National Electric Power Regulatory Authority
Islamic Republic of Pakistan

Registrar

NEPRA Tower, Ataturk Avenue(East), G-5/1, Islamabad
Ph: +92-51-9206500, Fax: +92-51-2600026
Web: www.nepra.org.pk, E-mail: registrar@nepra.org.pk

No. NEPRA/TRF-260/PPDCL-2014/1812-1814
February 12, 2015

Subject: **Determination of the Authority in the Matter of Tariff Petition filed by Punjab Power Development Company Ltd. for its Marala Hydropower Project [Case # NEPRA/TRF-260/PPDCL-2014]**

Dear Sir,

Please find enclosed herewith the subject Determination of the Authority along Annex-I & Annex-II (23 pages) in Case No. NEPRA/TRF-260/PPDCL-2014.

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

3. Please note that Order of the Authority Determination along with Reference Tariff Table (Annex-I) & Debt Service Schedule (Annex-II) needs to be notified in the official Gazette.

Enclosure: As above

(Syed Safeer Hussain)

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

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

DETERMINATION OF THE AUTHORITY IN THE MATTER OF TARIFF PETITION FILED BY PUNJAB POWER DEVELOPMENT COMPANY LIMITED FOR ITS MARALA HYDROPOWER PROJECT

1. BACKGROUND

1.1 Punjab Power Development Company Limited (herein referred to as the "Petitioner") filed a Tariff Petition dated March 17, 2014 (hereinafter referred to as the "Petition") pursuant to Rule 3 of the National Electric Power Regulatory Authority (Tariff Standards and Procedures) Rules, 1998 (hereinafter referred to as the "tariff rules") on April 2, 2014 for determination of EPC stage generation tariff for its 7.64 MW Marala Hydropower project (herein referred to as the "Project") being set up at Upper Chenab Canal, Marala Barrage, District Sialkot, Punjab.

1.2 In accordance with sub-rule 3 of rule 4 of the tariff rules, the Petition was admitted by the Authority on April 15, 2014. Consequent to the admission, notice of admission/ Hearing was published in the national newspapers on June 05, 2014, inviting thereby all the stakeholders, interested/affected persons or parties to participate in the tariff setting process through filing of comments/ Intervention Requests. Further, in accordance with sub-rule 5 of rule 4 of the tariff rules, written notices were sent to the key stakeholders and parties, which in the opinion of the Authority were likely to be interested or affected or may be of assistance to the Authority in arriving at a just and informed determination, requesting for their participation in the tariff setting process. In accordance with section 7 (5) of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997, the Authority also sought recommendations of the Government of Punjab on this Petition.

1.3 Neither any intervention request nor any comments were filed in response to the Authority's notice of admission and Hearing. The power purchaser has been identified as Gujranwala Electric Power Company (GEPCO), however it has been noted with concern that throughout the proceedings of the Petition, GEPCO has failed to provide any input.

2. SUBMISSIONS OF THE PETITIONER

2.1. The project is currently at an advanced stage of construction and is being set up under Asian Development Bank's Renewable Energy Development Sector Investment Program (hereinafter referred to as REDSIP). It is pertinent to mention here that under this loan, the five hydropower projects which were envisaged to be constructed in Punjab are:

Name of Project	Capacity as per Feasibility
Marala Hydropower Project	7.2 MW
Pakpattan Hydropower Project	3.2 MW
Okara Hydropower Project	4.0 MW
Chianwali Hydropower Project	5.4 MW
Deg-Outfall Hydropower Project	5.0 MW
Total	**24.8 MW**

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

2.2. Summary of the technical and financial information provided by the petitioner regarding the project is as follows:

Technical Specifications

Capacity	7.64 MW
Type of Facility	Very Low Head Hydropower Project
Turbine Type	Pit Type Kaplan (Horizontal Shaft)
Number of Units	4
Per Unit Design Discharge	105 cumecs
Head (Rated)	2.16 meters
Auxiliary Consumption	1%
Net Annual Energy Generation	42.94 GWh

Financial Parameters

Cost Head	Rs. Million
Civil Works	1,998.96
Electrical and Mechanical Works	1,518.32
Total EPC Cost (including escalation)	**3,517.28**
Duties, Taxes & Sindh Infrastructure Cess	73.17
Land, Resettlement and Compensation	47.10
Project Administration	87.93
C.D.M. (Clean Development Mechanism)	6.12
Project Management - Engineering & Supervision	59.19
Consultancy	46.33
Financial Charges	90.75
Interest During Construction	44.44
Total Project Cost	**3,972.30**
Debt Equity Ratio	80:20
Debt Financing	Foreign
Base Rate	6 Month LIBOR
Premium	0.60%
Repayment Period	20 Years
Commitment Fee	0.75%
Return on Equity (including Return on equity during construction)	17%
Construction Period	30 months
Tariff Control Period	30 Years
Proposed Levelised Tariff (1-30 Years)	Rs. 11.4552/kWh
USD/PKR Exchange Rate	102.93

3. PROCEEDINGS

3.1. The Hearing on the matter was held on June 19, 2014 in Islamabad. The Hearing was duly attended by representatives of the petitioner. During the Hearing, the Authority expressed its reservations on the relatively high project cost which has been claimed by the Petitioner for

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

this project. In response, the Petitioner clarified that the higher project cost is attributable to the very low head (2.16 meters) available at site and correspondingly higher per MW EPC cost i.e. about US$ 4.5 Million. The Authority thereon expressed its reservations that such sites should not be harnessed while better sites are still available. In response, the Petitioner submitted that the best hydropower sites in the province of Punjab have been earmarked for private sector in order to attract private investment into the sector. Notwithstanding the reasons explained by the Petitioner, the Authority is of the opinion that the most economical sites should be harnessed on priority, whether being developed by the Provincial Government itself or through private sponsors, for reducing the basket rate over the medium and long term.

3.2. Pursuant to proceedings of the Hearing, the petitioner submitted additional information/ cost claims and clarifications vide its letters No. PD-PPMU/1144/2014 dated June 25, 2014 and No. PD.PPMU/899/2014 dated September 30, 2014.

4. ISSUES

4.1. Based on the available information, proceedings of the case and information submitted by the petitioner, the following main issues were framed for discussion and consideration by the Authority:

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

4.2. Whether the power purchaser will bear the hydrological risk?

4.2.1. The Petitioner has proposed that hydrological risk shall be borne by the power purchaser. The Power Purchaser has not provided any input on this matter. As per the policy, the risk of hydrology is the responsibility of the power purchaser.

4.2.2. In the Authority's tariff determinations for comparable hydropower projects, the hydrological risk is required to be borne by the power purchaser. The Authority after due consideration has decided that in the instant case, the power purchaser will bear hydrological risk of the project. The Power Purchaser is directed to carry out proper due diligence of the historical average monthly hydrology and the same should be incorporated along with the monthly benchmark energy in the Power Purchase Agreement (PPA), as elaborated in paragraph 4.3.3.

4.3. Whether the capacity and annual generation claimed by the petitioner are justified?

4.3.1. The Authority has noted that different installed capacity and gross annual generation figures are quoted in various documents submitted by the petitioner. Installed capacity and annual

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

energy figures claimed in the Tariff Petition vis-à-vis feasibility study, tender documents and detailed design report/EPC contract of the project are tabulated hereunder for clarity:

	Feasibility Study	**Tender Documents**	**Detailed Design Report/EPC Contract**	**Tariff Petition**
Capacity (MW)	7.20	7.64	7.64	7.64
Gross Annual Energy (GWh)	48.516	50.41(1)	43.83(2) / 50.50	43.87

(1) Based on future hydrology of approved L section.
(2) Based on historical pattern of daily inflows.

4.3.2. Further, the Petitioner has claimed auxiliary consumption of 1% and net annual energy generation of 42.94 GWh in the tariff petition. The Authority has probed, in exhaustive detail, whether considering the availability of water flows, the increase in installed capacity from 7.20 MW to 7.64 MW is justified. The Petitioner was given the opportunity to justify the claimed installed capacity of 7.64 MW and gross annual generation of 43.87 GWh, as against gross annual generation of 50.50 GWh specified in the detailed design report/EPC contract. Based on the submissions of the petitioner, the Authority has inferred that the plant has been designed with excess capacity in anticipation of a possible future remodelling of the Upper Chenab Canal. The Authority is cognizant of the fact that hydro power projects are designed keeping in view future plans; however, it has noted with concern that the petitioner has claimed projected energy generation, i.e. based on historical pattern of daily inflows prior to remodelling, for the entire tariff control period of 30 years. Further, the petitioner has failed to provide the exact current status of remodelling plan, expected date of its completion, etc.

4.3.3. Keeping into consideration the circumstances of the case the Authority has decided as follows:

- The net annual energy generation of 49.995 GWh i.e. gross annual generation of 50.50 GWh specified in the detailed design report/EPC contract, less allowed auxiliary consumption @ 1% of 0.505 GWh, will be taken as net annual bench mark energy for tariff computations. Net annual generation supplied to the power purchaser in a year, in excess of benchmark energy of 49.995 GWh will be charged at 10% of the prevalent approved tariff.

- The power purchaser will be required to bear hydrological risk only to the extent of net annual energy of 43.39 GWh i.e. gross annual energy 43.83 GWh as specified in the detailed design report/EPC contract, less allowed auxiliary consumption @ 1% of 0.438 GWh. The petitioner will provide authentic details of month-wise bench mark energy generation, to the power purchaser, based on historical hydrological flows for incorporation in the power purchase agreement.

- After remodelling of the canal, the petitioner shall apply to the Authority with full authentic documentary evidence for reconsideration of hydrological risk mechanism allowed to it through this determination.

4.3.4. The Authority has noted that through the aforesaid decisions:

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

- The financial burden of excess capacity installed, without adequate justifications, will not be passed on to the end consumers.
- The petitioner will have substantial interest in ensuring that remodelling of the canal takes place at the earliest and at the same time it will be getting the benefit of full tariff for net annual energy generation up to 49.995 GWh.
- The power purchaser will only be required to bear hydrological risk for the energy available on the basis of historical water flows.

4.4. Whether construction period claimed by the petitioner is justified?

4.4.1. The Petitioner has requested for approval of 30 months construction period. The Authority has observed that the EPC contract provided by the Petitioner specifies the time period for completion of the project as 900 days (about 30 months).

4.4.2. The Authority earlier in a similar project had allowed 30 months construction period. Therefore, the Authority hereby allows the petitioner maximum project construction period of 30 months. The petitioner is directed to submit detail of any liquidated damages, penalties, etc. (by whatever name called), actually recoverable by the petitioner from the EPC contractor(s), pertaining to the construction period allowed by the Authority, for adjustment in the project cost, along with its application for allowing tariff adjustments at the COD. Further, the construction start date should be negotiated by the petitioner with the power purchaser and should be incorporated in the Power Purchase Agreement. The petitioner will be allowed adjustments at the COD for maximum project construction period of 30 months starting from the construction start date stipulated in the Power Purchase Agreement.

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

4.5.1. The Petitioner has claimed the following project costs:

Sn	Description	Local Cost (Rs. Mill)	Foreign Cost (Equivalent Rs. Mill)	Total Equivalent Project Cost (Rs. Mill)
1	Civil Works including Employers Facilities and Design Services	350.13	1648.83	1,998.96
2	Electrical and Mechanical Works including Design Services, Transportation, Testing and Commissioning	38.62	1479.70	1,518.32
3	**Total Bid Price**	**388.75**	**3,128.53**	**3,517.28**
4	Duties &Taxes (5% of Imported Items only)	64.41	-	64.41
5	Sind Infrastructure Cess @ 0.68% of Imported Items	8.76	-	8.76
6	Land, Resettlement and Compensation	47.10	-	47.10
7	Project Administration, Audit & Account @ 2.5% of EPC Cost	87.93	-	87.93
8	C.D.M (Clean Development Mechanism)	6.12	-	6.12

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

9	Project Management - Engineering & Supervision	59.19	-	59.19
10	Consultancy	32.43	13.90	46.33
11	**Capital Cost**	**694.69**	**3,142.43**	**3,837.12**
12	Financing Charges	-	90.75	90.75
13	Interest During Construction	-	44.44	44.44
14	**Project Cost**	**694.69**	**3,277.62**	**3,972.30**

4.5.2. The project costs claimed by the Petitioner are discussed head-wise below:

4.5.3. EPC Cost

4.5.3.1. The Authority has noted that as per documentary evidences provided by the petitioner, International Competitive Bidding (ICB) mode has been adopted for the execution of the project; and M/s SINOTEC-SHPE JV has been appointed as Contractor for providing construction and development services on EPC/ turnkey basis. As per the contractual documents, the ICB process began with Bid Submission & Opening of Technical Bid on October 25, 2010, followed by Price Bid Opening on March 07, 2011. The Letter of Acceptance/ Notification of Award of contract was given by the petitioner on August 29, 2011, whereas after fulfilment of all necessary conditions including submission of Performance Guarantee by EPC contractor (September 09, 2011), Signing of Contract Agreement (September 24, 2011) and submission of Advance Payment Guarantee by EPC contractor (October 01, 2011), an Effective Date of May 28, 2012 has been stipulated in the contract. The Time for Completion of the whole of the Facilities, as per the contract, is Nine Hundred (900) calendar days from the Effective Date.

4.5.3.2. The Petitioner has provided Technical and Price Bid Evaluation reports prepared by its management consultants (Punjab Hydropower Consultants – A JV of four consultancy firms, namely Hydro Power Engineering GMBH & Co. HPE, Germany; Technical Resource Services (Pvt) Ltd.; Electra Consultants, Pakistan; and Technical Engineering and Management Consultants, Pakistan). As per the bid evaluation reports, the Asian Development Bank's Single Stage two envelope bidding procedure has been adopted for the purpose of procurement of Plant, Design, Supply and Installation of the project on EPC/ Turnkey basis. The reports suggest that a total of 7 firms submitted proposals for award of contract, out of which the following 3 firms were determined as substantially responsive to the commercial and technical terms and conditions of the tender documents:

i. China Liaoning International Economic & technical Cooperation Ltd. (CLIC)
ii. Ghulam Rasool & Company Pvt. Ltd. (GRC-COVER JV)
iii. SINOTEC – SHPE JV

4.5.3.3. According to the Price Bid Evaluation report, the price bids of the abovementioned bidders were checked for errors, adjusted for exchange rate differences and after factoring in the discount offered by each of the bidders, the bid price of SINOTEC-SHPE JV was determined as the lowest. The Authority, after considering the fairly detailed evaluation

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

procedure conducted under the guidelines of Asian Development Bank, has established that the EPC bidding procedure was satisfactory.

4.5.3.4. The Petitioner has claimed a total EPC cost of Rs. 3,517.28 Million. The signed EPC contract stipulates that the contract price shall be the aggregate of foreign component of US$ 30,894,947 and Local component of Rs. 388,742,781, which works out to be US$ 34.671 million at reference exchange rate of 102.93.

4.5.3.5. The Authority has noted with concern that the per MW EPC cost of the project is significantly higher than the EPC cost approved for comparable hydropower projects. The Petitioner vide its letter no. PD-PPMU/1144/2014 dated June 25, 2014 furnished clarifications on the issue of high per MW EPC cost of the project which was raised by the Authority during the Hearing. The Petitioner submitted that the Very Low Head (VLH) technology deployed for projects in Punjab has certain limitations including:

a) Almost all projects require a combination of falls which are 4 – 10 km apart.
b) Due to combination of falls, re-modelling of main canals and reconstruction of existing bridges and regulators etc. are additional cost components which are otherwise not part of common HPPs.
c) Machines need a larger diameter along with large power houses.
d) Capacity of projects is small leading to higher per MW cost.

4.5.3.6. The Authority has noted that the largest impact on the per MW EPC cost of the project is attributable to the large-scale civil works involved with this very low head project.

4.5.3.7. Further, the Authority has noted that as per the terms of the EPC contract submitted by the Petitioner, the EPC price is fixed and the EPC contract contains no price escalation clauses. Therefore, no increase in EPC price will be required at the time of COD adjustment of Tariff, except for increase on account of exchange rate variation against foreign component of the EPC price. However, an abnormally high part of the EPC price, especially the civil works component of the EPC price, is payable in US Dollars. Civil works are generally deemed as a local cost due to the fact that most inputs for civil works are locally available. Based on this notion, the Authority's "Mechanism for Determination of Tariff for Hydropower Projects" also allows adjustments due to escalation in local prices of steel, cement, labor and fuel.

4.5.3.8. Notwithstanding the above, the Authority has noted that since the signing of the EPC contract in September 2011 until September 2014, the Pakistani Rupee's average rate of depreciation against the US Dollar has been acceptable when compared with local price inflation indices of some of the major inputs for construction of hydropower projects, as well as the average local CPI inflation rate published by the Pakistan Bureau of Statistics, as depicted in the table below:

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

	Inflation/ Depreciation Rates
Steel Bar and Sheets	15%
Steel Products	21%
Cement	38%
Diesel Oil	13%
Pakistan CPI	27%

USD/PKR Exchange Rate	16%

4.5.3.9. Based on the aforementioned, the Authority has decided to accept the pricing of a major part of civil works in US Dollars, as per the EPC contract.

4.5.4. Cost of Interconnection

4.5.4.1. The Authority has noted that the EPC price includes the price of construction of transmission line and associated costs amounting to Rs. 2.333 Million. The total length of the 11 KV Transmission Line is 2 Km.

4.5.4.2. The power purchaser identified by the Petitioner, GEPCO has not provided its comments on the tariff petition or the interconnection arrangement of the project, despite written directions issued by the Authority.

4.5.4.3. Since the comments of power purchaser on interconnection arrangements and the associated costs are not available, the Authority is constrained to exclude Rs. 2.333 million on account of price of construction of transmission line and associated costs from the EPC contract price. The Authority has decided to allow recovery of the interconnection cost incurred by the petitioner, if any, at the COD stage, after it submits a detailed plan duly endorsed by the power purchaser and authentic verifiable documents, to the satisfaction of the Authority, that these costs have been actually incurred in a prudent manner.

4.5.5. Duties and Taxes

4.5.5.1. Customs Duties amounting to Rs. 64.41 Million, assumed @ 5% of the foreign cost of plant & equipment, have been claimed by the Petitioner. Additionally, Sindh Infrastructure Cess amounting to Rs.8.76 Million @ 0.68% of imported items has been included in the cost estimates of the Project. The Authority, in similar cases, has allowed duties and taxes @ 5% of the cost of plant and machinery to be imported from abroad and has decided to allow duties and taxes to the petitioner on similar lines. Accordingly the duties and taxes allowed by the Authority work out to US $ 0.651 million, which will be subject to adjustment on actual at COD. Adjustment of duties and taxes on actual at COD stage, will be allowed for only those duties and taxes which are imposed on the petitioner. Adjustment of taxes/duties payable on fees/charges, etc. of various third parties, not directly imposed on the petitioner, will not be allowed. The mechanism for adjustment of duties and taxes at actual on COD is detailed in paragraph (I) (b) of the order.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

4.5.5.2. The Authority after due consideration allows US $ 30.895 million and Rs. 386.410 million as EPC cost to the petitioner with no price escalations except for those detailed in the order. In addition, duties and taxes of US $ 0.651 million are allowed at this stage, which will be subject to adjustment at actual on COD as detailed in paragraph (I) (b) of the order.

4.5.6. Land Resettlement and Compensation

4.5.6.1. The Petitioner has claimed land and resettlement cost amounting to Rs. 47.10 million. The following breakup regarding the cost of land has been provided by the Petitioner:

Land	Rs. 12.600 Million
Affected Buildings/ Structures	Rs. 27.867 Million
Trees Compensation	Rs. 0.434 Million
Infrastructures	Rs. 2.026 Million
Third Party/External M&E (LARP)	Rs. 1.000 Million
Special Security Measures	Rs. 3.132 Million
Total	**Rs. 47.10 Million**

4.5.6.2. As per the Due Diligence Report dated July 2011 prepared by Punjab Power Management Unit (PPMU) Resettlement team, a total of 30.5 Acres of Government owned land is required for the project and no private land is involved in the execution of this project. The Authority considers that the estimated total cost of compensation/relocation and impact mitigation in the Due Diligence Report amounting to Rs. 33.40 million is reasonable, and the same is hereby allowed in the instant case subject to adjustment as detailed in paragraph I (d) of the order.

4.5.7. Project Administration, Audit & Account (Project Development)

4.5.7.1. The Petitioner has claimed Project Administration, Audit & Account cost of Rs. 87.93 million. The Authority has noted that this cost is mainly the project development cost of the Petitioner which comprises of expenditures incurred during construction phase on account of salaries of officers and staff, rents, purchase of office equipment and fixtures, and various fees. In view of costs allowed to similar hydropower projects under this head the Authority hereby allows Project development cost of US$ 0.22 million (Rs. 22.645 Million).

4.5.8. Carbon Credits Consultancy cost

4.5.8.1. The Petitioner has provided Consultancy Services Agreement dated April 23, 2014 signed between the petitioner and the consultant for Capacity Building and CDM Registration of five Hydropower Projects. As per the agreement, the consultant has been hired for the purpose of assisting the Government of Punjab in CDM pre-registration and pre-implementation process for five of its hydro power projects (24.8MW in total) being financed through the REDSIP program and to provide CDM trainings for the Government of Punjab to accumulate experiences on overall CDM process for its institutional capacity building.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

4.5.8.2. The Authority considers that the Govt. of Punjab has taken a positive step in attempting to register its projects under the CDM, and these will be one of the first projects to cover some groundwork with regard to claiming carbon credits. The petitioner is directed to submit a progress report on the CDM registration of the project, along with its request for allowing tariff adjustments at COD.

4.5.8.3. Moreover, the Authority considers that the lump sum price of Rs. 6,356,906 as per the Consultancy contract is reasonable, considering the fact that the contract covers five hydropower projects. Further, since the scope of work of the consultant for CDM remains constant, regardless of the capacity of each project, the Authority has decided that the cost be split up evenly over the five projects, namely Marala HPP, Pakpattan HPP, Okara HPP, Chianwali HPP and Deg-Outfall HPP. Accordingly, the cost for consultancy of CDM for each project works out to be Rs. 1.271 million and is hereby allowed.

4.5.9. Management Consultancy cost

4.5.9.1. The Petitioner initially claimed a Project Management - Engineering & Supervision cost of Rs. 59.19 million, whereas a cost of Consultancy amounting to Rs. 46.33 million was also claimed separately. However, the Petitioner vide its letter dated June 25, 2014 has clarified that both of the aforementioned costs are in fact related to the management consultancy contract, but were inadvertently split up in the Tariff Petition. The sum of the split up cost, as claimed by the Petitioner works out to be Rs. 105.52 Million.

4.5.9.2. In support of its claim the petitioner has provided copy of its contract with consultants M/s Punjab Hydropower Consultants, a Joint Venture of four consultancy firms, namely Hydro Power Engineering GMBH & Co. HPE, Germany; Technical Resource Services (Pvt) Ltd.; Electra Consultants, Pakistan; and Technical Engineering and Management Consultants, Pakistan. The Authority has noted that the scope of services of the Management consultant primarily involves construction management and engineering related services for all five hydropower project being constructed under the REDSIP loan in Punjab, including Marala HPP.

4.5.9.3. Further, the maximum price payable under the contract is US$ 0.438 Million for foreign component and Rs. 103.530 Million for local component. The Authority considers that given the scope of the Management Consultancy contract, the price negotiated by the Petitioner for Management Consultancy services falls within acceptable limits, and therefore the same is allowed to the Petitioner. However, since the contract covers five hydropower projects, this cost is to be spread over the five hydropower projects on logical grounds.

4.5.9.4. The Authority has decided to split the management consultancy contract price between all five projects based on their respective feasibility stage capacities (as detailed in paragraph 2.1 of this determination). The maximum ceiling for cost of management consultancy allowed for Marala hydropower project prorated on the basis of feasibility design capacity is US$ 0.127 Million in foreign component and Rs. 30.057 Million in local component.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

4.5.9.5. Moreover, the Petitioner has also submitted variation order for consultancy services agreement amounting to Rs. 51.769 million local component and US$ 0.170 foreign component. The Authority has noted that this variation order was necessitated due to delay in contract award of Chianwali HPP and Deg-Outfall HPP by nine (9) months. The Authority considers that since the variation order is attributable to other hydropower projects, the additional cost of management consultancy contract variation order cannot be considered in case of Marala hydropower project, and hence this cost is disallowed in this case.

4.5.10. <u>Financing Charges</u>

4.5.10.1. The Petitioner has claimed financial charges amounting to Rs. 90.75 Million based on 2.58% of the total EPC cost. The Petitioner has submitted that this cost involves the cost of letter of credit (LC) and commitment charges stipulated in the loan agreement.

4.5.10.2. Based on the documentary evidence submitted by the petitioner, the Authority has assessed US$ 0.185 million as financial charges. The Authority has further decided that these financial charges will be subject to adjustment at COD on the basis of actual expense, up to a maximum of 3% of the allowed debt (excluding the impact of interest during construction and financial charges), on production of authentic documentary evidence.

4.5.11. <u>Interest During Construction</u>

4.5.11.1. The petitioner has claimed interest during construction (hereinafter referred to as "IDC") amounting to Rs. 44.44 Million (equivalent to US$ 0.432 Million), based on 30 months construction period and interest rate of six months LIBOR (0.80%) plus 0.6% spread. The information and documentary evidences provided by the petitioner have been scrutinized and found to be acceptable. The terms and conditions allowed by the Authority pertaining to the construction period and interest rate on debt are detailed in other parts of this determination. Based on the financing and other terms/conditions allowed to the petitioner, the Authority has assessed IDC as US$ 0.340 million. The IDC will be adjusted at COD on the basis of actual debt draw downs (within the overall debt allowed by the Authority at COD), actual JPY/PKR exchange rate variation and actual interest rates not exceeding the limit of 6 months LIBOR plus 0.60%, during the project construction period allowed by the Authority.

4.5.12. Recapitulating, the approved project cost under various cost heads is given hereunder:

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

	Equivalent Total (US$ Million)
EPC Cost	34.649
Duties & Taxes	0.651
Land, Resettlement and Compensation	0.324
Project Administration	0.220
C.D.M. Consultancy	0.012
Management Consultancy	0.419
Financial Charges	0.185
Interest During Construction	0.340
Total Project Cost	**36.800**

4.6. Whether the terms and conditions of debt claimed by the petitioner are justified?

4.6.1. The petitioner has requested for allowing the following terms for its 100% foreign debt:

Debt as % of project cost	80%
Debt Servicing	Bi-annual
Premium	6-month LIBOR + 0.60%
Debt repayment period	20 Years plus 5 Years Grace Period

4.6.2. The Authority has noted that the Petitioner's loan is denominated in Japanese Yen. After due consideration, the Authority has decided to allow the indexation of debt component with JPY/PKR exchange rate parity.

4.6.3. The Authority has also considered terms of debt claimed by the petitioner as detailed above and has noted that these terms compare favorably with the debt terms allowed to some other hydropower projects. The Authority has therefore decided to allow the debt terms detailed at paragraph 4.6.1 above to the petitioner.

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

4.7.1. The Petitioner has claimed the following variable and fixed O&M costs:

	Foreign (US$ Million)	Local (Rs. Million)	Total (Rs. Million)
Fixed O&M costs	0.171	70.70	88.38
Variable O&M costs	-	29.46	29.46
Total O&M	0.171	100.16	117.84

4.7.2. The petitioner has submitted that fixed O&M costs represent the fixed costs incidental to plant Operation and Maintenance, covering management fee, remuneration to the personnel, rent, utilities, and fee for maintaining consents, local taxes and cost of expatriate services to be engaged for O&M of the plant.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

4.7.3. Moreover, the petitioner has submitted that variable O&M costs primarily include cost of the services of operation and maintenance on a kWh basis for the day to day management of the hydropower plant, covering the replacement of spare parts on completion of their service life; replacement on account of premature failure of the parts; the cost of maintenance of un-foreseen/un-scheduled outages; as well as Consumption of lubricants, chemicals, etc.

4.7.4. The Authority considers that the O&M costs claimed by the Petitioner, being 3.14% of the allowed project cost less Interest During Construction, are excessively high compared to O&M costs allowed to similar hydropower projects. After due consideration, the Authority has assessed total O&M cost as US$ 0.656 Million (Rs. 67.55 Million), i.e. 1.8% of approved project cost less IDC.

4.7.5. The breakup of allowed O&M cost of the Petitioner is given hereunder:

	Foreign (US$ Million)	Local (Rs. Million)	Total (Rs. Million)
Fixed O&M costs	0.098	40.53	50.66
Variable O&M costs	-	16.89	16.89
Total O&M	0.098	57.42	67.55

4.8. Whether insurance during operations claimed by the petitioner is justified?

4.8.1. The petitioner has claimed cost of insurance during operations on the basis of 1.35% of the claimed EPC cost.

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

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

4.9.1. The Petitioner has requested for allowing 17% return (IRR based) on invested equity, which is in line with return already being allowed to hydropower generation sector by the Authority.

4.9.2. Further, the Petitioner has assumed Redemption of Equity in its tariff calculations. The Authority observed that this project is being developed in the public sector and therefore it does not need to be transferred to anyone at the end of the tariff control period. In view thereof, the Authority finds no justification to allow redemption of equity to the petitioner.

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

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

injections (within the overall equity allowed by the Authority at COD) during the project construction period allowed by the Authority.

ORDER

Pursuant to Rule 6 of the National Electric Power Regulatory Authority Licensing (Generation) Rules, 2000, read with Section 31(4) of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997, Punjab Power Development Company Limited (the Petitioner) is allowed to charge, for its Marala Hydropower Project, the following specified/approved tariff for delivery of electricity to the power purchaser:

Tariff Components	Years 1-20 Rs./kWh	Years 21-30 Rs./kWh	Indexation
Fixed charges			
Fixed O & M			
- Local	0.8107	0.8107	CPI - General
- Foreign	0.2027	0.2027	US$/PKR & US CPI
Insurance	0.9630	0. 9630	US$/PKR
Debt service	3.2819	-	JPY/PKR & LIBOR
Return on equity	2.5760	2.5760	US$/PKR
Return on equity during construction	0.5603	0.5603	US$/PKR
Variable charges			
Variable O & M - Local	0.3378	0.3378	CPI - General
Water Use Charge	0.1500	0.1500	CPI - General
Total	**8.8824**	**5.6005**	

i) The reference tariff has been calculated on the basis of net annual benchmark energy generation of 49.995 GWh for installed capacity of 7.64 MW.

ii) The above charges will be limited to the extent of net annual energy generation of 49.995 GWh. Net annual generation supplied during a year to the power purchaser in excess of benchmark energy of 49.995 GWh, will be charged at 10% of the prevalent approved tariff.

iii) In the above tariff no adjustment for carbon emission reduction receipts, has been accounted for. However, upon actual realization of carbon emission reduction receipts, the same shall be distributed between the power purchaser and the

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

petitioner in accordance with the approved mechanism given in the applicable government policy.

iv) The reference US$/PKR rate has been taken as 102.93.

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

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

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

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

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

a. The specific items of project cost to be paid in foreign currency (i.e. US$ or JPY) will be adjusted at COD on account of actual variation in exchange rate over the reference US$/PKR exchange rate of Rs. 102.93 and reference JPY/PKR exchange rate of 0.99 on production of verifiable documentary evidence by the Petitioner. For all project costs payable in PKR, the amounts allowed in US$ will be converted into PKR using the reference US$/PKR exchange rate of Rs.102.93.

b. Duties and/or taxes, not being of refundable nature, imposed on the petitioner up to the commencement of its commercial operations will be subject to adjustment at actual on COD, as against US $ 0.651 million allowed now, upon production of verifiable documentary evidence to the satisfaction of the Authority.

c. Adjustment of the interconnection cost to be borne by the petitioner, if any, will be allowed at COD upon submission of a detailed plan duly endorsed by the power purchaser and authentic verifiable documents, to the satisfaction of the Authority.

d. Land and Resettlement costs will be allowed as per actual, as against US$ 0.324 Million allowed now, upon production of verifiable documentary evidence. The initial schedule of rates and variation in them shall be certified by the Provincial government and approved by NEPRA.

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

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

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

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

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

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

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

II. Pass-Through Items

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

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

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

Where:

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

$E_{(Red)}$ = Equity redeemed

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

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

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

III. Hydrological Risk

The power purchaser will be required to bear hydrological risk only to the extent of 43.392 GWh net annual energy generation. Payment on account of hydrological risk shall be made by the power purchaser, on the basis of benchmark monthly energy generation, based on the average historic hydrology for that particular month.

IV. Indexations:

The following indexation shall be applicable to the reference tariff:

i) Indexation applicable to O&M

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

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

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

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

Where;

$F\ O\&M_{(LREV)}$ = The revised applicable fixed O&M local component of tariff

$F\ O\&M_{(FREV)}$ = The revised applicable fixed O&M foreign component of tariff

$V\ O\&M_{(LREV)}$ = The revised applicable variable O&M local component of tariff

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

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

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

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

$CPI_{(REV)}$ = The revised Consumer Price Index (General) as notified by the Pakistan Bureau of Statistics

$CPI_{(REF)}$ = 190.82 Consumer Price Index (General) of March 2014 notified by the Pakistan Bureau of Statistics

$US\ CPI_{(REV)}$ = The revised US CPI (all urban consumers)

$US\ CPI_{(REF)}$ = 236.293 US CPI (all urban consumers) for the month of March 2014 as notified by the US Bureau of Labor Statistics

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

$ER_{(REF)}$ = The reference TT & OD selling rate of US dollar as notified by the National Bank of Pakistan - Current reference 102.93

ii) Water Use Charges

Water Use Charges will be paid on units delivered basis and will be indexed with Consumer Price Index (CPI) annually. The indexed component of water use charges shall not exceed the actual expense. The first such adjustment shall be due after one year of COD, according to the following formula:

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

Where;

$WUC_{(REV)}$ = The revised Water Use Charge component indexed with Consumer Price Index (CPI)

$CPI_{(REV)}$ = The revised Consumer Price Index (General) as notified by the Pakistan Bureau of Statistics

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

$CPI_{(REF)}$ = Reference Consumer Price Index (General) of the latest available month preceding the date of COD as notified by the Pakistan Bureau of Statistics

iii) Adjustment of insurance component

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

iv) Return on equity

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

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

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

Where:

$ROE_{(REV)}$ = Revised return on equity component of tariff expressed in Rs/kWh.

$ROE_{(REF)}$ = Reference return on equity component of tariff expressed in Rs/kWh.

$ROEDC_{(REV)}$ = Revised return on equity during construction component of tariff expressed in Rs/kWh.

$ROEDC_{(REF)}$ = Reference return on equity during construction component of tariff expressed in Rs/kWh.

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

$ER_{(REF)}$ = The reference TT & OD selling rate of US dollar of 102.93

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

v) Adjustment for LIBOR variation

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

$$\Delta I = P_{(REV)} * (LIBOR_{(REV)} - 0.189\%) / 2$$

Where:

ΔI	=	the variation in interest charges applicable corresponding to variation in 6 months Yen LIBOR. ΔI can be positive or negative depending upon whether 6 months Yen $LIBOR_{(Rev)}$ per annum > or < 0.189%. The interest payment obligation will be enhanced or reduced to the extent of ΔI for each half year under adjustment.
$P_{(REV)}$	=	is the outstanding principal (as indicated in the attached debt service schedule to this order at Annex-II) on a bi-annual basis at the relevant calculations date.

Note:

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

V. Terms and Conditions of Tariff:

Design & Manufacturing Standards:

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

Emissions Trading/ Carbon Credits:

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

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.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

Others:

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

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

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

AUTHORITY

28 01 15

(Khawaja Muhammad Naeem)
Member

29/1/15

(Maj. (R) Haroon Rashid)
Member

30.1.15

(Himayat Ullah Khan)
Member

30/1/2015

(Habibullah Khilji)
Member

(Brig. (R) Tariq Saddozai)
Chairman

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA
AUTHORITY

12.02.15

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA AUTHORITY

Annex-I

PUNJAB POWER DEVELOPMENT COMPANY LIMITED (PPDCL)
MARALA HYDROPOWER PROJECT
REFERENCE TARIFF

Year	Variable O&M Local	Water Use Charge	Fixed O&M Local	Fixed O & M Foreign	Insurance	Return on Equity (ROE)	ROE During Construction (ROEDC)	Withholding Tax @7.5%	Loan Repayment	Interest Charges	Total Tariff
	Rs./kWh	Rs./kWh	Rs./kWh	Rs./kWh	Rs./kWh	Rs./kWh	Rs./kWh	Rs./kWh	Rs./kWh	Rs./kWh	Rs./kWh
1	0.3378	0.1500	0.8107	0.2027	0.9630	2.5760	0.5603	0.2352	2.8092	0.4727	9.1177
2	0.3378	0.1500	0.8107	0.2027	0.9630	2.5760	0.5603	0.2352	2.8315	0.4505	9.1177
3	0.3378	0.1500	0.8107	0.2027	0.9630	2.5760	0.5603	0.2352	2.8538	0.4281	9.1177
4	0.3378	0.1500	0.8107	0.2027	0.9630	2.5760	0.5603	0.2352	2.8764	0.4055	9.1177
5	0.3378	0.1500	0.8107	0.2027	0.9630	2.5760	0.5603	0.2352	2.8991	0.3828	9.1177
6	0.3378	0.1500	0.8107	0.2027	0.9630	2.5760	0.5603	0.2352	2.9221	0.3599	9.1177
7	0.3378	0.1500	0.8107	0.2027	0.9630	2.5760	0.5603	0.2352	2.9452	0.3368	9.1177
8	0.3378	0.1500	0.8107	0.2027	0.9630	2.5760	0.5603	0.2352	2.9684	0.3135	9.1177
9	0.3378	0.1500	0.8107	0.2027	0.9630	2.5760	0.5603	0.2352	2.9919	0.2900	9.1177
10	0.3378	0.1500	0.8107	0.2027	0.9630	2.5760	0.5603	0.2352	3.0156	0.2664	9.1177
11	0.3378	0.1500	0.8107	0.2027	0.9630	2.5760	0.5603	0.2352	3.0394	0.2425	9.1177
12	0.3378	0.1500	0.8107	0.2027	0.9630	2.5760	0.5603	0.2352	3.0634	0.2185	9.1177
13	0.3378	0.1500	0.8107	0.2027	0.9630	2.5760	0.5603	0.2352	3.0877	0.1943	9.1177
14	0.3378	0.1500	0.8107	0.2027	0.9630	2.5760	0.5603	0.2352	3.1121	0.1699	9.1177
15	0.3378	0.1500	0.8107	0.2027	0.9630	2.5760	0.5603	0.2352	3.1367	0.1453	9.1177
16	0.3378	0.1500	0.8107	0.2027	0.9630	2.5760	0.5603	0.2352	3.1615	0.1205	9.1177
17	0.3378	0.1500	0.8107	0.2027	0.9630	2.5760	0.5603	0.2352	3.1865	0.0955	9.1177
18	0.3378	0.1500	0.8107	0.2027	0.9630	2.5760	0.5603	0.2352	3.2116	0.0703	9.1177
19	0.3378	0.1500	0.8107	0.2027	0.9630	2.5760	0.5603	0.2352	3.2370	0.0449	9.1177
20	0.3378	0.1500	0.8107	0.2027	0.9630	2.5760	0.5603	0.2352	3.2626	0.0193	9.1177
21	0.3378	0.1500	0.8107	0.2027	0.9630	2.5760	0.5603	0.2352	-	-	5.8358
22	0.3378	0.1500	0.8107	0.2027	0.9630	2.5760	0.5603	0.2352	-	-	5.8358
23	0.3378	0.1500	0.8107	0.2027	0.9630	2.5760	0.5603	0.2352	-	-	5.8358
24	0.3378	0.1500	0.8107	0.2027	0.9630	2.5760	0.5603	0.2352	-	-	5.8358
25	0.3378	0.1500	0.8107	0.2027	0.9630	2.5760	0.5603	0.2352	-	-	5.8358
26	0.3378	0.1500	0.8107	0.2027	0.9630	2.5760	0.5603	0.2352	-	-	5.8358
27	0.3378	0.1500	0.8107	0.2027	0.9630	2.5760	0.5603	0.2352	-	-	5.8358
28	0.3378	0.1500	0.8107	0.2027	0.9630	2.5760	0.5603	0.2352	-	-	5.8358
29	0.3378	0.1500	0.8107	0.2027	0.9630	2.5760	0.5603	0.2352	-	-	5.8358
30	0.3378	0.1500	0.8107	0.2027	0.9630	2.5760	0.5603	0.2352	-	-	5.8358
Levelized Tariff	**0.3378**	**0.1500**	**0.8107**	**0.2027**	**0.9630**	**2.5760**	**0.5603**	**0.2352**	**2.6728**	**0.2912**	**8.7997**

Levelized Tariff (1-30 years) discounted at 10% per annum = US Cents 8.5492/kWh at reference exchange rate of 1 US$ =Rupees 102.93.

Annex-II

PUNJAB POWER DEVELOPMENT COMPANY LIMITED (PPDCL)
MARALA HYDROPOWER PROJECT
Debt Servicing Schedule

	Foreign Debt					Annual Principal Repayment Rs./Kwh	Annual Interest Rs./kWh	Annual Debt Servicing Rs./kWh
Period	Principal Million $	Repayment Million $	Mark-Up Million $	Balance Million $	Debt Service Million $			
	29.44	0.68	0.12	28.76	0.7971			
	28.76	0.68	0.11	28.08	0.7971			
1	29.44	1.36	0.23	28.08	1.5941	2.8092	0.4727	3.2819
	28.08	0.69	0.11	27.39	0.7971			
	27.39	0.69	0.11	26.70	0.7971			
2	28.08	1.38	0.22	26.70	1.5941	2.8315	0.4505	3.2819
	26.70	0.69	0.11	26.01	0.7971			
	26.01	0.69	0.10	25.31	0.7971			
3	26.70	1.39	0.21	25.31	1.5941	2.8538	0.4281	3.2819
	25.31	0.70	0.10	24.62	0.7971			
	24.62	0.70	0.10	23.92	0.7971			
4	25.31	1.40	0.20	23.92	1.5941	2.8764	0.4055	3.2819
	23.92	0.70	0.09	23.21	0.7971			
	23.21	0.71	0.09	22.51	0.7971			
5	23.92	1.41	0.19	22.51	1.5941	2.8991	0.3828	3.2819
	22.51	0.71	0.09	21.80	0.7971			
	21.80	0.71	0.09	21.09	0.7971			
6	22.51	1.42	0.17	21.09	1.5941	2.9221	0.3599	3.2819
	21.09	0.71	0.08	20.38	0.7971			
	20.38	0.72	0.08	19.66	0.7971			
7	21.09	1.43	0.16	19.66	1.5941	2.9452	0.3368	3.2819
	19.66	0.72	0.08	18.94	0.7971			
	18.94	0.72	0.07	18.22	0.7971			
8	19.66	1.44	0.15	18.22	1.5941	2.9684	0.3135	3.2819
	18.22	0.73	0.07	17.49	0.7971			
	17.49	0.73	0.07	16.76	0.7971			
9	18.22	1.45	0.14	16.76	1.5941	2.9919	0.2900	3.2819
	16.76	0.73	0.07	16.03	0.7971			
	16.03	0.73	0.06	15.30	0.7971			
10	16.76	1.46	0.13	15.30	1.5941	3.0156	0.2664	3.2819
	15.30	0.74	0.06	14.56	0.7971			
	14.56	0.74	0.06	13.82	0.7971			
11	15.30	1.48	0.12	13.82	1.5941	3.0394	0.2425	3.2819
	13.82	0.74	0.05	13.08	0.7971			
	13.08	0.75	0.05	12.34	0.7971			
12	13.82	1.49	0.11	12.34	1.5941	3.0634	0.2185	3.2819
	12.34	0.75	0.05	11.59	0.7971			
	11.59	0.75	0.05	10.84	0.7971			
13	12.34	1.50	0.09	10.84	1.5941	3.0877	0.1943	3.2819
	10.84	0.75	0.04	10.08	0.7971			
	10.08	0.76	0.04	9.32	0.7971			
14	10.84	1.51	0.08	9.32	1.5941	3.1121	0.1699	3.2819
	9.32	0.76	0.04	8.56	0.7971			
	8.56	0.76	0.03	7.80	0.7971			
15	9.32	1.52	0.07	7.80	1.5941	3.1367	0.1453	3.2819
	7.80	0.77	0.03	7.03	0.7971			
	7.03	0.77	0.03	6.26	0.7971			
16	7.80	1.54	0.06	6.26	1.5941	3.1615	0.1205	3.2819
	6.26	0.77	0.02	5.49	0.7971			
	5.49	0.78	0.02	4.72	0.7971			
17	6.26	1.55	0.05	4.72	1.5941	3.1865	0.0955	3.2819
	4.72	0.78	0.02	3.94	0.7971			
	3.94	0.78	0.02	3.16	0.7971			
18	4.72	1.56	0.03	3.16	1.5941	3.2116	0.0703	3.2819
	3.16	0.78	0.01	2.37	0.7971			
	2.37	0.79	0.01	1.58	0.7971			
19	3.16	1.57	0.02	1.58	1.5941	3.2370	0.0449	3.2819
	1.58	0.79	0.01	0.79	0.7971			
	0.79	0.79	0.00	-	0.7971			
20	1.58	1.58	0.01	-	1.5941	3.2626	0.0193	3.2819

* 1 USD = 103.11 JPY

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA AUTHORITY