National Electric Power Regulatory Authority
Islamic Republic of Pakistan

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No. NEPRA/Dir.(Tech.)/LAD-05/ 2325-31 April 26, 2023

Chief Executive Officer
Lahore Electric Supply Company (LESCO),
22-A, Queen's Road, Lahore

Subject: **Determination of the Authority in the matter of Investment Plan filed by Lahore Electric Supply Company Limited (LESCO) under Section 32 of the NEPRA Act for MYT Tariff Control Period from FY 2023-24 TO FY 2027-28.**

The Authority as per provisions of Section 32 of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 read with Para 23 of NEPRA Guidelines for Determination of Consumer End Tariff (Methodology and Process), 2015 approves the investment plan and losses assessment of LESCO for five (05) years MYT control period from FY 2023-24 to FY 2027-28.

2. The subject Determination along with **Annex-1 to Annex-V (total 46 pages)** is enclosed herewith for information and further necessary action please.

Enclosure: As above

26/04/23

(Engr. Mazhar Iqbal Ranjha)

CC:

1. Secretary, Cabinet Division, Cabinet Secretariat, Islamabad.
2. Secretary, Ministry of Energy (Power Division),'A' Block, Pak Secretariat, Isbd.
3. Secretary, Ministry of Finance, 'Q' Block, Pak Secretariat, Islamabad.
4. Secretary, Energy Department., Government of the Punjab, 8th Floor, EFU House, Main Gulberg, Jail Road, Lahore,
5. CEO, NTDC,414 WAPDA House, Shaharah-e-Qauid-e-Azam, LAHORE
6. Chief Executive Officer. Central Power Purchasing Agency Guarantee Limited (CPPA-G),Shaheen Plaza, 73-West, Fazl-e-Haq Road, Islamabad

Determination of the Authority in the matter of Investment Plan filed by Lahore Electric Supply Company Limited (LESCO) under Section 32 of the NEPRA Act for MYT Tariff Control Period From FY 2023-24 TO FY 2027-28

1. In compliance with the requirements of the Section 32 of the NEPRA Act and NEPRA Guidelines for determination of the Consumer End tariff (Methodology and Process) 2015, LESCO submitted five years (05) investment plan for Multi Year Tariff (MYT) control period from FY 2023-24 to FY 2027-28 vide its letter dated 30-8-2022. The submitted investment plan had certain shortcomings, few of them are highlighted below:

    i. The scope of investment plan included FY 2022-23 which was already approved by Authority in the MYT re-determination dated 18-9-2017.
    ii. Training & Developments costs were not included in the plan
    iii. The functional improvement plan was not as per Distribution Company Integrated Investment Plan (DIIP) formats

2. For the purpose, extensive discussions and meetings were held with LESCO officials so as to revise their plans according to the required formats. Accordingly, LESCO submitted its revised investment plan on 27-10-2022, wherein, the shortcomings were partially addressed. LESCO was once again informed to revise the investment plan. Accordingly, LESCO presented its updated Distribution Company Integrated Investment Plan (DIIP) for FY 2023-24 to FY 2027-28 on 23-11-2022 before the Authority. LESCO's responsibilities reflected in the DIIP include the following:

    i. Strengthening and expansion in system at high voltage for removing constraints for power transfer from NTDC transmission system to DISCOs system.
    ii. Increasing sales in their service territory and corresponding expansion of their network at the medium and low voltage level.
    iii. Expansion in system for reduction in losses and improving quality parameters
    iv. Administrative measures and Commercial improvement including metering and IT development, Advanced Metering Infrastructure (AMI) project implementation, Aerial Bundled Cable (ABC), etc.
    v. Improving Safety and Capacity building & trainings

3. The above functions have been grouped as follows:

S. #	Major Area	Sub-Projects
1	Secondary Transmission and Grid (STG) Expansion and Rehabilitation Projects	Construction of New 132 kV Grid Stations
		Augmentation of 132 kV Grid Stations
		Extension of 132 kV Transformer Bays
		Extension of 132 kV Line Bays
		Erection of New 132 kV Transmission Lines

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		Rehabilitation/Reconductoring of 132 kV Transmission Lines
		Installation of Capacitors at 132 kV Grid Stations
2	Distribution of Power (DOP) Expansion and Rehabilitation Projects	Installation of New 11 kV Lines
		Installation of New Distribution Transformers
		Reinforcement of Overloaded Distribution Transformers
		Installation of New LT Lines
		Installation of 11 kV Capacitors
		11 kV feeder load shifting on new grid stations
3	Energy and Loss Reduction (ELR) Projects	Replacement of Defective/Burnt Distribution Transformers
		Rehabilitation of Existing HT and LT Lines
		GIS Mapping/Re-routification of 11 kV Feeders
		GIS Mapping of LT Lines
4	Deposit Works / Consumer Financing	Installation of New 11 kV Lines
		Installation of New LT Lines
		Installation of New Distribution Transformers
		Installation of new Grid Stations
5	Commercial Improvement Plans	Installation of Advanced Metering Infrastructure (AMI) / Smart Energy Meters
		Aerial Bundled Cable (ABC) program
		Customer Service Improvement
		Anti-Theft Efforts
		Installation of IT Infrastructures
6	Financial Improvement Plan	Enterprise Resource Planning (ERP)
		Oracle Plant Maintenance (SAP PM) for all maintenance activities to be performed
7	Human Resource Improvement Plans	Hiring of Additional Manpower to undertake the Projects
		Capacity Building of Human Resource as per TNA
		Revamping training centers
8	Communication Improvement Plans	Public Communication, outreach and awareness activities
		Mass Media activities
		Corporate Social Responsibility (CSR)
9	Operational Improvement Plans	Transformer Repair Workshop (TRW)
		Lineman Training and Tools

4. In order to fulfill the proceedings under NEPRA Guidelines for determination of the Consumer End tariff (Methodology and Process) 2015, the Authority framed the following issues for the hearing of LESCO held on November 23, 2022. The hearing notice along with list of issues was issued to all stakeholder.

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i. **Whether the claimed cost of Rs. 16,184 Million under the head of STG is justified?** Petitioner must provide the project wise rationale against requested investment and techno commercial benefits to be achieved through proposed investment in terms of constraints removal, additional energy available for sales through MVA additions, reliability & continuity of supply, reduction in transmission losses, etc.

ii. **Whether the claimed cost of Rs. 19,998 Million in the head of ELR including 1,425 Million for ABC program is justified?** LESCO must provide the basis against requested investment, areas prioritized for ABC program and financial impact of T&D losses reduction through ELR program.

iii. **Whether the claimed cost of Rs. 46,713 Million in the head of DOP is justified?** Petitioner to provide the rationale against requested investment in terms of removal of 11 kV Feeder overloading and benefits of proposed investment in meeting future load growth and timely provision of electricity services to prospective consumers.

iv. **Whether the claimed cost of Rs. 8,906 Million in the head of AMI/Smart Energy Meters is justified?** Petitioner to provide the basis against requested investment in terms of voltage wise areas where AMI system will be implemented and benefits of proposed investment. Whether any plan of AMR/AMI installation on PMT level is included in the investment plan or otherwise?

v. **Whether the claimed cost of Rs. 17,553 Million in the head of others Functional Improvement is justified?** Petitioner to provide the basis against requested investment, breakup of cost and benefits of proposed investment.

vi. **Petitioner to provide payback period of investments claimed under the head of DOP, ELR and STG.**

5. **Issue # 01: Whether the claimed cost of Rs. 16,184 Million under the head of STG is justified?** The Petitioner must provide the project wise rationale against requested investment and techno commercial benefits to be achieved through proposed investment in terms of constraints removal, additional energy available for sales through MVA additions, reliability & continuity of supply, reduction in transmission losses, etc.

PETITIONER'S SUBMISSIONS FOR STG PROJECTS:

5.1. The Petitioner in initial version of DIIP submitted STG investment for FY 2022-23 to FY 2026-27 but since the investment for FY 2022-23 was already approved for previous Tariff control period therefore LESCO was directed to revise its plan. Accordingly, the revised DIIP for FY 2023-34 to FY 2027-28 was submitted and

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presented before the Authority on 23-11-2022. The costing and scope of investment remained same in both submissions apart from the timeline.

5.2. The petitioner in its submissions during hearing and revised DIIP, has claimed investment requirement of Rs. 16,184 Million for STG (Expansion & Rehabilitation) projects. Further, LESCO claimed that project costing was undertaken on the basis of the most recent procurement costs, and site specific needs and all major equipment, associated equipment, & civil works are included in the estimates. In addition, petitioner also made provision for physical and price contingencies. The scope of STG (Expansion & Rehabilitation) as provided by petitioner is given below:

Sr. No.	Description	MVA additions	Year 1	Year 2	Year 3	Year 4	Year 5	Total
	A - GRID STATIONS (Nos)							
I	New 132kV Grid Stations	980	5	2	3	2	2	**14**
Ii	Augmentation of Power Transformers at 132 kV G/S	278	5	7	2	6	0	**20**
Iii	Extension (Line Bays)	-	4	0	2	0	0	**6**
Iv	Extension (Transformer Bays)	210	3	0	2	2	0	**7**
V	Installation of Capacitor Banks(MVAR)	-	206	102	96	124	124	**652**
	B - Erection of 132 kV Transmission Lines							
I	132kV Transmission Line Projects (Nos.)	-	10	4	5	4	5	**28**
Ii	132kV Transmission Lines (km)	-	149	20	53	28.3	32.6	**282.9**

5.3. The year wise details of claimed cost by petitioner under head of STG is as under:

Sr. No.	Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
A - GRID STATIONS (Rs. Million)							
i	New 132kV Grid Stations	1,972	501	1,552	1,298	942	**6,265**
ii	Augmentation of Power Transformers at 132 kV G/S	515	944	269	859	0	**2,587**
iii	Extension (Line Bays)	63	0	48	0	0	**111**
iv	Extension (Transformer Bays)	217	0	313	248	0	**778**
v	Installation of Capacitor Banks	180	110	99	128	133	**650**
	Total	**2,947**	**1,555**	**2,281**	**2,533**	**1,075**	**10,391**
B - Erection of 132kV Transmission Lines (Rs. Million)							
i	Cost	2,239	480	1,235	835	1,004	**5,793**
	Grand Total (Escalated)	**5,186**	**2,035**	**3,516**	**3,368**	**2,079**	**16,184**

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5.4. Regarding the rationale for selection of STG projects, petitioners has submitted that STG Projects were identified by performing system studies in collaboration with NTDC under TSEP project as follows:

- Verification & Finalization of (Power Market Survey) PMS Report
- Validation of LESCO Existing Network
- Load flow studies of the system to confirm existing and expected future system constraints
- Identification of sub-projects to eliminate constraints
- Further load flow studies to assess sub project technical viability, and overall compatibility with NTDC system upgrades
- Sub project costs were compiled and then analyzed for financial and economic viability

5.5. The petitioner also submitted following forecast as identified in PMS survey for next years.

A. Consumer Growth by Category

Year	Year 1	Year 2	Year 3	Year 4	Year 5
Domestic	297,444	301,827	307,798	324,582	341,417
Commercial	20,490	20,946	21,466	22,025	23,167
Industrial	2,110	2,150	2,185	2,230	2,346
Agriculture	2,315	2,370	2,434	2,506	2,636
Others	2,748	2,963	3,197	3,434	3,612
Total	**325,107**	**330,256**	**337,080**	**354,777**	**373,178**

B. **Category wise Demand and Energy Forecast**

Description	Year	Domestic	Commercial	Public Light	Small Industries	M&L Industries	Tube Well	Bulk	Total
Base Forecast (Computed)	Energy (GWh)								
	2020-21	10390	1652	140	575	7808	1184	656	22405
	2022-23	11296	1817	141	591	8713	1205	771	24535
	2026-27	14093	2271	144	633	10082	1261	971	29455
	2030-31	17532	2867	149	681	11890	1326	985	35431
	GR (CAGR)	**5.40%**	**5.70%**	**0.60%**	**1.70%**	**4.30%**	**1.10%**	**4.10%**	**4.70%**
	Demand (MW)								
	2020-21	2402	458	39	180	1992	236	167	4298
	2022-23	2614	504	39	185	2288	240	207	4816
	2026-27	3268	630	40	198	2663	251	246	5783
	2030-31	4070	796	42	213	3134	264	250	6931
	GR (CAGR)	**5.40%**	**5.70%**	**0.60%**	**1.70%**	**4.60%**	**1.10%**	**4.20%**	**4.90%**

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5.6. The Petitioner during the course hearing, claimed to achieve following tangible and non-tangible benefits from STG projects:

- Improvements in the Capacity of Substations
- Reduction in loading of existing 132/11kV transformers
- Sufficient spare capacity to allow connection of additional load resulting from load growth
- Improvement in the voltage profile of the substations
- Reduction in transmission and transformation losses
- System constraints related to overloading, voltage violation and reactive power compensation will be resolved
- The transformation capacity addition (MVA) and increase in the length of the transmission lines (km) is quantified as under:

Description		Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Grid Stations(No)	Total	**177**	**182**	**184**	**187**	**189**	**191**
MVA Capacity	Addition	-	534	202	305	295	132
	Total	**13392**	**13926**	**14128**	**14433**	**14728**	**14860**
132kV Transmission Line (km)	Addition	-	80	20	33	20.5	8
	Total	**3145**	**3225**	**3245**	**3278**	**3299**	**3307**

- The quantification of additional energy available for sales and loss reductions is given below:

Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
STG Energy Savings (GWh)	34.24	13.71	17.65	23.08	8.96	**97.64**
%age of loss reduction	0.12%	0.05%	0.06%	0.07%	0.03%	**0.33%**
Incremental Sale (GWh)	421.4	580.8	821.5	1054.4	1158.5	-

5.7. The petitioner also presented a comprehensive financial analysis for STG projects before the Authority to justify the STG investments. The petitioner in its financial analysis claimed following:

Sr	Description	Value
1	Present Value of Cost	Rs. 14,513 Million
2	Present Value of Benefits	Rs. 20,877 Million
3	Net Present Value (NPV)	Rs. 6,363 Million
4	Benefit to Cost Ration BCR	1.44
5	Internal Rate of Return	22.4%
6	Payback Period	6.41 years

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ANALYSIS

5.8. The existing sub-transmission network of LESCO which include grid stations and transmission lines is given below.

Description	Value
LESCO OWNED GRID STATIONS (Nos)	120
GRID STATIONS FEEDING LAHORE RING (Nos)	72
NTDC GRID STATIONS FEEDING LESCO (Nos)	10
GRID FEEDING INDIVIDUAL CONSUMERS (Nos)	52
LENGTH OF TRANSMISSION LINE (KM)	3126.42
IPPS FEEDING LESCO (Nos)	11
SMALL HPPs FEEDING LESCO (Nos)	2
PEAK DEMAND LESCO (MW) (Dated. 27-06-2022 at 4:00 PM)	5,960

5.9. The Authority has noted that LESCO is the largest distribution company in terms of electricity demand, sales and consumption. Further, the existing sub-transmission network of LESCO has constraints/overloading, out of 441 power transformers 70 are overloaded as per statistics of FY 2021-22. Therefore, the Authority believes that it is imperative to remove overloading so that reliability, quality and continuity of the supply is ensured to the largest DISCO of Pakistan.

5.10. Moreover, the details of proposed new additions as per subject investment plan in LESCO's network for ensuring smooth operations and removal of constraints from transmission networks are given below:

Total MVA Added at 132 kV Grids:	1,468 MVA
New Transmission Lines/Rehabilitation:	283 km
Capacitors Installation (132 kV Fixed):	652 MVAR
New 132 kV Grid Stations (No.)	14
Augmentation of 132 kV Transformers (No)	20
Extension of 132 kV Transformers	7
Extension of 132 kV Line Bays	6

5.11. The Authority observed that LESCO has requested an investment of Rs. 16,184 Million (avg. Rs. 3,237 Million per year) for five year MYT control period. The trend of previous years investment under STG transpired that LESCO has not been able to fully utilize the investment allowed by NEPRA. It is also noted by the Authority that the average investment utilized in last four years is Rs. 3,905 Million per year as shown below:

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FY	STG investment allowed by NEPRA	STG investment utilized by LESCO	Utilization (%)
2018-19	4,573	3,056	67
2019-20	5,724	3,266	57
2020-21	6,798	4,203	62
2021-22	6,349	5,093	80
Average	**5,861**	**3,905**	-
Total	**23,444**	**15,618**	67

5.12. The comparison of new grid stations and MVA additions in previous years with those claimed for upcoming MYT control period are given below:

Description	FY 2018-19 to FY 2021-22	FY 2023-24 to FY 2027-28
New Grid Stations (No)	18	14
MVA Added	1,679	1,468
Transmission Length added (km)	247 km	283 km
Total Cost	**Rs. 14,442 Million**	**Rs. 16,184 Million**

DECISION OF THE AUTHORITY FOR STG INVESTMENT

5.13. In view of foregoing discussion and analysis, the investment of Rs. 16,184 Million as claimed by LESCO is reasonable and in line with the previous utilization trends of the company therefore same is being allowed to LESCO:

Sr. No.	Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
A - GRID STATIONS (Rs. Million)							
I	New 132kV Grid Stations	1,972	501	1,552	1,298	942	6,265
Ii	Augmentation of Power Transformers at 132 kV G/S	515	944	269	859	0	2,587
Iii	Extension (Line Bays)	63	0	48	0	0	111
Iv	Extension (Transformer Bays)	217	0	313	248	0	778
V	Installation of Capacitor Banks	180	110	99	128	133	650
	Total	2,947	1,555	2,281	2,533	1,075	10,391
B - Erection of 132kV Transmission Lines (Rs. Million)							
I	Cost	2,239	480	1,235	835	1,004	5,793
	Grand Total (Escalated)	5,186	2,035	3,516	3,368	2,079	16,184

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Saving Targets							
I	STG Energy Savings (GWh)	34.24	13.71	17.65	23.08	8.96	**97.64**
Ii	Incremental Sale (GWh)	421.4	580.8	821.5	1054.4	1158.5	-

6. **Issue # 02: Whether the claimed cost of Rs. 19,998 Million in the head of ELR including 1,425 Million for ABC program is justified? LESCO must provide the basis against requested investment, areas prioritized for ABC program and financial impact of T&D losses reduction through ELR program.**

PETITIONER'S SUBMISSIONS FOR ELR & ABC PROJECTS:

6.1. The Petitioner in its revised DIIP and during the course of hearing dated 23-11-2022 briefed that the Energy Loss Reduction (ELR) is the part of System Augmentation Program (SAP). Further, ELR cover improvements in Distribution System by installing new feeders, modifying existing feeders, replacing overloaded Transformers, re-conductoring etc.

6.2. The petitioner in its submissions during hearing and revised DIIP, has claimed investment requirement of Rs. 18,572 Million for Energy Loss Reduction (ELR) program and Rs. 1,425 Million for ABC program. LESCO further stated that the ELR comprises of HT and LT proposals and these proposals are prepared / selected where all or any one of the following improvement is required:

- Improving Voltage drop (where voltage drop is more than 5%)
- Reducing Power Loss (where power loss is more than 3.5%)
- Reducing Annual Energy Loss (where annual energy loss is more than 3%)
- Decreasing Percentage Loading (where loading is above or equal to 80%)
- Improving Power Factor;
    - Independent/ Industrial (>0.95)
    - Mix Load urban (>0.95)
    - Mix Load Rural (>0.90)

6.3. The petitioner provided following scope of ELR works. Petitioner further briefed the Authority that after completion of **630** nos. of HT Proposals, total **280** nos. of new feeders will be added in the existing **2,058** nos. of feeders.

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Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
No. of HT Proposals (No)	90	108	126	144	162	**630**
No. of LT Proposals (No)	1,900	2,000	2,000	2,100	2,200	**10,200**

6.4. In addition to above, the Petitioner also stated that GIS Mapping of HT/LT network will be performed to properly tag field assets and integrate them with ERP and other softwares for generating automated ELR proposals in the future. The scope of GIS mapping is given below:

Description	Year 1	Year 2	Year 3	Year 4	Year 5
GIS Mapping Activities	Development of IT infrastructure and GIS Survey of distribution Network	GIS Survey and mapping of distribution Network	GIS Survey and mapping of distribution Network Integration with CIBS, ERP, etc.	No of HT/LT proposal generated by GIS	
HT GIS Mapping (No of feeders)	431	905	823		
LT GIS Mapping (No of feeders	318	667	608		

6.5. The year wise details of cost claimed by the Petitioner under the head of ELR for HT and LT proposals is as under.

Million Rupees

Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
HT Proposals Cost	1,080	1,470	1,826	2,223	2,663	**9,262**
LT Proposals Cost	1,438	1,717	1,828	2,045	2,282	**9,310**
Total Project Cost	**2,518**	**3,187**	**3,654**	**4,268**	**4,945**	**18,572**

6.6. Regarding the investment of Rs. 1,425 Million claimed under the head of ABC roll out program and the areas prioritized for ABC program, the petitioner submitted that it has considered following criteria to identify the scope of ABC project.

- Highest AT&C losses
- Remote areas with high % of direct hooking
- Congested areas to reduce safety hazards.

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6.7. As a result, top 40 feeders have been selected with estimated length of 573 km of LT conductor to be replaced with ABC. Requirement of ABC length against each feeder is calculated from Circle wise per consumer LT Line length as reported in FY 2020-21.

6.8. LESCO also confirmed that ABC will include all the cores (Phase, Neutral & Earthing) as per international best practices in order to avoid safety hazards. For the five years, the scope and cost of ABC as presented by petitioner during hearing dated 23-11-2022 is as follows.

Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Feeders (Nos.)	8	8	8	8	8	**40**
Length of ABC (KM)	92	108	132	103	138	**573**
Cost Million Rupees	200	246	316	268	396	**1,425**

6.9. The list of 40 feeders qualified for ABC program is given at **Annex-III.** Petitioner during the course hearing, claimed to achieve following tangible and non-tangible benefits from ELR and ABC projects:

- Revenue enhancement through reduction in AT&C losses, pilferage, outages, and reduction in O&M cost.
- Installation of ABC will force the consumers, using electricity by direct hooking, to come in the network by legal means thereby increasing the bonafide consumers of LESCO.
- Provision of more reliable supply of electricity to the consumers
- Enhance safety conditions for human life and property
- The quantification of energy savings (GWh) and reduction in losses as result of implementation of ELR program is given below:

Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
HT Savings (GWh)	14.4	17.28	20.16	23.04	25.92	119.7
LT Savings (GWh)	39.52	41.6	41.6	43.68	45.76	251.94
Total (GWh)	**53.92**	**58.88**	**61.76**	**66.72**	**71.68**	**312.96**
% loss reduction	**0.20%**	**0.20%**	**0.21%**	**0.21%**	**0.22%**	**1.04%**

- The quantification of energy savings (GWh) and reduction in losses as result of implementation of ABC program is given below

Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
ABC Energy Savings (GWh)	23.52	15.97	18.31	16.06	15.55	89.41

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%age of loss reduction	0.09%	0.06%	0.06%	0.05%	0.05%	0.30%

6.10. The petitioner also presented a comprehensive financial analysis for ELR and ABC projects before the Authority to justify the investments. The petitioner in its financial analysis claimed following:

Sr	Description	ELR	ABC
1	Present Value of Cost	Rs. 16,729 Million	Rs. 1,287 Million
2	Present Value of Benefits	Rs. 24,382 Million	Rs. 2,918 Million
3	Net Present Value (NPV)	Rs. 7,653 Million	Rs. 1,631 Million
4	Benefit to Cost Ration BCR	1.46	2.27
5	Internal Rate of Return	25%	44.99%
6	Payback Period	6.32 Years	5.47 Years

ANALYSIS

6.11. The 11 kV network assets of LESCO are given below.

Description	Value
11 KV FEEDERS (No)	2,058
HT LINE (No)	31,562
LT LINE (No)	15,533
LT/HT RATIO	1:2
DISTRIBUTION TRANSFORMERS (No)	126,758
CAPACITY OF DISTRIBUTION TRANSFORMERS (MVA)	9,479

6.12. From above figures, it is transpired that LESCO has excellent ratio of 1:2. As per international best practices a LT/HT ratio of 1 to 1.2 would be very beneficial to power Distribution Company as this measure is a must to improve efficiency and voltage regulation of distribution. It is an established fact that increasing HT lines can help in reducing both line losses and voltage drops thereby increasing efficiency of a company. The main reason for better LT/HT ratio is that LESCO has lower share of rural areas/village electrification programs which results in increase of LT lines.

6.13. The Authority has noted that despite better LT/HT ratio and urban consumer mix LESCO is unable to meet T&D losses targets of NEPRA. Therefore, ELR and ABC investments are vital for achieving NEPRA's target of T&D losses and

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turning the company from loss making to profitable organization. The historic trend of actual losses incurred by LESCO against NEPRA allowed T&D losses targets is given below:

Financial Year	LESCO's Actual Losses (%)	NEPRA Allowed Losses (%)
FY 2017-18	13.8	11.76
FY 2018-19	13.2	11.76
FY 2019-20	12.4	10.88
FY 2020-21	11.96	10.03
FY 2021-22	11.52	9.08
FY 2022-23	-	8.00

6.14. Further, the Authority observed that out of 2,058 feeder a total of 451 feeders are overloaded. Moreover, 20,140 number of distribution transformers are also overloaded. Therefore, HT and LT proposals and investments as proposed by LESCO are pivotal for eliminating overloading of 11 kV feeders and distribution transformers. The ELR investment will improve the reliability, quality and continuity of the supply in LESCO. A total of 280 new 11 kV feeders will be added by LESCO in five years MYT control period under ELR program. In addition, the chain augmentation and addition of distribution transformers will also be undertaken to relieve the system overloading and ensure smooth operations.

6.15. LESCO has requested an investment of Rs. 18,572 Million (avg. Rs. 3,714 Million per year) for five year MYT control period under ELR head. The trend of previous years investment under ELR head is given below which transpired that LESCO has fully utilized the investment allowed by NEPRA under head of ELR in past years:

FY	ELR investment allowed by NEPRA	ELR investment utilized by LESCO	Utilization (%)
2018-19	613	1,497	244
2019-20	714	1,622	227
2020-21	813	1,595	196
2021-22	925	1,083	117

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Average	766	1,449	-
Total	3,065	5,797	189

6.16. The comparison of HT Proposal executed in previous years with those claimed for upcoming MYT control period are given below:

Description	FY 2018-19 to FY 2020-21	FY 2023-24 to FY 2027-28
Total HT proposal	308	630
Avg. HT proposals per year	**103**	**126**
Number of LT Proposal	5,610	10,200
Avg. LT proposal per year	**1,870**	**2,040**

6.17. Regarding, ABC program it is observed that LESCO is implementing this in rural areas where direct hook connections are higher and in congested urban areas for safety purposes. LESCO will be converting total 40 feeders into ABC cable i.e. 8 feeders per year during MYT control period.

DECISION OF THE AUTHORITY FOR ELR & ABC INVESTMENT

6.18. In view of foregoing discussion and analysis, the investment of Rs. 18,572 Million as claimed by LESCO has been allowed however the claimed losses reduction through ELR i.e. 1.04% has been rationalized as per allowed investment.

Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
ELR Claimed Cost	2,518	3,187	3,654	4,268	4,945	18,572
ELR Cost Allowed	2,518	3,187	3,654	4,268	4,945	18,572
Saving Targets						
HT Savings (GWh)	14.4	17.28	20.16	23.04	25.92	119.7
LT Savings (GWh)	39.52	41.6	41.6	43.68	45.76	251.94
Total (GWh)	**53.92**	**58.88**	**61.76**	**66.72**	**71.68**	**312.96**

6.19. The investment of Rs. 1,425 Million as claimed by LESCO is being allowed to LESCO, however, the claimed loss reduction of 0.30% has been rationalized as per quantum of the investment allowed under ABC head.

Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
ABC Claimed Cost	200	246	316	268	396	1,425
ABC Cost Allowed	200	246	316	268	396	1,425
Saving Targets						
HT Savings (GWh)	14.4	17.28	20.16	23.04	25.92	119.7
LT Savings (GWh)	39.52	41.6	41.6	43.68	45.76	251.94

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Total (GWh)	53.92	58.88	61.76	66.72	71.68	312.96

7. **Issue # 3: Whether the claimed cost of Rs. 46,713 Million in the head of DOP is justified? The Petitioner to provide the rationale against requested investment in terms of removal of 11 kV Feeder overloading and benefits of proposed investment in meeting future load growth and timely provision of electricity services to prospective consumers.**

PETITIONER'S SUBMISSIONS FOR DOP PROJECTS:

7.1. Regarding the claim of Rs. 46,713 Million under the head of Distribution of Power (DOP) program, petitioner clarified that DOP head includes Rs. 43,177 million which relates to consumer financing while Rs. 3,536 million will be financed from own resources.

7.2. Further, LESCO briefed that the DOP head deals with projects to meet future load growth and timely provision of electricity services to prospective consumers. Moreover, petitioner submitted that there are programs where rehabilitation work is undertaken without involving satisfactory benefit to cost (B/C) ratios but are still essential in a DISCO's liability. Such rehabilitation / expansion works are done under the Distribution of Power (DOP) program.

7.3. LESCO further claimed that DOP deals with projects where the Distribution of Power or continuity of services is the main objective instead of feasibility. Major activities performed under this program are:

i. Construction of feeders due to addition of a 132 KV new transformer, new 132 KV grid station.
ii. Shifting of the load from overloaded grid station / feeder to lightly loaded grid station / feeder.
iii. Rehabilitation of feeder by replacement of conductor, pole, structure or the introduction of new ones by mid spanning (to reduce span length).
iv. Deteriorated conductor (with broken strands) or a conductor with more / unacceptable number of joints is replaced on top priority basis.
v. Augmentation of distribution transformer (with higher capacity) due to the addition of new general connections / increase of load by individual customers.

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vi. Installation of 11KV capacitors for improvement of power factor/voltage profile

7.4. The scope of DOP self-financing work as shared by LESCO is given below:

Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
HT PROPOSALS:						
Load Shifting On New Grids (Nos.)	20	15	5	20	15	75
Re-conductoring Of 11kV Feeders (Nos.)	10	10	10	10	10	50
LT PROPOSALS:						
Addition/Augmentation Of T/F (Nos.)	200	340	375	450	550	1,915
11 kV Capacitors (Nos.)	545	600	500	200	100	1,945

7.5. The cost details of DOP self-financing work is given below:

Million Rupees

Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
HT PROPOSALS:						
Load Shifting/Reconductoring	240	227	145	309	274	1,195
LT PROPOSALS:						
Addition/Augmentation Of T/F	160	309	362	463	603	1,897
11kV Capacitors	109	136	121	51	27	445
TOTAL	**509**	**672**	**628**	**823**	**904**	**3,536**

7.6. Regarding DOP Consumer Financed Projects petitioner stated that requirement of new HT and LT Lines under deposit works are estimated by existing district wise per consumer HT and LT lines. The scope of deposit works is given below:

Description	2024	2025	2026	2027	2028	Total
New Connections (No)	320,025	325,107	330,256	337,080	354,777	1,667,245
New HT lines (KM)	712	723	735	750	789	3,709
New LT line (KM)	344	349	355	362	381	1,791
Transformers (Nos.)	9066	9212	9366	9549	10053	47,246

7.7. The year wise cost details of DOP Consumer Financing projects as estimated by LESCO is given here under:

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Sr.	Description	Cost of the Project (Rs. in million)					
		Year 1	Year 2	Year 3	Year 4	Year 5	Total
1	Cost of Material:						
a.	11 kV H.T Line	525	534	542	553	582	2,736
b.	0.4 kV L.T Line	236	240	244	249	262	1,231
c.	Distribution Transformers	2,206	2,030	2,063	2,103	2,215	10,406
d.	Service Connections	3,111	3,160	3,210	3,277	3,449	16,207
2	Total Cost of Material	6,078	5,964	6,059	6,182	6,508	30,792
3	Installation Charges/Storage Charges/Contingencies	1,349	1,848	2,395	3,003	3,790	12,385
4	**Total Cost**	**7,428**	**7,812**	**8,454**	**9,185**	**10,298**	**43,177**

7.8. The Petitioner during the course hearing, claimed to achieve following tangible and non-tangible benefits from ELR and ABC projects:

i. Provision of electricity service to new consumers.
ii. Increase in asset base of LESCO
iii. The quantification of energy savings (GWh) and reduction in losses as result of implementation of DOP self-financing program is given below:

Description	Yearl	Year 2	Year 3	Year 4	Year 5	Total
RECONDUCTORING OF 11KV FEEDERS (GWh)	6.6	5.5	3.3	6.6	5.5	27.5
ADDITION ENERGY AVAILABLE FOR SALES FROM AUGMENTATION OF T/F (GWh)	3.2	5.44	6	7.2	8.8	30.6
11KV CAPACITORS (GWh)	15.4	17	14.2	5.7	2.8	55.1
Total Energy Saved (GWh)	**25.2**	**27.9**	**23.5**	**19.5**	**17.1**	**113.2**

iv. The quantification of year wise additional energy available for sales as result of implementation of DOP consumer-financing program is given below:

Description	2024	2025	2026	2027	2028	Total
MVA Addition (MVA)	420	427	433	442	466	2,188
Additional Energy (GWh)	350	355	360	368	387	1820

7.9. The petitioner also presented a comprehensive financial analysis for DOP projects before the Authority to justify the investments. The petitioner in its financial analysis claimed following:

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Sr	Description	DOP-self financed
1	Present Value of Cost	Rs. 3,209 Million
2	Present Value of Benefits	Rs. 4,918 Million
3	Net Present Value (NPV)	Rs. 1,709 Million
4	Benefit to Cost Ration BCR	1.53
5	Internal Rate of Return	26.73 %
6	Payback Period	5.88 Years

ANALYSIS

7.10. The Authority is of the opinion that DOP program is very important because its purpose is to meet the future load growth and provision of electricity services to new consumers. The consumer growth rate forecasted by LESCO is around 5%.

7.11. Moreover, the Authority noted that LESCO has requested an investment of Rs. 43,177 million for consumer financing DOP projects @ Rs. 8,635 Million per year while Rs. 3,536 million for own resources DOP projects @ Rs. 707 Million per year. The trend of previous years investment under DOP head transpired that LESCO has almost fully utilized the investment allowed by NEPRA under head of DOP, as shown below:

FY	DOP investment allowed by NEPRA			DOP investment utilized by LESCO			Utilization (%)		
	Consumer	Own	Total	Consumer	Own	Total	Consumer	Own	Tota
2018-19	3,341	728	4,069	4,727	206	4,933	141	28	121
2019-20	3,592	884	4,476	4,488	225	4,713	125	25	105
2020-21	3,861	1,063	4,924	4,250	225	4,475	110	21	91
2021-22	5,416	1,265	6,681	5,208	361	5,569	96	29	83
Average	4,053	985	5,038	4,668	254	4,923	**115**	**26**	**98**
Total	16,210	3,940	20,150	18,673	1,017	19,690	**115**	**26**	**98**

DECISION OF THE AUTHOIRTY ON DOP INVESTMENT

7.12. In view of foregoing discussion and analysis, the investment of Rs. 46,713 Million as claimed by LESCO for DOP program is being allowed to ensure timely service delivery to new consumers.

Million Rupees

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Description	Yearl	Year 2	Year 3	Year 4	Year 5	Total
Claimed Cost DOP Self Financing	509	672	628	823	904	3,536
Claimed Cost of DOP Consumer Financing	7,428	7,812	8,454	9,185	10,298	43,177
Total DOP Claimed	**7,937**	**8,484**	**9,082**	**10,008**	**11,202**	**46,713**
Total DOP cost Allowed	**7,937**	**8,484**	**9,082**	**10,008**	**11,202**	**46,713**
Saving Targets DOP Self Financing						
Total Energy Saved (GWh)	25.2	27.9	23.5	19.5	17.1	113.2
Saving Targets DOP Consumer Financing						
MVA Addition (MVA)	420	427	433	442	466	2,188
Additional Energy available for sales (GWh)	350	355	360	368	387	1,820

8. **Issue # 04: Whether the claimed cost of Rs. 8,906 Million in the head of AMI/Smart Energy Meters is justified? Petitioner to provide the basis against requested investment in terms of voltage wise areas where AMI system will be implemented and benefits of proposed investment. Whether any plan of AMR/AMI installation on PMT level is included in the investment plan or otherwise?**

PETITIONER'S SUBMISSIONS FOR AMI/SMART ENERGY METERS

8.1. Regarding the claim of Rs. 8,906 Million under the head of Commercial Improvement Plan (AMI), petitioner stated that AMI technology will assist LESCO in achieving significant improvement in commercial performance as LESCO has an outdated metering system based on electro-mechanical metering which is often subject to inaccurate manual readings and field tampering, resulting in a significant loss of revenue and increased opportunities for theft. Petitioner further said that the AMI project will help reduce distribution losses, enhance load control and load management, provide automated consumption (billing) data, improve revenue / collection and customer services, reduce billing complaints, increase operational efficiency, reduce operating costs and modernize the electricity metering and billing operations while also responding to Smart Energy Meter alerts and events.

8.2. The Petitioner further added that it plans to carry out a large-scale meter replacement program across its territory, with AMI (GSM/GPRS) meters on **Industrial ,Tube well connections & 50 High Loss Feeders** under own resources

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in Five Years. In this phase, LESCO under this DIIP will Procure **535,450** AMI/ Smart Energy Meters under own resources in 5 Years. Moreover, 50 feeders have been identified on the basis of Highest Quantum loss as reported in FY 2021-22.

8.3. Regarding AMR/AMI system installation on PMT, LESCO intimated that the proposal is under consideration with MoE(PD) and will be incorporated as per decision of MoE(PD)

8.4. LESCO in its revised DIIP and during the course of hearing provided following scope of AMI project:

Description	Year1	Year 2	Year 3	Year 4	Year 5	Total
High Loss Feeders (No. of Connections)	32,610	94,844	94,844	94,844	94,843	411,985
Tube-wells & Industrial (No. of Connections)	41,650	65,441	5,458	5,458	5,458	123,465
Total (Nos.)	**74,260**	**160,285**	**100,302**	**100,302**	**100,301**	**535,450**

8.5. The list of 50 feeders identified for AMI project is given at **Annex-V.** The cost details of AMI project as provided by LESCO is given below:

	Cost of the Project (Rs. in million)					
Description	**Year1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
High Loss Feeders	437	1269	1269	1269	1269	5,513
Tube-wells & Industrial	916	1440	120	120	120	2,716
Others (Replacement of defective meters , OPEX etc)	147	170	120	120	120	677
Total Cost	**1,500**	**2,879**	**1,509**	**1,509**	**1,509**	**8,906**

8.6. The Petitioner during the course hearing, claimed to achieve following tangible and non-tangible benefits from AMI projects:

i. Automated Meter Reading without human intervention and consumer satisfaction
ii. Loss reduction and recovery improvement in high loss area.
iii. Assessment of load profile of each consumer on real time
iv. Availability of real time data for planning purpose etc.
v. Remotely disconnection and reconnection
vi. Better asset management
vii. The quantification of energy savings (GWh) and reduction in losses as result of implementation of DOP self-financing program is given below:

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Description	Year1	Year 2	Year 3	Year 4	Year 5	Total
AMI System/ Smart Energy Meters Savings (GWh)	36.25	64.90	20.40	20.40	20.40	162.62
%age of loss reduction	0.13%	0.22%	0.07%	0.06%	0.06%	0.55%

8.7. The petitioner also presented a comprehensive financial analysis for AMI project before the Authority to justify the investments. The petitioner in its financial analysis claimed following:

Sr	Description	DOP-self financed
1	Present Value of Cost	Rs. 7,300 Million
2	Present Value of Benefits	Rs. 12,132 Million
3	Net Present Value (NPV)	Rs. 4,832 Million
4	Benefit to Cost Ration BCR	1.66
5	Internal Rate of Return	30.76 %
6	Payback Period	4.91 Years

ANALYSIS

8.9. The Authority observed that AMI project with remote disconnection features at consumer level aiming 50 feeders having highest losses is essential for LESCO to achieve the NEPRA determined targets of T&D losses. Moreover, LESCO was allowed an investment of 30 billion rupees for AMI project in MYT re-determination dated 18-9-2017, however, LESCO was unable to materialize this ADB funded project. This 30 billion project was aimed to achieve 2% loss reduction.

DECISION OF THE AUTHORITY FOR AMI INVESTMENT

8.10. Keeping in view the importance of AMI project in modernization of LESCO's infrastructure thereby bringing commercial improvements in company, the claimed investment of Rs. 8,906 Million for AMI project is being allowed to LESCO. However, the claimed loss reduction of 0.55% as result of implementation of AMI project has been rationalized as per quantum and scope of the project.

Million Rupees

Description	Year1	Year 2	Year 3	Year 4	Year 5	Total
Cost Claimed for AMI	1,500	2,879	1,509	1,509	1,509	8,906

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Allowed Cost FOR AMI	1,500	2,879	1,509	1,509	1,509	8,906
Saving Targets						
AMI System/ Smart Energy Meters Savings (GWh)	36.25	64.90	20.40	20.40	20.40	162.62

9. Issue # 05: Whether the claimed cost of Rs. 17,553 Million in the head of others Functional Improvement is justified? Petitioner to provide the basis against requested investment, breakup of cost and benefits of proposed investment.

PETITIONER'S SUBMISSIONS FOR OTHER FUNCTIONAL IMPROVEMENT PLAN

9.1. Regarding the claim of Rs. 17,533 Million under the head of other functional improvement plans, petitioner stated that other functional improvement plan includes GIS Mapping, SCADA System, ERP / IT equipment & data centers, T&P for line staff and operational vehicles, new buildings, furniture for new building/offices, civil works, CCTV camera, transformer workshops and for officers of BPS 17 and above. The petitioner has bifurcated other functional improvement plan into the following sub-plans:

i. **GIS Mapping / SCADA:** The petitioner claimed that under this head LESCO plans the development of IT infrastructure for GIS survey of distribution Network (HT+LT), mapping/digitization of LESCO's distribution and transmission network, integration of web base GIS application with CIBS, ERP etc. Further, through implementation of this LESCO aims to achieve regulatory compliance, accuracy of assets parameters & locations. Moreover, GIS mapping of distribution network will increase the efficiency of HT/LT proposals generation, technical loss of distribution system can be calculated efficiently, efficient identification of assets resulting in reliable assets data & its monitoring, reduced overhead cost due to digital environment. This will enable informed decision making.

ii. **IT Equipment & ERP:** Petitioner submitted that the gaps identified by AF Ferguson PWC in the 2018 assessment exercise are being taken on board by the new ERP team consisting of a director, functional and technical consultants to enhance the scope of ERP project. The Scope for Five Years is as under:

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- Enterprise Asset Management
- Meter Data Management (C2M Advance Metering) 100k/year
- Business Analytics
- Distribution Network Management
- Outage Management System
- Mobile Work Force Management
- IT Hardware (Servers, Storage, Routers, Switches, Printers, Datacenter Site, Cyber Security)

iii. **Buildings and Civil Works:** Petitioner submitted that there are many offices which are rented at the moment. Therefore, through this plan construction will be undertaken to shift rented office buildings to LESCO owned buildings, construction of customer services centers, construction of employee's residences and stores. Moreover, the constructed infrastructure will be capitalized that will not only increase company's assets but also save rental amount along with providing facility to general public and LESCO employees.

iv. **Furniture, Office Equipment and CCTV Cameras:** LESCO submitted that to run the office affairs without any hindrance and to meet the changing cultural/modern requirements Furniture, Fixtures, computer & allied equipment's are being provided on need/demand basis through a scrutiny committee constituted in this regard. Moreover, CCTV Camera would be installed on all Grid Stations and other Offices to ensure safety and security.

v. **Transport / Operational Vehicles:** LESCO being public utility requires an efficient and effective services to be provided to its consumers. For this purpose, mobility is a basic essential factor in the service delivery to the consumers. For this purpose operation following yard stick has been adapted to best equip line staff with operational vehicles:

Operational Sub Divisions		
i)	Single Cabin Pickup	01 each in Sub Division
ii)	Ladder Fitted Vehicle	
iii)	Bucket Mounted Truck / Mini Truck	
iv)	Crane	01 each in Division
Construction, GSC and GSO		

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i)	Single Cabin Pickup	02 each in Sub Division
ii)	Mini Trucks	01 each in Sub Division
iii)	Crane	01 each in Sub Division
iv)	Tractor with Trolley	01 each in Sub Division
Regional and Field Stores		
i)	Trailor	01 each in Regional Store
ii)	Fork Lifter 5 Ton	01 each in Regional Store
iii)	Fork Lifter 3 Ton	01 each in Regional & Field Store
iv)	Truck	01 each in Regional & Field Store

vi. **Transport Policy:** The overriding purpose of this policy is to facilitate the officers by providing them vehicles under joint ownership for official and personal use. This initiative will be an attraction for the officers for getting vehicles, enabling them to serve the Company efficiently and effectively. The officers will use vehicles for official use as first priority while for personal use as well. It will apply to all officers (BPS-17 and above) except consultants and deputationists. Unless otherwise revised, following shall be the entitlement criteria for the sanctioning purpose of vehicles.

Scheme	BPS	Vehicle Category
A	17	Motor Car having engine capacity upto 1000 CC (+5%).
B	18	Motor Car having engine capacity upto 1300 CC (+5%).
C	19	Motor Car having engine capacity upto 1500 CC (+5%).
D	20	Motor Car having engine capacity upto 1800 CC (+5%).

In addition to above, petitioner submitted following benefits in terms of fuel saving/others costs by implementation of vehicle policy.

Million Rs

BPS	Strength	Existing Vehicles under Use	POL & Other expenses in a year	Proposed Vehicle	Capital Cost Claimed	POL & other expenditure in a year	Savings in a year
17	353	700-1000 CC	48.26	1000 CC	1,301.7	21.52	26.74
18	127	1000 CC	17.22	1300 CC	481.3	10.12	7.10
19	34	1300 CC	4.57	1500 CC	170.7	3.31	1.26
20	12	1300-1800 CC	3.78	1800 CC	78.3	1.88	1.90

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vii. **Transformer Workshop:** The purpose of Transformer Workshop is to repair the damage transformer. This will decrease the repair time of transformers; the efficiency of operation offices will increase. There are two workshops planned in two district of LESCO in 1st phase as below:

- Sheikhupura (132kV Attabad Grid Station)
- Kasur (Kasur. Office Complex)

In the 2nd phase, construction of new TRW-Workshops will be carried out in Nankana and Okara. In the 3rd Phase, upgradation of existing Workshops will be carried out

viii. **Line T&P and PPEs for Safety:** To create safe & secure environment and to mitigate fatal / non-fatal accidents both for employees and general public, following initiatives have been planned:

- Active participation in NEPRA's "Power with Safety" drive
- Procurement of adequate quantity of quality T&P/PPEs items for line staff including Bucket Mounted Vehicles / Cranes which is already mentioned in Vehicles section
- Safety Seminars for employees at Circles / Divisions/ Sub-division levels
- Awareness programs for general public through electronic, print and social media
- Promotion of HSE Signs & Slogan ("Safety First") at all offices of LESCO to create awareness among employees, visitors and general public.
- Development of Mobile App for digital PTW
- Procurement of Smart Phones for grid station staff and PDC

ix. **Manpower Staffing Plan:** The recruitment plan is an essential component of the HR plan. Appropriate staffing aligned with Business Strategy is a must to ensure smooth implementation of projects, operations, sustainability and achievement of goals. Below is the recruitment plan from FY 2022-23 to FY 2025-26 involving the staff for IT, Planning, Strategic Planning, commercial, communications, transmission and distribution. Recruitment & Selection/ Induction for the FY 2021-22 is as under:

- Appointment through Promotion : 375

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- Appointment through direct/new Induction :
- Officers: = 36, 2. Officials= 7
- Hiring under DDS (Died During Service) Employee's Quota = 128

x. **Capacity Building & Trainings:** The number of training programs (technical, commercial procedures, regulatory, HSEQ, corporate governance, market, policy & planning) carried out in the FY 2021-22 are as under:

- Training for officers: 2.21 per employee
- Training for officials: 0.36 per employee These training imparted to employees on following areas:
- Soft Skills
- Promotion training of officers from WAPDA staff colleges
- Promotion training of officials
- Safety training for line staff
- Other pertaining to leadership, EI etc.

xi. **Improving Health & Education facilities:** LESCO health care Facility is governed under WAPDA Medical Attendance Rules 1979 and PEPCO revised health care policy duly adopted by LESCO. All health care facilities are covered except cosmetic and dermatology requirements. However, if treatment of a LESCO employee is carried out as outdoor patient the reimbursement limits is done as per policy. In addition, Advance for Non-Fatal Accidents, Welfare Grant for LESCO employees (Serving/Retired/Widows of deceased employees) apart from their direct remunerations are supported through a number of Welfare Grants such as Monthly Welfare Grant, Marriage Grant, Education Scholarship, Prime Minister Assistance package for families of employees who die during service, Ex-Gratia Grant for employees died during Fatal accidents in addition to Prime Minister Assistance Package. Moreover, scholarships are being provided to working employees to facilitate employees in education of their children.

9.2. The year wise costs claimed under the head of other functional improvement plan is given below:

Description	Year1	Year 2	Year 3	Year 4	Year 5	Total
GIS Mapping / SCADA	200	213	227	242	257	1,139

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IT Equipment & ERP/ Data Centre	500	756	1356	561	474	**3,647**
Line T & P / PPEs	263	280	298	318	338	**1,497**
Bucket Mounted Vehicles	650	692	737	785	836	**3,700**
Operational Vehicles	240	256	272	290	309	**1,367**
Transport Policy	500	314	365	407	460	**2,046**
Buildings and Civil Works	500	533	567	604	643	**2,847**
CCTV - Camera	100	107	113	121	129	**570**
TRW - Workshop	80	85	91	97	103	**456**
Furniture & Office Equipment	50	53	57	60	64	**284**
Total	**3,083**	**3,289**	**4,083**	**3,485**	**3,613**	**17,553**

ANALYSIS

9.3. As far as T&P / safety equipment, Transformer Workshop and operational vehicles are concerned these are very important for ensuring safety of staff and carrying out routine works as per safety standards.

9.4. Regarding transport policy of LESCO, the Authority is of the opinion that under prevailing economic situation such costs need to be avoided.

9.5. Moreover, SCADA, GIS Mapping, ERP are also important for system operations and asset management especially in view of Market Opening under CTBCM regime.

9.6. Further, the Authority noted that the historic utilization of investment in others head which included T&P for safety, ERP, operational vehicles, Offices & furniture, buildings and civil works is more than 90% as shown below.

FY	Allowed	Actual	%
2018-19	1,420	1040	73.24
2019-20	1,218	1,260	103.45
2020-21	1,275	1,488	116.71
2021-22	1,352	1,071	79.22
Average	1,316.25	1,214.75	-
Total	**5,265**	**4,859**	**92.29**

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DECISION OF THE AUTHORITY ON DOP INVESTMENT

9.7. Keeping in view the foregoing discussion and analysis, following investment is allowed to LESCO:

Million Rupees

Description	Year1	Year 2	Year 3	Year 4	Year 5	Total
IT Equipment & ERP/ Data Centre	500	756	1356	561	474	3,647
Line T & P / PPEs	263	280	298	318	338	1,497
Bucket Mounted Vehicles	650	692	737	785	836	3,700
Operational Vehicles	240	256	272	290	309	1,367
Buildings and Civil Works	500	533	567	604	643	2,847
CCTV – Camera	100	107	113	121	129	570
Furniture & Office Equipment	50	53	57	60	64	284
TRW – Workshop	80	85	91	97	103	456
GIS Mapping / SCADA	200	213	227	242	257	1,139
Total Allowed	**2,583**	**2,975**	**3,718**	**3,078**	**3,153**	**15,507**
Transport Policy	Not allowed by Authority under prevailing economic situation of the country					

10. **Issue # 06: Petitioner to provide payback period of investments claimed under the head of DOP, ELR and STG.**

10.1 The Petitioner has provided following details of payback period of the investment claimed under DOP , ELR and STG investments.

Energy Saving/ Loss Reduction	Net Present Value (NPV) Million Rs	Payback period (Years)	IFRR (%)	Benefit to Cost Ratio
Ariel Bundle Cable (ABC)	1,631	5.47	44.99%	2.27
AMI System/ Smart Energy Meters	4,832	4.91	30.76%	1.66
Distribution of Power (DoP)	1,709	5.88	26.73%	1.53
Energy Loss Reduction (ELR)	7,653	6.32	24.73%	1.46
Secondary Transmission & Grids (STG)	14,513	6.41	22.44%	1.44
Overall - DIIP	**30,338**	**5.94**	**25.44%**	**1.52**

10.2. The savings and loss reduction targets as provided by LESCO are given below:

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Energy Saving/ Loss Reduction	Year1	Year 2	Year 3	Year 4	Year 5	Total
DoP (GWh)	25.24	27.94	23.47	19.47	17.13	113.25
ELR (GWh)	53.92	58.88	61.76	66.72	71.68	312.96
ABC (GWh)	23.52	15.97	18.31	16.06	15.55	89.41
STG (GWh)	34.24	13.71	17.65	23.08	8.96	97.64
AMI System (GWh)	36.52	64.90	20.40	20.40	20.40	162.62

10.3. Moreover, LESCO vide email dated 9-12-2022 also submitted sensitivity analysis with respect to useful life & WACC which is summarized below:

NPV Profile		WACC				
		10%	12.5%	15.0%	17.5%	20.0%
Useful Life (Years)	15	30,687	21,861	14,948	9,492	5,154
	17	34,625	24,628	16,907	10,889	6,157
	19	38,403	27,178	18,645	12,082	6,983
	21	41,578	29,228	19,980	12,961	7,566
	23	44,309	30,913	21,031	13,623	7,988
	25	46,639	32,288	21,852	14,119	8,290
	27	48,573	33,379	22,475	14,479	8,501
	29	50,171	34,241	22,947	14,741	8,648
	30	50,863	34,601	23,137	14,843	8,703

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LOSSES ASSESSMENT OF LESCO

11. The T&D losses allowed to LESCO in previous MYT control period i.e. FY 2018-19 to FY 2022-23 is given below. It is important to note that for FY 2022-23 the loss target allowed to LESCO is 8%. Moreover, it is noted that by Authority that the actual losses of LESCO for FY 2021-22 are 11.52 % against the approved number of 9.08%.

Financial Year	132kV Losses	11kV Losses	LT Losses	Total
FY 2018-19	2.10	6.36	3.30	11.76
FY 2019-20	2.05	5.72	3.11	10.88
FY 2020-21	1.97	5.16	2.90	10.03
FY 2021-22	1.87	4.61	2.60	9.08
FY 2022-23	**1.75**	**4.10**	**2.15**	**8.00**

12. LESCO explained to the Authority that the reason for deviation from Authority's approved T&D loss targets is non-implementation of AMI project as 2% reduction was envisaged by implementation of AMI project. Furthermore, the loan approved for AMI project of LESCO has been cancelled by ADB.

TRANSMISSION & TRANSFORMATION LOSSES

13. The Transmission Losses allowed to LESCO during FY 2022-23 are 1.75%. The transmission loss target for 1st year of MYT control period i.e. FY 2023-24 is taken same as 1.75 % with overall decrease of 0.3% in preceding years of the MYT control period in line with the submissions of LESCO.

Description	Start Point	Year 1	Year 2	Year 3	Year 4	Year 5
Allowed Transmission Loss	1.75%	1.75%	1.63%	1.58%	1.52%	1.45%
Reduction claimed by LESCO	-	0.12%	0.05%	0.06%	0.07%	0.03%

14. Moreover, 0.03% reduction as claimed in FY 2027-28 (i.e. 5th year) will be considered in next tariff control period.

DISTRIBUTION LOSSES

15. The Distribution Losses allowed to LESCO during FY 2022-23 are 6.25 % which include 4.10% of H.T/11 kV loss and 2.15% of L.T losses. This target also contained the 2% reduction in distribution losses on account of the AMI project. However, due to scrap of project, the proposed reduction of 2% could not be achieved.

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16. Therefore, the Authority has taken starting point of 8.25% rather than 6.25% for Distribution losses on account of non-implementation of AMI project. The loss reduction allowed to LESCO is as follows:

Million Rs

Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
AMI Reduction	0.15%	0.29%	0.15%	0.15%	0.15%	0.89%
ELR Reduction	0.25%	0.32%	0.37%	0.43%	0.49%	1.86%
ABC Reduction	0.02%	0.02%	0.03%	0.03%	0.04%	0.14%
Total Reduction for Distribution	0.42%	0.63%	0.55%	0.60%	0.69%	2.89%
Allowed Distribution Loss Targets						
Description	**Start Point**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Distribution Loss	**8.25%**	**8.25%**	**7.83%**	**7.20%**	**6.65%**	**6.05%**
Assessed Reduction	-	0.42%	0.63%	0.55%	0.60%	0.69%
Segregation of Allowed Distribution Losses						
11 kV Loss Target	**6.10%**	**6.10%**	**5.82%**	**5.36%**	**4.99%**	**4.59%**
L.T Loss Target	**2.15%**	**2.15%**	**2.01%**	**1.84%**	**1.66%**	**1.46%**

17. Moreover, 0.69% reduction as assessed in FY 2027-28 (5th Year) will be considered in next tariff control period.

18. The performance targets which are to be achieved by LESCO though above referred investment is given below.

Alignment with Vision/Mission	Challenge	Unit of Measurement	Current Status	Status after 5 Years
Cost Effectiveness, Reliability, Secure	a. Continuity of Supply	SAIFI & SAIDI	34.66 & 3821.84	26.93 & 1030.18
	b. Reliability of Supply	Voltage Variation %	(±) 13%	(±) 5%
		Power Factor	0.85	0.95
	c. T&D Loss	%	11.52	7.50
Commitment to Customers	Customer Services	Complaints (%)	9.9%	1.0%
Safe & Secure, environmentally responsible	a. Transformation Capacity	MVA	13392	14860
	b. Transmission Line	Km	3145	3307
	Network Constraints	% Overloading	20%	0%
	Recovery	% age	95%	100%
	Safety	No. of Accidents	27	0

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19. DIRECTION OF THE AUTHORITY

i. LESCO shall submit its Power Acquisition Program as provided under Section 32 of the Act read with the provisions as laid down in NEPRA (Electric Power Procurement) Regulations, 2022.

ii. LESCO shall submit a quarterly progress report showing utilization of allowed investment, physical progress and analysis regarding the benefits accrued against amount incurred for each project highlighted under different heads. The submitted quarterly progress report shall be reviewed/verified by a third-party consultant/firm selected by the Authority on ToRs approved by the Authority for monitoring purpose on quarterly basis. The charges/fee for hiring of the services of third-party consultant/firm for the purpose shall be borne by LESCO.

iii. LESCO shall submit progress report for the specified targets (T&D losses, SAIFI, SAIDI, Reliability, Continuity, Quality of Power Supply and other performance standards) linked with the investment plan approved by the Authority.

iv. No re-appropriation shall be allowed to LESCO against the approved investments under different heads.

v. In case of any deviation under each head of investment for more than 5% of the approved investment plan due to any regulatory decisions/interventions, LESCO shall be required to submit the additional investment requirements for prior approval of the Authority.

vi. LESCO shall ensure zero fatal accidents goal and shall ensure safe working environment for its employees and general public by utilizing approved budget by the Authority against safety plans

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20. ORDER OF THE AUTHORITY

The Authority as per provisions of Section 32 of the NEPRA Act, 1997 1997 read with Para 23 of NEPRA Guidelines for Determination of Consumer End Tariff (Methodology and Process), 2015 approves the investment plan and losses assessment of LESCO for five (5) years MYT control period from FY 2023-24 to FY 2027-28.

A. Investment Plan **(Million Rs.)**

Head	Year 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	Total
STG (Annex-I)	5,186	2,035	3,516	3,368	2,079	16,184
ELR (Annex-II)	2,518	3,187	3,654	4,268	4,945	18,572
ABC Program (Annex-III)	200	246	316	268	396	1,425
DOP Self (Annex-IV)	509	672	628	823	904	3,536
AMI/Smart Meter (Annex-V)	1,500	2,879	1,509	1,509	1,509	8,906
IT & ERP/Data Centre	500	756	1356	561	474	3,647
Line T & P / PPEs	263	280	298	318	338	1,497
Bucket Mounted Vehicles	650	692	737	785	836	3,700
Operational Vehicles	240	256	272	290	309	1,367
Buildings and Civil Works	500	533	567	604	643	2,847
CCTV – Camera	100	107	113	121	129	570
Furniture & Office Equipment	50	53	57	60	64	284
Transformer Workshop	80	85	91	97	103	456
GIS Mapping / SCADA	200	213	227	242	257	1,139
Total Own Resources	**12,496**	**11,994**	**13,341**	**13,314**	**12,986**	**64,130**
Consumer Financing	**7,428**	**7,812**	**8,454**	**9,185**	**10,298**	**43,177**

B. Losses Targets

Voltage Level	Start Point	Year 1	Year 2	Year 3	Year 4	Year 5
Transmission Loss	1.75%	1.75%	1.63%	1.58%	1.52%	1.45%
H.T/11 kV Loss	6.10 %	6.10%	5.82%	5.36%	4.99%	4.59%
L.T Loss	2.15%	2.15%	2.01%	1.84%	1.66%	1.46%
T&D Loss	**10.00%**	**10.00%**	**9.46%**	**8.78%**	**8.17%**	**7.50%**

AUTHORITY

Rafique Ahmad Shaikh
Member

Mathar Niaz Rana (nsc)
Member

Engr. Maqsood Anwar Khan
Member

Tauseef H. Farooqi
Chairman

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
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26/4/23

LAHORE ELECTRIC SUPPLY COMPANY (LESCO)

Summary of Five Years Distribution Integrated Investment Plan (DIIP)

(Transmission & Grids)

Sr No	Description	Year-1	Year-2	Year-3	Year-4	Year-5	Total
A - GRID STATIONS (Nos)							
i	Construction of New Grid Stations	5	2	3	2	2	14
ii	Augmentation of Power Transformers	5	7	2	6	0	20
iii	Extension of Existing Grid Stations with line bays	4	0	2	0	0	6
iv	Extension of Existing Grid Stations with Transformer Bays	3	0	2	2	0	7
v	Installation of Capacitor Banks (MVAR)	206	102	96	124	124	652
Additional (MVA)							
i	Construction of New Grid Stations	372	104	212	132	132	952
ii	Augmentation of Power Transformers	70	98	27	83	0	278
iii	Extension of Existing Grid Stations	92	0	66	52	0	210
	Total	**534**	**202**	**305**	**267**	**132**	**1440**
Cost (Mln. Rs.)							
i	Construction of New Grid Stations	1972.06	501.52	1552.31	1153.00	941.59	6120.48
ii	Augmentation of Power Transformers	514.84	944.17	269.00	974.00	0.00	2702.01
iii	Extension of Existing Grid Stations with line bays	62.75	0.00	48.20	0.00	0.00	110.94
iv	Extension of Existing Grid Stations with Transformer Bays	217.17	0.00	312.70	277.80	0.00	807.67
v	Installation of Capacitor Banks	180.25	109.78	99.12	128.03	133.46	650.63
	Total	**2947.06**	**1555.47**	**2281.33**	**2532.83**	**1075.04**	**10391.74**
B - Erection of 132 kV Transmission Lines							
i	132kV Transmission Line Projects (Nos.)	10	4	5	4	5	28
ii	Erection of New 132kV Transmission Lines (km)	123.00	20.00	33.00	20.50	8.00	204.50
iii	Reconductoring of 132kV Transmission Lines (km)	26.00	0.00	20.00	7.80	24.64	78.44
Cost (Mln. Rs.)							
i	Erection of New 132kV Transmission Lines (km)	1892.62	479.74	859.32	604.75	246.00	4082.44
ii	Reconductoring of 132kV Transmission Lines (km)	346.16	0.00	375.64	230.10	757.68	1709.58
	Total	**2238.78**	**479.74**	**1234.96**	**834.85**	**1003.68**	**5792.02**
	Grand Total (A+B) (Mln. Rs.)	**5,186**	**2,035**	**3,516**	**3,368**	**2,079**	**16,184**
Note	In case of major variation in prices, the cost estimates will be revised.						

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List of Grid Station Works

Sr. No.	Proposed Substation	Voltage Level (kV)	Type	Transformer (MVA)/ Line Bays	MVA	Material	Civil Works	E&SS	Installation/ Over Head	Total Estimated Cost	Remarks
						Million Rs.	Million Rs.	Million Rs.	Million Rs.	Million Rs.	
1	Bismillah Housing/Bilal Housing	132	New	2x40	80	251.98	97.78	5.64	20.68	376.09	Procurement of New Transformer
2	Mustafabad GIS / Barki LSE	132	New	2x40	80	334.61	129.85	7.49	27.47	499.41	Procurement of New Transformer
3	Baghbanpura GIS	132	New	2x40	80	334.60	129.85	7.49	27.47	499.41	Procurement of New Transformer
4	Sui Gas-II	132	New	2x26	52	104.08	70.05	4.00	22.02	200.15	Spare 26 MVA Transformer will be used
5	Pak Arab	132	New	2x40	80	265.99	103.22	5.96	21.84	397.00	Procurement of New Transformer
6	Mochi Gate	132	Aug.	1x40	14	91.64	-	1.03	10.30	102.97	Procurement of New Transformer
7	Raiwind New	132	Aug.	1x40	14	91.64	-	1.03	10.30	102.97	Procurement of New Transformer
8	Okara City-2	132	Aug.	1x40	14	91.64	-	1.03	10.30	102.97	Procurement of New Transformer
9	Chung	132	Aug.	1x40	14	91.64	-	1.03	10.30	102.97	Procurement of New Transformer
10	Green View	132	Aug.	1x40	14	91.64	-	1.03	10.30	102.97	Procurement of New Transformer
11	Okara City-I	132	Ext.	1x 26	26	27.59	5.96	0.75	2.98	37.28	Spare 26 MVA Transformer will be used
12	Bucheki	132	Ext.	1x26	26	27.59	5.96	0.75	2.98	37.28	Spare 26 MVA Transformer will be used
13	Sharaqpur Road SKP	132	Ext.	1x40	40	114.80	17.11	2.14	8.56	142.61	Procurement of New Transformer
14	Sheikhupura	132	Ext.	2 x Line Bays		22.29	1.24	-	1.24	24.77	
15	Shahkot	132	Ext.	1 x Line Bays		11.50	0.64	-	0.64	12.78	
16	Sangla Hill	132	Ext.	1 x Line Bays		11.87	0.66	-	0.66	13.19	
17	500 kV SKP	132	Ext.	1 x Line Bays		10.81	0.60	-	0.60	12.008	
18	Installation of Capacitor Banks	11	New	306 MVAR		149.61	18.03	-	12.62	180.25	
	Sub-Total A				**534**					**2947.06**	
19	Fazaia-I	132	New	2x26	52	128.02	86.16	4.92	27.08	246.18	Spare 26 MVA Transformer will be used
20	Lake City GIS	132	New	2x26	52	132.77	89.37	5.11	28.09	255.34	Spare 26 MVA Transformer will be used
21	Shamkay	132	Aug.	1x40	14	120.04	-	1.35	13.49	134.88	Procurement of New Transformer
22	LEFO	132	Aug.	1x40	14	120.04	-	1.35	13.49	134.88	Procurement of New Transformer
23	Kasur New	132	Aug.	1x40	14	120.04	-	1.35	13.49	134.88	Procurement of New Transformer
24	Model Town	132	Aug.	1x40	14	120.04	-	1.35	13.49	134.88	Procurement of New Transformer
25	Raiwind	132	Aug.	1x40	14	120.04	-	1.35	13.49	134.88	Procurement of New Transformer
26	Okara city - I	132	Aug.	1x40	14	120.04	-	1.35	13.49	134.88	Procurement of New Transformer
27	Shamkay	132	Aug.	1x40	14	120.04	-	1.35	13.49	134.88	Procurement of New Transformer
28	Installation of Capacitor Banks	11	New	102 MVAR		91.12	10.98	-	7.68	109.78	
	Sub-Total B				**202**					**1555.47**	
29	IEP Town	132	New	2x26	52	132.24	89.01	5.09	27.97	254.31	Spare 26 MVA Transformer will be used
30	Edenabad Halloki	132	New	2x40	80	434.83	168.74	9.74	35.70	649.00	Procurement of New Transformer
31	S.A Gardens	132	New	2x40	80	434.83	168.74	9.74	35.70	649.00	Procurement of New Transformer
32	Lullyani	132	Aug.	1x26	13	109.35	-	2.43	9.72	121.50	Procurement of New Transformer
33	Manga Mandi	132	Aug.	1x40	14	131.28	-	1.48	14.75	147.50	Procurement of New Transformer
34	Ellahabad	132	Ext.	1x26	26	91.69	19.82	2.48	9.91	123.90	Procurement of New Transformer
35	Mominpura	132	Ext.	1x40	40	151.98	22.66	2.83	11.33	188 80	Procurement of New Transformer
36	Fatepuri	132	Ext.	2 x Line Bays		28.92	1.61	-	1.61	32.13	
37	Farooqabad	132	Ext.	2 x Line Bays		14.46	0.80	-	0.80	16.07	Conversion from ISO Bay to Line Bay
38	Installation of Capacitor Banks	11	New	96 MVAR		82.27	9.91	-	6.94	99.12	
	Sub-Total C				**305**					**2281.33**	

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List of Grid Station Works

Sr. No.	Proposed Substation	Voltage Level (kV)	Type	Transformer (MVA)/ Line Bays	MVA	Material	Civil Works	E&SS	Installation/ Over Head	Total Estimated Cost	Remarks
						Million Rs.	Million Rs.	Million Rs.	Million Rs.	Million Rs.	
39	Fazaia-II	132	New	2x40	80	433.18	170.04	9.81	35.97	654.00	Procurement of New Transformer
40	Ittehad Town	132	New	2x26	52	334.33	129.74	7.49	27.45	499.00	Procurement of New Transformer
41	Kahna Nau	132	Aug.	1x40	14	149.08	-	1.68	16.75	167.50	Procurement of New Transformer
42	Pattoki	132	Aug.	1x40	14	149.08	-	1.68	16.75	167.50	Procurement of New Transformer
43	Punjab University H/S	132	Aug.	1x26	13	122.85	-	2.73	10.92	136.50	Procurement of New Transformer
44	Sabzazar	132	Aug.	1x40	14	149.08	-	1.68	16.75	167.50	Procurement of New Transformer
45	Shamkey	132	Aug.	1x40	14	149.08	-	1.68	16.75	167.50	Procurement of New Transformer
46	Kala Shah Kaku (220 kV)	132	Aug.	1x40	14	149.08	-	1.68	16.75	167.50	Procurement of New Transformer
47	Kanganpur	132	Ext.	1x26	26	102.79	22.22	2.78	11.11	138.90	Procurement of New Transformer
48	Muridkey	132	Ext.	1x26	26	102.79	22.22	2.78	11.11	138.90	Procurement of New Transformer
49	Installation of Capacitor Banks	11	New	124 MVAR		106.26	12.80	-	8.96	128.03	
	Sub-Total D				**267**					**2532.83**	
50	Quaid-e-Azam Indst. Estate	132	New	2x40	80	453.26	175.89	10.15	37.21	676.50	Procurement of New Transformer
51	Spring Meadows	132	New	2x26	52	137.35	92.78	5.30	29.16	265.09	Spare 26 MVA Transformer will be used
52	Installation of Capacitor Banks	11	New	124 MVAR		110.77	13.35	-	9.34	133.46	
	Sub-Total E				**132**					**1075.04**	

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List of Transmission Line Works

Sr. No.	Transmission Line	Voltage Level (kV)	Type	Conductor Name	Length (km)	Material (Million Rs.)	Civil Works (Million Rs.)	ROW (Million Rs.)	Installation/ Over Head (Million Rs.)	Total Estimated Cost (Million Rs.)	Remarks
1	Feed for Bismillah Housing Society	132	D/C	Rail	6	70.01	33.34	1.67	6.11	111.13	
2	Sheikhupura-Halmore-SharaqPur	132	D/C	Rail	26	242.31	79.62	5.19	19.04	346.16	Reconductoring
3	Feed for Pak Arab	132	D/C	Rail	4	48.34	23.02	1.15	4.22	76.73	
4	Feed for Sui Gas-II	132	D/C	Rail	5	60.42	28.77	1.44	5.27	95.91	
5	In/Out of Jandiala Sher Khan - Sapphire T/L at Khanqa Dogran	132	D/C	Rail	28	318.07	151.46	7.57	27.77	504.88	
6	Sheikhupura – Warburton - Nankana	132	D/C	Rail	43	420.20	200.10	10.00	36.68	666.99	Conversion from S/C to D/C & Reconductoring
7	Shahkot – Sangla Hill	132	S/C	Lynx	18	67.97	32.37	1.62	5.93	107.89	2nd Circuit Stringing
8	500 kV SKP - 132 kV SKP	132	D/C	Rail	13	136.49	64.99	3.25	11.92	216.64	Conversion from S/C to D/C & Reconductoring
9	Feed for Mustafa Abad In/Out from FatehGarh – P.W.R.	132	D/C	Rail	4	46.67	22.23	1.11	4.07	74.09	
10	Feed for Baghbanpura GIS	132	D/C	Rail	2	24.17	11.51	0.58	2.11	38.36	
	Sub-Total A				**149**					**2238.78**	
11	Feed for Fazia-I	132	D/C	Rail	3	46.21	22.01	1.10	4.03	73.36	
12	Feed for Lake City	132	D/C	Rail	3	47.93	22.82	1.14	4.18	76.08	
13	In/ Out of Attabad - KSK Circuit-1 at 132 kV Lahore North	132	D/C	Rail	7	101.89	48.52	2.43	8.89	161.72	
14	In/ Out of Attabad - KSK Circuit-2 at 132 kV Lahore North	132	D/C	Rail	7	106.21	50.58	2.53	9.27	168.58	
	Sub-Total B				**20**					**479.74**	
15	Feed for IEP Town	132	D/C	Rail	4	63.63	30.30	1.51	5.55	101.00	
16	Fatepuri - 132 kV Lahore North	132	D/C	Rail	18	273.31	130.15	6.51	23.86	433.83	
17	Sheikhupura – Farooqabad	132	D/C	Rail	20	262.95	86.40	5.63	20.66	375.64	Reconductoring
18	Feed for Edenabad Halloki	132	D/C	Rail	6	111.51	53.10	2.66	9.74	177.00	
19	Feed for S.A Gardens	132	D/C	Rail	5	92.93	44.25	2.21	8.11	147.50	
	Sub-Total C				**53**					**1234.96**	
20	Feed for Fazaia-II	132	D/C	Rail	4	74.34	35.40	1.77	6.49	118.00	
21	Feed for Ittehad Town	132	D/C	Rail	6	111.51	53.10	2.66	9.74	177.00	
22	Ghazi Road - Batupur	132	D/C	Rail	10.5	195.14	92.93	4.65	17.04	309.75	
23	Wapda Town - DHA Rahbar	132	D/C	HTLS	7.8	161.07	52.92	3.45	12.66	230.10	Reconductoring
	Sub-Total D				**28.3**					**834.85**	
24	Feed for Quaid-e-Azam Indst. Estate	132	D/C	Rail	4	77.49	36.90	1.85	6.77	123.00	
25	Feed for Spring Meadows	132	D/C	Rail	4	77.49	36.90	1.85	6.77	123.00	
26	Kot Lakhpat - Kahna Nau	132	S/C	HTLS	11.77	253.35	83.24	5.43	19.91	361.93	Reconductoring
27	Lahore - sharaqpur Road	132	S/C	HTLS	3	64.58	21.22	1.38	5.07	92.25	Reconductoring
28	Okara New - Okara City-1	132	S/C	HTLS	9.87	212.45	69.81	4.55	16.69	303.50	Reconductoring
	Sub-Total E				**32.64**					**1003.68**	

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ELR SCOPE & COST

i. SCOPE

Scope of Work for 11 kV and Below Rehabilitation		unit	Year 1	Year 2	Year 3	Year 4	Year 5	Total
A.								
1	**Rehabilitation of HT Lines**							
	Number of proposals	Nos.	90	108	126	144	162	630
	New Line	Kms.	612	648	710	650	714	3334
	Reconductoring	Kms.	120	290	140	160	180	891
	Re-routing	Kms.	-	-	-	-	-	-
2	**11kV 500 MCM Cable**	Kms.	Already included in STG plan					
Scope of Work for LT Rehabilitation								
B.								
1	**LT Lines Rehabilitation**							
	New LT Line	Kms.	337	336	341	345	359	1718
	Reconductoring of LT Line	Kms.	500	500	855	884	890	3629
2	**Other Equipment and Material**							
	a. Single Phase Meters	-	-	-	-	-	-	-
	b. Three Phase Meters	-	-	-	-	-	-	-
	Sub Total	-	-	-	-	-	-	-
3	**New Transformers**							
	a. 25 KVA	Nos.	-	-	-	-	-	-
	b. 50 KVA	Nos.	112	118	118	117	122	586
	c. 100 KVA	Nos.	297	312	312	361	379	1662
	d. 200 KVA	Nos.	556	586	586	449	470	2646
	e. 400 KVA	Nos.	2	2	2	3	3	12
	Sub Total	**Nos.**	**967**	**1018**	**1018**	**929**	**973**	**4906**

ii. COST

Cost of Work for 11 kV and Below Rehabilitation		Rs. In Million					
A.		Year 1	Year 2	Year 3	Year 4	Year 5	Total
1	**Rehabilitation of HT Lines**						
	Cost of proposals	**1080**	**1,470**	**1,826**	**2,223**	**2,663**	**9,263**
	New Line	956	1129	1626	1956	2314	7980
	Reconductoring	124	341	200	267	349	1281
	Re-routing	-	-	-	-	-	-
4	**11kV 500 MCM Cable (km)**	-	-	-	-	-	-
Cost of Work for LT Rehabilitation							
B.							
1	**LT Lines Rehabilitation**	**433**	**659**	**770**	**1107**	**1299**	**4268**
	New LT Line	346	527	616	886	1039	3414
	Reconductoring of LT Line	87	132	154	221	260	854
2	**Other Equipment and Material**						
	a. Single Phase Meters	-	-	-	-	-	-
	b. Three Phase Meters	-	-	-	-	-	-
	Sub Total	-	-	-	-	-	-

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3	**New Transformers**						
	a. 25 KVA	-	-	-	-	-	-
	b. 50 KVA	61	65	65	64	67	322
	c. 100 KVA	267	281	281	325	341	1496
	d. 200 KVA	668	703	703	538	564	3175
	e. 400 KVA	9	9	9	10	10	48
	Sub Total	**1005**	**1058**	**1058**	**938**	**982**	**5041**
4	**Installation of 11 kV Panels**	Already included in STG plan					

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ANNEXURE - III

LIST OF FEEDERS FOR ABC PLAN Year 1							
Sr.No	SUB DIV CODE	CIRCLE	SUB DIV	FEEDER CODE	FEEDER NAME	CONSUMERS	% AT&C LOSS
1	11311	3	WAHGA	1320	DIYAL	1426	77.3
2	11311	3	WAHGA	1316	BHASEEN	3188	76.6
3	11129	1	KALA KHATAI	36912	KALA KHATAI ROAD	10095	54.4
4	11224	2	LAHORE PARK	115720	ALI HUSSAIN SHAH	1030	43.2
5	11238	2	RANA TOWN	59913	AMNA PARK	8472	37.1
6	11238	2	RANA TOWN	59912	RANA TOWN	9720	34.7
7	11129	1	KALA KHATAI	50503	NEW JAVAID PARK	6220	31.0
8	11238	2	RANA TOWN	59905	PECO	4460	26.9
LIST OF FEEDERS FOR ABC PLAN 2							
Sr.No	SUB DIV CODE	CIRCLE	SUB DIV	FEEDER CODE	FEEDER NAME	CONSUMERS	% AT&C LOSS
9	11164	1	JARANAWALA ROAD	50735	WAHGRAY	1993	53.5
10	11155	1	SULTANPURA	121004	FAIZ BAGH	5982	58.2
11	11313	3	N BILLAL CLNY	1307	RAVI SYPHON	4084	55.3
12	11311	3	WAHGA	1308	TAQI PURA	3733	54.3
13	11745	7	PATTOKI RURAL	15816	HANJRA	4163	58.1
14	11743	7	JAMBER KALAN	1539	BHUGHIANA KALAN	4661	55.7
15	11731	7	CHUNIAN CITY	25407	NOWSHERA	5142	53.4
16	11812	8	NANKANA RURAL	33006	LASANI	2151	53.6
LIST OF FEEDERS FOR ABC PLAN Year 3							
17	11745	7	PATTOKI RURAL	112901	11-KV LAKHODAIR FE	3299	53.0
18	11311	3	WAHGA	1310	WAHGA	4637	50.3
19	11753	7	RAJA JANG	35317	RAO KHAN WALA	6447	49.7
20	11735	7	KANGANPUR	30306	KANGANPUR	1039	48.2
21	11737	7	ELLAH ABAD WEST	50609	BAQAPUR	1784	46.9
22	11722	7	RURAL AREA KASUR	9915	MAAN KASUR	5237	46.1
23	11735	7	KANGANPUR	30301	G.R.SINGH	5403	45.5
24	11714	7	LULYANI	31414	11-KV YOUSAF NAGAR	3702	45.0
LIST OF FEEDERS FOR ABC PLAN Year 4							
25	11737	7	ELLAH ABAD WEST	50610	SAREASAR	2211	44.4
26	11738	7	CHUNIAN EAST	25408	JUND WALA	2809	44.3
27	11121	1	RACHNA TOWN	50843	INDUSTRIAL	7468	44.2
28	11124	1	FAIZPUR	41217	JARANWALA ROAD	2502	43.4
29	11747	7	HALLAH	15804	KACHA-PACCA	8945	43.1
30	11736	7	KANGAN PUR WEST	30310	MACHANA	1157	43.0
31	11723	7	NOOR PUR KASUR	31022	TODDAY PUR	1590	42.9

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32	11311	3	WAHGA	1309	ATTO KAY AWAN	5787	42.6
LIST OF FEEDERS FOR ABC PLAN Year 5							
33	11737	7	ELLAH ABAD WEST	50601	HATHAR	4300	42.3
34	11128	1	ALI PARK	50826	SHER-E-BANGAL	3512	42.1
35	11355	3	MAHMOOD BOOTI	110612	MARL MARI	3204	41.6
36	11723	7	NOOR PUR KASUR	31018	SAKANDAR PURA	2286	41.6
37	11723	7	NOOR PUR KASUR	31016	SAAD	3550	41.2
38	11726	7	KHUDIAN NORTH	31011	VERIUM	2480	41.2
39	11733	7	CHANGA MANGA	15820	CHANGA MANGA	10623	41.2
40	11727	7	MANDI USMAN WALA	31010	P.L.U	2809	40.8
41	11238	2	RANA TOWN	59911	HANJERWAL	8267	3.3

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DOP SCOPE and COST

ANNEXURE - IV

i. SCOPE.

Sr. No.	Description	Unit	Quantities					
			Year 1	Year 2	Year 3	Year 4	Year 5	Total
Scope of Work for 11 kV and Below Expansion								
A.								
1	Expansion of HT Lines							
	Number of proposals	Nos	30	25	15	30	25	125
	Length of new HT line	Km	100	75	25	100	75	375
	Reconductoring	Km	270	270	270	270	270	1350
2	11 KV Capacitors							
	a. Fixed 450 KVAR	Nos	545	600	500	200	100	1,945
	b. Fixed 900 KVAR	Nos	-	-	-	-	-	-
	c. Others	Nos	-	-	-	-	-	-
	Sub Total		545	600	500	200	100	1,945
3	11 KV Panel	Nos	11 KV Panel for HT Proposal is included in STG head					
4	11kV 500 MCM Cable	km	11KV 500 MCM Cable for HT Proposal is included in STG head					
Scope of Work for LT Expansion								
B.								
1	New LT Lines							
	Number of proposals	Nos	200	340	375	450	550	1,915
	Length of new LT line (Total Wasp+ANT)	Km	7.5	13	14	17	22	73.5
	Transformers							
	a. 25 KVA	Nos	-	-	-	-	-	-
	b. 50 KVA	Nos	20	34	37.5	45	55	192
2	c. 100 KVA	Nos	80	136	150	180	220	766
	d. 200 KVA	Nos	100	170	187.5	225	275	958
	e. others KVA	Nos	-	-	-	-	-	-
	Sub Total		200	340	375	450	550	1,915
3	LT Capacitors		-	-	-	-	-	-
	a. Different KVARs	Nos	-	-	-	-	-	
4	Other Equipment's and Material							
	a. Single Phase Meters	Nos	-	-	-	-	-	-
	b. Three Phase Meters	Nos	-	-	-	-	-	-
	c. MDI	Nos	-	-	-	-	-	-
	Sub Total		-	-	-	-	-	-
Scope of Cost Deposit Work								
C.	Village Electrification							
1	New HT Lines							

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	Length of new HT line	Km	17	11	8	-	-	-
2	**New LT Lines**			-	-	-	-	-
	Length of new LT line	Km	18	12	9	-	-	-
3	**Transformers**			-	-	-	-	-
	a. 25 KVA	Nos	9	6	5	-	-	-
	b. 50 KVA	Nos	2	2	2	-	-	-
	c. 100 KVA	Nos		-	-	-	-	-
	d. 200 KVA	Nos		-	-	-	-	-
	e. others KVA	Nos	1	-	-	-	-	-
	Sub Total		12	8	7	-	-	-
D. 1	**Independent Feeder** **New HT Lines**							
	Length of new HT line	Km	160	168	176	185	194	884
2	**New LT Lines**							
	Length of new LT line	Km	-	-	-	-	-	-
3	**Transformers**							
	a. 25 KVA	Nos	-	-	-	-	-	-
	b. 50 KVA	Nos	-	-	-	-	-	-
	c. 100 KVA	Nos	-	-	-	-	-	-
	d. 200 KVA	Nos	-	-	-	-	-	-
	e. others KVA	Nos	-	-	-	-	-	-
	Sub Total		-	-	-	-	-	-
4	**11 KV Panel**	Nos	32	34	35	37	39	177

ii. **COST**

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Sr. No.	Description	Rs. In Million					
		Year 1	Year 2	Year 3	Year 4	Year 5	Total
Cost of Work for 11 kV and Below Expansion (DOP)							
A.							
1	**Expansion of HT Lines**						
	New Line	160	150	50	200	150	710
	Reconductoring	97	90	104	85	109	485
2	**11 KV Capacitors**						
	a. Fixed 450 KVAR	109	136	121	51	27	445
	b. Fixed 900 KVAR	-	-	-	-	-	-
	c. Others	-	-	-	-	-	-
	Sub Total	**109**	**136**	**121**	**51**	**27**	**445**
3	**11 KV Panels**	-	-	-	-	-	-
4	**11 kV 500 MCM Cable**	-	-	-	-	-	-
Cost of Work for LT Expansion							
B.							
1	**New LT Lines**						
	Number of proposals						
	New LT line	8	15	18	23	30	95
2	**Transformers**						
	a. 25 KVA						
	b. 50 KVA	11	25	30	40	53	160
	c. 100 KVA	21	77	98	136	189	521
	d. 200 KVA	120	191	216	264	330	1121
	e. others KVA						
	Sub Total	152	294	344	440	573	1802
3	**LT Capacitors**						
	a. Different KVARs	-	-	-	-	-	-
4	**Other Equipments and Material**						
	a. Single Phase Meters	-	-	-	-	-	-
	b. Three Phase Meters	-	-	-	-	-	-
	c. MDI	-	-	-	-	-	-
	Sub Total	-	-	-	-	-	-
Cost of Cost Deposit Work							
C.	**Village Electrification**						
1	**New HT Lines**						
	New HT line	1.16	0.77	0.58	0	0	2.52
2	**New LT Lines**						
	New LT line	0.63	0.42	0.32	0	0	1.37
3	**Transformers**						
	a. 25 KVA	5	4	3	0	0	11.60
	b. 50 KVA	1	1	1	0	0	4.39
	c. 100 KVA						
	d. 200 KVA						
	e. others KVA	0.05					0.05
	Sub Total	6.05	5	4	0	0	16.04
D.	**Independent Feeder**	-	-	-	-	-	-
1	**New HT Lines**	-	-	-	-	-	-
	New HT line	141	148	155	163	171	778
2	**New LT Lines**	-	-	-	-	-	-
	New LT line	-	-	-	-	-	-
3	**Transformers**	-	-	-	-	-	-
	a. 25 KVA	-	-	-	-	-	-
	b. 50 KVA	-	-	-	-	-	-
	c. 100 KVA	-	-	-	-	-	-
	d. 200 KVA	-	-	-	-	-	-

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	e. others KVA	229	240	252	265	278	1264
	Sub Total	229	240	252	265	278	1264
4	**11 KV Panel**	35.2	36.96	38.81	40.75	42.79	194.5

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F CODE	F NAME	SUBDIV CODE	Year	SUBDIV NAME	METERS				LOSSES ENDING JUNE-21			
					S PH	THREE PH	MDI	TOTAL	PROG UNITS RECVD	PROG NET UNITS BILLED	unit Lost	% Age Prog Loss
36912	KALA KHATAI ROAD	11129	1	KALA KHATAI	6336	13	206	6572	32,421,332	17,822,691	14,598,641	45
1316	BHASEEN	11311	1	WAHGA	1865	81	32	1982	21,536,000	10,204,404	11,331,596	52.6
59912	RANA TOWN	11238	1	RANA TOWN	8458	29	86	8678	33,904,216	23,013,534	10,890,682	32.1
59913	AMNA PARK	11238	1	RANA TOWN	7618	37	71	7802	30,178,615	19,620,140	10,558,475	35
41216	SHARQPUR KHURD	11162	1	KOT ABDUL MALIK	8419	22	156	8605	39,302,086	29,337,461	9,964,625	25.4
12114	KAMAHAN ROAD	11527	1	SITARA COLONY	6778	14	94	6904	35,374,776	25,751,332	9,623,444	27.2
50503	NEW JAVAID PARK	11129	1	KALA KHATAI	5214	10	135	5361	27,594,542	19,443,733	8,150,809	29.5
12106	LEFO ROAD	11527	1	SITARA COLONY	8573	21	91	8747	29,595,864	21,743,951	7,851,913	26.5
42829	PAK MILITARY ACCOUNTS	11218	1	ENGINEER TOWN	7138	292	195	7627	32,409,920	24,631,077	7,778,843	24
50710	KOT ABDUL MALIK	11162	1	KOT ABDUL MALIK	1271	12	137	1442	30,647,919	24,359,246	6,288,673	20.5
41217	JARANWALA ROAD	11124	2	FAIZPUR	1702	22	258	1994	21,245,911	12,159,829	9,086,082	42.8
115007	SHAFIQUE ABAD	11133	2	AMIN PARK	1783	1	353	2141	38,437,080	29,989,024	8,448,056	22
59910	FAZAL COLONY	11114	2	BUND ROAD	3893	10	242	4145	29,762,770	21,338,600	8,424,170	28.3
35305	HASIL ROAD	11222	2	JIA BAGA	6673	50	127	6856	28,532,480	20,166,868	8,365,612	29.3
50808	ALI PARK	11128	2	ALI PARK	6935	11	218	7175	35,945,090	27,806,492	8,138,598	22.6
41205	BHATTIANWALA	11161	2	SHEIKHUPURA ROAD	7036	11	94	7150	24,682,528	16,583,295	8,099,233	32.8
41222	KHAKI	11161	2	SHEIKHUPURA ROAD	3233	7	183	3432	27,900,476	20,057,987	7,842,489	28.1
37202	SAJOWAL	11164	2	JARANWALA ROAD	6039	57	124	6271	21,315,268	13,528,767	7,786,501	36.5
104404	RASOOL PURA	11535	2	KAHNA	4925	16	104	5050	31,492,352	23,969,146	7,523,206	23.9
104411	PURANA KAHNA	11535	2	KAHNA	7930	473	100	8512	39,865,528	33,042,858	6,822,670	17.1
12120	GAWALA COLONY	11531	3	HAMZA TOWN	4532	35	99	4672	27,199,901	19,638,330	7,561,571	27.8
50506	11-KV MAJEED PARK	11131	3	SHAHDARA	8300	2	40	8358	24,650,298	17,318,696	7,331,602	29.7
11323	NEW FEROZPUR ROAD	11533	3	NISHTER COLONY	8394	28	113	8544	31,266,700	24,005,862	7,260,837	23.2
50505	11-KV NAROWAL	11131	3	SHAHDARA	6773	0	59	6851	22,097,667	15,114,561	6,983,106	31.6
41204	BURJ ATTARI	11164	3	JARANWALA ROAD	4562	37	130	4760	20,979,999	14,288,040	6,691,959	31.9
37206	MANDIA WALA	11164	3	JARANWALA ROAD	4827	58	124	5058	19,458,816	12,836,420	6,622,396	34
89310	MULTANI COLONY	11352	3	MADINA COLONY	12318	16	97	12440	31,967,900	25,389,310	6,578,590	20.6
11311	SOOFI ABAD	11533	3	NISHTER COLONY	5948	21	103	6077	29,099,396	22,577,327	6,522,069	22.4
78211	11 KV NIAZ BAIG	11262	3	NIAZ BAIG	10068	57	138	10303	39,809,187	33,609,071	6,200,116	15.6
50735	WAHGRAY	11164	3	JARANWALA ROAD	1284	30	68	1402	11,370,716	5,208,187	6,162,529	54.2
1313	IQBAL FURUNACE	11316	4	SAHAFI COLONY	2843	44	54	2956	23,815,642	17,676,438	6,139,204	25.8
100309	AHMED TOWN ROAD	11313	4	N BILLAL CLNY	7581	12	136	7735	33,209,648	27,108,875	6,100,773	18.4
41223	NAIN SUKH	11124	4	FAIZPUR	5995	18	252	6284	30,292,184	24,276,994	6,015,190	19.9
12109	CHANDARI ROAD	11531	4	HAMZA TOWN	7481	17	178	7688	28,007,200	22,069,859	5,937,341	21.2
36903	AMAMIA COLONY	11123	4	FAISAL PARK	10435	21	76	10564	28,890,884	22,964,028	5,926,856	20.5
95007	BAKAR MANDI	11115	4	DHOLANWAL	8173	100	107	8385	30,295,396	24,383,157	5,912,239	19.5
3009	RANGIL PUR	11264	4	CHUNG	4949	28	201	5203	26,735,338	20,829,441	5,905,897	22.1
11321	NISHTAR	11533	4	NISHTER COLONY	10121	23	178	10332	41,363,054	35,518,914	5,844,140	14.1
41225	ILAM DIN COLONY	11161	4	SHEIKHUPURA ROAD	3889	7	60	3970	17,355,509	11,551,622	5,803,887	33.4
71115	AMEER ROAD	11134	4	KARIM PARK	4306	11	194	4529	21,421,620	15,648,697	5,772,923	26.9
104406	GURUMANGAT	11532	5	SUFIA ABAD	8567	56	115	8748	36,844,272	31,191,421	5,652,851	15.3
71011	DODYPIR	11353	5	ENGINEERING UNIV.	6936	37	36	7026	21,930,356	16,305,204	5,625,152	25.7
104420	SHARIF PARK	11535	5	KAHNA	3530	23	79	3638	22,210,681	16,628,763	5,581,918	25.1
78201	JOHAR TOWN	11274	5	COLLEGE ROAD	4019	560	343	4929	26,703,736	21,144,683	5,559,053	20.8
3827	MIAN PARK	11543	5	TAJPURA	5284	7	83	5387	19,707,346	14,229,521	5,477,825	27.8
3026	NEW CHOUNG	11264	5	CHUNG	8159	28	74	8266	25,176,400	19,756,251	5,420,149	21.5
78212	KATAR BUND ROAD	11262	5	NIAZ BAIG	297	18	145	462	29,134,977	23,739,977	5,395,000	18.5
12105	GHOUSIA	11534	5	ISMAIL NAGAR	3641	28	80	3756	18,136,664	12,954,614	5,182,050	28.6
111701	DUBAI TOWN	11221	5	ALI RAZA ABAD	5490	27	53	5575	18,307,000	13,157,057	5,149,943	28.1
95009	B BLOCK	11115	5	DHOLANWAL	6897	146	34	7080	24,797,916	19,699,389	5,098,527	20.6
Total					**297418**	**930**	**1042**	**54867**	**242949348**	**188806880**	**54,142,468**	**22.29**

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA AUTHORITY