



Registrar

National Electric Power Regulatory Authority
Islamic Republic of Pakistan

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No. NEPRA/TRF-433/PMTC-2018/3691-3693
March 8, 2018

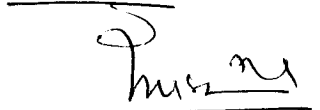
Subject: Decision of the Authority in the matter of Petition filed under Rule 3 of the NEPRA (Tariff Standards & Procedure) Rules, 1998 for Modification of the Tariff Decision dated May 04, 2017 (Pak Matiari Lahore Transmission Company (Private) Limited (PMTC) in the matter of Matiari Lahore 4,000 MW ± 660 KV HVDC Transmission Project [Case # NEPRA/TRF-433/PMTC-2018]

Dear Sir,

Please find enclosed herewith the subject Decision of the Authority along with Annex-I and Annex-II (23 pages) in Case No. NEPRA/TRF-433/PMTC-2018.

2. The Decision is being intimated to the Federal Government for the purpose of 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).
3. Order of the Authority along with Reference Tariff Table (Annex-I) and Debt Servicing Schedule (Annex-II) of the Decision need to be notified in the official Gazette.

Enclosure: As above


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(Syed Safer Hussain)

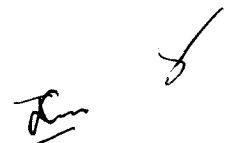
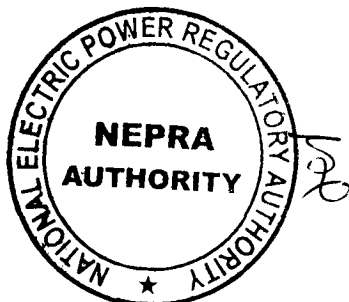
Secretary
Ministry of Energy
'A' Block, Pak Secretariat
Islamabad

CC:

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

DECISION OF THE AUTHORITY IN THE MATTER OF PETITION FILED UNDER RULE 3 OF THE NEPRA (TARIFF STANDARDS & PROCEDURE) RULES, 1998 FOR MODIFICATION OF THE TARIFF DECISION DATED MAY 04, 2017 (PAK MATIARI LAHORE TRANSMISSION COMPANY (PRIVATE) LIMITED (PMTC)) IN THE MATTER OF MATIARI LAHORE 4,000 MW ± 660 KV HVDC TRANSMISSION LINE PROJECT

1. M/s Pak Matiari Lahore Transmission Company (Private) Limited (hereinafter referred to as "PMTC" or the "Petitioner" or the "Company") vide their letter dated Jan 15, 2018 submitted the petition under Rule 3(1) of NEPRA Tariff Rules 1998 for modification of the tariff determination dated May 4, 2017 in the matter of Matiari-Lahore 4000 MW \pm 660KV HVDC transmission line.
2. **Grounds**
 - 2.1 The grounds submitted by the Petitioner referred to certain developments and requirements for the operations and Maintenance functions for this first HVDC Transmission Line of the country. The petitioner requested following modifications:
 - i. Re-allocation of O&M cost US\$ 3 Million annually from NTDC O&M component to O&M of the project company (local) as mutually agreed between NTDC and the Project Company;
 - ii. Re-allocation to be limited to O&M cost under local component;
 - iii. Total O&M cost allowed to both NTDC & PMTC under the tariff determination will remain unchanged without any additional indexation implication; thus the overall tariff allowed will not be affected.
3. **Relief Sought**
 - 3.1 The petitioner submitted to the Authority for reallocation of the O&M cost component and modification of the tariff determination as the requested reallocation will not cause any change to the overall O&M cost. However, the modification will result in the reduction of the NTDC local component by US\$ 3 Million with corresponding increase in PMTC's local component with same amount of US\$ 3 Million.
 - 3.2 The Petitioner also submitted that the O&M agreement will be signed by NTDC directly instead of a subsidiary of NTDC.
4. **Proceedings**
 - 4.1 In terms of Rule 4 of the Tariff Rules, 1998, the petition was admitted by the Authority for consideration and further regulatory proceedings on January 18, 2018.
5. **Submissions of the Petitioner for Tariff Modification**
 - 5.1 In the tariff petition the Petitioner submitted brief background of the tariff of the project. The Petitioner submitted that one window facilitator i.e. Private Power Infrastructure Board (PPIB) filed Petition with NEPRA for tariff determination for \pm 660kV, 4000 MW Matiari-Lahore Transmission Line Project. During the tariff setting proceedings, two interveners Anwar Kamal Law Associates and Lucky Power Electricity Company Limited participated. Accordingly in pursuance of NEPRA Tariff (Standards & Procedure) Rules, 1998 ("Tariff Rules"), NEPRA issued Tariff Determination on Aug 08, 2016. Subsequently the Authority issued the decision on Nov 24, 2016

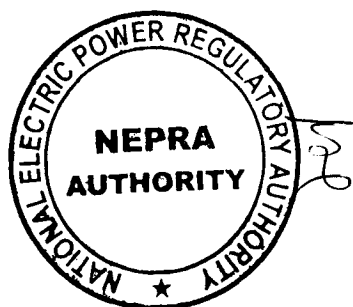


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based on the Review Motion filed by PPIB. The Petitioner further submitted that in accordance with the clause 10 VI (a) of the Authority's referred decision dated Nov 24, 2016, the Project Company, upon issuance of Letter of Intent (LOI) / Letter of Support (LOS) by the relevant agency (PPIB), approached NEPRA for the grant of Special Purpose Transmission License (SPTL) along with a request for the acceptance of aforementioned tariff awarded against the tariff petition filed by PPIB.

- 5.2 Accordingly, PMTC after acquiring LOI on Mar 31, 2017 from PPIB, submitted an application on Apr 07, 2017, for unconditional acceptance of the tariff determined for ± 660 kV 4000 MW, Matiari-Lahore Transmission Line Project. Considering the application and related information/documents in accordance with the NEPRA's tariff determination for the Project, the Authority vide its decision dated May 04, 2017 granted aforementioned Tariff for this transmission line to PMTC.
- 5.3 The Petitioner while justifying modification request of the above tariff submitted that PPIB through tariff petition had requested an annual operational and maintenance amount of US\$ 57.57 Million out of which US\$ 37.62 million was for the foreign component and US\$ 19.95 million for local component. In addition, an amount of USD 16.78 million was also requested under local component for NTDC's share to enable it to carry out O&M of HVDC transmission line. In addition to the tariff modification request, PMTC later also provided further justification and supporting evidence vide letter no 18-959 & 18-985 dated Feb 06, 2018 & Feb 13, 2018 respectively.
- 5.4 The Petitioner submitted that, NEPRA in its tariff determination dated Aug 18, 2016 had allowed the O&M component by allocating USD (14.80+7.85 = 22.65) million for O&M to the Project Company and USD 16.78 million to NTDC for carrying out O&M of the Transmission Line.
- 5.5 The Petitioner in support of its request submitted that the Converter Station is a highly complicated and technologically sophisticated facility. It also submitted that the Project Company's O&M components has to not only cover the O&M responsibilities of the Converter Station but also include the assistance to NTDC for O&M of the Transmission Line, including dedicated Special Tools and Equipment, Spare Parts, and Training of local O&M staff. These costs thus needs to be covered under the O&M cost to be approved for the Project Company.
- 5.6 The petitioner also expressed that on Dec 09, 2016, representative from CET and PMTC discussed this aspect with NTDC and PPIB jointly and they developed a consensus to seek NEPRA's approval to re-allocate the O&M cost of USD 3 Million annually from O&M Local Cost of 16.78 million of NTDC, to the Project Company for the Operation and Maintenance of Converter Station and providing material and service for Operation and Maintenance of Transmission Line. Later, NTDC vide its letter dated Mar 09, 2017 to PPIB confirmed its consent for the re-allocation of USD 3 million from NTDC to the Project Company:

"..... and considering the need of HVDC Transmission Line for evacuation of coal based Power Generation coming in the Southern part of the Country, NTDC agreed to provide



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O&M Services for the Transmission Line at US\$ 13.78 M and give the remaining amount of US\$ 3M to the Project Company for O&M of the Converter Stations".

5.7 The Petitioner also submitted that based on the above agreed arrangement, the Petitioner had accepted the referred tariff dated May 04, 2017. However, the Project Company and NTDC has to seek NEPRA's approval for the same. The petitioner also justified that current request for the O&M cost reallocation will have no financial and commercial impact on the tariff determination and the Transmission tariff already approved by NEPRA. Likewise the total O&M cost as approved in the tariff determination will remain unchanged and will re-appropriate only US \$ 3 million as evidenced in the following table:

Item	Already Approved (Mln US\$)	After Reallocation (Mln US \$)
Fixed O&M Foreign	14.8	14.8
Fixed O&M PMTC Local	7.85	10.85
Fixed O&M NTDC Local	16.78	13.78
Total	39.43	39.43

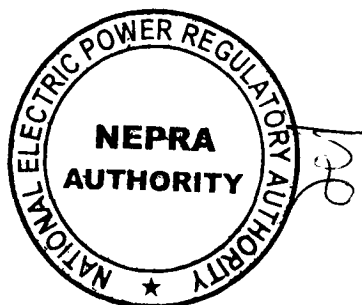
5.8 The basis and cost-components of the O&M cost to be re-appropriated provided by the Petitioner is as under:

	Item	Cost in US\$ Million	
a.	132 KV Power Supply	Initial Cost	2.07
		Electricity Charges	31.23
b.	Water Treatment	Initial Investment	0.54
		Cost during O&M period	1.26
c.	Major Overhaul of transmission line		30.50
d.	Insulation Study		3.75
e.	Spare Parts for Relay Station		3.66
f.	Spare parts for Ground Electrode		7.03
	Total		80.18
	Annual Cost	Divided over 25 years	3.207
		Rounded-off p.a	3

a) 132kV Power Supply

The Petitioner has submitted that the power supply for equipment debugging and adjusting, testing, commissioning and O&M Staff accommodation for overhaul period of the Converter Stations during which the HVDC line and 500kV HVAC grid will be disconnected, requiring 8000kW of power supply. The project company also considers that, in case the NTDC's 500kV HVAC line shuts down, another reliable power supply from 132kV Distribution Grid (DISCOs) will also be required. Based on request of the Project Company, LESCO and HESCO issued Demand Notice to the NTDC for provision of 132kV Power Supply to Project Company both at Lahore Converter Station and Matiari Converter Station respectively. The initial construction costs as submitted by HESCO and LESCO includes Sharing Cost, Security Deposit, Fixed Charges, Variable Charges and Surcharges. The initial costs for this 132kV power supply is summarized as below:

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	Item	Cost
*LESCO (in PKR)	Capital Cost	25,410,561.00
	Security Deposit	21,920,000.00
	Sharing Cost	49,248,000.00
HESCO (in PKR)	Capital Cost	48,400,000.00
	Security Deposit	21,920,000.00
	Sharing Cost	49,248,000.00
Total (in PKR)		216,146,561.00
Land Acquisition and ROW for Lahore Converter Station	As per NTDC Estimation	12,000,000.00
Total (in USD)	USD 1 = PKR 104.4	2,070,369.36

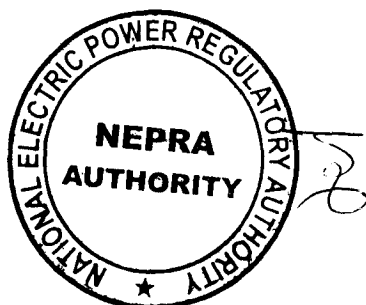
*Based on HESCO demand notice in absence of any demand notice from LESCO.

The price of the Charges of 132kV power supply stipulated in the Demand Notice is as below:

132 kV Electricity Cost for Overhaul (LESCO)		
Item	Description	Total
Energy capacity required	8000 KW/for each Converter Station	
Unit price (for Commercial use)	Variable charges=11.70 Rs/ Kwh Fixed charges=360 Rs/KW/M Surcharge=2.50 Rs/KW/M	According to LESCO tariff C-3 as per LESCO Demand Notice
10 days (Annual Overhaul)	24 hrs×10 days	240 hrs
Fixed charges	360 Rs/kW/M	
Variable charges	11.70 Rs/ Kwh	
Surcharge charges	2.50 Rs/KW/M	

The Calculations of Annual Electricity Charges are as follow:

Item	Calculation	Result
Energy capacity required	8000 KW/for each Converter Station	
Unit price (for Commercial use)	Variable charges=11.70 Rs./ Kwh Fixed charges=360 Rs./KW/M Surcharge=2.50 Rs./KW/M	
Step 1		
Monthly Fixed charges	360 Rs./kW/M×8000KW	Rs. 2,880,000/M
Step 2		





Variable charges during Overhaul	(11.7Rs/KWh+2.50 Rs./KW/M)×240hr×8000KW	Rs. 27,263,200/KW/M
Step 3		
Annual Fixed Charges	360Rs./KW/M×8000kW×12 M	Rs. 34,560,000
Step 4		
Annual Electricity Cost of 132kV (for 1 Converter Station)	Pakistani Rupees (Step 2 + Step 3)	Rs. 61,823,200
	US Dollar (1 USD= 104.4 PKR)	USD 592,176

In view of above, the summarize cost of 132 KV power supply claimed to be re-appropriated;

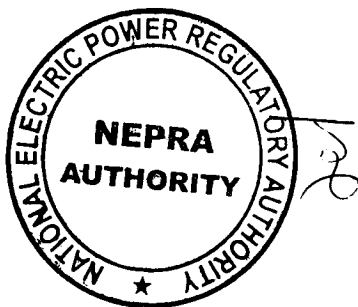
#	Annual 132 kV Electricity charge	Total (USD)
1.	LESCO/per year	592,176
2.	HESCO/per year	592,176
3.	Total Annual Electricity Charge (LESCO + HESCO)	1,184,352
4.	Total Electricity Charges (for 25 years)	29,608,800
5.	Initial Cost (As per Demand Notices)	2,070,369
6.	Land Acquisition and ROW Cost for Lahore site (to be done by NTDC as per Minutes) (PKR 12 Million) (Exch Rate; 1US\$=Rs. 104.4)	114,942
	Grand Total (Item 4+5+6)	31,794,111

b) Water treatment

The petitioner submitted that the water treatment will take place by sand filtration, activated carbon filtration equipment and nano-filtration process to remove the excess elements, then further processed by dosing of chemicals, sedimentation filtration, depth filtration and UV disinfection for the water to meet the standards as applicable worldwide through the World Health Organization (WHO) Guidelines 2011.

According to the Petitioner, for two Converter Stations, the initial investment of equipment is approximately USD 546,098 as summarized below:

Description	Specification	Qty for Matiari	Unit Rate (USD)	Qty for Lahore	Unit Rate (USD)	Total Price (USD)
Quartz sand filter	Q40m3/h	2	53,272	2	53,272	213,088
Activated carbon filters	Q40m3/h	2	53,272	2	56,123	218,791
Nano-filtration Water Treatment Plan	15T/h	2	15,873	2	15,873	63,492
Chlorine dioxide generator	100g/h	1	5,327	0		5,327
ultraviolet sterilizer	Q25m3/h	1	5,327	1	5,612	10,940



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Gate valve	DN150, P=1.0MPa	8	266	8	281	4,376
Online Instrumentation		1	2,664	1	2,806	5,470
Steel wire reinforced thermoplastics (PE) composite pipe	Φ160x9, 1.6MPa	300	40	300	42	24,614
Grand Total (US \$)						546,098

The Petitioner has also submitted the annual operation and maintenance cost for two water treatment plant as under:

Consumables	Quantity	Price (In USD)	Annual Cost (in USD)
PH Adjustment Agent	2 Lot	12,113	24,226
Quartz sand (Change every 5 years)	3000 kg	275	55
Nano Filtration Membrane	2 Lot	13,254.5	26,509
Total			50,790
Grand Total for 25 years			1,269,750

c) **Major Overhaul**

The Petitioner has submitted that, a major overhaul of the Transmission Line is mandatory prior to 15th year after COD, which include change of all the composite insulators considering that composite insulator has a life expectancy of 15 years. It was also submitted that earlier overhaul was in NTDC's scope of work, during the course of finalization of the O&M Agreement, both parties agreed that the Project Company will perform such overhaul as it requires the experience for HVDC Transmission Line to complete the overhaul work of entire Transmission Line within 30 days for which NTDC considered itself being incapable of doing so, particularly to ensure the required availability of the Transmission line.

The Petitioner also submitted that as per the latest design, 665 km of HVDC lines is located in highly polluted area, and remaining 221 km is in middle-level pollution area close to Lahore side. According to this latest design (subject to change as per actual line route), the number of HVDC towers has been increased to 1,998 from originally planned tower number of 1,977 in the Feasibility Study.

It was also submitted that all the composited insulators have a life span upto 15 years, after which they have to be replaced within 30 days of the overhaul period. As a result, it is anticipated that 10,463 sets of composited insulators will need to be installed on 1,728 suspension towers. At least 50 teams of engineers and skilled labor with HVDC overhaul experience and 50 sets of equipment and machinery will be required to carry out the work along the line simultaneously. Besides replacement of composite insulators, the teams will also carry out inspections of the condition of the entire transmission line and necessary maintenance work for conductor, OPOGW, tower



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hardware, porcelain/ glass insulator, tower and grounding material, to ensure the stable operation of the line in the future.

Estimated costs submitted by Petitioner to carry out major overhaul listed below are based on current prices:

No	Items	Estimated Cost (US\$)
i.	Materials	5.996
ii.	Total Equipment and Machinery	5.722
iii.	Others	13.209
iv.	Tax	5.573
	Total	30.50

d) Insulation Study

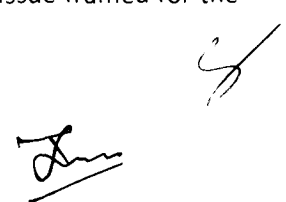
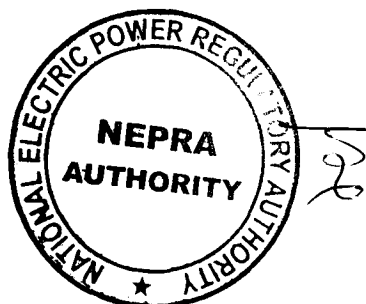
The Petitioner submitted that composite insulators had been widely used in China both in HVAC system and HVDC system, excellent performance had been achieved in the past 20 years. In order to achieve high performance and lower the initial capital costs, the Project Company will also use composite insulator in Pakistan, due to the reason that the composite insulator is suitable for high pollution environment but whether suitable for such high temperature and high ultra-violet in Pakistan is still not clear since no detailed study had been performed on the use of composite insulators in Pakistan. The Petitioner further submitted insulation study on the insulator shall be done continuously to monitor the status of insulator on transmission line to avoid failure of insulators which may lead to serious problem on the HVDC system. The aging test of the Study will require replacement of 3-5 insulator strings (USD 397/string) every 100 km for each year. The cost of Insulation Study is USD 150,000 per year. Total cost during O&M period will be USD 3,750,000. The costs will include the replacement of composite insulator, installation of new composite insulators and testing of the insulators and the logistics costs.

e) Spare Parts of Relay Station and Ground Electrodes

According to the Petitioner, spare parts of the relay station will also have to be provided by the Project Company as they are of the same nature of the transmission line spare parts which NTDC finds difficult to acquire as per the technical specification of the project. The estimated cost of supplying spare parts for relay station during the O&M period is USD 3.66 million and USD 7.034 million for the ground electrodes.

6. Hearing

6.1 In terms of Rule 9 (1) of the Tariff Rules – 1998, the Authority decided to conduct hearing and provide opportunity of hearing to the Petitioner. In compliance with the provisions of Rules 4(5)(6) and 5, notices of admission and hearing were sent to the parties i.e. NTDC, PPIB, CPPA-G, Ministry of Energy, Ministry of Finance. Likewise notices were also sent to the two interveners of the initial tariff proceedings of the project, which include Anwar Kamal Law Associates and Lucky Electric Power Company Limited. On the basis of submissions of the Petitioner, the issue framed for the Petitioner to respond in the hearing was:



“Whether the re-allocation of O&M cost from NTDC local to O&M PMTC local for upto US\$ 3 million annually as mutually agreed by the NTDC and project Company is justified?”

- 6.2 Hearing in the matter was held on Feb 08, 2018 which was attended by senior officials from NTDC, PPIB and PMTC including the MD –NTDC and CEO-PMTC and their respective teams.
- 6.3 Since Private Power Infrastructure Board (PPIB) being the one window facilitator had earlier submitted the original tariff petition for this project, therefore the views were sought vide letter dated Feb 02, 2018. In the hearing also, on query from the Authority, the representative of PPIB gave its consent and later through their response have submitted that:

“PPIB supports NTDC’s recommendations of re-allocation of O&M cost from NTDC local to O&M PMTC local for upto USD 3 million annually to the project company without change in the overall tariff of the project. This may help to achieve successful and timely completion of the HVDC transmission line project in order to avoid any potential loss to NTDC / CPPA-G due to the delay in commissioning”

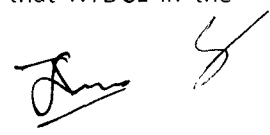
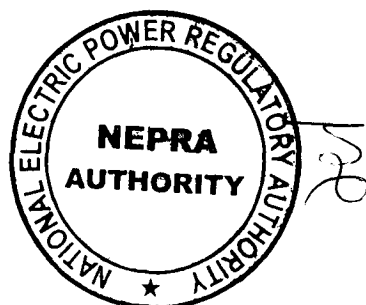
- 6.4 Likewise the Authority also sought views from National Transmission & Despatch Company Limited (NTDCL) through letter dated Feb 02, 2018. NTDCL during the hearing expressed that they support the re-allocation from NTDCL local component for Operation and Maintenance to the Project Company. The same was also confirmed by their letter dated Feb 09, 2018, which reads as under:

“NTDCL supports the modification in decision dated May 04, 2017 & original decision dated Nov 24, 2016 and also agrees for the re-allocation of US\$ 3 million in O&M local component as proposed by PMTC under Rule 3 of the NEPRA (Tariff Standards & Procedures) Rule – 1998 for modification of the tariff determination dated May 04, 2017 in the matter of Matiari-Lahore 4,000 MW, ±660 kv HVDC transmission line project by PMTC.”

- 6.5 The Petitioner in support of the tariff modification has also confirmed that the Project Company and NTDCL have agreed that the defects due to design, manufacture and the installation for the Transmission Line shall be the responsibility of the Project Company and the penalty for un-availability due to such kind of the defects shall also be the responsibility of the Project Company. Whereas NTDCL has also carried out the cost estimation and as per their estimations this re-allocation of US\$ 3 million annually from this allocated amount won’t jeopardize their ability to perform their obligations for this HVDC transmission line.

7. Decision

- 7.1 The instant request has been examined in light of the earlier petition of PPIB, submissions of the PMTC, comments of NTDCL and related available documents. The Authority observed that in the instant tariff modification request certain Project related costs allocations have been claimed by the petitioner which it has submitted, were not envisaged earlier during the course of tariff setting process for the HVDC transmission line tariff. The Authority also noticed that NTDCL in the

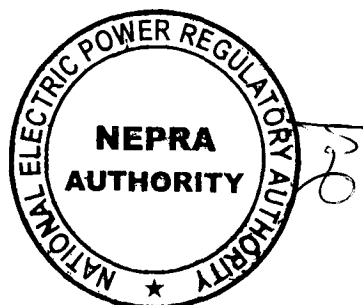
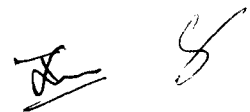


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subsequent meeting with the PMTC agreed to share from its local component for the additional costs which were not sought from the Authority at the time of tariff determinations.

- 7.2 The Authority observed that NTDC was allowed US\$ 16.78 million for operation and maintenance under local component. Later the two main stakeholders responsible for this HVDC transmission line i.e. PMTC, and NTDC, on mutual understanding in a joint meeting attending PPIB also, agreed that US\$ 3 Million will be re-allocated from NTDC's O&M component to Project Company's local component. The Authority also noted that there are certain capital expenditures to be incurred which have been claimed to be expensed out as 1/25th of initial cost in each year under the O&M scope of this tariff modification.
- 7.3 The Authority further noticed that the a major justification given by the Petitioner for the tariff modification is that the reallocation of US\$ 3 million will not change the overall O&M amount already determined by the Authority and resultantly will have no impact on overall transmission tariff approved for this HVDC Transmission Line project. The Authority also considered that additional work i.e. water treatment plant, 132 kV line, major overhaul, insulation study etc. not earlier envisaged in the original petition have now been addressed by both the relevant organizations through change in certain scope of work from one local component to another local component, with no increase in overall tariff. The Authority also gave due consideration to the fact that NTDC has confirmed that such re-allocation will not impact their ability to perform their obligations for this transmission line. Likewise, it has also been justified in this tariff modification request that Project Company will be responsible for any defects due to design, manufacture and installation.
- 7.4 The Authority also observed that there is no exchange rate implication for this tariff modification since change of equal amount is from a local component to another local component within the overall head of annual O&M cost already allowed. Through this arrangement both PMTC and NTDC aim to address the operational and maintenance functions for this first HVDC transmission line of the Country. Accordingly, the Authority has decided to allow re-allocation of US\$ 3 million from NTDC local component to PMTC local component.
- 7.5 In addition to that, consistent with earlier decision for this Project and also pursuant to PPIB Letter No. (618)PPIB/TLP/16/FIN-O47702 dated Nov 01, 2016 wherein it was committed as under;

"During 1-5th year main employees in converter stations shall be skilled Chinese, and will be accompanied with a few number of Pakistan apprentices to assist. Before the overhaul in the 15th year, the proportion of Chinese Engineers will be decreasing, while that of Pakistani Chinese Engineers will be increasing. However, as the overhaul is very important, the number of Chinese Engineers shall not reduce excessively, while the number of skilled Pakistani will already be increased significantly. After the overhaul in the 15th year, there are only a few Chinese Engineers (we estimate 10-12 persons) for each station to supervise the O&M work during the 16-20th year, and the local employees would work on O&M for converter station independently during the 21-25th year."



7.6 The Authority therefore while allowing this re-appropriation of O&M cost from NTDC to PMTC has also directed the Petitioner that maximum amount under the claimed major overhauling cost should be utilized towards engaging local resources.

7.7 The summary of the O&M cost and tariff already allowed with comparison of re-allocated cost and tariff is as under;

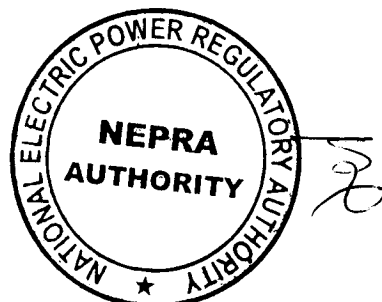
Description	Amount Already Approved	Amount After Reallocation
	US \$ Mln	US \$ Mln
O&M Foreign	14.8	14.8
O&M Local		
• PMTC Local	7.85	10.85
• Fixed O&M NTDC Local	16.78	13.78
• Land Lease	2.46	2.46
Total	41.90	41.90

Description	Tariff	Tariff	Difference
	Rs. /Kw/h	Rs. /Kw/h	Rs. /Kw/h
Fixed O&M Foreign	0.0441	0.0441	-
O&M Local			
• PMTC Local	0.0234	0.0323	0.0089
• NTDC Local	0.0500	0.0411	(0.0089)
• Land Lease	0.0073	0.0073	-
Total			-

7.8 The Authority also considered that in original tariff determination dated Aug 18, 2016 and Decision on the Review Motion dated Nov 24, 2016, it was mentioned that the Special Purpose Transmission Company (SPTC), upon issuance of Letter of Intent (Lo1) / Letter of Support (LOS) by the relevant agency, will approach NEPRA for the grant of Special Purpose Transmission License (SPTL) along with a request for the acceptance of aforementioned tariff. Accordingly PMTC was issued LOI on 31st March 2017 by PPIB. The Transmission tariff was accepted by the Petitioner and Special Purpose Transmission License was granted on May 04, 2017 and Feb 19, 2018 respectively. Since the petitioner has accepted the already determined tariff in the decision of the Authority dated Nov 24, 2016, therefore, the same also needs to be modified along with the decision dated May 04, 2017. The decision with respect to modification of the aforesaid original decision dated 24-11-2016 will be issued separately. The relevant parties are directed to complete their O&M related contractual requirements on the mutually agreed terms, not in contradiction to the tariff approved by the Authority for this HVDC transmission line project.

8. ORDER

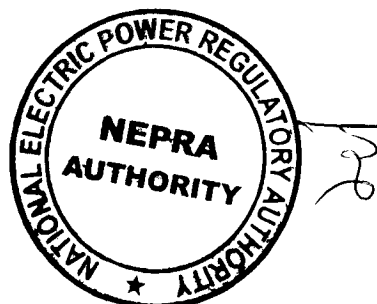
In accordance with the provision of Section 7 read with Section 31(4) of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997, the Authority hereby modifies the approved reference Transmission Tariff/Transmission Service Charge (TSC) vide




decision dated May 04-2017 in the matter of Tariff Petition filed by the Pak Matiari Lahore Transmission Company Limited (PMTc) for ± 660kv 4000 MW HVDC Matiari-Lahore Transmission Line Project and PMTC is allowed to charge the following revised reference tariff;

Tariff Components	Year 1-10 Rs/kW/h	Year 11-25 Rs/kW/h	Indexation
O&M-PMTC			
Foreign	0.0441	0.0441	PKR/US\$, US CPI
Local	0.0323	0.0323	CPI – General
NTDCL-O & M Local	0.0411	0.0411	CPI – General
Land Lease	0.0073	0.0073	As per actual
Insurance	0.0410	0.0410	Annually as per actual up to 1% of EPC Cost, PKR/US\$
Sinosure Fee	As per Annex-I		As per actual upto 0.60% of the (outstanding debt at the start of the year plus expected interest payment during the year)
Debt Service	0.5239	-	LIBOR, PKR/US\$
Return on Equity	0.1684	0.1860	PKR/US\$
Return on Equity during construction	0.0388	0.0388	PKR/US\$

- i. The reference TSC is based on 98.5% availability with 1.5% annual non-penalized maintenance outages.
- ii. The reference PKR/Dollar rate has been assumed at Rs. 104.40
- iii. The above Tariff is applicable to the PMTC as per the LOS by PPIB and as per the acceptance by the Project Company for a period of twenty (25) years commencing from the date of the COD.
- iv. Sinosure Fee on outstanding balance of Debt and interest at gross rate of 0.60% has been allowed for each applicable year as indicated in the reference tariff table attached herewith as Annex-II.
- v. The Tariff is calculated on the basis of Build Own Operate and Transfer (BOOT) basis. The Project will be transferred to NTDCL upon the expiry of the term of the TSA signed between NTDCL and Project Company (PMTc).
- vi. All invoicing and payment terms are assumed to be in accordance with the TSA which will be signed between NTDCL and PMTC not inconsistent with the instant determination.
- vii. Redemption of equity has been allowed after 10 years of commercial operations of the Transmission Line.
- viii. The payment will be made to PMTC in Pak Rupee as per the below mentioned formula:
Payment= Capacity *No of hours in a year*Rate in Rs/kW/hr
Where;





Capacity= The contracted capacity as agreed in TSA
No of hours in a year=8,760

- ix. The impact of actual losses upto 4.3% shall be allowed on the basis of units transmitted.
- x. The Project Company should maximize engaging of local resources for the project.
- xi. The component wise tariff is indicated at Annex-I.
- xii. Debt Servicing Schedule is attached as Annex-II.

The following indexations shall be applicable to the reference tariff;

I. **One Time Adjustments**

- a) The transmission line cost components will be adjusted at the time of COD, the rates/price is fixed for every component whereas the actual quantities verified by NTDC/Independent Engineer/Owner's Engineer will be considered for COD adjustment as per the mechanism given below;

i) **Tower Material Cost:**

Type of Tower	Height of Tower	Weight of Tower (Ton)	No of Towers	Total weight of tower (ton)	US \$/ Ton	Total Tower Material Cost
1	2	3	4	5=2*3*4	6	7=5*6
Basis of Adjustment at COD						
ZP1,ZP2,ZPT,JP 1,JP2,JP3 and Electrode Line Tower	As per actual	As per actual	As per actual	To be Calculated	(Fixed) 1,050	To be Calculated

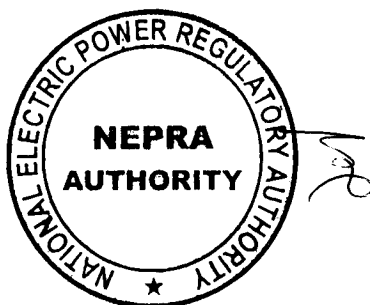
ii) **Conductor Cost:**

Type of Conductor	Length (km)	Weight of Conductor (Ton/km)	Total Weight/Ton	USD per Ton	Conductor Cost
1	2	3	4=2*3	5	6=5*4
ACSR 1250 conductor JL1/G3A-1250/70, ACSR 630 Conductor JNRLH1/G1A-630/45, Ground Wire GJ-80 & AAAC Conductor JL1/LHA1-800/550	As per actual	As per actual	To be Calculated	(Fixed) 2,600 for ACSR & ground wire, 3,050 for AAAC	To be Calculated

iii) **Civil Works:**

Tower Type	Average volume of tower foundation (m ³)	Quantity of tower	Total volume (m ³ of tower foundation)	US \$/ m ³	Conductor Cost

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1	2	3	4=2*3	5	6=4*5
ZP1,ZP2,ZPT,JP1,JP2,JP3 and Electrode Line Tower	As per actual	As per actual	To be calculated	Fixed 440	To be calculated

iv) **Tower Erection:**

Type of Tower	Weight of Tower (Ton)	No of Towers	Total weight of tower (ton)	US \$/ Ton	Total Tower Material Cost
1	2	3	4=2*3	5	6=4*5
ZP1,ZP2,ZPT,JP1,JP2,JP3 and Electrode Line Tower	As per Actual	As per Actual	To be Calculated	Fixed 220	To be Calculated

v) **Stringing Cost:**

Length of line	US \$/ Km	Total Tower Material Cost
1	2	3=1*2
As per Actual	Fixed 20,000	To be Calculated

vi) **Insulator Cost:**

Type of insulator	Quantity	Per Unit Cost (USD)	Total Cost (USD)
HVDC T/Lines	1	2	3=1*2
Composite Insulators (Set)	As per actual	(Fixed) 397	To be Calculated
Porcelain Insulators (Piece)		(Fixed) 70	
Electrode T/Lines			
Porcelain Insulators (Piece)		(Fixed) 70	

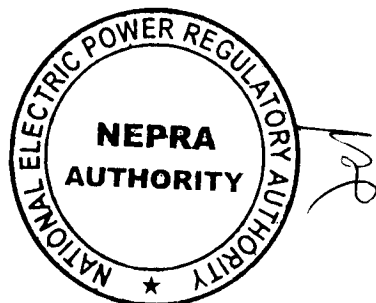
Note:

The above required actual data for COD adjustment must be verified by Independent Engineer/Owner Engineer to be appointed by NTDC, for techno-economic optimized design.

vii) **Total Transmission Line Cost:**

The total transmission line cost will be work out at COD as tabulated;

Sr.No	Description	Price US \$
i.	Tower Material	To be adjusted as per actual quantities
ii.	Conductor	
iii.	Foundation	
iv.	Tower Erection	
v.	Stringing	
vi.	Insulator	
vii.	OPGW	5.47 % of conductor cost
viii.	Hardware	15.41 % of tower material cost

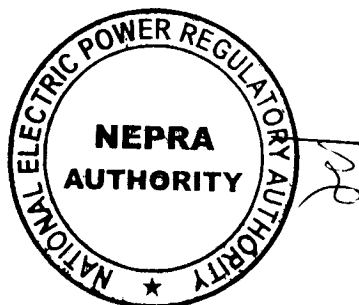


ix.	Grounding Material	2.16 % of tower material cost
x.	Relay Station	US \$ 3,663,217 (Fixed)
xi.	OPGW connection	US \$ 301,471 (Fixed)
xii.	Total equipment and machinery cost	*****
xiii.	Spare Parts (warranty Period)	1.42% total equipment and machinery cost
xiv.	Design and Engineering	3.65% total equipment and machinery cost
xv.	Mobilization	8.10% total equipment and machinery cost
xvi.	Transportation and custom clearance	5.85% total equipment and machinery cost
xvii.	Project Management Cost	1.79% total equipment and machinery cost
xviii.	Supervision for construction and installation	1.73% total equipment and machinery cost

Sr.No	Description	Price US \$
xix.	Security Coverage Cost	US \$ 9,895,358 (Fixed), cost for deployment of security forces including rangers will be allowed as per actual, subject to submission of documentary evidences to the satisfaction of the Authority at the time of COD

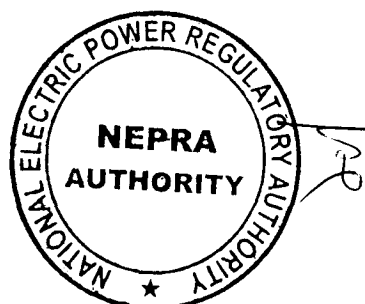
Note:

- o The above required actual data for COD adjustment must be verified by Independent Engineer/Owner Engineer to be appointed by NTDC, for techno-economic optimized design;
 - o All the cost components of transmission line as mentioned above will be adjusted at COD on the basis of verifiable documentary evidence (verified by the Independent engineer / owner's engineer and duly endorsed by the NTDC) to the satisfaction of the Authority subject to maximum limits as mentioned in the table above.
- b) Duties and/or taxes, not being of refundable nature, directly imposed on PMTC up to the commencement of its commercial operations for the import of its machinery and equipment for the construction of converter station and transmission line will be subject to adjustment at actual on COD, upon production of verifiable documentary evidence to the satisfaction of the Authority.
- c) Actual amount withheld from contractors as per applicable laws and regulations will be allowed as part of the project cost at the time of COD on the basis of verifiable documentary evidence.
- d) Security cost in addition to already allowed amount for this project will be allowed as per actual, subject to the submission of the documentary evidence to the satisfaction of the Authority at the time of COD justifying the need as confirmed by the relevant Authority / Agencies.
- e) NTDC development cost which includes right of way compensation, land lease cost and cost of site survey, load flow studies and environmental studies will be adjusted on the basis of actual up to maximum limit of US \$ 12 Million as allowed by the Authority on verifiable documentary

evidence at COD. The cost specific to this project will not be admissible to be claimed by NTDC in any other tariff petition submitted to the Authority.

- f) Insurance during construction will be adjusted as per actual, subject to maximum limit of 1% of the adjusted and approved EPC cost, on production of authentic documentary evidence at the time of COD tariff adjustment.
- g) Financial charges will be adjusted at COD on the basis of actual, up to a maximum of 3% of the total debt allowed (excluding the impact of interest during construction, Sinosure fees and financial charges), on production of authentic documentary evidence.
- h) Sinosure Fee, applicable on debt and accrued interest thereon (IDC) during the project construction period will be adjusted at COD on the basis of actual subject to the maximum allowed limit and payments terms as approved by the Authority, on account of variation in PKR/US\$ exchange rate during the project construction period, based on documentary evidence to be provided by PMTC.
- i) If PMTC is required to make payment of Withholding Tax on Overseas Investment Insurance Fee (Sinosure Fee) on interest part of debt during the project construction period of 2 years 3 months and debt repayment period of ten years after COD, the same shall be allowed as pass through cost in tariff based on actual upon production of verifiable documentary evidence to be provided by PMTC.
- j) For Overseas Investment Insurance Fee (Sinosure Fee), reference component of tariff for each year expressed in Rs./kWh as indicated in the reference tariff table at Annex-II will be adjusted on the basis of variation in PKR/US\$ exchange rate variation subject to maximum rate of 0.60% per annum and terms of payment as approved by the Authority at COD. Reference Sinosure component of tariff for each year will be revised accordingly.
- k) The cost of feasibility study will be allowed up to maximum of US\$ 5.4 Million subject to timely submission of studies to NTDC for endorsement of cost and relevance of studies. In addition, the evidence of payments made to the Institute carrying out the feasibility study will have to be also provided for verification at the time of COD.
- l) Interest during Construction (IDC) will be adjusted at COD on the basis of actual debt composition, variation in PKR/US\$, debt drawdown (not exceeding the amount allowed by the Authority) and applicable 6-months LIBOR/KIBOR during the project construction period allowed by the Authority.
- m) Principal repayment and the cost of debt will be adjusted at COD as per the actual borrowing composition and variation in LIBOR/ KIBOR at relevant dates during the project construction period
- n) In case, the spread on LIBOR/KIBOR is agreed at lower than 450/300 basis points, the benefit of such reduction in rate will be adjusted in proportion of 40% to PMTC and 60% to the consumer through necessary adjustment in tariff at COD.



- o) Return on Equity (ROE) and Return on Equity During Construction (ROEDC) will be adjusted at COD on the basis of actual equity injections and PKR/US\$ exchange rate variation (within the overall equity allowed by the Authority at COD) during the project construction period as allowed by the Authority.
- p) The specific items of project cost paid in foreign currency (i.e. US\$) will be adjusted at COD on account of actual variation in exchange rate over the reference PKR/US\$ exchange rate of Rs. 104.40 on production of verifiable documentary evidence to the satisfaction of the Authority.
- q) The reference tariff table shall be revised at COD while taking into account the above adjustments. The PMTC shall submit its request to the Authority within 90 days of COD for necessary adjustments in tariff.

II. **Pass-Through Items**

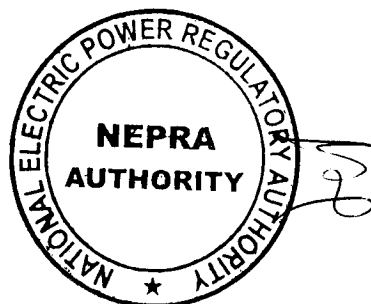
- a. No provision for Income Tax has been accounted for in the tariff. If PMTC is obligated to pay any tax in relation to its transmission business, the exact amount paid by PMTC may be reimbursed by the NTDC to PMTC on production of original receipts. This payment may be considered as pass-through payment (as Rs./kWh) spread over a 12 months period in addition to fixed charges proposed in the Reference Tariff. Furthermore, in such a scenario, PMTC may also submit to the NTDC details of any tax shield savings and the NTDC will deduct the amount of these savings from its payment to the Petitioner on account of taxation.
- b. If PMTC is required to make payment of Withholding Tax on Sinosure Fee and Debt Servicing component of tariff, the same shall be treated as Pass Through cost of PMTC.
- c. Sales Tax, Excise Duty or other Duty, Levy, Charge, Surcharge or Other Impositions applicable on the PMTC (whether federal or provincial) not considered in the Tariff will be Pass-Through under the TSA.
- d. No provision for the payment of Workers Welfare Fund and Workers Profit Participation has been made in the tariff. In case, the PMTC has to pay any such fund, that will be treated as pass through item in the TSA.

III. **Indexations:**

The following indexation shall be applicable to the reference tariff;

i. **Indexation applicable to O&M**

The local part of PMTC-O&M cost and NTDC O & M will be adjusted on account of Inflation (CPI) and PMTC-O&M foreign will be adjusted on account of variation in Rupee/Dollar exchange rate and US CPI. Quarterly Adjustment for local inflation, foreign inflation and exchange rate variation will be made on 1st July, 1st October, 1st January & 1st April respectively on the basis of latest available information with respect to CPI - General (notified by the Pakistan Bureau of Statistics), US CPI (notified by US bureau of

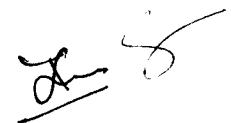
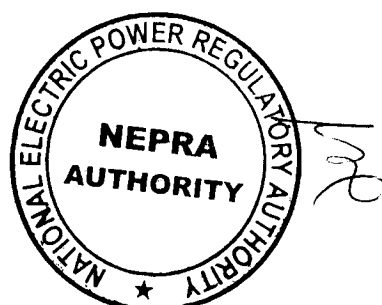


labor statistics) and revised TT & OD Selling rate of US Dollar as notified by the National Bank of Pakistan. The mode of indexation will be as follows:

$$\begin{aligned}
 \text{F-O\&M-PMTC}_{(FREV)} &= \text{F-O\&M-PMTC}_{(FREF)} * \text{US CPI}_{(REV)} / \text{US CPI}_{(REF)} * \text{ER}_{(REV)} / \text{ER}_{(REF)} \\
 \text{F-O\&M-PMTC}_{(LREV)} &= \text{F-O\&M-PMTC}_{(LREF)} * \text{CPI - G}_{(REV)} / \text{CPI - G}_{(REF)} \\
 \text{F-O \& M-NTDCL}_{(LREV)} &= \text{F-O\&M-NTDCL}_{(LREF)} * \text{CPI - G}_{(REV)} / \text{CPI - G}_{(REF)}
 \end{aligned}$$

Where:

- F-O&M-PMTC_(FREV) = The revised applicable Fixed O&M foreign component of the fixed charges of Independent Transmission Company indexed with US CPI and US \$/PKR fluctuation. CPI – General
- F-O&M-PMTC_(LREV) = The revised applicable Fixed O&M Local component of the fixed charges of Independent Transmission Company indexed with CPI - General
- F-O & M-NTDCL_(LREV) = The revised applicable Fixed O&M Local component of the fixed charges of NTDCL indexed with CPI – General
- F-O&M-PMTC_(FREF) = The reference Fixed O&M foreign component of the fixed charges of Independent Transmission Company for the relevant period
- F-O&M-PMTC_(LREF) = The reference Fixed O&M local component of the fixed charges of Independent Transmission Company for the relevant period
- F-O & M-NTDCL_(LREV) = The reference Fixed O&M local component of the fixed charges for NTDCL for the relevant period
- CPI - G_(REV) = The Revised Consumer Price Index (General)
- CPI - G_(REF) = 207.30, Reference Consumer Price Index (General) of June, 2016 as notified by the Pakistan Bureau of Statistics
- US CPI_(REV) = The Revised US Consumer Price Index (All Urban Consumers) notified by US Bureau of Labor Statistics.
- US CPI_(REF) = 241.38, Reference US CPI notified by the Bureau of Labor Statistics (All Urban Consumers) for the month of June, 2016.
- ER_(REV) = The Revised TT & OD selling rate of US dollar as notified by the National Bank of Pakistan
- ER_(REF) = 104.4 The reference TT & OD selling rate of US dollar as notified by the National Bank of Pakistan

ii. Adjustment for LIBOR variation

The interest part of fixed charge component will remain unchanged throughout the term except for the adjustment due to exchange rate variation and variation in 6- month LIBOR, while spread on LIBOR (4.50%) remaining the same, according to the following formula

$$\Delta I = P_{(REV)} * (LIBOR_{(REV)} - 1.1442\%) / 2$$

Where:

ΔI = The variation in interest charges applicable corresponding to variation in 6-month LIBOR. ΔI can be positive or negative depending upon whether $LIBOR_{(REV)} >$ or $<$ 1.1442%. The interest payment obligation will be enhanced or reduced to the extent of ΔI for each period under adjustment applicable on bi-annual basis.

$P_{(REV)}$ = 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 dates.

Note:

Foreign debt and its interest shall be adjusted on account of actual variation in PKR/US\$ over the applicable reference PKR/US\$ exchange rate on bi-annual basis.

iii. Sino-sure:

In case of Overseas Investment Insurance Policy, PMTC will be allowed annual indexation in the reference tariff component of sinosure fee based on the submission of documentary evidences upto the allowed limit (0.60% of the outstanding debt plus interest payment during the year). Further, the tariff component of Sinosure Fee will also be adjusted on account of variation in PKR/US\$ exchange rate variation on annual basis.

iv. Return on Equity and Return on Equity During Construction

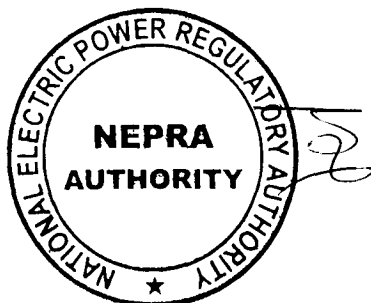
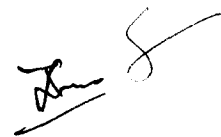
The Return on Equity (ROE) and Return on Equity during Construction (ROEDC) components of tariff will be adjusted for variation in PKR/US\$ exchange rate on the basis of revised TT & OD selling rate of US Dollar notified by the National Bank of Pakistan according to the following formula;

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

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

Where:

$ROE_{(REV)}$ = The revised ROE component of the tariff expressed in Rs/kWh



$ROE_{(REF)}$	=	The reference ROE component of the tariff expressed in Rs/kWh
$ROEDC_{(REV)}$	=	The revised ROEDC component of the tariff expressed in Rs/kWh
$ROEDC_{(REF)}$	=	The reference ROEDC component of the tariff expressed in Rs/kWh
$ER_{(REV)}$	=	The revised US\$/PKR exchange rate as notified by the National Bank of Pakistan
$ER_{(REF)}$	=	The reference exchange rate of PKR 104.4=1 US\$

v. **Insurance:**

Insurance cost component of tariff, in case insurance is denominated in foreign currency, will be adjusted on account of PKR/US\$ exchange rate variation at COD and thereafter on an annual basis at actual subject to the maximum of 1% of the EPC cost on production of verifiable documentary evidence by PMTC, according to the following formula:

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

Where:

$Ins_{(REV)}$	=	Revised Insurance cost component of tariff adjusted with the exchange rate variation (PKR/US\$)
$ER_{(REV)}$	=	The revised US\$/PKR exchange rate as notified by the National Bank of Pakistan
$ER_{(REF)}$	=	The reference exchange rate of PKR 104.4=1 US\$

vi. **Land Lease:**

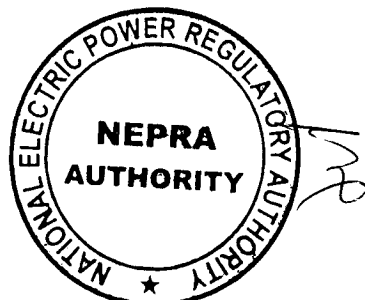
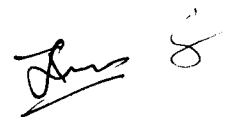
Land Lease component of tariff will be adjusted on annual basis on production of verifiable documentary evidence by PMTC.

IV. Adjustment on account of inflation, US CPI, foreign exchange rate variation and LIBOR variation 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.

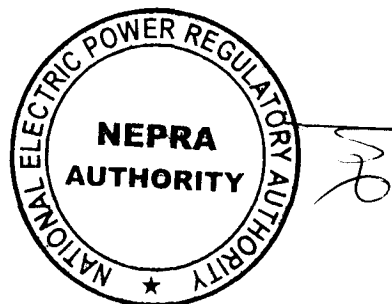
V. **Directions to the Petitioner and NTDC**

The Authority directed following aspects to be addressed by Petitioner and NTDC:

- i. Since it is the first HVDC project of the Country, it needs to be ensured that there is a reliable and robust power transmission corridor fully integrated with the power generation projects at the sending end and fully capable of receiving at the Lahore converter station. It should be ensured that generation load of 4000 MW is timely and consistently available for this

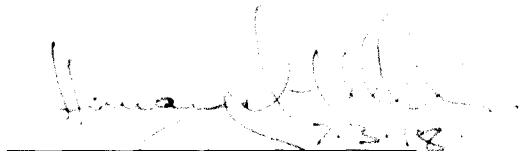


- transmission line. It is important that clear responsibilities are identified and defined in this regards.
- ii. It should be ensured by NTDCL to effectively and efficiently manage in its network the energy transmitted through this HVDC transmission line.
 - iii. Both, technical and financial capability of NTDCL should be ensured with regards to various obligations being entrusted for this HVDC transmission line.
 - iv. TSA and IA and related other legal covenants should incorporate and consider technology transfer and indigenous capacity development for this and future HVDC projects. Specifically training to NPCC to be ensured.
 - v. All required system studies should be completed by the EPC contractor and NTDCL.
 - vi. Necessary contingency planning should be carried out for this HVDC Transmission Line as it has envisaged significant energy transmission from South to load centers.
 - vii. Compliance should be ensured with grid code and NEPRA Performance Standard (Transmission) Rules, 2005.
 - viii. PMTC and NTDCL should ensure that limits of reactive power exchange between HVDC link and AC system needs are clearly defined and duly complied.
 - ix. Minimum possible transmission line length should be ensured giving due consideration to future transmission plans, social and environment aspect. Among other benefits, it will also reduce the construction cost, land cost and associated maintenance and security costs.
 - x. NTDCL to ensure mitigation measures for reinforcement to strengthen its network after completion of detailed studies.
 - xi. The security related costs claimed as part of this Project Cost should not duplicate the amount and security measures as assured to CPEC Projects.
 - xii. The TSA should adequately cover and address transmission consideration including NTDCL role as System Operator.
 - xiii. TSA must be consistent with the provisions of this determination and the SPTL granted by NEPRA.
 - xiv. TSA should specify on bi-directional transmission based on future requirements envisaged at this stage.
 - xv. Any payment by NTDCL inconsistent to this determination will not be recognized as allowed cost in NTDCL Revenue Requirements in its tariff Petition submitted to NEPRA.
 - xvi. PMTC to meet the maximum targeted losses of 4.3% and the comprehensive mechanism in this regard for achieving these targeted losses and the penalties for failure to achieve the targeted losses must be agreed in the TSA.
 - xvii. The TSA and IA should clearly set out related terms and conditions including financial, technical and performance specifications as per international standards.
 - xviii. The PMTC/PPIB shall be required to decide clearly the responsibility structure for construction, operations, routine and related maintenance for the project as per the international standards.
 - xix. All requirements of the Pakistan Environmental and Protection Agency (PEPA) Act 1997 relating to environmental protection environmental impact and social assessment shall be required to be ensured by the Petitioner at the time of issuing LOS to the related



- entity/organization including NOCs from respective Provincial Authorities of Sindh and Punjab.
- xx. PPIB shall ensure that all technical studies which are in progress are finalized to the satisfaction of NTDCL. NTDCL shall provide a certificate to the effect that it is satisfied with the results of such studies and all concerns identified under "Adequacy of Studies" referred in tariff determination have been fully addressed.
- xxi. TSC shall be payable if the transmission line is complete and capable of transmitting 4000MW as per commitment of petitioner.
- xxii. The TSC will be due and paid whether or not any power is transmitted to the Transmission Line subject to the availability of the transmission line and the detailed mechanism to be agreed under the TSA
- xxiii. Relevant and applicable Income Tax, Sales Tax incentives and reduced duties (custom) cess etc to be ensured by PPIB to PMTC.
- xxiv. Pre-COD energy transmission is allowed on terms and conditions to be mutually agreed and mentioned in Transmission Service Agreement (TSA). The transmission service charge however should not exceed the rates as approved by the Authority in this tariff determination.
- xxv. The PPIB shall be required to decide and agree the relevant terms and duration for lock-in period for this Project and ensure necessary exemption are availed by PMTC to reduce the transmission cost of the Project.
9. The order along with, reference tariff table and debt servicing 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.

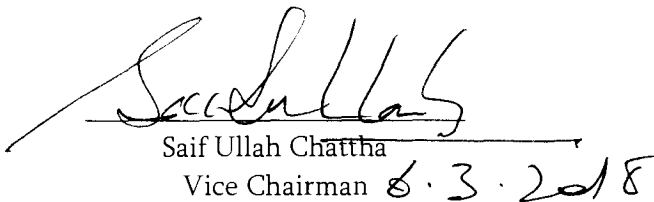
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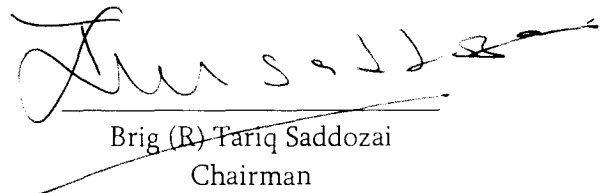
Himayat Ullah Khan
Member



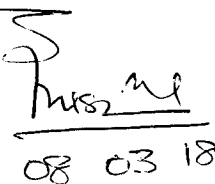
Syed Masood-ul-Hassan Naqvi
Member



Saif Ullah Chattha
Vice Chairman 6.3.2018



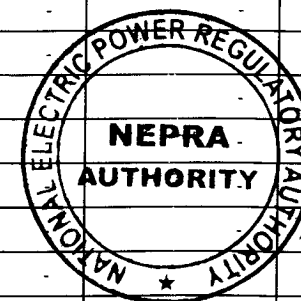
Brig (R) Tariq Sadozai
Chairman



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REFERENCE TARIFF TABLE-PAK MATIARI LAHOR TRANSMISSION COMPANY

Year	O&M				Total O&M	Insurance	Return on Equity	ROEDC	Loan Repayment	Interest Charges	Sinosure	Tariff
	Foreign	Local ICT	Local NTDC	Land								
	Rs. / kW/h	Rs. / kW/h	Rs. / kW/h	Rs. / kW/h								
1	0.0441	0.0323	0.0411	0.0073	0.1249	0.0409	0.1680	0.0388	0.3038	0.2189	0.0250	0.9203
2	0.0441	0.0323	0.0411	0.0073	0.1249	0.0409	0.1680	0.0388	0.3212	0.2015	0.0231	0.9184
3	0.0441	0.0323	0.0411	0.0073	0.1249	0.0409	0.1680	0.0388	0.3396	0.1831	0.0211	0.9163
4	0.0441	0.0323	0.0411	0.0073	0.1249	0.0409	0.1680	0.0388	0.3590	0.1637	0.0189	0.9142
5	0.0441	0.0323	0.0411	0.0073	0.1249	0.0409	0.1680	0.0388	0.3796	0.1431	0.0166	0.9119
6	0.0441	0.0323	0.0411	0.0073	0.1249	0.0409	0.1680	0.0388	0.4013	0.1214	0.0142	0.9095
7	0.0441	0.0323	0.0411	0.0073	0.1249	0.0409	0.1680	0.0388	0.4243	0.0984	0.0117	0.9069
8	0.0441	0.0323	0.0411	0.0073	0.1249	0.0409	0.1680	0.0388	0.4485	0.0741	0.0090	0.9042
9	0.0441	0.0323	0.0411	0.0073	0.1249	0.0409	0.1680	0.0388	0.4742	0.0485	0.0061	0.9014
10	0.0441	0.0323	0.0411	0.0073	0.1249	0.0409	0.1680	0.0388	0.5014	0.0213	0.0031	0.8984
11	0.0441	0.0323	0.0411	0.0073	0.1249	0.0409	0.1856	0.0388	-	-	-	0.3902
12	0.0441	0.0323	0.0411	0.0073	0.1249	0.0409	0.1856	0.0388	-	-	-	0.3902
13	0.0441	0.0323	0.0411	0.0073	0.1249	0.0409	0.1856	0.0388	-	-	-	0.3902
14	0.0441	0.0323	0.0411	0.0073	0.1249	0.0409	0.1856	0.0388	-	-	-	0.3902
15	0.0441	0.0323	0.0411	0.0073	0.1249	0.0409	0.1856	0.0388	-	-	-	0.3902
16	0.0441	0.0323	0.0411	0.0073	0.1249	0.0409	0.1856	0.0388	-	-	-	0.3902
17	0.0441	0.0323	0.0411	0.0073	0.1249	0.0409	0.1856	0.0388	-	-	-	0.3902
18	0.0441	0.0323	0.0411	0.0073	0.1249	0.0409	0.1856	0.0388	-	-	-	0.3902
19	0.0441	0.0323	0.0411	0.0073	0.1249	0.0409	0.1856	0.0388	-	-	-	0.3902
20	0.0441	0.0323	0.0411	0.0073	0.1249	0.0409	0.1856	0.0388	-	-	-	0.3902
21	0.0441	0.0323	0.0411	0.0073	0.1249	0.0409	0.1856	0.0388	-	-	-	0.3902
22	0.0441	0.0323	0.0411	0.0073	0.1249	0.0409	0.1856	0.0388	-	-	-	0.3902
23	0.0441	0.0323	0.0411	0.0073	0.1249	0.0409	0.1856	0.0388	-	-	-	0.3902
24	0.0441	0.0323	0.0411	0.0073	0.1249	0.0409	0.1856	0.0388	-	-	-	0.3902
25	0.0441	0.0323	0.0411	0.0073	0.1249	0.0409	0.1856	0.0388	-	-	-	0.3902
Levelized Tariff	0.0441	0.0323	0.0411	0.0073	0.1249	0.0409	0.1737	0.0388	0.2562	0.0976	0.0113	0.7435



The reference TSC is based on 98.5% power transmitting capacity with 1.5% annual non-penalized maintenance outages.

Exchange Rate 1 US \$ = 104.4 PKR

Levelized Tariff @ 10% works out to be US Cents 0.7121/kW/h

DEBT SERVICING SCHEDULE-PAK MATIARI LAHOR TRANSMISSION COMPANY

Libor 1.144%

Spread 4.500%

Interest rate 5.64%

Period	Foreign Debt					Annual Principal Repayment Rs./kW/h	Annual Interest Rs./kW/h	Annual Debt Servicing Rs./kW/h
	Principal	Repayment	Mark UP	Balance	Total Debt Service			
	US \$	US \$	US \$	US \$	US \$			
1	1,326,671,165	50,272,921	37,439,987	1,276,398,244	87,712,908	0.3038	0.2189	0.5227
2	1,276,398,244	51,691,673	36,021,235	1,224,706,571	87,712,908			
3	1,224,706,571	53,150,464	34,562,444	1,171,556,107	87,712,908	0.3212	0.2015	0.5227
4	1,171,556,107	54,650,423	33,062,485	1,116,905,684	87,712,908			
5	1,116,905,684	56,192,713	31,520,195	1,060,712,972	87,712,908	0.3396	0.1831	0.5227
6	1,060,712,972	57,778,527	29,934,381	1,002,934,444	87,712,908			
7	1,002,934,444	59,409,095	28,303,813	943,525,349	87,712,908	0.3590	0.1637	0.5227
8	943,525,349	61,085,679	26,627,229	882,439,670	87,712,908			
9	882,439,670	62,809,578	24,903,330	819,630,092	87,712,908	0.3796	0.1431	0.5227
10	819,630,092	64,582,127	23,130,781	755,047,965	87,712,908			
11	755,047,965	66,404,699	21,308,209	688,643,266	87,712,908	0.4013	0.1214	0.5227
12	688,643,266	68,278,706	19,434,202	620,364,560	87,712,908			
13	620,364,560	70,205,600	17,507,308	550,158,960	87,712,908	0.4243	0.0984	0.5227
14	550,158,960	72,186,872	15,526,036	477,972,088	87,712,908			
15	477,972,088	74,224,058	13,488,850	403,748,030	87,712,908	0.4485	0.0741	0.5227
16	403,748,030	76,318,735	11,394,173	327,429,296	87,712,908			
17	327,429,296	78,472,526	9,240,382	248,956,770	87,712,908	0.4742	0.0485	0.5227
18	248,956,770	80,687,099	7,025,809	168,269,671	87,712,908			
19	168,269,671	82,964,170	4,748,738	85,305,501	87,712,908	0.5014	0.0213	0.5227
20	85,305,501	85,305,501	2,407,407	-	87,712,908			

