



Government of Pakistan
Ministry of Water and Power
Private Power Infrastructure Board

Ref: No.6(618)PPIB/UT/TLP/FIN/0-45933

8/2 February 2016

Brig. (R) Tariq Saddozai
Chairman NEPRA
NEPRA Tower,
Islamabad

Subject: Petition for determination of Tariff for ± 660KV HVDC

Dear Sir,

*6/39
9.2.16
Ref: 15/10/16*

The large scale capacity additions in the electrical generation system are planned in the next few years which will necessitate corresponding augmentation in the transmission network. Due to the keen interest of the private sector for investment in power generation and the constraints on public sector resources, the Government of Pakistan (GOP) has decided to invite the private sector for investment in the field of AC and DC Extra High Voltage (EHV) Power Transmission Lines, Substations, and Converter Stations for which the GOP has announced "Policy Framework for Private Sector Transmission Line Projects, 2015".

2. NTDC and State Grid Corporation of China (SGCC)/CET signed Co-operation Agreement dated 20th April 2015 for the development of ± 660 KVDC Matiari - Lahore Transmission Project for wheeling 4000 MW generation in southern part of the country to mid country load centers. The Project is included in China Pakistan Economic Corridor (CPEC) priority projects and is being developed on BOOT basis.
3. Accordingly, a petition for determination of tariff has been papered on the basis of financial and technical information provided by the SGCC/CET to NTDC duly supported with relevant materials and Annexures and the same is being filed by PPIB under Rule 3 of NEPRA Tariff Standards and Procedures

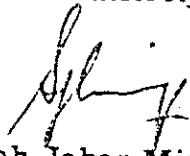


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Rules 1998, being a one-window facilitator responsible for coordinating with all the agencies and Ministries.

4. Notwithstanding the above, NEPRA is requested to carry out its own due diligence pursuant to and in accordance with the applicable laws, rules and regulations to ensure the interests of the consumers and independent transmission companies.

Yours sincerely,



(Shah Jahan Mirza)
Managing Director

Copy to: Secretary, Water & Power, Islamabad.

TARIFF PETITION

**FOR DISPERSAL OF POWER THROUGH ±660KV HVDC
MATIARI-LAHORE TRANSMISSION LINE**

SUBMITTED BY

PRIVATE POWER & INFRASTRUCTURE BOARD

GLOSSARY

CET	China Electric Power Equipment and Technology Co. Ltd., subsidiary of State Grid Corporation of China, a State owned company in China
COD	Commercial Operation Date
Company	National Transmission and Despatch Company Limited (NTDCL)
CRPEA	Contract Registrar and Power Exchange Administrator
CPI	Consumer Price Index
EPC	Engineering, Procurement and Construction
E&M	Electrical & Mechanical
GOP	Government of Pakistan
GWh	Giga Watt hour (1,000,000 kilowatt hour)
IDC	Interest During Construction
IPP	Independent Power Producer
IRR	Internal Rate of Return
ITC	Independent Transmission Company
KESC	Karachi Electric Supply Company Ltd. (K-Electric)
KIBOR	Karachi Interbank Offered Rate
kW	Kilowatt
kWh	Kilowatt hour
LIBOR	London Interbank Offered Rate
L/C	Letter of Credit
MW	Mega Watt (1,000 kilowatts)
MWh	Mega Watt Hour
NEPRA/Authority	National Electric Power Regulatory Authority
NTDC/Purchaser	National Transmission and Dispatch Company Limited
O&M	Operation & Maintenance
Petitioner	National Transmission and Despatch Company Limited
Project	±660KV HVDC Matiari-Lahore approx. 878 km Transmission Project with Design Transmission Capability of 4,000 MW
PKR/Rupees-/Rs.	Pak Rupees, Legal Currency of Pakistan
PPA	Power Purchase Agreement
PPIB	Private Power & Infrastructure Board
ROE	Return on Equity
SGCC	State Grid Corporation of China, a State owned company in China
SO	System Operator
TNO	Transmission Network Operator
Transmission Policy	GOP Policy Framework for Transmission Policy 2015
TSA	Transmission Service Agreement
TSC	Transmission Service Charges
USD\$/	United States Dollars; legal tender of USA
WAPDA	Pakistan Water & Power Development Authority
WPPO	Wapda Power Privatization Organization

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A. INTRODUCTION

Rule 3 The Tariff Petition Proposal (the "Petition") under Rule 31 of the Regulation of Generation, Transmission and Distribution of Electric Power Act 1997 (XL of 1997) (the "Act") read with Rule 3 of the National Electric Power Regulatory Authority (Tariff Standards and Procedure) Rules, 1998 (the "Tariff Rules") for determination of the Tariff for establishment of ±660 kV HVDC Matiari-Lahore approx 878 km Transmission Project with Design Transmission Capability 4,000 MW for evacuation of power the power projects proposed in Southern part of the country to the mid country load centers.

Rule 3(2)(a) Petitioner's Name and Address

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National Transmission and Despatch Company Limited
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Authorized Representatives

- i. Rana Wajaht Hussain, General Manager (GSC) NTDCL
- ii. R. S. Rehan, General Manager (Planning) Power
- iii. Mr. Muhammad Shabbir, Dy. GM Finance (WPPO)
- iv. Mr. Waseem Saadat, Manager (CPC)

Rule 3(2)(a) Transmission License

Transmission License No. TL/01/2002 as amended
Dated: December 31, 2002

Rule 3(2)(b) Grounds

Grounds forming the basis for this application are furnished hereunder.

Rule 3(2)(c) Relief Sought

Relief sought is mentioned in Para 17 of this Petition.

Rule 3(2)(f) Summary of Evidence

A brief of technical and financial data, which forms the basis of a Tariff for this Project is given in the subsequent Paras.

Attachments

- a. Annexure I to IX attached hereto in support of the Tariff Petition.

B. MAIN BODY OF THE TARIFF PETITION

1. Brief History

- 1.1.** Upon un-bundling of Water and Power Development Authority, hereinafter referred to as the "WAPDA" and restructuring of its power wing departments i.e., distribution, transmission and thermal power generation organizations into various corporate companies, as DISCOS, NTDC and GENCO(s) in accordance with Companies Ordinance 1984. National Transmission and Despatch Company Limited, hereinafter referred to as "NTDC" or "NTDCL" or the "Company" as the case may be was registered under the Companies Ordinance 1984 on August 3, 1998 to own, operate and build infrastructure for transmission system of 220 kV and 500 kV Transmission Lines and associated Sub-Stations. The Company commenced its commercial operation on 24th December, 1998 and was organized to takeover the properties, assets, rights and obligation of Transmission net work all over Pakistan previously owned by WAPDA, except Karachi.
- 1.2.** NTDC was granted a Transmission License NO. TL/01/2002 on December 31, 2002 by National Electric Power Regulatory Authority, hereinafter referred to as "NEPRA" or the "Authority", to engage in the business for a term of Thirty (30) years, valid up to December 30, 2032, pursuant to Section 15 of the 1997 Regulation of Generation, Transmission and Distribution of Electric Power Act.
- 1.3.** In view the growing energy requirements in the country and various proposals to cope with the growing energy demand for setting up power plants namely Engro Thar Coal (Phase I and II), SSRL Thar Coal, Port Qasim, Lucky Energy, Siddique Sons Energy and Hub Power Company's Coal based on Thar coal and imported coal based power generation units in the Southern areas of Pakistan along with electricity generated by Wind Projects etc; NTDCL plans to transmit the generated energy to the load centres in the central Punjab and other load centres. However, due to constraints on public sector resources and borrowing capacity of NTDCL, GOP Policy Framework for Development of Transmission Line in private sector has been notified in the year 2015 to invite private sector to enhance the role of private sector in power sector in addition to power generation. The induction of private sector in Transmission Line would result in capacity additions in the system and bring about stability, reliability and sustainability.

For transmission of long distance bulk power, NTDC arranged Feasibility studies including system studies and cost studies through SNC Lavalin, Canada in 2013 which evaluated options of 500kV AC expansion, 765 kV AC and ±600 kV DC and recommended the HVDC option as most viable technically and economically in the long term. In light of SNC Lavalin recommendations, NTDC has opted for High Voltage DC Transmission Lines for transmitting such a huge capacity of power from Southern part of the country to Central part. Presently, NTDCL is planning to

construct ±660 kV HVDC Transmission Line from Matiari (Sindh) to Lahore (Punjab), approximately 878 km long, with Design Transmission Capability 4,000 MW . Two Convertor Stations at Matiari and Lahore will also be a part of this project to interface with the existing HVAC system in Pakistan.

NTDC has conducted a system stability studies with the assistance of CET and has confirmed the ±660 kV HVDC Transmission Line is the most viable option for the evacuation of power.

- 1.4 HVDC Projects with large capacity have capital requirements and. NTDCL, by its own, has not been able to arrange financing for construction of this HVDC Project. Due to encouraging response of private sector for investment in power generation and constraints on public sector resources, the Government of Pakistan has decided to develop this Project pursuant to the Transmission Policy under China Pakistan Economic Corridor (CPEC) scheme agreed between the Governments of Pakistan and China. This application for determination of a Tariff for the establishment of ±660 kV HVDC approx. 878 km Matiari- Lahore Transmission Project with Design Transmission Capability 4,000 MW on Build Own Operate and Transfer (BOOT) basis in private sector under above mentioned policy framework for private sector transmission line projects on the basis of financial and technical data received from China Electric Power Equipment and Technology Co. Ltd. (CET). The proposed Project will be transferred to NTDC upon the expiry of term of 25 years in accordance with the provisions of Transmission Policy on the payment of US Dollar one (1).

2. PROFILE OF NTDC

- 2.1 NTDCL upon incorporation as a Company under the Company Law and getting Transmission License from NEPRA has been restructured into following three (3) main tiers.

i) **Transmission Network Operator (TNO)**

TNO is responsible for the construction, operation and maintenance of transmission system including planning, design and capacity expansion of the transmission system and setting up new transmission facilities.

ii) **System Operator (SO)**

System Operator is responsible for the safe and reliable operation of the network and to despatch the generation facilities in an economic order (according to load demand and provide balancing services for the network.)

iii) **Contract Registrar and Power Exchange Administrator (CRPEA)**

CRPEA will be responsible in future for the recording and notification of contracts and other matters relating to bilateral trading between the generation licensees and Bulk Power Consumers (BPC) /distribution companies for their future capacity needs.

- 2.2 NTDCL was also responsible for purchase of power from power producers in Pakistan and import of electricity from neighbouring countries except Karachi upto June 4, 2015, however, upon the modification in Transmission License, such functions has been assigned to Central Power Purchasing Agency (Guarantee) Limited.
- 2.3 NTDC, in addition to the core functions, is also providing services (non-core functions) to the distribution companies in the areas of design, construction of transmission lines / sub-stations, maintenance support for the telecommunication system and protection. To discharge these functions NTDC has setup a Services Division headed by General Manager which is a self-financing department.

3. NTDCL SCOPE OF SERVICES

- 3.1 The Company presently operates and maintains thirteen (13) 500kV and thirty five (35) 220kV Grid Stations; 5,077km 500kV transmission line and 8,965 km 220kV transmission line in Pakistan. This Transmission System evacuates power from all generation facilities and delivers it to the Distribution Companies (DISCOs). NTDC transmission system is also linked with power system of K-Electric formally known as Karachi Electric Supply Company Ltd. (KESC) which makes it possible to exchange power between the two power networks.

4. EXISTING INFRASTRUCTURE

- 4.1 Following are some of the major infrastructure under operation and maintenance of NTDC.

A. 500 KV GRID STATIONS

1. Sheikh Muhammadi Peshawar
2. Rawat
3. Sheikhpura
4. Gatti (Faisalabad)
5. Nokhar (Gujranwala)
6. Multan
7. Muzaffargarh

8. Yousaf Wala
9. Guddu
10. Dadu
11. Jamshoro
12. NKI (Karachi)
13. Dera Ghazi Khan

B. 220 KV GRID STATIONS

1. Burhan
2. Bannu
3. Daud khel
4. Mardan
5. Sangjani
6. Shahi Bagh
7. Islamabad University
8. Bund Road, Lahore
9. Ghakkar
10. Jaranwala
11. Kala Shah Kaku
12. Ludewala, Sargodha
13. Nishat Abad
14. New Kot Lakhpat
15. Ravi
16. Sarafraz Nagar
17. Sialkot (Sahowala)
18. Wapda Town, Lahore
19. Shalamar
20. Sumundari Road
21. New Muzaffargarh
22. Bawalpur
23. Vehari
24. Hala Road, Hyderabad
25. Quetta industrial
26. Sibbi
27. Shikar Pur
28. T. M. Khan
29. Daharki
30. Rohri

31. Okara
32. Toba Tek Singh
33. Khuzdar
34. Bandala
35. Loralai

C. Transmission Lines Under NTDCL Control:

NTDCL is maintaining transmission lines at voltage levels of 500kV and 220kV. Lengths of the Transmission Lines at 500kV and 220kV levels are 5,077 KM and 8,965 KM respectively. Existing Transmission net work is shown as **Annexure-I**.

5. UNDER CONSTRUCTION PROJECTS

5.1 In order to cope with the growing demand of electricity in the country, NTDCL is already in the process of expanding its transmission facilities and following are some of the under construction projects. Proposed Net Work is shown as **Annexure-II**.

A. 500 and 220 KV GRID STATIONS

1. 500kV Lahore South
500 KV Rahim Yar Khan
500KV Shikarpur
220 KV Ghazi Road Grid Station, Lahore
2. 220 KV Manshera Grid Station
3. 220 KV Chakdara
220 KV Lalain
220 KV Noshera
220 KV Chistian
220 KV DM Jamali
220 KV Gujrat

B. TRANSMISSION PROJECTS UNDER CONSTRUCTION

1. Transmission Schemes for Dispersal of Power from Neelum – Jhelum Hydropower Project
 - 500kV Single Circuit Quad Bundle Transmission Line from Neelum-Jhelum to Gujranwala (235 km)
 - 500kV Single Circuit Quad Bundle Transmission Line from Neelum-Jhelum to Rewat (110 km Long)
 - Extension at 500kV Gakkhar & Rewat Grid Stations

2. Transmission Lines associated with 500 KV Grid Station Shikarpur
 - i) 500 KV In and Out Guddu Dadu Circuit I and II at Shikarpur
 - ii) 220 KV In and Out Guddu Uch at 500 KV Shikarpur
 - iii) 220 KV Uch II - Sibbi Transmission Line

6. PUBLIC SECTOR'S CONSTRAINTS IN ENERGY SECTOR

6.1 Public and Private sector has been facing multifarious problems in practical terms in setting up transmission facilities in the country. Among others, few of these are listed in below:

- **Lack of Local Manufacturing Facilities and Capabilities:**
Most of the machinery and equipment required for the project being imported from foreign countries. The local manufacturing capability is very limited.
- **Expensive Imported Equipment:**
Since the project involves multifarious type of imported heavy equipment and machinery, therefore, the projects require huge amounts of funds.
- **Higher Capital Project Cost:**
Transmission Line projects are normally considered big projects in terms of quantum of funds and gestation period. A large number of components formulate the total cost of the project; inter-alia, cover development cost, cost of land & its development, compensation and resettlement cost, civil work, plant and equipment, spare parts, soil testing, engineering, consultancy, erection, supervision, import charges, working capital and financial charges. The challenge for the prospective investor is to arrange funds commensurate with project cost.
- **Long Gestation / Implementation Period:**
Transmission Line projects normally take longer time for completion besides being capital-intensive. There may be issues such as delay in getting the right of way for land and multiple other reasons considering the huge length of the project and hence it is challenging for sponsors to take such development risks.
- **Difficulty in Associating Foreign Equity and Joint Venture Partner:**
Local private investors desirous to participate in Transmission Line projects, face problems finding foreign equity or joint venture partners as such projects require expertise of the sponsor and willingness to take such development risk.
- **Arrangements for Finances:**
Sponsors of private power projects are facing great problems in tapping local and foreign currency loans for their projects. The negotiations with local and foreign

lenders involve much time due to which it becomes difficult to achieve financial close timely. On the other hand many foreign loan giving agencies require various types of 'Guarantees'. It is difficult to obtain Supplier's Credit facilities in the given circumstances.

- **Procedural Rigidities:**

Currently there exist a number of lengthy, time & money-consuming complicated procedures due to which private investors are problem-stricken. These include the provision of bank guarantees, finalization of project agreement with multitude of government agencies etc.

Considering the above highlighted issues, it is of utmost importance that the private sector sponsors are given the required incentives to setup such projects in Pakistan.

7. THE PROJECT OVERVIEW AND OBJECTIVES

Govt. of Pakistan approved the Policy Framework for setting up Transmission Lines in Private sector of 220 kV and above Transmission Lines and Grid Stations on Build Own Operate and Transfer (BOOT) basis. SGCC and NTDCL entered into a Co-operation Agreement dated 20th April 2015 (**Annexure-III**) to develop the following transmission lines on BOOT basis.

- (a) ±660 kV HVDC approx. 878 km Matiari-Lahore Transmission Project with Design Transmission Capability 4000 MW
- (b) ±660 kV HVDC Transmission Line from Port Qasim-Faisalabad for 4000 MW

The Tariff Petition is for ±660 kV HVDC approx. 878 km Matiari-Lahore Transmission Project with Design Transmission Capability 4,000 MW. The prime objective of this Project is to evacuate bulk upcoming power generation from local and imported coal power plants to mid-country load centers and also enhance efficiency, reliability, and quality of electricity supplied in terms of the overall technical and commercial losses reduction, continuous availability and improved voltage profile of electricity in the Country. The Project shall also facilitate electricity sector reforms, investment planning, financing and technical assistance in the country. Different alternatives for Transmission Line route and Convertor Stations site were analyzed and the best feasible sites for the Convertor Stations and the transmission route were selected on the basis of feasibility study. The T/L route will pass mostly through rural land away from any settlement and obstruction with least temporary loss to crops / trees which will be properly compensated.

8. PROJECT DETAILS

- 8.1 Keeping in view the various proposals for setting up of Thar and Imported coal based power generation in the Southern areas of Pakistan; NTDC has selected ±660 kV HVDC Bipole Transmission Line, which is approximately 878 km in length, with Design Transmission Capability of 4,000 MW from Matiari to Lahore on Built Own Operate and Transfer (BOOT) basis.
- 8.2 Following are the proposed Power Projects expected to be setup in the Southern area of Pakistan for which the power will be evacuated by means of this Project.

Sr. No.	Project Name	Location	Gross Capacity (MW)
1	Engro Thar Coal Company Ltd (Phase-I)	Thar, Sindh	330
2	Engro Thar Coal Company Ltd (Phase-II)	Thar, Sindh	330
3	SSRI Thar Coal	Thar, Sindh	1,320
4	Port Qasim Project	Port Qasim	1,320
5	The Hub Power Company Ltd (Phase-I)	Hub Baluchistan	660
6	The Hub Power Company Ltd (Phase-II)	Hub Baluchistan	660
7	Siddique Sons Energy	Port Qasim	330
	Total		4,950

Proposed interconnection Scheme of these Projects with Matiari - Lahore HVDC System is attached hereto at **Annexure-IV**.

- 8.3 Since the project is associated with the Power Projects generating electricity on indigenous coal as well as imported coal at low operating costs; therefore foreign exchange worth billions of dollars will be saved annually that would otherwise be required for import of oil needed for an equivalent electricity generation. The revenues

of the government would increase due to direct and indirect taxation, duties and levies on the production of goods and services that will result from the power generation benefits within the project area as well as from the electricity duty collected by the federal government. Sale of electricity is the direct revenue which will be collected by the GOP. This would be helpful to reduce the basket of price being billed to the consumers.

- 8.4 Indirect or the secondary benefits would include creation of employment opportunities and improved standard of living of the people of the area and vicinity. There will be multiple effects on socio-economic development of the region as well. Communication, infrastructures, livestock, forestry, cottage industry, livestock development and other opportunities would open up with construction of the proposed project. Most of the indirect benefits are difficult to quantify in monetary terms but should not be ignored while making the decision for the implementation of the project.
- 8.5 The High Voltage Direct Current (HVDC) technology provides the economical solution for large distance bulk power transfer with low losses and enhanced system reliability.

9. SCOPE OF PROJECT

9.1 Technical Parameters

Following are technical parameters of the project:-

Design Transmission Capability	4,000 MW
Length of the Transmission Line from Matiari to Lahore	878 km (approx.)
Voltage Level	± 660 kV HVDC
Converter Station at Matiari	
Grounding / Electrode Station at Matiari	
Converter Station at Lahore	
Grounding / Electrode Station at Lahore	
Conductor	4x1,250 mm ²
Allowed Loss Ratio	4.3% per annum for Bi-pole operations

10. IMPLEMENTATION METHODOLOGY

- 10.1 HVDC Projects have large capital requirement, and NTDC, by its own, is not able to arrange huge financing investment for construction of this HVDC Project due to its own financial constraints. Therefore, NTDC has planned to execute this project through private sector on BOOT basis as per aforementioned Policy Framework for Private Sector Transmission Line Projects 2015.
- 10.2 Normal construction period of these type of projects is 36-42 months. Such project needs to be developed in parallel with the above mentioned power generation projects so that it may be ready to evacuate power from such projects.
- 10.3 For the dispersal of power from Thar and Imported Coal based Projects, dispersal of power from both type of power plants from Matiari to upcountry load centers, ±660 kV HVDC bipolar transmission line will be constructed along with Converter Stations and associated Electrode/Grounding Stations at both ends.

10.4 Scope of Work

The scope of work for Design Transmission Capability 4,000 MW is given in the following Table.

Sr.No.	Scope of Work
1	±660 kV HVDC Bi-polar T/L from Matiari to Lahore
2	Two converter stations at Matiari and Lahore
3	Two Electrode/Grounding Station at Matiari and Lahore, three Repeater stations and electrode transmission line

SGCC/CET Cost Estimate for ±660 kV HVDC Transmission Project.

Sr.No.	Description	Project Cost in Million (US\$)
Cost Components		
1-	EPC Costs	1,757.20
2-	Non-EPC Costs/Development Costs	32.921
3-	Financial Charges @ 3.50% of Debt	58.81

4-	NTDC Development Costs	15.21
5-	* Insurance during construction	-
6-	Sinosure Fee/Premium (0.63% annual fee and 0.095% commitment)	21.26
7-	Taxes (SIC 1.05%, and Custom Duty 5%)	106.31
	Project Cost Excluding IDC	1,991.71
8-	Interest During Construction	108.67
	Total Project Cost including IDC	2,100.38

* Please refer to Section 11.5

10.5 Importance of the Project

Addition of power in National Grid is essentially required to meet the power demand of the country. An addition of more than 4,000 MW power has been planned by installation of Thar and other Imported Coal based Power Plants. Interconnection scheme has been prepared by NTDC for safe and reliable dispersal of power from the proposed power plants to the load centers, and as a result thereof power supply position in the country will be improved.

11. PROJECT COST ESTIMATE

The following is the cost estimate:-

11.1 Basis of Cost Estimates

The total project cost estimate for HVDC transmission line, associated Converter stations and electrode stations is provided by CET to NTDC.

The exchange rates used for cost estimate are as under and this will be used as the Reference rate for true-ups and indexations and mentioned in this document:

1 US\$ = Rs. 103.5

- 11.2 The estimate of capital cost of the Matiari to Lahore Transmission Project covers civil works, electrical & mechanical erection and installation, engineering, special subject research, commissioning and equipment costs, development costs, feasibility study costs, costs for permits and licenses etc.. It also covers the costs for land management

consultancy, administrative/audit/accounts expenditure and custom duty and Sindh Infrastructure Cess (SIC) to be paid on the foreign imported machinery & equipments both for electrical as well as mechanical components.

The Capital cost funding structure is given as follows:

Sr. No	Description	Percentage (%)	Amount (Million US\$)
1	Debt	80%	1,680.30
2	Equity	20%	420.08
	Total	100%	2,100.38

A brief of assumptions of various cost estimates is given as follows.

11.3 EPC Cost

The EPC Cost consists of following major components as per the detail given by SGCC/CET (Annexure-V):

Sr. No	Description	Amount (Million US\$)
1	2x Converter Stations (including AC yard, DC yard, ground electrode and other auxiliary system)	1,260.14
2	Approx. 878 km Transmission Line (1250 mm^2) and three repeater stations	497.06
	Total	1,757.20

11.4 Non EPC Cost

The Non EPC Cost is as detail given below as provided by SGCC/CET:.

Sr. No.	Description	Million USD
1	Fixed Assets/Vehicles/Office Equipment	2.8848
2	Housing/Office rental expenses	0.8280
3	Additional Security - other than GoP*	0.8348
4	Feasibility Study	5.4000
5	Permits, License & Company Formation	0.8696
6	Project Administration Cost	2.7813
7	Advisors and Consultants	7.8896
8	HR Costs	8.7959
9	Travelling Costs	0.5040
10	Company I.C Fee	1.9800
11	Registration Fee	0.0005
12	Processing Fee	0.0193
13	Bank Guarantee – LOI	0.0003
14	Performance Guarantee – LOS	0.0560
15	Non-refundable Project Fee	0.0773
	Total	32.9212

*It is pointed out that pursuant to Co-operation Agreement and the Transmission Policy, GoP has assumed the responsibility of the security through its security agencies for the security of work site, Chinese staff, equipment and material and operating assets. The security costs assumed here is only for the security which will not fall under the ambit of GoP and for ITC. GOP is working on making the security arrangements for the projects falling within the China Pakistan Economic Corridor projects, however, at this stage the specific details and mechanics of the security arrangements being finalized by the GoP are not available and hence it is unclear if any costs related to security arrangements will be charged by this Project or not. Accordingly, no costs related to such security arrangement have been built-in the Tariff. If any such costs are charged to the Project for arrangements related to security, the same will be considered a pass-through item in the TSA. .

11.5 Insurance During Construction and Operation

Insurance during construction as well as Operation will be required to be obtained as per the requirement of Lenders and different project documents during the Term of the Transmission Service Agreement (TSA). NEPRA allowed insurance costs during Construction as well Operation @ 1.00% of EPC Cost in power generation projects in its most recent Tariff determinations. NTDC also assumes 0.25% of EPC costs during

construction period of its HVAC transmission lines in its tenders, however, such insurance is not for the transmission line and not for the operations period. Accordingly, we understand that these costs approved for power projects by NEPRA and taken by NTDC are not relevant in HVDC Transmission Line Project being developed on BOOT basis as Risk matrix of Power generation projects/NTDC construction projects are entirely different from this Project. Therefore, in order to ascertain a prudent and justified assumption for insurance cost during construction and operation, an internationally renowned insurance broker MARSH appointed to conduct a study to ascertain and submit a report on this subject for the consideration of NEPRA to decide a cap (if possible) for insurance cost during construction as well as operation. This study is in process and will be submitted as soon as it is completed. Therefore, NTDCL has not assumed any insurance cost during construction and operation period in this Petition and it is requested that the insurance tariff component and cost cap (if report mentions one) to be included in the Tariff before the Tariff is Determined by NEPRA upon submission of the above mentioned report.

11.6 Custom Duties & Taxes

The ITC is allowed to import plant and equipment upon payment of custom duty @ 5% pursuant to Para 3 of Transmission Policy 2015. Therefore, Custom Duties @ 5% and Sindh Infrastructure Cess has been taken @ 1.05% of EPC Cost. This is estimated as USD 106.31 million. Further no provincial or federal sales tax, advance Income Tax and Federal Excise Duty on equipment imported into Pakistan or any other taxes and duties applicable on the ITC have been assumed in the Tariff Petition. If such taxes or duties are not exempted and are applicable on the ITC which are not taken into account in the Project Costs, the Project Cost will be adjusted based on actual costs incurred at COD. Custom Duty and Sindh Infrastructure Cess which is estimated as USD 106.31 million shall be adjusted at COD as per actual cost incurred by the ITC.

11.7 Interest During Construction

The construction period is assumed as 27 months from the date of Financial Closing. The Interest During Construction (IDC) is based on 100% foreign currency financing USD based loan estimated at USD 108.67 Million and has been calculated on the basis of the construction period of 27 months with the following drawdown assumptions:

Year 1 – 65%
Year 2 – 30%
Year 3 (1 quarter only) – 05%

The IDC has been calculated on quarterly basis based on the above yearly drawdown assumptions at an interest rate of 5.20% for foreign financing. Six (6) Months LIBOR has been assumed as 0.45% per annum and spread is 4.75%. There may be PKR based local financing as well for the Project and in case of local financing, IDC will be recalculated at COD based on the local financing percentage based on reference KIBOR of 8.50% per annum and Spread of 3.50% per annum. However, IDC at COD will be recalculated based on the above drawdown percentages with trued-up costs. It is pointed out that the loan spread of 4.75% is applicable only in the case of Sinosure Overseas Investment Policy and in case ITC opts to have Sinosure Buyer Credit Policy then the loan spread would change to 4.50%.

11.8 Return on Equity During Construction:

It was agreed with SGCC/CET pursuant to Para 1.3(e) of Co-operation Agreement that Internal Rate of Return (IRR) would be not less than 17% as allowed in the case of IPPs project. Therefore, Return on Equity During Construction (ROEDC) has been worked out on the basis of this assumption, which comes out to be USD 99.47 million. This ROEDC is based on equity invested which is estimated at USD 420.08 Million calculated on the basis of the construction period of 27 months with the following drawdown assumptions:

Year 0 (drawn in the month preceding start of construction)
12% (for the Pre-financial close development/mobilization costs)

Year 1 – 53%
Year 2 – 30%
Year 3 (1 quarter only) – 05%

The ROEDC @ 17% has been calculated on quarterly basis (other than Year 0) based on the above yearly drawdown assumptions. ROEDC at COD will be recalculated based on the trued-up Project Costs based on the above drawdowns.

11.9 Return on Equity During Operations:

As stated at above Paragraph, ROE (IRR basis) @17% has been assumed on the total equity invested into the Project 420.08 million. Since this Project will be on BOOT basis, the equity invested will be redeemed once the debt servicing is completed in the first ten (10) years of operations. Total equity invested will be redeemed from year eleven (11) onwards till the end of concession period. Project Costs are based on certain assumptions and these costs may be changed and any new additional costs may apply as the development of the Project progresses. At COD, this component will be recalculated based on the trued-up Project Cost.

11.10 Debt-Servicing Component

The debt servicing (repayment of principal and interest charges) would be on half-yearly basis based on equal installments for the 10 year repayment period. The debt portion is presently estimated as 80% of total project cost.. This component will also be recalculated at COD based on trued-up Project Costs. Debt Service schedule is enclosed herewith as **Annexure-VI**.

11.11 Financing Charges

Financing Charges includes the costs related to the debt financing of the Project. Such costs generally include, inter alia, the lenders up-front fee, management fee, & commitment fee; fees related to lenders' technical, environmental, financial and legal consultants etc. These are estimated as 3.5% of the total borrowing i.e. US\$ 58.81 million.

11.12 Sinosure Costs during Construction & Operations:

Chinese Banks provide financing on the provision of SINOSURE insurance coverage, which are of two types:

- (a) Sinosure Buyer Credit Policy, upfront fee @ 7% of the total debt servicing as allowed by NEPRA in Upfront Tariff of Coal based projects
- (b) Sinosure Overseas Investment Policy, fee @ 0.60% annual premium (net of taxes) payable in advance during the construction and operations period plus a commitment fee @ 0.09% (net of taxes) payable during the construction period. There is a 5% withholding tax applicable on the Sinosure fees and hence the grossed-up Sinosure fee would be 0.63% annual premium and 0.095% commitment fee. If the withholding tax percentage changes, the percentages will accordingly be revised.

Sinosure Overseas Investment Policy will apply for ITC for the Project as 100% foreign debt is assumed and therefore the Sinosure Costs are assumed @0.63% annual premium payable during constructions as well as operations and commitment fee of 0.095% payable during construction period calculated on the following basis:

Annual Sinosure Costs during Construction for each year = [(Current outstanding Debt Principal at start of the year + Proposed Debt Drawdown during the year + Expected IDC accumulation up till the end of current year)*Annual Premium@0.63%] + [Remaining undrawn debt amount at end of the year*Commitment Fee @ 0.095%]

As per the above calculations, the Sinosure Costs during construction amount to USD 21.26 million which are taken in the Project Costs.

As explained above, Sinosure Premium will also be payable on annual basis during the operations period in advance at start of the year and accordingly the annual Sinosure costs during operations are calculated on the following basis.

Yearly Sinosure Costs during operations = [(Current outstanding Debt Principal at start of the year + Expected Interest Payments during the current year)*Annual Premium@0.63%]

It is important to note that Sinosure may use a long term fixed swap rate instead of LIBOR while calculating interest payments for the purpose of calculation of Sinosure premium and hence the calculations done for the purposes of this Petition may not be sufficient, however, as the swap rate is not known yet, we have used the debt servicing based on the Referent Libor and Reference Spread. Sinosure Costs will be finalized at COD as per actual amounts and the Project Cost will accordingly be trued-up.

In case the ITC fails to obtain Sinosure Overseas Investment Policy and opts for Sinosure Buyer Credit Policy. The Tariff will be adjusted at COD based on factual determination of SINOSURE Policy and Fee.

11.13 Withholding Tax on Dividend

Withholding tax on Dividends has been considered as a pass through item. Therefore, Withholding tax on Dividends has not been included in the cost estimates.

11.13 NTDC Project Development Cost

NTDC is also carrying certain activities including site survey, load flow studies, environmental studies, land lease costs, crop compensation, right of way etc for the development of the Project. Therefore, assumed as USD 15.21 million (including taxes) as NTDC development cost, which will be re-imbursed by the ITC to NTDC as per the determination and approval of NEPRA.

11.14 Transmission Losses

CET proposed following three (3) sizes of conductors for wheeling of electricity from Matiari to Lahore. Each conductor had different Project Costs. Accordingly, the conductor with the best cost-benefit ratio was finalized by NTDC. The Transmission System Loss for each conductor are given as below.

(i) Conductor – 6x900 mm²

Allowed system loss ratio for this conductor would be 4.1% per annum based on design capability of 4,000 MW as adjusted to design conditions.

(ii) Conductor - $4 \times 1,250 \text{ mm}^2$

Allowed system loss ratio for this conductor would be 4.3% per annum based on Design Capability 4,000 MW as adjusted to design conditions. This conductor is selected by NTDC.

(iii) Conductor - $4 \times 1,000 \text{ mm}^2$

Allowed system loss ratio for this conductor would be 5.0% per annum based on design capability of 4,000 MW as adjusted to design conditions.

Since the Transmission Service Charge (TSC) is proposed as fixed monthly payment based on 4,000 MW Design Capability irrespective of the number kWh wheeled after COD, it is estimated that NTDC has to pay approximately USD 320.00 million per year as TSC (based on levelized TSC). Therefore, it was agreed that Conductor of $1,250 \text{ mm}^2$ will be used which was agreed to be the most economical option.

12 OPERATION AND MAINTINANCE (O&M) COST

The O&M Cost is consist of following major components.

- (i) Fixed O&M Cost – ITC Foreign
- (ii) Fixed O&M Cost – ITC Local
- (iii) Fixed O&M Cost – NTDC Local
- (iv) Land Lease Cost

Each cost is briefly discussed below:

12.1 Fixed O&M Costs – Foreign

Fixed O&M Cost – Foreign is primarily for the operation and maintenance of the Converter Stations both at Matiari and Lahore. This annual cost is estimated as USD 37.62 million. The detail is given at Annexure-VII. This includes costs of the pay and allowances of the staff, tools, spare parts, social security, administration etc. The imported spare parts and special tools for transmission line and repeater stations are also included in the Fixed O&M Costs – Foreign.

12.2 Fixed O&M Costs – ITC Local

These include the local currency O&M contractual costs which includes local costs associated to the Converter Station, partial overhaul/replacement costs, partial spare parts costs and company partial operational costs (administrative costs, rent, utilities, HR etc.). This cost is estimated as USD 19.95 million. The local spare parts, special tools and services for transmission line and repeater stations are also included in the Fixed O&M Costs –Local. The detail is given at Annexure-VII.

12.3 Fixed O&M Costs – NTDC Local

Pursuant to Co-operation Agreement dated 20th April 2015, NTDC will take the responsibility of the operation and maintenance of the approx. 878KM long transmission line due to the on going security situation in the Country. In order to avoid conflict of interest, NTDC will incorporate SPV company "NTDC O&M Company" under the Company Ordinance 1984 to carry out such responsibility under Operation and Maintenance Agreement to be executed between ITC and NTDC O&M Company. NTDC O&M Company will develop a team consisting six (6) Sub Division for routine maintenance and patrolling of the equally disptibuted area, three (3) live line Sub Divisions, in total two (2) Divisions. Such infrastriucture is essential as under the Transmission Policy the annual availability is 98.5% and only 1.5% time is available for all outages. It is expected that NTDC will construct housing facilities, colonies, buy vehicles and incur other such type of expenses which are capital expenses in nature at its own expense for its subsidiary and adjust it in NTDC Revenues, estimated as USD 21.00 million. However, the annual budget required to NTDC O&M Company is USD 16.78 million which is included in this tariff as per detail at **Annexure VIII.**

12.4 Land Lease Costs:

Pursuant to the Transmission Policy2015 as well as agreed between NTDC and SGCC that NTDC will be responsible for the Right of Way and acquisition of land for the Project. Accordingly, NTDC will acquire the required land and will lease it to the ITC through a Land Lease Agreement to be executed between NTDC and ITC. An amount of USD 2.46 million has been taken as annual land lease cost in the Tariff.

13. REFERENCE TARIFF

- 13.1 Pursuant to Para C(3) of Policy frame Work for Private Sector Transmission Lines, the Transmission Service Charges (TSC) will be in Rs./kWh basis (**Annexure-IX**). According to the Transmission Policy, the TSC is based on Design Transmission Capability 4000 MW and has been calculated by dividing the annual revenue requirement by the product of (i) Design Transmission Capability in KW (4,000,000), and (ii) number of hours in a year (8760). Such TSC will be paid on Design Transmission Capability (converted into kWh) on a monthly basis. The losses are assumed @ 4.3% per annum for both Transmission Line and Converter Stations based on the selected conductor.

13.2 Main Assumptions

The Tariff is worked out on the basis of above stated Project Costs during constructions as well as operations on the basis of following major assumptions.

Sr. No.	Description	Assumptions
1.	Design Capability	4000 MW
2.	Design Transmission Capability (converted into kWh)	35,040,000,000 kWh
3.	Interest Rate	0.45% Six Month LIBOR plus loan spread of 4.75%. In case of local financing the interest rate that will apply for this tariff will be based on six month KIBOR (8.5%) plus spread of 3.50%.
4.	Debt Payment Schedule	Semi Annual Payment inclusive of Principal and interest.
5.	Loan Tenure	10 years repayment period plus 27 months grace/availability period.
6.	Construction Period	27 months
7.	Debt Drawdown in three Years	Year 1 - 65% Year 2 - 30% Year 3 - 05%
8	Equity Drawdowns	Year 0 - 12% Year 1 – 53% Year 2 – 30% Year 3 – 05%
9.	Reference Exchange Rate	1 US Dollar = Rs.103.5
10.	NPV Discount Rate	10%
11.	Fixed O&M Costs	As per Para 12
12.	Operational Insurance	As per Para 11.5
13.	Term of the Project (BOOT)	25 Years from COD
14.	Return on Equity (ROE) IRR Based	17%
15.	Return on Equity During Construction	17%

	(ROEDC)	
16.	Custom Duties	5%
17	Sindh Infrastructure Cess	1.05%
18	Allowed Transmission Losses including the losses for both Converter Stations as well as the Transmission Line	4.3% per annum based on the selected conductor and design conditions.
19	Reference Pakistan CPI	202.11 (August 2015)
20	Reference US CPI-U	238.654 (July 2015)
21	Reference US PPI for Steel	173.5 (August 2015)
22	Reference US PPI for Electrical Machinery	113.8 (August 2015)
23	LME Bid Prices for Aluminum for 3 month contracts	USD 1,622.00 (21st September 2015)
24	Withholding Tax on dividends	NIL – Pass Through as per actual
25.	Corporate Income Tax	As per Transmission Policy, provision of Section 148 will not be applicable on ITC upto first ten (10) years from the establishment of ITC or from the date of commencement of business, whichever is earlier. Thereafter, it will be considered as Pass Through as per actual.

13.3 Transmission Service Charge (TSC) Structure

Transmission Service Charge components consists of Operational and Maintenance Charges (Local and Foreign for ITC and NTDC O&M Company), Land Lease Cost, Return on Equity during Construction as well as Operation, Debt Servicing Component Sinosure costs during operations and Operational Insurance. TSC is a fixed monthly payments payable to ITC on Rs./kWh basis based on Design Transmission Capability. The Reference Tariff worked out on the basis of above stated assumptions and cost excluding insurance cost is attached herewith as Annexure-IX.

13.4 Tariff Control Period

Useful / economic life of 25 years has been envisioned for the Project. The ITC shall transfer a fully functional system at expiry of TSA term to NTDC on the notional price of USD one (1). Accordingly, the Tariff is applicable for a period of 25 years commencing from Commercial Operation Date (COD) of the Project.

13.5 Tariff

Based on the above mentioned facts and assumption, Levellized Tariff for each component of Tariff is summarized in the following Table.

Tariff Component	(Rs./kWh)	(Cents/kWh)
Fixed O&M – Foreign	0.111	0.107
Fixed O&M- ITC Local	0.059	0.057
Fixed O&M- NTDC O&M Local	0.050	0.048
Land Lease	0.007	0.007
* Insurance Cost	-	-
Sinosure Fee	0.015	0.014
Debt Service	0.435	0.420
ROE	0.218	0.211
ROEDC	0.051	0.049
Total	0.946	0.914

- * Insurance Cost during construction and operation will be communicated subsequently upon the receipt of Insurance Report from an Insurance Expert. Please refer to Section 11.5

14. INDEXATION MECHANISM

During the life of the Project operations, quarterly adjustments/indexations for local inflation, foreign inflation and exchange rate variations will be made after COD and thereafter on 1st July, 1st October, 1st January and 1st April each year. Interest rate variations and exchange rate variations for debt servicing will be made on 1st July and 1st January.

Following is the detail of Tariff indexation to be applicable for the Project:

Tariff Components	Tariff Indexation & Adjustment
O & M (Foreign Currency Portion)	US\$ to Pak Rupees and USCPI (quarterly)
O & M including land lease costs (Local Currency Portion)	Pakistan CPI (quarterly)
Insurance during Operations	US\$ to Pak Rupees not exceeding actual insurance cost incurred (annual)
Return on Equity	US\$ to Pak Rupees (quarterly)
Return on Equity during Construction	US\$ to Pak Rupees (quarterly)
Principal Repayment (Foreign Currency Loan)	US\$ to Pak Rupees (semi-annual)
Principal Repayment (Local Currency Loan)	NIL
Interest/Mark-up Payment (Foreign Currency Loan)	LIBOR (semi-annual) US\$ to Pak Rupees (semi-annual)
Interest/Mark-up Payment (Local Currency Loan)	KIBOR (semi-annual)
Sinoures Costs during operations	As per actual amount basis

The formulae for the above indexations are given below:

14.1 Fixed Operating and Maintenance Costs – Local and Land Lease Cost

The Reference Fixed O&M Cost Component – Local for both ITC and NTDC O&M Company, inclusive of Land Lease Costs shall be indexed on quarterly basis to the Pakistan CPI, as notified by the Federal Bureau of Statistics based on the following formula:

$$\boxed{\text{LFO\&M}_{(\text{LRev})} = \frac{\text{Relevant Reference Transmission Service Charge} * (\text{Pak CPI}_{(\text{Rev})})}{\text{Pak CPI}_{(\text{Ref})}}}$$

Where:

- $\text{LFO\&M}_{(\text{LRev})}$ = the revised Local Fixed O&M Cost Component applicable for the relevant quarter
- $\text{CPI}_{(\text{Rev})}$ = the revised CPI in Pakistan for the month prior to the month in which indexation is applicable, as notified by the Federal Bureau of Statistics.
- $\text{CPI}_{(\text{Ref})}$ = the Reference CPI in Pakistan as given in this document, as notified by the Federal Bureau of Statistics.

14.2 Fixed Operating and Maintenance Costs - Foreign

The Reference Fixed O&M Cost Component - Foreign shall be quarterly indexed to both:

- (a) the USD/PKR exchange rate, based on the revised TT & OD selling rate of USD:PKR notified by the National Bank of Pakistan; and
- (b) the US CPI (for all Urban-consumers), issued by the US Bureau of Labor Statistics

The applicable formula shall be as follows:

$$\boxed{\text{FO\&M}_{(\text{FRev})} = \frac{\text{Relevant Reference Transmission Service Charge} * (\text{US CPI}_{(\text{Rev})})}{\text{CPI}_{(\text{Ref})} * (\text{FX USD}_{(\text{Rev})}/\text{FX USD}_{(\text{Ref})})}}$$

Where:

- $\text{FFO\&M}_{(\text{FRev})}$ = the revised Foreign Fixed O&M Cost Component, applicable for the relevant quarter
- $\text{US CPI}_{(\text{Rev})}$ = the revised US CPI (for all Urban-consumers) for the month prior to the month in which indexation is applicable, issued by US Bureau of Labor Statistics.

US CPI _(Ref)	=	the Reference US CPI (for all Urban-consumers) as given in this document, as issued by US Bureau of Labor Statistics.
FX USD _(Rev)	=	the revised TT & OD selling rate of PKR/USD as on the date on which indexation is applicable, as notified by the National Bank of Pakistan.
FX USD _(Ref)	=	Reference PKR/USD rate, as given in this document

14.3 Insurance Costs during Operations

Insurance costs during operations shall be paid by NTDC as per the actual annual premium upon production of authentic documentary evidence. The Insurance costs (including taxes) under the Tariff will be decided upon receipt of Insurance Report from the insurance broker as mentioned above in this Petition. Once the costs (as per the report.) are finalized, the following formula will be applied annually for indexation, not exceeding the actual costs incurred.

The applicable formula shall be as follows:

$$\text{Insurance}_{(\text{Rev})} = \text{Relevant Reference Transmission Service Charge}^*(\text{FX USD}_{(\text{Rev})}/\text{FX USD}_{(\text{Ref})})$$

Where:

Insurance _(Rev)	=	the revised Insurance Cost Component, applicable for the relevant year
FX USD _(Rev)	=	the revised TT & OD selling rate of PKR/USD as on the date on which indexation is applicable, as notified by the National Bank of Pakistan.
FX USD _(Ref)	=	Reference PKR/USD rate, as given in this document

14.4 Sinosure Costs during Operations

Sinosure costs during operations shall be paid by NTDC as per the actual annual premium (including withholding taxes) upon production of authentic documentary evidence. If the withholding tax assumed on Sinosure cost is changed, the percentages given in this document for Sinosure costs will accordingly be revised. The amount basis on which such percentages will apply will be finalized at COD.

14.5 Debt Principal Repayments – Foreign Currency Loans

The Principal Component of Foreign Currency Loan shall be, on a semi-annual basis, indexed against the USD/PKR exchange rate, based on the revised TT & OD selling rate of USD:PKR notified by the National Bank of Pakistan.

The applicable formula shall be as follows:

$$P_{(FRev)} = \text{Relevant Reference Transmission Service Charge} * (\text{FX USD}_{(Rev)}/\text{FX USD}_{(Ref)})$$

Where:

$P_{(FRev)}$ = the revised Foreign Principal Repayment Component,

$\text{FX USD}_{(Rev)}$ = the revised TT & OD selling rate of PKR/USD as on the date on which indexation is applicable, as notified by the National Bank of Pakistan.

$\text{FX USD}_{(Ref)}$ = Reference TT&OD selling rate of PKR/USD at COD, as notified by the National Bank of Pakistan

14.6 Debt Interest Payments – Foreign Currency Loans

The Interest Component of Foreign Currency Loan shall be on a semi-annual basis indexed against the relevant LIBOR variations and against the USD/PKR exchange rate.

The applicable formula shall be as follows:

$$I_{(FRev)} = \text{Relevant Reference Transmission Service Charge} * (\text{FX USD}_{(Rev)}/\text{FX USD}_{(Ref)}) * ((\text{LIBOR}_{(Rev)} + \text{Spread of } 4.75\%) / (\text{LIBOR}_{(Ref)} + \text{Spread of } 4.75\%))$$

Where:

$I_{(FRev)}$ = the revised Interest Payment Component,

$\text{FX USD}_{(Rev)}$ = the revised TT & OD selling rate of PKR/USD as on the date on which indexation is applicable, as notified by the National Bank of Pakistan.

$FX\ USD_{(Rev)}$	=	Reference TT&OD selling rate of PKR/USD at COD, as notified by National Bank of Pakistan
$LIBOR_{(Rev)}$	=	Revised 6 months LIBOR rate as at the last day of the preceding semiannual period
$LIBOR_{(Ref)}$	=	Reference 6 months LIBOR at COD

14.7 Return on Equity

ROE component of tariff will be quarterly indexed on account of variation in PKR/USD parity as per the following formula:

$$ROE_{(Rev)} = \text{Relevant Reference Transmission Service Charge} * (FX\ USD_{(Rev)}/FX\ USD_{(Ref)})$$

Where:

$ROE_{(Rev)}$	=	the revised ROE Component,
$FX\ USD_{(Rev)}$	=	the revised TT & OD selling rate of PKR/USD as on the date on which indexation is applicable, as notified by the National Bank of Pakistan.
$FX\ USD_{(Ref)}$	=	Reference TT&OD selling rate of PKR/USD at COD, as notified by the National Bank of Pakistan

14.8 Return on Equity during Construction

ROEDC component of tariff will be quarterly indexed on account of variation in PKR/USD parity as per the following formula:

$$ROEDC_{(Rev)} = \text{Relevant Reference Transmission Service Charge} * (FX\ USD_{(Rev)}/FX\ USD_{(Ref)})$$

Where:

$ROEDC_{(Rev)}$	=	the revised ROEDC Component,
$FX\ USD_{(Rev)}$	=	the revised TT & OD selling rate of PKR/USD as on the date on which indexation is applicable, as

notified by the National Bank of Pakistan.

FX USD_(Ref) = Reference TT & OD selling rate of PKR/USD at COD, as notified by National Bank of Pakistan

15 ONE-TIME ADJUSTMENTS

15.1 Capital Cost (EPC + Non-EPC/Development Costs)

At the time ITC opts for the determined Tariff, Capital Costs will be adjusted based on the movement and variation in US PPI for steel, LME Aluminum USD/ton bid prices for 3 month contracts and variation is US PPI for electrical machinery between the date of this Petition and date of acceptance of Tariff by ITC. The formula for adjustment is appearing below:

$$CC_{(Rev)} = (CC_{(Ref)} * 8\% * \Delta US PPI_{(Steel)}) + (CC_{(Ref)} * 47\% * \Delta US PPI_{(EM)}) \\ + (CC_{(Ref)} * 5\% * \Delta LMEA_{(3MC)}) + (CC_{(Ref)} * 40\%)$$

Where:

CC_(Rev) = the revised Capital Cost at the time of opting of a Tariff

CC_(Ref) = the Capital Cost in this Petition

$\Delta US PPI_{(Steel)}$ = The variation in USD PPI for Steel i.e. US PPI_(Steel-N) / US PPI_(Steel-O)

US PPI_(Steel-N) = US PPI for Steel, as notified by the Bureau of Labor Statistics, at the time of ITC opting for the Tariff

US PPI_(Steel-O) = The Reference US PPI for Steel, as notified by the Bureau of Labor Statistics

$\Delta US PPI_{(EM)}$ = The variation in USD PPI for Electrical Machinery i.e. US PPI_(EM-N) / US PPI_(EM-O)

US PPI_(EM-N) = US PPI for Electrical Machinery, as notified by the Bureau of Labor Statistics, at the time of ITC opting for the Tariff

US PPI_(EM-O) = The Reference US PPI for Electrical Machinery, as notified by the Bureau of Labor Statistics, as appearing in this Petition

$\Delta LMEA_{(3MC)}$ = The variation in LME 3 month contract bid price (USD/ton) for aluminum i.e. LMEA_(3MC-N) / LMEA_(3MC-O)

LMEA_(3MC-N) = LME 3 month contract bid price (USD/ton) for aluminum, at the time of ITC opting for the Tariff

LMEA_(3MC-O) = The Reference LME 3 month contract bid price (USD/ton) for aluminum, as appearing in this Petition

15.2 Taxes during Construction

Taxes built-in the Project Cost for this document include Custom duties and Sindh Infrastructure Cess linked with EPC Costs. At the time of acceptance of the Tariff by ITC, this number will be recalculated based on revised Capital Costs as above. All the taxes (including but not limited to the ones mentioned above) on account of the Project Company applicable on Capital Costs (EPC + Non-EPC), NTDC Development Costs, Sinosure Costs during construction and Insurance Premium during construction will be adjusted based on actual at COD.

15.3 Insurance Costs during Construction

Insurance costs during construction shall be trued-up at COD as per the actual annual premium (including any taxes) upon production of authentic documentary evidence. The Insurance costs under the Tariff will be decided upon receipt of Insurance Report from the insurance broker as mentioned above in this Petition which will act as a cap for Insurance Costs (if the report mentions a cap).

15.4 Sinosure Costs during Construction and Operations

The Sinosure Costs payable during the construction period as well as the Sinosure Cost component for operations will be trued-up at COD based on actual payments made by ITC (including taxes) and expected payments during operations. The basis/amounts such premium will apply will be finalized at COD.

15.5 Interest during Construction

At the time of acceptance of Tariff by ITC, based on the revised Capital cost and Taxes, IDC will accordingly be revised.

At the time of COD, based on the revised Sinosure Costs, Taxes, NTDC Development Costs (that are part of Project Costs) and Pre-COD insurance Costs determined, debt and equity will be recalculated based on the revised costs. Accordingly IDC will also be recalculated based on revised debt (based on the drawdowns given in this Petition) and will also be adjusted

based on quarterly movement (as the drawdowns are assumed quarterly) in 6 month LIBOR during the construction period.

15.6. Return on Equity during Construction

At the time of acceptance of Tariff by ITC, based on the revised Capital cost and Taxes, ROEDC will accordingly be revised.

At the time of COD, based on the revised Sinosure Costs, Taxes, NTDC Development Costs (that are part of Project Costs) and Pre-COD Insurance Costs determined, debt and equity will be recalculated based on the revised costs. Accordingly ROEDC will also be recalculated based on revised equity (based on the drawdowns given in this Petition).

15.7 Foreign Exchange Adjustments at COD

After all the above true-ups and adjustments, the revised Project Costs will be converted into PKR at COD based on the average of monthly foreign exchange rates during construction period (1st day of each month). All these changes will lead to revised total Project Cost at COD in PKR which will lead to revised PKR tariff components at COD. Such revised tariff components will be used as a base for recurring indexations during the operations period.

16 Pass-through Items and other Assumptions

- (i) Any changes in any tax rates for taxes applicable on the ITC or on the dividends leading to higher costs will be a Pass-Through item under TSA.
- (ii) Any such, 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.

- (iii) Any with-holding or sales tax etc on Land Lease Costs, and O&M costs has not been assumed in the proposed Tariff. NEPRA to decide the methodology for payment of such costs, in case these costs incurred by them.
- (iv) Withholding tax on dividends has been considered as a pass through item under the TSA. Therefore, Withholding tax on dividends has not been included in the cost estimates.
- (v) No Working Capital has been assumed for bridge financing for Payment of TSC from NTDC to IfC
- (vi) Custom duty @ 5% and Sindh Infrastructure Cess @ 1.05% of EPC Cost has been assumed whether locally produced or not as per GOP Transmission policy.
- (vii) 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.
- (viii) Any tax on any income of the ITC including sales proceeds from NTDC, general sales tax and all other corporate taxes will be treated as Pass - Through items. Sales Tax (if applicable) will be claimed along with Transmission Service Charge invoices.
- (ix) All invoicing and payment terms are assumed to be in accordance with the TSA which will be signed between NTDC and ITC.
- (x) 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.
- (xi) As security is the responsibility of GoP as mentioned above in this document, no extensive security costs have been assumed. If such costs apply, these will be treated as pass-through item in the TSA.
- (xii) Any benefit/ concession/incentives given to any other project of similar nature will also be applicable to the ITC.

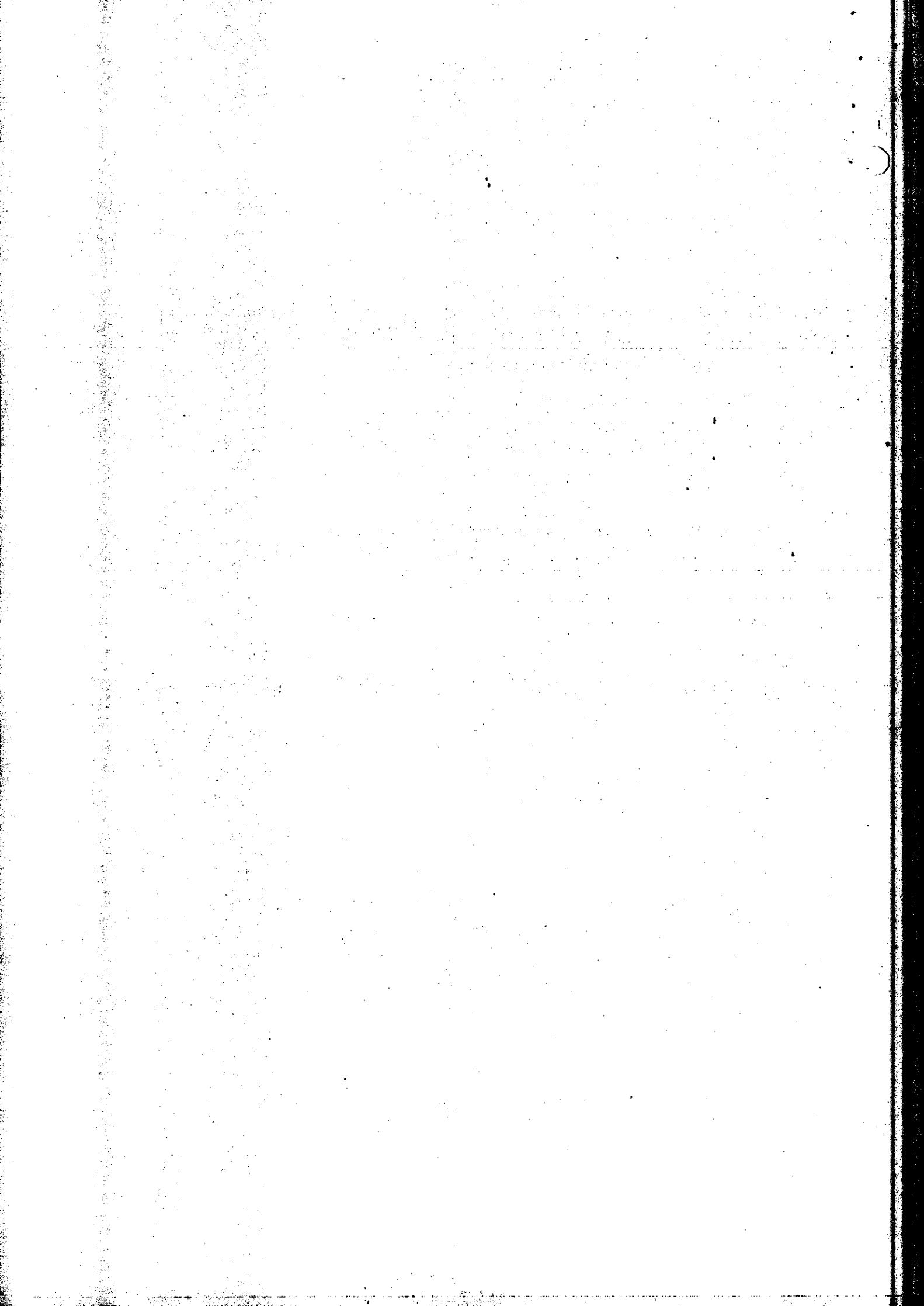
17. RELIEF SOUGHT

The following Tariff on Levellized basis in Rs./kWh is prayed for the approval of the Authority on the basis of above stated facts, circumstances, costs estimates provided by CET and assumptions for the Term of Twenty five (25) years subject to indexation/adjustments as stated in the above Paragraphs.

Tariff Component	(Rs./kWh)	(Cents/kWh)
Fixed O&M – Foreign	0.111	0.107
Fixed O&M- ITC Local	0.059	0.057
Fixed O&M- NTDC O&M Local	0.050	0.048
Land Lease	0.007	0.007
* Insurance Cost	-	-
Sinosure Fee	0.015	0.014
Debt Service	0.435	0.420
ROE	0.218	0.211
ROEDC	0.051	0.049
Total	0.946	0.914

The detail Year wise and component wise Tariff Table is attached hereto with the Tariff Petition as Annexure-IX. All the supporting documents and information is enclosed herewith the Tariff Petition. However, in case of any explanation or clarification are required by the Authority, NTDC would be pleased to provide all such necessary information in support of its case.

Managing Director



NTDC 500kV NETWORK

YEAR 2019-20

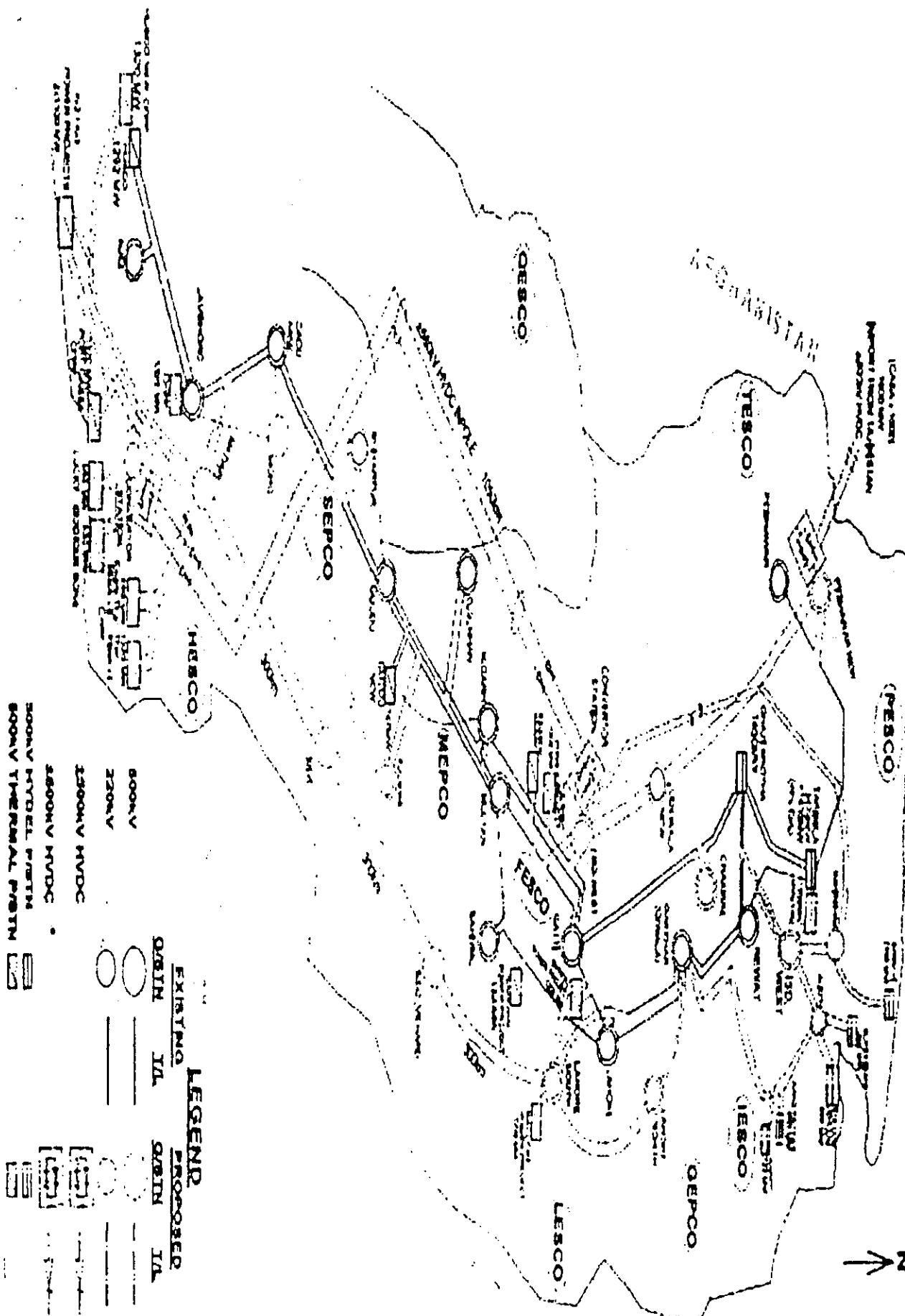
C H I N A

CHINA
NATIONAL
POWER GRID
CORPORATION

(PESCO)

CHINA

N

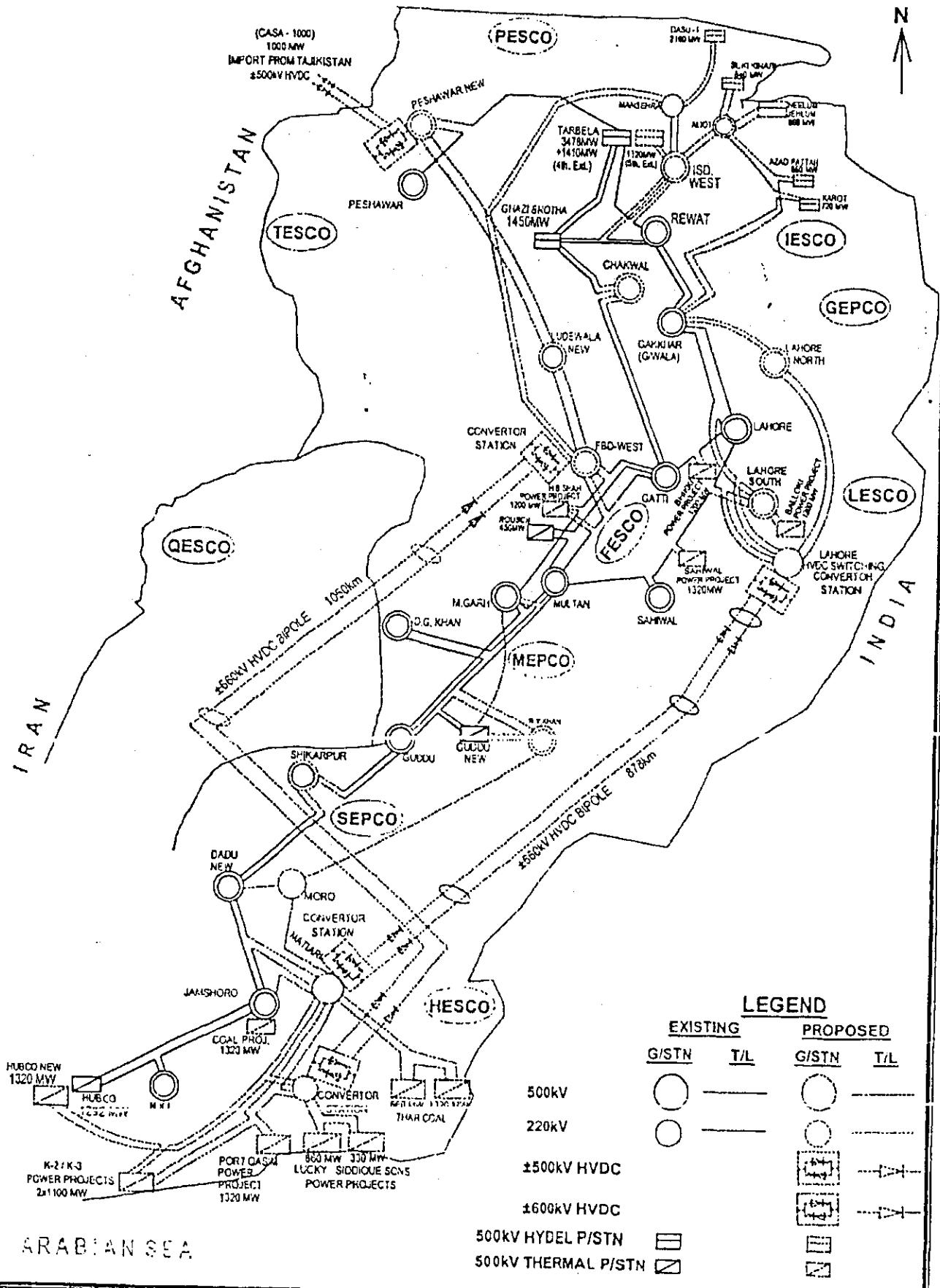


NTDC 500kV NETWORK

YEAR 2021-22

CHINA

1



ROUTE OPTIMIZATION

N

Route A

Route B

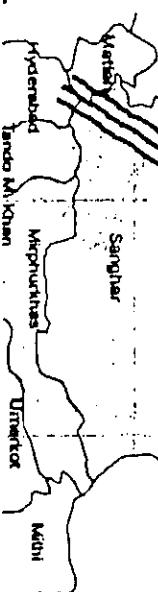
INDIA

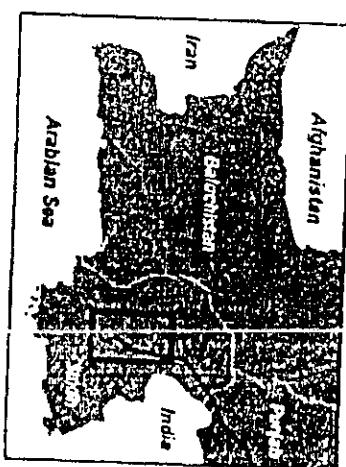
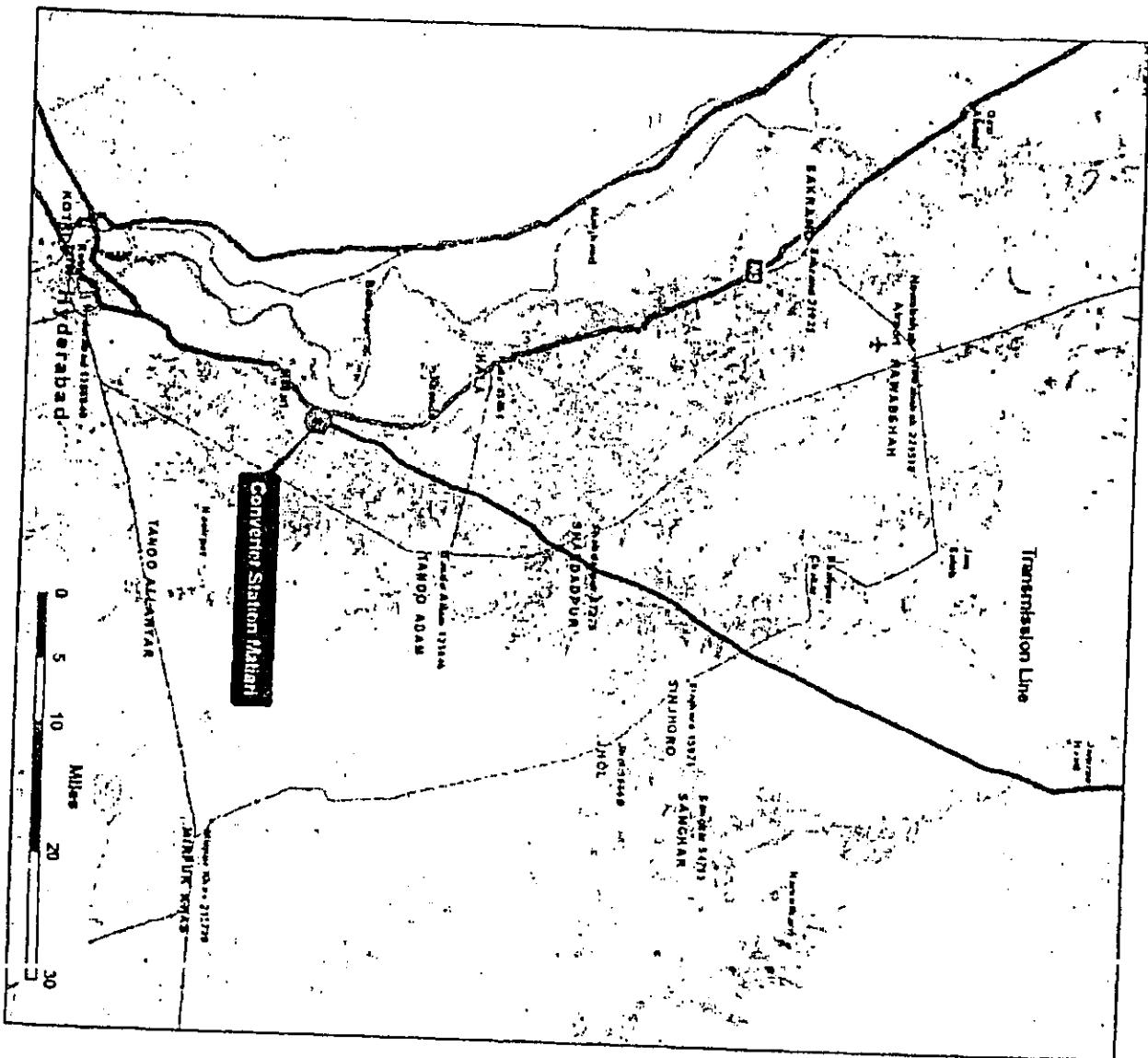
- Legend**
- Original Alignment
 - Alignment after 1st Revision
 - Final Alignment
 - District Boundary

Route C

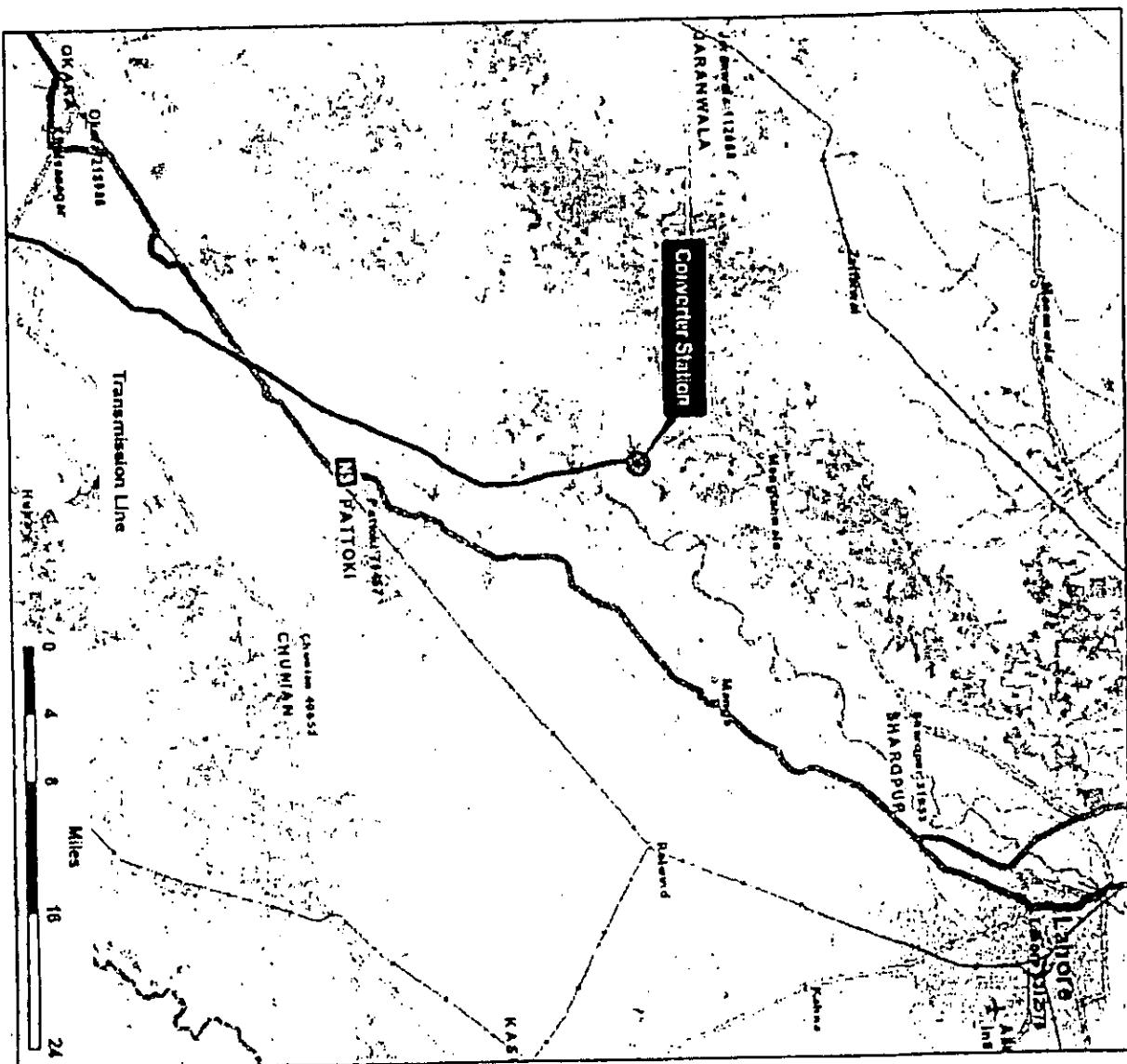
0 50 100 200
Kilometers

ROUTE ALIGNMENTS MAP
±660 KV HVDC Transmission
Line from Matiari to Lahore



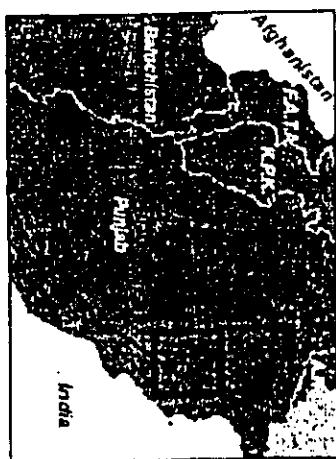


**PROPOSED LOCATION OF
CONVERTER STATION
NEAR MATARI
1630KV HVDC Transmission
Line from Jharia to Lahore**



**PROPOSED LOCATION OF
CONVERTER STATION
NEAR LAHORE**

ABOVE HYDC Transmission
Line from Muzaffar to Lahore



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PROJECT INDEX MAP

