



**National Electric Power Regulatory Authority**  
Islamic Republic of Pakistan

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Registrar

No. NEPRA/TRF-194/KPCL-2011/4825-4827  
May 29, 2012

Subject: **Determination of the Authority in the matter of Tariff Petition filed by Karot Power Company Ltd. (KPCL) for approval of Feasibility Stage Tariff in respect of 720 MW Karot Hydropower Project (Case No. NEPRA/TRF-194/KPCL-2011) Intimation of Determination of Tariff pursuant to Section 31(4) of the Regulation of Generation, Transmission and Distribution of Electric Power Act (XL of 1997)**

Dear Sir,

Please find enclosed herewith the subject Determination of the Authority along with Annexure-I & II (40 pages) in Case No. NEPRA/TRF-194/KPCL-2011.

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

3. Please note that only Order of the Authority at para 21 of the Determination relating to the reference tariff, adjustments, indexation and terms and conditions etc along with Annexure-I & II needs to be notified in the official Gazette.

Enclosure: As above

( Syed Safer Hussain )

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

CC:

1. Secretary, Cabinet Division, Cabinet Secretariat, Islamabad.
2. Secretary, Ministry of Finance, Islamabad.



**NATIONAL ELECTRIC POWER REGULATORY AUTHORITY  
(NEPRA)**

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No. NEPRA/R/TRF-194/KPCL-2011

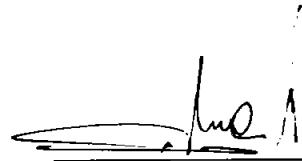
May 29<sup>th</sup>, 2012

**Petitioner**

Karot Power Company (Pvt.) Ltd. (KPCL) for Determination of Generation  
Tariff in respect of its 720 MW Karot Hydropower Project

**Authority**

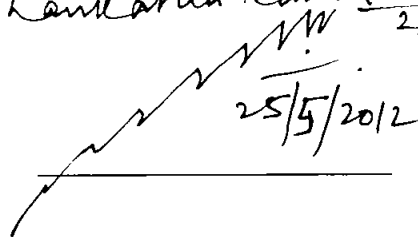
Khawaja Muhammad Naeem  
Member (Tariff)



Shaukat Ali Kundi  
Member

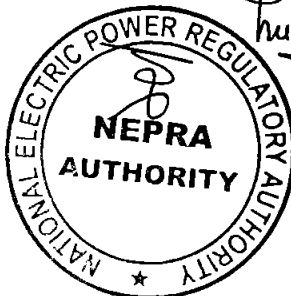
*Since I have already dissented to the grant of extension for third term to Karot Power Company, therefore I do not agree to the grant of tariff determination in favor of Karot Power Company, under Rule 16(2) of the Tariff Standards & Procedure Rules, 1998. Shaukat Ali Kundi*

Habibullah Khilji  
Member

*25/5/2012*  
  
*25/5/2012*

Ghiasuddin Ahmed  
Acting Chairman

  
*28/5*



*Mussaq*

**Determination of the Authority in the matter of**  
**Tariff Petition filed by Karot Power Company Limited (KPCL) for approval of feasibility stage**  
**tariff in respect of 720-MW Karot Hydropower Project**  
**(Case No. NEPRA/TRF-194/KPCL-2011)**

Karot Power Company (Private) Limited (hereinafter referred to as "KPCL or the Petitioner") filed tariff petition on September 23, 2011 for determination of Feasibility stage generation tariff in respect of 720-MW Karot Hydropower Project located on the river Jhelum near Karot village, around 74 kilometers upstream of Mangla in the Province of Punjab.

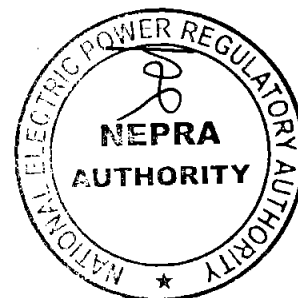
2. The Authority in its regulatory meeting RM 11-497 held on October 06, 2011 admitted the petition and decided to hold public hearing on November 02, 2011 at the NEPRA Head Office, Islamabad. Accordingly, notice of admission mentioning the date, time and venue of the public hearing was published in the daily newspapers on October 08, 2011. Simultaneously, written notices were also sent to the key stakeholders, various government agencies and trade bodies for their participation in the tariff setting process either through their comments or becoming a party to the case as intervener. No intervention request was filed with the Authority. However comments in writing have been filed by the Power Purchaser (CPPA), Energy Department Government of the Punjab. The issues raised by the commentators during the public hearing held on November 02, 2011 and subsequently received by the Authority from the aforementioned stakeholders have been discussed under relevant heads in the determination of the Authority.

**3. Submission of the Petitioner**

3.1 The submission of the Petitioner in a summarized form is given hereunder.

**Technical features of the plant**

Project Company	Karot Power Company (Private) Limited
Project Location	Karot, District Rawalpindi, Province of Punjab, Pakistan
Project feasibility	SMEC International (Pty) Ltd Australia Mirza Associates Engineering Services (Pvt) Ltd. Lahore, Pakistan Engineering General Consultants (Pvt) Ltd, Lahore, Pakistan.
Concession Period	50 years from COD
Power Purchaser	National Transmission and Despatch Company Limited (through Central Power Purchasing Agency)
Turbines	Four Francis turbines (vertical of 183 MW each
Design discharge	1200 m <sup>3</sup> /s
Reservoir conservation level	461 m.a.s.l
Maximum Gross head	79 m
Dam Height	91 m above foundation
Dam type	Concrete gravity dam



Installed capacity (Gross)	720 MW
Mean annual energy (gross)	3436 GWh
Auxiliary Consumption	1%
Operating Capacity	712.8 MW
Energy Production estimate	3401 GWh (Net)
Plant Factor	54.48%

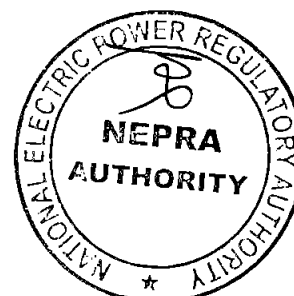
### 3.2 Financial parameters of the project

Total estimated project cost	US\$ 1424.38 million	
Funding Plan	Debt 80% : Equity 20%	
Lenders	A syndicate of international development financial institutions and local and international banks including Chinese banks.	
Terms of long term debt	Mix of foreign currency and Pakistani Rupees. 16 years term with 48 months grace period, debt repayment bi-annual based on 6 months LIBOR Plus 475 bps and 6 months KIBOR plus 300 bps.	
Project Operation cost	Year 1-12, US\$ 62.52 million	Year 13-50, US\$ 53.19 million
Tariff	Levelized PKR 6.0/kWh, US cents 7.50/kWh	

4. Based on submissions of the Petitioner, comments offered by the stakeholders and proceedings of the case, the following issues have been framed and discussed in the determination.

- i) Whether the issue of Article 157 as amended through 18<sup>th</sup> Amendment to Constitution of Islamic Republic of Pakistan 1973, as raised by the Energy Department Government of Punjab, come within the purview of NEPRA?
- ii) Whether concession period/PPA term of 50 years as claimed by the Petitioner is justified?
- iii) Whether project construction period of 48 months as proposed by the Petitioner is justified?
- iv) Whether reference US\$/PKR exchange rate of Rs.80.0 claimed by the Petitioner is justified?
- v) Whether Capacity and Energy production as claimed by the Petitioner is justified?
- vi) Whether total project comprising EPC Cost and Non-EPC Cost claimed by the Petitioner is justified?
- vii) Whether the proposed terms of debt financing and Interest during Construction (IDC) are justified?
- viii) Whether Equity and Return on Equity as claimed by the Petitioner is justified?
- ix) Whether the per annum O & M Expenses claimed by the Petitioner are justified?
- x) Whether Insurance during operation as claimed by the Petitioner is justified?

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- xi) Whether Water Use Charge (WUC) as claimed by the Petitioner is justified?
- xii) Whether Petitioner's claim of Working Capital Requirement is justified?
- xiii) Whether Debt Service Reserve Account/Letter of Credit Cost as claimed by the Petitioner is justified?
- xiv) Whether Novation Cost as claimed by the Petitioner is justified?
- xv) Whether the claimed Tariff of US cents 7.500/kWh levelized over 50 years of project concession period is justified?

5. Whether the issue of Article 157 as amended through 18<sup>th</sup> Amendment to the Constitution of Islamic Republic of Pakistan 1973, as raised by the Energy Department Government of Punjab, come within the purview of NEPRA?

5.1 The Energy Department Government of Punjab vide letter No. Ps. Sopy-Engg/56/2011 dated November 3, 2011 raised the issue of constitutional provision (18<sup>th</sup> Amendment to the Constitution) reproduced as hereunder.

*Post 18<sup>th</sup> amendment, under mentioned has been added in Article-157 (1);*

*"Provided that the Federal Government prior to taking a decision to construct or cause to be constructed hydro-electric stations in any province shall consult the Provincial Government concerned"*

*In this regard it is submitted that Federal Government resting in Ministry of Water and Power has not formally consulted the Punjab Government. As such, the matter may be taken up with the Federal Government to abide by the aforementioned provisions of the Constitution.*

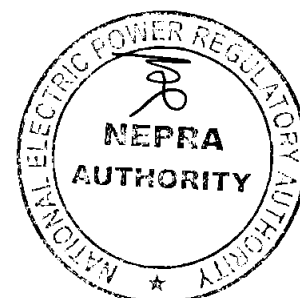
5.2 The issue raised by the Punjab Government was forwarded to the Petitioner its comments and reply. The Petitioner in response has submitted as follows.

*"18<sup>th</sup> Amendment to the Constitution of the Islamic Republic of Pakistan was made through ACT No. X of 2010, which came in ta effect on April 19, 2010, without any retrospective affect. Therefore any actions taken by the Federal Government before April 19, 2010 towards a decision to construct or cause to be constructed hydro-electric stations in any province do not need any consultation with that province as specified in Clause (1) of Article-157 of 18<sup>th</sup> Amendment. Also there is no provisian in the 18<sup>th</sup> amendment which binds the Federal Government to undertake ex-past-facto consultation with the provincial government (s) in this respect.*

*On the other hand after clause (2) of Article-157, the following new clause has been added namely:*

*Article-157(3)- In case of any dispute between the Federal Government and a Provincial Government in respect of any matter under this Article, any of the said Governments may move the Council of Common Interests for resolution of the dispute.*

*3*



*Therefore it implies that although there is no need to consult the provincial government on the already decided matters of the Federal Government but the resolution of any dispute had been provided for in the 18<sup>th</sup> amendment.*

*In view of the above, if the Government of Punjab has any objection/dispute over the following benefits which shall accrue to it without any investment, or making any efforts what so ever, through the decision of the Federal Government to allow construction of the Karot Hydropower Project in Rawalpindi District, the matter may be referred to the Council of Common Interests”.*

*Therefore, in a win-win situation the objection raised by Punjab Government is beyond comprehension, especially under the given circumstances where seeking the comments by NEPRA from one and all on the Tariff Petition filed by the Sponsors of Project, is tantamount to more than consultation with the provincial government”.*

5.3 In order to have views of the Federal Government on the issue raised by the Government of Punjab, the Authority referred the matter to Private Power Infrastructure Board (PPIB) facilitating agency functioning under administrative control of the Federal Government, through letter No. NEPRA/TRF-194/KPCL-2011/24 dated February 6, 2012. PPIB has submitted its response on February 24, 2012 stating that 18<sup>th</sup> Amendment came in to full force and effect on April 20, 2010 and is prospective in operation. The Karot Hydropower project was awarded to the project sponsors through issuance of LOI in May 2007. The decision of Federal Government to construct 720 MW Karot Hydropower project in the private sector was taken long before the advent of Constitution (18<sup>th</sup> Amendment) Act 2010. This being the case, the objection raised by the government of Punjab is infructuous and incorrect and therefore may be set aside.

5.4 The Authority considers that the objection raised by the Punjab Government pertains to approval of the project by the Federal Government and due consultation required under the 18<sup>th</sup> Amendment and therefore does not come under the purview of NEPRA Act and rules and regulations made under. If Government of Punjab has any objection on construction of the project, it may take up the matter to the Council of Common Interests in a manner prescribed in Article 157 of the Constitution of Islamic Republic of Pakistan 1973. As regards the petition, there is no impact on tariff with regards to the issue raised by the Punjab Government.

6. Whether concession period/PPA term of 50 years as claimed by the Petitioner is justified?

6.1 The Petitioner submitted that it has requested for approval of 50 years tariff after COD on BOOT basis. The levelized tariff of US cents 7.50 /kWh has been calculated based on 50 years life of the project. Redemption of equity has been calculated after 12 years of plant operation (after repayment of debt in 12 years) as per the GOP Policy for Power Generation project 2002.

6.2 The Power Purchaser (CPPA) in its comments has submitted that the tariff calculations have been made on the basis of a 50-year concession period/PPA term. Although the 2002

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Power Policy allows concession period for up to 50 years, we prefer an agreement term of 25 to 30 years for projects implemented on BOOT basis. All other hydropower IPPs in Pakistan have agreement term of 25 to 30 years and we suggest a similar term for Karot HPP. The shorter concession period dovetails with the ultimate objective of a competitive power market in the country in future while a 50 year term is a virtual negation of the BOOT concept. We also believe the provinces would oppose a longer concession period as the hydropower projects are to be transferred to them at the end of the term. At the same time, a shorter PPA term is not against the interest of the investor/power seller as the company would be able to re-coup its equity over a shorter period. Hence, it is requested that the tariff petition should be revised on the basis of 25 or 30 years PPA term/concession period.

6.3 In response to the above reservations of the Power Purchaser the Petitioner in its response submitted the following.

- China Three Gorges International Corporation (CTGI) is a wholly owned subsidiary of China Three Gorges Corporation (CTG) responsible for overseas investment on behalf of CTG. As per CTGs policy for investment, CTGI only invest on long-term basis in various countries. Due to nature of Pakistan-China relations, CTGI has committed to invest on long-term basis in Power Sector of Pakistan, which includes, investment in hydel, wind and coal based power projects.
- In order to provide incentives to Hydel energy sector, the Economic Coordination Committee (ECC) (which is one of supreme decision making forum in the Government of Pakistan), modified the 'Policy for Power Generation Projects 2002' to increase the concession period of hydel projects from 25-30 years to 50 years.
- Keeping in view the incentive offered by ECC for a concession period of 50 years and CTGIs long-term investment policy in Pakistan's Power Sector, CTGI has opted for the concession period of 50 years for the Karot Power Project. Therefore, CTGI requests the Authority to grant such concession in light of the concession period enhancement provided by ECC and Policy for Power Generation Projects 2002.

6.4 The Authority understands that GOP Policy for Power Generation Projects 2002 allows maximum limit of 50 years term for hydropower projects on BOOT basis. The Authority in the case of other hydropower projects has approved tariff for a term of 25-30 years on the basis of specific requests of the Petitioners as well as the Power Purchaser. In the opinion of the Authority, a typical hydropower plant requires replacement and major overhauling of its electrical and mechanical equipment after expiry of 30 years. The Petitioner has also recognized this fact and, therefore, requested for adjustment of major replacement of electrical and mechanical equipment cost as 'Novation cost' after 30 years operation of the plant. However, it has not specifically mentioned the cost associated with such replacement. The Authority also acknowledges the argument of CPPA about the development of competitive market which could be encouraged only if shorter term contracts are allowed. The Authority, therefore, considers that it would be pragmatic and in line with its earlier decision for such other

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hydropower projects to allow a concession period of 30 years in the instant case as well. The Authority, therefore, approves 30 years term for Karot hydropower project on BOOT basis.

7. Whether project construction period of 48 months as proposed by the Petitioner is justified?

7.1 The proposed financing terms show that 48 months grace period for debt has been assumed by the Petitioner. The feasibility study of KPCL mentions a project construction period of 48 months from construction start to Commercial Operation date (COD).

7.2 Since the project is at an initial stage (feasibility stage) and therefore its COD and RCOD will be firmed up at a later stage upon signing of PPA with the Power Purchaser. Therefore, on the basis of information submitted by the Petitioner, the Authority allows a project construction period of 48 months from the date of construction start.

8. Whether reference US\$/PKR exchange rate of Rs.80.0 claimed by the Petitioner is justified?

8.1 The Petitioner has assumed US\$/PKR exchange rate of Rs. 80.00 per US\$ for calculation of the requested levelized tariff of US\$ cents 7.50/kWh (Rs 6.00/kWh). The cost estimates provided in the feasibility study have also been based on the same exchange rate of Rs. 80.00 to a US\$.

8.2 The Authority has, therefore, decided to approve US\$/PKR rate of Rs. 80.0 to a US\$ as reference exchange rate at this stage. The foreign component of project cost will be adjusted on the basis of actual US\$/PKR exchange over reference exchange rate during the project construction period. However, no such adjustment will be allowed for local component of project cost, except for the cost reopeners as specifically mentioned in the approved Mechanism for Determination of Tariff for Hydropower Projects (the Hydropower Mechanism)

9. Whether Capacity and Energy production as claimed by the Petitioner is justified?

9.1 The Petitioner has proposed installed capacity of 720 MW and net available capacity of 712.8 MW after the auxiliary consumption of 7.2 MW at 1% of installed capacity. The annual net deliverable energy has been estimated at 3401 GWh at plant factor of 53.92%.

9.2 Perusal of project feasibility report submitted by the Petitioner revealed that the project hydrology is based on collection of available data and generation of additional data to fill the gaps which are required for conducting the feasibility study of Karot Hydropower Project. For carrying out the detailed hydrological study the consultants have used climatological and hydrological data obtained from Surface Water Hydrology Project (SWHP) of WAPDA and from Pakistan Meteorological Department (PMD). Further climatological and hydrological data was also obtained from different gauging stations namely Domel, Balakot, Naran, Rawla Kot, Bagh, Palandri, Dhudnial, Garhi Dupatta, Muzaffarabad, Murree, Risalpur and Mangla. It has been stated in the feasibility that emphasis was given to flow data of Karot Gauging Station for the

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period from 1969 to 1979. After 1979, Karot Stream Gauging station was closed, therefore flow data of new stream gauging station at Azad Pattan established by SWHP WAPDA has been used.

9.3 To arrive at available monthly hydrology for Karot Hydropower project, the consultants have verified the results based on their studies for climatology parameters (air, temperature, wind speed, rainfall and evaporation), watershed and river network analysis, flow and flood studies for the project site for different gauging stations in the catchments with the actual flows of Karot stream gauging station.

9.4 A long term period of daily flows of Jhelum River related to Karot Project indicates that a discharge of 812 m<sup>3</sup>/s, 1264 m<sup>3</sup>/s and 1619 m<sup>3</sup>/s are available for durations of 40%, 25% and 15% respectively, of the time of the year. For optimization of project capacity and energy for Karot Hydropower project the consultants have carried out cost/benefit study for design discharge in the range of 600m<sup>3</sup>/s - 1800 m<sup>3</sup>/s. The optimum discharge is one at which generation cost per kWh is the minimum and the Net Present Value (NPV) is the maximum.

9.5 Accordingly an optimum discharge of 1200 m<sup>3</sup>/s has been selected for calculating the project capacity and energy of the Karot Hydropower plant based on the following technical parameters.

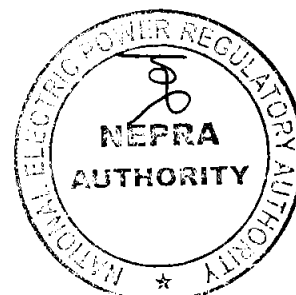
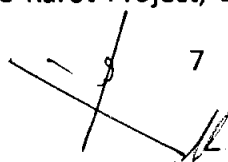
Gross head	79 m
Net average operating Head	73.1 m
Design Discharge	1200 m <sup>3</sup> /s
Installed Capacity	720 MW
Auxiliary Consumption	7.2 MW (1.0%)
Net Capacity	712.8 MW
Mean Annual energy (Gross)	3436 GWh
Net deliverable energy	3401 GWh
Plant Capacity Factor	53.92%

9.6 It may be mentioned here that Karot hydropower project was identified by MONENCO (Montreal Engineering Company) in 1984 and as per its feasibility study the project installed capacity was estimated at 93 MW based on design discharge of 215 m<sup>3</sup>/s, gross available head of 52 m and mean annual energy of 727 GWh at plant factor of 89.2%.

9.7 The project identified by MONENCO was revised by WAPDA-GTZ in 1994 by adopting project installed capacity of 240 MW based on the design discharge of 550m<sup>3</sup>/s, gross head of 52 m and mean annual energy of 1613 GWh at plant factor of 76.7%.

9.8 Although study carried out by WAPDA-GTZ improved the project capacity by increasing the design discharge to 50% time of the year, the issues of identification of alternate dam axis, head, optimization of discharge and refinement of project layout remained to be studied.

9.9 The latest feasibility study was carried out by SMEC International (Pty) Ltd, Australia, Mirza Associates Engineering Services (Pvt) Ltd and Engineering General Consultants (Pvt) Ltd. Through this latest study for the Karot Project, certain improvements in project design have



been made such as the Power House location, location and length of head race and tail race channels and increase in the reservoir level to 461 m.a.s.l. The installed capacity and energy of Karot Hydropower Project has been arrived at through study of different available options under the given project parameters based on cost optimization.

9.10 The Petitioner at Para 4.6.3 of the Petition has submitted that "data given in the Feasibility studies is reasonable but preliminary. Considering the significance of hydrology for the Project, this information will be reconfirmed as reconfirmation of hydrological data is in the best interest of the Project Company and the Power Purchaser. It is anticipated that prior to the achievement of financial close, reconfirmation of hydrology of the Project will be completed. In case there is substantial variation in the hydrology, the Project Company shall approach NEPRA for rectification/amendment of the tariff".

9.11 The Petitioner has further submitted that "the data beyond 2004 at Karot has been collected and is being compiled, whereas the latest data is being collected through metering station established by the Project Company at the site along with obtaining the latest data from the existing station manned by WAPDA and its related Projects near the site of Karot Hydropower Project. This data will be analyzed and applied for a realistic optimization during the detailed design stage".

9.12 The issue was discussed in the hearing of the Petition wherein the Petitioner submitted that it shall only refer the matter to NEPRA, when there will be found a substantial variation in the actual hydrological conditions at site over the results of feasibility studies.

9.13 The Authority notes that though the project feasibility of KPCL is based on detailed analysis of hydrological studies and other technical parameters, yet there are some areas where the project consultants have shown a need for require further studies for correct estimates of the project size and energy, while taking into consideration the possible effects on the project in future post upstream and downstream construction of other hydropower projects.

9.14 The Authority, while reviewing project feasibility of KPCL observed that the proposed size of the project has been increased to 720 MW from 240 MW as per earlier studies carried out by GTZ. There is a three-fold increase in the project size whereas increase in energy is only two times. The Authority considers that there are a number of aspects which require detailed investigations and studies during the EPC design phase, which the Petitioner is expected to undertake. Since the feasibility report has already been approved by the PPIB's panel of experts, the Authority has, therefore, decided to provisionally accept project net installed capacity of 712.80 MW and net annual energy production of 3401 GWh for the purpose of tariff calculations at this stage. The Authority directs the Petitioner to specifically look into the following areas, before filing its next tariff petition for determination of EPC stage tariff under the approved Hydropower Mechanism.

- i) Project optimization should also be based on probabilistic simulation evaluation through software, Models like EnPEP, Walaragua and WASP. Such models use the probability of

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occurrence of the different hydrological conditions and evaluate different project options and their attractiveness in the overall system operation. The indices like NPV, benefit to cost ratios only relate to the project as a stand-alone. The attractiveness of the project is not tested against other competing and existing projects, while satisfying load demand profile of the overall system.

- ii) Since the project is planned up-stream Mangla hydropower project, therefore it is also important that reservoir regulation of Karot be examined in conjunction with operation of Mangla reservoir. Whether Karot affects positively on Mangla operation, there is a need to conduct detailed studies.
- iii) Although the reservoir at Karot would slow down the sediment flow into Mangla reservoir, the feasibility recommends flushing sediments during the months of May and June or July. This aspect also needs further evaluation and its possible effects on Mangla.
- iv) For the 4-hour peak operation of the Karot reservoir, the top storage of the reservoir becomes critical. The daily reservoir level variation upto 30 meters from October to May would require a detailed study for the stability of the reservoir valley slopes under rapid rise and fall of the water surface level. Similarly, sediment flushing within 5 days span would require lowering of reservoir level from 461 m to 420 m. This exercise which is proposed twice in a year also warrants a careful study of the stability of the reservoir and its 'Rim'.

**10. Whether total project comprising EPC Cost and Non-EPC Cost claimed by the Petitioner is justified?**

10.1 The Petitioner has proposed total project cost of US\$ 1424.38 million for its 720 MW Hydropower project with the following breakup of costs.

Project cost details	(US\$ Million)
Civil Works	424.500
Hydro Mechanical Equipment	204.650
Electrical Equipment	173.730
Contingencies	104.130
Land Resettlement/Environment	12.500
Project Development Cost	89.170
Engineering and Supervision	89.170
Duties and Taxes	19.780
Insurance during construction	21.800
Legal fees and charges	10.900
Financial charges	62.170
Interest during construction	143.510
Sinosure Fee	68.370
<b>Total Project Cost</b>	<b>1424.380</b>

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10.2 The Petitioner has submitted that cost estimates that form part of the approved feasibility study are based on preliminary studies including hydrological, sedimentation, seismic, neo-tectonic and topographical studies. In the next phase, the said preliminary studies shall be confirmed and if required, further studies may be undertaken, after which the Project tender documents will be finalized. The final design along with the said tender documents will be circulated to the potential bidders for the EPC contract and will form basis of the final EPC contract price.

10.3 Perusal of feasibility study of KPCL reveals that the consultants have worked out various components of total project cost on the basis of preliminary design of the project based on feasibility level studies which will be firmed up upon detailed engineering to be carried out at the EPC stage.

10.4 Notwithstanding the fact that the approved Mechanism for determination of tariff for hydropower projects (the Hydropower Mechanism) emphasizes on feasibility to be prepared based on thorough and comprehensive studies of technical (including firm BOQs) and financial parameters, yet the Authority in order to promote hydropower sector in the country has decided to rely, as far as possible, on cost estimates as provided in the feasibility of KPCL duly approved by the Panel of Experts of PPIB and refer to its own broad benchmarks, wherever necessary, for cost components already approved by the Authority for other hydropower projects.

10.5 In line with determination of the Authority for other hydropower projects the total project cost of KPCL has been bifurcated in to two main cost components i.e. EPC cost and the Non-EPC cost as discussed separately in the following paragraphs.

#### 11. EPC Cost

11.1 According to the feasibility of KPCL, the consultants have estimated US\$ 891.7 million as the EPC cost. This includes the cost of civil works (less general items), electrical and mechanical works, cost of project contingencies and land and resettlement cost.

11.2 The EPC cost of project is dependent on the scope of work to be agreed with the EPC Contractor. Considering the existing practice, the scope of EPC works include, civil works cost, electro-mechanical works and the amount of contingencies associated with the civil and electro-mechanical works. The cost of land and resettlement is generally responsibility of the project sponsors and therefore does not qualify as EPC cost. On the basis of aforementioned the EPC cost of KPCL as requested by the Petitioner is given hereunder.

<b>EPC Cost</b>	<b>US\$ Million</b>
Civil works	424.500
Hydro-mechanical equipment	204.650
Electrical equipment	173.730
Contingencies	104.130
<b>EPC Cost</b>	<b>907.010</b>



11.3 The proposed EPC cost of 907.010 million has been discussed for each cost component in the following paragraphs.

11.4 Civil Works

11.4.1 The Petitioner has proposed US\$ 424.50 million for the civil works cost. The following break up of civil works cost has been provided by the Petitioner.

Civil Works Cost	Foreign US\$ Mln	Local US\$ Mln	Total US\$ Mln
Preliminary Works/environmental costs	10.032	42.592	52.624
Mobilization/Demobilization cost	0.000	10.000	10.000
Temporary Roads and Passages	0.000	5.000	5.000
Diversion works	11.449	12.838	24.287
Concrete Gravity dam	43.686	87.991	131.676
Spillways	20.279	44.572	64.850
Power Tunnel	13.500	19.120	32.620
Surge Shafts & Chambers	6.794	7.958	14.752
Pressure Shaft	5.096	15.450	20.546
Power House	8.080	20.908	28.988
Tail race and Outlet structure	2.326	9.021	11.347
General	3.310	24.500	27.810
<b>Total</b>	<b>124.540</b>	<b>299.960</b>	<b>424.500</b>

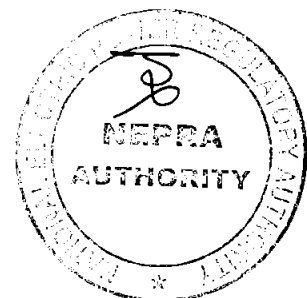
11.4.2 A review of above shows that an aggregate of US\$ 18.770 million have been included on account of miscellaneous cost under various aforementioned sub-heads of civil works cost, for which no plausible explanation or basis has been provided either in the feasibility or the petition. The Authority in the case of other comparable hydropower project has allowed only half of such costs. Therefore, civil works cost of US\$ 415.115 million has been allowed to KPCL after allowing half of US\$18.770 million i.e. US\$ 9.385 million

11.4.3 The Petitioner has also requested for adjustment of civil works cost in accordance with the approved Hydropower Mechanism. Since the present petition is not based on firm BOQs, therefore, the Authority has no reference to proceed in accordance with the Hydropower Mechanism which requires firm BOQs at the first stage of tariff filing. The Authority however has decided to examine the BOQs at the EPC stage when the Petitioner files its tariff petition and carryout detailed prudency review of all civil works costs.

11.5 Electro-Mechanical equipment

11.5.1 The Petitioner has claimed a total amount of US\$ 378.380 million on account of cost of its electro-mechanical equipment, comprising US\$ 204.650 million on account of hydro-mechanical equipment and US\$ 173.730 million on account of electrical equipment. The cost of

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hydro-mechanical equipment and electrical equipment is inclusive of transportation cost and erection and commissioning cost.

11.5.2 The cost of electro-mechanical equipment US\$ 378.380 million requested by the Petitioner is high as compared to approved cost of electro-mechanical for another comparable hydropower project of 840 MW.

11.5.3 Review of estimates of KPCL shows an amount of US\$ 10.80 million as miscellaneous expenses, which have been included by the feasibility consultants on lump sum basis under various components of hydro-mechanical equipment without any explanation or rationale.

11.5.4 The Power Purchaser (CPPA) in its comments to the Authority has objected on higher cost of hydro-mechanical equipment claimed by the Petitioner. The Authority considers that detailed prudence of costs under the Hydropower Mechanism, will be carried out at the EPC stage tariff when cost of equipment and other related EPC costs will be firmed up pursuant to negotiated EPC price on the basis of international competitive bidding (ICB) process to be carried out by the project sponsors. However, relying on cost estimates given in the project feasibility, the Authority has approved US\$ 199.252 million (including half of miscellaneous cost) for the cost of hydro-mechanical equipment and US\$ 173.730 million for the cost of electrical equipment.

#### 11.6 Cost of Contingencies

11.6.1 The Petitioner has proposed US\$ 104.13 million on account of project contingencies. The Petitioner has submitted that based on the Consultants experience in the development of hydropower projects, they have recommended that contingencies for unforeseen conditions and requirements for changes in the civil design or technical specifications be taken into account in the Project Cost estimates. These contingencies have also been approved by the POE of PPIB as part of the Feasibility study. Further, given the size of the project and the corresponding length of its implementation period, project lenders will insist on contingencies to cover unexpected variations and unforeseen events. In view of this and based on the Consultants advice, the following contingencies are reflected in the project cost estimates.

- 16% for Civil Works (excluding General Civil Works)
- 15% for Hydro-mechanical Equipment; and
- 10% for Electrical Equipment

11.6.2 The issue of contingencies was also raised by the CPPA in the hearing held on November 02, 2011 as well as in its written comments to the Authority. The Petitioner in its response submitted that an amount of US\$ 104.13 million has been included in the Karot tariff petition due to the large number of uncertainties involved in development of hydropower projects especially related to civil construction (unforeseen rock formations); the contingencies act as a means of providing comfort to the lenders who will be financing up to 80% of the project cost.

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11.6.3 The Petitioner has further submitted that the technical consultants (SMEC) determined the contingency amount in line with international practices adopted by hydropower developers and included the same as part of the technical studies carried out for the Feasibility study of the Project. However, based on the sponsors (Three Gorges) own experience of development of large and small hydropower projects, it has been found that the estimates developed by SMEC to be on the conservative side. Since the amount of contingency has been approved by the Panel of Experts at the Private Power Infrastructure Board (PPIB), therefore, the sponsors have adopted to proceed further based on their estimates.

11.6.4 The Authority considers that the approved Hydropower Mechanism provides for adjustment of civil works cost and for variation in the cost of equipment at the EPC stage tariff and therefore allowing the cost of contingencies as a separate component does not merit any justification. As mentioned earlier the feasibility of Karot has not been prepared strictly in accordance with the provisions of Hydropower Mechanism and secondly the cost of civil and electro-mechanical works as mentioned in its feasibility, has been estimated based on the project consultant's experience for development of hydropower projects in other countries.

11.6.5 The Authority has carefully examined petitioner's request for allowing the cost of contingencies and based on discussions with the project sponsors as well as comments received from the Petitioner on this particular issue, the Authority is of the opinion that outright rejection of petitioner's claim for contingencies is likely to be taken up by the existing foreign project sponsors negatively and may, therefore, lead to project being scrapped which will not be in the interest of consumers. The Authority has, therefore, decided that considering the project size and quality of project feasibility, it shall allow limited project contingencies at this stage.

11.6.6 Review of feasibility of KPCL reveals that scope of civil works particularly in the presence of large capacity reservoir in Karot hydropower project would amount to greater uncertainties as compared to other project of 840 MW and therefore requires to be looked at on project specific requirements of Karot Hydropower project. As regards the amount of contingencies for mechanical and electrical equipment, not much variation is expected over the cost already approved by the Authority for these components. In view of the aforementioned, the Authority has approved US\$ 65.126 million on account of contingencies on the basis of 12% for civil works (less general items) and 5% each for mechanical and electrical equipment.

12. Recapitulating, the approved EPC cost for KPCL works out to be US\$ 853.223 million as given hereunder.

EPC Cost	Approved (US\$ Mln)
Civil Works	415.115
Hydro-mechanical Equipment	199.252
Electrical Equipment	173.730
Contingencies	65.126
<b>Total</b>	<b>853.223</b>

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### 13. Non-EPC Cost

13.1 The Petitioner has proposed US\$ 517.370 million in aggregated, for its Non-EPC cost of various cost components as discussed hereunder.

#### 13.2 Project Development cost

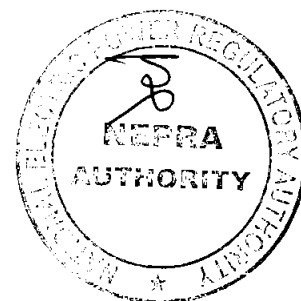
13.2.1 The Petitioner has claimed US\$ 89.17 million on account of project development cost. According to the information provided by the Petitioner this cost component includes cost related to the development of project such as fees and expenses already incurred or to be incurred for such propose till COD of the project as mentioned hereunder.

- Feasibility study which includes Hydrological studies, Sedimentation study, Topographical survey of land, Geological and geotechnical study, Neotectonic and seismic hazard study, Project layout study, Dam design study, Hydro-mechanical and electrical study and transportation study.
- Costs related to the performance guarantee to be furnished to PPIB
- Costs related to the power purchaser letter of credit
- Various regulatory fees
- Cost of company registration and formation
- Project company staff salaries, allowances and other benefits
- Project company head office running expenses during project construction
- Travelling costs of project company
- Cost of appropriate health, safety and environment arrangements
- Cost of PR and media management
- Cost of security arrangements for the project
- Cost of permits
- Project advisory – Local and foreign financial advisor, Insurance advisor, Audit and Tax advisor, Security advisor, Carbon Credit advisor, Environmental consultant and Cost of mobilization of the O&M contractor.

13.2.2 The Petitioner has submitted that the cost of Project Development has been estimated on the basis of Consultants past experience for development of hydropower projects and is assumed at 10% of the EPC Cost comprising Civil Works (excluding cost for general civil works), Hydro-Mechanical equipment, Electrical equipment and cost of contingencies.

13.2.3 The Authority understands that Project Development cost of Karot hydropower project would be higher in view of the size and long gestation period as compared to other hydropower projects approved by the Authority. The Petitioner has claimed this cost component as lump sum without any cost break up, based on 10% of the proposed EPC cost as per its consultant's estimate for the feasibility stage tariff. The Authority considers that detailed prudence of cost is required to be carried out at the EPC stage when costs of different project activities will be firmed up. However at this stage, the rationale of 10% of the EPC cost used in the feasibility of Karot is accepted being consistent with other comparable project of 840-MW already approved

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by the Authority. Accordingly, the Project development cost of KPCL based on 10% of the approved EPC (less general items) works out to be US\$ 82.541 million which is considered to be reasonable and therefore, approved by the Authority.

### 13.3 Engineering and Supervision

13.3.1 The Petitioner has claimed US\$ 89.17 million for Engineering and Supervision on the basis of 10% of its claimed EPC cost which includes civil works cost (less the cost of general civil works), electro-mechanical equipment cost and cost of contingencies. This cost component pertains to engineering services during the construction phase such as detail design, tender document and specification preparation, contract administration and construction supervision etc.

13.3.2 Based on the same rationale as mentioned above, the Authority has approved US\$ 82.541 million on account of cost of Engineering and Supervision for KPCL.

### 13.4 Duty and Taxes

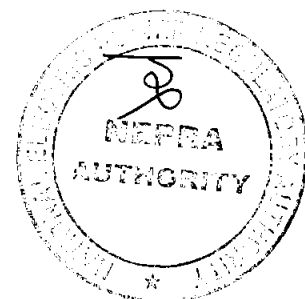
13.4.1 The Petitioner has claimed US\$ 19.78 million for custom duty and other taxes. According to the Petitioner, it has assumed custom duty at 5% on import of machinery, equipment, goods, spares and materials for the Project, in accordance with the GoP Power Generation Policy 2002. Further, 1% on account of Special Excise duty and 0.5% for the Sindh Infrastructure Development Surcharge has been included in the amount of custom duty claimed by the Petitioner. The Petitioner has submitted that in case a higher rate of Custom Duty is levied, the same shall be charged and adjusted as per actual at COD.

13.4.2 The cost of custom duty and taxes based on approved electro-mechanical equipment cost works out to be US\$ 18.836 million and allowed to KPCL. Duties and/or taxes, not being of refundable nature, imposed on the company up to the commencement of its commercial operations for the import of its plant, machinery and equipment will be adjusted at actual on COD, as against US\$ 18.836 million allowed now, upon production of verifiable documentary evidence to the satisfaction of the Authority.

### 13.5 Land, Resettlement/Environment cost

13.5.1 The Petitioner has claimed US\$ 12.500 million under the head of land and resettlement/environment cost. As per the petitioner the cost associated with acquisition of land, compensation for resettlement to the inhabitants of karot to be affected by the development of the project, environmental compensation for removal of trees and other allied costs have been estimated and accounted for under this head.

13.5.2 The Petitioner has claimed cost of land and resettlement/environment on estimation basis, which is adjustable as per provisions of the Hydropower Mechanism based on authentic documentary evidence at COD. The Authority has, therefore, decided to allow US\$ 12.500 million for the cost of land, resettlement/environment at this stage as per claim of the



Petitioner. The cost of land and resettlement/environment cost will be adjusted at COD in accordance with the approved Hydropower Mechanism.

### 13.6 Insurance during construction

13.6.1 The petitioner has claimed US\$ 21.800 million (2.40% of claimed EPC Cost) for Insurance during construction which covers Construction All Risk Insurances (CAR), CAR delay in Start-up Insurance, Terrorism Insurance, Marine and Inland Transit Insurance and Comprehensive General Liability.

13.6.2 The Authority in the case of other hydropower projects has allowed this cost component in the range of 2% to 2.75%. Considering the long gestation period of Karot hydropower project as well as the high geological risk associated with the project, the Authority considers that the basis of 2.4% is reasonable. Accordingly, US\$ 20.477 million for Insurance during Construction based at 2.4% of the approved EPC cost is allowed to KPCL. Insurance during construction will be adjusted at COD based on actual subject to the maximum of 2.40% of the adjusted and approved EPC cost upon production of verifiable documentary evidence to the satisfaction of the Authority.

### 13.7 Legal fees and charges

13.7.1 The Petitioner has claimed US\$ 10.90 million on account of legal fees and charges associated with engagement of an international and a domestic law firm for advice on all legal aspects of the Project. The Petitioner has submitted that given long implementation period of the project, the services of legal advisors shall be required throughout the development and construction period to assist in connection with the negotiation and execution of EPC contracts, the IA, PPA, the Water Use Agreement, Agreement with lenders, Project site agreements and other services. Further, the legal advisors will also be required to assist that the Project complies with all the contracts and agreements and all regulatory requirements to ensure that all legal issues are indentified and appropriately rectified in a timely manner. Furthermore, the cost for appointment of PPIB legal counsel is also included under this head.

13.7.2 The Authority understands that the cost of legal fees and charges is dependent on the scope, duration and the status of law firm whether local or foreign. Since Karot hydropower project is being developed by foreign investors and lenders, therefore, the cost of legal fees and charges for this project may be comparatively higher. The Authority in similar hydropower project allowed the cost of legal fees and charges claimed by the Petitioner based on 1% of the EPC cost. The Authority has, therefore, decided to allow cost of legal fees and charges at 1% of the approved EPC for KPCL. Accordingly US\$ 8.532 million is approved as cost of legal fees and charges for KPCL.

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### 13.8 Financial Charges

13.8.1 The Petitioner has claimed US\$ 62.17 million on account of financing fees and charges. The cost of financing fees and charges mentioned in the feasibility of Karot, however, amounts to US\$ 70.850 million.

13.8.2 In support of the claim, the Petitioner has submitted that financial charges include the costs related to the debt and equity financing of the project. Such costs include the fee related to arrangement of equity, lenders up-front fee, commitment fee and charges related to various letters of credit to be established in favor of various contracting parties; fees payable and stamp duty applicable on the financing documents; agency fee; security trustee fee; lenders project monitoring fee and the fees for the lenders' various advisors. These financial charges have been estimated based on the Consultants past experience for similar projects and are in line with the prevailing market conditions and practices applicable for financing transactions.

13.8.3 The breakup of the costs provided by KPCL under this head is given hereunder.

Cost	Rate	US\$ Mln
Debt Arrangement fee	1% of CAPEX (One time)	10.90
Commitment fee	0.5% p.a	10.11
L/C Confirmation Charges	2.75% (one time)	24.52
L/C Commission	0.15% per Quarter	9.36
Lenders Advisors and project monitoring fees		7.28
<b>Total</b>		<b>62.17</b>

13.8.4 The Petitioner has requested the Authority to allow the charges (associated with Commitment Fee, L/C Commission and other fees related to Lenders' advisors and project monitoring costs) to be firmed up at the time of EPC stage tariff determination as these costs are dependent on various factors such as market liquidity, country risk etc. which are beyond the control of the Project Company.

13.8.5 The cost of financial charges generally claimed by the IPPs comprise, debt arrange fee, commitment fee, L/C commission fee and lenders advisors fee etc. while cost of L/C confirmation charges is dealt separately. The claimed cost of financing charges excluding L/C confirmation charges amount to US\$ 37.650 million.

13.8.6 According to the information provided by the Petitioner, the Petitioner has not yet finalized the project financing with its lenders. The Petitioner has therefore claimed financing fees and charges on estimate basis.

13.8.7 The Authority in other cases has approved a benchmark of 3% of loan amount excluding the impact of IDC and financial charges. On this basis the financial fees and charges for Karot hydropower project works out to be US\$ 25.888 million and therefore allowed at this stage.

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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 fees and financial charges) on production of authentic documentary evidence.

### 13.9 L/C Confirmation Charges

13.9.1 The Petitioner has claimed US\$ 24.52 million on account of L/C Confirmation Charges. The amount of L/C confirmation charges (one time) has been based at 2.75% of its proposed amount of EPC Cost (US\$ 891.7 million). The Petitioner has submitted that due to the negative credit rating assigned to Pakistan by Standard & Poor's and Moody's and based on experiences with foreign EPC contractors on other similar transactions, it is anticipated that L/C confirmation will be a standard requirement by all potential EPC contractors. The rate for L/C confirmation being quoted on similar transactions varies between 2% - 4.5% based on duration of the L/C. The rate used for the purpose of this petition is 2.75%, however, the same is subject to change as the rate is dependent on the risk assessment associated with Pakistan at the time the L/C is opened. The Petitioner has therefore requested for adjustment of the same on the basis of actual at the time of COD.

13.9.2 The Power Purchaser (CPPA) in its comments during hearing of the petition strongly objected on petitioner's claim for L/C Confirmation charges submitting that the whole financing for the project is proposed to be arranged from Chinese banks in China and therefore the Petitioner can make payments directly to the EPC contractor from China without opening L/C with the local banks in Pakistan, hence the Petitioner's claim for allowing L/C confirmation charges is not justified and therefore may not be allowed. The Power Purchaser further submitted that the aforementioned practice is being applied in some hydropower project. The Power Purchaser also quoted an example of Laraib Energy and Patrind Hydropower project where there are no L/C confirmation charges.

13.9.3 The concerns shown by the Power Purchaser do have basis and need to be considered in the right perspective. The Petitioner has not finalized project financing as yet. The Petitioner has, however, proposed that all financing for the project will be arranged from Chinese commercial banks. In this regard the Petitioner has provided a copy of consent by its proposed lenders i.e. Industrial and Commercial Bank of China (ICBC). In opinion of the Authority the cost of L/C confirmation charges can be avoided on the basis of arrangement suggested by the power purchaser, especially in view of the fact that, both, the project sponsors and proposed lenders are Chinese foreign investors. The Authority also noted that no documentary evidence in confirmation to the specific requirement of L/C confirmation charges has been provided by the Petitioner. In view of the aforementioned, the Authority considers that the Petitioner's claim of L/C confirmation charges is not justified and, therefore, disallowed by the Authority.

### 13.10 Sinosure Fee

13.10.1 The Petitioner in its petition has claimed US\$ 68.370 million on account of Sinosure Fee for the project construction period at 1.2% per annum covering both debt and



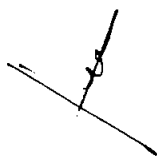

equity investment. Further, it has also claimed US\$ 10.6 million and US\$ 3.42 million per annum on account of Sinosure Fee for the operational period covering debt for a period of first 12 years and equity investment for the 50 years of proposed project concession period. The Petitioner has claimed Sinosure coverage for the operational period through a separate component of tariff of Rs 113.73/kW/Month (levelized) in its proposed tariff table.

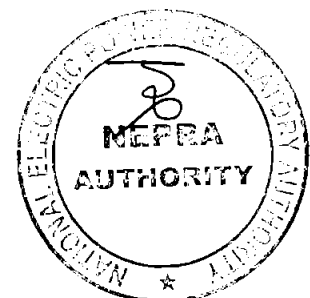
13.10.2 The Petitioner has submitted that Sinosure is China's official export credit insurance agency, offering export credit and credit insurance. Sinosure insures both China's overseas investments and overseas investments into China, and guarantees both investment into debt and equity. As per the Petitioner, investment insurance 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 in countries where the insured have made investments. It is designed to support and promote Chinese companies and financial organizations.

13.10.3 The Petitioner has further submitted that according to the requirement of the Chinese government, state-owned enterprises such as CTGPC, undertaking overseas investments are required to acquire 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. Due to the current social and economic scenario prevalent in Pakistan, the current rate for arrangement of Sinosure insurance for both debt and equity investments is 1.20% per annum. The fee charged shall apply throughout the Project life i.e. during construction as well as operations phase of the Project.

13.10.4 The Authority has already allowed Sinosure fee in the case of Three Gorges First Wind Power Project (TGFWP) being developed by the same main sponsors, as per request of the Petitioner, amounting to US\$ 6.806 million lump sum based on 6.53% of the loan amount, to be adjusted at COD subject to the maximum limit of 6.53% of the loan facility allowed on production of authentic documentary evidence. The Authority has also received information on financing of Neelum-Jhelum hydropower project whereby the Ministry of Economic Affairs & Statistics (Economic Affairs Division) Government of Pakistan as borrower is in the process of negotiations on Sinosure coverage in the range of 6%-7%.

13.10.5 The Authority observed that basis and terms of Sinosure fee requested by KPCL are different from those allowed to TGFWP, despite the fact that source of financing and project sponsors are the same in both projects. The Petitioner has requested for Sinosure fee to be applicable on both i.e. debt and equity whereas in TGFWP the sponsors had requested for Sinosure fee to be applicable on debt only during the debt servicing period after COD. Further, the Petitioner has claimed Sinosure fee at 1.2% per annum to be applicable on the outstanding amount of debt and equity during the construction period and for entire period of debt repayment in first 12 years of plant operation and equity over 50 years project life, whereas no Sinosure fee on equity was either claimed or allowed to TGFWP by the Authority.

  
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13.10.6 The Power Purchaser in its comments to the Authority has objected on exorbitant amount of Sinosure fee of US\$ 68.370 million included in the project cost without providing any basis. Further, it has not supported petitioner's request of Sinosure coverage on the equity part of project financing.

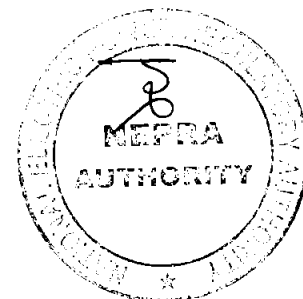
13.10.7 The Authority also observed that the Petitioner in its tariff petition has not submitted any basis, backup calculations and documentary evidence in support of its claim of Sinosure fee. The Petitioner was therefore asked vide our letter No. NEPRA/TRF-194/KPCL-2011/84 dated February 03, 2012 and subsequent letter No. NEPRA/TRF-194/KPCL-2011/25 dated February 24, 2012 dated to provide the basis and backup calculations along with documentary evidence in support of its claimed amount of Sinosure Fee of US\$ 68.370 million for the project construction period and US\$ 10.600 million per annum for the operational year 1-12 and US\$ 3.42 million per annum for the operational year 13-50 separately for debt and equity components. The Petitioner vide letter No. KPCL-012/051 dated February 28, 2012 submitted letter of Industrial and Commercial Bank of China (ICBC) as supporting document whereby the ICBC Bank has shown its interest for financing of the Karot project subject to provision of Sinosure coverage on the insured assets i.e. debt principal plus interest and equity, at a premium of around 1.2% per annum. The Petitioner through subsequent letter of ICBC Bank dated March 5, 2012, submitted the basis and terms of Sinosure fee whereby the following methodology for calculation of Sinosure fee on debt has been indicated;

- i) Prior to achievement of Commercial Operation Date (COD – at a rate per annum of the debt injected calculated on semi-annual basis; and
- ii) Post achievement of Commercial Operations Date – at a rate per annum of the total principal outstanding plus interest payable for the immediately succeeding year (next two six-monthly installments) calculated on semi-annual basis.

13.10.8 The Authority noted that the Petitioner's request for Sinosure coverage on debt has a basis which has been acknowledged in the public sector power projects financed by the Chinese investors. The Authority considers that given the size of investment in Karot hydropower project by the Chinese lenders and project's importance in the current energy crises as well as security and economic situation of the country, the Petitioner's requirement of Sinosure coverage based on terms proposed by the Petitioner can not be ignored.

13.10.9 The Authority after thorough consideration in the matter has decided to allow Sinosure coverage on Debt investment only based on outstanding amount of debt and interest covering the project construction period of four (4) years and twelve (12) years debt repayment period after COD at indicated per annum rate of 1.2%. Accordingly, US\$ 26.419 million have been worked out on account of Sinosure fee for the project construction period and included in the approved project cost. Similarly Sinosure Fee for the 1-12 years of debt repayment period has been calculated for each year based on petitioner indicated terms of payment and included as a separate component of tariff in the component-wise tariff table attached herewith as Annex-I.

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13.10.10 The Petitioner is directed to negotiate Sinosure coverage on debt at better terms while finalizing project financing with the Chinese lenders/insurance agency. The amount of Sinosure fee for the project construction period as well as operational period will be adjusted on the basis of actual subject to the maximum per annum rate of 1.2% on production of authentic documentary evidence at COD.

13.10.11 As for the Petitioner's claim of Sinosure coverage on Equity investment, it has been observed by the Authority that Sinosure coverage on equity investment was not claimed by the Petitioner in another project which had the same main sponsors (i.e. Three Gorges). The Petitioner through its own letter dated February 28, 2012 has submitted letter of the main project sponsoring company (China Three Gorges Corporation) whereby the following has been stated;

"The management committee of the CTG closely reviews the ground realities of the country (Country Risk profile reflected through Sovereign Credit Rating of the countries established by S&P and Moodys) in which the investment in being proposed so as to ascertain the investment Risk involved in the transaction. After completing its assessment the management committee of CTG, if the situation requires, recommends SINOSURE coverage to be procured against its equity investment. This has been the case with regards to investments recently undertaken by CTG in Sudan and Laos".

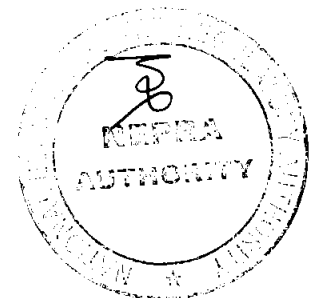
"Given the uncertainties associated with the political and security situation in Pakistan coupled with the issue of Circular Debt, the management committee of CTG has deemed SINOSURE coverage to be prerequisite for investing into the Karot Project".

13.10.12 The Authority considers that higher risk of project sponsors in hydropower projects is more than compensated through higher rate of return allowed by the Authority to hydropower IPPs as compared to thermal and wind power projects. The Authority noted that no such insurance/fee on equity has been claimed in other hydropower projects financed by foreign investors. The Authority further considers that, by accepting petitioner's claim of Sinosure coverage on equity, it cannot put an additional burden on the consumers for whole life of the project as the current situation of power sector in the country referred to by the Petitioner will not last for an indefinite period.

13.10.13 The Authority holds that it cannot accept the petitioner's claim of Sinosure coverage on equity due to the aforementioned reasons including non-provision of credible documentary evidence by the Petitioner. The Authority, therefore, declines to the petitioner's claim of Sinosure coverage on equity investment.

13.11 Whether the proposed terms of debt financing and Interest during Construction (IDC) are justified?

13.11.1 The Petitioner has submitted that the project cost is envisaged to be funded in Debt/Equity ratio of 80:20 and will be firmed up once the term sheet for arrangement of debt financing has been finalized at a later stage. The Petitioner in the hearing of the petition mentioned that financing would be arranged from major Chinese banks.



13.11.2 For the purpose of the tariff petition, the Petitioner has assumed LIBOR based financing with LIBOR at 0.71% and spread over LIBOR (Premium) at 475 basis points. The debt is to be paid on semi-annual basis in the first 12 years after commercial operation date. Based on aforementioned financing terms, the Petitioner has estimated US\$ 143.50 million for Interest During Construction (IDC) spread over 48 months of project construction period. The Petitioner has further submitted that actual IDC, shall be subject to adjustment depending on the fluctuations in base rate of LIBOR, funding requirements (draw downs) and variations in US\$/PKR exchange rate.

13.11.3 The Petitioner's proposed spread over LIBOR of 475 basis points was strongly objected by the Power Purchaser (CPPA) during the hearing as well as through its written comments to the Authority. According to the CPPA, the spread over LIBOR should be considerably lower in the presence of Sinasure coverage on debt as both these financial instruments cover risk of debt service payments.

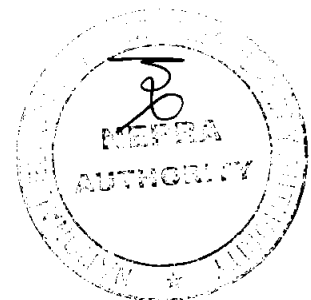
13.11.4 The Petitioner in its reply has submitted that the margin of 475 basis points is considered to be reasonable given (i) current financial situation in the international markets which is currently facing a liquidity crunch, (ii) Pakistan's security situation, due to which international lenders shall require a premium for taking on the additional risk of investing in Pakistan, and (iii) Pakistan's credit ratings which have deteriorated significantly during the past year.

13.11.5 The Petitioner has further submitted that NEPRA in its recent determination for another hydropower project, for which LIBOR based financing was arranged through international development financial institutions has already allowed a margin of 475 basis points.

13.11.6 The Authority considers that premium on LIBOR is negotiable between the sponsor and lenders at the time of finalizing project financing. The financing of KPCL is not yet finalized and the Petitioner has proposed premium of 475 basis points without affirmation of the lenders. The Authority considers that observations of the power purchaser on the issue of proposed premium of 475 basis points do merit consideration. The Authority observed that the facts stated by the petitioner are not correct as it has not allowed premium of 475 basis points along with Sinasure coverage to any other IPP. The Authority holds that considering company profile of main project sponsors (Three Gorges) as well Sinasure coverage on debt already allowed by the Authority in this case, the Petitioner is in a better position to negotiate with its lenders on favourable terms. The Authority has already allowed a premium of 450 basis points in Three Gorges First Wind Power project and therefore approves the same rate of premium (i.e. 450 basis points) for KPCL.

13.11.7 Based on the petitioner's proposed terms of financing, current LIBOR at 0.73% and approved premium of 4.50%, the IDC on semi-annual basis has been worked out to be US\$ 112.207 million and approved for KPCL. Interest During Construction (IDC) will be adjusted at COD on the basis of actual debt composition, debt drawdown of loan (not exceeding the

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amount allowed by the Authority) and applicable 6-months LIBOR during the project construction period allowed by the Authority.

**13.12 Whether Equity and Return on Equity as claimed by the Petitioner is justified?**

13.12.1 The Petitioner has proposed that 20% of project cost will be financed from sponsors' investment as equity. The Petitioner has proposed 20% rate of return on equity (IRR based) net of Withholding Tax on dividends for the project. The Petitioner has requested that it should be allowed return on equity at 20% (IRR based) based on the following components.

- Return on equity during the project construction period (ROEDC)
- Return on equity for operational period of 50 years (ROE)
- Special Return on equity for project development period as per decision of ECC dated July 28, 2009.

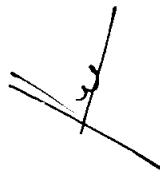

13.12.2 The Petitioner has further submitted that based on risk profile of hydropower projects, country's current credit rating, security issues and economic uncertainties, the proposed rate of return at 20% is fully justified.

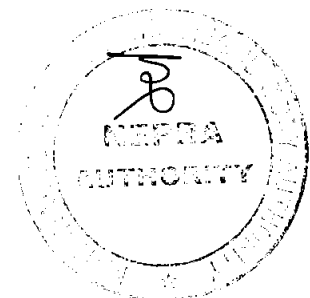
13.12.3 Authority has allowed 17% return on equity (IRR based) in the case of other hydropower projects including those funded by the foreign investors. In the opinion of the Authority, 17% return on equity (IRR based) is exclusive of withholding tax on dividends and therefore quite reasonable under the present circumstances. The Authority does not find any justification for allowing a higher rate of return in the instant case. The Authority has therefore decided to maintain its decision of 17% return on equity (IRR based) net of withholding tax as already allowed to other hydropower project. 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.

13.12.4 The Authority, however, accepts the petitioner's request for a special return on equity in accordance with the aforementioned ECC's decision based on equity injected by KPCL for the 30 months period prior to the date of construction start while maintaining an overall return on equity of 17% (IRR based). The Authority will allow special return on equity in accordance with the ECC decision on production of verifiable documentary evidence at COD.

**14. Whether the per annum O & M Expenses claimed by the Petitioner are justified?**

14.1 The Petitioner has claimed US\$ 62.52 million and US\$ 53.19 million on account of its per annum operational costs for the year 1-12 and 13-50 of the project life respectively. This cost is inclusive of O&M cost, insurance cost and working capital cost which are discussed separately as hereunder.

  
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## 14.2 O&M cost

14.2.1 The Petitioner has claimed US\$ 13.500 million on account of its per annum O&M cost with the following breakup.

Per annum O&M cost	1-12 years (US\$ Mln)	13-50 years (US\$ Mln)
O&M Cost	4.00	4.00
Owner's staff cost	5.50	5.50
Other fixed cost	4.00	4.00
<b>Sub-Total</b>	<b>13.50</b>	<b>13.50</b>
<b>Variable O&amp;M cost</b>		
Variable O&M cost	9.50	9.50
<b>Total</b>	<b>23.00</b>	<b>23.00</b>

14.2.2 The Petitioner in support of the aforementioned claim has submitted as follows.

- The O&M cost includes the fixed fee payable to the O&M Operator for carrying out the regular operations and maintenance services of the Project of which 50% is usually borne in local currency and remaining 50% is paid in foreign currency. As per the Petitioner this includes the costs associated with routine and preventive maintenance services to be performed by the O&M operator as well as the administrative cost associated with provision of the O&M services.
- Owner's staff cost (US\$ 5.50 million per annum) includes the costs related to salaries and benefits of all staff (administrative, operational and security) employed by the Petitioner at the site and Head Office. According to the Petitioner the security requirements for the Project Company have been determined keeping in view the total area of the Project site (including dam and reservoir area) and recent deterioration in the security situation in Pakistan.
- The other fixed cost (US\$ 4.00 million per annum) includes costs associated with;
  - Provision for major overhaul of the hydropower plant. The cost of major overhaul varies from 7% to 15% of the equipment cost. The estimated cost of overhauling has been amortized over the project life, in order to ensure that adequate funding would be available to perform the required maintenance activities.
  - Acquisition of fixed assets required for the project and their subsequent replacement in accordance with generally accepted accounting principles. These assets include Vehicles, tools & inspection equipment, tools for measuring, recording and analyzing hydrological data and furniture and fixtures required for the offices to be maintained at site and at Head office.
  - Various administrative costs such as rents & utilities, travelling, audit and other legal expenses, phone and broadband bills including requirement for maintaining satellite



connectivity to National Power Control centre in Islamabad, printing & stationary, entertainment, generation license and other regulatory fees, agency and security trustee fee and other fees payable to the lenders and lender's legal and technical advisors.

- The running and maintenance of vehicles at the Islamabad and site office.

14.2.3 The variable O&M cost has been calculated on the average annual net energy generation of 3401 GWh of which 50% shall be in foreign currency and the remaining 50% shall be in PKR. This component caters for the following costs of the project company.

- O&M of plant during a period of abnormal hydrology and sedimentation pattern being outside the scope of O&M contractor.
- Maintenance of reservoir and allied civil structures.
- Cost of lubricants, chemicals etc.

14.2.4 The Petitioner has submitted that its per annum O&M cost has been estimated by the feasibility consultants based on their experience for such hydropower projects. The Petitioner has further submitted that its per O&M cost works out to be 1.67% of the project cost which is below the O&M cost allowed to other hydropower projects.

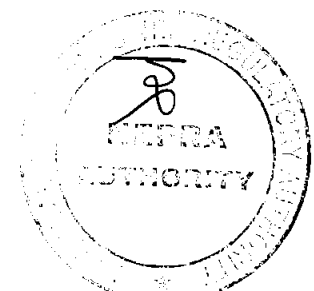
14.2.5 The Authority in another comparable hydropower project of 840-MW, has allowed per annum O&M cost on the basis of 1.5% of the total project cost. The Authority understands that KPCL's per annum O&M cost is based on estimates worked out by the consultants while exact requirement of KPCL for its per annum O&M cost will be established once all project parameters and costs are firmed up through detailed engineering of the project and negotiations with the EPC and O&M contractors. The Authority has therefore decided to allow the Petitioner its per annum O&M cost on the basis of 1.5% of the total approved project cost on similar lines as already allowed by it to another comparable size hydropower project. Accordingly, US\$ 18.647 million on account of per annum O&M cost of KPCL has been approved with the following cost breakup into local and foreign for Fixed and Variable O&M costs.

Per Annum O&M Cost	US\$ Million	Tariff (Year 1-30)
<b>Fixed O&amp;M Cost</b>		
Local (Rs/kW/Month)	5.5942	52.3217
Foreign (Rs/kW/Month)	5.5942	52.3217
<b>Variable O&amp;M Cost</b>		
Local (Rs./kWh)	3.7295	0.0877
Foreign (Rs./kWh)	3.7295	0.0877

15. Whether Insurance during operation as claimed by the Petitioner is justified?

15.1 The Petitioner has claimed US\$ 16.960 million per annum for its insurance expense during the project operational period. According to the Petitioner the insurance expense

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consists of all-risk insurance/reinsurance for the project as well as business interruption insurance which is a lender's stipulated requirement. The cost of insurance covers machinery, breakdown, natural calamities (such as earthquakes), sabotage and consequential business interruption. The Petitioner has submitted that insurance expense is expected to be denominated in foreign currency USD. According to the petitioner it has calculated its per annum insurance expense at 1.5% of the EPC cost. The Petitioner has submitted that per annum insurance expense allowed by the Authority to other projects at 1.35% will not be sufficient for this project due to area of the project (which includes the dam and reservoir area) that would also need to be insured.

15.2 The Authority in other cases has allowed per annum insurance expense at maximum of 1.35% of the EPC cost to be adjusted at COD on the basis of actual. In the opinion of the Authority, the maximum limit of 1.35%, in view of the approved EPC cost of KPCL, is sufficient to fulfill annual requirement of the Petitioner for its insurance expense. Accordingly, the per annum insurance expense on the aforementioned basis works out to be US\$ 11.5185 million and approved for KPCL. The annual insurance expense will be adjusted at actual subject to the maximum of 1.35% of revised approved EPC cost at COD and thereafter on annual basis while upper maximum limit remaining the same.

16. Whether Petitioner's claim of Working Capital Requirement is justified?

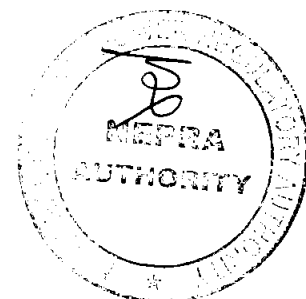
16.1 The Petitioner has claimed US\$ 5.100 million and US\$ 3.430 million per annum on account of cost of financing its working capital requirements for first 12 years and rest of project life respectively. The Petitioner has submitted that due to mismatch in the timing of cash flows (accounts receivable and accounts payable) it shall require working capital facility of US\$ 34.708 million (Rs 2776.66 million) in order to meet its payment obligations on time. According to the Petitioner, mismatch in its cash flows would result from the following contributing factors.

- 30 days time gap between the monthly energy and capacity charges invoice and payment by the power purchaser.
- Advance monthly payments by O&M contractor for acquisition of O&M services.
- Maintenance of adequate levels of stores and spares to ensure timely availability of long-lead items for continued smooth operation of the plant.

16.2 The Petitioner has worked out its working capital cost of financing on the basis of following assumptions.

KIBOR (6-monthly rate)	12.40%
Margin over Bank Rate	2.50%
All-In Interest rate	14.90%

16.3 The Authority has not allowed the cost of working capital facility in the case of other hydropower IPPs for meeting gap between accounts receivables and accounts payables, due to



the reason that there is no requirement of fuel inventory in hydropower projects and also that 70% capacity payment is made in advance by the power purchaser as per the standardized PPA.

16.4 The power purchaser in its comments has also not supported KPCL's request for allowing cost of working capital based on aforementioned reasons. The Authority considers that it has allowed tariff based on annual cost requirement of the Petitioner. It is therefore responsibility of the Petitioner to manage any variation in its monthly cashflows, as for certain components of tariff, the petitioner will receive payments from the power purchaser in advance of their actual expenditure, which will offset any negative cashflows on month to basis. In line with decision of the Authority in other such cases, the Petitioner's request for allowing cost of working capital facility is declined.

17. Whether Debt Service Reserve Account/Letter of Credit Cost as claimed by the Petitioner is justified?

17.1 The Petitioner has requested for allowing it cost of L/C to meet lenders requirement of maintaining Debt Service Reserve Account (DSRA). Accordingly the Petitioner has requested that US\$ 0.48 million per annum on account of L/C charges may be approved by the Authority.

17.2 The Authority in the case of Uch Power and Zorlu Enerji Pakistan Ltd. has allowed DSRA L/C cost on specific requirement of their international lenders/financial institutions such as IFC, ADB etc. The financing for the KPCL project is proposed to be arranged from consortium of Chinese commercial banks. The Authority has already allowed Sinasure coverage on debt as per request of the Petitioner, which covers all construction and operational risk of the project including payment default by the Power Purchaser. Further, in case of default, the Power Purchaser, under the standardized PPA, is obligated to make payment of full invoiced amount along with markup charges to an IPP. In view of the aforementioned, the Authority considers that the Petitioner's request for allowing cost of L/C charges on account of debt service reserve account is not justified and therefore not approved by the Authority.

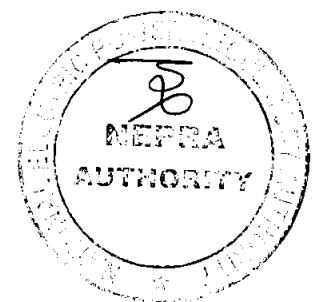
18. Whether Water Use Charge (WUC) as claimed by the Petitioner is justified?

18.1 The Petitioner has worked out US\$ 6.380 million (Rs. 510.40 million) per annum for payment of Water Use Charges at a rate of Rs. 0.1500/kWh based on net annual energy production of 3401 GWh. The request of KPCL for Rs. 0.1500/kWh on account of Water Use Charges is in accordance with the GoP Policy for Power Generation Projects 2002, therefore approved as per request of the Petitioner. Water Use Charge will be paid on units delivered basis and will be indexed with Wholesale Price Index (WPI) annually from the date of COD. The first such adjustment shall be due after one year of commercial operation from COD.

19. Whether Novation Cost as claimed by the Petitioner is justified?

19.1 The Petitioner has submitted that in order to have smooth operation of hydropower projects for the entire project life i.e. 50 years, it is a standard practice in China to have a

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novation program in place whereby all electrical and mechanical equipment is replaced within 30-40 years (standard life span of electrical/mechanical equipment).

19.2 The Petitioner has further submitted that the novation cost was not considered as part of the operation & maintenance cost in the Feasibility Study developed for this project. However based on the main sponsors' extensive experience in development, operation & maintenance of large hydropower projects, the sponsor is certain that some of the major electrical and mechanical equipment will need to be replaced during the life of the Project. While this has not been considered as part of the Feasibility Study, the sponsors would request NEPRA to allow such costs to be treated as a pass-through under the tariff in case these are incurred.

19.3 The Authority considers that the Petitioner's request for consideration of novation cost is based on its proposed project concession of 50 years. The Authority has already allowed KPCL, a project concession period of 30 years on BOOT basis and therefore, the need for consideration of such cost does not arise. In view of the aforementioned the Petitioner's claim of novation cost to be considered as pass-through is not justified, hence, not considered by the Authority

20. Whether the claimed Tariff of US cents 7.500/kWh levelized over 50 years of project concession period is justified?

20.1 The Petitioner's request for approval of a levelized tariff of US cents 7.50/kWh on BOOT basis for 50 years life of the project is based on proposed capital cost of US\$ 1212.500 million, operating costs of US\$ 62.52 million for the first 12 years and US\$ 53.190 million for next 38 years and technical/financial parameters and assumptions for the project. However, on the same basis, the levelized tariff of KPCL for 50 years life of the project according to our calculations works out to be US\$ Cents 6.7239/kWh. The difference of US cents 0.7761/kWh in the requested levelized tariff of US cents 7.50/kWh and the one worked out by the Authority has resulted mainly due to over estimation of certain project costs such as Interest during construction, Sinosure Fee for the project construction period and return on equity (IRR based). The difference in the amount of certain cost components impacting the requested tariff by the petitioner is given hereunder.

Cost components	Petitioner (US\$ Mln)	NEPRA Working (US\$ Mln)	Difference (US\$ Mln)
Sinosure Fee - Construction period	68.370	36.806	31.564
Interest During Construction	143.500	128.597	14.903
Debt	1139.50	1102.323	37.177
Equity	284.876	275.581	9.295
Sinosure fee for operation period	257.160	228.948	28.212
Return on Equity including Construction period & equity redemption (per annum)	90.767	75.440	15.327

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20.2 The cumulative effect of above costs has resulted in levelized tariff of US\$ 6.7239/kWh as against worked out by the Petitioner US\$ 7.500/kWh.

20.3 The Authority on the basis of approved cost for each tariff component has worked out a levelized tariff of US cents 5.3977/kWh based on 30 years project concession period which is US cents 1.3262/kWh lower than the worked out tariff of US Cents 6.7239/kWh based on petitioner's claimed costs, due to cost adjustments as already discussed in the preceding pages.

20.4 The Petitioner through its letter No. KPCL/12/57 dated April 25, 2012 sought further time for submission of additional information/documentary evidence in support of its petition. The Authority while realizing the importance of this project and considering the fact that the project is being developed by the foreign investors provided another opportunity to the Petitioner for submission of additional information supported with documentary evidence within seven days. The Petitioner through letters dated May 10, 2012 and May 17, 2012 submitted its response while reiterating its request in respect of the following costs/components of tariff as mentioned hereunder.

- Project contingencies amounting to US\$ 104.13 million may be allowed as estimated by the project consultant in the approved feasibility study.
- Sinosure coverage on equity investment may be allowed as per request of the Petitioner in the Petition.
- Special return on equity as per decision of the ECC be allowed at this stage.
- Net annual energy production may be revised from 3401 GWh to 3249.78 GWh based on updated study of flow data.

20.5 The Authority considered the petitioner's request on above mentioned issues in its meeting held on May 22, 2012. The Authority noted that the Petitioner has reiterated its request for Authority's consideration without any additional documentary evidence. The Authority also observed that the Petitioner has requested for revision in annual energy estimates at this belated stage and without any requisite approval by the competent authority. The Authority has already decided on above mentioned issues after due consideration based on available record as mentioned at relevant pages of this determination. The Authority considers that the Petitioner has another opportunity to present its case based on detailed engineering and thorough due diligence of the project at the time of filing next tariff petition i.e. EPC stage in accordance with the approved Hydropower Mechanism. In view of the aforementioned the Authority does not find any justification to reconsider its decision on the above mentioned issues as requested by the Petitioner.

## 21. Order.

Pursuant to Rule 6 of the NEPRA Licensing (Generation) Rules, 2000, Karot Power Company (Private) Limited (KPCL) is allowed to charge the following tariff for delivery of electricity to the Central Power Purchasing Agency (CPPA) for onward delivery to Ex-WAPDA distribution companies.

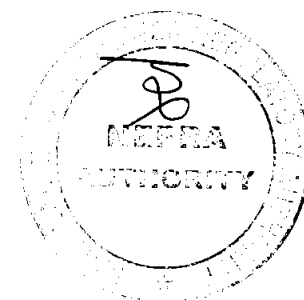
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Tariff Components	Year 1-12	Year 13-30	Indexation
<b>Variable Charge (Rs/kWh)</b>			
Variable O&M - Local	0.0877	0.0877	WPI
Variable O&M - Foreign	0.0877	0.0877	PKR/US\$, US CPI
Water Use Charge	0.1500	0.1500	WPI
<b>Fixed Charge (Rs/kW/M)</b>			
Fixed O&M - Local	52.3217	52.3217	WPI
Fixed O&M - Foreign	52.3217	52.3217	PKR/US\$, US CPI
Insurance	107.7301	107.7301	PKR/US\$
Debt Service	1053.4217	-	LIBOR, PKR/US\$
Return on Equity	395.3194	420.2153	PKR/US\$
Return on equity during construction (ROEDC)	122.3496	122.3496	PKR/US\$

- i. The reference tariff has been calculated on the basis of net contracted capacity of 712.8 MW and net annual energy production of 3401 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. The above tariff is applicable for a period of thirty (30) years on BOOT basis commencing from Commercial Operation Date (COD).
- iv. Debt service will be paid in the first 12 years of commercial operation of plant after COD.
- v. Redemption of equity has been allowed after 12 years of commercial operation of the plant.
- vi. The Petitioner is entitled to adjustment of cost reopeners and cost escalation in the civil works. Such adjustment will be allowed subject to provision of the required information/data in accordance with the Mechanism for Determination of Tariff for Hydropower Projects approved by NEPRA.
- vii. The Petitioner will be paid Sinosure Fee at a rate of 1.2% per annum on the basis of outstanding amount of debt plus interest payable for the immediate succeeding year (next two six-monthly installments) calculated on semi-annual basis as indicated in the reference tariff table attached herewith as Annex-I.

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- viii. The reference PKR/Dollar rate has been assumed at 1 USD = 80 PKR.
- ix. The component wise tariff is indicated at Annex-I
- x. Debt Servicing Schedule is attached as Annex-II

**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 LIBOR at the relevant date.
- b. Interest During Construction (IDC) will be adjusted at COD on the basis of actual debt composition, debt drawdown of loan (not exceeding the amount allowed by the Authority) and applicable 6-months LIBOR during the project construction period allowed by the Authority.
- c. 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. 80.00 on production of verifiable documentary evidence to the satisfaction of the Authority.
- d. Duties and/or taxes, not being of refundable nature, imposed on the company up to the commencement of its commercial operations for the import of its plant, machinery and equipment will be adjusted at actual on COD, as against allowed amount of US\$ 18.836 million, upon production of verifiable documentary evidence to the satisfaction of the Authority.
- e. Cost of land and resettlement will be adjusted in accordance with the Hydropower Mechanism based on authentic documentary evidence at COD.
- f. Insurance during construction will be adjusted at COD based on actual subject to the maximum of 2.40% of the adjusted and approved EPC cost upon production of verifiable documentary evidence to the satisfaction of the Authority.
- g. 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 fees and financial charges) on production of authentic documentary evidence.
- h. 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.



- i. The adjustment for Special return on equity in tariff for the 30 months period will be allowed at COD on the basis of actual equity injection prior to the construction start date on the basis of verifiable documentary evidence to be provided by the Petitioner.
- j. The amount of Sinosure fee will be adjusted in tariff based on finalized terms with insurance provider subject to the maximum rate of 1.2% per annum on production of reliable documentary evidence to the satisfaction of the Authority.
- k. 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% equity according to the following formula:

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

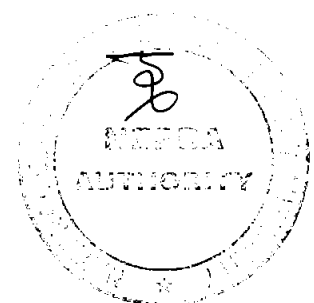
Where:

$E_{(Ref)}$	=	Adjusted Reference Equity at COD
$E_{(Red)}$	=	Equity Redeemed
$\text{ROEDC}_{(Ref)}$	=	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.

## 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 Variable O&M cost is based on 50% local and 50% foreign expense. The Fixed O&M cost is based on 50% local and 50% foreign expense. The local part of O&M will be adjusted on account of Inflation (WPI), 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 WPI (or alternative index as determined by the Authority), US CPI (notified by US bureau of labor statistics) 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

$$F O\&M_{(LREV)} = O\&M_{(LREF)} * WPI_{(REV)} / 209.47$$

$$F O\&M_{(FREX)} = O\&M_{(FREX)} * USCPI_{(REV)} / 229.392 * ER_{(REV)} / 80$$

Where:

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

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

$O\&M_{(LREF)}$  = The reference fixed O&M local component of tariff for the relevant period.

$O\&M_{(FREX)}$  = The reference fixed O&M foreign component of tariff for the relevant period.

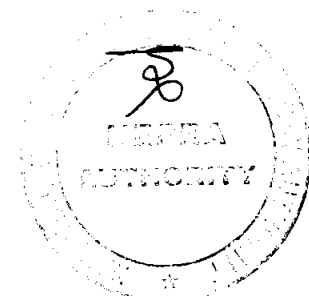
$WPI_{(REV)}$  = The Revised Wholesale Price Index (Manufacturers) / or alternative index as determined by the Authority.

$WPI_{(REF)}$  = The Wholesale Price Index (Manufactures) of July 2011 / or alternative index as determined by the Authority and notified by the Federal Bureau of Statistics.

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

$US CPI_{(REF)}$  = Reference US CPI (All Urban Consumers) notified by the Bureau of Labor Statistics for the month of March 2012.

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



b. Variable O&M

$$V O\&M_{(LREV)} = O\&M_{(LREF)} * WPI_{(REV)} / 209.47$$

$$V O\&M_{(FREX)} = O\&M_{(FREX)} * USCPI_{(REV)} / 229.392 * ER_{(REV)} / 80$$

Where:

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

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

$O\&M_{(LREF)}$  = The reference variable O&M local component of tariff for the relevant period.

$O\&M_{(FREX)}$  = The reference variable O&M foreign component of tariff for the relevant period.

$WPI_{(REV)}$  = The Revised Wholesale Price Index (Manufacturers) / or alternative index as determined by the Authority.

$WPI_{(REF)}$  = The Wholesale Price Index (Manufactures) of July 2011 / or alternative index as determined by the Authority and notified by the Federal Bureau of Statistics.

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

$US CPI_{(REF)}$  = Reference US CPI (All Urban Consumers) notified by the Bureau of Labor Statistics for the month of March 2012.

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

ii) Water Use Charges

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

$$WUC_{(REV)} = WUC_{(REF)} * WPI_{(REV)} / 209.470$$

Where;

$WUC_{(REV)}$  = The revised Water Use Charge component of tariff indexed with Whole Sale Price Index (WPI).

$WUC_{(REF)}$  = The reference Water Use Charge component of tariff for the relevant period.

$WPI_{(REV)}$  = The Revised Wholesale Price Index (Manufacturers) / or alternative index as determined by the Authority.



$WPI_{(REF)} = 209.47$ , the Wholesale Price Index (Manufactures) of July 2011 / or alternative index as determined by the Authority and notified by the Federal Bureau of Statistics.

Note: -

At the time of this determination, the Authority is still in the process of establishing an alternative index for WPI (Manufacturers) which has been discontinued by FBS since August 2011. Pending determination of the alternative index by NEPRA, the last available WPI (Manufacturers) for the month of July 2011 has been used as reference. Upon determination of the alternative indexation by NEPRA, the reference indexation values shall be revised to the alternative index value for the month of March 2012.

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 authentic 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 for the relevant period.

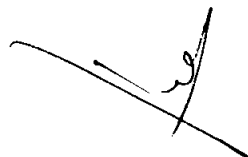

$ER_{(REV)}$  = The revised TT & OD selling rate of US dollar as notified by the National Bank of Pakistan.

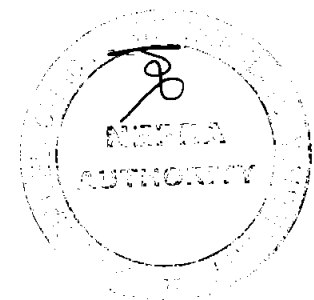
$ER_{(REF)}$  = The reference TT & OD selling rate of US dollar as notified by the National Bank of Pakistan.

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 of 4.50% on LIBOR remaining the same, according to the following formula:

$$\Delta I = P_{(REV)} * (LIBOR_{(REV)} - 0.73%) / 2$$

  
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Where;

- $\Delta I$  = the variation in interest charges applicable corresponding to variation in six-month LIBOR.  $\Delta I$  can be positive or negative depending upon whether LIBOR<sub>(REV)</sub> > or < 0.73%. The interest payment obligation will be enhanced or reduced to the extent of  $\Delta I$  for each quarter under adjustment applicable on quarterly basis.
- $P_{(REV)}$  = the outstanding principal (as indicated in the attached debt service schedule to this order at Annex-II) on a semi-annual basis at the relevant calculations dates.

v) 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:

$$\begin{aligned} ROE_{(REV)} &= ROE_{(REF)} * ER_{(REV)}/ER_{(REF)} \\ ROEDC_{(REV)} &= ROEDC_{(REF)} * ER_{(REV)}/ER_{(REF)} \end{aligned}$$

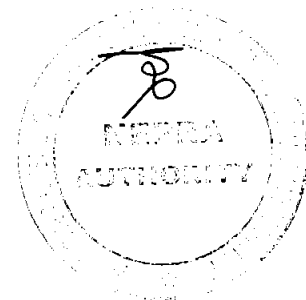
Where;

- $ROE_{(REV)}$  = 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 for the relevant period.
- $ROEDC_{(REF)}$  = Reference Return on Equity during Construction component of tariff expressed in Rs/kW/M for the relevant period.
- $ER_{(REV)}$  = 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 the petitioner's request for adjustment in tariff in accordance with the requisite indexation mechanism stipulated hereinabove.

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**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.

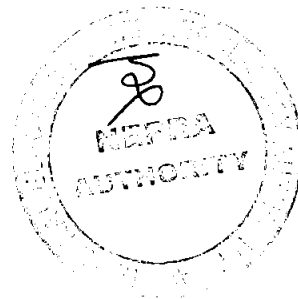
**Power Curve of the Hydel Power Complex:**

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.

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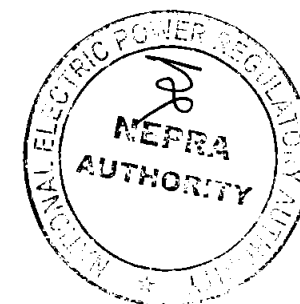


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**KAROT POWER COMPANY (PVT) LTD  
REFERENCE TARIFF**

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	Withholding Tax @7.5%	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/kW/M	Rs. / kWh
1	0.0877	0.0877	0.1500	52.3217	52.3217	107.7301	395.3194	122.3496	38.8252	574.3590	479.0626	107.4191	5.1787
2	0.0877	0.0877	0.1500	52.3217	52.3217	107.7301	395.3194	122.3496	38.8252	604.7908	448.6309	99.9693	5.1600
3	0.0877	0.0877	0.1500	52.3217	52.3217	107.7301	395.3194	122.3496	38.8252	636.8349	416.5868	92.1249	5.1403
4	0.0877	0.0877	0.1500	52.3217	52.3217	107.7301	395.3194	122.3496	38.8252	670.5768	382.8448	83.8648	5.1195
5	0.0877	0.0877	0.1500	52.3217	52.3217	107.7301	395.3194	122.3496	38.8252	706.1066	347.3151	75.1670	5.0976
6	0.0877	0.0877	0.1500	52.3217	52.3217	107.7301	395.3194	122.3496	38.8252	743.5188	309.9029	66.0084	5.0746
7	0.0877	0.0877	0.1500	52.3217	52.3217	107.7301	395.3194	122.3496	38.8252	782.9133	270.5084	56.3646	5.0503
8	0.0877	0.0877	0.1500	52.3217	52.3217	107.7301	395.3194	122.3496	38.8252	824.3950	229.0267	46.2097	5.0248
9	0.0877	0.0877	0.1500	52.3217	52.3217	107.7301	395.3194	122.3496	38.8252	868.0746	185.3471	35.5169	4.9979
10	0.0877	0.0877	0.1500	52.3217	52.3217	107.7301	395.3194	122.3496	38.8252	914.0685	139.3532	24.2575	4.9696
11	0.0877	0.0877	0.1500	52.3217	52.3217	107.7301	395.3194	122.3496	38.8252	962.4993	90.9223	12.4015	4.9397
12	0.0877	0.0877	0.1500	52.3217	52.3217	107.7301	395.3194	122.3496	38.8252	1,013.4962	39.9254		4.9086
13	0.0877	0.0877	0.1500	52.3217	52.3217	107.7301	420.2153	122.3496	40.6924				2.3265
14	0.0877	0.0877	0.1500	52.3217	52.3217	107.7301	420.2153	122.3496	40.6924				2.3265
15	0.0877	0.0877	0.1500	52.3217	52.3217	107.7301	420.2153	122.3496	40.6924				2.3265
16	0.0877	0.0877	0.1500	52.3217	52.3217	107.7301	420.2153	122.3496	40.6924				2.3265
17	0.0877	0.0877	0.1500	52.3217	52.3217	107.7301	420.2153	122.3496	40.6924				2.3265
18	0.0877	0.0877	0.1500	52.3217	52.3217	107.7301	420.2153	122.3496	40.6924				2.3265
19	0.0877	0.0877	0.1500	52.3217	52.3217	107.7301	420.2153	122.3496	40.6924				2.3265
20	0.0877	0.0877	0.1500	52.3217	52.3217	107.7301	420.2153	122.3496	40.6924				2.3265
21	0.0877	0.0877	0.1500	52.3217	52.3217	107.7301	420.2153	122.3496	40.6924				2.3265
22	0.0877	0.0877	0.1500	52.3217	52.3217	107.7301	420.2153	122.3496	40.6924				2.3265
23	0.0877	0.0877	0.1500	52.3217	52.3217	107.7301	420.2153	122.3496	40.6924				2.3265
24	0.0877	0.0877	0.1500	52.3217	52.3217	107.7301	420.2153	122.3496	40.6924				2.3265
25	0.0877	0.0877	0.1500	52.3217	52.3217	107.7301	420.2153	122.3496	40.6924				2.3265
26	0.0877	0.0877	0.1500	52.3217	52.3217	107.7301	420.2153	122.3496	40.6924				2.3265
27	0.0877	0.0877	0.1500	52.3217	52.3217	107.7301	420.2153	122.3496	40.6924				2.3265
28	0.0877	0.0877	0.1500	52.3217	52.3217	107.7301	420.2153	122.3496	40.6924				2.3265
29	0.0877	0.0877	0.1500	52.3217	52.3217	107.7301	420.2153	122.3496	40.6924				2.3265
30	0.0877	0.0877	0.1500	52.3217	52.3217	107.7301	420.2153	122.3496	40.6924				2.3265
<b>Levelized Tariff</b>	<b>0.0877</b>	<b>0.0877</b>	<b>0.1500</b>	<b>52.3217</b>	<b>52.3217</b>	<b>107.7301</b>	<b>402.2208</b>	<b>122.3496</b>	<b>39.3428</b>	<b>528.6745</b>	<b>232.7295</b>	<b>49.8513</b>	<b>4.3182</b>

Levelized Tariff (1-30 years) discounted at 10% per annum = US Cents 5.3977/kWh at reference exchange rate of 1US\$=Rupees 80.00.





## KAROT POWER COMPANY (PVT) LTD

## 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 Millin \$																																																																																																																																																																																										
1	994.5307	30.3089	26.0070	964.2217	56.3159	61.4105	51.2214	112.6318	574.3590	479.0626	1,053.4217																																																																																																																																																																																				
	964.2217	31.1015	25.2144	933.1202	56.3159							2	933.1202	31.9148	24.4011	901.2054	56.3159	64.6642	47.9676	112.6318	604.7908	448.6309	1,053.4217	901.2054	32.7494	23.5665	868.4560	56.3159	3	868.4560	33.6058	22.7101	834.8502	56.3159	68.0904	44.5415	112.6318	636.8349	416.5868	1,053.4217	834.8502	34.4846	21.8313	800.3656	56.3159	4	800.3656	35.3864	20.9296	764.9792	56.3159	71.6981	40.9338	112.6318	670.5768	382.8448	1,053.4217	764.9792	36.3117	20.0042	728.6675	56.3159	5	728.6675	37.2613	19.0547	691.4063	56.3159	75.4969	37.1349	112.6318	706.1066	347.3151	1,053.4217	691.4063	38.2356	18.0803	653.1706	56.3159	6	653.1706	39.2355	17.0804	613.9351	56.3159	79.4970	33.1348	112.6318	743.5188	309.9029	1,053.4217	613.9351	40.2615	16.0544	573.6736	56.3159	7	573.6736	41.3144	15.0016	532.3592	56.3159	83.7091	28.9228	112.6318	782.9133	270.5084	1,053.4217	532.3592	42.3947	13.9212	489.9645	56.3159	8	489.9645	43.5034	12.8126	446.4612	56.3159	88.1443	24.4875	112.6318	824.3950	229.0267	1,053.4217	446.4612	44.6410	11.6750	401.8202	56.3159	9	401.8202	45.8083	10.5076	356.0119	56.3159	92.8145	19.8173	112.6318	868.0746	185.3471	1,053.4217	356.0119	47.0062	9.3097	309.0057	56.3159	10	309.0057	48.2354	8.0805	260.7702	56.3159	97.7322	14.8996	112.6318	914.0685	139.3532	1,053.4217	260.7702	49.4968	6.8191	211.2734	56.3159	11	211.2734	50.7911	5.5248	160.4823	56.3159	102.9104	9.7214	112.6318	962.4993	90.9223	1,053.4217	160.4823	52.1193	4.1966	108.3630	56.3159	12	108.3630	53.4822	2.8337	54.8808	56.3159	108.3630	4.2688	112.6318	1,013.4962
2	933.1202	31.9148	24.4011	901.2054	56.3159	64.6642	47.9676	112.6318	604.7908	448.6309	1,053.4217																																																																																																																																																																																				
	901.2054	32.7494	23.5665	868.4560	56.3159							3	868.4560	33.6058	22.7101	834.8502	56.3159	68.0904	44.5415	112.6318	636.8349	416.5868	1,053.4217	834.8502	34.4846	21.8313	800.3656	56.3159	4	800.3656	35.3864	20.9296	764.9792	56.3159	71.6981	40.9338	112.6318	670.5768	382.8448	1,053.4217	764.9792	36.3117	20.0042	728.6675	56.3159	5	728.6675	37.2613	19.0547	691.4063	56.3159	75.4969	37.1349	112.6318	706.1066	347.3151	1,053.4217	691.4063	38.2356	18.0803	653.1706	56.3159	6	653.1706	39.2355	17.0804	613.9351	56.3159	79.4970	33.1348	112.6318	743.5188	309.9029	1,053.4217	613.9351	40.2615	16.0544	573.6736	56.3159	7	573.6736	41.3144	15.0016	532.3592	56.3159	83.7091	28.9228	112.6318	782.9133	270.5084	1,053.4217	532.3592	42.3947	13.9212	489.9645	56.3159	8	489.9645	43.5034	12.8126	446.4612	56.3159	88.1443	24.4875	112.6318	824.3950	229.0267	1,053.4217	446.4612	44.6410	11.6750	401.8202	56.3159	9	401.8202	45.8083	10.5076	356.0119	56.3159	92.8145	19.8173	112.6318	868.0746	185.3471	1,053.4217	356.0119	47.0062	9.3097	309.0057	56.3159	10	309.0057	48.2354	8.0805	260.7702	56.3159	97.7322	14.8996	112.6318	914.0685	139.3532	1,053.4217	260.7702	49.4968	6.8191	211.2734	56.3159	11	211.2734	50.7911	5.5248	160.4823	56.3159	102.9104	9.7214	112.6318	962.4993	90.9223	1,053.4217	160.4823	52.1193	4.1966	108.3630	56.3159	12	108.3630	53.4822	2.8337	54.8808	56.3159	108.3630	4.2688	112.6318	1,013.4962	39.9254	1,053.4217	54.8808	54.8808	1.4351	(0.0000)	56.3159										
3	868.4560	33.6058	22.7101	834.8502	56.3159	68.0904	44.5415	112.6318	636.8349	416.5868	1,053.4217																																																																																																																																																																																				
	834.8502	34.4846	21.8313	800.3656	56.3159							4	800.3656	35.3864	20.9296	764.9792	56.3159	71.6981	40.9338	112.6318	670.5768	382.8448	1,053.4217	764.9792	36.3117	20.0042	728.6675	56.3159	5	728.6675	37.2613	19.0547	691.4063	56.3159	75.4969	37.1349	112.6318	706.1066	347.3151	1,053.4217	691.4063	38.2356	18.0803	653.1706	56.3159	6	653.1706	39.2355	17.0804	613.9351	56.3159	79.4970	33.1348	112.6318	743.5188	309.9029	1,053.4217	613.9351	40.2615	16.0544	573.6736	56.3159	7	573.6736	41.3144	15.0016	532.3592	56.3159	83.7091	28.9228	112.6318	782.9133	270.5084	1,053.4217	532.3592	42.3947	13.9212	489.9645	56.3159	8	489.9645	43.5034	12.8126	446.4612	56.3159	88.1443	24.4875	112.6318	824.3950	229.0267	1,053.4217	446.4612	44.6410	11.6750	401.8202	56.3159	9	401.8202	45.8083	10.5076	356.0119	56.3159	92.8145	19.8173	112.6318	868.0746	185.3471	1,053.4217	356.0119	47.0062	9.3097	309.0057	56.3159	10	309.0057	48.2354	8.0805	260.7702	56.3159	97.7322	14.8996	112.6318	914.0685	139.3532	1,053.4217	260.7702	49.4968	6.8191	211.2734	56.3159	11	211.2734	50.7911	5.5248	160.4823	56.3159	102.9104	9.7214	112.6318	962.4993	90.9223	1,053.4217	160.4823	52.1193	4.1966	108.3630	56.3159	12	108.3630	53.4822	2.8337	54.8808	56.3159	108.3630	4.2688	112.6318	1,013.4962	39.9254	1,053.4217	54.8808	54.8808	1.4351	(0.0000)	56.3159																											
4	800.3656	35.3864	20.9296	764.9792	56.3159	71.6981	40.9338	112.6318	670.5768	382.8448	1,053.4217																																																																																																																																																																																				
	764.9792	36.3117	20.0042	728.6675	56.3159							5	728.6675	37.2613	19.0547	691.4063	56.3159	75.4969	37.1349	112.6318	706.1066	347.3151	1,053.4217	691.4063	38.2356	18.0803	653.1706	56.3159	6	653.1706	39.2355	17.0804	613.9351	56.3159	79.4970	33.1348	112.6318	743.5188	309.9029	1,053.4217	613.9351	40.2615	16.0544	573.6736	56.3159	7	573.6736	41.3144	15.0016	532.3592	56.3159	83.7091	28.9228	112.6318	782.9133	270.5084	1,053.4217	532.3592	42.3947	13.9212	489.9645	56.3159	8	489.9645	43.5034	12.8126	446.4612	56.3159	88.1443	24.4875	112.6318	824.3950	229.0267	1,053.4217	446.4612	44.6410	11.6750	401.8202	56.3159	9	401.8202	45.8083	10.5076	356.0119	56.3159	92.8145	19.8173	112.6318	868.0746	185.3471	1,053.4217	356.0119	47.0062	9.3097	309.0057	56.3159	10	309.0057	48.2354	8.0805	260.7702	56.3159	97.7322	14.8996	112.6318	914.0685	139.3532	1,053.4217	260.7702	49.4968	6.8191	211.2734	56.3159	11	211.2734	50.7911	5.5248	160.4823	56.3159	102.9104	9.7214	112.6318	962.4993	90.9223	1,053.4217	160.4823	52.1193	4.1966	108.3630	56.3159	12	108.3630	53.4822	2.8337	54.8808	56.3159	108.3630	4.2688	112.6318	1,013.4962	39.9254	1,053.4217	54.8808	54.8808	1.4351	(0.0000)	56.3159																																												
5	728.6675	37.2613	19.0547	691.4063	56.3159	75.4969	37.1349	112.6318	706.1066	347.3151	1,053.4217																																																																																																																																																																																				
	691.4063	38.2356	18.0803	653.1706	56.3159							6	653.1706	39.2355	17.0804	613.9351	56.3159	79.4970	33.1348	112.6318	743.5188	309.9029	1,053.4217	613.9351	40.2615	16.0544	573.6736	56.3159	7	573.6736	41.3144	15.0016	532.3592	56.3159	83.7091	28.9228	112.6318	782.9133	270.5084	1,053.4217	532.3592	42.3947	13.9212	489.9645	56.3159	8	489.9645	43.5034	12.8126	446.4612	56.3159	88.1443	24.4875	112.6318	824.3950	229.0267	1,053.4217	446.4612	44.6410	11.6750	401.8202	56.3159	9	401.8202	45.8083	10.5076	356.0119	56.3159	92.8145	19.8173	112.6318	868.0746	185.3471	1,053.4217	356.0119	47.0062	9.3097	309.0057	56.3159	10	309.0057	48.2354	8.0805	260.7702	56.3159	97.7322	14.8996	112.6318	914.0685	139.3532	1,053.4217	260.7702	49.4968	6.8191	211.2734	56.3159	11	211.2734	50.7911	5.5248	160.4823	56.3159	102.9104	9.7214	112.6318	962.4993	90.9223	1,053.4217	160.4823	52.1193	4.1966	108.3630	56.3159	12	108.3630	53.4822	2.8337	54.8808	56.3159	108.3630	4.2688	112.6318	1,013.4962	39.9254	1,053.4217	54.8808	54.8808	1.4351	(0.0000)	56.3159																																																													
6	653.1706	39.2355	17.0804	613.9351	56.3159	79.4970	33.1348	112.6318	743.5188	309.9029	1,053.4217																																																																																																																																																																																				
	613.9351	40.2615	16.0544	573.6736	56.3159							7	573.6736	41.3144	15.0016	532.3592	56.3159	83.7091	28.9228	112.6318	782.9133	270.5084	1,053.4217	532.3592	42.3947	13.9212	489.9645	56.3159	8	489.9645	43.5034	12.8126	446.4612	56.3159	88.1443	24.4875	112.6318	824.3950	229.0267	1,053.4217	446.4612	44.6410	11.6750	401.8202	56.3159	9	401.8202	45.8083	10.5076	356.0119	56.3159	92.8145	19.8173	112.6318	868.0746	185.3471	1,053.4217	356.0119	47.0062	9.3097	309.0057	56.3159	10	309.0057	48.2354	8.0805	260.7702	56.3159	97.7322	14.8996	112.6318	914.0685	139.3532	1,053.4217	260.7702	49.4968	6.8191	211.2734	56.3159	11	211.2734	50.7911	5.5248	160.4823	56.3159	102.9104	9.7214	112.6318	962.4993	90.9223	1,053.4217	160.4823	52.1193	4.1966	108.3630	56.3159	12	108.3630	53.4822	2.8337	54.8808	56.3159	108.3630	4.2688	112.6318	1,013.4962	39.9254	1,053.4217	54.8808	54.8808	1.4351	(0.0000)	56.3159																																																																														
7	573.6736	41.3144	15.0016	532.3592	56.3159	83.7091	28.9228	112.6318	782.9133	270.5084	1,053.4217																																																																																																																																																																																				
	532.3592	42.3947	13.9212	489.9645	56.3159							8	489.9645	43.5034	12.8126	446.4612	56.3159	88.1443	24.4875	112.6318	824.3950	229.0267	1,053.4217	446.4612	44.6410	11.6750	401.8202	56.3159	9	401.8202	45.8083	10.5076	356.0119	56.3159	92.8145	19.8173	112.6318	868.0746	185.3471	1,053.4217	356.0119	47.0062	9.3097	309.0057	56.3159	10	309.0057	48.2354	8.0805	260.7702	56.3159	97.7322	14.8996	112.6318	914.0685	139.3532	1,053.4217	260.7702	49.4968	6.8191	211.2734	56.3159	11	211.2734	50.7911	5.5248	160.4823	56.3159	102.9104	9.7214	112.6318	962.4993	90.9223	1,053.4217	160.4823	52.1193	4.1966	108.3630	56.3159	12	108.3630	53.4822	2.8337	54.8808	56.3159	108.3630	4.2688	112.6318	1,013.4962	39.9254	1,053.4217	54.8808	54.8808	1.4351	(0.0000)	56.3159																																																																																															
8	489.9645	43.5034	12.8126	446.4612	56.3159	88.1443	24.4875	112.6318	824.3950	229.0267	1,053.4217																																																																																																																																																																																				
	446.4612	44.6410	11.6750	401.8202	56.3159							9	401.8202	45.8083	10.5076	356.0119	56.3159	92.8145	19.8173	112.6318	868.0746	185.3471	1,053.4217	356.0119	47.0062	9.3097	309.0057	56.3159	10	309.0057	48.2354	8.0805	260.7702	56.3159	97.7322	14.8996	112.6318	914.0685	139.3532	1,053.4217	260.7702	49.4968	6.8191	211.2734	56.3159	11	211.2734	50.7911	5.5248	160.4823	56.3159	102.9104	9.7214	112.6318	962.4993	90.9223	1,053.4217	160.4823	52.1193	4.1966	108.3630	56.3159	12	108.3630	53.4822	2.8337	54.8808	56.3159	108.3630	4.2688	112.6318	1,013.4962	39.9254	1,053.4217	54.8808	54.8808	1.4351	(0.0000)	56.3159																																																																																																																
9	401.8202	45.8083	10.5076	356.0119	56.3159	92.8145	19.8173	112.6318	868.0746	185.3471	1,053.4217																																																																																																																																																																																				
	356.0119	47.0062	9.3097	309.0057	56.3159							10	309.0057	48.2354	8.0805	260.7702	56.3159	97.7322	14.8996	112.6318	914.0685	139.3532	1,053.4217	260.7702	49.4968	6.8191	211.2734	56.3159	11	211.2734	50.7911	5.5248	160.4823	56.3159	102.9104	9.7214	112.6318	962.4993	90.9223	1,053.4217	160.4823	52.1193	4.1966	108.3630	56.3159	12	108.3630	53.4822	2.8337	54.8808	56.3159	108.3630	4.2688	112.6318	1,013.4962	39.9254	1,053.4217	54.8808	54.8808	1.4351	(0.0000)	56.3159																																																																																																																																	
10	309.0057	48.2354	8.0805	260.7702	56.3159	97.7322	14.8996	112.6318	914.0685	139.3532	1,053.4217																																																																																																																																																																																				
	260.7702	49.4968	6.8191	211.2734	56.3159							11	211.2734	50.7911	5.5248	160.4823	56.3159	102.9104	9.7214	112.6318	962.4993	90.9223	1,053.4217	160.4823	52.1193	4.1966	108.3630	56.3159	12	108.3630	53.4822	2.8337	54.8808	56.3159	108.3630	4.2688	112.6318	1,013.4962	39.9254	1,053.4217	54.8808	54.8808	1.4351	(0.0000)	56.3159																																																																																																																																																		
11	211.2734	50.7911	5.5248	160.4823	56.3159	102.9104	9.7214	112.6318	962.4993	90.9223	1,053.4217																																																																																																																																																																																				
	160.4823	52.1193	4.1966	108.3630	56.3159							12	108.3630	53.4822	2.8337	54.8808	56.3159	108.3630	4.2688	112.6318	1,013.4962	39.9254	1,053.4217	54.8808	54.8808	1.4351	(0.0000)	56.3159																																																																																																																																																																			
12	108.3630	53.4822	2.8337	54.8808	56.3159	108.3630	4.2688	112.6318	1,013.4962	39.9254	1,053.4217																																																																																																																																																																																				
	54.8808	54.8808	1.4351	(0.0000)	56.3159																																																																																																																																																																																										

