



National Electric Power Regulatory Authority
Islamic Republic of Pakistan

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Web: www.nepra.org.pk, E-mail: registrar@nepra.org.pk

No. NEPRA/TRF-351/PPIB-2016/15960-15962
November 24, 2016

Subject: Decision of the Authority in the matter of Motion for Leave for Review filed by Private Power and Infrastructure Board (PPIB) against the Tariff Determination of the Authority for \pm 660 KV, 4000 MW HVDC Matiari-Lahore Transmission Line Project [Case # NEPRA/TRF-351/PPIB-2016]

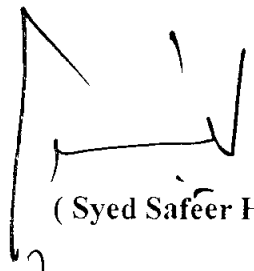
Dear Sir,

This is in continuation of this office letter No. TRF-351/PPIB-2016/11318-11321 dated August 18, 2016 whereby Determination of the Authority in the matter of Tariff Petition filed by Private Power and Infrastructure Board (PPIB) for \pm 660 KV, 4000 MW HVDC Transmission Line Project was sent to the Federal Government for notification in the official Gazette.

2. Please find enclosed herewith the subject decision of the Authority along with Reference Tariff Table (Annex-I) and Debt Servicing Schedule (Annex-II) (35 pages) in the matter of Motion for Leave for Review filed by Private and Power Infrastructure Board (PPIB).
3. The decision is being intimated to the Federal Government for the purpose of notification of adjustment in the approved tariff through the official Gazette pursuant to Section 31 (4) of the Regulation of Generation, Transmission and Distribution of Electric Power Act (XL of 1997).
4. Order of the Authority along with Reference Tariff Table (Annex-I) and Debt Servicing Schedule (Annex-II) needs to be notified in the official Gazette.

Enclosure: As above

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


24/11/16
(Syed Safer Hussain)
2

CC:

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

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY (NEPRA)

Case No. NEPRA/TRF-351/PPIB-2016

**DECISION OF THE AUTHORITY IN THE MATTER OF MOTION
FOR LEAVE FOR REVIEW FILED BY PPIB AGAINST THE TARIFF
DETERMINATION OF THE AUTHORITY FOR ± 660 KV 4000 MW
MATIARI-LAHORE HVDC TRANSMISSION LINE**

Date: November ²⁴, 2016

FILED BY

PRIVATE POWER INFRASTRUCTURE BOARD (PPIB)

(i)

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY (NEPRA)

Case No. NEPRA/TRF-351/PPIB-2016

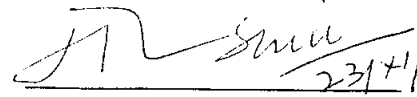
November 24, 2016

Petitioner:

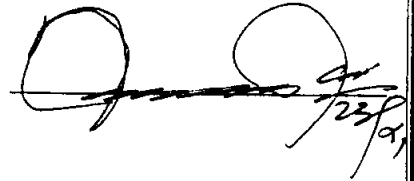
Private Power and Infrastructure Board (PPIB)

Authority

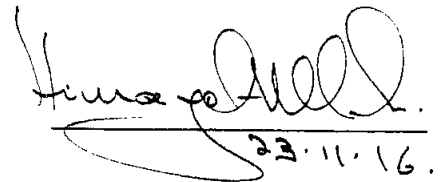
Maj (R) Haroon Rashid
Member


23/11/16

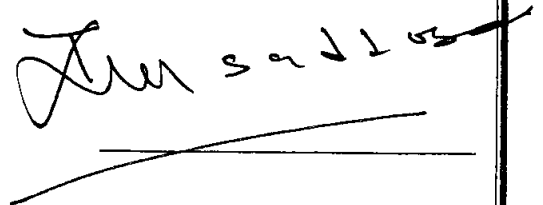
Syed Masood-ul-Hassan
Member

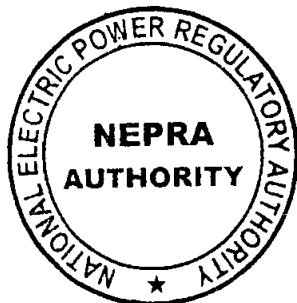

23/11/16

Himayat Ullah Khan
Member/Vice Chairman

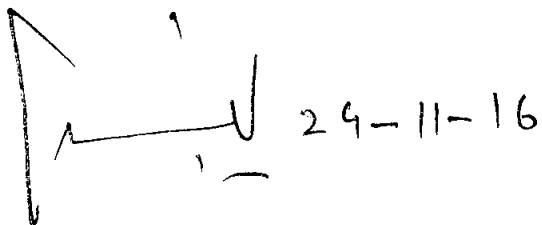

23.11.16.

Brig (R) Tariq Saddozai
Chairman





(ii)


24-11-16



Subject: **DECISION OF THE AUTHORITY IN THE MATTER OF MOTION FOR LEAVE FOR REVIEW FILED BY PPIB AGAINST THE TARIFF DETERMINATION OF THE AUTHORITY FOR $\pm 660\text{KV}$ 4000MW HVDC MATIARI-LAHORE TRANSMISSION LINE PROJECT**

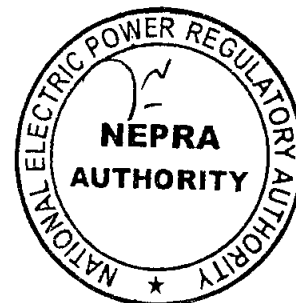
1. **Introduction:**

- 1.1 Private Power Infrastructure Board (PPIB), (hereinafter referred to as the "Petitioner") vide letter No 6(618)PPIB /TLP/FIN/0-47405 filed motion for leave for review under Rule 16 (6) of NEPRA (Standard and Procedure) Rules, 1998 read with the provisions of NEPRA (Review Procedure) Regulations, 2009 on September 02, 2016 against the tariff determination of the Authority for $\pm 660\text{kV}$, 4000MW HVDC Matiari-Lahore Transmission Line Project (M-L T/L Project) issued vide letter No NEPRA/TRF-351/PP1B-2016/11318-11321 dated August 18, 2016 and requested to condone the delay in filing of review motion.
- 1.2 The Authority admitted the review motion and condoned the delay in filing the review motion within the stipulated time period considering the peculiar facts and circumstances of the case. The hearing in the matter was held on Oct 18, 2016 which was attended by the representatives of PPIB, NTDCL, China Electric Power Technologies Company Limited (CET), CPPA-G, and Planning Commission of Pakistan & Financial Advisors of the Petitioner.

2. **Grounds For Motion For Leave For Review:**

The petitioner sought review of the following costs and other terms and conditions determined by the Authority;

1. EPC Costs
2. O&M Costs
3. Taxes on Contractors
4. Calculation of Sinosure Cost
5. Advisor and Consultant Cost (Non-EPC)
6. Withholding Tax (WHT) on Dividends
7. Construction Period
8. Calculations of ROEDC
9. Duties and taxes during construction period
10. NTDCL development cost
11. True-up of drawdowns (debt and equity)
12. Indexation formula for Debt Servicing
13. Directions to the Petitioner and NTDCL
14. Adjustment at COD for length of Transmission Line



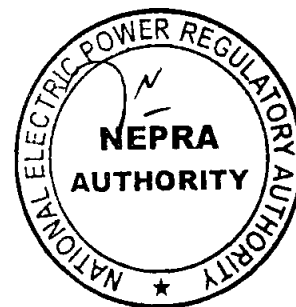


3. The Authority considered the submissions and arguments of the Petitioner advanced during the hearing along with evidence submitted vide its letter No. 6(618) PPIB/TLP/16/FIN/O-47702 dated November 01, 2016. Pertinent to mention that according to NEPRA (Review Procedure) Regulations, 2009, any party aggrieved from any order of the Authority and discovery of new and important matter of evidence or on account of some mistake or error apparent on the face of the record or from any other sufficient reasons, may file a review motion for consideration by the Authority.
4. Keeping in view the provisions of NEPRA (Review Procedure) Regulations, 2009, the contentions of the petitioner are regrouped under following heads;
- I. **Grounds considered for review:**
 - a. EPC Costs
 - b. Adjustment at COD for length of Transmission Line
 - c. Taxes on Contractors
 - II. **Clarification Issues:**
 - a. Sinoure Cost- 7% of total debt or debt servicing
 - b. Construction Period
 - c. Duties and taxes during construction period
 - d. Withholding Tax (WHT) on Dividends
 - e. Indexation formula for Debt Servicing
 - f. Directions to the Petitioner and NTDC
 - III. **No new discovery of evidence or mistake or error:**
 - a. O&M Costs
 - b. Advisor and Consultant Cost (Non-EPC)
 - c. NTDC development cost
 - d. True-up of drawdowns (debt and equity)
 - e. Calculations of ROEDC
 - f. Calculation of Sinoure Cost

5. **Grounds considered for review:**

The Authority noted that the petitioner produced additional information and evidence with regard to the EPC costs, adjustment at COD for length of transmission line and taxes on contractors which will result in the alteration or modification of the Authority's tariff determination. Accordingly, these are discussed in relevant sections below;

↖





5.1 **EPC Cost:**

5.1.1 EPC cost for the HVDC transmission line consists of two major components i.e. converter station cost and transmission line cost. The Authority in the tariff determination had allowed US \$ 1,000 million (US \$ 250,000/MW) for two converter stations as against the claimed cost of US \$ 1,260.14 million (US \$ 315,035/MW). The petitioner was also allowed US \$ 307.300 million (US\$ 350,000/km) for 878km transmission line as against the claimed cost of US \$ 497.06 million (US \$ 566,123/km).

5.1.2 The petitioner in its review motion has requested to reconsider and allow US \$ 1,082 million (US \$ 270,532/MW) for converter station and US \$ 508 million (US \$ 578,129/km) for transmission line. The additional cost requested by the petitioner in respect of converter station cost included the additional security cost of US \$ 7.702 million.

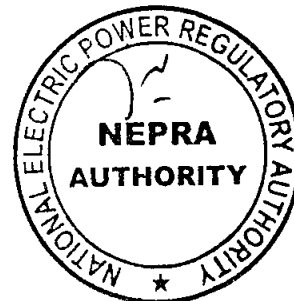
5.1.3 The comparison of EPC cost in tariff petition, tariff determination and claimed in review motion is tabulated below;

| Sr.No | EPC Cost Component | Claimed in Tariff Petition | Determined | Claimed in Review Motion |
|-----------------------|----------------------------|----------------------------|----------------------|--------------------------|
| | | Amount US \$ | Amount US \$ | Amount US \$ |
| i. | Converter Station (Per MW) | 315,035 | 250,000 | 270,532 |
| ii. | Transmission line (Per Km) | 566,123 | 350,000 | 578,129 |
| Total EPC Cost | | 1,757,195,994 | 1,307,300,000 | 1,589,725,262 |

5.1.4 The analysis of the cost claimed for the converter station in review motion reveals that all the referred sub components of converter station were already part of the claimed converter station cost in tariff petition and were considered by the Authority at the time of tariff determination and after detailed deliberation, the Authority had allowed US \$ 1,000 million (US \$ 250,000/MW) for converter station cost.

5.1.5 Further with regard to the additional costs claim, the Authority has considered the security arrangement cost and is of the view that the already allowed security cost of US \$ 2.243 million for the converter station is sufficient. Moreover, as per the Cooperation Agreement signed for this project between NTDC and SGCC refers that, "GOP shall provide and be responsible for sufficient security by security agency of Government, for example ranger, police etc. for work site, Chinese staff, equipment & material and operating assets, from feasibility study till the BOOT period completion. Such cost shall be borne by GOP or allowed as pas through cost in the tariff." Accordingly if the project still additionally requires deployment of more security forces including rangers then the security cost, incurred thereon in addition to the already allowed cost, will be allowed as per actual, subject to submission of verifiable documentary evidences to

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the satisfaction of the Authority at the time of COD justifying the additional security requirements as required and proposed by relevant Authorities.

5.1.6 The petitioner's review claim with regard to the transmission line cost has also been considered by the Authority and discussed below;

5.1.7 **Transmission Line Cost:**

5.1.7.1 The petitioner in its review motion has requested to allow revised US \$ 508 million (US\$ 578,129/km) for transmission line for which the Authority determined US\$ 307 million (US \$ 350,000/km) as against the originally claimed transmission line cost of US \$ 497 million (US \$ 566,123/km).

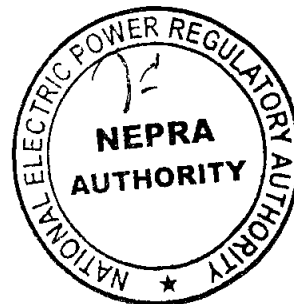
5.1.7.2 The Authority noted that the petitioner in its original petition did not provide component wise detailed breakdown of cost claimed for transmission line. The petitioner only provided the total number without quantifying different components. The Authority therefore considered cost claimed in view of international project cost of such HVDC projects. Consequently the costs of international projects and recommendations of individual experts were also considered to arrive at the cost allowed.

5.1.7.3 The petitioner in its review motion has claimed further increased transmission line cost of US \$ 508 million as against its original claim in tariff petition of US \$ 497 million and submitted the clarification on cost comparisons with international projects which is not much relevant at this stage. As this is the review motion against the cost allowed by the Authority specifically for the Matiari-Lahore HVDC transmission line project, therefore component wise cost analysis is considered more relevant. Accordingly, the petitioner was directed during the review motion proceedings, to provide component wise breakup and details of different costs categories specific to Pakistan and also provide cost of each tower type to be used.

5.1.7.4 The petitioner vide letter No 6(618) PPIB/TLP/FIN/0-47516 dated Sep 29, 2016 submitted the price break down of transmission line claimed cost. The information submitted includes;

- Type of towers
- Range of nominal height of tower
- Quantity of each type of tower
- Foundation per tower
- Material Price- Steel (US \$/tower)
- Weight per tower
- Installation cost/tower
- Insulators, fittings, hardware, grounding material, relay station and spare parts
- Other cost which includes design and engineering, mobilization, transportation, security coverage cost, project management and construction supervision for the transmission line component of EPC

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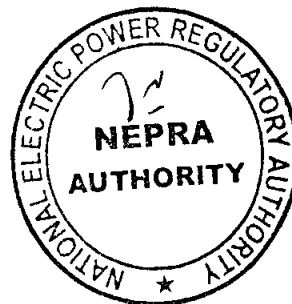
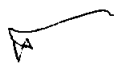


5.1.7.5 The information provided was not as per the requirement therefore the petitioner was again directed vide letter No NEPRA/SAT-I/TRF-35/14543-44 dated Oct 21, 2016 to provide detailed justification for the parameters for each of the category of tower and calculation of the transmission line cost per kilometer duly endorsed by NTDC which has technical and relevant expertise, being the main agency with related expertise in the operations of transmission system in the Country. Further NTDC was also required to give its clear opinion on the reasonableness of component wise costs.

5.1.7.6 The petitioner vide letter No 6(618)/PPIB/TLP/16/FIN/0-47702 dated Nov 01, 2016 and vide letter No 6(618)/PPIB/TLP/16/FIN/0-47760 dated Nov 08, 2016 provided detailed information pertaining to rates and weight assigned to different cost components duly endorsed by NTDC. Below is the comparison of cost claimed by the petitioner and the corresponding costs recommended and duly endorsed by NTDC;

| Sr. No | Transmission Line Components | As per Petitioner | As per NTDC |
|---|--------------------------------------|--------------------|--------------------|
| | | Amount US \$ | Amount US \$ |
| i. | Tower Material | 94,011,929 | 77,445,900 |
| ii. | Conductor | 85,591,022 | 79,331,011 |
| iii. | Civil Works | 97,073,625 | 70,020,166 |
| iv. | Tower Erection | 40,386,419 | 16,226,760 |
| v. | Stringing | 59,122,121 | 28,096,000 |
| vi. | Insulators | 18,780,046 | 18,780,046 |
| vii. | OPGW | 4,339,304 | 4,339,304 |
| viii. | Hardware | 11,937,807 | 11,937,807 |
| ix. | Grounding Material | 1,669,665 | 1,669,665 |
| x. | Relay Station | 3,663,217 | 3,663,217 |
| xi. | OPGW connection | 301,471 | 301,471 |
| Total equipment and machinery cost | | 416,876,626 | 311,811,347 |
| xii. | Spare parts | 4,419,351 | 4,419,351 |
| xiii. | Design and Engineering | 11,395,464 | 11,395,464 |
| xiv. | Mobilization | 25,273,460 | 25,273,460 |
| xv. | Transportation and Customs Clearance | 18,239,586 | 18,239,586 |
| xvi. | Project Management | 5,573,013 | 5,573,013 |
| xvii. | Supervision | 5,383,813 | 5,383,813 |
| xviii. | Security Coverage Cost | 20,436,226 | 20,436,226 |
| Total Cost | | 507,597,539 | 402,532,260 |

5.1.7.7 Based on NTDC's recommendations in respect of component wise cost of transmission line a detailed analysis has been carried out, which is given in the following tables;





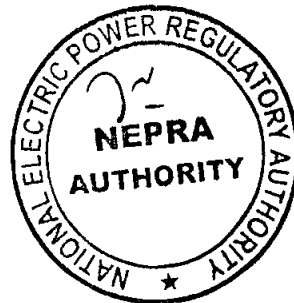
a. Tower Material Cost:

| Type of Tower | Range of Nominal Height | Angle | Weight of Tower (Ton) | No of Towers | Total weight of tower (ton) | Petitioner Price | | NTDC Price | |
|----------------------|-------------------------|--------|-----------------------|--------------|-----------------------------|------------------|---------------------------|------------|---------------------------|
| | | | | | | US \$/ Ton | Total Tower Material Cost | US \$/ Ton | Total Tower Material Cost |
| 1 | 2 | 3 | 4 | 5 | 6=4*5 | 7 | 8=6*7 | 9 | 10=6*9 |
| ZP1 | 36~54 | 0° | 31.00 | 1,427 | 44,237.00 | 1,275 | 56,384,480 | 1,050 | 46,448,850 |
| ZP2 | 48~78 | 0° | 58.80 | 110 | 6,468.00 | 1,275 | 8,244,113 | 1,050 | 6,791,400 |
| ZPT | 36~51 | 0° | 32.00 | 183 | 5,856.00 | 1,275 | 7,464,058 | 1,050 | 6,148,800 |
| JP1 | 30~42 | 0-20° | 52.00 | 207 | 10,764.00 | 1,275 | 13,719,794 | 1,050 | 11,302,200 |
| JP2 | 30~42 | 20-40° | 57.00 | 35 | 1,995.00 | 1,275 | 2,542,827 | 1,050 | 2,094,750 |
| JP3 | 30~42 | 0-60° | 62.00 | 35 | 2,170.00 | 1,275 | 2,765,882 | 1,050 | 2,278,500 |
| Electrode Line Tower | | | 8.40 | 270 | 2,268.00 | 1,275 | 2,890,793 | 1,050 | 2,381,400 |
| Total | | | | 2,267 | 73,758.00 | | 94,011,947 | | 77,445,900 |

b. Conductor Cost:

| Type of Conductor | Length (kM) | Weight of Conductor (Ton/kM) | Total Weight/Ton | Petitioner Price | | NTDC Price | |
|--------------------------------------|-------------|------------------------------|------------------|------------------|-------------------|--------------|-------------------|
| | | | | USD per Ton | Conductor Cost | US\$ per Ton | Conductor Cost |
| 1 | 2 | 3 | 4 | 5 | 6=4*5 | 7 | 8=4*7 |
| ACSR 1250 conductor JL1/G3A-1250/70 | 5,571.23 | 4.011 | 22,346.22 | 2,812 | 62,859,917 | 2,600 | 58,100,172 |
| ACSR 630 Conductor JNRLH1/G1A-630/45 | 205.00 | 1.243 | 254.82 | 2,812 | 716,554 | 2,600 | 662,532 |
| Ground Wire GJ-80 | 106.00 | 0.630 | 66.78 | 2,812 | 187,785 | 2,600 | 173,628 |
| AAAC Conductor JL1/LHA1-800/550 | 1,786.00 | 3.744 | 6,686.78 | 3,268 | 21,852,397 | 3,050 | 20,394,679 |
| Total | | | 29,358.6 | | 85,616,653 | | 79,331,011 |

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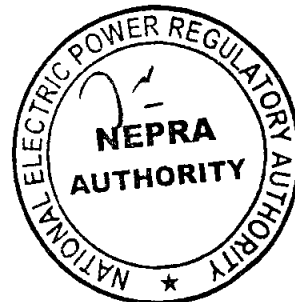
c. Civil Works:

| Type of Tower | Average volume of tower foundation (m ³) | Quantity of tower | Total volume (m ³ of tower foundation) | Petitioner Price | | NTDC Price | |
|----------------|--|-------------------|---|-----------------------|----------------------|-----------------------|----------------------|
| | | | | US \$/ m ³ | Conductor Cost | US \$/ m ³ | Conductor Cost |
| 1 | 2 | 3 | 4=2*3 | 5 | 6=4*5 | 7 | 8=4*7 |
| ZP1 | 64.2 | 1,427 | 91613.4 | 610 | 55,884,647.44 | 440 | 40,310,149.03 |
| ZP2 | 89.08 | 110 | 9797.8 | 610 | 5,976,708.63 | 440 | 4,311,059.06 |
| ZPT | 77.29 | 183 | 14144.07 | 610 | 8,627,955.79 | 440 | 6,223,429.86 |
| JP1 | 119.21 | 207 | 24,676.47 | 610 | 15,052,775.44 | 440 | 10,857,715.83 |
| JP2 | 183.4 | 35 | 6,419.00 | 610 | 3,915,623.17 | 440 | 2,824,377.73 |
| JP3 | 197.81 | 35 | 6,923.00 | 610 | 4,223,065.78 | 440 | 3,046,139.12 |
| Electrode Line | 20.6 | 270 | 5,562.00 | 610 | 3,392,848.74 | 440 | 2,447,295.36 |
| Total | 174.920 | 2,267 | 159,136.74 | | 97,073,625.00 | | 70,020,166.00 |

d. Tower Erection:

| Type of Tower | Range of Nominal Height | Angle | Weight of Tower (Ton) | No of Towers | Total weight of tower (ton) | Petitioner Price | | NTDC Price | |
|----------------------|-------------------------|--------|-----------------------|--------------|-----------------------------|------------------|---------------------------|------------|---------------------------|
| | | | | | | US \$/ Ton | Total Tower Material Cost | US \$/ Ton | Total Tower Material Cost |
| 1 | 2 | 3 | 4 | 5 | 6=3*4 | 7 | 8=7*9 | 9 | 10=6*9 |
| ZP1 | 36~54 | 0° | 31.00 | 1,427 | 44,237.00 | 548 | 24,222,105 | 220 | 9,732,140 |
| ZP2 | 48~78 | 0° | 58.80 | 110 | 6,468.00 | 548 | 3,541,573 | 220 | 1,422,960 |
| ZPT | 36~51 | 0° | 32.00 | 183 | 5,856.00 | 548 | 3,206,471 | 220 | 1,288,320 |
| JP1 | 30~42 | 0-20° | 52.00 | 207 | 10,764.00 | 548 | 5,893,861 | 220 | 2,368,080 |
| JP2 | 30~42 | 20-40° | 57.00 | 35 | 1,995.00 | 548 | 1,092,368 | 220 | 438,900 |
| JP3 | 30~42 | 0-60° | 62.00 | 35 | 2,170.00 | 548 | 1,188,190 | 220 | 477,400 |
| Electrode Line Tower | | | 8.40 | 270 | 2,268.00 | 548 | 1,241,850 | 220 | 498,960 |
| Total | | | | 2,267 | 73,758.00 | | 40,386,419 | | 16,226,760 |

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e. **Stringing Cost:**

| Length of line | Petitioner Price | | NTDC Price | |
|----------------|------------------|---------------------------|------------|---------------------------|
| | US \$ / Km | Total Tower Material Cost | US \$/ km | Total Tower Material Cost |
| 1 | 2 | 3=1*2 | 4 | 5=1*4 |
| 878 | 67,337 | 59,122,121 | 32,000 | 28,096,000 |

f. **Insulator Cost:**

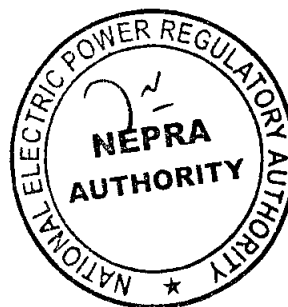
| Type of insulator | Quantity as per Petitioner Price /NTDCL | Unit Cost (US\$) as per petitioner and agreed by NTDCL | Unit Cost (US\$) as per petitioner and agreed by NTDCL |
|------------------------------|---|--|--|
| HVDC T/Lines | 1 | 2 | 3=1*2 |
| Composite Insulators (Set) | 10,702 | 397 | 4,248,694 |
| Porcelain Insulators (Piece) | 188,412 | 76 | 14,319,312 |
| Electrode T/Lines | | | |
| Porcelain Insulators (Piece) | 2,790 | 76 | 212,040 |
| | | Total | 18,780,046 |

g. **Other Costs:**

NTDCL vide its letter No GM/GSC/HVDC/CAMP-I dated Nov 01, 2016 submitted that the cost for insulators, OPGW, hardware, grounding material, spare parts and are reasonable. Further to that NTDCL vide its letter No GM/GSC/HVDC/129-131 dated Nov 22, 2016 also submitted that the costs for design and engineering, project management and construction supervision are reasonable. However with regard to the mobilization and transportation cost NTDCL submitted that NTDCL is not in a position to comment on the reasonability of these costs as it does not has any prior experience of construction of HVDC transmission line, it also referred that NEPRA may assess the reasonability of these costs keeping in view that this is the first project of its kind. Below is detail of other costs claimed by petitioner and comments of NTDCL:

| Sr.No | Description | Claimed by Petitioner | NTDCL's Comment |
|-------|-------------------------------|-----------------------|-------------------------------|
| | | Amount US \$ | Amount US \$ |
| i. | OPGW | 4,339,304 | Petitioner Cost is reasonable |
| ii. | Hardware | 11,937,807 | |
| iii. | Grounding Material | 1,669,665 | |
| iv. | Spare Parts (warranty Period) | 4,419,351 | |
| v. | Design and Engineering | 11,395,464 | |

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| Sr.No | Description | Claimed by Petitioner | NTDCL's Comment |
|-------|---|-----------------------|---|
| | | Amount US \$ | Amount US \$ |
| vi. | Project Management Cost | 5,573,013 | Petitioner Cost is reasonable |
| vii. | Supervision for construction and installation | 5,383,813 | |
| viii. | Relay Station | 3,663,217 | |
| ix. | OPGW connection | 301,471 | |
| x. | Mobilization | 25,273,460 | NEPRA may assess the reasonability of these costs |
| xi. | Transportation and custom clearance | 18,239,586 | |
| xii. | Security Coverage Cost | 20,436,226 | |
| | Total | 131,412,423 | |

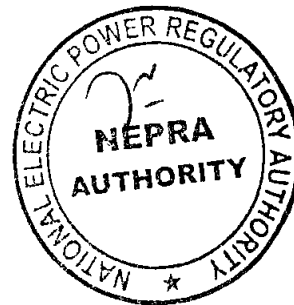
5.1.7.8 The Authority having considered the additional information provided by the Petitioner and NTDCL's recommendations is of the view that it has to rely on the recommendations of NTDCL being the sole system operator of transmission network in Pakistan. In view thereof the Authority has decided as under;

- i. The unit costs of tower material, conductor, civil works, and tower erection as provided by NTDCL are reasonable and hence allowed.
- ii. The cost of Relay Station and OPGW connection as provided by NTDCL is reasonable and hence allowed.
- iii. The cost of OPGW, hardware and grounding material are reasonable however the cost of OPGW varies with the conductor cost and the cost of Hardware and Grounding Material vary with the tower material cost therefore the cost of OPGW, Hardware and Grounding Material will be adjusted at the time of COD on the basis of verifiable documentary evidences to the satisfaction of the Authority. Accordingly the following percentage numbers as linked to the NTDCL proposed relevant costs have been worked out and hence allowed;

| | | |
|--------------------|---|--------------------------|
| OPGW | = | 5.47% of conductor cost |
| Hard ware | = | 15.41% of tower material |
| Grounding Material | = | 2.16 % of tower material |

- iv. NTDCL considered US \$ 15,000 per km for its 500 KV HVAC transmission line. For Matiari Lahore Project NTDCL has proposed US \$ 32000 per km for stringing and requested further review by NEPRA. Normally for such projects it is in the range of US\$ 12,000-15,000 per km for various configuration, size and number of conductors per line/pole. Therefore the Authority is of the view that even the cost of stringing by NTDCL is higher,

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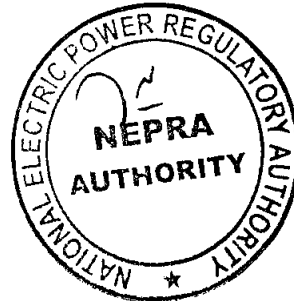


however, considering that the 1250mm² conductor requires special machinery and trained Chinese personnel and a short completion time, the unit cost of US\$ 20,000 per km is allowed for stringing.

- v. For the insulators the petitioner had proposed two types of insulator i.e. composite insulator and porcelain insulators with their unit cost. NTDCCL did not provide any comment on these and recommended the same as proposed. It is noted that as far as composite insulators are concerned their use on HVDC system is not established and their performance is also not documented. However, the Authority requires that the proposed Independent /Owner's engineer must review this aspect thoroughly while agreeing to the use of composite insulators. The Authority therefore has not questioned the suitability of these at the same stage. Similarly the rate of composite insulators has also been allowed as proposed by NTDCCL i.e. US\$ 397/ unit. The Authority is also cognizant of the fact that for the Porcelain insulators, different type of insulators will be required and used by the ITC ranging between 160 KN to 500 KN as per the design requirement. It is also noted that the HVDC insulator of 200 KN costs around US\$ 40/unit. The cost of insulators increases as the strength specification (KN) increases. To work out overall cost the quantities of different strength specifications insulators should have been provided. However the petitioner has quoted an average rate of US\$ 76/unit, which is considered on the higher side as major portion of transmission line will pass through flat terrain with medium pollution level. In view thereof, the Authority considered that US\$ 70/unit for the porcelain insulators both for the HVDC line and the electrode portion will be reasonable and hence allowed. On the basis of previous discussion the assessed cost is indicated in the following table:

| Description | Quantity | Unit Cost \$ | Total Cost \$ |
|----------------------------|----------------|--------------|-------------------|
| HVDC Line | | | |
| Composite Insulators (Set) | 10,702 | 397 | 4,248,694 |
| Porcelain (Piece) | 188,412 | 70 | 13,188,840 |
| Electrode | | | |
| Porcelain (Piece) | 2,790 | 70 | 195,300 |
| Total | 201,904 | | 17,632,834 |

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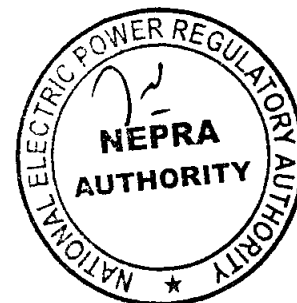
| Sr. No | Transmission Line Cost Component | Amount US \$ |
|---|----------------------------------|--------------------|
| i. | Tower Material | 77,445,900 |
| ii. | Conductor | 79,331,011 |
| iii. | Civil Works | 70,020,166 |
| iv. | Tower Erection | 16,226,760 |
| v. | Stringing | 17,560,000 |
| vi. | Insulators | 17,632,834 |
| vii. | OPGW | 4,339,304 |
| viii. | Hardware | 11,937,807 |
| ix. | Grounding Material | 1,669,665 |
| x. | Relay Station | 3,663,217 |
| xi. | OPGW connection | 301,471 |
| Total equipment and machinery cost | | 300,128,135 |

vii. The spare parts, design & engineering, transportation & custom clearance, project management and supervision cost will vary with the total equipment and machinery cost which will be adjusted at the time of COD on the basis of verifiable documentary evidences to the satisfaction of the Authority. However for the reasonability of these components the proposed percentage numbers as linked to the NTDC proposed equipment and machinery cost have been adopted and considered reasonable. Hence the below mentioned cost items are allowed as a percentage of total equipment and machinery cost;

| | |
|--------------------------------------|---|
| Spare parts | = 1.41% of total equipment and machinery cost |
| Design and Engineering | = 3.65% of total equipment and machinery cost |
| Transportation and Customs Clearance | = 5.85% of total equipment and machinery cost |
| Project Management | = 1.79% of total equipment and machinery cost |
| Supervision | = 1.73% of total equipment and machinery cost |

viii. The Authority has noted that the mobilization cost claimed by the petitioner is 8.11% of the total equipment and machinery cost of transmission line. The Authority has been informed that this cost ranges between 5-7% depending on nature and size of similar project. The Authority further considers that for ambitious 27 month construction period the cost may be higher to some extent. This project being first in Pakistan and since there is no authentic and reliable information available specific to Pakistan in this respect; therefore the Authority is constrained to assess this cost on the basis of 7%, which is an upper limit of total equipment and machinery cost of transmission line

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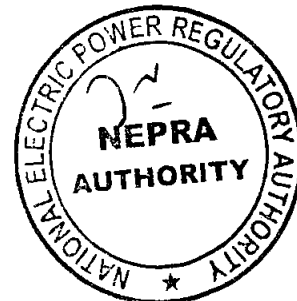
subject to provision of verifiable documentary evidences to the satisfaction of Authority at the time of COD.

- ix. The Authority while considering the petitioner's request for increasing the security cost is of the view that the already allowed security arrangement cost of US \$ 9.859 million for transmission line is sufficient. Moreover, as per the Cooperation Agreement signed for this project between NTDCL and SGCC refers that, "GOP shall provide and be responsible for sufficient security by security agency of Government, for example ranger, police etc. for work site, Chinese staff, equipment & material and operating assets, from feasibility study till the BOOT period completion. Such cost shall be borne by GOP or allowed as pas through cost in the tariff." Accordingly if the project still additionally requires deployment of more security forces including rangers then the security cost, incurred thereon in addition to the already allowed cost, will be allowed as per actual, subject to submission of verifiable documentary evidences to the satisfaction of the Authority at the time of COD justifying the additional security requirements as required and proposed by relevant Authorities.
- x. The cost allowed for tower material, conductor, foundation, tower erection, stringing, insulator and the cost due to change in length of transmission line will be adjusted at the time of COD as per the mechanism provided in this decision (Order Part).
- xi. During the review motion proceedings, NTDCL informed that they are going to appoint Independent Engineer/Owner's Engineer for review of design and to work out the exact quantities of different components of transmission line as noted in the above sections. The Authority considers that the role of the independent engineer/owner's engineer is critical to the optimum techno-economic design and to achieve cost effective solution. Therefore, the data to be submitted at the time of COD for transmission line cost adjustment must be duly verified by Independent Engineer/Owner's Engineer and duly endorsed by NTDCL. The actual cost of these towers and related components will be adjusted as per the design finalized and complied during the implementation phase and technical specification finalized by NTDCL.

5.1.7.9 As per the decision in the above para the total transmission line cost works out as under;

| Sr. No | Transmission Line Cost Component | Amount US \$ | Remarks (Adjustment at the time of COD) |
|--------|----------------------------------|--------------|--|
| i. | Tower Material | 77,445,900 | As per actual quantities |
| ii. | Conductor | 79,331,011 | |
| iii. | Civil Works | 70,020,166 | |
| iv. | Tower Erection | 16,226,760 | |

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| Sr. No | Transmission Line Cost Component | Amount US \$ | Remarks (Adjustment at the time of COD) |
|---|--------------------------------------|--------------------|--|
| v. | Stringing | 17,560,000 | As per actual quantities |
| vi. | Insulators | 17,632,834 | |
| vii. | OPGW | 4,339,304 | 5.47 % of conductor cost |
| ix. | Grounding Material | 1,669,665 | 2.16 % of tower material cost |
| x. | Relay Station | 3,663,217 | Fixed Cost Component |
| xi. | OPGW connection | 301,471 | |
| Total equipment and machinery cost | | 300,128,135 | |
| xii. | Spare parts | 4,252,816 | 1.42% of total equipment and machinery cost |
| xiii. | Design and Engineering | 10,954,677 | 3.65% of total equipment and machinery cost |
| xiv. | Mobilization | 21,008,969 | 7% of total equipment and machinery cost |
| xv. | Transportation and Customs Clearance | 17,557,496 | 5.85% of total equipment and machinery cost |
| xvi. | Project Management | 5,372,294 | 1.79% of total equipment and machinery cost |
| xvii. | Supervision | 5,192,217 | 1.73% of total equipment and machinery cost |
| xviii. | Security Coverage Cost | 9,895,358 | Fixed Cost Component however, the security cost for deployment of security forces including rangers will be adjusted at COD as per actual subject to submission of documentary evidences duly justifying such additional security cost requirements. |
| Total Transmission Line Cost | | 374,357,171 | |
| Total Transmission Line Cost in US \$/km | | 426,375 | |

5.2 Adjustment of the length of transmission line:

The adjustment of the length of transmission line has already been discussed in the preceding section.

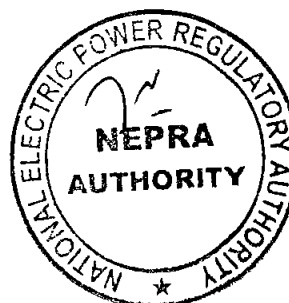
6. Taxes on Contractors:

6.1 Withholding taxes:

6.1.1 The Petitioner in its review motion submitted that in the tariff determination dated August 18, 2016, the Authority did not allow withholding taxes and sales tax while determining EPC cost, O&M costs, land lease cost and interest cost. The Petitioner stated that if any WHT or Sales Tax is payable by the Petitioner, it will be Petitioner's final tax liability and will impact equity IRR, however, this has not been allowed as pass-through unlike precedents approved by NEPRA.

6.1.2 The Petitioner requested to allow WHT on EPC costs, O&M costs, land lease costs and interest income etc. in the Project Costs at the time of COD as allowed in the precedent cases.

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6.1.3 Considering the submission of the Petitioner, the Authority has decided to allow WHT (non-adjustable) as per actual on EPC cost, O&M costs, land lease cost and interest cost subject to submission of documentary evidences of tax withheld and deposited at the time of COD.

6.2 **Sales Tax:**

6.2.1 The Petitioner further stated that no Sales Tax has been assumed in the tariff determination. The petitioner submitted that if any Sales Tax is payable by the ITC to its contractors/advisors, such Sales Tax will not be adjustable/ refundable and will impact the equity IRR. Accordingly, the Petitioner requested to clarify the Para 51 (Order), sub-para II (Pass-Through Items), clause (c) of tariff determination to include the Sales Tax of non-refundable/non-adjustable nature as pass-through that will have to be paid by the ITC to the EPC/O&M Contractors.

6.2.2 Considering the request of the Petitioner, the Authority decided to include the word "Sales Tax" in pass through items if it becomes unadjusted due to the reasons submitted by petitioner.

7. **Clarification Issues:**

7.1 **Sinosure Fee (7% of Total Debt or Debt Servicing):**

7.1.1 The petitioner requested to review the limit of Sinosure buyer credit policy which is approved as 7% of the "total debt". However, according to precedent determination made by NEPRA, the limit for buyer credit policy is 7% of the "total debt and the interest payment".

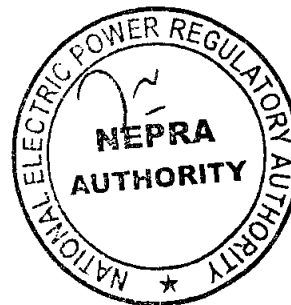
7.1.2 In view of the claim submitted by the Petitioner the Authority hereby clarifies that the limit of Sinosure buyer credit policy is 7% of the "total debt servicing" i.e. total debt and the interest payment, same as allowed for Sinosure Overseas Investment Policy.

7.2 **Construction Period:**

7.2.1 The Authority in tariff determination allowed construction period of 27 month from construction start to commercial operation date (COD). The petitioner in review motion intends to clarify that 27 month construction period should be from financial close to COD instead of construction start date to COD.

7.2.2 The Authority considered the submission of the Petitioner and hereby clarifies that construction period of 27 month is allowed following the construction start date as per Transmission Service Agreement (TSA). The petitioner has to ensure that the construction period does not exceed the approved 27 month timeline. It may be noted that if the construction period exceeds 27 month

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then no additional cost overruns, additional interest and returns will be allowable for that exceeding period.

7.3 Duties and Taxes during construction period:

7.3.1 The Petitioner in its review motion submitted that as per the determination of the Authority at Para 51 (Order), sub-para I (One Time Adjustments), clause (a), where it is mentioned that duties and / or taxes, imposed on ITC for the import of its plant, machinery and equipment will be subject to adjustment at actual on COD. The Petitioner asked to clarify that the plant, machinery and equipment will also include transmission line, the conductor, steel tower, insulator and fitting etc. as these are regarded as materials which make the major components of the transmission line.

7.3.2 In view of the submission of the Petitioner, the Authority hereby clarifies that the duties and / or taxes, not being of refundable nature directly imposed on ITC for the import of its plant, machinery and equipment related to construction of converter station and transmission line will be adjusted at actual on COD, subject to production of verifiable documentary evidence to the satisfaction of the Authority.

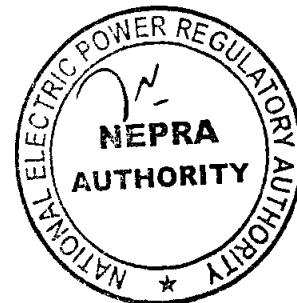
7.4 Withholding Tax (WHT) on Dividends:

7.4.1 The petitioner has requested to allow WHT on dividends as pass-through without any caps. The petitioner submitted that the WHT rate for the transmission line project is 12.5% as compared to 7.5% which will consequently has a bigger impact on the equity IRR for the developers. The petitioner also submitted that if WHT on dividends is not allowed, the guaranteed IRR by GOP to SGCC will not be 17% as agreed in the Cooperation Agreement.

7.4.2 The petitioner submitted that the Authority in upfront tariff determinations of coal has moved away from IRR based to a simple ROE based approach on the fact that for calculation of IRR based return, a lot of information is required which is cumbersome and time consuming process. The Petitioner elaborated that if IRR is calculated based on the ROE numbers approved by NEPRA, the guaranteed IRR numbers are reached upon after deduction of WHT on dividends meaning thereby that NEPRA has indirectly allowed WHT on dividends by building a cushion in the ROE percentage. Although, WHT on dividends is not allowed as pass-through separately, the ROE component includes the WHT impact and hence the guaranteed IRR is net of WHT.

7.4.3 The Authority has considered the submission of petitioner and is of the view that return of 17% stand allowed whereas the WHT on dividends is the individual liability of the shareholders on the profits earned by them therefore there remains no justification for burdening this cost to the end consumers.

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7.4.4 Moreover, the Authority has already taken a principle decision through its recent upfront tariff and cost plus determinations; the list of those decisions is given below;

- a. Determination of the Authority in the matter of tariff petition for 747 MW combined cycle power plant filed by CPGCL (Date April 26, 2016)
 - b. Determination of NEPRA in the matter of upfront tariff for wind power generation projects (Date Jun 24, 2015)
 - c. Determination of NEPRA in the matter of upfront tariff for small hydro power generation projects (Date April 02, 2015)
 - d. Determination of NEPRA in the matter of upfront tariff for solar power generation projects (Date Jan 21, 2014)
- Etc.

7.4.5 In view of above the submission of the petitioner does not merit consideration and accordingly the Authority maintains its decision on this issue.

7.5 **Indexation Formula for Debt Servicing:**

7.5.1 The petitioner requested to reflect the US \$ / PKR variation in the formula for the adjustment of LIBOR variation as is mentioned in the table under the Para 51 (Order) of tariff determination that the indexation on debt servicing component will be based on variation in LIBOR as well as US\$/PKR.

7.5.2 The Authority has considered the submission of the petitioner and has decided to clarify the formula for the adjustment of LIBOR variation in the Order part of this decision.

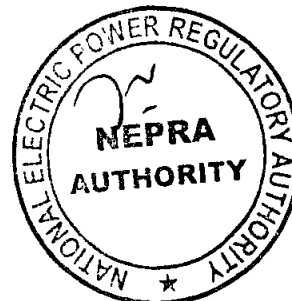
7.6 **Directions to the Petitioner:**

7.6.1 The petitioner requested to replace the Para V (f) of the tariff determination (pertains to Eligibility Criteria and Terms and Condition of Tariff) which states as under;

"The TSC will be paid only if Transmission Line is available for dispatch of energy to its committed power transmitting capacity, except for defined and agreed force majeure events."

With the below referred para:

"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".



- 7.6.2 The Authority noted the submission of the petitioner and has clarified the matter under “Eligibility Criteria and Terms and Conditions of tariff”.
- 7.6.3 Further to that in order to ensure that the payment will be made to ITC as requested the unit of tariff has replaced with “Rs. /kW/h” instead of “Rs./kWh” and the payment will be made to ITC as per the below mentioned formula:

Payment= Capacity * Number of hours in a year*Rate in Rs/kW/hr

Where;

Capacity=The contracted capacity as agreed in TSA

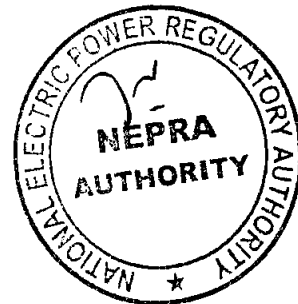
No of hours in a year=8,760

8. No new discovery of evidence or mistake or error:

Regarding the request of the petitioner for reviewing O&M Costs, Advisor and Consultant Cost (Non-EPC), NTDC Development Cost, True-up of drawdowns (debt and equity), Calculations of ROEDC, Calculation of Sinosure Cost in the impugned determination, the petitioner has failed to bring any new evidence or document on record or mistake or error apparent on the face of record which warrant review of these referred items. The fact of the matter which is also evident from the perusal of the determination that the Authority considered all material facts and evidence while determining the costs under these heads therefore the request of the petitioner to review these costs does not merit consideration and accordingly the Authority has decided to maintain its decision to the extent of the costs already allowed in the tariff determination.

9. Based on the decision in the above paragraphs the project cost has been revised as under;

| Matiari-Lahore Transmission Line Project | | |
|--|-------------------------------|-----------------|
| S.No | Description | Approved |
| | | US \$ million |
| i. | EPC Cost | 1,374.36 |
| ii. | Non EPC Costs | 29.54 |
| iii. | Financial Charges | 36.31 |
| iv. | NTDC Development Cost | 12.00 |
| v. | Insurance during construction | 13.74 |
| vi. | Sinosure fee | 16.11 |
| vii. | Taxes | 83.15 |
| viii. | Interest During Construction | 93.13 |
| Total Project Cost | | 1,658.34 |

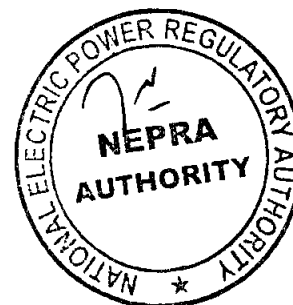


10. ORDER

The Authority hereby determines and approves following reference Transmission Tariff/Transmission Service Charge (TSC) under section 7 read with section 31(4) of Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 and Rule 16 of NEPRA Tariff (Standards and Procedures) Rules, 1998 in the matter of Tariff Petition filed by the Private Power Infrastructure Board (PPIB) for ± 660kv 4000 MW HVDC Matiari-Lahore Transmission Line Project:

| Tariff Components | Year 1-10 Rs/kW/h | Year 11-25 Rs/kW/h | Indexation |
|---|-------------------------|--------------------------|--|
| O&M-ITC | | | |
| Foreign | 0.0441 | 0.0441 | PKR/US\$, US CPI |
| Local | 0.0234 | 0.0234 | CPI – General |
| NTDCL-O & M Local | 0.0500 | 0.0500 | CPI – General |
| Land Lease | 0.0073 | 0.0073 | As per actual |
| Insurance | 0.0409 | 0.0409 | 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 | 0.5227 | - | LIBOR, PKR/US\$ |
| Return on equity | 0.1680 | 0.1856 | 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 qualified Independent Transmission Company (ITC) as declared by PPIB for a period of twenty (25) years commencing from the date of the COD and has been awarded special purpose transmission license by NEPRA.
- 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. As per the Cooperation Agreement, the Project will be transferred to NTDC upon the expiry of the term of the TSA signed between NTDC and ITC.
- vi. All invoicing and payment terms are assumed to be processed in accordance with the TSA which will be signed between NTDC & ITC and consistent in all aspects 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 ITC in Pak Rupee as per the below mentioned formula:
Payment= Capacity *Number of hours in a year*Rate in Rs/kW/hr
Where;
Capacity= The contracted capacity as agreed in TSA
Number of hours in a year=8,760
- ix. The component wise tariff is indicated at Annex-I.
- x. Debt Servicing Schedule is attached as Annex-II.

The following indexations shall be applicable to the reference tariff;

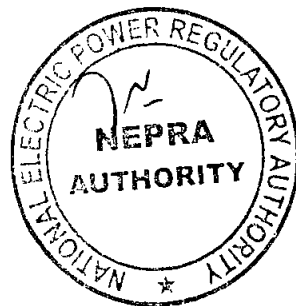
I. One Time Adjustments

- 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 Independent Engineer/Owner's Engineer and duly endorsed by NTDC 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 ,JP1,JP2,JP3 and Electrode Line Tower | As per actual | As per actual | As per actual | To be Calculated | (Fixed) 1,050 | To be Calculated |

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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 |
|---|--|-------------------|---|-----------------------|------------------|
| 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 |

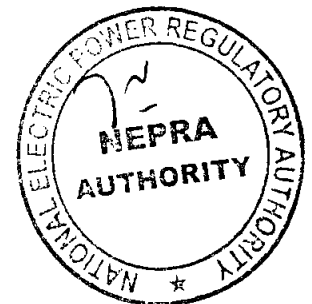
iv) **Tower Erection:**

| 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 |

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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 and duly endorsed 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 and technical specifications finalized by NTDC |
| ii. | Conductor | |
| iii. | Foundation | |
| iv. | Tower Erection | |
| v. | Stringing | |
| vi. | Insulator | |
| vii. | OPGW | Upto 5.47 % of conductor cost |
| viii. | Hardware | Upto 15.41 % of tower material cost |
| ix. | Grounding Material | Upto 2.16 % of tower material cost |
| x. | Relay Station | US \$ 3,663,217 (Fixed) |
| xi. | OPGW connection | US \$ 301,471 (Fixed) |
| | Total equipment and machinery cost | ***** |
| xii. | Spare Parts (warranty Period) | Upto 1.42% of total equipment and machinery cost |
| xiii. | Design and Engineering | Upto 3.65% of total equipment and machinery cost |
| xiv. | Mobilization | Upto 7% of total equipment and machinery cost |
| xv. | Transportation and custom clearance | Upto 5.85% of total equipment and machinery cost |
| xvi. | Project Management Cost | Upto 1.79% of total equipment and machinery cost |
| xvii. | Supervision for construction and installation | Upto 1.73% of total equipment and machinery cost |



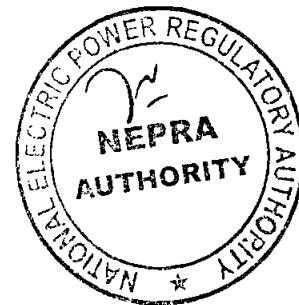


Decision Of The Authority In Matter Of Motion For Leave For Review Filed By PPIB
Against The Tariff Determination Of The Authority For ± 660kV 4000 MW HVDC
Matiari-Lahore Transmission Line Project Case No. NEPRA/TRF-351/PPIB-2016

| Sr.No | Description | Price US \$ |
|--------|------------------------|---|
| xviii. | 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:

- The above required actual data for COD adjustment must be verified by Independent Engineer/Owner Engineer to be appointed by NTDC and duly endorsed by NTDC also, for techno-economic optimized design.
 - All the cost components of transmission line as mentioned above will be adjusted at COD on the basis of verifiable documentary evidence (verified by independent engineer/owner's engineer and duly endorsed by NTDC) to the satisfaction of the Authority subject to the maximum limits as mentioned in the table above.
- b) Duties and/or taxes, not being of refundable nature, directly imposed on ITC 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 project cost at the time of COD on the basis of verifiable documentary evidences.
- d) Additional security cost in addition to already allowed security cost will be allowed as per actual, subject to submission of documentary evidences to the satisfaction of the Authority at the time of COD justifying the need as confirmed by relevant Authorities/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 ITC.
- i) If ITC is required under applicable laws 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 ITC.
- j) For Overseas Investment Insurance Fee (Sinosure Fee), reference component of tariff for each year expressed in Rs./KW/h 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 NTDCL 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 negotiated by ITC at lower than 450/300 basis points respectively, the benefit of such reduction in rate will be adjusted in proportion of 40% to ITC and 60% to the consumer through necessary adjustment in tariff at COD.

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- 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/US \$ 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 ITC shall submit its request along with all relevant source documents 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 ITC is obligated to pay any tax in relation to its transmission business, the exact amount paid by ITC may be reimbursed by the NTDC to ITC on production of original receipts. This payment may be considered as pass-through payment (as Rs./kW/h) spread over a 12 months period in addition to fixed charges proposed in the Reference Tariff. Furthermore, in such a scenario, ITC 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 ITC is required under applicable laws 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 ITC.
- c. Sales Tax, Excise Duty or other Duty, Levy, Charge, Surcharge or Other Impositions applicable on the ITC (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 ITC 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;

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i. Indexation applicable to O&M

The local part of ITC-O&M cost and NTDC O & M will be adjusted on account of Inflation (CPI) and ITC-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:

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

$$F-O\&M-ITC_{(LREV)} = F-O\&M-ITC_{(LREF)} * CPI - G_{(REV)} / CPI - G_{(REF)}$$

$$F-O\ \&\ M-NTDCL_{(LREV)} = F-O\&M-NTDCL_{(LREF)} * CPI - G_{(REV)} / CPI - G_{(REF)}$$

Where:

F-O&M-ITC_(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

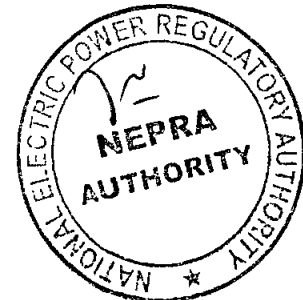
F-O&M-ITC_(LREV) = The revised applicable Fixed O&M Local component of the fixed charges of Independent Transmission Company indexed with CPI - General

F-O & M-NTDCL_(LREV) = The revised applicable Fixed O&M Local component of the fixed charges of NTDC indexed with CPI – General

F-O&M-ITC_(FREF) = The reference Fixed O&M foreign component of the fixed charges of independent Transmission Company for the relevant period

F-O&M-ITC_(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 NTDCCL 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

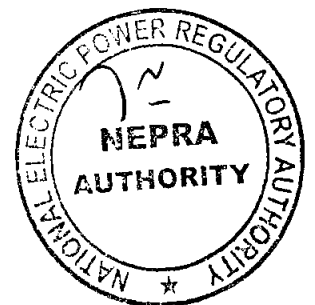
The interest part of fixed charge component will remain unchanged throughout the term except for the adjustment due to exchange rate variation and variation in 6- month LIBOR, while spread on LIBOR (4.50%) remaining the same, according to the following formula

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

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.

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$P_{(REV)}$ = 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, ITC 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;

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

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

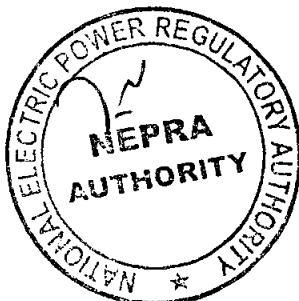
Where:

$ROE_{(REV)}$ = 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

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| | | |
|-----------------|---|---|
| $ROEDC_{(REF)}$ | = | 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 ITC , according to the following formula:

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

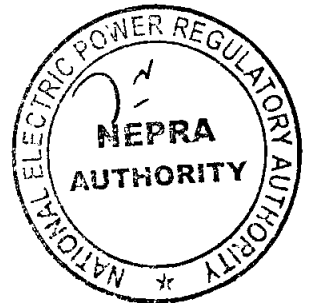
Where:

| | | |
|---------------|---|---|
| $Ins_{(REV)}$ | = | 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 ITC.

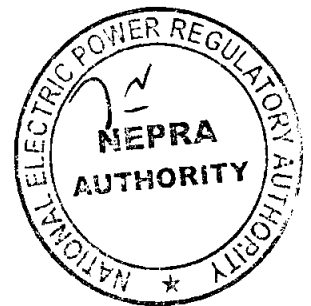
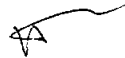
IV. Adjustment on account of inflation, US CPI, foreign exchange rate variation and LIBOR variation will be approved and announced by the Authority within fifteen working days after receipt of the Petitioner's request for adjustment in tariff in accordance with the requisite indexation mechanism stipulated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



V. Directions to the Petitioner and NTDC

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

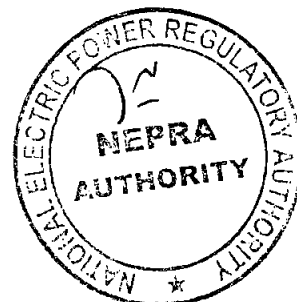
- i. Since it is the first HVDC project of the Country, it needs to be ensured that there is a reliable and robust power transmission corridor fully integrated with the power generation projects at the sending end and fully capable of receiving at the Lahore converter station. It should be ensured that 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 NTDC to effectively and efficiently manage in its network the energy transmitted through this HVDC transmission line.
- iii. Both, technical and financial capability of NTDC should be duly 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 also.
- v. All required system studies as claimed should be timely completed by the EPC contractor and NTDC.
- 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 in the Country.
- vii. Compliance should be ensured with grid code and NEPRA Performance Standard (Transmission) Rules, 2005.
- viii. Petitioner and NTDC 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. NTDC 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 and also confirmed by GOP in the Cooperation Agreement signed for this project.
- xii. The TSA should adequately cover and address transmission consideration including NTDC 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. The Authority directs the ITC 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 to be clearly agreed in the TSA.

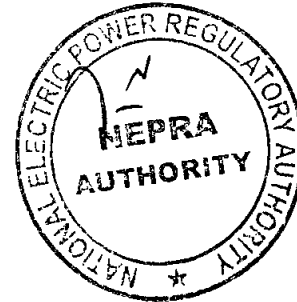
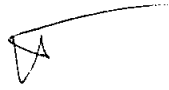
VI. Eligibility criteria and Terms and Conditions of Tariff:

- a. Upon issuance of LOI/LOS to the relevant Special Purpose Transmission Company (SPTC) by relevant agency, SPTC shall be required to approach NEPRA for the grant of Special Purpose Transmission License (SPTL) along with a request for the approval of tariff as per relevant provisions of NEPRA Act, Rules and Regulations.
- b. The TSA and IA should clearly set out related terms and conditions including financial, technical and performance specifications as per international standards.
- c. The Petitioner/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.
- d. 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.
- e. 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" para no 47.6.2 have been fully addressed.
- f. TSC shall be payable if the transmission line is complete and capable of transmitting 4000MW as per commitment of petitioner.





- g. 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
 - h. Relevant and applicable Income Tax, Sales Tax incentives and reduced duties (custom) cess etc. to be ensured by PPIB to ITC.
 - i. 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 agreed however should not exceed the rates as approved by the Authority in this tariff determination.
 - j. The Petitioner/PPIB shall be required to decide and agree the relevant terms and duration for lock-in period for this Project.
- VII. 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.



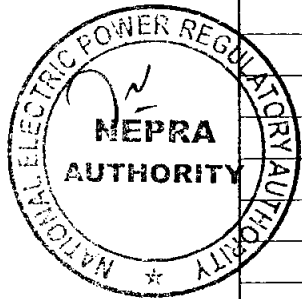
REFERENCE TARIFF TABLE-MATIARI LAHOR HVDC TRANSMISSION LINE

| Year | O&M | | | | Total O&M | Insurance | Return on Equity | ROEDC | Loan Repayment | Interest Charges | Sinasure | Tariff |
|-------------------------|---------------|---------------|---------------|---------------|---------------|---------------|------------------|---------------|----------------|------------------|---------------|---------------|
| | Foreign | Local ICT | Local NTDC | Land | | | | | | | | |
| | Rs. / kW/h | Rs. / kW/h | Rs. / kW/h | Rs. / kW/h | | | | | | | | |
| 1 | 0.0441 | 0.0234 | 0.0500 | 0.0073 | 0.1249 | 0.0409 | 0.1680 | 0.0388 | 0.3038 | 0.2189 | 0.0250 | 0.9203 |
| 2 | 0.0441 | 0.0234 | 0.0500 | 0.0073 | 0.1249 | 0.0409 | 0.1680 | 0.0388 | 0.3212 | 0.2015 | 0.0231 | 0.9184 |
| 3 | 0.0441 | 0.0234 | 0.0500 | 0.0073 | 0.1249 | 0.0409 | 0.1680 | 0.0388 | 0.3396 | 0.1831 | 0.0211 | 0.9164 |
| 4 | 0.0441 | 0.0234 | 0.0500 | 0.0073 | 0.1249 | 0.0409 | 0.1680 | 0.0388 | 0.3590 | 0.1637 | 0.0189 | 0.9142 |
| 5 | 0.0441 | 0.0234 | 0.0500 | 0.0073 | 0.1249 | 0.0409 | 0.1680 | 0.0388 | 0.3796 | 0.1431 | 0.0166 | 0.9119 |
| 6 | 0.0441 | 0.0234 | 0.0500 | 0.0073 | 0.1249 | 0.0409 | 0.1680 | 0.0388 | 0.4013 | 0.1214 | 0.0142 | 0.9095 |
| 7 | 0.0441 | 0.0234 | 0.0500 | 0.0073 | 0.1249 | 0.0409 | 0.1680 | 0.0388 | 0.4243 | 0.0984 | 0.0117 | 0.9070 |
| 8 | 0.0441 | 0.0234 | 0.0500 | 0.0073 | 0.1249 | 0.0409 | 0.1680 | 0.0388 | 0.4485 | 0.0741 | 0.0090 | 0.9043 |
| 9 | 0.0441 | 0.0234 | 0.0500 | 0.0073 | 0.1249 | 0.0409 | 0.1680 | 0.0388 | 0.4742 | 0.0485 | 0.0061 | 0.9014 |
| 10 | 0.0441 | 0.0234 | 0.0500 | 0.0073 | 0.1249 | 0.0409 | 0.1680 | 0.0388 | 0.5014 | 0.0213 | 0.0031 | 0.8984 |
| 11 | 0.0441 | 0.0234 | 0.0500 | 0.0073 | 0.1249 | 0.0409 | 0.1856 | 0.0388 | - | - | - | 0.3902 |
| 12 | 0.0441 | 0.0234 | 0.0500 | 0.0073 | 0.1249 | 0.0409 | 0.1856 | 0.0388 | - | - | - | 0.3902 |
| 13 | 0.0441 | 0.0234 | 0.0500 | 0.0073 | 0.1249 | 0.0409 | 0.1856 | 0.0388 | - | - | - | 0.3902 |
| 14 | 0.0441 | 0.0234 | 0.0500 | 0.0073 | 0.1249 | 0.0409 | 0.1856 | 0.0388 | - | - | - | 0.3902 |
| 15 | 0.0441 | 0.0234 | 0.0500 | 0.0073 | 0.1249 | 0.0409 | 0.1856 | 0.0388 | - | - | - | 0.3902 |
| 16 | 0.0441 | 0.0234 | 0.0500 | 0.0073 | 0.1249 | 0.0409 | 0.1856 | 0.0388 | - | - | - | 0.3902 |
| 17 | 0.0441 | 0.0234 | 0.0500 | 0.0073 | 0.1249 | 0.0409 | 0.1856 | 0.0388 | - | - | - | 0.3902 |
| 18 | 0.0441 | 0.0234 | 0.0500 | 0.0073 | 0.1249 | 0.0409 | 0.1856 | 0.0388 | - | - | - | 0.3902 |
| 19 | 0.0441 | 0.0234 | 0.0500 | 0.0073 | 0.1249 | 0.0409 | 0.1856 | 0.0388 | - | - | - | 0.3902 |
| 20 | 0.0441 | 0.0234 | 0.0500 | 0.0073 | 0.1249 | 0.0409 | 0.1856 | 0.0388 | - | - | - | 0.3902 |
| 21 | 0.0441 | 0.0234 | 0.0500 | 0.0073 | 0.1249 | 0.0409 | 0.1856 | 0.0388 | - | - | - | 0.3902 |
| 22 | 0.0441 | 0.0234 | 0.0500 | 0.0073 | 0.1249 | 0.0409 | 0.1856 | 0.0388 | - | - | - | 0.3902 |
| 23 | 0.0441 | 0.0234 | 0.0500 | 0.0073 | 0.1249 | 0.0409 | 0.1856 | 0.0388 | - | - | - | 0.3902 |
| 24 | 0.0441 | 0.0234 | 0.0500 | 0.0073 | 0.1249 | 0.0409 | 0.1856 | 0.0388 | - | - | - | 0.3902 |
| 25 | 0.0441 | 0.0234 | 0.0500 | 0.0073 | 0.1249 | 0.0409 | 0.1856 | 0.0388 | - | - | - | 0.3902 |
| Levelized Tariff | 0.0441 | 0.0234 | 0.0500 | 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-MATIARI LAHOR HVDC TRANSMISSION LINE

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 | | | |

