	0.01	1.54	0.1764			
	1.54	0.17	0.01	1.38	0.1764			
16	1.71	0.33	0.02	1.38	0.3527	2.0577	0.1101	2.1678
	1.38	0.17	0.01	1.21	0.1764			
	1.21	0.17	0.01	1.04	0.1764			
17	1.38	0.34	0.01	1.04	0.3527	2.0804	0.0874	2.1678
	1.04	0.17	0.01	0.87	0.1764			
	0.87	0.17	0.00	0.70	0.1764			
18	1.04	0.34	0.01	0.70	0.3527	2.1034	0.0644	2.1678
	0.70	0.17	0.00	0.52	0.1764			
	0.52	0.17	0.00	0.35	0.1764			
19	0.70	0.35	0.01	0.35	0.3527	2.1266	0.0412	2.1678
	0.35	0.17	0.00	0.18	0.1764			
	0.18	0.18	0.00	0.00	0.1764			
20	0.35	0.35	0.00	0.00	0.3527	2.1500	0.0178	2.1678

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