HAZARA ELECTRIC SUPPLY COMPANY LIMITED

PETITION FOR GRANT OF LICENSE FOR
DISTRIBUTION OF ELECTRIC POWER

HAZECO

Hazara Electric Supply Company Limited

HAZECO Head Office
Gulistan Colony, Abbottabad

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No. HAZECO/CEO/ Date: ___/10/2024

The Registrar
National Electric Power Regulatory Authority
NEPRA Tower, Ataturk Avenue (East)
Sector G-5/1, Islamabad

Subject: **Application for Grant of Distribution License for the Hazara Electric Supply Company Limited**

1. I, **Basharat Ali**, being the Chief Executive Officer and duly authorized representative of Hazara Electric Supply Company Limited (**HAZECO**), by virtue of a resolution passed in the 6th meeting of HAZECO's Board of Directors held on 24th August 2024 hereby apply to the National Electric Power Regulatory Authority for the grant of a **License for Distribution of Electric Power** to HAZECO pursuant to Section 20 of the National Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997.

2. I hereby certify that the documents-in-support attached with this petition are prepared and submitted in conformity with the provisions of the National Electric Power Regulatory Authority Licensing (Application Modification, Extension, and Cancellation) Procedure Regulations, 2021, and the Eligibility Criteria (Distribution License) Rules, 2023, and further undertake to abide by the terms and provisions of the rules and regulations *ibid*. I further undertake and confirm that the information provided in the attached documents-in-support is true and correct to the best of my knowledge and belief.

3. A bank draft in the sum of **Rs. 4,093,246/-** (after deduction of tax) being the non-refundable license application fee calculated in accordance with Schedule-II of the National Electric Power Regulatory Authority Licensing (Application Modification, Extension, and Cancellation) Procedure Regulations, 2021, is also attached herewith.

HAZARA ELECTRIC SUPPLY COMPANY LIMITED

Basharat Ali
Chief Executive Officer / Authorized Representative

BEFORE THE NATIONAL ELECTRIC POWER REGULATORY AUTHORITY

PETITION BY THE HAZARA ELECTRIC SUPPLY COMPANY LIMITED (HAZECO) FOR GRANT OF LICENSE FOR DISTRIBUTION OF ELECTRIC POWER UNDER SECTION 20 OF THE REGULATION OF GENERATION TRANSMISSION & DISTRIBUTION OF ELECTRIC POWER ACT, 1997, READ WITH REGULATION 3 OF THE NATIONAL ELECTRIC POWER REGULATORY AUTHORITY LICENSING (APPLICATION MODIFICATION, EXTENSION, AND CANCELLATION) PROCEDURE REGULATIONS, 2021

INDEX OF DOCUMENTS:

Annex-N7	Employment records of senior engineering and technical staff;	132-207
Annex-N8	Profile of any sub-contractors [**N/A**];	
Annex-N9	Technical and financial proposal for operation, maintenance, planning and development of system.	208-220
Annex-N10	Design of system and facilities and details of technology;	221-222
Annex-N11	Service Territory;	223-236
Annex-N12	Any financing plans, financing terms, tariff calculations, analysis of economic and financial viability;	237
Annex-N13	*Not used*	
Annex-N14	Environmental and Social Soundness Assessment (ESSA) study/report	238-379
Annex-N15	System studies	380-386
Annex-N16	Patrolling and inspection procedures	387-390
Annex-N17	Maintenance plans and procedures	391-413
Annex-N18	Fault location/trouble-shooting procedures	414-415
Annex-N19	Training and development procedures and manuals (this is repetition and same as N29)	416-476
Annex-N20	Information and documents in support of distribution expansion and investment	477-484
Annex-N21	Information relating to:	485-498
Annex-N21/1	*Distribution system configuration*	485-498
Annex-N21/2	*Service territory, right of way and feeder maps*	499
Annex-N21/3	*Voltage levels and regulation*	500-502
Annex-N21/4	*Type of distribution system*	503-509
Annex-N21/5	*Line equipment characteristics*	510-516
Annex-N21/6	*Power quality control*	517-519
Annex-N21/7	*Back-up/express feeder provision*	520-523
Annex-N21/8	*Accident protection and prevention procedures*	524-526
Annex-N21/9	*Emergency provisions*	527-528
Annex-N21/10	*Protection, control and measuring instruments*	529-539
Annex-N21/11	*Type of metering system to be used*	540-543
Annex-N21/12	*Metering installation and testing facilities*	544-548
Annex-N21/13	*Communication systems*	549-551
Annex-N22	Relevant feeder maps Number of consumers and expected load	552-691

Annex-N23	Consumer class/category, sub-category on the basis of sanctioned load and voltage Level	692-693
Annex-N24	Tariff categories of consumer classes to he served	694-697
Annex-N25	Demand and consumption pattern on different time periods	698-699
Annex-N26	Procurement Plan for meeting expected loads	700-710
Annex-N27	12-month projections on expected load, number of consumers and expected sale of units for each consumer category	711-713
Annex-N28	5-year Investment Plan indicating schemes/models/framework for undertaking supply of electric power (including frameworks for providing non-discriminatory services and acquisition/sale of assets in relevant service territories)	714-751
Annex-N29	Consumer Service Manual	752
Annex-N30	Information relating to:	
Annex-N30/1	*Proposed service territory*	Same as N11
Annex-N30/2	*Billing and collection procedures (including provisions for remote metering)*	753
Annex-N30/3	*Ability to access consumer metering systems and other services/equipment*	754-756
Annex-N30/4	*Emergency provisions and protocols*	757-758
Annex-N30/5	*Basis of common services for commercial and residential consumers and their allocation thereof*	759.

for the Petitioner / Hazara Electric Supply Company Limited:

HAZARA ELECTRIC SUPPLY COMPANY LIMITED

Basharat Ali
Chief Executive Officer
Hazara Electric Supply Company Limited (**HAZECO**)
Gulistan Colony (*Opp.* Govt. Post-Graduate College No. 1)
Abbottabad
Tel: 0992 – 921404
Email: dcp_pepco@yahoo.com

A. General Information of the Petitioner

Name of Petitioner:	Hazara Electric Supply Company Limited
Registered Address:	Room 209, 2nd Floor, A Block, Pak Secretariat, Islamabad.
Business Address:	HAZECO Head Office, Gulistan Colony (Opp. Govt. Post-Graduate College No. 1, Abbottabad
Proposed Service Territory:	The districts of: 1. Abbottabad; 2. Haripur; 3. Mansehra; 4. Battagram; and 5. Torghar. in the Province of Khyber Pakhtunkhwa ("**Proposed Service Territory**")
No. of Consumers:	Approximately 776,805

B. Background

1. In 1998, the Federal Government, as part of its plan to restructure the power sector in Pakistan, decided to unbundle the Power Wing of the Water & Power Development Authority ("**WAPDA**"). This decision was taken in pursuance of a strategic plan, which was approved by the Council of Common Interests in the year 1993. Under this strategic plan, WAPDA's Power Wing was to be 'unbundled', so that the power generation (thermal), transmission, and distribution businesses could be carved out of WAPDA's Power Wing and entrusted to newly formed companies.

2. In pursuance of this strategic plan, in 1998, the Federal Government incorporated a number of companies and subsequently, WAPDA transferred asset-blocks from its Power Wing to the newly created companies, which included power distribution companies or "**DISCOs**".

Initially, eight (08) DISCOs were formed, one of which was the Petitioner, Peshawar Electric Supply Company Limited ("**PESCO**").

3. PESCO was granted a distribution license (Distribution License No. DL/07/2002) by NEPRA on 30th April 2002. Initially, this license allowed PESCO to distribute electricity all over the province of Khyber Pakhtunkhwa ("**KPK**") (formerly N.W.F.P.) as well as the former Federally Administrated Tribal Areas ("**FATA**"). Moreover, PESCO also owned the complete power distribution network in FATA.

4. In 2007, the Federal Government took a policy decision to bifurcate PESCO by creating a separate distribution company to supply power to the areas falling under the erstwhile FATA. This new company, Tribal Areas Electric Supply Company ("**TESCO**") was operationalized in 2007 and subsequently, PESCO's distribution assets and network in the former FATA were transferred to TESCO.

5. TESCO was granted a distribution license by the Authority on 12th August 2013, and on the same date, NEPRA approved Modification No. 1 to PESCO's old distribution license by removing the areas falling in the erstwhile FATA from PESCO's Service Territory.

6. On 14th January 2022, PESCO applied to the Authority for renewal/extension of the Distribution License No. DL/07/2002. The Authority however, on 9th May 2023, granted PESCO a fresh distribution license (License No. DL/07/2023) for distribution of electric power in its Service Territory on a non-exclusive basis, for a term extending up to 8th May 2043.

7. Similarly, in 2010, the Federal Government decided to bifurcate Hyderabad Electric Supply Company ("**HESCO**") by creating a separate company by the name of Sukkur Electric Power Company ("**SEPCO**"). Accordingly, SEPCO was incorporated and took over HESCO's power distribution business in the Sukkur, Larkana, and Dadu circles, and was licensed accordingly by the Authority.

8. Shareholding in all DISCOs is fully owned/controlled by the Federal Government. The DISCOs are accordingly "state-owned enterprises" as defined in Section 2(o) of the State-Owned Enterprises (Governance & Operations) Act, 2023.

C. Proposal for Bifurcation of PESCO

9. The idea of bifurcating PESCO for a host of technical, commercial, and managerial reasons has been under consideration for many years now. When PESCO applied for extension/renewal of its existing distribution license in 2022, the Authority framed the following issue to specifically address this matter:

> *(f) The service area of all the DISCOs is relatively large and will it not be prudent to consider bifurcating these into small units to bring more efficiency?*

10. During the hearing on PESCO's application on 21st April 2022, the following submissions were made by PESCO on this issue, as recorded in para-11 of the Authority's decision:

> *(11). About bifurcating the service area of DISCO(s) into smaller units, PESCO was of the view that PESCO has already working on bifurcation of the Company into small DISCOs to improve its efficiency and for provision of better services to its consumers. The case has been submitted to General Manger (Technical Services), Power Planning & Monitoring Company (Pvt) Limited, Islamabad for further consideration.*

11. The issue of bifurcation of large DISCOs, such as PESCO, QESCO, and MEPCO was taken up in a meeting of the Federal Cabinet held on 21st December 2022, which directed the Ministry of Energy (Power Division) to review the matter and to determine the viability of bifurcating large DISCOs including PESCO. The Power Division accordingly constituted a

committee headed by the then Federal Minister for Power Division to review this issue. The said committee thereafter referred the matter for a detailed technical, administrative, and commercial evaluation to Power Planning & Monitoring Company ("**PPMC**"), which asked a number of large DISCOs, including PESCO to carry out a detailed review of the proposal.

12. In compliance with PPMC's directives, CEO PESCO constituted a committee on 11th March 2022 to comprehensively review the proposal to bifurcate PESCO and to give a proposal regarding the proposed bifurcation. This committee consisted of the following members:

(i)	Chief Engineer (P&E)	Convenor
(ii)	Chief Commercial Officer	Member
(iii)	Chief Engineer (O&M) T&G	Member
(iv)	Director General (HR)	Member
(v)	Finance Director	Member
(vi)	Project Director (GSC)	Member
(vii)	Manager (MIRAD)	Member

13. Salient features of the review carried out by the aforementioned committee are as follows:

(i) PESCO was supplying power under its license to twenty-eight (28) districts in the province of KPK, with an area of 78,088 sq. km, with 4.2 million consumers (as of June 2023).

(ii) Areas under PESCO's license had gone through a difficult situation since 2001 due to factors including militancy and terrorism. There was extreme poverty in many areas and due to a host of factors, the recovery of arrears had not been possible and electricity theft was on the rise.

(iii) Since its creation, the number of consumers in PESCO's administrative units had increased many times over, which made

these units unmanageable.

(iv) PESCO's present organizational structure was unable to support integration of new technology, such as AMR, GIS, mobile meter reading, and IT Based interventions.

(v) PESCO also faced problems due to an acute shortage of technical and non-technical field staff.

(vi) Bifurcation of PESCO would improve the efficiency and control of operational functions by increasing revenue realization, reduction in T&D losses, improving continuity issues like quality of service and reliable supply of power.

(vii) Bifurcation would allow for better management of surveillance, operation, vigilance, and customer service. Many issues cannot be managed from Peshawar due to long distances between the circles and the present headquarter.

(viii) After bifurcation, the employees would be adjusted to the DISCO that is relevant to their districts of domicile, helping the employees to perform better and to have better familiarity with their area of posting.

14. The committee accordingly recommended that:

The bifurcation will be beneficial provided that both human and financial resources are made available as per latest yardstick and it will further improve the following:

- *Better monitoring and control with economical utilization of resources.*
- *More focused investment and non-compliant areas can be monitored more closely.*
- *Management size of consumers as well as transmission and distribution system.*
- *Reduction in line losses and improvement in recovery.*

- *Ensuring stable/uninterrupted power supply to consumers by timely rectification of faults due to manageable distances.*
- *Prompt redressal of consumer complaints.*

15. PESCO has continued over the years to suffer from significant losses resulting in its current financial crisis. The increasing demand of uninterrupted power consumption and interests of commercial and industrial clients has led to a situation, where managing the expanse of the whole province of KPK has become unmanageable by PESCO. It has thus become inevitable to bifurcate PESCO and carve a part of its service territory for better technical, commercial, and administrative performance.

16. The areas comprising of the present Hazara-I and Hazara-II Circles of PESCO, being geographically and commercially heterogeneous as compared to the rest of the province of Khyber Pakhtunkhwa are therefore ideal to start the process of breaking down PESCO into more manageable units. These areas cover the following districts in the province of Khyber Pakhtunkhwa:

(i) Abbottabad;
(ii) Haripur;
(iii) Mansehra;
(iv) Battagram; *and*
(v) Torghar.

("**Proposed Service Territory**")

17. It was accordingly proposed that PESCO should be bifurcated by carving out the HAZECO's Proposed Service Territory from PESCO's existing Service Territory and for HAZECO to obtain a license from the Authority to distribute and sell electric power in the Proposed Service Territory.

D. Approval of the Federal Government for bifurcation of PESCO and establishment of HAZECO

18. On 13th July 2023, the Ministry of Energy (Power Division) submitted a summary to the Federal Cabinet, with the following proposal at para-5:

> *5. In view of the foregoing, the Federal Government's approval is solicited for:*
>
> *(i) Creation of a new power distribution company by the name of Hazara Electric Supply Company (HAZECO) to take over PESCO's power distribution business in the present Hazara-I and Hazara-II circles, and to commence business subject to all legal and regulatory requirements;*
>
> *(ii) Authorization to the Power Division to take all steps to affect the incorporation of HAZECO, to formulate and implement the bifurcation plant for PESCO, and for the following officials to act as the initial 'promoters' of HAZECO:*
>
> - *Secretary, Power Division;*
> - *Additional Secretary – I, Power Division;*
> - *Sr. Joint Secretary (CAD), Power Division.*
>
> *(iii) Reorganization / Restructuring of PESCO by dividing its business and assets between PESCO and HAZECO as per all legal and regulatory approvals.*

19. The summary submitted by the Ministry of Energy (Power Division) was approved by the Federal Cabinet on 20th July 20223 and HAZECO was formally incorporated as a public limited company on 31st October 2023. Shareholding in HAZECO is also wholly owned by the Federal Government.

E. Approval for Bifurcation of PESCO's Distribution Area by PESCO's Board of Directors

20. The comprehensive technical and commercial proposal for bifurcation of PESCO's existing service territory by excluding the areas that presently consists of Hazara-I and Hazara-II Circles of PESCO was presented before the 195th meeting of PESCO's Board of Directors held on 29th December 2023 and was duly approved.

21. The scheme for bifurcation, approved by PESCO's Board of Directors

includes details on division of human resource, technical resources and distribution network, financial resources including debts and liabilities, division of legal cases, and all other matters related to the proposed bifurcation of PESCO's distribution territory and to carve out HAZECO's distribution territory.

22. PESCO's Board of Directors further resolved to file a license modification petition before the Authority to seek the deletion of HAZECO's Proposed Distribution & Sale Territory from PESCO's distribution license.

23. Similarly, HAZECO's Board of Directors, in its 6th meeting held on 26th August 2024 resolved that HAZECO should file the instant application for obtaining a license for *inter alia* distribution of electric power in HAZECO's Proposed Service Territory.

24. The Petitioner furthermore understands that PESCO has also filed a licensee proposed modification to its Distribution License No. DL/07/2023 to remove HAZECO's Proposed Service Territory from its own service territory.

25. As per the scheme of bifurcation approved by PESCO's Board of Directors, as well as HAZECO' Board of Directors, HAZECO's Proposed Service Territory, within PESCO's existing service territory, can be depicted as follows:

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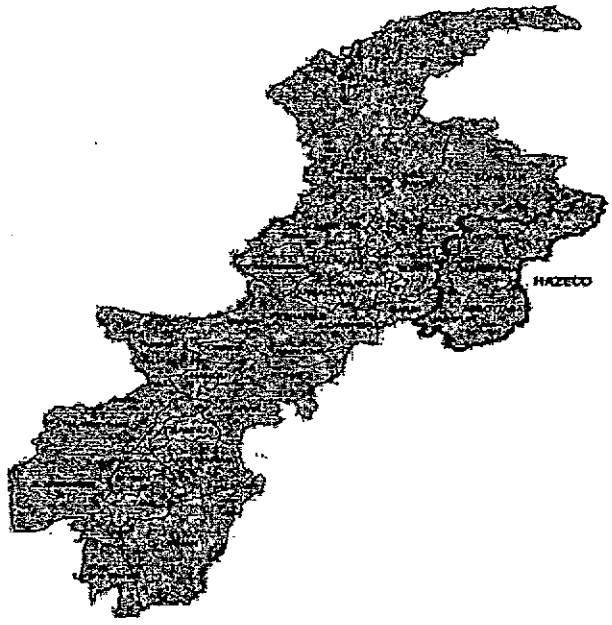


Figure 1: HAZECO's Proposed Service Territory within PESCO's Existing Service Territory

26. A more detailed map of HAZECO's proposed Service Area is as follows:

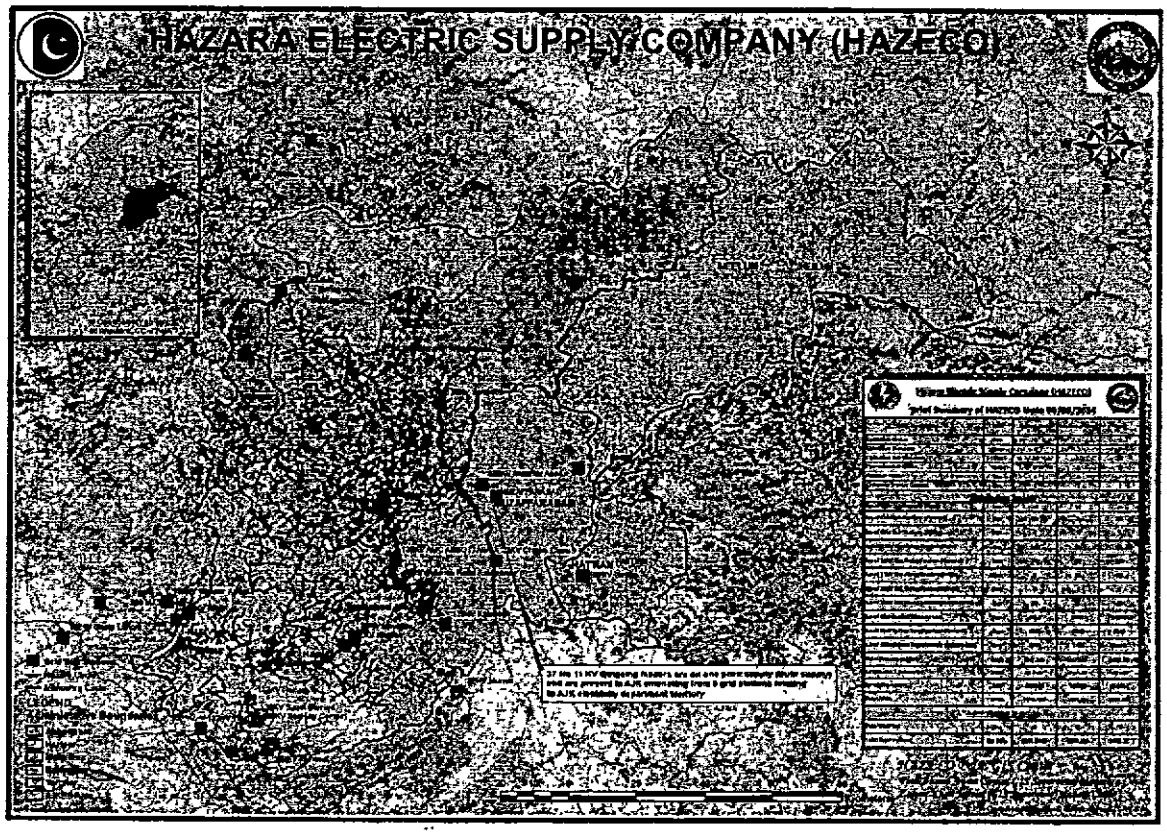


Figure 2: HAZECO's Proposed Service Territory

F. Requirements under the Eligibility Criteria (Distribution Licenses) Rules, 2023

27. As aforementioned, PESCO was granted a fresh distribution license on 9th May 2023 (License No. DL/07/2023). As a successor to PESCO's distribution business in the Proposed Service Territory, HAZECO fulfills the eligibility criteria laid down in Rule 3 of the Eligibility Criteria (Distribution Licenses) Rules, 2023. In particular;

(i) HAZECO is duly registered as a company with the Securities & Exchange Commission of Pakistan;

(ii) The Proposed Service Territory has been specified in the instant petition;

(iii) As per Rule 3(1)(c) read with Schedule-I, HAZECO, as a successor to an existing distribution licensee should be deemed to fulfill the minimum solvency requirements;

(iv) As a successor to an existing distribution licensee, HAZECO already has in place all systems for coordination with NPCC, CPPA, NTDC, and all other relevant entities for safe and effective operation of a power distribution system;

(v) Systems are already in place to ensure compliance with all the requirements under Rule 3(1)(f) and (g) read with Schedule-II, and the relevant documents are annexed herewith to show that HAZECO has the required technical, administrative, manpower, and IT resources in place to effectively manage and operate the power distribution system in its Proposed Service Territory.

28. An affidavit is also attached herewith to the effect that HAZECO fulfills all the requirements under the Eligibility Criteria (Distribution Licenses) Rules, 2023, and the undersigned remains available to furnish any further documents to this effect in support of the instant application.

G. Conclusion & Prayer

29. Based on the feasibility studies and bifurcation plan approved by the Federal Government on 20th July 2023, as well as PESCO's Board of Directors in its 195th meeting held on 29th December 2023, and HAZECO's Board of Directors in its 6th meeting held on 26th August 2024, and on the basis of the documents annexed with this petition from **Annexures N1** to **N30**, the petitioner seeks issuance of a license by the Authority for the distribution of electric power in the **Proposed Service Territory** under Sections 20 of the Regulation of Generation Transmission & Distribution of Electric Power Act, 1997.

30. The Petitioner has duly complied with all requirements under the provisions of National Electric Power Regulatory Authority Licensing (Application Modification, Extension, and Cancellation) Procedure Regulations, 2021, the National Electric Power Regulatory Authority Licensing (Distribution) Regulations, 2022, and undertakes to fulfill any other requirements in this regard prescribed by the Authority.

31. In view of the foregoing, it is prayed that the Authority may be pleased to grant a license to the Petitioner for distribution of electric power in the Proposed Service Territory, for a period of **twenty (20)** years from the date of grant of license:

Islamabad, October 2024

Petitioner/Hazara Electric Supply Company Limited

through

HAZARA ELECTRIC SUPPLY COMPANY LIMITED

Basharat Ali

Chief Executive Officer / Authorized Representative

HAZARA ELECTRIC SUPPLY COMPANY LIMITED

Tel# 0992-920211 Fax# 0992-921405 Email:- ceo.hazeco@gmail.com		*Office of the* **Chief Executive Officer** **HAZECO H/Q, 426/A, PMA Link Road, Jinnahabad, Abbottabad**

No. 395 /CEO/2025 Dated. 23/01/2025

The Registrar,
National Electric Power Regulatory Authority (NEPRA),
NEPRA Tower Attaturk Avenue (East), Sector G-5/1,
Islamabad.

Subject:- **APPLICATION FOR GRANT OF DISTRIBUTION AND SUPPLY LICENCE(S) FOR THE HAZARA ELECTRIC SUPPLY COMPANY LIMITED.**

This is with reference to the two (02) separate applications for the grant of Distribution and Supply License(s) that HAZECO submitted for the consideration of the Authority. In this regard, it is observed that the main part of our applications does not include the districts of Upper Kohistan, Lower Kohistan and Kolai Pallas, whereas in the prospectus, the same has been mentioned/included.

In this regard, it is submitted that the Ministry of Energy (Power Division), vide its Notification no. 12/(24)/2024-CA-I on 07/01/2025 has confirmed that the districts mentioned above will also form part of the service territory of HAZECO. In order to remove any doubt/confusion at a belated stage, through this letter, an addendum is submitted to consider the services territory of HAZECO as follows: (i) Abbottabad, (ii) Haripur, (iii) Mansehra, (iv) Battagram, (v) Torghar, (vi) Upper Kohistan, (vii) Lower Kohistan and (viii) Kolai Pallas.

Further to the above, it is submitted that HAZECO must assume the responsibilities of providing distribution and supply of electric power services in the above-mentioned districts of the Province of Khyber Pakhtunkhwa. In order to continue its operation, the Company/HAZECO requests the Authority to allow applying for an interim tariff on the same terms and conditions that are currently applicable to PESCO subject to any adjustment subsequently.

Chief Executive Officer
HAZECO, Abbottabad

GOVERNMENT OF PAKISTAN
MINISTRY OF ENERGY
(POWER DIVISION)

Islamabad, the January 07th, 2025

NOTIFICATION

No. 12(24)/2024-CA-I. In pursuance of the approval granted by the Federal Cabinet in Case No. 379/ 41/ 2024 dated 17-12-2024, it is hereby notified that Hazara Electric Supply Company (HAZECO) is authorized to take over the power distribution and supply business of Peshawar Electric Supply Company (PESCO) in the present districts of Kohistan Lower, Kohistan Upper, and Kolai Pallas.

2. HAZECO shall commence its business operations in the aforementioned districts subject to compliance with all applicable legal and regulatory requirements.

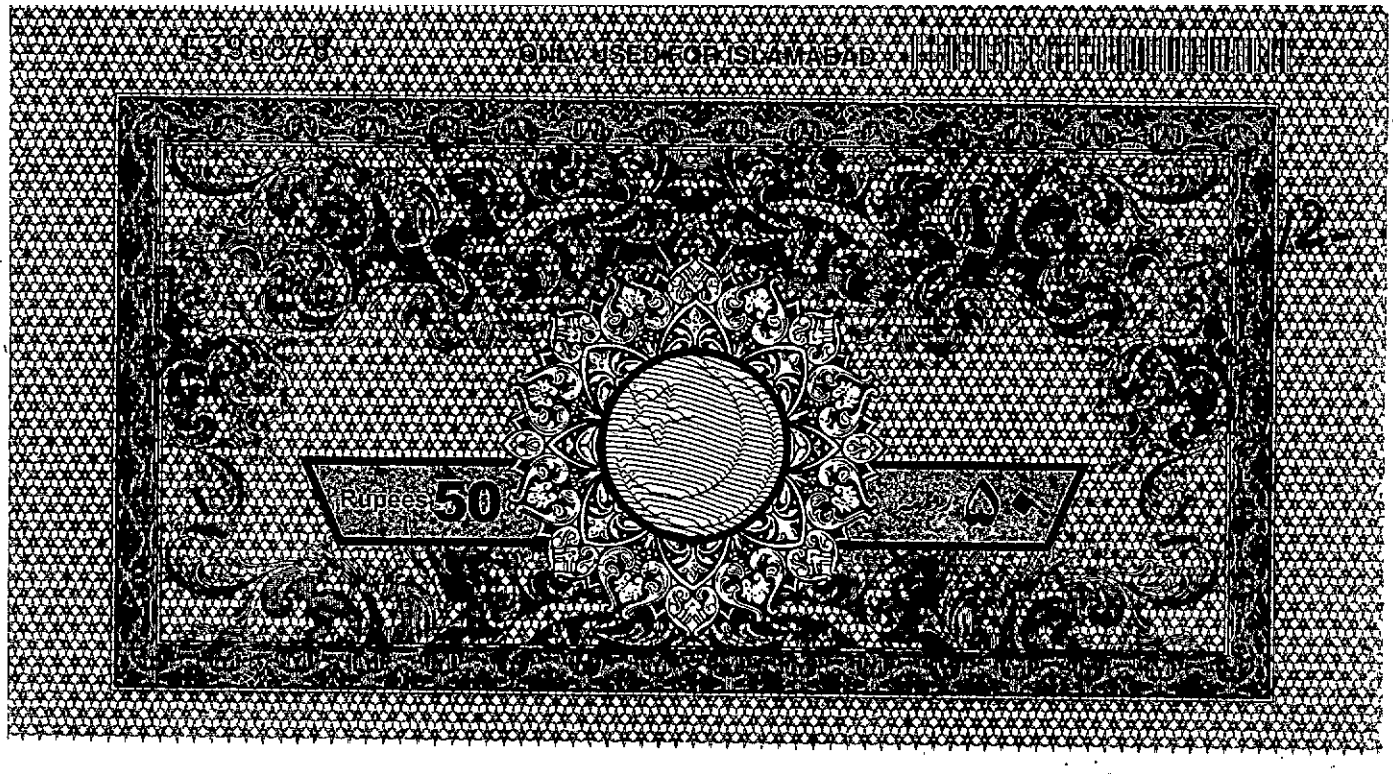
3. All concerned authorities and stakeholders are directed to facilitate the smooth transition and operationalization of HAZECO in accordance with the law.

(Qudrat Ali Khan)
Section Officer (Corporate Affairs-I)
Ph: 051-9209119

The Manager,
Printing Corporation of Pakistan Press, University Road,
Karachi.

Copy to:

1. The DG to the Minister for Energy (Power Division), Islamabad.
2. The PS to Secretary, Ministry of Energy (Power Division), Islamabad.
3. The Chairman, National Electric Power Regulatory Authority (NEPRA), Islamabad.
4. The CEO, Peshawar Electric Supply Company (PESCO), Peshawar.
5. The CEO, Hazara Electric Supply Company (HAZECO), Abbottabad.
6. Office File



Affidavit

[Rule 4 of the Eligibility Criteria (Distribution Licenses) Rules, 2023]

I, **Basharat Ali** son of Inayat Ullah, resident of Phase 8, DHA, House No. 39/1-C, Street No. 8, Lahore Cantt, Lahore, CNIC No. 35201-3615917-7, being Chief Executive Officer and authorised representative of Hazara Electric Supply Company Limited (**HAZECO**) do hereby state on solemn affirmation that:

1. I am the duly authorized representative of HAZECO by virtue of resolution of HAZECO's Board of Directors passed in its 6th Meeting held on 26th August 2024;

2. HAZECO has filed an application before NEPRA for grant of a license for distribution of electric power under Section 20 of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997;

3. HAZECO fulfills all requirements for grant of a license for distribution of electric power under Eligibility Criteria (Distribution Licenses) Rules, 2023; *and*

4. HAZECO undertakes to fulfill all obligations under National Electricity Policy and National Electricity Plan, framed under Section 14A, and all other sections of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 and the NEPRA Licensing (Distribution) Regulations, 2022.

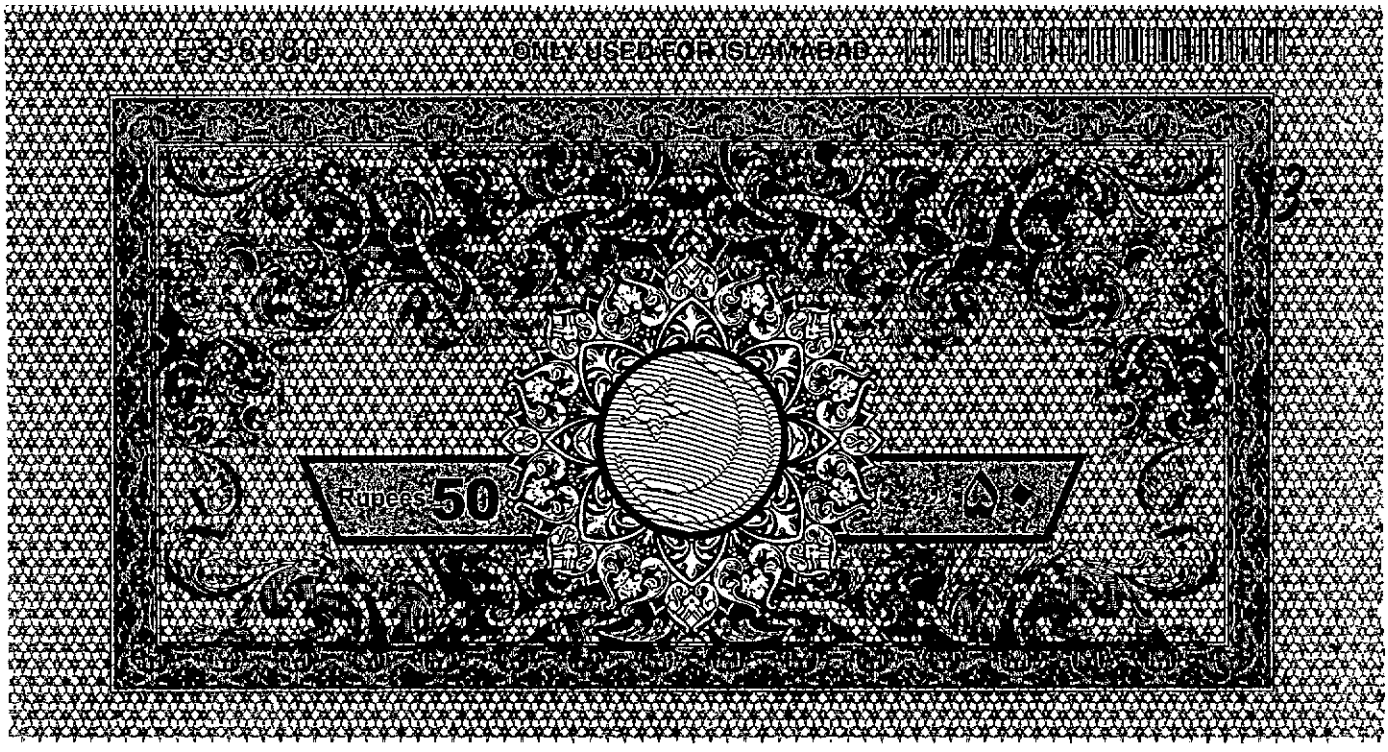
That, whatever has been stated above is true and correct to the best of my knowledge and belief and nothing material has been concealed.

DEPONENT
12th October 2024

ATTESTED
TARIQ IQBAL MAHER
Advocate High Court
Oath Commissioner
ISLAMABAD

ATTESTED
TARIQ IQBAL MAHER
Advocate High Court
Notary Public
ISLAMABAD

E-398809 ONLY USED FOR ISLAMABAD



Affidavit

[*Rule 3(4)(g) and (7) of the NEPRA Licensing (Application, Modification, Extension and Cancellation)* Procedure Regulations, 2021]

I, **Basharat Ali** son of Inayat Ullah, resident of Phase 8, DHA, House No. 39/1-C, Street No. 8, Lahore Cantt, Lahore, CNIC No. 35201-3615917-7, being Chief Executive Officer and authorised representative of Hazara Electric Supply Company Limited (**HAZECO**) do hereby state on solemn affirmation that:

1. I am the duly authorized representative of HAZECO by virtue of resolution of HAZECO's Board of Directors passed in its 6th Meeting held on 26th August 2024;

2. HAZECO has filed an application before NEPRA for grant of a license for distribution of electric power under Section 20 of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997;

3. HAZECO does not currently possess any license from NEPRA issued under the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997;

4. The contents of HAZECO's petition and the annexures thereof are correct, authentic, and accurate to the best of my knowledge and belief and nothing material has been concealed.

That, whatever has been stated above is true and correct to the best of my knowledge and belief and nothing material has been concealed.

DEPONENT
12th October 2024

ATTESTED
TARIQ IQBAL MAHER
Oath Commissioner
ISLAMABAD

ATTESTED
TARIQ IQBAL MAHER
Advocate High Court
Notary Public
ISLAMABAD

HAZARA ELECTRIC SUPPLY COMPANY LIMITED

Room No.209, 2nd Floor, Block-A, Pak Secretariat, Islamabad

No. 129-35 HAZECO/BoD/6th/Item-7 dated: 20th September 2024

14-

Chief Executive Officer
HAZECO.

Subject: **APPROVAL FOR FILING OF PETITION BEFORE NEPRA FOR GRANT OF DISTRIBUTION LICENSE FOR HAZECO AND BEFORE PESHAWAR HIGH COURT FOR RECONSTRUCTION OF PESCO.**

1. Mr. Rizwan Faiz Muhammad, the consultant, presented the agenda to the Board of Directors of HAZECO in its 6th Meeting held on 24th August 2024 and provided an overview of the current Hazara-I and Hazara-II Circles of PESCO. These are considered well-suited for the initial phase of restructuring PESCO into more manageable units. The eight districts under consideration in Khyber Pakhtunkhwa are:

1. Abbottabad
2. Haripur
3. Mansehra
4. Battagram
5. Upper Kohistan
6. Lower Kohistan
7. Torghar
8. Kolai Palas

2. It was informed that PESCO has been bifurcated by delineating HAZECO's proposed service territory from PESCO's existing service area, and that HAZECO be granted a license by the Authority to distribute and sell electric power within this proposed service territory.

3. The Board was requested to approve the bifurcation scheme and authorize the CEO to submit petitions to NEPRA for the issuance of a distribution license to HAZECO. Additionally, authorization was sought for the payment of the requisite fee to NEPRA for the distribution license and for filing a petition with the Peshawar High Court regarding the restructuring of PESCO.

4. The CEO pointed out that as per para 2(b) of the Ministry of Energy, Power Division's Notification No. 12(24)/2020-DISCO-II dated January 18, 2023 "HAZECO shall consist of 02 Circles namely Hazara-I and Hazara-II Circles with the new Company's Headquarters at Abbottabad". As such, at the moment, the districts of Kohistan are not part of HAZECO.

RESOLUTION OF BOD

5. Agreeing with the CEO's clarification, the Board directed the consultant to revise the petition and confine it only to Hazara-I and Hazara-II Circles, as per Ministry of Energy, Power Division's Notification No. 12(24)/2020-DISCO-II dated January 18, 2023. The Board resolved as under:

HAZARA ELECTRIC SUPPLY COMPANY LIMITED

Room No.209, 2nd Floor, Block-A, Pak Secretariat, Islamabad

15

1. **Approval of Bifurcation Scheme:**

   The Board approved the Scheme of Bifurcation for PESCO's assets, business, manpower, and liabilities as previously sanctioned by PESCO's Board of Directors.

2. **Petition Filing for Reorganization:**
   Approval was granted for the filing of a petition, in conjunction with PESCO, before the Peshawar High Court under the relevant provisions of the Companies Act, 2017. This petition seeks the reorganization of PESCO in accordance with the Scheme of Bifurcation approved by the Boards of both companies.

3. **Petition for Distribution License:**
   The Board approved the filing of a petition with NEPRA to obtain a distribution license for HAZECO.

4. **Petition for Power Supply License:**
   Approval was given for filing a petition with NEPRA to obtain a license for the supply of electric power for HAZECO.

5. **Approval of Fees and Incidental Expenses:**
   The Board authorized the payment of all necessary fees to NEPRA, the Peshawar High Court, SECP, and any incidental expenses associated with the filing of the aforementioned petitions.

6. **Authorization to CEO:**
   The CEO was authorized to sign all necessary documents, including petitions, affidavits, and vakalatnama, on behalf of HAZECO.

6. This is issued in accordance with the approval of HAZECO Board.

Company Secretary HAZECO

Distribution:

1. All Board Members.

SECRET

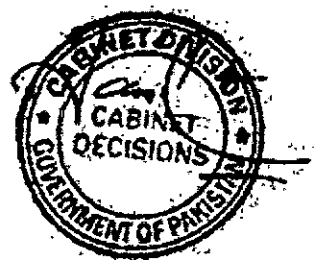
16-

Case No.421/Rule-19/2023 Dated: 20.07.2023	**BIFURCATION / REORGANIZATION OF PESCO AND FORMATION OF HAZARA ELECTRIC SUPPLY COMPANY (HAZECO)**
Presented by: **Power Division**	

DECISION

The Cabinet considered the summary dated 13th July, 2023 submitted by the **Power Division**, which was circulated in terms of rule 17(1)(b) read with rule 19(1) of the Rules of Business, 1973 for **'Bifurcation / Reorganization of PESCO and Formation of Hazara Electric Supply Company (HAZECO)'** and approved the proposal at **Para 5** of the summary.

☆☆☆



NO. 12(24)/2019-DISCOs/CA-I
GOVERNMENT OF PAKISTAN
MINISTRY OF ENERGY
(POWER DIVISION)
*****

-17-

SUMMARY FOR THE CABINET

Subject: **BIFURCATION / REGORGANIZATION OF PESCO AND FORMATION OF HAZARA ELECTRIC SUPPLY COMPANY (HAZECO)**

In 1998, pursuant to the Strategic Plan for WAPDA, approved by the Council of Common Interest in 1993, WAPDA's Power Wing was restructured by creating independent power generation, transmission, and distribution companies. In 1998, initially eight (08) distribution companies were created of which, the Peshawar Electric Supply Company ("PESCO") was tasked with carrying out the power distribution business all over the province of Khyber Pakhtunkhwa as well as the *former* Federally Administrated Tribal Areas ("FATA"). Later on, two more companies namely Sukkur Electric Supply Company (2010) and Tribal Area Electric Supply Company (2013) were created.

2. The proposal to bifurcate DISCOs covering very large geographical areas, such as PESCO, Quetta Electric Supply Company ("QESCO") and Multan Electric Power Company ("MEPCO") have been under consideration for some time. In this regard, the Prime Minister was pleased to approve the proposal of this Division moved through a summary dated 30.12.2022 (**Annex-I**) to bifurcate PESCO into PESCO and HAZECO (DISCO for Hazara-I and Hazara-II circles) which was notified by this Division on 18-01-2023 (**Annex-II**). In the meantime, a Writ Petition No. 674-P/2023 has been filed in Peshawar High Court, whereby the petitioner has raised objections that the approval of Cabinet and CCI was required for establishment of HAZECO. The Court has granted status quo in the matter. It may be mentioned that the Cabinet has approved appointment of first Independent Directors of HAZECO vide Case No. 362/Rule-19/2023 dated 24.06.2023 (**Annex-III**).

3. Under the Strategic Plan for WAPDA, the corporate entities such as the DISCOs are to be owned by the Federal Government until such time that sector is eventually privatized. Thus, the shareholding in all DISCOs is presently owned/controlled by the Federal Government, which is managed by the Power Division as per entry at Sr. No. 2 (*matters relating to electric utilities*) in Part 31B of Schedule 2 of the Rules of Business, 1973. Accordingly, shareholding in HAZECO shall also be fully owned by the Federal Government and as per the requirements of the SOEs (Governance and Operations) Act, 2023 and Companies Act, 2017, the Federal Government's approval will be required to create a new Government-owned company.

18-

4. Furthermore, under the Companies Act, 2017, any scheme to divide a company and to transfer its assets to two or more companies requires the approval, *inter alia*, of its shareholder(s). Since shareholding in PESCO is also fully owned/controlled by the Federal Government, its approval shall also be required in this respect.

5. In view of the foregoing, the Federal Government's approval is solicited for: -

(i) Creation of a new power distribution company by the name of Hazara Electric Supply Company (HAZECO) to take over PESCO's power distribution/ supply business in the present Hazara-I and Hazara-II circles, and to commence business subject to all legal and regulatory requirements.

(ii) Authorization to the Power Division to take all steps to affect the incorporation of HAZECO, to formulate and implement the bifurcation plan for PESCO, and for the following officials to act as the initial 'promoters' of HAZECO:

- Secretary, Power Division.
- Additional Secretary – I, Power Division.
- Sr. Joint Secretary (CAD), Power Division.

(iii) Reorganization / Restructuring of PESCO by dividing its business and assets between PESCO and HAZECO as per all legal and regulatory approvals.

6. The Minister for Power Division has seen and authorized the submission of this Summary to the Cabinet.

(Shakeel Qadir Khan)
Additional Secretary

Islamabad, the 13th July, 2023.

PESHAWAR ELECTRIC SUPPLY COMPANY

Phone No. 091-9210226
Fax No. 091-9223136
Email: sec.pesco@gmail.com

Office of the
Company Secretary PESCO
Room No.158 Wapda House,
Shami Road, Peshawar

19-

No. 2510 /196th BoD

Dated 29/12/2023

Finance Director,
PESCO, HQ.

Subject:- **Decision of the 196th Meeting of Board of Directors, PESCO.**

PESCO Board of Directors in its 196th Board meeting held on 27-12-2023, deliberated the following agenda point. The discussion and the decision of the Board are as under:-

Agenda Point # 3

Approval for Bifurcation of Assets & Liabilities and the Accounts of HAZECO & Remaining PESCO.

In light of the directions issued by the Board of Directors, PESCO in its 195th meeting held on 19-12-2023, the management presented the detailed analysis regarding the allocation of share of accumulated losses to HAZECO as well as the feasibility of allocation of A|&K Receivables to remaining PESCO. All possible aspects regarding allocation of losses to HAZECO along with other critical points were thoroughly deliberated. After detailed discussion, it was decided to allocate accumulated losses to HAZECO amounting to Rs. 21.814 Billion in the ratio of HAZECO Non-current Assets to total Assets of PESCO i.e 5% approx. Accordingly, the revised identified basis of allocation and revised segregated Financials Statements are given as under:-

Basis for Segregation:-

Financial Statement component	Identified Basis
Operating fixed assets	
Land, Building Distributable equipment's	Geographical presence.
Vehicles	Physical possession at balance sheet date.
Other equipment's	Physical possession at balance sheet date.
Capital Work in Process	Geographical presence of work in process at balance sheet date.
Long term loans	Bifurcation is made on employee wise falls under respective territory of HAZECO and PESCO.
Stores, spare parts and loose tools	Bifurcation is made on Geographical presence as well as share of work in process under the territory of respective companies.
Trade debts	Actual receivable from customers in jurisdiction of each company.
Loans, advances and other receivable	

Duties and other taxes	On the basis of actual existing customer in respective territory.
General sales tax	Actual payable of customer of each company.
Accrued liabilities	Actual accrual pertaining to territory of each company.
Capital contribution awaiting connections	On the basis of actual existing customer in respective territory.
Accrued markup	On the basis of utilization of loan in respective territory of each company.
Provision for taxation	All provision in allocated to PESCO due to NTN.
Revenue	Actual amount billed to the customers that exists in territory of respective company.
Amortization of deferred credits	According to segregation of deferred credits.
Cost of electricity	Calculated on the basis of actual unit consumed.
Administrative and General expenses	Allocated on the basis of each XEN / RO trial of each company and proportionate expenditure of Headquarter and centralized units.
Depreciation	On asset allocation basis.
Other income	Actual income generated by the division/ RO forming part of each company plus the income generated by common business units on the basis of actual allocation of division and RO's income for the same source.
Financial charges	
Markup	In proportion to the long-term loan allocated to each company.
Foreign currency fluctuation	In proportion to the long-term loan allocated to each company.
Bank charges	On charges incurred for services provided by banks of each company
HR Committees Constituted to operationalize HAZECO	Reports are prepared on the basis of actual as well as on need base.
Technical and Commercial Committees Constituted to operationalize HAZECO	Reports are prepared on actual basis of jurisdiction.
Allocation of Vehicles	The 130 No. of vehicles with a book value of Rs. 75,517,099 have been transferred to HAZECO.
Allocation of Grid stations	The 23 Grid stations out of 2 are under construction are allocated to HAZECO.
Segregation of Plots	The 36 plots are allocated to HAZECO.

Advance to supplier	Actual as per trial balance of each area.
Advance taxes	Taxes are allocated to PESCO as HAZECO has no NTN due to newly incorporation.
Advances for expenses	Advance given for expense for each area as per trial balance.
Due from WAPDA	Allocated on actual basis i.e. supply of electricity and for receivable against WAPDA Welfare Fund Employee wise basis is used working in territory of each company.
Cash and bank balances	Actual cash held at bank by the offices of each company as well as share of deposits against capital expenditure.
Liabilities against government investment	Total amount allocated to PESCO due to losses incurred by PESCO territory.
Accumulated losses	Accumulated losses amounting to Rs. 21,814 million has been transferred to HAZECO at 5% of (Ratio Non-current Assets of HAZECO to total Assets of PESCO) net off adjustment of Rs. 5,641 million against share of equity injection with the approval of BoD.
Long term loans	Allocated on the basis of utilization of loan in respect territory. However, ERRA Loan has been allocated to PESCO considering the at source adjustment of various loans against receivable from GoAJK, resulting in over-adjustment of Rs.1,420 million against HAZECO.
Staff retirement benefits	Allocated on the number of employees working in territory of respective company.
Deferred credit	The area and purpose for which the development funds were received on proportionate basis.
Consumers' security deposits	Actual deposits received from customers falling in the territory of each company.
Trade and other payables Associated undertakings	Amount is allocated on actual basis with adjustment of Rs. 1,420 million of loan and Rs. 5,274 million of Subsidy receivable against CPPA-G payables.
Trade and other payable	All amount is allocated to PESCO and HAZECO on actual basis and by considering the nature of transaction fully allocated to PESCO under various heads.
Receipt against deposit work	Actual receipts against works in the territory of respective company.

ANNEX "N1"

PROSPECTUS OF HAZARA ELECTRIC SUPPLY COMPANY (HAZECO)
STATE OWNED ENTERPRISE ENTITY
REGISTERED UNDER COMPANIES ACT, 2017
ON OCTOBER 31, 2023

Document No:	N1	Prospectus of HAZECO

PROSPECTUS OF HAZECO

INTRODUCTION

Hazara Electric Supply Company Limited (HAZECO) ("the Company") is a public limited company incorporated on October 31, 2023 under the Companies Act, 2017, having its registered office at Islamabad.

PRINCIPAL ACTIVITIES

The principal activities of the Company are to own, operate and maintain the power distribution network located within the jurisdiction area referred below to provide reliable, sustainable and uninterrupted electric power supply to approximately 776,805 consumers: -

a. Abbottabad
b. Haripur
c. Mansehra
d. Battagram
e. Kohistan Upper
f. Kohistan Lower
g. Torghar
h. Kolai Palas

VISION

To be a leading and innovative distribution company of the country

MISSION

Our mission is to be a technology driven company providing excellent services to customers, maintaining a secure, efficient, and stable distribution network, enhancing timely recovery of dues having zero tolerance for corruption and electricity theft, providing a safe working environment, promoting a merit-based and rewarding career for employees and responsive to the legitimate expectations of the stakeholders.

CORE VALUES

Innovation, care, efficiency, integrity

GOALS

1. Provision of excellent services to customers
2. Maintaining a secure, efficient, and stable distribution network
3. Ensure timely recovery of dues
4. Providing a safe working environment
5. Responsive to the legitimate expectations of the stakeholders

Document No:	N1	Prospectus of HAZECO

TAGLINE

Burqraftaar

SHARE HOLDING

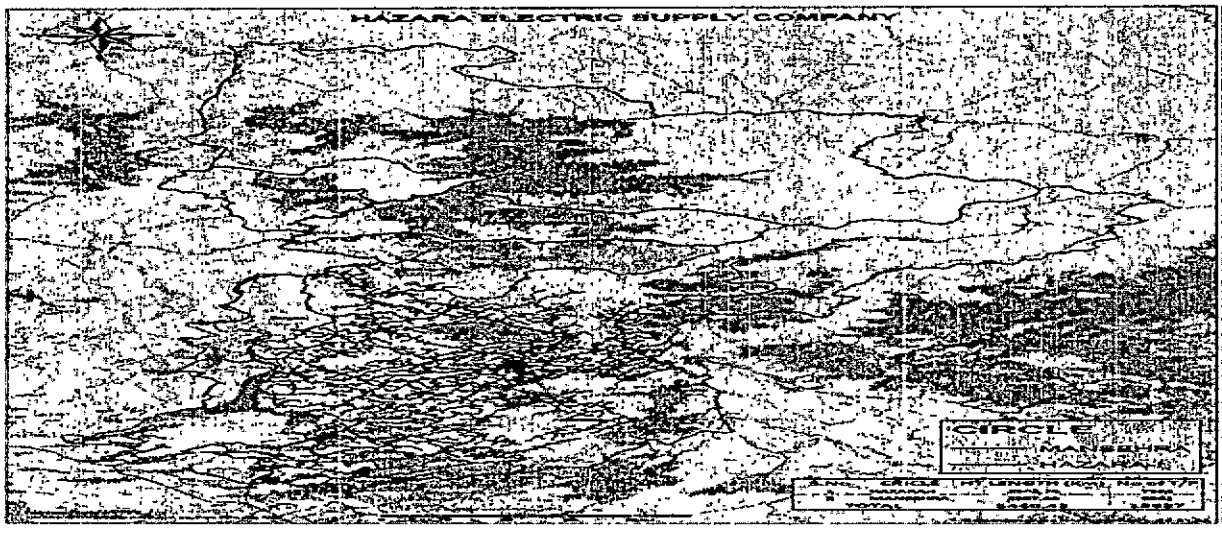
HAZECO is a fully owned State-Owned Enterprise Entity, having 1000 Ordinary shares of Rs.10 each, issued as fully paid up to President of Islamic Republic of Pakistan (through Ministry of Energy (Power Division)) and its nominee Directors.

INITIAL PROMOTERS/SENIOR MANAGEMENT

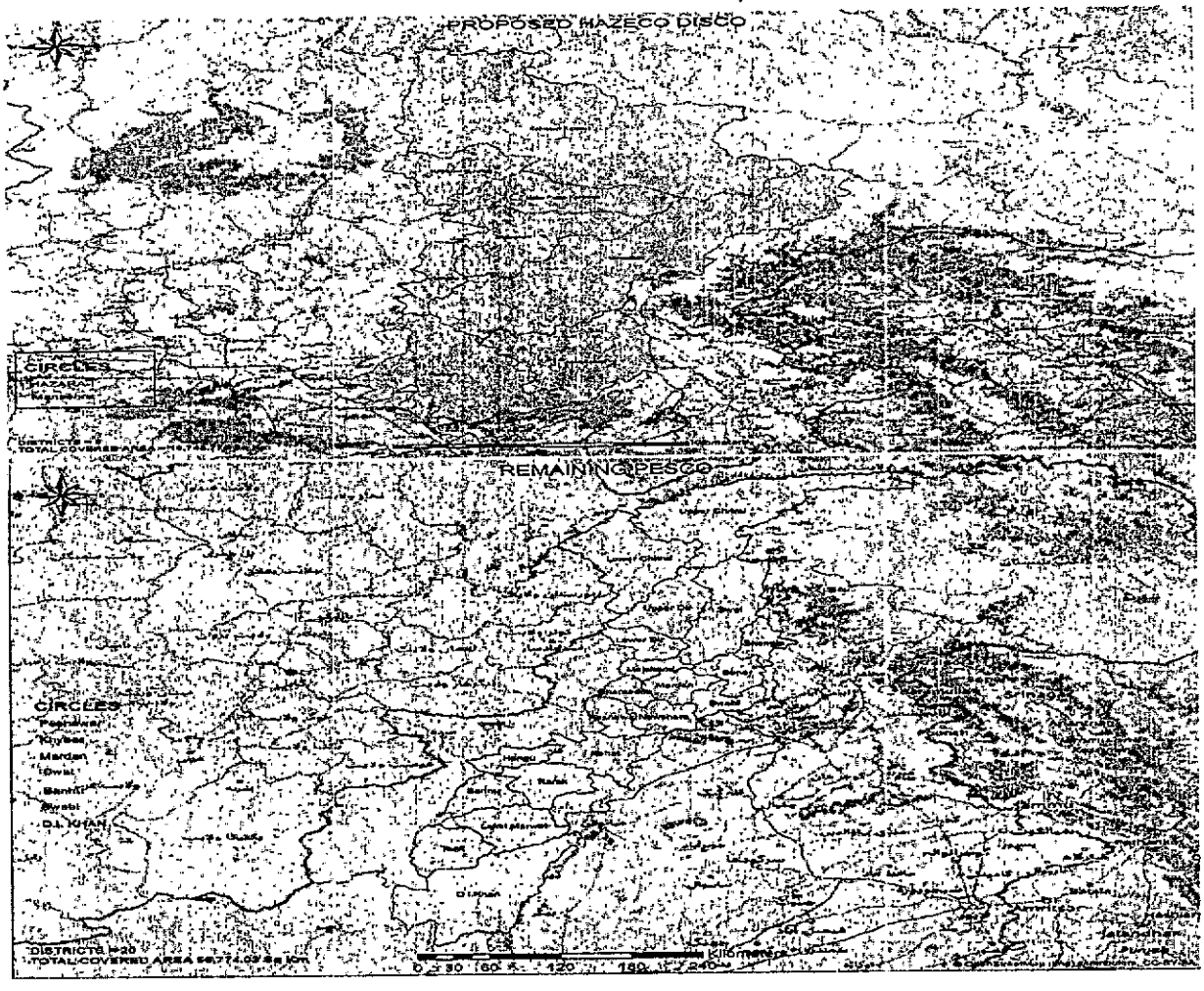
i.	The Secretary, Ministry of Energy (Power Division)	Director
ii.	Addl: Secretary-I (MOE, (PD))/MD, PP&MC	Director
iii.	Sr. Joint Secretary Admin, (MOE, (PD))	Director/CEO, HAZECO

MAP

Maps of HAZECO are as under:



Document No:	N1	Prospectus of HAZECO



CONSUMERS STATISTICS

Category	No. of Consumers	%Share
Domestic	694,933	89.46%
Commercial	69,463	8.94%
Industrial	3,533	0.45%
Bulk	182	0.02%
Tube Wells	674	0.09%
General Services	194	0.02%
Others	7,826	1.01%
Total	**776,805**	**100%**

DISTRIBUTION SYSTEM

Document No:	N1	Prospectus of HAZECO

Circle	Feeders		HT Line (KM)	LT Line (KM)	Distribution T/Fs	
	No.	Average Length (KM)			No.	MVA
Hazara-I	138	21.03	2902.76	2366.76	7566	816.25
Hazara-II	72	34.31	2470.27	10445.9	5939	418.685
Total	**210**	**25.59**	**5373.03**	**12813**	**13505**	**1234.94**

TRANSMISSION SYSTEM

Circle	GRID STATIONS IN HAZECO						
	500KV	220KV	132KV	66KV	33KV	132KV Consumer Grids	Total
Hazara-I	-	-	12	2	-	4	18
Hazara-II	-	1	7	-	2	-	10
Total	-	**1**	**19**	**2**	**2**	**4**	**28**

FINANCIAL REVIEW

PROFIT & LOSS STATEMENT

Rs. In Million

Description	FY 2022-23
Sales Revenue (Including Subsidy)	66,746
Power Purchase Price(PPP)	(57,891)
Gross Profit	**8,855**

O&M Cost	8,478
Other Income (Net of other costs)	(211)
Net Profit/(Loss) for the Period	**588**

As HAZECO is incorporated on October 31, 2023, however the financial results/performance of Hazar-I & Hazara-II (Now HAZECO) during FY 2022-23 (presented in above table) was quite satisfactory. Sales revenue (including subsidy) during FY 2022-23 was Rs. 66,746 million, whereas the Power Purchase Cost was Rs. 57,891 million. Accordingly, the gross profit of Hazar-I & Hazara-II (Now HAZECO) was Rs. 8,855 million during the reporting period. The O&M cost was Rs. 8,477 million and other income (net other costs) was Rs. 211 million. The company (HAZECO) earned a net profit of Rs. 588 million during FY 2022-23, despite of the fact that net loss of PESCO during FY 2022-23 was Rs. 81 billion. It is pertinent to highlight those T&D losses of Hazara I (12.34%) & Hazara II (17.67%) circles were within NEPRA target (20.16%), whereas T&D losses of all other circles of PESCO were higher than NEPRA target.

BALANCE SHEET AS ON 30.06.2023

Rs. In Million

Description	2022-23	Description	2022-23
Shareholders' equity	1,839	**Non-Current Assets**	
Non-Current Liability		Property, plant and equipment	18,004
Long term loans	942	**Total Non-Current Assets**	**18,004**
Other Non-Current Liabilities	26,679	**Current Assets**	

Total Non-Current Liability	**27,621**	Trade debts	13,185
Current Liability		Receivable from GoP	6,806
Trade and other payables	12,221	Other Receivables	3,155
Other Current Liabilities	741	Bank balances	1,271
Total Current Liabilities	**12,962**	**Total Current Assets**	**24,418**
Total Liabilities	**42,422**		
Total Equity & Liabilities	**42,422**	**Total Assets**	**42,422**

As on 30th June, 2023, Hazar-I & Hazara-II (Now HAZECO) has Non-Current Assets of Rs. 18,004 million and Current Assets of Rs. 24,418 million. The total liabilities of the Company were Rs. 40,583 million and Share Holder Equity was Rs. 1,839 million whereas the shareholder equity of was PESCO was Rs. 418,045 million i.e negative equity, which showed the excellent financial position of the Hazar-I & Hazara-II (Now HAZECO) and weak financial position of remaining PESCO's circles.

HUMAN RESOURCE

Category	Existing Sanctioned Strength	Working Strength	Vacant
Officers	75	60	15
Officials	4439	1828	2611
Total	**4514**	**1888**	**2626**

FUTURE OUTLOOK

Document No:	N1	Prospectus of HAZECO

29.

HAZECO is adjusting its long-term business plan and strategy to adopt new technology-based solution for its financial health, customer services and supply of reliable power to its customers. The company is in the process of planning for up-gradation, rehabilitation, extension and renovation of Transmission & Distribution Network i-e. Grid Stations, Transmission Lines and Feeders to improve the voltage profile of its system to turnaround HAZECO into one of the best performing DISCOS. Strategic plan shall include;

- Bifurcation and combing of 11kV feeders
- Transitioning of Feeders from Low-Tension Bare Conductor Lines to Aerial Bundled Cable (ABC) to Combat Electricity Theft via Unauthorized Connections.
- Implementation of the Asset Performance Management System (APMS) on 100 & 200 KVA Transformers.
- Conversion of consumers to Automated Meter Reading (AMR) Meters.
- Deployment of Insulated Conductors for Transformer Jumpering in Narrow Streets to Ensure Safety.
- Area Planning of Overloaded i-e high loss and high voltage drop feeders.
- Up-gradation of HAZECO's GIS Infrastructure through deployment of Arc-GIS Enterprise.
- Extension of High-Tension (HT) Lines, Low-Tension (LT) Lines, Distribution Transformers, HT and LT Feeders.
- Optimum use of Billing and ERP systems to bring efficiency and transparency in HAZECO's operations.
- Replacement of Non-Static Energy Meters with Static Energy Meters.
- Bifurcations of circles/divisions/subdivision for better services to consumers.
- Outsourcing of Bill distribution and meter reading as pilot project.

TABLE OF SERIES-WISE RESPONSE TO QUERIES BY NEPRA ON HAZECO'S APPLICATION FOR GRANT OF AN ELECTRIC POWER DISTRIBUTION LICENSE

(a) Under the Eligibility Criteria (Distribution Licenses) Rules, 2023

#	Rule	Information / Document Required	HAZECO Response
1	3(d)	Minimum Human Resources requirement as provided in clause 2 of Schedule-II to meet all of its service-level commitments.	The applicant, HAZECO is being created through the bifurcation of the existing licensee, PESCO, to carry out the distribution and supply of electric power in the proposed "Service Territory", which presently falls under PESCO's license. PESCO was granted a license for distribution of electric power on 9th May 2023 (License No. DL/07/2023). As per the scheme of bifurcation of PESCO, which was approved by the Boards of both PESCO and HAZECO, the human resource of PESCO is to be distributed amongst both companies to ensure that HAZECO is able to carry out the distribution business in its proposed service territory as per the requirements under the applicable rules and regulations. The minimum human resource requirement, as per the Eligibility Criteria (Distribution Licenses) Rules, 2023 is available, and details have already been given in **Annex-N6** and **N7**, already attached with petition.
2	3(e)	shall have the ability to ensure prompt and effective coordination with the system operator, market operator and other relevant entities to comply with the provisions of the grid code, commercial code, distribution code and other relevant legal instruments as applicable;	The applicant, HAZECO is being created through the bifurcation of the existing licensee, PESCO, to carry out the distribution and supply of electric power in the proposed "Service Territory", which presently falls under PESCO's license. PESCO was granted a license for distribution of electric power on 9th May 2023 (License No. DL/07/2023). As a successor to PESCO in the Service Territory, HAZECO will take over PESCO's existing structures, systems,

HAZARA ELECTRIC SUPPLY COMPANY LTD

				equipment, and resources to ensure prompt and effective coordination with the system operator, marker operator, and relevant distribution licensees to comply with the provisions of the Grid Code, Distribution Code, Commercial Code and other relevant legal instruments as applicable.
3	3(f)	Information regarding ability to ensure its quality of distribution service by—		
		i.	establishing and maintaining the standardized and non-discriminatory procedures for the timely provision of connections, redressal of complaints, effective customer services and maintenance of distribution facilities;	The applicant, HAZECO is being created through the bifurcation of the existing licensee, PESCO, to carry out the distribution and supply of electric power in the proposed "Service Territory", which presently falls under PESCO's license. PESCO was granted a license for distribution of electric power on 9th May 2023 (License No. DL/07/2023). Thus, all systems, resources, equipment, and facilities, that are ensured to required quality of distribution service, including for provision of connections, redressal of complaints, effective customer services and maintenance of distribution facilities, will be available, being inherited from PESCO. Similarly, as aforementioned, all structures, systems, equipment, and resources to ensure prompt and effective coordination with the system operator, marker operator, and relevant distribution licensees to comply with the provisions of the Grid Code, Distribution Code, Commercial Code and other relevant legal instruments as applicable will be available to HAZECO. Furthermore, all technical and IT/internet resources currently available to PESCO, as well as all systems and standards regarding recording/safekeeping of record and data will also be inherited from PESCO, to ensure compliance with the applicable rules.
		ii.	ensuring compliance with grid code, distribution code and performance standards specified by the Authority for distribution of electric power;	
		iii.	fulfilling the requirements of minimum technical resources prescribed under these rules;	
		iv.	sharing the information and data through website or portal related to forecasts, transmission and distribution plans and information regarding network constraints;	
		v.	maintaining the complete and accurate records and data in respect of distribution services. All such records and data shall, unless provided otherwise under the law, be maintained for a period of five years after the creation of such record or data	

4	3(g)	The applicant shall have a robust IT strategy outlining the planning and execution roadmap for ensuring transparency, effectiveness, efficiency and security in all operations of the distribution of electric power comprising—		
		i.	a secure and reliable data storage and network infrastructure for hosting backend as well as key applications	The applicant, HAZECO is being created through the bifurcation of the existing licensee, PESCO, to carry out the distribution and supply of electric power in the proposed "Service Territory", which presently falls under PESCO's license. PESCO was granted a license for distribution of electric power on 9th May 2023 (License No. DL/07/2023). Thus, HAZECO will use the same IT strategy as is being currently employed by PESCO to ensure transparency, effectiveness, efficiency and security in distribution of electric power. PESCO's existing data storage and network infrastructure is being divided amongst PESCO and HAZECO to ensure that HAZECO has the necessary systems and resources to comply with its obligations under the relevant rules. Similarly, PESCO's existing network security and analytics system is going to be used by HAZECO to ensure compliance with the requirements in this regard under the rules.
		ii.	a reliable data backup and recovery system for operation continuity	
		iii.	an effective information security mechanism, to ensure confidentiality, integrity and the secure availability of data as part of an IT governance framework	
		iv.	an effective and efficient mechanism of analysis and reporting of information through transparency portals, website and other secure information sharing techniques	

HAZARA ELECTRIC
SUPPLY COMPANY
LIMITED

ANNEX "N2" -30-

SECURITIES AND EXCHANGE COMMISSION OF PAKISTAN

Company Registration Office

CERTIFICATE OF INCORPORATION

[Under section 16 of the Companies Act, 2017 (XIX of 2017)]

Corporate Unique Identification No. 0243576

I hereby certify that **HAZARA ELECTRIC SUPPLY COMPANY LIMITED** is this day incorporated under the Companies Act, 2017 (XIX of 2017) and that the company is **limited by shares.**

Given at **Islamabad** this **Thirty First** day of **October,** Two **Thousand** and **Twenty Three**

Saila Jamshaid
Joint Registrar

SEAL OF REGISTRAR OF COMPANIES • SECP

https://eservices.secp.gov.pk/eServices/ControllerServlet?request_id=VERIFY_ONLINE_INCORP_CERT&id=0243576

Disclaimer: This certificate of incorporation is not a permission to accept deposits from the general public by offering fake jobs/investment packages

-31-

THE COMPANIES ACT, 2017 (XIX of 2017)

(COMPANY LIMITED BY SHARES)
ARTICLE OF ASSOCIATION
OF

HAZARA ELECTRIC SUPPLY COMPANY LIMITED

1. The Regulations contained in Table 'A' to the First Schedule to the Companies Act, 2017 shall be the regulations of HAZARA ELECTRIC SUPPLY COMPANY LIMITED so far as these are applicable to a public company.

PUBLIC COMPANY

2. The Company is a "Public Company" within the meaning of Section 2(1)(52) of the Act and accordingly:

   (1) The number of the members of the Company (exclusive of persons in the employment of the Company), shall not be limited, provided that for the purpose of this provision, where two or more persons hold one or more shares in the company jointly, they shall be treated as single member, and

   (2) The right to transfer shares of the Company shall not be restricted in the manner and to the extent herein appearing.

3. The authorized capital of the company is Rs.100,000 (One Hundred Thousand Rupees Only) divided into 10,000 (Ten Thousand) ordinary shares of Rs.10 (Ten Rupees Only) each.

4. The minimum subscription upon which the directors may proceed to make the first allotment has been fixed as Rs. 100000

TRANSFER OF SHARES

5. The directors shall not refuse to transfer any fully paid shares unless the transfer deed is invalid or defective.

DIRECTORS

6. The number of directors shall not be less than three or a higher number as fixed under the provisions of Section 159 of the Act. The following persons shall be the first directors of the Company and shall hold the office upto the date of First Annual General Meeting:

1 Alam Zeb Khan
2. Zafar Abbas
3. Rashid Mahmood

32.

We, the several persons whose names and addresses are subscribed below, are desirous of being formed into a company, in pursuance of this article of association, and we respectively agree to take the number of shares in the capital of the company as set opposite our respective names:

Name and surname (present & former) in full (In Block Letters)	NIC No. (in case of foreigner) Passport No.	Father / Husband Name in full	Nationality (ies) with any former Nationality	Occupation	Usual residential address in full or the registered/principal office address for a subscriber other than natural person	Number of shares taken by each subscriber (in figures and words)	Signatures
Alam Zeb Khan	6110177788425	Fateh Khan	Pakistan	Senior Joint Secretary Power Division	House No 39, Street 11, Sector I-8/1 ISLAMABAD Islamabad Capital Territory (I.C.T.) Pakistan	1	
Ministry of Energy (Power Division) through Rashid Mahmood	3520290754451	Muhammad Sharif	Pakistan	Secretary Power Division	Room No. 201-204, 2nd Floor, A Block, Pak Secretariat, Red Zone ISLAMABAD Islamabad Capital	9,997	
Zafar Abbas	6110165455929	Ghulam Abbas	Pakistan	Additional Secretary-I Power Division	House No 34A, Agha Khan Road, Sector F-6/4 ISLAMABAD Islamabad Capital Territory (I.C.T.)	1	
Rashid Mahmood	3520290754451	Muhammad Sharif	Pakistan	Secretary Power Division	House no 45-B, Muhalla GOR-2, Bahawalpur House, LAHORE Punjab Pakistan	1	

Total number of shares taken (in figures and words)	10,000 (Ten Thousand)

Dated: the 31 day of Oct 20 23

Witness to above signatures: witness not required since the documents submitted electronically

Signature:

Address

-33-

THE COMPANIES ACT, 2017 (XIX of 2017)

(COMPANY LIMITED BY SHARES)
MEMORANDUM OF ASSOCIATION
OF

HAZARA ELECTRIC SUPPLY COMPANY LIMITED

1. The name of the Company is HAZARA ELECTRIC SUPPLY COMPANY LIMITED

2. The Registered Office of the Company will be situated in Islamabad Capital Territory (I.C.T.)

3. (i) To design, insure, construct, acquire, own, operate and maintain power generation complexes, and carry on the business of generating, purchasing, importing, transforming, converting, distributing, supplying, exporting, transmitting and dealing in power generation including electricity and all other forms of energy and products; to render services associated therewith and of promoting the conservation and efficient use of electricity; and to perform all other acts which are necessary or incidental to the business of electricity generation, transmission, distribution and supply including but not limited to over hauling and re-powering of power plants; and to deal in electrical and all other related appliances.

(ii) Except for the businesses mentioned in sub-clause (iii) hereunder, the company shall engage in all the lawful businesses and shall be authorized to take all necessary steps and actions in connection therewith and ancillary thereto.

(iii) Notwithstanding anything contained in the foregoing sub-clauses of this clause nothing contained herein shall be construed as empowering the Company to undertake or indulge, directly or indirectly in the business of a Banking Company, Non-banking Finance Company (Asset Management Services, Leasing, Investment Finance Services, Investment Advisory Services, REIT management Services, Housing Finance Services, Private Equity and Venture Capital Fund Management Services, Discounting Services, Pension Fund Scheme Business, Micro Financing), Corporate Restructuring Company, Insurance Business, Modaraba management company, Stock Brokerage business, forex, Clearing House, Securities and Futures Advisor, Commodity Exchange, managing agency, business of providing the services of security guards or any other business subject to license and restricted under any law for the time being in force or as may be specified by the Commission.

(iv) It is hereby undertaken that the company shall not:

(a) engage in any of the business mentioned in sub-clause (iii) above or any unlawful operation;

(b) launch multi-level marketing (MLM), Pyramid and Ponzi Schemes, or other related activities/businesses or any lottery business;

(c) engage in any of the permissible business unless the requisite approval, permission, consent or licence is obtained from competent authority as may be required under any law for the time being in force.

4. The liability of the members is limited.

5. The authorized capital of the company is Rs. 100,000 (One Hundred Thousand Rupees Only) divided into 10,000 (Ten Thousand) Ordinary shares of Rs.10 (Ten Rupees Only) each.

-34-

We, the several persons whose names and addresses are subscribed below, are desirous of being formed into company, in pursuance of this memorandum of association, and we respectively agree to take the number of shares in the capital of the company as set opposite our respective names:

Name and surname (present & former) in full (in Block Letters)	NIC No. (in case of foreigner, Passport No)	Father's/ Husband's Name in full	Nationality (ies) with any former Nationality	Occupation	Usual residential address in full or the registered/principal office address for a subscriber other than natural person	Number of shares taken by each subscriber (in figures and words)	Signatures
Alam Zeb Khan	61101777884[illegible]	Fateh Khan	Pakistan	Senior Joint Secretary Power Division	House No 39, Street 11, Sector I-8/1 ISLAMABAD Islamabad Capital Territory (I.C.T.) Pakistan	1	
Ministry of Energy (Power Division) through Rashid Mahmood	3520290754451	Muhammad Sharif	Pakistan	Secretary Power Division	Room No. 201-204, 2nd Floor, A Block, Pak Secretariat, Red Zone ISLAMABAD Islamabad Capital	9,997	
Zafar Abbas	6110165455929	Ghulam Abbas	Pakistan	Additional Secretary-I Power Division	House No 34A, Agha Khan Road, Sector F-6/4 ISLAMABAD Islamabad Capital Territory (I.C.T.)	1	
Rashid Mahmood	3520290754451	Muhammad Sharif	Pakistan	Secretary Power Division	House no 45-B, Muhalla GOR-2, Bahawalpur House, LAHORE Punjab Pakistan	1	

Total number of shares taken (in figures and words)	10,000 (Ten Thousand)

Dated: the 31 day of Oct 20 23

Witness to above signatures: witness not required since the documents submitted electronically

Signature: [redacted]

Address [redacted]

ANNEX "N3"

35

Annex-N3 is **not applicable** since HAZECO has not been incorporated for a full year, and therefore, no annual financial statements have yet been prepared.

ANNEX "N4"

36

Section - D - Company subscribers, directors, chief executive officer, and in case of single member company, nominee

2.7 State Number of directors fixed by subscribers:

[Please note that as per law a company must have minimum director as follows:]

Kind of company	Minimum number of directors required by law	No. of proposed directors
Single Member Company	01	
Private Limited Company	02	
Public Limited Company	03	3

2.8 Details of subscribers, directors and chief executive officer *

Name And Surname (Present And Former) In **	Father/Husband Name in Full	CNIC/NICOP (In Case of Pakistani National) or Passport No (In Case of Foreigner)	**Incorporation/Registration No	Nationality (with former nationality and nationality of the origin, if different)	***Occupation	Residential Address/Registered Office Address Or Principle Office (In Case of a Subscriber Other Than A Natural Person)	NTN (In Case of Director Where Applicable)	Designation (Director/Subscriber/CEO) Please	Nature of Directorship (appointed, nominee/independent/other)	Name of Entity Nominating the Director	No. of Shares Subscribed (For Subscribers)	****Signatures
Alam Zeb Khan	S/O Fateh Khan	6110177788423		Pakistan	Senior Joint Secretary Power Division	House No 39, Street 11, Sector I-8/1 ISLAMABAD Islamabad Capital Territory		Director And Subscriber	Appointed		1	Electronically signed by Alam Zeb
Ministry of Energy (Power Division) through Rashid	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	9,997	[redacted]
Zafar Abbas	S/O Ghulam Abbas	6110165455929		Pakistan	Additional Secretary-I Power Division	House No 5-A, Agha Khan Road, Sector F-6/4 ISLAMABAD Islamabad		Director And Subscriber	Appointed		1	Electronically signed by Zafar Abbas
Alam Zeb Khan	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]		[redacted]
Rashid Mahmood	S/O Muhammad Sharif	3520290754451		Pakistan	Secretary Power Division	House no 45-B, Muhalla GOR-2, Bahawalpur House LAHORE Punjab		Director And Subscriber	Appointed		1	Electronically signed by Rashid Mahmo

*Add details as applicable

** Applicable on subscribers other than natural persons

***Please also mention names of other companies where directorship is held.

**** Signature of subscribers and consent to act as director or chief executive as the case may be. In case of online submission, the document will be signed electronically

2.9 Details of Nominee (only in case of single member company- Nominee shall not be a person other rhan relatives of the member-namely, a spouse, father, mother, brother, sister and son or daughter)

Name of Nominee [redacted]

CNIC of Nominee [redacted]

Residential address of Nominee [redacted]

ANNEX "N5"

Annex - N5

Financial Statements including details of HR Report containing details of Financial and Technical Resources 37

Annex - N5	Evidence of HAZECO's Financial and Technical resources for carrying out the Distribution and Sale activities, including:
Annex - N5 / 1	Cash Balances with Bank Certificates
Annex - N5 / 2	Charges / encumbrances on assets
Annex - N5 / 3	Last Audited Financial Statements
Annex - N5 / 4	Eol to provide financing to HAZECO
Annex - N5 / 5	Net Worth and Equity Debt Ratio of HAZECO

PESCO AND HAZECO

SEGREGATED FINANCIAL STATEMENTS

FOR THE YEAR ENDED 30 JUNE 2023

INDEPENDENT PRACTITIONER'S ASSURANCE REPORT ON BIFURCATION OF PESCO FINANCIAL STATEMENTS AND ESTABLISHMENT OF HAZECO

To Board of Directors

We have completed our assurance engagement to report on the compilation of pro forma financial information of Peshawar Electric Supply Company Limited ("PESCO", "the Company"). The pro forma financial information consists of segregated statement of financial position as at 30 June 2023, the segregated statement of profit or loss and comprehensive income for the year ended 30 June 2023, the segregated statement of changes in equity and related notes. The applicable criteria on the basis of which management has compiled the pro forma financial information are identified basis of segregation. The pro forma financial information has been compiled by management of the Company to illustrate the impact of the Demerger of Hazara Electric Supply Company Limited ("HAZECO", "the Company") from PESCO on the Company's financial position as at 30 June 2023 and the Company's financial performance for the year ended 30 June 2023. As part of this process, information about the Company's segregated statement of financial position, the segregated statement of profit or loss and comprehensive income and the segregated statement of changes in equity has been extracted by management from the Company's financial statements for the year ended 30 June 2023, on which an audit report has been published.

Our report is solely for the purpose of assisting Peshawar Electric Supply Company Limited in identification and measurement of financial record and related data regarding bifurcation of PESCO and establishment of HAZECO.

Responsibility for the Pro Forma Financial Information

Management of the Company is responsible for compiling the pro forma financial information on the basis defined in basis for segregation section of our report.

Practitioner's Responsibility

Our responsibility is to express an opinion about whether the pro forma financial information has been compiled, in all material respects, by the management on the basis defined in basis for segregation section of our report.

We conducted our engagement in accordance with International Standard on Assurance Engagements (ISAE) 3420, Assurance Engagements to Report on the Compilation of Pro Forma Financial Information Included in a Prospectus, issued by the International Auditing and Assurance Standards Board. This standard requires that the practitioner comply with ethical requirements and plan and perform procedures to obtain reasonable assurance about whether management has compiled, in all material respects, the pro forma financial information on the basis of the applicable criteria.

For purposes of this engagement, we are not responsible for updating or reissuing any reports or opinions on any historical financial information used in compiling the pro forma financial information, nor have we, in the course of this engagement, performed an audit or review of the financial information used in compiling the pro forma financial information.

A reasonable assurance engagement to report on whether the pro forma financial information has been compiled, in all material respects, on the basis of the applicable criteria involves performing procedures to assess whether the applicable criteria used by the management in the compilation of the pro forma financial information provide a reasonable basis for presenting the significant effects directly attributable to the event or transaction, and to obtain sufficient appropriate evidence about whether:

AHW

The related pro forma adjustments give appropriate effect to those criteria;

and

The pro forma financial information reflects the proper application of those adjustments to the unadjusted financial information.

The procedures selected depend on the practitioner's judgment, having regard to the practitioner's understanding of the nature of the Company, the event or transaction in respect of which the pro forma financial information has been compiled, and other relevant engagement circumstances.

The engagement also involves evaluating the overall presentation of the pro forma financial information. We believe that the evidence we have obtained is sufficient and appropriate to providea basis for our opinion.

Basis for Segregation

The management of Company has identified following basis with approval of Board of Directors for the segregation of audited financial statement into HAZECO and PESCO;

Financial Statement component	**Identified Basis**
Operating fixed assets	
Land, Building Distributable equipment's	Geographical presence.
Vehicles	Physical possession at balance sheet date.
Other equipment's	Physical possession at balance sheet date.
Capital Work in Process	Geographical presence of work in process at balance sheet date.
Long term loans	Bifurcation is made on employee wise falls under respective territory of HAZECO and PESCO.
Stores, spare parts and loose tools	Bifurcation is made on Geographical presence as well as share of work in process under the territory of respective companies.
Trade debts	Actual receivable from customers in jurisdiction of each Company.
Loans, advances and other receivable	
Advance to supplier	Actual as per trial balance of each area.
Advance taxes	Taxes are allocated to PESCO as HAZECO has no NTN due to newly incorporation.
Advances for expenses	Advance given for expense for each area. As per trial balance.
Due from WAPDA	Allocated on actual basis i.e. supply of electricity and for receivable against WAPDA welfare Fund employee wise basis is used working in territory of each Company.
Cash and bank balances	Actual cash held at bank by the offices of each Company as well as share of deposits against capital expenditure.
Liabilities against government investment	Total amount allocated to PESCO due to losses incurred by PESCO territory.

KHW

Financial Statement component	Identified Basis
Accumulated Losses	Accumulated losses amounting to Rs. 5,489 million has been transferred to HAZECO net off adjustment of Rs. 5,641 million against share of equity injection with approval of BOD.
Long term loans	Approval on the basis of utilization of loan in respect territory. However, ERRA Loan has been allocated to PESCO considering the source adjustment of various loans against receivable from GoAJK, resulting in over-adjustment of Rs. 1,420 million, against HAZECO.
Staff retirement benefits	Allocated on the number of employees working in territory of respective Company.
Deferred credit	The area and purpose for which the development funds were received on proportionate basis.
Consumers' security deposits	Actual deposits received from customers falling in the territory of each Company.
Trade and other payables	
Associated undertakings	Amount is allocated on actual basis with adjustment of Rs. 1,420 million loan and Rs. 5,274 million of Subsidy receivable against CPPA-G payable.
Trade and other payable	All amount is allocated to PESCO and HAZECO on actual basis and by considering the nature of transaction fully allocated to PESCO under various heads.
Receipt against deposit work	Actual receipts against works in the territory of respective Company.
Duties and other taxes	On the basis of actual existing customer in respective territory.
General sales tax	Actual payable of customer of each Company.
Accrued liabilities	Actual accrual pertaining to territory of each Company.
Capital contribution awaiting connections	On the basis of actual existing customer in respective territory.
Accrued markup	On the basis of utilization of loan in respective territory of each Company.
Provision for taxation	All provision is allocated to PESCO due to NTN.
Revenue	Actual amount billed to the customers that exists in territory of respective Company.
Amortization of deferred credits	According to segregation of deferred credits.
Cost of electricity	Calculated on the basis of actual unit consumed.
Administrative and General expenses	Allocated on the basis of each XEN / RO trial of each Company and proportionate expenditure of Headquarter and cehtralized units.
Depreciation	On asset allocation basis.

Financial Statement component	Identified Basis
Other income	Actual income generated by the division / RO forming part of each Company plus the income generated by common business units on the basis of actual allocation of division and RO's income for the same source.
Financial charges	
Markup	In proportion to the long-term loan allocated to each Company.
Foreign currency fluctuation	In proportion to the long-term loan allocated to each Company.
Bank charges	On charges incurred for services provided by banks of each Company
HR Committees Constituted to operationalize HAZECO	Reports are prepared on the basis of actual as well as on need base.
Technical and Commercial Committees Constituted to operationalize HAZECO	Reports are prepared on actual basis of jurisdiction.
Allocation of Vehicles	The 130 No. of vehicles with a book value of Rs. 75,517,099 have been transferred to HAZECO (Annex-A).
Allocation of Grid stations	The 23 Grid stations out of 2 are under construction are allocated to HAZECO (Annex-B).
Segregation of Plots	The 36 plots are allocated to HAZECO Ref (Annex-C).

Opinion

In our opinion, the pro forma financial information has been compiled, in all material respects, on the basis of the applicable criteria.

A.H.W. & Co. Chartered Accountants

Date: 03 APR 2024
Islamabad

PESHAWAR ELECTRIC SUPPLY COMPANY LIMITED &
HAZARA ELECTRIC SUPPLY COMPANY LIMITED
SEGREGATED STATEMENT OF FINANCIAL POSITION
FOR THE YEAR ENDED 30 JUNE 2023

	Note	PESCO (Audited) 30 June 2023 Rupees	HAZECO (Management) 30 June 2023 Rupees	Remaining PESCO (Management) 30 June 2023 Rupees
EQUITY AND LIABILITIES				
Share capital and reserves				
Authorized share capital: 500,000,000 (10,000) ordinary shares of Rupees 10 each		50,000,000,000	[illegible]	50,000,000,000
Issued, subscribed and paid up capital	1	10,000	[illegible]	10,000
Deposits for issue of share capital	2	130,867,728,553	[illegible]	128,045,648,563
Accumulated losses		(548,912,627,559)	[illegible]	(543,423,501,284)
TOTAL EQUITY		(418,044,889,006)	[illegible]	(415,377,842,721)
Non-current liabilities				
Liabilities against government investment	3	50,187,189,539	[illegible]	50,187,189,539
Long term loans - secured	4	8,061,124,905	[illegible]	7,118,885,905
Staff retirement benefits	5	148,528,485,046	[illegible]	127,427,834,642
Deferred credit	6	43,715,376,868	[illegible]	38,371,933,267
Consumers' security deposits	7	6,793,519,936	[illegible]	5,397,948,646
		257,285,696,294	[illegible]	228,503,791,999
Current liabilities				
Trade and other payables	8	512,133,192,562	[illegible]	504,015,738,115
Accrued markup	9	3,791,062,735	[illegible]	3,784,566,035
Current maturity of long term loans	4	3,556,618,533	[illegible]	3,556,618,533
Provision for taxation		3,145,518,170	[illegible]	3,145,518,170
		522,626,392,000	[illegible]	514,502,440,853
TOTAL LIABILITIES		779,912,088,294	[illegible]	743,006,232,853
Contingencies and commitments	10	-		-
		361,867,199,288	[illegible]	327,628,390,132
ASSETS				
Non-current assets				
Property, plant and equipment	11	116,012,851,449	[illegible]	97,913,385,845
Long term loans - considered good	12	709,333	[illegible]	701,426
		116,013,560,782	[illegible]	97,914,087,271
Current assets				
Stores, spare parts and loose tools	13	11,247,241,103	[illegible]	9,984,695,756
Trade debts	14	97,620,337,566	[illegible]	84,435,568,052
Loans and advances - considered good	15	3,732,288,648	[illegible]	3,726,936,653
Other receivables	16	96,905,868,230	[illegible]	96,647,901,323
Receivable from government of Pakistan (Ministry of Finance)	17	26,091,064,330	[illegible]	26,091,064,330
Cash and bank balances	18	10,256,838,629	[illegible]	8,828,136,747
		245,853,638,506	[illegible]	229,714,302,861
		361,867,199,288	[illegible]	327,628,390,132

The annexed notes form an integral part of these financial statements.

CHIEF EXECUTIVE OFFICER

DIRECTOR

PESHAWAR ELECTRIC SUPPLY COMPANY LIMITED &
HAZARA ELECTRIC SUPPLY COMPANY LIMITED
SEGREGATED STATEMENT OF PROFIT OR LOSS
FOR THE YEAR ENDED 30 JUNE 2023

	Note	PESCO (Audited) 30 June 2023 Rupees	HAZECO (Management) 30 June 2023 Rupees	Remaining PESCO (Management) 30 June 2023 Rupees
Sale of electricity	19	240,223,816,812	[illegible]	182,401,813,268
Subsidy from GoP	19	39,271,580,895	[illegible]	30,347,593,703
		279,495,397,707	[illegible]	212,749,406,971
Cost of electricity	20	(322,563,824,475)	[illegible]	(264,672,835,741)
Gross profit		(43,068,426,768)	[illegible]	(51,923,428,770)
Amortization of deferred credit	6	2,308,964,609	[illegible]	2,015,423,586
		(40,759,462,159)	[illegible]	(49,908,005,185)
OPERATING COST				
Other operating cost excluding depreciation	21	(41,579,990,507)	[illegible]	(35,997,798,919)
Depreciation on property, plant and equipment		(4,210,463,101)	[illegible]	(3,556,372,687)
		(45,790,453,608)	[illegible]	(39,554,171,606)
Operating (loss)/Income		(86,549,915,767)	[illegible]	(89,462,176,790)
Other income				
Rental and service income	22	52,485,906	[illegible]	41,476,944
Other income	23	10,121,705,368	[illegible]	9,480,603,447
		10,174,191,274	[illegible]	9,522,080,391
Financial expense	24	(1,065,899,814)	[illegible]	(1,065,751,253)
Net gain / loss before taxation		(77,441,624,307)	[illegible]	(81,005,847,652)
Taxation	25	(3,153,184,278)	[illegible]	(3,153,184,278)
Net gain / loss after taxation		(80,594,808,585)	[illegible]	(84,159,031,930)
Other Comprehensive Income:				
Actuarial loss on remeasurement of post retirement benefits		(16,155,526,751)	[illegible]	(13,687,914,828)
Total comprehensive loss for the year		(96,750,335,336)	[illegible]	(97,846,946,758)

The annexed notes form an integral part of these financial statements.

CHIEF EXECUTIVE OFFICER

DIRECTOR

PESHAWAR ELECTRIC SUPPLY COMPANY LIMITED
HAZARA ELECTRIC SUPPLY COMPANY LIMITED
SEGREGATED STATEMENT OF CHANGES IN EQUITY
FOR THE YEAR ENDED 30 JUNE 2023

Description	Consolidated PESCO			
	Issued,subscribed and paid up share capital	Deposit for issue of shares	Accumulated Loss	TOTAL
	Rupees			
Balance as on 01 July 2022	10,000	92,855,405,071	(452,222,342,099)	(359,366,927,028)
Total comprehensive loss for the year				
Loss for the year	-	-	(80,594,808,585)	(80,594,808,585)
Actuarial loss on remeasurement of post retirement benefits	-	-	(16,155,526,751)	(16,155,526,751)
	-	-	(96,750,335,336)	(96,750,335,336)
GoP Equity Injection	-	38,012,323,482	-	38,012,323,482
Prior year Adjustment (Subsidy)			60,049,876	60,049,876
Balance as on 30 June 2023	10,000	130,867,728,553	(548,912,627,559)	(418,044,889,006)

Description	HAZARCO			
	Issued,subscribed and paid up share capital	Deposit for issue of shares	Accumulated Loss	TOTAL
	Rupees			
Balance as on 01 July 2022	-	-	(6,585,737,697)	(6,585,737,697)
Total comprehensive income for the year				
Income for the year	-	-	1,096,611,422	1,096,611,422
Actuarial loss on remeasurement of post retirement benefits	-	-	-	-
GOP equity Enjection	-	2,822,079,990	-	2,822,079,990
Balance as on 30 June 2023	-	2,822,079,990	(5,489,126,275)	(2,667,046,285)

Description	Remaining PESCO			
	Issued,subscribed and paid up share capital	Deposit for issue of shares	Accumulated Loss	TOTAL
	Rupees			
Balance as on 01 July 2022	10,000	92,855,405,071	(445,636,604,402)	(352,781,189,331)
Total comprehensive loss for the year				
Loss for the year	-	-	(81,691,420,007)	(81,691,420,007)
Actuarial loss on remeasurement of post retirement benefits	-	-	(16,155,526,751)	(16,155,526,751)
	-	-	(97,846,946,758)	(97,846,946,758)
GoP Equity Injection	-	35,190,243,492	-	35,190,243,492
Prior year Adjustment (Subsidy)	-	-	60,049,876	60,049,876
Balance as on 30 June 2023	10,000	128,045,648,563	(543,423,501,284)	(415,377,842,721)

The annexed notes form an integral part of these financial statements.

CHIEF EXECUTIVE OFFICER

DIRECTOR

	Note	PESCO (Audited) 30 June 2023 Rupees	FATA-FESCO (Management) 30 June 2023 Rupees	Remaining PESCO (Management) 30 June 2023 Rupees
1 ISSUED, SUBSCRIBED AND PAID UP SHARE CAPITAL				
Ordinary shares of Rs.10 each, issued as fully paid up		10,000		10,000
2 DEPOSITS FOR ISSUE OF SHARE CAPITAL				
Incorporation expenses incurred by WAPDA		5,042,575		5,042,575
Incorporation expense incurred by Ministry		-		-
Allocation of net worth transferred by WAPDA	2.1	8,885,483,927	[illegible]	6,063,403,937
		8,890,526,502	[illegible]	6,068,446,512
Adjustmment of other loans and assets		7,620,265,187		7,620,265,187
Adjustmment of net assets on transfer of FATA business to		1,571,234,102		1,571,234,102
		18,082,025,791	[illegible]	15,259,945,801
Equity injection against mark-up		2,094,239,584		2,094,239,584
Equity injection against supplemental charges		879,673,400		879,673,400
Equity injection against accounts receivables		27,773,678,000		27,773,678,000
GoP Equity injection		5,236,221,196		5,236,221,196
GoP Equity injection		20,142,046,300		20,142,046,300
GoP Equity injection		15,292,224,200		15,292,224,200
GoP Equity injection		3,355,296,600		3,355,296,600
GoP Equity injection		38,012,323,482		38,012,323,482
		130,867,728,553	[illegible]	128,045,648,563

2.1 It represents the net amount of assets and liabilities which is adjusted against WAPDA deposits for issuance of shares.

3 LIABILITIES AGAINST GOVERNMENT INVESTMENT

Federal Governmant Investment (Circular Debt Settlement)	50,187,189,539	[illegible]	50,187,189,539

	Note	PESCO (Audited) 30 June 2023 Rupees	HAZECO (Management) 30 June 2023 Rupees	Remaining PESCO (Management) 30 June 2023 Rupees
4 LONG TERM LOANS - secured				
Loan from Governmant of Pakistan		125,284,795		125,284,795
Asian Development bank -Trench 1 (2438-PK)		847,267,493		847,267,493
Asian Development bank -Trench II (2727-PK)		955,422,626		955,422,626
Asian Development bank -Trench III (2972-PK)		1,976,630,025		1,976,630,025
Asian Development bank -Trench IV (3096-PK)		1,668,205,374		1,668,205,374
Earthquake Reconstruction and RehabiliationAuthority		2,083,217,020		2,083,217,020
Electrification work at Chitral (Federal PSDP) CCPR- 3129		594,653,000		594,653,000
132 KV Grid system Chitral (Federal PSDP) CCPR-3130		148,522,590		148,522,590
Evaction of Power from Swabi (Federal PSDP) CCPR		477,771,000		477,771,000
Supply of Power to Rasahki E.Zone(Federal PSDP) CCPR-7018.		1,798,530,515		1,798,530,515
Supply of Power to Hattar E.Zone(Federal PSDP) CCPR-7019.		942,239,000	[illegible]	-
		11,617,743,438	[illegible]	10,675,504,438
Less: current maturity		(3,556,618,533)		(3,556,618,533)
		8,061,124,905	[illegible]	7,118,885,905

5 STAFF RETIREMENT BENEFITS - Consolidated

Four types of defined benefit plans are offered by the Company namely, pension, medical, free electricity and compensated absences.

Description	Pension obligations	Free electricity	Medical benefits	Compensated absences	Total
	30 June 2023	30 June 2023	30 June 2023	30 June 2023	30 June 2023
	Rupees				
Present value of defined benefit obligation	128,935,840,619	6,690,179,884	9,113,901,338	3,788,563,205	148,528,485,046

5.1 Amount recognized in balance sheet is as follows:

Net liability at beginning of the year	109,458,241,759	4,738,365,842	8,618,513,658	3,605,990,342	126,421,111,601
Charge for the year	12,712,925,750	697,313,665	1,237,776,531	399,049,909	15,047,065,855
Re-measurement of liability	15,411,390,781	1,477,038,053	(732,902,083)	-	16,155,526,751
Benefits paid during the year	(8,646,717,671)	(222,537,676)	(9,486,768)	(216,477,046)	(9,095,219,161)
	128,935,840,619	6,690,179,884	9,113,901,338	3,788,563,205	148,528,485,046

5.2 **Salaries wages and benefits include the following in respect of defined benefits plans:**

Current service cost	1,019,716,555	72,655,569	74,917,544	72,174,590	1,239,464,258
Interest cost	11,693,209,195	624,658,096	1,162,858,987	326,875,319	13,807,601,597
Re-measurement of liability	15,411,390,781	1,477,038,053	(732,902,083)	-	16,155,526,751
	28,124,316,531	2,174,351,718	504,874,448	399,049,909	31,202,592,606

STAFF RETIREMENT BENEFITS - HAZEC

Description	Pension obligations	Free electricity	Medical benefits	Compensated absences	Total
	30 June 2023	30 June 2023	30 June 2023	30 June 2023	30 June 2023
	Rupees				
Reconciliation of payable to defined benefit plan					
Charged till date (Progressive)	10,564,782,160	874,080,093	374,247,602	539,276,519	[illegible]
Re-measurement of liability (Progressive)	14,493,203,549	177,051,100	872,142,496	83,901,910	[illegible]
Benefits paid till date (Progressive)	(6,674,088,364)	(133,814,307)	(17,374,687)	(52,757,667)	[illegible]
Present value of defined benefit obligation	**18,383,897,345**	**917,316,886**	**1,229,015,411**	**570,420,762**	[illegible]
Amount recognized in balance sheet is as follows:					
Net liability at beginning of the year	15,376,142,947	666,551,381	1,150,757,555	516,736,597	[illegible]
Charge for the year	1,523,233,497	89,100,437	156,317,906	89,196,184	[illegible]
Re-measurement of liability	2,349,192,668	195,674,742	(77,455,482)	-	[illegible]
Benefits paid during the year	(864,671,767)	(34,209,674)	(604,568)	(35,512,019)	[illegible]
	18,383,897,345	**917,316,886**	**1,229,015,411**	**570,420,762**	[illegible]

-84

Salaries wages and benefits include the following in respect of defined benefits plans:

Current service cost	129,046,762	10,071,193	9,626,791	1,127,116	[illegible]
Interest cost	1,394,186,735	79,029,244	146,691,115	88,069,068	[illegible]
Re-measurement of liability	2,349,192,668	195,874,742	(77,455,482)	-	[illegible]
	3,872,426,165	**284,975,179**	**78,862,424**	**89,196,184**	[illegible]

STAFF RETIREMENT BENEFITS - Remaining PESCO

Description	Pension obligations	Free electricity	Medical benefits	Compensated absences	Total
	30 June 2023	30 June 2023	30 June 2023	30 June 2023	30 June 2023
			Rupees		
Present value of defined benefit obligation	110,551,943,274	5,772,862,998	7,884,885,927	3,218,142,443	127,427,834,642
Amount recognized in balance sheet is as follows:					
Net liability at beginning of the year	94,082,098,812	4,071,814,461	7,467,756,103	3,089,253,745	108,710,923,120
Charge for the year	11,189,692,253	608,213,228	1,081,458,625	309,853,725	13,189,217,831
Re-measurement of liability	13,062,198,113	1,281,163,311	(655,446,601)	-	13,687,914,823
Benefits paid during the year	(7,782,045,904)	(188,328,002)	(8,882,200)	(180,965,027)	(8,160,221,133)
	110,551,943,274	5,772,862,998	7,884,885,927	3,218,142,443	127,427,834,642
Salaries wages and benefits include the following in respect of defined benefits plans:					
Current service cost	890,669,793	62,584,376	65,290,753	71,047,474	1,089,592,396
Interest cost	10,299,022,460	545,628,852	1,016,167,872	238,806,251	12,099,625,435
Re-measurement of liability	13,062,198,113	1,281,163,311	(655,446,601)	-	13,687,914,823
	24,251,890,366	1,889,376,539	426,012,024	309,853,725	26,877,132,654

	Notes	PESCO 30 June 2023 Rupees	HAZECO [illegible] Rupees	Remaining PESCO 30 June 2023 Rupees
6 DEFERRED CREDIT				
Deposits by Consumers :				
Balance brought forward		57,758,648,874	[illegible]	49,739,686,852
Additions during the year		6,802,360,711	[illegible]	6,434,436,348
		64,561,009,585	[illegible]	56,174,123,200
Amortization				
- Balance brought forward		(18,536,668,108)	[illegible]	(15,786,766,347)
- For the year		(2,308,964,609)	[illegible]	(2,015,423,586)
		(20,845,632,717)	[illegible]	(17,802,189,933)
		43,715,376,868	[illegible]	38,371,933,267

6.1 This represents amount received from customers for new connections/construction works. The amount is initially recorded under Trade Payable and transferred to this head once task is completed. The amount is amortized over the life of fixed assets.

	Notes	PESCO 30 June 2023 Rupees	HAZECO [illegible] Rupees	Remaining PESCO 30 June 2023 Rupees
7 CONSUMERS' SECURITY DEPOSITS				
Consumers' security deposits	7.1	6,793,519,936	[illegible]	5,397,948,646
		6,793,519,936	[illegible]	5,397,948,646

7.1 These represent security deposits received from consumers at the time of electricity connection and are refundable / adjustable on disconnection of electricity supply. This amount has been kept in a separate bank account.

	Notes	PESCO 30 June 2023 Rupees	HAZECO [illegible] Rupees	Remaining PESCO 30 June 2023 Rupees
8 TRADE AND OTHER PAYABLES				
Associated undertakings - unsecured	8.1	449,848,408,370	[illegible]	449,633,487,735
Trade creditors payable		5,943,087,759	[illegible]	5,943,087,759
		455,791,496,129	[illegible]	455,576,575,494
Receipt against deposit work		27,461,559,119	[illegible]	24,243,685,166
Realized :				
Electricity duty		116,489,005	[illegible]	116,489,005
Professional Tax		454,650	[illegible]	454,650
Income tax withheld		691,058,323	[illegible]	691,058,323
TV License fee payable		49,588,170	[illegible]	35,949,274
Neelum Jhelum surcharge Payable		876,600,465	[illegible]	705,394,581
Equalization surcharge payable		779,668,867	[illegible]	535,944,629
Finance Cost surchage Payable		2,046,273,842	[illegible]	1,533,288,803
UOS/Tariff Rationalization Surcharge Payable		1,020,886,105	[illegible]	702,992,987
General sales tax		468,782,630	[illegible]	468,782,630
		6,049,802,057	[illegible]	4,790,354,882

	Notes	PESCO 30 June 2023 Rupees	HAZECO 30 June 2023 Rupees	Remaining PESCO 30 June 2023 Rupees
Un - Realized				
Electricity duty		1,847,365,004	[illegible]	1,775,463,630
Income tax		1,546,549,826	[illegible]	1,440,479,711
TV license fee		1,340,835,194	[illegible]	1,277,115,332
Neelum Jhelum surcharge		1,299,466,427	[illegible]	968,545,602
Equalization surcharge		225,319,515	[illegible]	163,275,666
Extra Tax		73,930,373	[illegible]	68,643,900
Further Tax		40,512,811	[illegible]	39,327,464
Sales Tax 2014		23,107,277	[illegible]	20,475,066
Tax under 235-A		97,440,043	[illegible]	85,820,042
Finance Cost surchage		6,431,643,659	[illegible]	4,487,888,379
U.O.S/Tariff Rationalization Surcharge		222,310,384	[illegible]	147,922,626
General sales tax		4,424,892,705	[illegible]	4,012,793,380
		17,573,373,218	[illegible]	14,487,750,798
Other Liabilities and Retentions :				
Employees shares in fund		9,461,941	[illegible]	8,887,746
Accrued liabilities		2,385,418,408	[illegible]	2,342,872,336
Retention money - contractors / suppliers		651,225,334	[illegible]	651,225,334
Capital contribution awaiting connections		2,083,998,614	[illegible]	1,787,528,617
Other liabilities		126,857,742	[illegible]	126,857,742
		5,256,962,039	[illegible]	4,917,371,775
		512,133,192,562	[illegible]	504,015,738,115
8.1 Creditors - associated undertakings				
Central Power Purchasing Agency		449,380,274,013	[illegible]	449,165,353,378
FESCO		-	[illegible]	-
National Trans: & Despatch Company		-	[illegible]	-
MEPCO		455,930,995	[illegible]	455,930,995
Pakistan Electric Power Company		12,203,362	[illegible]	12,203,362
		449,848,408,370	[illegible]	449,633,487,735
9 ACCRUED MARKUP				
Markup on ADB loans		3,522,447,097	[illegible]	3,522,447,097
ERRA		198,122,738	[illegible]	198,122,738
Electrification work at Chitral		12,930,000	[illegible]	12,930,000
132 KV Grid system Chitral		23,087,800	[illegible]	23,087,800
Evaction of Power from Swabi		8,986,000	[illegible]	8,986,000
Supply of Power to Rasahki		18,992,400	[illegible]	18,992,400
Supply of Power to Hattar		6,496,700	[illegible]	-
		3,791,062,735	[illegible]	3,784,566,035

10 CONTINGENCIES AND COMMITMENTS

There is no material contingencies as at the end of the period and as at June 30, 2023.(2022: Nil)

	Notes	PESCO 30 June 2023 Rupees	HAZECO 30 June 2023 Rupees	Remaining PESCO 30 June 2023 Rupees
Property, plant and equipment				
Operating fixed assets		78,628,588,361	[illegible]	66,601,236,718
Capital work in progress	11.1	37,384,263,088	[illegible]	31,312,149,127
		116,012,851,449	[illegible]	97,913,385,845

Consolidated Statement of Financial Position as at June 30, 2023

	Freehold Land	Leasehold Land	Buildings	Distribution Equipment	Computer and Electronic Equipment	Furniture and Fixtures	Vehicles	Other Equipment	Total
COST									
Balance as at 30.06.2022	1,115,579,303	878,400	3,838,237,285	99,618,583,729	759,515,330	53,235,232	1,176,661,335	922,158,014	107,484,848,628
Additions during the year	243,904,110	-	-	-	47,198,124	6,227,444	140,082,797	227,932,527	665,345,002
Transfers from CWIP	-	-	232,867,017	13,567,712,172	-	-	-	-	13,800,579,189
Disposals									
Balance as at 30.06.2023	1,359,483,413	878,400	4,071,104,302	113,186,295,901	806,713,454	59,462,676	1,316,744,132	1,150,090,541	121,950,772,819
DEPRECIATION									
Balance as at 30.06.2022	214,920,635	-	936,782,012	36,433,945,197	443,604,695	41,116,397	733,596,780	522,676,276	39,326,641,992
Charge for the year	-	-	84,323,229	3,866,651,999	64,577,568	7,465,070	72,013,462	115,431,752	4,210,463,100
Depreciation adjustment during the year	-	-	-	-	-	-	-	-	-
Balance as at 30.06.2023	-	-	1,021,105,241	40,300,597,196	508,182,263	48,581,467	805,610,242	638,108,028	43,537,105,092
Net Balance as at 30.06.2023	1,359,483,413	878,400	3,049,999,061	72,885,698,705	298,531,171	10,881,209	511,133,890	511,982,513	78,413,667,727

Consolidated Statement of Financial Position as at June 30, 2023

	Freehold Land	Leasehold Land	Buildings	Distribution Equipment	Computer and Electronic Equipment	Furniture and Fixtures	Vehicles	Other Equipment	Total
COST									
Balance as at 30.06.2022	130,872,166	-	743,230,022	16,343,167,681	36,912,201	6,559,807	169,343,007	64,112,495	[illegible]
Additions during the year	127,258,807	-	39,589,704	1,733,331,577	5,782,000	-	12,457,172	23,313,540	[illegible]
Transfers from CWIP									
Disposals									
Balance as at 30.06.2023	258,130,973	-	782,819,726	18,076,499,258	42,694,201	6,559,807	181,800,179	87,426,035	[illegible]
DEPRECIATION									
Balance as at 30.06.2022	-	-	172,306,714	6,435,610,032	20,998,908	4,354,115	94,181,941	27,035,412	[illegible]
Charge for the year	-	-	15,200,235	614,812,465	3,691,220	391,755	12,101,139	7,893,600	[illegible]
Depreciation adjustment during the year	-	-	-	-	-	-	-	-	-
Balance as at 30.06.2023	-	-	187,506,948	7,050,422,497	24,690,128	4,745,871	106,283,080	34,929,012	[illegible]
Net Balance as at 30.06.2023	258,130,973	-	595,312,777	11,026,076,761	18,004,073	1,812,936	75,517,099	52,497,023	[illegible]

Consolidated Statement of Financial Position as at June 30, 2023

	Freehold Land	Leasehold Land	Buildings	Distribution Equipment	Computer and Electronic Equipment	Furniture and Fixtures	Vehicles	Other Equipment	Total
COST									
Balance as at 30.06.2022	984,707,137	878,400	3,095,007,263	83,275,416,048	722,603,129	46,675,425	1,007,318,328	858,045,519	89,990,652,249
Additions during the year	116,645,303	-	(39,589,704)	(1,733,331,577)	41,416,124	6,227,444	127,825,625	204,618,987	(1,276,387,797)
Transfers from CWIP	-	-	232,867,017	13,567,712,172	-	-	-	-	13,800,579,189
Disposals									
Balance as at 30.06.2023	1,101,352,440	878,400	3,288,284,576	95,109,796,643	764,019,253	52,903,869	1,134,943,953	1,062,664,506	102,514,843,640
DEPRECIATION									
Balance as at 30.06.2022	214,920,635	-	764,475,298	29,998,335,165	422,605,787	36,762,282	639,414,839	495,640,864	32,572,154,870
Charge for the year	-	-	69,122,994	3,251,839,534	60,886,368	7,073,315	59,912,323	107,538,152	3,556,372,686
Depreciation adjustment during the year	-	-	-	-	-	-	-	-	-
Balance as at 30.06.2023	-	-	833,598,293	33,250,174,699	483,492,155	43,835,596	699,327,162	603,179,016	36,128,527,556
Net Balance as at 30.06.2023	1,101,352,440	878,400	2,454,686,284	61,859,621,944	280,527,098	9,068,273	435,616,791	459,485,490	66,386,316,084

	Notes	PESCO 30 June 2023 Rupees	HAZECO [illegible]	Remaining PESCO 30 June 2023 Rupees
12 LONG TERM LOANS - considered good				
House Building Advance		1,011,385	[illegible]	994,930.00
Purchase of Plot		29,580	[illegible]	28,128
		1,040,965	[illegible]	1,023,058
Current maturity of long term loans		(331,632)	[illegible]	(321,632)
		709,333	[illegible]	701,426
13 STORES, SPARE PARTS AND LOOSE TOOLS				
Stores		11,252,209,586	[illegible]	9,989,664,239
Provision for obsolete stores		(4,968,483)	[illegible]	(4,968,483)
		11,247,241,103	[illegible]	9,984,695,756
14 TRADE DEBTS				
Sale of electricity	14.1	58,604,101,410	[illegible]	49,239,441,730
Government levies and other charges	14.2	39,016,236,156	[illegible]	35,196,126,322
Secured and considered good		97,620,337,566	[illegible]	84,435,568,052
Considered doubtful		102,952,001,380	[illegible]	101,139,523,378
		200,572,338,946	[illegible]	185,575,091,430
Less: Provision for doubtful debts		(102,952,001,380)	[illegible]	(101,139,523,378)
		97,620,337,566	[illegible]	84,435,568,052

14.1 Trade debts are secured to the extent of corresponding consumers' security deposits against electricity connection.

	Notes	PESCO 30 June 2023 Rupees	HAZECO [illegible]	Remaining PESCO 30 June 2023 Rupees
14.2 Trade debts - Government levies and other charges				
Electricity Duty Receivable-E/Bills		1,847,365,004	[illegible]	1,775,463,630
Income Tax Recivable-E/Bills		1,546,549,826	[illegible]	1,440,479,711
G.S.T Recivable		25,337,238,893	[illegible]	24,265,503,248
T.V Fee Recivable		1,340,835,194	[illegible]	1,277,115,332
Neelum Jehlum S/c Receivable		1,299,466,427	[illegible]	968,545,602
Equalization S/c Receivable		225,319,515	[illegible]	163,275,666
Extra Tax Receivable		373,411,646	[illegible]	331,851,427
Further Tax Receivable		186,902,695	[illegible]	151,579,065
Sales Tax 2014 Receivable		107,568,766	[illegible]	100,497,490
Tax under 235-A Receivable		95,849,462	[illegible]	84,726,391
Tax under 235-B Receivable		1,590,581	[illegible]	1,093,651
FC Surcharge Receivable		6,431,643,659	[illegible]	4,487,888,379
U.O.S/Tariff Rationalization				
Surcharge Receivable		222,310,384	[illegible]	147,922,626
Additional tax		184,104	[illegible]	184,104
		39,016,236,156	[illegible]	35,196,126,322

	Notes	PESCO 30 June 2023 Rupees	HAZECO [illegible] Rupees	Remaining PESCO 30 June 2023 Rupees
15 LOANS AND ADVANCES - considered good				
Current portion of long term loans - considered good		331,632	[illegible]	321,632
Advance to supplier - considered good		256,091,464	[illegible]	255,832,381
Advance income tax		2,714,320,774	[illegible]	2,714,320,774
Advance Sales tax		50,000,000	[illegible]	50,000,000
Advance general sales tax spillover		616,458,341	[illegible]	616,458,341
Advance extra tax spillover		27,508,740	[illegible]	27,508,740
Advance further tax spillover		10,456,340	[illegible]	10,456,340
Withholding Taxes at-source		-	[illegible]	-
Advances for expenses	15.1	57,121,357	[illegible]	52,038,445
		3,732,288,648	[illegible]	3,726,936,653

15.1 Advances for expenses

Advance for Travelling Expenses	9,365,822	[illegible]	8,622,542
Advance against Other Expenses	47,755,535	[illegible]	43,415,903
	57,121,357	[illegible]	52,038,445

16 OTHER RECEIVABLES - considered good

Due from WAPDA and associated undertakings-net	16.1	49,981,168,816	[illegible]	49,723,210,248
Sales tax receivable - net		43,182,161,128	[illegible]	43,182,152,789
Pension receivable from associted undertakings		3,735,248,779	[illegible]	3,735,248,779
Others receivables net		7,289,507	[illegible]	7,289,507
		96,905,868,230	[illegible]	96,647,901,323

16.1 Due from WAPDA and associated undertakings - net

WAPDA Welfare Fund	695,245,070	[illegible]	598,366,091
WAPDA	944,119,146	[illegible]	783,039,557
GENCO-1	882,477	[illegible]	882,477
GENCO-2	6,538,699	[illegible]	6,538,699
GENCO-3	8,157,053	[illegible]	8,157,053
GENCO-4	1,678,430	[illegible]	1,678,430
NTDC	764,145,957	[illegible]	764,145,957
LESCO	10,893,487	[illegible]	10,893,487
FESCO	16,576,302	[illegible]	16,576,302
QESCO	84,068,245	[illegible]	84,068,245
GEPCO	11,319,697	[illegible]	11,319,697
IESCO	486,872,291	[illegible]	486,872,291
HESCO	4,726,208	[illegible]	4,726,208
TESCO	46,943,948,099	[illegible]	46,943,948,099
SEPCO	1,997,655	[illegible]	1,997,655
	49,981,168,816	[illegible]	49,723,210,248

16.1.1 Due from WAPDA and associated undertakings are unsecured and do not carry interest.

17 Receivable from Government of Pakistan (Ministry of Finance)

This represents subsidy receivable from Ministry of Finance as per detail bellow :

	Notes	PESCO 30 June 2023 Rupees	[illegible] 30 June 2023 Rupees	Remaining PESCO 30 June 2023 Rupees
Opening balance as at 1 July		42,901,199,260	[illegible]	38,291,195,837
Tariff differential subsidy recognized during the year		32,833,116,356	[illegible]	32,833,116,356
Industrial Support Package.		-		-
Zero Rated Claims		818,214,607	[illegible]	818,214,607
Kissan Package Subsidy		23,008,879	[illegible]	23,008,879
Credit note adjusted		(50,484,474,772)	[illegible]	(45,874,470,849)
		26,091,064,330	[illegible]	26,091,064,330

18 BANK BALANCES

Cash at bank		10,256,838,629	[illegible]	8,828,136,747
		10,256,838,629	[illegible]	8,828,136,747

	Notes	PESCO 30 June 2023 Rupees	[illegible] 30 June 2023 Rupees	Remaining PESCO 30 June 2023 Rupees
19 SALE OF ELECTRICITY				
Sale of electricity		272,160,112,275	[illegible]	214,338,108,731
Tariff Differential Subsidy		-		-
Less: Sales tax		(31,936,295,463)	[illegible]	(31,936,295,463)
Net sale of electricity		240,223,816,812	[illegible]	182,401,813,268
Subsidy from the Government of Pakistan (GoP) on sale of electricity		39,271,580,895	[illegible]	30,347,593,703
		279,495,397,707	[illegible]	212,749,406,971

20 COST OF ELECTRICITY :

Central Power Purchase Agency		317,624,007,678	[illegible]	259,733,018,944
Market Operations Agency Fee		121,253,663	[illegible]	121,253,663
Inadmissible Sales Tax on Supplies		4,818,563,134	[illegible]	4,818,563,134
		322,563,824,475	[illegible]	264,672,835,741

	Notes	PESCO 30 June 2023 Rupees	HAZECO 30 June 2023 Rupees	Remaining PESCO 30 June 2023 Rupees
21	**OTHER OPERATING COST EXCLUDING DEPRECIATION**			
	Salaries, wages and other benefits	27,686,971,304	[illegible]	22,891,789,879
	Repairs and maintenance	1,018,027,862	[illegible]	862,409,699
	Rent, rates and taxes	85,163,645	[illegible]	73,016,443
	Power, light and water	87,286,082	[illegible]	75,161,320
	Postage and telephone	43,615,571	[illegible]	36,935,769
	Office supplies and other expenses	625,584,932	[illegible]	560,544,627
	Travelling Allowance	324,358,902	[illegible]	266,555,260
	Transportation Expenses	272,188,060	[illegible]	206,297,523
	Insurance expense	27,460,000	[illegible]	24,714,000
	Electricity bill collection charges	216,420,351	[illegible]	192,625,811
	Legal and professional charges	58,802,222	[illegible]	53,597,261
	NEPRA fee and charges	98,074,471	[illegible]	88,267,024
	PITC Charges	81,281,755	[illegible]	73,153,580
	Auditor's remuneration	950,000	[illegible]	855,000
	Advertisement and publicity	5,640,238	[illegible]	4,286,807
	Provision for doubtful debts	10,913,946,930	[illegible]	10,558,163,929
	Directors fee	14,923,427	[illegible]	13,431,084
	Miscellaneous expenses	19,294,755	[illegible]	15,993,906
		41,579,990,507	[illegible]	35,997,798,919
22	**RENTAL AND SERVICE INCOME**			
	Meter rent	38,661,805	[illegible]	30,273,323
	Public lighting	1,538,866	[illegible]	1,277,990
	Service rent	1,440,513	[illegible]	1,189,868
	Connection / Reconnection fees	10,844,722	[illegible]	8,735,763
		52,485,906	[illegible]	41,476,944
23	**OTHER INCOME**			
	Profit on bank deposits	1,503,380,463	[illegible]	1,503,380,463
	Sale of scrap	139,627,036	[illegible]	139,627,036
	Late payment surcharge	5,363,891,540	[illegible]	4,781,677,535
	Wheeling charges from TESCO	2,098,487,876	[illegible]	2,098,487,876
	Miscellaneous	1,016,318,453	[illegible]	957,230,537
		10,121,705,368	[illegible]	9,480,603,447
24	**FINANCE COST**			
	Markup on ADB Loans	584,697,755	[illegible]	584,697,755
	ERRA	18,002,472	[illegible]	18,002,472
	Bank charges	3,488,434	[illegible]	3,339,870
	Exchange Loss	459,711,153	[illegible]	459,711,153
		1,065,899,814	[illegible]	1,065,751,250
25	**TAXATION**			
	Current Tax	3,145,518,170	[illegible]	3,145,518,170
	Prior year	7,666,108	[illegible]	7,666,108
		3,153,184,278	[illegible]	3,153,184,278

CHIEF EXECUTIVE OFFICER

DIRECTOR

Annex – I

REPORT OF HR COMMITTEE CONSTITUTED FOR OPERATIONALIZATION OF HAZECO

REPORT OF HR COMMITTEE CONSTITUTED FOR OPERATIONALIZATIONAL OF HAZECO

INTRODUCTION

A committee comprising of the following officers was constituted by the competent authority in accordance with minutes of meeting of the committee held on 17th November, 2023 at PPMC, Islamabad for effective and efficient manpower transition from PESCO to HAZECO:

a. Mr. Saghir Ahmad, GM HR PPMC — Convener

b. Mr. Sardar Sajid Nawaz, DG HR PESCO — Member

c. Mr. Siab Ahmad, Manager (HR), PESCO — Member

TERM OF REFERENCE

The Terms of Reference (TOR) of the above referred HR Committee were as under:

i) Development of Organogram of HAZECO

ii) Manpower Transition from PESCO to HAZECO including;
   a. Identification of employees for allocation to HAZECO
   b. Complete plan of allocation of employees to HAZECO
   c. Development of offer of appointment to be issued to allocated employees to HAZECO

iii) Plan for distribution of resources, including vehicles, physical assets etc.

iv) Preparation of draft HR policies

v) Plan for transfer of all record relating to HR, including personal files, inquiry files etc.

vi) Transfer of all record relating to vehicles and physical assets

vii) Mechanism for transfer of pension liabilities

59-

BACKGROUND AND PROCEEDINGS

Ministry of Energy (Power Division) vide notification No. 12(24)/202019-DISCO-II dated 18/01/2023 has conveyed approval of the Prime Minister for establishment of HAZECO and bifurcation of PESCO for its better management and increase in operational efficiency.

Accordingly, Ministry of Energy (Power Division) vide office order No.12 (24)/2018-DISCO-I dated 03/02/2023 has constituted a committee for finalization of matters related to bifurcation of PESCO and incorporation of HAZECO.

The Committee in its meeting held on 17th November, 2023, deliberated the process of establishment of HAZECO and steps required for commencement of its operations. Further, the said committee finalized various recommendations to complete the transition process efficiently & effectively. Accordingly, the HR Committee conducted two meetings in the office of the convener to discuss and examine the existing as well as future requirements of Human Resources, vehicles, preparation of HR Policies as per TORs. The committee deliberated the points referred in TOR at length, which is reflected below:

i) Development of Organogram of HAZECO

The Committee has developed the organogram for various functions & departments of HAZECO, which is annexed per detail given below:

a. Organogram for HAZECO HQ (Annexure-A)
b. Organogram for Technical Directorate (Annexure-A/1)
c. Organogram for Operation Directorate (Annexure-A/2)
d. Organogram for Customer Services Directorate (Annexure-A/3)
e. Organogram for MIRAD (Annexure-A/4)
f. Organogram for HR & Admn Directorate (Annexure-A/5)
g. Organogram for Finance Directorate (Annexure-A/6)
h. Organogram for Internal Audit Department (Annexure-A/6)

In the first stage, proposed positions of C level officers will be as under:

Name of Position	No. of Positions	Status	Remuneration
Chief Executive Officer	1	On contract	Market based salary
Chief Financial Officer	1	On contract	Market based salary
Chief Commercial Officer	1	On contract	Market based salary

Chief Human Resource	1	On contract	Market based salary
Chie Technical Officer	1	On contract	Market based salary
Chief Operating Officer	1	On contract	Market based salary
Company Secretary	1	On contract	Market based salary

The remaining organization structure will be considered and approved by BoD HAZECO at second stage.

The committee propose that after bifurcation of PESCO into HAZECO by Ministry of Energy vide letter referred above, and subsequent posting orders of employees issued by PESCO from time to time till formal operationalization of HAZECO, the employees of PESCO posted within the territorial limits/ jurisdiction of (newly created company) HAZECO, shall deemed to be transferred to HAZECO, for all service intents and purposes.

Human Resources Status

The current/existing formation wise status of employees working in HAZECO is as under:

Circle	Sanctioned	Working	Vacant
SE Opr Hazara I Circle	2205	985	1220
SE Opr Hazara II Circle	1304	562	742
DM MIS PESCO Computer Centre Abbottabad	45	24	21
AM Field Store Abbottabad, Haripur, Mansehra	72	24	48
XEN Construction Division Abbottabad	198	47	151
XEN SS&TL Abbottabad	503	224	279
SDO Grid Construction S/Div Abbottabad	75	13	62
XEN M&T Abbottabad	28	6	22
Incharge Circle Training Centre Abbottabad	10	3	7
Total	4440	1888	2552

Existing manpower status (category wise) of employees under operational jurisdiction of HAZECO is as under:

Sr#	Nomenclature of Post/Design	BPS	Sanctioned	Working	Vacant
1	S.E. (Op:)	19	2	2	0
2	Dy: Dir Tech:	18	2	2	0
3	Dy: Manager M&T	18	1	1	0
4	Dy: Manager MIS	18	1	1	0

49	Junior Store Keeper	14	3	3	0
50	L.S-II	14	138	58	80
51	Lab Assistant	14	4	1	3
52	LFM-II	14	4	7	-3
53	MRS-I	14	11	2	9
54	PC Operator	14	9	0	9
55	SSO-II	14	29	19	10
56	Steno Grade-II	14	15	0	15
57	Sub Engineer	14	1	2	-1
58	Test Asstt:	14	3	1	2
59	A.D.M	13	2	2	0
60	Cable Jointer	13	1	0	1
61	Fitter-I	11	4	2	2
62	L.M.I	11	348	293	55
63	MRS-II	11	28	13	15
64	Senior Clerk	11	49	14	35
65	Store Clerk	11	6	0	6
66	Work Supervisor	11	1	0	1
67	Winder	10	0	1	-1
68	Electrician-II	9	1	0	1
69	Fitter-II	9	17	2	15
70	J.Clerk W/S:	9	113	23	90
71	J/Clerk Comli:	9	22	2	20
72	L.M-II	9	355	233	122
73	Meter Mechanic	9	4	0	4
74	Meter Reader	9	435	260	175
75	SSA	9	24	13	11
76	Surveyor	9	1	1	0
77	Tracer	9	22	0	22
78	Security Sergeant	8	14	7	7
79	ALM	7	1052	449	603
80	ASSA	7	71	59	12
81	Auditor	7	26	0	26
82	Bill Distributor	7	224	29	195
83	Driver	7	112	50	62
84	Electrician	7	1	0	1
85	Gate Clerk	7	3	2	1
86	Helper	7	7	2	5
87	Legal Clerk	7	4	0	4
88	Security Guard	6	247	58	189
89	Blacksmith	5	2	0	2
90	Meter Helper	5	6	0	6
91	T.W.O	5	4	2	2
92	Turner	5	0	1	-1

93	Welder	5	1	0	1
94	Daftari	4	8	0	8
95	Cleaner	3	17	2	15
96	Store Helper	3	15	4	11
97	Bearer	2	0	1	-1
98	Khalasi	2	5	0	5
99	Chowkidar	1	46	2	44
100	Ehalmed	1	2	0	2
101	Mali	1	37	8	29
102	Naib Qasid	1	129	42	87
103	Sweeper	1	80	15	65
Grand Total			**4440**	**1888**	**2552**

Employment Status

Summary of employment status of employees working in HAZECO is as under:

S.No	Service Status	Total Number of Employees
1	Regular	1444
2	Lump Sum	385
3	Contractual	33
4	Part Time Workers	23
5	Deputationists	02
6	Daily Wage	01

Hazara Division Domiciled Employees

Hazara Division Domiciled employees working in HAZECO as well as PESCO is as under:

Domicile	HAZARA Division Domiciled Employee working in HAZECO	HAZARA Domiciled Employee working in PESCO	Total
Abbottabad	619	10	629
Battagram	40	3	43
Ghazi	1	0	1
Haripur	401	4	405
Havelian	1	0	1
Kohistan	6	19	25
Mansehra	558	4	562
Torghar	3	0	3
Total	1629	40	1669

Overall Domiciled Wise Data of Employees in HAZECO

Overall summary of domicile wise data of employees working in HAZECO is as under:

S.No	Domicile	Number of Employees
1	Abbottabad	619
2	AJK	4
3	Attock	14
4	Bagh (AJK)	1
5	Bahawal Nagar	1
6	Bahawalpur	1
7	Bannu	13
8	Battagram	40
9	Bhimber (AJK)	1
10	Chakwal	2
11	Charsadda	27
12	D.I.Khan	4
13	Diamir	1
14	Dir	3
15	Faisalabad	2
16	Fata	2
17	Fateh Jhang	1
18	Federal	1
19	Ghazi	1
20	Gilgit	1
21	Gujranwala	3
22	Hafizabad	1
23	Hangu	2
24	Haripur	401
25	Havelian	1
26	Hyderabad	1
27	Islamabad	1
28	Jhang	2
29	JHELUM	1
30	Karachi	1
31	Karak	9
32	Kasur	1
33	Khaniwal Punjab	1
34	KHYBER AGENCY	1
35	Kohat	10
36	Kohistan	6
37	Kurram	1
38	Lahore	4
39	Lakki Marwat	10
40	Lower Dir	2
41	Malakand	3

42	Malakand Ag:	1
43	Mansehra	558
44	Mardan	38
45	Mian Wali	1
46	Mirpur Khass	1
47	Muzaffarabad (AJK)	4
48	Nankana	1
49	Norowal	1
50	Nowshera	22
51	Nowshero Feroz Sindh	1
52	Peshawar	21
53	Quetta	2
54	Rahim Yar Khan	1
55	Rawalpindi	7
56	Sindh Rural	1
57	Swabi	22
58	Swat	2
59	Torghar	3
Total		**1888**

Keeping in view the above, it is recommended that after establishment/ functioning of HAZECO, new company offer of employment shall be issued to all employees working in jurisdiction of HAZECO. If an employee fails to accept the offer of employment up to the specific deadline, then he/she be transferred back to PESCO.

This transition process shall be started and completed immediately after operationalization of HAZECO.

a) **Complete plan of allocation of employees in HAZECO**

The exact requirement of staffing in HAZECO shall be determined after finalization of organogram and sanctioned strength of staff by the Ministry of Energy (Power Division) or PPMC Islamabad. However, the management of HAZECO may adopt following modus operandi:

Option-I

After approval of organogram and finalization of category wise sanctioned strength of employees, the management of HAZECO may seek option from the employees, whose seniority is being maintained at PESCO level, for their posting in HAZECO. After submission of their option, seniority such employees shall be maintained and

reckoned at HAZECO as per their original seniority of PESCO. It will provide an opportunity to the officers, who are senior on their cadre and seniority list to be considered for promotion.

Option-2

Based on the requirement and availability of vacant positions, the management of HAZECO may fill the vacant position by opening and allowing "Local Deputation to employees of other Distribution Companies"

Option-3

In case, the above were not fruitful, then critical vacancies may be filled in from open market through advertisement. Similarly, the competent authority may also outsource non-core business like janitorial services, security services, naib qasids, etc subject to completion of all codal formalities as required under the law.

b) Development of offer of appointment HAZECO

Company Employment Offer has been drafted, and appended as Annexure-B

iii) Plan for distribution of resources, including vehicles, physical assets etc.

Summary of vehicles including on-road and off roach vehicles under the jurisdiction of HAZECO is as under:

S.No.	Formation	Authorized	On Road	Off Road
1	Hazara Circle-I	70	41	12
2	Hazara Circle-II	58	31	3
3	SS&TL Division A/Abad	10	8	2
4	XEN GSC A/Abad	4	4	-
5	XEN (Construction) Hazara	22	22	-
6	M&T Hazara	1	1	-
7	Stores A/Abad, Haripur, & Mansehra	6	6	-
	Total	171	113	17

Office wise details along with make/type, registration No, and Model number is as under:

S.No.	Attached with	Make/Type	Regist: No	Model	Status
1	DCM	Suzuki Van	BD-1914	2014	On Road
2	S.E.	Toyota D/Door	A-1549	2011	On Road
3	City Division.	Toyota Hilux STD 520	0182-4	2014	On Road
4	City-I S./Division	Shah Zore	B-4890	2003	On Road
5	City-II S/Div	Suzuki pick up	D-4801	2013	On Road
6	City S/Division	Toyota Pick Up	B-4805	2006	On Road
7	Havelian-I	Pothar Jeep	B-4746	2005	On Road
8	Havelian-II	Suzuki Jeep	MA-8283	1990	On Road
9	Lora Chowk	Shah Zore	B-3715	1992	On Road
10	City S/Division.	Mazda School Van	ADA-1110	1993	On Road
11	F.I.U	M/Cycle Honda CD-70	CEP-2941	2013	On Road
12	PCC A/Abad	Pothar Jeep	B-1576	2004	On Road
13	Havelian-II	Toyota Pick Up	AB-3439	2020	On road
14	Lora Chowk	Toyota Pick Up	AB-3446	2020	On road
15	Havelian-I	ShahZore	AB-4824	2022	On road
16	Havelian-I	Master Truck	D-2966	2002	Off Road
17	Lora Chowk	Mitsubishi	B-5597	1997	Off road
18	Lora Chowk	Suzuki Pick Up	B-4460	2002	Off road
19	Lora Chowk	Suzuki Pick Jeep	ADA-1026	1990	Off road
20	Shimla Hill	Motor Cycle	ADA-4648	1992	Off road
21	City-I A/Abad	Motor Cycle	ADA-4649	1996	Off road
22	S/Hill S/Div	Shah Zore	B-4571	2002	Off Road
23	XEN	Kia Sportage Jeep	A-1401	2005	On Road
24	XEN	Hino Truck	B-5327	1987	On Road
25	SDO J/Abad -II	Suzuki Pickup	B-4603	2004	On Road
26	SDO J/Abad -II	Toyota Pickup	AB-3486	2020	On Road
27	SDO J/Abad -I	Toyota Pickup	A-1615	2015	On Road
28	SDO (P) Dhamtour	Hyundai Shahzore	B-4329	2002	Off Road
29	SDO (P) Lora.	Toyota Pickup	B-4673	2005	On Road
30	SDO (P) N/Sher	Suzuki Pick-up	B-4127	2002	On Road
31	SDO (P) N/Gali	Suzuki Pick-up	D-4784	2013	On Road
32	SDO Jinnah abad-II	RHD ISUZU Truck Bucket Crane	GAA-551	2022	On Road
33	SDO N/Sher	Hyundai	AB-4828	2021	On Road
34	SDO Nathia gali	Hyundai	AB-4871	2021	On Road
35	Divisional Office	Toyota Pick Up	AB-3467	2020	On Road
36	SDO KTS	Suzuki Jeep	R-5082	2005	on Road
37	SDO TIP	Toyota Pick Up	B-3086	2014	On Road
38	SDO TIP	Toyota Pick Up	B-1537	1995	On Road
39	SDO City	Toyota Pick Up	ADA-8408	1986	On Road
40	SDO City	Toyota Pick Up	AB-3451	2020	On Road
41	SDO Khanpur	Suzuki Pik Up	B-3099	2014	On Road

42	SDO Khanpur	Hyundi/Pik-up	B-1381	2002	On Road
43	SDO Khanpur	Toyota Pick Up	AB-3475	2020	On Road
44	SDO SNK	Toyota single cabin	A-0004	2008	On Road
45	SDO Mang	Toyota Pick Up	AB-3459	2020	On Road
46	TIP S/Division	Mistu: Mini Truck	B-1355	1997	Off Road
47	SDO TIP	Nissan Pik-up	ADB-1669	1986	Off Road
48	Ghazi	Toyota Pick Up	AB-3448	2020	On Road
49	Hattar	Shehzore	AB-4836	2020	On Road
50	KTS	Shahzore	B-1380	2002	On Road
51	Hattar	Toyota Pick Up	0050	2016	On Road
52	Ghazi	Shahzore	HRB-1843	2006	On Road
53	Divisional Office	Toyota Hilux	A-1195	2014	On Road
54	S.E.	Toyota Hi-Lux D/Cabin	BD-4965	2016	On Road
55	Dy: Director Technical	Suzuki Jeep	B-1450	2004	On Road
56	Dy: Commercial Manager	Suzuki Van	BD-1943	2014	On Road
57	XEN	Toyota Hilux	B-4791	2014	On Road
58	XEN	Bucket Mounted Vehicle	GAA-748	2022	On Road
59	XEN	Bedford Truck	ADA-2278	1980	On Road
60	SDO City S/Div: Mansehra	Shehzor Hyundai	B-1974	2001	On Road
61	SDO City S/Div: Mansehra	Hyundai Pick-Up	AB-4725	2022	On Road
62	SDO Khaki	Toyota Pickup	B-2138	2005	On Road
63	SDO Khaki	Hyundai Pickup	AB-4812	2022	On Road
64	SDO Balakot	Mitsubishi Pickup	B-3709	2007	On Road
65	SDO Ghari Habib Ullah	Suzuki Ravi Pickup	3283	2015	On Road
66	SDO Ghari Habib Ullah	Hyundai Pickup	AB-4827	2022	On Road
67	SDO Ghazikot	Toyota Hilux Pickup 4x2	MAB-5032	2015	On Road
68	SDO Ghazikot	Suzuki Pickup	B-2294	2004	On Road
69	XEN	Toyota Hilux Pickup 4x2	BD-4963	2016	On Road
70	SDO Rural S/Div: Mansehra	Hyundai Pickup	AB-4833	2022	On Road
71	SDO Oghi-II S/Divn:	Suzuki Pickup	B-4784	2013	On Road
72	SDO Oghi-II S/Divn:	Toyota Hilux Pickup	AB-3477	2020	On Road
73	SDO Rural S/Div: Mansehra	Suzuki Pickup	MA-B-5087	2014	On Road

74	SDO Oghi-I S/Diva:	Toyota Hi-Ace	BNB-3117	2008	On Road
75	XEN	Mitsubishi-D/Cabin Pickup	A-1268	2007	On Road
76	Division Office	Master Truck	B-4554	2007	On Road
77	SDO Shinkiari	Toyota Pickup	ADB-4945	1995	On Road
78	SDO Shinkiari	Hyundai Pickup	AB-4838	2022	On Road
79	SDO Siran Valley	Suzuki Pickup	MA-4781	2013	On Road
80	SDO Siran Valley	Hyundai Pickup	AB-4830	2022	On Road
81	SDO Baffa	Hyundai Pickup	MAB-1940	2002	On Road
82	SDO Baffa	Suzuki Pickup	B-3284	2013	On Road
83	SDO Battagram	Suzuki Pickup	B-1156	2014	On Road
84	SDO Battagram	Mistubishi Pickup	SWB-645	1996	On Road
85	SDO Baffa	Hyundai Shahzor	BD-2359	2004	Off Road
86	SDO Siran Valley	Mini Truck	0018	2007	Off Road
87	Rural Sub Division	Toyoota Pickup	B-3646	2005	Off Road
88	XEN	Toyota P/UP	A-1584	2011	Repairable
89	XEN	Man Crane Mounted truck	APF-0017	2015	do
90	XEN	Master Truck	D-2803	2008	On Road
91	AET Abbottabad	Toyota P/UP	AB-3454	2020	do
92	AET Abbottabad	Mazda D/Cab P/UP	ADB-4121	1993	Off Road
93	AET Haripur	Mazda P/UP	A-2359	1995	Repairable
94	AET Haripur	Master Mini Truck	B-2272	2007	On Road
95	AET Haripur	Hyundai P/UP	AB-4834	2022	On Road
96	AEM Abbottabad	Toyota Land Cruiser Jeep	IDA-5614	1984	Repairable
97	AEM Abbottabad	Suzuki Bolan	BD-1911	2014	Repairable
98	GC S/D GSC A/Abad	Suzuki Jimny Jeep	BB-1632	2009	On Road
99	GC S/D GSC A/Abad	Nissan P/Up	A-3105	1988	On Road
100	GC S/D GSC A/Abad	Nissan P/Up	A-2342	1986	On Road
101	GC S/D GSC A/Abad	Toyota P/Up	A-2907	1987	On Road
102	XEN Construction Division A/Abad	TOTYOTA PICK-UP (HILUX)	D-5260	2014	ON ROAD
103	SDO A/Abad	SUZUKI JEEP	D-4275	1992	ON ROAD
104	SDO A/Abad	BED FORD TRUCK	MRB-1281	1976	ON ROAD
105	SDO A/Abad	TRUCK CRANE	B-3868	1988	ON ROAD
106	SDO A/Abad	MITSUBISHI MINI TRUCK	B-1948	1998	ON ROAD
107	SDO A/Abad	SUZUKI P/UP	3414	2014	ON ROAD
108	SDO A/Abad	BED FORD TRUCK	A-1263	1985	ON ROAD
109	SDO HARIPUR	Master Truck	1022	2007	ON ROAD

110	SDO HARIPUR	SUZUKI JEEP	A-1156	1992	ON ROAD
111	SDO HARIPUR	Totota P/Up	R-3901	2005	ON ROAD
112	SDO HARIPUR	Mazda P/UP	2464	1994	ON ROAD
113	SDO HARIPUR	Hundai Shahzoor	2494	2002	ON ROAD
114	SDO MANSEHRA	SUZUKI JEEP	PRA-2682	1984	ON ROAD
115	SDO MANSEHRA	BED FORD TRUCK	AD-453	1985	ON ROAD
116	SDO MANSEHRA	TOYOTA PICK-UP	PRH-3384	1992	ON ROAD
117	SDO MANSEHRA	TOYOTA PICK-UP	M-4487	1979	ON ROAD
118	SDO MANSEHRA	SHAHZORE PICK-UP	NR-0043	2004	ON ROAD
119	SDO MANSEHRA	BED FORD TRUCK	MRB-4724	1976	ON ROAD
120	SDO MANSEHRA	MITSUBISHI MINI TRUCK	SWB-644	1986	ON ROAD
121	SDO MANSEHRA	SUZUKI JEEP	A-1235	1990	ON ROAD
122	SDO MANSEHRA	BED FORD TRUCK	MRB-7453	1967	ON ROAD
123	SDO MANSEHRA	KIA VAN	A-5589	1990	ON ROAD
124	DM Abbottabad	Mazda P/UP	A-1643	2016	On Road
125	Field Store Abbottabad	Mazda Cargo Truck	ADD-3542	2002	On Road
126	Field Store Abbottabad	P/up	ADB-1675	1989	On Road
127	Field Store Abbottabad	Lifter	ADB-1676	1989	On Road
128	Field Store Abbottabad	Mini Truck	AB-4771	2022	On Road
129	Field Store Mansehra	Cargo Truck	B-7141	1998	On Road
130	Field Store Mansehra	Toyoat P/UP	MA-4820	1987	On Road

LANDED PROPERTY UNDER JURISDICTION OF HAZECO

The list of land assets in HAZECO is attached as annexures mentioned against each:

a. Abstract / summary of total land assets under Hazara-I & Hazara- Circles (Annexure-C)
b. Detail of sites / land assets under Hazara-I and Hazara-II Circle (Annexure-C/1)
c. List of land assets in Hazara-I & II Circles already transferred in the name of PESCO. (Annexure C/2)
d. List of land under process of transfer from ex-owners to PESCO in Hazara-I & II Circles (Annexure-C/3)
e. List of court cases pertaining to lands / properties in Hazarra-I & Hazara-II Circles (Annexure C/4)

f. List of leased land assets in possession of PESCO in Khyber Pakhtunkhwa (Hazara-I and II Circles) (Annexure C/5)

g. List of Pre-WAPDA Land Assets to be transferred To PESCO but pending for approval of Government of Khyber Pakhtunkhwa n Hazara Circle-I & II (Annexure-C/6)

h. List of Non-Transferable Land Assets in possession of PESCO in Hazara-I & II circles (Annexure-C/7)

For effective and efficient transfer of land assets, HAZECO may engage a Legal Counsel / Property Management Firm for transfer of all landed Assets to the company.

Grid Stations

Grid stations under the jurisdiction of HAZECO shall be provided by the Technical Committee as per their TORs.

iv) **Preparation of Draft HR Policies**

Following draft HR policies have been framed, which is appended herewith per annexures mentioned against each:

i) Service Regulations of HAZECO-2023 (Annexure-D)
ii) Schedule-I (Cadre Wise Job specifications) (Annexure-D/1)
iii) Schedule-II (Promotion Policy) (Annexure-D/2)
iv) Schedule-III (Code of Conduct) (Annexure-D/3)
v) Schedule-IV (Leave Rules) (Annexure-D/4)
vi) Anti-Harassment Policy (Annexure-E)
vii) Disciplinary Policy (Annexure-F)
viii) Compensation & Benefits Policy (Annexure-G)
ix) Employment Policy (Annexure-H)
x) Health Policy (Annexure-I)
xi) Learning & Development Policy (Annexure-J)
xii) Vehicle Management Policy (Annexure-K)
xiii) Transfer Posting Policy (Annexure-L)
xiv) HRIS Automated Office Notification Policy (Annexure-M)
xv) HRIS Profile Looking System (Annexure-N)

xvi) House Allocation Policy (Annexure-O)

xvii) Deputation Policy (Annexure-P)

xviii) Collaborative Office Management System (Annexure-Q)

xix) Online Attendance Management System (Annexure-R)

xx) Travel Management Policy (Annexure-S)

v) **Plan for transfer of all record relating to HR, including personal files, inquiry files etc.**

The record including, personal files, PERs, seniorities, inquiries, audit record etc. all officers / staff, shall be immediately transferred to HAZECO after operationalization of the company.

vi) **Transfer of all record relating to vehicles and physical assets**

All record relating to vehicles to be handed over to HAZECO immediately after operationalization of HAZECO.

vii) **Mechanism for transfer of pension liabilities**

Summary of pensioners drawing pension from HAZECO is as under:

Sr. No	Company	Total Pensioners
1	PESCO	2090
2	IESCO	18
3	CRRK WAPDA	1
4	FESCO	4
5	GEPCO	4
6	HESCO	1
7	LESCO	6
8	PD NEELUM	9
9	TDP WAPDA	72
	Total	2205

FINDINGS

After detailed deliberations, and keeping in view the future requirements of the company, initial draft has been finalized, subject to final review and revision by the auditors later on, if any.

CONCLUSION

The committee has reached to the conclusion that in compliance of the Terms of Reference (TORs), the assigned tasks has been completed. The main tasks completed include; development of organogram, manpower transition plan, distribution of resources, preparation of the HR policies, transfer of record relating to HR, including personal files, inquiry files etc., and mechanism for transfer of pension liabilities.

Siab Ahmad
Manager (HR)
PESCO (Member)

Sardar Sajid Nawaz
Director General (HR)
PESCO (Member)

Saghir Ahmad
General Manager (HR)
PPMC, Islamabad
(Convener)

PROPOSAL FOR BIFURCATION OF PESCO

- PESHAWAR ELECTRIC SUPPLY COMPANY (PESCO)
- PROPOSED HAZECO

References:

- Section Officer (ELECTRIC SUPPLY COMPANYs-II) Ministry of Energy (Power Division) Islamabad Letter No. 12 (01) / 2018-ELECTRIC SUPPLY COMPANYs-II dated 09.03.2022
- General Manager (Technical Services) PPMC Islamabad Letter No. 1214-18 dated 10.03.2022
- Addl; Director General (HR) Office Order No. 17833-40 dated: 11.03.2022 regarding constitution of committee.
- Prime Minister office Islamabad Record Note dated: 30.05.2022
- General Manager (Technical Services) PPMC Islamabad Letter No. 1925-27 dated 02.06.2022
- Minutes of Meeting (Held on 17-11-2023 on Bifurcation of PESCO and Establishment of HAZECO)

PROPOSAL FOR BIFURCATION OF PESCO

PESHAWAR ELECTRIC SUPPLY COMPANY LIMITED

Phone# 091-9212230
Fax # 091-9212024

Office of the Chief Executive
Wapda House, Peshawar

No. 17833-40/Bifurcation of DISCOs

Date: 11 03/2022

OFFICE ORDER

Subject: DECISION TAKEN IN THE CABINET MEETING HELD ON TUESDAY 21ST DECEMBER 2021- BIFURCATION OF LARGE DISCOs

In pursuance of Section Officer (DISCOs-II) Ministry of Energy (Power Division) GoP Islamabad Letter No. 12(01)/2018-DISCOs-II dated 09.03.2022 and General Manager (Technical Services)PPMC Islamabad Letter No. 1214-18 dated 10.03.2022, Chief Executive Officer PESCO Peshawar is pleased to constitute the committee comprising of the following officers for submission of visable proposal for Bifurcation of PESCO.

1.	Chief Engineer (P&E) PESCO H/Q	Convenor
2.	Chief Commercial Officer PESCO H/Q	Member
3.	Chief Engineer (O&M)T&G PESCO H/Q	Member
4.	Director General (HR) PESCO H/Q	Member
5.	Finance Director PESCO H/Q	Member
6.	PD GSC PESCO Peshawar	Member
7.	Manager (MIRAD) PESCO H/Q	Member

Addl: Director General (HR)
PESCO H/Q Peshawar

Copy to:

1. Chief Engineer (P&E) PESCO H/Q
2. Chief Commercial Officer PESCO H/Q
3. Chief Engineer (O&M)T&G PESCO H/Q
4. Director General (HR) PESCO H/Q
5. Finance Director PESCO H/Q
6. PD GSC PESCO Peshawar
7. Manager (MIRAD) PESCO H/Q
8. Circulation File.

Alongwith relevant copies of the order and proceedure /steps required for the Bifurcation of DISCOs

PROCEDURES & STEPS REQUIRED FOR BIFURCATION OF DISCO

(3/4)

1) **Preparation of Working Paper**

DISCOs will prepare a comprehensive working paper but not limited to the following activities:

i) Study of existing of electrical networks of the company viz-a-viz:
   a. Area of Jurisdiction
   b. Customer profile
   c. No. of Employees
   d. HT/LT networks (Feeders, Average length of feeders, Distribution transformers
   e. Grid Stations and transmission lines etc
   f. Commercial parameters like losses, receivables
   g. Quality of service

ii) Study of proposed networks after bifurcation
iii) Study of the CDPs, power sources from where proposed companies can import power
iv) Load flow studies for ascertaining the stability of proposed networks
v) Justification of bifurcation
   a. Loss reduction
   b. Improvement in recovery
   c. Reduction in damage rate of distribution of transformers
   d. Increase in sale of power etc.
vi) Benefit cost analysis
vii) HR setup for the proposed companies
viii) Man power transition.
ix) Distribution of assets and liabilities
x) Proposed location of Headquarters
xi) Proposed budget approval
xii) Arrangement for posting of manpower in new companies
xiii) Allocation of Stores & Assets

2) **Permission from the Privatization Commission**

Permission from the Privatization Commission is required as they plan and implement the transaction for private-sector participation in the management of DISCOs using a concession or management contract model.

PROPOSAL FOR BIFURCATION OF PESCO

No. 12(01)/2018-DISCOs-II
GOVERNMENT OF PAKISTAN
MINISTRY OF ENERGY
(POWER DIVISION)

GM (TS) PPMC
DATE 09-03-2022

Managing Director PPMC
09 MAR 2022

Islamabad the March 09, 2022

The Managing Director,
PPMC,
Islamabad.

Subject: - **DECISION TAKEN IN THE CABINET MEETING HELD ON TUESDAY THE 21ST DECEMBER, 2021**

In pursuance of Cabinet Decision's in case No. 1236/ 42/ 2021 dated 21-12-2022 (Annex-A), this Division notified a Committee vide Notification of even number dated 05-01-2022 (Annex-B) for firming-up and recommending on the viability of bifurcation of large DISCOs, including MEPCO, QESCO, and PESCO. The composition of the Committee is as under: -

a) Minister for Energy (Convener)
b) Minister for Planning, Development and Special Initiatives
c) Minister for Industries & Production
d) Minister for Science & Technology
e) Advisor to the Prime Minister on Finance & Revenue

2. In order to proceed further, Managing Director, PPMC is requested to constitute a Committee comprising member of MEPCO, QESCO and PESCO for necessary working covering all areas of concerns and suggesting way forward to this Division latest by 31-03-2022 enabling the above Committee to firm-up recommendations regarding the bifurcation of MEPCO, QESCO and PESCO.

Encl: As above

(Naveed Ahmad)
Section Officer (DISCOs-II)

Copy to:

- DG to the Minister for Energy, Power Division Islamabad.
- SO, to the Secretary, Power Division Islamabad.
- PS to the Additional Secretary-I, Power Division, Islamabad.
- PS to the Sr. Joint Secretary (E&D), Power Division, Islamabad.

General Manager (Technical Services)

POWER PLANNING AND MONITORING COMPANY (PVT.) LIMITED
Office # 512, 1st Floor, Evacuee Trust Complex, Agha Khan Road, Islamabad
051-9215302, Fax: 051-2726935, Email: gmtspmc@gmail.com

No. 1214-18
Dated 10-03-2022

1. Chief Executive Officer, MEPCO, Multan.
2. Chief Executive Officer, PESCO, Peshawar.
3. Chief Executive Officer, QESCO, Quetta.

Subject: **DECISION TAKEN IN THE CABINET MEETING HELD ON TUESDAY THE 21ST DECEMBER 2021 – BIFURCATION OF LARGE DISCOs.**

Ref: Ministry of Energy (Power Division) letter No.12(01)/2018-DISCOs-II dated March 9, 2022 (copy attached).

1. Section Officer (DISCOs-II) has notified a Committee vide above referred letter in pursuance of Cabinet Decision's case No.1236/42/2021 dated 21.12.2021 for firming-up and recommending on the viability of bifurcation of large DISCOs, including MEPCO, QESCO and PESCO.

2. Further in compliance of above referred letter, a Committee is also being constituted with the approval of MD PPMC comprising of the CEOs of respective DISCOs, all GMs of PPMC, CEO PITC under the convenorship of MD PPMC enabling the main Committee constituted vide above referred letter to firm-up recommendations regarding bifurcation of MEPCO, QESCO and PESCO.

3. In this regard, it is requested to please submit comprehensive proposal / case of bifurcation of your DISCO keeping in view of large geographical spread, customer base, operational complexities etc. as per Procedure and Steps attached with this letter, for processing / scrutiny of the case by the above proposed Committee as mentioned in Para-2 above, for further submission to Ministry of Energy (Power Division) / main Committee.

(Engr. Adnan Riaz Mir)
General Manager (Technical Services)

Encl: As above.

cc:

1. Mr. Naveed Ahmad, SO (DISCOs-II), Ministry of Energy (Power Division), Islamabad.
2. SO to MD PPMC, Islamabad.

PROPOSAL FOR BIFURCATION OF PESCO

POWER PLANNING AND MONITORING COMPANY (PVT.) LIMITED
Office # 113, 1st Floor, Evacuee Trust Complex, Agha Khan Road, Islamabad
051-9211382, Fax: 051-2728915, Email: gmts.ppmc@gmail.com

General Manager
(Technical Services)

No. 1995-27 /GM(TS)/
Dated 02-06-2022

Chief Executive Officer,
PESCO, Peshawar.

Sub:- **BIFURCATION OF LARGE DISCOs.**

Ref: This office letter No.1214-18 dated 10.3.2022, your letter No.CEO/PESCO/162-66/CEP&E dated 30.3.2022 and telephonic discussion dated 01.06.2022.

The proposal received in this office vide your above referred letter has thoroughly been examined and discussed by the committee constituted at PPMC level. It has been desired by the convener of the committee that alternate simulations be also carried out to arrive at most appropriate and viable proposal.

The subject case may please be expedited and additional proposal(s) in light of committee's directions be submitted at the earliest possible to proceed further.

(Engr. Aduan Riaz Mir)
General Manager (Technical Services)
PPMC

cc:
1. GM (HR) PPMC Islamabad.
2. SO to MD PPMC Islamabad.

SECRET

PRIME MINISTER'S OFFICE(PUBLIC)
ISLAMABAD

RECORD NOTE

30th May, 2022

Subject: **PRIME MINISTER'S VISIT TO MANSEHRA ON 29TH MAY, 2022**

Prime Minister of Pakistan visited Mansehra on 29th May, 2022 and was pleased to make the following announcements.

S.#	Requests/Issue	Action by
I.	Establishment of Medical College at Mansehra	➢ Secretary, M/o National Health Services Regulations and Coordination ➢ Chief Secretary, KPK
II.	Development package worth one billion rupees for the Hazara region	Secretary, M/o Finance Secretary, M/o Planning Development and Special Initiatives
III.	Establishment of Hazara Electric Supply Company	Secretary, M/o Energy (Power Division)

2. All concerned Ministries / Divisions / Departments are requested to take further necessary action for implementation of the above directives as per rules / policy under intimation to this Office at the earliest.

(Nadeem Aslam Chaudhary)
Additional Secretary-III

I. Secretary, M/o National Health Services Regulations and Coordination, Islamabad
II. Secretary, M/o Energy (Power Division), Islamabad
III. Secretary, Ministry of Finance, Islamabad
IV. Secretary, M/o Planning Development and Special Initiatives, Islamabad

PM's Office u.o. No. 114/PSR/Mansehra/2022/PAD-II/KP dated 30.05.2022

PROPOSAL FOR BIFURCATION OF PESCO

POWER PLANNING AND MONITORING COMPANY
Office # 112, Evacuee Trust Complex, Agha Khan Road, Islamabad
Tele: 051-9211301, 051-9211302, Fax: 051-2726915, E-mail : gmcspepco@gmail.com

MINUTES OF MEETING HELD ON 17.11.203 ON BIFURCATION OF PESCO AND ESTABLISHMENT OF HAZECO.

A meeting was held on 17.11.2023 at 10.00 AM in PPMC Committee Room to formulate a strategic plan aimed at facilitating HAZECO in initiating its operations as an independent DISCO. The meeting was attended by the following:

(1) Director BoD HAZECO
(2) CEO HAZECO
(3) General Manager (R&CO) PPMC
(4) General Manager (TS) PPMC.
(5) General Manager (HR) PPMC.
(6) CFO PPMC.
(7) Director General (Law) PPIB
(8) Technical Director/GM(Technical) PESCO
(9) CFO PESCO
(10) DG (HR) PESCO
(11) Mr. Rizwan Faiz, Advocate
(12) Company Secretary PPMC

The meeting deliberated necessary steps required for the bifurcation of PESCO and the seamless initiation of HAZECO's operations. The consensus among the participants was that the bifurcation of PESCO and the establishment of HAZECO should adhere to high professional standards, encompassing all essential legal, administrative, and regulatory prerequisites.

It was informed by reps of PESCO that the data required for bifurcation of PESCO is already completed. It was emphasized that the data necessitates updating upto October 2023. To ensure credibility and mitigate potential conflicts or objections from stakeholders in the future, it was suggested to authenticate this data through a third-party audit firm.

It was further informed that PESCO requires to file a spinning-off petition with the National Electric Power Regulatory Authority (NEPRA) and the Securities and Exchange Commission of Pakistan (SECP). Simultaneously, HAZECO will apply for a distribution license and submit a tariff petition to NEPRA.

The Committee expressed that the entire process should be meticulously planned to enable HAZECO to submit its application for the grant of a distribution license to NEPRA well before end of December 2023 and before that all prerequisites be completed.

To ensure the efficiency of the transition process, the Committee put forth the following recommendations:

a. A comprehensive work plan will be developed, with detailed outline of all activities, along with clearly defined timelines.

POWER PLANNING AND MONITORING COMPANY
Office # 112, Evacuee Trust Complex, Agha Khan Road, Islamabad
Tele: 051-9211301, 051-9211302, Fax: 051-2726915, E-mail : gmcspepco@gmail.com

b. PESCO to update all existing financial, commercial, technical, and human resource data upto October 2023.

c. An independent audit firm be hired by CEO PESCO to authenticate the data prepared, contributing to the credibility and thoroughness of the data within two weeks.

d. Following three committees were recommended to oversee and facilitate a smooth transition in the process:

1. Technical/Commercial Committee
   - Mr. Adnan Mir, GM (Technical Services) PPMC-Convener
   - Mr. Tahir Moeen, Technical Director PESCO – Member
   - Mr. Habib-ur-Rehman, SE Khyber Circle PESCO-Member
   - Mr. Muhammad Tufail, Manager Commercial PESCO-Member

2. Finance Committee
   - Mr. Basharat Ali, CFO PPMC-Convener
   - Mr. Yasir Naseem, CFO PESCO-Member
   - Mr. Shahzad Hanaan, Manager Finance CPC PESCO-Member

3. HR Committee
   - Mr. Saghir Ahmad, GM(HR) PPMC-Convener
   - Sardar Sajid Nawaz, DG HR PESCO-Member
   - Mr. Siab Ahmad, Manager (HR) PESCO-Member

e. The above Committees will submit their reports on or before Monday, 27th November 2023.

f. The Terms of Reference of the Committees are annexed.

g. A WhatsApp group consisting of all relevant officers will be formed.

h. Mr. Rizwan Faiz will prepare draft legal documents required for the bifurcation of PESCO and establishment of HAZECO

(Saqib Jamal) 20/11/23
General Manager (R&CO) PPMC/
Convener of the Committee

c.c.
1. Additional Secretary-I, Power Division, Islamabad.
2. CEO HAZECO, Islamabad.
3. CEO PESCO, Peshawar.
4. All Members of Committees.

PROPOSAL FOR BIFURCATION OF PESCO

Agenda Point #(i)

❖ STUDY OF EXISTING ELECTRICAL NETWORKS OF THE COMPANY

VIZ-A-VIZ

19.

PROPOSAL FOR BIFURCATION OF PESCO

Agenda Point #(i) a.

EXISTING AREA OF JURISDICTION

- Peshawar Electric Supply Company (PESCO) was established as Public Limited Company on April 1998

- PESCO was granted license by NEPRA for distribution of electricity to 28 administrative districts of Khyber Pakhtunkhwa province.

1) Peshawar
2) Charsadda
3) Nowshera
4) Mardan
5) Tank
6) Bannu
7) D.I.Khan
8) Karak
9) Lakki Marwat
10) Hangu
11) Kohat
12) Swat
13) Swabi
14) Buner
15) Dir (Upper)
16) Dir (Lower)
17) Shangla
18) Chitral Upper
19) Chitral Lower
20) Kohistan Upper
21) Kohistan Lower
22) Kolai Palas
23) Abbottabad
24) Haripur
25) Mansehra
26) Battagram
27) Torghar
28) Malakand

PROPOSAL FOR BIFURCATION OF PESCO

Agenda Point #(i) a.

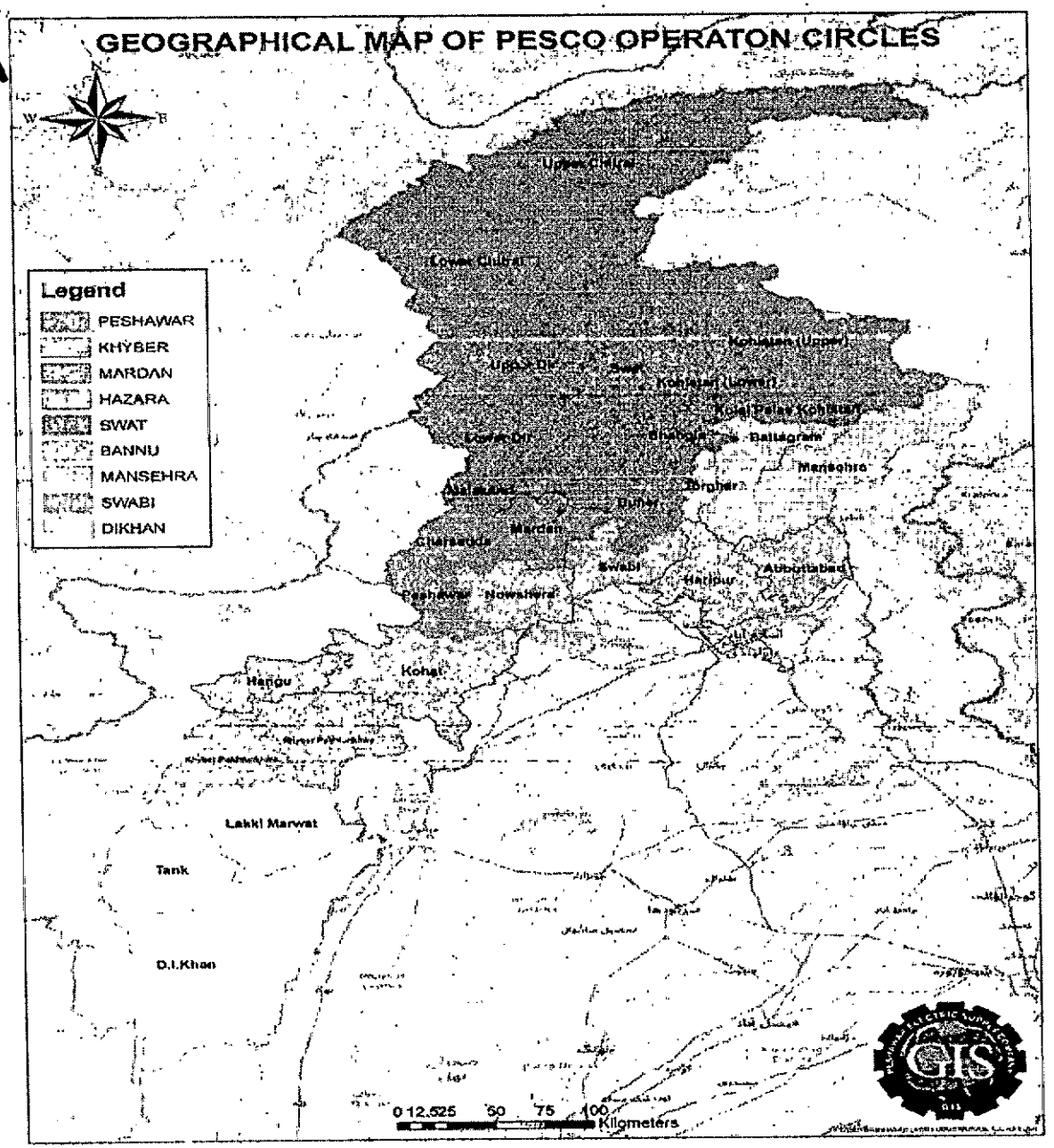
Remaining PESCO

1) Peshawar
2) Charsadda
3) Nowshera
4) Kohat
5) Hangu
6) Karak
7) Bannu
8) Lakki Marwat
9) D.I.Khan
10) Tank
11) Mardan
12) Swabi
13) Swat
14) Malakand
15) Buner
16) Shangla
17) Dir (Upper)
18) Dir (Lower)
19) Chitral Upper
20) Chitral Lower
21) Kohistan Upper
22) Kohistan Lower
23) Kolai Palas

Proposed HAZECO

1) Abbottabad
2) Haripur
3) Mansehra
4) Battagram
5) Torghar

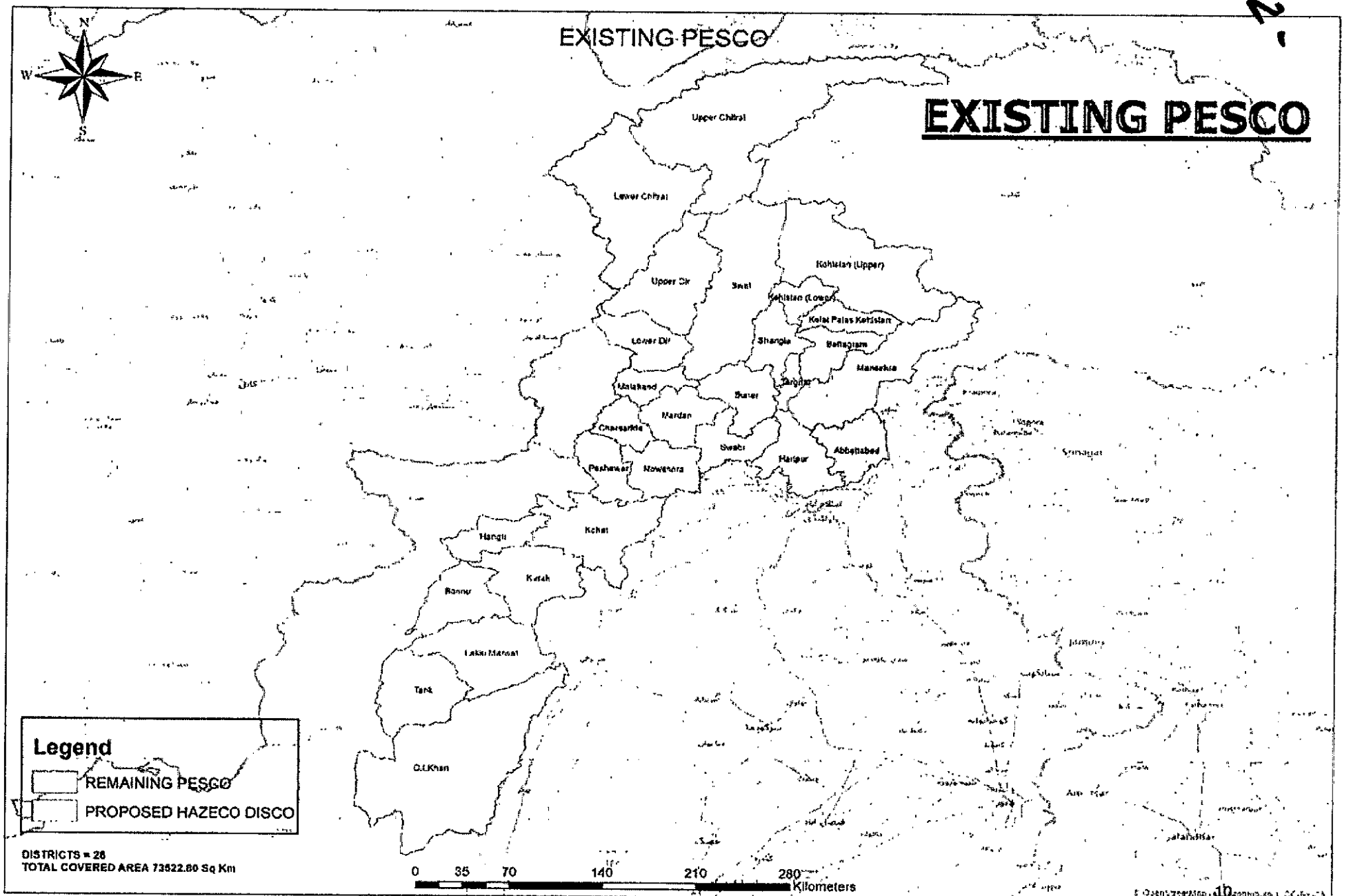
PESCO JURISDICTION



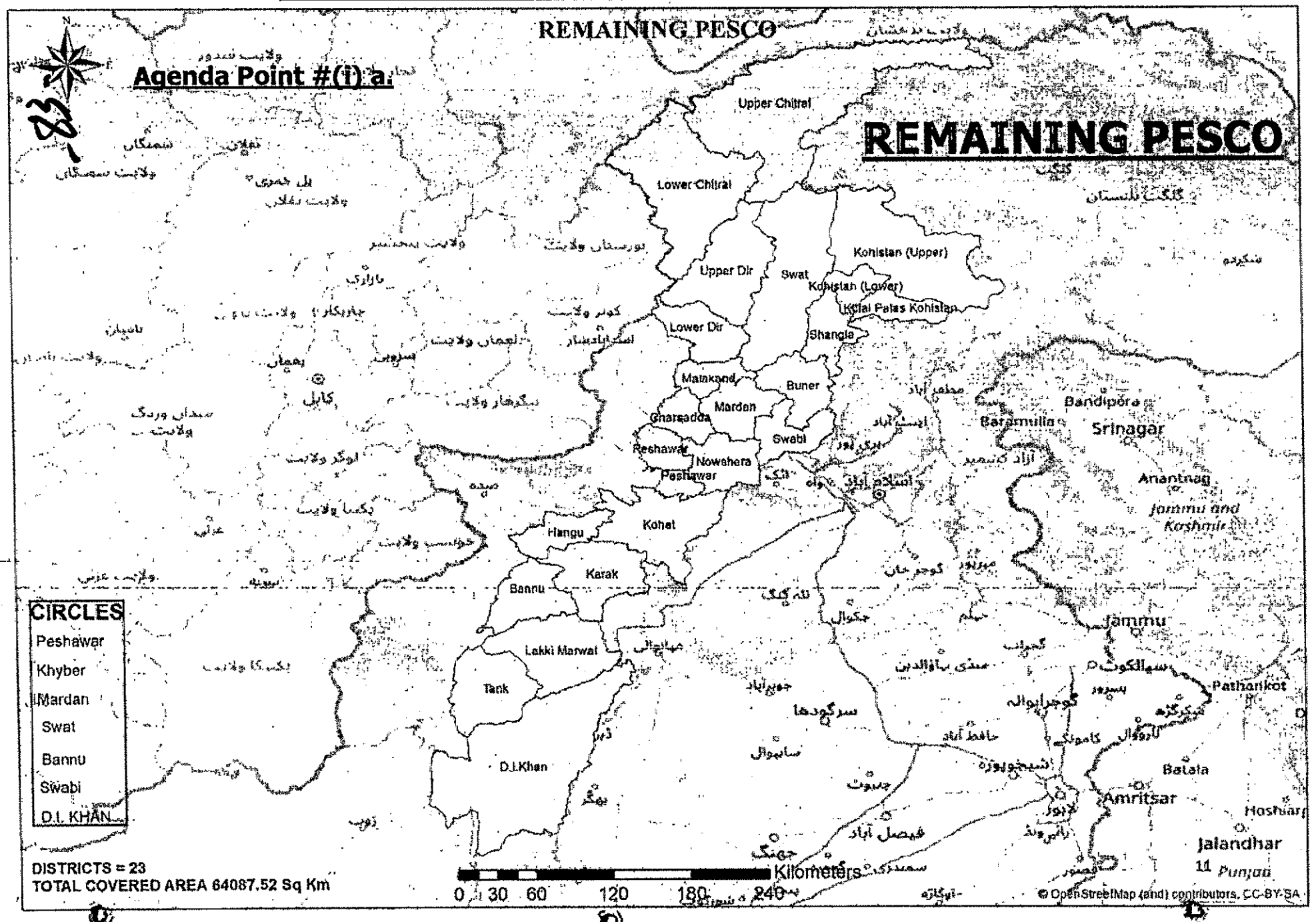
Districts:	**28 No.**
Covered Area:	**74,521 Sq Km**
Population:	**35.53 Million**
Circle:	**08 No**
Division:	**39 No**
Sub Divn:	**191 NO**

Circle	Consumers in Million
Peshawar	0.712
Khyber	0.619
Mardan	0.365
Hazara-I	0.447
Swat	0.815
Bannu	0.215
Hazara-II	0.280
Swabi	0.289
D.I Khan	0.362
PESCO	4.2

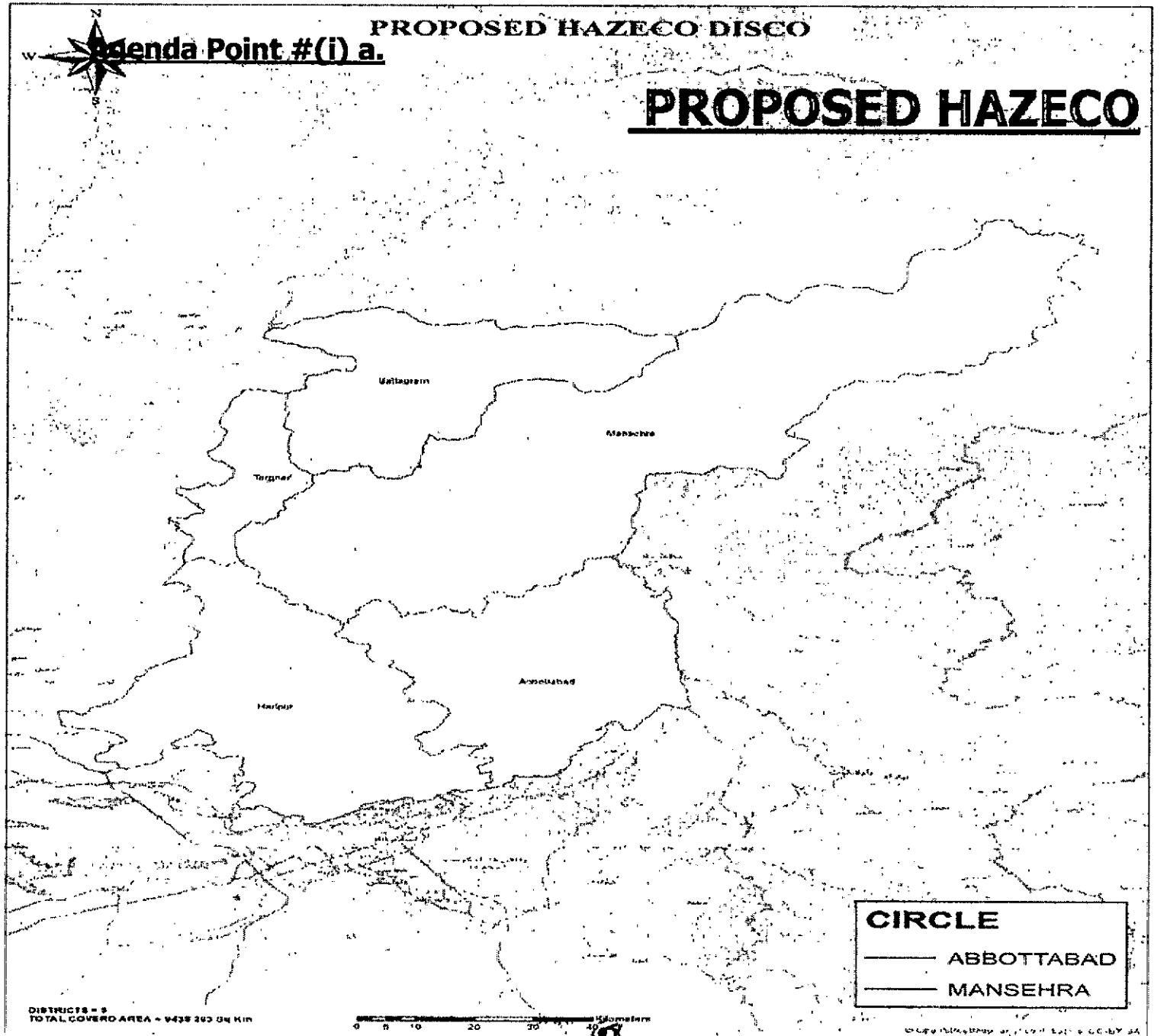
Agenda Point #(i) a. PROPOSAL FOR BIFURCATION OF PESCO



PROPOSAL FOR BIFURCATION OF PESCO



PROPOSAL FOR BIFURCATION OF PESCO



PROPOSAL FOR BIFURCATION OF PESCO

Agenda Point #(i) b.
CONSUMER'S PROFILE

ELECTRIC SUPPLY COMPANY		Domestic	Commercial	Industrial	Bulk	Tube Wells	General Services	Other	Total
PESCO (Existing)	No.	3,735,839	411,378	28,595	901	23,147	1,241	45,781	4,246,882
	%age	87.97	9.69	0.67	0.02	0.55	0.03	1.08	100
PESCO (Remaining)	No.	3,040,906	341,915	25,062	719	22,473	1,047	37,955	3,470,077
	%age	87.63	9.85	0.72	0.02	0.65	0.03	1.09	81.71
Proposed HAZECO	No.	694,933	69,463	3,533	182	674	194	7,826	776,805
	%age	89.46	8.94	0.45	0.02	0.09	0.02	1.01	18.29

PROPOSAL FOR BIFURCATION OF PESCO

Agenda Point #(i) b.
CONSUMER'S PROFILE

98

ELECTRIC SUPPLY COMPANY		Domestic	Commercial	Industrial	Bulk	Tube Wells	General Services	Other	Total
PESCO (Existing)	No.	3,735,839	411,378	28,595	901	23,147	1,241	45,781	4,246,882
	%age	88.0	9.7	0.7	0.0	0.6	0.0	1.1	100
PESCO (Remaining)	No.	3,040,906	341,915	25,062	719	22,473	1,047	37,955	3,470,077
	%age	81.4	83.1	87.6	79.8	97.1	84.4	82.9	82
Proposed HAZECO	No.	694,933	69,463	3,533	182	674	194	7,826	776,805
	%age	18.6	16.9	12.4	20.2	2.9	15.6	17.1	18

PROPOSAL FOR BIFURCATION OF PESCO

82

Agenda Point #(i) d.

- **HT/LT NETWORKS**

(FEEDERS, AVERAGE LENGTH OF FEEDERS), DISTRIBUTION TRANSFORMERS.

PROPOSAL FOR BIFURCATION OF PESCO

Agenda Point #(i) d

EXISTING PESCO HT / LT NETWORKS

S.No	Circle	Feeders		HT Lines (Km)	LT Lines (Km)	Distribution T/Fs	
		No.	Average Length (Km)			No.	MVA
1	Peshawar	258	14.27	3682.16	3680.64	20591	1,887.54
2	Khyber	251	25.82	6481.47	5762.92	18376	1,617.63
3	Mardan	89	26.81	2385.96	2526.56	9787	771.23
4	Hazara I	138	27.88	3847.708	7074.530	7715	825.005
5	Swat	185	41.83	7738.01	10445.89	17667	1,385.70
6	Bannu	108	51.64	5577.02	5021.37	13671	820.495
7	Hazara II	72	44.57	3209.32	6793.43	5942	418.86
8	Swabi	95	26.49	2516.23	2366.76	7067	580.755
9	DI Khan	80	38.26	3060.77	2379.70	7720	531.76
Total		**1276**	**30.17**	**38498.7**	**46051.82**	**108536**	**8838.97**

PROPOSAL FOR BIFURCATION OF PESCO

Agenda Point #(i) d.

REMAINING PESCO HT / LT NETWORKS

S.No	Circle	Feeders		HT Lines (Km)	LT Lines (Km)	Distribution T/Fs	
		No.	Average Length (Km)			No.	MVA
1	Peshawar	258	14.27	3682.17	3680.64	20591	1,887.54
2	Khyber	251	25.82	6481.47	5762.92	18376	1,617.63
3	Mardan	89	26.81	2385.97	2526.57	9787	771.23
4	Swat	185	41.83	7738.01	10445.90	17667	1,385.70
5	Bannu	108	51.64	5577.03	5021.37	13671	820.495
6	Swabi	95	26.49	2516.24	2366.76	7067	580.755
7	DI Khan	80	38.26	3060.77	2379.70	7720	531.76
Total		**1066**	**29.49**	**31441.65**	**32183.86**	**94879**	**7595.11**

PROPOSAL FOR BIFURCATION OF PESCO

Agenda Point #(i) d.

PROPOSED HAZECO HT / LT NETWORKS

S.No	Circle	Feeders		HT Lines (Km)	LT Lines (Km)	Distribution T/Fs	
		No.	Average Length (Km)			No.	MVA
1	Hazara-I	138	27.88	3847.71	7074.53	7715	825.005
2	Hazara-II	72	44.57	3209.32	6793.43	5942	418.86
Total		**210**	**33.60**	**7057.02**	**13867.96**	**13657**	**1243.87**

- 132 KV Right Bank Tarbela GSS Sahre MIX:
  - 11 KV Baitgally Feeder (15 to 20 % PESCO area while 80 % of HAZECO
  - 11 KV Utla Feeder (80 to 85 % PESCO Area while 10 to 15 % HAZECO

- 33 KV Thakot GSS Sahre MIX:
  - 11 KV Chakisar Feeder is being emanating from 33 KV Thakot GSS but feeding the remaining PESCO

PROPOSAL FOR BIFURCATION OF PESCO

Agenda Point #(i) e.

GRID STATIONS & TRANSMISSION LINES

Circle	Grid Stations (KV)								Transmission Lines (Km)				
	500	220	132	66	33	Consumer Grid (132)	Total	MVA		132KV	66KV	33KV	Total
PESCO (Existing)	01	07	94	10	02	11	**125**	7706.75	Line wise	3092.976	414.460	75.0	3582.436
									Circuit wise	4570.923	427.590	75.0	5073.513

PROPOSAL FOR BIFURCATION OF PESCO

Agenda Point #(i) e.

GRID STATIONS & TRANSMISSION LINES

Circle	Grid Stations (KV)								Transmission Lines (Km)				
	500	220	132	66	33	Consumer Grid (132)	Total	MVA	Description	132KV	66KV	33KV	Total
PESCO (Remaining)	01	06	76	08	1	07	**99**	6452.45	Line wise	2516.677	338.26	-	2854.937
									Circuit wise	3822.789	351.390	-	4174.179
Proposed HAZECO	-	01	18	2	1	04	**26**	1254.30	Line wise	576.299	76.20	75.0	727.499
									Circuit wise	748.134	76.2	75.0	899.334

PROPOSAL FOR BIFURCATION OF PESCO

Agenda Point #(i) e.

Circle	Grid Stations						
	500KV	220KV	132KV	66KV	33KV	132KV Consumer Grid	Total
Peshawar	-	1	17	-	-	-	18
Khyber	1	1	16	3	-	5	26
Mardan	-	1	6	-	-	1	8
Hazara-I	-	-	12	2	-	4	18
Swat	-	1	17	1	-	-	19
Bannu	-	1	7	2	-	-	10
Hazara-II	-	1	7	-	2	-	10
Swabi	-	-	5	-	-	1	6
D.I.Khan	-	1	7	2	-	-	10
Total	01	07	94	10	2	11	125

- 2 x 220KV Grid Station Kohat & Swabi are proposed by NTDC under Remaining PESCO
- 1 x 220KV Grid Stations Haripur is proposed by NTDC under Proposed HAZCO

PROPOSAL FOR BIFURCATION OF PESCO

Agenda Point #(i) e.

	Circle	Grid Stations						
		500KV	220KV	132KV	66KV	33KV	132KV Consumer Grids	Total
Remaining PESCO	Peshawar	-	1	17	-	-	-	18
	Khyber	1	1	16	3	-	5	26
	Mardan	-	1	6	-	-	1	8
	Swat	-	1	18	1	1	-	21
	Bannu	-	1	7	2	-	-	10
	Swabi	-	-	5	-	-	1	6
	D.I.Khan	-	1	7	2	-	-	10
	Total	01	06	76	08	1	07	99

	Circle	Grid Stations						
		500KV	220KV	132KV	66KV	33KV	132KV Consumer Grids	Total
Proposed HAZECO	Hazara-I	-	-	12	02	-	04	18
	Hazara-II	-	01	06	-	01	-	8
	Total	-	01	18	02	01	04	26

PROPOSAL FOR BIFURCATION OF PESCO (Existing)

SR: NO.	NAME OF GRID STATION	SR: NO.	NAME OF GRID STATION	SR: NO.	NAME OF GRID STATION
1	132KV Abbottabad	21	132KV Gumbat	41	132KV Kohat
2	132KV AMC - Abbottabad	22	132KV Gurguri	42	132KV Kotal Town Kohat
3	132KV Balakot	23	132KV Hangu	43	132KV Kulachi
4	132KV Barikot	24	132KV Haripur	44	132KV Lachi
5	132KV Bannu	25	132KV Hussai	45	132KV Lal Qilla Maidan
6	132KV Battal	26	132KV Hattar-1	46	132KV Madyan
7	132KV Batkhela	27	132KV Hattar-2	47	132KV Mansehra
8	132KV Besham	28	132KV Hattar Economic Zone	48	132KV Mardan-2
9	132KV Chakdara	29	132KV Hattian **(AJK)**	49	132KV Mardan-3
10	132KV Charsadda	30	132KV Havellian	50	132KV Marble City
11	132KV D.I.Khan	31	132KV Hayatabad	51	132KV Mattani
12	132KV Dalazak	32	132KV Jalala	52	132KV Matta
13	132KV Daggar	33	132KV Jamrud	53	132KV Munda Jandol
14	132KV Dir Chukiyatan	34	132KV Jehangira	54	132KV Musazai (Badaber)
15	132KV Drosh (Chitral)	35	132KV Jutilasht (Chitral)	55	132KV Muzaffarabad **(AJK)**
16	132KV Draban	36	132KV Karak	56	132KV Nathia Gali
17	132KV Dargai	37	132KV Kernal Sher Khan	57	132KV Nishat Tarbela
18	132KV Dohbian	38	132KV Katlang	58	132KV Nizampur
19	132KV Gadoon Amazai	39	132KV Khanpur	59	132KV Noseri **(AJK)**
20	132KV Gomal Unity DIKhan	40	132KV Khwaza Khela	60	132KV Nowshera City

PROPOSAL FOR BIFURCATION OF PESCO (Existing)

SR: NO.	NAME OF GRID STATION	SR: NO.	NAME OF GRID STATION	SR: NO.	NAME OF GRID STATION
61	132KV Nowshera Industrial	81	132KV Shahibagh	101	66KV Kurram Garhi
62	132KV Oghi	82	132KV Shangla Par	102	66KV Tajazai (No Load)
63	132KV Pabbi	83	132KV Siraj Baba	103	66KV Tank (No Load)
64	132KV Panyala (Abdul Khel)	84	132KV Swabi	104	66KV Timergara
65	132KV Pezu	85	132KV Swat	105	33KV Pattan
66	132KV Peshawar Cantt	86	132KV Tall	106	33KV Thakot
67	132KV Peshawar City	87	132KV Tangi	**Existing NTDC Grid Stations**	
68	132KV Peshawar Fort	88	132KV Taru Jabba		
69	132KV Pesh Industrial	89	132KV Tank		
70	132KV Pesh University	90	132KV Tajazai	**1**	**500KV GSS Sheikh Mohammadi Peshawar**
71	132KV Prova	91	132KV Timergara	**2**	**220KV GSS D.I.Khan**
72	132KV Rampura **(AJK)**	92	132KV Warsak	**3**	**220KV GSS Domail (Bannu)**
73	132KV Rajjar	93	132KV Wapda House Peshawar	**4**	**220KV GSS Shahibagh Peshawar**
74	132KV Regi Model Town	94	132KV Wari	**5**	**220KV GSS Nowshera**
75	132KV Rehman Baba	95	66KV Badaber	**6**	**220KV GSS Mardan**
76	132KV Right Bank Tarbela	96	66KV Band Kurai	**7**	**220KV GSS Chakdara**
77	132KV Sabirabad	97	66KV Haripur	**8**	**220KV GSS Mansehra**
78	132KV Sakhi Chashma	98	66KV Havelian	**Consumer Grids (132KV) 11 Nos**	
79	132KV Serai Nourang	99	66KV Kheshki		
80	132KV Shabqadar	100	66KV Kohat		

PROPOSAL FOR BIFURCATION OF PESCO (Remaining)

NTDC GSS		PESCO GSS					
S.#	Grid Station	S.#	Grid Station	S.#	Grid Station	S.#	Grid Station
1	500KV Sheikh Muhammadi	15	132KV Taru Jabba	39	132KV Mardan-2	63	132KV Dhobian
2	220KV Shahi Bagh	16	132KV Warsak	40	132KV Mardan-3	64	132KV Barikot
3	220KV Mardan	17	132KV Wapda House	41	132KV Bannu	65	132KV Batkhela
4	220KV Domel Bannu	18	132KV Gumbat	42	132KV D.I.Khan	66	132KV Chakdara
5	220KV D.I.Khan	19	132KV Hangu	43	132KV Gomal Uni DIK	67	132KV Marble City
6	220KV Nowshera	20	132KV Hayatabad	44	132KV Panyala	68	132KV Daggar
7	220KV Chakdara	21	132KV Musazai	45	132KV Karak	69	132KV Drosh (Chitral)
		22	132KV Jamrud	46	132KV Kulachi	70	132KV Dargai
		23	132KV Jehangira	47	132KV Pezu	71	132KV Jutilasht (Chitral)
		24	132KV Kohat	48	132KV Prova	72	132KV Khwaza Khela
1	132KV Charsadda	25	132KV Kotal Town	49	132KV Gurguri	73	132KV Lal Qilla
2	132KV Dalazak	26	132KV Lachi	50	132KV Serai Nourang	74	132KV Madyan
3	132KV Pabbi	27	132KV Mattani	51	132KV Siraj Baba	75	132KV Matta
4	132KV Peshawar Cantt	28	132KV Nizampur	52	132KV Tank	76	132KV Munda Jandol
5	132KV Peshawar City	29	132KV RMT	53	132KV Tajazai	77	132KV Shangla Par
6	132KV Peshawar Fort	30	132KV Nowshera City	54	132KV Sabirabad	78	132KV Swat
7	132KV Pesh Industrial	31	132KV Nowshera Indl	55	66KV Band Kurai	79	132KV Timergara
8	132KV Pesh University	32	132KV Tall	56	132KV Draban	80	132KV Wari
9	132KV Rajjar	33	66KV Badaber	57	66KV Kurram Garhi	81	132KV Dir
10	132KV Rehman Baba	34	66KV Kohat	58	66KV Tajazai	82	132KV Kamal Sher Khan
11	132KV Sakhi Chashma	35	66KV Kheshki	59	66KV Tank	83	132KV Besham
12	132KV Shabqadar	36	132KV Hussai	60	132KV Swabi	84	66KV Timergara
13	132KV Shahibagh	37	132KV Jalala	61	132KV G/Amazai	85	33KV Pattan
14	132KV Tangi	38	132KV Katlang	62	132KV R.B.Tarbela	**Consumer Grids (132KV) 07 Nos**	

PROPOSAL FOR BIFURCATION OF PROPOSED HAZECO

NTDC		PROPOSED HAZECO			
S.#	**Grid Station**	**S.#**	**Grid Station**	**S.#**	**Grid Station**
1	220KV Manshera	1	132KV Abbottabad	13	132KV Hattar Economic Zone
Consumer Grids (132KV) 04 Nos		2	132KV AMC A/Abad	14	132KV Mansehra
		3	132KV Haripur	15	132KV M/Abad **(AJK)**
		4	132KV Hattar-1	16	132KV Noseri **(AJK)**
		5	132KV Hattar-2	17	132KV Oghi
		6	132KV Havellian	18	132KV Rampura **(AJK)**
		7	132KV Khanpur	19	66KV Haripur
		8	132KV Nathia Gali	20	66KV Havelian
		9	132KV Nishat Tarbela	21	33KV Thakot
		10	132KV Balakot		
		11	132KV Battal		
		12	132KV Hattian **(AJK)**		

PROPOSAL FOR BIFURCATION OF PESCO

Agenda Point #(i) f.
COMMERCIAL PARAMETERS (DISTRIBUTION LOSSES)

Figures in Million

ELECTRIC SUPPLY COMPANY	Fiscal Year 2023-24			
	Unit Received	Unit Billed	Unit Lost	%age Loss
PESCO (Existing)	5875.39	3814.24	2061.14	**35.08**
PESCO (Remaining)	4913.98	2986.27	1927.70	**39.23**
Proposed HAZECO	961.41	827.97	133.44	**13.88**

PROPOSAL FOR BIFURCATION OF PESCO

Agenda Point #(i) f.

❖ COMMERCIAL PARAMETERS (BILLING & COLLECTION)

Figures in Million

DISCO	Fiscal Year 2023-24								
	Billing			Collection			%Age Collection		
	Govt;	Private	Total	Govt;	Private	Total	Govt;	Private	Total
PESCO (Existing)	19456.83	135099.71	154556.54	13859.66	117612.29	131471.95	71.23	87.06	85.06
PESCO (Remaining)	11635.6	110707.4	122343	10474.4	94336.45	104810.9	90.0	85.2	85.7
Proposed HAZECO	7821.2	24392.34	32213.54	3385.25	23275.84	26661.07	43.3	95.4	82.8

PROPOSAL FOR BIFURCATION OF PESCO
Agenda Point #(i) f.
COMMERCIAL PARAMETERS (RECEIVABLES)

With Subsidy

Figures in Rs; Billion

DISCO	Fiscal Year 2023-24		
	Govt;	Private	Total
PESCO (Existing)	21.08	198.44	219.52
% Age	100	100	100
PESCO(Remaining)	8.17	190.64	198.81
% Age	38.76	96.07	90.57
Proposed HAZECO	12.91	7.8	20.71
% Age	61.24	3.93	9.43

Without Subsidy

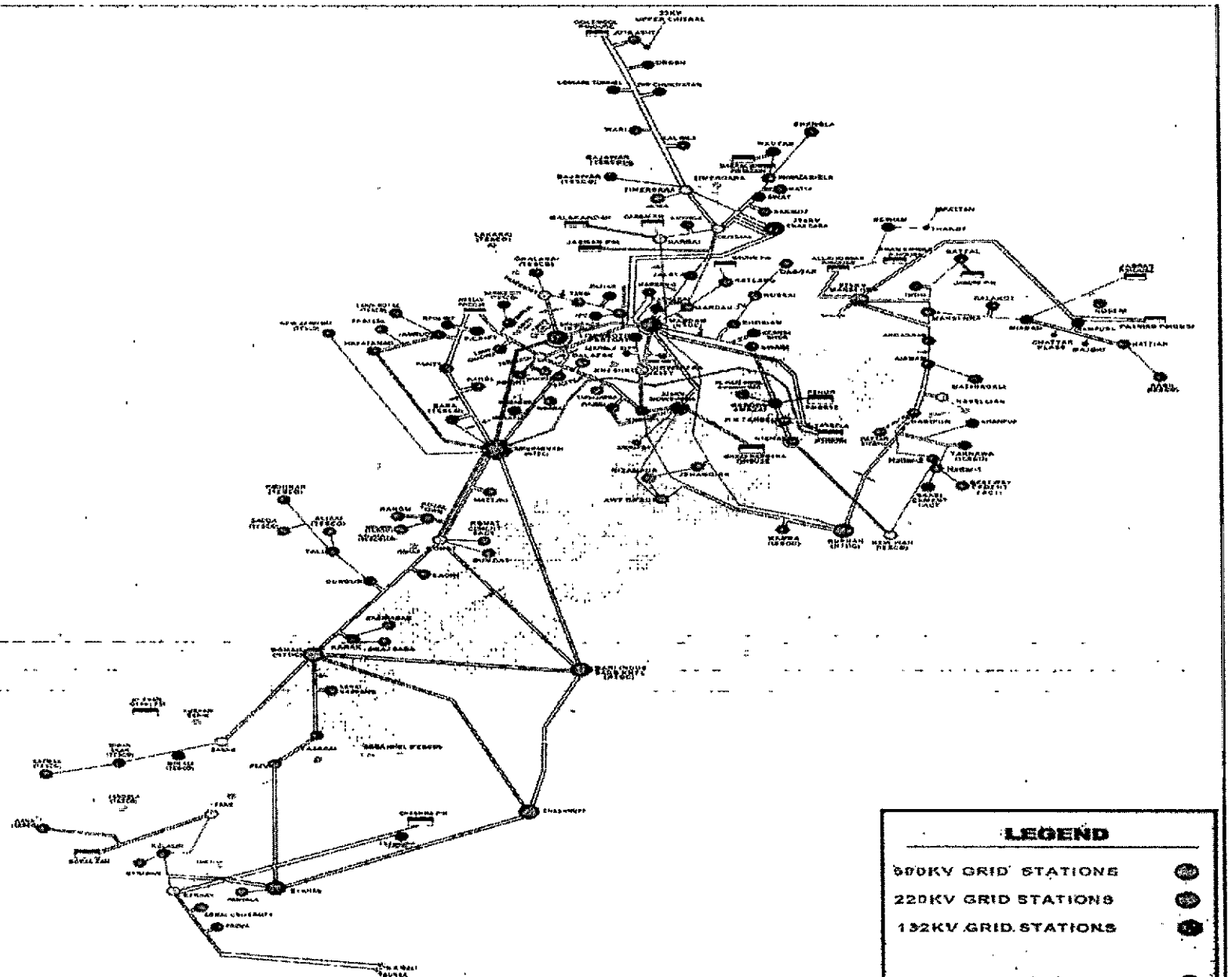
DISCO	Fiscal Year 2023-24		
	Govt;	Private	Total
PESCO (Existing)	20.82	194.2	215.02
% Age	100	100	100
PESCO(Remaining)	8.03	187.3	195.3
% Age	38.57	96.42	90.82
Proposed HAZECO	12.79	6.94	19.74
% Age	61.43	3.57	9.18

PROPOSAL FOR BIFURCATION OF PESCO

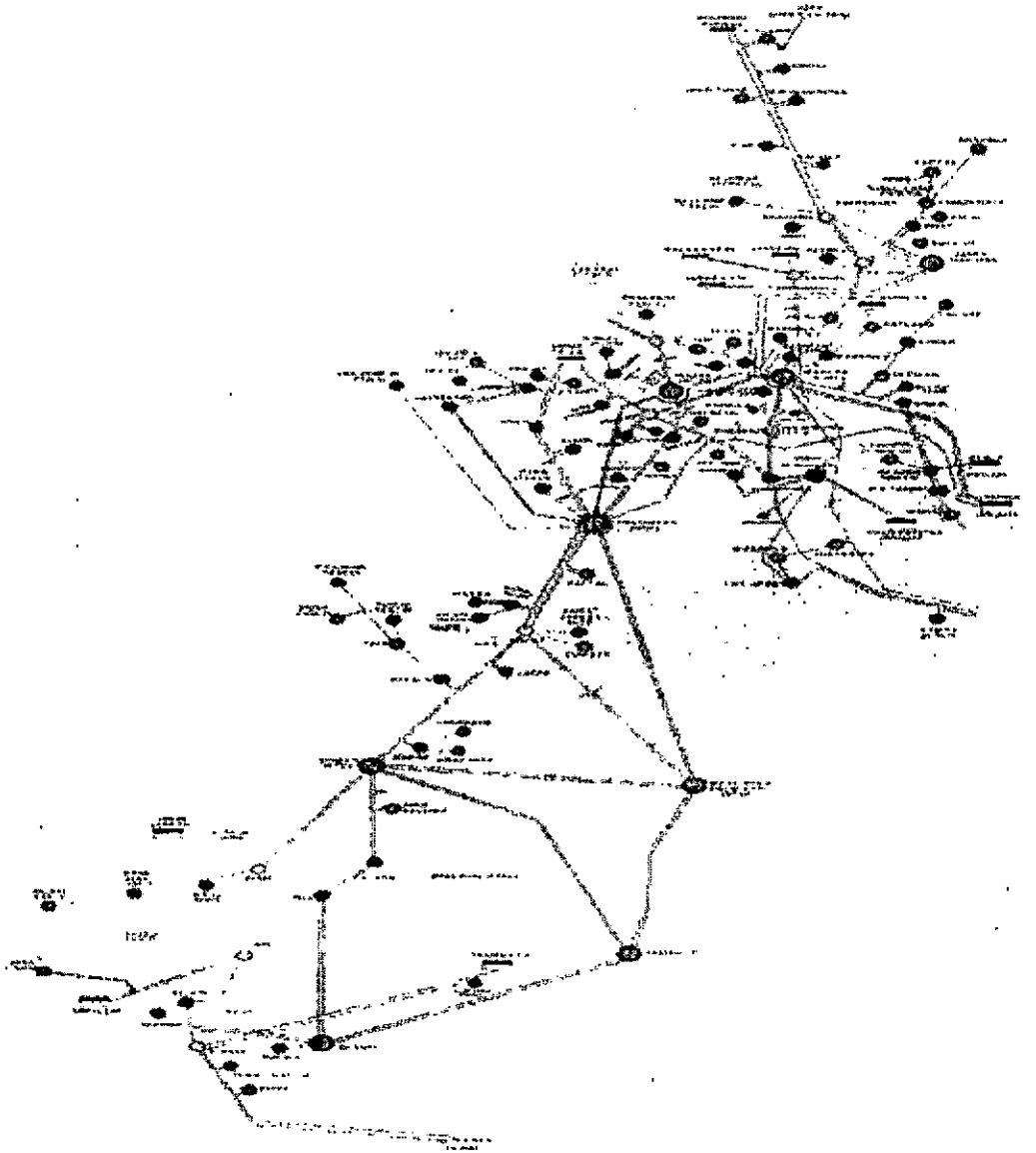
Agenda Point #(ii).

STUDY OF PROPOSED NETWORKS AFTER BIFURCATION

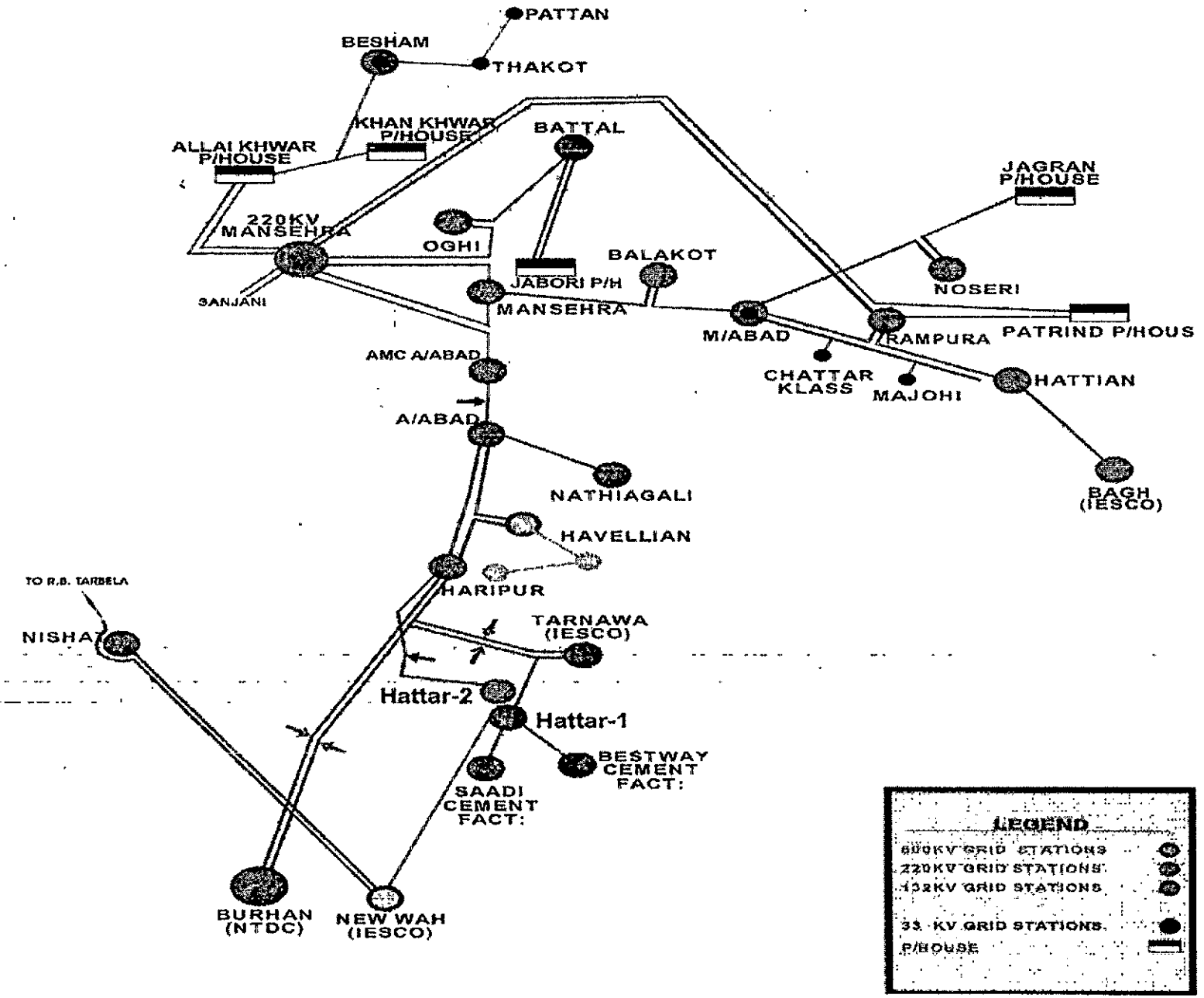
GEOGRAPHICAL MAP OF PESCO



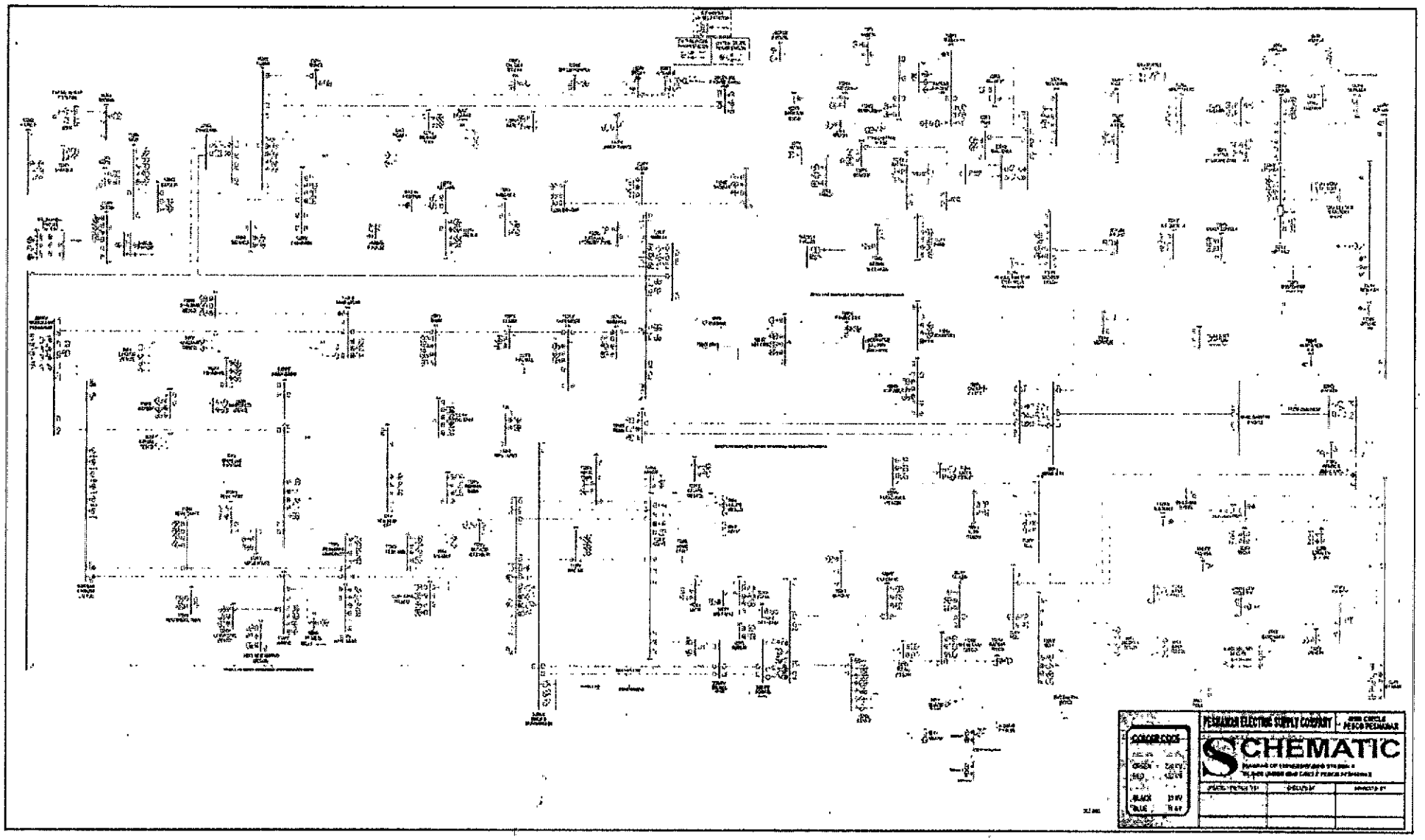
GEOGRAPHICAL MAP OF REMAINING PESCO



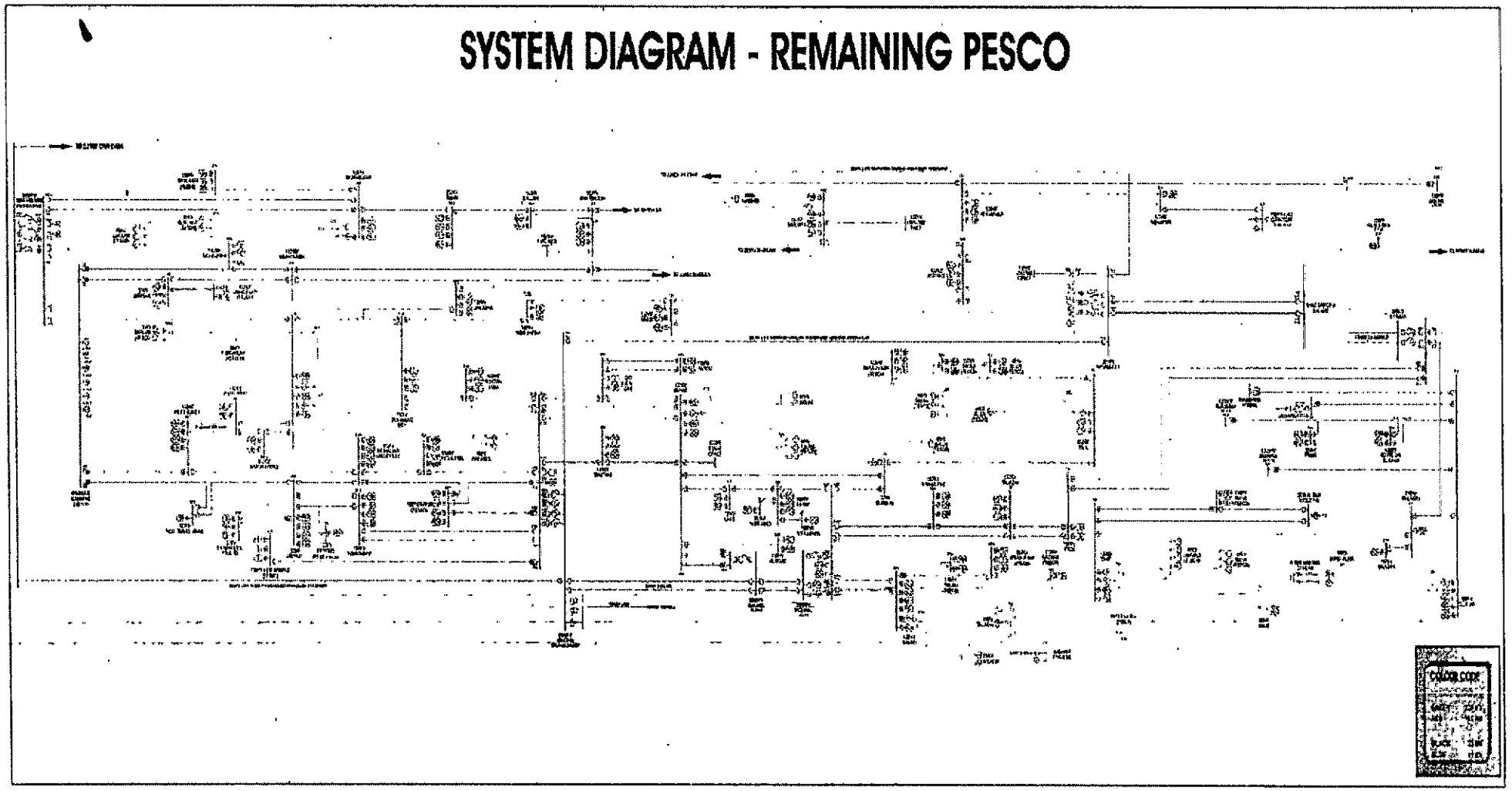
GEOGRAPHICAL MAP OF PROPOSED HAZECO



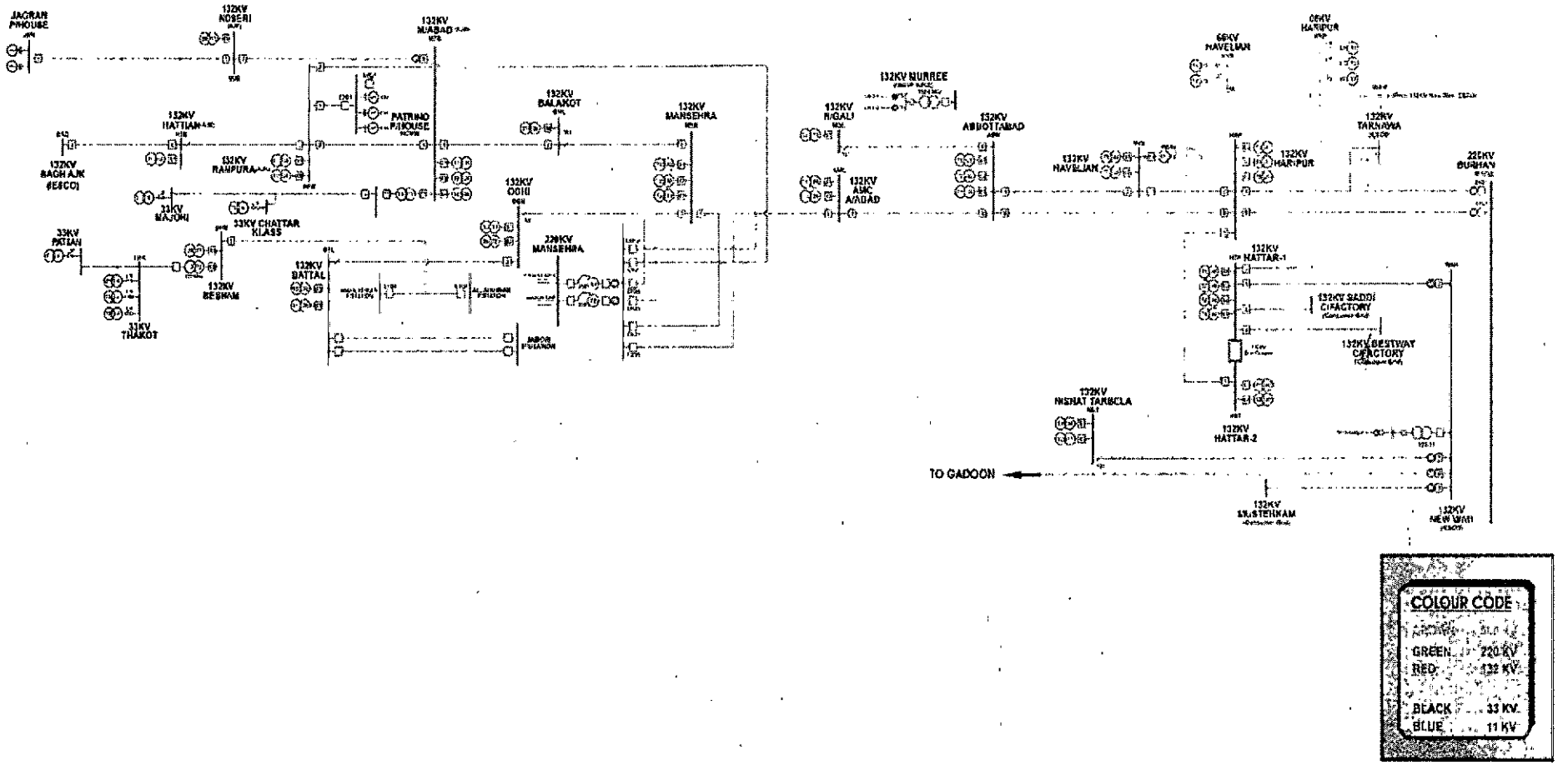
SYSTEM NETWORK DIAGRAM OF PESCO



SYSTEM NETWORK DIAGRAM OF REMAINING PESCO



SYSTEM NETWORK DIAGRAM OF PROPOSED HAZECO

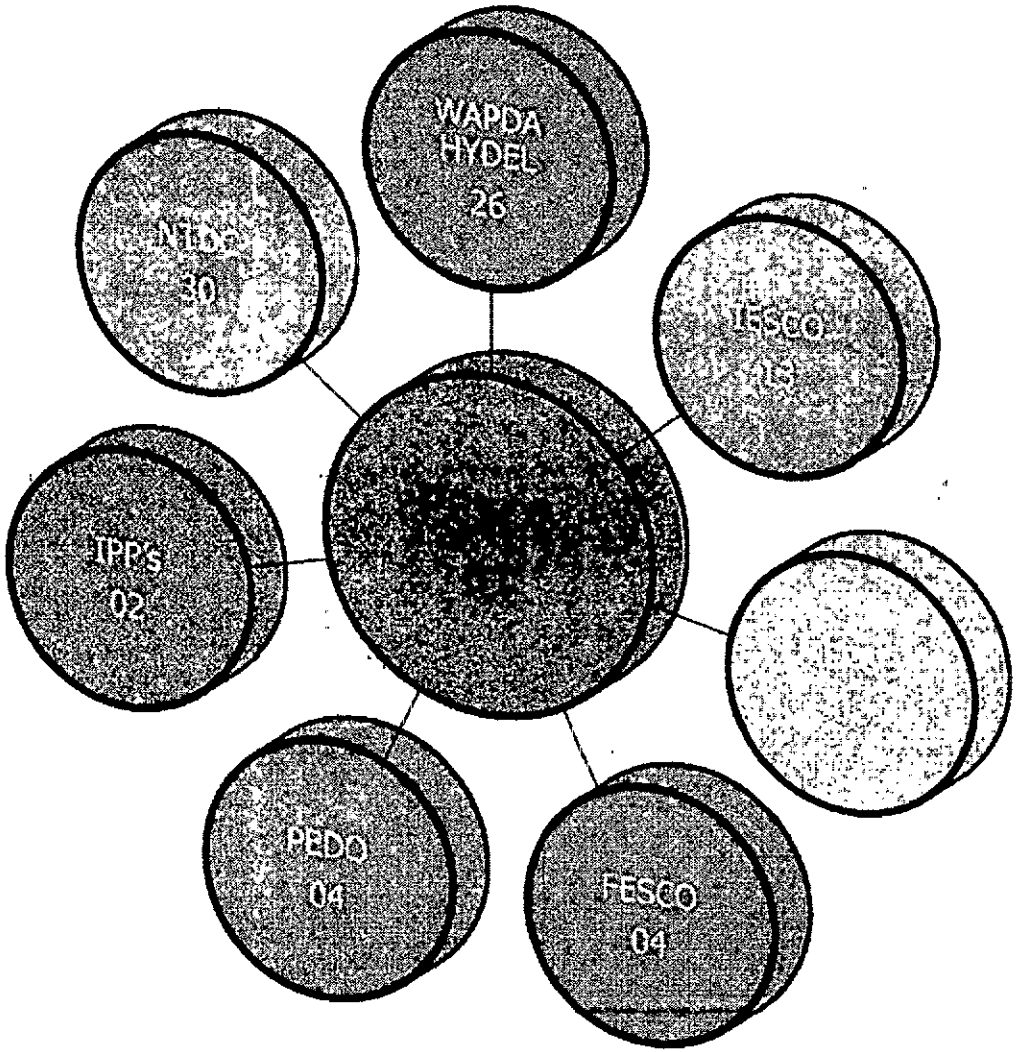


PROPOSAL FOR BIFURCATION OF PESCO

Agenda Point #(iii).

STUDY OF CDPs POWER SOURCES FROM WHERE PROPOSED COMPANIES CAN IMPORT POWER

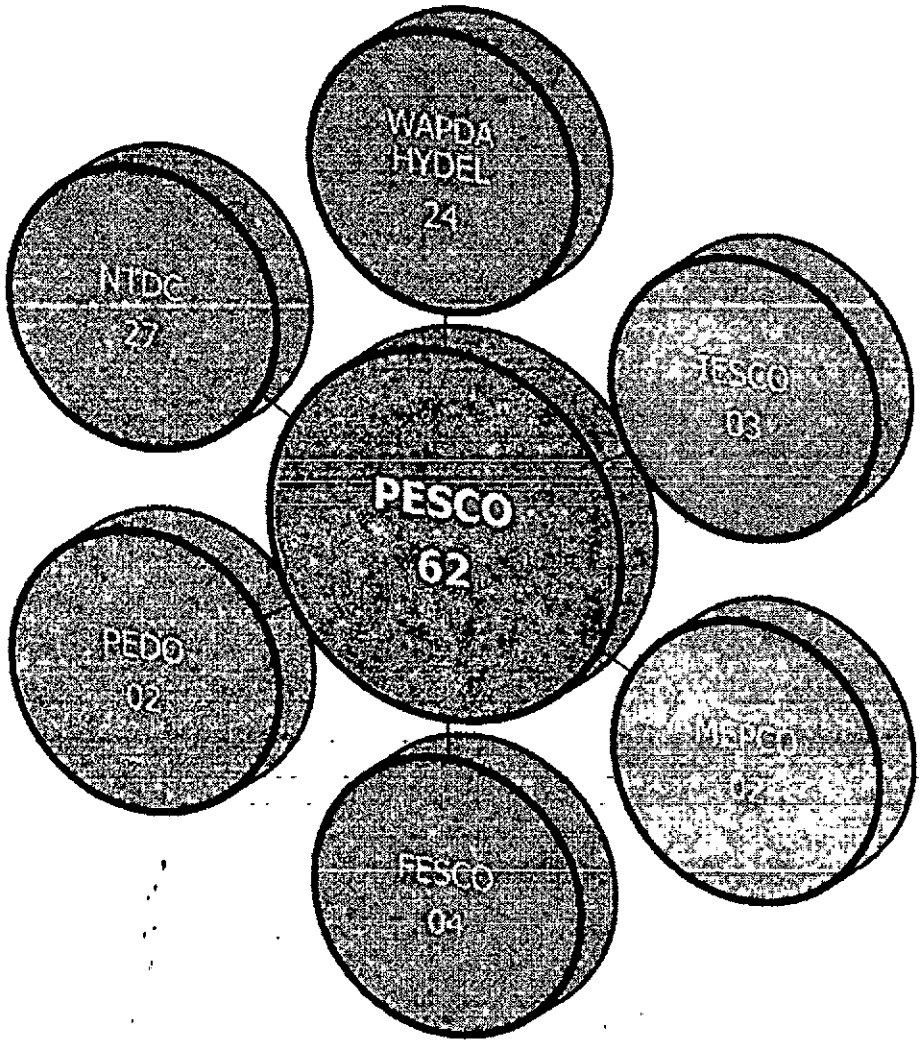
COMMON DISTRIBUTION POINTS
(PESCO & OTHER COMPANIES)



PESCO

132KV	**:**	**58**
66KV	**:**	**02**
11KV	**:**	**21**

COMMON DISTRIBUTION POINTS
(REMAINING PESCO & OTHER COMPANIES)

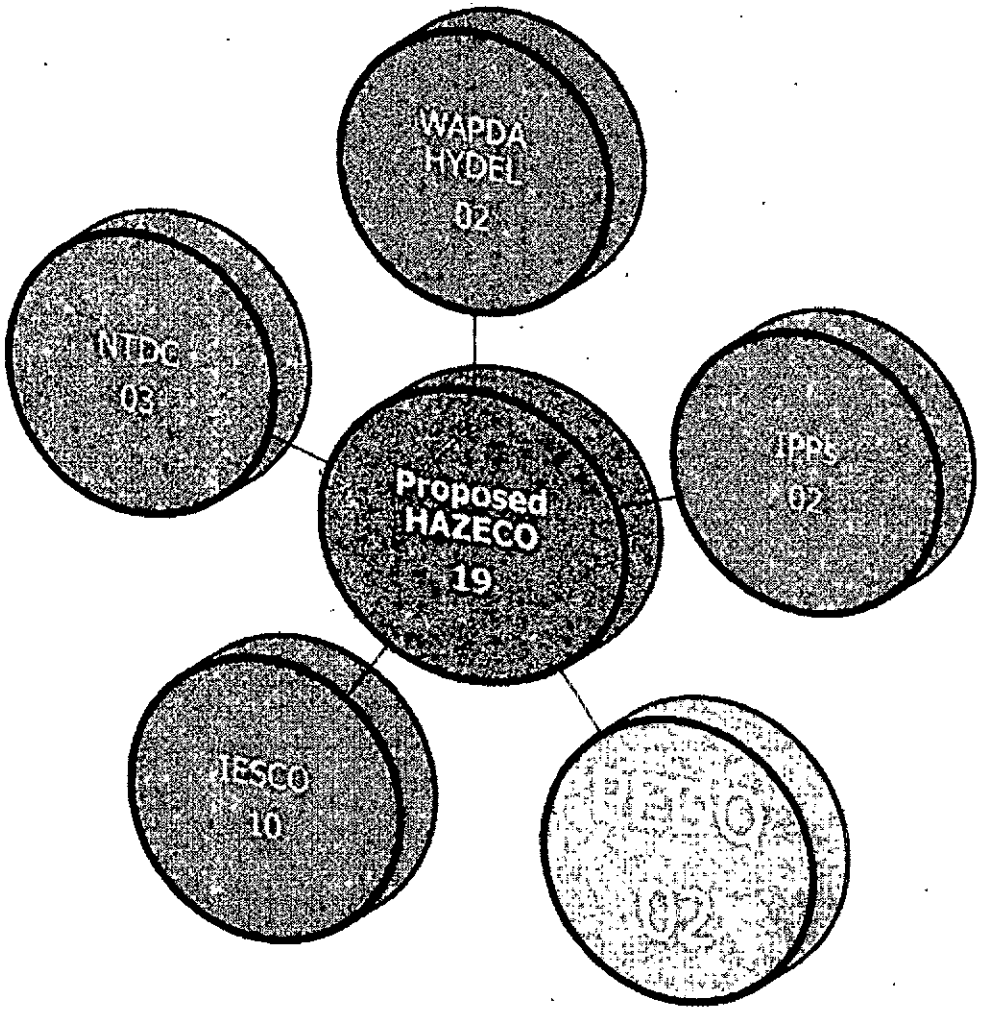


REMAINING PESCO

132KV	:	43
66KV	:	01
11KV	:	18

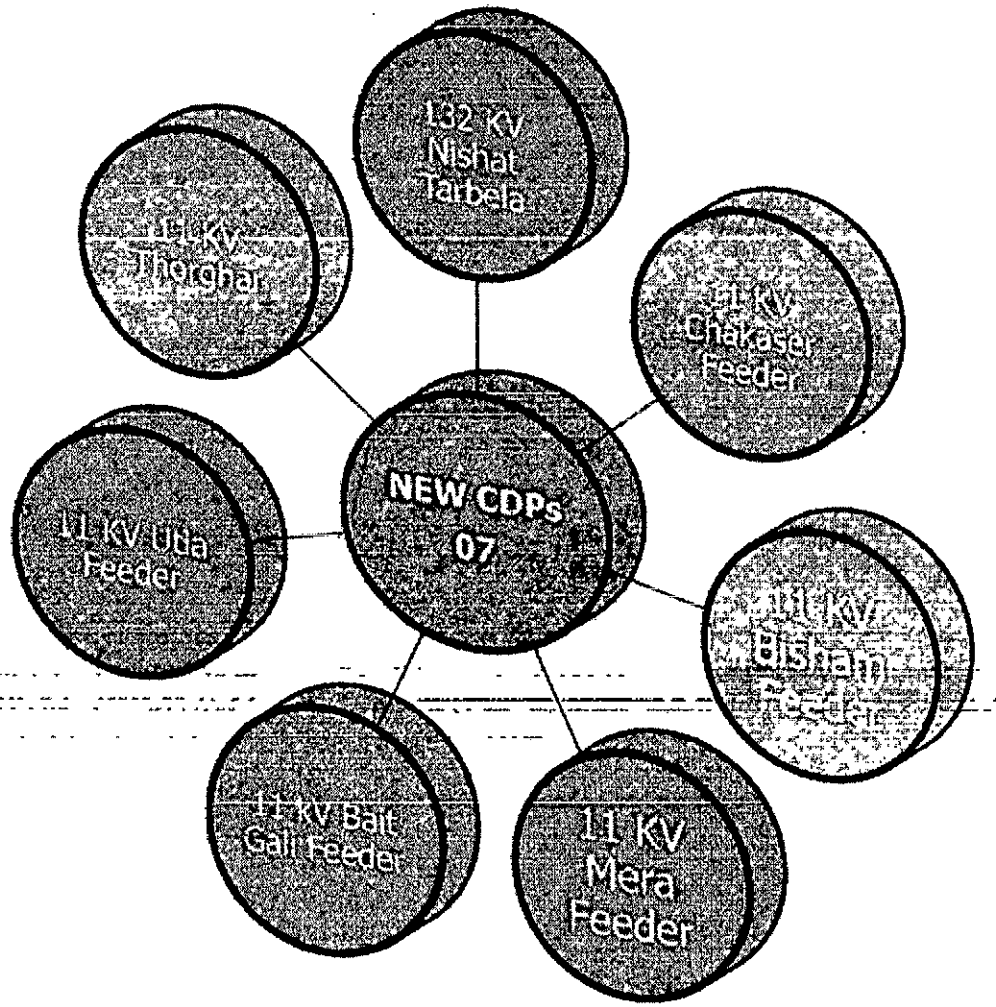
COMMON DISTRIBUTION POINTS EXISTING (PROPOSED HAZECO WITH OTHER COMPANIES)

132KV: 15
66KV : 01
11KV : 03



COMMON DISTRIBUTION POINTS
(NEW CDPS TO BE CREATED BETWEEN PESCO & HAZECO AFTER BIFURCATION)

132KV: 01
11KV : 06



PROPOSAL FOR BIFURCATION OF PESCO

Agenda Point #(iv).

LOAD FLOW STUDIES FOR ASCERTAINING THE STABILITY OF PROPOSED NETWORKS.

PROPOSAL FOR BIFURCATION OF PESCO

Agenda Point #(iv).

❖ TECHNICAL LOSS

Company	Total Demand (MW) as per study	Demand (MW)	Power Loss	%age Technical Loss As per Study
PESCO (Existing)	2787.6	2712.8	74.8	2.68
PESCO (Remaining)	2251.8	2195.3	56.5	2.51
Proposed HAZECO	535.9	517.5	18.4	3.43

Agenda Point #(iv).

PESCO – HAZECO LOAD FLOW STUDIES BASE CASE 2023-24

PTI INTERACTIVE POWER SYSTEM SIMULATOR--PSS(R)E MON, NOV 27 2023 13:44

PESCO - HAZECO LOAD FLOW STUDIES AREA TOTALS

BASE CASE-2023-24 IN MW/MVAR

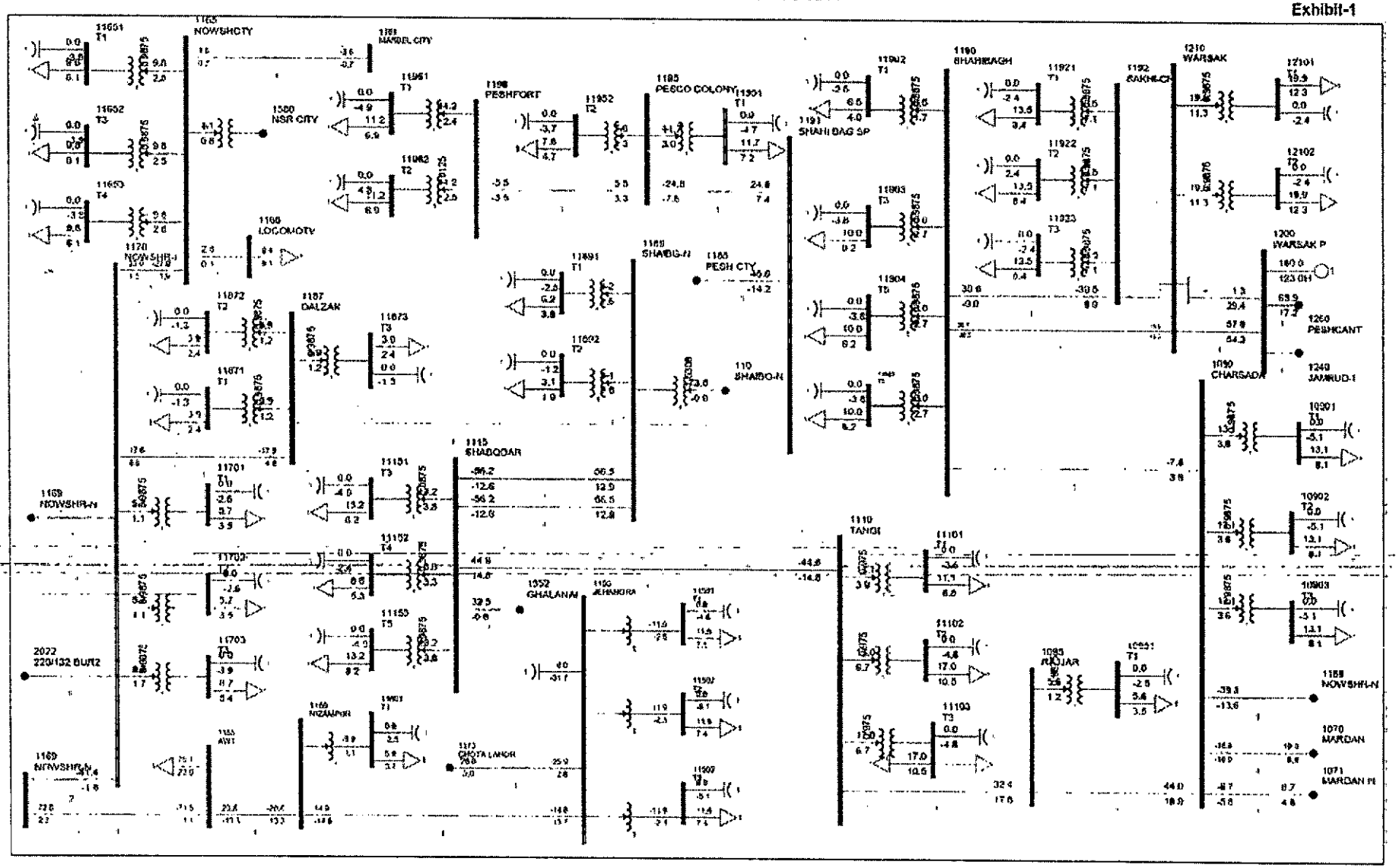
	FROM ---ASSIGNED TO THE AREA---				TO				-NET INTERCHANGE-			
X-- AREA --X	GENE-RATION	FROM IND GENERATN	TO IND MOTORS	TO LOAD	TO BUS SHUNT	GNE BUS DEVICES	TO LINE SHUNT	FROM CHARGING	TO LOSSES	TO TIE LINES	TO TIES + LOADS	DESIRED NET INT
1	648.6	0.0	0.0	**2195.3**	0.0	0.0	0.0	0.0	**56.5**	-2043.5	-1603.1	0.0
PESCO	186.6	0.0	0.0	1266.9	-1124.1	0.0	-0.0	207.9	451.2	-466.9	-199.6	
11	455.7	0.0	0.0	**517.5**	0.0	0.0	1.1	0.0	**18.4**	272.8	-81.3	0.0
HAZECO	-14.8	0.0	0.0	267.5	-20.1	0.0	-0.0	42.6	74.5	-80.3	-294.0	
COLUMN	1104.3	0.0	0.0	**2712.8**	0.0	0.0	1.1	0.0	**74.8**	-1770.7	-1684.4	0.0
TOTALS	171.8	0.0	0.0	1534.4	-1144.2	0.0	0.0	250.6	525.7	-547.2	-493.6	

117

Agenda Point #(iv).
(REMAINING PESCO)

PESCO LOAD FLOW STUDY
YEAR 2023-24: BASE CASE

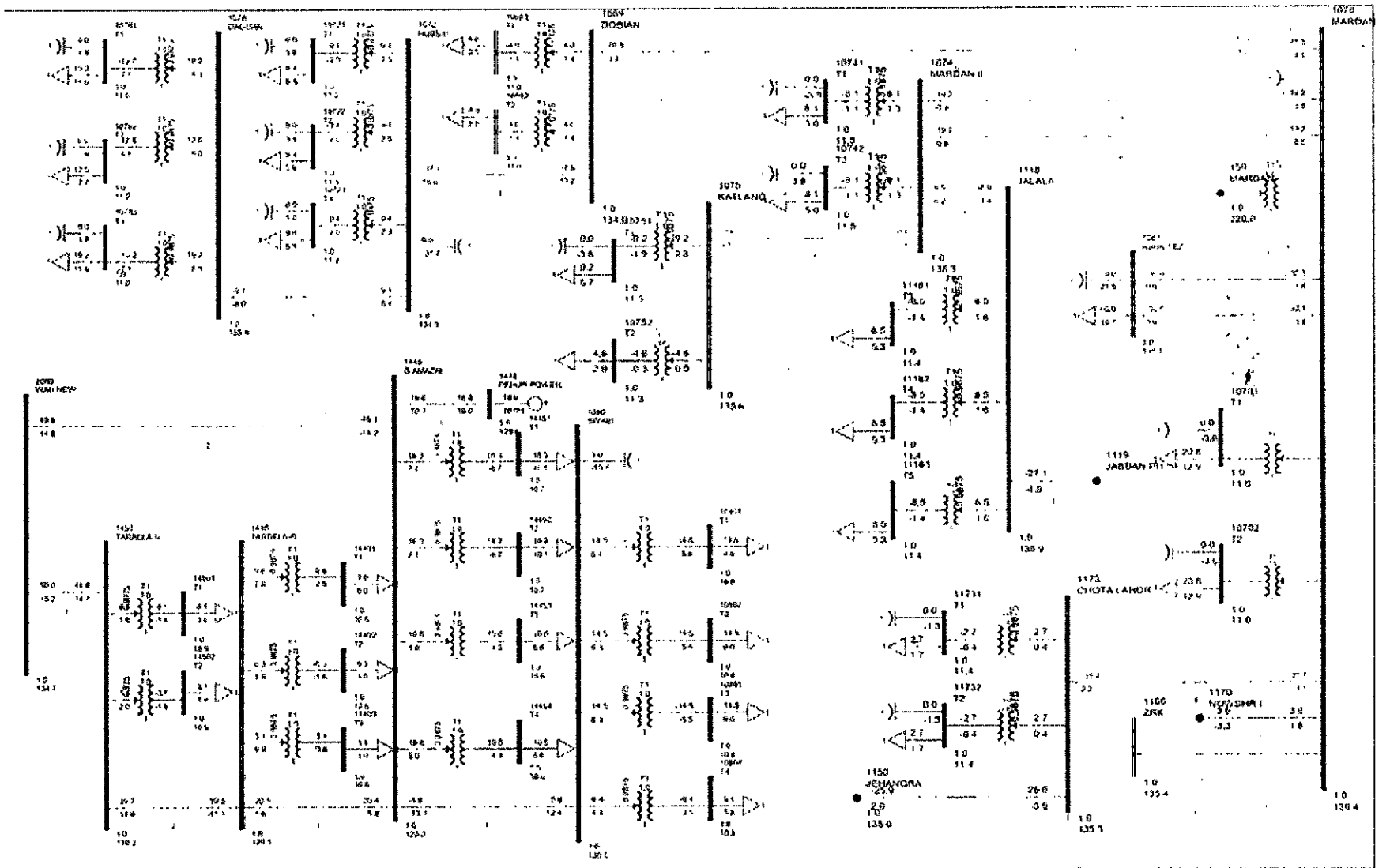
Exhibit-1



Agenda Point #(iv).
(REMAINING PESCO)

YEAR 2023-24: BASE CASE

Exhibit-2

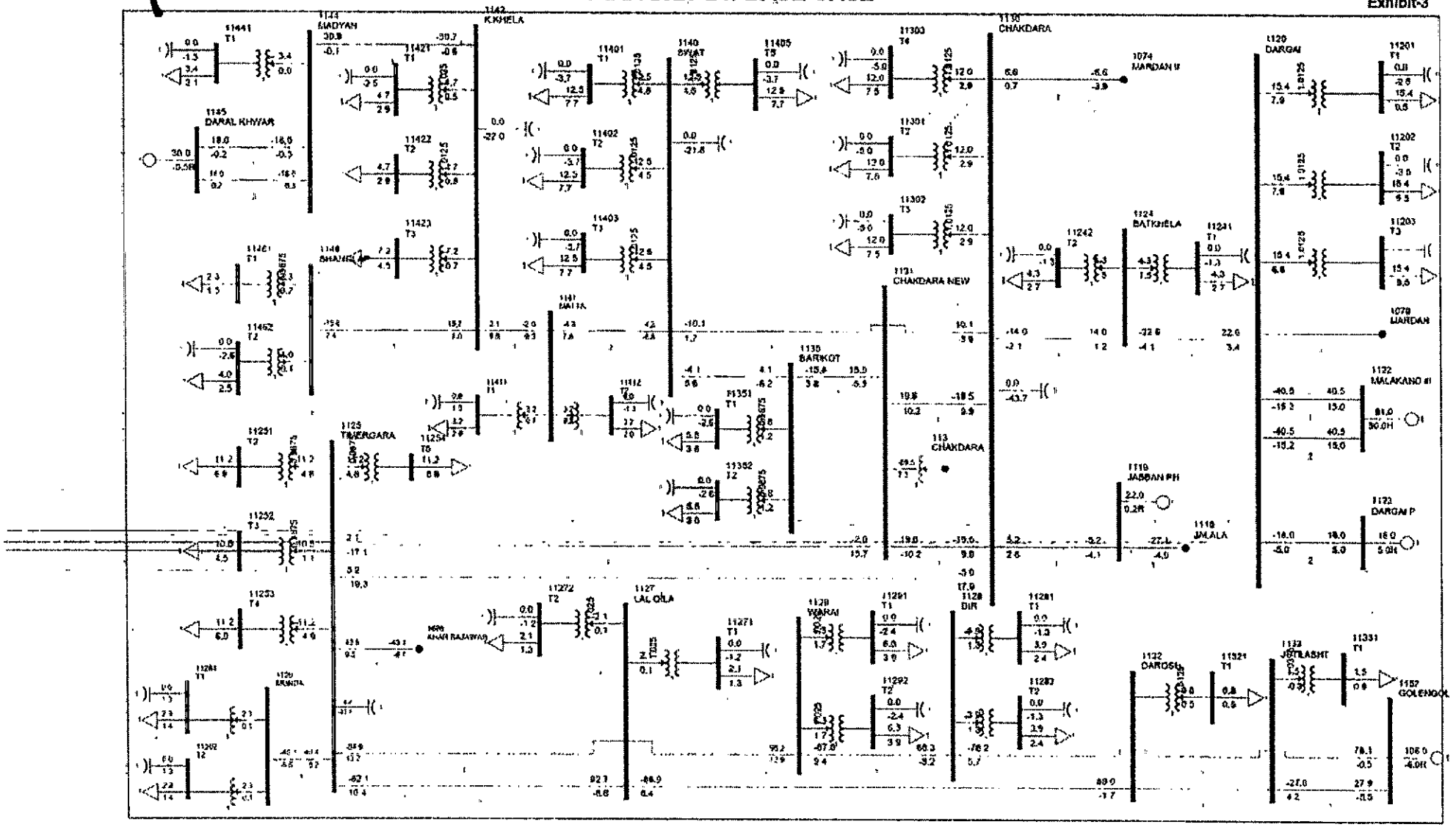


Agenda Point #(iv).
(REMAINING PESCO)

119.

PESCO LOAD FLOW STUDY
YEAR 2023-24: BASE CASE

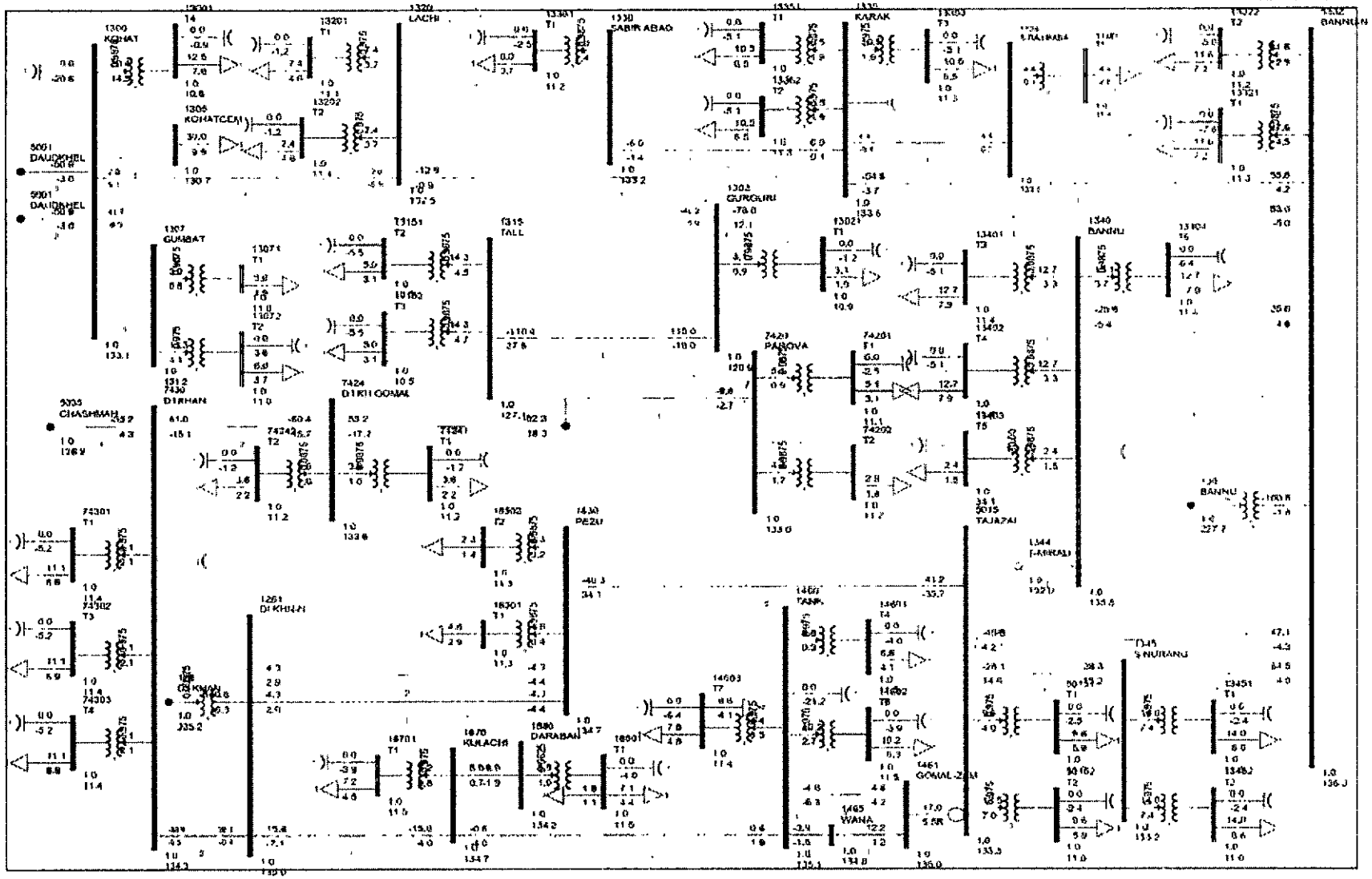
Exhibit-3



Agenda Point #(iv).
(REMAINING PESCO)

PESCO LOAD FLOW STUDY
YEAR 2023-24: BASE CASE

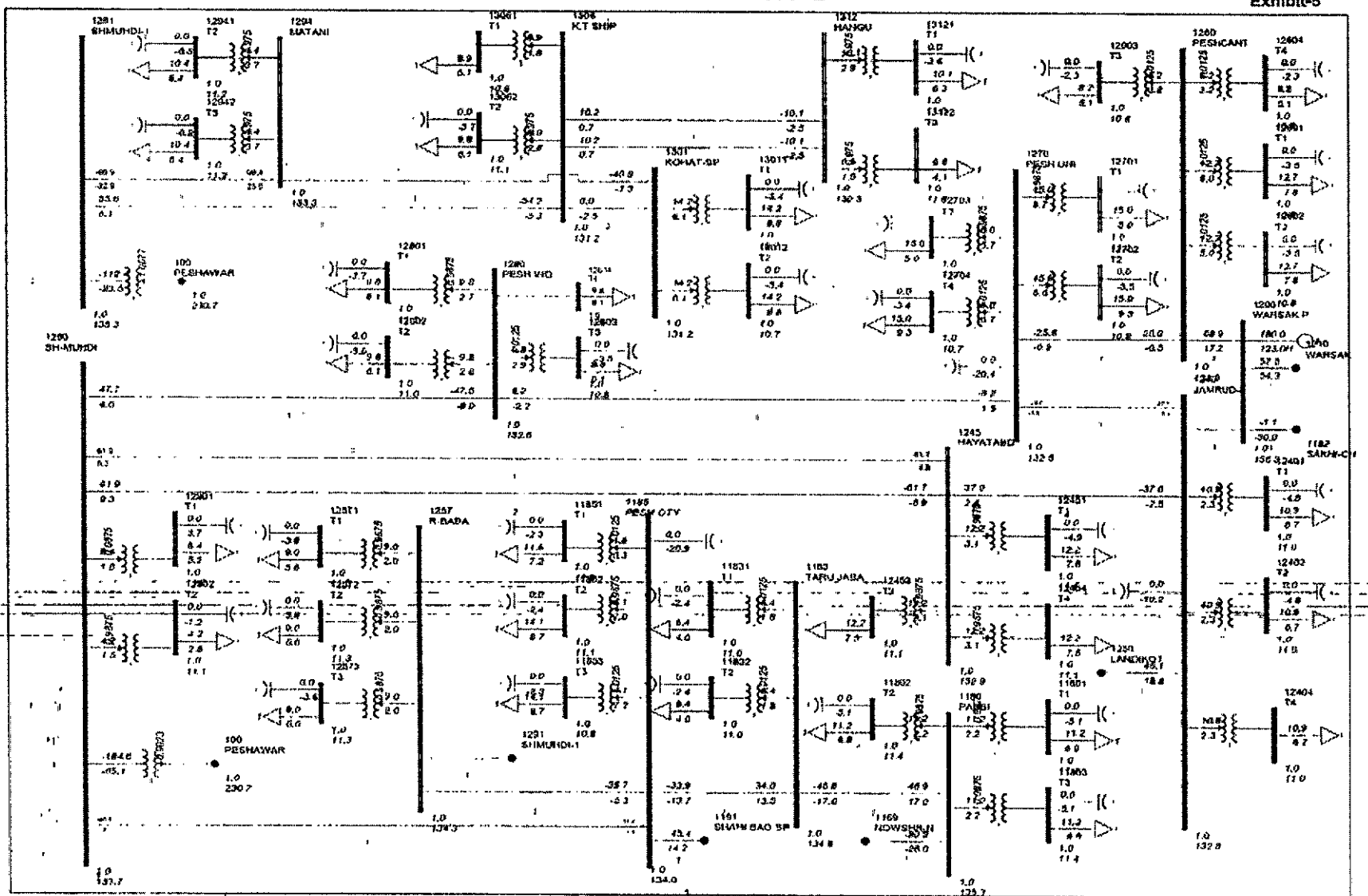
Exhibit-4



Agenda Point #(iv).
(REMAINING PESCO)

PESCO LOAD FLOW STUDY
YEAR 2023-24: BASE CASE

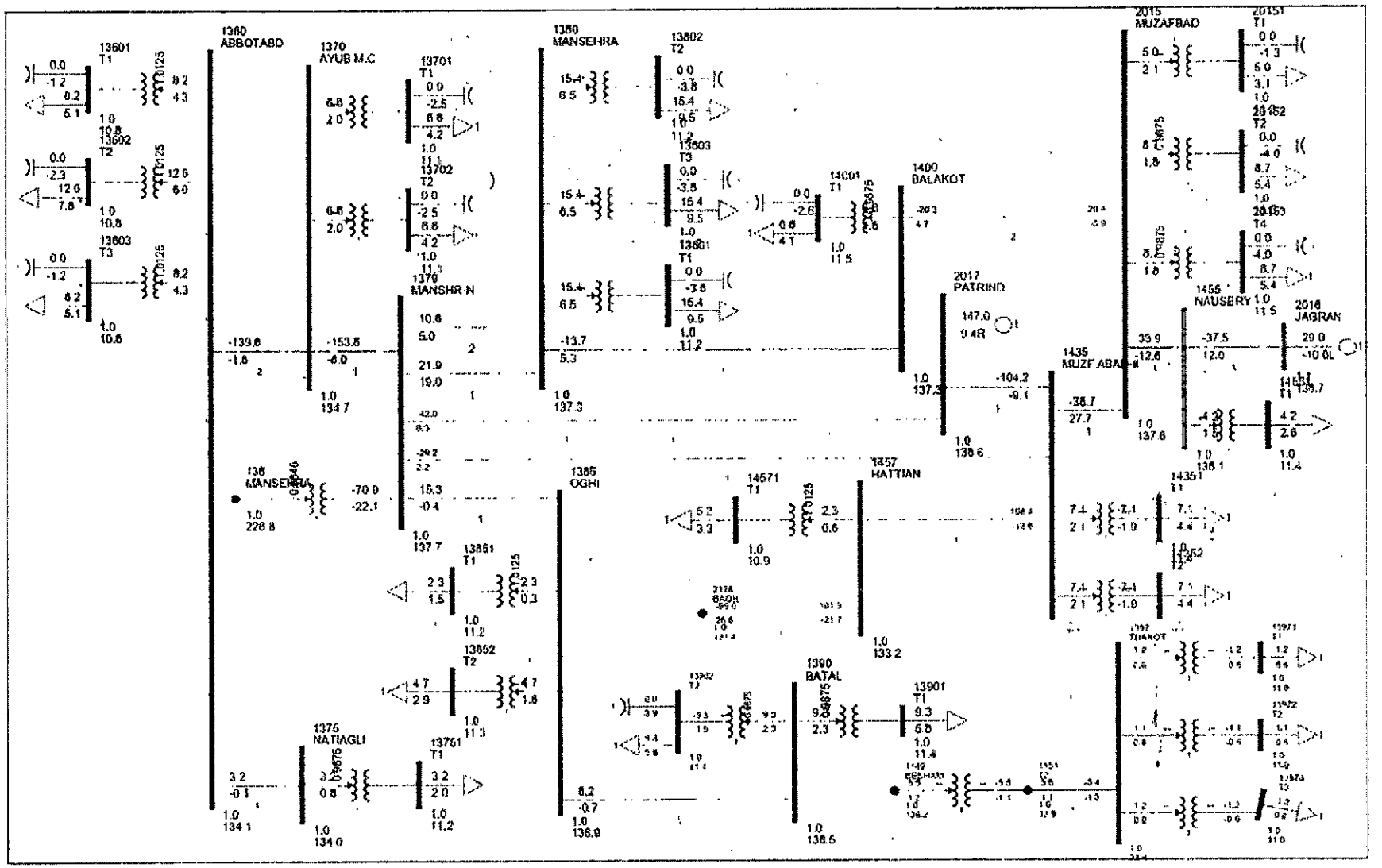
Exhibit-5



Agenda Point #(iv).
(PROPOSED HAZECO)

HAZECO LOAD FLOW STUDY
YEAR 2023-24: BASE CASE

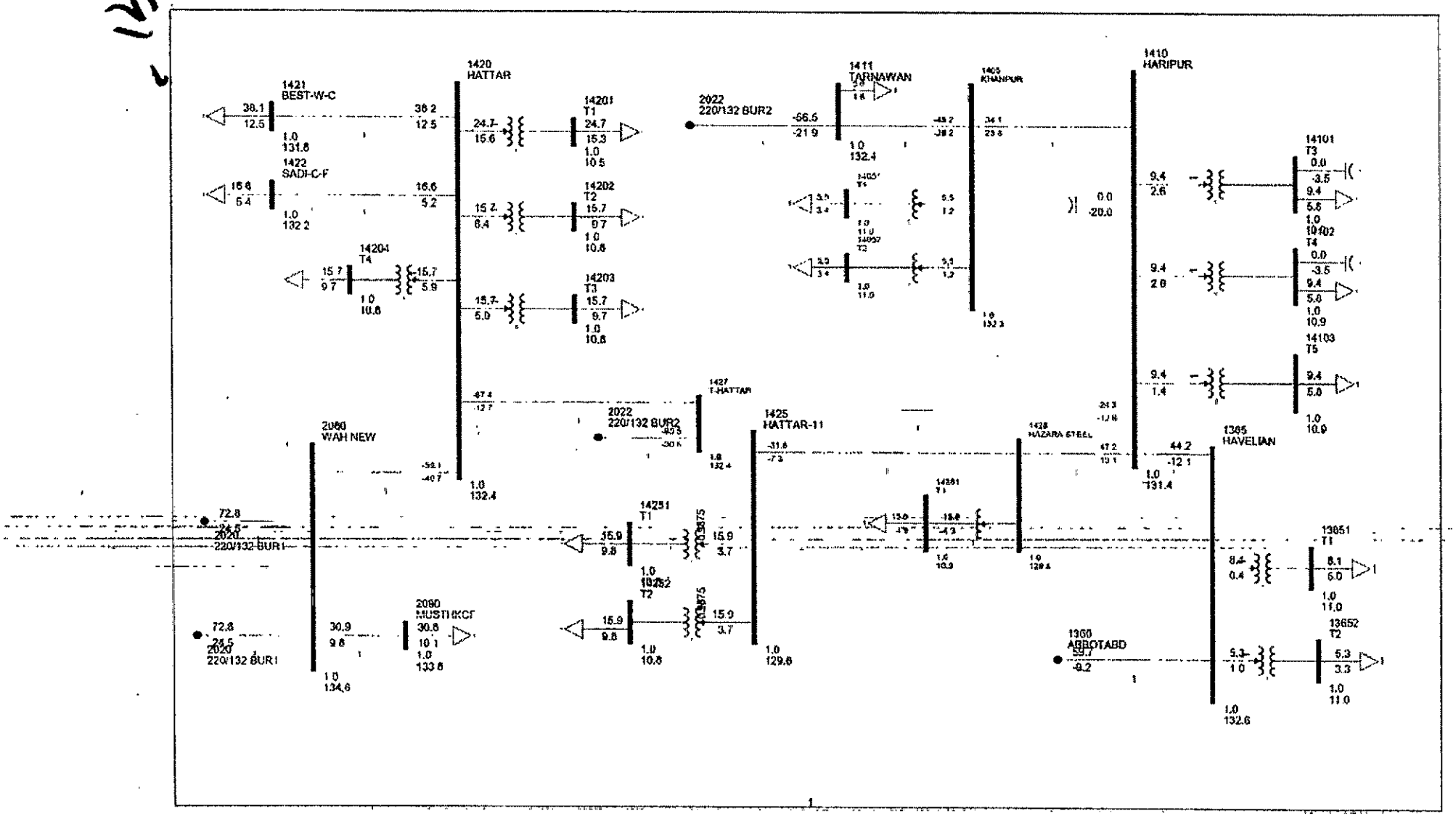
Exhibit-1



Agenda Point #(iv).
(PROPOSED HAZECO)

HAZECO LOAD FLOW STUDY
YEAR 2023-24: BASE CASE

Exhibit-2



PROPOSAL FOR BIFURCATION OF PESCO

Agenda Point #(v).

- **Allocation of Stores & Assest to HAZECO**

PROPOSAL FOR BIFURCATION OF PESCO

Agenda Point #(v).

❖ ALLOCATION OF STORES & ASSEST TO HAZECO

PROPOSAL FOR BIFURCATION OF PESCO

Agenda Point #(vi) b.

- **Complete Information regarding receivables from consumers related to HAZECO as well as subsidy receivables**

127-

PROPOSAL FOR BIFURCATION OF PESCO
Agenda Point #(vi) b.
COMMERCIAL PARAMETERS (RECEIVABLES)

With Subsidy

Figures in Rs: Billion

DISCO	Fiscal Year 2023-24		
	Govt;	Private	Total
PESCO (Existing)	21.08	198.44	219.52
PESCO(Remaining)	8.17	190.64	198.81
Proposed HAZECO	12.91	7.80	20.71

Without Subsidy

DISCO	Fiscal Year 2023-24		
	Govt;	Private	Total
PESCO (Existing)	20.82	194.20	215.02
PESCO(Remaining)	8.03	187.25	195.28
Proposed HAZECO	12.79	6.94	19.74

PROPOSAL FOR BIFURCATION OF PESCO

Agenda Point #(xiii).

ALLOCATION OF STORES & ASSESTS

SETUP OF (MM) STORES REMAINING PESCO

Regional Stores :

1) Regional Store Peshawar
2) Regional Store Nowshera
3) Regional Store Bannu
4) Regional Store Chakdara

Field Storesu :

1) Field Store Charsadda
2) Field Store Mardan
3) Field Store Kohat
4) Field Store Hangu
5) Field Store D.I.Khan
6) Field Store Swat
7) Field Store Swabi

SETUP OF (MM) STORES PROPSED HAZECO

1) Regional Stores :

1) Regional Store Abbotabad

1) Field Stores :

1) Field Store Haripur
2) Field Store Mansehra

EXISTING SETUP OF (MM) STORES OF PESCO

Regional Stores

1) Regional Store Peshawar
2) Regional Store Nowshera
3) Regional Store Bannu
4) Regional Store Abbotabad
5) Regional Store Chakdara

Field Stores

1) Field Store Charsadda
2) Field Store Mardan
3) Field Store Kohat
4) Field Store Hangu
5) Field Store D.I.Khan
6) Field Store Swabi
7) Field Store Swat
8) Field Store Haripur
9) Field Store Mansehra

131-

PROPOSAL FOR BIFURCATION OF PESCO

Mr. Turab Muhammad
Manager Commercial
PESCO

Engr. Habib Ur Rehman
SE Khyber Circle
PESCO

Engr. Tahir Moeen
CE (Tech)/T.D
PESCO

Engr. Adnan Riaz Mir
GM (Technical Services) PPMC

ANNEX "N-9"

TECHNICAL PROPOSAL FOR PLANNING AND DEVELOPMENT OF SYSTEM:

a) Executive Summary

HAZECO will expand and rehabilitate its Transmission and Distribution (T&D) systems. From new grid stations to AMRs for commercial improvements, initiatives have been planned to improve the overall performance of the company in an integrated manner.

Costs Summary:

- Total Cost: Rs. 18372 Million

Benefits Summary:

- Total Benefits: Savings of 275 MKWh of energy through loss reduction and smooth dispersal of power from new generation.

Scope of Works:

- Construction of New Grid Station = 04 No.s
- Conversion of Grid Station = 03 No.s
- Augmentation of Power Transformer = 01 No.s
- Extension of Power Transformer = 01 No.s
- Rehabilitation of Grid Station = 09 No.s
- New Transmission Lines = 80 Km
- Reconductoring of Transmission Lines = 39 Km
- Bifurcation of 11 Kv Feeders = 23 No.s
- Reconductoring of HT Lines = 230 Km
- Installation of Transformers = 679 No.s
- Reconductoring of LT lines = 115 Km

b) INTRODUCTION

The planning and development of a robust system for a power distribution company in Pakistan play a pivotal role in addressing the dynamic energy landscape of the country. With the increasing demand for electricity and the integration of renewable energy sources, the power distribution sector faces challenges that necessitate a strategic and forward-thinking approach. The introduction of cutting-edge technologies and smart grid solutions becomes imperative to enhance the efficiency, reliability, and sustainability of the power distribution network.

In the context of Pakistan's electricity sector, which is characterized by both opportunities and challenges, an effective system planning, and development initiative should encompass factors such as optimal energy mix, grid modernization, and the integration of advanced metering infrastructure. The introduction of smart technologies, coupled with comprehensive planning, is crucial for addressing issues like load shedding, improving energy accessibility in rural areas, and ensuring a stable and resilient power distribution system. As the nation moves towards a more diversified and sustainable energy future, a well-executed planning and development strategy becomes a cornerstone for the power distribution company to navigate the complexities of the evolving energy landscape in Pakistan.

In addition to the National Power System Expansion Plan (NPSEP) 2011–2030, it is essential to recognize the broader energy landscape in Pakistan. The country is endowed with diverse energy resources, including hydroelectric, thermal, and renewable sources. The electricity sector in Pakistan, managed by vertically integrated public sector companies like Water and Power, plays a pivotal role in harnessing and distributing this energy to meet the growing demands of the nation. Analyzing the complexities of electric power generation growth and considering national policies is crucial for steering the country towards sustainable and efficient energy solutions. Moreover, models for integrated expansion and operation planning of distribution systems contribute to optimizing the distribution network for enhanced efficiency. Initiatives like the National Power Policy 2013 underscore the importance of a well-developed power production, transmission, and distribution system to address challenges and pave the way for a resilient energy future.

c) OBJECTIVE

The objective of planning and development of system is to significantly enhance the stability and reliability of the electrical supply in Hazara division. The aim is to achieve this by implementing a comprehensive set of measures that will modernize and strengthen the existing power infrastructure in Hazara division.

Key Points:

Infrastructure Enhancement: The purpose is to improve the overall electrical infrastructure by establishing new substations, transmission lines, and distribution networks. These enhancements are crucial to accommodate the growing demand for electricity in the Hazara division.

Stability Improvement: By introducing new technologies and expanding the capacity of the transmission and distribution systems, the project aims to enhance the stability of the electrical grid. This includes reducing the risk of power outages and ensuring a consistent and reliable electricity supply to the residents and businesses in the city.

Capacity Building: The planning and development of system also includes initiatives for capacity building within the local electrical sector. This involves training and skill development programs for the workforce involved in the operation and maintenance of the upgraded systems, ensuring the sustainable and efficient operation of the enhanced infrastructure.

Environmental Impact: Consideration of environmental impact is an integral part of the project's objectives. The implementation of modern, efficient technologies and practices aims to minimize the environmental footprint of the electrical transmission and distribution systems.

Overall, the Transmission and Distribution System of HAZECO is to create a modern, resilient, and environmentally conscious electrical infrastructure that meets the current and future energy needs of Hazara division, contributing to the overall development and prosperity of the area and its residents.

d) APPROACH:

The approach for planning and developing the electric distribution system is a systematic and comprehensive process aimed at ensuring the efficient, reliable, and sustainable operation of the distribution network. The approach involves a multi-step strategy that considers various factors, including current infrastructure, technological advancements, regulatory requirements, and future energy demands.

Network Assessment:

- Conducting a thorough assessment of the existing distribution network, identifying strengths, weaknesses, and areas for improvement.
- Utilizing advanced tools and technologies to gather real-time data on network performance and load characteristics.

Demand Forecasting:

- Employing sophisticated forecasting models to project future electricity demand accurately.
- Considering factors such as population growth, industrial expansion, and technological trends to anticipate changes in energy consumption.

Technological Innovation:

- Embracing innovative technologies, such as advanced metering infrastructure (AMI), to enhance system control, monitoring, and efficiency.
- Evaluating the feasibility of incorporating automation and artificial intelligence for real-time decision-making.

e) METHODOLOGY:

The methodology involves a collaborative and adaptive process to address the dynamic nature of the energy landscape.

Stakeholder Engagement:

- Engaging key stakeholders, including regulatory bodies, local communities, and industry experts, to gather diverse perspectives and ensure alignment with broader goals.

Risk Assessment:

- Conducting a rigorous risk assessment to identify potential challenges and uncertainties associated with the planning and development phases.
- Developing mitigation strategies to address and minimize identified risks.

Phased Implementation:

- Adopting a phased approach to system development to allow for incremental improvements and adjustments based on real-world performance and feedback.
- Ensuring flexibility in the plan to adapt to emerging technologies and unforeseen changes.

Regulatory Compliance:

- Ensuring strict adherence to regulatory requirements and standards governing the electric distribution system.
- Collaborating with regulatory authorities to obtain necessary approvals and certifications.

In summary, the methodology combines a strategic approach with advanced technologies, stakeholder collaboration, and adaptability to create a resilient and future-ready electric distribution system.

f) PROJECT Scope

Secondary Transmission System

-213

HAZECO PROPOSED GRID STATIONS & TRANSMISSION LINES									
Sr.No.	Name of Grid Station /Transmission Line	Type	Transformer		T/Line		Length (km)	Year	Estimated Cost (Rs. Million)
			31.5/40 MVA	20/26 MVA					
Grid Station									
1	132 KV Haripur (Power T/F)	Ext:		1				2023-24	150
2	132 KV Sarai Salih, (Haripur)	Con:		2	D/C	Lynx	2	2024-25	810
3	132 KV Pattan	Con:		1	D/C	Rail	5	2024-25	700
4	132 KV Haripur (Power T/F) World Bank Project	Aug:	1					2024-25	300
5	132 KV Thakot	Con:		1	SDT	Lynx	20	2025-26	930
6	132 KV Shinkyari, Mansehra	New		2	D/C	Lynx	5	2026-27	1130
7	132KV Abbottabad-II	New	2		D/C	Lynx	2	2026-27	1150
8	132KV Hattar-III near Bilal Masjid	New	2		D/C	Lynx	1	2026-27	1110
9	132 KV Gandaf	New		1	SDT	Lynx	35	2027-28	1450
Transmission Line									
8	220 kV Haripur - Hattar SEZ D/C T/Line for SEZ Long term arrangment	New T/L			D/C	Rail	5	2025-26	350
9	Re conductoring of 132 kV AMC Abbottabad – Murree Road Abbottabad T/Line (World Bank Project)	Recond:			S/C	Greeley / HTLS	6	2025-26	250
10	Reconductoring of 132 kV New Wah - Hattar T/Line (World Bank Project)	Recond:			S/C	Greeley / HTLS	28	2026-27	600
11	132 kV New Wah – Hattar In/Out at 220 kV Haripur	New T/L			D/C	Rail	5	2026-27	250
12	220/132KV Mansehra – 132KV AMC A/Abad Line Upgradation of remaining portion	Recond:			S/C	Rail	5	2027-28	150
	TOTAL		5	8			119		9330

Distribution Rehabilitation and Expansion Plan

HAZECO Power Distribution Rehabilitation (ELR) 2023-24 to 2027-28

No.	Description	Unit	Per Feeder	Quantities							Unit Rate (Jun-2023)	Total Cost in Million RS					
				2023-24		2024-25		2025-26		2026-27		2027-28		Qty. Total		2023-24	2024-25	2025-26	2026-27	2027-28	Qty. Total
				3	Feeders (11 KV)	4	Feeders (11 KV)	4	Feeders (11 KV)	3	Feeders (11 KV)	4	Feeders (11 KV)	18	Feeders (11 KV)	3 Feeders (11 KV)	4 Feeders (11 KV)	4 Feeders (11 KV)	3 Feeders (11 KV)	4 Feeders (11 KV)	18 Feeders (11 KV)
A.	**Material For 18 No. 11KV Feeders**																				
	New 11 KV Lines																				
	a. Osprey	KM	9.9	30	40	40	30	40	178	5299524						157	210	210	157	210	944
1.	b. Dog	KM	5	15	20	20	15	20	90	3116375						47	62	62	47	62	280
	c. 11 KV 500 MCM Cable	KM	0.1	0	0	0	0	0	2	2976000						1	1	1	1	1	5
	Sub Total	KM	15.000	45	60	60	45	60	270							205	273	273	205	273	1230
	11 KV Line Reconductoring																				
	a. Osprey	KM	5	15	20	20	15	20	90	3408428.77						51	68	68	51	68	307
2.	b. Dog	KM	4	12	16	16	12	16	72	1592903.02						19	25	25	19	25	115
	c. Rabbit	KM	1	3	4	4	3	4	18	1072838.02						3	4	4	3	4	19
	Sub Total	KM	10.00	30	40	40	30	40	180							73	98	98	73	98	441
	11KV Capacitors																				
3.	Fixed 11 KV 450 KVAR	set	1	3	4	4	3	4	18	162900						0	1	1	0	1	3
	Sub Total	set	1	3	4	4	3	4	18							0	1	1	0	1	3
4.	11KV Panels	No.	1	3	4	4	3	4	18	2449999						7	10	10	7	10	44
5	11KV 500 MCM Cable	KM	0.3	1	1	1	1	1	5	2976000						3	4	4	3	4	16
6	**Total (Item 1 to 5) Cost of HT Feeders**															289.01	385.35	385.35	289.01	385.70	1734

HAZECO Power Distribution Rehabilitation (ELR) 2023-24 to 2027-28

No.	Description	Unit	Per Proposal	Quantities						Unit Rate (Jun 2023)	Cost					
				2023-24	2024-25	2025-26	2026-27	2027-28	Total		2023-24	2024-25	2025-26	2026-27	2027-28	Total
B	**Detail of LT Proposals involving New Transformers & Various Type of Material**															
7	**Transformers**															
	a. 25 KVA	No.		17	19	1	1	1	38	564047	9.5	10.8	0.3	0.3	0.3	21.3
	b. 50 KVA	No.		40	39	28	28	28	161	833463	33.0	32.1	22.9	22.9	22.9	133.9
	c. 100 KVA	No.		31	32	30	30	30	152	1295056	39.9	41.3	38.5	38.5	38.5	196.6
	d. 200 KVA	No.		9	10	9	9	9	47	1920796	16.9	19.0	18.0	18.0	18.0	89.8
	Sub Total	No.		96	100	67	67	67	397		99.3	103.2	79.7	79.7	79.7	441.6
8	**New 11 KV Lines**															
	Rabbit (Conversion LT Feeders)	KM	0.39	37	39	26	26	26	155	1564414.6	58.572	60.707	40.970	40.970	40.970	242.188
	Insulated Rabbit	KM	0.021	2	2	1	1	1	8	152000	0.306	0.318	0.214	0.214	0.214	1.267
	Sub Total	KM	0.411	37	39	26	26	26	163		58.878	61.025	41.184	41.184	41.184	243.455
C	**New LT Line**															
9	a. 3-Phase Wasp Line	KM	0.04	4	4	3	3	3	16	1576199	6.053	6.273	4.234	4.234	4.234	25.027
	b. 3-Phase ANT Line	KM	1.09	105	108	73	73	73	433	1473719	154.210	159.832	107.867	107.867	107.867	637.642
	Sub Total	KM	1.130	108	112	76	76	76	449		160.263	166.105	112.100	112.100	112.100	662.669
10	**LT Line Re-Conductoring**															
	a. 3-Phase Wasp	KM	0.16	15	16	11	11	11	64	684571.98	10.515	10.898	7.355	7.355	7.355	43.479
	b. 3-Phase Ant	KM	0.01	1	1	1	1	1	4	582091.98	0.559	0.579	0.391	0.391	0.391	2.311
	Sub Total	KM	0.170	16	17	11	11	11	67		11.074	11.478	7.746	7.746	7.746	45.789
D	**Other Equipment and Material**															
11	**Energy Meters (against defective)**															
	a. Single Phase	No.		14404	15125	15881	16675	17509	79593	3251	46.829	49.170	51.628	54.210	56.920	258.757
	b. Three Phase	No.		1625	1707	1792	1881	1976	8981	33900	55.097	57.852	60.745	63.782	66.971	304.447
	Sub Total	No.		16030	16831	17673	18556	19484	88574		101.926	107.022	112.373	117.992	123.891	563.204
E	**Total (Item 7 to 11) Cost of LT Feeders**										**431.412**	**448.876**	**353.085**	**358.703**	**364.603**	**1956.679**

HAZECO Power Distribution Rehabilitation (ELR) 2023-24 to 2027-28

S. No:	Description	Unit	Quantities						Unit Rate Rs:	Total Cost in Million Rs:					
			2023-24	2024-25	2025-26	2026-27	2027-28	Total		2023-24	2024-25	2025-26	2026-27	2027-28	Total
F	Total (Item 1 to 11) Cost of HT & LT Proposals									720	834	738	648	750	3691
G	12% Store Charges									86	100	89	78	90	443
H	8% Installation Charges									58	67	59	52	60	295
I	Total Material Cost (F+G+H)									865	1001	886	777	900	4429
J	Contigency (3%)									26	30	27	23	27	133
K	Total Material Cost(I+J)									890	1031	913	801	927	4562
L	Escalated Cost @ 29%									209	242	214	188	218	1070
M	Total Material Cost(K+L)									1099	1273	1127	988	1145	5633

HAZECO Power Distribution Expansion (DOP) 2023-24 to 2027-28

No.	Description	Unit	Per Feeder	Quantities						Unit Rate (Jun-2023)	Total Cost in Million Rs.					
				2023-24	2024-25	2025-26	2026-27	2027-28	Total		2023-24	2024-25	2025-26	2026-27	2027-28	Total
				1 Feeders	1 Feeders	1 Feeders	1 Feeders	1 Feeders	05 Feeders		1 Feeders	1 Feeders	1 Feeders	1 Feeders	1 Feeders	05 Feeders
				11 KV	11 KV	11 KV	11 KV	11 KV	11 KV		11 KV	11 KV	11 KV	11 KV	11 KV	11 KV
A.	**Material For 05 No. 11KV Feeders**															
	New 11 KV Lines															
	a. Osprey	KM	9.9	10	10	10	10	10	50	5299524	52	52	52	52	52	262
1.	b. Dog	KM	5	5	5	5	5	5	25	3116375	16	16	16	16	16	78
	c. 11 KV 500 MCM Cable	KM	0.1	0	0	0	0	0	1	2976000	0	0	0	0	0	1
	Sub Total	KM	15.000	15	15	15	15	15	75		68	68	68	68	68	342
	11 KV Line Reconductoring															
	a. Osprey	KM	5	5	5	5	5	5	25	3408428.77	17	17	17	17	17	85
2.	b. Dog	KM	4	4	4	4	4	4	20	1592903.02	6	6	6	6	6	32
	c. Rabbit	KM	1	1	1	1	1	1	5	1072838.02	1	1	1	1	1	5
	Sub Total	KM	10.00	10	10	10	10	10	50		24	24	24	24	24	122
	11KV Capacitors															
3.	Fixed 11 KV 450 KVAR	set	1	1	1	1	1	1	5	162900	0.16	0.16	0.16	0.16	0.16	1
	Sub Total	set	1	1	1	1	1	1	5		0.16	0.16	0.16	0.16	0.16	1.00
4.	11KV Panels	No.	1	1	1	1	1	1	5	2449999	2	2	2	2	2	12
5	11KV 500 MCM Cable	KM	0.3	0	0	0	0	0	2	2976000	1	1	1	1	1	4
6	Total (Item 1 to 5) Cost of HT Feeders										96.34	96.34	96.34	96.34	96.34	482

HAZECO Power Distribution Expansion (DOP) 2023-24 to 2027-28

No.	Description	Unit	Per Proposal	Quantities						Unit Rate (Jun 2023)	Cost					
				2023-24	2024-25	2025-26	2026-27	2027-28	Total		2023-24	2024-25	2025-26	2026-27	2027-28	Total
B	**Detail of LT Proposals Involving New Transformers & Various Type of Material**															
7	**Transformers**															
	a. 25 KVA	No.		5	6	2	2	2	15	564047	2.8	3.1	0.9	0.9	0.9	8.7
	b. 50 KVA	No.		7	8	26	26	26	94	833463	6.0	6.4	22.0	22.0	22.0	78.4
	c. 100 KVA	No.		12	12	17	17	17	75	1295056	15.7	15.7	22.1	22.1	22.1	97.6
	d. 200 KVA	No.		15	16	22	22	22	97	1920796	29.6	30.0	42.3	42.3	42.3	186.4
	Sub Total	No.		40	41	67	67	67	282		54.0	55.2	87.3	87.3	87.3	371.0
8	**New 11 KV Lines**															
	Rabbit (Conversion LT Feeders)	KM	0.39	15	16	26	26	26	110	1564414.6	24.161	24.966	40.939	40.939	40.939	171.944
	Insulated Rabbit	KM	0.021	1	1	1	1	1	6	152000	0.126	0.131	0.214	0.214	0.214	0.900
	Sub Total	KM	0.411	15	16	26	26	26	116		24.287	25.097	41.153	41.153	41.153	172.844
C	**New LT Line**															
9	a. 3-Phase Wasp Line	KM	0.04	2	2	3	3	3	11	1576199	2.497	2.580	4.231	4.231	4.231	17.768
	b. 3-Phase ANT Line	KM	1.09	43	45	73	73	73	307	1473719	63.612	65.732	107.786	107.786	107.786	452.703
	Sub Total	KM	1.130	45	46	76	76	76	318		66.108	68.312	112.017	112.017	112.017	470.471
10	**LT Line Re-Conductoring**															
	a. 3-Phase Wasp	KM	0.16	6	7	11	11	11	45	684571.98	4.337	4.482	7.350	7.350	7.350	30.868
	b. 3-Phase Ant	KM	0.01	0	0	1	1	1	3	582091.98	0.231	0.238	0.391	0.391	0.391	1.640
	Sub Total	KM	0.170	7	7	11	11	11	48		4.568	4.720	7.740	7.740	7.740	32.509
D	**Other Equipment and Material**															
11	**Energy Meters**															
	a. Single Phase	No.		14676	15410	16180	16989	17839	81094	3251	47.712	50.097	52.602	55.232	57.994	263.637
	b. Three Phase	No.		2348	2466	2589	2718	2854	12975	33900	79.603	83.583	87.762	92.150	96.757	439.855
	Sub Total	No.		17024	17875	18769	19708	20693	94069		127.314	133.680	140.364	147.382	154.751	703.492
E	**Total (Item 7 to 11) Cost of LT Feeders**										**276.280**	**287.002**	**388.547**	**395.565**	**402.934**	**1750.327**

HAZECO Power Distribution Expansion (DOP) 2023-24 to 2027-28

No.	Description	Unit	Quantities						Unit Rate	Total Cost in Million Rs.					
			2023-24	2024-25	2025-26	2026-27	2027-28	Total	Rs.	2023-24	2024-25	2025-26	2026-27	2027-28	Total
F	Total (Item 1 to 11) Cost of HT & LT Proposals									373	383	485	492	499	2232
G	12% Store Charges									45	46	58	59	60	268
H	8% Installation Charges									30	31	39	39	40	179
I	Total Material Cost (F+G+H)									447	460	582	590	599	2678
J	Contigency (3%)									13	14	17	18	18	80
K	Total Material Cost(I+J)									461	474	599	608	617	2759
L	Escalated Cost @ 29%									108	111	141	143	145	647
M	Total Material Cost(K+L)									569	585	740	751	762	3406

g) **Financial Phasing for Planning and Development of System**

HAZECO Five Years Investment Plan (In Millions)						
DESCRIPTION	2023-24	2024-25	2025-26	2026-27	2027-28	Total
ELR	1099	1273	1127	988	1146	5634
DOP	569	585	740	751	764	3409
STG	150	1510	1280	3640	1600	8180
World bank (STG)		300	250	600		1150
Total Cost	**1818**	**3668**	**3397**	**5979**	**3511**	**18372**

ANNEX "N 10"

Doc No: N10 -221-

DESIGN OF SYSTEM AND FACILITIES AND DETAILS OF TECHNOLOGY.

The design of power distribution systems and facilities in HAZECO is meticulously structured based on the System Development Index (SDI). Several crucial aspects are taken into account during the decision-making process, encompassing the design and material requirements for both urban and rural areas. For the reconductoring of urban and rural lines, considerations are made with regard to the size of conductors.

The transmission system includes 132 KV and 66 KV grid stations, enhancing the overall network's capacity and efficiency. The integration of these higher voltage grid stations ensures a robust and reliable power supply across different regions.

To ensure reliable and stable Power supply as well as reduction in technical loss, the design and drawings of Grid Stations and Transmission Lines profiles are prepared as per NTDC design drawings specifications and NEPRA Grid code. The standard Power T/Fs 40 MVA, 20/26 MVA & 10/13 MVA are usually used. The ZM-1, ZM-30, ZM-60, SPA, SPG and SPD Tower/Poles as well as the Lynx and Rail conductors are normally used for Transmission Lines.

To ensure optimal functionality, various commonly used assemblies are selected, and specific estimations are made for each assembly. The distribution voltage is standardized at 11 KV on High Tension (HT) and 0.4 KV on Low Tension (LT) systems. In pursuit of economic efficiency and safety, a combination of Pre-Stressed Concrete (PC) Poles and Steel structures is strategically installed for extending HT/LT lines in electrified areas, maintaining a ratio of 10:90, respectively.

For efficient current transmission from the Grid Station to the point of Distribution System (DS) and utilization, Aluminum Conductor Steel Reinforced (ACSR) and All Aluminum Conductor (AAC) are employed. Distribution Transformers of varying capacities, including 25 KVA, 50 KVA, 100 KVA, and 200 KVA, are strategically installed to meet the diverse energy demands.

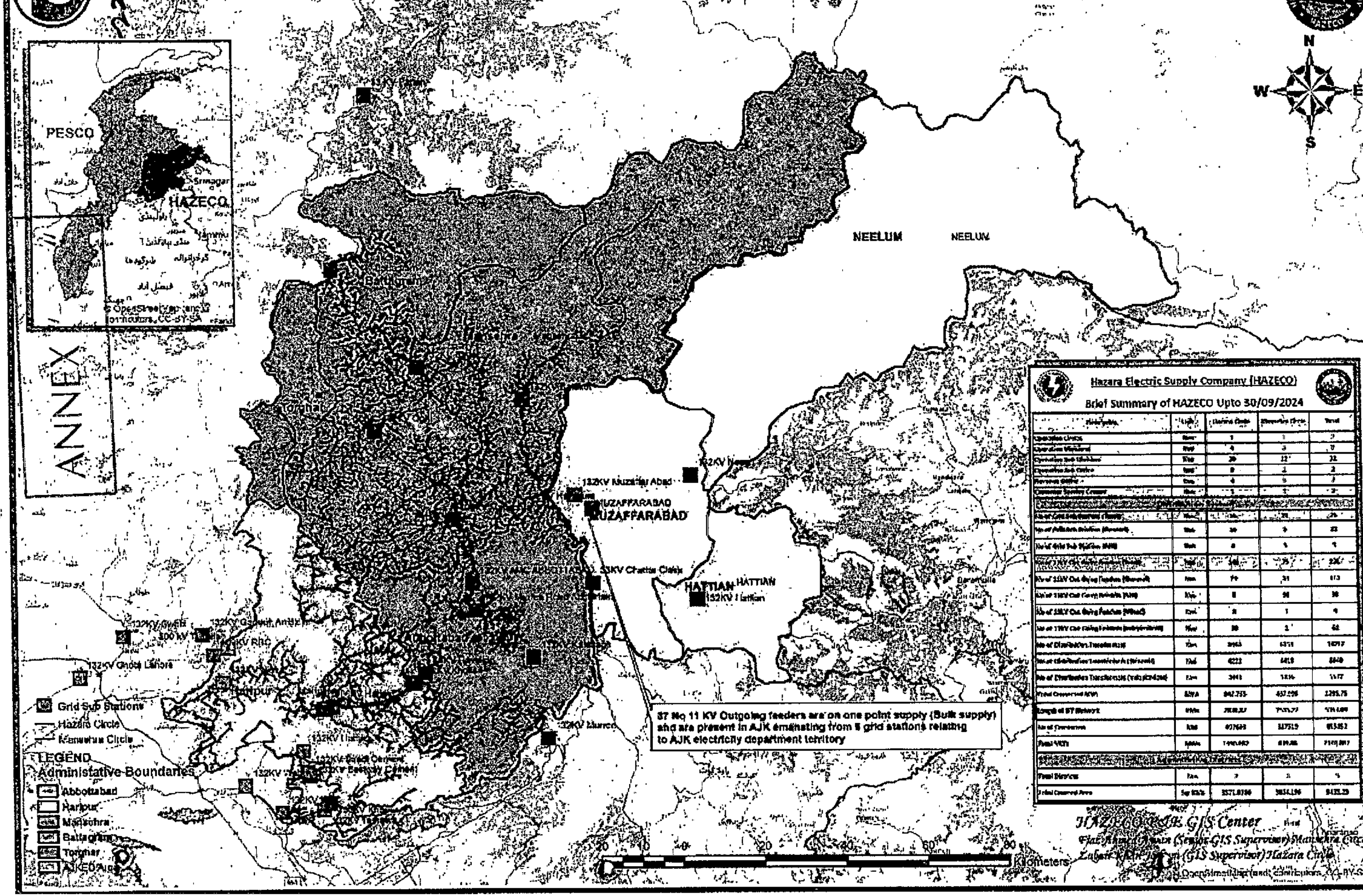
The span length of structures and PC Poles is meticulously calculated in accordance with SDI, ensuring adequate clearance, safety measures, and avoiding obstructions in normal day-to-day life. This comprehensive approach to design ensures a reliable and efficient power distribution system for the diverse needs of kpk.

DETAILS OF TECHNOLOGY.

The deployment of Advanced Metering Infrastructure (AMI) meters stands as a testament to the division's commitment to modernization. The implementation of these Automated Meter Reading (AMR) meters allows for real-time data collection, enabling more accurate monitoring of energy consumption. This not only streamlines the billing process but also empowers consumers with better insights into their energy usage patterns. Additionally, the High Tension (HT) and Low Tension (LT) networks have been meticulously mapped using Geographic Information System (GIS) technology. GIS mapping offers a comprehensive visualization of the entire network infrastructure, aiding in efficient planning, maintenance, and troubleshooting. For designing transmission line PSSE (Power system Simulation for Engineer) system is being used.

Looking towards the future, the Hazara Division is poised for further advancements through upcoming projects. The installation of Advanced Power Management Systems (APMS) is set to revolutionize energy distribution and consumption monitoring. APMS will enable real-time monitoring of power system parameters, enhancing the division's ability to respond promptly to any deviations or faults. Moreover, the introduction of state-of-the-art ABC (Aerial Bundled Conductor) cables and the implementation of an Enterprise Resource Planning (ERP) system will play pivotal roles in boosting overall operational efficiency. ABC cables minimize energy losses and enhance the reliability of the distribution network, while the ERP system integrates various business processes, ensuring seamless communication and data flow across the organization. Together, these initiatives mark a strategic move towards a technologically advanced and efficient energy distribution system in the Hazara Division.

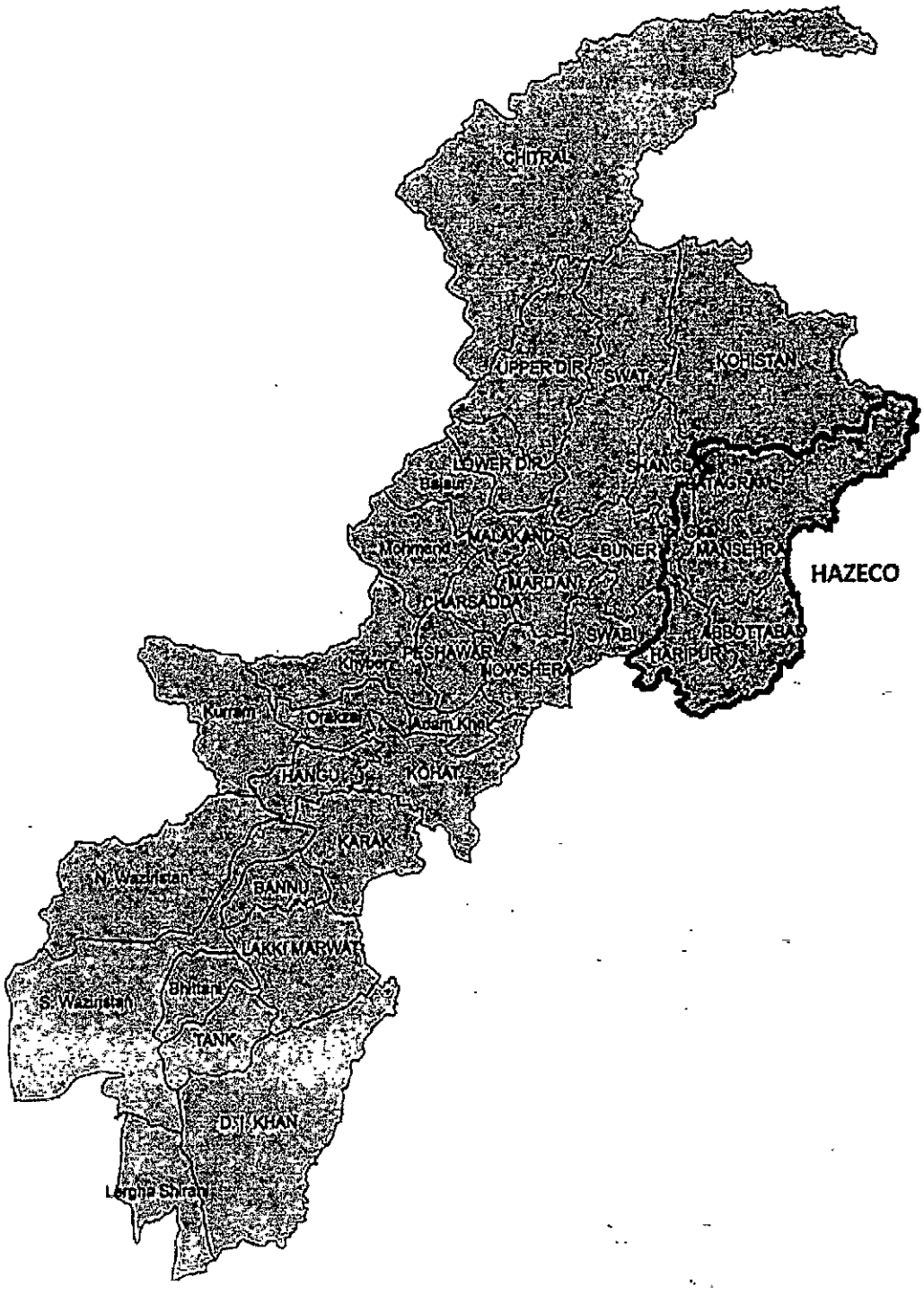
HAZARA ELECTRIC SUPPLY COMPANY (HAZECO)



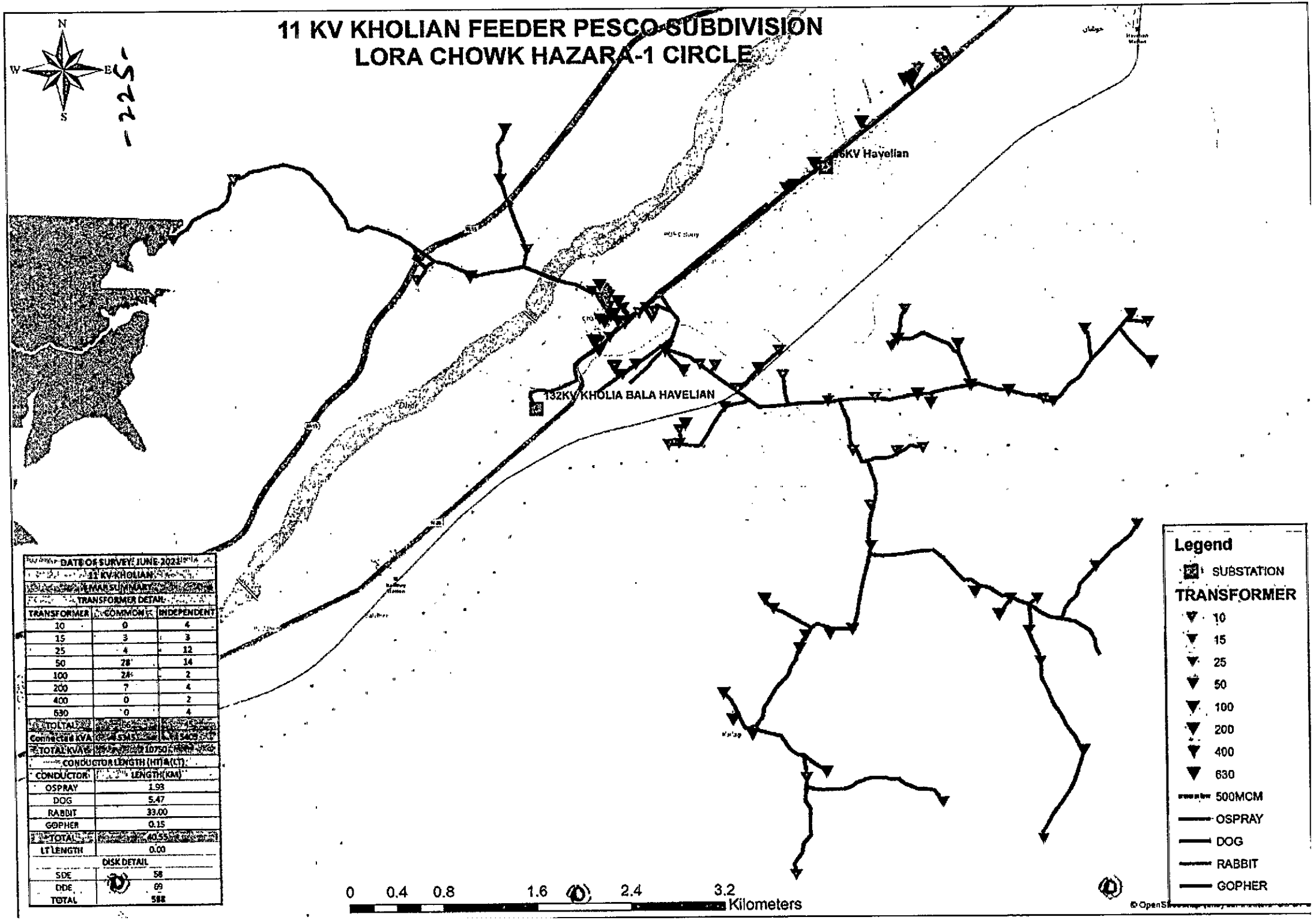
Hazara Electric Supply Company (HAZECO)

Brief Summary of HAZECO Upto 30/09/2024

Description	Unit	Hazara Circle	Mansehra Circle	Total
Operation Circles	Nos	1	1	2
Operation Divisions	Nos	4	3	7
Operation Sub Divisions	Nos	20	12	32
[illegible]	[illegible]	0	2	2
[illegible]	[illegible]	4	3	7
Customer Service Center	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]				
No of Grid Sub Stations	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
No of Distribution Transformers	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total Connected (KVA)	KVA	[illegible]	[illegible]	[illegible]
Length of HT Network	[illegible]	[illegible]	[illegible]	[illegible]
No of Consumers	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]				
Total Districts	Nos	[illegible]	[illegible]	[illegible]
Total Covered Area	Sq KMs	[illegible]	[illegible]	[illegible]

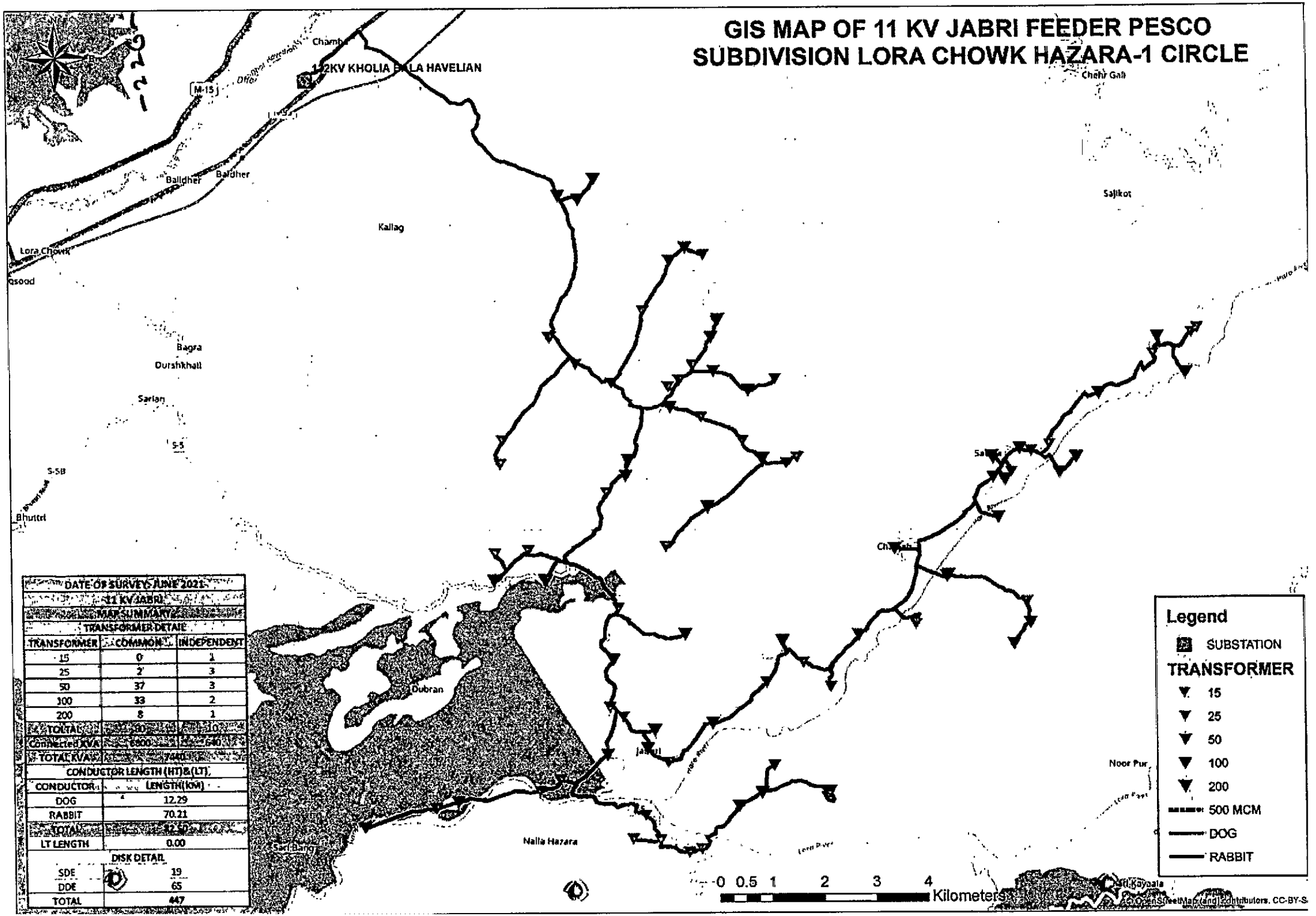

CHITRAL
UPPER DIR
SWAT
KOHISTAN
LOWER DIR
Batgram
SHANGLA
TORGHAR
MALAKAND
Mohmand
BUNER
MANSEHRA
HAZECO
MARDAN
CHARSADDA
SWABI
ABBOTTABAD
PESHAWAR
Khyber
HARIPUR
NOWSHERA
Kurram
Orakzai
Adam Khel
HANGU
KOHAT
KARAK
N. Waziristan
BANNU
LAKKI MARWAT
S. Waziristan
Bhittani
TANK
D.I. KHAN
Lenghe Shirani

11 KV KHOLIAN FEEDER PESCO SUBDIVISION
LORA CHOWK HAZARA-1 CIRCLE



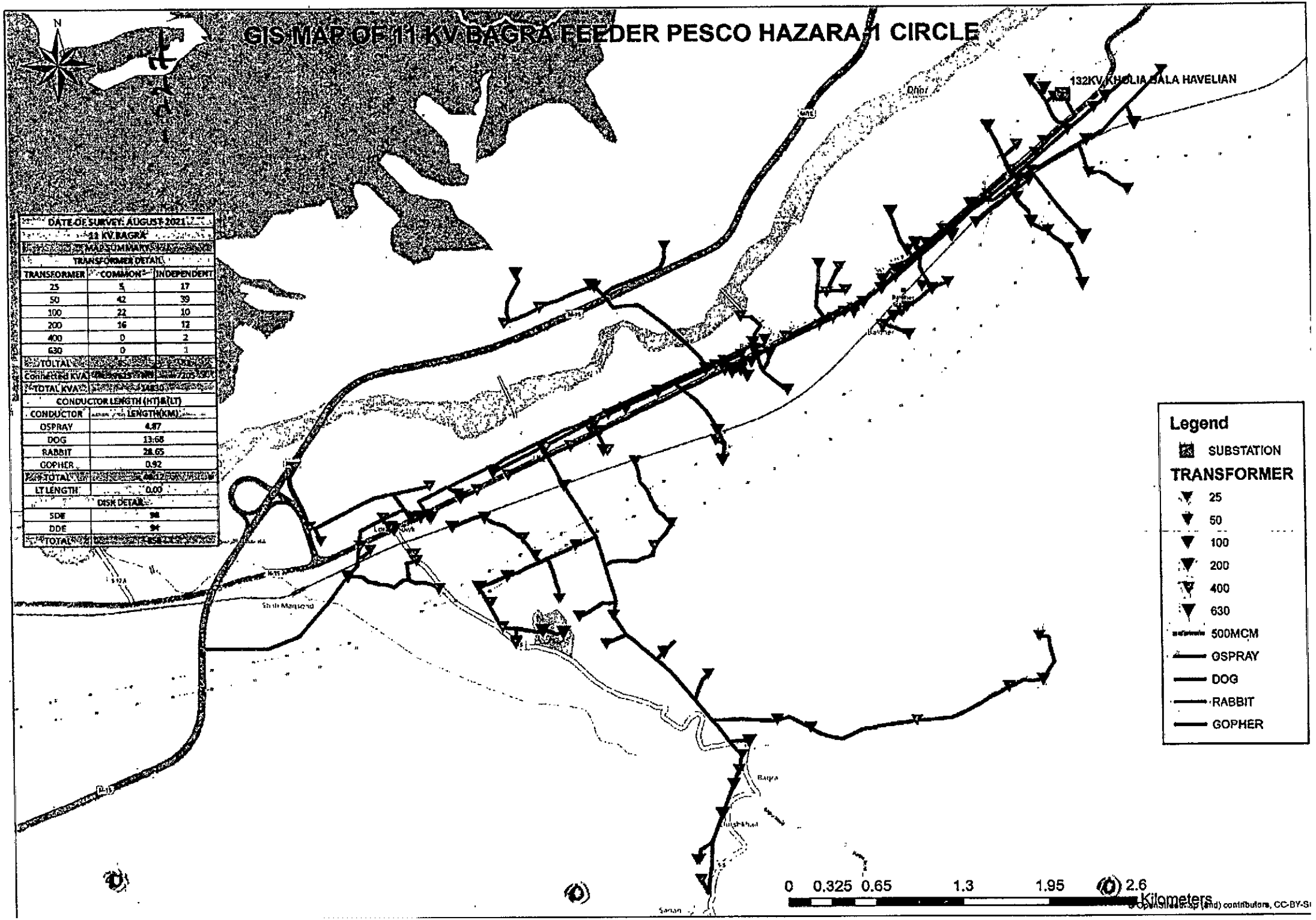
DATE OF SURVEY: JUNE 2023		
11 KV KHOLIAN		
SUMMARY		
TRANSFORMER DETAIL		
TRANSFORMER	COMMON	INDEPENDENT
10	0	4
15	3	3
25	4	12
50	28	14
100	24	2
200	7	4
400	0	2
630	0	4
TOTAL	66	45
Connected KVA	6535	5405
TOTAL KVA	10750	
CONDUCTOR LENGTH (HT)&(LT)		
CONDUCTOR	LENGTH(KM)	
OSPRAY	1.93	
DOG	5.47	
RABBIT	33.00	
GOPHER	0.15	
TOTAL	40.55	
LT LENGTH	0.00	
DISK DETAIL		
SDE	58	
DDE	69	
TOTAL	588	

GIS MAP OF 11 KV JABRI FEEDER PESCO SUBDIVISION LORA CHOWK HAZARA-1 CIRCLE

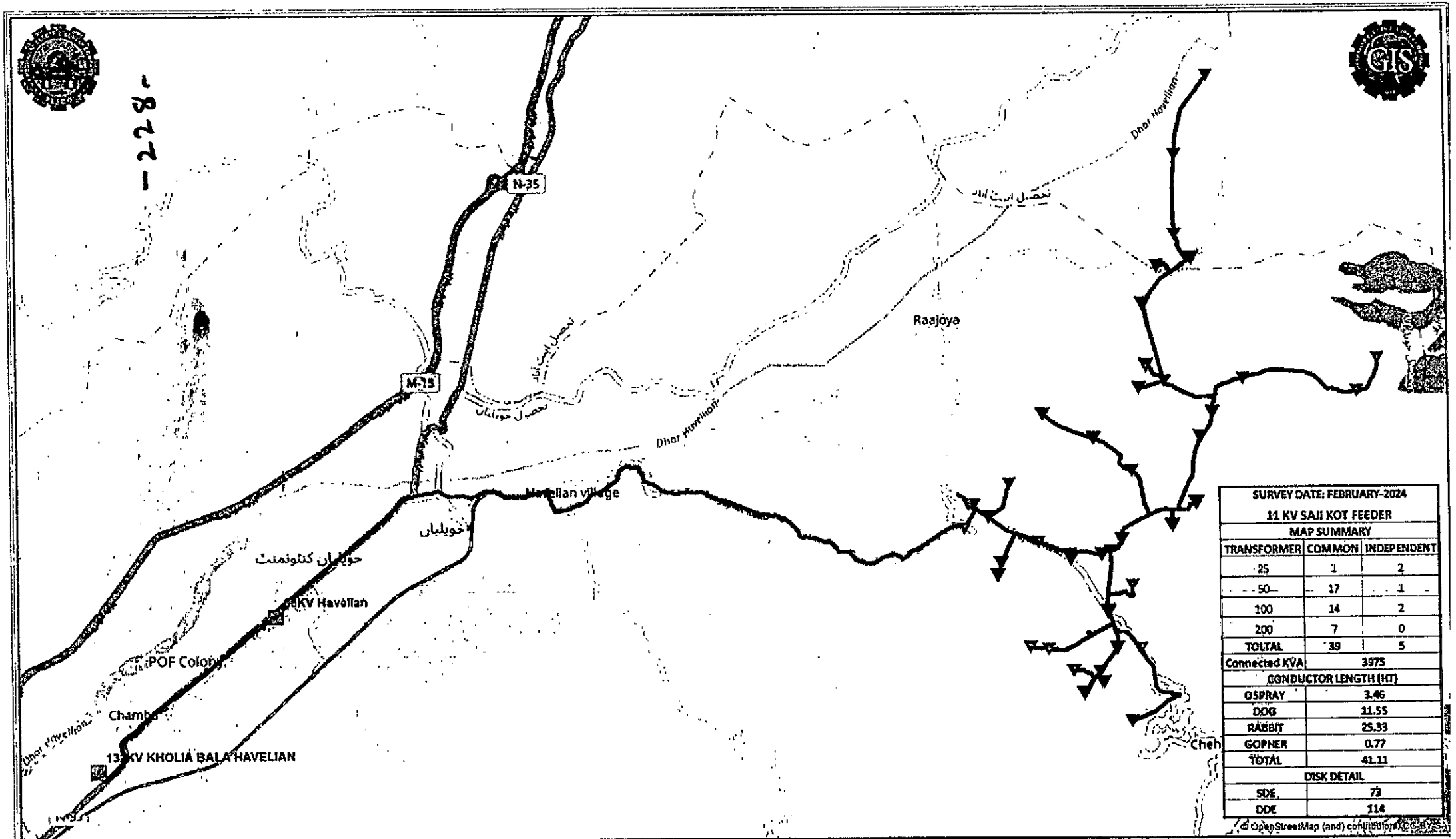


DATE OF SURVEY JUNE 2021		
11 KV JABRI		
MAP SUMMARY		
TRANSFORMER DETAIL		
TRANSFORMER	COMMON	INDEPENDENT
15	0	1
25	2	3
50	37	3
100	33	2
200	8	1
TOTAL	80	10
Connected KVA	6800	640
TOTAL KVA	7440	
CONDUCTOR LENGTH (HT)&(LT)		
CONDUCTOR	LENGTH(KM)	
DOG	12.29	
RABBIT	70.21	
TOTAL	82.50	
LT LENGTH	0.00	
DISK DETAIL		
SDE	19	
DDE	65	
TOTAL	447	

GIS MAP OF 11 KV BAGRA FEEDER PESCO HAZARA-1 CIRCLE



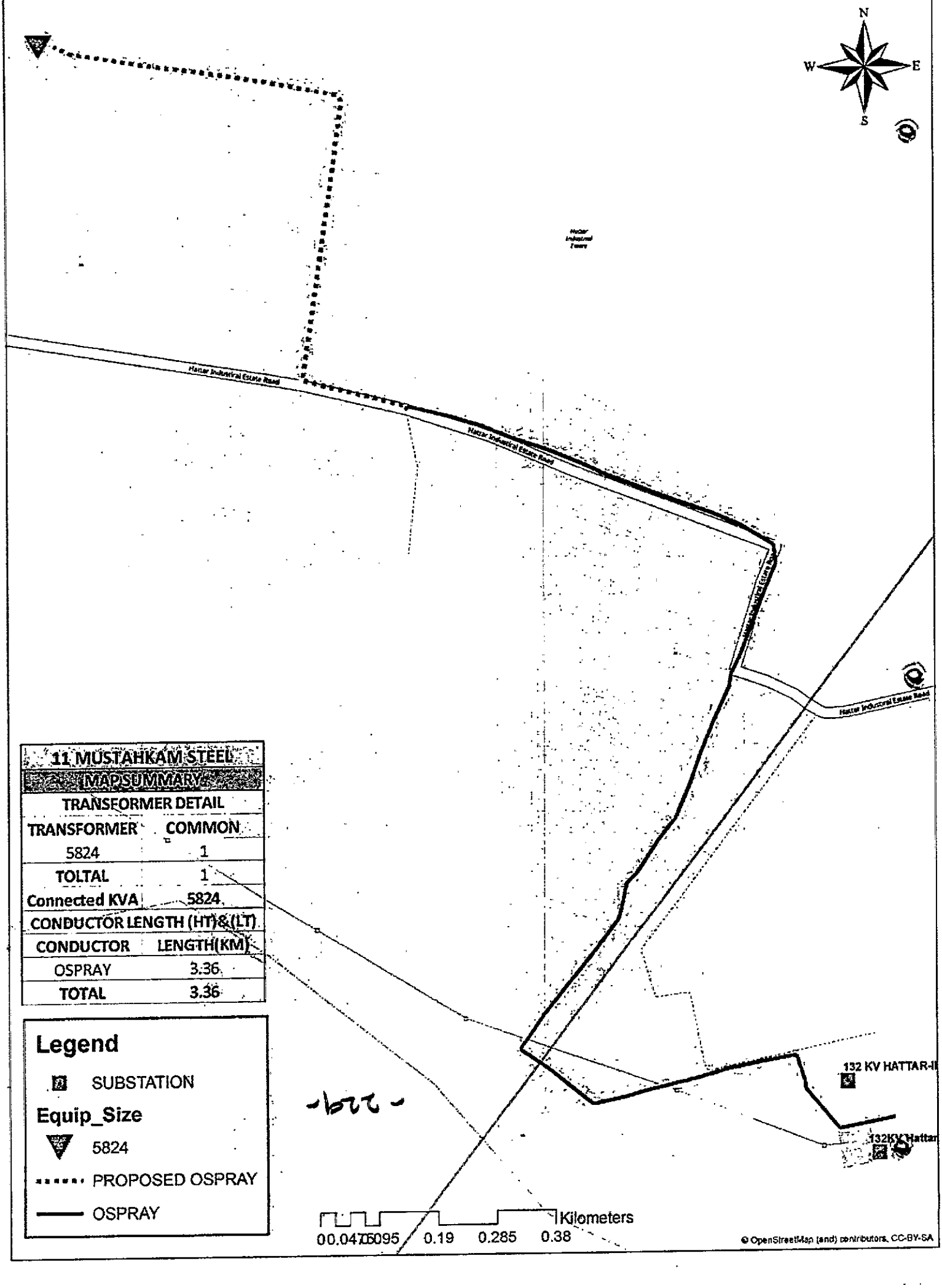
DATE OF SURVEY: AUGUST 2021		
11 KV BAGRA		
MAP SUMMARY		
TRANSFORMER DETAIL		
TRANSFORMER	COMMON	INDEPENDENT
25	5	17
50	42	39
100	22	10
200	16	12
400	0	2
630	0	1
TOLTAL	85	81
Connected KVA	7205	7205
TOTAL KVA	14830	
CONDUCTOR LENGTH (HT)&(LT)		
CONDUCTOR	LENGTH(KM)	
OSPRAY	4.87	
DOG	13.68	
RABBIT	28.65	
GOPHER	0.92	
TOTAL	48.12	
LT LENGTH	0.00	
DISK DETAIL		
SDE	98	
DDE	94	
TOTAL	192	



11 KV SAJI KOT FEEDER (117207)

PESCO SUBDIVISION LORA CHOWK, CITY ABBOTTABAD DIVISION HAZARA-I CIRCLE

11 KV MUSTAHKAM STEEL FEEDER PESCO SUBDIVISION HATTAR PESCO HAZARA-1 CIRCLE

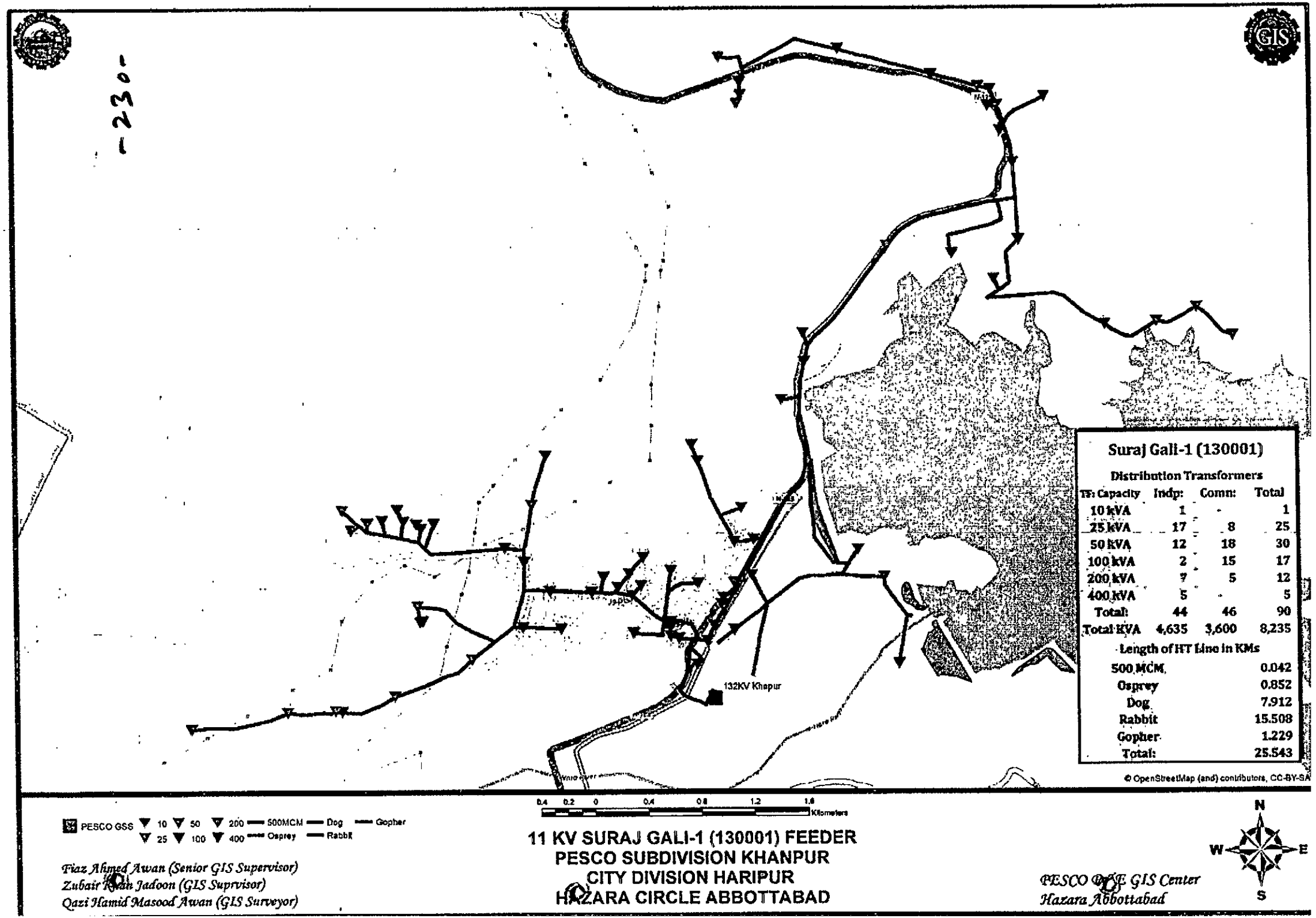


11 MUSTAHKAM STEEL	
MAP SUMMARY	
TRANSFORMER DETAIL	
TRANSFORMER	COMMON
5824	1
TOLTAL	1
Connected KVA	5824
CONDUCTOR LENGTH (HT)& (LT)	
CONDUCTOR	LENGTH(KM)
OSPRAY	3.36
TOTAL	3.36

Legend

- SUBSTATION
- Equip_Size
- 5824
- PROPOSED OSPRAY
- OSPRAY

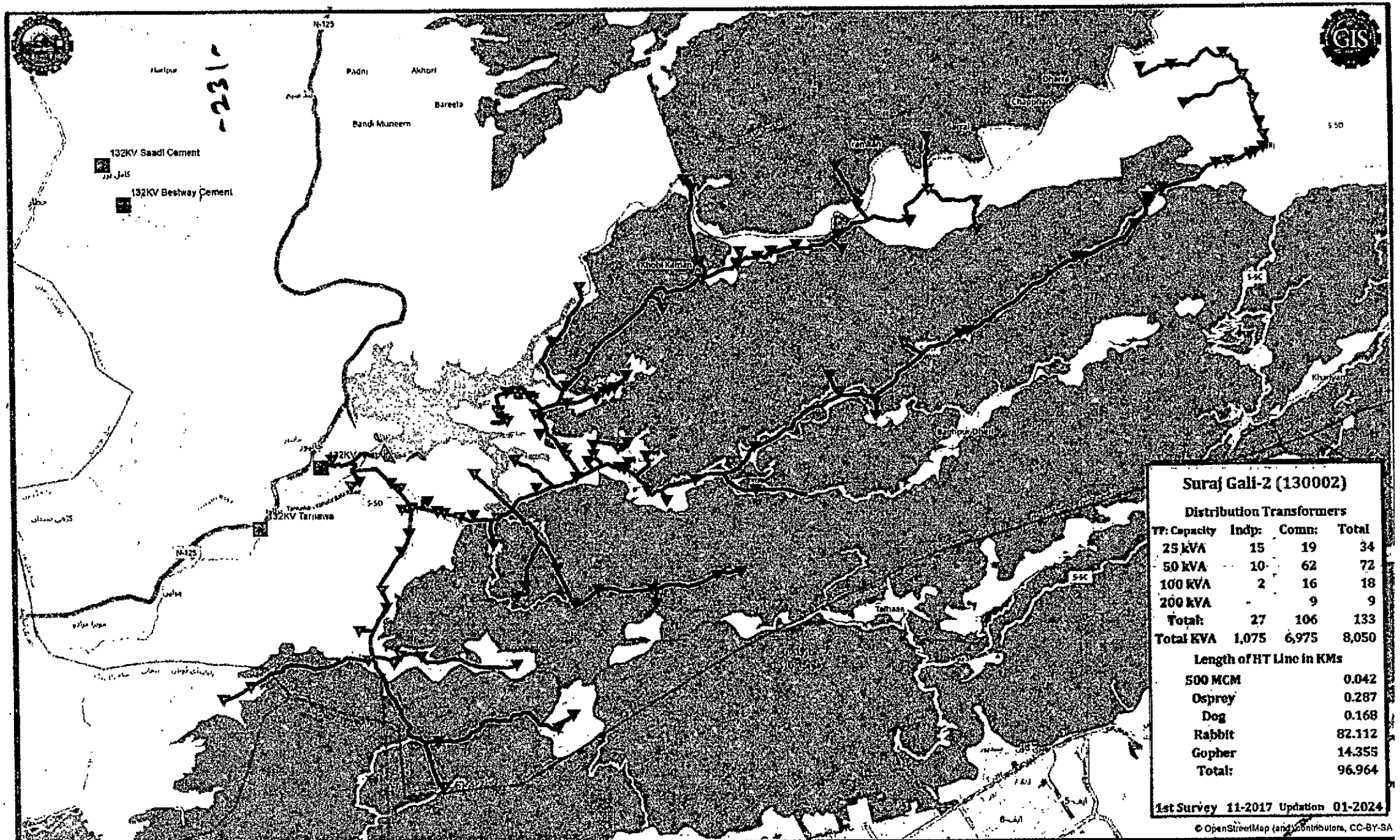
-226-



11 KV SURAJ GALI-1 (130001) FEEDER
PESCO SUBDIVISION KHANPUR
CITY DIVISION HARIPUR
HAZARA CIRCLE ABBOTTABAD

Fiaz Ahmed Awan (Senior GIS Supervisor)
Zubair Khan Jadoon (GIS Suprvisor)
Qazi Hamid Masood Awan (GIS Surveyor)

PESCO HQ GIS Center
Hazara Abbottabad

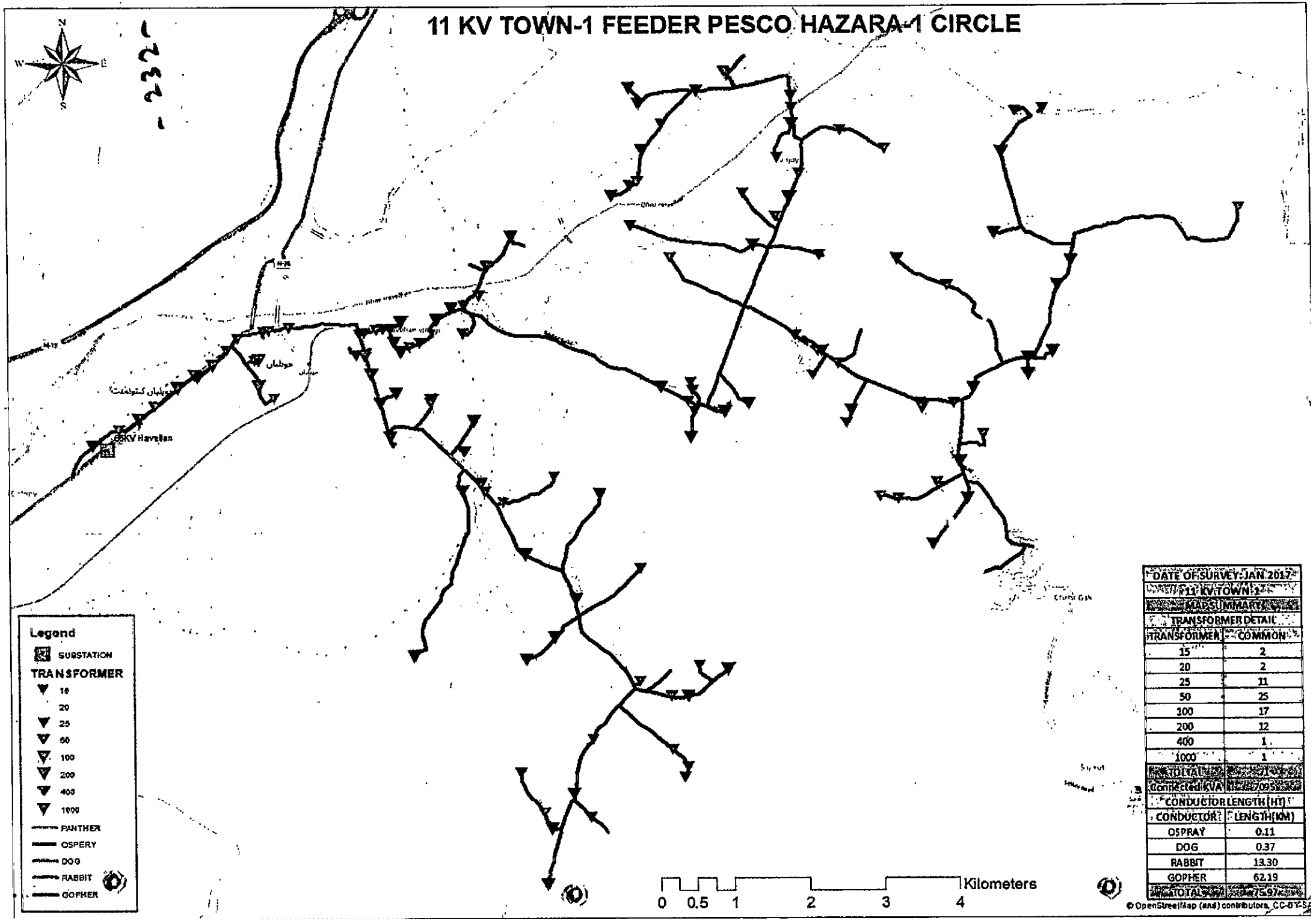


11 KV SURAJ GALI-2 (130002) FEEDER
PESCO SUBDIVISION KHANPUR
CITY DIVISION HARIPUR
HAZARA CIRCLE ABBOTTABAD

Fiaz Ahmed Awan (Senior GIS Supervisor)
Zubair Khan Jadoon (GIS Suprvisor)
Qazi Hamid Masood Awan (GIS Surveyor)

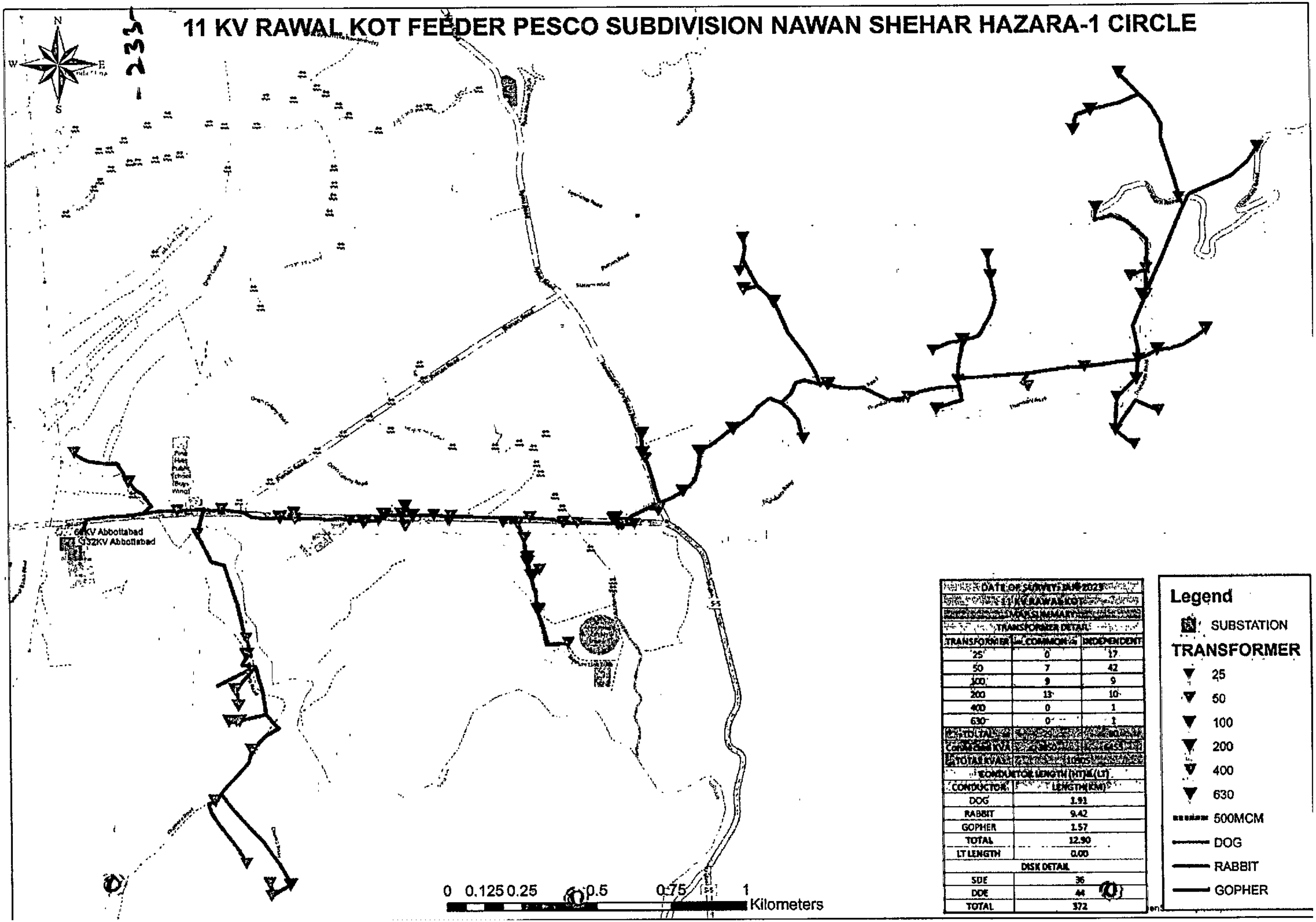
PESCO P&E GIS Center
Hazara Abbottabad

11 KV TOWN-1 FEEDER PESCO HAZARA-1 CIRCLE



DATE OF SURVEY: JAN.2017	
11 KV TOWN-1	
MAP SUMMARY	
TRANSFORMER DETAIL	
TRANSFORMER	COMMON
15	2
20	2
25	11
50	25
100	17
200	12
400	1
1000	1
TOTAL	71
Connected KVA	7095
CONDUCTOR LENGTH (HT)	
CONDUCTOR	LENGTH (KM)
OSPRAY	0.11
DOG	0.37
RABBIT	13.30
GOPHER	62.19
TOTAL	75.97

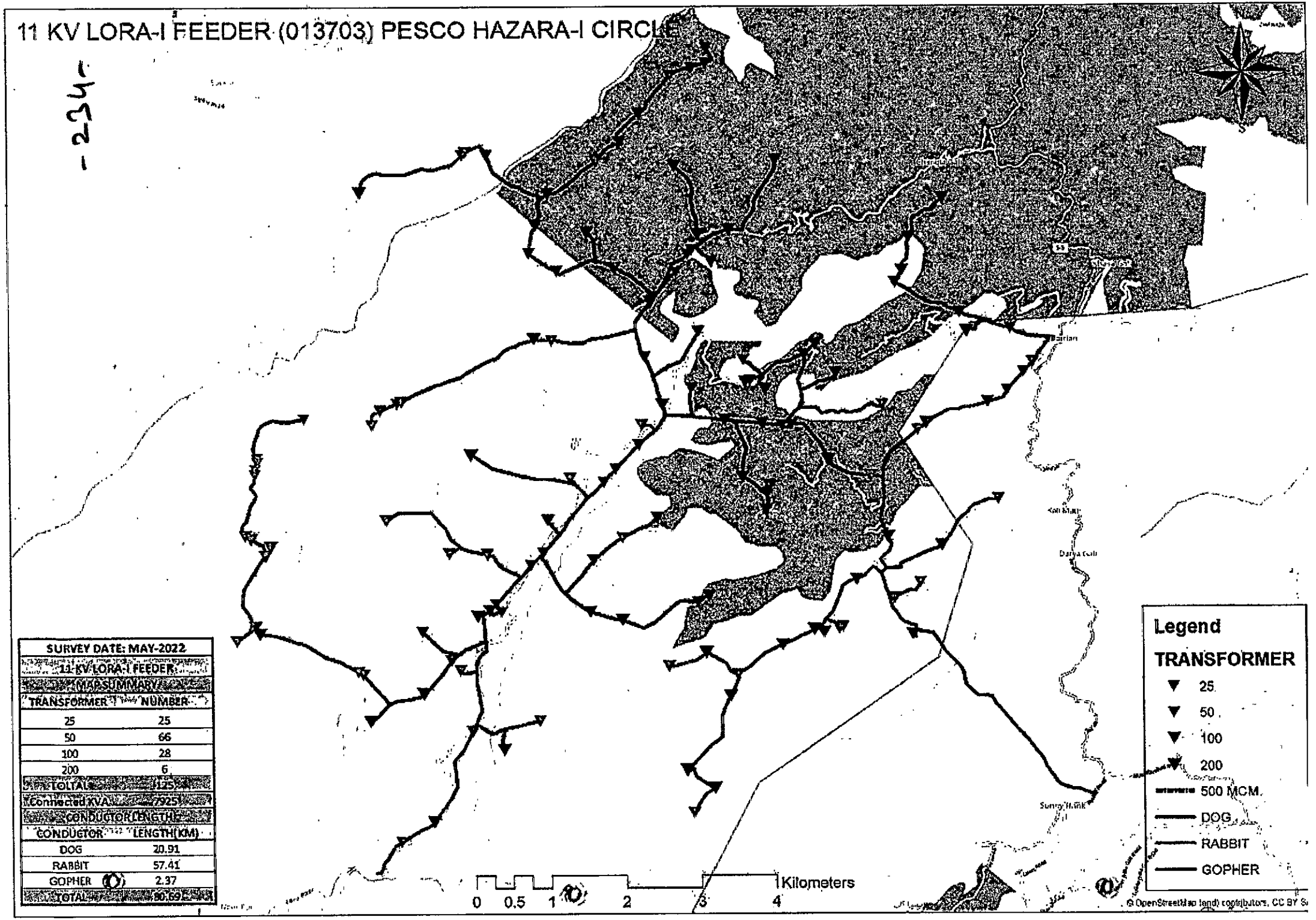
11 KV RAWAL KOT FEEDER PESCO SUBDIVISION NAWAN SHEHAR HAZARA-1 CIRCLE



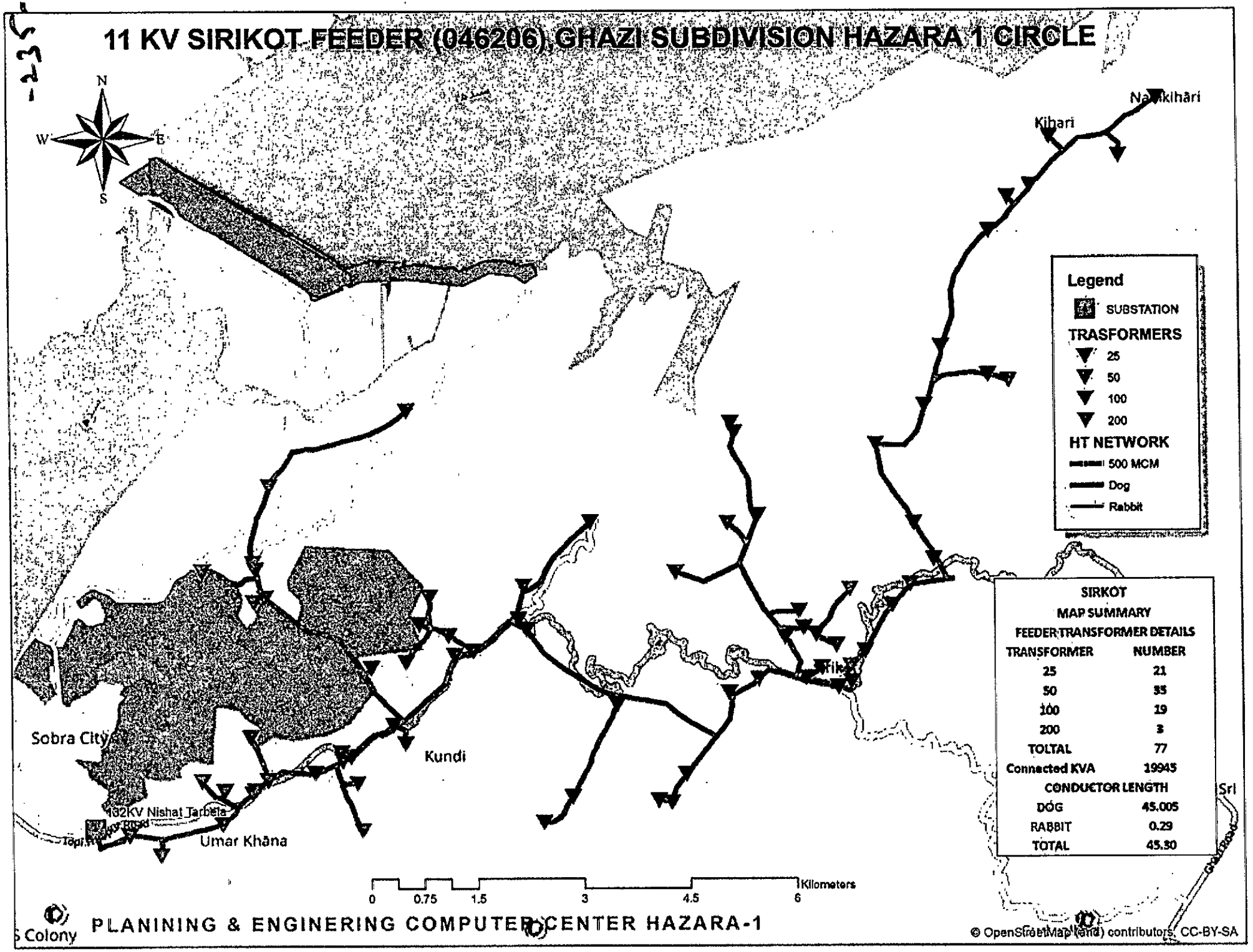
DATE OF SURVEY: JAN 2023		
11 KV RAWALKOT		
MAP SUMMARY		
TRANSFORMER DETAIL		
TRANSFORMER	COMMON	INDEPENDENT
25	0	17
50	7	42
100	9	9
200	13	10
400	0	1
630	0	1
TOTAL	[illegible]	80
Connected KVA	3850	6455
TOTAL KVA	10305	
CONDUCTOR LENGTH (HT)&(LT)		
CONDUCTOR	LENGTH(KM)	
DOG	1.91	
RABBIT	9.42	
GOPHER	1.57	
TOTAL	12.90	
LT LENGTH	0.00	
DISK DETAIL		
SDE	36	
DDE	44	
TOTAL	372	

11 KV LORA-I FEEDER (013703) PESCO HAZARA-I CIRCLE

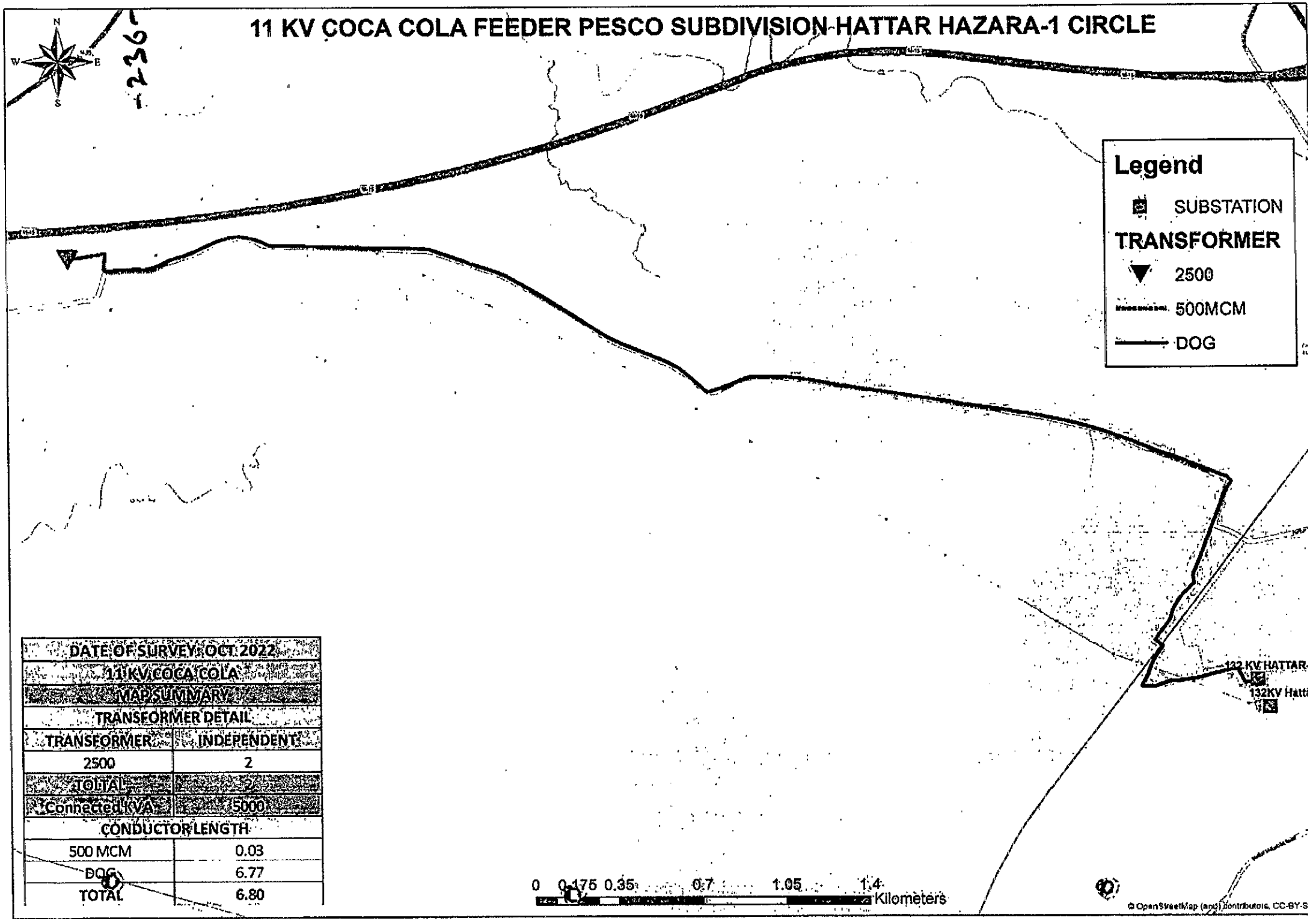
-234-



SURVEY DATE: MAY-2022	
11 KV LORA-I FEEDER	
MAP SUMMARY	
TRANSFORMER	NUMBER
25	25
50	66
100	28
200	6
TOTAL	125
Connected KVA	7925
CONDUCTOR LENGTH	
CONDUCTOR	LENGTH(KM)
DOG	20.91
RABBIT	57.41
GOPHER	2.37
TOTAL	80.69


11 KV SIRIKOT FEEDER (046206) GHAZI SUBDIVISION HAZARA 1 CIRCLE
N
W
E
S
Nawkihari
Kihari
Legend
SUBSTATION
TRASFORMERS
25
50
100
200
HT NETWORK
500 MCM
Dog
Rabbit
SIRKOT
MAP SUMMARY
FEEDER TRANSFORMER DETAILS
TRANSFORMER NUMBER
25 21
50 35
100 19
200 3
TOLTAL 77
Connected KVA 19945
CONDUCTOR LENGTH
DOG 45.005
RABBIT 0.29
TOTAL 45.30
Sobra City
Kundi
132KV Nishat Tarbela
Umar Khana
Srl
0 0.75 1.5 3 4.5 6 Kilometers
PLANINING & ENGINERING COMPUTER CENTER HAZARA-1
© OpenStreetMap (and) contributors, CC-BY-SA

11 KV COCA COLA FEEDER PESCO SUBDIVISION HATTAR HAZARA-1 CIRCLE



DATE OF SURVEY: OCT 2022	
11 KV COCA COLA	
MAP SUMMARY	
TRANSFORMER DETAIL	
TRANSFORMER	INDEPENDENT
2500	2
TOTAL	2
Connected KVA	5000
CONDUCTOR LENGTH	
500 MCM	0.03
DOG	6.77
TOTAL	6.80

Doc No: N12

HAZECO Financial Plan (In Millions)						
DESCRIPTION	2023-24	2024-25	2025-26	2026-27	2027-28	Total
ELR	1099	1273	1127	988	1146	5634
DOP	569	585	740	751	764	3409
STG	150	1510	1280	3640	1600	8180
World bank (STG)		300	250	600		1150
Total Cost	**1818**	**3668**	**3397**	**5979**	**3511**	**18372**

ANNEX "N/2"

-237-

ANNEX "N 14" Doc No: N14

-238-

Government of Pakistan

Environmental and Social Soundness Assessment (ESSA) Study

AND

Environmental and Social Management Framework (ESMF)

Electricity Distribution Efficiency Improvement Project (EDEIP)

Ministry of Energy (Power Division) and PESCO

Government of Pakistan

Environmental and Social Soundness Assessment (ESSA) Study

AND

Environmental and Social Management Framework (ESMF)

Electricity Distribution Efficiency Improvement Project (EDEIP)

Ministry of Energy (Power Division) and PESCO

Executive Summary

The Government of Pakistan (GoP) through the Ministry of Energy (MoE) – Power Division (PD), Peshawar Electric Supply Company (PESCO), is planning to implement the **Electricity Distribution Efficiency Improvement Project** (EDEIP) (proposed project). The GoP is seeking financial assistance from the World Bank (WB). Under the project, MoE - PD, PESCO, (hereinafter described as implementing agencies or IAs) intend to undertake priority development works to strengthen their respective electricity distribution networks to ensure reliable supply of electricity to their consumers.

To address the generic environmental and social impacts of the proposed project, the present Environmental and Social Soundness Assessment (ESSA) and Environmental and Social Management Framework (ESMF) has been prepared, in compliance with the national/provincial regulatory and WB policy requirements. Similarly, a Resettlement Framework (RF) has also been prepared to guide the resettlement planning of the proposed project.

Project Background

Pakistan's electricity sector is in crisis due to high cost of generation, dependent on imported fuels that makes the sector vulnerable to changes in fuel prices and currency exchange rates. Higher cost of electricity supply has exacerbated cost recovery challenges for the distribution companies. This has hampered investments particularly by loss making electricity distribution companies (DISCOs) to strengthen their networks and is resulting in increased outages and interruptions, costing businesses and affecting household welfare. These inefficiencies in the sector are estimated to be costing Pakistan about 6.5 percent of its gross domestic product (GDP), according to a World Bank report published in 2018. Also, in terms of reliability of electricity supply Pakistan is among the lowest performing countries in the world. It is ranked at 167 out of 190 economies on getting electricity indicator in Ease of Doing Business 2019. Moreover, a significant number of households do not have access to electricity and per capita electricity consumption at 471 kWh is less than one-fifth of the world average according to the World Development Indicators 2017. While government is adding low-cost generation and plans to shift the generation mix towards renewable sources targeting 20 percent by 2025 and 30 percent by 2030, yet long-term financial viability of the power sector is dependent on DISCOs' efficiency improvement.

Losses accruing in DISCOs have a cascading effect throughout the energy value chain. In FY19 about PKR 116 billion remained uncollected and total receivables reached PKR 1,050 billion (translates into a turnover rate of 350 days) of which PKR 800 billion were private receivables. Consequently, DISCOs total payables were PKR 971 billion. Moreover, DISCOs also incurred a financial loss of PKR 37 billion in FY19 on account technical and non-technical/pilferage losses exceeding the National Electric Power Regulatory Authority (NEPRA) targets. Non-existent incentive structures and lack of transparency in data collection and reporting are major barriers to improving governance and performance of the DISCOs. Therefore, to make power sector financially viable the DISCOs would need to become more efficient by investing in new technologies which would help improve their performance and profitability.

The proposed project will support the targeted DISCOs (PESCO) by providing financial and technical support for investments to modernize their electricity

distribution networks and institutional development resulting in improved operational efficiency in the sector and reliable supply to the consumers. It will help in the (i) physical strengthening of distribution networks; (ii) deployment of modern equipment, technology and information systems; and (iii) provide technical assistance, studies, consultancies and management support. The proposed project will also support in undertaking power sector reforms.

Project Overview

The project development objectives are to improve electricity supply and operational efficiency in targeted areas of selected distribution companies and strengthen the capacity of power sector institutions to implement reforms. The project components are briefly described below.

Component 1: Improving Grid Reliability

This component will finance investments in Secondary Transmission and Grid (STG) and Energy Loss Reduction (ELR) programs of the DISCOs to improve reliability of electricity supply and reduce technical losses. The subprojects financed under this Component can be divided into following categories:

- construction of new 132 kV substations and the associated transmission lines;
- augmentation, extension, conversion, upgradation and rehabilitation of the existing substations and the associated transmission lines;
- construction, rehabilitation and re-conductoring of 132kV (and below) transmission lines with low loss conductors e.g. high-tension low sag (HTLS); and
- expansion and rehabilitation of 33kV and 11kV feeders.

Component 2: Modernizing Operations and Management

This component will support modernization of the DISCOs' operations and management functions using latest equipment, technology and information systems. Major activities include:

- Automation and Information Systems. This entails upgradation deployment of information systems and ERP solutions. This will help improve planning, grid operations and customer services by providing access to and integrating modern information systems e.g. Incident Management System (IMS), feeder automation, transformer monitoring and protection systems, Geographic Information System (GIS), Customer Management System (CMS) and Enterprise Resource Planning (ERP). This will lead to deployment of supervisory control and data acquisition (SCADA[1]) and Distribution Management Systems (DMS) during project implementation (subject to finalization of feasibility and required approvals) to integrate these information systems and to start the implementation of smart grids.
- Revenue Protection Program. It will comprise installation of Aerial Bundled Cables (ABC), Advanced Metering Infrastructure (AMI), Transformer monitoring System, and other measures to pre-empt theft, reduce losses, improve recoveries, and better service delivery based on access to reliable and timely data.

[1] SCADA is a backbone of Smart Grids and a standard for modern utilities and is required by the Regulator and the Grid Code.

Component 3: Building Capacity & Technical Assistance

This component will help build capacity of the DISCOs with particular focus on:

- Improving operations and maintenance. This will cover procurement of tools, equipment, hardware, software, consulting and non-consulting services for improved operations and maintenance practices e.g., for live-line maintenance, upgrade repair workshops, inventory/asset management;
- Training and capacity building. Conduct studies and assessments including preparation/updation of manuals, procedures and systems in particular for HR management, inventory management, procurement, financial management, customer services and safeguards and assist with their implementation and conduct training programs including workshops, seminars and post graduate degrees in relevant fields;
- Project implementation support. This includes financing of: (a) consulting and other services; (b) individual experts/advisors and any incremental staff positions; (c) equipment and software; (d) financial, operational & technical audits; and (e) operating cost of Project Management Units (PMUs). Key activity will be hiring of Project Implementation & Management Support Consultants (PIMS) covering implementation of all project related activities including: procurement, contract administration, quality control, financial management, preparation/updation of feasibilities, designs and bidding documents as well as support in implementation of safeguard instruments.

Component 4: Reform Support

The purpose of the Component 4 is to support MoE- PD, fulfill its policy mandate under the National Electricity Policy 2021, and implement power sector reforms. This component consists of two main subcomponents: a) supporting governance and institutional reforms; and b) supporting transition to wholesale electricity market through commencement of the Competitive Trading Bilateral Contract Market (CTBCM).

Institutional and Policy Framework for Environmental and Social Management

The key regulatory institutions for the management of environmental and social aspects of the proposed project are the provincial Environmental Protection Agencies (EPAs) that have been established under Pakistan Environmental Protection Act 1997. The provincial Environmental Protection Acts are comprehensive legislations and provide the legislative framework for protection, conservation, rehabilitation and improvement of the environment. The project will follow the requirements of these Acts. All the environmental approvals will be obtained from the provincial EPAs. All efforts will be made to protect the environment and comply with environmental quality standards during the construction and operation phases of the project. Other relevant laws and policies include Provincial Wildlife Protection, Preservation, Conservation and Management Acts, Land Acquisition Act (1894), Provincial Antiquities Acts, Explosive Act (1884), Employment of Child Act (1991), Pakistan Labor Policy (2010), National Forest Policy (2015), National Climate Change Policy (2012) and National Environment Policy (2005). In addition to the national/provincial legal requirements, the project will also comply with the World Bank's Environmental and Social Framework (ESF) as well as the Environmental and Social Standards (ESSs) requirements.

Baseline Description

The environmental and socioeconomic characteristics of the areas covered by PESCO were studied while preparing the present ESMF. Peshawar Electric

Supply Company (PESCO) is responsible for distribution of electricity in twenty-eight districts of Khyber Pakhtunkhwa (KP) . These districts included Peshawar, Upper Chitral, Lower Chitral, Swat, Upper Kohistan, Lower Kohistan, Kolai Palas, Shangla, Battagram, Mansehra, Torghar, Upper Dir, Lower Dir, Malakand, Buner, Mardan, Charsadda, Swabi, Abbottabad, Haripur, Nowshera, Kohat, Hangu, Karak, Bannu, Laki Marwat, Tank and Dera Ismail Khan. PESCO is divided into eight circles covering about 1,204,621 hectares (ha) of land in total. The seven tribal agencies (districts) and six frontier regions are covered by Tribal Areas Electricity Supply Company (TESCO).

Environmental and Social Management

To address the generic environmental and social impacts of the proposed project, the present Environmental and Social Soundness Assessment (ESSA) and Environmental and Social Management Framework (ESMF) has been prepared, in compliance with the national/provincial regulatory and WB policy requirements. The project's environmental risks and impacts are typical of an electricity distribution system. These are mainly associated with health impacts of low levels of electromagnetic radiation, occupational health and safety related to working at heights for assembly of towers and stringing, and electrical works and those related to the use and disposal of hazardous materials such as transformer oils and possibility of poly-chlorinated biphenyls (PCBs) in obsolete transformers and Sulfur Hexafluoride (SF6) gas in circuit breakers. Such activities are normal and routine work for distribution companies globally for which known as well as reliable mechanisms and safety precautions are expected to be sufficient to prevent accidents. Furthermore, given that the project will finance construction of only a few new substations and will mainly involve rehabilitation of existing substations, rehabilitation and re-conductoring of transmission lines and expansion and rehabilitation of 11kV feeders, the environmental risks and impacts are unlikely to be adverse and significant. Moreover, risks and impacts are expected to be reversible and site-specific without likelihood of impacts going beyond the actual footprint of the project.

Overall, the project is expected to promote socio-economic benefits for the country and extend opportunities for further electrification of currently non-electrified areas, improvement of the quality of electricity supply, voltage improvement and reduction of outages. The project activities may have small scale land acquisition and resettlement impacts. These are mostly small substations of 132 kV rating with small land requirements of 4 to 6 acres for Air Insulated Substations (AIS) and 1-2 acres for Gas Insulated Substations (GIS). Moreover, the DISCOs will conduct a thorough land and resettlement screening. The DISCOs prefer to use government land (several proposed substations for PESCO are on government land) and small areas needed for construction also offers the flexibility to shift the site in case there are social issues. Therefore, the approach will be very flexible in terms of location and area to be acquired. The DISCOs will prefer land

acquisition through private negotiations though willing buyer-willing seller as a first option, but if this fails, then other modes of acquisition will be used. This will follow the requirements of ESS5. The social risks and issues for the rehabilitation, upgradation, and augmentation are expected to be insignificant, only the existing right of way (ROW) and land of the facilities will be used. The direct potential social impacts are likely to remain limited, site-specific, largely reversible, and can be readily addressed through mitigation measures. In addition to the above, some potential social risks and impacts associated with this project relate to capacity for assessment and management of social risks and impacts by the DISCOs, being relatively new to some of the ESF elements especially related to Environmental and Social Standards (ESSs) 2, 3 and 4.

Components 1 and 2 of the proposed project involve the construction activities and may result in potential adverse environmental and social impacts and risks that will be largely localized, short term in duration and can be managed through implementation of appropriate mitigation measures. The anticipated environmental impacts during design phase of the proposed project included (a) soil erosion (b) soil and water contamination (c) resettlement issues and (d) safety hazards and public health concerns (e) noise emissions and (f) aesthetic value. The care will be adopted in site selection for new grid stations, route selection for transmission lines and type of equipment.

The potential environmental and social impacts during the construction and operation phase of the project included (a) soil erosion and degradation (b) air quality deterioration (c) surface water and ground water contamination (d) loss of vegetation mostly in already modified habitats (e) land acquisition and asset loss (f) damage to irrigation network and public infrastructure (g) noise and vibration (h) safety issues (i) public health issues (j) influx of labor (k) gender issues (l) child labor and (m) impacts on sites of historical, cultural, archaeological or religious significance. The mitigation measures are proposed to tackle these environmental and social impacts during design, construction and operation phases of the project. These mitigation measures will be implemented at construction sites.

The remaining two components (Components 3 and 4) do not include any physical interventions and hence will not entail any direct environmental and or social impacts. However, the environmental and social aspects and considerations will be incorporated in the studies and other activities to be carried out under these components.

Stakeholder Consultations

Consultation with affected people and other stakeholders were held during the preparation of this document. Th3 stakeholder consultation workshops were organized, in PESCO. The representatives of government departments, educational institutions and non-governmental organizations participated in these stakeholder workshops. The views of the participants on potential environmental and social impacts and mitigation measures, engagement with the project and future consultations were noted. The concerns and views of the stakeholders will be further considered during the environmental and social studies and implementation of the project. Other than three stakeholder workshops, consultations with affected communities and government departments including environmental protection department and labor department were also held. In addition, meetings were held with the MoE - PD to discuss the project scope, environmental and social implications and risks, GRM procedures and institutional arrangements. A stand-alone Stakeholder Engagement Plan (SEP) has been prepared, which includes communications strategy to inform key stakeholders, including the affected communities, to effectively understand, engage in and support the development of the

project.

Procedure for Preparing Environmental and Social Impact Assessments (ESIAs) and ESMPs

The following steps will be applied during the preparation of ESIAs and ESMPs of the proposed subprojects and their implementation:

Step 1: Screening of sub-projects to assess the ESIA/ESMP requirements

Step 2: Environmental and social aspects will be considered during the analysis of various project alternatives and designs

Step 3: Primary baseline environmental data of the project influence area (covering physical, chemical, biological and socioeconomic environment) will be collected. Assessment of impacts and their significance and preparation of documents (ESMP, Resettlement Plan or RP)

Step 4: Consultations with the stakeholders (including affected communities) during to E&S studies and after completion of draft ESIA. Disclosure of the ESIA, ESMP and RP (including translated summaries) on DISCO's website

Step 5: Submission of E&S documents along with necessary fees to provincial EPAs (Punjab, Sindh and KP) and the World Bank and clearance of these documents from provincial EPAs and WB.

Step 6: Preparation of environmental specification for bidding documents, including preparation of bill of quantities (BOQs) and inclusion of ESMP in the bidding documents.

Step 7: Contractors will develop site-specific construction-ESMPs and will implement them. Regular monitoring of compliance by the Construction supervision consultant and DISCOs.

Institutional Arrangements

DISCOs will be responsible for the overall management, supervision, and execution of the project through the Project Management Unit (PMU). A full-time Project Director (PD) will be appointed to head the PMU. The overall responsibility of environmental performance, including ESMP implementation, will rest with the PMU. Each DISCO has an existing environmental and social unit (ESU), which needs to be fully staffed for the management of environmental and social impacts of the project. DISCOs will depute these specialists to PMU to ensure the effective implementation of ESMF and ESMPs (and also RF and RP). In addition, PMU will also hire independent ESIA consultants for the preparation of safeguard instruments for the proposed subprojects. Construction contractors will also have adequate environmental, health and safety specialists to implement the environmental and social management plans of the ESMP.

Capacity building programs will be conducted for all the project staff including engineers and relevant stakeholders during initial stages of the project to sensitize them on the management of environmental and social issues, and to build the requisite capacities. DISCOs' independent ESIA consultants and construction supervision consultants (CSC) will deliver the training programs. At the construction site, CSC will take the lead in implementing the capacity building plan, though the contractors will also be responsible for conducting training for their own staff and workers. The various aspects that are covered under the capacity building will include general environmental and social awareness, key environmental and social sensitivities of the area, key environmental and

social impacts of the project, ESMP requirements, gender sensitivity, grievance redressal mechanism, WB ESF requirements, occupational health and safety (OHS) aspects including safe and defensive driving practices and waste disposal.

For Component 4, a Project Implementation Unit (PIU) will be established within the MoE. **Grievance Redress Mechanism**

A project-specific grievance redress mechanism (GRM) will be established in each DISCO to receive, evaluate, and facilitate the resolution of affected parties' concerns, complaints, and grievances about the environmental and social performance of the Project. A three-tier GRM has been designed to provide a time-bound, early, transparent and fair resolution for affected persons' (APs') and other stakeholders' grievances regarding E&S management of each subproject. All complaints received verbally or in writing will be properly documented and recorded in the Complaint Management Register(s). In addition, an easy-to-access web - based system will be developed to receive the complaints. The first tier of GRM will be established at the field level and will offer the fastest and most accessible mechanism for resolution of grievances at the local level. A local level Grievance Redress Committee (GRC) will be formed for this purpose headed by the ESU Manager, with membership from Land Acquisition Collector and other relevant staff of Revenue Department (when resettlement activities are in progress), contractors' representatives, consultants' representatives, representatives of other relevant departments, and two members from the Aps. At this tier, the designated E&S staff of PMU site office will make attempt to resolve the complaints within two to 10 working days, depending on the nature of grievance. The E&S staff in PMU will refer the unresolved issues or grievances (with written documentation) to the second tier of GRM, the PMU level GRC. The PMU level GRC will be established by each DISCO and will consist of the following persons: (i) the head of PMU will act as head of the GRC; (ii) a representative from DISCO senior management; (iii) Manager/Deputy Manager of ESU; (iv) representative of DC office (where relevant); (v) representative of PIC/CSC; (vi) Chief Resident Engineer of the CSC (on-call); (vii) representative of relevant government offices (on-call); and (viii) two to three representatives of respective project -affected people (on-call). The GRC will suggest corrective measures at the field level and assign clear responsibilities for implementing its decision within 25 working days, depending on the nature of the grievance. In the event that a grievance cannot be resolved directly by the second tier GRC or if complainant is dissatisfied with the decision of GRC, the affected people can seek alternative redress through the Chief Executive Officer (CEO) or Board of Directors of DISCOs, district administration, the Secretary Energy and Power Department or higher-level administrative authorities, the Pakistan Citizen Portal or the court of law, as appropriate.

According to the lessons learned in various project contexts, there is also a need to establish a separate GRM to deal exclusively with those complaints that involve workers employed by the Contractors for construction activities. Such grievances may involve wage rates and unpaid overtime works; irregular and partial payments; lack / inadequacy of living accommodations; lack of clean drinking water and sanitation facilities; lack of medical care in emergencies; lack of protection against gender-based violence (GBV) by labor suppliers, supervisors, and others who also deal with workers. The GRCs dealing with labor grievances / complaints will have members who are directly and indirectly associated with the construction works. The GRC will include a PMU official who is in charge at the worksite as the convener, resident engineer of the CSC, a workers' representative, and the contractor's representative. The convener will designate an official to receive the complaints and ensure the complainant does not lose his/her job and is not intimidated into

withdrawing the complaint before the formal hearing.

The MoE has an online complaint system in place which can be used under EDEIP (Component 4). The Pakistan Citizens Portal may also provide an alternate platform for filing grievances.

Cost of ESSA and ESMF Implementation

The implementation cost of Environmental and Social Soundness Assessment and Environmental and Social Management Framework has been estimated to be 61.5 million PKR (about 0.37 million USD). This includes cost of environmental and social training and cost of conducting ESIAs and preparing ESMPs and RPs of subprojects during the project implementation.

List of Acronyms

ABC	Aerial Bundled Cable
AED	Anti-Encroachment Drive
AEDB	Alternative Energy Development Board
AIS	Air Insulated Substation
AMI	Automated metering Infrastructure
BCM	Billion Cubic Meter
BOD	Board of Directors
BOQ	Bill of Quantities
CCI	Council of Common Interest
CD	Circular Debt
CDM	Clean Development Mechanism
CDMP	Circular Debt Management Plan
CMS	Customer Management System
COC	Code of Conduct
CPPA-G	Central Power Purchasing Agency-Guarantee
CRBC	Chashma Right Bank Canal
CSC	Construction Supervision Consultants
CTBCM	Competitive Trading Bilateral Contract Market
DALY	Disability Adjusted Life Years
dB	Decibel
DC	Deputy Commissioner
DISCOs	Distribution Companies
DMS	Distribution Management System
ECA	Employment of Child Act
EDEIP	Electricity Distribution Efficiency Improvement Project
EIA	Environmental Impact Assessment
ELR	Energy Loss Reduction
EPA	Environmental Protection Agency
EPA	Electricity Purchase Agreement
ERP	Emergency Response Plan
ESC	Environmental and Social Cell
ESCP	Environment and Social Commitment Plan

ESDD	Environmental and Social Due Diligence
ESHS	Environmental, Social Health and Safety
ESIA	Environmental and Social Impact Assessment
ESSA	Environmental and Social Soundness Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESRC	Environmental and Social Risk Classification
ESSs	Environmental and social Standards
FM	Financial Management
GBV	Gender Based Violence
GCA	Gross Command Area
GDP	Gross Domestic Product
GHG	Greenhouse Gases
GIS	Gas Insulated Substation
GIS	Geographic Information System
GoP	Government of Pakistan
GRC	Grievance Redressal Committee
GRM	Grievance Redressal Mechanism
GRS	Grievance Redress Service
HESCO	Hyderabad Electric Supply Company
HR	Human Resource
HT	High Tension
HTLS	High Tension Low Sag
IA	Implementing Agency
IAA	Independent Auction Administrator
IBIS	Indus Basin Irrigation System
IEE	Initial Environmental Examination
ILO	International Labor Organization
IMS	Incident Management System
IMSC	Implementation and Management Support Consultants
ISMO	Independent System and Market Operator
KP	Khyber Pakhtunkhwa
kWh	Kilo Watt Hour
LAA	Land Acquisition Act
LMP	Labor Management Procedure

LPG	Liquified Petroleum Gas
LT	Low Tension
MAF	Million Acre Foot
M&E	Monitoring and Evaluation
MIRAD	Market Implementation and Regulatory Affairs Department
MoE	Ministry of Energy
MSDS	Material Safety Data Sheet
MSIP	Management Strategies and Implementation Plans
MW	Mega Watt
NCS	National Conservation Strategy
NEPRA	National Electric Power Regulatory Authority
NEQs	National Environment Quality Standards
NGO	Non-Governmental Organization
NTDC	National Transmission and Dispatch Company
O&M	Operation and Maintenance
OCHS	Occupational and Community Health and Safety
OHS	Occupational Health and Safety
P&D	Planning and Development
PAPs	Project Affected Persons
PCB	Poly-chlorinated Biphenyl
PD	Power Division
PD	Project Director
PEC	Pakistan Engineering Council
PEPA	Pakistan Environmental Protection Act
PEPCO	Pakistan Environmental Protection Council
PEPCO	Pakistan Electric Power Company
PEPO	Pakistan Environmental Protection Ordinance
PESCO	Peshawar Electric Supply Company
PITC	Power Information Technology Company
PM	Particulate Matter
PMU	Project Management Unit
PPA	Power Purchase Agreement
PPMC	Power Planning and Management Company

PSE	Public Sector Employee
RF	Resettlement Framework
ROW	Right of Way
RP	Resettlement Plan
SCADA	Supervisory Control and Data Acquisition
SEA	Sexual Exploitation and Abuse
SEP	Stakeholder Engagement Plan
SH	Sexual Harassment
SOE	State Owned Enterprise
STG	Secondary Transmission and Grid
STI	Sexually Transmitted Infections
SWD	Sindh Wildlife Department
T&D	Transmission and Distribution
TESCO	Tribal Areas Electricity Supply Company
TL	Transmission Line
UNESCO	United Nations Educational, Scientific and Cultural Organization
VAC	Violence Against Children
WB	World Bank
WHO	World Health Organization

Table of Contents

Annexes

List of Tables and Figures

1. Introduction

The Government of Pakistan (GoP) through the Ministry of Energy (MoE) – Power Division (PD), Peshawar Electric Supply Company (PESCO), is planning to implement the **Electricity Distribution Efficiency Improvement Project** (EDEIP) (proposed project). The GoP is seeking financial assistance from the World Bank (WB). Under the project, the MoE – PD seeks to undertake power sector reforms while PESCO, intend to undertake priority development works to strengthen their respective electricity distribution networks to ensure reliable supply of electricity to their consumers. The MoE – PD, PESCO are described as implementation agencies (IAs) in this document.

To address the generic environmental and social impacts of the proposed project, the present Environmental and Social Soundness Assessment and Environmental and Social Management Framework (ESSA and ESMF) has been prepared, in compliance with the national/provincial regulatory and WB policy requirements. Similarly, a Resettlement Framework (RF) has also been prepared to guide the resettlement planning of the proposed project.

1.1. Project Background

Over the past few years Pakistan has struggled to meet its fiscal targets. One of the key fiscal risks is the underperformance of the State-Owned Enterprises (SOEs) dominated by power sector entities. The arrears in the electricity sector (the Circular Debt) have grown to an estimated PKR 1.6 trillion[2] . Therefore, improving distribution companies' efficiencies is a prime and core requirement to reduce sector's fiscal burden, lower cost of power supply and attract investments.

Pakistan's electricity sector is in crisis due to high cost of generation, dependent on imported fuels that makes the sector vulnerable to changes in fuel prices and currency exchange rates. Higher cost of electricity supply has exacerbated cost recovery challenges for the distribution companies. This has hampered investments particularly by loss making electricity distribution companies (DISCOs) to strengthen their networks and is resulting in increased outages and interruptions, costing businesses and affecting household welfare. These inefficiencies in the sector are estimated to be costing Pakistan about 6.5 percent of its gross domestic product (GDP), according to a World Bank report[3] of 2018. Also, in terms of reliability of electricity supply Pakistan is among the lowest performing countries in the world. It is ranked at 167 out of 190 economies on getting electricity indicator in Ease of Doing Business 2019. Moreover, a significant number of households do not have access to electricity and per capita electricity consumption at 471 kWh is less than one-fifth of the world average according to the World Development Indicators 2017. While government is adding low-cost generation and plans to shift the generation mix towards renewable sources targeting 20 percent by 2025 and 30 percent by 2030, yet long-term financial viability of the power sector is dependent on DISCOs' efficiency improvement.

Losses accruing in DISCOs have a cascading effect throughout the energy value chain. In FY19 about PKR 116 billion remained uncollected and total receivables reached PKR

[2] Zhang, Fan. 2019. *In the Dark: How Much Do Power Sector Distortions Cost South Asia?* South Asia Development Forum. Washington, DC: World Bank. https://www.doi.org/10.1596/978-1-4648-1154-8.

[3] https://www.worldbank.org/en/region/sar/publication/in-the-dark-how-much-do-power-sector-distortions-cost-south-asia

1,050 billion (translates into a turnover rate of 350 days) of which PKR 800 billion were private receivables. Consequently, DISCOs total payables were PKR 971 billion. Moreover, DISCOs also incurred a financial loss of PKR 37 billion in FY19 on account technical and non-technical/pilferage losses exceeding the National Electric Power Regulatory Authority (NEPRA) targets. Non-existent incentive structures and lack of transparency in data collection and reporting are major barriers to improving governance and performance of the DISCOs. Therefore, to make power sector financially viable the DISCOs would need to become more efficient by investing in new technologies which would help improve their performance and profitability.

1.2. Project Overview

To address some of the problems discussed above, the proposed project will support the targeted DISCOs by providing financial and technical support for investments to modernize their electricity distribution networks and institutional development resulting in improved operational efficiency in the sector and reliable supply to the consumers. It will help in the (i) physical strengthening of distribution networks; (ii) deployment of modern equipment, technology and information systems; and (iii) provide technical assistance, studies, consultancies and management support. Under the proposed project, three DISCOs namely PESCO has been selected.

The proposed project will have four components listed below; more details are provided later in the document.

- Improving Grid Reliability
- Modernizing Operations & Management
- Capacity Building & Technical Assistance
- Reform Support.

The project will include a number of subprojects to be implemented by the IAs. Further information on these subprojects is provided later in the document.

1.3. Environmental and Social Assessment of the Project

In accordance with the WB Environmental and Social Framework (ESF), a risk management approach is being followed for the proposed project. The project has been assigned an Environmental and Social Risk Classification (ESRC) of Moderate.

Environmental Aspects. The project's environmental risks and impacts are typical of an electricity distribution system. These are mainly associated with health impacts of low levels of electromagnetic radiation, occupational health and safety related to working at heights for assembly of towers and stringing, and electrical works and those related to the use and disposal of hazardous materials such as transformer oils and possibility of poly-chlorinated biphenyles (PCBs) in obsolete transformers and Sulfur Hexafluoride (SF6) gas in circuit breakers. Such activities are normal and routine work for distribution companies globally for which known as well as reliable mechanisms and safety precautions are expected to be sufficient to prevent accidents. Furthermore, given that the project will finance construction of only a few new substations and will mainly involve rehabilitation of existing substations, rehabilitation and re-conductoring of transmission lines and expansion and rehabilitation of 11kV feeders, the environmental risks and impacts are unlikely to be adverse and significant. Moreover, risks and impacts are expected to be reversible and site-specific without likelihood of impacts going beyond the actual footprint

of the project.

Social Aspects. Overall, the project is expected to promote socio-economic benefits for the country and extend opportunities for further electrification of currently non-electrified areas, improvement of the quality of electricity supply, voltage improvement and reduction of outages. The project activities may have small scale land acquisition and resettlement impacts. These are mostly small substations of 132 kV rating with small land requirements of 4 to 6 acres for Air Insulated Substations (AIS) and 1-2 acres for Gas Insulated Substations (GIS). Moreover, the DISCOs will conduct a thorough land and resettlement screening. The DISCOs prefer to use government land (several proposed substations for PESCO are on government land) and small areas needed for construction also offers the flexibility to shift the site in case there are social issues. Therefore, the approach will be very flexible in terms of location and area to be acquired. The DISCOs will prefer land acquisition through private negotiations though willing buyer-willing seller as a first option, but if this fails, then other modes of acquisition will be used. This will follow the requirements of ESS5. The social risks and issues for the rehabilitation, upgradation, and augmentation are expected to be insignificant, only the existing right of way (ROW) and land of the facilities will be used. The direct potential social impacts are limited, site-specific, largely reversible, and can be readily addressed through mitigation measures. In addition to the above, some potential social risks and impacts associated with this project relate to capacity for assessment and management of social risks and impacts by the DISCOs, being relatively new to some of the ESF elements especially related to Environmental and Social Standards (ESSs) 2, 3 and 4.

1.4. Environmental and Social Documents

In compliance with the national/provincial regulation and WB ESF, the following specific environmental and social documents are being/will be prepared for the proposed project:

- ESSA and ESMF (the present document)
- Resettlement Framework – to address the resettlement impacts of the project
- Stakeholder Engagement Plan – to describe various modes of stakeholder engagement including consultations and grievance redress mechanism (GRM)
- Labor Management Procedures to describe assessment of potential labor related risks, overview of labor regulation, staff responsibility, policies and procedures.
- Environmental and Social Impact Assessment(s) – for subprojects that can potentially cause significant environmental and social risks and impacts
- Environmental and Social Management Plan(s) – for subprojects that are unlikely to cause significant environmental and social risks and impacts.
- Resettlement Plan (RP) – for subprojects potentially causing involuntary resettlement impacts such as land acquisition.
- Environmental and Social Commitment Plan to summarize the various actions taken and responsibilities to be fulfilled for environmental and social aspects in compliance with the WB ESF.

1.5. Environmental and Social Management Framework

The proposed project is likely to have potential environmental and social impacts, and hence require a detailed environmental and social assessment in compliance with the

-259-

government and World Bank requirements. However, exact location and nature of some of the subprojects under Component 1 of the project described in **Section 1.2** are not known at this stage and hence detailed environmental and social assessment of these components cannot be carried out. Therefore, the present ESSA and ESMF has been prepared to identify generic environmental and social impacts and to formulate a framework for future detailed assessments to be carried out once the nature and location of subprojects are determined. The ESSA and ESMF has been developed to:

- integrate the environmental and social concerns into the identification, design, and implementation of all the Project interventions in order to ensure that those are environmentally and socially sustainable;
- ensure all relevant environmental and social issues are mainstreamed into the design and implementation of the subprojects;
- consider in an integrated manner the generic environmental and social risk, benefits and impacts of the project and identify generic measures to avoid, minimize and manage risks and impacts while enhancing benefits;
- provide guidance to conduct Environmental and Social Impact Assessments (ESIAs) and prepare Environmental and Social Management Plans (ESMPs) for the subprojects in compliance with the government's policies, acts, and rules as well as with the World Bank's safeguard policies and guidelines.
- To establish clear procedures and methodologies for the environmental and social planning, assessment, review, approval and implementation of subprojects to be financed under the Project;
- To develop methodology for screening of subprojects and to recommend appropriate safeguard instruments for mitigating and monitoring of environmental, social, and resettlement risks/impacts associated with each subproject;
- To specify appropriate roles and responsibilities of all implementing agencies and outline the necessary reporting procedures for managing and monitoring environmental and social concerns related to subprojects;
- To determine the training, capacity building and technical assistance needed to successfully implement the provisions of the ESSA and ESMF.

1.6. ESSA and ESMF Study Methodology

The methodology followed in preparing the present ESSA and ESMF consists of the following steps:

1.6.1. Review of the Project Details

At the onset of the study, the project details were obtained from IAs (PESCO) and studied carefully. Meetings were held with the concerned officials as needed. Attempts were made to obtain as much information as available at this stage on the subprojects. Data gaps were identified where needed and data collection needs specified for the ESIA and or ESMPs to be prepared for the individual subprojects.

1.6.2. Review of Relevant Legislation, Policies, and Guidelines

In order to determine the policy, legal and institutional environment for the project, the applicable policies, guidelines and legislations concerning the project's environmental and social aspects were reviewed. As the project is to be implemented in three provinces

namely Khyber Pakhtunkhwa (KP), Punjab and Sindh and funded by the World Bank, the following policies and legislations will be reviewed:

- Policies and legislations of Government of Pakistan, Government of KP, Government of Punjab and Government of Sindh.
- The World Bank Standards, Guidelines, Policies and Directives.

The present ESSA and ESMF has been prepared following the requirements defined in the WB Environmental and Social Framework (ESF).

During the present study, the above legislations, regulations, and framework were studied in depth to determine their relevance and applicability to the proposed project, in addition to determining and specifying actions to be taken by the project proponents / implementing agencies to fulfill the associated requirements. Further details of these legislations, regulations, and framework are presented later in the document.

1.6.3. Review of Secondary Literature

Under this task, relevant published and unpublished reports and documents were identified and reviewed. These include among others similar environmental assessment reports particularly of donor-funded projects, project documents, environmental and social management frameworks, environmental monitoring reports, news articles, and research reports. The primary objective of this task was to determine the potentially negative environmental as well as social impacts of projects similar to the proposed project and the associated mitigation/management strategies that were proposed to address those impacts. Secondary data was also collected where applicable to obtain baseline conditions of the project area and its surroundings.

1.6.4. Scoping

During this phase, key information on the project was reviewed and interaction between its activities and key environmental resources charted out. A long list of the potential environmental as well as social issues likely to arise as a result of the project was thus developed. Subsequently, the significant potential impacts were short listed, screening out the non-relevant and or insignificant impacts, based upon their nature and severity. Furthermore, the area of influence of the project activities was determined to the extent possible at this stage. Thus, the sectorial as well as spatial boundaries of the project were determined for the purpose of the environmental and social assessment. The stakeholder analysis was also carried out for the consultations carried out during the study discussed below (and during the project implementation).

1.6.5. Stakeholder Engagement

A Stakeholder Engagement Plan (SEP) is being prepared for the proposed project to identify various modes of stakeholder engagement including stakeholder consultations and GRM. As part of this task, consultation framework has also been developed to be implemented during the project implementation particularly during the environmental and social assessment of individual sub-projects and then during their construction phase.

1.6.6. Collection of Baseline Data

During this phase, baseline data was collected and compiled, in order to develop an initial baseline of the project area's physical, biological and socio-economic environment. For this purpose, mostly secondary sources were used to the extent possible as described in **Section 1.6.3** earlier. No instrument data collection and or laboratory analysis was carried

out at this stage; however, need of detailed data collection to be carried out during environmental and social assessment of individual sub-projects was determined.

1.6.7. Impact Assessment

Once the baseline data collection was completed, impact assessment was carried out to identify potentially negative but generic impacts of the proposed activities under the project. Subsequently, generic mitigation measures were identified to address these potential impacts. Site- and sub-project-specific impact assessment will be carried out as part of the environmental and social assessment of individual sub-projects to be undertaken under the proposed project.

In addition to the above, screening criteria was developed to determine the level and extent of environmental and social assessment to be carried out for each individual sub-project. Generally, larger sub-projects with significant impacts will require full environmental and social assessment to be carried out, medium size sub-projects with less significant impacts will require environmental and social management plan (ESMP) to be prepared, whereas smaller sub-projects with insignificant impacts will require only mitigation checklists to be filled.

1.6.8. ESSA and ESMF Compilation

During this task, the process and outcome of the tasks described above was compiled in the form of the present Environmental and Social Soundness Assessment and Environmental and Social Management Framework (ESSA and ESMF). The structure of the ESSA and ESMF is described in the section below.

1.7. ESSA and ESMF Structure

Executive Summary: This provides a general summary of the ESSA and ESMF contents and key findings, in a vocabulary that is easily understood by the public at large. It concisely covers all aspects of the report.

Chapter 1: Introduction. This Chapter describes the ESSA and ESMF purpose, objectives, principles and methodology. This Chapter introduces the project proponents and provides other relevant information. The layout of ESSA and ESMF is also described in it to facilitate its reading.

Chapter 2: Project Description. This Chapter provides a simplified description of the proposed Project. The project description includes background and purpose of the project, components of the project, and anticipated types of subprojects. This Chapter has been compiled on the basis of information obtained from DISCOs.

Chapter 3: Environmental and Social Management Requirements. This Chapter describes the relevant national/provincial environmental and social legal requirements as indicated in various legislation, regulations and guidelines relevant to the project and ESSA and ESMF as well as the World Bank's ESF applicable to the project and its subprojects. The Chapter states how such requirements will be complied during various phases of the project.

Chapter 4: Environmental and Socio-Economic Characteristics. This Chapter covers the dimensions of the study area and review relevant physical, biological, land-use, and socioeconomic conditions. This Chapter has been compiled on the basis of baseline data collection described in **Section 1.6.3**.

Chapter 5: Impact Assessment. This Chapter describes the generic E&S impacts to be potentially caused by the proposed project along with the associated generic mitigation measures to address these impacts.

Chapter 6: Stakeholder Consultations. This Chapter summarizes the stakeholder engagement activities carried out so far in addition to presenting a summary of the stakeholder consultations carried out by DISCOs. Also, discussed in the Chapter are the consultations to be carried out during the environmental and social assessments of individual sub-projects.

Chapter 7: Environmental and Social Assessment. This Chapter describes the process for ensuring that environmental and social concerns are adequately assessed and addressed through institutional arrangements and procedures for identification, preparation, approval and implementation of subprojects. This Chapter also lists arrangements for disclosing subprojects information to comply with the Bank's Policy of Disclosure of Information.

Chapter 8: Institutional Framework. This Chapter outlines the existing and proposed institutional setup for DISCOs to manage the E&S aspects of the project.

Chapter 9: Grievance Redress Mechanism (GRM). This Chapter describes the GRM proposed for the project in order to address the complaints and grievances raised by project affected persons and other stakeholders.

Chapter 10: Cost of ESSA and ESMF Implementation. This Chapter presents the estimated cost of ESSA and ESMF implementation.

2. Project Description

This Chapter provides a simplified description of the overall EDEIP and an overview of the subprojects to be implemented by IAs. Further details will be provided in the subproject ESIAs and ESMPs.

2.1. EDEIP Objectives

The project development objectives are to improve electricity supply and operational efficiency in targeted areas of selected distribution companies and strengthen the capacity of power sector institutions to implement reforms. Following key indicators will be monitored for each selected DISCO to measure project's success in improving their performance and profitability:

- Reduction in number of interruptions
- Increase in maximum load in mega-watts (MW) handled
- Reduction in transmission and distribution (T&D) losses as percentage of units received
- Improvement in bill collection rate (without subsidies)
- Improvement in cash flow from operations to cover current liabilities.

The project will ensure that a reliable monitoring and reporting system is in place to ensure reliability of data.

2.2. Participating DISCOs

The proposed project will be implemented by PESCO. PESCO covers entire Khyber Pakhtunkhwa (KP) (except Tribal Districts, which have been merged with KP and are served by a separate DISCO). It has 3.0 million consumers and annual sales of 4.8 tera watt-hours (TWh).

2.3. EDEIP Components

Pakistan has ten electricity distribution companies (DISCOs) (excluding privatized Karachi Electric). The DISCOs included in this proposed project have been selected, on the government's request, through a combination of qualifying criteria which included: readiness of the individual subprojects; capacity for project implementation; and getting a mix of projects representative of the problems in the sector, which would allow learning and scaling up.

The Project will help the DISCOs to modernize and improve their service delivery. In addition to strengthening the transmission and distribution network to ensure reliable supply of electricity by increasing the load carrying capacity under Component 1 of EDEIP, the Project will help improve service delivery and financial viability of the DISCOs by installing Aerial Bundled Cables (ABCs) in some of the high revenue/high loss feeders, implementing AMI for large consumers and by deploying SCADA and Distribution Management System (DMS), a backbone of Smart Grids and a standard for

modern utilities, under Component 2 of EDEIP. Component 2 will also enable the DISCOs to effectively use latest technology and information systems/IT infrastructure for improved operations, planning and management of the network; customer services; and other functions. Component 3 of the Project will help improve maintenance practices through the use of latest tools, equipment and training to enhance safety culture during construction, operations and maintenance activities; provide technical assistance for training, studies, preparation of manuals, pilot projects and support project implementation. Component 4 is to support Power Division/Government of Pakistan in implementing the sector reforms and improve sector governance. These components are further described in paras below.

2.3.1. Component 1: Improving Grid Reliability

This component will finance investments in Secondary Transmission and Grid (STG) and Energy Loss Reduction (ELR) programs of the DISCOs to improve reliability of electricity supply and reduce technical losses. The subprojects financed under this Component can be divided into following categories:

- New Grid Stations. Construction of new 132 kV grid stations and the associated transmission lines;
- Existing Grid Stations. Augmentation, extension, conversion, upgradation and rehabilitation of the existing grid stations and the associated transmission lines;
- Transmission Lines. Construction, rehabilitation and re-conductoring of 132kV (and below) transmission lines with low loss conductors e.g. high-tension low sag (HTLS); and
- Energy Loss Reduction. Expansion and rehabilitation of 33kV and 11kV feeders.

2.3.2. Component 2: Modernizing Operations and Management

This component will support modernization of the DISCOs' operations and management functions using latest equipment, technology and information systems. Major activities include:

- Automation and Information Systems. This entails upgradation deployment of information systems and ERP solutions. This will help improve planning, grid operations and customer services by providing access to and integrating modern information systems e.g., Incident Management System (IMS), feeder automation, transformer monitoring and protection systems, Geographic Information System (GIS), Customer Management System (CMS) and Enterprise Resource Planning (ERP). This will lead to deployment of SCADA[4] and Distribution Management Systems (DMS) during project implementation (subject to finalization of feasibility and required approvals) to integrate these information systems and to start the implementation of smart grids.
- Revenue Protection Program. It will comprise of installation of Aerial Bundled Cables (ABC), Advanced Metering Infrastructure (AMI), Transformer monitoring System, and other measures to pre-empt theft, reduce losses, improve recoveries, and better service delivery based on access to reliable and timely data.

[4] SCADA is a backbone of Smart Grids and a standard for modern utilities and is required by the Regulator and the Grid Code.

2.3.3. Component 3: Building Capacity & Technical Assistance

This component will help build capacity of the DISCOs with particular focus on:

- Improving operations and maintenance. This will cover procurement of tools, equipment, hardware, software, consulting and non-consulting services for improved operations and maintenance practices e.g., for live-line maintenance, upgrade repair workshops, inventory/asset management.;
- Training and capacity building. Conduct studies and assessments including preparation/updation of manuals, procedures and systems in particular for HR management, inventory management, procurement, financial management, customer services and safeguards and assist with their implementation and conduct training programs including workshops, seminars and post graduate degrees in relevant fields
- project implementation support including financing of: (a) consulting and other services; (b) individual experts/advisors and any incremental staff positions; (c) equipment and software; (d) financial, operational & technical audits; and (e) operating cost of Project Management Units (PMUs). Key activity will be hiring of Implementation & Management Support Consultants (IMSC) covering implementation of all project related activities including: procurement, contract administration, quality control, financial management, preparation/updation of feasibilities, designs and bidding documents as well as support in implementation of safeguard instruments.

2.3.4. Component 4: Reform Support

The purpose of the Component 4 is to support MoE - PDfulfill its policy mandate under the National Electricity Policy 2021, and implement power sector reforms. This component consists of two main subcomponents: a) supporting governance and institutional reforms; and b) supporting transition to wholesale electricity market through commencement of the Competitive Trading Bilateral Contract Market (CTBCM), as described in more details below:

a. *Supporting Governance and Institutional Reforms:* The PD is in the process of consolidating all policy related activities that are currently being conducted by different parts of the sector entities, into one centralized location that will be dedicated to supporting PD in development of policies, strategic plans, frameworks, monitoring, and other activities. Towards this end, PD[5] will collaborate with Power Planning and Monitoring Company (PPMC), a newly established entity as a result of PEPCO restructuring. PPMC's role will not involve any management of the DISCOs operation but will be focused primarily on the monitoring of the DISCOs performance, providing policy direction, conduct research and development, carry out strategic studies, sector assessments, analysis, audits, feasibilities for new technologies, etc., all with the aim of improving DISCOs processes and efficiency. With the reconstitution of new boards of DISCOs (part of PACE-I), they have been given more autonomy, at both, board, and management level, including HR functions. The GoP's (through PD) role is now to monitor their performance to improve their efficiency regarding technical and commercial losses in line with goals set in the CDMP. One of the first policy activity to be supported through this subcomponent is the development of the National

[5] According to the National Electricity Policy 2021, Ministry of Energy (Power Division) may designate any entity (or entities) to perform its policy mandate.

Electricity Plan (one of the PACE-II Prior Actions). This subcomponent will also finance procurement of software, including trainings, hardware, consulting services (individual experts/advisors as well as firms), research and development program (that would establish PPMC as a center of excellence), required to perform the core policy and strategic functions. See details in Annex 1.

b. *Supporting the Implementation of Competitive Trading Bilateral Contract Market (CTBCM):* The MoE -PD is also in the process of the implementation of electricity market reforms to transition from existing single-buyer market to a competitive wholesale market. The initial market design was approved by NEPRA in December 2020, and it is expected to commence operation in April 2022. The progress towards commencement is monitored through a Market Implementation & Monitoring Group, led by secretary PD and Chairman NEPRA. There are a number of activities already ongoing to accommodate this transition, including new Grid Code and new Commercial Code (both part of PACE-II prior actions). Furthermore, there are some key institutions that are in the process of being established and that will be supported through this subcomponent, such as Independent System Operator (ISO), Market Operator (MO), and Independent Auction Administrator (IAA). Towards this end, the PD will collaborate with Alternative Energy Development Board (AEDB)/Private Power Infrastructure Board (PPIB),[6] CPPA, and NTDC to implement this subcomponent. The support through this subcomponent will further finance procurement of tools, equipment, software, training and consultancies required for effective start-up of these three entities. The IAA will be a new entity responsible for running the competitive auctions for new capacity procurement / new contracts of DISCOs. It will be established as part (AEDB)/ (PPIB) restructuring. The establishment of the ISO and MO will involve organizational restructuring of NTDC and CPPA, whereby Market Operator (MO) function of CPPA-G and System Operator (SO) function of NTDC will be restructured into separate legal entities.

2.4. Description of Subprojects

This Section provides an indicative list the subprojects included under Component 1 of EDEIP.

PESCO

- 11-kilovolt (kV) capacitor banks
- Upgrading 132-kV bus bars at 20 grid stations
- Extension of four grid stations
- Augmentation of 12 grid stations
- Re-conductoring of four transmission lines with a total length of 49 kilometers (km)
- Installation/improvement of 130 high tension (HT) feeders
- Installation/improvement of low tension (LT) feeders

[6] The Cabinet has approved the proposal for a merger of AEDB and PPIB. While the amendments to the respective Acts still need to take place, the two companies have started operating under one Managing Director.

- Installation of transformer monitoring system
- Installation of 65,000 smart meters
- Aerial bundle cable (ABC) for 74 feeders (4,000 km).

2.5. Project Implementation Schedule

According to the current schedule, the project is likely to be approved by end the current year and its implementation will continue till end of 2027.

2.6. Project Cost

The project total cost has been estimated to be United States Dollars (US $) 252.96 million. The estimated cost of improving grid reliability (component 1) is 78.85 million USD, for modernizing operations and management (component 2) is 65.63 million USD, for capacity building and technical assistance (component 3) is 54.64 million USD, for reform support (component 4) is 20.00 million USD, administration and other costs are 19.91 million USD, financing cost is 13.94 million USD and government of Pakistan share is 19.91 million USD.

3. Environmental and Social Management Requirements

This section describes the Bank safeguard policies and standards applicable to the project and its subprojects as well as relevant national and provincial environmental and social legal requirements as indicated in various legislation, regulations and guidelines relevant to the project and ESSA and ESMF scope.

3.1. Institutional Frameworks

The national as well as provincial institutional framework for decision making and policy formulation for environmental and conservation aspects is briefly described below.

3.1.1. Ministry of Climate Change

After the 18th Amendment in the Constitution of Pakistan, the Environment Ministry was devolved to the provinces and a new Ministry of National Disaster Management was created. The Government of Pakistan renamed the Ministry of National Disaster Management in 2012 as the Ministry of Climate Change to deal with the threats posed by global warming and to protect environment in the country. The National Policy of Climate Change was also approved in the same year. The policy describes the following measures regarding environmental assessment:

- Take necessary measures to redesign administrative structures and procedures of Federal and Provincial EPAs and Planning and Development Division to integrate climate change concerns into Initial Environmental Examination (IEE) processes;
- Ensure that IEE/EIA and other mechanisms are strictly observed in all development projects, particularly infrastructure projects, by the concerned agencies.
- The ministry has now been dissolved and transformed into a division under National Disaster Management Authority that would implement the National Policy on Climate Change with coordination of provincial governments.

3.1.2. Pakistan Environmental Protection Council

The apex body, Pakistan Environment Protection Council (PEPC), was first constituted in 1984 under section 3 of the Pakistan Environmental Protection Ordinance (PEPO), 1983, with President of Pakistan as its Chairman. In 1994, an amendment was made in the Ordinance to provide for the Prime Minister or his nominee to be the head of the Council. The Council was reconstituted after enactment of the new law i.e., Pakistan Environmental Protection Act, 1997.

It is headed by the Prime Minister (Chief Executive) of Pakistan. The council is represented by trade and industry, leading no-governmental organizations (NGOs), educational intuitions, experts, journalists and concerned ministries.

The Council is responsible to a) coordinate and supervise enforcement of the provisions of Environmental Protection Act (discussed later in the Chapter; b) approve comprehensive national environmental policies and ensure their implementation within the framework of a national conservation strategy as may be approved by the Federal Government from time to time; c) approve the National Environmental Quality Standards; (d) provide guidelines for the protection and conservation of species, habitats, and biodiversity in general, and for the conservation of renewable and non-renewable resources; and (e) coordinate integration

of the principles and concerns of sustainable development into national development plans and policies.

3.1.3. Provincial Environmental Protection Councils

The provincial Environmental Protection Councils have been established in each province under the provincial Environmental Protection Acts. The Councils are headed by the respective Chief Minister or such other person as the Chief Minister may nominate in his/her behalf in the province. The functions of each Council are:

- To frame its own Rules of Procedure, co-ordinate and supervise the enforcement of the provisions of the Environmental Protection Act and other laws relating to the environment in the province;
- Approve comprehensive provincial environmental and sustainable development policies and ensure their implementation within the framework of a conservation strategy and sustainable development plan as may be approved by Government from time to time;
- Provide guidelines for the protection and conservation of species, habitats, and biodiversity in general, and for the conservation of renewable and non-renewable resources;
- Coordinate integration of the principles and concerns of sustainable development into socio-economic and development policies, plans and programs at the provincial, district and local levels;
- Deal with inter-provincial and federal-provincial issues, and liaise and coordinate with other Provinces through appropriate inter-provincial forums regarding formulation and implementation of standards and policies relating to environmental matters with an inter-provincial impact, provide guidelines for biosafety and for the use of genetically modified organisms; and,
- Assist the Federal Government or Federal Agency in implementation and or administration of various provision of United Nation Convention on Laws on Seas, 1980 (UNCLOS) in coastal waters of the province.

3.1.4. Pakistan Environmental Protection Agency

The Pakistan Environmental Protection Agency (Pak-EPA) headed by a Director General has wide ranging functions given under the Pakistan environmental Protection Act (PEPA) including preparation and co-ordination of national environmental policy for approval by the PEPC, administering and implementing the PEPA and preparation, establishment or revision of the National Environment Quality Standards (NEQS). The Pak-EPA also has the responsibility for reviewing and approving IEE and EIA reports for the following projects:

- Projects on federal land
- Military projects
- Projects involving trans-country or trans-province impacts

The responsibility for the review and approval of all other IEEs and EIAs was delegated to the relevant Provincial Environmental Protection Agencies. Vide notification dated 29 June, 2011 the Pakistan Environmental Protection Agency was assigned to the Capital Administration and Development Division under National Disaster Management Division.

3.1.5. Provincial Environment Protection Agencies

The provincial Environmental Protection Agencies have established under Pakistan Environmental Protection Act 1997. Each EPA is headed by its respective Director General who exercises powers delegated previously to him/her by the Pakistan Environmental Protection Agency and now by the provincial Environmental Departments. For the proposed project, KP EPA, Punjab EPA and Sindh EPA are the relevant regulatory agencies for the review and approval of IEE and EIA reports (see **Figure 3.1**).

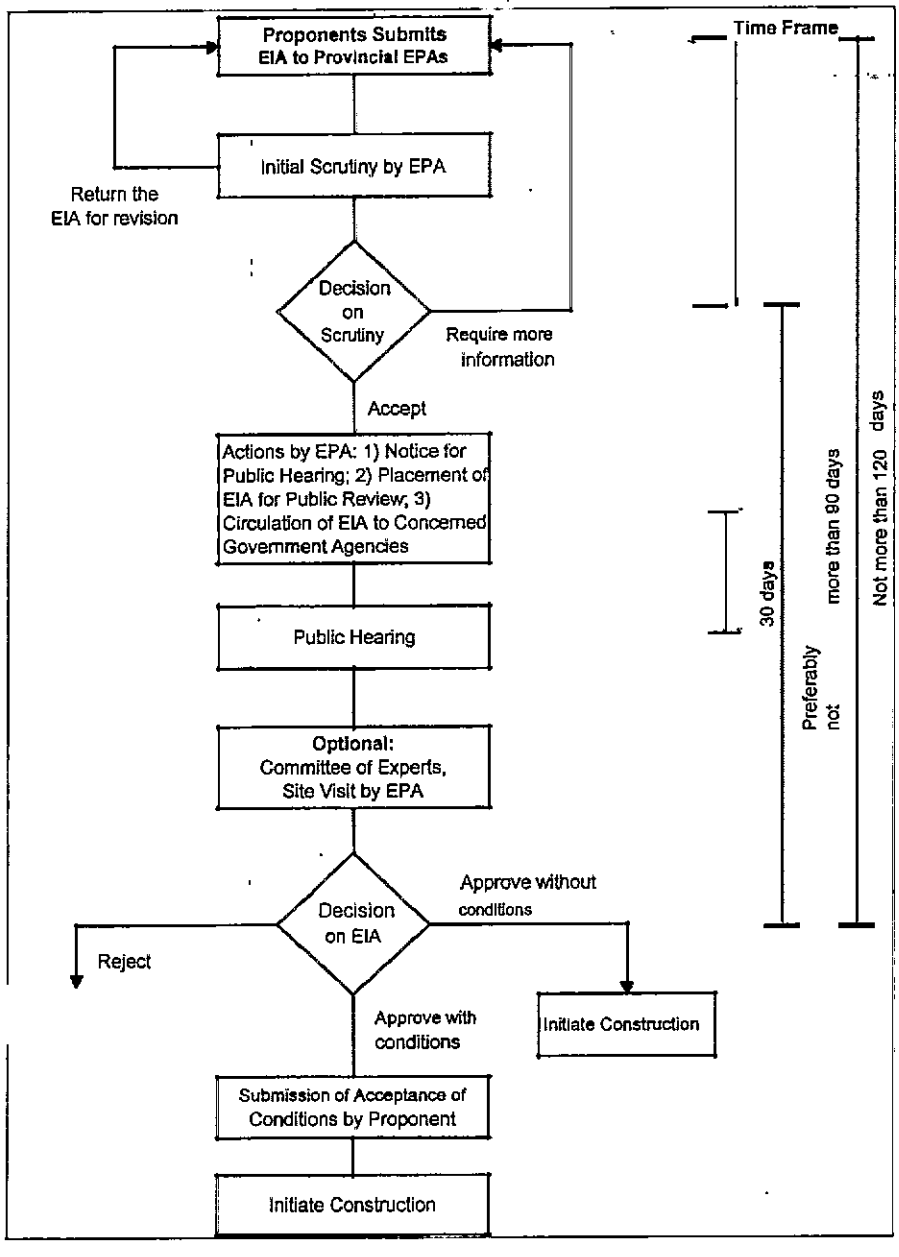


Figure 3-1: EIA Review and Approval Process

3.1.6. Revenue Department

The Board of Revenue was originally constituted under the provisions of West Pakistan Board of Revenue Act 1957, which on dissolution of one Unit in 1970 became the Board

of Revenue. Every province in Pakistan has Board of Revenue department. The Board of Revenue is the Controlling authority in all matters connected with the administration of Revenue collection including land taxes, land revenue, administration of land laws and maintenance of record of rights in land, management of state land, recovery of government dues, changes in administrative units/creation of new divisions, districts and tehsils, consolidation of holdings, acquisition of land for public purposes and for companies and disaster management and relief. In the field formation of revenue department, each division is headed by Divisional Commissioner, each district is headed by Deputy Commissioner and each tehsil is headed by Assistant Commissioner which is assisted by Tehsildars and Naib Tehsildars.

For EDEIP, the Revenue Departments of three provinces (i.e., Punjab, Sindh and KP) will be involved. The DISCOs in the respective provinces will request their respective Revenue Departments to acquire the land (if any) for the new grid stations and pay compensation to the affectees for the losses and affected structures. All the relevant rules and regulations of the revenue department will be implemented at the project.

3.1.7. Labor Departments

The Labor Department in the province is custodian of the guaranteed rights of the workers like; right to organize, right to collective bargaining, participation in the affair of the respective organization, health and safety, minimum wages, and compensation etc. The main functions of the Labor Department included (i) maintenance of industrial peace and harmony in the province (ii) settlement of industrial disputes through the process of reconciliation, arbitration and adjudication (iii) coordination with district labor and human resource boards, dissemination of labor market information and implementation of government policies in this regard (iv) adjudication of claims of compensation and cases of non-payment of wages (v) registration and de-registration of trade unions/federations (vi) audit and scrutiny of the annual returns/funds of trade unions and federations (vii) enforcement of labor welfare laws on factories, transport, railway, shops, commercial and industrial establishments (viii) coordination of government efforts combating the issue of child labor and bonded labor (ix) provision of training, information and advisory services to the industry for the improvement of health, safety and working environment of working conditions and environment and (x) compilation of statistical data on labor matters.

For EDEIP, the Labor Departments of Punjab, KP and Sindh will be involved. They will be responsible to look after the health and safety conditions of the workers, payment of minimum wages and compensations to the workers and provision of different trainings to the workers and advisory services to the DISCOs during construction phase of the project. DISCOs will be responsible to coordinate, implement legal framework of the labor department related to project and provide necessary data of labor engaged at the project to the labor department.

3.1.8. Women Development Departments

Women Development Department is the department of strategies, administration, schemes and formation of laws related to women, it is the responsibility of department to cover all the needful grounds regarding women without the discrimination of class, creed, religion, economic position. Women development department is working on the empowerment of women by providing them social, economic and legal assistance in all fields by running different projects and implementing pro women laws and providing awareness to develop self-esteem and confidence. The main functions of women development department are (i) legislation, policy formulation and sectoral planning for women development (ii)

transformation of the government into an organization that actively practices and promotes gender equality and women empowerment (iii) implementation of administrative and institutional reforms and departmental restructuring for promoting gender equality (iv) mainstreaming gender equality perspective across public policies, laws, programs, and projects by departments and agencies of the government with a focus on women empowerment (v) promotion, coordination and monitoring of execution of national and provincial policies and commitments on gender reforms and women development (vi) provision of technical support and expertise for gender mainstreaming in all departments of the government and its agencies (vii) building of partnership with line departments, non-governmental and civil society organizations to deliver on the rights and entitlement of women (viii) collaboration with legal, judicial, law enforcement and other relevant governmental and non-government agencies to facilitate women's access to formal legal and justice system.

In EDEIP, Women Development Departments of Punjab, Sindh and KP will be involved. DISCOs in their respective areas will ensure that all the rules and regulations regarding women development will be implemented and regular coordination with the women development departments will be maintained during the project execution.

3.2. Environmental Policies, Legislations, and Guidelines

The national and provincial policies, legislations and regulations relevant to the projects are listed in the **Table 3.1**.

Table 3-1: Legislations/Acts/Policies Related to Environmental and Social Aspects and their Relevance to the Project

	Act	Brief Coverage	Relevance to the Project
1.	National Conservation Strategy, 1992	Pakistan National Conservation Strategy (NCS), which was approved by the federal cabinet in March 1992, is the principal policy document on environmental issues in the Country. The NCS outlines the Country's primary approach towards encouraging sustainable development, conserving natural resources and improving efficiency in the use and management of resources. The NCS has 68 specific programs in 14 core areas in which policy intervention is considered crucial for the preservation of Pakistan's natural and physical environment.	The core areas that are relevant in the context of the proposed project are pollution prevention during construction, conserving biodiversity and supporting forestry and plantation.
2.	National Environmental Policy, 2005	In March 2005, Government of Pakistan (GoP) launched its National Environmental Policy, which provides a framework for addressing the environmental issues. Section 5 of the policy commits for integration of environment into development planning as instrument for achieving the objectives of National Environmental Policy. It also provides	Clause (b) of sub-section 5.1 states that environmental impact assessment related provisions in Environmental Protection Act, 1997, will be diligently enforced for all developmental projects.

	Act	Brief Coverage	Relevance to the Project
		broad guidelines to the Federal Government, Provincial Governments, Federally Administered Territories and Local Governments to address their environmental concerns and to ensure effective management of their environmental resources.	
3.	National Climate Change Policy, 2012	The National Climate Change Policy provides a framework for addressing the issues that Pakistan faces or will face in future due to the changing climate. In view of Pakistan's high vulnerability to the adverse impacts of climate change, in particular extreme events, adaptation effort is the focus of this policy document. The vulnerabilities of various sectors to climate change have been highlighted and appropriate adaptation measures spelled out. The policy covers measures to address issues in various sectors such as water, agriculture, forestry, coastal areas, biodiversity and other vulnerable ecosystems. Notwithstanding the fact that Pakistan's contribution to global Greenhouse Gas (GHG) emissions is very small, its role as a responsible member of the global community in combating climate change has been highlighted by giving due importance to mitigation efforts in sectors such as energy, forestry, agriculture and livestock. Furthermore, appropriate measures relating to disaster preparedness, capacity building, institutional strengthening; technology transfer; introduction of the climate change issue in higher education curriculum; ensuring environmental compliance through Initial Environmental Examinations (IEE) and Environment and Social Impact Assessment (ESIA) in the development process; addressing the issue of deforestation and illegal trade in timber; promoting Clean Development Mechanisms (CDM); and raising Pakistan's stance regarding climate change at various	The provisions of this policy relevant to the project will be reviewed and measures will be incorporated in the environmental assessment reports.

	Act	Brief Coverage	Relevance to the Project
		international forums, have also been incorporated as important components of the policy. The policy thus provides a comprehensive framework for the development of action plans for national efforts on adaptation and mitigation.	
4.	National Forest Policy 2015	The goal of this policy is Expansion of national coverage of forests, protected areas, natural habitats and green areas for restoration of ecological functions and maximizing economic benefits while meeting Pakistan's obligations to international agreements related to forests. The objectives of policy are presented below: i. Enhancing public awareness on components of this policy shall be applicable.economic,social,ecologicaland cultural values of forests ii. Implementing a national level mass afforestation program to expand and maintain forest coverage to meet international standards iii. Controlling deforestation through regulating movement of timber and inter-provincial trade of timber iv. Establishing and managing protected areas and networking through ecological corridors v. Reducing carbon footprints of energy and economic sector programs vi. Facilitating implementation of international conventions and agreements related to forestry, biodiversity and climate change vii. Promoting standardized and harmonized scientific planning of forests, research and education	During the implementation of the project if there will be cutting of trees then replantation will be ensured. Maintenance of ecological corridors and curb deforestation and promote conservation
5.	National Power Policy 2013	The vision of the policy is that Pakistan will develop the most efficient and consumer centric power generation, transmission, and distribution system that meets the needs of its population and boosts its economy in a sustainable and affordable manner.	The proposed project will improve the efficiency of grid stations and efficiency of distribution system in the areas of proposed distribution companies.

	Act	Brief Coverage	Relevance to His Project
		The goals of power policy are described below: (i) Build a power generation capacity that can meet Pakistan's energy needs in a sustainable manner. (ii) Create a culture of energy conservation and responsibility (iii) Ensure the generation of inexpensive and affordable electricity for domestic, commercial, and industrial use by using indigenous resources such as coal (Thar coal) and hydel. (iv) Minimize pilferage and adulteration in fuel supply (v) Promote world class efficiency in power generation (vi) Create a cutting-edge transmission network (vii) Minimize inefficiencies in the distribution system (viii) Minimize financial losses across the system (ix) Align the ministries involved in the energy sector and improve the governance of all related federal and provincial departments as well as regulators	–
6.	Pakistan Labor Policy, 2010	The main objective of the Labor Policy, 2010 is the social and economic well-being of the labor of Pakistan. The Labor Policy, 2010 has following 4 parts: i. Legal Framework; ii. Advocacy: rights of workers and employers; iii. Skill development and employment; and iv. Manpower export.	The labor will be employed for construction of the proposed project. The provision of policy will apply to all the labor employed.
7.	Provincial Environmental Protection Acts	The provincial environmental protection acts are comprehensive legislation and provide the legislative framework for protection, conservation, rehabilitation and	The project will follow the requirements of provincial environmental protection acts. All the

	Act	Brief Coverage	Relevance to the Project
		improvement of the environment. The 'environment' has been defined in the Act as: (a) air, water and land; (b) all layers of the atmosphere; (c) all organic and inorganic matter and living organisms; (d) the ecosystem and ecological relationships; (e) buildings, structures, roads, facilities and works; (f) all social and economic conditions affecting community life; and (g) the interrelationships between any of the factors specified in sub-clauses 'a' to 'f'. The important points of the law are: • No proponent of a project shall commence construction or operation unless he has filed with the Agency an IEE or, where the project is likely to cause an adverse environmental effect, an EIA, and has obtained from the Agency approval in respect thereof • Prohibition of certain discharges or emissions; • Handling of hazardous substances • Prohibition of action adversely affecting environment • The Agency shall carry out or arrange environmental monitoring of all projects in respect of which it has approved an initial environmental examination or environmental impact assessment to determine whether the actual environmental impact exceeds the level predicted in the assessment and whether the conditions of the approval are being complied with. • The Agency shall from time to time require the person in charge of a project to furnish, within such period as may be specified, an environmental audit or environmental review report or environmental management plan containing a comprehensive appraisal of the environmental aspects of the project. • Environmental Quality Standards (EQS) for wastewater, air emissions and noise	environmental approvals will be obtained from the provincial EPAs. All efforts will be made to protect the environment and comply with environmental quality standards during the construction phase of the project.

	Act	Brief Coverage	Relevance to the Project
		• Provincial Government can issue notices and enforce them to protect the environment.	
8.	Provincial Environmental Protection Agencies, (Review of IEE and EIA) Regulations	These regulations set out: • Key policy and procedural requirements for filing an IEE and EIA; • The purpose of environmental assessment; • The goals of sustainable development; • The requirement that environmental assessment be integrated with feasibility studies; • The jurisdiction of the Federal and Provincial EPA's and Planning &Development (P&D) Departments; • The responsibilities of proponents; • Duties of responsible authorities; • Provides schedules of proposals that the project requires either IEE or an EIA; • The environmental screening process of the projects under schedule I, II and III; and • The procedure for the environmental approval for filing the case with the concerned EPA for the granting of the NOC.	The provisions of these regulations are applicable for environmental screening of the project, which implies that an EIA would be required for the proposed project. The process described in the regulation will be useful for distribution companies (i.e., PESCO) to follow the procedure to file an EIA with their respective provincial environmental protection agencies and to understand its review process along with timelines to be followed
9.	Environmental Quality Standards	The Environmental protection agencies of Sindh and Punjab have their own environmental quality standards which were approved in 2015 and 2016 and are being followed by the projects in these provinces. Whereas the KP EPA follows the national environmental quality standards. Environmental quality standards are for: • Drinking Water; • Ambient Air; • Noise; • Industrial Gaseous Emissions; • Municipal and Liquid Industrial Effluents; • Motor vehicle exhaust • Treatment of Liquid and Bio-Medical Waste	All projects to be implemented in the provinces of Punjab, Sindh and KP must conform to their respective environmental quality standards during all the phases i.e., construction and operation.
10.	Provincial Wildlife	The provinces of Punjab, KP, and Sindh have their acts related to wildlife protection.	The provisions of these laws will be applicable

	Act	Brief Coverage	Relevance to the Project
	Protection, Preservation, Conservation and Management Acts	These acts are for the regulation of activities relating to protection, preservation, conservation and management of wildlife and protected areas in the provinces.	during the site selection for the new grid stations and updation of transmission lines in the areas of respective provinces.
11.	Land Acquisition Act (LAA), 1894	The primary law for acquisition of land for public purposes in Pakistan is the "Land Acquisition Act, 1894" (hereinafter referred as the Act). The land acquired under the Act vests in the province and it is only thereafter that the province may transfer it to someone else.	Though this law is relevant to the project, its covenants have been covered mainly in the resettlement policy framework, which is a companion document of this environmental and social framework (ESSA and ESMF) report.
12.	Pakistan Penal Code, 1860	The Code deals with the offences where public or private property or human lives are affected due to intentional or accidental misconduct of an individual or organization. The Code also addresses control of noise, noxious emissions and disposal of effluents.	The provisions of the Penal Code, 1860 are applicable to the project in terms of penalties for effecting human lives and public property. It also addresses the control of noise, air emissions and effluent disposal.
13.	The Canal and Drainage Act, 1873	The Canal and Drainage Act 1873 (amended in 1952, 1965, 1968 and 1970) prohibits corruption or fouling of water in canals (defined to include channels, tube wells, reservoirs and watercourses), or obstruction of drainage.	This Act will be applicable to the physical works to be carried out during the proposed project.
14.	Explosives Act, 1884	It provides regulations for handling, storage, transportation and use of explosives.	Under the Explosives Act, the project contractors shall be bound by regulations on handling, transportation and using explosives during construction of proposed project.
15.	The Telegraph Act, 1885	The Telegraph Act (Section 11) confers powers to enter private lands and (Section 10) construct/maintain electric poles and lines without the need to acquire the land affected and paying compensation for it. However, the sub-section 10 (d) referred to	This Act makes a provision of installing poles/towers without acquiring any land. However, provision is there for temporary

	Act	Brief Coverage	Relevance to the Project
		avoid causing unnecessary damages to the affected land and associated assets. Finally, the Section 16 provides that if any such damage occurs; (i.e., damages to crops, irrigation facilities, land quality or land income). The proponent has to provide compensation for the damages.	acquisition of land during the construction period. As such, compensation is made for the loss of crop for a specific period.
16.	Electricity Act, 1910	The Act provides a legal basis for distribution of Power. It enables a licensee to conduct operations for supply of electricity and binds the license to payment of compensation in respect of any damages caused during the construction, operation and maintenance (O&M) of Power distribution facilities.	This act will be applicable if any damages occur during construction of the power facilities.
17.	Forest Act, 1927	The Forest Act, 1927 was largely based on previous Indian Forest Acts implemented under the British. The first and most famous was the Indian Forest Act of 1878. Both the 1878 act and the 1927 one sought to consolidate and reserve the areas having forest cover, or significant wildlife, to regulate movement and transit of forest produce, and duty leviable on timber and other forest produce. It also defines the procedure to be followed for declaring an area to be a Reserved Forest, a Protected Forest or a Village Forest. The said act has since been amended and replaced by the provincial Forest Acts, after forestry came into the provincial domain under the 18th amendment to the Constitution of Pakistan. However, the main applicable clauses still hold true in essence.	This Act will be relevant in case any part of the proposed intervention is located on a land previously prescribed as Forest Land by the provincial governments. In such cases, Land acquisition will Be governed under this Act, and the Provincial department Responsible for execution of T/L project, will need To negotiate with The provincial Forest department.
18.	Factories Act, 1934	The Factories Act, 1934 concerns regulation of labor in factories and addresses issues regarding labor, wages, working hours and health and safety. The Factories Act also briefly refers to environmental issues. Section 14 deals with the disposal of industrial wastewater and states that "effective arrangements shall be made in every factory for the disposal of wastes and effluents due to the manufacturing process carried on therein." The Factories Act states that "the Provincial	The provisions of this act related to labor And environmental issues will be applicable to The project

	Act	Brief Coverage	Relevance to the Project
		Government may make rules prescribing the arrangements to be made under sub-section (1) or requiring that the arrangements made in accordance with that sub-section shall be subject to the approval of such authority as may be prescribed. This allows provincial governments to establish rules for factories, whose operation exposes persons to "serious risk of bodily injury, poisoning, or disease."	
19.	Protection of Trees and Brushwood Act, 1949	The Protection of Trees and Brushwood Act, 1949 prohibits cutting or chopping of trees and brushwood without prior permission of the relevant department in the provincial government.	The proposed Project involves tree cutting. The related activities Should only be undertaken under the tower footing. They should not clear trees or brushwood outside the acquired area.
20.	WAPDA Act, 1958	The WAPDA Act of 1958 is the other relevant legal framework, which permits "right of entry" for the purpose of construction - for instance, (i) survey of any land, erect pillars for the determination of intended lines of works, make borings and excavations and do all other acts which may be necessary for the preparation of any scheme; and (ii) pay or tender payment for all necessary damage to be done as aforesaid. The Act further states that "in case of dispute as to the sufficiency of the amount so paid or tendered, the dispute shall be referred to the Deputy Commissioner (DC) of the district whose decision shall be final.	The provisions of this act will be applicable in EDEIP during construction of transmission lines and grid stations.
21.	Cutting of Trees (Prohibition) Act, 1975	The Act was enforced in 1975 to place restrictions on cutting of trees in order to restrain unchecked trend of tree felling without replacement plantations.	This act will be applicable to the subject project where the cutting of tree will be involved.
22.	Employment of Children Act (ECA), 1991	Article 11(3) of the Constitution of Pakistan prohibits employment of children below the age of 14 years in any factory, mines or any other hazardous employment. In accordance with this Article, the Employment of Child Act (ECA) 1991 disallows the child labor in the country. The ECA states 8that no child shall be employed	The project proponent and their contractors shall be bound by the ECA to disallow any child labor at the project sites.

	Act	Brief Coverage	Relevance to the Project
		or permitted to work in any of the occupation set forth in the ECA (such as transport sector, railways, construction, and ports) or in any workshop wherein any of the processes defined in the Act is carried out. The processes defined in the Act include carpet weaving, biri (kind of a cigarette) making, cement manufacturing, textile, construction and others.	
23.	National Disaster Management Act, 2010	National Disaster Management Act, 2010 was passed by Parliament of Pakistan in 2010. The Act applies to whole Pakistan including tribal areas. The Act was passed in backdrop of 2010 Floods in Pakistan and strengthens disaster management system.	This act is applicable to the proposed project due to its location in mountainous areas of KP Province. The proposed project will require special consideration of disaster and risk management strategies as per the Act.
24.	The Protection against Harassment of Women at the Workplace Act, 2010	The Protection against Harassment of Women at the Workplace Act (2010) refers to sexual harassment at the workplace.	This Act will be applicable to the project if women are employed for the construction of the proposed project.
25.	Provincial Antiquities Acts	The Antiquity acts of Punjab, Sindh and KP are adopted from the Pakistan Antiquities Act of 1975 with a few minor changes. The Antiquities Act, 1975 (amended in 1990) states the following: • "Ancient" is any object that is at least 75 years old; • All accidental discoveries of artefacts must be reported to the Federal Department of Archaeology; • The Government is the owner of all buried antiquities discovered on any site, whether protected or otherwise; • All new construction within a distance of 200 feet from protected antiquities is forbidden; • No changes or repairs can be made to a protected monument, even if it is owned privately, without approval of the responsible authorities; and	The law will be applicable to the project mainly due to its two provisions: ▪ According to the law, any construction activity within 61 m or 200 ft. of protected antiquities, are prohibited. ▪ The provisions of this act would also be applicable, if any accidental archaeological discoveries may occur during the excavation works for the construction of proposed Project.

	Act	Brief Coverage	Relevance to the Project
		• The cultural heritage laws of Pakistan are uniformly applicable to all categories of sites regardless of their state of preservation and classification as monuments of national or world heritage.	
26.	Guideline for Solid Waste Management, 2005	Guidelines for Solid Waste Management (2005) are in draft form (Pak-EPA in cooperation with Japan International Corporate Agency and United Nations Development Program).	The provision of these guidelines is applicable for waste generation and management during construction works of the proposed electricity distribution efficiency improvement project.
27.	Building Codes of Pakistan (Seismic Provisions 2007)	The Pakistan Engineering Council (PEC) governs the application of Building Code of Pakistan (Seismic Provisions-2007). Prior to the start of construction, the proposed sub projects will take design approval from PEC to ensure compliance with seismic provision according to zones.	The project will take the design approval from PEC prior to construction to ensure compliance with seismic provisions according to zones. The requirements of the seismic zoning map shall be superseded if a site-specific hazard analysis, probabilistic, deterministic or both, is carried out for a building or structure.
28.	Sindh Occupational Health and Safety Act, 2017 and Punjab Occupational Health and Safety Act, 2019	These Acts address occupational safety and health conditions at all workplaces for the protection of persons at work against risk of injury arising out of the activities at work places and for the promotion of safe, healthy and decent working environment adapted to the physical, physiological and psychological needs of all persons at work	The provisions of this act for health and safety of workers during construction will be applicable to the project
29.	Khyber Pakhtunkhwa Worker's Compensation Act, 2013	An Act to provide for the payment by certain classes of employers to their workers or their legal heirs of compensation for injury or death by accident.	This act will be applicable to PESCO during their implementation of project in KP.

3.3. WB Environmental and Social Framework

As part of the project preparation, environmental and social assessments of proposed project will be carried out in accordance with the World Bank's Environmental and Social

Framework (ESF) . The Environmental and Social Standards (ESSs) as embedded in the ESF are discussed below.

ESS1: Assessment and Management of Environmental and Social Risks and Impacts: This Standard sets out the borrower's responsibilities for assessing, managing and monitoring environmental and social risks and impacts associated with each stage of a project supported by the Bank through Investment Project Financing, in order to achieve environmental and social outcomes consistent with the Environmental and Social Standards (ESSs). Its objectives include:

- To identify, evaluate and manage the environment and social risks and impacts of the project in a manner consistent with the ESSs.
- To adopt a mitigation hierarchy approach to:
  a. Anticipate and avoid risks and impacts;
  b. Where avoidance is not possible, minimize or reduce risks and impacts to acceptable levels;
  c. Once risks and impacts have been minimized or reduced, mitigate; and
  d. Where significant residual impacts remain, compensate for or offset them, where technically and financially3 feasible.
- To adopt differentiated measures so that adverse impacts do not fall disproportionately on the disadvantaged or vulnerable, and they are not disadvantaged in sharing development benefits and opportunities resulting from the project.
- To utilize national environmental and social institutions, systems, laws, regulations and procedures in the assessment, development and implementation of projects, whenever appropriate.
- To promote improved environmental and social performance, in ways which recognize and enhance Borrower capacity.

Relevance of the Standard for the Project:

The key project risks are related to the distribution system and mainly associated with routine occupational health and safety related to construction and rehabilitation of distribution network. These are related to working at height, electrical works and, use and disposal of hazardous materials such as transformer oils and possibility of PCBs in obsolete transformers and SF6. Such activities are normal and routine work for distribution companies globally for which known and reliable mechanisms, including both designs and procedures as well as safety precautions and practices, are expected to be sufficient to prevent accidents. With over 28,000 kms of 132 kV network which is increasing annually by about 450 kms, there is plenty of in-country experience to handle such activities. Some community health impact can be expected from low levels of electromagnetic force. Based upon such information, such impacts are not expected to be significant and adverse.

The environmental impacts are associated with construction waste and e-waste from the end of useful life of the project equipment, hardware and discarded computers; removal of vegetation and earthworks, construction activities; soil contamination; and disposal and/or reuse of old transformers and restrictions on land use. Given that the project will mainly involve work on low voltage transmission (132kV and below) and expansion and rehabilitation of 11kV feeders, the environmental risks and impacts are unlikely to be

significant and are expected to be reversible and site-specific without likelihood of impacts going beyond the actual footprint of the project. Therefore, there are no material threats to ecosystem services, natural habitats, biodiversity and living natural resources protection, conservation, maintenance and restoration of natural habitats and biodiversity. The project is expected to have a positive impact on climate change as it is expected to reduce CO_2 emissions by installing more efficient grid equipment.

The direct social impacts and risks are anticipated to be mainly related to Component-1. Under this component, the project may require small parcels of private land for new substations and associated structures. These are substations with small land requirements. Similarly, the extensions may also require small scale acquisition of private land. It is anticipated that the proposed rehabilitation works will generally be carried out within the areas of the existing facilities or networks and are unlikely to have significant adverse social impacts. The impact of the Component 2 is expected to be minor. Other social impacts and risks will be related to the limited labour influx, gender, community health and safety and distress of public/community due to disruption of utility services. Some of the activities proposed under Component-2 such as improvement of customer service, flexible, community-oriented approach in dealing with service delivery and payment collections etc. may have some social impacts related to vulnerable groups which will be identified during the preparation. These impacts will be assessed under ESIAs. The ESIAs will also include gender assessment to identify challenges in recruiting and retaining more women on technical jobs in the selected distribution companies. The project design will also devise strategies for zero tolerance for Gender based Violence (GBV) and Sexual Exploitation and Abuse (SEA)/Sexual Harassment (SH). The ESIA will identify the vulnerable and disadvantaged groups and assess impacts on them.

Environmental and Social management tools are being developed by IAs during project preparation. For projects with identified footprint and design completed, the management tools will include the ESIAs; RPs, and Environmental and Social Management Plans (ESMPs). For projects whose location, footprint and design will be finalized during implementation, ESSA and ESMF (the present document) and RF have been prepared. These instruments have been prepared by IAs, consulted on, reviewed and cleared by the Bank, and disclosed in-country and on the Bank's system before appraisal. An ESCP has been prepared and will be agreed with the borrower based on the findings of the ESIAs, ESMPs, RPs/RF and the Bank's Environment and Social Due Diligence (ESDD) on SEP provisions, institutional arrangement for implementation, capacity building measures and the monitoring plan. The DISCOs will clearly spell out in the ESCP on payment of compensation for lands under transmission towers and use of private negotiations for determining the land rates for acquisition in case expropriation will be used.

Contractors will be required to develop OHS management plans, method statements and job hazards analyses. Such safeguard instruments will be approved by supervision engineers and the Bank's safeguard staff will provide oversight and guidance on OHS related issues. Learning from the past experiences, the it will be ensured that ESSA, ESMF, ESIA and bidding documents have stringent contractual provisions that will enable supervision engineers to enforce compliance with OHS instruments. Both Supervision Engineers and contractors will have full time accredited OHS specialists/staff.

ESS2: Labor and Working Conditions. This Standard recognizes the importance of employment creation and income generation in the pursuit of poverty reduction and inclusive economic growth. Borrowers can promote sound worker-management relationships and enhance the development benefits of a project by treating workers in the

project fairly and providing safe and healthy working conditions. Its objectives include:

- To promote safety and health at work.
- To promote the fair treatment, nondiscrimination and equal opportunity of project workers.
- To protect project workers, including vulnerable workers such as women, persons with disabilities, children (of working age, in accordance with this ESS) and migrant workers, contracted workers, community workers and primary supply workers, as appropriate.
- To prevent the use of all forms of forced labor and child labor.
- To support the principles of freedom of association and collective bargaining of project workers in a manner consistent with national law.
- To provide project workers with accessible means to raise workplace concerns.

Relevance of the Standard for the Project:

The Project will involve different types of workers including (a) direct workers (DISCO employees); b) contracted workers engaged in construction works, locally hired unskilled laborers; consultancy services firms (for specific deliverables under the project; technical support to DICSOs during preparation and implementation of ESIAs, ESMPs, RPs etc.); and c) primary supply workers.

The Project has prepared Labor Management Procedures (LMP) consistent with the requirements of the World Bank's ESS2. The plan includes assessment of potential labor related risks, SEA/SH, overview of labor regulation, staff responsibility, policies and procedures, working age, contract terms and conditions, GRM and other requirements per ESS2. The DISCOs will ensue that contractor's labor camps have adequate living (properly ventilated living rooms, clean bathrooms and toilets, hygienically cooked food, etc.) and recreational facilities.

Keeping in view the small-scale nature of civil works, large number of labor is not expected to be hired. Pakistan has comprehensive labor laws covering the contract of employment, termination of contract, working time and rest time (working hours, paid leave, maternity leave and maternity protection, other leave entitlements), prevent child and forced labor, minimum age and protection of young workers, equality, pay issues, workers' representation in the enterprise, trade union and employers' association regulation and other aspects. In addition, Pakistan has also ratified more than 30 ILO labor conventions. However, some measures will be needed to enhance the DISCOs' implementation and supervision capacity of labor aspects mainly through supervision consultants. These measures are described in LMP.

General risks identified at the concept stage indicated that OHS risks associated with daily day-to-day operations of DISCO and less related specifically to project activities. Hence as a part of the project, operational capabilities of DISCOs in OHS will be enhanced through (i) reviewing OHS manuals with the intention of bringing them at par with the international best practices and acceptable OHS standards; (ii) imparting trainings to technical staff on OHS and use of modern and technically advance equipment to address key OHS issues; (iii) procuring and providing technical staff with safety tools and equipment to address specific OHS aspects; and (iv) if required, increase staff strength to adequately address OHS issues.

The Project will also put in place systems and measures for establishing and maintaining a safe working environment and the contractors will have to comply with stringent guidelines of project's OHS management system and their own management system. The system will include (i) OHS management plans and instruments (ii) hazard management instruments such as Job Hazards Analysis and works method statements with emphasis on potential hazards particularly related to electrocution and life-threatening works, (iii) training of workers and maintenance of training records, (iv) documentation and reporting of accidents and incidents, and (v) remedial and corrective measures. Periodic review of OHS policies and procedures will be made mandatory.

ESS3: Resource Efficiency and Pollution Prevention and Management. This Standard recognizes that economic activity and urbanization often generate pollution to air, water, and land, and consume finite resources that may threaten people, ecosystem services and the environment at the local, regional, and global levels. The current and projected atmospheric concentration of greenhouse gases (GHG) threatens the welfare of current and future generations. At the same time, more efficient and effective resource use, pollution prevention and GHG emission avoidance, and mitigation technologies and practices have become more accessible and achievable. This ESS sets out the requirements to address resource efficiency and pollution1 prevention and management throughout the project life cycle consistent with good international industry practice. Its objectives include:

- To promote the sustainable use of resources, including energy, water and raw materials.
- To avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities.
- To avoid or minimize project-related emissions of short and long-lived climate pollutants.
- To avoid or minimize generation of hazardous and non-hazardous waste.
- To minimize and manage the risks and impacts associated with pesticide use.

Relevance of the Standard for the Project:

This is an energy efficiency project, aimed at improving operational efficiencies of the three DISCOs. This will be done by reducing the aggregate technical and commercial losses in the network compared to base values to create more financially sustainable DISCOs that will rely less on state funds by improving receivables and reducing system losses. It will help to reduce GHG emissions as well as black carbon by installing new energy efficient electrical equipment according to the prevailing standards. This will be done by installing new circuit breakers with near zero SF6 leakage to replace ageing breakers and new transformers with zero oil leakage to replace aged and overloaded transformers through the rehabilitation and augmentation of substations. The project will help the DISCOs to calculate GHG reductions.

This project also seeks to improve the reliability and reduce energy theft in the DISCOs by deploying ABC in densely populated areas as it is more efficient and has higher reliability and less losses. The deployment of ABC's will contribute to reducing the risk of electrocutions by eliminating flying naked wires and connections. Furthermore, the project involves works on low voltage transmission lines which typically have low frequency of electromagnetic field emanating from power lines. The TL will also have buffer zones and adequate ground clearance in accordance with the international standards bringing EMF

exposure to within compliance limits.

DISCOs do not use pesticides to control vegetation. Utility companies in Pakistan have not procured a PCB transformer for over decades now. However, some of the old transformers replaced under project may contain PCBs. Hence as a precautionary principle, their handling, transportation and disposal will be addressed through provisions in ESIAs and ESMPs.

Technical evaluation will take into consideration load and no-load losses of transformers and other equipment to be procured for the most efficient and financially viable equipment in the network. The electrical equipment will conform to appropriate standards on protection from interference of electric and magnetic field.

ESIA and ESMPs will also address transportation, handling and storage, use and disposal of electrical equipment which may contain hazardous and non-hazardous chemicals.

ESS4: Community Health and Safety. This Standard recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts. In addition, communities that are already subjected to impacts from climate change may also experience an acceleration or intensification of impacts due to project activities. ESS4 addresses the health, safety, and security risks and impacts on project-affected communities and the corresponding responsibility of Borrowers to avoid or minimize such risks and impacts, with particular attention to people who, because of their particular circumstances, may be vulnerable. Its objectives include:

- To anticipate and avoid adverse impacts on the health and safety of project-affected communities during the project life cycle from both routine and nonroutine circumstances.
- To promote quality and safety, and considerations relating to climate change, in the design and construction of infrastructure, including dams.
- To avoid or minimize community exposure to project-related traffic and road safety risks, diseases and hazardous materials.
- To have in place effective measures to address emergency events.
- To ensure that the safeguarding of personnel and property is carried out in a manner that avoids or minimizes risks to the project-affected communities.

Relevance of the Standard for the Project:

Community health and safety risks associated with the project activities include exposure to EMF and hazardous substances, air quality, noise, any harm which might be caused to communities by the influx of outside workers and physical hazards from the TL on project sites and installation activities. These risks can also be related to SEA/SH, spread of different diseases like COVID-19 and other communicable diseases.

The ESSA and ESMF has evaluated the risks and impacts of the project on health and safety of the communities during the project life cycle, and proposed mitigation measures in accordance with the mitigation hierarchy. Emergency response measures have been incorporated into the ESCP. Similarly, preparation of work methods statements, job hazards analysis as well as job safety analysis by the Contractor have been made part of ESCP.

The ESSA and ESMF has also assessed exposure of communities to construction stage related traffic, accident, and health and safety issues. Further, all works and operations will be planned, designed and implemented to comply with the WBG EHS guidelines including i) General

and ii) on Power Transmission.

ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement. This Standard recognizes that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons. Project-related land acquisition or restrictions on land use may cause physical displacement (relocation, loss of residential land or loss of shelter), economic displacement (loss of land, assets or access to assets, leading to loss of income sources or other means of livelihood), or both. The term "involuntary resettlement" refers to these impacts. Resettlement is considered involuntary when affected persons or communities do not have the right to refuse land acquisition or restrictions on land use that result in displacement.

Experience and research indicate that physical and economic displacement, if unmitigated, may give rise to severe economic, social and environmental risks: production systems may be dismantled; people face impoverishment if their productive resources or other income sources are lost; people may be relocated to environments where their productive skills are less applicable and the competition for resources greater; community institutions and social networks may be weakened; kin groups may be dispersed; and cultural identity, traditional authority, and the potential for mutual help may be diminished or lost. For these reasons, involuntary resettlement should be avoided. Where involuntary resettlement is unavoidable, it will be minimized and appropriate measures to mitigate adverse impacts on displaced persons (and on host communities receiving displaced persons) will be carefully planned and implemented. Its objectives include:

- To avoid involuntary resettlement or, when unavoidable, minimize involuntary resettlement by exploring project design alternatives.
- To avoid forced eviction.
- To mitigate unavoidable adverse social and economic impacts from land acquisition or restrictions on land use by: (a) providing timely compensation for loss of assets at replacement cost and (b) assisting displaced persons in their efforts to improve, or at least restore, their livelihoods and living standards, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.
- To improve living conditions of poor or vulnerable persons who are physically displaced, through provision of adequate housing, access to services and facilities, and security of tenure.
- To conceive and execute resettlement activities as sustainable development programs, providing sufficient investment resources to enable displaced persons to benefit directly from the project, as the nature of the project may warrant.
- To ensure that resettlement activities are planned and implemented with appropriate disclosure of information, meaningful consultation, and the informed participation of those affected.

Relevance of the Standard for the Project:

The project will have limited permanent land needs for construction/expansion of substations and temporary impacts for distribution network rehabilitation. Distribution line rehabilitation works will mostly follow the existing ROW and will generally have limited temporary impacts during cabling work. These will be assessed during preparation.

Under the project, small land areas will be required primarily for the construction of a few new proposed substations. These substations will need land ranging from 2 to 4 acres and their siting can be sufficiently flexible to use willing buyer-willing seller approach and to avoid/minimize encroachments. Similarly, for new TLs, DISCOs have a flexibility to shift the alignment to avoid/minimize encroachments. Therefore, the approach is going to be very flexible in terms of location and alignment of TLs. The extent of land acquisition and involuntary resettlement impacts will also be minimized for the construction of new substations through: (i) preferably using Government land (this is a practice which DISCOs are currently following and several proposed substations of PESCO are already on government land); and (ii) design modifications, generally, land requirement for 132 kV substations is about 4 to 6 acres. In areas where availability of land is considered an issue, DISCOs will opt for Gas Insulated Substations (GIS) which require only 1-2 acres, half the size of the Air Insulated Substations (AIS). PESCO is operating an unmanned substation in less than 1 acre. Some of these small substations and TLs are expected to be located in small districts which are not densely populated, e.g., PESCO has shared some proposed sites which are not located in densely populated areas. In addition, the extensions and augmentations will be carried out within the existing premises having a boundary wall.

Therefore, the chances of encroachments are non-existent for extensions and augmentations.

As per the Telegraph Act of 1885 (the law governing the construction of transmission lines), the implementing agencies do not require acquisition of the land falling under towers. This has been a challenge and the landowners, at times, resist such use of their land. To address this issue, it has been agreed that the DISCOs (the implementing agencies for this project) will pay compensation for the land under towers. This is what the National Transmission and Dispatch Company (NTDC) in Pakistan has done for some transmission projects as 'good practice'.

Sub-projects will be screened for land acquisition and involuntary resettlement impacts. Willing Buyer-Willing Seller approach will be the first preference by DISCOs as these projects have small footprints and are expected to have multiple site options. In this case, DISCOs will inform the site owners about their right to decline without any consequences and will consider options where the sellers are willing to sell. As explained above, for new grid stations and ROW, these are small areas and DISCOs have a flexibility to shift the alignment or site to avoid or minimize the encroachments. Therefore, these issues do not appear to be significant at concept stage and involuntary land acquisition and displacement of encroachers is not expected.

Though willing-buyer -willing seller approach will be the first priority of DISCOs, there might be a possibility that this approach may not work for some subprojects with limited site options due to technical considerations and some encroachers may also be identified for displacement. Keeping this in view, implementing agencies have prepared an RF in accordance with ESS5 which has been consulted on, reviewed and cleared by the Bank, and disclosed in-country and on the Bank system before project appraisal.

ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources. This Standard recognizes that protecting and conserving biodiversity and sustainably managing living natural resources are fundamental to sustainable development. Biodiversity is defined as the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species,

and of ecosystems. Biodiversity often underpins ecosystem services valued by humans. Impacts on biodiversity can therefore often adversely affect the delivery of ecosystem services. Its objectives include:

- To protect and conserve biodiversity and habitats.
- To apply the mitigation hierarchy and the precautionary approach in the design and implementation of projects that could have an impact on biodiversity.
- To promote the sustainable management of living natural resources.
- To support livelihoods of local communities, including Indigenous Peoples, and inclusive economic development, through the adoption of practices that integrate conservation needs and development priorities.

Relevance of the Standard for the Project:

As mentioned above under ESS1, there are no material threats to protection, conservation, maintenance and restoration of natural habitats, biodiversity and living natural resources. While all projects are not known at this time, the project is expected to mainly be carried out in urban and peri urban areas only. The project is also not expected to have adverse impacts on ecosystem services as well as use of living natural resources as most of the project activities will be carried out within the existing substations and in already modified urban settings. However, some clearing of vegetation and felling of trees is expected for grid stations. Some felling and pruning of trees can be expected for vegetation below TLs or on the ROW of TLs. Furthermore, the borrower will not introduce any alien or non-native specifies of flora or fauna in the project area. Appropriate measures have been described in ESSA and ESMF to reduce chances of accidental introduction of alien flora/fauna. Therefore, this ESS6 is not relevant to the project at concept stage.

ESS8: Cultural Heritage. ESS8 recognizes that cultural heritage provides continuity in tangible and intangible forms between the past, present and future. People identify with cultural heritage as a reflection and expression of their constantly evolving values, beliefs, knowledge and traditions. Cultural heritage, in its many manifestations, is important as a source of valuable scientific and historical information, as an economic and social asset for development, and as an integral part of people's cultural identity and practice. ESS8 sets out measures designed to protect cultural heritage throughout the project life cycle. This ESS sets out general provisions on risks and impacts to cultural heritage from project activities. ESS7 sets out additional requirements for cultural heritage in the context of Indigenous Peoples. ESS6 recognizes the social and cultural values of biodiversity. Provisions on Stakeholder Engagement and Information Disclosure are set out in ESS10. Its objectives include:

- To protect cultural heritage from the adverse impacts of project activities and support its preservation.
- To address cultural heritage as an integral aspect of sustainable development.
- To promote meaningful consultation with stakeholders regarding cultural heritage.
- To promote the equitable sharing of benefits from the use of cultural heritage.

Relevance of the Standard for the Project:

This standard is relevant to the project. While some of the districts have culturally significant sites, it is unknown at this stage if there will be any impacts on these sites due

to the project. The ESIAs to be prepared during the project implementation would, in any event, evaluate any direct or indirect impacts of project activities on these cultural assets or determine the presence of any others that may not be listed but could be of significance. Depending on the exact determination of the nature and scale of the project risks and impacts, mitigation measures or a plan will be prepared as part of the ESIA/ESMP and will be incorporated into the ESCP as required. Procedures for handling chance finds will be determined during the ESIA and made part of the ESMP to handle any such situations during project implementation.

ESS10: Stakeholder Engagement and Information Disclosure. This Standard recognizes the importance of open and transparent engagement between the Borrower and project stakeholders as an essential element of good international practice. Effective stakeholder engagement can improve the environmental and social sustainability of projects, enhance project acceptance, and make a significant contribution to successful project design and implementation. Its objectives include:

- To establish a systematic approach to stakeholder engagement that will help Borrowers identify stakeholders and build and maintain a constructive relationship with them, in particular project-affected parties.
- To assess the level of stakeholder interest and support for the project and to enable stakeholders' views to be taken into account in project design and environmental and social performance.
- To promote and provide means for effective and inclusive engagement with project-affected parties throughout the project life cycle on issues that could potentially affect them.
- To ensure that appropriate project information on environmental and social risks and impacts is disclosed to stakeholders in a timely, understandable, accessible and appropriate manner and format.
- To provide project-affected parties with accessible and inclusive means to raise issues and grievances, and allow Borrowers to respond to and manage such grievances.

Relevance of the Standard for the Project:

Given the nature of project activities, various groups of stakeholders will be involved in the project design, implementation and decision-making. The identified stakeholders include Project Affected Persons (PAPs) and local surrounding communities; customers/electricity users across the areas of DISCOs' operations; local government departments; line departments including environment protection, agriculture, revenue, irrigation, social welfare, women development and labor; civil society organizations and NGOs operating locally in the project area.

Consultation and disclosure of information with stakeholders has been/will be a core element during both the planning and implementation stages of project.

The borrowers have developed a Stakeholder Engagement Plan (SEP) to ensure meaningful consultations during the project preparation which will also outline the Grievance Redress Mechanism (GRM). This GRM will build on the existing GRM and procedures established and operational in each DISCO.

4. Environmental and Socio-economic Characteristics of the Project Area

This Chapter provides an overview of the baseline conditions of the area covered by electricity networks of the IAs (ie, PESCO). This overview has been prepared on the basis of secondary resources including previous environmental assessment reports and official websites of various government departments. More site-specific baseline conditions will need to be included in the subproject-specific ESIAs and ESMPs. This chapter deals with areas where physical interventions and impacts are expected.

4.1. Area Covered by PESCO

Peshawar Electric Supply Company (PESCO) is responsible for distribution of electricity in twenty-eight districts of Khyber Pakhtunkhwa (KP). These districts included Peshawar, Upper Chitral, Lower Chitral, Swat, Upper Kohistan, Lower Kohistan, Kolai Palas, Shangla, Battagram, Mansehra, Torghar, Upper Dir, Lower Dir, Malakand, Buner, Mardan, Charsadda, Swabi, Abbottabad, Haripur, Nowshera, Kohat, Hangu, Karak, Bannu, Laki Marwat, Tank and Dera Ismail Khan. PESCO is divided into eight circles[7] covering about 1,204,621 ha of land in total. The seven tribal agencies (districts) and six frontier regions are covered by Tribal Areas Electricity Supply Company (TESCO). The baseline conditions of KP areas under PESCO are explained in the below paragraphs. The map of PESCO operational areas is presented in **Figure 4.1**.

Khyber Pakhtunkhwa (KP) is the third largest province of Pakistan by population and the smallest province by area. The total area of KP province is 101, 741 square kilometers. The geographical location of KP is 34.0000° North latitude and 71.3200° East longitude[8]. It borders with Afghanistan in the north-west, Balochistan in the south, Punjab in the south-east, Gilgit Baltistan in the north-east and Azad Kashmir in the east. The total number of districts of KP are thirty-five and Peshawar is the capital of the province.

The terrain of the province is dominated by mountains. It is surrounded by the Hindukush Mountain range in the north-west. The Himalayas surround the province in the north-east. The east-west tending Safed Koh Cherat range forms its southern boundary. Tirich Mir rising 7690 m above the sea level is the highest point in the province. The Peshawar Valley is enclosed by the Malakand range on its northern side and by the Khyber hills on its western sides. The Kurram range encloses the Bannu basin in its north and the mountains cover the basin along the eastern and southern boundaries. The Dera Ismail Khan basin in the south of the province is separated from the Bannu basin by the Bhittani mountain range.

The relatively flat alluvial plains, with the best groundwater resources, are the hub of economic activity, mostly in the form of agriculture. Some parts of these plains are irrigated by one or more rivers crossing most of the plains. The whole province drains into the Indus River, with the exception of the Kunhar River which flows down the Kaghan Valley into the Jehlum River. The Indus River flows between the Swat and Mardan districts on the right bank and the districts of Kohistan, Mansehra and Abbottabad on the left bank. It flows through Tarbela Dam, the largest earth-filled dam on the planet. Most of the irrigation water in Khyber Pakhtunkhwa is supplied by the Kabul River (Warsak Dam) and Tarbela

[7] http://www.pesco.gov.pk/what_we_do.asp
[8] http://kp.gov.pk/page/quickviewofkhyberpakhtunkhwa

Dam, both of which are located in the province. Chashma Right Bank Canal (CRBC) also makes a significant contribution in terms of irrigation water supply.

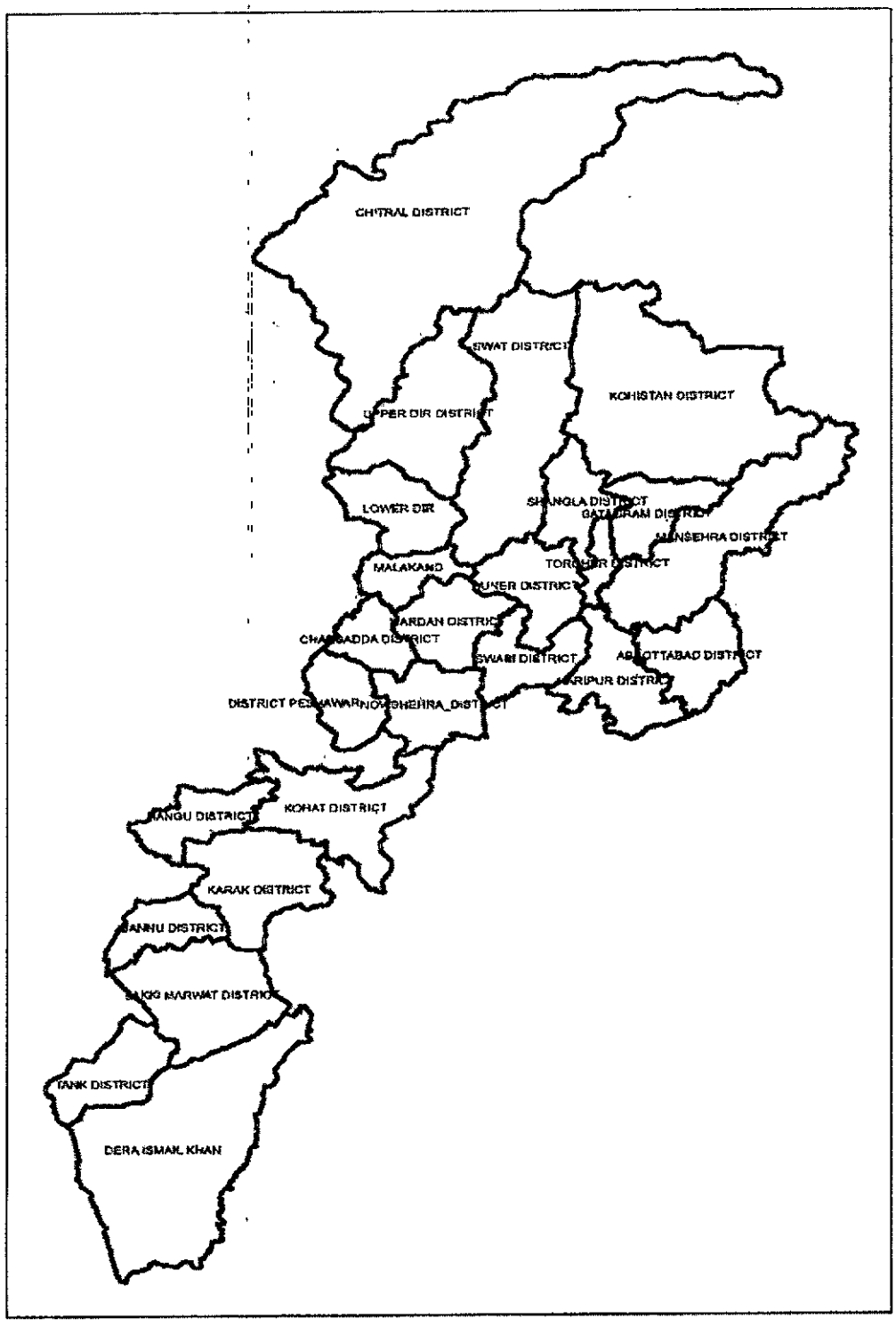


Figure 4-1: PESCO's Areas of Operation

The Khyber Pakhtunkhwa Province is located in the extreme northwest of the Indo-

Pakistani subcontinent where it merges with the Eurasian continent. This merging is the consequence of the collision of two tectonic plates: the Laurasian plate and the Greater Indian plate. The province can be subdivided into four broad geological units (i) Metamorphic and igneous rocks of the northern mountains; (ii) Mesozoic rocks of the southern and southwestern part;(iii) Tertiary rocks of the central and south-eastern part; and (iv) Upper Tertiary and Quaternary fill of the intermontane basins[9].

According to the seismic map of Pakistan, the Chitral area lies in Zone 4 which has ground acceleration of greater than 0.32 g and northern parts of the province mostly lie in zone 3 (moderate to severe damage) of the Earthquake Zones Classification of the Uniform Building Code of Pakistan[10]. The central and southern parts mostly lie in zone 2B (minor to moderate damage).

The climatic profile of the Khyber Pakhtunkhwa province is extremely diverse due to various altitudes and vegetation cover, mountain barriers and topography. Its climate varies from the dry and hot rocky zones in south to the cool and lavish green forests in the north. Six types of climatic profiles are recognized for the KP province.

Semi-arid subtropical continental lowland: The features included large plains, characterized by great annual and daily variations in temperature; maximum temperature about 41°C; minimum temperature from 4.5 °C; a few frosty days, generally low humidity; mainly late summer monsoon rains and rainfall between 80 and 500 millimeters (mm). The areas under this zone are Western zone of the Peshawar Valley, Bannu basin, Dera Ismail Khan basin

Sub-humid subtropical continental lowland: The features included rainfall of 500 to 1000 mm, increasing sharply towards the hills. At least two months per year are humid; winters are distinctly colder and summers cooler than climatic region above (semi-arid subtropical continental lowland). The areas under this zone are Buner area in Swat district, Talash and Adinzai Valleys in Dir district, part of Abbottabad district, and Nizampur area as well as the eastern part of the Peshawar Valley.

Humid subtropical continental highland: The features included mountainous areas, including the narrow intervening valleys. The maximum temperature occurs in June or July and is less than 38 °C; winters are cold, snowy and foggy; rainfall exceeds 1250 mm; late winter and summer rains are common. The areas included spurs of the outer Himalayas extending into Mansehra district.

Sub-humid subtropical continental highland: Does not greatly differ from the above region (humid subtropical continental highland), except for the rainfall, which ranges from 500 to 1250 mm. The areas included hills of Swat, Dir, Kohistan, Kohat and Karak districts.

Semi-arid subtropical continental highland: Similar to sub-humid subtropical continental highland, but the rainfall is less: 200 to 500 mm. The areas included Northern part of Swat and southern part of Chitral, as well as Kohat, Karak, Waziristan, Bajaur, Khyber districts.

Arid subtropical continental highland: Similar to the other subtropical continental highland regions except for the rainfall, which is less than 200 mm. The area included northern part of Chitral District.

Khyber Pakhtunkhwa has complicated and diverse hydrological conditions and different situations of water resources and water availability in different parts. In the south (Dera

[9] Hydrogeology and groundwater resources of north West Frontier Province Pakistan, 1988
[10] Building Code of Pakistan 2007

Ismail Khan, Tank, Lakki Marwat and Bannu) there is shortage of water, whereas the north, including Chitral, Upper Dir, Lower Dir, Swat, Shangla, and Kohistan, has abundant water resources. There are three sources of freshwater: precipitation; streams and rivers; and groundwater.

Air pollution is a rapidly growing environmental problem in Khyber Pakhtunkhwa, as in the rest of Pakistan. The major causes of worsening air quality in the urban areas are: increasing domestic and industrial power consumption which is met by coal; highly inefficient energy use; exponential growth in the number vehicles; increasing industrial activities by marble factories, brick kilns, sugar mills, and cement factories without adequate air emission control; and open air burning of solid waste, including plastic. The data presented in a study[11] shows very high concentrations of air pollutants in Peshawar; the levels of fine particle matter ($PM_{2.5}$), sulfur dioxide (SO_2) and nitrogen dioxide (NO_2) are respectively three times, two times and one and a half times higher than the World Health Organization (WHO) guidelines, while ozone (O_3) and carbon monoxide (CO) are within the guidelines.[12]

Noise pollution in the urban areas of the KP Province is a rapidly growing environmental hazard. Higher levels of noise pollution can have a range of health effects, including stress related mental health issues, heart disease, insomnia, cognitive impairment among children and annoyance. According to survey of Environmental Protection Agency of Khyber Pakhtunkhwa at various traffic junctions in Peshawar shows a very high noise level with an average value of 90 decibel (dB) to 100 dB which is well above the upper limit of 85 dB prescribed the WHO. The main sources of this urban noise pollution are: vehicles horns; and defective silencers of the two-stroke auto rickshaws.[13]

The wide range of geographical and climatic conditions of Khyber Pakhtunkhwa yields equally diverse ecosystems and sets of floral and faunal species. In terms of ecosystems, there are various types of forests, including meadows, rangelands (or pastures), and wetlands. The province hosts approximately 4500 species of plants, 100 mammal species, 466 bird species, 66 reptile species, 44 butterfly species and 118 fish species, and protected areas expand over 14% of the total provincial area. However, climate change---rise in temperature, changes in precipitation patterns, increase in floods and droughts---and heavy application of hazardous agrochemicals are adversely affecting ecosystems and biodiversity in Pakistan as well as in the province.

Forests cover approximately 20% (29%, if the alpine pastures are added) of the total land area of Khyber Pakhtunkhwa province. The country's most significant tract of west Himalayan temperate forests is located in Palas Valley of the province, which belongs to a Himalayan moist temperate coniferous forest ecosystem, extending over Abbottabad, Mansehra and Swat. The plant species in this region include the conifers, such as blue pine, spruce, yew, fir, birch and rhododendron. Mammals include the endangered snow leopard and blue sheep.

Other forest ecosystems of the province are: forest ecosystem of cold desert and snowfields in Hindu Kush Mountain region of Chitral; steppe pine forest ecosystem in the lower valleys of Chitral, Kohistan, and high elevation parts of Dir; alpine meadows of Kaghan Valley and eastern Hindu Kush Mountain Ranges in Swat and Kohistan; sub-Alpine scrub

[11] Cleaning Pakistan's Air Policy Options to Address the Cost of Outdoor Air Pollution, 2014

[12] Site specific information/data on air quality will be included in the subproject ESIAs/ESMPs as appropriate.

[13] Site specific information/data on noise will be included in the subproject ESIAs/ESMPs as appropriate.

and birch ecosystem in upper Swat and Kaghan valleys; dry temperate coniferous forest ecosystem of upper Kaghan in Mansehra district, Kalam in upper Swat and Dir district; subtropical pine forest ecosystem in Haripur, Abbottabad, Mansehra, Buner and Swat; dry subtropical semi evergreen scrub ecosystem on the foothills of Hindu Kush and Himalayan mountains in the districts of Haripur, Abbottabad, Mansehra, Buner, and Swat; and tropical thorn ecosystem in the southern districts.

There are four types of rangelands or pastures in the province: alpine pastures lying above 3,000 meters altitude and below the snowline, with forage productivity of 1,500 kg/ha; trans-Himalayan grazing lands at 2,300-3,300 m elevation, with forage productivity of 300-1,200 kg/ha; Himalayan Forest grazing lands in 1,000-2,000 m altitude, with forage productivity of 200-3,000 kg/ha; and arid/semi-arid grasslands at around 250 m elevation and having forage productivity of 400-500 kg/ha.

Khyber Pakhtunkhwa province has the richest diversity of flora and fauna in the country, owning to variety of its climatic zones. The tree species include conifer, Himalayan spruce, Indian pine, silver fir, cedar, pine nut, birch, Himalayan pistachio, horse chestnut, maple, Himalayan poplar, ash, walnut, oak, gum, babul, Indian olive, black locust, Indian rosewood, mulberry, Indian plum, and chinaberry. In addition to the timber tree species, there are various economic, medicinal and aromatic non-timber species, which produce wild fruits and vegetables, mushrooms, resins, gum, fibres, silk cocoons.

The high-altitude northern parts are home to: Himalayan ibex; markhor; snow leopard; Himalayan bear; Himalayan snowcock; and snow partridge. The alpine and sub-alpine regions of the province host species, such as Himalayan ibex, markhor, Western Tragopan and Monal pheasants. The moist and dry temperate forests in the districts of Chitral, Dir, Swat, Mansehra and Abbottabad provide habitats to species, such as Himalayan black bear, common leopard, grey goral, Koklass pheasant and Kalij pheasant. The lower reaches of Himalaya and Hindu Kush, where the sub-tropical scrub forests exist, provide habitat to rhesus macaque, urial, common leopard and birds like Chir pheasant, black partridge, Chukar partridge and See-see partridge. Notable species in the desert and thorn forests of the province include chinkara, cape hare, Afghan urial, grey wolf, sandgrouse and houbara bustard. Khyber Pakhtunkhwa holds the world's largest populations of Kashmir Markhor and western Tragopan pheasant and contains Endemic Birds Areas, as designated by the Birdlife International. The wetlands host numerous species of migratory water birds, including swans, geese, ducks, waders, falcons and cranes. demoiselle crane, Eurasian cranes, houbara bustard, Saker falcon, peregrine falcon, bar-headed goose, and red-crested pochard[14].

The number of Protected Areas[15] notified in Khyber Pakhtunkhwa includes 6 national parks, 3 wildlife sanctuaries, 38 game reserves, 90 community game reserves, 16 private game reserves, 2 wildlife refuges and 8 wildlife parks. The combined area of all the Protected Areas is 666,340.368 hectare (ha).

The total population[16] of Khyber Pakhtunkhwa was estimated to be 37.15 million in 2018-19, which is 17.1% of the national population. The province had an annual growth rate of 2.9% as compared to the national rate of 2.4% in 2017.The average household size in Khyber Pakhtunkhwa is 7.6 and 8.1 in urban and rural areas, respectively.

[14] ESSA and ESMF, KP Irrigated Agriculture Improvement Project,2019
15 http://kpwildlife.com.pk/pa.html, June 2021
[16] Bureau of Statistics, KP in Figures 2019

In 2017-18, the national literacy rates were 52% and 73% for women and men, respectively. The literacy rates in the province show greater disparity between genders: 39% for women and 73% for men. The rate is the second lowest in Khyber Pakhtunkhwa among the provinces. The Pakistan Education Statistics 2016-2017 estimated that among 51.53 million children in Pakistan between the ages of 5 and 16 years, 22.84 million children did not attend school. In primary to higher secondary level, 49% of girls are out of school as compared to 40% of the boys. In Khyber Pakhtunkhwa, 1.8 million children are out of school; considering that the population of the province is about 15% of national, proportionately more children appear to be schooled in the province. Among those out of school in Khyber Pakhtunkhwa, 64% of were girls and 36% boys. Some of the factors responsible for the slow progress in education include: (i) shortage of schools especially for girls and also in remote and far-flung areas; (ii) shortage and absenteeism of teachers;
(iii) lack of qualified and trained teachers; (iv) missing facilities such as water, toilets and boundary walls; (v) weak supervision; and (vi) out-of-school factors such as conservative and tribal culture, insecurity and lawlessness, and poverty.

The health facilities are available to the people in the province. In 2018[17], 283 hospitals, 988 dispensaries, 100 rural health centers, 937 basic health units and 23 sub health centers were providing services to the people of KP.

The major crops in the province are wheat, maize, rice, sugarcane, gram, tobacco and barley. In 2018-19[18], the area under cultivation of wheat was 724000 ha, maize 468000 ha, rice 62000 ha, sugarcane 111000 ha, gram 29000 ha, tobacco 25000 ha and barley 21000 ha.

The livestock of KP included cattle, buffalos, sheep and goats. According to 2019 estimation, the population of cattle in the province was 6.67 million, buffalos were 2.67 million, sheep were 2 million and goats were 9.21 million.

The civilian labor force in the province was 7.72 million in 2017-18 which included 6.45 million male and 1.27 million female. Out of total reported labor force, 7.17 million is employed and 0.55 million labor force was unemployed.

[17] Bureau of Statistics, KP in Figures 2019
[18] Bureau of Statistics, KP in Figures 2019

5. Environmental and Social Impact Assessment

This Chapter assesses the generic impacts of the proposed project on the physical, biological and human environment of the project area. Also provided in the Chapter are the recommended generic mitigation measures to minimize if not eliminate the potentially adverse impacts. More specific impact assessment and the associated mitigation measures will be covered in the ESIAs and ESMPs of the proposed subprojects.

5.1. Design Phase Considerations (Components 1 and 2)

The decisions made at the design phase of any project can be quite far reaching. For the Components 1 and 2 of proposed project, the aspects which can be significant with respect to the environmental impacts include:

- Site selection for new grid stations
- Route selection for transmission lines
- Type of equipment.

These concerns associated with the design phase and the measures to avoid/minimize them are tabularized below in **Table 5.1.**

Table 5-1: Environmental and Social Aspects to be Included in Design

Impacts	Likely Causes for Proposed Project	Measures to be Incorporated in Project Design
Soil erosion	Poor site selection; unstable soils.	▪ Areas having unstable soil will be avoided for the grid station sites and transmission line/HT feeder routes. ▪ Canal and river banks will be avoided while placing the transmission line towers.
Soil and water contamination	Absence of appropriate waste (solid and liquid) disposal.	▪ Appropriate waste disposal systems will be included in the design of the grid stations and associated facilities.
	Using transformers with PCB-containing oil.	▪ The transformer procured during the proposed project will be PCB-free. ▪ Leaked oil collection arrangement (such as a channel and a drain pit below the transformers) will be incorporated in the design of the transformer foundations at the grid stations.
Loss of natural vegetation and Threat to Wildlife	Routing the Transmission lines through forested and wildlife-sensitive areas	▪ Most of the works will be carried out either inside the existing grid stations or within communities/cultivation

Impacts	Likely Causes for Proposed Project	Measures to be Incorporated in Project Design
		fields where the natural habitat has long been modified. ▪ Areas having precious/sensitive natural vegetation and wildlife resources will be avoided for the grid station sites and transmission line routes, where possible. ▪ Protected areas (national parks, wildlife sanctuaries and game reserves) will be avoided while selecting the grid station sites and transmission line routes.
Resettlement Issues	Poor site selection; Poor route alignment	▪ The new grid stations to be established as part of the proposed project will preferably be located in open areas, free of any existing structure. Government-owned land will be preferred. ▪ The transmission line routes included in the proposed project will be selected avoiding settlements, buildings, other structures and cultivation, as far as possible, thus minimizing the resettlement issues.
Safety hazards and public health concerns	Poor site selection; Poor route alignment; Inappropriate equipment selection (such as PCB-containing transformers)	▪ All safety precautions will be taken to minimize the safety hazards and risk of accidental electrocution. These will include double periphery walls at the grid stations and appropriate clearance (between the live wires/connectors and the buildings/structures/trees). ▪ Transmission lines will not be routed through the settlements as far as possible. Appropriate clearance will be maintained all along the transmission lines and feeders. ▪ Appropriate waste disposal systems will be included in the design of the grid stations. These include sewage disposal, and if required, treatment system (e.g., septic tank).

Impacts	Likely Causes for Proposed Project	Measures to be Incorporated in Project Design
		▪ PCB-free transformers will be selected for the project. (This aspect is already included in the DISCOs' transformer specifications.)
Noise emissions	Poor equipment selection	▪ The project equipment, particularly transformers to be installed at the grid stations will meet the noise standards (70dB(A) for industrial zones day and night; 45dB(A) night and 55 dB(A) daytime for residential areas).
Aesthetic value	Intrusion in the natural landscape	▪ Tree plantation will be carried inside and at the periphery of the grid stations, without compromising the safety aspects (i.e., required clearances will be maintained). For this purpose, provision will be made in the site layout of the grid stations.

5.2. Potential Impacts during Construction and O&M Phases (Components 1 and 2)

An overview of the potential impacts and their respective mitigation measures for the construction and O&M phases of the interventions under Components 1 and 2 of the project is provided in **Table 5.2**. More detailed and subproject-specific impact assessment will be carried out as part of ESIAs and ESMPs.

Table 5-2: Potential Impacts and Generic Mitigation Measures

Potential Impacts	Generic Mitigation Measures
Construction Phase	
Soil Erosion and Degradation	• Cut and fill at the proposed grid station site will be carefully designed, and ideally should balance each other. The surplus soil, if any, will be disposed at places approved by the DISCOs. Such sites will be selected after surveying the area and ensuring that soil deposition will not have any significant impacts, such as loss of productive land, blocked access, natural vegetation and disturbance to drainage. • If necessary, fill material for grid station sites will be obtained from appropriate locations approved by DISCOs. Such locations will be selected after surveying the area and ensuring that soil extraction will not have any significant impacts, such as soil erosion, loss of natural vegetation and disturbance to drainage. • Where the use of cultivated land is unavoidable for obtaining the fill material, the top 30cm soil layer will be removed and

Potential Impacts	Generic Mitigation Measures
	stockpiled for redressing the land after removal of the borrow material. The excavation in such areas will be limited to 50cm depth. • The fill material will not be obtained from any cultivation fields or orchards, except where the land owner allows doing so. • Areas from where the fill material is obtained or surplus soil deposited, will be landscaped to minimize erosion and hazard for people and livestock. • Construction camp will be located in a stable and flat area, requiring minimal de-vegetation and leveling. The contractor(s) will obtain approval from the DISCOs for this purpose. • Embankments and excavated slopes will not be left untreated/unattended for long durations. Appropriate slope stabilization measures will be taken per the design (e.g., stone pitching). • Vehicular traffic on unpaved roads will be avoided as far as possible. Operation of vehicles and machinery close to the water channels, water reservoir will be minimized. • After the completion of the construction works, the transmission line routes, campsites and other construction sites will be completely restored. No debris, surplus construction material or any garbage will be left behind. • Photographic record will be maintained for pre-project, during-construction and post-construction condition of the sites (grid station, transmission line/feeder routes, camps and access roads). • Vehicles and equipment will not be repaired in the field. If unavoidable, impervious sheathing will be used to avoid soil and water contamination. • The domestic sewage from the construction camps will be connected to the city sewerage system. If such system is not available, appropriate treatment and disposal system, such as septic tanks and soaking pits, will be constructed having adequate capacity. The contractor(s) will submit to the DISCOs the plans for the camp layout and waste disposal system, and obtain approval. • Waste oils will be collected in drums and sold to the recycling contractors. • The inert recyclable waste from the site (such as card board, drums, broken/used parts, etc.) will be sold to recycling contractors. The hazardous waste will be kept separate and handled according to the nature of the waste. • Domestic solid waste from the construction camp will be disposed in a manner that does not cause soil contamination.

Potential Impacts	Generic Mitigation Measures
	The waste disposal plan submitted by the contractor(s) will also address the solid waste.
Air quality deterioration	▪ Air quality analysis at the new grid station site will be conducted before mobilization of the construction crew, in order to establish baseline conditions of the ambient air quality at these locations. ▪ Construction camps will be established at least 500 m from communities (except when such camps are established inside the grid stations). The contractor(s) will obtain DISCO's approval for this purpose, as mentioned earlier. ▪ Construction machinery, generators and vehicles will be kept in good working condition and properly tuned, in order to minimize the exhaust emissions. ▪ Fugitive dust emissions will be minimized by appropriate methods, such as spraying water on soil, where required and appropriate. The waste water from kitchen and washing area of the construction camp may be used for water spraying. ▪ Project vehicles will avoid passing through the communities and cultivation fields as far as possible. If unavoidable, speed will be reduced to 15 km per hour to avoid excessive dust emissions. ▪ While working within the communities for works such as transmission line laying, coordination with the communities will be maintained to minimize any detrimental impacts on the crops and settlements. ▪ Ambient air quality analysis will be carried out at the grid station sites once every two months during the construction phase.
Surface Water and Groundwater Contamination	▪ The groundwater quality analysis at each of the grid station sites (and campsites if established outside the grid stations) will be conducted before mobilization of the construction crew, in order to establish baseline conditions of the water quality at these locations. ▪ Construction camp will not be located within 500 m of rivers and major canals (unless it is placed inside the grid station). Location will be finalized after obtaining DISCO's approval. ▪ The contractor(s) will submit to the DISCOS the plans for the camp layout and waste disposal system, and obtain approval. ▪ Groundwater quality analysis will be carried out at the grid station sites and campsites once a month during the construction phase.
Loss of Natural Vegetation and impacts on wildlife	▪ Clearing of natural vegetation will be minimized as far as possible during the transmission line works. ▪ Herbicides will not be used to clear vegetation along the transmission line route (or at other project locations).

Potential Impacts	Generic Mitigation Measures
	▪ For each transmission line route, a tree cutting plan will be prepared and submitted to DISCOs for approval. A complete record will be maintained for any tree cutting or trimming. The record will include: the number, species, type, size, age, condition and photograph of the trees to be cut/trimmed. ▪ The construction crew will be provided with LPG as cooking (and heating, if required) fuel. Use of fuel wood will not be allowed. ▪ No fires will be allowed inside the forest. ▪ Construction camps will not be established inside the forested area. ▪ Tree plantation plan will be developed and implemented at each of the grid stations included in the proposed project. Provisions will be made for tree plantation while designing the layout of the grid stations. This will compensate any tree cutting in the non-forest area along the transmission lines. Indigenous tree species will be selected for plantation; Eucalyptus trees will not be used in any case. ▪ Garbage will not be left in the open. ▪ The project staff will not be allowed to indulge in any hunting or trapping activities.
Land Acquisition and Asset Loss[43]	▪ The new grid station will preferably be established on a government land. Otherwise, land will be outright procured from the owner on a willing-seller-willing-buyer basis. In case that is not possible, land will be acquired on a market price or replacement cost basis in accordance with the Land Acquisition Act and the WB standard for involuntary resettlement. ▪ Appropriate compensation will be paid to the landowner for the land under the transmission line tower to be erected as part of the proposed project. ▪ Compensation will be paid for the crops damaged during the construction activities. The compensation will be paid to the cultivator, and absence of the land title will not be a bar to receiving the compensation. ▪ Complete record will be maintained for the determination and payment of the compensation. ▪ It will be ensured that the land under the 132-kV and 66-kV transmission line tower remains available for cultivation. ▪ Operation of project vehicles and construction machinery outside the RoW will be avoided. Attempts will be made to use existing tracks/roads to access the transmission line corridor/tower locations. In case new access routes are

[43] Resettlement issues are addressed in detail in RF, which is presented under a separate cover.

Potential Impacts	Generic Mitigation Measures
	necessary, the cultivated land will be avoided as far as possible. Damage to crops will be compensated. ▪ Tubular poles will be used where necessary, instead of conventional transmission line towers, in the urban area as appropriate ▪ The transmission line route will be aligned along the existing roads/RoW as far as possible. ▪ Grievance redressal mechanism will be put in place to address the community complaints. ▪ A Resettlement Framework (RF) has been prepared to address the involuntary resettlement, including land requirement, the damaged crops, caused by the project activities. The RF includes an entitlement framework that defines criteria to determine compensation of each type of resettlement impact such as land acquisition and loss of assets. Other aspects covered in the RF include institutional and implementation framework, the monitoring and documentation systems and the grievance redressal mechanism.
Damage to Irrigation Network and public infrastructure	▪ Operation of construction machinery and project vehicles will be avoided close to the canals and water courses. ▪ Any damage caused by the project activities will be completely repaired. ▪ Damage to the existing infrastructure will be minimized if not avoided altogether through astute planning. ▪ All damaged infrastructure will be restored to original or better condition.
Blocked Access	▪ In case of the blockage of the existing routes, alternate routes will be identified in consultation with the affected communities. ▪ The contractor will prepare and implement a traffic management plan to minimize impacts on the local routes.
Noise and Vibration	▪ It will be ensured that the noise levels measured at the communities near the project sites are kept within the acceptable limits (70 dB(A) for industrial zones day and night; 45 dB(A) night and 55 dB(A) daytime for residential areas). ▪ Noise levels will be measured at the key locations described above. If the noise levels are found to be more than the prescribed limits, appropriate measures will be undertaken by the construction team such as rescheduling the works, using quieter equipment and/or erecting barriers to protect the communities from excessive noise. ▪ Vehicular traffic through the communities will be avoided as far as possible. Project routes will be authorized by the DISCOs.

Potential Impacts	Generic Mitigation Measures
	▪ Vehicle speeds will be kept low, and horns will not be used while passing through or near the communities. ▪ Vehicles will have exhaust silencers to minimize noise generation. ▪ Nighttime traffic will be avoided near the communities, as far as possible. ▪ Movement of all project vehicles and personnel will be restricted to within work areas, to avoid noise disturbance. ▪ Working hours for construction activities within the communities will be limited to between 8 am and 6pm (between 6 am and 8 pm during the summers). ▪ Liaison with the community will be maintained. Grievance redressal mechanism will be put in place to address the community complaints, as stated earlier.
Safety Hazards (occupational health and safety)	• The contractor will prepare and implement occupational and community health and safety (OCHS) plan, in accordance with the WB ESF, World Bank Group's Environment, Health and Safety Guidelines as well as World Health Organization (WHO) Guidelines, ILO Code of Practice and any internationally recognized OHS standard such as ISO 45001 or US OSHA 29 CFR 1926 or any standard specifically mentioned in the bidding documents. The Plan will include applicable safety standards and protocols, requirements of job hazard analysis, training requirements, documentation and reporting mechanism. OCHS plan must cover the following areas: ◦ Objectives ◦ Scope of work ◦ HSE Management Structure ◦ OCHS Enforcement Structure ◦ Regulatory Compliances and Conformance Standards ◦ Hazards Identification and Risks assessments ◦ Hazard Register and Risk Matrix ◦ HSE Procedures and supporting documents ◦ Key Performance Indicators ◦ Trainings and Inductions ◦ Incident and Accident Reporting ◦ Internal Review and Audits • The construction sites will have protective fencing to avoid any unauthorized entry. • The project drivers will be trained for defensive driving skills. • Vehicular speeds near/within communities will be kept low to minimize safety hazards.

Potential Impacts	Generic Mitigation Measures
	• Construction camp sites will be located at least 500 m away from the nearest community. Camp site will be selected with DISCO's approval • Firefighting equipment will be made available at the camps. • The camp staff will be provided OCHS training. • All safety precautions will be taken to transport, handle and store hazardous substances, such as fuel. • Liaison with the community will be maintained. In particular, the nearby communities will be informed before commencing the testing commissioning of the system. Protective fencing will be used where appropriate/possible. Awareness raising program will be implemented to educate the communities regarding the hazards associated with the transmission lines, feeders and other electrical systems/equipment. Warning signs will be used at the appropriate locations.
Public Health Issues	▪ The construction camps will have septic tanks and soaking pits of adequate size. ▪ Camps will be at least 500 m from any groundwater wells used by the community. ▪ The construction camps will have appropriate solid waste disposal mechanism ▪ The construction camps and site offices will have first-aid kits. ▪ The construction crew will be provided awareness for the transmissible diseases (such as HIV/AIDS, hepatitis B and C). ▪ Guidelines for gender based violence (GBV) and violence against children (VAC) will be implemented ▪ Compliance with GoP Guidelines on Covid-19
Influx of Labor	▪ Limit the siting of any temporary facilities within the boundaries of the worksites as far as possible; ▪ Use of non-wood fuel for cooking and heating; ▪ Code of conduct (CoC) for workers and employees will be enforced for the protection of local communities, gender-based violence, other social issues, flora and fauna and a ban on tree cutting and hunting. Any violation of the COC would lead to strict punishment including termination of employment; ▪ Awareness among workers will be created on proper sanitation and hygiene practices to endorse proper health; ▪ Good housekeeping practices will be maintained at project site(s);

Potential Impacts	Generic Mitigation Measures
	▪ Adequate personal hygiene facilities will be provided in good condition with adequate supply of clean water; ▪ Arrangements will be made to treat the affected workers on time to control the movement of vectors diseases; ▪ Workers and surrounding communities will be sensitized on awareness and prevention of HIV/AIDS and STI through training, awareness campaigns and workshops; ▪ Free HIV/AIDS and STI screening and provided for site workers ▪ counselling sessions will be held to made the workers award of the risks of HIV/AIDs and STI; ▪ An employees will be terminated, who continues misconduct or lack of care, carry out duties amateurishly or inattentively, fail to conform to provisions of the contract, or persist in any conduct which is harmful to safety, health, or the protection of the environment; ▪ The use of drugs and alcohol will not be allowed at the work/construction site; ▪ Carrying weapons into the workplace premises will be prohibited; ▪ Site security arrangements will be listed as an item in the Bill of Quantities (BoQs) to avoid any delays; which may cause due to security issues; ▪ The contractor will create awareness of construction crew to sensitize them about security situation in the project area, in coordination with private/public security agencies; ▪ Appropriate fencing, security check points, gates and security guards will be provided at the construction sites to ensure the security of equipment, machinery and materials, as well as to secure the safety of site staff; ▪ The Contractor will ensure that good relations are maintained with local communities and their leaders to help reduce the risk of vandalism and theft; ▪ To avoid conflicts with local people on employment matters, it is recommended to the contractor to employ the locals in skilled, semi-skilled, and unskilled work. This will reduce pressure on resources such as residential and health facilities; ▪ The contractor will proactively manage the potential impacts from labor influx and potential cultural conflicts

Potential Impacts	Generic Mitigation Measures
	between local communities and workers, which include following: ▪ Construction camps will be built in the designated areas, located minimum 500m away from the village settlements; ▪ The Contractor's monthly training program will cover topics related to respectful attitude while interacting with the local communities; ▪ Inclusion of COC obligations and the applicable legislation in the contracts of all employees and workers with the provision of sanctions and penalties in case of violations; □ World Bank Guidelines on Influx of labor[44] will be used for further guidance.
Gender Issues	▪ The routes/places used by the women will be avoided as far as possible. If unavoidable, alternate routes to be identified for the communities, if required, especially along routes frequented by women folk, such as route to the local well or water source. ▪ Camp sites for construction will be 500 m away from the nearest community, as recommended earlier. ▪ Construction crew will avoid in entering villages and settlements. ▪ Communities will be informed and consulted before commencing works inside or near the communities. ▪ Strict code of conduct will be maintained by the construction crew. Local norms will be respected. ▪ Staff will receive training on the prevention of SEA/SH, ▪ integrating provision related to SEA/SH in bidding document, ▪ workers requiring to sign Code of Conducts (CoC) prepared by the Contractors and reviewed and approved by PMU, ▪ preparation of SEA/SH plans as a part of the E&S management instruments which will be prepared based on these frameworks during implementation, ▪ including a SEA/SH specialist as a part consultant organization and ▪ identification and mapping of the service providers.
Child labor	▪ the provisions of the Child Labor Act will still be made part of the construction contracts

44 http://pubdocs.worldbank.org/en/863471511809509053/ESS2-FactSheet-WB-ESF.pdf

Potential Impacts	Generic Mitigation Measures
Resistance from community	▪ stakeholder consultation and engagement to be carried out on an on-going basis ▪ GRM to be established ▪ Community awareness to be enhanced for project activities such as ABC works and their importance ▪ Community liaison to be maintained throughout the various phases of the project
Impacts on Sites of Historical, Cultural, Archeological or Religious Significance	▪ The site(s) for the new grid station(s) will be selected at a safe distance from any known historical or cultural building or site. ▪ In case of discovery of any sites or artifacts of historical, cultural, archeological or religious significance, the work will be stopped at that site. ▪ The provincial and federal archeological departments will be notified immediately, and their advice will be sought before resumption of the construction activities at such sites. ▪ The existing graveyards will not be damaged. The construction work close to the graveyards will be carried out after informing/consulting the relevant communities.
Operation Phase Impacts	
Soil and water Contamination	▪ The grid stations will have appropriate solid waste collection and disposal arrangements. ▪ The grid stations will have appropriate sewage handling system. The grid stations' sewage collection system will be connected to the Municipality operated sewerage system, if available. Otherwise, grid stations will have their own septic tanks and soakage pits. ▪ Waste oils and chemicals will be disposed in accordance with their respective Material Safety Data Sheet (MSDS). MSDS will be made available at the grid stations and maintenance workshops. ▪ Non-toxic recyclable waste (such as cardboard) will be given away for recycling. ▪ Toxic waste will be stored separately, and incinerated at an appropriate double chamber incinerator. ▪ Grid stations will have channels and drainage pits to collect any leaked oil from the transformers in the grid stations. This oil will be sent back to the workshop for recycling. ▪ Any soil contaminated by the oil/chemical spillage will be removed and disposed of appropriately in accordance with the MSDS of the spilled oil/chemical.
Safety hazards	▪ DISCOs will implement the Safety Code prepared by NEPRA. ▪ The O&M staff will be provided essential protective gears and equipment.

Potential Impacts	Generic Mitigation Measures
	▪ The O&M staff will be provided safety training. Refresher courses will be arranged on regular basis. ▪ Firefighting equipment will be made available at the grid stations. ▪ The Emergency Response Plan (ERP), prepared by DISCOs, will be made available at each grid station. Its salient points will be displayed at prominent places within each grid station. The O&M staff will be given training on the ERP. The Environmental and Social Cell (ESC) will review the ERP and with respect to the environmental and social considerations, and recommend changes if needed. The ERP will include procedure to inform the nearby communities in case of fire in the grid stations. ▪ The communities near the grid stations and transmission lines will be educated on the risk of electrocution, and how to avoid accidents. ▪ Appropriate signage on safety precautions will be installed at the key locations. ▪ The trees under the transmission lines will be regularly trimmed in order to maintain 8 m clearance.
Public Health Concerns	▪ Inappropriate solid waste and sewage disposal from grid stations and their residential areas ▪ Leakage of PCB-containing transformer oil ▪ Electromagnetic (EM) radiation caused by the high tension transmission lines. ▪ Compliance with GoP Guidelines on Covid-19
Loss of agriculture	▪ Damage to the crops will be avoided during the transmission line patrolling. ▪ Any damage during the repair and maintenance activities will be compensated. ▪ Liaison with the nearby communities will be maintained in this regard. ▪ The grievance redressal mechanism will be maintained on continuous basis.
Noise generation	▪ Appropriate equipment selection will forestall any concerns associated with noise. ▪ Noise measurements will be carried out at the outer fence of the grid stations, in order to ensure that the noise levels are within acceptable limits. If found beyond these limits at any stage, appropriate measures will be taken, such replacing the noisy equipment, and/or erecting noise barrier along the grid station outer periphery. ▪ Liaison with the nearby communities will be maintained in this regard.

Potential Impacts	Generic Mitigation Measures
	▪ The grievance redressal mechanism will be maintained on continuous basis.
Gender Issues	▪ Gender mainstreaming will be encouraged in DISCOs. Employment opportunities will be created for women. Women friendly work environment will be established within DISCO facilities (e.g., separate toilets, system to address sexual harassment).

5.3. Potential Impacts of Activities under Components 3 and 4

No physical interventions are proposed under the Components 3 and 4 of the Project, hence there are no direct environmental and or social impacts of these activities. However, certain activities such as conducting studies, preparing feasibilities and formulating plans can potentially have downstream environmental and social impacts. While precise details of many of these activities will be worked out during the project implementation, an initial assessment has been carried out as described in **Table 5.3** below.

Table 5-3: Potential Impacts and Generic Mitigation Measures of Activities under Components 3 and 4

Potential Impacts/Aspects/Issues	Generic Mitigation/Management Measures
• Labor issues associated with PIU and its consultants (whether individuals or firms) • E&S implications of National Electricity Plan implementation • Downstream environmental, social and resettlement impacts of Plan implementation, feasibilities, studies, analyses, and R&D activities • E&S implications of functioning of Center of Excellence	• PIU will carry out initial screening of activities under Components 3 and 4 to determine E&S aspects with more clarity and then finalize proposed actions. Broad screening methodology is already presented in Section 7.2 of this document. This can be further refined to tailor it to the Component 4 activities during the project implementation. • PIU will conduct a high level E&S assessment of the National Electricity Plan focusing policy and institutional dimensions. The ToR of this assessment will be prepared during the project implementation and shared with the Bank. • PIU will ensure that E&S aspects are seamlessly integrated in National Electricity Plan, in line with the National Electricity Policy that covers these aspects. The consultations to be carried out while formulating the Plan will also cover the E&S aspects. • PIU will ensure inclusion and integration of E&S aspects in consultancies, feasibilities, studies and analyses where relevant. The ToRs for these tasks will incorporate the E&S aspects adequately; these ToRs will be shared with the Bank before awarding the contracts for these assignments. • PIU will ensure inclusion of E&S aspects in capacity building initiatives, where needed and relevant. For this purpose, the ToR to be prepared for the capacity building will have necessary section of E&S aspects relevant to

Potential Generic Impacts/Aspects/Issues	Mitigation/Management Measures
	the topic of the capacity building. ToR will be shared with the Bank before initiating the procurement process. • PIU will ensure inclusion and integration of E&S aspects in R&D activities where applicable and relevant. For this purpose, the ToR to be prepared for the R&D activities will have necessary section of E&S aspects relevant to the topic. ToR will be shared with the Bank before initiating the procurement process. • PIU will ensure inclusion and integration of E&S aspects in the scope, ToR, and standard operating procedure (SOP) of the Center of Excellence • PIU will ensure inclusion of E&S aspects in all procurements where applicable • PIU will ensure inclusion and integration of E&S aspects in standards and systems as appropriate and applicable • PIU will ensure inclusion and integration of E&S aspects in frameworks, tools and systems for DISCOs, where applicable and relevant. • PIU will engage consultants (both individual as well as consulting firms) to conduct various tasks including feasibilities, analyses, assessments and studies. Contracts of these consultancies will follow the labor and OHS rules and guidelines as detailed in the Labor Management Procedures (LMP) prepared for EDEIP.

6. Stakeholder Consultations

This section describes the stakeholder consultations carried out during the ESMF preparation. It also provides the consultations framework for future projects.

6.1. Stakeholder Engagement Plan

As described in Section 3.3, the project has prepared a Stakeholder Engagement Plan (SEP) to describe objectives, process and outcome of the stakeholder engagement already carried out during the project preparation and to be carried out during the project implementation – in accordance with the WB ESS 10. The key aspects of the SEP are summarized below.

ESS10 requires that borrowers engage with stakeholders throughout the project life cycle, commencing such engagement as early as possible in the project development process and in a timeframe that enables meaningful consultations with stakeholders on project design. The nature, scope and frequency of stakeholder engagement have to be proportionate to the nature and scale of the project and its potential risks and impacts.

The overall objective of the SEP is to define a program for stakeholder engagement, including public information disclosure and consultation, throughout the entire project cycle. The SEP outlines the ways in which the project team will communicate with stakeholders and includes a mechanism by which people can raise concerns, provide feedback, or make complaints about the project and any activities related to the project. The involvement of the local population is essential to the success of the project in order to ensure smooth collaboration between project staff and local communities and to minimize and mitigate environmental and social risks related to the proposed project activities.

6.1.1. Stakeholder Identification and Analysis

For meaningful and substantive engagement, it is necessary to determine who the stakeholders are and understand their needs and expectations for engagement, as well as their priorities and objectives in relation to the Project. This information will then be used to tailor engagement to each type of stakeholder. As part of this process, it is particularly important to understand how each stakeholder may be affected – or perceives they may be affected – so that engagement can be modified accordingly.

Project stakeholders are defined as individuals, groups or other entities who:

- are impacted or likely to be impacted directly or indirectly, positively or adversely, by the Project (also known as 'affected parties'); and
- may have an interest in the Project ('interested parties'). They include individuals or groups whose interests may be affected by the Project and who have the potential to influence the Project outcomes in any way.

Cooperation and negotiation with the stakeholders throughout the Project development often also require the identification of persons within the groups who act as legitimate representatives of their respective stakeholder group, i.e. the individuals who have been entrusted by their fellow group members with advocating the groups' interests in the process of engagement with the Project. Community representatives may provide helpful insight into the local settings and act as main conduits for dissemination of the Project-related information and as a primary communication/liaison link between the Project and targeted communities and their established networks. Verification of stakeholder representatives (i.e. the process of confirming that they are legitimate and genuine advocates of the community they represent) remains an important

task in establishing contact with the community stakeholders. Legitimacy of the community representatives can be verified by talking informally to a random sample of community members and heeding their views on who can be representing their interests in the most effective way.

6.1.2. Methodology

The project intends to utilize various methods of engagement that will be used as part of its continuous interaction with project stakeholders. For the engagement process to be effective and meaningful, a range of various techniques need to be applied that are specifically tailored to the identified stakeholder groups. In accordance with best practice approaches, the project will apply the following principles for stakeholder engagement:

- ***Openness and life-cycle approach***: public consultations for the project(s) will be arranged during the whole life-cycle, carried out in an open manner, free of external manipulation, interference, coercion or intimidation;
- ***Informed participation and feedback***: information will be provided to and widely distributed among all stakeholders in an appropriate format; opportunities are provided for communicating stakeholders' feedback, for analyzing and addressing comments and concerns;
- ***Inclusiveness and sensitivity***: stakeholder identification is undertaken to support better communication and build effective relationships. The participation process for the projects is inclusive. All stakeholders at all times encouraged to be involved in the consultation process. Equal access to information is provided to all stakeholders. Sensitivity to stakeholders' needs is the key principle underlying the selection of engagement methods. Special attention is given to vulnerable groups, in particular women, internally displaced persons (IDPs) if any in KP, persons with disabilities, youth, elderly and the cultural sensitivities of diverse ethnic and religious minority groups and those living in remote or inaccessible areas.

The three categories of stakeholders as per the ESS10 are outlined below.

- **Affected Parties** – persons, groups and other entities within the Project Area of Influence (PAI) that are directly influenced (actually or potentially) by the project and/or have been identified as most susceptible to change associated with the project, and who need to be closely engaged in identifying impacts and their significance, as well as in decision-making on mitigation and management measures;
- **Other Interested Parties** – individuals/groups/entities that may not experience direct impacts from the Project but who consider or perceive their interests as being affected by the project and/or who could affect the project and the process of its implementation in some way; and
- **Vulnerable Groups** – persons who may be disproportionately impacted or further disadvantaged by the project(s) as compared with any other groups due to their vulnerable status[45], and that may require special engagement efforts to ensure their equal representation in the consultation and decision-making process associated with the project.

[45]Vulnerable status may stem from an individual's or group's race, national, ethnic or social origin, color, gender, language, religion, political or other opinion, property, age, culture, literacy, sickness, physical or mental disability, poverty or economic disadvantage, and dependence on unique natural resources.

6.2. Summary of Consultations

The consultations carried out by the IAs during the project preparation are summarized below. **Table 6-1: Summary of Consultations – MoE**

The several discussions and meetings were held with the MoE - PDover the past few months to design Component 4 and support PD to implement power sector reforms that started under PACE1. Meetings were held with Secretary Power and other officials including Additional Secretary and Joint Secretary of the MoE as well as officials of relevant entities including CPPA-G, PPIB and PPMC. On November 2, 2021 a meeting was held with a Joint Secretary in the Ministry of Energy to discuss the project scope, environmental and social risks, possible impacts and mitigation measures. Institutional arrangements and GRM procedures under EDEIP and the implementation of the National Electricity Policy 2021. The proposed activities are in line with National Electricity Policy 2021 to support MoE fulfil its policy mandate under the National Electricity Policy 2021, and implement power sector reforms focusing on two priority areas of the government. These are: a) supporting governance and institutional reforms; and b) supporting transition to wholesale electricity market through commencement of the Competitive Trading Bilateral Contract Market (CTBCM).

Table 6-2: Summary of Consultations - PESCO

Stakeholders Comments and Suggestions	PESCO's Response
The environmental impact that you identified included terrestrial habitat alteration, tree cutting and impact on wildlife. Have you done an assessment that how many number of trees will be cut and what is program of replantation?	When we cut one tree, we replant three trees. It is our policy. In this project we have selected those location where no tree cutting will be involved.
Are there any excavation activities involved in this project? If yes then how will you dispose the spoil material?	We shall work at the existing facilities of grid stations. The locations where the capacity of transformer is small, we are going to install large capacity transformer or along with that we shall install another transfer. The foundation pads for these transformers are already established. No major new construction or excavation will be involved in this project.
Will you involve third party for monitoring of air and noise pollution during construction phase?	It will be considered during environmental and social impact assessment studies and if there will be any. sensitive locations near the construction sites, the project may engage a third party for environmental monitoring. During our consultations with grid station staff and communities living near the grid stations, we asked people about their views regarding noise pollution during work at grid station or during installation of new equipment. They explained that there is no such problem of noise due to

Stakeholders Comments and Suggestions	PESCO's Response
	construction at the grid station. The Working gang was also consulted and they explained that they carry out activities during off peak hours so that there should be minimum or no disturbance to the communities.
Which hazardous material will be used at this project?	There is no such use of hazardous material in this project. The only hazardous material is transformer oil. The highly contaminated oil has been excluded/banned from the system and we have included in the bidding document that the mineral oil will be provided for the transformers which will be PCB free. The transformer oil comes in large drums and these drums are reused.
The grid station where the improvements will be done, the old wires will be changed. What is plan for safe disposal of those wires?	The conductors which we are going to replace will be collected from the site and will be brought to the main store. We have a disposal directorate. They auction this material and vendors bid for the material.
The electricity bills are going up and availability of electricity is short. There is frustration among the masses. Will there be any impact of this project on electricity bills?	We are going to install ABC cable and bare conductors will be replaced. The commercial losses and technical losses will be controlled. There will be an impact on electricity bills as well.
What will be impact of this project on load shedding?	We are going to upgrade the system so that load shedding could be reduced.
In the hilly areas of Swat there are two hazards which hinder the supply of electricity. One is flood while the other is strong winds. The electric transformers which you have installed near river Swat or in other flood areas, will you also change these transformers in those areas? Have you done any survey in this regard?	We are currently dealing with the large transmission lines (132 kV). The transmission line which you mentioned is 11 kV distribution line. We have a separate directorate to deal with these lines and its issues.
Is there any specific package under this project for education and health institutions? Will there be any provision of dedicated transmission lines to these institutions?	There are formations which are defined as sensitive and are exempted from the load shedding in the areas under PESCO. Only in case of major faults, there will be load shedding. Educational institutes and hospitals are included in those sensitive formations.
The transformers are very heavy how will you transport these transformers to hilly areas like	We construct the grid at those locations where a proper access road would be available. The equipment is very precious and we do not plan activities in locations where access is not possible.

Stakeholders Comments and Suggestions	PESCO's Response
Malakand division and Hazara division where the load capacity of bridges is less?	There is a committee which selects the site for construction of grid station.
Currently you will work on large transmission line, is there any plan to upgrade the small transmission lines which transmit power to villages?	We are also working on feeders and expansion work is also in progress.
During construction activities there will be disruption in power supply. Is there any alternate plan for those areas so that the people should not suffer?	In case of long load shedding, we issue a schedule and share with the public. Our repair and construction activities are normally carried out in off peak hours. We shall arrange alternate transformers for continuous power supply.
In Charsadda, there is load shedding of 10-12 hours. The Bacha Khan University Charsadda is located in a security risk area. Is there any provision of dedicated line for the university in the project?	The feeders of Charsadda area are included in the project. Load shedding shall be controlled with this upgradation. There is no provision of a dedicated line for the Bacha Khan University in the project.
The tree cutting should be avoided. The wildlife is disturbed due to cutting of trees.	We have noted your point and will incorporate it in the relevant safeguard documents.
It is explained that trees will be replanted with 1:3. There are forest trees which take years to grow. If we replant two to three trees as an alternate of large grown trees. Will it be a good alternate?	We are going to upgrade existing grids and no tree cutting will be involved in it.
The labor who will be working on the project and expired as a result of an accident during the construction activities. What are provisions in the project for such labor?	The ten standards of WB are above the national law. Labor management procedures will be prepared and all labor issues will be covered in this document. Special clauses will be added in the contract. The contractor will implement those measures and the DISCO will monitor the implementation.
When the transformer of an area in Lower Dir becomes out of order, the people of community arrange the repair by themselves. There should be mechanism that in case of damage there should be provision of alternate transformer to that community so that there should be no disruption of power.	We have noted your comments.

Stakeholders Comments and Suggestions	PESCO's Response
The themes on which WWF is working, we can provide you technical input on those themes/aspects. We can tell PESCO about the type of trees in different areas of KP, damage on tress, alternate plantation, impact on wildlife and impact of climate change.	We shall coordinate with WWF.
If the project requires an input from WWF, we can provide our input in written form. We can visit the sites and also can conduct meetings.	PESCO will consult with WWF and seek their guidance through the life of the project.
The stakeholders were willing to provide help in areas of disaster management, community engagement and advocacy.	PESCO appreciates this support and will benefit from relevant stakeholder expertise.
The stakeholders were willing to participate in workshops/trainings arranged by the project.	PESCO will arrange trainings and involve stakeholders on environmental and social issues

6.3. Future Consultations

Stakeholder engagement and consultations are on-going activities and will continue to be carried during the project construction and O&M phases. An indicative framework is presented below listing these consultations.

Table 6-5: Consultation Framework

Description	Target Stakeholders	Timing	Responsibility
Higher level meetings on: through the project • Policy level environmental and social considerations, capacity and scope of work	• Policy makers and	As needed during implementation	Focal point at
• Stakeholder consultations as part of the preparation of each subproject-specific ESMPs and RPs	• Affected communities • Secondary stakeholders	During preparation of each ESMP/RP	ESMP/RP Consultants
• Public awareness campaigns/ scoping sessions to share the ESMPs and RPs with the communities and other stakeholders. • Location: various places in project area	• Communities within subproject area, general public; and line departments/ agencies.	During the preparation of ESMP; to be continued thereafter	PMU/ ESMP Consultants
• Consultations with the communities during each ESMP and RP implementation • Location: various places in project area	• Communities at/around subproject area	Before commencement of subproject activities.	PMU and ESMP Consultants
• Establishment of GRM and GRCs • Location: various places in project area	• Communities at/around subproject area	Before commencement of subproject activities.	PMU and ESMP Consultants
• Grievance redress • Location: various places in project area	• PMU staff; consultants; relevant	Subproject implementation Stage	PMU and ESMP Consultants

Description	Target Stakeholders	Timing	Responsibility
	line departments; and communities.		
• Informal consultations and discussions. • Location: various places in project area	• Communities at/around subproject area	Subproject implementation Stage	PMU and ESMP Consultants; Contractor
• Consultations with the communities during internal monitoring • Location: various places in project area	• Communities at/around subproject area	Construction Stage	PMU and ESMP Consultants
• Consultations with the Communities during the Independent Monitoring • Location: various places in project area	• Communities at/around subproject area	Construction Stage	M&EC
• Consultation workshops to review ESSA/ESMF/ESMPs/RPs implementation, any outstanding issues and grievances, views and concerns of communities; and actions needed to address them. • Location: site offices in project area.	• Communities at/around subproject area; relevant line department; relevant NGOs	Six-monthly during implementation phase	PMU and ESMP Consultants
• Consultations with the communities during the site visits by the World Bank Review Missions. • Location: various places in project area.	• PMU; Communities at/around subproject Area	Construction/ Operation Stage	PMU; WB Mission

6.4. Disclosure Requirements

The present ESMF and other E&S documents including RF and SEP as well as Urdu translation of their executive summaries will be disclosed at the website of each IA. The ESIA and RP prepared during the project implementation will be disclosed in a similar manner.

7. Environmental and Social Management

This chapter describes the step-by-step methodology to be followed for carrying out the environmental and social assessment studies for proposed subprojects to be implemented under Components 1 and 2 of the project and the preparation of ESIAs, and implementation of the ESMPs.

7.1. Sequence of Proposed Activities

The sequence of various activities to be followed during the preparation of ESIAs and ESMPs of the proposed subprojects and their implementation are given in **Table 7.1**. Detailed guidelines for carrying out these activities are described in the subsequent sections.

Table 7-1: Sequence of Proposed Activities for E&S Framework

Step	Activity	Description of the Activity	Timing/Status	Responsibility
1	Screening	Screening of the proposed subprojects to assess the ESIA/ESMP requirements	Project preparation	DISCOs
2	E&S Considerations in Project Design & Analysis of Alternatives	Environmental and social aspects will be considered during the analysis of various project alternatives and designs	During detailed design and E&S studies	Design consultants and E&S Consultants (to be hired by DISCOs)
3	E&S Studies –	Primary baseline environmental data of the project influence area (covering physical, chemical, biological and socioeconomic environment) will be collected Assessment of impacts and their significance Preparation of ESMP Preparation of RP/ARP (in case of resettlement impacts)	During project implementation	E&S Consultants
4	Consultations and Disclosure	Consultations with the stakeholders (including affected communities) during to E&S studies and	During E&S studies	E&S Consultants and DISCOs

Step	Activity	Description of the Activity	Timing/Status	Responsibility
		after completion of draft ESIA. Disclosure of the ESIA, ESMP and RP (including translated summaries) on DISCO's website	After completion of E&S studies	
5	Submission of ESIA and RP for -EPA and WB clearance	Submission of E&S documents along with necessary fees to Sindh EPA, and arranging a public hearing for EPA	After Completion of ESIA – Prior to construction	DISCOs and their Environmental Staff
6	Environmental conditions for Bidding Documents	Preparation of environmental specification for bidding documents, including preparation of BOQs and inclusion of ESMP in the bidding documents.	Prior to bidding	DISCOs and their Environmental Staff
7	Implementation of ESMP	Contractors will develop site-specific construction-ESMPs and will implement them Regular monitoring of compliance by the Construction supervision consultant and DISCOs.	During Construction	Contractor DISCOs and their Environmental Staff Construction Supervision Consultant

7.2. Step 1: Screening

Environmental and social screening activities will be carried out for the proposed subprojects by reviewing the project details and site visits.

Project Screening Criteria

Once a subproject is identified, a reconnaissance site visit will be carried out. The purpose of this visit will be to initiate the environmental and social assessment of the project, to assess the baseline conditions of the area, to identify the key environmental resources and social features of the area, to identify any environmental and or social sensitivity of the area, and to determine presence of any environmental and or social hotspots in the area. A checklist will be filled for each subproject based upon the findings and observations of the reconnaissance visit. A sample checklist is provided in **Annex A**.

The next step would be to screen each subproject based upon the checklist filled as described above and to categorize the subproject in accordance with the criteria defined in **Table 7.2.**

Table 7-2: Screening Criteria for Environmental and Social Impacts

Full ESIA Required; Resettlement Plan (RP) Required	IEE/ESMP Required; ARP required in case of Resettlement Impacts	Mitigation Checklist Required
Subprojects: having significant irreversible and widespread impacts (such as establishment of a new grid station); OR involving significant degradation of forestry of sensitive natural habitat; OR requiring an EIA according to national regulations. Subproject causing involuntary resettlement of 200 or more people (RP would be required)	Projects potentially causing low to moderate level of negative but reversible and localized impacts (such as extension or augmentation of an existing grid station with no new land requirement). Subproject causing involuntary resettlement of less than 200 people (ARP would be required)	Projects having only minor impacts

If the screening process concludes that the project is likely to have significant and or irreversible negative environmental and or social impacts, an ESIA will need to be carried out, as shown in **Table 7.2.** In addition, a RP will also need to be prepared in case the project is likely to cause resettlement impacts. If the screening process concludes that the project is likely to have low to moderate level of negative impacts, an Environmental and Social Management Plan (ESMP) will be prepared prior to initiating the subproject. In case the subproject is likely to cause resettlement impacts, a RP will also be prepared. For all other subprojects potentially causing low level of environmental and or social impacts, the only assessment required will be the screening carried out with the help of the checklist mentioned earlier.

Detailed E&S studies are to be carried out for the proposed subprojects. Terms of references (ToR) for the proposed ESIA studies have been prepared and presented in **Annex B**, while the ToR for preparing an ESMP is presented in **Annex C**. ESIAs and ESMPs of the proposed subprojects will be prepared following these ToRs.

Anti- Encroachment Drive (AED). Subprojects located in areas where AED has been or is being carried out will be excluded from the project.

7.3. Step 2: E&S Considerations in Subproject Design and Analysis of Alternatives

Environmental and social issues will be mainstreamed into the Project design through a detailed analysis of alternatives of the subproject location, alignment, design, technology, and construction approach. The primary objective of the 'analysis of alternatives' is to identify the location/design/technology for a particular subproject that would generate the least adverse

impact and maximize the positive impacts/benefits.

7.4. Step 3: E&S Studies

7.4.1. Baseline Data Collection

Influence area for each subproject will be identified covering areas likely to be directly or indirectly affected by the subproject construction and operation.

Baseline environmental data of the subproject influence area (covering physical, chemical, biological, and socioeconomic environment) will be collected through a review of secondary literature and primary data collection/survey. Primary data collection will be carried out for assessment of land form and land use, ambient air and noise quality, surface water and groundwater quality, wildlife habitats, forests and other ecological conditions in the subproject influence area. Primary surveys will also be carried out to establish the baseline socioeconomic conditions of the communities in the subproject area. Details of surveys to be carried out are given in the ESIA ToR (**Annex B**).

7.4.2. Impact Assessment

Based on the initial assessment, potential impacts and risks of the proposed subprojects have been identified and presented in previous **Chapter 5**.

A detailed characterization and assessment of these impacts will be carried out in the respective subproject specific ESIA/ESMP. In addition, the impacts of the proposed subprojects on the environmental and social components will be identified through consultation with experts and the local community. The impacts will be analyzed and graded qualitatively (e.g. high, medium, low) in order to identify the major impacts. Potential impacts will be predicted using the professional judgment of the multi-disciplinary team members based on baseline information collected and any modeling studies if required. The impact assessment will also consider both cumulative and induced impacts of the subprojects.

7.4.3. Environmental and Social Management Plan

ESMPs will be prepared in order to address all the identified potential environmental and social impacts and risks following the principles of the mitigation hierarchy. To the extent feasible, all potential impacts and risks will be avoided through design changes, and if avoidance is not possible – measures will be taken to minimize the magnitude of the impact. Mitigation measures will be proposed for all the significant impacts. If the residual impacts are still significant even after applying the mitigation measures, compensation measures will be proposed. Further, enhancement measures will be proposed for increasing the benefits of positive impacts. A sample mitigation plan, as a guideline, is prepared and presented in **Table** 7.3 to address the impacts during construction and operation stages. Based on these guidelines, a detailed ESMP will be prepared as part of the subproject ESIA or as a standalone document as determined through the screening process discussed in **Section** 7.2.

An environmental monitoring plan will also be prepared in the ESMP to monitor the effectiveness of the mitigation measures and compliance with the environmental standards. A template for this plan is provided in **Annex D**.

Table 7-3: Sample Mitigation Plan

Impact	Mitigation Measures	Responsible for Implementation	Responsible for Supervision
1. Loss of natural vegetation and trees due to land clearing under project footprints	Compensation to be paid to tree owners Plantation of trees in the grid station	DISCOs, Contractor	CSC DISCOs
2. Acquisition of private land for the construction of project facilities	Adequate compensation and resettlement assistance for affected households as per the entitlement matrix	DISCOs	DISCOs
3. Loss of livelihood due to the permanent acquisition of agricultural lands	Adequate compensation and implementation of income and livelihood restoration plan	DISCOs	DISCOs
4. Impact on residential structures, and wood and fruit trees	Adequate compensation and resettlement assistance for affected households as per the entitlement matrix	DISCOs	DISCOs
5. Employment generation for the local community	The hiring of local people during construction works	Contractor	DISCOs
6. Generation of spoils (excess excavation) and their disposal	Transport and disposal of spoils and designated disposal sites Proper dumping and adequate compaction to avoid dust and release back to the river Landscaping of the disposal areas after completion of works	Contractor	DISCOs CSC
7. Generation of construction waste including hazardous waste	Containers of adequate size and numbers in place for collection of various types of wastes (metal, rubbers, used fuels, batteries, etc.) Procurement of services of a waste management contractor for transport and treatment of recyclable and hazardous Waste	Contractor	DISCOs CSC
8. Generation of solid waste from worker's campsites and offices	Segregation of solid waste into kitchen waste (organics), paper and plastic (recyclable) and garbage (non-recyclable) Placement of containers of adequate size and numbers Organic waste will be treated through in-vessel composters and the manure will be given to the local communities	Contractor	DISCOs CSC

Impact	Mitigation Measures	Responsible for Implementation	Responsible for Supervision
	Recyclable waste will be compressed through bailers and use services of the waste management contractor Disposal of the garbage at the waste disposal site developed for the project.		
9. Wastewater discharges from the construction camps, sites, and batching plants	Construction of wastewater treatment facilities at the campsite (e.g., septic tank and soak pit) and at the worksites (sedimentation tanks for batching plants and discharges from tunnels; and site drainage)	Contractor	DISCOs CSC
10. The potential risk of soil pollution by construction works	Storage of fuels and chemical in contained facilities Availability of spill kits for immediate cleanup of any oil spills	Contractor	DISCOs CSC
11. Increased traffic on the local roads	Traffic Management Plan (e.g., avoiding school hours, following sped limits, hiring licensed drivers, etc.) including awareness-raising and safety measures	Contractor	DISCOs CSC
12. Air and noise pollution from construction and traffic	Compliance with NEQS on vehicle and machinery emissions, and ambient noise	Contractor	DISCOs CSC
13. Impacts from increased human activities on flora and fauna	Use of non-wood fuel for cooking and heating; Code of conduct for workers and employees' protection of flora and fauna Awareness-raising to workers on the protection of flora and fauna	Contractor	DISCOs CSC
14. Occupational health and safety (OHS) issues	Prepare and implement OHS management plan (see **Annex E** for a template for an OHS Plan outline) (the Plan will be prepared in accordance with the WB ESF, World Bank Group's Environment, Health and Safety Guidelines as well as World Health Organization (WHO) Guidelines, ILO Code of Practice and any internationally recognized OHS standard such as ISO 45001 or US OSHA 29 CFR 1926 or any standard specifically mentioned in the bidding documents); Conduct a 'job hazard analysis at the new construction site to identify potential hazards that may arise from the proposed	Contractor	DISCOs CSC

Impact	Mitigation Measures	Responsible for Implementation	Responsible for Supervision
	works or working conditions to the project workers and implement necessary control measures. Use of relevant personal protection equipment at all times Regular training program for workers on occupational health safety (monthly training and daily toolbox talks) Incident investigation and reporting Availability of fire-fighting, ambulance, medical and rescue facilities at the site for implementation of an emergency response plan; Implementation of GoP guidelines for protection against Covid-19		
15. Safety hazards due to increased traffic especially for children and elderly people, electrocution risk	Traffic Management Plan (e.g. avoiding school hours, following sped limits, hiring licensed drivers, etc.) including awareness-raising and safety measures. Safety signage; Awareness raising of communities	Contractor	DISCOs CSC
16. Community exposure to work hazards	Barricade the work areas with hard fencing to prevent the entry of community in the construction areas. Placing of adequate signboards and flagmen to divert the community away from the construction works.	Contractor	DISCOs CSC
17. Dust from vehicular movement on local roads and construction activities	Frequent sprinkling of water on the local roads and worksites to control dust emissions	Contractor	DISCOs CSC
18. Impacts from the influx of labor from the outside areas	A construction camp will be built with all adequate facilities (safe drinking water and sanitation, kitchen, rest areas, recreation) The Contractor will establish a mechanism to collect the complaints from the workers and address those complaints by the approved GRM plan	Contractor	DISCOs CSC
19. Possible cultural conflicts between communities and workers and health impacts, including	The contractor's code of conduct shall cover the program to promote awareness to the construction workers on respecting the local community, avoiding gender-based	Contractor	DISCOs CSC

Impact	Mitigation Measures	Responsible for Implementation	Responsible for Supervision
women's privacy and access, and gender-based violence	violence, and the risk of spreading sexually transmitted diseases. The Contractor's monthly training program will cover topics related to Code of Conduct such as sexual harassment particularly towards women and children, violence, including sexual and/or gender-based violence and respectful attitude while interacting with the local community. Staff will receive training on the prevention of SEA/SH, integrating provision related to SEA/SH in bidding document, workers requiring to sign Code of Conducts (CoC) prepared by the Contractors and reviewed and approved by PMU, preparation of SEA/SH plans as a part of the E&S management instruments which will be prepared based on these frameworks during implementation, including a SEA/SH specialist as a part consultant organization and identification and mapping of the service providers.		
20. Risk of child labor	No hiring of workers less than 18 years of age	Contractor	DISCOs CSC
21. Impact on women and girls' privacy due to the presence of construction labor	Measures to protect the privacy of women and girls by the contractor, sub-contractors and service providers	Contractor	DISCOs CSC
22. Generation of solid waste (including some hazardous waste) from the grid station and staff colony	Implement a solid waste management plan	DISCOs	
23. Community health and safety of the DISCO staff and family living in the colony	Maintenance of water supply, sanitation and drainage facilities in the residential colony.	DISCOs	

Impact	Mitigation Measures	Responsible for Implementation	Responsible for Supervision
24. Impacts from electric and magnetic fields from transmission lines on community health and safety	Will comply with WBG EHSGs/WHO recognized standards on EMF through design considerations	DISCOs	
25. Workers' health and safety during routine operation and maintenance	Implementation of OHS plan	DISCOs	
26. Protection against Covid-19	Implementation of GoP guidelines for protection against Covid-19	DISCOs	

7.4.4. Preparation RP

In case any subproject would potentially cause resettlement impacts, RP would be prepared in accordance with the criteria and procedure described in RF.

7.5. Step 4: Stakeholder Consultations and Disclosure

Stakeholder consultations will be carried out to help identify opportunities and risks, improve subproject design and implementation, and increase subproject ownership and sustainability. Stakeholder consultations will be carried out during all phases of the project, in accordance with the requirements and guidelines provided in SEP.

The stakeholders of the Project have been classified into the following two categories:

- Primary Stakeholders: include people, groups, institutions that either have a direct influence on the project or are directly impacted (positively or adversely) by the project and its activities. These stakeholders include district-governments that are involved in project implementation, local communities, civil society organizations, private landowners, and poor non-titled persons/households.
- Secondary stakeholders: are those that have a bearing on the project and its activities by virtue of their being closely linked or associated with the primary stakeholders and due to the influence, they have on the primary stakeholder groups. These stakeholders include all relevant government institutions such as EPA, Local Government, National Transmission and Dispatch Company (NTDC), and non-government organizations.

Stakeholder consultations will be carried out during the preparation of the safeguard instruments to obtain their feedback and address their concerns.

The ESIA/ESMP and RP of each subproject will be disclosed on the DISCOs website and also on the World Bank website. The Executive Summary of the ESIAs, ESMPs, and RPs will be translated into Urdu and will be disclosed on the DISCOs website. Hard copies of the Executive Summary reports of Urdu/local languages will also be made available in the relevant local government offices.

7.6. Step 5: Submission of ESIA and RP for EPA and World Bank Clearance

ESIA and RP for each subproject will be submitted to World Bank and EPA for clearance and approval before initiating any construction works. In addition, the proposed subprojects require various approvals from the relevant government departments during implementations. These requirements are summarized in **Table 7.4**.

Table 7-4: Environmental Approvals and Permits Required during Project Implementation

	Details of Approval and Permits	Issuing Authority	Requirements	Responsible Agency	Timing
1	**Clearance of ESIA and RP**	World Bank	Submission of ESIA and RP	DISCOs	Prior to Construction of the project
2	**Environmental Approval** for the overall construction of the Project	EPA	Submission of ESIA	DISCOs	Prior to Construction of the Project
3	**Environmental Approval** for establishing crusher plants (if applicable)	EPA	Submission of IEE Application	Contractor	During the construction phase
		Forest Department	Submission of Request	Contractor	During the construction phase
		Industries Department	Submission of Request with layout and location maps	Contractor	During the construction phase
		Mines and Mineral Department	Submission of Request	Contractor	During the construction phase
4	**Permit** for storage of blasting material (if applicable)	Deputy Commissioner of District	Submission of a request with the location map of the explosive store	Contractor	During the construction phase
5	**Permit** for the transport of blasting material (if applicable)	Chief Inspector of Explosives	Submission of a request along with type and quantities of explosives, explosive store location information and a recommendation letter from the Employer	Contractor	During the construction phase

	Details of Approval and Permits	Issuing Authority	Requirements	Responsible Agency	Timing
6	**Permit** for cutting of forest trees	Forest Department	Submission of a request	DISCOs	During the construction phase
7	**Permit** for the use of quarry and excavated material	Mines and Mineral Department	Submission of a request with the location map of the quarry area and estimated quantity of required material	DISCOs will sign the lease agreement and handover it to the contractor	During the construction phase
8	Batching Plant	EPA	NOC is not required for establishing a batching plant, but the project has to inform EPA about the facility with a surety that all mitigation measures to control pollution will be adopted.	Contractor	During the construction phase
9	**Environmental Approval** for the operation of the Project	EPA	Submission of a compliance report on the implementation of conditions and recommendations given in the Environmental Approval for construction.	DISCOs	After completion of the Construction and prior to operation

7.7. Step 6: Environmental and Social Requirements in Bidding Documents

DISCOs will include the following Environmental, Social, Health and Safety (ESHS) Conditions in the bidding documents to ensure all the mitigation measures proposed in the ESMPs are effectively implemented:

- Past performance of the Contractor on ESHS aspects including sexual exploitation and abuse and gender-based violence;
- ESHS Staff with the Contractor;
- Performance Security;
- Mitigation measures to address construction impacts (as given in ESIA/ESMP);
- Payments for implementation of ESHS measures;
- Code of conduct of Contractor's Personnel;

- Management Strategies and Implementation Plans (MSIP) to manage the ESHS Risks.

Each of the above conditions is elaborated in **Table 7.5**.

Table 7-5: ESHS Conditions in the Bidding Documents

Condition	Rationale for inclusion of this Condition in the Contract	Specifications to be included in Bidding Documents	Responsibility	
			Bidders	DISCOs
1. Past performance of the Contractor on ESHS is one of the eligibility criteria for the shortlisting process	The contractor's past performance on compliance with ESHS is an indicator of the contractor's commitment and capability for implementation of the ESMP	Record of past performance; The Bidder shall "declare any civil work contracts that have been suspended or terminated and/or performance security called by an employer for reasons related to the non-compliance of any environmental, or social (including sexual exploitation and abuse (SEA) and gender-based violence (GBV) or health or safety requirements or safeguard in the past five years".	Bidder to make the Declaration	DISCOs to use this information to seek further information or clarifications in carrying out its due diligence
2. Contractor shall propose ESHS Specialists in his team	The Contractor's staff should include ESHS specialists who would be responsible for the implementation of all mitigation measures on ESHS risks and compliance with ESMP	The Bidder shall propose Environmental, Social, Health and Safety (ESHS) Specialists as the Contractor's Key Personnel at the Site. The Bidder shall provide details of the proposed ESHS specialists including academic qualifications and work experience. The ESHS Specialists should have a minimum bachelor's degree in engineering or a master's degree in	The bidder to submit the CVs of proposed ESHS Specialist(s)	DISCOs will review and approve

Condition	Rationale for Inclusion of this Condition in the Contract	Specifications to be included in Bidding Documents	Responsibility	
			Bidders	DISCOs
		sciences related to environmental management. The Specialists should have 5 years of experience working on monitoring and managing ESHS risks related to similar projects.		
3. Contractor shall submit ESHS Performance Security for compliance with ESHS obligations	The Contractor should have a financial implication if he could not comply with ESHS requirements. Hence performance security will be collected from the contractor	The Bidder shall submit the ESHS Performance Security in the form of a "demand guarantee" in the amount of one percent of the Contract Amount.	The bidder will submit a Performance Security	
4. Implement Mitigation Measures to Address Construction-Related Impacts given in ESMP	The mitigation measures to address potential ESHS risks and impacts should be included in the bidding documents. The contractor shall be made responsible for the implementation of the mitigation measures through the necessary conditions in the contract.	DISCOs will include the ESMP in the General Specifications of the Bidding Document, and the reference to this document will be provided in the Conditions of the Contract as follows: • The Contractor shall implement the mitigation and monitoring measures given in the ESMP to address ESHS risks associated with the construction works. The Consultant shall refer to the ESIA of the Project, which is available on the		PMU will include this condition in the bidding document

Condition	Rationale for inclusion of this Condition in the Contract	Specifications to be included in Bidding Documents	Responsibility	
			Bidders	DISCOs
		DISCOs' websites for further guidance. • The Contractor shall comply with the World Bank Group's General Environmental Health and Safety Guidelines. Such specifications or conditions should be (i) written clearly in simple terms; (ii) unambiguous to avoid any misinterpretation; (iii) acted upon by the bidder without requiring inputs/actions of other parties; (iv) clearly described if it is to be priced as a standalone item or part of delivering other items of the work; (v) practicable and outcome oriented: i.e., specify the end results as opposed to the method of achieving it.		
5. Payments for implementation of ESHS Mitigation and Monitoring Measures	BOQs on ESHS implementation are included in the Bidding Documents	Generally, the cost of delivering ESHS, particularly the OHS requirements shall be a subsidiary obligation of the Contractor covered under the prices quoted for other Bill of Quantity items. No separate payments will be made for the	Bidder will quote for the ESHS Management. OHS, CHS and environmental aspects should be costed separately.	DISCOs will include this in the general specifications of the bid document

Condition	Rationale for Inclusion of this Condition in the Contract	Specifications to be included in Bidding Documents	Responsibility	
			Bidder	DISCOs
		implementation of OHS requirements. However, the budget will be allotted for the implementation of other ESHS aspects such as waste management, spoil site development, environmental monitoring, etc.		
6. Code of Conduct for all site personnel including Contractor's and DISCOs' Personnel	All workers hired by the Contractor should sign a code of conduct to ensure compliance with ESHS obligations of the Contract	The Bidder shall submit the Code of Conduct that will apply to the Contractor's employees and subcontractors. The Code of Conduct will state that the workers will comply with the following ESHS requirements: • Wearing of Personal Protective Equipment (PPE's) in the workplace at all times • Non-discrimination in dealing with the local community by race, ethnicity, gender, religion, disability, sexual orientation, gender identity, social, or health status • Respectful attitude while interacting with the local community • Prohibit sexual harassment particularly	Bidder shall submit code of Conduct with the bid documents	DISCO will include worker's code of conduct in the general conditions of the bidding document

Condition	Rationale for Inclusion of this Condition in the Contract	Specifications to be Included in Bidding Documents	Responsibility	
			Bidders	DISCOs
		towards women and children • Prohibit violence, including sexual and/ or gender-based violence • Respecting the reasonable work instructions • Protection and Proposer use of the property		
7. Contractor's Management Strategies and Implementation Plans (MSIP) to manage the ESHS Risk	The Contractor proposal should include his understanding of the ESHS requirements of the project and the proposed strategies to manage the ESHS risks	The Bidder shall submit Management Strategies and Implementation Plans (MSIP) to manage the following key ESHS risks: • Strategy for the protection of workers and community from the construction-related hazards inside the terminal • Pollution prevention (wastewater, air and noise emissions) and management • A waste management plan for proper collection and disposal of waste • Traffic management plan to ensure the safety of local communities from construction traffic • Hazardous material management plan safe storage and handling	The bidder will submit MSIP along with the Bid Documents	

Condition	Rationale for Inclusion of this Condition in the Contract	Specifications to be included in Bidding Documents	Responsibility	
			Bidders	DISCOs
		• Strategy to address labor influx impacts on the local communities • Gender-based violence and sexual exploitation and abuse prevention and response action plan • Emergency response plan and early warning system The Contractor shall be subsequently required to submit (before mobilization) Contractor's Environment and Social Management Plan (C-ESMP) by the above strategies and Condition 4 of this Table.		

7.8. Step 7: Implementation of ESMPs of Subprojects

The steps to be followed during the construction stage of subprojects for effective implementation of ESMP are described in this section.

7.8.1. Contractor's Construction Environmental Action Plan

As a requirement under the bidding documents, the Contractors will need to submit a Construction Environmental and Social Management Plan (C-ESMP) prior to their mobilization for PMU approval. Submission and approval of this plan by CSC/PMU will be one of the conditions for the contractor to be able to start site mobilization. This plan will consist of the following site-specific management plans that will be prepared in compliance with the requirements of the bidding documents, ESMP and World Bank EHS guidelines:

- C-OHS Management Plan
- Waste management plan
- Wastewater discharges management plan
- Air and noise emissions management plan
- Hazardous material management and spill control plan

- Water supply and sanitation management at the worksites and workers' accommodations
- Management of labor influx and facilities for the foreign workers
- Labor recruitment procedures and labor management
- Traffic management plan
- Training plan for ESHS risks including HIV/AIDS, sexual exploitation and abuse, and gender-based violence
- Emergency Response Plan
- Grievance Redress Mechanism
- Demobilization plan after completion of works

In addition, the Contractor will need to submit a Job Safety/Hazard Analysis at the beginning of construction works at each new site addressing the measures associated with various hazards at the work sites. These reports will be reviewed and approved by the DISCOS after ensuring the mitigation measures proposed in the analysis are in place at the work sites.

7.8.2. Compliance Monitoring and Reporting

Environmental and Social staff of the Contractor are responsible for implementing the ESMP, while the environmental and social specialists of the Construction Supervision Consultant and DISCOS will be responsible for the overall monitoring of the EMSPs throughout the Project implementation.

Compliance monitoring comprises of on-site inspection of the construction activities to verify that measures identified in the ESMP and that are included in the clauses for contractors are being implemented. This type of monitoring is similar to the normal technical supervision tasks ensuring that the Contractor is achieving the required standards and quality of work.

The following reports will be prepared on the implementation of ESMP:

- Monthly environmental monitoring reports by the Contractor on the status of implementation of environmental, social, health and safety aspects, and
- Quarterly environmental monitoring reports by the PMU on the status of implementation of environmental, social, health and safety aspects

The topics to be covered in these reports are summarized below:

- Environmental incidents or non-compliance with contract requirements
- Health and safety incidents, accidents, injuries and all fealties that require treatments
- Inspection of Workers accommodation (including worker welfare facilities such as toilets in work areas, cold drinking water for workers during summers, and other similar facilities); Workers and community grievances
- Training conducted and their content;
- Environmental issues encountered and how they were mitigated and
- Compliance status on ESMP requirements.

8. Project Institutional Framework

This Chapter describes the institutional framework for the management of the overall project particularly its environmental and social aspects.

8.1. Institutional Arrangements for Environmental and Social Management within DISCOs

DISCOS will be responsible for the overall management, supervision, and execution of the project through the Project Management Unit (PMU). A full-time Project Director (PD) will be appointed to head the PMU. See **Figure 8.1** for the PMU organogram.

The overall responsibility of environmental performance, including ESMP implementation, will rest with the PMU. Each DISCO has an existing Environmental and Social Safeguard Cell (ESSC), which needs to be fully staffed for the management of environmental and social impacts of the project. DISCOS will depute these specialists to PMU to ensure the effective implementation of ESSA and ESMF and ESMPs (and also RF and RP). In addition, PMU will also hire independent ESIA consultants for the preparation of safeguard instruments for the proposed subprojects.

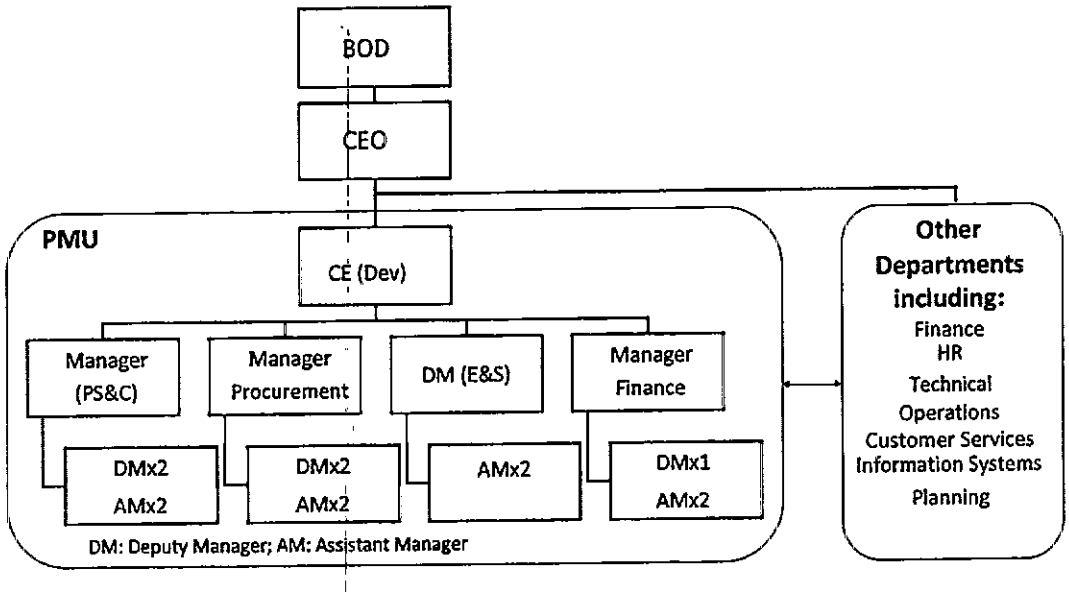


Figure 8-1: Institutional Arrangements for PMUs in each DISCO

Details of environmental and social staff associated with various consultants and contractors that may be engaged under the project are summarized below.

- **Environmental and Social Staff in PMU.** The Environmental and Social Safeguard Cell (ESSC) of PMU includes the following staff:
  - A Deputy Manager, Environmental and Social
  - two Assistant Managers (one environment, and one social)
  - The staff will assist the PMU on issues related to environmental and social management and oversee the independent ESIA Consultants. The Construction Supervision

Consultant (CSC) and contractors will compile quarterly monitoring reports on ESMP compliance, to be sent to the Project Director and also shared with the World Bank, throughout the construction period.

- **Independent ESIA Consultants.** PMU will procure services of independent consultants for preparation of ESIA of the projects including preparation of RP.
- **Project Implementation Consultants (and/or Construction Supervision Consultants)**: The Project Implementation Consultant will be responsible for (i) carrying out feasibility studies and detailed engineering designs of the projects, and (ii) construction supervision of these projects. The consultants will have adequate environmental, social, health and safety specialists to implement the environmental and social management plans of the ESMP.
- **Project Management Consultant (PMC)**: The PMC team will consist of an environmental specialist and a social specialist. They will support the PMU staff in carrying out their responsibilities.
- **Contractors:** Construction contractors will also have adequate environmental, health and safety specialists to implement the environmental and social management plans of the ESMP.
- **Monitoring and Evaluation Consultants (M&E Consultants).** The PMU will also engage an independent organization to carry out third-party environmental and social monitoring during project implementation.

The roles and responsibilities of PMU's environmental and social staff and consultants for environmental and social management of the Project are given in **Table 8.1**.

Table 8-1: Roles and Responsibilities in Environmental and Social Management

Organization	Responsibilities
PMU	• Ensure that all project activities are well-managed and coordinated. • Recruitment of consultants for ESIA studies; and approval of ESIA by the EPA and WB • Procurement of works and goods. • Payment of compensation to the project affected households
E&S Staff within PMU	• Reviewing consultants' deliverables related to environmental and social assessment, reviewing bid documents for inclusion of ESMP measures, supervising construction activities, producing periodic monitoring reports, • Supervising CSC for the implementation of ESMP including mitigation measures and implementation of C-ESMP • Carry out direct monitoring of key aspects such as COHS, GRM • Closely coordinate with other concerned agencies, local governments, and communities to support the implementation of ESMP
ESIA Consultants	• Carrying out ESIA studies in compliance with the EPA and World Bank guidelines following the ESSA and ESMF • Prepare ESIA and RP
Project Implement Consultants / Construction Supervision Consultants	• Prepare feasibility studies and detailed engineering designs for projects • Supervise civil works, ensuring compliance with all design parameters including quality requirements and ESMP implementation • Prepare monthly reports and submit to PMU • PIC/CSC will have dedicated environmental and social staff

Organizations	Responsibilities
Project Management Consultant	• Support the E&S staff of PMU in carrying out their responsibilities • Review of ESIA reports prepared by ESIA Consultants • Ensuring inclusion of ESMP in bidding documents • Providing training on ESMP principles and requirements to CSC, contractors, DISCOS field staff, and others as needed to ensure effective implementation of ESMP
Contractor	• Prepare C-ESMP with site-specific mitigation measures. • implementation of mitigation and monitoring measures proposed in the ESMP • Each contractor will recruit an Environmental, Health, and Safety Manager, who will be responsible for implementing the contractors' environmental, health and safety responsibilities, and liaising with government agencies. S/he will have adequate environmental, social, health, and safety staff.
M&E Consultant	• Independent monitoring of the implementation of ESMPs and RPs • External Monitoring and evaluation.

8.2. Implementation Arrangements for Component 4

The PD of the MoE will be the implementing entity and principal accounting authority for Component 4 of EDEIP. A joint secretary will serve as a project director of the PIU and will be supported by budget officer(s) from within Power Division to oversee financial management aspect. It will oversee execution of planned activities and will collaborate with relevant entities as described in **Figure 8.2** below for their effective execution. On the policy aspect, Power Planning and Monitoring Company (PPMC) will support MoE, whereas PPIB/AEDB will be responsible to carry out the work related to the IAA. The setting up of the ISMO will involve NTDC and CPPA-G, who is currently serving the role of the market operator. A Project Steering Committee (PSC) is proposed to provide a high-level oversight, strategic guidance and facilitate coordination between relevant entities and departments for smooth implementation of Component 4 of EDEIP in particular and overall project implementation in general. PSC would be chaired by Secretary Energy with Member Energy Planning Commission, CEOs of PITC, DISCOs and PPMC and representatives of NEPRA and Privatization Commission as its members. The PSC composition is fit for purpose and other members can be co-opted on the need basis. The PD of PIU in MOE will be secretary to the PSC. MoE-PD will designate a focal point on the E&S to coordinate and ensure implementation of the E&S aspects.

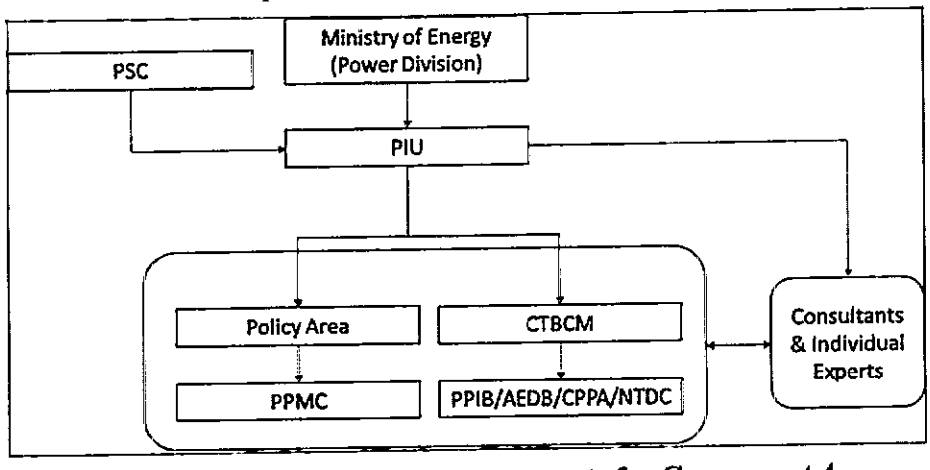


Figure 8-2: Institutional Arrangements for Component 4

8.3. Capacity Building and Training

Training will be conducted for all the project staff including engineers and relevant stakeholders during initial stages of the project to sensitize them on the management of environmental and social issues, and to build the requisite capacities.

The proposed training plan is given in **Table 8.2**; it will be reviewed and finalized during the project-specific ESIAs. DISCOs' independent ESIA consultants and CSC will deliver the training programs. At the construction site, CSC will take the lead in implementing the capacity building plan, though the contractors will also be responsible for conducting training for their own staff and workers. The various aspects that are covered under the capacity building will include general environmental and social awareness, key environmental and social sensitivities of the area, key environmental and social impacts of the project, ESMP requirements, WB ESF requirements, OHS aspects, and waste disposal. **Table 8.2** provides a summary of various aspects of environmental and social training to be conducted at the construction sites/stage. PMUs may revise the plan during the project implementation as required.

Table 8-2: Environmental and Social Training Programs

Contents	Participants	Planner	Schedule
General environmental and socio-economic awareness; Environmental and social sensitivity of the project influence area; COHS aspects and key COHS risks; Social and cultural values of the area; WB ESF requirements; national/provincial regulatory requirements	The selected managerial staff of PMU and DISCOS including their consultants	Independent ESIA Consultants	Before the start of the project activities. (To be repeated as needed.)
General environmental and socio-economic awareness; Environmental and social sensitivity of the project influence area; ESIA findings, ESMP; RP; Mitigation measures; Community issues; GRM; COHS aspects	DISCOS personnel who will in charge of construction as well as O&M and the Engineers from the local contractors	CSC E&S Staff	During project implementation (To be repeated as needed.)
E&S issues associated with the construction works ESMP requirements of the contractors; Workers health and safety; WB ESF requirements; GRM; COHS aspects	Construction crew	Contractors EHS Staff	Prior to the start of the construction activities and during the construction activities (To be repeated as needed.)
E&S monitoring and supervision; COHS aspects	CSC E&S staff	CSC/ESU	Prior to the start of the construction activities and during the construction activities (To be repeated as needed.)
COHS aspects	Construction crew	Contractors EHS Staff	Prior to the start of the construction activities and during the construction activities (To be repeated as needed.)

Contents	Participants	Trainer	Schedules
Gender sensitivity	All project personnel	CSC E&S Staff	Before the start of the project activities. (To be repeated as needed.)
GRM	Community members	CSC E&S Staff	Before the start of the site activities. (To be repeated as needed.)
Housekeeping, hygiene, waste management and disposal	Camp crew	Contractors EHS Staff	Prior to the camp establishment (To be repeated as needed.)
Management of waste oils and chemicals in accordance with MSDS	Construction workers	Contractors EHS Staff	Prior to the start of the construction activities and during the construction activities (To be repeated as needed.)
Safe and defensive driving practices	Project drivers	Contractors EHS Staff	Prior to the start of the construction activities and during the construction activities (To be repeated as needed.)

8.4. Institutional Enhancement

The institutional strengthening and enhancement will be considered during the project implementation based upon the complexity of subprojects and the environmental and social setting and the associated risks and impacts of the proposed activities. This aspect will be further assessed and covered under the subproject ESIAs and ESMPs. In particular, OHS related capacities that already exist in DISCOs in their respective Safety Departments need to be assessed and their linkage with the ESUs need to be established for a better coordination and enhanced compliance with the relevant safety codes. The Safety Departments are already in the process of adopting and implementing the Safety Code prepared by NEPRA; this effort will be assessed during the proposed project and the need of any additional training/capacity enhancement will be determined and actions taken as appropriate.

9. Grievance Redress Mechanism

9.1. Project GRM for DISCOs

A project-specific grievance redress mechanism (GRM) will be established to receive, evaluate, and facilitate the resolution of affected parties' concerns, complaints, and grievances about the environmental and social performance of the Project.

A three-tier GRM has been designed to provide a time-bound, early, transparent and fair resolution for APs' and other stakeholders' grievances regarding E&S management of each subproject. All complaints received verbally or in writing will be properly documented and recorded in the Complaint Management Register(s). In addition, an easy-to-access web-based system will be developed to receive the complaints. If the complaint cannot be resolved at these three tiers, the complaint will have a choice to lodge his/her complaint at the related court of law. The GRM for the project is outlined below.

First Tier of GRM. The first tier of GRM will be established at the field level and will offer the fastest and most accessible mechanism for resolution of grievances at the local level. A local level Grievance Redress Committee (GRC) will be formed for this purpose headed by the ESU Manager, with membership from Land Acquisition Collector and other relevant staff of Revenue Department (when resettlement activities are in progress), contractors' representatives, consultants' representatives, representatives of other relevant departments, and two members from the Affected Persons (APs) . At this tier, the designated E&S staff of PMU site office will make attempt to resolve the complaints within two to 10 working days, depending on the nature of grievance. The ESU Manager (or his/her nominee) will convene the meetings of local GRC and conduct proceedings informally to reach an amicable settlement between the parties within 10 days of receiving a complaint (verbally or in writing) from an affected person or his/her representative. The proceeding of the GRC meetings will be recorded in writing, and copies will be provided to the parties involved. Grievances will be documented with personal details (name, address, date of complaint, and nature of the complaint) will be included unless anonymity is requested. A tracking number will be assigned to each complaint/grievance. Should the grievance remain unresolved or the AP is not satisfied with the decision, the grievance can be lodged with the project level grievance redress committee, led by the head of PMU.

Second Tier of GRM. The E&S staff in PMU will refer the unresolved issues or grievances (with written documentation) to the second tier of GRM, the PMU level GRC. The PMU level GRC will be established by each DISCO and will consist of the following persons: (i) the head of PMU will act as head of the GRC; (ii) a representative from DISCO senior management; (iii) Manager/Deputy Manager of ESU; (iv) representative of DC office (where relevant); (v) representative of PIC/CSC; (vi) Chief Resident Engineer of the CSC (on-call); (vii) representative of relevant government offices (on-call); and (viii) two to three representatives of respective project-affected people (on-call). A hearing can be called with the GRC, if necessary, where the AP(s) can present details of his/her/their concern/grievance. The GRC will meet as necessary when there are grievances to be addressed. The GRC will suggest corrective measures at the field level and assign clear responsibilities for implementing its decision within 25 working days, depending on the nature of the grievance. If complainant is still dissatisfied with the decision, the existence of the GRC/GRM shall not impede the complainant's access to the government's administrative or judicial remedies.

Third Tier of GRM: In the event that a grievance cannot be resolved directly by the second tier GRC or if complainant is dissatisfied with the decision of GRC, the affected people can

seek alternative redress through the CEO or Board of Directors of DISCOs, district administration, the Secretary Energy and Power Department or higher-level administrative authorities, the Pakistan Citizen Portal or the court of law, as appropriate.

Monitoring and reporting. The monitoring reports of RP and ESMP implementation will include the following aspects pertaining to progress on grievances: (i) number of cases registered, level of jurisdiction (first, second, third tiers), number of hearings held, decisions made, status of pending cases; and (ii) lists of cases in process and already decided upon, may be prepared with details such as name with copy of NIC, complaint number, date of application, date of hearing, decisions, remarks, actions taken to resolve issue(s), and status of grievance (i.e., open, pending, closed).

World Bank's Grievance Redress Mechanisms: Communities and individuals who believe that they are adversely affected by a World Bank (WB) supported project may submit complaints to existing project-level grievance redress mechanisms or the WB's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), please visit http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org.

9.2. Proposed GRM for Construction Workers

The GRM discussed in **Section 9.1** would address the grievances/complaints lodged by the project affected persons and other local stakeholders. However, according to the lessons learned in various project contexts, there is also a need to establish a separate GRM to deal exclusively with those complaints that involve workers employed by the Contractors for construction activities. Such grievances may involve wage rates and unpaid overtime works; irregular and partial payments; lack / inadequacy of living accommodations; lack of clean drinking water and sanitation facilities; lack of medical care in emergencies; lack of protection against gender-based violence (GBV) by labor suppliers, supervisors, and others who also deal with workers.

The GRCs dealing with labor grievances / complaints will have members who are directly and indirectly associated with the construction works. The GRC will include a PMU official who is in charge at the worksite as the convener, resident engineer of the CSC, a workers' representative, and the contractor's representative. The convener will designate an official to receive the complaints and ensure the complainant does not lose his/her job and is not intimidated into withdrawing the complaint before the formal hearing.

To ensure impartiality and transparency, hearings on complaints will be held in a non-threatening environment and will remain open to all other workers on the site when appropriate. The GRCs will record the (i) details of the complaints; (ii) reasons that led to acceptance or rejection of the individual cases, as well as the number of accepted and rejected cases; and (iii) decisions agreed with the complainants. PMU will keep records of all resolved and unresolved complaints and grievances and make them available for review as and when asked for by the World Bank and other interested entities/persons.

9.3. GRM for Ministry of Energy

For general complaints MoE has a complaint cell and provides an online option to file available on its website: http://www.mowp.gov.pk/frmDetails.aspx. The MoE will also nominate a focal point in the PIU to manage the complaint mechanism under EDEIP.

Further, the Pakistan Citizens Portal may also be used to file a grievance in instances where the public is not aware of an alternate grievance recourse mechanism. Headed by the Prime Minister's Performance Delivery Unit (PMDU), Pakistan Citizen's Portal is an online integrated GRM which connects all government organizations at the federal and provincial level through a mobile application. Available on both Android and iOS, PCP is used for lodging complaints against any government department or functionary, seeking guidance/information regarding government procedures and to provide suggestions to the government for the resolution of any issue pertaining to the interest of the general public. User Guidelines Manual for PCP is available in both Urdu and English. As of 1 November 2021, the PCP had 3019275 million registered users in the country. A total of 281,4630 complaints were registered and 2664254 complaints were resolved. Despite being a robust GRM, PCP's utility to the project's disadvantaged and vulnerable stakeholders is limited due to low female coverage and because of it being a mobile app-based platform which cannot be accessed by persons with no access to mobile phones, with low ICT literacy, or those living in areas with no network connectivity.

10. Budget for ESSA and ESMF Implementation

This Chapter presents the cost of ESMF implementation that includes E&S training to be conducted by PMU and various E&S studies to be commissioned by DISCOs during the project implementation.

10.1. Cost of Training

The E&S training to be conducted during the proposed project have been discussed in **Section 8.2.** The estimated cost of these training are presented below.

Table 10-1: Estimated Cost of Environmental and Social Training

Contents	Estimated Cost for each DISCO (PKR)	Notes
General environmental and socio-economic awareness; Environmental and social sensitivity of the project influence area; Social and cultural values of the area; WB ESF requirements; national/provincial regulatory requirements	500,000	PKR 100,000 per session x five sessions.
General environmental and socio-economic awareness; Environmental and social sensitivity of the project influence area; ESIA findings, ESMP; RP; Mitigation measures; Community issues; GRM	500,000	PKR 100,000 per session x five sessions.
E&S issues associated with the construction works ESMP requirements of the contractors; Workers health and safety; WB ESF requirements; GRM	0	Included in the contractor's cost
E&S monitoring and supervision	0	Included in the CSC cost
COHS aspects	0	Included in the contractor's cost
Gender sensitivity	0	Included in the CSC cost
GRM	0	Included in the CSC cost
Housekeeping, hygiene, waste disposal	0	Included in the contractor's cost
Safe and defensive driving practices	0	Included in the contractor's cost
Total	**1,000,000**	
Cost for three DISCOs	**3,000,000**	

10.2. Cost of Preparing ESIAs and RPs

The requirement and procedure for conducting various E&S studies (ESIAs, ESMPs, RPs) has been discussed in Chapter 7. The estimated cost of conducting these studies by each DISCO

is presented below.

Table 10-2: Estimated Cost of Conducting E&S Studies

Contents	Estimated Cost for each DISCO (PKR)	Notes/Basis
ESIA	5,000,000	Expert Judgment
ESMP	2,500,000	
RP	5,000,000	
Others	2,000,000	
Total	**14,500,000**	
Cost for three DISCOs	**43,500,000**	

10.3. Total Cost of ESSA and ESMF Implementation

The total cost of ESSA and ESMF implementation is presented below.

Table 10-3: Total Estimated Cost of ESSA and ESMF Implementation

Contents	Estimated Cost for each DISCO (PKR)	Notes/Basis
E&S Training	1,000,000	See Table 10.1
E&S Studies	14,500,000	See Table 10.2
Miscellaneous and Unforeseen Costs	5,000,000	-
Total	**20,500,000**	
Cost for three DISCOs	**61,500,000**	
	About USD 366,071	**1 USD = PKR 168**

Annex A: Sample Checklist of Likely Environmental and Social Impacts of Subprojects

This Form is to be used by the PMUs to determine the type of further assessment to be carried out for each subproject. This checklist may need to be customized, and approval obtained from the Bank for the revised checklist.

Name of Subproject:

Number of Subproject:

Proposing Agency:

Subproject Location:

Subproject Objective:

Infrastructure to be Rehabilitated:

Estimated Cost:

Proposed Date of Commencement of Work:

Technical Drawing/Specifications Reviewed (circle answer): Yes __ No __

Further Assessment Needs: Full ESIA to be carried out for the subproject if one or more aspects in the following table are assessed under 'Significant/Large' category. An ESMP to be prepared for the subproject if one or more aspects in the following table are assessed under 'Moderate/Medium' category. No further assessment would be needed if most of the aspects in the following table are assessed under 'None' or Minor/Small' category.

I. Subproject Related Issues

	ISSUES	None	Minor/ Small	Moderate/ Medium	Significant / Large	Mitigation Measures/Further Actions
A.	**Zoning and Land Use Planning**					
1	Will the subproject affect land use zoning and planning or conflict with prevalent land use patterns?					

	ISSUES	None	Minor/ Small	Moderate/ Medium	Significant / Large	Mitigation Measures/Further Actions
2	Will the subproject involve significant land disturbance or site clearance?					
3	Will the subproject land be subject to potential encroachment by urban or industrial use or located in an area intended for urban or industrial development?					
B	Utilities and Facilities					
4	Will the subproject require the setting up of ancillary facilities?					
5	Will the subproject make significant demands on utilities and services?					
6	Will the subproject require significant levels of accommodation or service amenities to support the workforce during construction (e.g., contractor will need more than 20 workers)?					
C	Water and Soil Contamination					
7	Will the subproject require large amounts of raw materials or construction materials?					
8	Will the subproject generate large amounts of residual wastes, construction material waste or cause soil erosion?					

	ISSUES	None	Minor/ Small	Moderate/ Medium	Significant / Large	Mitigation Measures/Further Actions
9	Will the subproject result in potential soil or water contamination (e.g., from oil, grease and fuel from equipment yards)?					
10	Will the subproject lead to contamination of ground and surface waters by herbicides for vegetation control and chemicals (e.g., calcium chloride) for dust control?					
11	Will the subproject lead to an increase in suspended sediments in streams affected by road cut erosion, decline in water quality and increased sedimentation downstream?					
12	Will the subproject involve the use of chemicals or solvents?					
13	Will the subproject lead to the destruction of vegetation and soil in the right-of-way, borrow pits, waste dumps, and equipment yards?					
14	Will the subproject lead to the creation of stagnant water bodies in borrow pits, quarries, etc., encouraging for mosquito breeding and other disease vectors?					
D.	**Noise and Air Pollution Hazardous Substances**					
15	Will the subproject increase the levels of harmful air emissions?					

	ISSUES	None	Minor/ Small	Moderate/ Medium	Significant / Large	Mitigation Measures/Further Actions
16	Will the subproject increase ambient noise levels?					
17	Will the subproject involve the storage, handling or transport of hazardous substances?					
E.	**Fauna and Flora**					
18	Will the subproject involve the disturbance or modification of existing drainage channels (rivers, canals) or surface water bodies (wetlands, marshes)?					
19	Will the subproject lead to the destruction or damage of terrestrial or aquatic ecosystems or endangered species directly or by induced development?					
20	Will the subproject lead to the disruption/destruction of wildlife through interruption of migratory routes, disturbance of wildlife habitats, and noise-related problems?					
F.	**Destruction/Disruption of Land and Vegetation**					
21	Will the subproject lead to unplanned use of the infrastructure being developed?					
22	Will the subproject lead to long-term or semi-permanent destruction of soils in cleared areas not suited for agriculture?					

	ISSUES	None	Minor/ Small	Moderate/ Medium	Significant / Large	Mitigation Measures/Further Actions
23	Will the subproject lead to the interruption of subsoil and overland drainage patterns (in areas of cuts and fills)?					
24	Will the subproject lead to landslides, slumps, slips and other mass movements in road cuts?					
25.	Will the subproject lead to erosion of lands receiving concentrated outflow carried by covered or open drains?					
26	Will the subproject lead to long-term or semi-permanent destruction of soils in cleared areas not suited for agriculture?					
27	Will the subproject lead to health hazards and interference of plant growth adjacent to roads by dust raised and blown by vehicles?					
G.	**Cultural Property**					
28	Will the subproject have an impact on archaeological or historical sites, including historic urban areas?					
29	Will the subproject have an impact on religious monuments, structures and/or cemeteries?					
30	Have Chance Finds procedures been prepared for use in the subproject?					

-353-

	ISSUES	None	Minor/ Small	Moderate/ Medium	Significant / Large	Mitigation Measures/Further Actions
H.	**Expropriation and Social Disturbance**					
31	Will the subproject involve land expropriation or demolition of existing structures?					
32	Will the subproject lead to induced settlements by workers and others causing social and economic disruption?					
33	Will the subproject lead to environmental and social disturbance by construction camps?					

II. Site Related Issues

	Issues	Yes	No	Don't Know	Mitigation Measures
1	Does the subproject require land acquisition? [Note: Fill in the land acquisition form if YES]				
2	Will the subproject negatively impact livelihoods [Note: Describe separately if YES]				
3	Is the sub project located on land with contested ownership?				
4	Is the sub project located in an area with security problems				
5	Is the sub projected located on land reclaimed from floods (the ownership here may be contested)				

	Issues	Yes	No	Don't Know	Mitigation Measures
6	Is the subproject located in an area with designated natural reserves?				
7	Is the subproject located in an area with unique natural features?				
8	Is the subproject located in an area with endangered or conservation-worthy ecosystems, fauna or flora?				
9	Is the subproject located in an area falling within 500 meters of national forests, protected areas, wilderness areas, wetlands, biodiversity, critical habitats, or sites of historical or cultural importance?				
10	Is the subproject located in an area which would create a barrier for the movement of conservation-worthy wildlife or livestock?				
11	Is the subproject located close to groundwater sources, surface water bodies, water courses or wetlands?				
12	Is the subproject located in an area with designated cultural properties such as archaeological, historical and/or religious sites?				
13	Is the subproject in an area with religious monuments, structures and/or cemeteries?				
14	Is the project located in an area from where people have been displaced?				
15	Is the project located in an area where IDPs are temporarily settled?				

	Issues	Yes	No	Don't Know	Mitigation Measures
16	Is the project in a politically sensitive area?				
17	Is the subproject in a polluted or contaminated area?				
18	Is the subproject located in an area of high visual and landscape quality?				
19	Is the subproject located in an area susceptible to landslides or erosion?				
20	Is the subproject located in an area of seismic faults?				
21	Is the subproject located in a densely populated area?				
22	Is the subproject located on prime agricultural land?				
23	Is the subproject located in an area of tourist importance?				
24	Is the subproject located near a waste dump?				
25	Does the subproject have access to potable water?				
26	Is the subproject located far (1-2 kms) from accessible roads?				
27	Is the subproject located in an area with a wastewater network?				
28	Is the subproject located in the urban plan of the city?				
29	Is the subproject located outside the land use plan?				

-356-

Signed by Safeguard Focal Person: _____

Title: _____

Date: _____

Signed by Project Manager: Name: _____

Title: _____

Date: _____

Screening Questions for Involuntary Resettlement

Involuntary Resettlement Impact screening questionnaire.				
Probable IR/IP Impacts	**Yes**	**No**	**Not Known**	**Remarks**
Involuntary Acquisition of Land and Resettlement Impacts				
1. Will there be land acquisition?				
2. Is the site for land acquisition and ownership status and current usage of land to be acquired known?				
3. Will easement be utilized within an existing Right of Way (ROW)?				
4. Will there be loss of shelter and residential land due to land acquisition or due to clearance of existing right of way?				
5. Will there be loss of agricultural and other productive assets due to land acquisition or due to clearance of existing right of way?				
6. Will there be losses of crops, trees, and fixed assets due to land acquisition or due to clearance of existing right of way?				
7. Will there be loss of businesses or enterprises due to land acquisition or due to clearance of existing right of way?				
8. Will there be loss of income sources and means of livelihoods due to land acquisition or due to clearance of existing right of way?				
9. Will people lose access to natural resources, communal facilities and services due to involuntary restriction of land use or on access to legally designated parks/protected areas IA?				
10. Will access to land and resources owned communally or by the state be restricted?				
Information on Affected Persons:				
Any estimate of the likely number of persons that will be displaced by the Project? [ ] No [ ] Yes If yes, approximately how many? _____				
Are any of them poor, female-heads of households, or vulnerable to poverty risks? [ ] No [ ] Yes				
Are any displaced persons from indigenous or ethnic minority groups? [ ] No [ ] Yes				

Note: The project team may attach additional information on the project, as necessary.

Annex B: ESIA ToR

Terms of Reference (Discussion Draft)
Environmental and Social Impact Assessment (ESIA)
Electricity Distribution Efficiency Improvement Project (EDEIP)

1) Project Overview

The proposed Electricity Distribution Efficiency Improvement Project (EDEIP) will finance DISCOs' traditional investment program including (i) installation of new 132 kV substations; (ii) augmentation, extension, conversion and rehabilitation of the existing substations; (iii) construction, rehabilitation and re-conductoring of transmission lines; (iv) installation of Aerial Bundled Cables (ABC) in high loss feeders; (v) expansion & rehabilitation of 11kV feeders. Component 2 of the project will focus on interventions to transform DISCOs to improve their operation performance and financial profitability. It will include but not limited to DMS in PESCO, transformer monitoring in PESCO, Automated Metering Infrastructure (AMI), tools and equipment for improved operation and maintenance (O&M) and safety and automation of business processes through ERP and information systems. Component 3 will be for institutional strengthening and management support for effective implementation of the project.

2) Subproject Description

This Section provides an indicative list the subprojects included under Component 1 of EDEIP.

PESCO

- 11-kilovolt (kV) capacitor banks
- Upgrading 132-kV bus bars at 20 grid stations
- Extension of four grid stations
- Augmentation of 12 grid stations
- Re-conductoring of four transmission lines with a total length of 49 kilometers (km)
- Installation/improvement of 130 high tension (HT) feeders
- Installation/improvement of low tension (LT) feeders
- Installation of transformer monitoring system
- Installation of 65,000 smart meters
- Aerial bundle cable (ABC) for 74 feeders (4,000 km).

3) Potential Environmental and Social Issues

The proposed project's risks and impacts will mainly be associated with the occupational health and safety (OHS) issues such as working at heights, exposure to live wires and use and disposal of hazardous materials such as transformer oils and possibility of Polychlorinated Biphenyl (PCBs) in obsolete transformers and sulfur hexafluoride (SF6). In addition, project will also potentially cause construction related impacts such as air contamination from machinery/vehicular exhaust and dust generation, soil and water contamination from affluent releases and wastewater from construction site and offices/camps and clearance of natural vegetation and felling of trees.

The proposed social risks and impacts including involuntary resettlement caused by land acquisition and restrictions of access by people to designated parks and protected areas; physical and economic displacement; livelihood impacts disruption of access to health and education facilities; influx of labor, health and safety risks for construction workers as well as nearby communities, and additional vehicular traffic on the local roads and gender impacts including gender differences and disparities that may affect the success of the sub-project.

4) Environment and Social Impact Assessment

The overall objective of the ESIA is to provide input to the project design to enhance the benefit of the sub-project and to eliminate, avoid or mitigate the adverse environmental and social impacts that may result from the investment, and to establish the basis for environmental and social monitoring and evaluation through consultation with different stakeholders.

The consultants will assess the both positive and negative environmental and social impacts and risks of the proposed intervention by using qualitative and quantitative data. Particular attention should be paid to the impacts to, where applicable, ambient water and air quality as the result of the project's construction and operation; noise generated by powered mechanical equipment (PME) employed during the construction phase; habitat and species impacts/loss in the project areas and areas of influence at all stages of the project; ecosystem fragmentation; presence of equipment or material, soil heaps, and borrow pits during the construction phase; potential loss of trees and vegetation during construction and operations; solid waste, spoil, sludge and wastewater generation linked with construction and operation activities; resource efficiency use and cost saving requirements during construction and operations; physical cultural resources and the potential impacts on such resources; and health and safety impacts associated with working on or near live electrical equipment/wires, from improper handling and storage of construction materials as well as accidents occurring with the operation of moving equipment and with trucks moving on-site.

The consultants will assess potential social impacts may arise due to land acquisition and resettlement; induced secondary development during construction in the surrounding areas; potential damage or loss of agricultural land as well as crop damage by construction and operations and maintenance activities; potential permanent and temporary impacts on livelihood including due to resettlement, during construction and operation and maintenance activities; perception of risk among the population residing in areas close to the sub-project installations; changes to demographics including increased or decreased use of social services and/or existing infrastructure, land use, water resources, economic and cultural resources as appropriate; labor influx; gender and vulnerability related impacts; expected land use changes in the sub-project areas and areas of influence in the medium to long term; increased gender based violence, especially during construction; and conflict between construction workers and area inhabitants or local people.

The ESIA consultants will work with DISCO to carry out the tasks described below.

4.1. Review the Project details

Review the proposed project and its geographic, ecological, social, and temporal context, including any offsite investments that may be required. Identify the need for any resettlement plans[46].

Define the Impact Area and the **Corridor of Influence** of the project on the basis of the project scope and extent. The definition of area of influence should include all project components and its ancillary aspects, such as power transmission corridors, access roads, borrow and disposal areas, and construction camps, as well as unplanned developments induced by the project. [47]

4.2.Review of Institutional Arrangements

Carry out assessment of the institutional arrangements and capacity building needs related to environment, health, safety and social aspects within the DISCO. In particular, the occupational health and safety (OHS) practices during construction as well as operation and Maintenance (O&M) phases will be studied. Formulate recommendations for capacity enhancement based upon above assessment.

4.3.Review of the Legislative and Regulatory Framework

Review the policy, legal, and administrative framework within which the ESIA is carried out. Review the national and provincial environmental requirements. Indicate relevant international environmental agreements to which the country is a party. Also review the WB Environmental and Social Framework (ESF) as well as Environmental and Social Standards (ESS) and their triggering status for the Project and state the actions taken/planned in response to each ESS triggered.

4.4.Scoping

Scoping is the first step of the ESIA and will help in identifying the significant issues relating to the proposed actions and of determining the scope of the issues to be addressed in the ESIA. The key tasks include: i) carry out reconnaissance field visit(s); ii) hold initial stakeholder consultations; iii) identify the key aspects to be studied during the detailed ESIA, iv) consultation on ESIA ToRs with the stakeholders; v) prepare work plan for the subsequent ESIA tasks; and vi) prepare the Scoping Statement compiling the process and outcome of the scoping tasks described above.

[46] Separate Resettlement Plans (RPs) will be prepared for the project under a separate ToR.

[47] Please refer to the WB Environmental and Social Framework (ESF) for a complete definition of Corridor of Impact.

Review the definition of Area of Impact and the **Corridor of Influence** and revise if necessary.

4.5.Analysis of Alternatives

Systematically compare feasible alternatives to the proposed project site, technology, design, and operation--including the "without project" situation--in terms of their potential environmental and social impacts; the feasibility of mitigating these impacts; their capital and recurrent costs; their suitability under local conditions; and their institutional, training, and monitoring requirements. For each of the alternatives, quantify the environmental and social impacts to the extent possible, and attaches economic values where feasible. State the basis for selecting the particular project design proposed and justifies recommended emission levels and approaches to pollution prevention and abatement.

4.6.Detailed Baselines Studies and Analysis

Assess the dimensions of the study area and review relevant physical, biological, and socioeconomic conditions, including any changes anticipated before the project commencement. Study current and proposed development activities within the project area but not directly connected to the project. Also analyze the trends in the key environmental and social parameters of the area. Data should be relevant to decisions about project location, design, and operation.

Collect secondary and primary data on the following aspects:

Physical Environment. Physiography, climate, geology and seismology, soils, hydrology, groundwater, flooding, water quality, air quality, noise, and others.

Biological Environment. Forests; natural vegetation i.e. trees, shrubs, herbs, scrub, grasses, medicinal plants, and others; fauna i.e. mammals, birds including migratory birds, reptiles, amphibians, insects, fish and red listed species; biodiversity including carrying capacity; protected and non-protected areas including hunting, poaching, illegal fishing; wetlands; fish; benthic flora and fauna; and others.

Social Environment. Population and demography; socioeconomic characterization of the population household size, age, gender (existing country gender diagnostics; country-wide and region-specific data violence against women; data and/or information on cultural practices vis-à-vis women (early marriage, physical practices); existing services available from gender-based violence (GBV) Services Providers, quality, accessibility and gaps), ethnicity, language, literacy/education; social organizations and dynamics and types of vulnerability; health and education levels; access to basic services and facilities such as healthcare, education, drinking water and sanitation etc.; income and occupation; assets; sources of livelihood (particularly for women); land use and natural resources including agriculture, livestock, grazing, forestry; land tenure system; occupations structure; household income and expenditure; economic activities e.g. quarrying of minerals, tourism, fisheries, trade, services; social infrastructure and services including education, health, communications, others; vehicular traffic particularly used for commercial activities; access, law and order and security situation; community organizations; vulnerable groups and poverty situation; gender aspects; recreation areas/potential; cultural heritage; archaeology; objects of special interest, e.g. graveyards and monuments; and others.

4.7.Stakeholder Consultations

The identification of stakeholders potentially affected by the proposed project/subproject should take into account the different project stages:

- planning and design
- construction or rehabilitation period

- operation
- emergency situations.

The ESIA consultants will work closely with DISCO to identify the PAPs and other relevant stakeholders. The consultant will work with the DISCO in coordinating the ESIA consultations with relevant project affected persons, groups and other stakeholders. The consultants will lead the consultations with groups likely to be affected by the proposed project and with local NGOs on the environmental and social impacts and proposed mitigation measures and monitoring plans of the proposed project identified in the ESIA. The consultant will prepare records of these consultations. The draft ESIA should also be available in a public place accessible to affected groups and local NGOs.

These consultations with affected groups will be held in a culturally appropriate way so that they are meaningful to those being consulted. Relevant materials will be provided to these groups in a timely manner prior to consultations and in a form and language that is understandable and accessible to the groups being consulted.

There may be different stakeholder groups at different stages of the project. It should also be understood that the stakeholders may not all be proximal to the project, and this should be included in the assessment and stakeholder mapping. The Stakeholder Engagement Plan (SEP) should be prepared to identify relevant stakeholder groups and clarify how communication will be undertaken.

Continuing the consultation process initiated during scoping phase, hold following two additional rounds of consultations separately with both men and women through a combination of qualitative interviews and focus groups discussions involving project affected persons, community representatives; vulnerable groups; and any other groups identified as directly or indirectly impacted to determine their concerns and expectations in relation to the sub-project.

- During ESIA study. Conduct interagency and consultation meetings, including consultations for obtaining the informed views of the affected people, local nongovernmental organizations (NGOs) and other stakeholders. Hold consultative workshops at the site, in District HQs and with PAPs in the project corridor of influence.
- Hold consultations after preparing draft ESIA report (during Public Hearing) – with grass-root as well as institutional stakeholders.

4.8.Impact Assessment

Predict and assess the project's likely positive and negative impacts, in quantitative terms to the extent possible, associated with Project site, design, technology, construction, and operation. Determine various characteristics of the potential impacts including spatial extent (local, regional, global), nature (direct/indirect), temporal extent (temporary, permanent), reversibility, severity, and sensitivity of receptors. Based on this, characterize the significance of each impact. Identify mitigation measures and any residual negative impacts that cannot be mitigated, and also the significance of the residual impacts. Assess the Project with reference to the national regulatory requirements (e.g. National Environmental Quality Standards, Sindh Environmental Quality Standards) and WB ESS.

The focus for assessment of environmental and social risks and impacts will include but not limited to the following (as appropriate/applicable):

- Potential changes in land form and land use

- Potential impacts on air quality
- Potential impacts on water resources (availability, quality)
- Potential impacts on soil (erosion, contamination, subsidence)
- Potential impacts on flora and fauna, biodiversity, wetlands, national parks and other protected areas
- Potential impacts on physical cultural resources including mosques, graveyards, tombs, monuments, and others
- Land acquisition and resettlement
- Induced secondary development during construction in the surrounding areas.
- Potential damage or loss of agricultural land as well as crop damage by construction and operations and maintenance activities.
- Potential permanent and temporary impacts on livelihood including due to resettlement, during construction and operation and maintenance activities etc.
- Perception of risk among the population residing in areas close to the Grid and Transmission infrastructure.
- An assessment of changes to demographics including increased or decreased use of social services and/or existing infrastructure, land use and land use plans, water resources, economic and cultural resources as appropriate
- Labor influx
- Gender and vulnerability related impacts
- Expected land use changes in the project areas and areas of influence in the medium to long term.

Potential social risks

The consultant should also assess potential social risks including but not restricted to the following:

- A comprehensive assessment on Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH) risks in the light of World Bank requirements
- Conflict between construction workers and area inhabitants or local people.
- Law and order and security situation
- Risks related to the COVID pandemic.

Explore opportunities for environmental enhancement and provide their cost of implementation.

4.9.Environmental and Social Management Plan (ESMP)

Prepare ESMP complete with mitigation plan, compliance monitoring plan, effects monitoring plan and construction camp management plan including labor influx management plan, SEA/SH action plan (prevention and mitigation actions, awareness raising strategy targeting workers and communities, identification of GBV services providers and response protocol, SEA/SH reporting and allegation procedures, accountability and response framework), gender management plan, SOPs in the light of govt instructions, World Health Organization (WHO), World Bank for management of risks related to COVID-'9, institutional arrangements for implementation and monitoring, training needs, documentation and communication protocol,

grievance redress mechanism, cost of implementing ESMP, and mechanism to integrate ESMP with the Project (e.g., through contractual clauses).

Environmental and social management plan should be prepared in such a way that the maximum items in mitigation and monitoring plan can be later incorporated in the bidding document as part of the Bill of Quantities (BoQ).

The ESMP should follow the WBG EHS, Labor Influx, and SEA/SH Guidelines. The suggested and indicative contents of the ESIA reports (separate report for each subproject) is given in Annex 1. The OHS requirements both for construction and O&M phases will be specifically included in the ESMP.

5) Applicable Environmental and Social Legislation and Standards

The ESIA will be carried out on the basis of the following legislations and standards:

- Sindh Environmental Protection Act
- Land Acquisition Act 1894 (LAA 1894) with its successive amendments
- WAPDA Act, 1958;
- Telegraph Act 1885 amended 2014
- Environmental and Social Standard 1: Assessment and Management of Environmental and Social Risks and Impacts
- Environmental and Social Standard 2: Labor and Working Conditions
- Environmental and Social Standard 3: Resource Efficiency and Pollution Prevention and Management
- Environmental and Social Standard 4: Community Health and Safety
- Environmental and Social Standard 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement
- Environmental and Social Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources
-
-
- Environmental and Social Standard 8: Cultural Heritage
- Environmental and Social Standard 10: Stakeholder Engagement and Information Disclosure.

6) Team Composition and Skills required for ESIA preparation:

The core ESIA team will comprise the following key specialists:

- Environment Specialist
- Occupational Health and Safety Specialist
- Social Development Specialist
- Gender Specialist.

The Environment Specialist will lead the ESIA and associated ESMP preparation and have overall responsibility for the task. Each specialist will have a relevant university degree in Environmental and social sciences and preferably a postgraduate degree, 10-15 years of experience in similar types of assignments and a track record of experience in their area of specialization like preparation of and contribution to ESIAs and ESMPs. A GIS specialist will also be engaged as required.

The Gender Specialist will hold a degree in social sciences/gender studies and have at least 10 years of experience of working on gender issues including Gender-Based Violence (GBV) and Sexual Exploitation and Abuse (SEA). S/He will assist the Team Leader in carrying out the gender survey, analysis and consultations with women and female headed households.

7) Deliverables, Outputs and Time Line:

T

he Consultant is expected to submit the following deliverables:

- Stakeholder Engagement Plan (SEP): The report should reflect stakeholder identification, analysis, mapping and findings from the institutional stakeholders and project affected persons both men and women. The first draft should be delivered eight weeks after signing of the contract;
- Draft ESIA/ESMP Report: This will be circulated for comments and relevant issues raised will incorporated into revised version. This will be delivered 12 weeks after submission of the SEP.
- Conducting final consultation and preparing report. This should be undertaken in a week after submission of draft report.
- Final ESIA/ESMP Report: The final report should include a concise Executive Summary and should have all annexes and bibliography and the dissemination/disclosure plan. This will be delivered two weeks after conducting the final consultation.

SAMPLE TABLE OF CONTENTS OF

ESIA **ABBREVIATIONS AND GLOSSARY**

Executive Summary
Concisely discusses significant findings and recommended actions including summary Table of ESMP.

1. Introduction

1.1 Overview

1.2 Background of the project

1.3 Objective of ESIA

1.4 Approach to work

1.5 Project Impact Area and Corridor of Influence

1.6 Composition of study team

2. Legal and administrative framework

2.1 GoP/ Sindh requirements (legislation; guidelines and rules; policies; international treaties signed by Pakistan; national and provincial authorities; environmental procedures), their applicability, and compliance status for the Project.

2.2 World Bank requirements (ESF and ESS; and WBG Environmental Health and Safety guidelines) and their triggering and compliance status for the Project.

3. Project description

3.1 Need and purpose of project

3.2 Project location

3.3 Salient features

3.4 The project description that includes a technical description and schedule of the planned development stages, typically:

- Layout, equipment details
- Transmission line alignment
- Construction activities
- O&M activities
- OHS system and practices

The project description should include details of both the construction stages and the operation mode of the subproject.

3.6 Construction machinery, materials and other supplies (including estimated numbers/quantities)

3.7 Waste generation and disposal (including estimated quantities)

3.8 Manpower requirements

3.9 Operation and maintenance (supplies; waste generation and management; manpower requirements; others).

4. Baseline description/analysis

4.1 Study area

4.2 Physical environment (physiography; climate; geology and seismology; soils; hydrology; groundwater; flooding; geomorphology; water quality; air quality; noise; others). Develop the necessary cartography to demonstrate the spatial linkage with the project's area of influence.

4.3 Biological environment (flora including natural vegetation, planted trees, medicinal plants, different habitat types, red list species (including the conservation status); fauna including mammals, birds including migratory birds, reptiles, amphibians, insects, fish and red listed species; biodiversity including carrying capacity; protected and non-protected areas including hunting, poaching, illegal fishing; wetlands; and fisheries including benthic flora and fauna). Develop the necessary cartography to demonstrate the spatial linkage with the project's area of influence.

4.4 Social and economic environment (population and demography; socioeconomic characterization of the population household size, age, gender, ethnicity, language, literacy/education; social organizations and dynamics and types of vulnerability; health and education levels; access to basic services and facilities such as healthcare, education, drinking water and sanitation etc.; income and occupation; assets; sources of livelihood (particularly for women);land use and natural resources including agriculture, livestock, grazing, forestry; land tenure system; occupations structure; income and expenditure; economic activities e.g. quarrying, tourism, fisheries, trade, services; social infrastructure and services including education, health, communications, others; access, law and order and security situation; community organizations; vulnerable groups and poverty situation; gender aspects; recreation areas/potential and others).

4.5 Cultural aspects (cultural heritage; archaeology; and other objects of special interest, e.g. graveyards, monuments).

4.6 Identification of environmental and social hotspots based on the baseline analysis.

5. Project alternatives

5.1 Without project alternative

5.2 Site selection

5.3 Technology options

5.4 Routing options (where applicable)

6. Public Consultation and Information

Disclosure 6.1 Scoping sessions

6.2 Focused group discussions

6.3 Public consultations

6.4 Information disclosure

7. Environmental and Social Impact Assessment

7.1 Impacts on Physical Environment

7.2 Impacts on Biological Environment

7.3 Impacts on People.

8. Environmental and Social Management Plan (ESMP):

The plan will include the measures to mitigate the adverse social impacts and to enhance project benefits through modifying the project design. This can include but not limited to the following:

8.1 Institutional arrangements including roles and responsibilities and capacity available
8.2 Mitigation
- 8.2.1 Measures to enhance benefits and positive impacts.
- 8.2.2 Measures to mitigate negative impacts.
- 8.2.3 Arrangements for managing potential social risks.
- 8.2.4 Suggestions to improve the project design.

8.3 Gender and Vulnerability Management plan
8.4 Labor influx management plan
8.5 SEA/SH Action Plan
8.6 Consultation and Information Disclosure Plan in project implementation and operation.
8.7 Health and Safety Plan
8.8 Monitoring Plan including documentation and reporting
8.9 Project level grievance redress mechanism.
8.10 ESMP Cost Estimates.

9. References

Annexes

An indicative list of annexes is given below. Annex-I:

Resettlement Action Plan Terms of Reference Annex-

II: Consultation with Male PAPs Annex-III:

Consultation with Female PAPs Annex-IV: Meetings

Held with Key Stakeholders

Annex C: ESMP ToR

Terms of Reference (Discussion Draft)
Environmental and Social Management Plan (ESMP)
Electricity Distribution Efficiency Improvement Project (EDEIP)

Project Overview

The proposed Electricity Distribution Efficiency Improvement Project (EDEIP) will finance DISCOs' traditional investment program including (i) installation of new 132 kV substations; (ii) augmentation, extension, conversion and rehabilitation of the existing substations; (iii) construction, rehabilitation and re-conductoring of transmission lines; (iv) installation of Aerial Bundled Cables (ABC) in high loss feeders; (v) expansion & rehabilitation of 11kV feeders. Component 2 of the project will focus on interventions to transform DISCOs to improve their operation performance and financial profitability. It will include but not limited to DMS in PESCO, transformer monitoring in PESCO, Automated Metering Infrastructure (AMI), tools and equipment for improved operation and maintenance (O&M) and safety and automation of business processes through ERP and information systems. Component 3 will be for institutional strengthening and management support for effective implementation of the project.

Subproject Description (project not requiring any new land acquisition, e.g., grid station extension or augmentation)

- Conversion of 66 kV Grid stations (x 6)
- Transmission lines for the above grid stations (x 6)
- New transmission line (x 1)
- AMI (30,000 Meters)
- ABC (137 Feeders having 4,247Km LT Lines)

Potential Environmental and Social Issues

The proposed project's risks and impacts will mainly be associated with the occupational health and safety (OHS) issues such as working at heights, exposure to live wires and use and disposal of hazardous materials such as transformer oils and possibility of Polychlorinated Biphenyl (PCBs) in obsolete transformers and sulfur hexafluoride (SF6). In addition, project will also potentially cause construction related impacts such as air contamination from machinery/vehicular exhaust and dust generation, soil and water contamination from affluent releases and wastewater from construction site and offices/camps, clearance of natural vegetation and felling of trees, influx of labor, health and safety risks for construction workers as well as nearby communities, and additional vehicular traffic on the local roads.

Environment and Social Management Plan

To achieve the broad aim of ensuring safeguards' analysis, the consultants will undertake the task described below.

Review the Project details

Review the proposed project and its geographic, ecological, social, and temporal context, including any offsite investments that may be required.

Define the Impact Area and the **Corridor of Influence** of the project on the basis of the project scope and extent. The definition of area of influence should include all project components and its ancillary aspects, such as power transmission corridors, access roads, borrow and disposal areas, and construction camps, as well as unplanned developments induced by the project.

Carry out assessment of the institutional arrangements and capacity building needs related to environment, health, safety and social aspects within the DISCO. In particular, the occupational health and safety (OHS) practices during construction as well as operation and Maintenance (O&M) phases will be studied.

Review of the Legislative and Regulatory Framework

Review the policy, legal, and administrative framework within which the ESMP is being prepared. Review the national and provincial environmental requirements. Indicate relevant international environmental agreements to which the country is a party. Also review the WB Environmental and Social Framework (ESF) as well as Environmental and Social Standards (ESS) and their triggering status for the Project and state the actions taken/planned in response to each ESS triggered.

Scoping

Scoping is the first step of the assessment and will help in identifying the significant issues relating to the proposed actions and of determining the scope of the issues to be addressed in the ESMP. The key tasks include: i) carry out reconnaissance field visit(s); ii) hold initial stakeholder consultations; iii) identify the key aspects to be studied during the assessment, iv) prepare work plan for the subsequent tasks; and v) prepare the Scoping Statement compiling the process and outcome of the scoping tasks described above.

Review the definition of Area of Impact and the **Corridor of Influence** and revise if necessary.

Baselines Overview

Assess the dimensions of the study area and review relevant physical, biological, and socioeconomic conditions, including any changes anticipated before the project commencement. Study current and proposed development activities within the project area but not directly connected to the project. Also analyze the trends in the key environmental and social parameters of the area. Data should be relevant to decisions about project location, design, and operation.

Collect secondary and primary data on the following aspects:

Physical Environment. Physiography, climate, geology and seismology, soils, hydrology, groundwater, flooding, water quality, air quality, noise, and others.

Biological Environment. Forests; natural vegetation i.e. trees, shrubs, herbs, scrub, grasses, medicinal plants, and others; fauna i.e. mammals, birds including migratory birds, and red listed species; protected and non-protected areas including hunting, poaching, illegal fishing; wetlands; fish; benthic flora and fauna; and others.

Social Environment. Population and demography; land tenure system; occupations structure; household income and expenditure; economic activities; land use and natural resources; social infrastructure and services including education, health, communications; vehicular traffic particularly used for commercial activities; access, law and order and security situation; community organizations; vulnerable groups and poverty situation; gender aspects (existing country gender diagnostics; country-wide and region-specific data violence against women; data and/or information on cultural practices vis-à-vis women (early marriage, physical practices); existing services available from GBV Services Providers, quality, accessibility and gaps); recreation areas/potential; cultural heritage; law and order and security situation; assessment of COVID-19 pandemic situation in project areas; archaeology; objects of special interest, e.g. graveyards and monuments; and others.

Stakeholder Consultations

The identification of stakeholders potentially affected by the proposed project/subproject should take into account the different project stages:

- planning and design
- construction or rehabilitation period
- operation
- emergency situations.

There may be different stakeholder groups at different stages of the project. It should also be understood that the stakeholders may not all be proximal to the project, and this should be included in the assessment and stakeholder mapping. The Stakeholder Engagement Plan (SEP) should be prepared to identify relevant stakeholder groups and clarify how communication will be undertaken.

Continuing the consultation process initiated during scoping phase, hold following two additional rounds of consultations.

- During ESMP study. Conduct interagency and consultation meetings, including consultations for obtaining the informed views of the affected people, local nongovernmental organizations (NGOs) and other stakeholders. Hold consultative workshops at the site, in District HQs, and Peshawar.
- Hold consultations after preparing draft ESMP report – with grass-root as well as institutional stakeholders.

Impact Assessment

Predict and assess the project's likely positive and negative impacts, in quantitative terms to the extent possible, associated with Project site, design, technology, construction, and operation. Determine various characteristics of the potential impacts including spatial extent (local, regional, global), nature (direct/indirect), temporal extent (temporary, permanent), reversibility, severity, and sensitivity of receptors. Based on this, characterize the significance of each impact. Identify mitigation measures and any residual negative impacts that cannot be mitigated, and also the

significance of the residual impacts. Assess the Project with reference to the national regulatory requirements (e.g. National Environmental Quality Standards, Punjab and Khyber Pakhtunkhwa Environmental Quality Standards) and WB ESS.

Explore opportunities for environmental enhancement and provide their cost of implementation.

Environmental and Social Management Plan (ESMP)

Prepare ESMP complete with mitigation plan, compliance monitoring plan, effects monitoring plan and construction camp management plan including labor influx management plan, gender management plan, SEA/SH action plan (prevention and mitigation actions, awareness raising strategy targeting workers and communities, identification of GBV services providers and response protocol, SEA/SH reporting and allegation procedures, accountability and response framework), SOPs in the light of govt instructions, World Health Organization (WHO), World Bank for management of risks related to COVID-19, institutional arrangements for implementation and monitoring, training needs, documentation and communication protocol, grievance redress mechanism, cost of implementing ESMP, and mechanism to integrate ESMP with the Project (e.g., through contractual clauses).

Environmental and social management plan should be prepared in such a way that the maximum items in mitigation and monitoring plan can be later incorporated in the bidding document as part of the "Bill of Quantities" (BoQ).

The ESMP should follow the WBG EHS, Labor Influx, SEA/SH Guidelines. The suggested and indicative contents of the ESMP is given in Annex 1. The OHS requirements both for construction and O&M phases will be specifically included in the ESMP.

Applicable Environmental and Social Legislation and Standards

The following legislation and ESSs will be applicable for the project:

- Sindh Environmental Protection Acts
- Environmental and Social Standard 1: Assessment and Management of Environmental and Social Risks and Impacts
- Environmental and Social Standard 2: Labor and Working Conditions
- Environmental and Social Standard 3: Resource Efficiency and Pollution Prevention and Management
- Environmental and Social Standard 4: Community Health and Safety
- Environmental and Social Standard 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement
- Environmental and Social Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources
- Environmental and Social Standard 8: Cultural Heritage
- Environmental and Social Standard 10: Stakeholder Engagement and Information Disclosure.

SAMPLE TABLE OF CONTENTS OF

ESMP **ABBREVIATIONS AND GLOSSARY**

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Concisely discusses significant findings and recommended actions including summary Table of ESMP.

1. Introduction

1.1 Overview

1.2 Background of the project

1.3 Objective of ESMP

1.4 Approach to work

1.5 Project Impact Area and Corridor of Influence

1.6 Composition of study team

2. Legal and administrative framework

2.1 GoP/ KP/Punjab requirements (legislation; guidelines and rules; policies; international treaties signed by Pakistan; national and provincial authorities; environmental procedures), their applicability, and compliance status for the Project.

2.2 World Bank requirements (ESF and ESS; and WBG Environmental Health and Safety guidelines) and their triggering and compliance status for the Project.

3. Project description

3.1 Need and purpose of project

3.2 Project location

3.3 Salient features

3.4 The project description that includes a technical description and schedule of the planned development stages, typically:

- Layout, equipment details
- Transmission line alignment
- Construction activities
- O&M activities
- OHS system and practices

The project description should include details of both the construction stages and the operation mode of the subproject.

3.6 Construction machinery, materials and other supplies (including estimated numbers/quantities)

3.7 Waste generation and disposal (including estimated quantities)

3.8 Manpower requirements

3.9 Operation and maintenance (supplies; waste generation and management; manpower requirements; others).

4. Baseline description/analysis

Brief description of the area of influence and environmental and social baseline conditions derived from ESIA.

4.6 Identification of environmental and social hotspots based on the baseline analysis.

5. Public Consultation and Information

Disclosure 5.1 Scoping sessions

5.2 Focused group discussions

5.3 Public consultations

5.4 Information disclosure

6. Assessment of Potential Adverse Environmental and Social Impacts

6.1 Methods and techniques used in assessing and analyzing the environmental and social impacts of the proposed sub-project.

6.2 Discussion of the potentially significant adverse environmental and social impacts of the proposed sub-project.

7. Environmental and Social Management Plan (ESMP)

The plan will include the measures to mitigate the adverse social impacts and to enhance project benefits through modifying the project design. This can include but not limited to the following:

6.1 Mitigation
- 6.1.1 Measures to enhance benefits and positive impacts.
- 6.1.2 Measures to mitigate negative impacts.
- 6.1.3 Arrangements for managing potential social risks.
- 6.1.4 Suggestions to improve the project design.

6.2 Institutional Arrangement including roles and responsibilities and capacity available
6.3 Gender and Vulnerability Management plan
6.4 Labour influx management plan
6.5 SEA/SH Action Plan
6.6 Consultation and Information Disclosure Plan in project implementation and operation.
6.7 Health and Safety Plan
6.8 Monitoring Plan including documentation and reporting
6.9 Project level grievance redress mechanism.
6.10 ESMP Cost Estimates.

Annex D: Sample Monitoring Plan

Parameter	Means of Monitoring	Frequency	Responsible for Implementation	Responsible for Supervision
During Construction				
Top Soil	Visual inspection on stripping, storage and reuse of topsoil	Monthly	Contractor	CSC, PMU
Erosion	Visual inspection of erosion prevention measures and occurrence of erosion	Monthly	Contractor	CSC, PMU
Operation of quarry sites	Visual inspection of quarry sites	Monthly	Contractor	CSC, PMU
Surface water quality	Sampling and analysis of river water quality and wastewater discharges for the parameters given in NEQS	Quarterly	Contractor	CSC, PMU
	Spot measurements of pH, conductivity, turbidity. Visual inspection on presence of petroleum products.	Monthly	Contractor	CSC, PMU
Air Quality (dust, smoke)	Visual inspection to ensure good standard equipment is in use and dust suppression measures (spraying of	Weekly	Contractor	CSC, PMU

Parameter	Means of Monitoring	Frequency	Responsible for Implementation	Responsible for Supervision
	waters) are in place.			
	Visual inspection to ensure dust suppression work plan is being implemented	Weekly	Contractor	CSC, PMU
Spoil Disposal	Visual inspection to ensure that spoil disposal is done at the designated site	Monthly	Contractor	CSC, PMU
Waste management	Visual inspection that solid waste generated from construction camps, offices and construction sites is disposed at designated locations/sites	Monthly	Contractor	CSC, PMU
Spills from hydrocarbon and chemical storage	Visual inspection for leaks and spills at material storage sites and construction yards	Weekly	Contractor	CSC, PMU

-378-

Annex E: Sample Occupational Health and Safety Plan Outline

1. INTRODUCTION

1.1 Introduction of the Project

2 OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT PLAN

2.1 Purpose

2.2 Scope

2.3 Objectives and Targets

2.4 Working together for Success

2.5 OHSMP Management and Maintenance

2.6 OHSMP Documents Hierarchy

2.7 Policies

2.7.1 Human Rights Policy

2.7.2 HSE Policy

2.7.3 Alcohol and Drug Policy

2.7.4 Business Conduct and Ethics Code

2.7.5 OHS Management System Expectations

3 OHS Management System Processes

- PR01: Induction Process
- PR02: Job Hazard Analysis
- PR03: Meetings
- PR04: Personnel Competency and Training
- PR05: Short Service Worker Program (with tools for assessment)
- PR06: Reward and Recognition
- PR07: Disciplinary Process
- PR08: Permit to Work Process
- PR09: Work Observation Process
- PR10: Critical Risk Protocols
- PR11: Personal Protective Equipment (PPE)
- PR12: Incident Investigation
- PR13: Measurement - Leading and Lagging Indicators

- PR14: Pandemic Action Plan (COVID-19)
- PR15: OHS Compliance Audit
- PR16: Emergency Response Plan
- PR17: Inspections
- PR18: Personal Risk Assessment (new)
- PR19: Risk Management

4 Standard Operating Procedures (SOP), Work Instructions and Forms

- SOP 01: Explosives – Storage, Transport and use
- SOP 02: Work at Height
- SOP 03: Excavation
- SOP 04: Mobile Equipment
- SOP 05: Barricading and signs
- SOP 06: Safe Driving
- SOP 07: Cell Phone Use
- SOP 08: Drilling and Blasting
- SOP 09: Haulage
- SOP 10: Traffic Interface Planning
- SOP11: Severe Weather

5. Project Organization

5.1 DISCO Organogram
5.2 HSE Organogram
5.3 Roles and responsibilities
5.3.1 Project Director:
5.3.2 ESU Manager
5.3.3 ESU Personnel
5.3.4 OHS Staff
5.3.5 Site Supervisors
5.3.6 Workers

6. Key Performance Indicators

7. Incident and Accident Reporting

8. Internal Review and Audit System

ANNEX "N-15"

Doc No: N15

SYSTEM STUDY:

The Power flow study has been carried out through a state of the art tecnolgy and engineering tool call PSSE. It is the latest tool having iteration method used thought the world.

PSSE allows you to perform a wide variety of analysis functions, including power flow, dynamics, short circuit, contingency analysis, optimal power flow, voltage stability, transient stability simulation, harmonics, time series power flow and much more.

Power System Simulation for Engineering (PSS/E) is composed of a comprehensive set of programs for studies of power system transmission network and generation performance in both steady-state and dynamic conditions. Currently two primary simulations are used, one for steady-state analysis and one for dynamic simulations.

PSS/E can be utilized to facilitate calculations for a variety of analyses, including:

- Power flow and related network functions
- Optimal power flow
- Balanced and unbalanced faults
- Network equivalent construction
- Dynamic simulation

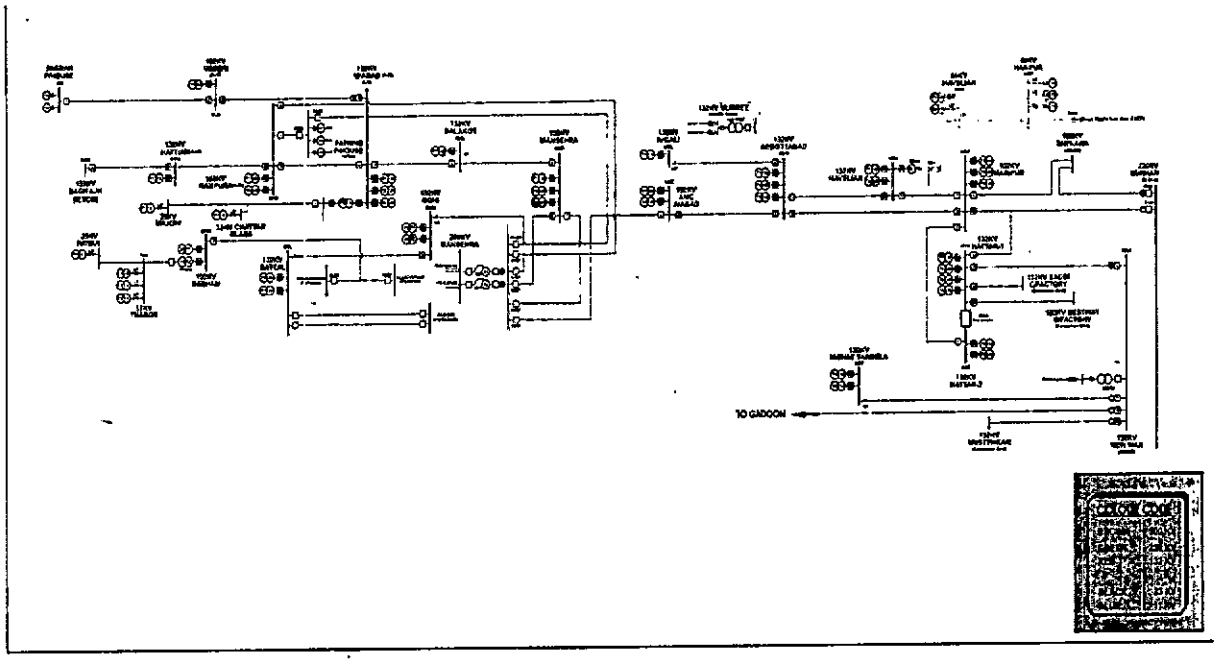
PSS/E uses a graphical user interface that is comprised of all the functionality of state analysis, including load flow, fault analysis, optimal power flow, equivalency, and switching studies.

In addition, to the steady-state and dynamic analyses, PSS/E also provides the user with a wide rage of auxiliary programs for installation, data input, output, manipulation and preparation. Furthermore, one of the most basic premises of PSS/E is that the engineer can derive the greatest benefit from computational tools by retaining intimate control over their application.

Power Flow

A power flow study (also known as load-flow study) is an important tool involving numerical analysis applied to a power system. Unlike traditional circuit analysis, a power flow study usually uses simplified notation such as a one-line diagram and per-unit system, and focuses on various forms of AC power (i.e.: reactive, real, and apparent).

SYSTEM NETWORK DIAGRAM OF PROPOSED HAZECO



LOAD FLOW ANALYSIS:

PESCO - HAZECO LOAD FLOW STUDIES BASE CASE 2023-24

PTI INTERACTIVE POWER SYSTEM SIMULATOR--PSS(R)E MON, NOV 27 2023 13:44

PESCO - HAZECO LOAD FLOW STUDIES

BASE CASE-2023-24

AREA TOTALS

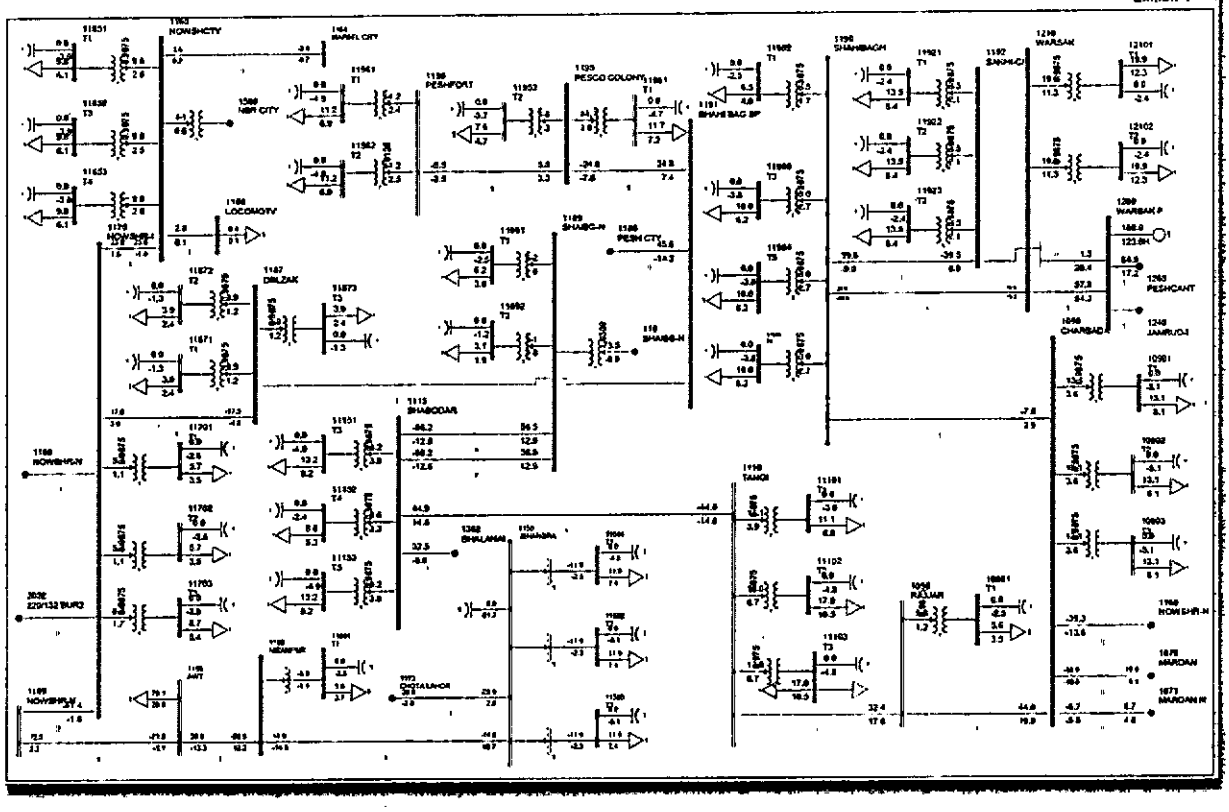
IN MW/MVAR

X-- AREA --X	FROM ---ASSIGNED TO THE AREA--- GENE-RATION	FROM IND GENERATN	TO IND MOTORS	TO LOAD	TO BUS SHUNT	GNE BUS DEVICES	TO LINE SHUNT	FROM CHARGING	TO LOSSES	-NET INTERCHANGE- TO TIE LINES	TO TIES + LOADS	DESIRED NET INT
1	648.6	0.0	0.0	2195.3	0.0	0.0	0.0	0.0	56.5	-2043.5	-1603.1	0.0
PESCO	186.6	0.0	0.0	1266.9	-1124.1	0.0	-0.0	207.9	451.2	-466.9	-199.6	
11	455.7	0.0	0.0	517.5	0.0	0.0	1.1	0.0	18.4	272.8	-81.3	0.0
HAZECO	-14.8	0.0	0.0	267.5	-20.1	0.0	-0.0	42.6	74.5	-80.3	-294.0	
COLUMN	1104.3	0.0	0.0	2712.8	0.0	0.0	1.1	0.0	74.8	-1770.7	-1684.4	0.0
TOTALS	171.8	0.0	0.0	1534.4	-1144.2	0.0	0.0	250.6	525.7	-547.2	-493.6	

(LOAD FLOW STUDY OF REMAINING PESCO)

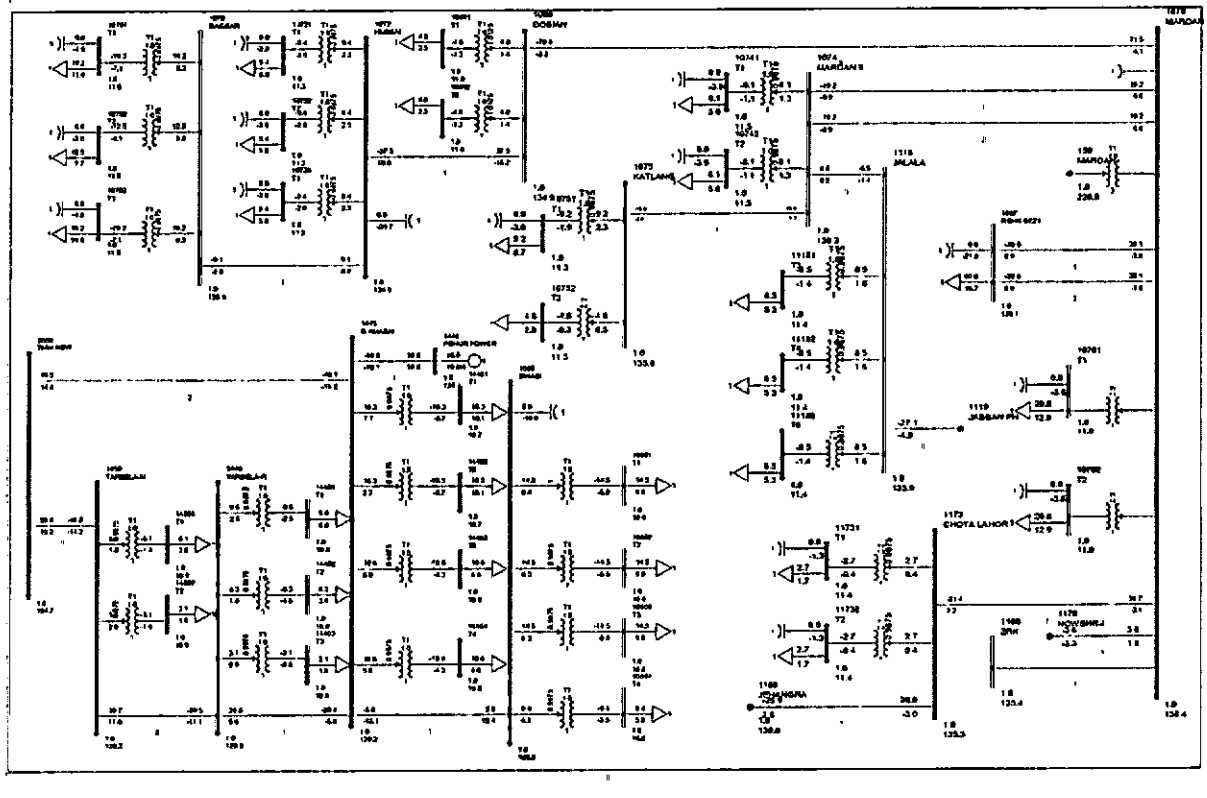
PESCO LOAD FLOW STUDY
YEAR 2023-24: BASE CASE

Exhibit-1



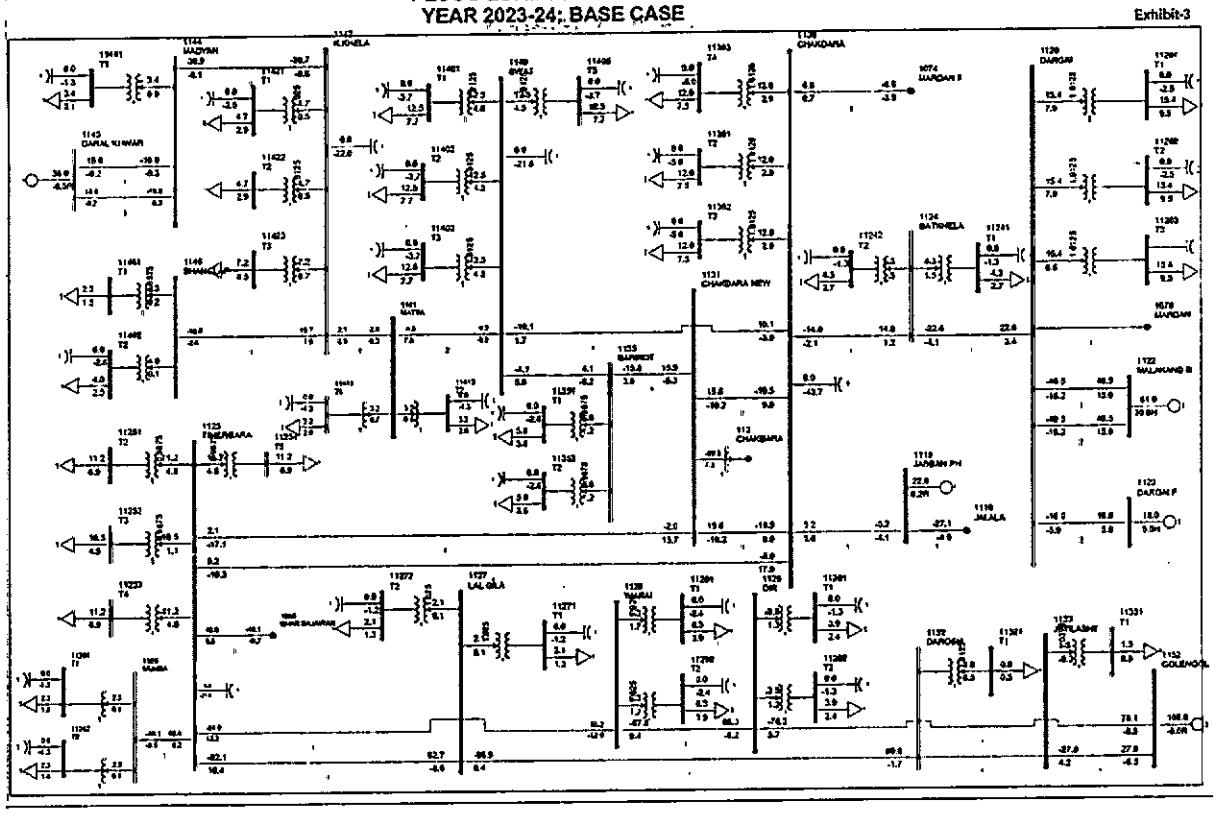
MARDAN LOAD FLOW STUDY
YEAR 2023-24: BASE CASE

Exhibit-2



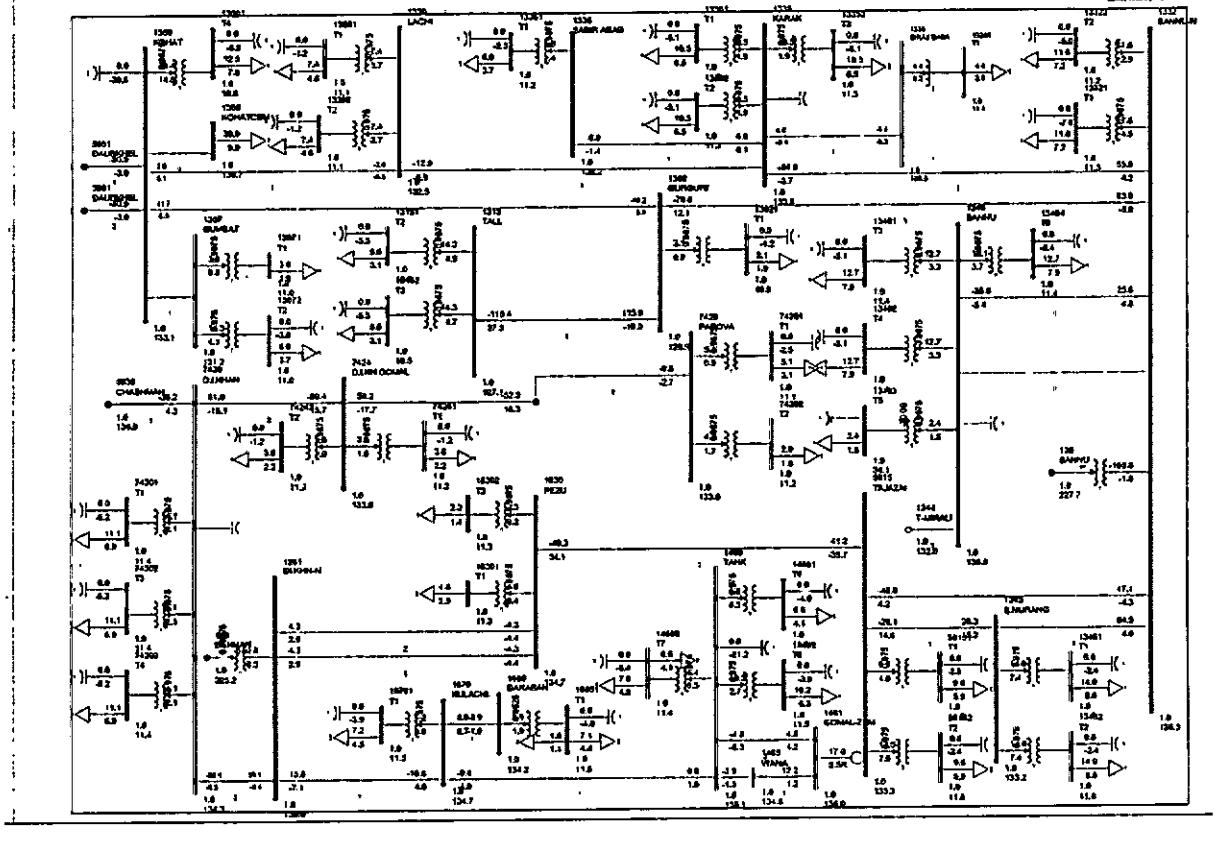
PESCO LOAD FLOW STUDY
YEAR 2023-24: BASE CASE

Exhibit-3



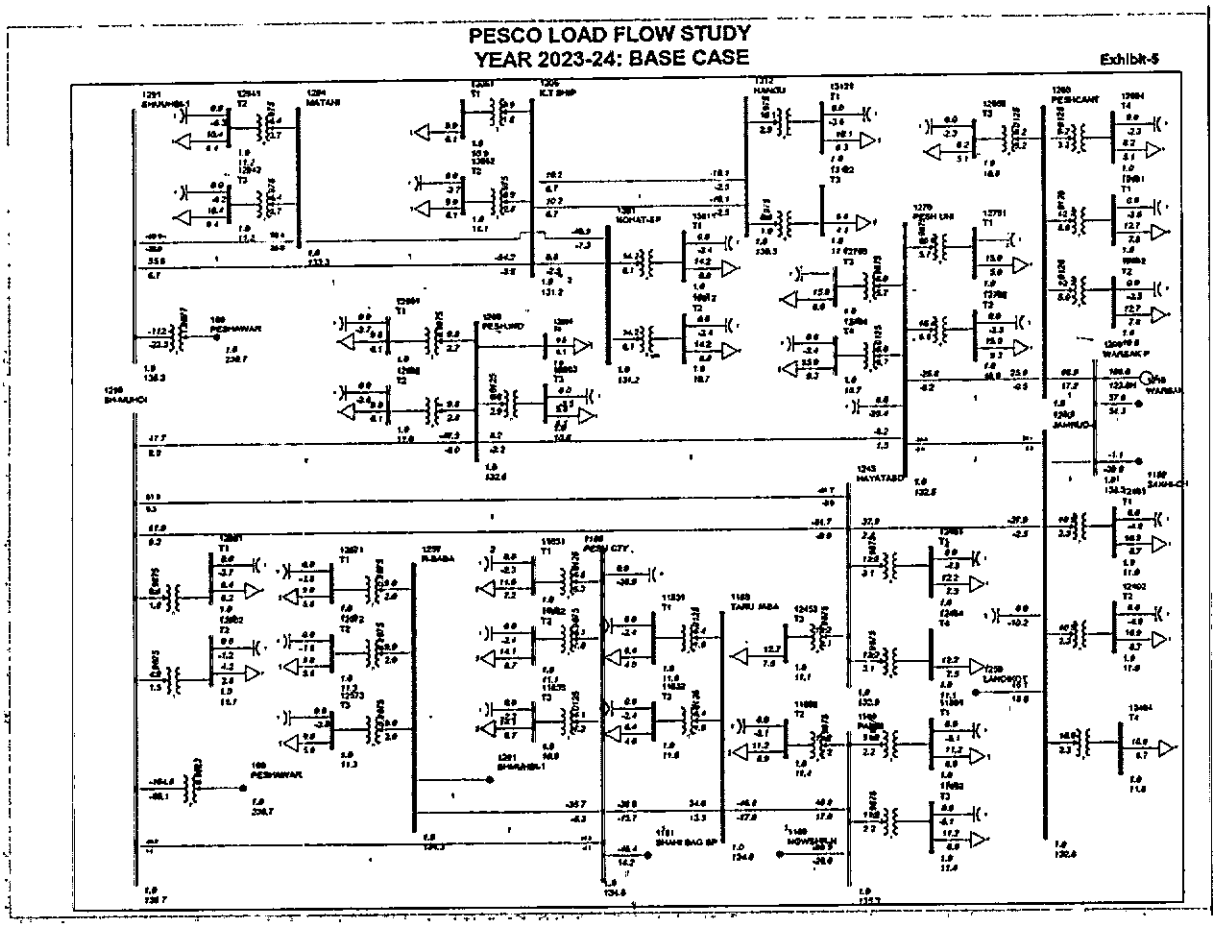
PESCO LOAD FLOW STUDY
YEAR 2023-24: BASE CASE

Exhibit-4

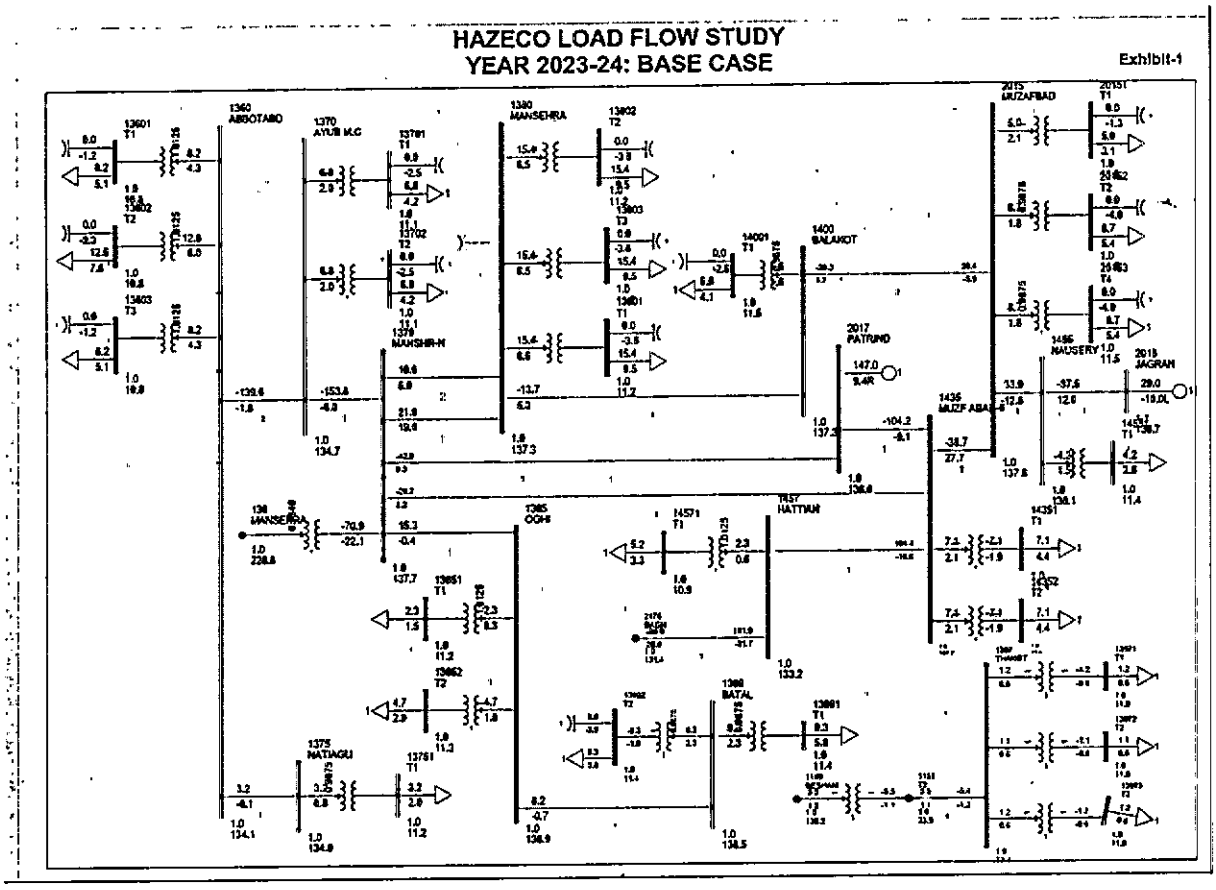


PESCO LOAD FLOW STUDY
YEAR 2023-24: BASE CASE

Exhibit-5

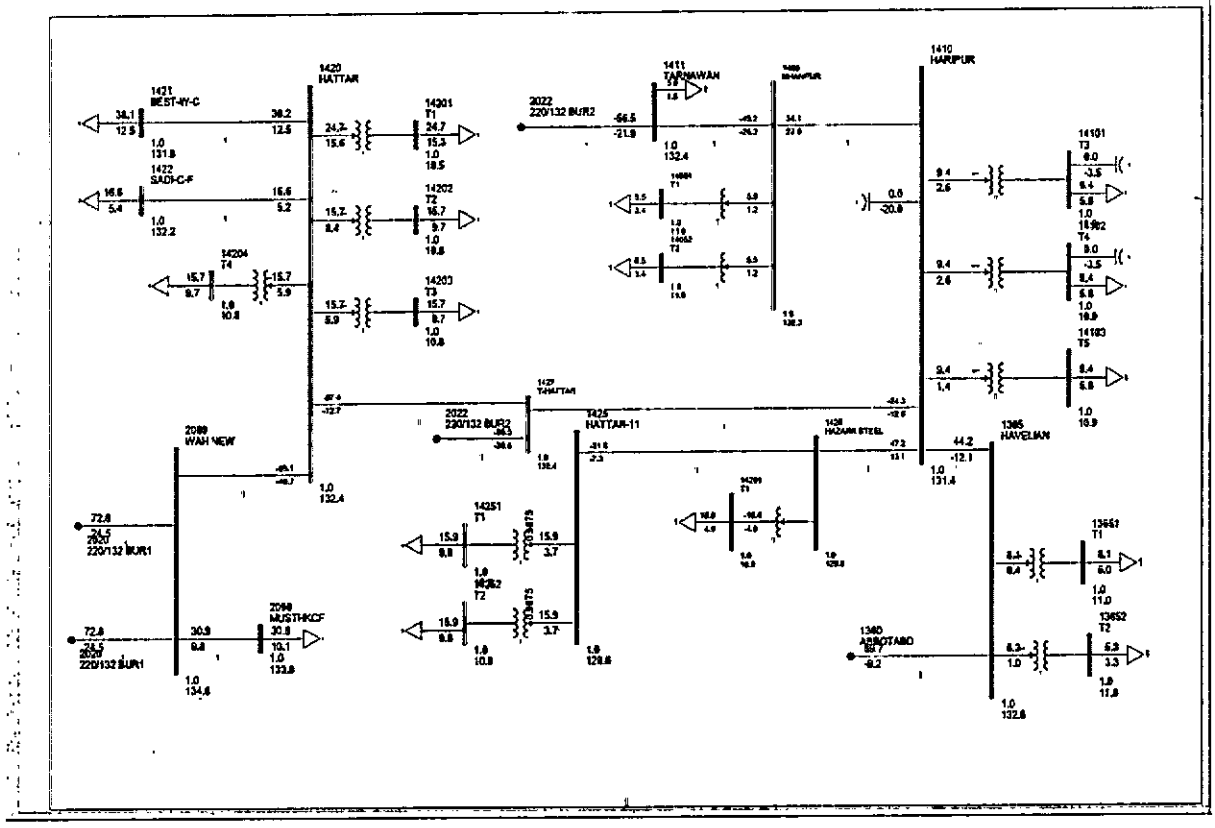


(LOAD FLOW STUDY OF HAZECO PESCO)



HAZECO LOAD FLOW STUDY
YEAR 2023-24: BASE CASE

Exhibit-2



ANNEX "N-16"

Doc No: N16

PATROLLING AND INSPECTION PROCEDURE:

INTRODUCTION:

Prime objective of HAZECO is to provide quality power supply to the consumers against which no compromise can be made and obviously the rest of the objectives are the by-products. One of the tools to achieve this task is undertaking the extensive maintenance of power distribution system. Since HAZECO had to face lot of criticism because of interruptions of supply and delayed shutdowns and had to cut sorry figure on lot of occasions in recent summer, mainly attributed to poor maintenance as such the issue is of utmost importance and need to be given Top Priority.

In order to to minimize the interruption of supply and to maintain a stable and reliable supply to customers, prior patrolling is being carried out and it is a continuous process round the year.

LINE PATROLLING

It may be classified as follows.

a) **Scheduled or regular patrolling**

Regular patrolling is checking HT/LT lines after a scheduled intervals i.e. twice a year or in a shorter interval for preventive maintenance.

b) **Non-scheduled patrolling**

Non-scheduled patrolling is not carried out on a fixed scheduled/ intervals, but is necessitated due to some happenings/ events/ incidents taking place on the system

Patrolling is further classified as under:

i). **Incidental patrolling:**

This is done while a person is on a tour or on survey for other specific works. This is done by an efficient worker of Company.

ii). **Casual Patrolling:**

This patrolling is necessitated after torrential rains, windstorms, flood, earth quake, war & any other calamity not waiting for repot of fault occurrence, even then supply is not failed.

iii). **Emergency patrolling:**

Emergency patrolling is carried out when a permanent fault has developed any where in Electrical Networks, if a fault persists after three switch operations, the sub station operator (SSO) inform the SDO/AMO operation to arrange for emergency patrolling.

iv). **Follow-up patrolling**

After a temporary line interruption repeatedly occurred every day during specified time, the staff is ordered to trace the causes of interruption and report on it within 4 days.

v). **Check patrols**

- In order to evaluate the efficiency of maintenance staff an officer checks lines/ work carried out in accordance to patrol book and line maintenance register.

vi). Crash patrolling

For a complete over hauling of the system, a program is chalked out and patrolling is carried out as campaign, minor defects (where PTW is not needed) are removed simultaneously and all major defects are removed after obtaining PTW within least possible time.

vii). Night patrolling

Some defects on distribution lines are visible only during night hours. To detect loose connections & Red hot/ glow paints.

PROCEDURE:

1. Pole to pole patrolling of feeders be completed. All types of defects should be detected and snaps should be taken particularly tree trimming / cutting, replacement of deteriorated jumpers of lines / distribution transformers and mid spanning etc.
2. Night patrolling should also carried out during summer season to pin point the hot spots and consequently be repaired.
3. Actual requirement of material based on patrolling should be prepared. The demand should be rationalized after thorough patrolling by concerned SDO's and LS's and submitted to HAZECO MM through proper channel (XEN/SE).
4. After approval, HAZECO MM should arrange and issue material to the concerned office after fulfilling codal formalities.
5. At the same time shut down schedule be prepared and submitted to HAZECO Chief Engineer (O&M) for approval.
6. Progress of maintenance shall be submitted to the CE (O&M) on daily basis along with snaps of the system before and after maintenance for each and every shut down.
7. Chief Engineer (O)/SE (O) will pay surprise site visits during the shutdown to ensure that XEN/SDO is properly monitoring the work.
8. Patrol Book / Maintenance Register must be maintained which shall be checked during inspection by CE/SE.

Sr No	Date of Preceding	.....	Discrepancy				

TOOLS AND EQUIPMENT (T&P):

- List OF Personal Protective Equipments (P.P.E) For Line Man
- Lineman's safety boots.
- Insulated safety hat.
- Insulated cutting pliers.
- Safety tool belt.
- Insulated rubber gloves.
- Protective leather gloves.
- Lifesaving chain.

T&P For Each Lineman

Each lineman shall be provided the following T&P:

1.	PP.	1 No.
2.	Forged steel adjustable climber	1 No.
3.	With anti climbing accessories for wooden poles only.	1 Set.
4.	Pulling Grip.	1 No.
5.	Screw driver 8 in (wooden handle)	1 No.
6.	Manila rope 1" dia	20 meters.
7.	Steel wire brush	1 No.
8.	Adjustable screw wrench 10" long	1 No.
9.	Iron hammer 1 lb	1 No.
10.	Tool bag (or bucket)	1 No.
11.	Lineman's knife	1 No.
12.	D-operating rod	1 No.
13.	Spanner set	1 Set.
14.	Torch 3 cell	1 No.
15.	Hand line	1 No.
16.	Phase tester/ Beeper	1 No.
17.	Kassi/ shoval/ Pick axe	1 No.
18.	Axes/Saw/ Tree Trimmer	1 No.

ANNEX "N-17"

Doc No: N17

MAINTENANCE PLANS AND PROCEDURE:

INTRODUCTION:

Maintenance planning is a process of determining which assets or facilities need to be maintained, when they need to be maintained, and how often. The process also involves identifying the resources required for the maintenance for example, what spare parts and materials are needed.

The current general maintenance plan of the power distribution system is mainly based on periodical overhaul and troubleshooting and has the problems of poor real-time performance and low accuracy. By comprehensively considering the real-time health status of the distribution system and the importance from multisource of the distribution equipment, the original maintenance plan is improved and a practical maintenance plan for the power distribution equipment based on the risk level is proposed. Firstly, the real-time health of the equipment is determined based on the state of the equipment's state evaluation index. The index model is used to calculate the equipment's real-time failure rate, and then the importance of the equipment is described in terms of equipment value, environment, personal safety, and user loss. The risk cost and risk level index of the equipment are determined by combining the real-time failure rate and importance index, and a color difference labelling method is used to formulate the differential maintenance plan. Finally, an example is given to verify the effectiveness of the method. The results show that the method can obtain the health status of the distribution equipment in time through real-time status assessment. At the same time, defining the importance of the equipment from the perspective of the entire distribution network security overcomes the disadvantages of only taking into account the risk of the equipment itself, and the color annotation method can be more intuitive. To mark the equipment risk level.

Prime objective of HAZECO is to provide quality power supply to the consumers against which no compromise can be made and obviously the rest of the objectives are the by-products. One of the tools to achieve this task is undertaking the extensive maintenance of power distribution system. Since HAZECO had to face lot of criticism because of interruptions of supply and delayed shutdowns and had to cut sorry figure on lot of occasions in recent summer, mainly attributed to poor maintenance as such the issue is of utmost importance and need to be given Top Priority.

The aim of network maintenance is as follows:

1. To maintain Continuity of Supply
2. To avoid a revenue loss.
3. To avoid any mishap.
4. To avoid damaging of Company equipment.
5. To avoid line losses & improvement of voltage.

6. To increase operational efficiency of Company equipment.
7. To avoid damaging/burning of equipment at consumer's premises.
8. To minimize public complaints regarding failure of supply.
9. Early return back to service after fault.

TYPES OF MAINTENANCE:

There are two categories of maintenance, that is routine and nonroutine (post fault) maintenance.

A. Routine maintenance /Planned Maintenance (Schedule):

This is carried out to time schedules and against check test. It is also called preventive maintenance. Planned Maintenance is a preventive maintenance program of scheduled regular electrical maintenance testing and actions with the specific primary intention of preventing breakdowns and system failures.

Preventive maintenance for distribution system is launched from 1st October of a year. This exercise is carried out feeder wise beginning from grid end and finishing at the tail.

B. Non-Routine maintenance (Post Fault):

It is also called Post fault maintenance and is done if a fault has occurred. There are two conditions:

- After a fault causing no apparent damages to check that no incipient damage has been caused.
- Maintenance on one piece may necessitate work on associated pieces not scheduled for maintenance.

The aim is to maintain the Electric System/Network. The following essential parts are maintained as per following method and plan.

- **Overhead lines**

  This is difficult to schedule as the network is spread over a large & waste area and all the equipments may need to be maintained at the same time. The works needed to be organized by using a book and check list.

- **Transformers**

  It is simpler to organize work on the maintenance of transformers. A standard procedure of maintenance or replacements should be available.

- **Switches**

These include all switches, isolators, fuses, checklists and time schedules can be made up by replacements procedures devised.

- **Services**

  This work must be tightly scheduled however without forewarnings to prevent removal of illegal connections/ Extension.

- **Earthing**

  The earthing requirements for the 11kv and LT system must be well defined (see TIC NO.9 and SDI no.59) system earth resistances must be checked regularly to keep them within specified limits/ standard.

- **Cables**

  Line maintenance work is required on cables only at terminals and sealing ends.

- **Capacitors**

  Before working on lines ensure that capacitors are discharged over voltage check is necessary.

- **Voltage Regulator**

  Maintenance is required/ as they operate like a transformer.

- **Street Light Maintenance**

  It is arranged/ done rapidly to avoid any accident or Blockage of Traffic with the coordination of local authority.

In order to implement the process of shutdowns to ensure maximum maintenance work with minimum shutdowns of electricity, following mechanism has been adopted.

<u>LINE PATROLLING</u>

It may be classified as follows.

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For a complete over hauling of the system, a program is chalked out and patrolling is carried out as campaign, minor defects (where PTW is not needed) are removed simultaneously and all major defects are removed after obtaining PTW within least possible time.

vii). Night patrolling

Some defects on distribution lines are visible only during night hours. To detect loose connections & Red hot/ glow paints.

PROCEDURES:

The formal procedures consist of issuing permits to work (PTW) and their cancellation on a standard form.

a) The apparatus/ line to be shut down.

b) The period of shut down.

c) The work to be done.

d) The authorized person.

SWITCHING:

The operator GSO/ (SSO) will authorize the work by issuing form b/ sc setting out all details switching will only be carried out under the instruction of the operator (SSO).

PERMIT TO WORK (PTW):

1. When instructions have been received and switching completed a permit to work is issued on a standard form, signed by the local officer and received by the authorized person.
2. Negotiations can be made over telephone so that work can be started as quickly as possible. On completing the switching operations the operator enters the event in the log sheet and attaches a work permit copy. He will past/display notices on the equipment switches.
3. The authorize person on side checks that all switching has been completed and secure to the permit to work. He will then earth the system with temporary earthing set and secure the area and display of notices as per D/SC indicating danger areas.

TEMPORARY EARTHING:

1. Earthing is done by the first establishing a solid point. Earthing equipment consists of an insulated flexible earthing lead with a clump to connect to the earth point the other end has a clamp to fix with line conductors/ wires on both sides of line (working zone).
2. The conductors may be checked to see if it is alive by using a high voltage line-detector which has a neon lamp or by flashing the conductor. If the system is dead, it should be earthed at its extremities so that the person working are protected/ safe.

DEFINING THE WORKING ZONE:

Before commending of the work, the safe area is defined by providing fencing or erecting barricades. Danger notices should be placed/ displayed.

SUPERVISION:

Staff should be briefed on danger points and the nature of the work and tools to be used. The authorized person will be totally responsible for the safety of all the staff and equipment, and all staff shall ewer regulation safety equipment.

RETURNING TO OPERATION:

Returning to operation must also observe procedures. The authorized officer get cleared the site personally, fencing and danger notices. He should then propose to remove the earth connections, then remove the earth firms from the conductors, then from the each point. After this he will loudly tell to staff that line is to considered to be alive, nobody is further allowed to work on the line. He will also inform the control engineer, who proposes to switch the systems back into operation. The clearance will then be signed and the system is ready to be reconnected and the SSO entered into the log sheet/order book. The clearance Certificate is on the reverse site of the permit to work when all the procedures are completed and all switchgear keys or interlocks returned, the SSO will reenergize the system.

MAINTENANCE OF DIFFERENT EQUIPMENTS:

OVERHEAD LINES:

This is the most difficult maintenance job to organize. The procedure is to patrol the line, report work be done and confirm the other items need no attention. The patrolling must be done by a man experience in construction of overhead line to make a good diagnosis.

The regular patrolling of all lines should be carried out at least once in year.

- Item on Check LIST
- Foundation
- Poles
- Paint Work
- Anti climbing devices • STAY WIRES.
- Wires and Elbows.
- Earth Resistance
- Insulators
- Fittings
- Ties
- Conductors
- Clearances

TREE TRIMMING:

Tree growth and storm-tossed branches can ground or break lines. The objective of tree trimming is to ensure that there is no tree interference with conductor and circuit equipment. The trimming shall be done to such as extent that the lines are not affected for at least next one year.

FACTORS IN TRIMMING TECHNIQUES:

Fundamental essentials to operation:

- How to use the trimming tools.
- How to use tie essential knots.
- How to climb and use a rope.
- Knowledge of conductors.
- Knowledge of trimming methods.
- Knowledge of cutting and lowering down of big limbs/ Branches.

TIMING OF TRIMMING

- Trees may be pruned at any time but it is generally done in early spring or late autumn.

USE OF ROPES FOR TREE TRIMMING

- Safety rope
- Butt rope
- Fall rope
- Guide rope

TRANSFORMER MAINTENANCE REGISTER:

_____KVA TRANSFORMER LOCATION _____

MAKE_____ SERIAL NO. _____ DATE OF INSTALLATION_____ PRIMARY CURRENT _____PRIMARY VOLTAGE_____

SECONDARY CURRENT _____ SECONDARY VOLTAGE _____

KIND OF LOAD _____ TAP CHANGER POSITION _____

NO. OF CONNECTION, GEN _____IND_____T/WELL _____ TOTAL _____

DATE	TIME	LOAD BEFORE BALANCE				LOAD AFTER BALANCE				FUSE INSTALLED RATING			FUSE ROD INSTALLED			EARTH RESISTANCE	COPPER STRIPS PROVIDED	P.G CONECTORS PROVIDED
		R	Y	B	N	R	Y	B	N	R	Y	B	R	Y	B			

PERMISSION:

Permission for trimming or removing tree from the owner or the forest department Verbal or written permission may be advised and job must be executed and completed very diplomatic manners to avoid any mishap and litigation.

Right and Wrong Methods:

METHODS OF TRIMMING.

The tree should be trimmed in such a way that;

- No part is closer than 1.8m to open wiring.
- The beauty and shape of tree is maintained.
- Removal of large limbs in such a way so that it shall not fall on a conductor. Every pruning cut larger than approx. 4 cm in dia should be sprayed to discourage the entry of organists.

TRANSFORMERS:

Organization of work:

The work is to be organized to two types of installations, pole-mounted and pad-mounted transformers. Pole-mounted transformers are inspected by routine line patrols, pad-mounted transformers be separate inspection, see Part 2, S.N. Check list must be provided for each transformers and facilities for checking oil levels and temperature. Requirements are laid down in COMPANY Technical instruction book for recording work standard for TI.

POLE-MOUNTED TRANSFORMERS (25 KVA TO 200 KVA):

Form older transformers oil samples must be taken and oil levels ascertained, new installations have sealed tanks. The former must be checked like pad-mounted transformers.

The sealed-tank type transformer has a cushion of air or inert gas tank over the oil level and has no conservators or breathers. The gas pressure must be checked. A filler plug is fitted but sealed at the factory and should not be opened.

Paint:

Paint and insulating epoxy resin covered top plate should be checked for a chips/cranks and broken/ missing.

Tap Changer (Off Load):

The tap changer must be adjustable twicely in a year during summer & winter season after disconnecting (off load) it from supply.

Transformer Loading:

The instruction are;

1. The load occasionally be checked during peak times. The load should be balanced over the three phases and not exceed the rating limit and the results may be recorded. An oil temperature indicator with a temperature indicating hand records this value.
2. High temperature indication 40 C above ambient) should be reported and checked against the limits set out in a Technical.
3. The loading checks are important as higher than rating or large unbalanced loads cause reduction of service life. Any movement or replacement of a transformer must be reported as required under technical instruction book and complete Form T-2 and T-3.
4. Transformer must be installed at central point/ place of LT network.

Pad-Mounted Transformers (100 to 630 KVA):

They are usually larger and more complex transformers mounted and installed in a metal enclosure with HT and LT protection and connection arrangements. Standard sizes are 63 KVA single phases (used for streetlight), 100, 200 and 630 KVA for the three phase units. The whole unit is serviced and maintained at the same time.

Maintenance Check list:

A proposed check list is given in company technical instruction book

Oil checks:

1. Oil levels gauges should first be checked, and tanks and cooling tubes for leaks. If any leaks are apparent, the transformers should be replaced and return to M&T for repair.
2. If there are not apparent leaks but the oil is low, top-up with the correct oil. Sample the oil; small cock is associated the drain plug. The oil sample should be checked for voltage insulation levels..

Bushings:

Check all the bushings, clean them.

Connections:

Check all the connections for tightness and correctness and grease with a non-oxidation grease.

Check all bolts.

Earthing:

The transformer tank and the LT neutral should be either. Check earth continuity by Megger.

Paint:

Check paint work, If damaged, clean off and prime and paint.

Tape Changers:

The distributions transformers are fitted with off-load changers. High resistance per due to wear may result in higher operating temperature.

Transformer Loading:

The load should be checked using a clip meters. A balance load of less than the rating should be indicated. If the transformer temperature is high but the load normal, the oil may have been contaminated. Consult M&T. For and movement or replacement of transformers.

Others Features on Transformers:

Some transformers are on the top of the transformer tank and kept filled to a certain 1 with oil (see a glass tube on its side). The oil level is to be maintained between limits indicated.

The fitted breather allows air into an out of the conservator. The breather is with a chamber containing silica gel to absorb air moisture. Replace the silica gel it begins to turn pink and restore it by heating gently. The healthy colour of silica gel is blue.

Tap Changer:

All distribution transformers are fitted with off-load tap changers range of +21/ 2degree/71/2% in steps of 21/2 %. The changeover must be made with the transformer off i.e. disconnected from the systems by moving a bolted link between six terminals the transformer back. Tap charging is required on seasonal basis to compensate for large or for small voltage drops. If the tap range must be changed, the customers will be disconnected for both changing taps and routine maintenance.

Protection of Small Transformers:

1. Protection of small transformers is restricted to overload and fault protection. The overload protection is bimetal strip which operated a tripping contact.
2. A fault protection is an electromagnetic which responds to current larger than load current. Their setting may be from three times load current upwards.

Switches:

Installed with a pole a pad mounted transformers, capacitors, etc. they only break load current, therefore, they are installed with fuses in series for a fault current. Their construction consists of knife blade and fingers with aware extinguishing device. I.e. either a gas developing sleeve or arc chutes.

Maintenance:

The switch using a gas developing sleeve has a limited number of operations before the sleeve chemical is exhausted. In regular disconnecting, operate the circuit breaker first to conserve they are quenching material. Check the operation on no load. Remove the switchblade. Check the latch springs, sleeve and blade and if burned, replace it.

Contact conditions, the contact spring and all fixing bolts should be checked for tightness. Grease contacts lightly and reassemble. For the arc chute switch the same as above must be applied, plus cleaning they arc chute.

Fuse Switches (D-Set):

These are drop-out cutout types, the fuse holder automatically disconnecting the fuse is blown. All three fuses have same and appropriate capacity according to the capacity of the Transformer.

Maintenance:

Inspect contact surfaces for burn and pitting, clean and replace if necessary. Examine the fuse tube; fuse link connections and connecting connectors for damage and corrosion. Replace if necessary. Check the spring pressure. Force of 9 to 11 kg is required to pull out the fuse holder. Ensure smooth closing and opening operation.

Check that the correct three fuses are fixed. Inspect and clean all the insulators tighter bolted fitting. Fuse rating is given in the Company instruction book with a scheduled of maintenance work.

Cables:

Little maintenance work is required on cable only at terminals and sealing ends have proper sag, insulation not damaged and missing.

Visual Inspection:

Have proper termination (indoor/ outdoor) proper connection by using P-G connectors/ thimbles.

Cable Clamps:

Check all the cable clamps have the correct packing between the clamp and the cable has no large sags. Check if all clamp bolts are tight. Mask the vermin proof. clean and inspect porcelains can sealing ends if fitted. A standard cable termination for an oil filled cable and for a more modern insulated cable be used.

Capacitors:

Capacitors require little maintenance. Only an over-voltage check is necessary. But the working ensures that they are discharged.

Visual Checks:

Electrical capacitor damage may be seen firstly by distorted sides secondly by seam (Fig.34). The insulator porcelains should be free from chips or cracks, broken and pollution free.

Electrical Connections:

Check the switch blades and fingers for wear. Check that all nuts and bolts are the common earth connection.

Charge Retention:

The capacitors can be checked for charge retention of DC voltage which is switched off when the capacitor is fully charged. The discharge current decays the formula.

$I=Io\ e^{-rt/}\ e$

Where Io is fully charged current . r is the resistance in ohms, t is the time in seconds, when current I is observed, and e is the natural logarithm. C is the capacitive reactance of the capacitor can be capacitor can be calculated.

Note:

R= resistance within the capacitor.

Voltage Regulation:

They operate like transformers. They have tap changing arrangements on the output side to be varied by (divide/ minus) 10% in 33 steps automatically or by hand. The schematic diagram is shown in Company instruction book.

Visual Inspection:

Look for oil leaks on the casing and any corrosion. Check the oil level indicator and the air breather and refill with silica gel. Electrical Connection:

These should be checked for tightness.

Control Checks:

There is an operation counter. Operations records are indication of wear on the contacts. They must be cleaned or replaced. The voltage output should be checked.

Maintenance:

The switch contactors are mounted in the top, and when clear of oil they may be checked for c/ wear or burns and pitting, and cleaned with sandpaper. If too badly damaged they should be replaced, contact pressure should be checked.

Oil should be sampled after every 12 months and checked for Di-electric strength.

Street-Lightening Maintenance:

General:

Control of the street lightening maintenance is recommendable. Proper method to organize the maintenance work having the advantage of better material control.

Inspection of Circuits:

The aerial lines are to be kept free from tree-branches. Underground circuits cannot be inspected, but the distribution boxes and connection should be checked.

Revision of Control Devices:

Switches and contactors are to be inspected and preventive maintenance is to be carried out, i.e. cleaning and greasing or painting of metallic parts and revision on tightness of connections, as well as the function tests and replacements of defective components.

Repairs and Replacements of Components:

The repair and replacements should be done promptly to avoid traffic disturbances or accidents.

Care of Maintenance Equipment:

Good care of equipment and tools is essential for the performances of work.

Services:

Check the 415 V system together with tapping points, customers, meters, earthing etc.

LT Connections:

On composite poles, inspection and maintenance work only after inspection of the 11 KV equipment. Check connections from 415 V conductors to the customers fuse box.

Intermediate pole foundations must be checked. Conductors, insulators, spools and ties must be sound and the sag controlled. Inspect connections to the customers' meter. For this joint to the 415V supply parallel groove connectors should be used.

Connections not to COMPANY Standard should be removed.

The services mast and conduit should be checked to see that they are firmly fitted. The method of fitting is shown in instruction book.

Meters:

The meter seals and connections must be intact and terminal cover must not be damaged. Check that the disk is rotating freely.

The meter should be effectively earthed. Periodically check that the earth resistances at this point. It should not exceed 10 ohms.

Check meter boxes for tampering.

Customers Installations:

Check on the fuse box and the installations that it has not been extended illegally or unprofessionally.

LT Earth Connections:

The earthing requirements are set out in a TIC no.9. The LT neutral connection is connected through an aluminium, spool to each poles/ structure which should be a wire-connected to a rod driven into the ground. The total resistances must be lower than 0.5 ohms.

ANNEX "N 20"

Doc No: N20

INFORMATION AND DOCUMENTS IN SUPPORT OF DISTRIBUTION EXPANSION AND INVESTMENT:

HAZECO Distribution Expansion and Investment Plan (In Millions)						
DESCRIPTION	2023-24	2024-25	2025-26	2026-27	2027-28	Total
ELR	1099	1273	1127	988	1146	5634
DOP	569	585	740	751	764	3409
Total Cost	**1668**	**1858**	**1867**	**1739**	**1911**	**9042**

HAZECO Power Distribution Rehabilitation (ELR) 2023-24 to 2027-28

No.	Description	Unit	Per Feeder	Quantities						Unit Rate Jun 2023	Total Cost in Million Rs.					
				2023-24	2024-25	2025-26	2026-27	2027-28	Total		2023-24	2024-25	2025-26	2026-27	2027-28	Total
				3 Feeders (11KV)	4 Feeders (11KV)	4 Feeders (11KV)	3 Feeders (11KV)	4 Feeders (11KV)	18 Feeders (11KV)		3 Feeders (11KV)	4 Feeders (11KV)	4 Feeders (11KV)	3 Feeders (11KV)	4 Feeders (11KV)	18 Feeders (11KV)
A.	**Material For 18 No. 11KV Feeders**															
1.	New 11 KV Lines															
	a. Osprey	KM	9.9	30	40	40	30	40	178	5299524	157	210	210	157	210	944
	b. Dog	KM	5	15	20	20	15	20	90	3116375	47	62	62	47	62	280
	c. 11 KV 500 MCM Cable	KM	0.1	0	0	0	0	0	2	2976000	1	1	1	1	1	5
	Sub Total	KM	15.000	45	60	60	45	60	270		205	273	273	205	273	1230
2.	11 KV Line Reconductoring															
	a. Osprey	KM	5	15	20	20	15	20	90	3408428.77	51	68	68	51	68	307
	b. Dog	KM	4	12	16	16	12	16	72	1592903.02	19	25	25	19	25	115
	c. Rabbit	KM	1	3	4	4	3	4	18	1072838.02	3	4	4	3	4	19
	Sub Total	KM	10.00	30	40	40	30	40	180		73	98	98	73	98	441
3.	11KV Capacitors															
	Fixed 11 KV 450 KVAR	set	1	3	4	4	3	4	18	162900	0	1	1	0	1	3
	Sub Total	set	1	3	4	4	3	4	18		0	1	1	0	1	3
4.	11KV Panels	No.	1	3	4	4	3	4	18	2449999	7	10	10	7	10	44
5	11KV 500 MCM Cable	KM	0.3	1	1	1	1	1	5	2976000	3	4	4	3	4	16
6	**Total (Item 1 to 5) Cost of HT Feeders**										**289.01**	**385.35**	**385.35**	**289.01**	**385.70**	**1734**

HAZECO Power Distribution Rehabilitation (ELR) 2023-24 to 2027-28

No.	Description	Units	Part of Proposal	Quantities						Unit Rate (Jun 2023)	Cost					
				2023-24	2024-25	2025-26	2026-27	2027-28	Total		2023-24	2024-25	2025-26	2026-27	2027-28	Total
B	Detail of LT Proposals Involving New Transformers & Various Type of Material															
7	Transformers															
	a. 25 KVA	No.		17	19	1	1	1	38	564047	9.5	10.8	0.3	0.3	0.3	21.3
	b. 50 KVA	No.		40	39	28	28	28	161	833463	33.0	32.1	22.9	22.9	22.9	133.9
	c. 100 KVA	No.		31	32	30	30	30	152	1295056	39.9	41.3	38.5	38.5	38.5	196.6
	d. 200 KVA	No.		9	10	9	9	9	47	1920796	16.9	19.0	18.0	18.0	18.0	89.8
	Sub Total	No.		96	100	67	67	67	397		99.3	103.2	79.7	79.7	79.7	441.6
8	New 11 KV Lines															
	Rabbit (Conversion LT Feeders)	KM	0.39	37	39	26	26	26	155	1564414.6	58.572	60.707	40.970	40.970	40.970	242.188
	Insulated Rabbit	KM	0.021	2	2	1	1	1	8	152000	0.306	0.318	0.214	0.214	0.214	1.267
	Sub Total	KM	0.411	37	39	26	26	26	163		58.878	61.025	41.184	41.184	41.184	243.455
C	New LT Line															
9	a. 3-Phase Wasp Line	KM	0.04	4	4	3	3	3	16	1576199	6.053	6.273	4.234	4.234	4.234	25.027
	b. 3-Phase ANT Line	KM	1.09	105	108	73	73	73	433	1473719	154.210	159.832	107.867	107.867	107.867	637.642
	Sub Total	KM	1.130	108	112	76	76	76	449		160.263	166.105	112.100	112.100	112.100	662.669
10	LT Line Re-Conductoring															
	a. 3-Phase Wasp	KM	0.16	15	16	11	11	11	64	684571.98	10.515	10.898	7.355	7.355	7.355	43.479
	b. 3-Phase Ant	KM	0.01	1	1	1	1	1	4	582091.98	0.559	0.579	0.391	0.391	0.391	2.311
	Sub Total	KM	0.170	16	17	11	11	11	67		11.074	11.478	7.746	7.746	7.746	45.789
D	Other Equipment and Material															
11	Energy Meters (against defective)															
	a. Single Phase	No.		14404	15125	15881	16675	17509	79593	3251	46.829	49.170	51.628	54.210	56.920	258.757
	b. Three Phase	No.		1625	1707	1792	1881	1976	8981	33900	55.097	57.852	60.745	63.782	66.971	304.447
	Sub Total	No.		16030	16831	17673	18556	19484	88574		101.926	107.022	112.373	117.992	123.891	563.204
E	Total (Item 7 to 11) Cost of LT Feeders										431.412	448.876	353.085	358.703	364.603	1956.679

HAZECO Power Distribution Rehabilitation (ELR) 2023-24 to 2027-28

No	Description	Unit	Quantities						Unit Rate Rs	Total Cost in Million Rs					
			2023-24	2024-25	2025-26	2026-27	2027-28	Total		2023-24	2024-25	2025-26	2026-27	2024-28	Total
F	Total (Item 1 to 11) Cost of HT & LT Proposals									720	834	738	648	750	3691
G	12% Store Charges									86	100	89	78	90	443
H	8% Installation Charges									58	67	59	52	60	295
I	Total Material Cost (F+G+H)									865	1001	886	777	900	4429
J	Contigency (3%)									26	30	27	23	27	133
K	Total Material Cost(I+J)									890	1031	913	801	927	4562
L	Escalated Cost @ 29%									209	242	214	188	218	1070
M	Total Material Cost(K+L)									1099	1273	1127	988	1145	5633

HAZECO Power Distribution Expansion (DOP) 2023-24 to 2027-28

No.	Description	Unit	Per Feeder	Quantities						Unit Rate (Jun 2023)	Total Cost in Million Rs.					
				2023-24	2024-25	2025-26	2026-27	2027-28	Total		2023-24	2024-25	2025-26	2026-27	2027-28	Total
				1 Feeders (11 KV)	1 Feeders (11 KV)	1 Feeders (11 KV)	1 Feeders (11 KV)	1 Feeders (11 KV)	5 Feeders (11 KV)		1 Feeders (11 KV)	1 Feeders (11 KV)	1 Feeders (11 KV)	1 Feeders (11 KV)	1 Feeders (11 KV)	5 Feeders (11 KV)
A.	Material For 05 No. 11KV Feeders															
	New 11 KV Lines															
1.	a. Osprey	KM	9.9	10	10	10	10	10	50	5299524	52	52	52	52	52	262
	b. Dog	KM	5	5	5	5	5	5	25	3116375	16	16	16	16	16	78
	c. 11 KV 500 MCM Cable	KM	0.1	0	0	0	0	0	1	2976000	0	0	0	0	0	1
	Sub Total	KM	15.000	15	15	15	15	15	75		68	68	68	68	68	342
	11 KV Line Reconductoring															
2.	a. Osprey	KM	5	5	5	5	5	5	25	3408428.77	17	17	17	17	17	85
	b. Dog	KM	4	4	4	4	4	4	20	1592903.02	6	6	6	6	6	32
	c. Rabbit	KM	1	1	1	1	1	1	5	1072838.02	1	1	1	1	1	5
	Sub Total	KM	10.00	10	10	10	10	10	50		24	24	24	24	24	122
	11KV Capacitors															
3.	Fixed 11 KV 450 KVAR	set	1	1	1	1	1	1	5	162900	0.16	0.16	0.16	0.16	0.16	1
	Sub Total	set	1	1	1	1	1	1	5		0.16	0.16	0.16	0.16	0.16	1.00
4.	11KV Panels	No.	1	1	1	1	1	1	5	2449999	2	2	2	2	2	12
5	11KV 500 MCM Cable	KM	0.3	0	0	0	0	0	2	2976000	1	1	1	1	1	4
6	Total (Item 1 to 5) Cost of HT Feeders										96.34	96.34	96.34	96.34	96.34	482

482

HAZECO Power Distribution Expansion (DOP) 2023-24 to 2027-28

No.	Description	Unit	Per Proposal	Quantities						Unit Rate (Jun 2023)	Cost					
				2023-24	2024-25	2025-26	2026-27	2027-28	Total		2023-24	2024-25	2025-26	2026-27	2027-28	Total
B	**Detail of LT Proposals Involving New Transformers & Various Type of Material**															
7	**Transformers**															
	a. 25 KVA	No.		5	6	2	2	2	15	564047	2.8	3.1	0.9	0.9	0.9	8.7
	b. 50 KVA	No.		7	8	26	26	26	94	833463	6.0	6.4	22.0	22.0	22.0	78.4
	c. 100 KVA	No.		12	12	17	17	17	75	1295056	15.7	15.7	22.1	22.1	22.1	97.6
	d. 200 KVA	No.		15	16	22	22	22	97	1920796	29.6	30.0	42.3	42.3	42.3	186.4
	Sub Total	No.		40	41	67	67	67	282		54.0	55.2	87.3	87.3	87.3	371.0
8	**New 11 KV Lines**															
	Rabbit (Conversion LT Feeders)	KM	0.39	15	16	26	26	26	110	1564414.6	24.161	24.966	40.939	40.939	40.939	171.944
	Insulated Rabbit	KM	0.021	1	1	1	1	1	6	152000	0.126	0.131	0.214	0.214	0.214	0.900
	Sub Total	KM	0.411	15	16	26	26	26	116		24.287	25.097	41.153	41.153	41.153	172.844
C	**New LT Line**															
9	a. 3-Phase Wasp Line	KM	0.04	2	2	3	3	3	11	1576199	2.497	2.580	4.231	4.231	4.231	17.768
	b. 3-Phase ANT Line	KM	1.09	43	45	73	73	73	307	1473719	63.612	65.732	107.786	107.786	107.786	452.703
	Sub Total	KM	1.130	45	46	76	76	76	318		66.108	68.312	112.017	112.017	112.017	470.471
10	**LT Line Re-Conductoring**															
	a. 3-Phase Wasp	KM	0.16	6	7	11	11	11	45	684571.98	4.337	4.482	7.350	7.350	7.350	30.868
	b. 3-Phase Ant	KM	0.01	0	0	1	1	1	3	582091.98	0.231	0.238	0.391	0.391	0.391	1.640
	Sub Total	KM	0.170	7	7	11	11	11	48		4.568	4.720	7.740	7.740	7.740	32.509
D	**Other Equipment and Material**															
11	**Energy Meters**															
	a. Single Phase	No.		14676	15410	16180	16989	17839	81094	3251	47.712	50.097	52.602	55.232	57.994	263.637
	b. Three Phase	No.		2348	2466	2589	2718	2854	12975	33900	79.603	83.583	87.762	92.150	96.757	439.855
	Sub Total	No.		17024	17875	18769	19708	20693	94069		127.314	133.680	140.364	147.382	154.751	703.492
E	**Total (Item 7 to 11) Cost of LT Feeders**										**276.280**	**287.002**	**388.547**	**395.565**	**402.934**	**1750.327**

983

HAZECO Power Distribution Expansion (DOP) 2023-24 to 2027-28

No.	Description	Unit	Quantities						Unit Rate	Total Cost in Million Rs.					
			2023-24	2024-25	2025-26	2026-27	2027-28	Total	Rs.	2023-24	2024-25	2025-26	2026-27	2027-28	Total
F	Total (Item 1 to 11) Cost of HT & LT Proposals									373	383	485	492	499	2232
G	12% Store Charges									45	46	58	59	60	268
H	8% Installation Charges									30	31	39	39	40	179
I	Total Material Cost (F+G+H)									447	460	582	590	599	2678
J	Contigency (3%)									13	14	17	18	18	80
K	Total Material Cost(I+J)									461	474	599	608	617	2759
L	Escalated Cost @ 29%									108	111	141	143	145	647
M	Total Material Cost(K+L)									569	585	740	751	762	3406

484

HAZECO Overloaded Feeders (Load Above 320 A)

Sr. No	Grid Name	Feeder Code	Name	Circle Code	Sub Division Code	Sub Division Name	Max Loade
1	132KV Haripur	005901	EXPRESS-TOWN-1	264	26411	HARIPUR-1	400
2	132KV AMC Abbottabad	062802	JHANGI	264	26476	JINNAH ABAD-2	400
3	132KV Mansehra	012807	KHAKI	267	26714	KHAKI	400
4	132KV Battal	001401	BATAGRAM	267	26734	BATTAGRAM	400
5	132KV Mansehra	012802	MANGLOOR	267	26742	RURAL MANSEHRA	400
6	132KV Haripur	005928	KOT NAJEEBULLAH HRP	264	26442	HARIPUR-II	350
7	132KV AMC Abbottabad	062803	JINNAH ABAD	264	26471	JINNAH ABAD-1	360
8	132KV Mansehra	012803	CITY MANSEHRA	267	26711	URBAN MANSEHRA	380
9	132KV Battal	001402	BATTAL	267	26732	SIRAN VALLY	380
10	132KV Battal	001404	DESHAN	267	26734	BATTAGRAM	380
11	132KV Mansehra	012816	PAKHAL	267	26735	BAFFA	380
12	132KV Haripur	005932	TOWN-4	264	26411	HARIPUR-1	330
13	132KV Abbottabad	000406	REPCO	264	26421	A/ABAD-I	320
14	132KV Abbottabad	000410	KEHAL	264	26421	A/ABAD-I	335
15	132KV Havellian	117205	BAGRA	264	26424	LORA CHOWK	345
16	132KV AMC Abbottabad	062804	A.P.S	264	26425	CITY-2 ATD	340
17	132KV Haripur	005921	KALABAT	264	26441	KALABAT TOWN SHIP	320
18	132KV Haripur	005927	KTS-2 HARIPUR	264	26441	KALABAT TOWN SHIP	340
19	132KV Haripur	005930	PANIA-2 HRP	264	26442	HARIPUR-II	320
20	132KV Mansehra	012806	CHANNAI	267	26711	URBAN MANSEHRA	320
21	132KV Mansehra	012811	ATTERSHISHA	267	26717	GHAZI KOT	320
22	132KV Mansehra	012808	DHODIAL	267	26731	SHINKIARI-1	330
23	132KV Mansehra	012813	SHINIARI	267	26731	SHINKIARI-1	330

ANNEX "N21"

Doc No: N21/1

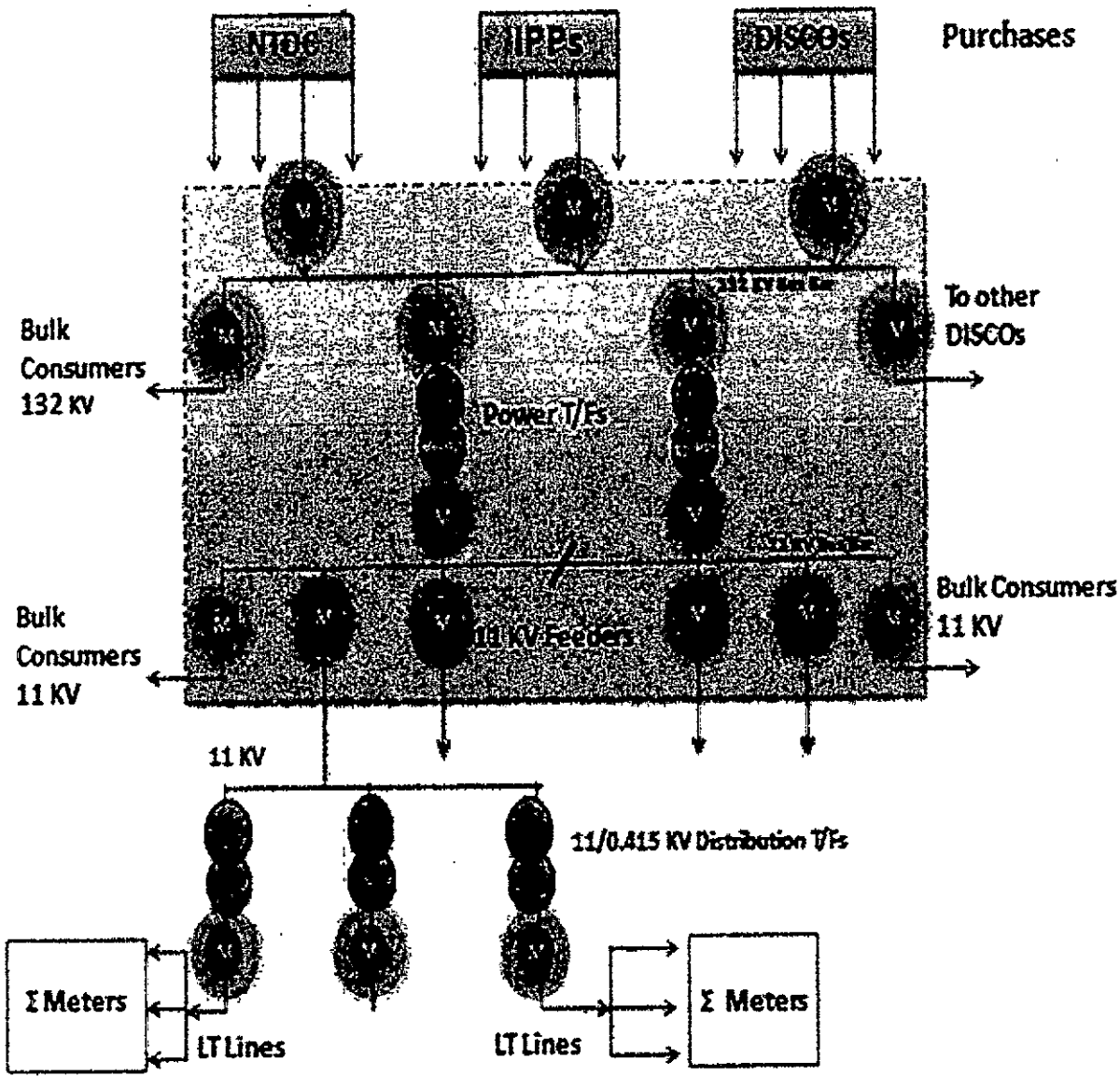
DISTRIBUTION SYSTEM CONFIGURATION:

485

The basic objective of the distribution system is to provide service with minimum voltage variations. The Service Interruptions should be of short duration and affect a small No. of consumers. The cost of Construction, Operation and Maintenance should be minimum with quality of service. The system should be Flexible so as to allow expansions with minimum expense and modification.

The power supply network of HAZECO comprises of 132/66kV transmission system which receives power at multiple points from NTDC, IPPs, WAPDA and other DISCOs. There are twenty-eight numbers air-insulated grid stations which step down the voltage from 132/66kV to 11kV for supplying the distribution network. Some of the grids are connected in a ring system.

The distribution network comprises of an overhead radial distribution system, characterized by voltage levels of 11 kV/ 415 volts besides few circuits of 33 kV.



HAZECO Grid Stations & Transmission Lines

Grid Station (kV)								Transmission Lines (km)				
500	220	132	66	33	Consumer Grid (132)	Total	MVA	Description	132kV	66kV	33kV	Total
-	01	19	2	2	4	28	1254.3	Line wise	576.299	76.2	75	727.499
								Circuit wise	748.134	76.2	75	899.334

HAZECO HT/LT Distribution Network

Sr.#	Circle	Feeders		HT Lines (km)	LT Lines (km)	Distribution Transformers	
		No.	Average Length (km)			No.	MVA
1	Hazara-I	138	21.03	2902.76	2366.76	7566	816.25
2	Hazara-II	74	34.31	2470.27	10445.9	5939	418.685
TOTAL		**212**	**25.59**	**5373.03**	**12813**	**13505**	**1234.94**

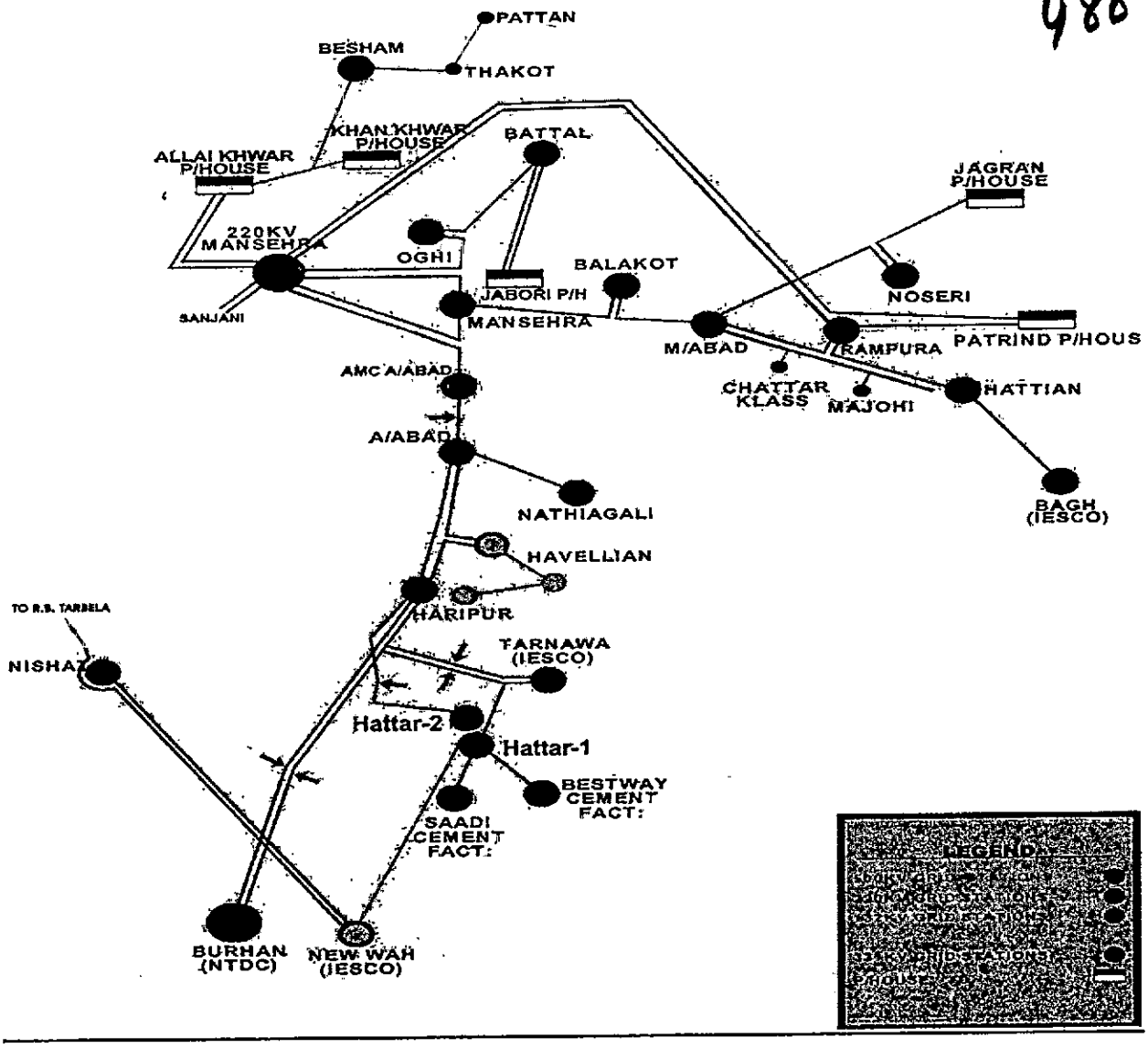
HAZECO Grid Stations (Circle-Wise Details)

Circle	Grid Stations						
	500 kV	220 kV	132 kV	66 kV	33 kV	132 kV Consumer Grids	Total
Hazara-I	-	-	12	02	-	04	18
Hazara-II	-	01	07	-	02	-	10
Total	**-**	**01**	**19**	**02**	**02**	**04**	**28**

TDC		HAZECO	
S.#	**Grid Station**	**S.#**	**Grid Station**
1	220kV Manshera	1	132kV Abbottabad
2	220kV Haripur (Proposed / Under Construction)	2	132kV AMC A/Abad
Consumer Grids (132kV) 04 Nos		3	132kV Haripur
		4	132kV Hattar-1
		5	132kV Hattar-2
		6	132kV Havellian
		7	132kV Khanpur
		8	132kV Nathia Gali
		9	132kV Nishat Tarbela
		10	132kV Balakot
		11	132kV Besham
		12	132kV Battal
		13	132kV Hattian (**AJK**)
		14	132kV Mansehra
		15	132kV M/Abad (**AJK**)
		16	132kV Noseri (**AJK**)
		17	132kV Oghi
		18	132kV Rampura (**AJK**)
		19	132kV Hattar Economic Zone
		20	66kV Haripur
		21	66kV Havelian
		22	33kV Pattan
		23	33kV Thakot

GEOGRAPHICAL MAP OF HAZECO

488



HAZECO PROPOSED
LIST OF COMMON DELIVERY POINTS (CDPs)

489

1. CDPs BETWEEN WAPDA HYDLE & HAZECO

SR NO	Name of Station	Name of Power Transformer/Line Section
1	Jagran Power House	132KV Line Jagran P/H-132KV Noseri, (JRN-1)
2	Allai Khwar Hydro P/Station	132KV Line Allai-132KV Besham
	2. CDPs BETWEEN NTDC & HAZECO	
1	220KV Mansehra	Auto T/F T-1
2	220KV Mansehra	Auto T/F T-2
3	220KV Mansehra	Auxiliary
	3. CDPs BETWEEN IESCO & HAZECO	
1	220KV Burhan	132KV Line Burhan-Haripur, E9Q1
2	220KV Burhan	132KV Line Burhan-Haripur, E1Q1
3	132KV New Wah	132KV Line New Wah-Hattar, WAH-3
4	132KV New Wah	132KV Line New Wah-Nishat Tarbela, WAH-7
5	132KV New Wah	132KV Line New Wah-Mustahkam C/Factory, WAH-9
6	132KV New Wah	66-KV Line New Wah-Haripur, WAH-11
7	132KV New Wah	11KV Feeder Old Khanpur
8	132KV Murree	11KV Feeder Lora-1
9	132KV Murree	11KV Feeder Lora-2
10	132KV Hattian (AJK)	132KV Line Hattian-Bagh
	4. CDPs BETWEEN IPPs & HAZECO	
1	Patrind Power House (AJK)	132KV Line Patrind-220KV GSS Mansehra
2	Patrind Power House (AJK)	132KV Line Patrind-Rampura

	5. PROPOSED CDPs BETWEEN PESCO & HAZECO	
1	132KV Nishat Tarbela	132KV Line Nishat Tarbela - Right Bank Tarbela
2	33KV Thakot	11KV Feeder Chakaser
3	33KV Pattan	11KV Feeder Dubair
4	33KV Pattan	11KV Feeder Dasu
5	132KV Besham	11KV Feeder Besham City
6	132KV Besham	11KV Feeder Mera
	6. PROPOSED CDPs BETWEEN PEDO & HAZECO	
1	Jabori Power House (Mansehra)	132KV Line Jabori P/H - 132KV GSS Battal Circuit-1
2	Jabori Power House (Mansehra)	132KV Line Jabori P/H - 132KV GSS Battal Circuit-2

1	CDPs between Wapda Hydel & HAZECO	= 02-Nos
2	CDPs between NTDC & HAZECO	= 03-Nos
3	CDPs between IESCO & HAZECO	= 10-Nos
4	CDPs between IPPs & HAZECO	= 02-Nos
5	CDPs between PESCO & HAZECO	= 06-Nos
6	CDPs between PEDO & HAZECO	= 02-Nos
	TOTAL:	**= 25 Nos**

132 KV = 15 Nos

66 KV = 01 Nos

11 KV = 09 Nos

TOTAL= 25 Nos

Distribution System Configuration and Components:

491

a) Bare Conductor Overhead System (Both HT and LT system).
b) Underground System (Both HT and LT system)

The main components are;

1. H.T Line
2. L.T Line
3. Distribution Transformer (Pad or Pole Mounted).
4. Customer Service.

A. Configuration of HT Distribution System:

Following are the main configuration of HT Distribution System.

1- **Radial Configurations.**

2- **Closed Loop Configurations.**

3- **Open Loop Configurations.**

4- **Double Supply Configurations.**

5- **Grid Form of HV Distribution system OR Network Distribution Configurations.**

6- **Improved Radial Configurations.**

RADIAL CONFIGURATIONS:

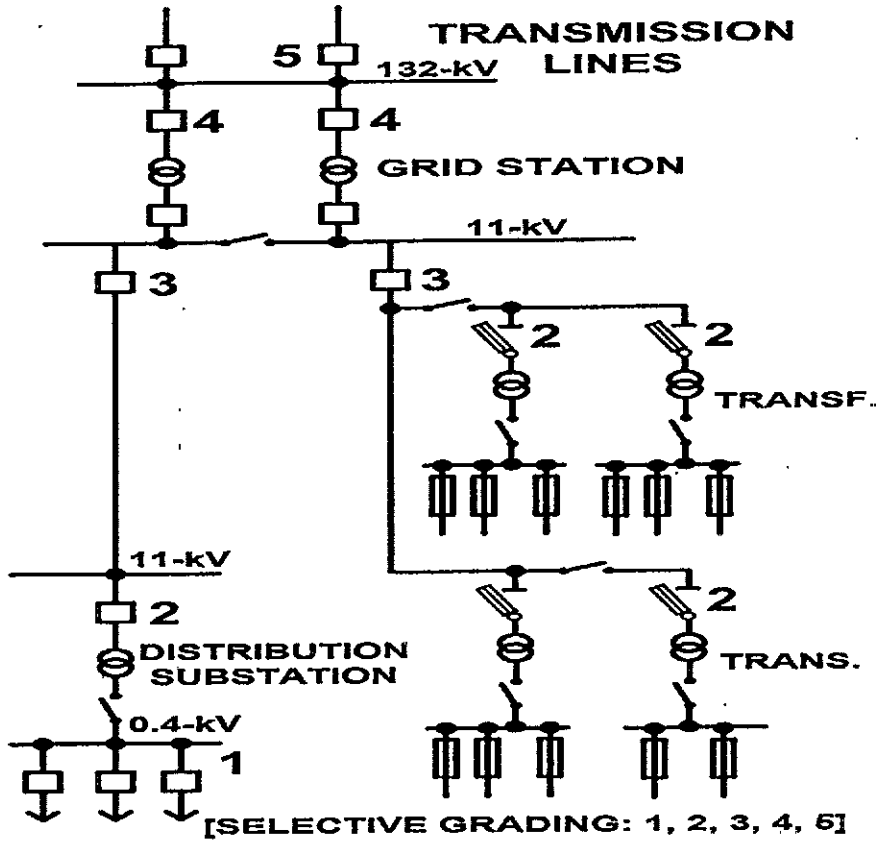
The Radial distribution system is the cheapest to build, and is widely used in sparsely populated areas. A radial system has only one power source for a group of customers. A power failure, short-circuit, or a downed power line would interrupt power in the entire line which must be fixed before power can be restored.

All the Sections/ Branches of a Feeder are fed from a Single Source in a fixed direction. No Alternate arrangement for energizing the affected section through by-passing the faulty section. It is the Simplest system in Designing, Construction, Operation and Maintenance. Load for each section is clearly known. Thus, size of the conductor for main & branches can be easily selected. Source & Load sides are Fixed. Very simple protection schemes e.g. over current & earth fault is sufficient. Fault current calculations needed for coordination of protective devices on the system are easy. Isolation of section from one side is sufficient. although under the rules both sides are to be grounded. It is cheapest configuration. No alternative arrangement. No extra length. No switching arrangement. There is no emergency load; so smaller size conductor can be used. Shortest routes can be adopted; only load is directly connected to source (No alternative arrangement is required). Simple Designing, Construction, Operation and Maintenance and simple Protection reduces the overall cost. As the system is suitable for rural areas, lines passes over the open fields, lengthy spans, less no. of poles are required.

However, it has very poor reliability. When fault occurs on a feeder; Breaker in Grid Station Opens and interrupts supply to all customers. Manually operated sectionalizers at the junction of main and branch line are installed; Faulty Section is isolated, and service can be restored to other parts of the feeder. Service to the area fed through faulty section will be restored after rectification of fault. If fault occurs at main section close to the Grid Station, all the consumers will have to wait till identification, tracing and rectification of fault.

It has excessive voltage drop & line losses because, the total load current through main section increases ir and ir as compared with system which facilitates load current distribution in two or more parallel paths. In the absence of any emergency load, thinner conductors are used. this contributes to increase voltage drop and line losses.

(1) Radial Dist. System



CLOSED LOOP CONFIGURATIONS:

A loop system, as the name implies, loops through the service area and returns to the original point. The loop is usually tied into an alternate power source. By placing switches in strategic locations, the utility can supply power to the customer from either direction.

If one source of power fails, switches are thrown (automatically or manually), and power can be fed to customers from the other source.

The loop system provides better continuity of service than the radial system, with only short interruptions for switching. In the event of power failures due to faults on the line, the utility has only to find the fault and switch around it to restore service. The fault itself can then be repaired with a minimum of customer interruptions.

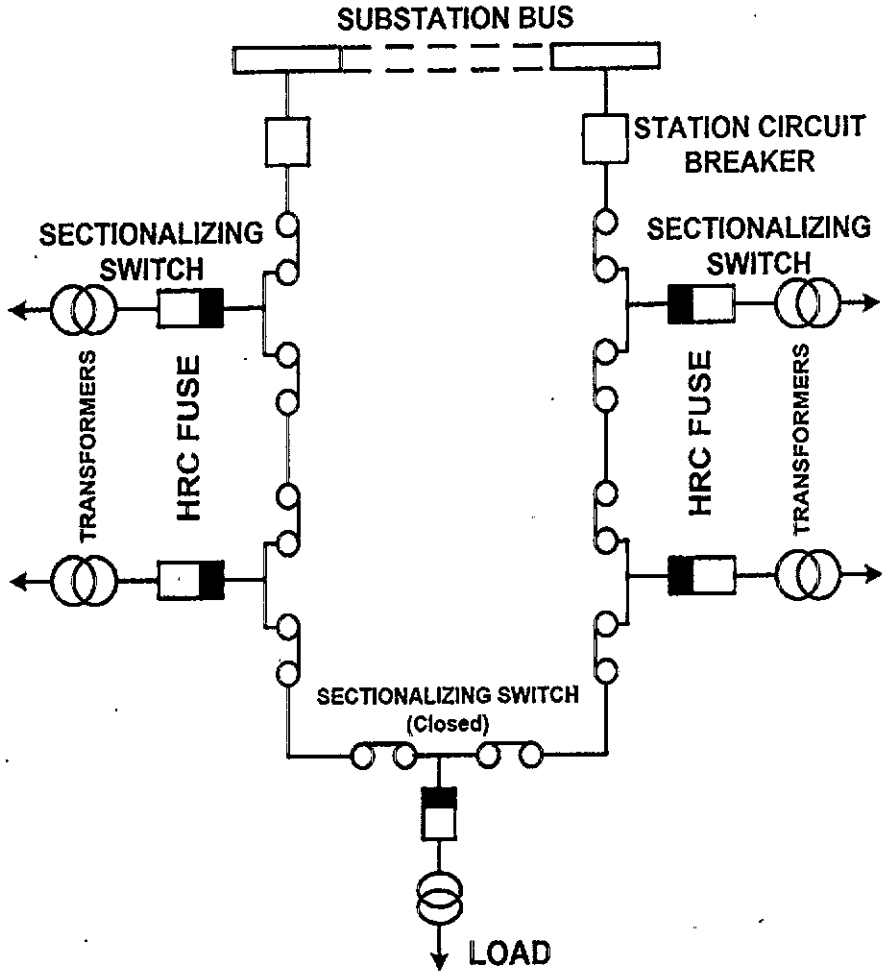
The loop system is more expensive than the radial because more switches and conductors are required, but the resultant improved system reliability is often worth the price

All the Sections/ Branches of a Feeder are fed from two Source. There is an alternate arrangement for energizing the affected section through by-passing the faulty section.

In case of fault, although the consumers are still without electricity but often the identification isolation of Faulty Section, the supply is restored. Availability is greatly improved and hence it is more reliable than Radial System. But, in case of two simultaneous faults on the loop, the supply to the areas between faulty section can not be restored till rectification of fault of at least one section. For economic purposes, if only one breaker is used, Availability will be affected. Use two breakers; in case of fault on the breaker or it is out for maintenance, the supply to whole loop will be off.

It has less voltage drop & line losses, because for the same area to be supplied with a closed loop system as compared with radial system, the voltage drop and line losses will be less. However, it is expensive as compared with radial system. Extra length of feeder is required. Two sectionalizers on both sides of Transformer are required. In emergency, total load of loop is fed from one side. Higher size of conductor is selected for carrying the twice as much as normal load. Single uniform size of conductor is needed to complete the loop. All these factors increase the capital cost. As loop is protected on both sides, so ratings and settings of protective devices are to be carefully determined keeping in view the Normal & Emergency loading conditions. To avoid abnormally high cost because of Higher Conductor size and two Sectionalizers, recommended for High Load Density/ Small Distances, preferably for well-planned urban localities. Equally good for rural areas if Economy permits. Loop should be less than 100-km otherwise fault location time may exceed 5 to 6 hours.

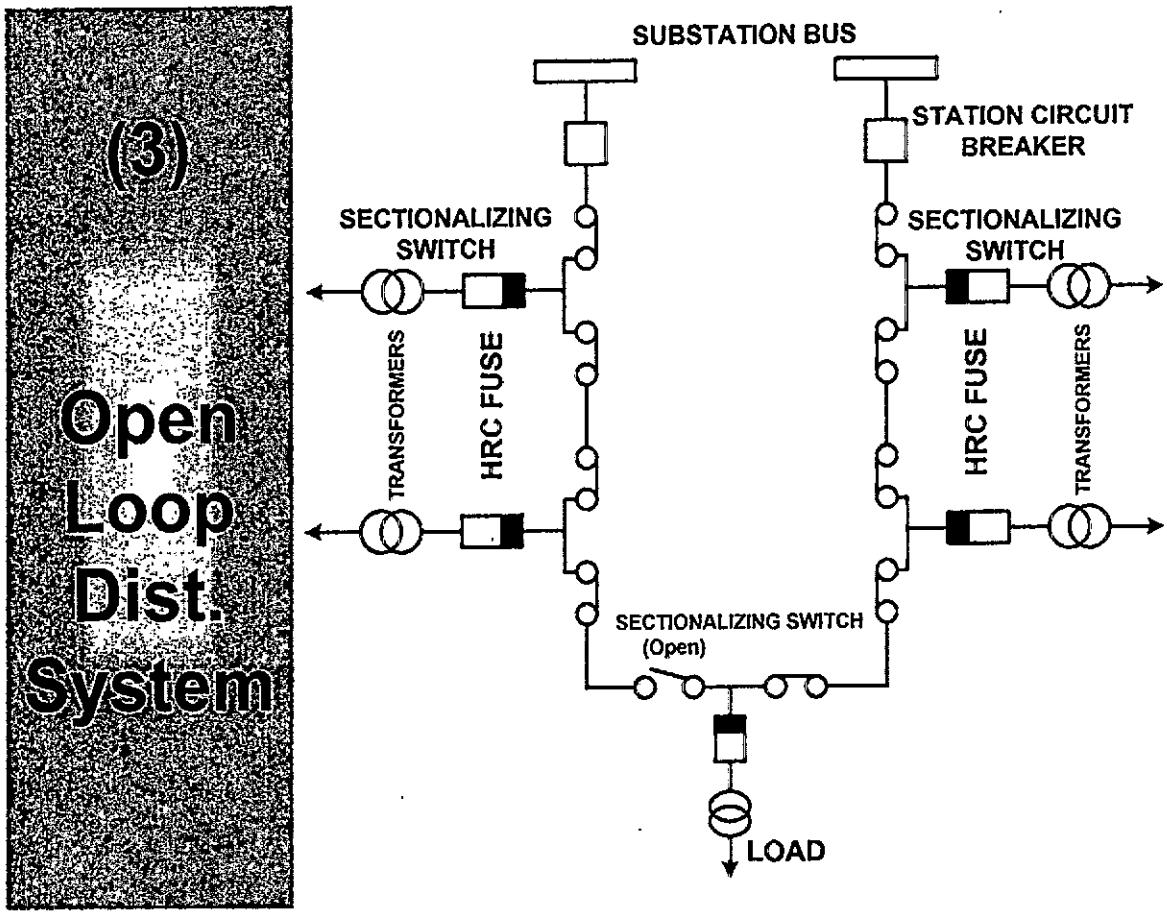
(2) Closed Loop Dist. System



OPEN LOOP CONFIGURATIONS:

If in a Closed Loop System, one of the two sectionalizers is kept normally open, the loop is called "Open Loop System.

The normally open sectionalizer will limit the effect of fault to one part of loop because only one breaker will open and other portion of loop will not be affected. Fault location time will be less because faulty part of the loop is clearly known. In case of fault total loop will not be required to be patrolled. availability will be increased as compared with Closed Loop System.



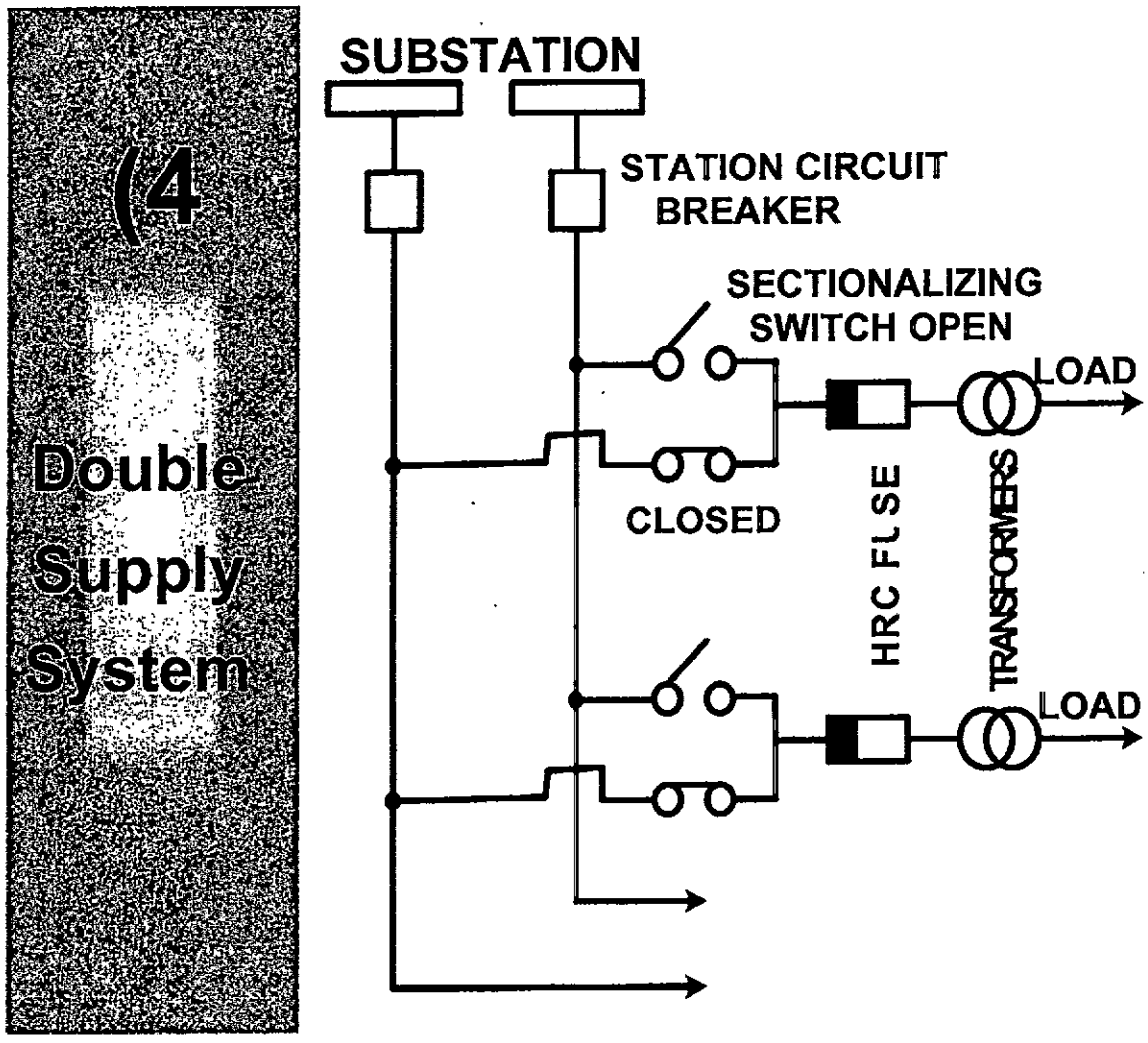
DOUBLE SUPPLY CONFIGURATIONS:

In addition to a Radial Feeder, another Radial Feeder is provided side-by-side to feed the same consumers through manually operated Sectionalizer or Automatic Changeover Switches. The additional feeder can be a purely standby, but for economic purposes both feeders should be equally loaded. Only Automatic Changeover Switch can serve the above said purpose. It has very higher service reliability.

In Open Loop System about 50% consumers will have to wait till fault location and isolation. But in this system healthy source is available at the consumer premises. Availability of supply is largely ensured.

The line losses are less, because of equal loading of both feeders, Line Losses are reduced as compared with if one was kept as standby. (if one feeder is used)

However, it is very expensive, because two feeders, each capable of carrying total load, will double the cost. Two Sectionalizers one automatic changeover switch for each transformer increases the cost. Extra length of line is required to connect supply of both feeders to each transformer through Sectionalizer, changeover switch. Hence cost increases. If load area is of Square or Rectangular shape, then too costly. But if along a road then cost is comparable with that of open loop. In addition to above, it reduces Safety, i.e If both feeders are connected to same transformer through manual, it will be hazardous. Besides, If one feeder is OFF due to some fault, it will trip the healthy feeder also.



GRID FORM OF HV DISTRIBUTION SYSTEM/NETWORK DISTRIBUTION CONFIGURATIONS:

Network systems are the most complicated and are interlocking loop systems. A given customer can be supplied from two, three, four, or more different power supplies. Obviously, the big advantage of such a system is added reliability. However, it is also the most expensive. For this reason, it is usually used only in congested, high load density municipal or downtown areas.

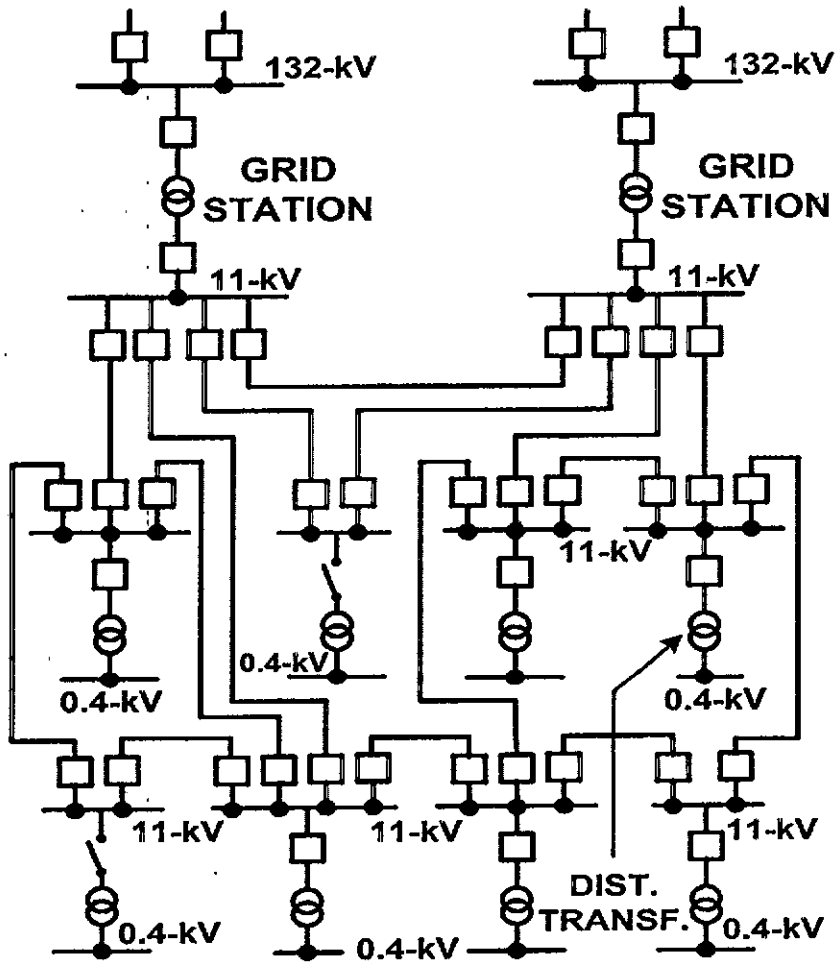
All the Distribution Transformers of a load area are interconnected providing two or more alternatives and whole system is fed from two or more bulk supply sources. System is usually underground.

The system is more reliable because the availability is almost 100%. Service to the consumers will not be affected at all or will be affected minimum in case of two simultaneous faults.

However, the System is more costly, because, It has automatic switching arrangements with sophisticated protection schemes. Establishment of remote-control center is necessary. All the operations are computer controlled. More alternatives sources are provided in this type of distribution system. Availability of supply cannot be improved through manual operation because it will take considerable time to identify a faulty section & determine the better alternative. Due to complexity of system, manual operation may result in wrong operations. Suitable for areas of higher priority & very high load density. Suitable for urban areas if economy is not a problem.

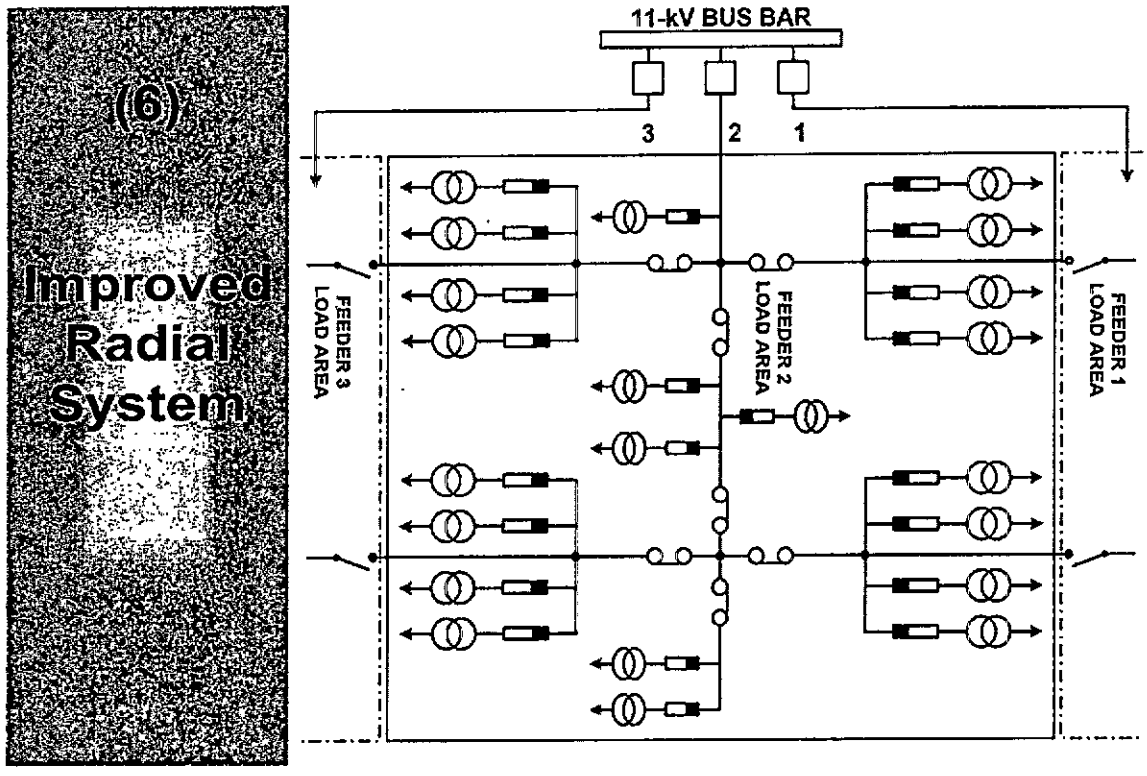
(5)

Grid Form of High Voltage System



IMPROVED RADIAL CONFIGURATIONS:

Availability & Reliability can be improved without converting a distribution system into any of aforesaid system. These measures may be costly or cheaper. Some sections/ branches of adjacent radial feeders are brought closer to each other and sectionalizers are installed. A part of that can be far from other in case of problem on one feeder. Both the feeders should have some spare capacity.



B. Configurations of LT/LV Distribution System:

Following are the main configuration of LT Distribution System;

1- **Radial Configurations.**
2- **Closed Loop Configurations.**
3- **Open Loop Configurations.**
4- **Double Supply Configurations.**
5- **Improved Radial Configurations.**

Radial System is preferred over others because Radial System is quite Simple and Cheapest. LT lines feed only one or few consumers and in case of fault very few consumers will be affected. Therefore, costly system/configuration are avoided.

However, Open Loop or Closed Loop Systems are also used for some important areas

Besides the above, the LT system can also be classified as;

1. LV system can be Single Phase, Three Phase or a Composite Circuit.
2. LV system can be Overhead or underground.

ANNEX "21/2"

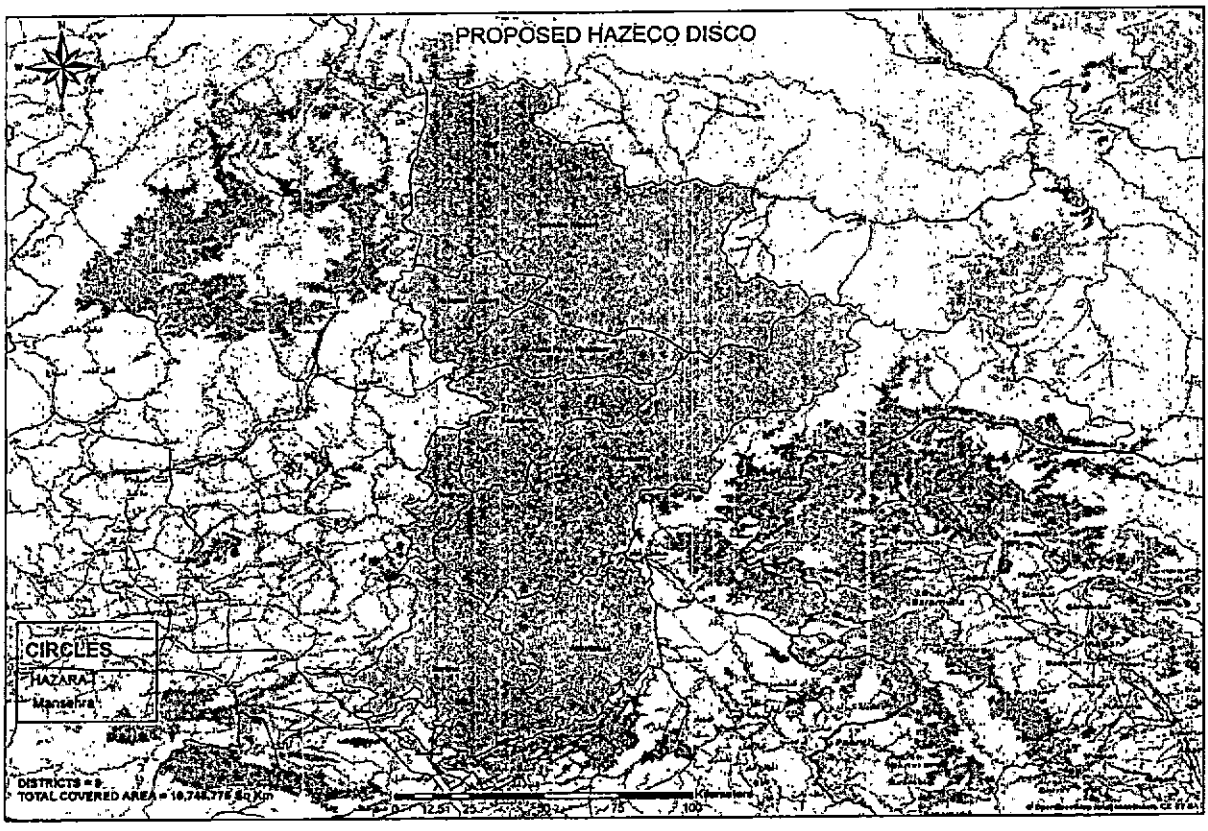
499

Doc No: N21/2

Service Territory, right of way and Feeder Maps

Jurisdiction of HAZECO comprises of eight districts of KPK namely:

1) Abbottabad
2) Haripur
3) Mansehra
4) Battagram
5) Kohistan Upper
6) Kohistan Lower
7) Torghar
8) Kolai Palas



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ANNEX "N 21/3"

VOLTAGE LEVEL AND REGULATION:

Nominal HT Voltage: 11 kV (with tolerance of +/- 5%)

Minimum HT Voltage: -5% or 10.45 kV

Nominal LT Voltage (Phase – Neutral): 230 Volts

Maximum LT Voltage: 102% or 234.6 Volts

Voltage Drop Allowable on the Distribution Transformer: 2.0% or 4.6 Volts

Voltage Drop Allowable on the Secondary System: 2.5% or 5.8 Volts

VOLTAGE REGULATION:

Purposes of voltage regulation on H.T and L.T distribution system is to keep the voltage within specified tolerance limits during peak as well as low load hours.

Factors like Lengthy Lines and Growing Loads contribute towards increased voltage drop. Tail end consumers should be supplied a voltage greater than or equal to minimum prescribed limit and First consumer should be provided with a maximum prescribed level.

Even if the 11 KV bus voltage is kept at maximum, there can be excessive voltage drop on Distribution System because either System is not well planned and has lengthy HT or LT Lines, Or on the other hand, even if the feeder is well planned but due to unexpected load growth, the voltage drops become higher with passage of time.

VARIOUS METHOD OF VOLTAGE REGULATION:

1. Use of Generator Voltage Regulator (In case of self-generation).
2. Use of Voltage Regulator & On-load Tap Changer.
3. Application of Capacitor (At Grid Station).
4. Balancing of Load on H.T Lines.
5. Increasing Feeder's Conductor Size.
6. Changing Feeder Sections from Single Phase to Multiphase.
7. Transferring Loads to new Feeders.
8. Installing new Grid Stations & Primary Feeders.
9. Increasing Primary Distribution Voltage Level (From 11 to 33-kV).
10. Voltage Regulators on Primary Feeders.
11. Shunt Capacitors at grid station and at Primary Feeders.
12. Series Capacitors on Primary Feeders.
13. Conversion of L.T Lines into H.T lines.
14. Use of Bundled Conductors for H.T Lines.
15. Proper Planning & Designing.

16. Through Tap Changer of Transformers.

A. On Load Tap Changers (OLTC) are provided on all Power Transformers for automatic voltage regulation.

B. Through Tap Changer of Distribution Transformers.

501

17. Voltage Control by proper Planning & Designing of Feeder

Some are explained below

TRANSFORMER TAP:

Normally Distribution Transformer has five TAPS except 10 KVA and 15 KVA which have only three Taps i.e. 2, 3, 4.

In distribution transformer the Tap No. 2 is called NORMAL Tap or PRINCIPAL Tap at which Transformer is designed for rated Current and Voltage.

The rated voltage at no load of this Tap is 11000 volts at Primary and 415 Volts at Secondary.

The tap No 1 is called PLUS Tap and Tap No 3, 4, 5 are called MINUS Taps.

In power transformers on grid station the voltage regulation is carried out through ON-LOAD tap changer (OLTC). The Tap No 17 is called PRINCIPLE tap out of 33 taps.

If the voltage at the start of feeder is set at 11550 V (Max. limit), with the help of ON-LOAD Tap Changer of Power Transformer, while Distribution Transformer is set at PRINCIPAL Tap, then ;

a) The Tail-end L.T Consumer should receive voltage ≥ 380-Volts (Min. limit) during Peak Load Hours.

b) The Consumer close to the Grid Station should receive voltage ≤ 400-Volts (Max. limit) during Low Load Period, while Distribution Transformers at Principal Tap.

On the other hand, If the voltage at the start of feeder is low and is 10450 V (Min.), then it should provide voltage ≥ 380-Volts to Tail-end Consumers through application of MINUS Tap of Distribution Transformers.

If voltage at Grid Station is LOW and cannot be regulated to achieve Normal or Maximum permissible values at 11 KV Bus, then the MINUS taps of Distribution Transformer are used.

LINE VOLTAGE REGULATOR

Generally, the unexpected load growth has caused excessive Voltage Drop or Distribution System is not well planned, and use of MINUS Tap is not effective, then Line Voltage Regulator is used. Besides the above, Automatic Line Voltage Regulator is used, to control Voltage Fluctuations.

If LVR is to be installed to compensate the excessive Voltage Drop, then its effective location of the line regulator shall be, at a point where H.T Line Voltage Drop reaches its permissible limit. e.g., 10450 Volts (Min.) and if Tail-end voltage is less than 10450 Volts during Peak. However, the best location is where voltage is 10450 Volts

SHUNT CAPACITOR

HT Shunt Capacitors are also installed for voltage and power factor improvement.

VOLTAGE CONTROL AND REGUALTION:

Purposes of voltage control on H.T and L.T distribution system is to keep the voltage within specified tolerance limits during peak as well as low load hours.

Factors like Lengthy Lines and Growing Loads contribute towards increased voltage drop. Tail end consumers should be supplied a voltage greater than or equal to minimum prescribed limit and First consumer should be provided with a maximum prescribed level

Voltage Regulation Ways and Means to Improve the Voltage

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2. Use of Voltage Regulator & On-load Tap Changer.
3. Application of Capacitor (At Grid Station).
4. Balancing of Load on H.T Lines.
5. Increasing Feeder's Conductor Size.
6. Changing Feeder Sections from Single Phase to Multiphase.
7. Transferring Loads to new Feeders.
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11. Shunt Capacitors on Primary Feeders.
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13. Conversion of L.T Lines into H.T lines.
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16. Use of Tap Changer on Distribution Transformers.
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Voltage Levels and Regulation

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Minimum HT Voltage: -5% or 10.45 kV

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Maximum LT Voltage: 102% or 234.6 Volts

Voltage Drop Allowable on the Distribution Transformer: 2.0% or 4.6 Volts

Voltage Drop Allowable on the Secondary System: 2.5% or 5.8 Volts

Voltage Regulation

- On Load Tap Changers (OLTC) are provided on all Power Transformers for automatic voltage regulation.
- HT Shunt Capacitors are also installed for voltage and power factor improvement.

TYPES OF DISTRIBUTION SYSTEM:

503

The Distribution System is consisting of H.V/(HT) and L.V/(LT) networks as well as consumer service. The HT is Primary Distribution Voltage having Level of 33 KV (rarely used) and 11 KV (mostly used).

While the L.V /LT is Secondary Distribution Voltage having Level of 400 volts (for three phase facility) and 230-Volts (for single phase facility).

Consumer service is the individual cable/wire and its voltage level depend upon the type of connection and applicable tariff.

ANNEX "N21/4

A. Types of HT Distribution System:

Following are the main types of HT Distribution System.

1- **Radial System:**
2- **Closed Loop System.**
3- **Open Loop System**
4- **Double Supply System**
5- **Grid Form of HV Distribution system OR Network Distribution System**
6- **Improved Radial System**

RADIAL SYSTEM:

The Radial distribution system is the cheapest to build, and is widely used in sparsely populated areas. A radial system has only one power source for a group of customers. A power failure, short-circuit, or a downed power line would interrupt power in the entire line which must be fixed before power can be restored.

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However, it has very poor reliability. When fault occurs on a feeder; Breaker in Grid Station Opens and interrupts supply to all customers. Manually operated sectionalizers at the junction of main and branch line are installed; Faulty Section is isolated, and service can be restored to

other parts of the feeder. Service to the area fed through faulty section will be restored after rectification of fault. If fault occurs at main section close to the Grid Station, all the consumers will have to wait till identification, tracing and rectification of fault.

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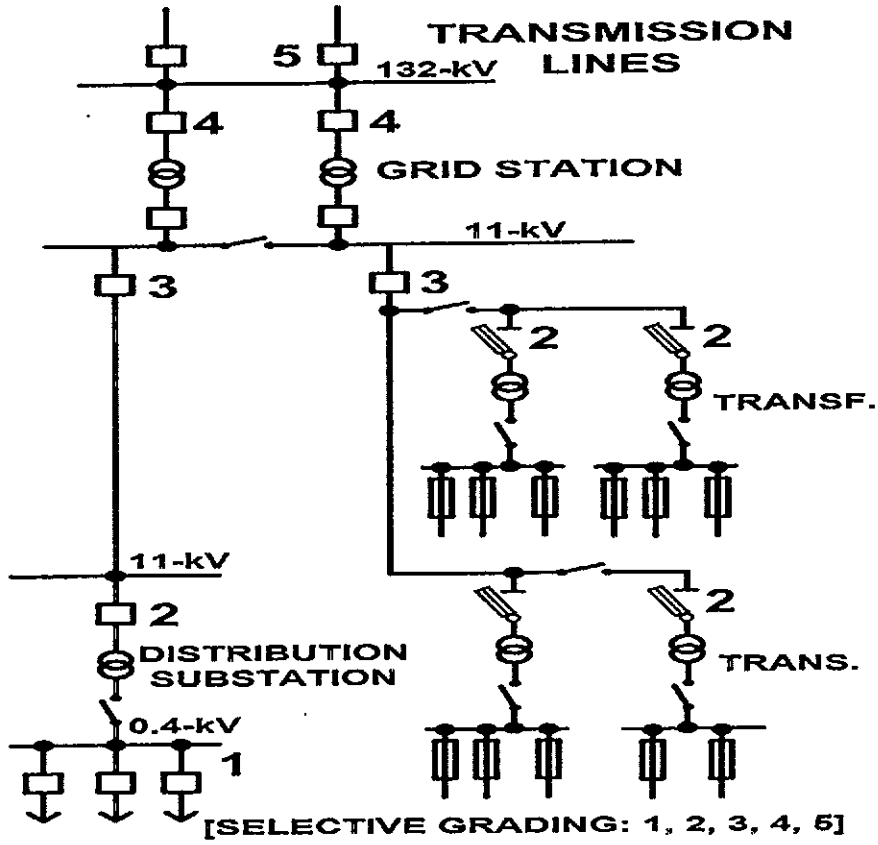

CLOSED LOOP SYSTEM:

A loop system, as the name implies, loops through the service area and returns to the original point. The loop is usually tied into an alternate power source. By placing switches in strategic locations, the utility can supply power to the customer from either direction.

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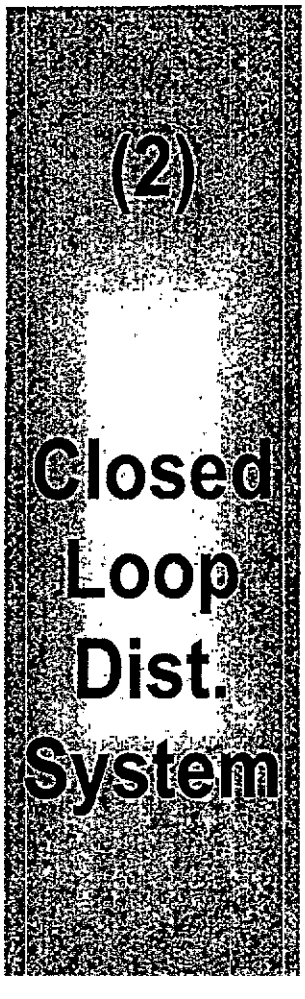

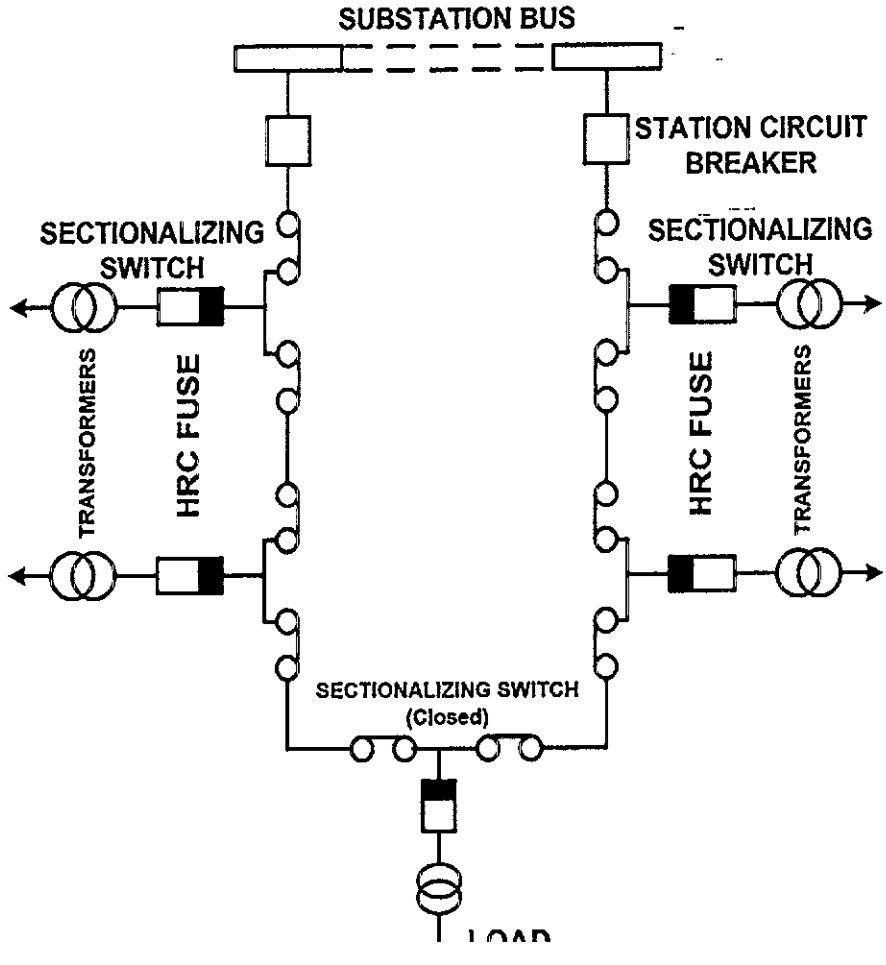

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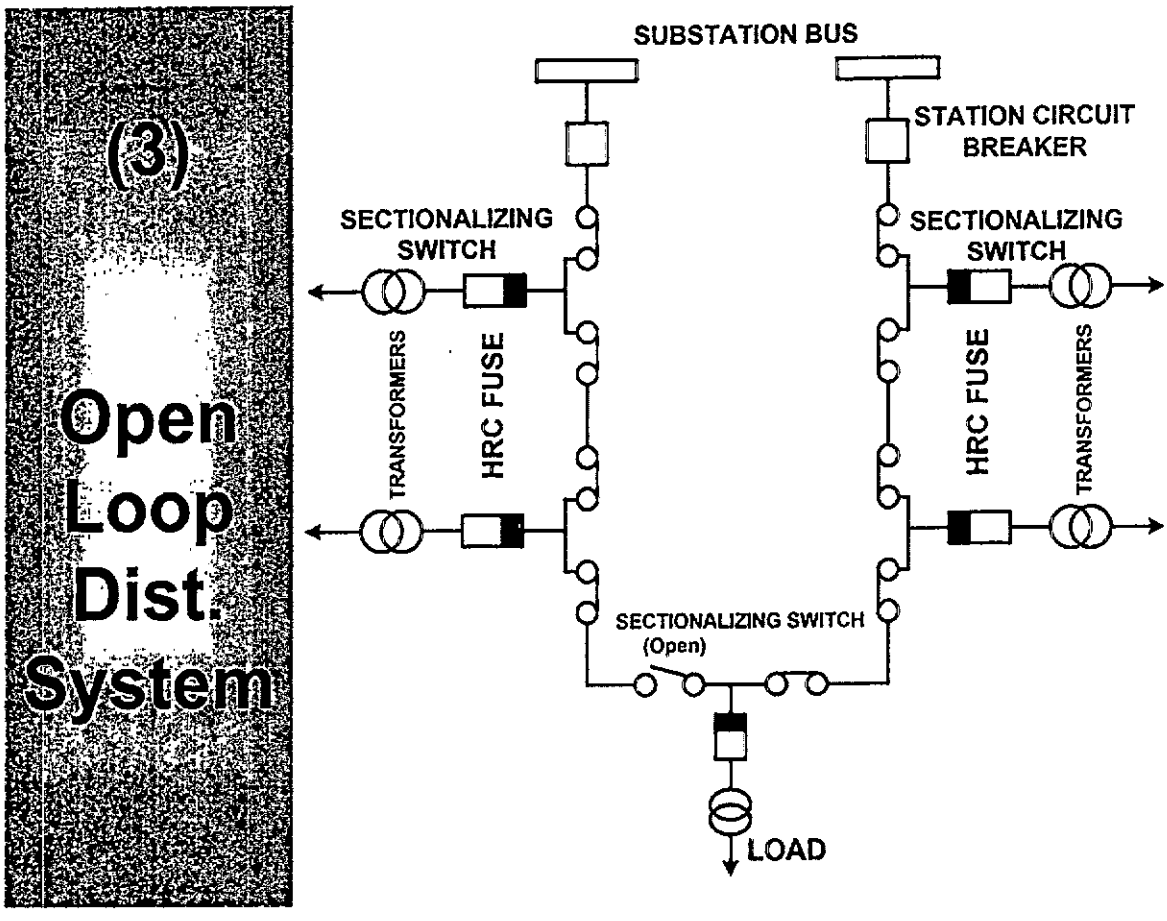

DOUBLE SUPPLY SYSTEM:

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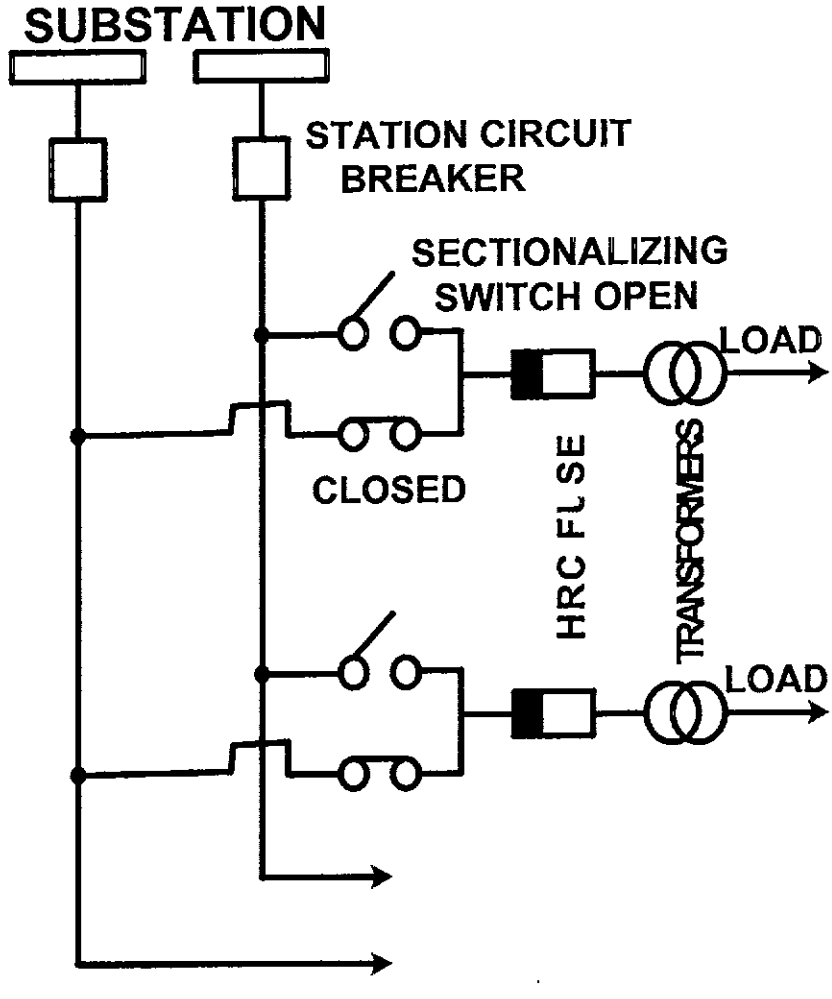
However, it is very expensive, because two feeders, each capable of carrying total load, will double the cost. Two Sectionalizers one automatic changeover switch for each transformer increases the cost. Extra length of line is required to connect supply of both feeders to each transformer through Sectionalizer, changeover switch. Hence cost increases. If load area is of Square or Rectangular shape, then too costly. But if along a road then cost is comparable with that of open loop. In addition to above, it reduces Safety, i.e If both feeders are connected to same transformer through manual, it will be hazardous. Besides, If one feeder is OFF due to some fault, it will trip the healthy feeder also.

(4 Double Supply System



GRID FORM OF HV DISTRIBUTION SYSTEM/NETWORK DISTRIBUTION SYSTEM:

Network systems are the most complicated and are interlocking loop systems. A given customer can be supplied from two, three, four, or more different power supplies. Obviously, the big advantage of such a system is added reliability. However, it is also the most expensive. For this reason, it is usually used only in congested, high load density municipal or downtown areas.

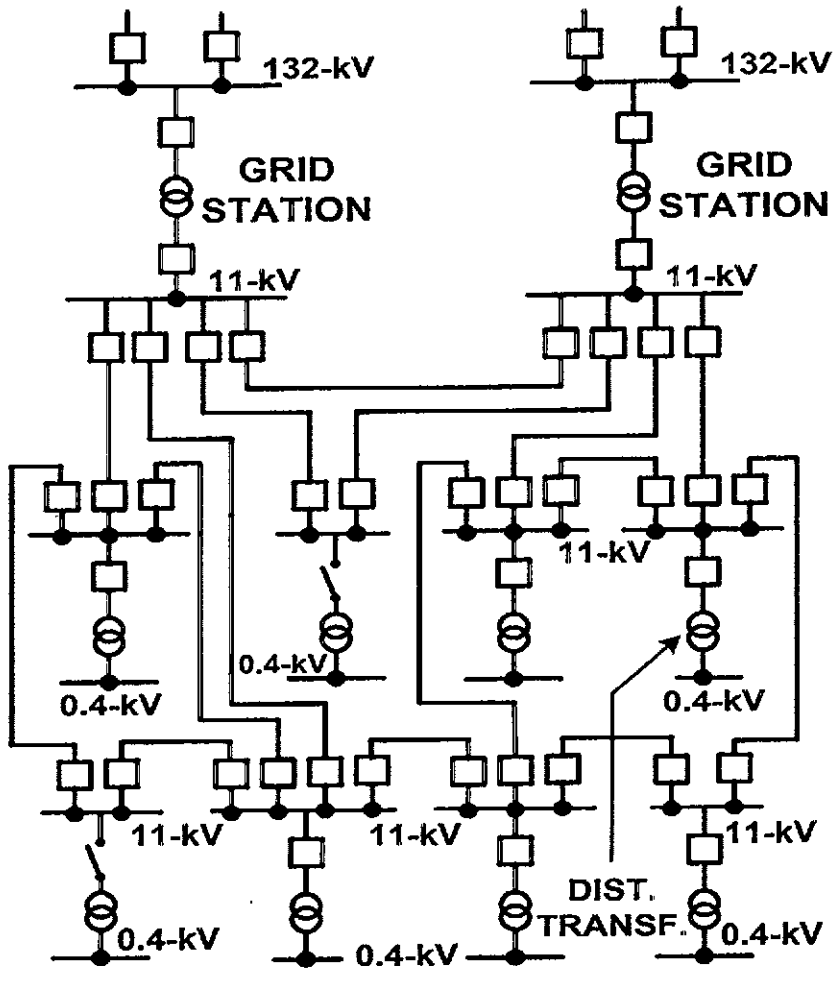
All the Distribution Transformers of a load area are interconnected providing two or more alternatives and whole system is fed from two or more bulk supply sources. System is usually underground.

The system is more reliable because the availability is almost 100%. Service to the consumers will not be affected at all or will be affected minimum in case of two simultaneous faults.

However, the System is more costly, because, It has automatic switching arrangements with sophisticated protection schemes. Establishment of remote-control center is necessary. All the operations are computer controlled. More alternatives sources are provided in this type of distribution system. Availability of supply cannot be improved through manual operation because it will take considerable time to identify a faulty section & determine the better alternative. Due to complexity of system, manual operation may result in wrong operations. Suitable for areas of higher priority & very high load density. Suitable for urban areas if economy is not a problem.

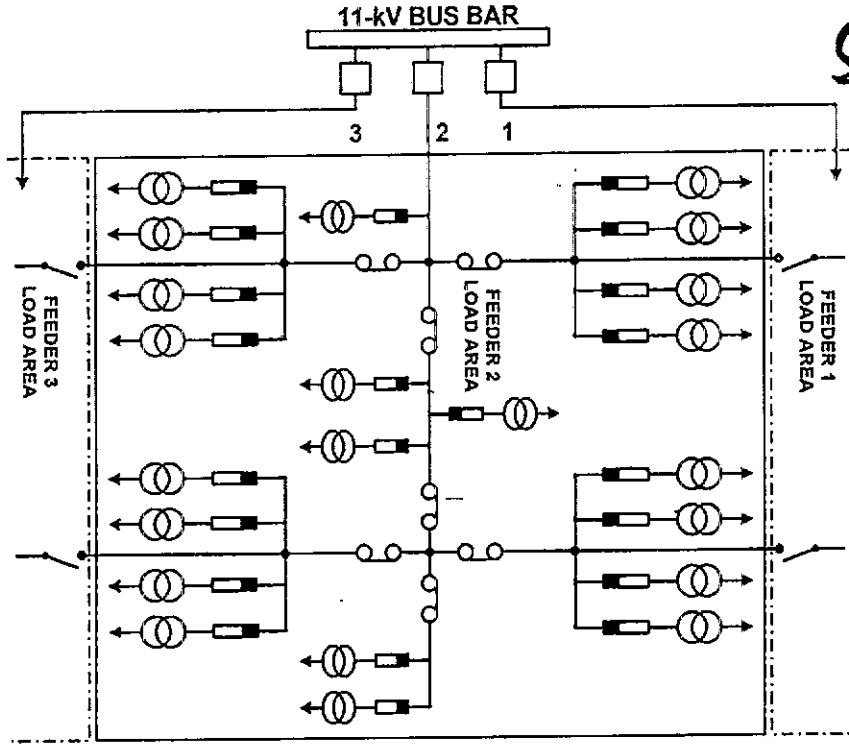
(5)

Grid Form of High Voltage System



IMPROVED RADIAL SYSTEM:

Availability & Reliability can be improved without converting a distribution system into any of aforesaid system. These measures may be costly or cheaper. Some sections/ branches of adjacent radial feeders are brought closer to each other and sectionalizers are installed. A part of that can be far from other in case of problem on one feeder. Both the feeders should have some spare capacity.



B. Types of LT/LV Distribution System:

Following are the main types of LT Distribution System;

1- **Radial System:**
2- **Closed Loop System.**
3- **Open Loop System**
4- **Double Supply System**
5- **Improved Radial System**

Radial System is preferred over others because Radial System is quite Simple and Cheapest. LT lines feed only one or few consumers and in case of fault very few consumers will be affected. Therefore, costly system/configuration are avoided.

However, Open Loop or Closed Loop Systems are also used for some important areas.

Besides the above, the LT system can also be classified as;

1. LV system can be Single Phase, Three Phase or a Composite Circuit.
2. LV system can be Overhead or underground.

ANNEX N 21/5"

510

Doc No: N21/5

LINE EQUIPMENT AND CHARACTERISTICS :

All of the equipment installed in the transmission and distribution network of HAZECO are complies with the in-vogue NTDC's Specifications, IEC Standards like other DISCOs.

There are various types of Line equipments. The types and its characteristics are given below.

1. Wire rope
2. Fiber rope
3. Tackle Blocks
4. Hand Hoists
5. Drums
6. Sheaves
7. Hooks
8. Ring, Links, Sewivels
9. Shackles
10. Eye Bolts
11. Turnbuckles
12. Spreader and Equalizer Beam
13. Blocks

ROPES:-

There are four kinds of rope.

1. Nylon rope (Very Strong)
2. Polyproline rope (2nd Strong)
3. Manila rope (3rd Strong)
4. Polymer rope (New Technology)

KNOTS:-

A knots is the inter winning of the end of a rope with in a portion of rope.

1. Square or Reef Knot

2. Single Bowline
3. Double Bowline
4. Double Bowline on a bight
5. Running Bowline
6. Bowline tied away from you

BENDS:-

A bend is the inter winning of the end of two rope or of the same rope to make one continuous rope is called bend.

TYPES OF BENDS:-

1. Single Sheet Bend
2. Double Sheet Bend
3. Becket Bend

HITCHES:-

A hitch is the attachment of a rope to a post pole ring hook or other object.

TYPES OF HITCHES:-

1. Clove Hitch
2. Clove Hitch with two half hitches
3. Snubbing Hitch
4. Timber Hitch
5. Taut Line Hitch
6. Double Black wall
7. Stirrup Hitch

HAND HOIST:-

It is used for

1. To raise up the load.
2. To Lower the load.

3. To operate without load.

It has two types.

1. Model C 2. Model D

CAPACITY OF MODEL C:-

Capacity of Model is 3/4 , 1.5 , 3, 4.5 , 6 , 15 Ton.

CAPACITY OF MODEL D:-

Capacity of Model are 3/4 , 1.5 , 3 Ton.

- Both Models (Types) have disc type brake.
- Model C has Roller link chain.
- Model D has Alloy Steel coiled link.

OPERATION:-

Keep the chain clean and lightly lubricated. Dirty chain badly effect the performance.

TO RAISE UP THE LOAD:-

Turn the pawl rod lever to marking 'UP' and the lever set in the handle slot. Operate the handle with a pump action.

TO LOWER THE LOAD:-

Turn the pawl rod lever to marking 'DOWN' and the lever set in the Handle slot. Now operate the handle with a pump action.

TO OPERATE WITHOUT LOAD:-

Turn the pawl rod lever to marking 'N' using handle wheel turn the handle wheel to raise or lower the load empty hook to the desired position.

Pulling on the chain hold the two lines of the chain tight with one hand turn the hand wheel to free the load brake and pull the chain in which ever direction is desired.

Always use the handle wheel instead of handle when operating with out load.

OILING:-

Use light machine oil.

BEARING:-

Oil holes are provided with ball valve oiler.

CHAIN:-

Chain should be clean and lubricated lightly.

LOAD BREAK:-

Operated dry. Load disc must be kept clean and free of oil .

Excessive over loading may be freeze the load brake.

REMEDY:-

If load brake freeze due to overloading then it released as:-

Set the pawl rod lever to 'DOWN' position tapping the handle lightly with a hammer and lowering the handle.

PARTS TO BE OILED:-

Chain , Bearing

PARTS TO BE NOT OILED:-

Must dry load brake parts Load brake parts such as.

i) Disc Hub ii) Brake disc iii) Rachet disc or rachet

BLOCK:-

There are two types of blocks.

1. Tackle Block
2. Snatch Block

PARTS OF BLOCKS:-

1. Shell
2. Swivel Hook
3. Sheave
4. Backet

STATIONARY BLOCK:-

This is a fix block. This can not change from one place to other.

MOVING BLOCKS:-

This block can move from one place to other and change from one place to other.

SNATCH BLOCK:-

It is used for pulling conductor and lowering, Lifting material in many ways.

ROPE LADDER:-

It is used for changing disc insulator string.

Normal length of ladder	(17-21) ft
From thimble eye to bottom	(15-19) ft
Chain length	(2-2.5) ft
Rope used Polypropylene	(4 strands Size ¾")
Rungs	Made of Close grain wood
Rungs Dia	1 3/8"
Rungs length	19.25"
Rungs used length	15.5"
Rungs hole size	3/8"
Spacing between two rungs	12" = 1ft

STRAIN BOARD:-

It is used for working on dead end on 220KV or 132KV Transmission line for changing of disc insulator or changing of complete string. Its size are 12' or 14'

TOOLS AND EQUIPMENT (T&P):

- List OF Personal Protective Equipments (P.P.E) For Line Man
- Lineman's safety boots.
- Insulated safety hat.
- Insulated cutting pliers.
- Safety tool belt.

- Insulated rubber gloves.
- Protective leather gloves.
- Lifesaving chain.

T&P FOR EACH LINEMAN:

Each lineman shall be provided the following T&P:

1. PP.	1 No.
2. Forged steel adjustable climber	1 No.
3. With anti climbing accessories for wooden poles only.	1 Set.
4. Pulling Grip.	1 No.
5. Screw driver 8 in (wooden handle)	1 No.
6. Manila rope 1" dia	20 meters.
7. Steel wire brush	1 No.
8. Adjustable screw wrench 10" long	1 No.
9. Iron hammer 1 lb	1 No.
10. Tool bag (or bucket)	1 No.
11. Lineman's knife	1 No.
12. D-operating rod	1 No.
13. Spanner set	1 Set.
14. Torch 3 cell	1 No.
15. Hand line	1 No.
16. Phase tester/ Beeper	1 No.
17. Kassi/ shoval/ Pick axe	1 No.
18. Axes/Saw/ Tree Trimmer	1 No.

TYPES OF CONDUCTOR, CURRENT CAPACITY, NO OF STRAND STEEL, NO OF STRAND ALUMINUM AND WEIGHT

Sr. No	Name	Type	Ampacity (Amp)				Strands and diameter				Weight (kg / km)		
			Wind vel = om/s		Wind vel = 0.61m/s		Steel		Aluminum				
			40 deg rise	50 deg rise	40 deg rise	50 deg rise	No	Dia mm	No	Dia mm	Steel	Al	Total
1	BEAVER	ACSR	177	210	281	316	1	3.99	6	3.99	97.5	205.8	303.3
2	CARDINAL	ACSR	632	761	873	995	7	3.38	54	3.38	490.4	1340	1830.4
3	CHICKADEE	ACSR	343	410	509	575	1	3.77	18	3.77	87.03	555.2	642.23
4	COYOTE	ACSR	259	309	359	445	7	1.91	26	2.54	157.20	363	520.20
5	CUCKOO	ACSR	558	670	781	889	7	3.08	24	4.62	367	1005	1372
6	DOG	ACSR	223	266	346	389	7	1.57	6	2.72	106.2	288.1	394.3
7	DRAKE	ACSR	564	678	788	896	7	3.45	26	4.44	510.9	111	1621.9
8	GOPHER	ACSR	86	101	148	165	1	2.36	6	2.36	34.1	72	106.1
9	HARE	ACSR	229	273	356	401	1	4.72	6	4.72	136.5	288.1	424.7
10	LYNX	ACSR	330	395	488	552	7	2.79	30	2.79	335.4	507	842.4
11	OSPREY	ACSR	432	518	625	708	1	4.47	18	4.47	121.8	777	898.8
12	PANTHER	ACSR	367	446	533	608	7	3	30	3	387.7	586.1	973.8
13	PELICAN	ACSR	389	465	569	644	1	4.14	18	4.14	104.5	666.5	771
14	RABBIT	ACSR	139	165	227	255	1	3.35	6	3.35	68.8	145	213.8
15	RACCOON	ACSR	181	218	290	326	1	4.09	6	4.09	102	216.3	318.3
16	RAIL	ACSR	626	753	868	989	7	2.47	45	3.7	261.2	1339	1600.2
17	RAVEN	ACSR	140	166	229	257	1	3.37	6	3.37	69.44	146.9	216.34
18	TIGER	ACSR	263	314	398	449	7	2.36	30	2.36	239.9	362.5	602.4
19	WANWING	ACSR	261	311	399	449	1	3.09	18	3.09	58.38	372.3	430.68
20	WOLF	ACSR	298	357	446	504	7	2.59	30	2.59	288.9	436.7	725.6
21	ZEBRA	ACSR	582	700	811	923	7	3.18	54	3.18	435.6	1185.8	1621.4
22	ZIGOLO	ACSR	337	403	498	564	7	2.38	26	3.06	447	530	776
23	ALLIANCE	AASC	327	274	349	396	-	-	7	4.25	-	345	345
24	CAIRO	AASC	353	428	516	588	-	-	19	3.98	-	650	650
25	GREELY	AAC	566	681	791	901	-	-	37	4.02	-	1295	1295
26	ARBUTUS	AAC	546	656	772	877	-	-	37	3.72	-	1111	1111
27	ARVIDAL	AAC	555	667	777	884	-	-	37	3.96	-	-	-
28	HAWTHORN	AAC	721	868	988	1127	-	-	61	3.55	-	1665	1665

ANNEX N21/6

517

Doc No: N21/6

POWER QUALITY CONTROL :

Power quality control is achieved through following measures, optimizing voltage levels and improving power factor to enhance the stability and efficiency of the electrical supply.

- Voltage Regulation
- Power Factor Correction/Improvement

Power quality evaluated through SAIFI SAIDI.

VOLTAGE REGULATION:

Purposes of voltage regulation on H.T and L.T distribution system is to keep the voltage within specified tolerance limits during peak as well as low load hours.

Factors like Lengthy Lines and Growing Loads contribute towards increased voltage drop. Tail end consumers should be supplied a voltage greater than or equal to minimum prescribed limit and First consumer should be provided with a maximum prescribed level.

Even if the 11 KV bus voltage is kept at maximum, there can be excessive voltage drop on Distribution System because either System is not well planned and has lengthy HT or LT Lines, Or on the other hand, even if the feeder is well planned but due to unexpected load growth, the voltage drops become higher with passage of time.

VARIOUS METHOD OF VOLTAGE REGULATION:

1. Use of Generator Voltage Regulator (In case of self-generation).
2. Use of Voltage Regulator & On-load Tap Changer.
3. Application of Capacitor (At Grid Station).
4. Balancing of Load on H.T Lines.
5. Increasing Feeder's Conductor Size.
6. Changing Feeder Sections from Single Phase to Multiphase.
7. Transferring Loads to new Feeders.
8. Installing new Grid Stations & Primary Feeders.
9. Increasing Primary Distribution Voltage Level (From 11 to 33-kV).
10. Voltage Regulators on Primary Feeders.
11. Shunt Capacitors at grid station and at Primary Feeders.
12. Series Capacitors on Primary Feeders.
13. Conversion of L.T Lines into H.T lines.
14. Use of Bundled Conductors for H.T Lines.
15. Proper Planning & Designing.
16. Through Tap Changer of Transformers.

A. On Load Tap Changers (OLTC) are provided on all Power Transformers for automatic voltage regulation.
B. Through Tap Changer of Distribution Transformers.
17. Voltage Control by proper Planning & Designing of Feeder

Some are explained below

TRANSFORMER TAP:

Normally Distribution Transformer has five TAPS except 10 KVA and 15 KVA which have only three Taps i.e. 2, 3, 4.

In distribution transformer the Tap No. 2 is called NORMAL Tap or PRINCIPAL Tap at which Transformer is designed for rated Current and Voltage.

The rated voltage at no load of this Tap is 11000 volts at Primary and 415 Volts at Secondary.

The tap No 1 is called PLUS Tap and Tap No 3, 4, 5 are called MINUS Taps.

In power transformers on grid station the voltage regulation is carried out through ON-LOAD tap changer (OLTC). The Tap No 17 is called PRINCIPLE tap out of 33 taps.

If the voltage at the start of feeder is set at 11550 V (Max. limit), with the help of ON-LOAD Tap Changer of Power Transformer, while Distribution Transformer is set at PRINCIPAL Tap, then ;

a) The Tail-end L.T Consumer should receive voltage ≥ 380-Volts (Min. limit) during Peak Load Hours.

b) The Consumer close to the Grid Station should receive voltage ≤ 400-Volts (Max. limit) during Low Load Period, while Distribution Transformers at Principal Tap.

On the other hand, If the voltage at the start of feeder is low and is 10450 V (Min.), then it should provide voltage ≥ 380-Volts to Tail-end Consumers through application of MINUS Tap of Distribution Transformers.

If voltage at Grid Station is LOW and cannot be regulated to achieve Normal or Maximum permissible values at 11 KV Bus, then the MINUS taps of Distribution Transformer are used.

LINE VOLTAGE REGULATOR

Generally, the unexpected load growth has caused excessive Voltage Drop or Distribution System is not well planned, and use of MINUS Tap is not effective, then Line Voltage Regulator is used. Besides the above, Automatic Line Voltage Regulator is used, to control Voltage Fluctuations.

If LVR is to be installed to compensate the excessive Voltage Drop, then its effective location of the line regulator shall be, at a point where H.T Line Voltage Drop reaches its permissible limit. e.g., 10450 Volts (Min.) and if Tail-end voltage is less than 10450 Volts during Peak. However, the best location is where voltage is 10450 Volts.

POWER FACTOR IMPROVEMENT:

Power factor correction is the term given to a technology that has been used since the turn of the 20th century to restore the power factor to as close to unity as is economically viable.

Power factor can be improved by connecting the capacitor at HT (11 KV) and LT network 400/230 V). The capacitor draws leading currents from the supply voltage by 90° and compensates for the lagging reactive components of the load current.

This is normally achieved by the addition of capacitors to the electrical network which compensate for the reactive power demand of the inductive load and thus reduce the burden on the supply.

To reduce losses in the distribution system, and to reduce the electricity bill, power factor correction, usually in the form of capacitors, is added to neutralize as much of the magnetizing current as possible.

Power factor correction can be achieved by,

1. Static capacitor
2. Switch Capacitor
3. Synchronous condenser
4. Phase advancer

Improving the power factor is a solution that allows technical and economic advantages, in fact, management of a low-energy installation implies an increase in costs THE TECHNICAL AND ECONOMIC ADVANTAGES OF POWER FACTOR CORRECTION 37 for the authority that supplies electricity, which consequently applies a tariff structure that penalizes the withdrawal of energy with reduced power factors

If the power system works with a low power factor the capital cost of the system in generation, transmission, and distribution increases. Hence, it is always advantageous for both consumers and suppliers to work at a higher improved power factor.

The following are some of the advantages of the improved power factor

i). The kW capacity of the prime mover is better utilised.

ii). The kVA capacity of the alternator, transformer, and transmission lines is increased.

iii). There is a reduction in transmission line losses.

iv). The voltage drop in the transmission line decreases which results in better regulation.

v). The efficiency of every plant is increased.

vi). The overall cost per unit decreases.

Power factor correction can also be made though series capacitor as well.

ANNEX N21/7 520

Doc No: N21/7

BACK-UP/EXPRESS FEEDER PROVISION:

All critical and sensitive installations like DHQ Hospitals, Army / Defence premises, Heavy Industries (Tariff B-III & B-IV) are provided with Express Feeders.

Since the hospital and other sensitive area needs a backup supply (Standby second source), including VVIP area, like President House, Governor House, CM House, Defence/ Army area, (Residential as well as working area, offices, Stations, Radar etc) Civil Secretariate etc, Therefore, a second source (dual supply) is given on desire and payment basis. However, for Hospital and President/PM/CM/Governor, the approval is not required while for other admin approval is required for giving an independent 2nd source of Supply.

The list of all back up/2nd source/Dual supply feeders and express/independent feeders are given below.

LIST OF BACK-UP/DUAL SUPPLY, EXPRESS/INDEPENDENT FEEDERS OF HAZECO

Sr No	Feeder Name	Subdivision Name	Load (KW)	Grid Station
1	PHOSPHATE	HARIPUR-1	2711	132 KV HARIPUR
2	JUDICIAL COMPLEX HARIPUR	HARIPUR-1	835	132 KV HARIPUR
3	HATTAR-3	HARIPUR-1	4949	132 KV HATTAR
4	HATTAR STEEL-2	HARIPUR-1	4990	132 KV HATTAR
5	TELEPHONE INDUSTRY PAKISTAN	HARIPUR-3 / TIP	2902	66 KV HARIPUR
6	SYTRONICS	HARIPUR-3 / TIP	4950	132 KV HATTAR
7	NOMEE STEEL	HARIPUR-3 / TIP	4990	132 KV HATTAR-2
8	SYNTRONIC UNIT 3	HARIPUR-3 / TIP	2300	132 KV HATTAR-2
9	HATTAR-2	SARAI NIMAT KHAN	9929	132 KV HATTAR
10	ADEEL STEEL (INDPENDENT)	SARAI NIMAT KHAN	4990	132 KV HATTAR
11	NOVA SYN PAC	SARAI NIMAT KHAN	2600	132 KV HATTAR
12	Nomee Steel	SARAI NIMAT KHAN	4877	132 KV HATTAR
13	HATTAR 8 (M/S HATTAR STEEL UNIT 3)	SARAI NIMAT KHAN	4950	132 KV HATTAR-2
14	NEELUM PAPER	SARAI NIMAT KHAN	3500	132 KV HATTAR-2
15	HATTAR-9	SARAI NIMAT KHAN	10203	132 KV HATTAR-2

16	VENUS CARPET	SARAI NIMAT KHAN	2035	132 KV HATTAR-2
17	KP ECONOMIC ZONE-II	MANG	4041	132 KV HARIPUR
18	PAK AUSTRIA UNIVERSITY	MANG	4330	132 KV HARIPUR
19	POF-1	HAVALIAN-1	1026	66KV HAVELLIAN
20	POF-2	HAVALIAN-1	1120	66KV HAVELLIAN
21	CENTRAL AMMUNITIION DEPOT HAV	HAVALIAN-1	840	66KV HAVELLIAN
22	INFANTRY BRIGADE	HAVALIAN-1	3750	66KV HAVELLIAN
23	ZEB PHARMACEUTICAL	HARIPUR-II	885	132 KV HARIPUR
24	CHAMBA PIND PROJEC	HARIPUR-II	823	132 KV HARIPUR
25	SALVE TECH	HARIPUR-II	4791	132 KV HATTAR
26	CRESENT TEXTILE	HARIPUR-II	1970	132 KV HATTAR
27	SPIN GHAR	HARIPUR-II	1500	132 KV HATTAR
28	BIAFO	HARIPUR-II	685	132 KV HATTAR
29	H.E.C.	HARIPUR-II	750	132 KV HATTAR
30	MURREE GLASS	HARIPUR-II	4167	132 KV HATTAR
31	NEELAM	HARIPUR-II	4500	132 KV HATTAR
32	HATTAR-4	HARIPUR-II	18982	132 KV HATTAR
33	ECO PACK	HARIPUR-II	4822	132 KV HATTAR
34	AL HADEED ENGINEERING	HARIPUR-II	4990	132 KV HATTAR
35	REHMAT STEEL FURNANCE	HARIPUR-II	4950	132 KV HATTAR
36	M/S PAKISTAN ACCUMULATOR	HARIPUR-II	4990	132 KV HATTAR
37	M/S MUJAHID STEEL	HARIPUR-II	4880	132 KV HATTAR
38	M/S M.A STEEL HATTAR	HARIPUR-II	4990	132 KV HATTAR
39	H.I.E-6 HATTAR	HARIPUR-II	14877	132 KV HATTAR
40	REHAMT CAPITAL STEEL	HARIPUR-II	1900	132 KV HATTAR
41	F.D.L	HARIPUR-II	2000	132 KV HATTAR
42	ALI STEEL	HARIPUR-II	4870	132 KV HATTAR
43	CORONET FOOD	HARIPUR-II	4900	132 KV HATTAR
44	FARID STEEL	HARIPUR-II	4900	132 KV HATTAR
45	MUJAHID STEEL-2	HARIPUR-II	4950	132 KV HATTAR
46	MINROX	HARIPUR-II	965	132 KV HATTAR
47	HORIZON PAPER MILLS	HARIPUR-II	4997	132 KV HATTAR
48	SHARIF GASES PVT LTD	HARIPUR-II	1998	132 KV HATTAR
49	HATTAR-7	HARIPUR-II	7648	132 KV HATTAR
50	KOHSAR STEEL	HARIPUR-II	4890	132 KV HARIPUR

51	QARSHI INDUSTRY	HARIPUR-II	1200	132 KV HARIPUR
52	WAH NOBEL	HARIPUR-II	1033	132 KV HATTAR-2
53	NEELAM STEEL-2	HARIPUR-II	4900	132 KV HATTAR-2
54	SILVER LAKE HIE HARIPUR	HARIPUR-II	3961	132 KV HATTAR-2
55	AL-GUJJAR BROTHER STEEL	HARIPUR-II	1298	132 KV HATTAR-2
56	MUSTEHKAM STEEL	HARIPUR-II	4950	132 KV HATTAR-2
57	COCA COLA BEVERAGES	HARIPUR-II	3695	132 KV HATTAR-2
58	PAK ACCUMULATOR-II	HARIPUR-II	4930	132 KV HATTAR-2
59	L-I G.B.C	GHAZI	3512	132 KV NISHAT TARBELA
60	QAZI PUR AIR FIELD	GHAZI	4271	132 KV NISHAT TARBELA
61	S.D.A	JINNAH ABAD-1	1223	132 KV ABBOTTABAD
62	CMH JINNAH ABAD	JINNAH ABAD-1	808	132 KV ABBOTTABAD
63	COMSATS UNIVERSITY ABBOTTABAD	JINNAH ABAD-1	618	132 KV AMC ABBOTTABAD
64	P.F.BASE KALABAGH	NATHIA GALI	430	132 KV NATHIA GALI
65	KAKUL(PMA)	NAWAN SHEHAR	1198	132 KV ABBOTTABAD
66	PMA-2	NAWAN SHEHAR	3200	132 KV AMC ABBOTTABAD
67	A.M.C ABBOTTABAD	JINNAH ABAD-2	2248	132 KV AMC ABBOTTABAD
68	S.I.E ABBOTTABAD	JINNAH ABAD-2	2791	132 KV AMC ABBOTTABAD
69	INOR-1	JINNAH ABAD-2	600	132 KV AMC ABBOTTABAD
70	INDUSTRIAL STATE	URBAN MANSEHRA	3664	132 KV MANSEHRA
71	CHANARI	URBAN MANSEHRA	1846	132 KV HATTIAN
72	CHIKKAR	URBAN MANSEHRA	800	132 KV HATTIAN
73	KHAWARA	URBAN MANSEHRA	1735	132 KV HATTIAN
74	MAJOHI	URBAN MANSEHRA	1000	33KV MAJOHI
75	STATE BANK	KHAKI	1000	132 KV MUZAFFAR ABAD
76	MUZAFARABAD CITY-4	BALAKOT	2000	132 KV MUZAFFAR ABAD
77	MUZAFARABAD KOHARI EXPRESS	BALAKOT	2000	132 KV MUZAFFAR ABAD
78	GARHI DOPATTA	BALAKOT	3077	132 KV HATTIAN
79	GARHI DOPATA-1	BALAKOT	1846	132 KV RAMPURA
80	GARHI DOPATA 2	BALAKOT	2125	132 KV RAMPURA
81	KOMMIKOT	BALAKOT	1000	132 KV RAMPURA
82	BARAR KOT	GHAZI KOT	1500	132 KV MUZAFFAR ABAD
83	NOSADDA	GHAZI KOT	1000	132 KV NOSEHRI

84	CHATTAR CLASS	GHAZI KOT	1000	33KV CHATTAR CLASS
85	KING ABDULLAH UNIVERSITY	GHAZI KOT	500	33KV CHATTAR CLASS
86	KOHALA-1	SHINKIARI-1	3077	132 KV MUZAFFAR ABAD
87	NOSERI	SHINKIARI-1	3077	132 KV MUZAFFAR ABAD
88	CMH SHINKIARY	SHINKIARI-1	2000	132 KV MUZAFFAR ABAD
89	KOHALLA-3	SHINKIARI-1	3258	132 KV RAMPURA
90	DOMEL SHINKIARY	SHINKIARI-1	1000	132 KV RAMPURA
91	CITY-1 SHINKIARI	SIRAN VALLY	3077	132 KV MUZAFFAR ABAD
92	WATER SUPPLY	SIRAN VALLY	3077	132 KV MUZAFFAR ABAD
93	CITY-5 SHINKIARY	SIRAN VALLY	3430	132 KV MUZAFFAR ABAD
94	DHQ BATTAGRAM	BATTAGRAM	1441	132 KV BATTAL
95	CITY-2 BATTAGRAM	BATTAGRAM	3077	132 KV MUZAFFAR ABAD
96	SECRETARIATE	BATTAGRAM	3077	132 KV MUZAFFAR ABAD
97	CITY-3	BATTAGRAM	3077	132 KV MUZAFFAR ABAD
98	AIRPORT-1	BATTAGRAM	2000	132 KV RAMPURA
99	NEW SECRETARIAT	BATTAGRAM	4115	132 KV RAMPURA
100	CHATTER	BATTAGRAM	2744	132 KV RAMPURA
101	AIRPORT-2	BATTAGRAM	3090	132 KV RAMPURA
102	ATHMOQAM	RURAL MANSEHRA	800	132 KV NOSEHRI
103	PANJKOT	RURAL MANSEHRA	800	132 KV NOSEHRI
104	PATTIKA	RURAL MANSEHRA	800	132 KV NOSEHRI
105	H.P.T OGHI MSRA	OGHI	3077	132 KV MUZAFFAR ABAD
106	KOHALA-2	OGHI	3122	132 KV MUZAFFAR ABAD
107	132 KV MUSTAHKUM CEMENT FACTORY	KHANPUR	50000	132 KV MUSTEHKAM CEMENT FACTORY
108	132 KV BEST WAY CEMENT FACTORY	KHANPUR	50000	132 KV BESTWAY CEMENT
109	132 KV SAADI CEMENT FACTORY	MANJ	25500	132 KV DEWAN CEMENT FACTORY
110	132 KV TARNAWA	KALABAT TOWN SHIP	15000	220 KV BURHAN

ANNEX N21/8

524

Doc No: N21/8

ACCIDENT PROTECTION AND PREVENTION PROCEDURE

PROPOSED HAZECO SAFETY POLICY :

The prevention of accidents, injuries and occupational illness shall be integrated into all aspects of every work activity, performed for or on behalf of HAZECO.

All levels of management and supervision shall be responsible for providing a safe working environment as well as elimination of the factors causing health hazards. They shall also be responsible for provision of adequate protective equipment, tools and devices for the safe execution of works and shall contribute for the development in performing their work so as to ensure their safety.

All persons, whether employees of HAZECO or contractors, working on a site, shall comply with the applicable safety legislation of the Government of Pakistan. In addition, they shall comply with safe working practice of HAZECO, already established, to ensure their own safety as well as of fellow workers.

Contractors working at sites, involving electrical hazards, shall perform the work with specially trained personnel, following the procedures, generally recognized by HAZECO, to be safe and risk-free for work in the proximity of live electrical apparatus.

All segments of HAZECO will be responsible for organizing and administer a safety program to develop safety culture among the employees. The Safety Directorate shall promote and monitor safety programs on all levels in HAZECO.

The Basic Safety Code can be summed up as follows:

"NO OPERATING CONDITION OR URGENCY OF SERVICE CAN EVER JUSTIFY ENDANGERING THE LIFE OF ANYONE".

PROPOSED ROLE AND RESPONSIBILITIES OF SAFETY DIRECTORATE :

1. Implementation of NEPRA Safety Code 2021.
2. Ensuring Regulatory & legal compliance on HSE matters
3. Setting & monitoring of HSE Goals & Objectives
4. Preparing new policies & procedures and review of old policies & procedures.
5. Ensuring HSE Awareness, Orientation & Training
6. Establishing and running a Risk management from HSE point of view.
7. Carry out Safety Oversight audits, inspections and surprise checks
8. Emergency response plan oversight.
9. Accident investigation and analysis.
10. HSE performance analysis & reviews.
11. Planning and conduct of various HSE meetings.

12. Internal & external communication
13. Environment management & compliance.
14. Advise on HSE matters e.g., evaluation and recommendation of safety material etc.
15. Recommending PPE & T&P specifications and supervising their field tests and trials.

LEADING CAUSES OF ACCIDENTS :

Data of last 20 years reveals following as the leading causes of Fatal/Non-Fatal accidents of employees and general public in electricity utility organization :

Employee accidents:

1. Non usage of Live line tester
2. Non isolation of work area
3. Improper PTW
4. Unauthorized work by employees
5. Improper use of PPE
6. High number of faults/ work load

Public accidents:

1. Encroachment by public
2. Un authorized work on PESCO network by general public.

ACCIDENT PREVENTION MEASURES /ACTIONS :

1. To prevent electric shock and other injuries resulting from contact with electrical circuits/ parts, following safe work practices are being emphasized in Safety Seminars, Safety Audits, Surprise checks of field formations and safety messages/instructions on Safety Portal on WhatsApp group :
   a. Usage of live line tester
   b. Proper isolation of work area.
   c. Proper implementation of PTW
   d. Use of proper and serviceable PPE and T&P
   e. Display safety signs, safety symbols, and accident prevention tags
   f. Use barricades in conjunction with safety signs to limit access to hazardous work areas.
   g. In absence of signs and barricades, use of a signal person to warn employees from entering the hazardous area
   h. Adopt proper system for hazard identification and removal of risks.
   i. Public awareness campaigns on safety issues
   j. Use of insulated bucket mounted vehicle
2. Introduction of Safety Stewards in the field as a temporary measure to assist Safety Directorate.

524

3. To ensure Safety during Summer and Monsoon (Apr to Sept) when most accidents take place, "Accident Prevention Plan" has been introduced to enable field formations to take preventive measures before hand to avoid accidents.
4. Feeder wise monthly fault trend analysis is being emphasized so that "Hot Spots" are identified and hazards are removed efficiently and economically before they become accidents.
5. Insulated Bucket mounted vehicles have been introduced to reduce hazards being faced by linemen in the field during corrective and preventive maintenance.
6. Safety belts are going to be replaced by Safety Harness which will ensure that there are no fatalities/ injuries due to fall from height.
7. Previously only LT gloves were being used, now HT gloves are proposed in additional safety to linemen.
8. Letters and follow up with local authorities to speed up anti encroachment drive against the violators.
9. Development & Implementation of a Safety Management System to institutionalize and strengthen safety, which is a Strategic Goal assigned by MOE (PD) for 2022 -2023 also.

ANNEX N21/9 527

Doc No: N21/9

EMERGENCY PROVISION:

There are three Basic provision in Emergency condition and circumstances.

1. Emergency SoP / Protocols
2. Emergency crew
3. Firefighting equipment.

In emergency the following steps are taken:

1) Before start of any sort of Maintenance activities please ensure Proper use of PPE and T&P items.
   i) Proper Earthing of the working zone on both sides (Right + Lef) through PTGs must be ensured prior to start of any activities.
   ii) Ensure proper lighting during work, especially at nighttime as well as inside Panels through search lights / torches etc and availability of same on every GSS.

2) Healthy Units of Fire Fighting Equipments must be re-filled and made Operational at all Grids.

3) Efforts / Measures on war footing basis are to be taken to arrange for the Re-filling of Healthy Units of Fire Fighting Equipments at all the Grid Stations without loss of time to meet with any unforeseen situation

4) To reduce the damages / flashes of 11 KV Power Cables / Termination Kits, it is instructed to chalk out detail GSS wise schedule to set right 11 KV Power Cables Earthing braided conductor with Earthing patti of Panels, through proper copper thimbles strongly bonding with Nut Bolts at least on 3 different points on the Patti (Phases wise) by utilizing potential of Technical Maintenance staff on war footing basis.

5) To accomplish the above job apply shut downs on 11 KV Incomings where facility of load shifting through Bus Coupler is not possible, then the same be carried out through shifting of load via Bus Coupler, otherwise shut downs be applied.

6) Measures must be taken to carry out Load Balancing of all the Power Transformers utilizing technical skills through inter-shifting of heavily loaded and lesser loaded 11 KV Outgoing Feeders on all the Incomings.

7) Right sizing / making Operational of all installed 11 KV Capacitor Banks with the replacement of damaged capacitor units structures with healthy one and proper monitoring of power factor through Sub Station Operators on duties at least once in 24-hours basis through calculations from KWH & KVARH Recorded units of Incomings of 24 Hrs on the daily Log sheets at least once in 24 Hrs.

8) Monitoring of 11 KV Bus Bar losses on daily basis for the 24-hours on the Log sheets besides Record of 11 KV Trippings / faults on the log sheets of each Incoming / Outgoing including Record keeping of 132/11 KV Trippings / outages on Tripping Register.

9) Ensure proper upkeeping of 132 KV yard free from weeds / grass herbs / shrubs and proper measures be taken for Ventilation of 11 KV and 132 KV control rooms as well as measures for Intact Vermin Proofing of all Panels and auxiliary Transformers.

10) Proper upkeeping of Record regarding attending hot spots of both 132KV & 11KV system after Thermo-vision of Grids and entries in Register and also arrange for Thermo-vision of both 132KV Yard Equipments as well as of 11KV Panels cable side of all heavily loaded Grids.

11) Proper upkeeping of Transmission Line Patrolling Record and of Remedial measures to be taken to redress such as worn out / damaged jumpers / conductors / heated up PG connectors / bindings / damaged discs / short braces / tree trimmings be carried out well before start of summer to ensure un-interrupted Power supply.

12) Through safety seminars educate the staff for adopting all safety measures during work through use of PPE and T&P items and in case of any shortage, please submit demand on war footing basis, as there is no compromise on SAFETY **"SAFETY FIRST THEN WORK"**.

13) During shut downs and PTW please ensure Proper Racking Out of 11 KV Switchgear (Trolleys) of 11KV Incoming & Outgoing Feeders through Sub Station Operators and usage of Tags like PTW / Shut Down etc on the same to avoid any mishap

EMERGENCY CREW :

- In all Divisions and Sub-Divisions, the emergency crew are available to deal with emergencies situation and are well equipped with PPE & T&P in accordance with the approved instruction and SoP.
- Emergency crews are available in grid stations to deal with emergencies and are equipped with latest different types of testing sets for various equipment installed in the grid station.

FIRE FIGHTING IN OFFICES & GRID STATIONS :

- Several sand fill buckets are available in every grid station, subdivision, Division and offices.
- Electrical fire extinguishers are carbon dioxide or dry powder, foam extinguisher, liquefied gas of CO_2

ANNEX N21/10 Doc No: N21/10

PROTECTION, CONTROL AND MEASURING INSTRUMENTS: 539

PROTECTION AND CONTROL:

Increasing renewable penetration and grid modernization initiatives are having a significant impact on the operating and fault characteristics of distribution systems. As a result, protection systems need to account for the changing nuances in systems transient response to disturbances and the resulting voltage and/or current to ensure safe and reliable operation. The approaches for modeling and analyzing power systems also need to evolve accordingly, based on the choice of protection system. Therefore, this paper reviews the state-of-the-art and evolving approaches for the protection of future energy systems. The approaches are categorized based on operating principles and variations in the underlying mathematical formulation – to present a comprehensive overview on fault detection and recommendations for future research. The evolving nature of distribution systems, interconnection requirements and standards, and system automation is also discussed in view of the need for higher fidelity models and/or limitations from current approaches. Finally, the protection algorhithms are compared based on their associated challenges with reliability, protection, and communication/design needs.

Distributed energy resources (DERs) offer technical and economic advantages to both power system utilities and utility customers. Originally, these systems operated radially to carry power from the substation to the end users. However, increasing penetration of inverter-based DERs (IBDERs) is significantly changing the control strategies and operation of modern power systems. IBDERs such as solar photovoltaics (PV), battery energy storage, and fuel cells are a major fraction of DERs being integrated. There is ongoing research in different domains to address challenges introduced by the changes in distribution systems including islanding detection, microgrid formation, transactive energy markets, power converters, fault detection, improving power system quality, declining system inertia, and network reconfiguration. Systems with high DER penetration are developing their advanced metering infrastructure (AMI); and an increasing reliance on advanced distribution management systems (ADMS) to ensure the reliability of complex networks during normal operations and resiliency during extreme events. The influence of these investments in phasor measurement unit (PMU) based wide-area monitoring, protection, and control systems can be seen in the research trends and resources available to grid operators. The evolution is also introducing the need for a networking layer to allow interaction between cyber-physical assets for efficient secondary and tertiary controls for system management.

Fault location, isolation, and service restoration (FLISR), an important application of ADMS, performs three actions: locate, isolate the fault, and restore the power via a self-healing approach. It is important to maintain reliable protection during the faults. Similar to other aspects of system operation, protection also needs to account for the intermittent DERs, changing network topology, smart volt-ampere reactive (VAR) compensation, generation loss, changing frequency, and other such challenges. Standards such as the IEEE 1547 aim at standardizing the interconnection of DERs to the distribution system. While periodic revisions to the standards (e.g. IEEE 1548–2018) prepares the system for future challenges, they also add challenges to the legacy practices and operating principles. Further, FLISR uses the combination of protective relay status, and other smart devices to locate a fault. Fault location is a prerequisite and can have a significant impact on all subsequent actions performed by the FLISR application. After locating the fault, isolation action is performed by opening appropriate tie/sectionalizing switches. This in turn impacts the direction and magnitude of the current post-reconfiguration. Therefore, suitable protection and control strategies for different systems can vary significantly because of the changes in power

system dynamics. This evolving operating conditions also include reduced fault current contributions from the IBDERs.

Service restoration is the final, integral part of the FLISR application that re-configures sections of the distribution system to stay grid-connected or as intentional islanded microgrids using DERs. This ability can be a major asset for improving system resilience during outages. But, IBDERs offer limited fault current given their design, control, and interconnection requirements which makes fault location more challenging. In the case of high impedance faults, the detection challenge is further exacerbated given the much smaller fault current. From FLISR's perspective, post-restoration island or grid resiliency is undermined if they cannot be adequately protected. This will be discussed from the perspective of many promising approaches like adaptive overcurrent, differential current, and hybrid protection schemes. Similar to grid-connected operation, these challenges have also spurred strong research interest in analyzing the protection behavior from an islanded microgrid's perspective. The impact of ride-through requirements, and the time-varying behavior of DERs in general remains a significant unknown.

The protection community is also seeing increased research in developing hybrid protection strategies using a combination of current and/or voltage measurements – almost exclusively for high-speed (sub-cycle) fault detection. Similar trends are being observed using data-driven methods - especially phasor measurement unit (PMU) based- and machine learning (ML-) approaches because of the available data and better computation abilities. We notice that the protection schemes will continue to evolve and may result in a mix of multiple approaches to monitor specific system behavior and augment legacy protection.

This review is focused on comparing the operating principles, challenges, modeling needs, and, communication/data requirements. The intended outcome is to help readers understand the challenges specific to their protection algorithm of interest and/or evaluate the most suited algorithm given their system, modeling approaches and data/analysis. Essentially, reliable FLISR implementations will need to address these significant challenges - fault detection, location, restoration - all of which need reliable protection scheme [21]. Selective modeling and characterization of the changing power system - including IBDERs, fault response, bidirectional power flow, control objectives of DERs, and others - will be critical, and need to be factored into protection studies [20], [22]. Fig. 1 presents a high-level overview of the protection schemes in view of the increasing DER penetration, the challenges considered, and the general direction of research. This figure presents the challenges as they become more prevalent given the level of DER penetration in a given system. Interestingly, very few papers focus on selective modeling strategies - tailored to the FLISR and interoperability challenges. Consecutively, this lack of discussion is also felt in reviews discussing the trends in protection research [[23], [24]]. As summarized in Fig. 1, the available literature and reviews for low/medium DER penetration, and isolated operation as grid-connected or intentionally islanded are significant [[23], [24], [25]].

In a distribution substation, electricity gets distributed to different customers. Substation protection equipment contains incoming and outgoing circuits, each connecting to the bus-bar system by an isolator, circuit breaker, transformer, etc

Distribution system protection schemes are essential to ensure the safety and reliability of power delivery to customers. They are designed to detect and isolate faults, prevent equipment damage, minimize service interruptions, and coordinate with other protection devices.

To protect the system from unnecessary service interruptions and disturbances V. To disconnect faulted lines, transformers, or other apparatus. Overhead distribution systems are subject two types of electrical faults, namely, transient (or temporary) faults and permanent faults.

The systems installed for automatic protection of High Voltage Transmission lines, Grid Stations and Medium Voltage (11 kV) distribution lines comply with the stipulation of NEPRA's Grid Code and following relevant NTDC Specifications;

- P-151:2008 (Control & Protection Panels)
- P-44:2018 (11 kV Metal Clad Switch Gear)

531

A. 132 KV TRANSMISSION LINE PROTECTION:

i. Primary Protection

Numerical Distance Relays (Quadrilateral & Mho Characteristics) with three Zones.

Broken conductor feature is enabled for additional protection.

Switch On To Fault (SOTF).

Direct Transfer Trip (DTT).

Permissive under Reach Transfer Trip (PUTT).

Permissive over Reach Transfer Trip (POTT).

These schemes also incorporate communication channels where available, i.e. PLC or OPGW.

ii. Backup Protection

Numerical Overcurrent & Earth Fault Relays (with Instantaneous & Inverse Time Characteristics).

B. 132 KV POWER TRANSFORMER PROTECTION:

i. Primary Protection Numerical Differential Relays.

ii. Backup protection

Numerical Overcurrent & Earth Fault Relays (with Instantaneous & Inverse Time Characteristics).

C. 11 KV FEEDER PROTECTION:

Numerical Overcurrent & Earth Fault Relays (with Instantaneous & Inverse Time Characteristics)

OVER CURRENT RELAYS, 51

During short circuit, Current increases, Voltage Depressed and impedance is reduced.

Electro-Mechanical, Digital and Numerical

- Inverse time IDMT
- Instantaneous
- Definite time

OPERATING PRINCIPLES

- Electro-Mechanical Induction.

- Electro-Mechanical attraction.
- Inverse Definite Minimum Time.IDMT
- Normal Inverse (NI), 3/10 relay
- Very Inverse.
- Extremely Inverse, 1.3/10 relay.
- Plug Setting, Current pick up.
- Time Dial Setting, T.D.S
- In-put transformers, out put dependent on
- Highest instantaneous voltage
- Highest instantaneous current.
- Level Detectors, Polarity Detectors, Comparators and Integrators circuits using Operational amplifier .
- Four to eight standard inverse characteristics.

Unbalance load protection. I={IL1+IL2+IL3}/3 or Negative Sequence current measurement

- Feeder Design Limitations.
- Load end grounding of fallen conductor.
- Improper HT fuses of Distribution transformers.
- High current transformer Ratios.
- Remedies. Zero Sequence protection.

RELAY SCHEMES

- Three phase units+ one residual (E/F) unit.
- Two phase units + one E/F unit.
- Out of balance current scheme for capacitor banks.
- AC trip scheme.
- DC trip scheme.

RELAY COORDINATION

- Inverse Relays.
- Time co-ordination.
- Current Co-ordination.
- Combination of both.
- Time co-ordination of Definite time non-directional and directional relays.
- Protective margin,0.3 to 0.4 Seconds,

Relay type

Instantanouse

timer

DIFFERENTIAL PROTECTION

533

Transformer should be protected against.

1. Internal faults.
2. Through faults.

Internal faults occur as a result of failure of the insulation, providing a short circuit path between phases and often to the ground iron core.

The heavy fault current can cause damage to winding and even burn the core. Differential protection provides the best protection against internal faults.

Through faults are cleared by protective devices down stream. However, with failure of down stream relays could place a severe over load on the transformer.

These currents due to through faults can cause mechanical and thermal damage.

All the protections for through faults must operate before the transformer reaches at thermal limit according to transformer damage curve. The distribution of currents in transformer in case of 3-Ph, Ph-Ph, P-E through faults are shown in Figure. Figure shows a typical coordination curve between feeder breakers, incoming bus breakers and HV side Fuse or circuit breaker. Normally differential protection is applied to all transformers of 10MVA and above and smaller transformer of importance.

PRINCIPAL:

If an equipment within the Protection Zone is functioning correctly, then the sum of currents entering the Zone must equal the sum pf currents leaving (i.e. their difference must be zero) consider a 132/11KV Power Transformer without any phase shift (YY). Full load current ratings are 100A and 1200 Amp. Respectively CT ratio on HV side taken as 100/5 and on LV side 1200/5.

If polarities of transformer are taken as subtractive, the single phase schematic circuit will be as under.

The current in primary side CT loops is 5A with the direction according to convention that "If primary current is entering 'P1' then secondary current leaves 'S1'. It is clear that 5A primary CT current balances secondary side CT current flowing through differential relay is I operate = i1 – i2 = 0

Hence the differential scheme is perfectly balanced. However, if current direction in any loop is reversed, then Iop = i1 – (-i2) = i1 + i2 = 5 + 5 = 10A and the scheme will trip. This shows the importance of current direction in differential scheme. Now the scheme is put under first test i.e. Through Fault Test. Consider an Out of zone fault of 2400 A.

I operate = i1 – i2 = 0

I op = 10 – 10 = 0

The scheme remains still balanced in case of external faults. If internal fault of the same 2400 A (double) occurs, then current flow in LV CT is cut off and 10A current flows in HV CT. This 10 A in HV CT loop is sufficient to operate the differential relay.

INTERNAL FAULT (WITH DOUBLE FEED)

Assume that impedance on both side of fault is same and both sources share equal currents.

I1 – I2 = 10 – (-10)

10 + 10 = 20A

Hence the scheme will trip too. Solid state relay circuit is show in Figure.

There are many factors still left that can affect the balance of scheme.

i). If CTs are not of identical design, difference current can flow to unbalance the scheme.

ii). Saturation of one of the two CTs.

iii). The magnetizing in rush currents in T/Fs.

iv). Phase shifting in star delta connected transformers.

v). Connections of CTs, phasing

vi). Selection of taps if HV and LV side CT currents are not equal.

vii). Effect of transformer taps.

The relay discussed is called a plain differential relay. To avoid problems of CT saturation or varying character CTs solution is to employ two restrain coils and one operating coil.

The restraining coils produce restraining Torque or a negative torque while the operating coil produces a positive torque or operating torque. Restrain torque strength can be changed by using a tapped winding. Consider such a relay having different character CTs with two ampere mismatch current. In case of plain differential scheme relay should operate but in modified scheme a restraining.

Current of (I1+I2)= 14A Q flows in restrain coil and Iop = I1 – I2 = 2A.

Two amperes in operating coil. The stronger restraining field keep the relay un-operative. Similarly if any CT saturates at such high fault currents relay will behave similarly.

%age of Iop/Rest X 100 = 2/14 = 14.3%

Relay will restrain if set more than 14.3% slope. Normal relays are provided with 15,30, and 45 percent slope. Higher the slope lesser the sensitivity of relay at 10 times fault.

Irest = (130+150)/2 = 140A

Iop = 150 – 130 = 20A

%age = (20/140)x100 = 14.3%

Such relays are therefore, termed as percentage differential relays because operating current is a fix percentage of restrain current for same slope.

From the figure it is clear that for a fixed restraining current of 14A operating coil pick up currents are different. At 15% slope relay is more sensitive than at 45% slope. Magnetizing inrush current-when a power transformer is energized transient magnetizing current flows for few cycles having instantaneous peaks of 8 to 20 times those of full load current.

Duration of which Depends upon

1. Size of transformer.
2. Size of power system.
3. Source resistance.
4. Residual flux level.
5. Core material.

535

Analysis

On analysis it revealed that second harmonic components are dominant.

Component	2 Harmonic	3H	4H
%age	63%	26%	5.1%

Since inrush current flows with only one side of transformer energized. The effect is similar to a fault on the system. The inrush current on an oscillogram is depicted in the figure. Therefore, Harmonic restraint circuitry is essential to avoid mal-operation of differential relays.

1. **Time Delay**

   One method for preventing tripping due to inrush the operating coil of the differential relay is de-sensitized for a few milliseconds when the primary breaker is closed.

2. **Second Harmonic Restraint Circuit**

   Second harmonic in the inrush current are filtered out using band pass filters then applied in the restraining circuits to restrain the relay further, when inrush current is flowing.

   But still exists a problem, whether these harmonics are generated by a power transformer or a saturated C.T. To avoid malfunction in such conditions, relay should differentiate between these conditions.

3. **Zero Detection Method**

   The wave shape of second harmonic currents of a C.T. and a power transformer compared with a fault current wave form suggest that magnetizing in rush wave normally stays at zero crossing for quite a sometime.

   This zero-level time is different for a C.T. wave form and a power transformer wave form.

   Hence relay is made to restrain if zero is detected in a cycle for more than a certain period (typically for $1/4^{th}$ of a cycle).

DISTANCE RELAY

- As line impedance is proportional to length of line, hence this relay is called distance relay.
- Its generic name or trade name is distance relay.
- Its actuating quantity is impedance. The most simple method to learn is illustrative method. RX diagram is helpful in this regard ,which is actually a graph between R& X

values of line conductor so that to show the value of impedance. We prefer impedance relays on over current relays as

- coordination of over current relays is difficult.

536

- Four important X-ics of 21 relays are given as under;
- (1) OHM RELAY. Before its explanation the concept of product relays is essential. In these relays in addition to line CT & line VT an additional CT or VT is required to make the relay directional. If for directional purpose,
- Additional CT is used then it is termed as current polarized. Ohm relay is current polarized. In this relay additional CT is resolved into two halves for balancing purpose. The current of this additional CT is called polarizing quantity or reference quantity. Hence ohm relay is called current polarized. Its equation is Z COS Q=R, here R=Constant (Line equation). It measures only real part i.e resistance only having units in ohm.

REACTANCE RELAY

- If you install a capacitor in operating cct. Of CT then X-ics are shifted by 90 degrees angle & cuts reactance x-ics called reactance relay, it measures reactance component only.

VOLTAGE POLARISED RELAY.

- Because voltage is used as reference quantity to make the relay directional. Half polarising voltage is used on one side and half on 2nd side for balancing purpose. Its equation is given as under,
- 1/R COS(ϕ -Θ)=V/I=Z (circle equation).It is an equation of circle whose circumference passes through origin as under;
- For different angles it measures different impedances. The relay measures maximum impedance where cord passes through origin i-e cord is maximum at diameter. 99% relays are mho type in the world. Now I/V=1/Z=Y(admittance relay). ADMITTANCE RELAY OR MHO RELAY
- It is inherently directional relay.(senses angle).It sees in line direction.It sees in between 0 &150 degrees.
- It measures different impedances at different angles.Impedance at 60 degrees is different than that from 30 degrees.
- Its center lies at an angle where it measures maximum fault impedance called max. torque angle or relay characteristics angle (MTA or RCA).

Plain Impedance X-ics.

- keep v&I constant and vary angle between v and I. This relay measures same impedance for every angle ,a circle is formed hence. A circle is formed having center at origin is termed as plain impedance characteristics. IF fault impedance is within circle then relay operates & if ZF is outside the circle ,relay does not operate & treats it normal. Such X-ics is also called non directional impedance distance relay.
- These four x-ics are generic names impedance

(1) ohm.

(2) Reactance type

(3) Mho type

(4) plain

537

- Application Line CT & line VT is required .Z relay is used on both ends of a line section. Manufacturer gives +ve seq. impedance of line conductor, -ve seq impedance & zero seq. impedance. For a T/L z+ and Z- are equal. He gives z+ seq. impedance/mile & zero seq. impedance /mile. Let Z+=3+J4 & Z magnitude= $\sqrt{9+16} = \sqrt{25}=5\Omega$/mile. ,$\Theta$= tan. inverse 4/3 ; ZP=V/I(relay sees voltage/PT ratio & sees current/CT ratio). Length of line=( ) ; Type of conductor=( ) Zp=v/I and zs=(v/pt ratio)/(I/ct ratio) , hence ,zs=v/I x(ct ratio)/(pt ratio) -eq . no.1 Let zp=50Ω;ct ratio=500/5 A;PT ratio=132000 kv/110 volt ,putting values, you get zs=4.17Ω say 5Ω which is the reach of relay . As you have set line impedance on relay side. Line x-ics angle or LCA is usually called ϕ & it is 65 degrees for 132 kv line, 75 for 220 kv &80-85 degrees for 500 kv line.

The relay may not operate at fault where it has to operate, it is called under reaching. To avoid over reaching first 85% of line is protected in zone 1, rest 15% in zone 2 , zone 3 is used as back up and back seeing . To sense all possible faults on a T/L we require two no. of 21 relays, one at each end. Each relay should have such a direction that it must see towards line from respective end.

ELECTRICAL MEASUREMENTS & INSTRUMENTS:

CLASSIFICATION OF INSTRUMENTS:

with respect to accuracy

A. Primary.
B. Secondary

With respect to circuitry

A. Analogue.
B. Digital

COMPARISON OF ANALOGUE AND DIGITAL INSTRUMENTS:

ANALOGUE:

a) Continuous Signal
b) Electro Mechanical Components
c) Circuit is simple
d) Mechanical Display
e) Less Accurate
f) Cheap for Moderate Accuracy
g) Costly for Max. Accuracy
h) Parallax Error
i) Zero Error
j) Positional Error
k) Reading Wrong Scales

l) Operation under wide range of Environment

m) Circuit is loaded

n) No Separate Power Supply required

538

DIGITAL:

a) Discrete Signal
b) Solid State Components
c) Circuit is complex
d) Digital Display
e) More Accurate
f) Costly for Moderate Accuracy
g) Cheap for Max. Accuracy
h) Parallax Error
i) Zero Error
j) Positional Error
k) Reading Wrong Scales
l) Operation under wide range of Environment
m) Circuit is loaded
n) No Separate Power Supply required

Measurement of Power in 3/Phase Circuit

i). One wattmeter method for balanced 3/Phase 4 wire circuit. Total Power P=3W

ii). One wattmeter method for balanced 3/Phase 3 wire circuit. Total Power P=W1+W2

iii). Two Wattmeter method for balanced 3/Phase 3 wire circuit. Total Power P=W1+W2.

iv). Three wattmeter method for balanced or unbalanced 3/Phase 4 wire circuit.

Measurement of Reactive Power

Modified wattmeter

In 3/Phase system, utilizing the vector relationships to produce 90 ° phase shift to read var.

Energy Meter:

Operating Principle of Electromechanical meter.

Operating Principle of Electromechanical meter is Electromagnetic Induction.

The deflecting torque is produced on Pivoted disc by means of the interaction of two alternating fluxes and the currents that they induce in the disc.

Operating Principle of Static Energy Meter.

Voltage & Current act on solid state electronic elements to produce output proportional to the energy to be measured.

Types of Energy Meters:

Different types of meters are being used depending upon nature of load and requirement of tariff.

1) Direct kWh meter
2) C.T. operated kWh meter

ANNEX N21/11"

Doc No: N21/11

540

TYPE OF METERING SYSTEM TO BE USED:

All of the metering systems installed at grid stations comply with the stipulations of Grid Code and relevant NTDC's specifications / IEC Standards.

Static Energy Meters installed for consumer billing also comply with the relevant NTDC specification / IEC standards i.e. DDS-50, DDS-60, DDS-65, IEC 62052-11 and IEC 62052-22 etc.

Since the evolution of static and smart meters (SMART METERING SYSTE), the types of meters become different and KWH meters, KVARH meter, and MDI meters are merged in a single meters having different window/plat forms built in single unit/meter.

TYPES OF ENERGY METERS:

Different of types of meters are being used depending upon nature of load and requirement of tariff.

1) Single Phase KWH static/electronic meter.
2) Three Phase KWH static/ electronic meter. (TOU/TOD).
3) RF AMR three phase KWH static/ electronic meter. (TOU/TOD).
4) AMR three phase KWH static/ electronic meter having GSM SIM
5) C.T. operated three phase KWH static/ electronic meter.
6) C.T. operated three phase KWH static/ electronic meter having GSM SIM.
7) Green Meter Three Phase KWH static/ electronic meter. (TOU/TOD) two way recording (Import / Export).
8) C.T. operated Green Meter Three Phase KWH static/ electronic meter. (TOU/TOD) two way recording (Import / Export).

TYPES OF ELECTRO-MECHANICAL ENERGY METERS (PREVIOUSLY USED:

Previously before the evolution of Static and smart meters, electro-mechanical meters were used.

1) Direct KWH meter.
2) C.T. operated KWH meter.
3) Maximum demand indicator KWH meters.
4) KVARH meters.
5) CT & PT operated KWH meters.
6) T.O.D/KWH meters.

METERING SYSTEM:

S41

Two three of meting system are working in proposed HAZECO. The conventional metering system added with mobile meter reading, AMR and Latest AMI (Automated Metering Infrastructure) system (SMART METERING SYSTEM) are used in proposed HAZECO.

DETAIL OF AMR , AMI AND LAYOUT OF THE AMI/SMART METERING:

Smart metering its vital role in energy conservation, management & its feasibility of application in existing power system.

The Automatic Meter Reading is the technology which gives utilities the ability to obtain meter-reading values remotely without physically visit the site and record manual meter reading. It allows to collect actual meter reading without entering the property. There are different modes of AMR. i.e through Handheld Units (HHU). In this mode Reading is collected once a month on a specified date just like conventional meter reading but in a automated way. The Fraud Alarms are collected at the time of meter reading through HHU.

The benefit of AMR is to

- Improved Customer Service.
- Increased Data Accuracy.
- Increased Data Security.
- Reduced Operational Costs.
- Reduced Pen Mistakes.
- Remote Monitoring and Analysis.
- Automatic Billing.

Low Operational Cost:

Meter reading and billing is carried out automatically. The time period between reading and billing is decreased as well as it results in saving of costs.

Reduction/Detection of losses / theft of electricity:

It enables to detect tampering of meters and sudden consumption loss (if the meter is by-passed).

Load Control/Planning:

The Real time consumption/demand information is available and helps in the investigation of network power losses.

542

ADVANCED METERING INFRASTRUCTURE (AMI):

In proposed HAZECO, the available AMI Technology is based on a fixed Network Wi-Fi (GPRS) as well as through optical fiber and conventional cables.

The AMI is an arrangement for automated, two-way communication for sending instructions and collection of meter data between meters and utility company.

It has the following benefits and advantage.

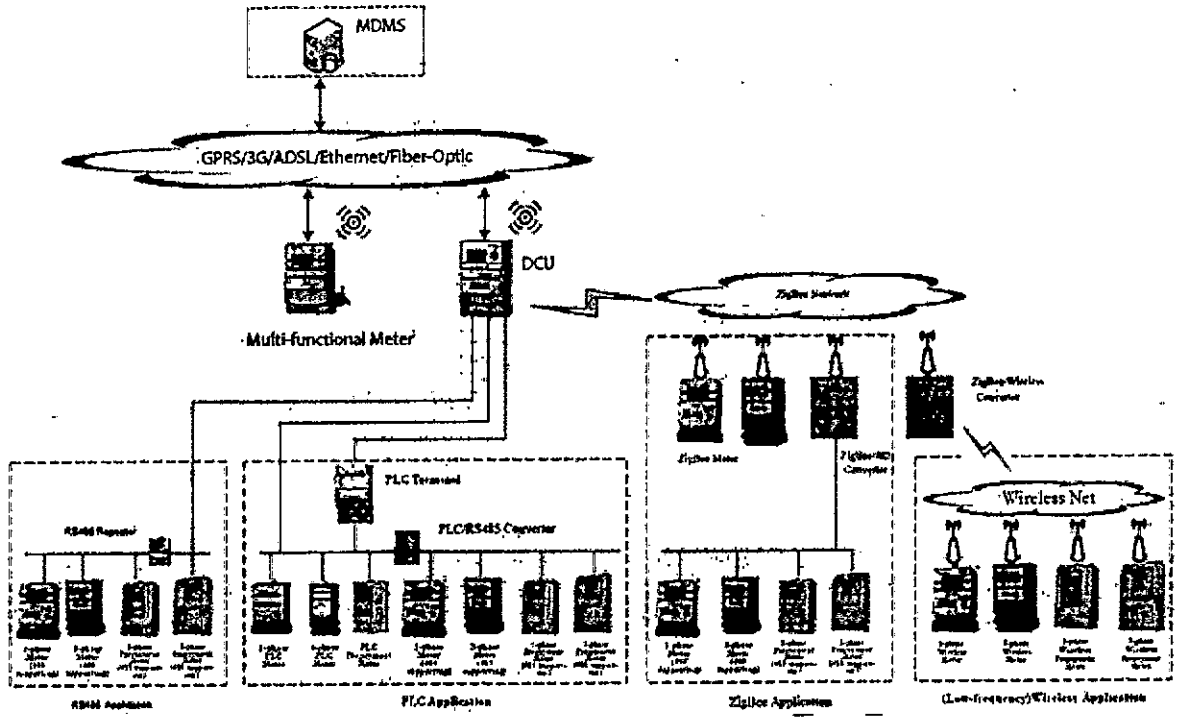
1. Provides to the company with real-time data about power consumption.
2. Remote Disconnection and Reconnection.
3. Demand Side Management.
4. Energy Loss Reduction.
5. Sanctioned Demand Control.
6. Information Collection for Assets Management.
7. Information Collection for Planning.
8. Quality of Service Information and Improvement.
9. O&M Cost Reduction.

The existing Components of AMI in the proposed company are as under:

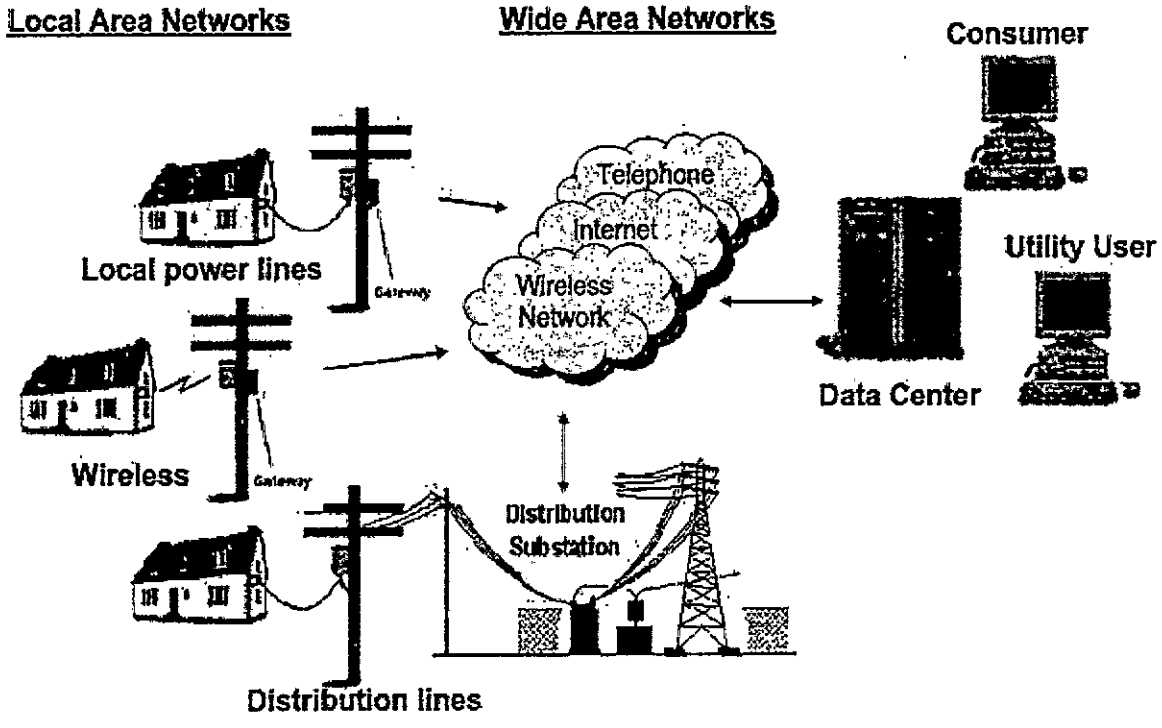
1) Smart Meters.
2) In House Display (IHD).
3) Communications.
4) Data Concentrator Unit (DCU).
5) Head End System (HES).
6) Meter Data Management System (MDMS).
7) Data Bases.
8) Time Synchronization System.
9) Interfaces between MDM and Billing System.
10) Fire Walls.
11) Billing System.

BLOCK DIAGRAM OF AMI:

543



AMI COMMUNICATION NETWORKS



ANNEX N 21/12

544

Doc No: 21/12

METERING INSTALLATION AND TESTING FACILITIES

Energy meters are vital instrument of revenue realization for the distribution utilities. Based on the meter reading, the utilities submit their bills to consumers for realization. Improper installation and Inaccurate/faulty recording may become catastrophic both to consumers and utilities. Thus, a need to ensure a high degree of performance and reliability from the meters has become important. The meters are tested and calibrated to ensure proper working and that the accuracy is to be maintained within permissible limits under IEC standards, Specifications and Rules.

Due to evolution of electronic/static and smart meters, today Meter Test Technology is much more than only testing accuracy and functionality of a conventional electricity meters (Electro-mechanical) i.e. with implementation of SmartMeters a complex test and data management system is required.

Consequently, extensively trained and equipped offices are available for installation & testing of energy meters at Sub-Division, Division & Circle levels. The meters are tested in Labs in M&T lab (meter and Testing) under qualified senior Engineer and technicians.

A state-of-the-art testing bench is available and has been imported from Slovakia (ELMA corporation).

With the development of smart meters, the world of meter testing technology has evolved significantly. It is no longer just about ensuring the accuracy and functionality of conventional electricity meters. The testing process has become much more complex and requires more sophisticated data management systems. Fortunately, HAZECO has the experts who can guide and perform the testing required for this new era, so as to perform proper testing essential to ensure accurate readings and minimise downtime.

TESTING FACILITIES:

In M&T lab, the existing test bench, (imported from Slovakia, ELMA corporation) has been tailored to exact requirements, ensuring accuracy and reliability every time. It has fully automatic procedures for meter testing, Automatic meter adjustment routines. It can deal with the meters having Accuracy classes of the reference standard 1 %, 0.5 % and 0.2 %, (1%s, 05%s and 0.2%s) as well as can test meters of wide range of voltages up to 480 V and currents up to 240 A

It has the following features;

- Accuracy classes of the reference standard: 1 %, 0.5 % and 0.2 % , (1 %s, 05%s and 0.2%s).
- wide range of voltages up to 480 V and currents up to 240 A.
- Independent operation of voltage and current signals.
- Harmonics generation capability up to the 50th.

- Comprehensive range of safety features.
- Flexible and extensive number of testing positions.
- Simultaneous testing of meters with different constants.
- Feature-rich Windows based control software
- Special features and extensions available.

STANDARD TESTS FOR ENERGY METERS

The performance tests of an energy meter as per IEC standards are divided mainly in three segments which include its mechanical aspects, electrical circuiting, and climatic conditions.

1. Mechanical component tests.
2. Climatic conditions test includes those limits which influence the performance of the meter externally.
3. Electrical requirements covered various tests before giving accuracy certificate. Under this segment, energy meter is tested for:
    - Heating effect
    - Proper insulation
    - Supply of voltage
    - Protection to earth fault
    - Electromagnetic compatibility

Electromagnetic Compatibility Test:

An electromagnetic compatible test is the most important test which finally ensures the accuracy of the energy meter. This test is fragmented in two parts- one is Emission tests, and the other is Immunity test. The electromagnetic interference problem is very common today. Those circuits in use today, can emit electromagnetic energy which can affect the performance and reliability of both its inner circuitry and the nearby equipment. EMI can travel through conduction or by radiation. When EMI goes through the wire or through cables, it is called conduction. When it travels through free space, it is called radiation.

Emission Test:

In an electronic system, there are many components like switching elements, chokes, circuit layout, rectifying diodes and much more which produce EMI. This test ensures that the energy meter does not affect the performance of the nearby instruments or we can say that it ensures that it does not conduct or radiate EMI beyond a definite limit. There are two types of emission test based on the EMI escapes from the system.

1) **Conducted emission test:**

   In this test, power lead and cables are checked to measure the EMI escape, and it covers small meter of the frequency range from 150 kHz to 30 MHz.

2) **Radiated emission test:**

This test measures the EMI escape through free space, and it covers large meters of the frequency range from 31 MHz to 1000 MHz.

Immunity Test

The emission test ensures that meter does not work as the source for EMI for other nearby equipment. similarly, immunity test ensures that meter does not work as a receptor and properly function in the presence of EMI. Again, immunity tests are of two types based on radiation and conduction.

1) **Conducted immunity test:**

   These tests ensure that meter's functioning do not get disturbed if it is in the blanket of EMI. The electromagnetic interference source either in contact through data, interface lines, power lines, or by contact.

2) **Radiated immunity test:**

   During this test, meter functioning is monitored and if it gets affected by EMI present in the surrounding area, that fault is recognized and corrected their only. It also is known as the electromagnetic high-frequency field test. Radiations generated by sources like small handheld radio transceivers, transmitters, switches, welders, fluorescent lights, switches, operating inductive loads etc.

Routine Testing;

Routine Tests Meters are calibrated such that the overall accuracy is within the percentage error limits. All initial calibrations of meters are performed in a laboratory or test house. The most common method for testing meters is to inject voltage and current from a stable power source in combination with a reference meter.

The main requirement in a test lab will be Test bench, Reference standards, Power source, Software and Accessories.

The test bench could be for single phase or three phase meters, electromechanical or electronic. It could be fully automatic, semiautomatic, or manual. As per Electricity Rules, the meters in service need to keep to the prescribed accuracy range. With time the accuracy of the Ferrari's meter degrades, and the meter tends to slow down. For that, periodical testing of and recalibration of all meters installed in the field for all categories of consumers need to be carried out as per the meter standards.

The testing schedule for HT consumers should cover the entire Metering System including CTs, PTs and Pilot Wire. Detailed ratio testing of CT, PT and control Pilot/ wires is to be done. Testing through mobile vans/mobile cubicles through secondary injections kit and phantom loading may also be carried out by Measurement Unit. All new meters should meet the requirements of Accuracy Class specified in thIEC stands, Specification and Ruules as well as in NEPRA rules.

Methods of Testing:

Irrespective of purpose, testing is generally carried out as stated below

- on site.
- In Meter Testing Lab (M&T) accredited as per IS/ISO/IEC.

Site Testing

On-site testing may be carried:

i) under actual prevailing load
ii) by injection method after connecting a suitable phantom load or a resistive load.

i). Actual Loading Method:

This method is also employed on site but generally for testing of single/three phase meters in laboratory. On a meter testing bench which is equipped with various taps to facilitate meter testing at different load conditions. The load is provided by standard resistance or lamps obviously power factor is unity. Load adjustments are done in steps of 1/10 th of full load at unity power factor. It is important to note in this connection that consumer's power factor varies from 0.5 to unity (or 0.85). Therefore, meter must be calibrated at 0.5 PF. To achieve this condition, the current coil is energized by R phase and voltage coil by Y phase and the polarity of pressure coil is reversed. Under these conditions, PF becomes 0.5 because of 120 degree phase shift between voltage and current vectors.

ii) Phantom or Fictitious Loading Method

When the capacity of meters under test is very high, testing with actual load method would involve a considerable loss of power and would not be economical too. Therefore, to avoid wastage of power during testing, phantom load method is adopted. In this method, pressure circuit is supplied from a circuit of normal voltage source and the current circuit from a separate low voltage source. Thus, total power consumed during testing becomes very small due to small pressure coil current at normal voltage plus full load current at very less voltage for current circuit meter. However, the meter under test in this condition simulates the full load condition by such phantom load kit.

Testing of CT Operated Meters:

The following tests should be carried out for CT operated meters:

a) Ratio test by primary injection kit,
b) Polarity test,
c) Continuity test of primary and secondary windings,
d) Insulation resistance test, and
e) Terminal markings as per name plate details.

It should be noted that CT Secondary terminals should not be kept open. For CT and PT operated meters, it is preferable to use a Test Terminal Block(TTB). The TTB provides the facilities of shorting CT secondaries for testing purpose without any interruption to the consumer. The CT leads should be directly connected to the meter, while PT supply to the meter should be connected through the fuses of proper rating. To eliminate the possibility of tampering with the fuses, the fuses should be provided with protective cover and properly sealed.

CHECKING AT SITE

The routine testing of meters should be carried out once in 3 years. In addition, surprise checks should be conducted at the consumer's installation and meters should be checked from time to time. The important points to be paid attention to while checking are given below.

1. Connections of meter are proper.
2. Seals are not tampered with.
3. No loose or direct connections exist.
4. Meter is not damaged to record less.
5. CTs are properly connected. No reversal of any phase connection exists. Multiplying factor is properly calculated and applied.
6. Meter is well protected from rain, vermin's and dust etc.
7. Links are connected.
8. Terminal block is not damaged.

With the help of load current of known magnitude (preferably of resistive type) and a wrist watch having a second's hand, the employee can off hand check at site regarding performance of the meter as also its accuracy to some extent.

ANNEX N 21/13 549

Doc No: N21/13

COMMUNICATION SYSTEMS:

The demand of electrical power is increasing with a very fast rate, so the transmission and distribution system (Power System) should be capable to overcome the demand with the most excellent quality of supply. Uninterrupted electric power distribution with adequate quality is fundamental requirement for modern society. Without proper communication between the devices used in the field and the control & protection equipment installed in control room with smooth operation & efficient control of such a big and complex power system is not possible. The proper communication scheme is used to transfer the data catch from the outdoor units to the control center for controlling and protecting power system.

Communication is the enabling technology which plays a significant role in the modernization and atomization of the electric power system. Supervisory Control and Data Acquisition (SCADA) systems are very much helpful to provide totally integrated computer environments-based power system with more flexibility in control and operation. It is necessary to provide accurate & precise control of the operation of the power system to mitigate the huge amount of power increasing day by day.

In proposed Hazeco, the PTCL landlines and mobile phones are used for communication between field offices, grid stations, PDC, RCC etc.

Communication has always played a critical role in power systems and will become even more critical when it comes to implementing an end-to-end and two-way open communication grid infrastructure. Power-system communications play a vital role in the safe and efficient operation of the electric power grid. Real-time automation and control of electric utility generation, transmission and distribution systems are dependent upon reliable and secure communication networks. The proper communication scheme is used to transfer the data catch for the outdoor units to the control center for controlling and protecting power system. Communication is the enabling technology which plays a significant role in the modernization and atomization of the electric power system.

Medium for transmission are broadband wireless communication telephone, lines, copper conductors, electrical phase conductors, earth.

Device to retrieve information for the carrier signals. A private network for power wireless provides more reliability due to the development of the technologies that include 4 G broadband wireless communication.

A private network for power wireless provides more reliability due to the development of the technologies that include 4G broadband wireless communication. Moreover, the improvement and secondary enhancement of 4G Long Term Evolution (LTE) technologies in wireless network is necessary to cope with properties of the power business because of security requirements and real-time in electrical power systems.

In NTDC, the communication between Power Houses and Grid station is being done on very high voltage electricity wires, through a system known as carrier. In this system sound waves are modulated, through modulation process, on electricity wave having 50 Hz frequency.

A carrier wave is an electromagnetic wave that is modulated in amplitude or frequency to carry a signal. As a carrier wave is an electromagnetic wave, it travels with the velocity of light and with constant amplitude. It is used to carry signals from one location to another on the surface of earth.

Power system including production, transmission and distribution is a very complex and wide infrastructure, which is essential for the growth and development of the society and economy. For such a huge & complex electrical network, protection and control is not possible without perfect and effective communication system, which is used to transfer the data & information from control centers to sub-stations located at same station or at different place, also to consumer ends. For this Electrical communication systems are designed to send messages or information from a source that generates the messages to one or more destinations

New communication channels and techniques provide opportunities to advance the speed of operation, security, dependability, and sensitivity of protection with optimized cost. No single communication technology is best suited and capable for all power system needs. The requirements must consider with following factors type of technique, type of communication, source of information, amount & frequency and delivery requirements of data transmitted. Due to these requirements a smart and intelligent electricity network has to be designed that can integrates all users connected to it and makes use of advanced information, control, and communication technologies to save energy, reduce cost, increase reliability and transparency. Almost countries are working on research and developing for such a smart and intelligent electricity network, known as smart grid.

POWERS SYSTEM CHALLENGES

For such a critical infrastructures designing, monitoring and controlling is more challenging job as a consequence of the steady growth of their size, complexity, level of uncertainty, unpredictable behavior, and interactions [4].Utilities and system integrators face a lot of difficult challenge regarding characteristics and protocols for data communication whenever equipment from different vendors was integrated into a single system. To mitigate the challenges and fulfil the requirements, now day power system automation is recommended inmost of countries. Power system faces various problems like as:

1) Cost effectiveness.
2) Capacity to handle data rates.
3) Adequate to meet response requirements.
4) Security (of data and of control actions).
5) Quality of electrical supply.
6) Behaviour during fault condition.

7) System adequacy.
8) System stability and Reliability.

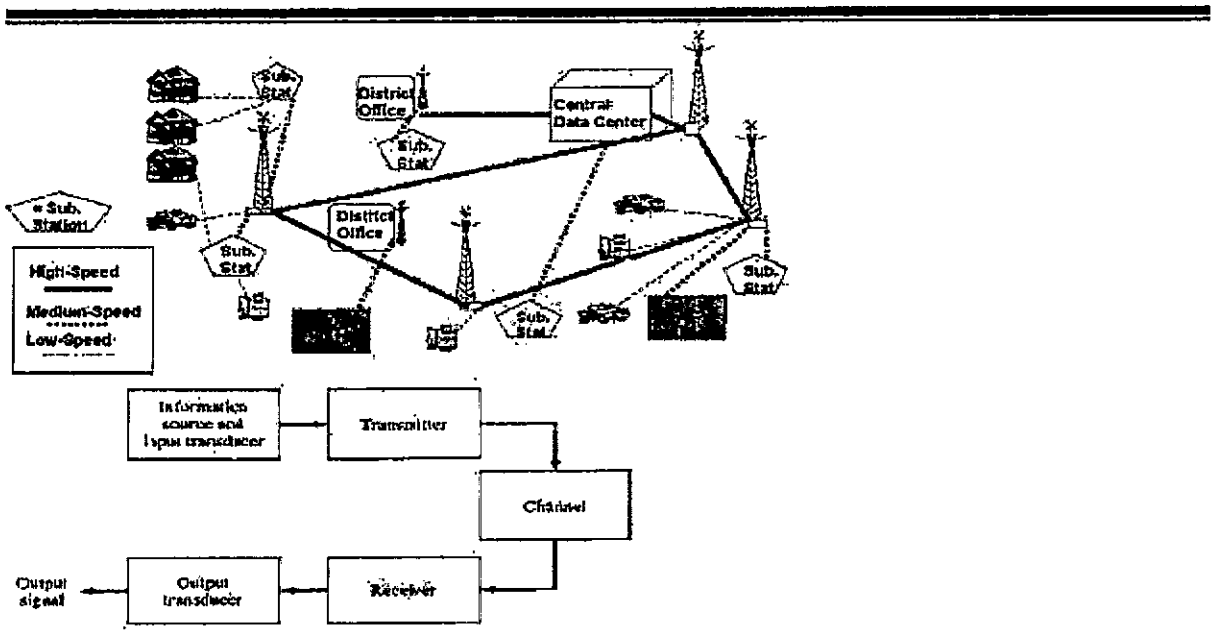
POWER SYSTEM AUTOMATION:

Power system automation is the process of automatic monitoring& control within the station or control commands from remote users to control power system devices by using IEDs, communications protocols, communications methods and some relevant software programming to enhance efficiency, reliability, and quality of electric service. Application of automation of power system can be defined as automatically monitoring, protecting and controlling switching operations by using suitable group of devices to restore power service in normal operating conditions after or during fault occurs in system.

In past the operation and control of power system using automation was very expensive but now a day by using latest technologies, scientific achievement and communication technology modern power systems are more reliable and cost effective. With the help of automation process by using computer interface with I& devices, the process as data acquisition, power system supervision, and power system control can work together in a coordinated automatic fashion.

COMMUNICATION FOR POWER SYSTEM:

In past all devices in communication for power system are according to available features at that time but now according to various requirements like: to increase flexibility in operation &control, reliability, stability the system should be modified. So by using modern & latest technology, up gradation of devices, computerized environment modern smart and intelligent power system can be developed. To control this system best communication system is also required. According to the present need & need in future of system various strategic plan with the help of practice and planning, an overall communications system is designed. A common architecture for a small distribution system is shown below.



DOC No: N22

MAPS/GIS STATUS OF 11 KV FEEDERS IN RESPECT OF HAZARA ELECTRIC SUPPLY COMPANY (HAZECO)

S.No	CIRCLE	NO OF FEEDERS	AJK (EXEMPTED)*	SENSITIVE (EXEMPTED)**	NEWLY BIFRUCATED FEEDERS***	MAPS AVAILABLE
1	ABBOTTABAD	136	0	13	22	101
2	MANSEHRA	76	37	0	0	39
HAZECO		212	37	13	22	140

All 140 maps are attached.

ANNEX "N22"

Note:

(*) 37 No 11 KV Outgoing feeders are one point supply (Bulk supply) and are present in AJK emanating from 5 grid stations relating to AJK electricity department territory (Maps not available).

(**) 10 No 11 KV sensitive security installation feeders being exempted from GIS Survey (Maps not available).

(***) 25 No 11 KV feeders are newly bifurcated and their maps are not available because the survey is not yet carried out by Abbottabad Circle.

582

ANNEX "N23"

692

N/23

Consumer class/category, sub-category on the basis of sanctioned load and voltage Level

Sr. No.	Category of Consumers	No. of Consumers
1	Domestic	694,933
2	Commercial	69,463
3	Industrial	3,533
4	Bulk	182
5	Tube well:	674
6	General Services	194
7	Others	7,826

691

Doc No: N23

CONSUMER CLASS/CATEGORY, SUB-CATEGORY ON THE BASIS OF SANCTIONED LOAD AND VOLTAGE LEVEL (As on June 23)

Tariff description	TARIFF NAME	Sanctioned Load (KW)	Number of Consumer				UNITS CONSUMED
			0.2kv	0.4 kv	11 Kv	132 kv	
DOMESTIC	A-1a(01)	1,034,958	1,795	663,917			67,425,042
	A-1a(02)	49	1	19			2,836
	A-1b(03)T	21,512	2,126	1,091			951,411
COMMERCIAL	A-2a(04)	88,455	405	63,095			4,788,694
	A-2b(05)	246	3	1			-
	A-2c(06)T	79,057	3,746	3			8,260,812
GENERAL SERVICES	A-3a(66)	71,633	1,543	5,981			5,452,992
INDUSTRIAL	B1(07)	11,495	176	886			28,577
	B1(08)	2	-	1			41
	B1b(09)T	12,714	1,061	4			616,566
	B2a(10)	22,807	39	132			12,065
	B2b(12)T	113,905	891	1			10,219,509
	B3(13)	10,330	-	10			-
	B3(14)T	189,647		-	80		27,804,600
	B4(17)T	140,500				4	62,600,000
BULK SUPPLY	C-1a(19)	-	-	1			-
	C-1b(25)	910	7	13			69,672
	C-1c(26)T	7,929	95	-			1,014,923
	C-2a(28)	20,300	4	6			594,960
	C-2b(29) T	18,380	11	-			1,586,791
Agriculture / Scarp Tube well	D-1a(42)	150	4	1			-
	D-1a(46)	282	-	18			-
	D-1b(45)T	275	17	-			1,148
	D-2(48)T	38	2	1			45
	D-2(52)	2,318	67	386			48,022
	D-2b(51)T	2,961	144	2			239,437
TEMPORARY SUPPLY	E-1i(55)	157	3	36			-
	E-1ii(56)	1,756	47	307			22,135
	E-2(58)	771	13	14			-
STREET LIGHTS	G-1(72)	3,633	59	24			34,947
	G-2(73)	5,377	67	26			39,942
RESIDENTIAL COLONIES	H-1(76)	1,190	6	1			36,599
AJK	K-1a(35)	1,000	1	3			-
	K-1b(36)T	75,894	36	-			29,241,198
Grand Total		**1,940,631**	**12,369**	**735,980**	**80**	**4**	**221,092,964**

ANNEX "N24"

Doc No: N24

TARIFF CATEGORIES OF CONSUMERS CLASSES TO BE SERVED:

694

The following categories of consumers and classes are served in the proposed HAZECO as per approved tariff by NEPRA and Govt of Pakistan.

1 DOMESTIC

The following subcategories fall in Domestic.

1.1 **Domestic (Single Phase)**

Its numeric Code is 01 and Tariff Code (A-1a)

01 A-1a(01) Sanctioned load less than 5kW

consumer having sanction load less than 5 kw shall be billed on single part KWH rate at 220Volt

1.2 **Domestic (Three Phase)**

Its numeric Code is 03 and Tariff Code (A-1b)

03 A-1b(03)T having 5kw and above sanction load

consumer having sanction load 5kwh and above shall be provided TOU metering arrangement 220Volt

55 E-1i(55) (TEMPORARY DOMESTIC) A-1(T)

Domestic Consumers having Load Up to 5KW at 220Volt

2 COMMERCIAL

The following subcategories fall in Commercial.

2.1 **Commercial (Single Phase)**

Its numeric Code is 04 and Tariff Code (A-2a)

04 A-2a(04) (COMMERCIAL)

Commercial Consumers having Load Up to 5KW at 220Volt For Single Phase Meter

2.2 **Commercial (Three Phase)**

Its numeric Code is 05 and Tariff Code (A-2b)

05 A-2b(05) COMMERCIAL

Commercial Consumers having Load Above 5KW at 440Volt For Three Phase Meter

2.3 **Commercial (TOU)**

Its numeric Code is 06 and Tariff Code (A-2C)

06 A-2c(06)T Time of use exceeding 5kW

Commercial Consumers having Load Above 5KW at 440Volt For TOU Meter

56 E-1ii(56) (TEMPORARY COMMERCIAL)

Commercial Consumers having Load Up to 5KW at 220Volt For Single Phase Meter

2.4 **Its numeric Code is 68 and Tariff Code (A-2d)**

68 A-2d(68) Electric vehicle charging station

Electric vehicle charging station having Load Above 5KW at 440 Volt For TOU Meter

3 INDUSTRIAL

The following subcategories fall in Industrial.

3.1 **Industrial (Three Phase)**

Its numeric Code is 07 & 08 and Tariff Code (B1) Single Part Tariff

07 B1(07) (INDUSTRIAL UPTO 25 KW)

consumer having sanctioned load up to 25 kw shall be billed on single part kwh rate

08 B1(08) (INDUSTRIAL UPTO 70 KW FOR CINEMAS,

Industrial Consumers having Load Up to 25 KW at 440Volt For Three Phase Meter

58 E-2(58) (TEMPORARY INDUSTRIAL UP TO 70 KW)

Industrial Consumers having Load Up to 70KW at 440 Volt For Single Part Meter

3.2 **Industrial (TOU)**

Its numeric Code is 09 and Tariff Code (B1b) Two Part Tariff

09 B1b(09)T To be shifted B2 (TOD) Tariff-12

consumer having load of 5 kw and above shall be provided TOU metering arrangement

3.3 **Industrial (Non-TOU)**

Its numeric Code is 10 and Tariff Code (B2a) Single Part Tariff

10 B2a(10) (INDUSTRIAL FROM 25 KW TO 500 KW)

industries having sanctioned load of more than 25 kw put and including 500 kw

3.4 **Industrial (Non-TOU)**

Its numeric Code is 11 and Tariff Code (B2a) Single Part Tariff

11 B2a(11) (INDUSTRIAL FROM 71 KW TO 500 KW FOR

Industrial Consumers having Load Above 70KW to 500KW at 440Volt For Three Phase Meter

3.5 **Industrial (TOU)**

Its numeric Code is 12 and Tariff Code (B2b) Two Part Tariff

12 B2b(12)T OD (INDUSTRIAL FROM 71 KW TO 500 KW FOR

Industrial Consumers having Load Above 70KW to 500KW at 440 Volt For TOU

3.6 **Industrial (Non-TOU)**

Its numeric Code is 13 and Tariff Code (B3) Two Part Tariff for 11KV & 33KV

13 B3(13) (INDUSTRIAL FROM 501 KW TO 5000 KW)

industries having sanctioned load of more than 500 kw up to and including 5 MW on 11kv or 33 kv

3.7 **Industrial (TOU)**

Its numeric Code is 14 and Tariff Code (B3) Two Part Tariff for 11KV & 33KV

14 B3(14)T TOD

industries having sanctioned load of more than 500 kw up to and including 5 MW on 11kv or 33 kv

3.8 **Industrial (TOU)**

Its numeric Code is 16 & 17 and Tariff Code (B4) Two Part Tariff for 66KV & 132KV

16 B4(16) (INDUSTRIAL ABOVE 5001 KW)

Industrial Consumers having Load Above 5000KW 66 & 132KV Grid Station/Line

17 B4(17)T B-4 (II) TOD

Industrial Consumers having Load Above 5000KW 66 & 132KV Grid Station/Line

3.9 **Seasonal**

Its numeric Code is and Tariff Code (F) Single Part Tariff

F Seasonal

industries having sanctioned load of more than 25 kw up to and including 500 kw

4 Bulk Supply

4.1 **Its numeric Code is 19 and Tariff Code (C-1a) Single Part Tariff**

19 C-1a(19) (BULK SUPPLY AT 400 VOLTS)

consumer having a metering arrangement at 400 volts, having sanctioned load up to and including 500 kw single part tariff

4.2 **Its numeric Code is 25 and Tariff Code (C-1b) Single Part Tariff**

25 C-1b(25) (BULK SUPPLY AT 400 VOLTS)

consumer having a metering arrangement at 400 volts, having sanctioned load up to and including 500 kw single part tariff

4.3 **Its numeric Code is 26 and Tariff Code (C-1c) Two Part Tariff**

26 C-1c(26)T (BULK SUPPLY AT 400 VOLTS)

consumer having sanctioned load 5 kw and above shall be provided TOU metering arrangement

4.4 **Its numeric Code is 28 and Tariff Code (C-2a) Two Part Tariff for 11KV & 33KV**

28 C-2a(28) (BULK SUPPLY AT 11 KV & 33 KV)

consumer receiving supply at 11 kv or 33 kv at one point metering arrangement having sanctioned load more than 500 kw up to and including 5MW

4.5 **Its numeric Code is 29 and Tariff Code (C-2b) Two Part Tariff for 11KV & 33KV**

29 C-2b(29) T Time of use

Bulk Consumers having Load 5KW & up to 500KW 11KV Line For 440Volt For TOU Meter Two Part Tariff

4.6 **Its numeric Code is 37 and Tariff Code (C-3a) Single Part Tariff for 11KV & 33KV**

37 C-3a(37) (BULK SUPPLY AT 66 KV & 132 KV)

Bulk Consumers having Load 5KW & up to 500KW 66 & 132 KV Grids For 440Volt For TOU Meter Two Part Tariff

4.7 **Its numeric Code is 38 and Tariff Code (C-3b) Two Part Tariff for 66KV & 132KV**

38 C-3b(38) (BULK SUPPLY AT 66 KV & 132 KV)

Bulk Consumers having Load 5KW & up to 500KW 66 & 132 KV Grids For 440Volt For TOU Meter Two Part Tariff

5 AJK

5.1 **Its numeric Code is 35 and Tariff Code (K-1a) Single Part Tariff**

35 K-1a(35) BULK SUPPLY AT 11-33 KV(ONLY FOR AJK

AJK 11KV Lines for NON-TOU Single Part Tariff

5.2 **Its numeric Code is 36 and Tariff Code (K-1b) Two Part Tariff**

36 K-1b(36)T BULK SUPPLY AT 11-33 KV(ONLY FOR AJK

AJK 11KV Lines for TOU Two Part Tariff

6 Agriculture/Scarp

6.1 **Its numeric Code is 41 and Tariff Code (D-1a) Single Part Tariff**

41 D-1a(41) Scarp

Agriculture T/Wells load Less than 5kW For 440Volt Non-TOU Meter Single Part Tariff

6.2 **Its numeric Code is 45 and Tariff Code (D-1b) Two Part Tariff**

45 D-1b(45)T scarp

Scarp load 5kW & Above For 440Volt TOU Meter Two Part Tariff

6.3 **Its numeric Code is 47 and Tariff Code (D-2a) Single Part Tariff**

47 D-2a(47) Agriculture T/Wells less than 5kW

Agriculture T/Wells load below 5kW single Part Tariff

6.4 **Its numeric Code is 50 and Tariff Code (D-2b) Two Part Tariff**

50 D-2b(50)T Agricultural Tubewells TOD above 5 KW

Agriculture T/Wells load 5kW & Above For 440Volt TOU Meter Two Part Tariff

7 General Services

Its numeric Code is 66 and Tariff Code (A-3a) Single Part Tariff

66 A-3a(66) GENERAL SERVICES

For individual connections and not applicable in Housing schemes/societies/colonies/commercial plazas/buildings etc. where ultimate load is determined.

8 Others Tariff

8.1 Street Light

Its numeric Code is 73 and Tariff Code (G) Single Part Tariff

73 G-(73) (STREET LIGHTS)

Street Lights For 440Volt Non-TOU Meter Single Part Tariff

8.2 Residential Colonies

Its numeric Code is 79 and Tariff Code (H) Single Part Tariff

79 H-(79) (RESIDENTIAL COLONIES HAVING WAPDA

Residential colonies attached to industrial premises having 5 kw and above For 440Volt Non-TOU Meter Single Part Tariff

Doc No: N25

HAZECo Max Demand as per Existing Recorded Data

HAZECo Max Demand, Drawl & Load Management (MW) with respect to 11 KV Incoming					
Month	**Jul-23**	**Aug-23**	**Sep-23**	**Oct-23**	**Nov-23**
Max Drawl	544	534	518	422	407
Load Management	134	133	127	103	99
Max Demand	**678**	**667**	**645**	**525**	**506**

HAZECo Max Demand, Drawl & Load Management (MW) with respect to 132 KV Incoming					
Month	**Jul-23**	**Aug-23**	**Sep-23**	**Oct-23**	**Nov-23**
Max Drawl	496	453	470	376	395
Load Management	134	133	127	103	99
Max Demand	**630**	**587**	**597**	**479**	**494**

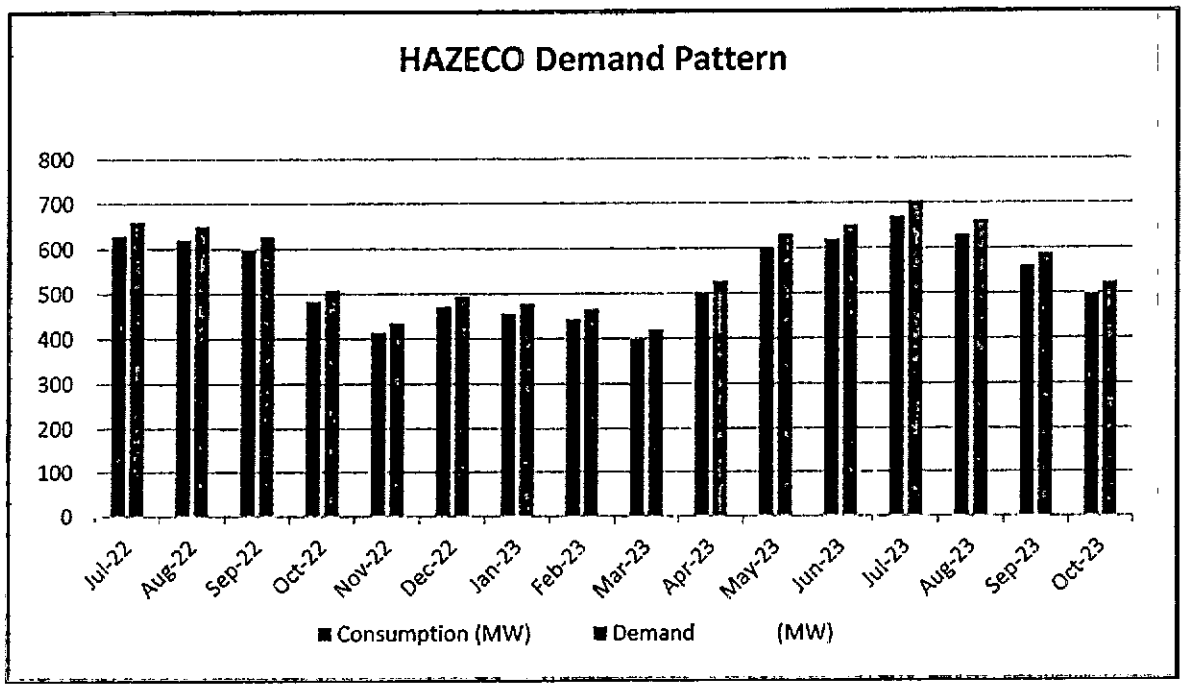
ANNEX "N25"

698

Doc No: N25

DEMAND AND CONSUMPTION PATTERN ON DIFFERENT TIME PERIODS

HAZECO Demand Pattern		
Month	Consumption (MW)	Demand (MW)
Jul-22	630	661
Aug-22	621	652
Sep-22	598	628
Oct-22	484	508
Nov-22	414	434
Dec-22	471	494
Jan-23	456	479
Feb-23	443	465
Mar-23	398	418
Apr-23	502	528
May-23	601	631
Jun-23	619	650
Jul-23	670	704
Aug-23	630	662
Sep-23	560	588
Oct-23	498	523



Disclaimer: This information is prepared on the basis of projected data of Demand Forecast.

ANNEX "N26"

700

Doc No: N26

(FOR TRANSMISSION SYSTEM)

PROCUREMENT OF MATERIAL REGARDING EDEIP PROJECT (ELECTRICITY DISTRIBUTION EFFICIENCY IMPROVEMENT PROJECT) APPROVED BY WORLD BANK:

DESCRIPTION:

PESCO has Prepared and approved PC-I for the World Bank EDEIP Project. World Bank has approved Loan No.9318-PK from its BoD for PESCO, HESCO and MEPCO. The three DISCOs have Signed Project Agreements and Subsidiary Loan agreements with the World Bank which are legally binding on all Parties. World Bank has conducted trainings of PESCO, HESCO and MEPCO staff. PESCO is in an advanced stage of project implementation i.e Publication of Tenders, Award of Contracts, Hiring of Project Implementation and Management Support Consultant Firm etc. World Bank loan has been approved for PESCO, MEPCO and HESCO projects only and including HAZECO in the approved loan portfolio may give rise to Legal implications. Therefore, PESCO will have to complete HAZECO's Part in the EDEIP project under World Bank Loan and later on after fulfilling Legal, Financial, and administrative requirements. After Completion of project (HAZECO's Part) and closing of loan in 2027, the completed project will be transferred to HAZECO as assets after observing all Financial & Codal formalities.

Project/Works to be constructed in HAZECO area under World Bank Electricity Distribution Efficiency Improvement Project (EDEIP).

S. No.	Name of Project	Material	Qty	Estimated Cost (Million Rs.)	Approved Budget 2023-24 (Million Rs.)
Augmentation of Power Transformers					
1	Augmentation of Power Transformer 132 kV - Haripur	132/11.5 kV, 31.5/40 MVA Power Transformer	01 No.	140	
Reconductoring of 132 kV Transmission Line for capacity enhancement					
2	Reconductoring of 132 kV New Wah - Hattar T/Line with HTLS/Greely Conductor	HTLS/Greely Conductor	28 Km	360	
3	Re conductoring of 132 kV AMC Abbottabad – Murree Road Abbottabad T/Line	HTLS/Greely Conductor	6 Km		
List of Grid Stations for Upgradation of Bus Bar					
4	132kV Haripur	**Twin Bundle Bus Bars**	2 No.	40	2050
5	132kV Hattar				
List of Grid Stations where 11 kV Switch Shunt Capacitor Banks (324 MVAR) are to be Installed					
6	132kV Haripur	T4	31.5/40 MVA	166.66	
7	132kV Hattar	T3	31.5/40 MVA		
8	132kV Hattar	T4	31.5/40 MVA		
9	132kV Hattar-II	T1	31.5/40 MVA		
10	132kV Hattar-II	T2	31.5/40 MVA		
11	132kV Havelian	T1	31.5/40 MVA		
Total				**706.66**	**2050**

PROCUREMENT PLAN (GRID STATION & TRANSMISSION LINE) FOR FY 2023-24 FOR HAZECO

1. Projects Financed through Own Resources:

S.No	Project Description	Amount of Material to be Procured (Million Rs.)	Finance Head	Material Detail
1	132 KV Hattar-III	427.71	PESCO Own Resources	Annexure – A (Grid Stations)
2	132 kV grid station Haripur-II (Sarai Saleh)	325.83	PESCO Own Resources	
3	132 kV grid station Thakot	283.08	PESCO Own Resources	
4	132KV S/C T/L Allai Power House to 132 KV GS Thakot	292.75	PESCO Own Resources	Annexure – B (Transmission Lines)
5	132 KV TL F/F HATTAR-III	30.39	PESCO Own Resources	
	Total Own Resources =	1359.76		

2. Projects Financed through Federal PSDP:

S. No	Project Description	Amount of Material to be Procured (Million Rs.)	Finance Head	Material Detail
1	132KV T/Line from 220KV GS Haripur - Hattar (SEZ)	86.95	Federal PSDP	Annexure – C (Transmission Lines)
	Total PSDP	**86.95**		

3. Projects Financed through Deposit Work:

S.No	Project Description	Amount of Material to be Procured (Million Rs.)	Finance Head	Material Detail
1	132 kV Hazara Steel	29.3	Deposit Work	Annexure – D (Grid stations)
2	132 kV GSS Hattar Phase - 7	56.24	Deposit Work	
	Total Deposit Work	**85.54**		

Total Own Resources (Grids & Transmission Lines) = Rs. 1,359.76 Million.

Total Deposit Work = Rs.85.54 Million.

Total Federal PSDP = Rs.86.95 Million.

Total World Bank = Rs.706.66 Million.

Grand Total = Rs.2,238.91 Million.

Annex A
(192)

Information	Project Name		132 kV GSS Hattar Phase - 7	132 kV Hazara Steel								
	GC-I Grids		Deposit	Deposite								
S/No	Description	Unit	BOQ	BOQ	Total Demanded Grid Station Material	Net Requirement	15% Contingency	Proposed Rationalized Demand	Unit Rate	Total Estimated Funds Required	132 kV GSS Hattar Phase - 7	132 kV Hazara Steel
1	31.5/40 MVA Power Transformer	No	0	0	0	0	0	0	239000000	-	0	0
2	20/26 MVA Power Transformer	No	0	0	0	0	0.0	0	192000000	-	0	0
3	10/13 MVA Power Transformer	No	0	0	0	0	0	0	0	-	0	0
4	132 KV Circuit Breaker	Set	2	0	2	2	1.0	3	5717400	17,152,200.00	11434800	0
5	132 KV Line CTs	No	6	0	6	6	3.0	9	1885000	16,965,000.00	11310000	0
6	132 KV Transformer CTs	No	0	0	0	0	2.0	2	1950000	3,900,000.00	0	0
7	132 KV Neutral CT 1 amp	No	0	0	0	0	0.0	0	0	-	0	0
8	132 KV Bus Isolator	Sets	2	0	2	2	1.0	3	3600000	10,800,000.00	7200000	0
9	132 KV Line Isolator	Set	2	0	2	2	1.0	3	3750000	11,250,000.00	7500000	0
10	132 KV Lighting Arrestor	No	0	0	0	0	1.0	1	720000	720,000.00	0	0
11	11 KV Lighting Arrestor	No	0	0	0	0	2.0	2	44900	89,800.00	0	0
12	132 KV Potential Transformer	No	0	0	0	0	1.0	1	2304610	2,304,610.00	0	0
13	132 KV Beam	No	2	0	2	2	2.0	4	295680	1,182,720.00	591360	0
14	132 KV Column	No	3	0	3	3	2.0	5	814800	4,074,000.00	2444400	0
15	132 KV Earth Masts	No	0	0	0	0	0.0	0	381696	-	0	0
16	11 KV Structure	No	0	0	0	0	0.0	0	57600	-	0	0
17	11 KV Structure 5E'	No	0	0	0	0	0.0	0	375000	-	0	0
18	Control Panel CP-10	No	0	0	0	0	0.0	0	1100000	-	0	0
19	Control Panel CP-30	No	1	0	2	2	1.0	3	1016305	3,048,915.00	2032610	0
20	Control Panel CP-50	No	0	0	0	0	0.0	0	931849	-	0	0
21	Relay Panel RP-3	No	1	0	2	2	1.0	3	2147400	6,442,200.00	4294800	0
22	Relay Panel RP-4	No	0	0	0	0	0.0	0	2262000	-	0	0
23	Relay Panel RP-5	No	0	0	0	0	0.0	0	2400000	-	0	0
24	Connector Type TMLH	No	0	0	0	0	1.0	1	30000	30,000.00	0	0
25	Connector Type TMHH	No	12	0	12	12	6.0	18	30000	540,000.00	360000	0
26	Connector Type TM 63A	No	0	0	0	0	0.0	0	0	-	0	0
27	Connector Type TM 75A	No	0	0	0	0	5.0	5	38000	190,000.00	0	0
28	Connector Type 90BH30	No	0	0	0	0	2.0	2	50000	100,000.00	0	0
29	Connector Type 90B63F	No	0	0	0	0	0.0	0	0	-	0	0
30	Connector Type 90B75F	No	0	0	0	0	2.0	2	58000	116,000.00	0	0
31	Connector Type 90 MHF	No	0	0	0	0	0.0	0	32000	-	0	0
32	Connector Type 45 MHF	No	0	0	0	0	0.0	0	32000	-	0	0
33	Connector Type TDMHH (3-Way) (2x600mm-1x600mm)	No	0	0	0	0	0.0	0	55000	-	0	0
34	Connector Type TDMHH (4-Way) (2x600mm-2x600mm)	No	0	0	0	0	0.0	0	60000	-	0	0
35	Tension String for 600mm Conductor	No	0	0	0	0	2.0	2	45000	90,000.00	0	0
36	Single Suspension Fitting for 600mm Twin Bundling	Set	0	0	0	0	0.0	0	75000	-	0	0
37	132 KV Double Tension String Assembly with & without turn buckle	Set	0	0	0	0	0.0	0	100000	-	0	0
38	Spacer SH for 600 mm	No	0	0	0	0	0.0	0	15000	-	0	0
39	Aluminum Pipe 4M Long 75mm Dia	No	0	0	0	0	1.0	1	48000	48,000.00	0	0
40	Aluminium Pipe 4M Long 63mm Dia	No	0	0	0	0	0.0	0	0	-	0	0
41	Earth Wire Tension Assembaly with G/Clamp	No	0	0	0	0	6.0	6	32000	192,000.00	0	0
42	Aluminium Conductor 600mm2	Mtr	355	0	355	355	169.0	524	3600	1,886,400.00	1278000	0
43	Earth Wire 7/0.116 (9mm)	Mtr	0	0	0	0	72.0	72	415	29,880.00	0	0
44	132 KV Post Insulators	No	0	0	0	0	0.0	0	400000	-	0	0
45	11 KV Post insulator with Clamp	No	0	0	0	0	1.0	1	65000	65,000.00	0	0
46	Battery 110 Volt Bank (55 cells)	Sets	0	0	0	0	0.0	0	785000	-	0	0
47	Battery Charger	No	0	0	0	0	0.0	0	360000	-	0	0
48	Staton Auxiliary Panel (AC/DC)	No	0	0	0	0	0.0	0	3000000	-	0	0
49	Incomming Panel 40 MVA	No	0	1	1	1	0.0	1	6500000	6,500,000.00	0	6500000
50	Incomming Panel 20/26 MVA	No	0	0	0	0	0.0	0	6200000	-	0	0
51	Bus Coupler 25 KA 2500 A	No	0	0	0	0	0.0	0	3800000	-	0	0
52	Outgoing Panel 25 KA 2500 A	No	0	4	4	4	3.0	7	5700000	39,900,000.00	0	22800000
53	Auxiliary T/F 200 KVA	No	0	0	0	0	1.0	1	6100000	6,100,000.00	0	0
54	Earth Rod (16mm dia 3M long)	No	22	0	22	22	18.0	40	15000	600,000.00	330000	0
55	Earth Platform	No	6	0	6	6	3.0	9	65000	585,000.00	390000	0
56	Grounding Conductor (95mm2)	Mtr	455	0	455	455	833.0	1288	3200	4,121,600.00	1456000	0
57	Cartridge Type "A"	No	110	0	110	110	92.0	202	3000	606,000.00	330000	0
58	Mould for above	No	2	0	2	2	1.0	3	17000	51,000.00	34000	0
59	Cartridge Type "B"	No	35	0	35	35	51.0	86	3500	301,000.00	122500	0
60	Mould for above	No	1	0	1	1	1.0	2	17000	34,000.00	17000	0
61	Cartridge Type "C"	No	20	0	20	20	18.0	38	3000	114,000.00	60000	0
62	Mould for above	No	1	0	1	1	1.0	2	17000	34,000.00	17000	0

GC-I Grids			Deposit	Deposite								
S/No	Description	Unit	BOQ	BOQ	Total Demanded Grid Station Material	Net Requirement	15% Contingency	Proposed Rationalized Demand	Unit Rate	Total Estimated Funds Required	132 kV GSS Hattar Phase - 7	132 kV Hazara Steel
63	4x2.5mm (Control Cable)	Mtr	735	0	735	735	824.0	1559	1132	1,764,788.00	832020	0
64	8x2.5mm (Control Cable)	Mtr	595	0	595	595	797.0	1392	1589	2,211,888.00	945455	0
65	16x2.5mm (Control Cable)	Mtr	680	0	680	680	750.0	1430	2558	3,657,940.00	1739440	0
66	4x6.0mm (Control Cable)	Mtr	825	0	825	825	1369.0	2194	1845	4,047,930.00	1522125	0
67	500MCM (S/C) P/Cable	Mtr	0	0	0	0	68.0	68	4365	296,820.00	0	0
68	1000 MCM (S/C) Power Cable	Mtr	0	0	0	0	1388.0	1388	6712	9,316,256.00	0	0
69	AWG (3/Core 4/0) Power Cable	Mtr	0	0	0	0	29.0	29	10261	297,569.00	0	0
70	19/.83 Cable (4 Core)	Mtr	0	0	0	0	21.0	21	785	16,485.00	0	0
71	Outdoor T/Kit (1000 MCM S/Core)	Set	0	0	0	0	5.0	5	26000	130,000.00	0	0
72	Indoor T/Kit (1000 MCM S/Core)	Set	0	0	0	0	7.0	7	20000	140,000.00	0	0
73	Indoor T/kit (500 MCM S/core)	set	0	0	0	0	1.0	1	16000	16,000.00	0	0
74	Outdoor T/kit (500 MCM S/core)	set	0	0	0	0	1.0	1	19000	19,000.00	0	0
75	Outdoor T/Kit (AWG "3/Core 4/0")	Set	0	0	0	0	0.0	0	30000	-	0	0
76	Indoor T/Kit (AWG "3/Core 4/0")	Set	0	0	0	0	0.0	0	22000	-	0	0
77	Disk Insulator (80 KN)	No	0	0	0	0	16.0	16	5700	91,200.00	0	0
78	132 KV Metering Panel	No	0	0	0	0	0.0	0	0	-	0	0
79	LT Cable 4 Core 37/83	Mtr	0	0	0	0	6.0	6	785	4,710.00	0	0
80	SF-6 Gass Cylinder 40 KG	No	0	0	0	0	1.0	1	418500	418,500.00	0	0
81	OBDHF for C.B	No.	0	0	0	0	0.0	0	0	-	0	0
82	OBDH40 (3 way) 2x1 for Bus Isolator	No.	0	0	0	0	0.0	0	0	-	0	0
83	132KV Beams	No.	0	0	0	0	0.0	0	0	-	0	0
84	132KV Column	No.	0	0	0	0	0.0	0	0	-	0	0
85	Earth Wire 9mm2	Mtr.	0	0	0	0	0.0	0	0	-	0	0
86	AL Conductor 600mm2	Mtr	0	0	0	0	0.0	0	0	-	0	0
87	DISC INSULATOR 100KN.	No.	0	0	0	0	0.0	0	0	-	0	0
88	FH200	No.	0	0	0	0	0.0	0	0	-	0	0
89	FH400	No.	0	0	0	0	0.0	0	0	-	0	0
90	V-SHACKLE	No.	0	0	0	0	0.0	0	0	-	0	0
								Total		162,592,411.00	56,241,510.00	29,300,000.00

Anx. B

	Project Name		132KV S/C T/L Allai Power House to 132 KV GS Thakot	132 KV TL F/F HATTAR-3							132KV S/C T/L Allai Power House to 132 KV GS Thakot	132 KV TL F/F HATTAR-3
			Own Resources	Own Resources								
S.No	Description of Material	Unit	Qty	Qty.	Total Demanded Grid Stataion Material	Net Demand	15% Contingency	Total Proposed Demand	Unit Rate	Total Estimated Funds Required		
1	132 KV Steel Type SPA	No	0.0	0.0	0.0	0.0	0	0	2,977,467	-	0	0
2	132 KV Steel Type SPD	No	0.0	1.0	1.0	1.0	0	1	4,004,780	4,004,780	0	4004780
3	132 KV Steel Type SPG	No	0.0	2.0	2.0	2.0	0	2	5,397,745	-	0	10795490
4	EA Type Tower	No	0.0	0.0	0.0	0.0	0	0	5,426,240	-	0	0
5	4 M extension for EA	No	0	0	0.0	0	0	0	773,760	-	0	0
6	ED Type Tower	No	3	0	3.0	3	0	3	9,080,520	27,241,560	27241560	0
7	ZM-I Tower (Complete)	No	0	0	0.0	0	0	0	2,233,950	-	0	0
8	ZM-30 Type Tower (Complete)	No	40	0	40.0	40	6	46	3,540,930	162,882,780	141637200	0
9	3 M Extension for ZM-30	No	5	0	5.0	5	1	6	661,970	3,971,820	3309850	0
10	ZM-60 Type Tower (Complete)	No	11	1	12.0	12	2	14	1,729,920	24,218,880	19029120	1729920
11	Landative Tower (Complete)	No	1	0	1.0	1	0	1	3,325,280	3,325,280	3325280	0
12	ACSR Rail Conductor	KMtr	32	4.326	36.5	36.456	14	50	1,552,700	78,343,031	49888251	6716980.2
13	Disc Insulator 100 KN	No	3204	500	3704.0	3704	556	4260	5,800	24,708,000	18583200	2900000
14	Disc Insulator 80 KN	No	0	0	0.0	0	0	0	4,990	-	0	0
15	Repair Sleeve for Lynx	No	0	0	0.0	0	0	0	5,500	-	0	0
16	SBD for Lynx	No	0	0	0.0	0	0	0	12,500	-	0	0
17	ST Fiiting for Lynx	Set	0	0	0.0	0	0	0	36,000	-	0	0
18	SS Fitting for Rail	Set	0	0	0.0	0	0	0	38,000	-	0	0
19	ST Fitting for Rail	Set	398	60	458.0	458	69	527	55,000	28,985,000	21890000	3300000
20	SBD for Rail	No	394	60	454.0	454	68	522	15,000	7,830,000	5910000	900000
21	SS Fitting for Earth Wire	Set	0	0	0.0	0	0	0	11,000	-	0	0
22	Mid Span Joint for Earth Wire	No	6	5	11.0	11	2	13	3,500	45,500	21000	17500
23	PG Connector T-220	No	0	0	0.0	0	0	0	8,500	-	0	0
24	Grounding Sets	No	64	1	65.0	65	10	75	30,000	2,250,000	1920000	30000
									Total	367,806,631	292,755,461.00	30,394,670.20

Ann: C

706

	Project Name		132KV T/Line from 220KV GS Haripur - Hattar (SEZ)						
			PSDP						
S.No	Description of Material	Unit		Total Demanded Grid Stataion Material	15% Contingency	Total Proposed Demand	Unit Rate	Total Estimated Funds Required	132KV T/Line from 220KV GS Haripur - Hattar (SEZ)
1	132 KV Steel Type SPA	No	0.0	0.0	0	0	2977467	0	0
2	132 KV Steel Type SPD	No	0.0	0.0	0	0	4004780	0	0
3	132 KV Steel Type SPG	No	0.0	0.0	0	0	5397745	0	0
4	EA Type Tower	No	0.0	0.0	0	0	5426240	0	0
5	4 M extension for EA	No	0	0.0	0	0	773760	0	0
6	ED Type Tower	No	0	0.0	0	0	9080520	0	0
7	ZM-I Tower (Complete)	No	0	0.0	0	0	2233950	0	0
8	ZM-30 Type Tower (Complete)	No	0	0.0	6	6	3540930	21245580	0
9	3 M Extension for ZM-30 Tower	No	0	0.0	1	1	661970	661970	0
10	ZM-60 Type Tower (Complete)	No	0	0.0	2	2	1729920	3459840	0
11	Landative Tower (Complete)	No	0	0.0	0	0	3325280	0	0
12	ACSR Rail Conductor	KMtr	56	56.0	14	70	1552700	108689000	86951200
13	Disc Insulator 100 KN	No	0	0.0	556	556	5800	3224800	0
14	Disc Insulator 80 KN	No	0	0.0	0	0	4990	0	0
15	Repair Sleeve for Lynx	No	0	0.0	0	0	5500	0	0
16	SBD for Lynx	No	0	0.0	0	0	12500	0	0
17	ST Fiiting for Lynx	Set	0	0.0	0	0	36000	0	0
18	SS Fitting for Rail	Set	0	0.0	0	0	38000	0	0
19	ST Fitting for Rail	Set	0	0.0	69	69	55000	3795000	0
20	SBD for Rail	No	0	0.0	68	68	15000	1020000	0
21	SS Fitting for Earth Wire	Set	0	0.0	0	0	11000	0	0
22	Mid Span Joint for Earth Wire	No	0	0.0	2	2	3500	7000	0
23	PG Connector T-220	No	0	0.0	0	0	8500	0	0
24	Grounding Sets	No	0	0.0	10	10	30000	300000	0
						Total		142,403,190	86,951,200.00

Ann: D
(1 of 2)

Information	Project Name		132 kV GSS Hattar Phase - 7	132 kV Hazara Steel								
	GC-I Grids		Deposit	Deposite								
S/No	Description	Unit	BOQ	BOQ	Total Demanded Grid Station Material	Net Requirement	15% Contingency	Proposed Rationalized Demand	Unit Rate	Total Estimated Funds Required	132 kV GSS Hattar Phase - 7	132 kV Hazara Steel
1	31.5/40 MVA Power Transformer	No	0	0	0	0	0	0	239000000	-	0	0
2	20/26 MVA Power Transformer	No	0	0	0	0	0.0	0	192000000	-	0	0
3	10/13 MVA Power Transformer	No	0	0	0	0	0	0	0	-	0	0
4	132 KV Circuit Breaker	Set	2	0	2	2	1.0	3	5717400	17,152,200.00	11434800	0
5	132 KV Line CTs	No	6	0	6	6	3.0	9	1885000	16,965,000.00	11310000	0
6	132 KV Transformer CTs	No	0	0	0	0	2.0	2	1950000	3,900,000.00	0	0
7	132 KV Neutral CT 1 amp	No	0	0	0	0	0.0	0	0	-	0	0
8	132 KV Bus Isolator	Sets	2	0	2	2	1.0	3	3600000	10,800,000.00	7200000	0
9	132 KV Line Isolator	Set	2	0	2	2	1.0	3	3750000	11,250,000.00	7500000	0
10	132 KV Lighting Arrestor	No	0	0	0	0	1.0	1	720000	720,000.00	0	0
11	11 KV Lighting Arrestor	No	0	0	0	0	2.0	2	44900	89,800.00	0	0
12	132 KV Potential Transformer	No	0	0	0	0	1.0	1	2304610	2,304,610.00	0	0
13	132 KV Beam	No	2	0	2	2	2.0	4	295680	1,182,720.00	591360	0
14	132 KV Column	No	3	0	3	3	2.0	5	814800	4,074,000.00	2444400	0
15	132 KV Earth Masts	No	0	0	0	0	0.0	0	381696	-	0	0
16	11 KV Structure	No	0	0	0	0	0.0	0	57600	-	0	0
17	11 KV Structure 58'	No	0	0	0	0	0.0	0	375000	-	0	0
18	Control Panel CP-10	No	0	0	0	0	0.0	0	1100000	-	0	0
19	Control Panel CP-30	No	2	0	2	2	1.0	3	1016305	3,048,915.00	2032610	0
20	Control Panel CP-50	No	0	0	0	0	0.0	0	931849	-	0	0
21	Relay Panel RP-3	No	2	0	2	2	1.0	3	2147400	6,442,200.00	4294800	0
22	Relay Panel RP-4	No	0	0	0	0	0.0	0	2262000	-	0	0
23	Relay Panel RP-5	No	0	0	0	0	0.0	0	2400000	-	0	0
24	Connector Type TMLH	No	0	0	0	0	1.0	1	30000	30,000.00	0	0
25	Connector Type TMHH	No	12	0	12	12	6.0	18	30000	540,000.00	360000	0
26	Connector Type TM 63A	No	0	0	0	0	0.0	0	0	-	0	0
27	Connector Type TM 75A	No	0	0	0	0	5.0	5	38000	190,000.00	0	0
28	Connector Type 90BH30	No	0	0	0	0	2.0	2	50000	100,000.00	0	0
29	Connector Type 90B63F	No	0	0	0	0	0.0	0	0	-	0	0
30	Connector Type 90B75F	No	0	0	0	0	2.0	2	58000	116,000.00	0	0
31	Connector Type 90 MHF	No	0	0	0	0	0.0	0	32000	-	0	0
32	Connector Type 45 MHF	No	0	0	0	0	0.0	0	32000	-	0	0
33	Connector Type TDMHH (3-Way) (2x600mm-1x600mm)	No	0	0	0	0	0.0	0	55000	-	0	0
34	Connector Type TDMHH (4-Way) (2x600mm-2x600mm)	No	0	0	0	0	0.0	0	60000	-	0	0
35	Tension String for 600mm Conductor	No	0	0	0	0	2.0	2	45000	90,000.00	0	0
36	Signle Suspension Fitting for 600mm Twin Bundling	Set	0	0	0	0	0.0	0	75000	-	0	0
37	132 KV Double Tension String Assembly with & without turn buckle	Set	0	0	0	0	0.0	0	100000	-	0	0
38	Spacer SH for 600 mm	No	0	0	0	0	0.0	0	15000	-	0	0
39	Aluminium Pipe 4M Long 75mm Dia	No	0	0	0	0	1.0	1	48000	48,000.00	0	0
40	Aluminium Pipe 4M Long 63mm Dia	No	0	0	0	0	0.0	0	0	-	0	0
41	Earth Wire Tension Assembaly with G/Clamp	No	0	0	0	0	6.0	6	32000	192,000.00	0	0
42	Aluminium Conductor 600mm2	Mtr	355	0	355	355	169.0	524	3600	1,886,400.00	1278000	0
43	Earth Wire 7/0.116 (9mm)	Mtr	0	0	0	0	72.0	72	415	29,880.00	0	0
44	132 KV Post Insulators	No	0	0	0	0	0.0	0	400000	-	0	0
45	11 KV Post Insulator with Clamp	No	0	0	0	0	1.0	1	65000	65,000.00	0	0
46	Battery 110 Volt Bank (55 cells)	Sets	0	0	0	0	0.0	0	785000	-	0	0
47	Battery Charger	No	0	0	0	0	0.0	0	360000	-	0	0
48	Staton Auxiliary Panel (AC/DC)	No	0	0	0	0	0.0	0	3000000	-	0	0
49	Incomming Panel 40 MVA	No	0	1	1	1	0.0	1	6500000	6,500,000.00	0	6500000
50	Incomming Panel 20/26 MVA	No	0	0	0	0	0.0	0	6200000	-	0	0
51	Bus Coupler 25 KA 2500 A	No	0	0	0	0	0.0	0	3800000	-	0	0

GC-I Grids			Deposit	Depusite								
S/No	Description	Unit	BOQ	BOQ	Total Demanded Grid Stataion Material	Net Requirement	15% Contingency	Proposed Rationalized Demand	Unit Rate	Total Estimated Funds Required	132 kV GSS Hattar Phase - 7	132 kV Hazara Steel
52	Outgoing Panel 25 KA 2500 A	No	0	4	4	4	3.0	7	5700000	39,900,000.00	0	22800000
53	Auxiliary T/F 200 KVA	No	0	0	0	0	1.0	1	6100000	6,100,000.00	0	0
54	Earth Rod (16mm dia 3M long)	No	22	0	22	22	18.0	40	15000	600,000.00	330000	0
55	Earth Platform	No	6	0	6	6	3.0	9	65000	585,000.00	390000	0
56	Grounding Conductor (95mm2)	Mtr	455	0	455	455	833.0	1288	3200	4,121,600.00	1456000	0
57	Cartridge Type "A"	No	110	0	110	110	92.0	202	3000	606,000.00	330000	0
58	Mould for above	No	2	0	2	2	1 0	3	17000	51,000.00	34000	0
59	Cartridge Type "B"	No	35	0	35	35	51.0	86	3500	301,000.00	122500	0
60	Mould for above	No	1	0	1	1	1.0	2	17000	34,000.00	17000	0
61	Cartridge Type "C"	No	20	0	20	20	18.0	38	3000	114,000.00	60000	0
62	Mould for above	No	1	0	1	1	1.0	2	17000	34,000.00	17000	0
63	4x2.5mm (Control Cable)	Mtr	735	0	735	735	824.0	1559	1132	1,764,788.00	832020	0
64	8x2.5mm (Control Cable)	Mtr	595	0	595	595	797.0	1392	1589	2,211,888.00	945455	0
65	16x2.5mm (Control Cable)	Mtr	680	0	680	680	750.0	1430	2558	3,657,940.00	1739440	0
66	4x6.0mm (Control Cable)	Mtr	825	0	825	825	1369.0	2194	1845	4,047,930.00	1522125	0
67	500MCM (S/C) P/Cable	Mtr	0	0	0	0	68.0	68	4365	296,820.00	0	0
68	1000 MCM (S/C) Power Cable	Mtr	0	0	0	0	1388.0	1388	6712	9,316,256.00	0	0
69	AWG (3/Core 4/0) Power Cable	Mtr	0	0	0	0	29.0	29	10261	297,569.00	0	0
70	19/.83 Cable (4 Core)	Mtr	0	0	0	0	21.0	21	785	16,485.00	0	0
71	Outdoor T/Kit (1000 MCM S/Core)	Set	0	0	0	0	5.0	5	26000	130,000.00	0	0
72	Indoor T/Kit (1000 MCM S/Core)	Set	0	0	0	0	7.0	7	20000	140,000.00	0	0
73	Indoor T/kit (500 MCM S/core)	set	0	0	0	0	1 0	1	16000	16,000.00	0	0
74	Outdoor T/kit (500 MCM S/core)	set	0	0	0	0	1 0	1	19000	19,000.00	0	0
75	Outdoot T/Kit (AWG "3/Core 4/0")	Set	0	0	0	0	0.0	0	30000	-	0	0
76	Indoor T/Kit (AWG "3/Core 4/0")	Set	0	0	0	0	0.0	0	22000	-	0	0
77	Disk Insulator (80 KN)	No	0	0	0	0	16.0	16	5700	91,200.00	0	0
78	132 KV Metering Panel	No	0	0	0	0	0.0	0	0	-	0	0
79	LT Cable 4 Core 37/83	Mtr	0	0	0	0	6.0	6	785	4,710.00	0	0
80	SF-6 Gass Cylinder 40 KG	No	0	0	0	0	1.0	1	418500	418,500.00	0	0
81	OBDHF for C.B	No.	0	0	0	0	0.0	0	0	-	0	0
82	OBDH40 (3 way) 2x1 for Bus Isolator	No.	0	0	0	0	0.0	0	0	-	0	0
83	132KV Beams	No.	0	0	0	0	0 0	0	0	-	0	0
84	132KV Column	No.	0	0	0	0	0.0	0	0	-	0	0
85	Earth Wire 9mm2	Mtr.	0	0	0	0	0.0	0	0	-	0	0
86	AL Conductor 600mm2	Mtr	0	0	0	0	0 0	0	0	-	0	0
87	DISC INSULATOR 100KN.	No.	0	0	0	0	0.0	0	0	-	0	0
88	FH200	No.	0	0	0	0	0.0	0	0	-	0	0
89	FH400	No.	0	0	0	0	0 0	0	0	-	0	0
90	V-SHACKLE	No.	0	0	0	0	0.0	0	0	-	0	0
								Total		162,592,411.00	56,241,510.00	29,300,000.00

D
(2 of 2)

Doc No: N26
For Distribution

HEZECO PROPOSED ANNUAL PROCUREMENT PLAN FY 2024-2025

Item Code	Item Description	Uom	Average Issued to HAZCO FY 22-23	Annaul Procurement Plan Propossed FY 24-25 on the base of Average Issuence of FY 22-23 with 5% Growth)
001213	HT STRUCTURE 58 FT	Ea	29	369
075007	HT STRUCTURE 45	Ea	92	1,165
001210	HT STRUCTURE 34.8	Ea	96	1,203
001220	LT STRUCTURE 30.8	Ea	184	2,318
001117	HT PC SPUN POLE 45 FEET	Ea	1	19
001113	HT PC SPUN POLE 36 Feet	Ea	0	0
001122	LT PC SPUN POLE	Ea	0	0
002110	ACSR DOG	Mtr	14,180	178,673
002120	ACSR RABBIT	Mtr	21,210	267,241
002160	ACSR OSPREY	Mtr	25,799	325,070
002330	AAC WASP Conductor	Mtr	7,072	89,104
002340	AAC ANT Conductor	Mtr	91,072	1,147,507
002365	Insulated Rabbit Conductor	Mtr	1,285	16,187
008110	25 KVA DISTRIBUTION T/F	Ea	10	125
008120	50 KVA DISTRIBUTION T/F	Ea	16	206
008130	100 KVA DISTRIBUTION T/F	Ea	7	91
008140	200 KVA DISTRIBUTION T/F	Ea	7	87
003140	GALVANISED STEEL WIRE 10MM STRANDED	KG	5,089	64,123
005110	LT Spool Insulator	Ea	1,807	22,764
005210	11 KV PIN INSULATOR	Ea	1,194	15,038
005230	11 KV DISC INSULATOR	Ea	510	6,423
005430	11 KV STEEL PIN	Ea	1,210	15,250
006250	CROSS ARM 11 KV LATTICE STEEL(D-FITTING	Ea	44	554
006260	CROSS ARM 11 KV ANGLE IRON	Ea	491	6,183
010710	SINGLE STRUCTURE PLATFORM	Ea	30	381
010720	DOUBLE STRUCTURE PLATFORM	Ea	12	152
011131	Nut & Bolt 5/8" x 1 1/2"	Ea	2	26

HEZECO PROPOSED ANNUAL PROCUREMENT PLAN FY 2024-2025

Item Code	Item Description	Uom	Average Issued to HAZCO FY 22-23	Annaul Procurement Plan Propossed FY 24-25 on the base of Average Issuence of FY 22-23 with 5% Growth)
011141	Nut & Bolt 1/2" x 1 1/2"	Ea	287	3,612
011510	D-SHACKLE ASSEMBLY (D-Bracket)	Ea	1,886	23,764
012441	CT LT 100/5 AMP	Ea	11	143
012442	CT LT 200/5 AMP	Ea	6	80
012443	CT LT 400/5 AMP	Ea	5	67
012444	CT LT 800/5 AMP	Ea	3	38
076033	DEAD END CLAMP FOR OSPRAY CONDUCTO	Ea	12	151
013924	11 KV DROPOUT CUTOUT SINGLE INSULATO	Ea	138	1,736
014241	PVC Cable 7/.052 10mm2 T/Core	Mtr	7,695	96,953
014252	PVC CABLE 19/.052 4-Core	Mtr	561	7,065
014253	PVC CABLE 19/.083 4-Core	Mtr	840	10,578
014254	PVC CABLE 37/.083 4-Core	Mtr	370	4,660
015510	DEAD-END CLAMP FOR DOG / RABBIT	Ea	242	3,053
015210	EARTHING ROD 10 FEET	Ea	847	10,675
015310	STAY ROD WITH ELBOW AND THIMBLE	Ea	207	2,602
015390	EYE NUT	Ea	338	4,257
080999	Single Phase Static Meter	Ea	2,130	26,841
091210	3-PHASE, AMR WHOLE CURRENT METERS	Ea	91	1,145
091220	3-PHASE, AMR CT/PT METERS	Ea	6	82
018352	LT Capacitor 450 KVAR	Ea		0
014124	15 KV XLPE 500 MCM S/C CABLE (UNARMOU	Mtr	75	940
090488	Universal Meter Frame 520mm x 640mm (n	Ea		25,000
004110	P.G. CONNECTOR TYPE S-117	Ea		0
004120	P.G. CONNECTOR TYPE S-157	Ea		0
004130	P.G. CONNECTOR TYPE T-110	Ea	373	4,700
004150	P.G. CONNECTOR TYPE T-150	Ea	93	1,173
004170	P.G. CONNECTOR TYPE T-220	Ea	77	976

Doc No: N27

12 MONTH PROJECTIONS ON EXPECTED LOAD, NUMBER OF CONSUMERS AND EXPECTED SALE OF UNITS FOR EACH CONSUMER CATEGORY: (As per growth rate of previous five year)

Year	Expected Sale (GWh) for HAZECO 2023-24*							
	Domestic	Commercial	Small Industry	Medium & Large	Bulk	Irrigation	Public Lighting	Total (GWh)
Jul-23	83.95	13.55	0.82	76.31	45.30	0.41	0.13	**220**
Aug-23	87.91	14.19	0.86	79.91	47.44	0.43	0.14	**231**
Sep-23	84.34	13.62	0.82	76.67	45.51	0.42	0.13	**222**
Oct-23	65.20	10.53	0.64	59.27	35.18	0.32	0.10	**171**
Nov-23	61.60	9.95	0.60	55.99	33.24	0.30	0.10	**162**
Dec-23	64.95	10.49	0.63	59.04	35.05	0.32	0.10	**171**
Jan-24	69.60	11.24	0.68	63.26	37.55	0.34	0.11	**183**
Feb-24	59.49	9.61	0.58	54.07	32.10	0.29	0.09	**156**
Mar-24	69.63	11.24	0.68	63.29	37.57	0.34	0.11	**183**
Apr-24	76.02	12.27	0.74	69.10	41.02	0.37	0.12	**200**
May-24	76.27	12.32	0.74	69.33	41.16	0.38	0.12	**200**
Jun-24	94.13	15.20	0.92	85.56	50.79	0.46	0.15	**247**
Total	**893.11**	**144.22**	**8.72**	**811.80**	**481.90**	**4.40**	**1.40**	**2346**

* Annual Growth Rate in Sale: 4.4%

ANNEX "N27"

Year	Expected Demand (MW) for HAZECO 2023-24							
	Domestic	Commercial	Small Industry	Medium & Large	Bulk	Irrigation	Public Lighting	Total (MW)
Jul-23	281.46	42.90	2.05	228.75	140.57	1.31	0.44	**635**
Aug-23	275.21	41.95	2.00	223.67	137.45	1.29	0.43	**665**
Sep-23	282.79	43.10	2.06	229.83	141.24	1.32	0.45	**638**
Oct-23	307.17	46.82	2.23	249.64	153.41	1.43	0.49	**493**
Nov-23	206.55	31.48	1.50	167.87	103.16	0.96	0.33	**466**
Dec-23	217.64	33.17	1.58	176.87	108.70	1.02	0.34	**491**
Jan-24	233.15	35.54	1.70	189.48	116.44	1.09	0.37	**526**
Feb-24	199.46	30.40	1.45	162.10	99.62	0.93	0.32	**450**
Mar-24	233.59	35.60	1.70	189.84	116.67	1.09	0.37	**527**
Apr-24	254.87	38.85	1.85	207.13	127.29	1.19	0.40	**575**
May-24	255.76	38.98	1.86	207.85	127.73	1.19	0.40	**577**
Jun-24	315.59	48.10	2.29	256.48	157.62	1.47	0.50	**712**

* Annual Growth Rate in Demand: 3%

712

Year	Expected Number of Consumers in HAZECO for 2023-24							
	Domestic	Commercial	Industrial	Bulk	Agriculture	Public Lighting	others	Total
Oct-23	694933	69463	3533	182	674	194	7826	776805
Nov-23	697574	69727	3546	183	677	195	7856	779757
Dec-23	700225	69992	3560	183	679	195	7886	782720
Jan-24	702885	70258	3573	184	682	196	7916	785694
Feb-24	705556	70525	3587	185	684	197	7946	788680
Mar-24	708237	70793	3601	185	687	198	7976	791677
Apr-24	710929	71062	3614	186	690	198	8006	794685
May-24	713630	71332	3628	187	692	199	8037	797705
Jun-24	716342	71603	3642	188	695	200	8067	800736
Jul-24	719064	71875	3656	188	697	201	8098	803779
Aug-24	721797	72148	3670	189	700	201	8129	806834
Sep-24	724539	72422	3684	190	703	202	8159	809899

* Annual Consumer Growth Rate: 4.2 %

Doc No: N28

ANNEX "N28"

714

INVESTMENT PLAN (2023-24 TO 2027-28)

HAZARA ELECTRIC SUPPLY COMPANY

715

Table of Contents

1. Purpose and Goal of Investment Plan

716

The Integrated Investment Plan entails HAZECO's vision, mission, core values, stakeholders' needs, general indicators, sales and consumer forecasts, power supply issues with limitations, human resources and organizational development, financial projections, regulatory requirements including quality of service, subsidies and legal restrictions affecting timely collection of delinquent payments, performance indices with initiatives and risk assessment and will serve as a central reference document for integrated cross-functional planning that will help HAZECO make informed decisions based on priorities.

The goal of the Investment Plan/Business Plan is to create a document which will be used by the CEO and senior managers of HAZECO to focus its activities and energies for the next five years in making HAZECO a financially viable company by improving the regulation and governance of the entity, introducing new technologies including upgrade of existing technology and machinery and improving human resources in line with best practices worldwide. This plan will also be utilized by the Strategic Planning Committee to the Board for regular monitoring, to ensure that the company achieves its stated objectives.

This Investment Plan covers a five-year period from 2023-24 to 2027-28, encompassing the following areas:

- Defining the activities and resources available to HAZECO through the incorporation agreements and laws relating to it
- Illustrating the strategic objectives for 2023-24 to 2027-28, aligned with optimally achievable scenario as defined by the regulator, which designated coordinators prepared to accomplish the strategic goals in the five-year timeframe of the Investment Plan
- Projecting the financial impact on HAZECO's bottom-line of implementing the project plans

i. Major Planning Situation

717

The following challenges faced by HAZECO require integrated cross functional planning:

- Technical challenges and technological advances that require HAZECO to upgrade the network, including metering to receive and measure continuous and reliable flow of power.
- Operational challenges to maintain continuous flow of reliable power to the customers and meet their expectations in demand dominated, load-shedding driven regime.
- Institutional challenges faced while developing the capacity of HAZECO.
- Smooth power evacuation, especially related to variable renewable being integrated in the network.
- Compliance with applicable laws and regulations.
- Social responsibility to conserve energy and social up-lift.

ii. Company's Investment Plan

The five-year Investment Plan (2023-24 to 2027-28) is intended to be used by HAZECO managers and the Strategic Planning Committee of the Board of Directors as a reference guide to the upgradation and operations of HAZECO, taking into consideration the activities projected to occur in the next five years. Although the Investment Plan is based on a five-year window, it will be a living document and will be updated to reflect changes in requirements.

The investment plan of HAZECO is based on the Achievable Scenario and it is prepared to demonstrate the overall needs of the DISCO to meet the benchmarks specified by NEPRA in five years.

2. Executive Summary

718

Under this five-year plan, HAZECO will expand and rehabilitate its Transmission and Distribution (T&D) systems. Moreover, plans have been prepared to improve the financial, commercial, human resource and communications functions, including IT that supports the main T&D business. From new grid stations to AMRs for commercial improvements, initiatives have been planned to improve the overall performance of the company in an integrated manner.

Abstract of the business plan is presented hereunder:

Costs Summary:

- Total Cost: Rs. 18372 Million

Benefits Summary:

- Total Benefits: Savings of 275 MKWh of energy through loss reduction and smooth dispersal of power from new generation.

Scope of Works:

- Construction of New Grid Station = 04 No.s
- Conversion of Grid Station = 03 No.s
- Augmentation of Power Transformer = 01 No.s
- Extension of Power Transformer = 01 No.s
- Rehabilitation of Grid Station = 09 No.s
- New Transmission Lines = 80 Km
- Reconductoring of Transmission Lines = 39 Km
- Bifurcation of 11 Kv Feeders = 23 No.s
- Reconductoring of HT Lines = 230 Km
- Installation of Transformers = 679 No.s
- Reconductoring of LT lines = 115 Km

3. Existing Network

7/9

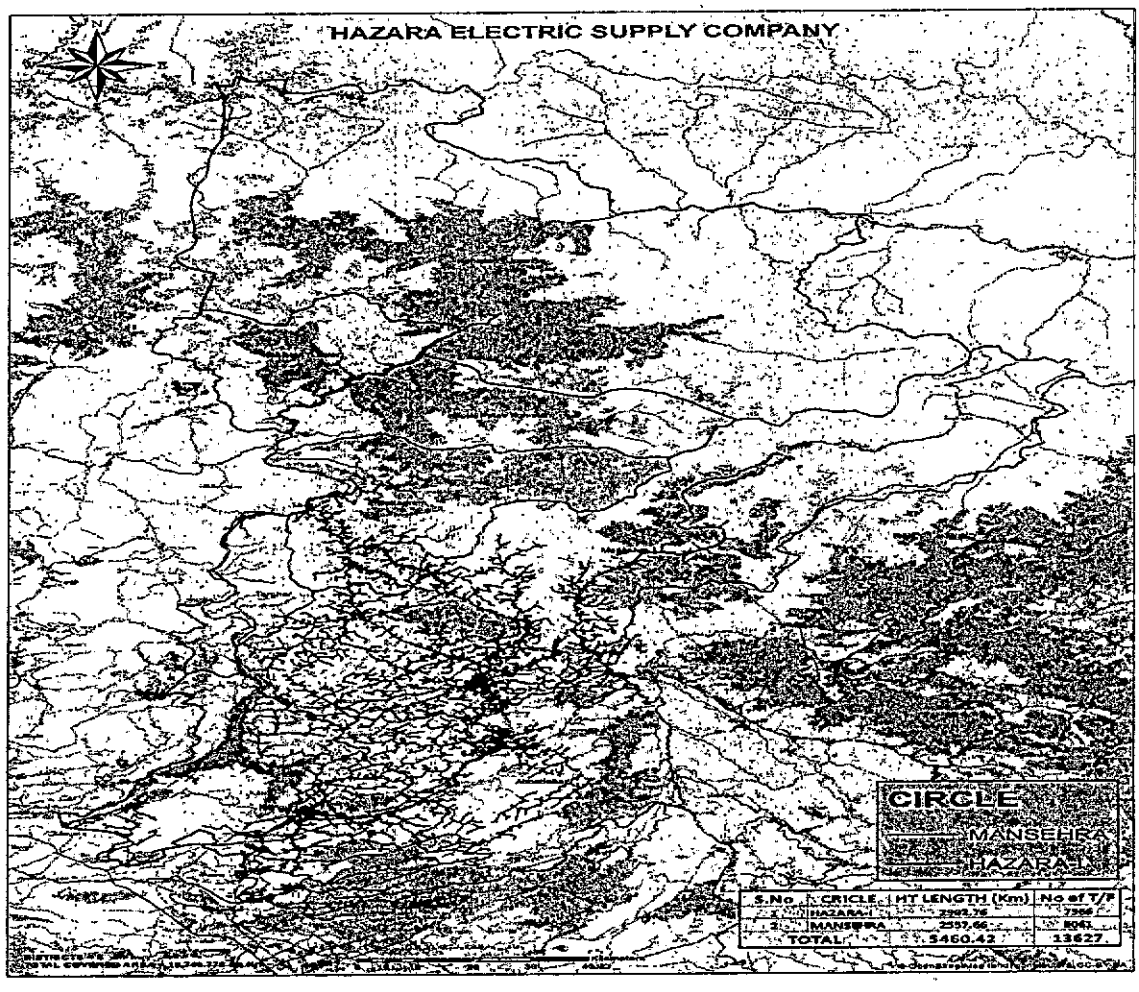
i. Secondary Transmission and Distribution Network Condition

HAZECO has 01 grid station of 220 kv, 19 grid stations of 132 kv, 02 grid stations of 66 kv, 02 grid stations of 33 kv and 04 consumer grid stations thus making a total of 28 grid stations. HAZECO serves 0.77 million customers through 210 number of distribution feeders with a total length of 5373 km of HT Lines and 12813 km of LT Lines. The total number of distribution transformers in HAZECO is 13505.

ii. Geographic Coverage

Hazara Electric Supply Company, HAZECO, is a Public Limited Utility Company, responsible for the distribution of electric power to the population of Hazara Division.

HAZECO's service area comprises of 08 civil districts of KPK, spanning a total service area of 16749 sq.km and 0.77 million consumers.

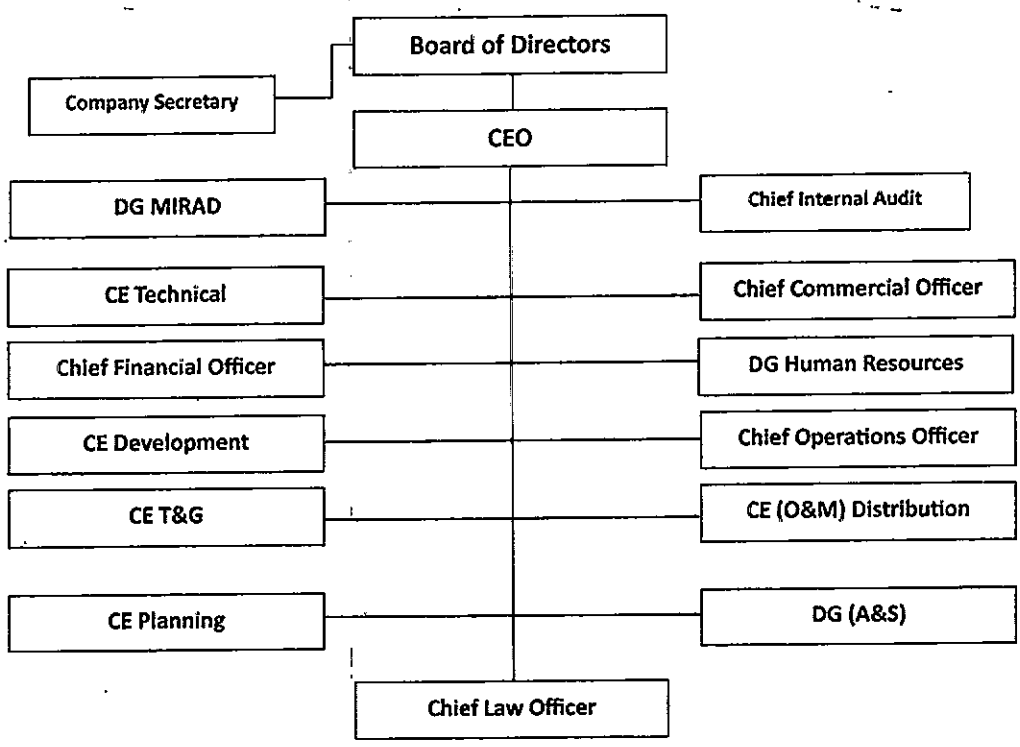


720

iii. Company's Structure, Human Resources and Corporate Governance

The following organogram explains the management hierarchy of HAZECO.

Its Board of Directors is responsible for overall policy making, decision making and guiding the authority. The day-to-day affairs of the company are run by its eight Executive Directors who are responsible for their respective functions, under the overall control of the Chief Executive Officer.

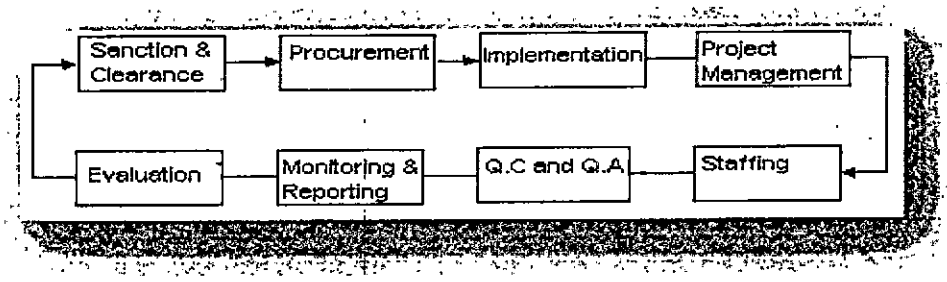


iv. Existing Project Design and Implementation System of DISCO

The project design and implementation system of HAZECO is based on the resource allocation (the anticipated amount of material required and obtained for the execution of the project), resource leveling (the required amount of resources to be provided at a proper time e.g, at the start of a phase, more work force and less material may be required as compared to the growth or maturity stage) and resource scheduling/loading (the amount of resources required during the specified phase of the project. HAZECO has the required capability, personnel and expertise to implement and execute a project. It has well-established, functioning departments that are capable of handling projects of similar nature and magnitude. Some of these departments are as under:

- Engineering
- Material Management
- Finance
- Commercial

Project implementation is summarized in the form of a flow chart as below:



Further, to align its planning department with the current and future needs of the business, HAZECO will restructuring its overall planning function.

v. Existing Operation System of DISCO

The existing administrative layout of HAZECO operation system is given below:

Description	Circles	Divisions	Subdivisions	R/O Office
Distribution	02	07	33	07

Each Distribution division has one revenue /customer service office. The distribution circles, divisions, customer services offices and subdivisions deal with all types of customers of the company. The Grid System Operation (GSO) circle, divisions and subdivisions take care of and maintain the power supply through 132kV and 66kV systems comprising of the transmission lines and grid stations while the Grid System Construction (GSC) executes 66kV and 132kV grid station and transmission lines works. The Metering and Testing (M&T) section takes care of the installation, maintenance and testing of energy meters of all types. The Construction Section undertakes the implementation and execution of investment programs of 11kV and LT (0.4 kV), System Augmentation Program (ELR and DOP), deposit works and village electrification.

4. Projects and Programs – Scope

722

i. Secondary Transmission System

This section covers scope for the expansion and rehabilitation of secondary transmission network (132 kV and or 66 kV) of HAZECO.

The business plan will enable HAZECO to achieve the NEPRA's specified Performance Standards Distribution and provision of the Transmission and Distribution Code, especially the Distribution Planning Code issued by NEPRA.

The proposed sub–Transmission Lines and Grid Stations works for HAZECO are separately identified in the formats below:

HAZECO PROPOSED GRID STATIONS & TRANSMISSION LINES (Scope)

Sr No	Name of Grid Station / Transmission Line	Type	Transformer		T/Line		Length (km)	Year	Estimated Cost (Rs Million)
			31.5/40 MVA	20/26 MVA					
Grid Station									
1	132 KV Haripur (Power T/F)	Ext:		1				2023-24	150
2	132 KV Sarai Salih, (Haripur)	Con:		2	D/C	Lynx	2	2024-25	810
3	132 KV Pattan	Con:		1	D/C	Rail	5	2024-25	700
4	132 KV Haripur (Power T/F) **World Bank Project**	Aug:	1					2024-25	300
5	132 KV Thakot	Con:		1	SDT	Lynx	20	2025-26	930
6	132 KV Shinkyari, Mansehra	New		2	D/C	Lynx	5	2026-27	1130
7	132KV Abbottabad-II	New	2		D/C	Lynx	2	2026-27	1150
8	132KV Hattar-III near Bilal Masjid	New	2		D/C	Lynx	1	2026-27	1110
9	132 KV Gandaf	New		1	SDT	Lynx	35	2027-28	1450

Transmission Line

8	220 kV Haripur - Hattar SEZ D/C T/Line for SEZ Long term arrangment	New T/L			D/C	Rail	5	2025-26	350
9	Re conductoring of 132 kV AMC Abbottabad – Murree Road Abbottabad T/Line **(World Bank Project)**	Recond:			S/C	Greeley / HTLS	6	2025-26	250
10	Reconductoring of 132 kV New Wah - Hattar T/Line **(World Bank Project)**	Recond:			S/C	Greeley / HTLS	28	2026-27	600
11	132 kV New Wah – Hattar In/Out at 220 kV Haripur	New T/L			D/C	Rail	5	2026-27	250
12	220/132KV Mansehra – 132KV AMC A/Abad Line Upgradation of remaining portion	Recond:			S/C	Rail	5	2027-28	150
	TOTAL		**5**	**8**			**119**		**9330**

HAZECO NEW DEPOSIT / CONSURMER GRID STATIONS

S NO	NAME OF GRID STATION	TYPE	LOAD (MW)
1	132 KV Hazara Steel	New	20
2	132 KV Karachi Steel	New	15
3	132 KV Nomi / Hattar Steel	New	25
4	132 KV Ghani Industries	New	22
5	132 KV Hattar SEZ	New	73
6	132 KV Pak Steel	New	50

HAZECO STG-Expansion and Rehabilitation

a. Grid Stations (Scope)

Sr No:	Description	Total No	Total Capacity (MVA)	2023-24	2024-25	2025-26	2026-27	2027-28
1	**New**							
a	132 KV	4	238				3	1
2	**Conversion**							
a	66 to 132 KV	1	28		1			
b	33 to 132 KV	2	36		1	1		
3	**Augmentation**							
a	132 KV	1	14		1			
b	66 KV	0						
4	**Extension (Transformer)**							
a	132 KV	1	26	1				
b	66 KV	0						
6	**Rehabilitation**							
a	132 KV	0						
Total		**9**	**342**	**1**	**3**	**1**	**3**	**1**

b. Transmission Lines (Scope)

i **New Line**

Sr No:	Description	Total Length (km)	2023-24	2024-25	2025-26	2026-27	2027-28
1	132 KV D/C	25		7	5	13	
2	132 KV SDT	55			20		35

ii **Rehabilitation/Reconductoring/Up-gradation**

Sr No:	Description	Total Length (km)	2023-24	2024-25	2025-26	2026-27	2027-28
1	132 KV D/C	0					
2	132 KV SDT	39			6	28	5
3	132 KV Addl: Ckt	0					

725

ii. Expansion and Rehabilitation – Scope

The distribution Voltage is 11 KV on HT and 0.4 KV on LT system. Estimation of material requirement is made on the basis of SDI. All aspects are considered while deciding the design and requirement of material e.g., requirement of new line for urban as well as for Rural area. For reconductoring of urban area's line as well as rural area are considered keeping in view the size of conductor as well. Different types of assemblies are selected which is used commonly and estimation for a specific assembly is made separately.

For economical and safety purpose, PC Poles will be utilized along with Steel structure for extension of HT/LT lines in the areas under electrification. The ratio of steel structures and PC' poles will be maintained as 10:90. ACSR and AAC will be used for the purpose of current carrying from the Grid Station to the point of DS/utilization. 25 KVA, 50 KVA, 100 KVA, 200 KVA sizes of Distribution Transformers will be used. Span length of structures and P.C Poles has been worked out according to SDI so as to ensure adequate clearance, safety as well as avoiding obstruction in normal life.

a. Scope of ELR

The scope of Work for Rehabilitation is tabulated here under:

Evaluation of Material Requirements For ELR

Scope of material requirements under the Distribution Rehabilitation Project is calculated as per data collected upto 06/2023 and detailed in the following section.

The BOQs for different ELR measures have been developed as follows:

New 11 KV Switchgear (Control Panels)

11 KV panels to be added according to the following break-up:

Panels for express feeders to be built for Shifting/bifurcation of existing feeders	18 Nos

ACSR Conductors for new express line construction

It is estimated that 18-Nos feeders will require construction of express lines for their bifurcation. On average 15 km of 3-phase HT line will be constructed per feeder based

on historical construction data. The overall share of different ACSR conductors in the total of 270 km of lines is estimated based on historical construction data and the segregate is given as below:

Km Line				
Osprey	66%	270 x 0.66		178 Km
Dog	33.33%	270 x 0.3333		90 Km
500 MCM cable	0.67%	270 x 0.0067		02 Km
			Total	**270 Km**

Calculation of Material for 11 KV System Rehabilitation

(i) 11 kV Line Re-conductoring

Estimated re-conductoring per feeder based on sample studies, works out to be = 10 Km

Estimated % share of different Conductors in re-conductoring:

Osprey	50%
Dog	40%
Rabbit	10%

Number of feeders for rehabilitation 18 Nos.

Therefore, total re-conductoring length 18 x 10 180 Km

The quantities of ACSR conductors required for re-conductoring are therefore:

Km Line				
Osprey	50%	180 x 0.500	90	KM
Dog	40%	180 x 0.400	72	KM
Rabbit	10%	180 x 0.100	18	KM
		Total	180	KM

(ii) Capacitor Applications for Power Factor Improvement

The sample studies indicate that at an average, one capacitor bank of 450 kVAR is needed per feeder for improving the power factor to 95% from existing average power

factor of 85% on the selected feeders. For 18 No. 11 kV feeders, the requirement of capacitor banks of 450 Kvar each will, therefore, be 18 Nos.

(iii) Installation of New Transformers

The number of new transformers required for installation is worked out as follows.

Share of Transformers

25 kVA	38	Nos.
50 kVA	161	Nos.
100 kVA	152	Nos.
200 kVA	47	Nos.
	Total: 397	**Nos.**

(iv) New LT Lines

Each new transformer is estimated to have at least seven LT circuits of (1.130 km). Based on this estimation, the LT line conductor is calculated as follows:

Total LT line required: $\frac{1130 \times 397}{1000}$ = 449 Km

The final estimated conductor lengths are therefore:

New 3-φ LT line (Wasp)	16 km
New 3-φ LT line (Ant)	433 km

(v) LT Line Reconductoring

The average LT line reconductoring per LT rehabilitation proposal is estimated based on historical as:

3-φ, Wasp conductor line		0.16 km per work order
3-φ, Ant Conductor line		0.01 km per work order
LT line reconductoring (3-φ, Wasp)	397 x 0.16	64 km
LT line reconductoring (3-φ, Ant)	397 x 0.01	4 km

728

(vi) New 11 KV Lines

The final estimated conductor lengths are therefore:

Rabbit (Conversion LT Feeders)	155 km
Insulated Rabbit	08 km

(vii) Energy Meters

The requirement of energy meters for replacement of defective meters is estimated as per Historic data which is distributed year wise.

No.	Description	Unit	Per Feeder	Quantities					
				2023-24	2024-25	2025-26	2026-27	2027-28	Total
				3 Feeders (11 KV)	4 Feeders (11 KV)	4 Feeders (11 KV)	3 Feeders (11 KV)	4 Feeders (11 KV)	18 Feeders (11 KV)
A.	**Material For 18 No. 11KV Feeders**								
1.	New 11 KV Lines								
	a. Osprey	KM	9.9	30	40	40	30	40	178
	b. Dog	KM	5	15	20	20	15	20	90
	c. 11 KV 500 MCM Cable	KM	0.1	0	0	0	0	0	2
	Sub Total	KM	15.000	45	60	60	45	60	270
2.	11 KV Line Reconductoring								
	a. Osprey	KM	5	15	20	20	15	20	90
	b. Dog	KM	4	12	16	16	12	16	72
	c. Rabbit	KM	1	3	4	4	3	4	18
	Sub Total	KM	10.00	30	40	40	30	40	180
3.	11KV Capacitors								
	Fixed 11 KV 450 KVAR	set	1	3	4	4	3	4	18
	Sub Total	set	1	3	4	4	3	4	18
4.	11KV Panels	No.	1	3	4	4	3	4	18
5	11KV 500 MCM Cable	KM	0.3	1	1	1	1	1	5

No.	Description	Unit	Per Proposal	Quantities					
				2023-24	2024-25	2025-26	2026-27	2027-28	Total
B	**Detail of LT Proposals Involving New Transformers & Various Type of Material**								
7	**Transformers**								
	a. 25 KVA	No.		17	19	1	1	1	38
	b. 50 KVA	No.		40	39	28	28	28	161
	c. 100 KVA	No.		31	32	30	30	30	152
	d. 200 KVA	No.		9	10	9	9	9	47
	Sub Total	No.		96	100	67	67	67	397
8	**New 11 KV Lines**								
	Rabbit (Conversion LT Feeders)	KM	0.39	37	39	26	26	26	155
	Insulated Rabbit	KM	0.021	2	2	1	1	1	8
	Sub Total	KM	0.411	37	39	26	26	26	163
C	**New LT Line**								
9	a. 3-Phase Wasp Line	KM	0.04	4	4	3	3	3	16
	b. 3-Phase ANT Line	KM	1.09	105	108	73	73	73	433
	Sub Total	KM	1.130	108	112	76	76	76	449

230

10	**LT Line Re-Conductoring**								
	a. 3-Phase Wasp	KM	0.16	15	16	11	11	11	64
	b. 3-Phase Ant	KM	0.01	1	1	1	1	1	4
	Sub Total	KM	0.170	16	17	11	11	11	67
D	**Other Equipment and Material**								
11	**Energy Meters (against defective)**								
	a. Single Phase	No.		14404	15125	15881	16675	17509	79593
	b. Three Phase	No.		1625	1707	1792	1881	1976	8981
	Sub Total	No.		16030	16831	17673	18556	19484	88574

b. Scope of DOP

732

Evaluation of Material Requirements For DOP

Scope of material requirements under the Distribution Expansion Project is calculated as per data collected upto 06/2023 and detailed in the following section.

The BOQs for different DOP measures have been developed as follows:

New 11 KV Switchgear (Control Panels)

11 KV panels to be added according to the following break-up:

Panels for express feeders to be built for
Shifting/bifurcation of existing feeders 05 Nos

ACSR Conductors for new express line construction

It is estimated that 05-Nos feeders will require construction of express lines for their bifurcation. On average 15 km of 3-phase HT line will be constructed per feeder based on historical construction data. The overall share of different ACSR conductors in the total of 75 km of lines is estimated based on historical construction data and the segregate is given as below:

Km Line

Osprey	66%	75 x 0.66		50 Km
Dog	33.33%	75 x 0.3333		25 Km
500 MCM cable	0.67%	75 x 0.0067		0.5 Km
			Total	**75 Km**

Calculation of Material for 11 KV System

(i) 11 kV Line Re-conductoring

Estimated re-conductoring per feeder based on sample studies, works out to be = 10 Km

Estimated % share of different Conductors in re-conductoring:

Osprey 50%
Dog 40%

733

Rabbit	10%	
Number of feeders for rehabilitation		05 Nos.
Therefore, total re-conductoring length	05 x 10	50 Km

The quantities of ACSR conductors required for re-conductoring are therefore:

Km Line

Osprey	50%	05 x 0.500	25 KM
Dog	40%	05 x 0.400	20 KM
Rabbit	10%	05 x 0.100	05 KM
		Total	50 KM

(ii) Capacitor Applications for Power Factor Improvement

The sample studies indicate that at an average, one capacitor bank of 450 kVAR is needed per feeder for improving the power factor to 95% from existing average power factor of 85% on the selected feeders. For 05 No. 11 kV feeders, the requirement of capacitor banks of 450 Kvar each will, therefore, be 05 Nos.

(iii) Augmentation of Over-loaded Transformers

The number of transformers required for replacement against overloading is worked out as follows:

Share of Transformers required for Augmentation.

25 kVA	15	Nos.
50 kVA	94	Nos.
100 kVA	75	Nos.
200 kVA	97	Nos.
Total:	**282**	**Nos.**

(iv) New LT Lines

Each transformer is estimated to have at least seven LT circuits of (1.13 km). Based on this estimation, the LT line conductor is calculated as follows:

Total LT line required: $\frac{1130 \times 282}{1000}$ = 318 Km

734

The final estimated conductor lengths are therefore:

New 3-φ LT line (Wasp)	11 km
New 3-φ LT line (Ant)	307 km

(v) LT Line Reconductoring

The average LT line reconductoring per LT proposal is estimated based on historical trend as:

3-φ, Wasp conductor line		0.16 km per work order
3-φ, Ant Conductor line		0.01 km per work order
LT line reconductoring (3-φ, Wasp)	282 x 0.16	45 km
LT line reconductoring (3-φ, Ant)	282 x 0.01	3 km

(vi) New 11 KV Lines

The final estimated conductor lengths are therefore:

Rabbit (Conversion LT Feeders)	110 km
Insulated Rabbit	06 km

(vii) Energy Meters

The requirement of energy meters for installation of new meters is estimated as per our demand for each year.

No.	Description	Unit	Per Feeder	Quantities					
				2023-24	2024-25	2025-26	2026-27	2027-28	Total
				1 Feeders (11 KV)	1 Feeders (11 KV)	1 Feeders (11 KV)	1 Feeders (11 KV)	1 Feeders (11 KV)	5 Feeders (11 KV)
A.	**Material For 05 No. 11KV Feeders**								
1.	New 11 KV Lines								
	a. Osprey	KM	9.9	10	10	10	10	10	50
	b. Dog	KM	5	5	5	5	5	5	25
	c. 11 KV 500 MCM Cable	KM	0.1	0	0	0	0	0	1
	Sub Total	KM	15.000	15	15	15	15	15	75
2.	11 KV Line Reconductoring								
	a. Osprey	KM	5	5	5	5	5	5	25
	b. Dog	KM	4	4	4	4	4	4	20
	c. Rabbit	KM	1	1	1	1	1	1	5
	Sub Total	KM	10.00	10	10	10	10	10	50
3.	11KV Capacitors								
	Fixed 11 KV 450 KVAR	set	1	1	1	1	1	1	5
	Sub Total	set	1	1	1	1	1	1	5
4.	11KV Panels	No.	1	1	1	1	1	1	5
5	11KV 500 MCM Cable	KM	0.3	0	0	0	0	0	2

No	Description	Unit	Per Proposal	Quantities					
				2023-24	2024-25	2025-26	2026-27	2027-28	Total
B	**Detail of LT Proposals Involving New Transformers & Various Type of Material**								
7	**Transformers**								
	a. 25 KVA	No.		5	6	2	2	2	15
	b. 50 KVA	No.		7	8	26	26	26	94
	c. 100 KVA	No.		12	12	17	17	17	75
	d. 200 KVA	No.		15	16	22	22	22	97
	Sub Total	No.		40	41	67	67	67	282
8	**New 11 KV Lines**								
	Rabbit (Conversion LT Feeders)	KM	0.39	15	16	26	26	26	110
	Insulated Rabbit	KM	0.021	1	1	1	1	1	6
	Sub Total	KM	0.411	15	16	26	26	26	116
C	**New LT Line**								
9	a. 3-Phase Wasp Line	KM	0.04	2	2	3	3	3	11
	b. 3-Phase ANT Line	KM	1.09	43	45	73	73	73	307
	Sub Total	KM	1.130	45	46	76	76	76	318
10	**LT Line Re-Conductoring**								
	a. 3-Phase Wasp	KM	0.16	6	7	11	11	11	45

	b. 3-Phase Ant	KM	0.01	0	0	1	1	1	3
	Sub Total	KM	0.170	7	7	11	11	11	48
D 11	**Other Equipment and Material** **Energy Meters**								
	a. Single Phase	No.		14676	15410	16180	16989	17839	81094
	b. Three Phase	No.		2348	2466	2589	2718	2854	12975
	Sub Total	No.		17024	17875	18769	19708	20693	94069

738

5. Details of Costing

The detailed costs of Transmission, Distribution and functional plans is provided hereunder:

i. STG-Expansion and Rehabilitation Costing

a.	Grid Stations Cost							
								Rs. In Million
Sr No.	Description	Total Cost	Total Capacity (MVA)	2023-24	2024-25	2025-26	2026-27	2027-28
1	**New**							
a	132 KV	3530	238				2980	550
2	**Conversion**							
a	66 to 132 KV	750	28		750			
b	33 to 132 KV	1000	36		500	500		
3	**Augmentation**							
a	132 KV	300	14		300			
b	66 KV							
4	**Extension (Transformer)**							
a	132 KV	150	26	150				
b	66 KV							
6	**Rehabilitation**							
	132 KV	0						
	Total	**5730**	**342**	**150**	**1550**	**500**	**2980**	**550**

739

b.	Transmission Lines Cost						
							Rs. In Million
i	New Line						
Sr No.	Description	Total Cost	2023-24	2024-25	2025-26	2026-27	2027-28
1	132 KV D/C	1270		260	350	660	
2	132 KV SDT	1330			430		900
ii	Rehabilitation/Reconductoring/Up-gradation						
Sr No.	Description	Total Cost	2023-24	2024-25	2025-26	2026-27	2027-28
1	132 KV D/C	0					
2	132 KV SDT	0					
3	132 KV Addl: Ckt	0					
iii	Reconductoring/ rerouting						
Sr No.	Description	Total Cost	2023-24	2024-25	2025-26	2026-27	2027-28
1	132 KV D/C						
2	132 KV SDT	1000			250	600	150
Total Cost		**3600**	**0**	**260**	**1030**	**1260**	**1050**

ii. Distribution Expansion and Rehabilitation Costing

a. Costing of ELR

No.	Description	Total Cost in Million Rs.					
		2023-24	2024-25	2025-26	2026-27	2027-28	Total
		3 Feeders (11 KV)	4 Feeders (11 KV)	4 Feeders (11 KV)	3 Feeders (11 KV)	4 Feeders (11 KV)	18 Feeders (11 KV)
A.	**Material For 18 No. 11KV Feeders**						
1.	New 11 KV Lines						
	a. Osprey	157	210	210	157	210	944
	b. Dog	47	62	62	47	62	280
	c. 11 KV 500 MCM Cable	1	1	1	1	1	5
	Sub Total	205	273	273	205	273	1230
2.	11 KV Line Reconductoring						
	a. Osprey	51	68	68	51	68	307
	b. Dog	19	25	25	19	25	115
	c. Rabbit	3	4	4	3	4	19
	Sub Total	73	98	98	73	98	441
3.	11KV Capacitors						
	Fixed 11 KV 450 KVAR	0	1	1	0	1	3
	Sub Total	0	1	1	0	1	3
4.	11KV Panels	7	10	10	7	10	44
5	11KV 500 MCM Cable	3	4	4	3	4	16
6	**Total (Item 1 to 5) Cost of HT Feeders**	**289.01**	**385.35**	**385.35**	**289.01**	**386.53**	**1735**

No.	Description	Total Cost in Million Rs.					
		2023-24	2024-25	2025-26	2026-27	2027-28	Total
B 7	**Detail of LT Proposals Involving New Transformers & Various Type of Material**						
	a. 25 KVA	9.5	10.8	0.3	0.3	0.3	21.3
	b. 50 KVA	33.0	32.1	22.9	22.9	22.9	133.9
	c. 100 KVA	39.9	41.3	38.5	38.5	38.5	196.6
	d. 200 KVA	16.9	19.0	18.0	18.0	18.0	89.8
	Sub Total	99.3	103.2	79.7	79.7	79.7	441.6
8	**New 11 KV Lines**						
	Rabbit (Conversion LT Feeders)	58.572	60.707	40.970	40.970	40.970	242.188
	Insulated Rabbit	0.306	0.318	0.214	0.214	0.214	1.267
	Sub Total	58.878	61.025	41.184	41.184	41.184	243.455
C	**New LT Line**						
9	a. 3-Phase Wasp Line	6.053	6.273	4.234	4.234	4.234	25.027
	b. 3-Phase ANT Line	154.210	159.832	107.867	107.867	107.867	637.642
	Sub Total	160.263	166.105	112.100	112.100	112.100	662.669
10	**LT Line Re-Conductoring**						
	a. 3-Phase Wasp	10.515	10.898	7.355	7.355	7.355	43.479
	b. 3-Phase Ant	0.559	0.579	0.391	0.391	0.391	2.311
	Sub Total	11.074	11.478	7.746	7.746	7.746	45.789
	a. Single Phase	46.829	49.170	51.628	54.210	56.920	258.757
	b. Three Phase	55.097	57.852	60.745	63.782	66.971	304.447
	Sub Total	101.926	107.022	112.373	117.992	123.891	563.204

E	Total (Item 7 to 11) Cost of LT	431.412	448.876	353.085	358.703	364.603	1956.679

No	Description	Total Cost in Million Rs.					
		2023-24	2024-25	2025-26	2026-27	2027-28	Total
F	Total (Item 1 to 11) Cost of HT & LT Proposals	720	834	738	648	751	3692
G	12% Store Charges	86	100	89	78	90	443
H	8% Installation Charges	58	67	59	52	60	295
I	Total Material Cost (F+G+H)	865	1001	886	777	901	4430
J	Contingency (3%)	26	30	27	23	27	133
K	Total Material Cost(I+J)	890	1031	913	801	928	4563
L	Escalated Cost @ 29%	209	242	214	188	218	1071
M	Total Material Cost (K+L) ELR	1099	1273	1127	988	1146	5634

b. Costing of DOP

S.No.	Description	Total Cost in Million Rs					
		2023-24	2024-25	2025-26	2026-27	2027-28	Total
		1 Feeders (11KV)	1 Feeders (11 KV)	1 Feeders (11 KV)	1 Feeders (11 KV)	1 Feeders (11 KV)	5 Feeders (11 KV)
A.	**Material For 05 No. 11KV Feeders**						
1.	New 11 KV Lines						
	a. Osprey	52	52	52	52	52	262
	b. Dog	16	16	16	16	16	78
	c. 11 KV 500 MCM Cable	0	0	0	0	0	1
	Sub Total	68	68	68	68	68	342
2.	11 KV Line Reconductoring						
	a. Osprey	17	17	17	17	17	85
	b. Dog	6	6	6	6	6	32
	c. Rabbit	1	1	1	1	1	5
	Sub Total	24	24	24	24	24	122
3.	11KV Capacitors						
	Fixed 11 KV 450 KVAR	0	0	0	0	0	1
	Sub Total	0	0	0	0	0	1
4.	11KV Panels	2	2	2	2	2	12
5	11KV 500 MCM Cable	1	1	1	1	1	4
6	**Total (Item 1 to 5) Cost of HT Feeders**	**96.34**	**96.34**	**96.34**	**96.34**	**98.01**	**483**

NO	Description	Total Cost in Million Rs.					
		2023-24	2024-25	2025-26	2026-27	2027-28	Total
B 7	**Detail of LT Proposals Involving New Transformers & Various Type of Material Transformer**						
	a. 25 KVA	2.8	3.1	0.9	0.9	0.9	8.7
	b. 50 KVA	6.0	6.4	22.0	22.0	22.0	78.4
	c. 100 KVA	15.7	15.7	22.1	22.1	22.1	97.6
	d. 200 KVA	29.6	30.0	42.3	42.3	42.3	186.4
	Sub Total	54.0	55.2	87.3	87.3	87.3	371.0
8	**New 11 KV Lines**						
	Rabbit (Conversion LT Feeders)	24.161	24.966	40.939	40.939	40.939	171.944
	Insulated Rabbit	0.126	0.131	0.214	0.214	0.214	0.900
	Sub Total	24.287	25.097	41.153	41.153	41.153	172.844
C	**New LT Line**						
9	a. 3-Phase Wasp Line	2.497	2.580	4.231	4.231	4.231	17.768
	b. 3-Phase ANT Line	63.612	65.732	107.786	107.786	107.786	452.703
	Sub Total	66.108	68.312	112.017	112.017	112.017	470.471
10	**LT Line Re-Conductoring**						
	a. 3-Phase Wasp	4.337	4.482	7.350	7.350	7.350	30.868
	b. 3-Phase Ant	0.231	0.238	0.391	0.391	0.391	1.640
	Sub Total	4.568	4.720	7.740	7.740	7.740	32.509
D	**Other Equipment and Material**						
11	**Energy Meters**						

	a. Single Phase	47.712	50.097	52.602	55.232	57.994	263.637
	b. Three Phase	79.603	83.583	87.762	92.150	96.757	439.855
	Sub Total	127.314	133.680	140.364	147.382	154.751	703.492
E	**Total (Item 7 to 11) Cost of LT**	**276.280**	**287.002**	**388.547**	**395.565**	**402.934**	**1750.327**

No.	Description	Total Cost in Million Rs.					
		2023-24	2024-25	2025-26	2026-27	2027-28	Total
F	**Total (Item 1 to 11) Cost of HT & LT Proposals**	373	383	485	492	501	2234
G	**12% Store Charges**	45	46	58	59	60	268
H	**8% Installation Charges**	30	31	39	39	40	179
I	**Total Material Cost (F+G+H)**	447	460	582	590	601	2680
J	**Contingency (3%)**	13	14	17	18	18	80
K	**Total Material Cost(I+J)**	461	474	599	608	619	2761
L	**Escalated Cost @ 29%**	108	111	141	143	145	648
M	**Total Material Cost(K+L) DOP**	**569**	**585**	**740**	**751**	**764**	**3409**

796

Hazara Electric Supply Company

Investment Plan

Description	Units	2023-24	2024-25	2025-26	2026-27	2027-28	Total
		Projected	Projected	Projected	Projected	Projected	
DOP	[Mln Rs]	1099	1273	1127	988	1146	**5634**
ELR	[Mln Rs]	569	585	740	751	764	**3409**
STG	[Mln Rs]	150	1510	1280	3640	1600	**8180**
World Bank Project (STG)	[Mln Rs]		300	250	600		**1150**
Total		1818	3668	3397	5979	3511	18372

747

7. Benefits of the Project

i. Tangible Benefits

Year	MVA to be Added		Energy to be available (MKWH)	
	Current	Cumulative	Current	Cumulative
2023-24	26	26	96.80	96.80
2024-25	64	90	238.27	335.07
2025-26	14	104	52.12	387.19
2026-27	212	316	789.28	1176.47
2027-28	26	342	96.80	1273.27

STG Saving

Year	Saving in Losses (MW)		Potential Saving in Energy (MKWH)	
	Current	Cumulative	Current	Cumulative
2023-24	0.10	0.10	0.48	0.48
2024-25	2.60	2.70	12.53	13.01
2025-26	3.30	6.00	15.90	28.91
2026-27	2.2	8.20	10.60	39.51
2027-28	0.50	8.70	2.41	41.92

Distribution Saving

728

Year	HT Rehab	LT Rehab
	Units MKWh	Units MKWh
	Realistic	Realistic
2023-2024	6.5	2.7
2024-2025	14.58	5.54
2025-2026	22.68	8.22
2026-2027	29.16	10.9
2027-2028	37.26	13.58

ii. Non-tangible Benefits

The other benefits like improvement in voltage profile, improving the overloading of the network will be achieved after completion of the project.

749

8. Financial Projections

Please find below the income statement, balance sheet and cash flow of HAZECO for tariff control period.

Hazara Electric Supply Company

Financial Statements	PESCO	PESCO	HAZECO	HAZECO	HAZECO	HAZECO		Rs. In Million
INCOME STATEMENT	Audited	Audited	Projected HEZECO	Projected	Projected	Projected	Projected	Projected
	2021-22	2022-23	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28
QUANTITATIVE DATA								
NO. OF CUSTOMERS (Million)	3.86	4.19	0.74	0.77	0.80	0.84	0.88	0.92
Growth in No. of customers(%)	31.19%	8.60%	4.20%	4.30%	4.40%	4.50%	4.60%	4.70%
UNITS SOLD (Mill. kWh)	10,394	9,584	828	869	911	958	1,007	1,059
UNITS PURCHASED (Mill kWh)	16,561	15,244	961	1,003	1,047	1,094	1,144	1,198
Growth in units purchased (%)								
UNITS LOST / DISTRIBUTION LOSSES (Mill. kWh)	6,167	5,660	133	134	136	136	137	139
FREE ELECTRICITY								
UNITS LOST / DISTRIBUTION LOSSES (% Age) *	37.24%	37.13%	13.88%	13.34%	12.98%	12.43%	12.00%	11.61%
AVERAGE SALES TARIFF (Rs./kWh)								
DISTRIBUTION CHARGE(Rs./kWh)								
Company TARIFF (Rs./kWh)	21.68	27.74	27.74	28.74	29.74	30.74	31.74	32.74
Consumer Tariff	16.53	23.09	23.09	24.34	25.64	26.74	27.84	28.54
PURCHASE PRICE (Rs./kWh)	16.53	20.84	20.84	21.09	21.34	21.59	21.84	22.09
SALES								
Sale of Power	171,813	240,224	5,542	5,780	6,034	6,306	6,596	6,906
Rental & Service income	49	52	4	5	5	5	6	6
Total Sales	171,782	240,276	5,546	5,785	6,039	6,311	6,602	6,912
Subsidy	51,390	34,332	2,966	3,145	3,345	3,548	3,764	4,029
Amortization of deferred Credit	2,071	2,309	199	212	225	239	253	271
	225,243	276,917	8,712	9,142	9,610	10,098	10,619	11,212
Purchase of Power	292,803	317,624	27,440	21,145	22,337	23,615	24,988	26,462
Gross Profit	-67,559.6	-40,707	-18,728	-12,003	-12,727	-13,518	-14,369	-15,249
OPERATING EXPENSESS								
	24,558	29,648	2,561	2,716	2,889	3,064	3,250	3,479
Maintenance & repair and Others	1,039	1,018	88	93	99	105	112	119
Depreciation	3,680	4,210	364	386	410	435	462	494
Provision for Bad Debt	8,849	10,913	943	1,000	1,063	1,128	1,196	1,281
Total Operating Expenses	38,127	45,790	3,956	4,195	4,462	4,732	5,020	5,374
OPERATING PROFIT / (LOSS)	-105,686	-86,496	-22,684	-16,198	-17,189	-18,249	-19,389	-20,623
ADD: Other Income	7,735	10,120	874	927	986	1,046	1,109	1,188
EBIT	-97,951	-76,376	-21,810	-15,271	-16,202	-17,204	-18,279	-19,435
LESS: Interest Expense	1,914	1,066	92	98	104	110	117	125
PROFIT / (LOSS) BEFORE TAX	-99,866	-77,442	-21,902	-15,368	-16,306	-17,314	-18,396	-19,560
Income Tax/Turnover tax	2,262	3,153	272	90	94	98	103	108
NET PROFIT/LOSS FOR THE YEAR	-102,128	-80,595	-22,174	-15,458	-16,400	-17,412	-18,499	-19,668

750

Financial Statements

Rs. In Million

Balance Sheet	Audited	Audited	Projected HESCO	Projected	Projected	Projected	Projected	Projected
	2021-22	2022-23	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28
Assets								
Fixed Assets								
Gross Fixed Assets	107,485	121,954	2,813	2,984	3,173	3,365	3,570	3,822
LESS: Accumulated Depreciation	39,112	43,322	999	1,060	1,127	1,195	1,268	1,358
Net Fixed Assets	68,373	78,632	1,814	1,924	2,046	2,170	2,302	2,464
Capital Work in Progress	33,544	37,384	862	915	973	1,032	1,094	1,171
Long Term Advances, Deposit	9	9	0.209	0	0	0	0	0
Current Assets								
Inventory / Stores & Spares	5,096	5,801	134	142	151	160	170	182
Account Receivable	172,810	197,313	4,552	4,827	5,134	5,445	5,776	6,183
Less: Provision for Bad Debt	92,827	103,740	2,393	2,538	2,699	2,863	3,037	3,251
Net Accounts Receivable	79,983	93,573	2,192	2,325	2,472	2,622	2,781	2,978
Receivable from Associated Companies	1,479	1,627	38	40	42	45	48	51
Receivable from TESCO	44,958	46,307	0	0	0	0	0	0
Advances, Deposits, Prepay. & Other Rec.	124,548	133,131	3,071	3,257	3,464	3,674	3,897	4,172
Cash & Bank Balances	9,252	10,257	237	251	267	283	300	321
Total Current Assets	238,935	245,842	5,671	6,014	6,396	6,783	7,196	7,704
TOTAL ASSETS	340,861	361,867	8,348	8,854	9,415	9,985	10,593	11,339
Liabilities & Equity	(0.00)	0						
Shareholders' Equity	20,176	20,176	465	494	525	557	591	632
Retained Earnings	-379,544	-438,221	-10,109	-10,721	-11,402	-12,092	-12,828	-13,732
Total Equity	-359,367	-418,045	-9,644	-10,227	-10,877	-11,535	-12,237	-13,100
Long Term / Deferred Liabilities								
ADB Loans/PHP Loan	7,867	8,061	186	197	210	222	236	253
Liability against govt.Loan	50,187	50,187	1,158	1,228	1,306	1,385	1,469	1,573
Deferred Credits (Consumer's Capital Cont. etc.)	126,421	148,528	3,426	3,634	3,862	4,095	4,344	4,650
Employees Retirement Benefits	45,483	50,479	1,165	1,235	1,313	1,393	1,478	1,582
Total Long Term / Deferred Liability	229,958	257,255	5,935	6,295	6,693	7,099	7,530	8,062
Payable to CPPA for Supplies-Plan deficit & Others	462,690	512,133	11,815	12,529	13,325	14,132	14,992	16,049
Payable to Associated Companies	2,144	3,146	73	77	82	87	92	99
Creditors, Accrued & Other Liabilities	5,436	7,377	170	180	192	204	216	231
Total current Liabilities	470,270	522,656	12,057	12,787	13,599	14,422	15,300	16,378
TOTAL LIABILITIES AND EQUITY	340,861	361,867	8,348	8,854	9,415	9,985	10,593	11,340

751

Financial Statements

Rs. In Million

CASH FLOW STATEMENT	Projected 2021-2022	Projected 2022-2023	Projected HEZECO 2022-2023	Projected 2022-2024	Projected 2022-2025	Projected 2022-2026	Projected 2022-2027	Projected 2022-2028
CASHFLOW FROM OPERATING ACTIVITIES								
Net Profit (loss) for the Period after tax	-99,866	-77,442	-1,787	-1,895	-2,015	-2,137	-2,267	-2,427
Adjustments:								
ADD: Depreciation	3,709	4,210	97	103	110	116	123	132
Amortisation of Deferred Income	-2,071	-2,309	-53	-56	-60	-64	-68	-72
Provision for Bad Debts	8,060	10,913	252	267	284	301	319	342
Intrest Income	-971	-1,504	-35	-37	-39	-42	-44	-47
Provision for Ret. Benefits	11,006	15,047	347	368	391	415	440	472
Interest Expense	1,914	1,066	25	26	28	29	31	33
Cash Flow from Operations	-78,216	-50,016	-1,154	-1,224	-1,301	-1,380	-1,464	-1,567
Working Capital Changes								
(Increase)/Decrease in Debtors	-10,501	-2,778	-64	-68	-72	-77	-81	-87
(Increase)/Decrease in Inventories	-258	-1,236	-29	-30	-32	-34	-36	-39
(Increase)/Decrease in Advances, Deposit,etc	-16,590	-29,557	-682	-723	-769	-816	-865	-926
Increase/(Decrease) in Creditors,accrued and other liabilities	50,339	69,167	1,596	1,692	1,800	1,909	2,025	2,167
	22,990	35,596	821	871	926	982	1,042	1,115
Payment for Ret. Benefits	-6,779	-9,095	-210	-223	-237	-251	-266	-285
Cash Flow from Operating Activities	-62,005	-23,515	-543	-575	-612	-649	-688	-737
Cash Generated From Operation								
Financial Charges Paid	-4,178	-10,161	-234	-249	-264	-280	-297	-318
Interest Received	0	0	0	0	0	0	0	0
Capital Reciepts -Deferred Credit		5,941	137	145	155	164	174	186
Net Cash flow From Operating activities	-66,183	-27,735	-640	-679	-722	-765	-812	-869
CASH FROM INVESTING ACTIVITIES:	-0	0						
Fixed Assets Acquired	-19,965	-18,306	-422	-448	-476	-505	-536	-574
Capital Work in Progress	7,218	8,306	192	203	216	229	243	260
Long Term Advances	3	4	0	0	0	0	0	0
Cash In/(Out) flow from Investing Activities	-12,746	-9,999	-231	-245	-260	-276	-293	-313
CASH FROM FINANCING ACTIVITIES								
NEW LOAN ADB(ERRA)	74,705	38,739	894	948	1,008	1,069	1,134	1,214
Cash In/(Out) flow from Financing Activities	74,705	38,739	894	948	1,008	1,069	1,134	1,214
Net Cashflow During the Year	-4,224	1,005	23	25	26	28	29	32
Cash - Start of the Year	13,476	9,252	213	226	241	255	271	290
Short Term Investment								
Cash - End of the Year	9,252	10,257	237	251	267	283	300	321

ANNEX "H 29"

752

HAZECO shall adopt NEPRA's standard Consumer Service Manual

ANNEX "N30/2

30/2.

Doc No: ~~21/1~~

753

BILLING AND COLLECTION PROCEDURE

BILLING:

Meter Reading Lists are prepared in advance by the **Computer Center**. They are sent to the Revenue Office who arranges for meter readings to be entered on the lists by the meter reading staff in the Sub-divisional Officer, follow up meter readings are prepared manually in Sub-Divisions. After entry of readings in the Sub-Divisional Office, the Meter Reading Lists are returned to the Revenue Office where control records over the computer billing are maintained. After entry in the Revenue Office Records the meter reading lists are collected together in a batch file for each Sub-Division. The batch number is comprised of the Sub-Division number (**1 digit**) and the billing cycle day number (**2 digits**). The batch files are then passed to the Computer Center alongwith **Forwarding Memo (CP-Form-80)**.

Consumer bills are prepared in the Computer Center and sent to the Revenue Office for distribution to consumers. Bills are distributed by Bill Distributors who are under the control of the Sub-Divisional Officer.

With preparation of consumers bill the computer also prints an assessment list showing the charges on each bill and also, at the end, the total of charges, and the total number of consumers connected, temporarily disconnected and with equipment removed in each batch.

COLLECTION OF ELECTRICITY BILLS:

All Commercial Bank Branches and Post Offices of the respective City / District where connection exists shall be collecting electricity bills from consumers who have been given option to deposit their electricity bills in any designated bank branch / post office. Online payment and payment through ATM Card / Credit Cards or through cross cheques at designated bank branches can also be made where possible. NADRA KIOSK are also authorized to collect electricity bills.

In order to avoid Late Payment Surcharge (LPS), consumers shall pay their bills within due date. Consumers can also make payments in Revenue Offices through crossed cheques / pay orders / bank drafts. However, in order to avoid late payment surcharge, the cheque / bank draft / pay order, be deposited to the Revenue Office and the bank branch at least three days prior to due date so as to ensure realization within due date."

ANNEX NO 30/3

30/3.

Doc No: N31/3

ABILITY TO ACCESS CONSUMER METRING SYSTEMS AND OTHER SERVICE/EQUIPMENT.

784

The ability to access meters and installation of consumers depend upon the type of connection, voltage level as per SoP, Authority/designation of employees, and rules/ regulation of NEPRA and Electricity act. The access is required for routine meter reading as well as for checking the meter for various reason.

Since presently the meters of General consumers (Residential, Commercial, General supply on 0.2 KV or 0.4 KV voltage level depending upon the load of consumers) are installed outside the premises, therefore the question of access does not arise. However, if load of consumers are more and CT operated meters are installed in ATB box, then the opening of ATB, where such type of meters are installed, lies with a various committees according the sanction load, tariff in accordance to rules and approved SoP of NEPRA.

However, since the meters, installed at 11 KV and above voltage levels, mostly in industrial and bulk supply tariff, are in a separate metering room, therefore the access to these meters is not possible by all the employee of DISCOs but those employees, as per approved rules of NEPRA and DISCOs, can access the meters and installations at an appropriate timing.

It is further clarified that the access to any meter is also protected by NEPRA, Electricity Act and abridged condition of the application contract, thus the meter can be access by employee of DISCO at appropriate time as per standing instruction and rules of NEPRA.

It is further added that besides the rules, generally hindrance is faced by the employees of DISCOs by those consumers which are involve in theft or any breach of law and illegal activities.

The access to meters and installations was problem in the era of 90s and before, when meters were installed inside the premiss and specially in residential connection, because there were numerous problems as per followings.

1) Dogs or other animals present in the premises.
2) Debris, vegetation, or rubbish around the meter box area.
3) Locked gates and meter boxes.
4) The approach track is dangerous.

In those days/period, the requirements were required by the consumers to provide the access to meters and installation for checking and meter reading i.e. Meters must always remain accessible and meters should not be installed in a place which are inconvenient to enter or where privacy is desired. Similarly, meters should be installed in such a way that the accessibility will not be obstructed.

Doc No: N31/3

EMERGENCY PROVISION AND PROTOCOLS

There are three Basic provision in Emergency condition and circumstances.

755

1. Emergency SoP / Protocols
2. Emergency crew
3. Firefighting equipment.

EMERGENCY SoP / PROTOCOLS :

1) Before start of any sort of Maintenance activities please ensure Proper use of PPE and T&P items.
   i) Proper Earthing of the working zone on both sides (Right + Lef) through PTGs must be ensured prior to start of any activities.
   ii) Ensure proper lighting during work, especially at nighttime as well as inside Panels through search lights / torches etc and availability of same on every GSS.

2) Healthy Units of Fire Fighting Equipments must be re-filled and made Operational at all Grids.

3) Efforts / Measures on war footing basis are to be taken to arrange for the Re-filling of Healthy Units of Fire Fighting Equipments at all the Grid Stations without loss of time to meet with any unforeseen situation

4) To reduce the damages / flashes of 11 KV Power Cables / Termination Kits, it is instructed to chalk out detail GSS wise schedule to set right 11 KV Power Cables Earthing braided conductor with Earthing patti of Panels, through proper copper thimbles strongly bonding with Nut Bolts at least on 3 different points on the Patti (Phases wise) by utilizing potential of Technical Maintenance staff on war footing basis.

5) To accomplish the above job apply shut downs on 11 KV Incomings where facility of load shifting through Bus Coupler is not possible, then the same be carried out through shifting of load via Bus Coupler, otherwise shut downs be applied.

6) Measures must be taken to carry out Load Balancing of all the Power Transformers utilizing technical skills through inter-shifting of heavily loaded and lesser loaded 11 KV Outgoing Feeders on all the Incomings.

7) Right sizing / making Operational of all installed 11 KV Capacitor Banks with the replacement of damaged capacitor units structures with healthy one and proper monitoring of power factor through Sub Station Operators on duties at least once in 24-hours basis through calculations from KWH & KVARH Recorded units of Incomings of 24 Hrs on the daily Log sheets at least once in 24 Hrs.

8) Monitoring of 11 KV Bus Bar losses on daily basis for the 24-hours on the Log sheets besides Record of 11 KV Trippings / faults on the log sheets of each Incoming / Outgoing including Record keeping of 132/11 KV Trippings / outages on Tripping Register.

9) Ensure proper upkeeping of 132 KV yard free from weeds / grass herbs / shrubs and proper measures be taken for Ventilation of 11 KV and 132 KV control rooms as well as measures for Intact Vermin Proofing of all Panels and auxiliary Transformers.

10) Proper upkeeping of Record regarding attending hot spots of both 132KV & 11KV system after Thermo-vision of Grids and entries in Register and also arrange for Thermo-vision of both 132KV-Yard Equipments as well as of 11KV Panels cable side of all heavily loaded Grids.

11) Proper upkeeping of Transmission Line Patrolling Record and of Remedial measures to be taken to redress such as worn out / damaged jumpers / conductors / heated up PG connectors / bindings / damaged discs / short braces / tree trimmings be carried out well before start of summer to ensure un-interrupted Power supply.

12) Through safety seminars educate the staff for adopting all safety measures during work through use of PPE and T&P items and in case of any shortage, please submit demand on war footing basis, as there is no compromise on SAFETY **"SAFETY FIRST THEN WORK".**

13) During shut downs and PTW please ensure Proper Racking Out of 11 KV Switchgear (Trolleys) of 11KV Incoming & Outgoing Feeders through Sub Station Operators and usage of Tags like PTW / Shut Down etc on the same to avoid any mishap

EMERGENCY CREW :

- In all Divisions and Sub-Divisions, the emergency crew are available to deal with emergencies situation and are well equipped with PPE & T&P in accordance with the approved instruction and SoP.
- Emergency crews are available in grid stations to deal with emergencies and are equipped with latest different types of testing sets for various equipment installed in the grid station.

FIRE FIGHTING IN OFFICES & GRID STATIONS :

- Several sand fill buckets are available in every grid station, subdivision, Division and offices.
- Electrical fire extinguishers are carbon dioxide or dry powder, foam extinguisher, liquefied gas of CO_2

ANNEX N 30/4

30/4

N-214

Emergency Provision and Protocol

757

There are three Basic provision in Emergency condition and circumstances.

1. Emergency SoP / Protocols
2. Emergency crew
3. Firefighting equipment.

Emergency SOP/Protocols :

1) Before start of any sort of Maintenance activities please ensure Proper use of PPE and T&P items.
   i) Proper Earthing of the working zone on both sides (Right + Lef) through PTGs must be ensured prior to start of any activities.
   ii) Ensure proper lighting during work, especially at nighttime as well as inside Panels through search lights / torches etc and availability of same on every GSS.

2) Healthy Units of Fire Fighting Equipments must be re-filled and made Operational at all Grids.
3) Efforts / Measures on war footing basis are to be taken to arrange for the Re-filling of Healthy Units of Fire Fighting Equipments at all the Grid Stations without loss of time to meet with any unforeseen situation
4) To reduce the damages / flashes of 11 KV Power Cables / Termination Kits, it is instructed to chalk out detail GSS wise schedule to set right 11 KV Power Cables Earthing braided conductor with Earthing patti of Panels, through proper copper thimbles strongly bonding with Nut Bolts at least on 3 different points on the Patti (Phases wise) by utilizing potential of Technical Maintenance staff on war footing basis.
5) To accomplish the above job apply shut downs on 11 KV Incomings where facility of load shifting through Bus Coupler is not possible, then the same be carried out through shifting of load via Bus Coupler, otherwise shut downs be applied.
6) Measures must be taken to carry out Load Balancing of all the Power Transformers utilizing technical skills through inter-shifting of heavily loaded and lesser loaded 11 KV Outgoing Feeders on all the Incomings.
7) Right sizing / making Operational of all installed 11 KV Capacitor Banks with the replacement of damaged capacitor units structures with healthy one and proper monitoring of power factor through Sub Station Operators on duties at least once in 24-

hours basis through calculations from KWH & KVARH Recorded units of Incomings of 24 Hrs on the daily Log sheets at least once in 24 Hrs.

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9) Ensure proper upkeeping of 132 KV yard free from weeds / grass herbs / shrubs and proper measures be taken for Ventilation of 11 KV and 132 KV control rooms as well as measures for Intact Vermin Proofing of all Panels and auxiliary Transformers.
10) Proper upkeeping of Record regarding attending hot spots of both 132KV & 11KV system after Thermo-vision of Grids and entries in Register and also arrange for Thermo-vision of both 132KV Yard Equipments as well as of 11KV Panels cable side of all heavily loaded Grids.
11) Proper upkeeping of Transmission Line Patrolling Record and of Remedial measures to be taken to redress such as worn out / damaged jumpers / conductors / heated up PG connectors / bindings / damaged discs / short braces / tree trimmings be carried out well before start of summer to ensure un-interrupted Power supply.
12) Through safety seminars educate the staff for adopting all safety measures during work through use of PPE and T&P items and in case of any shortage, please submit demand on war footing basis, as there is no compromise on SAFETY **"SAFETY FIRST THEN WORK"**.
13) During shut downs and PTW please ensure Proper Racking Out of 11 KV Switchgear (Trolleys) of 11KV Incoming & Outgoing Feeders through Sub Station Operators and usage of Tags like PTW / Shut Down etc on the same to avoid any mishap

Emergency Crew :

1. In all Divisions and Sub-Divisions, the emergency crew are available to deal with emergencies situation and are well equipped with PPE & T&P in accordance with the approved instruction and SoP.
2. Emergency crews are available in grid stations to deal with emergencies and are equipped with latest different types of testing sets for various equipment installed in the grid station.

Fire Fighting in Offices & Grid Stations :

1. Several sand fill buckets are available in every grid station, subdivision, Division and offices.
2. Electrical fire extinguishers are carbon dioxide or dry powder, foam extinguisher, liquefied gas of CO_2

ANNEX N30/5"

Doc No: N30/5

BASIS OF COMMON SERVICES FOR COMMERCIAL AND RESIDENTIAL CONSUMERS AND THEIR ALLOCATION: 754

The basis of common services is to redress the grievances and to provide facilities to residential and commercial consumers (including all consumers) at their doorsteps, as well as to provide an efficient, stable, sustainable and reliable power supply. The common services provide to Residential, Commercial consumers at different complaint offices established at different level. The allocation thereof is booked to O &M head as well as to MIS and IT expenditures. The following are the locations where the Customer services and complaint offices are established. .

a) Local Complaint office.

b) Complaint office in SDO office.

c) Complaint office at Revenue Office.

d) Customer Services Centre at Circle level.

e) Customer Service Centre at HQ level (WAPDA House Peshawar).

Besides the above, various services are provided through latest state of the art technology of Customer Complain Management System (CCMS) as well as through on-line and Web portal, Mobile application, SMS (8118), call (118) and UAN (111-000-128. The following are the common services.

i. Issuance of duplicate bill.

ii. Registration of all type of complaint with tracking ID system (All kind of complaints including failure of supply).

iii. Anti-theft portal (Roshan Pakistan)

iv. Citizen motivation for anonymous complaint.

v. On-line New connection system (ENC)

vi. On-line installment system.

vii. On-line bill correction.

viii. Bill payment through on-line banking.

ix. Bill payment through Mobile application

x. On-line FCC (Federal Complaint Cell).

xi. On-line PMDU (Prime Minister Delivery Unit).

xii. On-line Wafaqi Mohtasib complaint

xiii. On-line NEPRA complaint cell.