



National Electric Power Regulatory Authority
Islamic Republic of Pakistan

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No. NEPRA/TRF-309/KPCL-2015/2544-2546
February 24, 2016

Subject: Determination of the Authority in the matter of Petition filed by Karot Power Company (Pvt.) Ltd. (KPCL) for Determination of EPC-Stage Generation Tariff in respect of 720-MW Karot Hydropower Project [Case # NEPRA/TRF-309/KPCL-2015]

Dear Sir,

Please find enclosed herewith the subject Determination of the Authority along with Annexure-I, II, III & IV and Additional Note of Mr. Himayatullah Khan, Member NEPRA (39 pages) in Case No. NEPRA/TRF-309/KPCL-2015.

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

3. The Order of the Authority along with Annexure-I, II, III & IV of the Determination needs to be notified in the official Gazette.

Enclosure: As above

(Iftikhar Ali Khan)

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.



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No. NEPRA/R/TRF-309/KPCL-2015/2547

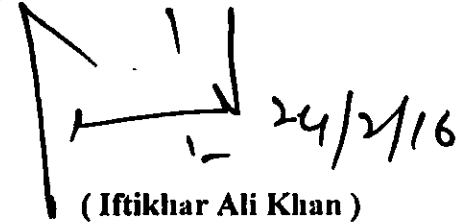
February 24, 2016

Chief Executive Officer,
Karot Power Company (Pvt.) Ltd.
House No. 5, Street No. 72,
F-8/3, Islamabad.

Subject: Determination of the Authority in the matter of Petition filed by Karot Power Company (Pvt.) Ltd. (KPCL) for Determination of EPC-Stage Generation Tariff in respect of 720-MW Karot Hydropower Project [Case # NEPRA/TRF-309/KPCL-2015]

The Authority has made its Determination on the subject matter. The Determination has been sent to Ministry of Water & Power for notification in the official Gazette vide letter No. NEPRA/TRF-309/KPCL-2015/2544-2546 dated 24.02.2016. A copy of the Determination is served herewith.

Enclosure: As above


(Iftikhar Ali Khan)



National Electric Power Regulatory Authority
Islamic Republic of Pakistan

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No. NEPRA/R/TRF-309/KPCL-2015/2548

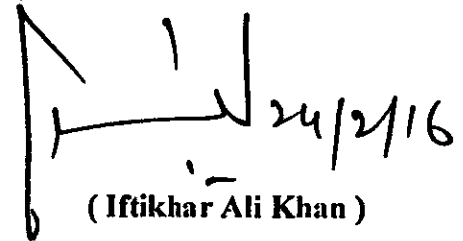
February 24, 2016

Chief Executive Officer
Central Power Purchasing Agency Guarantee Limited
6th Floor, Shaheed-e-Millat Secretariat,
Jinnah Avenue, Blue Area,
Islamabad

Subject: Determination of the Authority in the matter of Petition filed by Karot Power Company (Pvt.) Ltd. (KPCL) for Determination of EPC-Stage Generation Tariff in respect of 720-MW Karot Hydropower Project [Case # NEPRA/TRF-309/KPCL-2015]

The Authority has made its Determination on the subject matter. The Determination has been sent to Ministry of Water & Power for notification in the official Gazette vide letter No. NEPRA/TRF-309/KPCL-2015/2544-2546 dated 24.02.2016. A copy of the Determination is served herewith.

Enclosure: As above


(Iftikhar Ali Khan)

Determination of the Authority in the matter of Tariff Petition filed by Karot Power Company (Pvt) Limited for determination of EPC-Stage generation tariff in respect of 720-MW Karot Hydropower Project.

Karot Power Company (Private) Limited (hereinafter referred to as "KPCL" or the "Project Company" or the "Petitioner") filed tariff petition for determination of EPC-stage tariff for its 720-MW Karot hydropower project on April 02, 2015. The petition was admitted by the Authority on April 17, 2015. The hearing in the matter was initially scheduled for June 04, 2015, but was adjourned by the Authority after it came to know that the Petitioner's proposed change in the project design does not contain approval of the competent forum/agency. The Authority, therefore, directed the Petitioner to submit approval of Panel of Experts (POE) of PPIB before proceeding further in the matter.

2. Upon submission of approval of POE of PPIB by the Petitioner vide letter dated August 26, 2015, the Authority decided to hold another hearing of the petition on October 20, 2015. Accordingly, notice of hearing was published in the daily newspapers on October 02, 2015. Simultaneously written notices were also sent to the major stakeholders including the intervener (Mr. Asim Javed, resident of Islamabad) for participation and comments/objections if any on the petition. In response the Central Power Purchasing Agency (Guarantee) Limited (hereinafter "CPPA-G" of the "Power Purchaser") submitted its comments on various technical and financial aspects of the petition. The comments received from the intervener as well as the Power Purchaser were forwarded to the petitioner for reply which have been replied by the Petitioner. The observations/objections raised by the commentator as well as intervener have been discussed under relevant heads in the following paragraphs.

3. **Submissions of the Petitioner**

3.1 Karot Power Company (Private) Limited ("KPCL") is a private limited company registered under the Companies Ordinance, 1984. KPCL is in the process of developing a 720 MW hydropower project to be located near the Karot Bridge at Tehsil Kahuta, District Rawalpindi, Punjab (the "Project"). The Project is to be developed under the guidelines of Policy for Power Generation Projects 2002 (the "Policy") issued by the Government of Pakistan.

3.2 The 720 MW (gross) Karot Hydropower Project is located on Jhelum River just upstream of the Karot Bridge in Punjab Province. The development of the Project is being undertaken on a build-own-operate-transfer (BOOT) basis by the Karot Power Company (Private) Limited having 93% stake by China Three Gorges South Asia Investment Limited – a subsidiary of China Three Gorges Corporation. The project is being implemented under China-Pakistan Economic Corridor (CPEC) as a prioritized project.

3.3 The Project will be the fourth in the cascade of five hydropower ("HPP") stations planned on Jhelum River, downstream of the Azad Pattan HPP and upstream of the Mangla HPP. The dam is situated near Karot Bridge in Punjab Province, about 74 km away from Mangla Dam and 55km away from Islamabad. Access to the site is by the Islamabad-Kahuta-Kotli road.

3.4 Since the project is located on the Jhelum River which is an early rising stream. Its river flow normally starts increasing in early March (much earlier than the other rivers in Pakistan) and reaches its peak till May, and continues in high flows towards the end of August. This river flow pattern will result in availability of electricity during the critical periods of low availability of hydropower, and will result in mitigation of chronic power shortage problem in winter from March to May, when power output of Tarbela Hydropower Plant falls substantially.



3.5 The feasibility study of the Project was conducted by a consortium of engineering consultants headed by SMEC and was approved by the Panel of Experts organized by PPIB in the year 2009. KPCL was granted a generation license by NEPRA on 26 November 2013 for its hydro-based generation facility to be located at Karot village, District Rawalpindi, in the province of Punjab. Thereafter KPCL filed a tariff petition to NEPRA on the basis of the approved feasibility study as per the Policy; as a result the Tier-1 ("Feasibility Stage Tariff") was determined by NEPRA on 29th May 2012. A Motion for Leave for Review was filed by the Project on June 7, 2012 ("MLR") to request NEPRA to reconsider some of the items disallowed under the Feasibility Stage Tariff determination. Additional supporting information was submitted to NEPRA as part of the MLR application filed by the Project. NEPRA issued its determination on the MLR application filed by the Project on 11th December 2012.

3.6 KPCL was issued the Letter of Support ("LOS"); by Private Power & Infrastructure Board ("PPIB") on 29th Aug. 2013. In accordance with the requirements of the NEPRA Act, NEPRA Rules and the Hydropower Tariff Mechanism, KPCL has submitted this Petition for determination/approval of the EPC Stage Reference Tariff along with the one-time adjustments, pass-through items and indexation mechanisms and other terms and conditions for supply of electric power service to CPPA-G (the "Power Purchaser") from the Project.

3.7 The key information submitted by the Petitioner in a summarized form is given hereunder.

Project Company	Karot Power Company (Private) Limited		
Gross Capacity	720 MW		
Auxiliary Consumption	7.2 MW		
Net Capacity	712.8 MW		
Project Location	Karot, District Rawalpindi, Province of Punjab, Pakistan		
Concession Period	30 Years		
Power Purchaser	National Transmission and Despatch Company Limited (through Central Power Purchasing Agency Guarantee Limited)		
Turbines	Four Francis turbines (vertical) of 183 MW each		
Annual Energy Production	3,206 GWh (Gross)		
	3,174 GWh (Net)		
Capacity Factor	50.83%		
Construction Period	5 Years		
Concession Period	30 Years		
Project Basis	BOOT		
Project Cost	Description	US \$ Million	
	EPC Cost	1,277.8	
	Engineering and Supervision cost	127.8	
	Land Acquisition & Resettlement	12.5	
	Project Development Cost	127.8	
	Legal Fee & Charges	12.8	
	O&M Mobilization Cost	12.8	
	Duties and Taxes	23.6	
	Insurance during Construction	35.4	
	Financial Fee and Charges	55.6	
	Sinosure Fee	54.3	
	Interest during Construction	243.7	
	Total Project Cost	1,984.0	
	Project Financing	Description	Percentage
Equity		20%	396.8
Debt		80%	1,587.2
Total Financing		100%	1,984.0

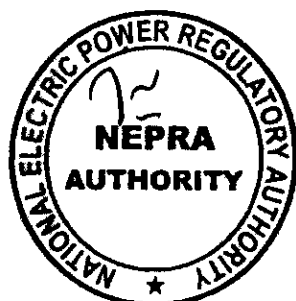


Equity	Description		Percentage	US \$ Million	
	China Three Gorges South Asia Investment Limited		93%	369.0	
	Associated Technologies Limited		5%	19.86	
	Malik Mubashir		2%	7.94	
	Total Equity		100%	396.8	
It is pertinent to highlight that the International Finance Corporation (IFC), a member of World Bank Group, has acquired shares in China Three Gorges South Asia Investment Limited. Therefore, the Project has adopted international competitive bidding (ICB) processes in line with the requirements of IFC for selection and appointment of the EPC contractors.					
Financing Terms			Terms		
			12 Year + 5 year grace period		
	Debt Repayment		Semi-Annual Installments		
	Mark-up rate		(6 month LIBOR + 4.75%)/(1-10%) (10% withholding tax)		
Operational Phase Cost	Description		Year 1-12	Year 11-30	
	Million US \$				
	Operations Cost	O & M		34.6	34.6
		Water Use Charges		4.7	4.7
		Insurance Cost		17.3	17.3
	Financial Charges (Average)	Interest		51.9	-
		Sinosure on Debt		7.5	-
		Sinosure on Equity		3.0	1.4
Total		119.0	58.0		
Tariff	US\$ 10.2479 per kWh / PKR 10.4119 per kWh				
Exchange Rate	1 US\$ = PKR 101.6				

4. Framing of Issues

4.1 Based on information provided by the Petitioner and comments received from Intervener as well as other stakeholders, the Authority approved the following issues for its consideration.

- i) Whether change in the project design has been approved by the competent forum/authority?
- ii) Whether the increase in the Project Construction Period from 4 years allowed at feasibility stage to 5 years now claimed by the Petitioner is justified
- iii) Whether the claimed plant Capacity and net annual Energy of 3174 GWh as against 3250 GWh allowed at the feasibility stage is justified?
- iv) Whether EPC bidding process has been conducted in a transparent manner and whether the EPC cost of US\$ 1277.8 million claimed by the Petitioner is justified?
- v) Whether Project Development cost, Engineering and Supervision cost and Legal Fees and Charges claimed by the Petitioner are justified?
- vi) Whether the claimed O&M Mobilization cost of US\$ 12.8 million is justified?
- vii) Whether Insurance During Construction claimed @ 2.75% of the EPC cost plus custom duties as against 2.4% of the EPC cost allowed at the feasibility stage is justified?



- viii) Whether Financial Fees and Charges claimed @ 3 50% of the debt amount as against 3% of the debt allowed at the feasibility stage is justified?
- ix) Whether Sinosure Fee claimed by the Petitioner on both debt and equity is justified?
- x) Whether Withholding Tax on bank interest and Sinosure Fee claimed by the Petitioner is justified?
- xi) Whether the claimed Return on Equity @ 20% (IRR based) as against 17% allowed by the Authority at feasibility stage is justified?
- xii) Whether the claimed per annum O&M cost of US\$ 34.6 million for Fixed and Variable O&M during operations as well as per annum insurance cost based at 1.35% of the EPC cost are justified?

5. Issues-wise Authority's decision

Issue#(i) Whether change in the Project Design has been approved by the competent forum/authority?

5.1 The Petitioner in his submissions to the Authority mentioned that it has carried out EPC bidding of the project based on feasibility stage basic design along with subsequent additional studies carried out by the project sponsors. The proposed conditions of EPC tendering process provided an option for modification/change of the project layout and main building design by the prospective bidders based on the project topology, geology, hydrology and other basic information combined with site visits, instead of strictly limiting the bidders to adopt that proposed in the feasibility.

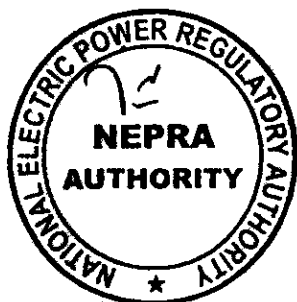
5.2 The Petitioner submitted that two stage bid evaluation criteria was adopted. At stage 1 (envelop 1), bidders were required to qualify based on the following parameters:

- i) Completeness of tenders in accordance with bidding documents.
- ii) Qualification of bidders: Eligibility of bidders was established : In terms of their capacity to design, build and commission the facility and to finance the works.

5.3 At stage-2 (Envelop 2) evaluation of first technical and then financial proposals was done. According to the Petitioner , three different technical schemes were proposed by the three qualified bidders as mentioned hereunder:

- i) A layout with rock fill asphalt core dam and spillway, diversion and surface power house located on the right river bend was proposed by the TGDC-CMEC (Selected EPC Contractor).
- ii) A layout with a concrete gravity dam same as that in the feasibility study, diversion tunnels, urge chamber in the headrace tunnels and an surface power house near the Karot bridge was proposed by the PC-DEC (Second lowest)
- iii) A layout with a rock fill asphalt dam and spillway, diversion and underground power house at a depth of some 50m below the ground surface was proposed by CGGC.(Third lowest)

5.4 In the first hearing of the petition held on June 4, 2015, it was noticed by the Authority that revised design of the project based on which EPC contractor has been selected was not approved by any competent forum/agency. The Authority therefore adjourned the hearing and directed the Petitioner to submit approval of Panel of Experts of PPIB for the revised design of the project before proceeding further in the case. The Petitioner through letter No. TDSAIL.KPCL/2015425 dated August 26, 2015 has submitted approval of Panel of Experts of PPIB for the revised design of the project.



5.5 WAPDA in its comments, received through the Power Purchaser had raised several issues regarding revised project design, which were communicated to the petitioner for reply. The Petitioner in its response has given detailed explanation and justification of specific issues raised by WAPDA and has also submitted that all those issues which have been raised by WAPDA were duly considered in various POE meetings which were also represented by Chief Engineer (WPPO/NTDC), Chief Engineer (Hydel Operations) WAPDA and General Manager (hydro Planning) WAPDA as members of POE.

5.6 The Petitioner in its submissions to the Authority further explained that previous project design as per feasibility was based on preliminary site studies and it is standard practice that at tender stage detailed design studies based on additional field investigations are done. According to the Petitioner, poor geology at the dam site has necessitated revision in the project design which was not envisaged in the feasibility of the project. The Petitioner submitted that it undertook further detailed investigations of the project over a period of more than 18 months. Detailed investigation reports were then made available to the EPC Bidders to propose a viable design that would meet the project requirements. The Petitioner also submitted that the revised design as proposed by the successful bidder has been duly evaluated technically and recommended by its appointed independent consultant (SMEC, Australia).

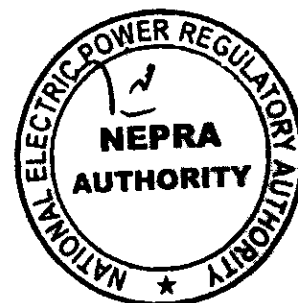
5.7 The Authority notes that the revised project design has been duly approved by the Panel of Experts of PPIB which include representatives of WAPDA and the Power Purchaser. Further, the Petitioner in its tariff petition to the Authority has requested EPC cost for approval of the Authority, based on the revised project design as proposed by the successful bidder and duly evaluated and recommended by an independent consultant (SMEC, Australia). The Authority therefore concludes that issues raised by WAPDA do not merit further consideration at this stage, as PPIB through its Panel of Experts which is the appropriate forum having representation of WAPDA and the power purchaser amongst other experts, has approved the revised project design.

6. **Issue#(ii) Whether the Increase in the Project Construction Period from 4 years allowed at feasibility stage to 5 years now claimed by the Petitioner is justified**

6.1 The Petitioner has proposed project construction time of 5 years. The Authority in its earlier determination at feasibility stage had allowed 4 years construction time. The issue of increase in the project construction also came under discussion during the hearing of petition. The Power Purchaser in his comments to the Authority also raised its objection on the issue of increased project construction period. The Petitioner in response to our query has submitted that all the three qualified bidders proposed project construction period of 5 years. The Petitioner further submitted that project construction period is estimated based on detailed design and engineering of the project which was not available at feasibility stage. The Petitioner in support referred to the project construction period of hydropower projects having comparable capacities in Malaysia and China and also under construction projects in Pakistan having 5 years or more construction period.

6.2 The Authority observes that it has allowed the project construction period in different hydropower projects ranging from 3 years to 6 years. The Authority considers that the project construction period is dependent on various project specific requirements such as location, communication infrastructure, complexities of civil structure and size of the project. Given the fact that the Authority in another comparable case of Suki Kinari has allowed 6 years project construction period and also the fact that project construction period of 5 years for KPCL has been approved by the Panel of Experts of PPIB as per the revised project design, therefore, the same is accepted by the Authority.





7. **Issue#(iii) Whether the claimed plant Capacity and net annual Energy of 3174 GWh as against 3250 GWh allowed at the feasibility stage is justified?**

7.1 The Petitioner has submitted that it shall install four Francis turbines of 183-MW each to make up total capacity of 720-MW. The Petitioner submitted that gross capacity and energy of the project is 720-MW and 3206 GWh respectively. After taking in to account auxiliary consumption @1%, the net deliverable capacity and annual energy is claimed to be 712.8-MW and 3174 GWh. The Authority in its earlier determination (feasibility stage) had approved net annual energy of 3249.78 GWh on the basis of revised studies of the project by the Petitioner.

7.2 The Power Purchaser through General Manager (C&M) Water WAPDA letter dated October 13, 2015 raised various issues regarding changed project design including decrease in annual energy from 3249.78 GWh previously allowed by the Authority to 3174 GWh now proposed by the petitioner. The Petitioner through its response dated October 30, 2015 submitted that decrease in annual energy from previously approved 3249.78 GWh to 3174 GWh (i.e. decrease of 76 GWh) is based on the revised design approved by POE of PPIB. The Petitioner further submitted that reduction in annual energy has resulted mainly due to the combined effect of the following factors;

- Decrease in mean annual flow from 821 m³/s (previously based on 10 days average) to 819 m³/s (based on daily run off data including additional 6 years).
- The tail water level increase
- Coefficient of output decreased from 8.58 to 8.5.

7.3 The Authority considers that under the two part tariff regime the petitioner is paid capacity charges based on net deliverable capacity after auxiliary consumption which is the same as previously approved by the Authority in feasibility stage tariff determination whereas the proposed estimated annual energy has been based on historical water flow data which may change on actual basis in the future. The Petitioner will therefore be paid energy charges on actual units delivered basis depending on actual water flows. Nevertheless, revised annual net estimated energy and capacity has been approved by PPIB's appointed Panel of Experts, which is the competent forum in this regard, therefore, the same is approved by the Authority.

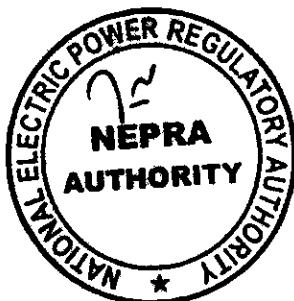
8. **Issue#(iv) Whether EPC bidding process has been conducted in a transparent manner and whether the EPC cost of US\$ 1277.8 million claimed by the Petitioner is justified?**

8.1 The Petitioner submitted that it has carried out a transparent process of bidding for selection of EPC Contractor. KPCL invited tenders for EPC of Karot Hydropower project through advertisement in the newspapers on 1st October 2014. Last date for submission of bids was 15th December 2014. Following five parties purchased the Bidding documents:

1. Descon Integrated Projects Pvt. Limited, Pakistan
2. China Machinery Engineering Corporation, China
3. Power Construction Corporation of China (Power China)
4. China Gezhouba Company Limited
5. Yangtze Three Gorges Technology and Economy Development Co, Ltd., China

8.2 The following three parties submitted their bids by due date and time:

1. Consortium of Yangtze Three Gorges Technology & Economy Development Co., Ltd and China Machinery Engineering Corporation-(TGDC-CMEC);



2. China Gezhouba Group Company Limited (CGGC);
3. Consortium of Power China –Dongfeng Electric Corporation (PC-DEC).

8.3 EPC Tender evaluation was conducted by KPCL from December 16th 2014, and completed on 09th January 2015. For this purpose, services of renowned international consultant (SMEC International, Australia) were hired by KPCL to carry out an Independent Evaluation of Bids. Bidders were initially evaluated for short listing on the basis of responsiveness, completeness, experience, capability, and financial soundness in accordance with Statement of Qualification (SOQ) provided in the Bidding documents. All the tenders met the short listing requirements.

8.4 Afterwards a detailed Technical evaluation of the bids was conducted, resulting in technical qualification of all three bidders. Financial evaluation was followed by technical evaluation. Based on combined technical and financial scores as well as recommendation of SMEC's independent evaluation report, the ranking of all the three qualified bidders was as hereunder.

Evaluation item	Weight	TGDC-CMEC	PC-DEC	CGGC
EPC Price		1,277.8	1405.1	1,349.9
Scoring:				
Technical Scores	70%	87	84	80
Financial Scores	30%	100.00	90.33	94.46
Total	100%	90.90	85.90	84.34
Ranking		1	2	3

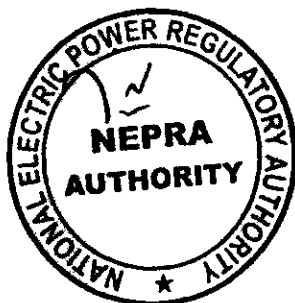
8.5 The Petitioner submitted that as per recommendations of SMEC, Consortium of Yangtze Three Gorges Technology & Economy Development Co., Ltd. (TGDC) and China Machinery Engineering Corporation (CMEC) was declared as the first preferable bidder who entered contract negotiation.

8.6 The Petitioner submitted that it has signed an EPC contract with consortium of Yangtze Three Gorges Technology and Economy Development Company (TGDC) and China Machinery Engineering Corporation (CMEC) at a price of US\$ 1277.78 million. The Contract is sub-divided into Off-shore Contract and On-Shore Contract. Distribution of responsibilities between the contracts is briefly described below:

- The Onshore Contract is signed with TGDC, which includes design, engineering, construction, erection, testing, commissioning and all other works for completion of the Project inside Pakistan.
- The Offshore Contract is signed with CMEC, which includes but not limited to supplying imported equipment and materials for the Project outside Pakistan. All equipment supplied under the Offshore Contract will be warranted by the Offshore Contractor.

EPC contract provides a lump-sum price, as provided in the below table:

Description	Local Currency (PKR Million)	Foreign Currency (US \$ Million)	Total (US \$ Million)
Equipment Supply Contract	-	203.0	203.0
Construction Contract	47,954.7	602.8	1,074.8
Total Contract Price	47,954.7	805.8	1,277.8



Comments of Intervener

8.7 The Intervener (Mr. Asim Javed Resident of Islamabad) submitted his comments to the Authority while raising objections over higher EPC cost claimed by the Petitioner. While comparing other hydropower projects in AJ&K, he submitted that civil works cost as claimed by the Petitioner is about 6-7 times higher than Gulpur Hydropower project given the fact that size of dam and power house in case of Karot hydropower project is about twice the size of Gulpur hydropower project. He further submitted that large hydropower projects should demonstrate economies of scale and therefore, civil works cost in the Feasibility of Karot hydropower project amounting to US\$ 424.500 million seems more realistic and should be allowed to the petitioner.

Comments of CPPA-G/Power Purchaser

8.8 CPPA-G in its comments submitted that per MW EPC cost (US\$ M 1.775/MW) of Karot hydropower project is on the higher side as compared to per MW EPC cost (US\$ M 1.51/MW) of similar project of 870.25 MW Suki Kinari hydropower project. He requested that EPC cost of Karot Hydropower Project may be looked in to by the Authority.

8.9 The Authority in the hearing inquired from the petitioner the reasons for its higher EPC cost than other comparable hydropower projects and directed the petitioner to provide detailed breakup of EPC Cost along with justification to the Authority.

8.10 The Petitioner vide letter No. TGSAIL/KPCL/2015619 dated October 28, 2015 has provided detailed breakup of EPC and other project related cost. While referring to objections raised by the Intervener and the Power Purchaser in their comments to the Authority, the Petitioner submitted that the EPC cost at this stage is higher than Feasibility stage EPC cost, mainly because of a) Increase in price level of inputs of civil works and other EPC items. Feasibility Stage EPC costs were estimated based on price level of 2009, and price escalation during the 6 years period (i.e. 2009 – 2015) resulted in increased EPC cost. b) Increase in construction period from 4 years to 5 years. c) EPC stage costs were prepared on the basis of better site information, subsequent geotechnical investigations and studies, highlighting geological problems that were not identified at feasibility stage. d) Deteriorating law and order situation in Pakistan, and rising political and security risks in Pakistan, due to which most of EPC contracting firms have to increase their expenditure in security protection when undertaking projects in Pakistan and e) possibility of under estimation of costs by consultant at feasibility stage.

8.11 The Petitioner further stated that despite the foregoing circumstances, the EPC prices quoted in the bids received from the bidders ranged between US\$ 1,277,814,333 and US\$ 1,405,147,215 (in 2015 values). The comparable estimate of EPC costs in the feasibility study is US\$ 1,642,789,000 (escalated at 3% to 2015 values). Thus, the lowest tender price is approximately 80% of the escalated feasibility estimate.

8.12 The Petitioner while justifying its higher EPC Cost than other comparable hydropower projects mentioned the following the reasons;

- Each project has its own physical characteristics, topography, geology, hydrology which govern the project design features like dam size, project layout etc. and the cost has a direct relationship with such project features. The reasons for higher EPC cost than comparable project of Suki Kinari are as under.
- Suki Kinari has high head, dam and crest length are much smaller than Karot.
- Power tunnel in Suki Kinari is comparatively longer but smaller diameter.
- Geology is better for Suki Kinari (metamorphic rock) than Karot having sedimentary rock.



- The size of turbines and power house is smaller being high head (847 m) and less discharge (114.m³/s) than Karot having medium/low head (80m) and much higher discharge (1100-1200 m³/s).
- Three diversion tunnels of larger dia (12.5m each) have been provided by the EPC contractor (TGDC) to pass a discharge of 6740 m³/s to manage the flood risk during construction as compared to 2 tunnels of 10m each provided in the feasibility.

8.13 The Petitioner further submitted that the agreed EPC price of US\$ 1277.78 is an outcome of adopting an effective and efficient International Competitive Bidding (ICB) process for procuring the services of EPC Contractor at the most competitive prices. Bidding process allowed each bidder to submit its own project layout and design, based on the project topography, geology, hydrology, and other basic information combined with site visits, so as to provide the most optimized and effective technical scheme for construction and implementation of the project. The bidders submitted different technical schemes, and the most robust and cost effective solution was selected through the bidding process based on independent evaluation of each bid carried by the independent consultant. The Petitioner submitted that it believes the prices as contracted with the EPC Contractors are reasonable under the prevailing market conditions.

8.14 While going through the information submitted by the Petitioner, it has been revealed that overall scope of civil works comprising, dam, spillways and diversion works in the case of Karot hydropower is large as compared to Suki Kinari hydropower project, which has resulted comparatively in higher civil works cost on per MW basis, whereas other components of EPC cost are comparable with different hydropower power projects approved by the Authority.

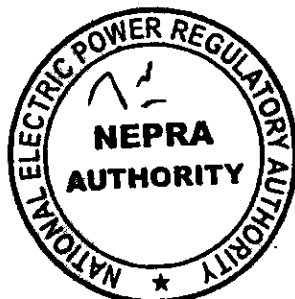
8.15 Comparison of EPC cost per MW approved for other hydropower projects at EPC stage located in the State of Azad Jammu & Kashmir (AJ&K) reveals that EPC cost on per MW basis of Karot (US\$ M 1.775/MW) is within the range of US\$ M 1.932/MW and US\$ M 1.819/MW approved in the case of Patrind and New Bong Escape (Laraib) hydropower projects respectively.

8.16 The Authority, however, notes that hydropower projects having long gestation periods and other construction risks are rather complex in nature and therefore, the initiative to undertake these projects is limited to few international contractors specialized in the development and construction of hydropower projects. The Authority also observes that due to current security situation prevailing in the country, international competitive bidding process, not only, has been limited to one or two countries, but has also reduced the essence of competition and best competitive EPC price for hydropower projects. Nevertheless, the Authority considers that the EPC cost of US\$ 1277.780 million claimed by the Petitioner is based on competitive bidding process carried out by the petitioner and therefore is accepted by the Authority. The EPC Cost of the Petitioner will be adjusted at COD on the basis of actual through provision of documentary evidence by the Petitioner to the satisfaction of the Authority and savings achieved, if any, by the petitioner in the EPC cost will be passed on to the consumers through necessary adjustment in the tariff.

Adjustment of Civil works cost

8.17 The Petitioner has sought approval for adjustment of civil works cost on account of variation in price of construction material involving steel, cement, labour and fuel during the project construction period of 5 years, in accordance with the GOP Power Policy 2002 as well as the Authority's approved Mechanism for Determination of Tariff for Hydropower Projects (Hydropower Mechanism).

8.18 As per the information provided by the Petitioner, the total civil works cost of US\$ 788.090 million comprises US\$ 130.853 million for cost of tunnels and US\$ 657.237 million for other civil



works cost. The Petitioner submitted that out of its civil works cost (US\$ 657.237 million other than tunnels) , US\$ 185.242 million comprises of foreign component and US\$ 471.995 million (equivalent to PKR 47,954.71 million) comprises local component representing cost of four items (labour, steel cement and fuel). Further breakup of each component of construction material as provided by the Petitioner is given hereunder:

Cost	PKR Million	% share
Fixed	28772.826	60%
Cement	5275.018	11%
Steel	3836.377	8%
Fuel	3356.830	7%
Labour	6713.659	14%
Total	47954.710	100%

8.19 The Petitioner submitted that the fixed cost as indicated above will remain unchanged. The reference adjustable cost of four items will be adjusted on the basis of variation in monthly relevant price indices over the reference price indices of each construction material as published by the Federal Bureau of Statistics, Pakistan.

8.20 The Petitioner has also requested for adjustment of tunnel cost of US\$ 130.853 million (PKR 13294.667 million) based on reference unit rates of assumed each rock type due to variation in the actual rock type due to geology during the project construction period.

8.21 The Authority has examined the proposed adjustment mechanism for civil works materials cost adjustment and adjustment of underground tunnels cost due to variation in geology and considers it to be consistent with the adjustment mechanism approved for such other hydropower projects hence approved by the Authority. The Petitioner will be allowed adjustment of above mentioned items of its civil works cost in accordance with the adjustment mechanism attached herewith as Annex-I & II.

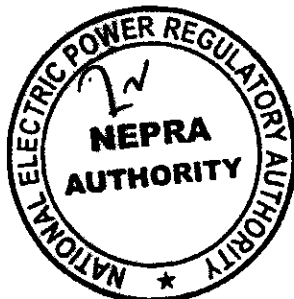
9. **Issue#(v) Whether Project Development cost, Engineering and Supervision cost and Legal Fees and Charges claimed by the Petitioner are justified?**

9.1 The Petitioner has claimed Project Development Cost of US\$ 127.800 million. However, detailed cost breakup of project Development cost provided by the Petitioner shows total estimated cost of US\$ 136.741 million.

9.2 The Power Purchaser as well as the Intervener (Mr. Asim Javed) have objected to higher project development cost claimed by the Petitioner. The Intervener has suggested that overall project development cost of Karot should not be more than US\$ 44 million. The Power Purchaser in its comments has suggested that the Petitioner should be allowed a reasonable cost of Project Development while keeping in view the cost allowed by the Authority under the same head to a comparable project of Suki Kinari and project construction period of Karot hydropower project.

9.3 The cost breakup for Project Development cost as provided by the Petitioner is given hereunder.

Project Development Cost	US\$ Million
Asset Acquisition cost	3.261
Transportation and Travelling	26.046
Office Costs	13.029
Resettlement Management cost	0.230



House Rental Expenses	9.691
BOD meeting & Conference	2.724
Employee Benefits	42.946
Consultant & Professional Charges	22.084
Security Protection	7.575
Financial Institution Charges	0.218
Government Review Charges	0.745
Generation License annual Fee	0.982
Registration Fee	0.850
L/C Charges	6.294
Bank Guarantee Charges	0.066
Total	136.741
Claimed (10% of EPC Cost)	127.781

9.4 In Authority's view, the Petitioner's claimed project development cost of US\$ 127.8 million based at 10% of the claimed EPC Cost is considered to be excessively high and unprecedented. The Authority in the latest tariff determination of 870.25-MW Suki Kinari Hydropower Project has allowed US\$ 37.437 million including the cost of O&M Mobilization, which in this case has been requested by the Petitioner separately.

9.5 The Authority has examined in detail the requested cost under cost head of Project Development and observed that estimated claimed cost under various sub-heads such as Transportation and Travelling, Employee benefits and Consultant and Professional charges are neither reasonable nor justified from any standards.

9.6 The Authority considers that it is mandated under the NEPRA laws to approve such cost which is prudent and reasonable to meet demonstrated needs of the Petitioner. The Authority notes that the Petitioner has not provided any convincing documentary evidence in support of its claimed cost of US\$ 127.800 million, though sufficient time was provided to the Petitioner in this regard. The Authority further notes that estimation of such cost based on certain percentage of EPC cost is not justified especially for those hydropower projects which are fairly at an advanced stage of development such as EPC stage in the instant case, where project sponsors are in better position to make correct assessment of various cost components based on current market conditions.

9.7 In order to assess a reasonable cost under this head, the Authority has carried out detailed evaluation of project development cost through its Consultant (Hydel) while keeping in view the project development cost allowed to other under construction hydropower projects. After making necessary adjustments while keeping in view project specific requirements of the Petitioner, such as project development and construction period, presence of foreign investors and taking into account project size etc, the Authority has assessed an aggregate of US\$ 44.736 million for the Petitioner on account of project development cost and is therefore approved by the Authority.

Engineering and Supervision Cost

9.8 The Petitioner has claimed US\$ 127.781 million for Project Engineering and Supervision Cost on the basis of 10% of the claimed EPC Cost. The Petitioner was asked to provide detailed cost breakup of its claim, as the basis for estimating such cost component based on percentage of EPC is not considered to be justified for hydropower projects at EPC stage, where such cost is known with more certainty. The breakup of cost as provided by the Petitioner is given hereunder:



Engineering and Supervision Cost	US\$ Million
Owner's Engineer	50.000
Reopener Verifier Under PPA	10.000
Independent Engineer under PPA	10.000
Site Investigation & Supervision of public infrastructure	31.500
Environmental & Ecological Charges	13.125
Project Company's Other engineering consultants	15.000
Total	129.625
Claimed at 10% of the EPC	127.781

9.9 The Intervener submitted that primarily Engineering and Supervision cost relates to cost of Owner's Engineer (OE) as other costs relating to Re-opener verifier and Independent Engineer are nominal. Owner's Engineer cost vary due to the construction period and experience of Consultant (local vs. international). The Intervener further submitted that New Bong Escape (Laraib) has incurred cost of around US\$ 7.0 million with 36 month construction period whose OE was of international standards (lead by MWH and NESPAK), Gulpur Project has applied US\$ 9.0 million with 48 months of construction period and the same OE. Patrind has claimed only US\$ 3.2 million based on local OE. Intervener submitted that all the Civil Work structures and services of the hydropower projects are of similar nature and the level of OE efforts does not have linear relationship with capacity of the project. He suggested that overall cost under Engineering and Supervision should not be more than US\$ 30.0 million after making necessary adjustments with regard to the project construction period and scope of work of Karot hydropower project.

9.10 The Power Purchaser in its comments has submitted that Engineering and Supervision cost on percentage basis is not supported as this does not have any direct or percentage relationship with the EPC cost of the project, therefore, Engineering and Supervision cost of 127 80 million as claimed by the Petitioner is quite high and unjustified. The Power Purchaser suggested that the Petitioner's Engineering and Supervision cost should be allowed on comparable basis with other such hydropower projects like Suki Kinari.

9.11 The Authority in principle agrees with the arguments put forward by the intervener as well as the Power Purchaser that Engineering & Supervision cost has no direct relationship with the EPC cost and size of the project and therefore, the overall cost claimed by the Petitioner under this head for project supervision by different consultants during the project construction period is neither reasonable nor justified. The Authority therefore considers that Engineering and Supervision cost of the Petitioner requires to be determined in view of scope of services to be provided by the Engineering consultants to fulfill project specific requirements of the Petitioner during the project construction period of 5 years.

9.12 The Authority, however, notes that the Petitioner in its Petition has claimed cost of environment and ecology under the cost of Land Acquisition and Resettlement whereas in the detailed breakup of Engineering and Supervision cost provided by the Petitioner post hearing of the Petition, the cost of environment and ecology has been claimed under the instant cost head as mentioned in the above table.

9.13 In order to have fair assessment of the Petitioner's Engineering and Supervision cost which includes environment and ecology cost, the Authority has carried out detailed analysis through NEPRA Consultant (Hydel). The analysis shows that the cost claimed for Owner's Engineer, Re-opener Engineer and Independent Engineer should not be more than US\$ 18.00 million, US\$ 0.50 million and US\$ 0.50 million respectively. The Authority notes that cost of US\$ 31.500 million



claimed under sub-head of Site Investigation and Supervision of Public Infrastructure is exorbitantly high. The Petitioner has not been able to provide and demonstrate the actual scope of work to be performed under this sub-head, neither any convincing documentary evidence has been provided by the Petitioner to establish its claim. The Authority also observed that US\$ 13.125 million for Environment & Ecology cost and US\$ 15.00 million claimed for Petitioner's own supervision during the project construction period in the presence of other consultants are unreasonably high.

9.14 Based on recommendations of NEPRA Experts, the Authority has assessed an overall cost of US\$ 29.200 million under the head of Engineering and Supervision Cost and is therefore approved by the Authority.

Legal Fee and Charges

9.15 The Petitioner has claimed US\$ 12.800 million under the cost head of Legal Fee and Charges on the basis of 1.0% of the EPC cost. As per the information provided by the Petitioner, this cost pertains to legal fees and charges associated with engagement of international and local law firms for advice on all legal aspects of the Project. The Petitioner submitted that given the long implementation period of the Hydropower Projects, the services of legal advisors will be required throughout the development and construction period to assist in connection with the negotiation and execution of EPC Contracts, Implementation Agreement (IA), Power Purchase Agreement (PPA), The Water Use Agreements, Financing Agreements, Security Agreements, Land acquisition/Lease Agreement, Project site and Other services.

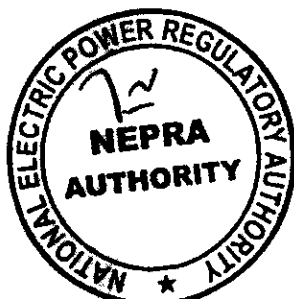
9.16 The Petitioner in support of its claimed cost mentioned that during the construction period, legal advisors will be required to assist the Petitioner in order to ensure that the Project complies with all contracts and agreements together with all regulatory and other consents and approvals and to ensure that all legal issues are identified and appropriately rectified in a timely manner.

9.17 The Authority considers that the Petitioner's claimed cost of US\$ 12.800 million based on percentage of EPC cost without provision of any credible documentary evidence is unreasonably high and unjustified. The Authority while keeping in view the scope of legal services required by the Petitioner as well as its previous decisions for such cost in other hydropower projects has assessed US\$ 7.500 million for legal fee and charges and the same is approved for the Petitioner

10. Issue#(vi) Whether the claimed O&M Mobilization cost of US\$ 12.8 million is justified?

10.1 The Petitioner has claimed US\$ 12.800 million on account of cost for mobilization of O&M contractor on the basis of 1.0% of the EPC Cost. As per the Petitioner O&M Mobilization cost pertains to cost to be incurred on mobilization of O&M contractor at site at least 7-9 months prior to COD to take over O&M of the project which is required for smooth transition from the construction period in to the Operational period. The following breakup of O&M mobilization cost has been provided by the Petitioner.

O&M Mobilization Cost	US\$ Million
Office Management (Rent and daily management)	0.484
Salaries, Remuneration	5.806
Cost of EPMS	1.800
Tools and Equipments	0.360
Cost of Vehicles	0.806
Traveling and Accommodation	1.229
Conducting of Operating Manual	2.419



Training Fee	1.080
Sales Tax	2.377
Total	16.362
Claimed in the Petition	12.778

10.2 The Authority in other under construction hydropower projects has allowed O&M Mobilization cost in the range of US\$ 0.75 million to US\$ 2.300 million. Keeping in view, the project specific requirements of the Petitioner, the Authority has assessed US\$ 3.000 million for the O&M Mobilization cost and therefore, is approved by the Authority.

Land Acquisition and Resettlement Cost

10.3 The Petitioner has claimed US\$ 12.500 million for land acquisition, resettlement and Environment Cost. The Petitioner has submitted that the cost under this head is associated with acquisition of land, procurement of land through private negotiation compensation for resettlement to inhabitants of the area to be affected by the development of the project.

10.4 The Petitioner further submitted that Project's right abutment lies in Punjab while its left abutment lies in AJ&K. The Project Company has to acquire land both in Punjab and AJ&K. However, price of land differs considerably between Punjab and AJ&K. The Petitioner submitted that in addition to normal land acquisition process it shall undertake amicable private negotiations for land acquisition and resettlement in a transparent manner under supervision /facilitation of local governments.

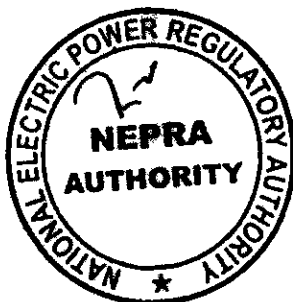
10.5 The Petitioner also submitted that in view of IFC's participation in project equity, it is required to comply with WB's "Performance Standard 5: Land Acquisition and Involuntary Resettlement". Therefore it is estimated that the land acquisition cost incurred by the project could potentially vary significantly. The Petitioner requested the Authority to approve the estimated cost of US\$ 12.500 million subject to adjustment of cost of land and resettlement on the basis of actual at COD.

10.6 The cost of land and resettlement is allowed as pass through on actual basis at COD based on verifiable documentary evidence to be provided by the petitioner to the satisfaction of the Authority. Accordingly the estimated cost of land acquisition and resettlement US\$ 12.500 million as claimed by the Petitioner is approved at this stage subject to adjustment at COD on the basis of actual on provision of credible documentary evidence by the Petitioner to the satisfaction of the Authority.

11. Issue#(vii) Whether Insurance During Construction claimed @ 2.75% of EPC cost plus custom duties as against 2.4% of the EPC cost allowed at the feasibility stage is justified?

11.1 The Petitioner has claimed insurance during construction at 2.75% of the EPC cost plus cost of custom duty. The Authority in the case of Suki Kinari has allowed Insurance during construction at 2.75% of the EPC cost which included cost of custom duty. The custom duty in the instant case is not part of EPC cost of the Petitioner, rather it has been claimed by the Petitioner separately under other costs of the project.

11.2 The Authority has set benchmark for insurance during construction based on EPC cost of the Project, which in the case of petitioner does not include cost of custom duty and taxes. The Authority has decided not to include cost of custom duties in calculation of insurance during construction component of cost. The Authority further notes that it has allowed maximum insurance during construction cost component at 2.75% of the EPC cost in another case with six years project



construction period. In view of the fact that project construction period of the Petitioner is spread over 5 years, the Authority has decided to allow cost of insurance during construction of US\$ 31.944 million worked out at 2.50% of the approved EPC cost:

Duties and Taxes

11.3 The Petitioner has claimed cost of custom duty and taxes at estimated amount of US\$ 23.600 million to be levied at 5% on import of machinery, equipment, goods, spares and materials for the project, Sindh Infrastructure Development Surcharge @ 0.95% for import of such plant and equipment and 6% Advance Tax at the time of import of machinery, equipment, goods, spares and materials. The Petitioner has submitted that no taxes to be levied by AJ&K government have been assumed in the tariff petition. In case Project is required to pay any such tax, the Authority is requested to allow them as pass through item. The Petitioner has requested for allowing estimated cost of custom duty and taxes amounting to US\$ 23.600 million subject to adjustment on the basis of actual at COD.

11.4 The cost of Custom duty and taxes to be paid by the petitioner for import of plant and equipment not manufactured locally, together with Sindh Infrastructure Development Surcharge or other taxes, levies or charges imposed on the project by Provincial/Federal Government, which are of non-refundable nature are considered to be pass through costs and adjusted on the basis of actual at COD. Accordingly, in line with decisions of the Authority in other such projects, the estimated amount of custom duty and taxes as proposed by the Petitioner US\$ 23.600 million is allowed at this stage subject to adjustment on the basis of actual at COD upon provision of verifiable documentary evidence to be provided by the Petitioner

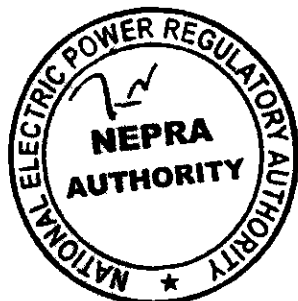
12. Issue#(viii) Whether Financial Fees and Charges claimed @ 3.50% of the debt amount as against 3% of the debt allowed at the feasibility stage is justified?

12.1 The Petitioner has claimed US\$ 55.600 million for Financial Fee and Charges on the basis of 3.5% of debt. The Petitioner submitted that Financial Fee and Charges include costs related to Debt Financing of the project. Such costs include fees and charges related to lenders Up-front fee, lenders advisors and agents charges, commitment fee, management fee, charges related to various letters of credit to be established in favour of various contracting parties, fees payable and stamp duty applicable on the financing documents, agency fee, security trustee fee, L/C commitment fee/charges for EPC and other financing fee and charges.

12.2 The Authority in other hydropower projects has allowed Financial Fee and Charges at set benchmark of 3.0% of the debt amount (excluding the impact of IDC and financial charges). The Authority considers that in view of the project size and amount of debt involved, US\$ 34.326 million worked out on the basis of 3.0% of debt (excluding the impact of IDC and financial charges) is quite sufficient to meet all debt related financial charges. The Authority does not find any convincing evidence to allow financial fees and charges at higher than its already set benchmark of 3.0% of the debt amount. The Authority therefore approves US\$ 34.326 million for financial fees and charges for the Petitioner.

13. Issue#(ix) Whether Sinosure Fee claimed by the Petitioner on both debt and equity is justified? And Issue#(x) Whether Withholding Tax on bank interest and Sinosure Fee claimed by the Petitioner is justified?

13.1 The Petitioner has claimed Sinosure Fee at gross 0.75% per annum for both project equity and debt. The rate of 0.75% includes 0.6% per annum for Sinosure Fee on both equity & debt while



Withholding tax at 20% of the Sinosure amount is to be deducted under the current legislation for payment to FBR. The Petitioner submitted that requirement of agency for Sinosure (insurance) is 0.6% per annum net of withholding tax. The Petitioner has therefore requested that Sinosure Fee at 0.75% (inclusive of withholding Tax) may be approved by the Authority for both debt and equity investment.

13.2 The Petitioner has submitted that Sinosure is China's official export credit insurance agency, offering export credit insurance and overseas investment insurance. The policy of Overseas Investment Insurance covers equity and debt portion of the project and is intended to provide the insured with risk guarantee when they suffer economic losses because of war, currency exchange ban, requisition or breach of contract by the government or related counterparts in countries where insured have made investments. According to the requirements of the Chinese government, state-owned enterprises such as CTG, undertaking overseas investments are required to acquire overseas investment insurance from Sinosure. Similarly loans arranged from Chinese banks (such as in the case of this project) will need to be covered under the Sinosure Insurance.

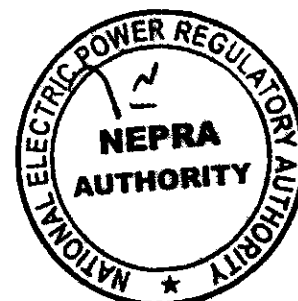
13.3 The Petitioner has submitted that being one of the prioritized project of the CPEC, the project has been allowed a concessional Sinosure rate @ 0.60% per annum (net of Taxes). Given that payments made to Sinosure are currently subject to 20% withholding tax at source, the preliminary terms agreed with the Sinosure require premium to be received must be equivalent to 0.6% per annum, meaning thereby that Sinosure insurance at 0.6% should be allowed net of withholding tax.

13.4 The Petitioner has further submitted that Sinosure Insurance will be calculated on the basis of amount of equity and debt injected during the project construction period as well as at the opening balance of debt and equity including interest thereon for the entire debt and equity repayment period. The Petitioner has therefore included Sinosure insurance as a separate component of tariff for payment of Sinosure Fee on debt & equity together in the first 12 years and in the remaining 18 years of overall tariff control period of 30 years.

13.5 The Authority in its previous determinations for projects being financed by Chinese investors has not allowed Sinosure Fee on equity part of financing. In the opinion of the Authority, hydropower projects under the cost plus regime are allowed sufficient rate of return (IRR based) to mitigate investors risks associated with development and construction of hydropower projects. However, if it is obligatory for the Petitioner to procure Sinosure on equity under the Chinese Government policy, it can do so by paying Sinosure Fee out of its allowed returns. In view of the aforementioned the Authority does not approve Sinosure on equity part of project financing.

13.6 The Petitioner has included withholding tax on Sinosure at 20% and therefore claimed 0.75% per annum for Sinosure Fee on debt. The current Withholding tax regime provides for 20% withholding tax. Since Withholding Tax like other applicable taxes, duties, GOP levies, fee and charges is a pass through cost for the Petitioner under the GOP Policy for Power Generation Projects 2002. The Authority has, therefore decided to allow Sinosure on debt part of project financing along with withholding tax at 20% as pass through cost as per request of the petitioner. For the purpose of calculation of tariff, the Sinosure Fee on debt at 0.75% per annum inclusive of 20% withholding has been used to work out Sinosure Fee of US\$ 27.816 million for project construction period of 5 years, while Sinosure Fee applicable on outstanding balance of debt and accrued interest thereon during the 12 years of debt repayment period after COD, is indicated in the component-wise tariff table attached herewith as Annex-III.

13.7 The Authority, however, notes that the proposed terms of Sinosure Fee are still to be finalized with Sinosure agency upon signing of necessary documents and therefore directs the Petitioner to negotiate at better terms so that the Impact of Sinosure on debt is reduced for adjustment of tariff at COD.



Terms of Debt

13.8 The Petitioner has proposed that 80% of the project cost will be financed from debt while 20% through sponsors' equity. The whole debt is proposed to be in foreign currency assumed at LIBOR (0.36%) plus 4.75% spread. The debt repayment period is 12 years excluding 5 years grace period for project construction. The debt servicing will be made on semi-annual basis based on prevailing 6-month LIBOR plus spread of 4.75%. In addition, the petitioner has claimed 10% Withholding tax on payment of debt including interest thereon. The Petitioner has therefore included 10% withholding tax on debt repayment and interest in its working for interest during construction and 12 years debt servicing period as per the following formula

Reference LIBOR	0.36%
Spread	4.75%
Total Rate (net of Taxes)	5.11%
Withholding Tax	10%
Total Rate (Including Tax) $(0.36\%+4.75\%/(1-10\%)=$	5.68%

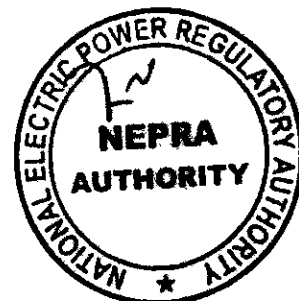
13.9 The Petitioner has further submitted that currently the project sponsors are expecting Dollar based financing. With induction of IFC as shareholder in the project the final terms of debt and its composition may change at the time of finalizing financing documents.

13.10 The Authority has reviewed the proposed terms of debt and finds these to be in general agreement with terms approved for other such hydropower projects. The Authority however notes that the Petitioner has requested spread on LIBOR at 4.75% which is considered to be unjustified. The Authority in other hydropower projects where Sinosure Fee is applicable has allowed maximum spread on LIBOR at 4.50%. However hydropower projects where Sinosure Fee is not applicable have been allowed spread on LIBOR at 4.75%. As the Authority has already approved Sinosure Fee for the Petitioner as discussed herein above, the Authority has therefore decided to allow spread on LIBOR at 4.50% to the Petitioner in line with its previous decision in the matter for other such hydropower projects.

13.11 The Petitioner has submitted that 10% withholding tax on interest portion of debt has been levied by the FBR which is also applicable to the Petitioner. The lending banks require repayment of debt and interest including agreed spread net of taxes. The Petitioner has therefore requested that it should be allowed the applicable withholding tax as pass through cost for the interest accrued during project construction period as well as 12 years operational period of debt repayment. The Petitioner has therefore sought Authority's approval for the grossed up rate of LIBOR and spread including 10% Withholding Tax.

13.12 As discussed above, withholding tax is considered to be pass through cost therefore is to be reimbursed to the petitioner by the Power Purchaser, if the same is levied upon the Petitioner, as per actual payment to be made by the Petitioner. The Authority, has therefore decided to approve Withholding Tax at 10% payable on markup and spread on LIBOR at this stage and included in its calculations of tariff for the petitioner. The Petitioner will be reimbursed by the Power Purchaser on account of actual payment of Withholding Tax as pass through cost upon verification of documentary evidence to be provided by the Petitioner.

13.13 Based on reference LIBOR at 0.36% plus approved spread of 4.50%, the grossed up rate of 5.40% (including 10% withholding) has been used to work out Interest during Construction (IDC) cost component of US\$ 195.012 million (based on debt phasing as provided by the Petitioner) and is approved by the Authority subject to adjustment on the basis of actual applicable LIBOR, timing of debt drawn, applicable PKR/US\$ exchange rate during the project construction period and maximum debt allowed by the Authority at COD.



14. Issue#(xi) Whether the claimed Return On Equity @ 20% (IRR based) as against 17% allowed by the Authority at feasibility stage is justified?

14.1 The Petitioner submitted that equity investment by the project sponsors will be 20% of total project cost while 80% of total project cost will be financed from foreign loans. The Petitioner has claimed 20% return on equity on IRR basis net of withholding tax. The Petitioner has also claimed return on equity for the 30 months prior to the construction start as per special relaxation allowed by GOP in the case of hydropower projects. The Petitioner has therefore included accrued return on equity for 30 months pre-construction period as well as 5 years construction period in the ROEDC component of tariff.

14.2 The Petitioner in support of its claim for 20% return on equity (IRR based) has referred to Para 61 of the Authority's Determination on Upfront Tariff for Coal No. NEPRA/TRF-UTC/2013/15274 dated November 21, 2014, wherein the Authority has assured that return on investment in Hydropower shall enjoy at least similar return as allowed by the Authority to Thar coal investors. The Petitioner has therefore requested the Authority;

- To approve Return on Equity at 20% (IRR based) , net of Withholding Tax on dividends.
- To approve Return on Equity during construction period (ROEDC) commencing 30 months prior to construction start date up to COD at a rate of 20% and payment thereafter (i.e. after COD) over the remaining life of the Project ensuring an ROEDC of 20% (IRR based) net of Withholding Tax on dividends.

14.3 The Petitioner has requested for 20% return on equity (IRR based) as provided in the Authority's determination of Upfront Tariff for Coal power projects. The Authority has already implemented the above mentioned provision by giving 20% return on equity (IRR based) in the Upfront Tariff for hydropower projects through its decision issued vide NEPRA/UTH-01/15042 dated October 14, 2015.

14.4 The Upfront Tariff is a general tariff and does not address the project specific risks and costs, whereas, in case of cost plus tariff, the project specific risks, project design and associated costs are taken in to consideration. The Authority after due deliberation, determines the tariff under NEPRA Tariff (Standards and Procedure) Rules 1998 as in the case of the Petitioner, all these factors were duly considered and determined at the time of approval of feasibility stage tariff including 17% IRR which was duly accepted by the Petitioner.

14.5 In the light of above, the Authority has already decided to allow 17% return (IRR based) on equity for the project construction period as well as operational period after COD in line with its decisions for such hydropower projects without any discrimination. In view of this, the Authority believes that already allowed IRR of 17% is fair and justified and same is hereby allowed.

14.6 Regarding, the Petitioner's request for allowing 30 months return on equity prior to commencement of construction start, the Authority noted that the petitioner has not achieved financial close as yet neither the date of actual construction start is known at this stage. In view hereof the Authority has decided to allow return for 30 months prior to construction start, through adjustment in tariff at COD based on verifiable documentary evidence to be provided by the Petitioner.

15. Issue#(xii) Whether the claimed per annum O&M cost of US\$ 34.6 million for Fixed and Variable O&M and per annum Insurance cost at 1.35% of the EPC are justified?

15.1 The Petitioner has claimed US\$ 34 600 million for annual O&M cost of the project. The following breakup of O&M cost has been provided by the Petitioner.



O&M Costs per annum	US\$ Million
Fixed O&M Local	8.300
Fixed O&M Foreign	19.400
Sub-Total	27.700
Variable O&M Local	4.800
Variable O&M Foreign	2.100
Sub-Total	6.900
Total O&M	34.600

15.2 The Petitioner submitted that local component of its total O&M cost is 70% and is to be allowed indexation based on Pakistan CPI (General) index whereas 30% foreign component requires indexation based on US CPI (All Urban Consumers) as well as PKR/USD indexation.

15.3 The Petitioner further submitted that fixed O&M expenses include costs associated with local staff, administrative expenses, corporate fee and audit fees etc. The foreign component comprises O&M expenses of the project company (due to the fact that majority stakeholders of project company are based outside Pakistan) comprising expenses to be incurred for a large number of expatriates, fixed fees payable to the O&M contractor including routine maintenance related costs, replacement of parts etc.

15.4 The Power Purchaser in its comments has objected on high O&M requested by the Petitioner. The commentator has suggested that per annum O&M cost is dependent on employed number of machines and not merely on size of the project. The Power purchaser submitted that per annum O&M cost for Patrind (3 turbines) and Laralb (4 turbines) were US\$ 4.056 million and US\$ 3.910 million respectively. It has been further submitted that there are 4 turbines in Karot hydropower project and therefore the per annum O&M cost of Karot should be determined while keeping in view the number of machines rather than on MW basis.

15.5 The Petitioner through letter No. TG5AIL/KPCL/2015528 dated November 10, 2015 in response to objections raised by the Power Purchaser has submitted that the per annum O&M cost claimed by KPCL is reasonable, given the fact that KPCL will enter in to an O&M Contract with foreign operator. The major cost of O&M contributes to O&M operators fee and expenses. The Petitioner mentioned that International Renewable Energy Agency, Report on Cost Analysis of Hydropower Projects states O&M costs in range of 2% to 2.5% of the project cost.

15.6 The Petitioner through its subsequent communication dated January 07, 2016 submitted that owing to poor geological condition of reservoir banks which may cause frequent landslides, its annual O&M cost include cost of reservoir protection and maintenance which is estimated at US\$ 3.276 million per annum.

15.7 The Authority considers that per annum O&M cost requested by the Petitioner is on higher side and is based on estimates as no documentary evidence confirming its claim has been provided by the Petitioner. The Authority in another case of comparable hydropower project has allowed US\$ 23.960 million for per annum O&M cost.

15.8 In order to have fair assessment of the Petitioner's per O&M cost requirement, the Authority has carefully analyzed the Petitioner's per annum O&M cost requirement through its experts. Based on recommendations of its experts and upon further verification from study conducted by an international consultant (Fitchner) 'A guide for Developers and Investors' issued in 2013, whereby an average per O&M cost of US\$ 33.2/kW/year has been suggested for hydropower projects and further adding to it an additional amount for maintenance of reservoir and other civil structures, the



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annual O&M cost of US\$ 25.900 million has been assessed for the Petitioner and is therefore, approved by the Authority.

15.9 The Authority has allowed distribution of total approved per annum O&M cost in to fixed local and foreign component as well as Variable O&M in to local and foreign component as per request of the Petitioner as indicated in the component-wise tariff table attached herewith as Annex-III.

Insurance during Operations

15.10 The Petitioner has claimed an estimated amount of per annum insurance of US\$ 17.300 million on the basis of 1.35% of the EPC Cost. The Petitioner submitted that the insurance cost consists of operations all risk insurance for the project, as well as business interruption insurance; these are standard insurances required by all lenders and also set out under the PPA. The Petitioner further submitted that aforementioned insurances are required to be maintained throughout the life of the project. Since the Pakistan Insurance/Reinsurance industry does not have sufficient capacity and expertise to manage such huge risks entirely, therefore, this risk is required to be insured/reinsured Internationally. The risks to be covered through insurance will include machinery breakdown, natural calamities (like earthquakes, floods etc) sabotage and consequential business interruption etc.

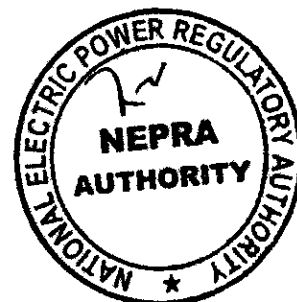
15.11 The Authority considers that insurance rates in the market vary from time to time depending on country's economic condition, law and order situation as well as scope and extent of coverage required for the project operations. The Authority in its recent determination of a hydropower project located in the same region as of the Petitioner has approved per annum insurance expense at 0.60% of the EPC cost on the basis of market quotes of insurance provided by the Petitioner, subject to adjustment on actual basis up to maximum at 0.75% of the EPC cost at COD. The Authority understands that current market conditions may change in future when the Karot hydropower project is scheduled to come in to operation after 5 years construction time approved by the Authority.

15.12 In view of the aforementioned, the Authority has decided to allow per annum insurance cost of US\$ 9.583 million based on 0.75% of the approved EPC, subject to adjustment on the basis of actual up to maximum at 1.35% of the EPC cost upon provision of verifiable documentary evidence by the Petitioner at COD.

Water Use Charge

15.13 The Petitioner has proposed Ps.15/kWh for Water Use Charge along with indexation based on CPI (General). At present the rate for water Use Charge is Ps 15/kWh and the same has been requested by the Petitioner for approval of the Authority.

15.14 Water Use Charge is pass through cost for the petitioner and is paid to the respective Provincial Government on units delivered basis as provided in the GOP Policy for Power Generation Projects 2002. The Petitioner has requested Ps. 15/kWh which is current applicable rate for use of water charge therefore approved by the Authority. The Petitioner will be allowed CPI indexation. The first such indexation will be applicable and allowed on completion of one year after commercial operation date (COD).



Water Utilization Cess

15.15 The Petitioner through letter No. TGSAIL/KPCL/2015675 dated November 12, 2015 has submitted that the Indus River System Authority (IRSA) has required KPCL to enter in to Water Utilization Cess Agreement for issuance of No Objection Certificate (NOC) by IRSA. The Petitioner submitted that as per the Indus River System Authority Act No. XXII of 1992 and subsequent Council of Common Interests Decision No. CCI.7/1/2012 dated February 09, 2012 KPCL is required to pay a Water Utilization Cess at the rate of Paisa. 0.50/kWh (half Paisa) on units delivered basis throughout operational life of the project.

15.16 The Petitioner through its subsequent letter dated November 25, 2015 has reiterated its request for approval of Paisa 0.50/kWh as Water Utilization Cess for payment to IRSA during the entire operational life of the project. The Petitioner also provided a copy of NOC obtained from IRSA whereby, the IRSA has issued conditional NOC subject to signing of bilateral Agreement by the Petitioner with IRSA for payment of Water Utilization Cess at specified rate of Paisa 0.50/kWh.

15.17 The Authority has examined the Petitioner's request and notes that such charge has not been requested by the petitioners in the past neither it was considered by the Authority in its previous decisions in the case of other hydropower projects in the private sector. The Authority however considers that if the Petitioner is required to pay Water Utilization Cess to IRSA at the rate of Paisa 0.50/kWh, the same shall be considered as pass through cost for the Petitioner and shall be reimbursed to the Petitioner by the Power Purchaser on actual basis after verification of documentary evidence. The Authority therefore has decided to allow Water Utilization Cess at Paisa 0.50/kWh to the Petitioner at this stage.

16. Based on approved cost for each component of tariff as discussed in the preceding paragraphs, the approved component wise tariff table is attached as Annex-III.

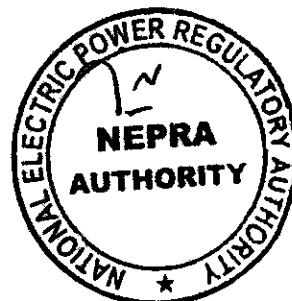
17. Order

Pursuant to Rule 6 of the NEPRA Licensing (Generation) Rules, 2000 read with section 31(4) of Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997, Karot Power Company (Private) Limited (hereinafter referred to as "KPCL" or the "Company") is allowed to charge the following tariff for delivery of electricity to the Central Power Purchasing Agency (Guarantee) Limited (CPPA-G) for onward delivery to Ex-WAPDA distribution companies.

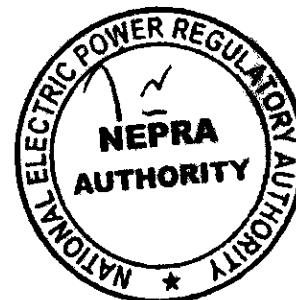
Tariff Components	Year 1-12	Year 13-30	Indexation
Variable Charge (Rs/kWh)			
Variable O&M - Local	0.1161	0.1161	Local CPI
Variable O&M - Foreign	0.0497	0.0497	PKR/US\$, US CPI
Water Use Charge	0.1500	0.1500	Local CPI
Fixed Charge (Rs/kW/M)			
Fixed O&M - Local	73.8339	73.8339	Local CPI
Fixed O&M - Foreign	172.2791	172.2791	PKR/US\$, US CPI
Insurance	113.8313	113.8313	PKR/US\$
Debt Service	1832.9282	-	LIBOR, PKR/US\$
Return on Equity	681.4679	724.3843	PKR/US\$
Return on equity during construction (ROEDC)	301.1605	301.1605	PKR/US\$



- i. The reference tariff has been calculated on the basis of net contracted capacity of 712.800 MW and net annual energy production of 3174 GWh.
 - ii. In the above tariff, no adjustment for Carbon Emission Reduction receipts (CERs) has been accounted for. However, upon actual realization of CERs, the same shall be distributed between the Power Purchaser and KPCL in accordance with the GOP Policy for Power Generation Projects 2002 as amended from time of time.
 - iii. Sinosure Fee on outstanding balance of Debt and interest at gross rate of 0.75% (Sinosure Fee net at 0.60% per annum plus Withholding Tax at 20%) has been allowed for each applicable year as indicated in the reference tariff table attached herewith as Annex-III.
 - iv. The above tariff is applicable for a period of thirty (30) years on BOOT basis commencing from Commercial Operation Date (COD).
 - v. Debt Service will be paid in the first 12 years of commercial operation of plant after COD.
 - vi. Redemption of equity has been allowed after 12 years of commercial operation of the plant.
 - vii. The reference PKR/Dollar rate has been assumed at 1 USD = 101.60 PKR.
 - viii. The component wise tariff is Indicated at Annex-III
 - ix. Debt Servicing Schedule is attached as Annex-IV
- i. **One Time Adjustment**
- a. The Principal repayment and the cost of debt will be adjusted at COD as per the actual borrowing composition and variation in LIBOR at the relevant date during the project construction period.
 - b. Interest During Construction (IDC) will be adjusted at COD on the basis of actual debt composition, variation in PKR/US\$, debt drawdown (not exceeding the amount allowed by the Authority) and applicable 6-months LIBOR during the project construction period allowed by the Authority.
 - c. In case, the spread on LIBOR is agreed at lower than 450 basis points, the benefit of such reduction in rate will be adjusted in proportion of 60% to the Petitioner and 40% to the consumer through necessary adjustment in tariff at COD.
 - d. The specific items of project cost to be paid in foreign currency (i.e. US\$) will be adjusted at COD on account of actual variation in exchange rate over the reference PKR/US\$ exchange rate of Rs. 101.60 on production of verifiable documentary evidence to the satisfaction of the Authority.
 - e. Custom duty and other applicable taxes at estimated amount of US\$ 23.600 million has been Included in the total project cost approved for KPCL. The custom duty on imported plant and machinery and other applicable taxes, GOP levies and charges imposed on the Petitioner, which are of non-refundable nature will be adjusted on actual basis on production of verifiable documentary evidence by the Petitioner to the satisfaction of the Authority.
 - f. The reference civil works cost for the local component amounting to Rs. 47954.710 million will be adjusted on account of variation in price index of four construction materials (Steel, Cement, Fuel and Labour) in accordance with the adjustment mechanism attached herewith as Annex-I.



- g. The reference cost of tunnels amounting to Rs. 13294.667 million will be adjusted due to variation in geology of actual rock type over the reference rock type for each tunnel as given in the reference tables attached herewith as Annex-II.
- h. Cost of land and resettlement will be adjusted on the basis of actual in accordance with the Hydropower Mechanism based on verifiable documentary evidence at COD.
- i. Insurance during construction will be adjusted at COD based on actual subject to the maximum of 2.50% of the adjusted and approved EPC cost upon production of verifiable documentary evidence to the satisfaction of the Authority.
- j. Financial charges will be adjusted at COD on the basis of actual subject to the maximum of 3% of the total debt allowed (excluding the impact of interest during construction, Sinosure fee and financial charges) on production of verifiable documentary evidence.
- k. Sinosure Fee on applicable debt and accrued interest thereon (IDC) during the project construction period will be adjusted at COD on the basis of actual subject to the maximum of 0.60% per annum and payments terms as approved by the Authority, on account of variation in PKR/US\$ exchange rate during the project construction period, based on documentary evidence to be provided by the Petitioner.
- l. Reference Sinosure Fee component of tariff for each year expressed in Rs/kW/Month as indicated in the reference tariff table at Annex-III will be adjusted on the basis of variation in PKR/US\$ exchange rate variation subject to maximum rate of 0.60% per annum and terms of payment as approved by the Authority at COD and the reference tariff table for each year of applicable Sinosure Fee will be revised accordingly.
- m. Return on Equity (ROE) and Return on Equity During Construction (ROEDC) will be adjusted at COD on the basis of actual equity injections and PKR/US\$ exchange rate variation (within the overall equity allowed by the Authority at COD) during the project construction period allowed by the Authority.
- n. The adjustment in tariff for Special return on equity for the 30 months period prior to construction start date will be allowed at COD on the basis of actual equity injection prior to the construction start date and PKR/US\$ exchange rate (within the overall equity allowed by the Authority at COD) on the basis of verifiable documentary evidence to be provided by the Petitioner.
- o. If the Petitioner is required to make payment of Withholding Tax on Overseas Investment Insurance Fee (Sinosure Fee) on interest part of debt during the project construction period of 5 years and debt repayment period of twelve years after COD, the same shall be allowed as pass through cost in tariff based on actual upon production of verifiable documentary evidence to be provided by the Petitioner.
- p. Insurance cost for the operational period will be adjusted on the basis of actual subject to maximum at 1.35% of the EPC cost at COD on production of verifiable documentary evidence by the Petitioner.
- q. The reference tariff table shall be revised at COD while taking in to account the above adjustments. The Petitioner shall submit its request to the Authority within 90 days of COD for necessary adjustments in tariff.



II. Pass-Through Items

No provision for income tax has been accounted for in the tariff. If the power producer is obligated to pay any tax, the exact amount paid by the power producer (the Company) shall be reimbursed by the Power Purchaser to the Company on production of original receipts. This payment should be considered as pass-through payment (Rs/kW/M) spread over a twelve (12) months period in addition to fixed charges in the Reference Tariff.

Withholding tax on dividends is also a pass through item just like other taxes as indicated in the government Guidelines. Withholding tax shall be paid @ 7.5% of the return on equity (including return on equity during construction). The Power Purchaser shall make payment on account of withholding tax at the time of actual payment of dividend subject to maximum of 7.5% of 17% return on equity according to the following formula:

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

Where:

$E_{(Ref)}$	=	Adjusted Reference Equity at COD
$E_{(Red)}$	=	Equity Redeemed
$ROEDC_{(Ref)}$	=	Adjusted Reference Return on Equity during Construction

In case the Company does not declare a dividend in any particular year or only declares a partial dividend, then the difference in the withholding tax amount (between what has been paid in that year and the total entitlement as per the Net Return on Equity) would be carried forward and accumulated so that the Company is able to recover the same as a pass through item from the Power Purchaser in future on the basis of the total dividend payout.

If the Petitioner is required to make payment of Withholding Tax on Sinosure Fee and Debt Servicing component of tariff, the same shall be treated as Pass Through cost of the Petitioner. The Power Purchaser shall reimburse to the Petitioner the actual amount paid on account of withholding tax after verification of relevant documentary evidence.

If the Petitioner is required to make payment on account of Water Utilization Cess to IRSA on total units delivered basis at Paisa 0.50/kWh, the same shall be treated as Pass through cost of the Petitioner and shall be reimbursed by the Power Purchaser on the basis of actual payment made by the Petitioner after verification of documentary evidence.

III. Hydrological Risk

Hydrological Risk shall be borne by the Power Purchaser in accordance with the GoP Policy for Power Generation Projects 2002.

IV. Indexation

The following indexation shall be applicable to the reference tariff:

i) Indexation applicable to O&M

The annual Variable O&M cost is based on 70% local and 30% foreign expense. The Fixed annual O&M cost is based on 30% local and 70% foreign expense. The local part of O&M will be adjusted on account of local inflation (CPI General), whereas the foreign part of O&M will be adjusted on account of Rupee/Dollar exchange rate



variation and US CPI. Quarterly adjustment for local inflation, foreign inflation and exchange rate variation will be made on 1st July, 1st October, 1st January & 1st April respectively on the basis of the latest available information with respect to local CPI (General) as notified by Federal Bureau of Statistics Pakistan, US CPI notified by US bureau of labor statistics (All Urban Consumers) and revised TT & OD Selling rate of US Dollar notified by the National Bank of Pakistan. The mode of indexation will be as under:

a. Fixed O&M

$$F O\&M_{(LREV)} = 73.8339 * CPI_{(REV)} / 199.66$$

$$F O\&M_{(FREX)} = 172.2791 * USCPI_{(REV)} / 237.031 * ER_{(REV)} / 101.60$$

Where:

$F O\&M_{(LREV)}$ = The revised applicable Fixed O&M local component of tariff indexed with local CPI.

$F O\&M_{(FREX)}$ = The revised applicable Fixed O&M foreign component of tariff indexed with US CPI and exchange rate variation.

73.8339 = The reference fixed O&M local component of tariff expressed in Rs/kW/Month.

172.2791 = The reference fixed O&M foreign component of tariff expressed in Rs/kW/Month.

$CPI_{(REV)}$ = The Revised Consumer Price Index (General) as notified by the Federal Bureau of Statistics, Pakistan for the relevant month.

199.66 = The Reference Consumer Price Index (General) of May 2015 notified by the Federal Bureau of Statistics, Pakistan.

$US CPI_{(REV)}$ = The Revised US Consumer Price Index (All Urban Consumers) notified by the US Bureau of Labor Statistics.

237.031 = Reference US CPI (All Urban Consumers) notified by the US Bureau of Labor Statistics for the month of May 2015.

$ER_{(REV)}$ = The revised TT and OD selling rate of US dollar as notified by the National Bank of Pakistan.

b. Variable O&M

$$V O\&M_{(LREV)} = 0.1161 * CPI_{(REV)} / 199.66$$

$$V O\&M_{(FREX)} = 0.0497 * USCPI_{(REV)} / 237.031 * ER_{(REV)} / 101.60$$

Where:

$V O\&M_{(LREV)}$ = The revised applicable Variable O&M local component of tariff indexed with local CPI.

$V O\&M_{(FREX)}$ = The revised applicable Variable O&M foreign component of tariff indexed with US CPI and exchange rate variation.

0.1161 = The reference variable O&M local component of tariff expressed in Rs/kWh.

0.0497 = The reference variable O&M foreign component of tariff expressed in Rs/kWh.

$CPI_{(REV)}$ = The Revised Consumer Price Index (General) as notified by the Federal Bureau of Statistics, Pakistan for the relevant month.



- 199.66 = The reference Consumer Price Index (General) of May 2015 notified by the Federal Bureau of Statistics, Pakistan.
- US CPI_(REV) = The Revised US Consumer Price Index (All Urban Consumers) notified by the US Bureau of Labor Statistics.
- 237.031 = Reference US CPI (All Urban Consumers) notified by the US Bureau of Labor Statistics for the month of May 2015.
- ER_(REV) = The revised TT and OD selling rate of US dollar as notified by the National Bank of Pakistan.

ii) Water Use Charge

Water Use Charge will be paid on units delivered basis and will be indexed with Consumer Price Index (CPI General) annually from the date of COD. The first such adjustment shall be due after one year of commercial operation date (COD), according to the formula:

$$WUC_{(REV)} = 0.1500 * CPI_{(REV)} / CPI_{(REF)}$$

Where;

- WUC_(REV) = The revised Water Use Charge component of tariff indexed with Consumer Price Index (General).
- 0.1500 = The reference Water Use Charge component of tariff expressed in Rs/kWh.
- CPI_(REV) = The Revised Consumer Price Index (General) notified by the Federal Bureau of Statistics, Pakistan for the relevant month.
- CPI_(REF) = The reference Consumer Price Index (General) of the relevant month at COD as notified by the Federal Bureau of Statistics, Pakistan.

iii) Insurance

Insurance cost component of tariff, in case insurance is denominated in foreign currency, will be adjusted on account of PKR/US\$ exchange rate variation at COD and thereafter on an annual basis at actual subject to the maximum of 1.35% of the EPC cost on production of verifiable documentary evidence by the Petitioner, according to the following formula:

$$Ins_{(REV)} = Ins_{(REF)} * ER_{(REV)} / ER_{(REF)}$$

Where;

- Ins_(REV) = Revised Insurance cost component of tariff adjusted with the exchange rate variation (PKR/US\$)
- Ins_(REF) = Reference insurance cost component of tariff.
- 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.

iv) Adjustment for LIBOR variation

The interest part of fixed charge component will remain unchanged throughout the term except for the adjustment due to exchange rate variation and variation in 6



months LIBOR, while spread on LIBOR (4.50%) remaining the same, according to the following formula:

$$\Delta I = P_{(REV)} * (LIBOR_{(REV)} - 0.36\%) / 2$$

Where;

ΔI = the variation in interest charges applicable corresponding to variation in six-month LIBOR. ΔI can be positive or negative depending upon whether $LIBOR_{(REV)} >$ or $<$ 0.36%. The interest payment obligation will be enhanced or reduced to the extent of ΔI for each period under adjustment applicable on bi-annual basis.

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

- v) The Petitioner will be allowed adjustment of reference Sinasure Fee component of tariff expressed in Rs./kW/Month on account of variation in PKR/US\$ exchange rate variation on bi-annual basis in accordance with the rate and other applicable terms as approved by the Authority at COD and the applicable Sinasure Fee component of tariff for each period will be adjusted accordingly.

vi) Return on Equity

Return on equity (ROE) as well as Return on Equity during Construction (ROEDC) component of tariff shall be adjusted for variation in PKR/US\$ exchange rate according to the following formula:

$$ROE_{(REV)} = ROE_{(REF)} * ER_{(REV)} / ER_{(REF)}$$

$$ROEDC_{(REV)} = ROEDC_{(REF)} * ER_{(REV)} / ER_{(REF)}$$

Where;

$ROE_{(REV)}$ = Revised Return on Equity component of tariff expressed in Rs/kW/M adjusted with exchange rate variation.

$ROEDC_{(REV)}$ = Revised Return on Equity during Construction component of tariff in Rs/kW/M adjusted with exchange rate variation.

$ROE_{(REF)}$ = Reference Return on Equity component of tariff expressed in Rs/kW/M.

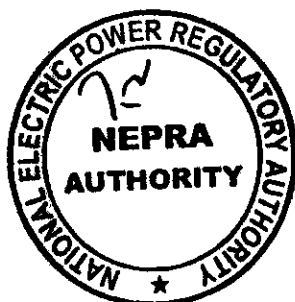
$ROEDC_{(REF)}$ = Reference Return on Equity during Construction component of tariff expressed in Rs/kW/M.

$ER_{(REV)}$ = Revised TT and OD selling rate of US dollar as notified by the National Bank of Pakistan.

$ER_{(REF)}$ = Reference TT and OD selling rate of US dollar.

Note: -

Adjustment on account of inflation, foreign exchange rate variation and LIBOR variation will be approved by the Authority within fifteen working days after receipt of complete information from the Petitioner through its request for adjustment in tariff in accordance with the requisite indexation mechanism stipulated hereinabove.



V. Other Terms and Conditions of Tariff

Design & Manufacturing Standards:

Hydel 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 and of standard quality.

Power Curve of the Hydel Power Complex:

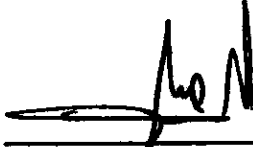
The power curve of the Hydel Power plant shall be verified by the Power Purchaser, as part of the Commissioning tests according to the latest IEC standards and shall be used to measure the performance of the hydel generating units.

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 policy issued by the Federal Government as amended from time to time.

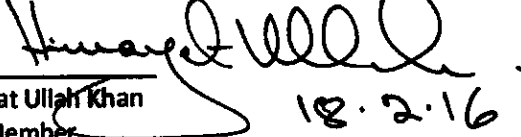
The above order of the Authority, along with Annex-I,II,III and IV attached herewith, are recommended for notification by the Federal Government, in the Official Gazette, in accordance with Section 31(4) of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997.

Authority


Khawaja Muhammad Naeem
Member



Syed Masood-ul-Hassan Naqvi
Member

My additional note on the subject tariff determination is attached and placed in record.


Himayat Ullah Khan
Member
18.2.16


Maj. (R) Haroon Rashid
Vice Chairman
18/2/16




Brig. (R) Tariq Sadozai
Chairman

23/2/16
28

24/2/2016

One Time Adjustment in Reference EPC Cost for Civil Works cost escalation

The cost of civil works will be adjusted due to variation in the prices/indices of a selected number of cost elements. The following formula ("Cost Escalation Formula"), calculates the amount of escalation allowed in the relevant month "n" of the construction period. As per the EPC terms, such adjustment is only applicable to local currency portion of the EPC Price.

$$a) P_n = V_n * [(C_n - C_0) / C_0] + W_n * [(S_n - S_0) / S_0] + Y_n * [(F_n - F_0) / F_0] + Z_n * [(L_n - L_0) / L_0] \square$$

$$b) T_{fn} = T_n + P_n \square$$

Where

P_n is the amount of escalation allowed in the relevant month "n" of the construction period; V_n , W_n , Y_n and Z_n represent the reference Rupee amount, on which the escalation shall be calculated, of Cement, Steel, Fuel and Labour respectively in the relevant month "n" of the construction period, as shown in table-1 below.

C, S, F and L are the unit price indices for Cement, Steel, Fuel and Labour, where the subscript "n" refers to the relevant month "n" and the subscript "o" refers to the base date of August 2014. The sources of indices for cement, steel, labour and fuel shall be as follows:

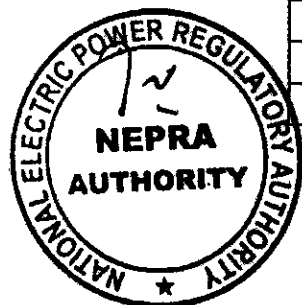
Labour (L)	200.14	Applicable index of "Construction Wage Rates" of 7.4 Consumer Price Index Number by Major Groups and Selected Commodities of the published Monthly Bulletin of Statistics of August 2014 by Pakistan Bureau of Statistics (PBS)
Fuel (F)	260.69	Applicable index of "Diesel Oil" of 7.9 Index Numbers of Wholesale Prices by Commodities of published Monthly Bulletin of Statistics of August 2014 by PBS
Cement (C)	207.76	Applicable index of "Cement" of 7.9 Index Numbers of Wholesale Prices by Commodities of published Monthly Bulletin of Statistics of August 2014 by PBS
Reinforcing Steel (S)	146.08	Applicable index of "Steel Bars & Sheets" of 7.9 Index Numbers of Wholesale Prices by Commodities of published Monthly Bulletin of Statistics of August 2014 by PBS

T_{fn} is the Total Final Amount for the relevant month n, after adding the Escalated Amount (P_n) to the Total Reference Amount (T_n) as provided in Table 1.

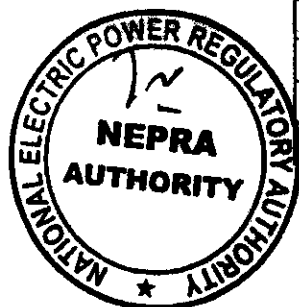
T_n is the Total Reference Amount for the relevant month "n" from Construction Start Date as given in Table 1.



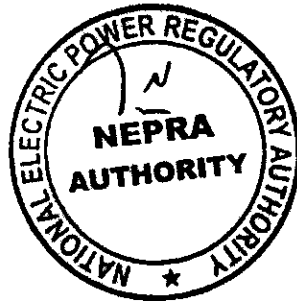
Month	Amount in PKR						Coefficients					
	Fixed	Cement	Steel	Fuel	Labor	Total	Fixed	Cement	Steel	Fuel	Labor	Total
	PKR	PKR	PKR	PKR	PKR	PKR	a	b	c	d	e	
1	374,278,232	68,617,676	49,903,764	43,665,794	87,331,587	623,797,053	0.60	0.11	0.08	0.07	0.14	1.00
2	445,464,404	81,668,474	59,395,254	51,970,847	103,941,694	742,440,674	0.60	0.11	0.08	0.07	0.14	1.00
3	523,477,233	95,970,826	69,796,964	61,072,344	122,144,688	872,462,056	0.60	0.11	0.08	0.07	0.14	1.00
4	629,741,981	115,452,696	83,965,597	73,469,898	146,939,796	1,049,569,968	0.60	0.11	0.08	0.07	0.14	1.00
5	639,740,470	117,285,753	85,298,729	74,636,388	149,272,776	1,066,234,116	0.60	0.11	0.08	0.07	0.14	1.00
6	639,740,470	117,285,753	85,298,729	74,636,388	149,272,776	1,066,234,116	0.60	0.11	0.08	0.07	0.14	1.00
7	715,532,726	131,181,000	95,404,364	83,478,818	166,957,636	1,192,554,544	0.60	0.11	0.08	0.07	0.14	1.00
8	689,684,773	126,442,208	91,957,970	80,463,224	160,926,447	1,149,474,622	0.60	0.11	0.08	0.07	0.14	1.00
9	652,775,199	119,675,453	87,036,693	76,157,107	152,314,213	1,087,958,665	0.60	0.11	0.08	0.07	0.14	1.00
10	638,497,250	117,057,829	85,132,967	74,491,346	148,982,692	1,064,162,084	0.60	0.11	0.08	0.07	0.14	1.00
11	579,045,848	106,158,406	77,206,113	67,555,349	135,110,698	965,076,414	0.60	0.11	0.08	0.07	0.14	1.00
12	567,548,624	104,050,581	75,673,150	66,214,006	132,428,012	945,914,374	0.60	0.11	0.08	0.07	0.14	1.00
13	521,930,490	95,687,256	69,590,732	60,891,890	121,783,781	869,884,150	0.60	0.11	0.08	0.07	0.14	1.00
14	537,618,180	98,563,333	71,682,424	62,722,121	125,444,242	896,030,300	0.60	0.11	0.08	0.07	0.14	1.00
15	542,837,708	99,520,246	72,378,361	63,331,066	126,662,132	904,729,513	0.60	0.11	0.08	0.07	0.14	1.00
16	478,181,838	87,666,670	63,757,578	55,787,881	111,575,762	796,969,730	0.60	0.11	0.08	0.07	0.14	1.00
17	415,025,322	76,087,976	55,336,710	48,419,621	96,839,242	691,708,869	0.60	0.11	0.08	0.07	0.14	1.00
18	350,206,840	64,204,587	46,694,245	40,857,465	81,714,929	583,678,067	0.60	0.11	0.08	0.07	0.14	1.00
19	270,051,347	126,472,577	91,980,056	80,482,549	63,011,981	631,998,510	0.43	0.20	0.15	0.13	0.10	1.00
20	254,672,977	109,898,151	79,925,928	69,935,187	59,423,695	573,855,936	0.44	0.19	0.14	0.12	0.10	1.00
21	236,321,451	96,966,854	70,521,348	61,706,180	55,141,672	520,657,505	0.45	0.19	0.14	0.12	0.11	1.00
22	337,954,063	116,533,593	84,751,704	74,157,741	78,855,948	692,253,048	0.49	0.17	0.12	0.11	0.11	1.00
23	416,625,557	130,022,607	94,561,896	82,741,659	97,212,630	821,164,349	0.51	0.16	0.12	0.10	0.12	1.00
24	749,596,739	192,001,417	139,637,394	122,182,720	174,905,906	1,378,324,175	0.54	0.14	0.10	0.09	0.13	1.00
25	810,307,982	200,329,531	145,694,205	127,482,429	189,071,862	1,472,886,009	0.55	0.14	0.10	0.09	0.13	1.00



26	754,243,394	157,420,240	114,487,448	100,176,517	175,990,125	1,302,317,724	0.58	0.12	0.09	0.08	0.14	1.00
27	673,203,966	123,420,727	89,760,529	78,540,463	157,080,925	1,122,006,610	0.60	0.11	0.08	0.07	0.14	1.00
28	671,196,568	123,052,704	89,492,876	78,306,266	156,612,533	1,118,660,947	0.60	0.11	0.08	0.07	0.14	1.00
29	669,823,551	122,800,984	89,309,807	78,146,081	156,292,162	1,116,372,584	0.60	0.11	0.08	0.07	0.14	1.00
30	572,498,758	104,958,106	76,333,168	66,791,522	133,583,043	954,164,596	0.60	0.11	0.08	0.07	0.14	1.00
31	426,931,718	78,270,815	56,924,229	49,808,700	99,617,401	711,552,864	0.60	0.11	0.08	0.07	0.14	1.00
32	391,879,481	71,844,571	52,250,597	45,719,273	91,438,546	653,132,468	0.60	0.11	0.08	0.07	0.14	1.00
33	402,849,021	73,855,654	53,713,203	46,999,052	93,998,105	671,415,036	0.60	0.11	0.08	0.07	0.14	1.00
34	375,663,201	68,871,587	50,088,427	43,827,373	87,654,747	626,105,334	0.60	0.11	0.08	0.07	0.14	1.00
35	318,906,950	58,466,274	42,520,927	37,205,811	74,411,622	531,511,584	0.60	0.11	0.08	0.07	0.14	1.00
36	320,495,961	58,757,593	42,732,795	37,391,195	74,782,391	534,159,935	0.60	0.11	0.08	0.07	0.14	1.00
37	415,345,442	76,146,664	55,379,392	48,456,968	96,913,936	692,242,403	0.60	0.11	0.08	0.07	0.14	1.00
38	386,470,591	70,852,942	51,529,412	45,088,236	90,176,471	644,117,651	0.60	0.11	0.08	0.07	0.14	1.00
39	382,260,270	70,081,049	50,968,036	44,597,031	89,194,063	637,100,449	0.60	0.11	0.08	0.07	0.14	1.00
40	483,235,086	88,593,099	64,431,345	56,377,427	112,754,853	805,391,809	0.60	0.11	0.08	0.07	0.14	1.00
41	513,758,681	94,189,092	68,501,157	59,938,513	119,877,026	856,264,469	0.60	0.11	0.08	0.07	0.14	1.00
42	550,954,357	101,008,299	73,460,581	64,278,008	128,556,017	918,257,262	0.60	0.11	0.08	0.07	0.14	1.00
43	595,669,571	109,206,088	79,422,610	69,494,783	138,989,567	992,782,619	0.60	0.11	0.08	0.07	0.14	1.00
44	640,828,191	117,485,168	85,443,759	74,763,289	149,526,578	1,068,046,985	0.60	0.11	0.08	0.07	0.14	1.00
45	665,130,074	121,940,514	88,684,010	77,598,509	155,197,017	1,108,550,124	0.60	0.11	0.08	0.07	0.14	1.00
46	554,290,237	101,619,877	73,905,365	64,667,194	129,334,389	923,817,062	0.60	0.11	0.08	0.07	0.14	1.00
47	423,515,158	77,644,446	56,468,688	49,410,102	98,820,204	705,858,597	0.60	0.11	0.08	0.07	0.14	1.00
48	358,618,916	65,746,801	47,815,855	41,838,874	83,677,747	597,698,194	0.60	0.11	0.08	0.07	0.14	1.00
49	444,155,597	81,428,526	59,220,746	51,818,153	103,636,306	740,259,328	0.60	0.11	0.08	0.07	0.14	1.00
50	463,744,656	85,019,854	61,832,621	54,103,543	108,207,086	772,907,759	0.60	0.11	0.08	0.07	0.14	1.00
51	476,010,619	87,268,614	63,468,083	55,534,572	111,069,144	793,351,032	0.60	0.11	0.08	0.07	0.14	1.00
52	492,362,111	90,266,387	65,648,282	57,442,246	114,884,493	820,603,519	0.60	0.11	0.08	0.07	0.14	1.00
53	419,799,073				97,953,117	517,752,190	0.81	0.00	0.00	0.00	0.19	1.00
54	344,771,482				80,446,679	425,218,161	0.81	0.00	0.00	0.00	0.19	1.00
55	292,588,661				68,270,688	360,859,348	0.81	0.00	0.00	0.00	0.19	1.00



56	297,683,715				69,459,534	367,143,249	0.81	0.00	0.00	0.00	0.19	1.00
57	292,588,661				68,270,688	360,859,348	0.81	0.00	0.00	0.00	0.19	1.00
58	297,683,715				69,459,534	367,143,249	0.81	0.00	0.00	0.00	0.19	1.00
59	282,398,552				65,892,995	348,291,548	0.81	0.00	0.00	0.00	0.19	1.00
60	104,412,462				24,362,908	128,775,370	0.81	0.00	0.00	0.00	0.19	1.00
汇总	28,772,826,152	5,275,018,128	3,836,376,820	3,356,829,718	6,713,659,436	47,954,710,254	0.60	0.11	0.08	0.07	0.14	1.00



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Adjustment in the cost of Tunneling Works due to Geological Conditions

- a. Subject to the verification of the Re-opener Verifier, cost variation due to geological conditions related to underground tunneling works will be allowed at Commercial Operation Date.
- b. The cost of the Tunneling Work shall be allowed to vary depending on the category of rock encountered during construction of tunnels. The increase or decrease in the cost shall be subject to the baseline conditions given in Table 1 of this Annex.

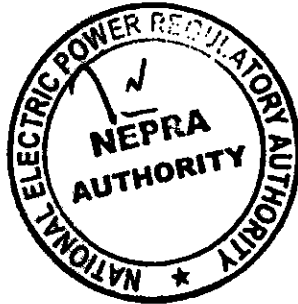


TABLE - 1

(i) Hydraulic Tunnel 1 – Diversion Tunnel- Classification of Ground Conditions

Class	Q-value	Length Assumed (m)	Unit Rate PKR/ meter Length	Cost of Construction PKR
1	$Q > 10$	0	2,691,714.53	-
2	$10 > Q > 4$	0	2,990,793.92	-
3	$4 > Q > 1$	382.3	3,323,104.35	1,270,422,793.77
4	$1 > Q > 0.1$	734.9	6,714,916.72	4,934,792,297.53
5	$0.1 > Q > 0.01$	224.6	11,134,537.04	2,500,817,019.18
6	$Q < 0.01$	0	12,247,990.74	-
Total		1,341.80		8,706,032,110.48

(ii) Hydraulic Tunnel 2 – waterway tunnel (diameter 9.6m)- Classification of Ground Conditions

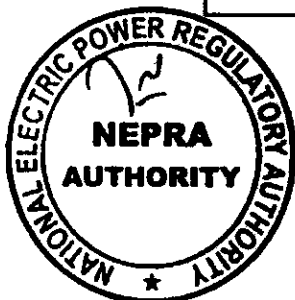
Class	Q-value	Length Assumed (m)	Unit Rate PKR/ meter Length	Cost of Construction PKR
1	$Q > 10$	0	1,643,391.04	-
2	$10 > Q > 4$	0	1,825,990.05	-
3	$4 > Q > 1$	1,107.42	2,028,877.83	2,246,819,888.71
4	$1 > Q > 0.1$	0	4,236,469.05	-
5	$0.1 > Q > 0.01$	0	4,459,485.11	-
6	$Q < 0.01$	0	4,905,433.62	-
Total		1,107.42		2,246,819,888.71

(iii) Hydraulic Tunnel 3 – waterway tunnel (diameter 7.9m)- Classification of Ground Conditions

Class	Q-value	Length Assumed (m)	Unit Rate PKR/ meter Length	Cost of Construction PKR
1	$Q > 10$	0	1,338,656.36	-
2	$10 > Q > 4$	0	1,487,395.96	-
3	$4 > Q > 1$	22.8	1,652,662.18	37,680,697.61
4	$1 > Q > 0.1$	59.8	3,398,863.41	203,252,031.80
5	$0.1 > Q > 0.01$	77.4	3,590,401.76	277,897,096.22
6	$Q < 0.01$	0	3,949,441.94	-
Total		160		518,829,825.64

(iv) Powerhouse Main Access Tunnel (traffic tunnel)- Classification of Ground Conditions

Class	Q-value	Length Assumed (m)	Unit Rate PKR/ meter Length	Cost of Construction PKR
1	$Q > 10$	0	1,233,669.71	-



2	$10 > Q > 4$	0	1,370,744.12	-
3	$4 > Q > 1$	213.6	1,523,049.02	325,323,271.53
4	$1 > Q > 0.1$	110.8	2,620,940.66	290,400,224.68
5	$0.1 > Q > 0.01$	9.6	2,767,679.50	26,569,723.24
6	$Q < 0.01$	0	3,044,447.45	-
Total		334.0		642,293,219.45

(v) Adit 1- Diversion tunnel Adit- Classification of Ground Condition

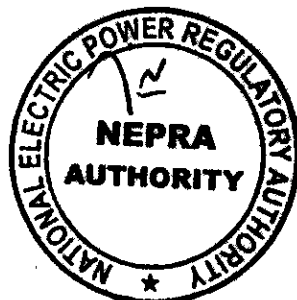
Class	Q-value	Length Assumed (m)	Unit Rate PKR/ meter Length	Cost of Construction PKR
1	$Q > 10$	0	529,564.88	-
2	$10 > Q > 4$	0	588,405.43	-
3	$4 > Q > 1$	75	653,783.81	49,033,785.60
4	$1 > Q > 0.1$	165	1,156,197.84	190,772,643.60
5	$0.1 > Q > 0.01$	60	2,083,861.72	125,031,703.20
6	$Q < 0.01$	0	2,292,247.89	-
Total		300		364,838,132.40

(vi) Adit 2- Waterway tunnel Adit- Classification of Ground Conditions

Class	Q-value	Length Assumed (m)	Unit Rate PKR/ meter Length	Cost of Construction PKR
1	$Q > 10$	0	445,948.03	-
2	$10 > Q > 4$	0	495,497.82	-
3	$4 > Q > 1$	241.5	550,553.13	132,958,580.41
4	$1 > Q > 0.1$	34.5	1,043,308.05	35,994,127.66
5	$0.1 > Q > 0.01$	69	2,130,791.78	147,024,632.54
6	$Q < 0.01$	0	2,343,870.95	-
Total		345		315,977,340.61

(vii) Other tunnel 1- massif drainage tunnel- Classification of Ground Conditions

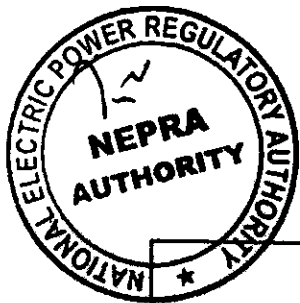
Class	Q-value	Length Assumed (m)	Unit Rate PKR/ meter Length	Cost of Construction PKR
1	$Q > 10$	0	338,499.91	-
2	$10 > Q > 4$	0	376,111.01	-
3	$4 > Q > 1$	313.3	417,901.12	130,928,420.90
4	$1 > Q > 0.1$	96.6	754,276.37	72,863,097.15
5	$0.1 > Q > 0.01$	33.3	827,963.80	27,571,194.54
6	$Q < 0.01$	0	910,760.18	-
Total		443.2		231,362,712.58



(viii) Other tunnel 2- Spillway drainage tunnel- Classification of Ground Conditions

	Q-value	Length Assumed (m)	Unit Rate PKR/ meter Length	Cost of Construction PKR
1	$Q > 10$	0	2,005,042.46	-
2	$10 > Q > 4$	0	2,227,824.96	-
3	$4 > Q > 1$	70	2,475,361.06	173,275,274.48
4	$1 > Q > 0.1$	25	3,094,028.86	77,350,721.60
5	$0.1 > Q > 0.01$	5	3,577,539.20	17,887,696.00
6	$Q < 0.01$	0	3,935,293.12	-
Total		100		268,513,692.08





Karot Hydropower Project
REFERENCE TARIFF

★ Year	Variable O&M Local	Variable O&M Foreign	Water Use Charge	Fixed O&M Local	Fixed O & M Foreign	Insurance	Return on Equity	ROE During Construction	Loan Repayment	Interest Charges	Sinosure fee	Total Tariff
	Rs./kWh	Rs/kWh	Rs./kWh	Rs. / kW/M	Rs. / kW/M	Rs. /kW/M	Rs. /kW/M	Rs. / kW/M	Rs. / kW/M	Rs./kW/M	Rs/kW/M	Rs. / kWh
1	0.1161	0.0497	0.1500	73.8339	172.2791	113.8313	681.4679	301.1605	980.1184	852.8097	121.6438	9.2013
2	0.1161	0.0497	0.1500	73.8339	172.2791	113.8313	681.4679	301.1605	1,033.7593	799.1688	113.9926	9.1807
3	0.1161	0.0497	0.1500	73.8339	172.2791	113.8313	681.4679	301.1605	1,090.3359	742.5922	105.9225	9.1589
4	0.1161	0.0497	0.1500	73.8339	172.2791	113.8313	681.4679	301.1605	1,150.0089	682.9192	97.4108	9.1360
5	0.1161	0.0497	0.1500	73.8339	172.2791	113.8313	681.4679	301.1605	1,212.9478	619.9804	88.4333	9.1118
6	0.1161	0.0497	0.1500	73.8339	172.2791	113.8313	681.4679	301.1605	1,279.3312	553.5970	78.9645	9.0863
7	0.1161	0.0497	0.1500	73.8339	172.2791	113.8313	681.4679	301.1605	1,349.3477	483.5805	68.9774	9.0593
8	0.1161	0.0497	0.1500	73.8339	172.2791	113.8313	681.4679	301.1605	1,423.1962	409.7320	58.4437	9.0310
9	0.1161	0.0497	0.1500	73.8339	172.2791	113.8313	681.4679	301.1605	1,501.0863	331.8419	47.3336	9.0010
10	0.1161	0.0497	0.1500	73.8339	172.2791	113.8313	681.4679	301.1605	1,583.2392	249.6890	35.6154	8.9694
11	0.1161	0.0497	0.1500	73.8339	172.2791	113.8313	681.4679	301.1605	1,669.8883	163.0399	23.2558	8.9361
12	0.1161	0.0497	0.1500	73.8339	172.2791	113.8313	681.4679	301.1605	1,761.2796	71.6485	10.2199	8.9010
13	0.1161	0.0497	0.1500	73.8339	172.2791	113.8313	724.3843	301.1605				4.0496
14	0.1161	0.0497	0.1500	73.8339	172.2791	113.8313	724.3843	301.1605				4.0496
15	0.1161	0.0497	0.1500	73.8339	172.2791	113.8313	724.3843	301.1605				4.0496
16	0.1161	0.0497	0.1500	73.8339	172.2791	113.8313	724.3843	301.1605				4.0496
17	0.1161	0.0497	0.1500	73.8339	172.2791	113.8313	724.3843	301.1605				4.0496
18	0.1161	0.0497	0.1500	73.8339	172.2791	113.8313	724.3843	301.1605				4.0496
19	0.1161	0.0497	0.1500	73.8339	172.2791	113.8313	724.3843	301.1605				4.0496
20	0.1161	0.0497	0.1500	73.8339	172.2791	113.8313	724.3843	301.1605				4.0496
21	0.1161	0.0497	0.1500	73.8339	172.2791	113.8313	724.3843	301.1605				4.0496
22	0.1161	0.0497	0.1500	73.8339	172.2791	113.8313	724.3843	301.1605				4.0496
23	0.1161	0.0497	0.1500	73.8339	172.2791	113.8313	724.3843	301.1605				4.0496
24	0.1161	0.0497	0.1500	73.8339	172.2791	113.8313	724.3843	301.1605				4.0496
25	0.1161	0.0497	0.1500	73.8339	172.2791	113.8313	724.3843	301.1605				4.0496
26	0.1161	0.0497	0.1500	73.8339	172.2791	113.8313	724.3843	301.1605				4.0496
27	0.1161	0.0497	0.1500	73.8339	172.2791	113.8313	724.3843	301.1605				4.0496
28	0.1161	0.0497	0.1500	73.8339	172.2791	113.8313	724.3843	301.1605				4.0496
29	0.1161	0.0497	0.1500	73.8339	172.2791	113.8313	724.3843	301.1605				4.0496
30	0.1161	0.0497	0.1500	73.8339	172.2791	113.8313	724.3843	301.1605				4.0496
Levelized Tariff	0.1161	0.0497	0.1500	73.8339	172.2791	113.8313	693.3647	301.1605	908.6478	415.1767	59.2203	7.6958

Levelized Tariff (1-30 years) discounted at 10% per annum = US Cents 7.5746/kWh at reference exchange rate of 1US\$=Rupees 101.60.

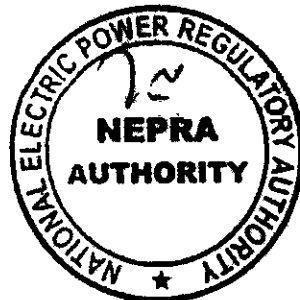
Karat Hydropower Project

Annex-IV

Debt Servicing Schedule

Period	Foreign Debt					Annual Principal Repayment Million US\$	Annual Interest Million US\$	Annual Debt Servicing Million US\$	Annual Principal Repayment Rs./kW/M	Annual Interest Rs./kW/M	Annual Debt Servicing Rs./kW/M																																																																																																																																																																																				
	Principal Million \$	Repayment Million \$	Mark-Up Million \$	Balance Million \$	Debt Service Million \$																																																																																																																																																																																										
1	1,349.9314	40.7080	36.4481	1,309.2234	77.1562	82.5152	71.7972	154.3123	980.1164	852.8097	1,832.9282																																																																																																																																																																																				
	1,309.2234	41.8071	35.3490	1,267.4163	77.1562							2	1,267.4163	42.9359	34.2202	1,224.4803	77.1562	87.0311	67.2812	154.3123	1,033.7593	799.1688	1,832.9282	1,224.4803	44.0952	33.0610	1,180.3851	77.1562	3	1,180.3851	45.2858	31.8704	1,135.0993	77.1562	91.7943	62.5181	154.3123	1,090.3359	742.5922	1,832.9282	1,135.0993	46.5085	30.6477	1,088.5908	77.1562	4	1,088.5908	47.7642	29.3920	1,040.8266	77.1562	96.8181	57.4943	154.3123	1,150.0089	682.9192	1,832.9282	1,040.8266	49.0539	28.1023	991.7728	77.1562	5	991.7728	50.3783	26.7779	941.3945	77.1562	102.1168	52.1955	154.3123	1,212.9478	619.9804	1,832.9282	941.3945	51.7385	25.4177	889.6559	77.1562	6	889.6559	53.1355	24.0207	838.5205	77.1562	107.7056	46.6068	154.3123	1,279.3312	553.5970	1,832.9282	838.5205	54.5701	22.5861	781.9504	77.1562	7	781.9504	56.0435	21.1127	725.9068	77.1562	113.6002	40.7121	154.3123	1,349.3477	483.5805	1,832.9282	725.9068	57.5567	19.5995	668.3502	77.1562	8	668.3502	59.1107	18.0455	609.2394	77.1562	119.8174	34.4949	154.3123	1,423.1962	409.7320	1,832.9282	609.2394	60.7067	16.4495	548.5327	77.1562	9	548.5327	62.3458	14.8104	486.1869	77.1562	126.3749	27.9374	154.3123	1,501.0863	331.8419	1,832.9282	486.1869	64.0291	13.1270	422.1578	77.1562	10	422.1578	65.7579	11.3983	356.3999	77.1562	133.2913	21.0211	154.3123	1,583.2392	249.6890	1,832.9282	356.3999	67.5334	9.6223	288.8665	77.1562	11	288.8665	69.3568	7.7994	219.5097	77.1562	140.5882	13.7262	154.3123	1,669.8883	163.0399	1,832.9282	219.5097	71.2294	5.9268	148.2803	77.1562	12	148.2803	73.1526	4.0036	75.1277	77.1562	148.2803	6.0320	154.3123	1,761.2796
2	1,267.4163	42.9359	34.2202	1,224.4803	77.1562	87.0311	67.2812	154.3123	1,033.7593	799.1688	1,832.9282																																																																																																																																																																																				
	1,224.4803	44.0952	33.0610	1,180.3851	77.1562							3	1,180.3851	45.2858	31.8704	1,135.0993	77.1562	91.7943	62.5181	154.3123	1,090.3359	742.5922	1,832.9282	1,135.0993	46.5085	30.6477	1,088.5908	77.1562	4	1,088.5908	47.7642	29.3920	1,040.8266	77.1562	96.8181	57.4943	154.3123	1,150.0089	682.9192	1,832.9282	1,040.8266	49.0539	28.1023	991.7728	77.1562	5	991.7728	50.3783	26.7779	941.3945	77.1562	102.1168	52.1955	154.3123	1,212.9478	619.9804	1,832.9282	941.3945	51.7385	25.4177	889.6559	77.1562	6	889.6559	53.1355	24.0207	838.5205	77.1562	107.7056	46.6068	154.3123	1,279.3312	553.5970	1,832.9282	838.5205	54.5701	22.5861	781.9504	77.1562	7	781.9504	56.0435	21.1127	725.9068	77.1562	113.6002	40.7121	154.3123	1,349.3477	483.5805	1,832.9282	725.9068	57.5567	19.5995	668.3502	77.1562	8	668.3502	59.1107	18.0455	609.2394	77.1562	119.8174	34.4949	154.3123	1,423.1962	409.7320	1,832.9282	609.2394	60.7067	16.4495	548.5327	77.1562	9	548.5327	62.3458	14.8104	486.1869	77.1562	126.3749	27.9374	154.3123	1,501.0863	331.8419	1,832.9282	486.1869	64.0291	13.1270	422.1578	77.1562	10	422.1578	65.7579	11.3983	356.3999	77.1562	133.2913	21.0211	154.3123	1,583.2392	249.6890	1,832.9282	356.3999	67.5334	9.6223	288.8665	77.1562	11	288.8665	69.3568	7.7994	219.5097	77.1562	140.5882	13.7262	154.3123	1,669.8883	163.0399	1,832.9282	219.5097	71.2294	5.9268	148.2803	77.1562	12	148.2803	73.1526	4.0036	75.1277	77.1562	148.2803	6.0320	154.3123	1,761.2796	71.6485	1,832.9282	75.1277	75.1277	2.0284	(0.0000)	77.1562										
3	1,180.3851	45.2858	31.8704	1,135.0993	77.1562	91.7943	62.5181	154.3123	1,090.3359	742.5922	1,832.9282																																																																																																																																																																																				
	1,135.0993	46.5085	30.6477	1,088.5908	77.1562							4	1,088.5908	47.7642	29.3920	1,040.8266	77.1562	96.8181	57.4943	154.3123	1,150.0089	682.9192	1,832.9282	1,040.8266	49.0539	28.1023	991.7728	77.1562	5	991.7728	50.3783	26.7779	941.3945	77.1562	102.1168	52.1955	154.3123	1,212.9478	619.9804	1,832.9282	941.3945	51.7385	25.4177	889.6559	77.1562	6	889.6559	53.1355	24.0207	838.5205	77.1562	107.7056	46.6068	154.3123	1,279.3312	553.5970	1,832.9282	838.5205	54.5701	22.5861	781.9504	77.1562	7	781.9504	56.0435	21.1127	725.9068	77.1562	113.6002	40.7121	154.3123	1,349.3477	483.5805	1,832.9282	725.9068	57.5567	19.5995	668.3502	77.1562	8	668.3502	59.1107	18.0455	609.2394	77.1562	119.8174	34.4949	154.3123	1,423.1962	409.7320	1,832.9282	609.2394	60.7067	16.4495	548.5327	77.1562	9	548.5327	62.3458	14.8104	486.1869	77.1562	126.3749	27.9374	154.3123	1,501.0863	331.8419	1,832.9282	486.1869	64.0291	13.1270	422.1578	77.1562	10	422.1578	65.7579	11.3983	356.3999	77.1562	133.2913	21.0211	154.3123	1,583.2392	249.6890	1,832.9282	356.3999	67.5334	9.6223	288.8665	77.1562	11	288.8665	69.3568	7.7994	219.5097	77.1562	140.5882	13.7262	154.3123	1,669.8883	163.0399	1,832.9282	219.5097	71.2294	5.9268	148.2803	77.1562	12	148.2803	73.1526	4.0036	75.1277	77.1562	148.2803	6.0320	154.3123	1,761.2796	71.6485	1,832.9282	75.1277	75.1277	2.0284	(0.0000)	77.1562																											
4	1,088.5908	47.7642	29.3920	1,040.8266	77.1562	96.8181	57.4943	154.3123	1,150.0089	682.9192	1,832.9282																																																																																																																																																																																				
	1,040.8266	49.0539	28.1023	991.7728	77.1562							5	991.7728	50.3783	26.7779	941.3945	77.1562	102.1168	52.1955	154.3123	1,212.9478	619.9804	1,832.9282	941.3945	51.7385	25.4177	889.6559	77.1562	6	889.6559	53.1355	24.0207	838.5205	77.1562	107.7056	46.6068	154.3123	1,279.3312	553.5970	1,832.9282	838.5205	54.5701	22.5861	781.9504	77.1562	7	781.9504	56.0435	21.1127	725.9068	77.1562	113.6002	40.7121	154.3123	1,349.3477	483.5805	1,832.9282	725.9068	57.5567	19.5995	668.3502	77.1562	8	668.3502	59.1107	18.0455	609.2394	77.1562	119.8174	34.4949	154.3123	1,423.1962	409.7320	1,832.9282	609.2394	60.7067	16.4495	548.5327	77.1562	9	548.5327	62.3458	14.8104	486.1869	77.1562	126.3749	27.9374	154.3123	1,501.0863	331.8419	1,832.9282	486.1869	64.0291	13.1270	422.1578	77.1562	10	422.1578	65.7579	11.3983	356.3999	77.1562	133.2913	21.0211	154.3123	1,583.2392	249.6890	1,832.9282	356.3999	67.5334	9.6223	288.8665	77.1562	11	288.8665	69.3568	7.7994	219.5097	77.1562	140.5882	13.7262	154.3123	1,669.8883	163.0399	1,832.9282	219.5097	71.2294	5.9268	148.2803	77.1562	12	148.2803	73.1526	4.0036	75.1277	77.1562	148.2803	6.0320	154.3123	1,761.2796	71.6485	1,832.9282	75.1277	75.1277	2.0284	(0.0000)	77.1562																																												
5	991.7728	50.3783	26.7779	941.3945	77.1562	102.1168	52.1955	154.3123	1,212.9478	619.9804	1,832.9282																																																																																																																																																																																				
	941.3945	51.7385	25.4177	889.6559	77.1562							6	889.6559	53.1355	24.0207	838.5205	77.1562	107.7056	46.6068	154.3123	1,279.3312	553.5970	1,832.9282	838.5205	54.5701	22.5861	781.9504	77.1562	7	781.9504	56.0435	21.1127	725.9068	77.1562	113.6002	40.7121	154.3123	1,349.3477	483.5805	1,832.9282	725.9068	57.5567	19.5995	668.3502	77.1562	8	668.3502	59.1107	18.0455	609.2394	77.1562	119.8174	34.4949	154.3123	1,423.1962	409.7320	1,832.9282	609.2394	60.7067	16.4495	548.5327	77.1562	9	548.5327	62.3458	14.8104	486.1869	77.1562	126.3749	27.9374	154.3123	1,501.0863	331.8419	1,832.9282	486.1869	64.0291	13.1270	422.1578	77.1562	10	422.1578	65.7579	11.3983	356.3999	77.1562	133.2913	21.0211	154.3123	1,583.2392	249.6890	1,832.9282	356.3999	67.5334	9.6223	288.8665	77.1562	11	288.8665	69.3568	7.7994	219.5097	77.1562	140.5882	13.7262	154.3123	1,669.8883	163.0399	1,832.9282	219.5097	71.2294	5.9268	148.2803	77.1562	12	148.2803	73.1526	4.0036	75.1277	77.1562	148.2803	6.0320	154.3123	1,761.2796	71.6485	1,832.9282	75.1277	75.1277	2.0284	(0.0000)	77.1562																																																													
6	889.6559	53.1355	24.0207	838.5205	77.1562	107.7056	46.6068	154.3123	1,279.3312	553.5970	1,832.9282																																																																																																																																																																																				
	838.5205	54.5701	22.5861	781.9504	77.1562							7	781.9504	56.0435	21.1127	725.9068	77.1562	113.6002	40.7121	154.3123	1,349.3477	483.5805	1,832.9282	725.9068	57.5567	19.5995	668.3502	77.1562	8	668.3502	59.1107	18.0455	609.2394	77.1562	119.8174	34.4949	154.3123	1,423.1962	409.7320	1,832.9282	609.2394	60.7067	16.4495	548.5327	77.1562	9	548.5327	62.3458	14.8104	486.1869	77.1562	126.3749	27.9374	154.3123	1,501.0863	331.8419	1,832.9282	486.1869	64.0291	13.1270	422.1578	77.1562	10	422.1578	65.7579	11.3983	356.3999	77.1562	133.2913	21.0211	154.3123	1,583.2392	249.6890	1,832.9282	356.3999	67.5334	9.6223	288.8665	77.1562	11	288.8665	69.3568	7.7994	219.5097	77.1562	140.5882	13.7262	154.3123	1,669.8883	163.0399	1,832.9282	219.5097	71.2294	5.9268	148.2803	77.1562	12	148.2803	73.1526	4.0036	75.1277	77.1562	148.2803	6.0320	154.3123	1,761.2796	71.6485	1,832.9282	75.1277	75.1277	2.0284	(0.0000)	77.1562																																																																														
7	781.9504	56.0435	21.1127	725.9068	77.1562	113.6002	40.7121	154.3123	1,349.3477	483.5805	1,832.9282																																																																																																																																																																																				
	725.9068	57.5567	19.5995	668.3502	77.1562							8	668.3502	59.1107	18.0455	609.2394	77.1562	119.8174	34.4949	154.3123	1,423.1962	409.7320	1,832.9282	609.2394	60.7067	16.4495	548.5327	77.1562	9	548.5327	62.3458	14.8104	486.1869	77.1562	126.3749	27.9374	154.3123	1,501.0863	331.8419	1,832.9282	486.1869	64.0291	13.1270	422.1578	77.1562	10	422.1578	65.7579	11.3983	356.3999	77.1562	133.2913	21.0211	154.3123	1,583.2392	249.6890	1,832.9282	356.3999	67.5334	9.6223	288.8665	77.1562	11	288.8665	69.3568	7.7994	219.5097	77.1562	140.5882	13.7262	154.3123	1,669.8883	163.0399	1,832.9282	219.5097	71.2294	5.9268	148.2803	77.1562	12	148.2803	73.1526	4.0036	75.1277	77.1562	148.2803	6.0320	154.3123	1,761.2796	71.6485	1,832.9282	75.1277	75.1277	2.0284	(0.0000)	77.1562																																																																																															
8	668.3502	59.1107	18.0455	609.2394	77.1562	119.8174	34.4949	154.3123	1,423.1962	409.7320	1,832.9282																																																																																																																																																																																				
	609.2394	60.7067	16.4495	548.5327	77.1562							9	548.5327	62.3458	14.8104	486.1869	77.1562	126.3749	27.9374	154.3123	1,501.0863	331.8419	1,832.9282	486.1869	64.0291	13.1270	422.1578	77.1562	10	422.1578	65.7579	11.3983	356.3999	77.1562	133.2913	21.0211	154.3123	1,583.2392	249.6890	1,832.9282	356.3999	67.5334	9.6223	288.8665	77.1562	11	288.8665	69.3568	7.7994	219.5097	77.1562	140.5882	13.7262	154.3123	1,669.8883	163.0399	1,832.9282	219.5097	71.2294	5.9268	148.2803	77.1562	12	148.2803	73.1526	4.0036	75.1277	77.1562	148.2803	6.0320	154.3123	1,761.2796	71.6485	1,832.9282	75.1277	75.1277	2.0284	(0.0000)	77.1562																																																																																																																
9	548.5327	62.3458	14.8104	486.1869	77.1562	126.3749	27.9374	154.3123	1,501.0863	331.8419	1,832.9282																																																																																																																																																																																				
	486.1869	64.0291	13.1270	422.1578	77.1562							10	422.1578	65.7579	11.3983	356.3999	77.1562	133.2913	21.0211	154.3123	1,583.2392	249.6890	1,832.9282	356.3999	67.5334	9.6223	288.8665	77.1562	11	288.8665	69.3568	7.7994	219.5097	77.1562	140.5882	13.7262	154.3123	1,669.8883	163.0399	1,832.9282	219.5097	71.2294	5.9268	148.2803	77.1562	12	148.2803	73.1526	4.0036	75.1277	77.1562	148.2803	6.0320	154.3123	1,761.2796	71.6485	1,832.9282	75.1277	75.1277	2.0284	(0.0000)	77.1562																																																																																																																																	
10	422.1578	65.7579	11.3983	356.3999	77.1562	133.2913	21.0211	154.3123	1,583.2392	249.6890	1,832.9282																																																																																																																																																																																				
	356.3999	67.5334	9.6223	288.8665	77.1562							11	288.8665	69.3568	7.7994	219.5097	77.1562	140.5882	13.7262	154.3123	1,669.8883	163.0399	1,832.9282	219.5097	71.2294	5.9268	148.2803	77.1562	12	148.2803	73.1526	4.0036	75.1277	77.1562	148.2803	6.0320	154.3123	1,761.2796	71.6485	1,832.9282	75.1277	75.1277	2.0284	(0.0000)	77.1562																																																																																																																																																		
11	288.8665	69.3568	7.7994	219.5097	77.1562	140.5882	13.7262	154.3123	1,669.8883	163.0399	1,832.9282																																																																																																																																																																																				
	219.5097	71.2294	5.9268	148.2803	77.1562							12	148.2803	73.1526	4.0036	75.1277	77.1562	148.2803	6.0320	154.3123	1,761.2796	71.6485	1,832.9282	75.1277	75.1277	2.0284	(0.0000)	77.1562																																																																																																																																																																			
12	148.2803	73.1526	4.0036	75.1277	77.1562	148.2803	6.0320	154.3123	1,761.2796	71.6485	1,832.9282																																																																																																																																																																																				
	75.1277	75.1277	2.0284	(0.0000)	77.1562																																																																																																																																																																																										

Reference LIBOR = 0.36% + Spread 4.50%



Additional Note

Subject: Determination of the Authority in the matter of Tariff Petition filed by Karot Power Co. (Pvt) Ltd for determination of EPC stage tariff for 720 MW Karot HPP (Case # NEPRA/TRF-309/KPCL-2015)

NEPRA had categorically observed in its decision on Asad Umer's Petition re: Coal Power Projects (dated 21st Nov 2014) that to "encourage clean technology and to attract hydro investment in the region" the Authority "assures that the return on investment in Hydroelectric shall enjoy at least similar returns as allowed by the Authority to Thar coal investors." The Upfront Tariff for Thar Coal announced by the Authority allows 20% IRR; hence, not allowing "at least similar returns to investment in Hydroelectric", in my opinion, is not in line with the Authority's assurance given in its decision dated 21st Nov 2014.

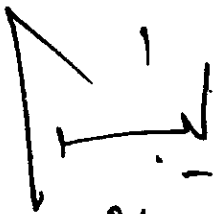
In addition, I believe that development of hydropower in our country should be prioritized and given an edge by allowing a higher return on investment over other competing technologies due to the following reasons:

- a) Energy Security: Development of hydropower projects in the country provides energy security as hydropower is an indigenous resource and insulates the economy from unexpected fluctuations in oil and gas prices, providing protection from an unhealthy dependence on oil and gas imports and conserving foreign exchange for other alternate uses.
- b) Useful Life of Hydropower Plants: The useful life of Hydropower plants is much longer than comparable thermal, wind, solar or nuclear power plants with its Civil structure lasting up to 100 years; hence the 30 year levelized tariff of a hydel project is not comparable to the levelized tariff of thermal projects as the benefit of the remaining life of the hydel project is not captured by such tariff.
- c) Operation & Maintenance: Due to their relatively easier O&M hydropower plants have been maintained at a far better standard than the thermal plants in Pakistan. Tarbela and Mangla power houses operate at much better availability levels even after 40 years of operation compared to the abysmal availability levels of much younger public-sector thermal plants.
- d) Environment Friendly: Hydropower, especially the run-of-river projects, have no adverse impact on the environment unlike polluting thermal plants using fossil fuels
- e) Cheapest Long-term Option: The very low variable cost (the lowest among all technologies) makes hydropower the cheapest option of electricity generation in the long-term.
- f) Risks/Longer Gestation: Due to greater risks involved in development of hydropower, coupled with its long gestation period, the private sector investor prefers to invest in the easier options available in thermal, wind & solar projects. There is a long list of investors opting to invest in coal, RLNG, wind & solar projects in the country rather than in hydro.

I am of the firm opinion that NEPRA, as the regulator, must provide an edge to hydropower projects in the form of a higher rate of return as compared to other technologies.


Himayatullah Khan
Member (M&E/KP)

18.2.16.


24-2-16

