



Registrar

# National Electric Power Regulatory Authority Islamic Republic of Pakistan

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No. NEPRA/TRF-298/PPDCL-2015/6153-6155  
May 5, 2016

**Subject: Determination of the Authority in the matter of Tariff Petition filed by Punjab Power Development Company Limited for its Deg-outfall Hydropower Project [Case No. NEPRA/TRF-298/PPDCL-2015]**

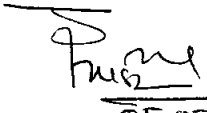
Dear Sir,

Please find enclosed herewith the subject Determination of the Authority along Annex-I & Annex-II (22 pages) in Case No. NEPRA/TRF-298/PPDCL-2015.

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

3. The Order of the Authority along with 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 DEG-OUTFALL HYDROPOWER PROJECT**

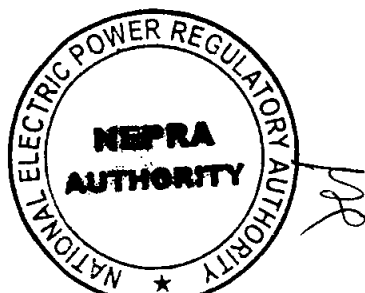
**1. BACKGROUND**

- 1.1 Punjab Power Development Company Limited (hereinafter referred to as the "Petitioner" or "PPDCL") filed a Tariff Petition dated January 25, 2015 (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 January 29, 2015 for determination of EPC stage generation tariff for its 4.04 MW Deg-Outfall Hydropower project (hereinafter referred to as the "Project") being set up at Upper Chenab Canal, District Sheikhpura, Punjab.
- 1.2 In accordance with sub-rule 3 of rule 4 of the Tariff Rules, the Petition was admitted by the Authority on February 24, 2015. Consequent to the admission, notice of admission/ hearing was published in the national newspapers on April 11, 2015, 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 Lahore Electric Supply Company (LESCO).

**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
<b>Total</b>	<b>24.8 MW</b>





- 2.2. Summary of the technical and financial information provided by the Petitioner regarding the Project is as follows:

**Technical Specifications**

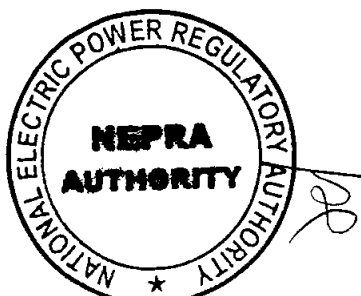
Capacity	4.04 MW
Type of Facility	Low Head Hydropower Project
Turbine Type	Pit Type Horizontal Kaplan
Number of Units	2
Per Unit Design Discharge	60 cumecs (120 cumecs total)
Head (Rated)	4.0 meters
Plant Factor	78%
Auxiliary Consumption	40 kW (1%)
Net Annual Energy Generation	27.65 GWh

**Financial Parameters**

Cost Head	PKR Million
Civil Works	1192.69
Electrical and Mechanical Works	727.02
Total EPC Cost (including escalation)	1919.71
C.D.M. (Clean Development Mechanism)	3.91
Land, Resettlement and Compensation	71.00
Project Management - Engineering & Supervision	27.97
Consultancy	29.62
Project Administration	47.99
Duties & Taxes, Sindh Infrastructure Cess	35.98
Financial Charges	49.53
Interest During Construction	59.36
Total Project Cost	2245.07
Debt Equity Ratio	80:20
Debt Financing	Foreign
Base Rate	6 Month LIBOR (0.8%)
Premium	0.6%
Repayment Period	20 Years
Return on Equity (IRR based)	17%
Construction Period	30 months
Tariff Control Period	30 Years
Proposed Levelised Tariff (1-30 Years)	Rs. 10.0478/kWh (US cents 9.7615/kWh)
Proposed Tariff (1-20 Years)	Rs. 10.3429
Proposed Tariff (21-30 Years)	Rs. 7.2973
USD/PKR Exchange Rate	102.9331

**3. PROCEEDINGS**

- 3.1. The hearing on the matter was held on April 29, 2015 in Islamabad. The hearing was duly attended by representatives of PPDCL, Islamabad Electric Supply Company (IESCO) and





Pakhtunkhwa Energy Development Organization (PEDO). During the hearing, the Petitioner was questioned regarding various technical and financial parameters of the Project.

- 3.2. Pursuant to proceedings in the hearing, the Petitioner submitted additional information/ cost claims and clarifications vide its letter No. PD/Dir(Tariff)PPMU/69/2015 dated July 14, 2015; letter No. PD/Dir(Tariff)-PPMU/76/2015 dated October 06, 2015; letter dated November 02, 2015; and letter No. PD/Dir(Tariff)-PPMU/1490/2016 dated February 29, 2016.

#### **4. ISSUES**

- 4.1. Based on the available information and proceedings of the case, 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.

- 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 as per policy. 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 detailed in paragraph 4.3.1.

#### **4.3. Whether the capacity and annual generation claimed by the Petitioner are justified?**

- 4.3.1. The Petitioner claimed annual energy of 27.65 GWh based on auxiliary consumption of 1%. The Authority considers that the energy, capacity and auxiliary consumption figures claimed by the Petitioner are reasonable given the design of the Project. The Authority hereby allows gross annual energy of 27.65 GWh and net annual energy of 27.374 GWh based on 1% auxiliary consumption.

#### **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 885 days.





4.4.2. The Authority earlier, for a similar project, had allowed 30 months construction period. In view thereof, the Authority hereby allows the Petitioner a 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?

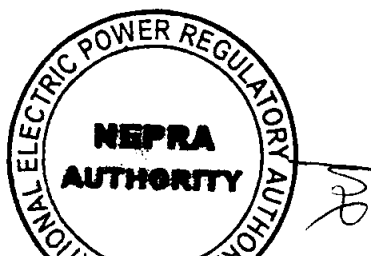
4.5.1. The Petitioner has claimed the following project costs:

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	206.91	985.78	1,192.69
2	Electrical and Mechanical Works including Design Services, Transportation, Testing and Commissioning	31.23	695.79	727.02
3	<b>Total Bid Price</b>	<b>238.14</b>	<b>1,681.57</b>	<b>1,919.71</b>
4	Duties & Taxes (5% of Imported Items only)	31.67	0	31.67
5	Sind Infrastructure Cess @ 0.68% of Imported Items	4.31	0	4.31
6	Land, Resettlement and Compensation	71.00	0	71.00
7	Project Administration, Audit & Account @ 2.5% of EPC Cost	47.99	0	47.99
8	C.D.M (Clean Development Mechanism)	3.91	0	3.91
9	Project Management - Engineering & Supervision	27.97	0	27.97
10	Consultancy	20.74	8.89	29.62
11	<b>Capital Cost</b>	<b>445.73</b>	<b>1690.46</b>	<b>2136.18</b>
12	Financing Charges	0	49.53	49.53
13	Interest During Construction	0	59.36	59.36
14	<b>Project Cost</b>	<b>445.73</b>	<b>1799.35</b>	<b>2245.07</b>

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.

4.5.3.2. The Petitioner 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 eight (8) firms submitted proposals for award of contract, out of which the following four (4) firms were determined as substantially responsive to the commercial and technical terms and conditions of the tender documents:

1. ETIMAAD – ALLONWARD JV
2. SINOTEC – SHPE JV
3. DESCON – SHZ JV
4. GRC – SAHAVIRIYA JV

4.5.3.3. The Authority noted that, as per documentary evidences provided, the financial bids of the four (4) bidders were opened after identifying them as technically responsive as per the applicable procurement rules. Subsequently, despite being technically responsive and financially lowest bidder, the contract was not awarded to M/s ETIMAAD – ALLONWARD JV and was instead awarded to M/s SINOTEC – SHPE JV which was the second lowest bidder.

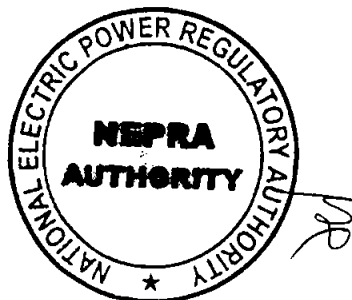
4.5.3.4. The Authority vide its letter no. NEPRA/SAT-I/TRF-298/1714 dated February 03, 2016 directed the Petitioner to submit a detailed clarification on disqualifying the lowest bidder when it has been declared technically responsive. The Petitioner in response vide its letter no. PD/Dir(Tariff)-PPMU/1490/2016 dated February 29, 2016 submitted that the Bids for Deg Outfall Hydropower Project were submitted on October 25, 2010. Eight (8) bidders submitted their bids for EPC project on International Competitive Bidding (ICB) basis. Technical Evaluation Report was submitted by the Consultants vide PHC/Tech/47/370 dated January 08, 2011 wherein four (4) bidders were declared technically responsive. Asian Development Bank (ADB) gave their concurrence / NOC for Technical Evaluation Report vide their fax dated January 19 2011. Price Bids were opened for the technically responsive bidders on January 28 2011. Price Bid Evaluation report was submitted by the Consultants vide PHC/Tech/47/422 dated March 09, 2011 wherein M/s Etimaad - Allonward JV's bid was lowest evaluated bidder. The corresponding bid price of M/s Etimaad - Allonward JV's came out to be Rs. 1,458.33 Million. In a subsequent development, the other bidders of the Project approached ADB and pointed out that M/s Etimaad - Allonward JV did not meet the specific qualification criteria of having experience in Transmission Line. The specific criteria required the technical bidders to be having experience of completing one EPC project for similar size and nature as well as completion of at least one Transmission Line project of 11kV. During pre-bid meetings some bidders requested to remove the requirement of experience in Transmission Line which was agreed by the Employer (PPMU) and minutes were circulated to all bidders accordingly, whereas the ADB's point of view was that an





"addendum" to the specific criteria requirements should have been issued. Therefore, according to ADB's clarification the stipulated criteria in the bidding documents will prevail. Consequently, the ADB disqualified the bidder M/s Etimaad - Allonward JV and recommended to award the project to the lowest qualified bidder i.e. M/s SINOTEC - SHPE JV vide their fax dated January 26, 2012. The ADB desired the Punjab Government that if the Punjab Government still wants to award the Deg-Outfall Contract to M/s Etimaad - Allonward JV, then ADB would not fund this Project. Instead the Punjab Government would have to provide the funding for this project from their own resources. The case was referred to Steering Committee (SC) of the REDSIP under the Chairmanship of Chairman P&D Board with the competency to accept the bid and award the contract. In this regard a lengthy correspondence was made between the Employer (PPMU), the ADB and other departments of the Government of the Punjab and eventually it was decided by the SC to accept the disqualification of M/s Etimaad - Allonward JV, and the EPC Contract for the Project was awarded to M/s SINOTEC - SHPE being lowest among the qualifying bidders.

- 4.5.3.5. The Authority considers that the lowest bidder could not be offered the EPC contract due to a legal/contractual lacuna; however, government entities entrusted with the role of developing power projects such as PPDCL are expected to be more vigilant during the tendering phase of projects and should rectify all operating procedures which are impeding efficient public procurement. Notwithstanding the aforementioned, the Authority has noted that the evaluation procedure conducted under the guidelines of Asian Development Bank was fairly detailed. Moreover, since the project is already nearing completion and is expected to bring relatively cheap energy into the grid, the Authority is constrained to accept the EPC bidding of this Project.
- 4.5.3.6. The Petitioner claimed a total EPC cost of Rs. 1,919.71 Million. The signed EPC contract submitted by the Petitioner stipulates that the contract price shall be the aggregate of foreign component of US\$ 16,413,885 and Local component of Rs. 238,141,922.
- 4.5.3.7. 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. The Petitioner submitted that the Very Low Head (VLH) technology deployed for projects in Punjab has certain limitations including:
- Almost all projects require a combination of falls which are 4 – 10 km apart.
  - 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.
  - Machines need a larger diameter along with large power houses.
  - Capacity of projects is small leading to higher per MW cost.
- 4.5.3.8. 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 low head project.





4.5.3.9. The Authority has noted that an abnormally high part of the EPC price, especially the civil works component which is generally deemed as a local cost, is payable in US Dollars; however, 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. 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.

4.5.3.10. The Authority after due consideration allows the aggregate of US \$ 16.414 million and Rs. 230.151 million as EPC cost (excluding cost of interconnection) to the Petitioner with no price escalations except for those detailed in the order.

#### 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. 7.991 Million. The total length of the 11 KV Transmission Line is 12 Km.

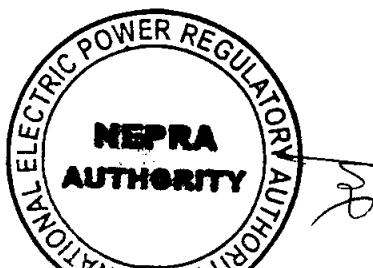
4.5.4.2. The Power Purchaser identified by the Petitioner, LESCO has not provided its comments on the tariff petition or the interconnection arrangement of the Project, despite written directions issued by the Authority.

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. 7.991 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.

4.5.4.4. The construction of inter-connection and related works which is the responsibility of the power purchaser, i.e. CPPA-G/ DISCO, should be ready before COD of the project; otherwise, penalty, if any, may be imposed on the power purchaser as per the standard terms of PPA/EPA. Further, the Authority hereby directs that the initial expenditure incurred by the power producer, if any, in this regard may be reimbursed by the power purchaser as per the terms agreeable to the power producer.

#### 4.5.5. Duties and Taxes

4.5.5.1. Customs Duties amounting to Rs. 31.67 Million, assumed at 5% of the foreign cost of plant & equipment, have been claimed by the Petitioner. Additionally, Sindh Infrastructure Cess amounting to Rs. 4.31 Million at 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 at 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 \$ 0.275 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.

#### 4.5.6. Land Resettlement and Compensation

4.5.6.1. The Petitioner has claimed land and resettlement cost amounting to Rs. 71.00 million. The following breakup regarding the cost of land has been provided by the Petitioner:

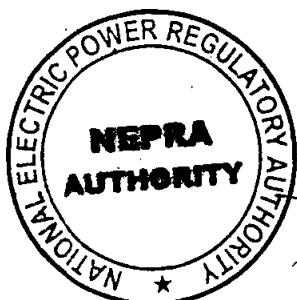
Land (56.46 Acres Private + 29.83 Acres Govt Land)	Rs. 51.943 Million
Crop Compensation (Wheat, Cucumber, Water Melon)	Rs. 4.229 Million
Trees Compensation	Rs. 0.514 Million
Building Compensation	Rs. 1.555 Million
Irrigation Facilities Compensation	Rs. 0.829 Million
Shifting / Realignment of Transmission Line	Rs. 1.242 Million
Severity Impacts Allowance	Rs. 1.796 Million
Third Party/External M&E (LARP)	Rs. 1.00 Million
Special Security Measures	Rs. 6.311 Million
<b>Total</b>	<b>Rs. 69.416 Million</b>

4.5.6.2. The Petitioner has included estimated cost of enhanced security measures for Chinese Contractor (Rs. 6.311 Million) as part of land, resettlement and compensation cost. The Authority in case of Marala and Pakpattan hydropower projects has already disallowed this cost. Likewise, the same is disallowed in this case.

4.5.6.3. As per the Land Acquisition and Resettlement Plan (LARP) revised on November 2013, a total of 86.29 acres of irrigated farmland is being acquired, out of which 56.46 acres of land belong to private land owners and 29.83 acres are possessed by the Punjab Irrigation Department. The Authority considers that the estimated total cost of compensation/relocation and impact mitigation in the Due Diligence Report amounting to Rs. 63.105 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 claimed Project Administration, Audit & Account cost of Rs. 47.99 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).



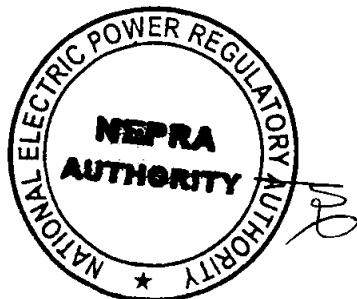


#### 4.5.8. Carbon Credits Consultancy cost

- 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.
- 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 claimed a Project Management - Engineering & Supervision cost of Rs. 27.97 million, whereas a cost of Consultancy amounting to Rs. 29.62 million was also claimed separately.
- 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 Deg-outfall 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.





4.5.9.4. As decided in the case of Marala and Pakpattan hydropower projects, this cost is to be split 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 Deg-outfall hydropower project prorated on the basis of feasibility design capacity is US\$ 0.088 Million in foreign component plus Rs. 20.873 Million in local component.

4.5.10. Financing Charges

4.5.10.1. The Petitioner has claimed financial charges amounting to Rs. 49.53 Million. The Petitioner has submitted that this cost involves the cost of letter of credit (LC) and commitment charges stipulated in the loan agreement.

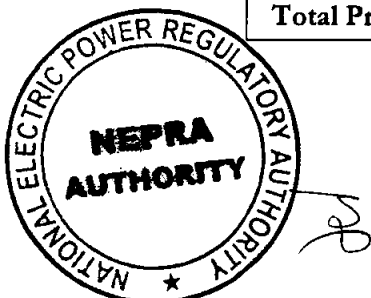
4.5.10.2. Based on the documentary evidence submitted by the Petitioner, the Authority has assessed US\$ 0.102 million as financial charges. The Authority has further decided that these financial charges will be subject to adjustment at COD on the basis of actual expense, up to a maximum of 3% of the allowed debt (excluding the impact of interest during construction and financial charges), on production of authentic documentary evidence.

4.5.11. Interest During Construction

4.5.11.1. The Petitioner has claimed interest during construction (hereinafter referred to as "IDC") amounting to Rs. 59.36 Million (equivalent to US\$ 0.577 Million), based on 30 months construction period and interest rate of six months LIBOR (0.8%) 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\$ 0.188 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:

	Equivalent Total (US\$ Million)
EPC Cost	18.650
Duties & Taxes	0.275
Land, Resettlement and Compensation	0.613
Project Administration	0.220
C.D.M. Consultancy	0.012
Management Consultancy	0.291
Financial Charges	0.102
Interest During Construction	0.188
<b>Total Project Cost</b>	<b>20.351</b>



#### 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 above at paragraph 4.6.1 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:

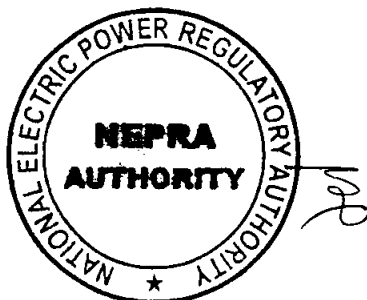
	Foreign (US\$ Million)	Local (Rs. Million)	Total (Rs. Million)
Fixed O&M costs	0.0916	37.7333	47.1667
Variable O&M costs	-	15.7222	15.7222
Total O&M	0.0916	53.4555	62.8889

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.

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 unforeseen/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\$ 0.362 Million (Rs. 37.360 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	0.054	22.416	28.020
Variable O&M costs	-	9.340	9.340
Total O&M	0.054	31.756	37.360

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

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

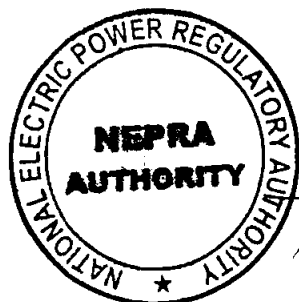
4.8.2. The Authority has decided to allow to the Petitioner, insurance during operations up to 1.35% of the allowed EPC cost, in accordance with the established benchmark. In case of insurance denominated in US \$, insurance cost component of tariff will be adjusted on account of US\$/PKR exchange rate 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 injections (within the overall equity allowed by the Authority at COD) during the project construction period allowed by the Authority.



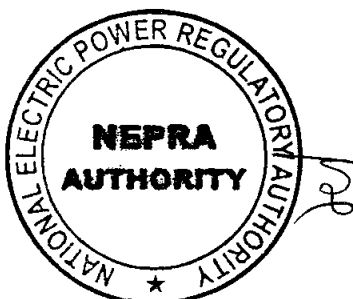


## ORDER

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 Deg-Outfall 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
<b>Fixed charges</b>			
Fixed O & M			
- Local	0.8189	0.8189	CPI - General
- Foreign	0.2047	0.2047	US\$/PKR & US CPI
Insurance	0.9467	0.9467	US\$/PKR
Debt service	3.3151	-	JPY/PKR & LIBOR
Return on equity	2.6020	2.6020	US\$/PKR
Return on equity during construction	0.8066	0.8066	US\$/PKR
<b>Variable charges</b>			
Variable O & M - Local	0.3412	0.3412	CPI - General
Water Use Charge	0.1500	0.1500	CPI - General
<b>Total</b>	<b>9.1852</b>	<b>5.8701</b>	

- i) The reference tariff has been calculated on the basis of net annual benchmark energy generation of 27.374 GWh for installed capacity of 4.04 MW.
- ii) The above charges will be limited to the extent of net annual energy generation of 27.374 GWh. Net annual generation supplied during a year to the Power Purchaser in excess of benchmark energy of 27.374 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 Petitioner in accordance with the approved mechanism given in the applicable government policy.
- iv) The reference US\$/PKR rate has been taken as 102.9331.



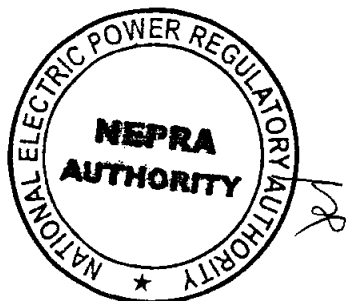


- v) The above tariff is applicable for a period of thirty years commencing from the commercial operations date (COD).
- vi) The component wise tariff is indicated at Annex-I.
- vii) Debt Servicing Schedule is attached as Annex-II.

**I. One Time Adjustments**

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. 102.9331 and reference JPY/PKR exchange rate of 0.9033 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.102.9331.
- 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 \$ 0.275 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 Rs. 63.105 Million (US\$ 0.613 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.
- 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.

## III. Hydrological Risk

The Power Purchaser will be required to bear hydrological risk only to the extent of 27.374 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 1<sup>st</sup> July, 1<sup>st</sup> October, 1<sup>st</sup> January and 1<sup>st</sup> 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:

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

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

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







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

$FO\&M_{(FREF)}$  = 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

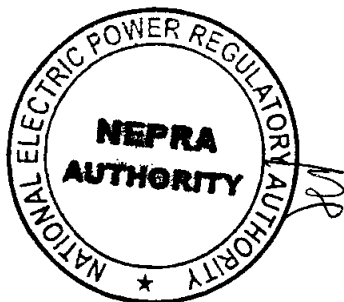
$CPI_{(REV)}$  = The revised Consumer Price Index (General) as notified by the Pakistan Bureau of Statistics

$CPI_{(REF)}$  = 198.80 Consumer Price Index (General) of November 2014 notified by the Pakistan Bureau of Statistics

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

$US\ CPI_{(REF)}$  = 236.151 US CPI (all urban consumers) for the month of November 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 102.9331

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

$CPI_{(REF)}$  = 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.

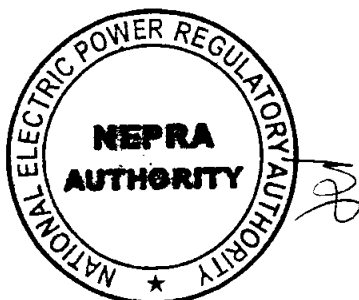
iv) Return on equity

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 102.9331

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:

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

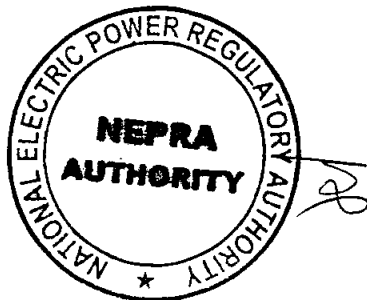
Where:

$\Delta I$  = the variation in interest charges applicable corresponding to variation in 6 months Yen LIBOR.  $\Delta I$  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  $\Delta I$  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.

**Others:**

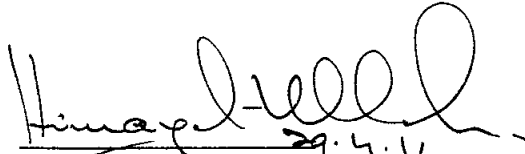
- i. The Authority has allowed/approved only those cost(s), term(s), condition(s), provision(s), etc. which have been specifically approved in this tariff determination. Any cost(s), term(s), condition(s), provision(s), etc. contained in the tariff petition or any other document which are not specifically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



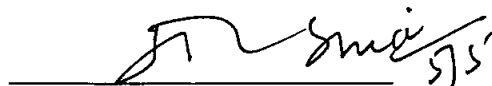


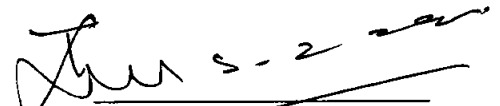
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AUTHORITY

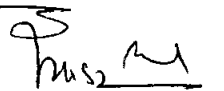
  
(Himayat Ullah Khan)  
Vice Chairman

  
(Syed Masood ul Hassan Naqvi)  
Member

  
(Major (Rtd.) Haroon Rasheed)  
Member

  
(Tariq Saddozai)  
Chairman

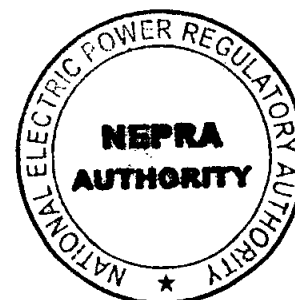


  
05.05.16

**PUNJAB POWER DEVELOPMENT COMPANY LIMITED (PPDCL)**  
**DEG OUTFALL HYDROPOWER PROJECT**  
**REFERENCE TARIFF**

Year	Energy Purchase Price		Capacity Purchase Price							Total Tariff
	Variable O&M Local	Water Use Charge	Fixed O&M Local	Fixed O&M Foreign	Insurance	Return on Equity (ROE)	ROE During Construction (ROEDC)	Loan Repayment	Interest Charges	
	Rs./kWh	Rs./kWh	Rs./kWh	Rs./kWh	Rs./kWh	Rs./kWh	Rs./kWh	Rs./kWh	Rs./kWh	
1	0.3412	0.1500	0.8189	0.2047	0.9467	2.6020	0.8066	2.8376	0.4775	9.1852
2	0.3412	0.1500	0.8189	0.2047	0.9467	2.6020	0.8066	2.8600	0.4550	9.1852
3	0.3412	0.1500	0.8189	0.2047	0.9467	2.6020	0.8066	2.8826	0.4324	9.1852
4	0.3412	0.1500	0.8189	0.2047	0.9467	2.6020	0.8066	2.9054	0.4096	9.1852
5	0.3412	0.1500	0.8189	0.2047	0.9467	2.6020	0.8066	2.9284	0.3867	9.1852
6	0.3412	0.1500	0.8189	0.2047	0.9467	2.6020	0.8066	2.9515	0.3635	9.1852
7	0.3412	0.1500	0.8189	0.2047	0.9467	2.6020	0.8066	2.9749	0.3402	9.1852
8	0.3412	0.1500	0.8189	0.2047	0.9467	2.6020	0.8066	2.9984	0.3167	9.1852
9	0.3412	0.1500	0.8189	0.2047	0.9467	2.6020	0.8066	3.0221	0.2930	9.1852
10	0.3412	0.1500	0.8189	0.2047	0.9467	2.6020	0.8066	3.0460	0.2691	9.1852
11	0.3412	0.1500	0.8189	0.2047	0.9467	2.6020	0.8066	3.0701	0.2450	9.1852
12	0.3412	0.1500	0.8189	0.2047	0.9467	2.6020	0.8066	3.0943	0.2207	9.1852
13	0.3412	0.1500	0.8189	0.2047	0.9467	2.6020	0.8066	3.1188	0.1963	9.1852
14	0.3412	0.1500	0.8189	0.2047	0.9467	2.6020	0.8066	3.1435	0.1716	9.1852
15	0.3412	0.1500	0.8189	0.2047	0.9467	2.6020	0.8066	3.1683	0.1467	9.1852
16	0.3412	0.1500	0.8189	0.2047	0.9467	2.6020	0.8066	3.1934	0.1217	9.1852
17	0.3412	0.1500	0.8189	0.2047	0.9467	2.6020	0.8066	3.2186	0.0965	9.1852
18	0.3412	0.1500	0.8189	0.2047	0.9467	2.6020	0.8066	3.2441	0.0710	9.1852
19	0.3412	0.1500	0.8189	0.2047	0.9467	2.6020	0.8066	3.2697	0.0454	9.1852
20	0.3412	0.1500	0.8189	0.2047	0.9467	2.6020	0.8066	3.2955	0.0195	9.1852
21	0.3412	0.1500	0.8189	0.2047	0.9467	2.6020	0.8066	-	-	5.8701
22	0.3412	0.1500	0.8189	0.2047	0.9467	2.6020	0.8066	-	-	5.8701
23	0.3412	0.1500	0.8189	0.2047	0.9467	2.6020	0.8066	-	-	5.8701
24	0.3412	0.1500	0.8189	0.2047	0.9467	2.6020	0.8066	-	-	5.8701
25	0.3412	0.1500	0.8189	0.2047	0.9467	2.6020	0.8066	-	-	5.8701
26	0.3412	0.1500	0.8189	0.2047	0.9467	2.6020	0.8066	-	-	5.8701
27	0.3412	0.1500	0.8189	0.2047	0.9467	2.6020	0.8066	-	-	5.8701
28	0.3412	0.1500	0.8189	0.2047	0.9467	2.6020	0.8066	-	-	5.8701
29	0.3412	0.1500	0.8189	0.2047	0.9467	2.6020	0.8066	-	-	5.8701
30	0.3412	0.1500	0.8189	0.2047	0.9467	2.6020	0.8066	-	-	5.8701
<b>Levelized Tariff</b>	<b>0.3412</b>	<b>0.1500</b>	<b>0.8189</b>	<b>0.2047</b>	<b>0.9467</b>	<b>2.6020</b>	<b>0.8066</b>	<b>2.6998</b>	<b>0.2941</b>	<b>8.8640</b>

*Levelized Tariff (1-30 years) discounted at 10% per annum = US Cents 8.6114/kWh at reference exchange rate of 1 US\$ = Rupees 102.93.*



**PUNJAB POWER DEVELOPMENT COMPANY LIMITED (PPDCL)  
DEG OUTFALL HYDROPOWER PROJECT**

**Annex-II**

**Debt Servicing Schedule**

Period	Foreign Debt					Annual Principal Repayment Rs./Kwh	Annual Interest Rs./kWh	Annual Debt Servicing Rs./kWh
	Principal Million \$	Repayment Million \$	Mark-Up Million \$	Balance Million \$	Debt Service Millin \$			
	16.28	0.38	0.06	15.90	0.4408			
	15.90	0.38	0.06	15.53	0.4408			
1	16.28	0.75	0.13	15.53	0.8816	2.8376	0.4775	3.3151
	15.53	0.38	0.06	15.15	0.4408			
	15.15	0.38	0.06	14.77	0.4408			
2	15.53	0.76	0.12	14.77	0.8816	2.8600	0.4550	3.3151
	14.77	0.38	0.06	14.38	0.4408			
	14.38	0.38	0.06	14.00	0.4408			
3	14.77	0.77	0.11	14.00	0.8816	2.8826	0.4324	3.3151
	14.00	0.39	0.06	13.61	0.4408			
	13.61	0.39	0.05	13.23	0.4408			
4	14.00	0.77	0.11	13.23	0.8816	2.9054	0.4096	3.3151
	13.23	0.39	0.05	12.84	0.4408			
	12.84	0.39	0.05	12.45	0.4408			
5	13.23	0.78	0.10	12.45	0.8816	2.9284	0.3867	3.3151
	12.45	0.39	0.05	12.06	0.4408			
	12.06	0.39	0.05	11.66	0.4408			
6	12.45	0.78	0.10	11.66	0.8816	2.9515	0.3635	3.3151
	11.66	0.39	0.05	11.27	0.4408			
	11.27	0.40	0.04	10.87	0.4408			
7	11.66	0.79	0.09	10.87	0.8816	2.9749	0.3402	3.3151
	10.87	0.40	0.04	10.47	0.4408			
	10.47	0.40	0.04	10.07	0.4408			
8	10.87	0.80	0.08	10.07	0.8816	2.9984	0.3167	3.3151
	10.07	0.40	0.04	9.67	0.4408			
	9.67	0.40	0.04	9.27	0.4408			
9	10.07	0.80	0.08	9.27	0.8816	3.0221	0.2930	3.3151
	9.27	0.40	0.04	8.87	0.4408			
	8.87	0.41	0.03	8.46	0.4408			
10	9.27	0.81	0.07	8.46	0.8816	3.0460	0.2691	3.3151
	8.46	0.41	0.03	8.05	0.4408			
	8.05	0.41	0.03	7.64	0.4408			
11	8.46	0.82	0.07	7.64	0.8816	3.0701	0.2450	3.3151
	7.64	0.41	0.03	7.23	0.4408			
	7.23	0.41	0.03	6.82	0.4408			
12	7.64	0.82	0.06	6.82	0.8816	3.0943	0.2207	3.3151
	6.82	0.41	0.03	6.41	0.4408			
	6.41	0.42	0.03	5.99	0.4408			
13	6.82	0.83	0.05	5.99	0.8816	3.1188	0.1963	3.3151
	5.99	0.42	0.02	5.58	0.4408			
	5.58	0.42	0.02	5.16	0.4408			
14	5.99	0.84	0.05	5.16	0.8816	3.1435	0.1716	3.3151
	5.16	0.42	0.02	4.74	0.4408			
	4.74	0.42	0.02	4.31	0.4408			
15	5.16	0.84	0.04	4.31	0.8816	3.1683	0.1467	3.3151
	4.31	0.42	0.02	3.89	0.4408			
	3.89	0.43	0.02	3.46	0.4408			
16	4.31	0.85	0.03	3.46	0.8816	3.1934	0.1217	3.3151
	3.46	0.43	0.01	3.04	0.4408			
	3.04	0.43	0.01	2.61	0.4408			
17	3.46	0.86	0.03	2.61	0.8816	3.2186	0.0965	3.3151
	2.61	0.43	0.01	2.18	0.4408			
	2.18	0.43	0.01	1.75	0.4408			
18	2.61	0.86	0.02	1.75	0.8816	3.2441	0.0710	3.3151
	1.75	0.43	0.01	1.31	0.4408			
	1.31	0.44	0.01	0.88	0.4408			
19	1.75	0.87	0.01	0.88	0.8816	3.2697	0.0454	3.3151
	0.88	0.44	0.00	0.44	0.4408			
	0.44	0.44	0.00	-	0.4408			
20	0.88	0.88	0.01	-	0.8816	3.2955	0.0195	3.3151

\*1 USD = 113.9523 JPY

*[Handwritten signature]*

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