



**SPECIAL STUDY REPORT ON
INSTALLATION OF AUTOMATIC
METER READING METERS / ADVANCE
METERING INFRASTRUCTURE AND
AERIAL BUNDLED CABLE IN
HYDERABAD ELECTRIC SUPPLY
COMPANY
FOR THE FINANCIAL YEARS
2016-17 TO 2021-22**

(AUDIT YEAR 2022-23)

AUDITOR-GENERAL OF PAKISTAN

PREFACE

The Auditor-General conducts audit in terms of Articles 169 and 170 of the Constitution of the Islamic Republic of Pakistan 1973, read with Sections 8 and 12 of the Auditor-General's (Functions, Powers, Terms and Conditions of Service) Ordinance 2001. The Special Study on Installation of Automatic Meter Reading (AMR) meters / Advance Metering Infrastructure (AMI) and Aerial Bundled Cable (ABC) in Hyderabad Electric Supply Company (HESCO) was carried out for the period 2016-17 to 2021-22 accordingly.

The Directorate General of Audit Power conducted the Special Study from July to August, 2022 with a view to report significant findings to stakeholders. Audit examined the economy, efficiency and effectiveness aspects of the installation of AMR meters / AMI meters and ABC in HESCO. In addition, Audit also assessed, on test check basis, whether the management complied with applicable laws, rules and regulations in managing its inventory. The Special Study Report indicates specific actions that, if taken, will help the management to operate the Company in an efficient manner. The report has been finalized in the light of discussions in the Departmental Accounts Committee (DAC) meeting held on January 23, 2023.

The Special Study Report is submitted to the President of Pakistan in pursuance of Article 171 of the Constitution, in order to be laid before both houses of Majlis-e-Shoora [Parliament].

-sd-

Islamabad
Dated: 22 May, 2024

(Muhammad Ajmal Gondal)
Auditor-General of Pakistan

TABLE OF CONTENTS

EXECUTIVE SUMMARY

SECTIONS	Page No
1. INTRODUCTION	1
2. DEFINE STUDY	1
3. STUDY DESIGN	2
4. DATA ANALYSIS & RESULTS	7
5. RECOMMENDATIONS	41
ACKNOWLEDGEMENT	44
MFDAC	45
ANNEXES	49

ABBREVIATIONS AND ACRONYMS

ABC	Aerial Bundled Cable
ADB	Asian Development Bank
AGP	Auditor-General of Pakistan
AMI	Advance Metering Infrastructure
AMR	Automatic Meter Reading
BCR	Benefit Cost Ratio
BER	Bid Evaluation Report
BoD	Board of Directors
BoQ	Bill of Quantity
CT	Current Transformer
DISCO	Distribution Company
DLP	Defect Liability Period
EA	Energy Accounting
ECC	Economic Coordination Committee
EDTIP	Electricity Distribution & Transmission Improvement Project
ELR	Energy Loss Reduction
ESP	Economic Stimulus Package
FEC	Foreign Exchange Component
G.M (TS)	General Manager (Technical Services)
GoP	Government of Pakistan
GoS	Government of Sindh
GPRS	General Packet Radio Service
GSM	Global System for Mobile-Communication
GWH	Giga Watt Hour
HESCO	Hyderabad Electric Supply Company
HT/LT	High Tension / Low Tension
IAS	International Accounting Standards
IOT	Inter Office Transaction
KV	Kilo Volt
KW	Kilo Watt
KWH	Kilo Watt Hour
LC	Local Component
LoA	Letter of Acceptance
LPS	Late Payment Surcharge
MDC	Meter Data Collection
MDM	Master Data Management

MoWP	Ministry of Water and Power
MUCED	Mehran University Centre for Energy & Development
MW	Mega Watt
MWH	Mega Watt Hour
NOC	Network Operating Centre
NTDC	National Transmission and Despatch Company
PAC	Public Accounts Committee
PDEIP	Power Distribution Enhancement Investment Programme
PDP	Power Distribution Program
PEPCO	Pakistan Electric Power Company
PITC	Power Information Technology Company
PKR	Pakistani Rupees
PPMCL	Pakistan Power Management Company
PPRA	Public Procurement Regulatory Authority
PMTs	Predetermined Motion Time System
PMU	Project Management Unit
P.Os	Purchase Orders
PT	Power Transformer
SEP	System Engineering Plan
SEPCO	Sukkur Electric Power Company
SM	Smart Meter
SSA	Special Sector Audit
SoPs	Standard Operating Procedures
TOC	Taking over Certificate
ToR	Terms of Reference
ToU	Time of Use
USAID (IRG)	United State Agency for International Development (International Research Grant)
US\$	United States Dollar
VPN	Virtual Private Network
WAPDA	Water and Power Development Authority
WB	World Bank

EXECUTIVE SUMMARY

Hyderabad Electric Supply Company Limited (HESCO), registered under Companies Ordinance, 1984, started its operations as a Public Limited Company during May, 1998. The principal activity of the Company is to purchase electricity from National Transmission and Despatch Company (NTDC) and to sell it to the consumers. HESCO sustained loss of millions of rupees due to theft of electricity and line losses. Moreover, there was a persistent issue of overbilling between Government of Sindh (GoS) and HESCO due to which the electricity arrears / dues were increasing day by day.

In 2008-09, the Government of Pakistan decided to install ABC on 33 High Tension (HT)/Low Tension (LT) feeders in various localities of HESCO through Asian Development Bank / World Bank loans arrangement to minimize technical and commercial losses. Moreover, installation of Global System for Mobile-Communication (GSM) based smart meters was also started in 2014 along with Metering Data Centre (MDC) setup in Qasimabad through US Grant in-Aid as well. Unfortunately, instead of updating and converting the same to AMI Centre, it was closed down without any reason in November, 2016. In the light of Economic Coordination Committee (ECC) decision in November, 2016 on the issue of overbilling between HESCO/SEPCO and Government of Sindh (GoS), HESCO installed AMR meters on GoS's electricity connection alongwith establishment of AMI Centre at Hussain Abad Colony, Hyderabad.

The Directorate General of Audit Power conducted Special Study of Installation of AMR meters / AMI and ABC in HESCO during August & September, 2022. Main objectives of the audit were to evaluate economy, efficiency and effectiveness of installation of AMR and ABC. The audit was conducted in accordance with prevailing rules and regulations. Audit could not evaluate the position of losses and preparation of feasibility before and after installation of ABC on specific feeder as the PC-I and feeder-wise data was not made available to audit. Moreover, data pertaining to adoption of safety measures for installation of ABC was also not shared.

Key Audit Findings

1. Non-production of record of Development Projects Financed by the USAID/World Bank.¹
2. Non-completion of installation of AMR meters project – Rs.37.77 million.²
3. Recoverable amount from newly installed connections – Rs.48.813 million.³
4. Non-completion of AMR meters project in Sindh Government Housing Colonies – Rs.154.75 million.⁴
5. Non-installation of AMR meters against 4,382 connections having arrears – Rs.469.80 million.⁵
6. Less recovery of HESCO pertaining to electricity connections of GoS (Energy Department) – Rs.17.170 billion.⁶
7. Unnecessary accumulation of principal amount and interest charges due to non-payment of loan - Rs.6,464.548 million.⁷
8. Unjustified closure of AMR Cell / USAID Project at Qasimabad.⁸
9. Accumulation of arrear against AMR Meters – Rs.6,942.04 million.⁹
10. Non-adjustment of advances under World Bank Loan No. 7565-PK – Rs.37.502 million.¹⁰
11. Loss due to late repayment of Principal and Interest Charges - Rs.218.281 million.¹¹
12. Non-forfeiture of bank guarantees due to non-completion of work by the contractor – Rs.48.191 million + US\$ 1.115 million.¹²

¹ Para # 4.1

² Para # 4.2

³ Para # 4.3

⁴ Para # 4.4

⁵ Para # 4.7

⁶ Para # 4.8

⁷ Para # 4.9

⁸ Para # 4.11

⁹ Para # 4.13

¹⁰ Para # 4.15

¹¹ Para # 4.16

¹² Para # 4.17

13. Undue favour to M/s Tyco Electronics by unjustified award of contract – Rs.1,439.731 million.¹³
14. Non-obtaining of insurance coverage from contractor – Rs.143.97 million.¹⁴
15. Inefficient utilization of World Bank Loan – US\$ 41.815 million.¹⁵
16. Excess charging of overhead on works transferred to Operations Division – Rs.59.753 million.¹⁶
17. Irrational charging of interest on works completed and transferred as capital expenditure – Rs.1,118.489 million.¹⁷
18. Wasteful expenditure for removing ABC from LT Feeders - Rs.32.301 million.¹⁸
19. Non utilization of ABC stock dumped in Sukkur warehouse – US \$ 4,238,224.78 + Rs.2.42 million.¹⁹

¹³ Para # 4.21

¹⁴ Para # 4.22

¹⁵ Para # 4.23

¹⁶ Para # 4.24

¹⁷ Para # 4.25

¹⁸ Para # 4.26

¹⁹ Para # 4.28

1. INTRODUCTION

The infrastructure of electricity in Pakistan is redundant and timeworn due to outdated electricity network equipment and transmission lines. At present, the Pakistan economy loses billions of rupees every year due to theft and poorly managed electricity infrastructure.

Smart Meter (SM) is the next generation of metering technology. These SM have real time data transmission mechanism for electricity suppliers and also real time billing through automatic meter reading (**Annex-A**). Issues like overbilling to consumers, meter tempering by consumers in connivance of line staff, ineffective complaint redressal and commercial losses can be addressed through installation of these meters. ABC in a distribution system is primarily used for the safety of precious human life and animals as well as to control non-technical losses i.e. electricity theft through “kunda” in thickly populated area by replacing barred conductor with ABC (**Annex-B**).

The special study reviews the implementation of Smart Metering technology and ABC in HESCO and their implications and effects in decreasing technical & non-technical losses, commercial losses. It highlights serious problems during / after the installation of ABC and smart meters in the selected areas of HESCO. This review also embraces the impact of ECC decision for recovery of HESCO dues from GoS. A brief overview of implementation status of smart metering and ABC is at **Annex-C(I-VI)**.

The status of implementation of AMR meters / AMI and installation of ABC in SEPCO could not be reflected in this study as the unprecedented heavy rain & flood largely in the area of jurisdiction of SEPCO hampered the audit activity.

2. DEFINE STUDY

i) Purpose of Study

The purpose of study included whether the:-

- a) SoPs were followed during design, supply, installation and commissioning of Advanced Metering Infrastructure (AMI), Automatic Meter

- Reading (AMR) meters and ABC.
- b) Expenditure incurred was in conformity with the relevant laws, rules and regulations.
 - c) Principles of economy, efficiency and effectiveness were followed.

ii) Scope of Study

The scope of Special Study includes the review of design, supply, installation and commissioning of AMI and procurement and installation of ABC in HESCO). This Special Study covers the impact of AMR meters on private connections after installation under USAID Programme and also procurement and installation of AMR meters on Govt. of Sindh (GoS) connections since ECC's decision in 2016. This study also covers the efforts made by HESCO for reducing its line losses through installation of ABC on HT/LT feeders since its incorporation.

iii) Beneficiaries of Study

The beneficiaries of study include the HESCO, Ministry of Energy (Power Division), General Public and GoS.

3. STUDY DESIGN

i) Time Period

The study was carried out during August & September, 2022.

ii) Data

The data comprising progress reports, overbilling and line losses position (before and after implementation of AMR meter/AMI & ABC network) and capitation status of the works was examined on test check basis besides reviewing the contract / loan agreements.

iii) METHODOLOGY

Following methodology was adopted during the course of execution of this Special Study: -

- Field work covering audit of record as per audit procedure
- Interview and discussion with the stakeholders.
- Detailed review of all agreements related to procurement of works, goods and services i.e. consultancy.

TORs OF SPECIAL STUDY

The Special Study of HESCO was conducted in line with the existing guidelines of Auditor-General of Pakistan (AGP). Accordingly, special study was conducted as per the following ToRs by SSA Wing in July, 2022:

- Whether the objectives set forth for installation of AMR meters and ABC by the companies were achieved or not?
- Whether the losses before and after installation of cables on specific feeders?
- Whether PPR, 2004 were observed during procurement of AMR meters / AMI and ABC?
- Whether consultants were hired for installation of meters as per PPRs, 2004?
- Whether payment to contractor or consultant were made in line with applicable rules and regulations?
- Whether the deliverables as agreed with network service providers were achieved or not?
- Whether the feasibility of feeder was prepared before installation of ABC on LT feeder?
- What safety measures were adopted for installation of ABC?

4. DATA ANALYSIS AND RESULTS

4. DATA ANALYSIS AND RESULTS

4.1 Non-production of Record of Development Projects Financed by the USAID / World Bank

- According to section 14-C (2) of Auditor-General's (Functions, Powers and Terms and Conditions of Service) Ordinance, 2001 the officer in-charge of any office or department shall afford all facilities and provide record for audit inspection and comply with requests for information in as complete a form as possible and with all reasonable expedition.
- According to section 14-C (3) of Auditor-General's (Functions, Powers and Terms and Conditions of Service) Ordinance, 2001 any person or authority hindering the auditorial functions of the Auditor-General regarding inspection of accounts shall be subject to disciplinary action under relevant Efficiency and Discipline Rules, applicable to such person.

During Special Study on installation of Automatic Meter Reading (AMR) meters / Advance Metering Infrastructure (AMI) and ABC in HESCO, it was observed that replacement of conventional meters with AMR meters in Qasimabad operation Sub-Division HESCO under USAID Power Distribution Program (PDP) was required to be implemented. The following record pertaining to project was not provided to audit for examination.

- i) PC-I of USAID Project in Qasimabad Sub-Division
- ii) Number of Jobs to be executed
- iii) Number of AMR meters with consumer reference No. to be replaced
- iv) Accessories of MDC Centre
- v) Any other facility attached with the USAID Project
- vi) Handing / Taking Over Certificate of the Project
- vii) Bidding documents & Contract Agreement for installation of AMR meters in Qasimabad Division with M/s Creative Electronics Pvt. Ltd. Lahore, M/s Zaffar Enterprises Karachi and M/s Mughal Enterprises, Karachi.
- viii) Record regarding return of dismantled healthy meters by

contractors (M/s Creative Electronics Pvt. Ltd. Lahore 388 Current Transformer (CT) operated 3-Phase AMR Meters, M/s Zaffar Enterprises Karachi 9,487 Single Phase & 198 Three Phase meters and M/s Mughal Enterprises, Karachi 1,000 Single Phase meters)

Furthermore, following record pertaining to World Bank Loan No. 7565-PK was also not provided to Audit for examination:

- i) PC-I of Loan No. 7565-PK (ABC)
- ii) Name & number of Jobs (Feeder Wise) to be executed in each Lot
- iii) Dismantled material returned by M/s Tyco Electronics (Job Wise)
- iv) A-90 of Completed Jobs / Job Cards of incomplete works
- v) Detail of inventory returned to store from incomplete Jobs (number & name of Jobs Feeder Wise)

Non-adherence to PAC Directives / AGP's ordinance resulted in non-production of record of Development Projects financed by the USAID/World Bank up to the financial year 2021-22.

The matter was taken up with the management in December, 2022. The management replied that desired record was more than 05 years old. However, the available record would be produced to Audit for verification.

The DAC in its meeting held on 23rd January, 2023 directed the management to inquire the matter and fix responsibility for non-production of record and submit its report along with record to Audit within 15 days.

Audit recommends compliance of DAC's decision.

(AIR Para No. 15 & 21)

4.2 Non-completion of installation of AMR meters project – Rs.37.77 million

As per Purchase Order No.17759-89/03/AMR/HESCO dated 02.03.2017 was place on M/s Accurate (Pvt) Ltd dated March 02, 2017 for design, supply, installation and commissioning of meters with delivery period of the project within 36 weeks from the signing of the contract i.e upto November 09, 2017. The contract had to install 14,355 AMR meters.

During Special Study on installation of AMR meters / AMI and ABC in HESCO, it was observed that a contract was awarded to M/s Accurate (Pvt) Ltd on March 02, 2017 for design, supply, installation and commissioning of meters with delivery period of the project within 36 weeks from the signing of the

contract i.e. upto November 09, 2017. The contractor had to install 14,355 AMR meters instead of 11,075 AMR meters. Hence, 3,280 AMR meters valuing Rs.37.77 million were not installed up to June, 2022. Due to non-completion of project, billing to GoS could not be served on actual consumption basis caused revenue loss to the Company.

Non-adherence to Purchase Order resulted in non-completion of AMR meters project amounting to Rs.37.77 million on GoS connections up to the financial year 2021-22.

The matter was taken up with the management in December, 2022. The management replied that the project was awarded for 14,355 connections available in GoS ledger at that time including Permanent Dis-connections. The contractor completed installation of 11,075 meters on running connections and accordingly certificate was issued.

The DAC in its meeting held on 23rd January, 2023 directed the management to inquire matter by General Manager (TS) PPMCL and submit report within 60 days.

Audit recommends implementation of DAC's decision.

(AIR Para No. 04)

4.3 Recoverable amount from newly installed connections – Rs.48.813 million

According to Para-V of ECC decision dated 25.11.2016, the remaining billing from August 2016 till installation of AMR/AMI meters shall be paid by GoS on the basis of average agreed billing for 67 months @ Rs.513.73 million per month for HESCO.

During Special Study on installation of AMR meters / AMI and ABC in HESCO, GoS owned 14,828 electricity connections with sanctioned load of 193,024.9 KW upto 31.12.2016. After agreement, 32 new connections of GoS having sanctioned load 1,158.6 KW were energized from 31.12.2016 to 31.05.2019 when online billing was started. During the said period, HESCO made recovery from GoS as per settlement agreement. This particular clause of settlement agreement bound HESCO not to recover the billing assessment of these new connections resulting estimated loss of Rs.48.813 million to HESCO (*Annex-D*).

Non-adherence to ECC's decision resulted in recoverable amount of

Rs.48.813 million from newly installed connections up to the financial year 2021-22.

The matter was taken up with the management in December, 2022. The management replied that matter of billing of connections installed after agreement period i.e (from 08/2016 to date) was agreed with GoS and matter was decided on the basis of joint reconciliation of these connections. The new connections were installed by GoS with commitment of payment of outstanding arrears after reconciliation.

The DAC in its meeting held on 23rd January, 2023 directed the management to recover the dues of new connections added after ECC decisions and get it verified within 60 days.

Audit recommends that the management needs to ensure compliance with DAC's decision.

(AIR Para No. 05)

4.4 Non-completion of AMR metering project in GoS Housing Colonies – Rs.154.75 million

According to Para-II(b) of ECC decision dated 25.11.2016, the DISCOs will install individual meters in place of bulk supply meters in all housing colonies owned by GoS. In order to facilitate the DISCOs, the GoS would provide details of required individual connections/meters and full cost of such individual meters as well as their installation. Any delay in identifying such connection shall be the responsibility of GoS which shall continue to pay the energy charges as reflected on the bulk meters till installation of individual meters.

During Special Study on installation of AMR meters / AMI and ABC in HESCO, it was noticed that an amount of Rs.154.56 million was received in pursuance of Settlement Agreement for installation of individual meters for replacing bulk supply meter in 57 housing colonies owned by GoS. As per record made available, only 13 housing colonies were completed upto 06/2022, whereas the work of individual connection metering of 44 colonies was not completed. Due to non-completion of individual metering, the company is persistently violating the agreement and also making revenue loss due to disputed billing of bulk supply meter.

Non-adherence to ECC decision resulted in non-installation of AMR meters project on GoS Housing Colonies amounting to Rs.154.75 million up to

the financial year 2021-22.

The matter was taken up with the management in December, 2022. The management replied that individual meters in 29 housing societies had been installed. The installation of individual meters work of remaining housing societies was under process.

The DAC in its meeting held on 23rd January, 2023 directed the management to install the meters of remaining housing societies and get the record verified within 90 days.

Audit recommends that the management needs to ensure compliance with DAC's decision.

(AIR Para No. 08)

4.5 Non-recruitment of staff / training of personnel at MDC Centre

According to Para-ii of Finance Division (Government of Pakistan) letter dated December 3, 2018, titled "austerity measures for financial year 2018-19" creation of new posts will be banned except those required for development projects and approved by the competent authority.

During Special Study on installation of AMR meters / AMI and ABC in HESCO, it was noticed that BoD HESCO in its 131st meeting held on 08th June, 2017 through Agenda Item 06 gave approval for creation of posts in MDC Centre along with desired experience required for said posts.

Sr. No.	Nomenclature of the Post	BPS	Mode of App. & Req. Qualif. & Experience recommended by Manager (MIS) HESCO
1.	Dy. Manager (AMI Operation & Development)	18	01
2.	Asstt: Manager (Network Support)	17	01
3.	Asstt: Manager (Data Base Administrator Support)	17	01
4.	Asstt: Manager (MDC / MDM)	17	01
5.	Supervisors (Network Support / MDC / MDM)	16	06

(Source: 131st BoD Minutes of Meeting)

Neither the desired persons were recruited nor posted independently for the project despite repeated reminders to HR by MIS. It is pertinent to mention here that there was no agenda item for BoD or any correspondence made by the management with Ministry of Power requiring staffing for the most

sophisticated and vital project of HESCO. Due to non-recruitment of suitable staff for MDC Centre, there were problems for handing / taking over of equipment of MDC Centre after expiry of the contract.

Non-adherence to Finance Division instructions resulted in non-recruitment of staff / training of personnel at MDC Centre HESCO up to the financial year 2021-22.

The matter was taken up with the management in December, 2022. The management replied that recruitment could not be done because of ban imposed by Ministry of Energy (Power Division) and it frozen the recruitments for a period of 06 months. The freezing period had expired on 27.11.2022 and thereafter the said case was processed and an agenda item regarding creation and recruitment against 06 No. posts for MDC Centre / AMR Cell, HESCO had been sent to the BoD HESCO for approval. The reply was not tenable as creation of new posts for development project was not banned by GoP.

The DAC in its meeting held on 23rd January, 2023 directed the management to inquire the matter besides fixing responsibility for non-recruitment of staff of development project and submit its report within 30 days.

Audit recommends that the management needs to ensure compliance with DAC's decision.

(AIR Para No. 12)

4.6 Non arrangement of training by the contractor for staff of MDC Centre

As per Purchase Order No.17759-89/03/AMR/HESCO dated 02.03.2017 was place on M/s Accurate (Pvt) Ltd., provision for training was made in Bill of Quantity (BoQ) item-7 of the contract. As per Purchase Order Clause-10(d), training charges amounting to Rs.500,000/- will be paid after completion of training (Certificate to be issued by Manager (MIS) HESCO).

During Special Study on installation of AMR meters / AMI and ABC in HESCO, it was noticed that as per bill of quantity (BoQ) item training was not given by the contractor to the staff of MIS HESCO. Neither any staff out of existing personnel having desired qualification / experience was posted in MDC Centre nor any training was arranged by the contractor in pursuance of above contract clause. As such the management could not get trained staff through the

agreement even when the defect liability period of the contract is going to expire on November, 2023.

Non-adherence to the terms of contract agreement resulted in non-arrangement of training by the contractor for staff of MDC Centre, HESCO up to the financial year 2021-22.

The matter was taken up with the management in December, 2022. The management replied that the end-user level combined training was arranged by M/s Accurate Private Limited for more than 100 personnel of HESCO and GoS for 03 days at Regional Training Center HESCO Jamshoro on 22 to 24 October 2018 and certificates were also distributed amongst all the participants by M/s Accurate private limited. But no documentary evidence showing the training of the staff was provided to Audit. Audit recommends the management to look into the matter for getting the staff trained by the contractor as early as possible.

The DAC in its meeting held on 23rd January, 2023 directed the management to get the record verified from Audit within 30 days.

Audit recommends that the management needs to ensure compliance with DAC's decision.

(AIR Para No. 05)

4.7 Non-installation of AMR meters against 4,382 connections having arrears – Rs.469.80 million

According to Para-II(b) of ECC decision dated 25.11.2016, the DISCOs will install individual meters in place of bulk supply meters in all housing colonies owned by GoS. In order to facilitate the DISCOs, the GoS would provide details of required individual connections/meters and full cost of such individual meters as well as their installation. Any delay in identifying such connection shall be the responsibility of GoS which shall continue to pay the energy charges as reflected on the bulk meters till installation of individual meters.

During Special Study on installation of AMR meters / AMI and ABC in HESCO, it was noticed that 4,382 connections with sanctioned load of 1,294.20 KW having arrears were running without AMR meters. As per agreement, the installation of AMR meters was required to be made, which were not installed.

Non-adherence to ECC decision resulted in non-installation of AMR meters against connections having arrears amounting to Rs. 469.80 million up to the financial year 2021-22.

The matter was taken up with the management in December, 2022. The management replied that AMR meters were installed on GoS connections after following set-procedures and codal formalities. Prior to installation of AMR meters, those connections were billed in the category of non-AMR meters which was a routine process. During heavy rain and flood various meters burnt or became defective which resulted in shortage of meters and it was the main cause of delay in installation of AMR meters. They also informed that AMR meters were being procured and would be installed accordingly.

The DAC in its meeting held on 23rd January, 2023 directed the management to inquire the matter of non-installation of meters and submit report within 90 days.

Audit recommends that the management needs to ensure compliance with DAC's decision.

(AIR Para No. 14)

4.8 Less recovery of HESCO pertaining to electricity connection of Government of Sindh (GoS Energy Department) – Rs.17.170 billion

According to ECC decision dated 25.11.2016, Para-7(iii) of the summary, the agreed outstanding amount i.e. Rs.27.398 billion shall be cleared by GoS in six equal monthly installment (of Rs.4.566 billion each) starting from September, 2016.

During Special Study on installation of AMR meters / AMI and ABC in HESCO, it was observed that an amount of Rs.27.398 billion was recoverable from GoS on account of energy dues. As per ECC decision the agreed outstanding amount i.e. Rs.27.398 billion was to be cleared by the GoS in six equal monthly installments. But GoS paid Rs.10.228 billion only. Hence, Rs.17.170 billion was less paid by GoS with regard to ECC decision.

Non-adherence to ECC decision resulted in less recovery of agreed outstanding amount of Rs.17.170 billion since 2016 from GoS up to the financial year 2021-22.

The matter was taken up with the management in December, 2022. The management replied that total amount of Rs.10.228 billion was recovered from GoS in six installments. The reply was not tenable as the matter needed to be

taken up with GoS for recovery of remaining electricity dues of Rs.17.170 billion.

The DAC in its meeting held on 23rd January, 2023 directed the management to get record verified from audit within 30 days.

Audit recommends that the management needs to ensure compliance with DAC's decision.

(AIR Para No. 35)

4.9 Unnecessary accumulation of principal amount and interest charges due to non-payment of loan - Rs.6,464.548 million

According to clause-2.04 of Loan Agreement No. 7565-PAK dated July, 2008, "if any amount of the withdrawn Loan Balance remains unpaid when due and such non-payment continues for a period of thirty (30) days, then the interest payable by the Borrower (PEPCO) shall instead be calculated as provide in Section-3.02(d) of the General Conditions. As per clause-2.04 & 2.05 of Relent Loan Agreement No. 2438-PAK dated November 29, 2008, "interest and other charges on the Loan shall be payable semiannually on February 15 and August 15 in each year". "The Borrower shall repay the principal amount of the Loan withdrawn drawn from the Loan Account in accordance with the provisions of Schedule 2 to this Loan Agreement.

During Special Study on installation of AMR meters / AMI and ABC in HESCO, it was noticed that two loans i.e. World Bank Loan No. 7565-PAK and ADB Loan-2438-PAK were acquired for procurement of ABC and its installation in HESCO. Withdrawal of Rs.2,332.524 million and Rs.1,992.878 million were made against these loans respectively but no due-payments on account of principal and interest charges as per amortization schedules were made by HESCO till date. Therefore, the principal repayments and interest charges had been accumulated to Rs.3,589.212 million and Rs.2,875.336 million respectively.

Non-adherence to the Amortization Schedule of Loan Agreement resulted in unnecessary accumulation of Principal amount and interest charges amounting to Rs.6,464.548 million due to non-payment up to the financial year 2021-22.

The matter was taken up with the management in December, 2022. The

management replied that HESCO was facing acute shortage of funds and financial crunch to discharge its liability. The matter had been taken up by Chief Financial Officer PEPCO with Ministry of Energy (Power Division) for adjustment of outstanding loans against subsidy of Rs.83.00 billion receivables from Government of Pakistan.

The DAC in its meeting held on 23rd January, 2023 directed CFO HESCO to make adjustment of 6 billion against subsidy receivable from GoP after reconciliation and get the record verified from Audit within 30 days

Audit recommends that the management needs to ensure compliance with DAC's decision.

(AIR Para No. 31 & 36)

4.10 Loss due to payment of commitment charges on account of inefficient utilization of loans - Rs.63.89 million

As per Section-I of Schedule-2(B)(1)(c) Subsidiary Agreement, “the Project Implementing Entities’ undertaking to operate with diligence and efficiency and in conformity with internationally acceptable administrative, technical, financial and economic managerial practices and standards, including a proper and transparent accounting system and regular financial audits in accordance with consistently applied accounting and auditing standards”.

During Special Study on installation of AMR meters / AMI and ABC in HESCO, it was revealed that credit facilities subsidiary agreements with ADB for US\$ 39.630 million and World Bank for US\$ 41.815 million were executed on November 29, 2008 and July 14, 2008 respectively. However, the company failed to utilize whole amount of these loans and US\$ 21.391million of ADB Loan and US\$ 16.199 of World Bank Loan remained un-utilized up till closure dates of these loans. Resultantly, commitment charges on un-utilized loan amounting to US\$ 0.128 million (US\$ 21.391 x 0.15% x 4) equivalent to Pak Rs.13.35 million and US\$ 0.4859 million (US\$ 16.199 x 0.5% x 6) equivalent to Pak Rs.50.54 (01 US\$=Pak Rs. 104) was paid to ADB and World Bank respectively. Thus, company sustained a loss of Rs. 63.89 million due to non-utilization of these loans.

Lack of planning, poor management and inefficient utilization of loans resulted in loss of Rs.63.89 million (Rs.13.35 million + Rs.50.54 million) due

to payment of commitment charges up to the financial year 2021-22.

The matter was taken up with the management in December, 2022. The management replied that there was no such relevant clause / schedule for payment of commitment charges under World Bank Loan Agreement No. 7565-PAK. Therefore, question for payment of commitment charges does not arise. The reply was not tenable as no documentary evidence substantiating management stance regarding WB Loan No. 7565-PAK was produced to Audit. However, no reply was given by the management regarding commitment charges on ADB loan No. 2438-PAK.

The DAC in its meeting held on 23rd January, 2023 directed the management to get its stance verified from Audit within 30 days.

Audit recommends that the management needs to ensure compliance with DAC's decision.

(AIR Para No. 26 & 32)

4.11 Unjustified closure of AMR Cell / USAID Project at Qasimabad

According to Rule 2A-1 (a) of Corporate Governance Rules 2013, for sound and prudent management, the business of the Public Sector Company is carried on with integrity, objectivity, due care and the professional skills appropriate to the nature and scale of its activities.

During Special Study on installation of AMR meters / AMI and ABC in HESCO, it was noticed that installation of AMR meters under USAID Power Development Program was initiated in April, 2013. As per arrangement made, all the meters and associated material was to be supplied by USAID International Research Grant (IRG). However, installation of the meters was to be made in the Operation Sub-Division Qasimabad by HESCO through its own resources. The system after completion of USAID contract on September 15, 2015 had been handed over to Power Information Technology Company (PITC) for its smooth operation. The ownership of Mobile SIMs had been transferred to PITC. USAID paid the communication charges of bandwidth and sims till September 30, 2015 and beyond that HESCO was to bear all the charges and PITC would continue to provide technical and management support of the system. Instead of clearing the outstanding dues of PITC, the AMR cell was closed by the management without assigning any reason. A preliminary enquiry was initiated in November, 2017 to "probe into the reason behind the closure of AMR Cell". The said enquiry was not

finalized and communicated to high ups for consideration and prompt action, despite lapse of more than six (6) years. As per draft of preliminary enquiry, it was concluded that:-

- i). The mis-happening with the project reflect the least interest of the management
- ii). As that, CEO verbally ordered at its own will and accord without any speaking order, so he himself is responsible

Non-adherence to Corporate Governance Rules resulted in unjustified closure of AMR Cell / USAID Project at Qasimabad up to the financial year 2021-22.

The matter was taken up with the management in December, 2022. The management replied that an inquiry committee had been constituted under the convenorship of General Manager (Operation) HESCO to probe into the reasons behind the closure of AMR section. Inquiry report would be submitted to Audit accordingly

The DAC in its meeting held on 23rd January, 2023 directed the management to submit inquiry report besides ensuring implementation of the recommendations within 15 days. DAC also directed the management to take action against the officers/officials who deliberately not submitted the inquiry report already conducted for prompt action.

Audit recommends implementation of DAC's decision.

(AIR Para No. 10)

4.12 Non-recognition of grant under USAID in Financial Statement

According to IAS-20 (International Accounting Standard) frame work Paragraph-24, "Presentation of grants related to assets" Government grants related to assets, including non-monetary grants at fair value, shall be presented in the statement of financial position either by setting up the grant as deferred income or by deducting the grant in arriving at the carrying amount of the asset.

During Special Study on installation of AMR meters / AMI and ABC in HESCO, it was noticed that installation of AMR Meters at Qasimabad Sub-Division was included in USAID grant under Power Development Program. As per scope of work, the procurement of all the meters i.e 16,132 (14,000 S-Phase, 1,700 3-Phase, 424 CT operated and 08 Current Transformer (CT)/Power

Transformer (PT) and associated material included in scope of work was made by USAID (IRG) and supplied to HESCO Stores. Against quantity as per scope, 15,049 meters (14,530 S-Phase/3-Phase, 519 CT Operated and CT/PT) were installed at different locations of Qasimabad Sub Division. Additionally, USAID also arranged 15,049 GPRS Sims from M/s Telenor Telecom along with Sims Bandwidth Services (3 MB) from M/s Wateen acquired at PITC/HESCO. But it was noticed that the financial impact of this project i.e. its cost was neither reflected in the financial statements for the year 2014-15 nor in financial Statement for 2015-16. It is also important to note that the Commercial Auditors of the Company did not raise any observation on financial statement as required under IAS.

Non-adherence to International Accounting Standard resulted in non-recognition of grant under USAID in Financial Statements of HESCO for the period 2014-15 and 2015-16.

The matter was taken up with the management in December, 2022. The management replied that the matter regarding recognition of grant under USAID in Financial Statements for the period 2014-15 and 2015-16 was under way.

The DAC in its meeting held on 23rd January, 2023 directed the management to recognize grant in financial statements and get the record verified from audit within 30 days

Audit recommends that implementation of DAC's decision.

(AIR Para No. 09)

4.13 Accumulation of arrears against AMR Meters – Rs.6,942.04 million

According to ECC decision dated 25.11.2016, Para-7(ii)(a) “In order to avoid such disputes in future, it was further agreed that, an Automatic Meter Reading System (AMR/AMI) would be installed on all connections owned by GoS by 31.12.2016, 50% of the cost of which would be borne by GoS. Online access would be provided to GoS (Energy Department) by the DISCOs to the AMR system. The Energy Department of the GoS will also prescribe a maximum limit of consumption for each connection/meter to the DISCOs, intimate to the respective DISCO when such limit is crossed and ask for disconnection of supplies of such consumer. On such intimation, the respective

DISCO shall ensure that electricity supply is discontinued to those connections/meters which have been intimated by the Energy Department.

During Special Study on installation of AMR meters / AMI and ABC in HESCO, arrears against non-communicated AMR accumulated to Rs.6,942.04 million upto 06/2022 due to deduction made out of monthly claims by energy Department of Govt. of Sindh. The said deduction was made due to crossing limit of sanctioned load with respect to connected load. These connections were not disconnected, as a result there was a difference among the billing data as per AMI server and AMR meters. Further, there were other problems due to which AMR meters became non-communicated category. At present, there were 5,683 AMR non-communicated meters as on 30.06.2022 due to negligence of the operational staff or any other unknown reason.

Non-adherence to the ECC decision resulted in less recovery of agreed outstanding amount of Rs.6,942.04 million since 2016 from GoS up to the financial year 2021-22.

The matter was taken up with the management in December, 2022. The management replied that non-communication of AMR meters was part of AMR project and can't be denied. This fact of non-communication of AMR meters was accepted by GoS and reconciliation of billing of AMR-non-communicated category would be decided through joint survey. The joint survey of sites of connections was in process and will be finalized soon.

The DAC in its meeting held on 23rd January, 2023 directed the management to devise SoP in consultation with GoS for reconciliation of billing data and expedite recovery of arrears within 90 days.

Audit recommends that the management needs to ensure compliance with DAC's decision.

(AIR Para No. 11)

4.14 Misrepresentation of trade debts pertaining to arrears of GoS in financial statement of HESCO – Rs.7.604 billion

According to ECC decision dated 25.11.2016, Para-10, approval of the ECC of the Cabinet is solicited for proposal contained in Para-7 and adjustment / writing off payable amounts by GoS in favour of the DISCOs, as given in Table-C at Annex-E, while fulfilling all codal formalities as per applicable

law(s) by the respective DISCO.

During Special Study on installation of AMR meters / AMI and ABC in HESCO, it was noticed that as per ECC decision, an amount of Rs.23.03 billion on account of trade debts was required to be adjusted in respective accounts of HESCO. But HESCO adjusted only an amount of Rs.15.554 billion on account of trade debts in its financial statements for the year ended on June, 2017. Hence, Trade Debts of Rs.7.476 billion was less adjusted by HESCO.

Non-adherence to ECC decisions resulted in misrepresentation of trade debts pertaining to arrears of GoS in financial statement of HESCO up to the financial year 2021-22.

The matter was taken up with the management in December, 2022. The management replied that an amount of Rs.23.46 billion was adjusted in financial statements and there was no misrepresentation of trade debts pertaining to GoS arrears in financial statements of HESCO. Audit contended that less amount was adjusted by the management as required by ECC decision.

The DAC in its meeting held on 23rd January, 2023 directed the management to get its stance verified from audit within 30 days.

Audit recommends that the management needs to ensure compliance with DAC's decision.

(AIR Para No. 16)

4.15 Non-adjustment of advances under World Bank Loan No. 7565-PK – Rs.37.502 million

According to Clause-9.2.5 of Financial Reporting Manual regarding Monitoring Advances, “employees taking advance shall complete the employee expense worksheet to document their expenses within 15 days of the scheduled advance end date. Employee shall sign the worksheet. Receipts and other support documentation shall be attached to this worksheet and submitted to the respective immediate head of accounting unite for processing”.

During Special Study on installation of AMR meters / AMI and ABC in HESCO, it was noticed that an advance amounting to Rs.37.502 million was granted to different officers/officials/supplier/contractor for different nature works but the adjustment as per World Bank schedule for the month of June, 2022 was still awaited.

Non-adherence to Financial Reporting Manual resulted in non adjustment of advances amounting to Rs.37.502 million given to employees / contractors / supplier up to the financial year 2021-22.

The matter was taken up with the management in December, 2022. The management replied that T.A Advance of Rs.1.283 million and advances to supplier/contractors amounting to Rs.36.218 million were adjusted from World Bank loan through imprest cash book.

The DAC in its meeting held on 23rd January, 2023 directed the management to get its stance verified from audit within 30 days

Audit recommends implementation of DAC's decision.

(AIR Para No. 20)

4.16 Loss due to late repayment of principal and interest charges - Rs.218.281 million

According to Clause-2.04 of Loan Agreement No. 7565-PAK dated July, 2008, "if any amount of the withdrawn loan balance remains unpaid when due and such non-payment continues for a period of thirty (30) days, then the interest payable by the Borrower (PEPCO) shall instead be calculated as provided in Section-3.02(d) of the General Conditions. As per Clause-B(b) Section-I of Schedule-2, the payment by the Project Implementing Entities (HESCO) to the Borrower (PEPCO) of interest charges on the principal amounts withdrawn and outstanding from time to time under the respective subsidiary agreement at a rate not to exceed seventeen percent (17%) per annum.

During Special Study on installation of AMR meters / AMI and ABC in HESCO, it was noticed that withdrawal of Rs.2,332.524 million was made against World Bank Loan No. 7565-PK amounting US\$ 41.815 million. As per amortization schedule principal amount along with interest charges @ 15% Rs.1,637.108 million was required to be repaid to World Bank / PEPCO by HESCO. As such no payment, on due dates, had been made since the execution of contract. Resultantly, HESCO had to pay extra 2% interest charges amounting to Rs.218.281 million to PEPCO as per Loan Agreement.

Total interest charges @ 15%	=	Rs.1,637.108 million
Estimated interest rate @ 17%	=	Rs.1,855.389 million

(Rs.1,637.108 million / 15% x 17%)

Difference / Loss = Rs.218.281 million

Non-adherence to the amortization schedule of Loan Agreement resulted in loss of Rs.218.281 million due to late repayment of Principal and Interest Charges up to the financial year 2021-22.

The matter was taken up with the management in December, 2022. The management replied that HESCO is facing acute shortage of funds and financial crunch to discharge its liability. The matter has been taken up by CFO PEPCO with Ministry of Energy (Power Division) for adjustment of outstanding loans against subsidy of Rs.83 billion receivable from Government of Pakistan

The DAC in its meeting held on 23rd January, 2023 did not agree with the management reply and directed to submit revised reply within 15 days.

Audit recommends that the management needs to ensure compliance with DAC's decision besides fixing responsibility.

(AIR Para No. 30)

4.17 Non-forfeiture of bank guarantees due to non-completion of work by the contractor – Rs.48.191 million + US\$ 1.115 million

As per contract agreement dated June 25, 2010 between HESCO and M/s Tyco Electronic pursuant to General Conditions of Contract Sub-Clause-27.10, “if the contractor fails to commence the work necessary to remedy such defect or any damage to the facilities caused by such defect within a reasonable time (which shall in no event be considered to be less than fifteen (15) days), the Employer may, following notice to the contractor, proceed to do such work, and the reasonable costs incurred by the employer in connection therewith shall be paid to the employer by the contractor or may be deducted by the employer from any monies due the contractor or claimed under the Performance Security”.

During Special Study on installation of AMR meters / AMI and ABC in HESCO, it was observed that six (06) performance bank guarantees amounting to Rs.48.191 million & US\$ 1.115 million were provided by the contractor M/s Tyco Electronics, Germany. The expiry date of these bank guarantees was May, 2014 and as such the same was to be got revalidated upto the expiry of defect liability period as per condition of contract but the same was not done. The contractor could not complete the project under Lot-I, II & III within stipulated

time. Left over jobs of the contractor were 64 out of 1,554 due to shortage of supply of hardware material. In the event of such default the said performance guarantees were to be forfeited as per contract agreement.

Non-adherence to contract clause resulted in non-forfeiture of bank guarantees amounting to Rs.48.191 million + US\$ 1.115 million due to non-completion of work up to the financial year 2021-22.

The matter was taken up with the management in December, 2022. The management replied that an inquiry committee was being constituted to probe into the facts and the outcome would be submitted accordingly.

The DAC in its meeting held on 23rd January, 2023 directed the management to inquire the matter for fixing responsibility and submit report within 30 days.

Audit recommends implementation of DAC's decision.

(AIR Para No. 37)

4.18 Non-renewal of bank guarantees - Rs.30.256 million

According to Contract Clause-4 of Purchase Order (PO) No. MMM/HESCO/DM (P&PD)/17579-89/03/AMR/HESCO dated March 02, 2017, "Performance Bond in the shape of Bank Guarantee be obtained from the firm and the same shall be retained valid upto 36-months from the date of completion of the project".

During Special Study on installation of AMR meters / AMI and ABC in HESCO, it was noticed that the contractor had provided the performance security equal to 10% of the contract in HESCO. The validity period of performance bank guarantees submitted by the contractor was expired on 28.09.2021. As per the contract, the Defect Liability period was fixed 36 months upto November 20, 2023 from the date of Project Acceptance Certificate which was issued on November 24, 2020 to the contractor. As such performance guarantee was to be got renewed but the same had not been provided by the contractor in violation of the clause of contract agreements.

Non-adherence to Contract Clause resulted in non-renewal of performance guarantees amounting to Rs.30.256 million up to the financial year 2021-22.

The matter was taken up with the management in December, 2022. The

management replied that as per the prevailing Purchase Order (PO) clause the guarantee had been retained by HESCO. Performance guarantee was valid up to 36-months and had not been issued / released to firm during the defect liability period. HESCO committee issued project acceptance certificate w.e.f May, 2019 with defect liability period of 36-months, which had already been passed. The reply was not tenable as the said performance guarantee was to be renewed upto November, 2023 which was not done.

The DAC in its meeting held on 23rd January, 2023 directed the management to inquire the matter for fixing responsibility for non-renewal of bank guarantee. DAC also directed to get the performance guarantee renewed and verified it within 30 days.

Audit recommends that the management needs to ensure compliance with DAC's decision.

(AIR Para No. 01)

4.19 Excess payment to the contractor on project of AMR meters – Rs.1.105 million

According to item 1(b), 2(b) & 3(b) of “1(A)-Description of Stores” of Purchase Order No.17759-89/03/AMR/HESCO dated 02.03.2017 to M/s Accurate, the contractor is liable to claim for installation, testing and commissioning of AMR Meters @Rs.1950/- for S-Phase, Rs.2,920 for 3-Phase and Rs.9,900 for LT Time of Use (ToU) meters. According to Clause-10 “Payment” of Purchase Order dated 02.03.2017 “i) contractor will be paid 65% of the total value of AMI meters, on the receipt of meters in Regional Store HESCO Hyderabad & Nawabshah and issuance of GRN. ii) 10% of the value of the AMI Meters will be paid on Individual Meter Installation, Testing and Commissioning (Certificate to be issued by concerned SDO (Op) XEN (Op) & S.E. (Op), iii) 15% of the value of meters will be paid upon Successful Commissioning, Operation and Acceptance of AMI System, (Acceptance Certificate to be issued by committee constituted by CEO HESCO, iv) remaining 10% of the value of Meters on completion of (01) year “Satisfactory Performance”. As per Clause-23 of purchase order states that “Project Acceptance Certificate will be issued after completion of entire Project by the Committee constituted by Chief Executive Officer HESCO. However, partial

acceptance certificate will be issued on each stage as per Clause 10 of this purchase order”.

During Special Study on installation of AMR meters / AMI and ABC in HESCO, it was observed that an amount of Rs.35.305 million was paid to the contractor in the light of said provision whereas only 10,655 AMR meters [4,948 S-Phase, 4,577, 3-Phase & 1,130 LT Time of Use (ToU)] were installed, tested and commissioned and as such Rs.34.200 million was to be paid against commissioning of installed meters, which was actually not done by the contractor. Hence, an amount of Rs.1.105 million was paid in excess to the contractor.

Non-adherence to purchase order clause resulted in excess payment amounting to Rs.1.105 million to the contractor on project of AMR meters on GoS connections up to the financial year 2021-22.

The matter was taken up with the management in December, 2022. The management replied the difference between the amount of installed quantity and amount of successful commissioned quantity was Rs.1.105 million as pointed out. However, further elaborated that amount of Rs.35.305 million was paid against 11,075 quantities on the basis of certificates issued by concerned. An amount of Rs.13.221 million was with-held of the remaining 3,280 un-installed meters in case, if any excess payment was established against contractor the same would be recovered while releasing the with-held payment.

The DAC in its meeting held on 23rd January, 2023 directed the management to get the stance verified from audit within 30 days

Audit recommends that the management needs to ensure compliance with DAC’s decision.

(AIR Para No. 06)

4.20 Undue favour to the contractor due to payment of unknown whereabouts of AMR Meters - Rs.4.680 million

According to Clause-10 “Payment” of Purchase Order dated 02.03.2017 to M/s Accurate, “i) contractor will be paid 65% of the total value of AMI meters, on the receipt of meters in Regional Store HESCO Hyderabad & Nawabshah and issuance of GRN. ii) 10% of the value of the AMI Meters will be paid on Individual Meter Installation, Testing and Commissioning (Certificate to be issued by concerned SDO (Op) XEN (Op) & S.E. (Op), iii)

15% of the value of meters will be paid upon Successful Commissioning, Operation and Acceptance of AMI System, (Acceptance Certificate to be issued by committee constituted by CEO HESCO, iv) remaining 10% of the value of meters on completion of (01) year “Satisfactory Performance”. Clause-23 of purchase order states that “Project Acceptance Certificate will be issued after completion of entire Project by the Committee constituted by Chief Executive Officer HESCO. However, partial acceptance certificate will be issued on each stage as per Clause 10 of this purchase order”.

During Special Study on installation of AMR meters / AMI and ABC in HESCO, it was observed that an amount of Rs.35.305 million was paid to the contractor M/s Accurate against installation of 11,075 AMR meters on connections of GoS, whereas only 10,655 AMR meters (4,948 Single Phase, 4,577 three-Phase & 1,130 LT TOU) were installed, tested and commissioned. However, whereabouts of 420 AMR meters valuing Rs.4.680 million remained unknown as these were not commissioned and functional in AMI System.

Non-adherence to contract clause resulted into undue favour to the contractor due to payment of Rs.4.680 million due to unknown whereabouts of AMR Meters up to the financial year 2021-22.

The matter was taken up with the management in December, 2022. The management replied that an enquiry committee was being constituted to probe into the facts and outcome would be submitted accordingly.

The DAC in its meeting held on 23rd January, 2023 directed the management to inquire the matter for fixing responsibility and submit report within 60 days.

Audit recommends that the management needs to ensure compliance with DAC’s decision.

(AIR Para No. 07)

4.21 Undue favour to M/S Tyco Electronics by unjustified award of contract – Rs.1,439.731 million

According to PPR – 2004, Section 29 Evaluation Criteria “Procuring agencies shall formulate an appropriate evaluation criterion listing all the relevant information against which a bid is to be evaluated. Such evaluation criteria shall form an integral part of the bidding documents. Failure to provide for an unambiguous evaluation criterion in the bidding documents shall amount

to mis-procurement.”

During Special Study on installation of AMR meters / AMI and ABC in HESCO, it was observed that two (02) bids for Supply & Installation of ABC with hardware and its testing and commissioning, dismantlement of existing LT System under Contract No. HESCO-WB-ELR-05 were received from M/s Perwaiz Trading Corporation Pvt. Ltd. Karachi on behalf of M/s Tyco Electronics, Germany for an amount of Rs.1,439.731 million and M/s SF Engineering Services, Karachi on behalf of M/s Resul, Portugal for an amount of Rs.986.699 million. The bids were opened on May 31, 2011 and as per Bid Evaluation Report (BER) prepared by consultant (M/s PES-EnMasse-JV), M/s Tyco Electronics, Germany was declared only responsive bidder with its bid stood at 145.91% higher than the lowest bid and 29.45% higher than the Engineer’s Estimate. HESCO Evaluation Committee compromised on main requirements and agreed with BER for lenient criteria just to cover up its inefficiency in floating tenders on time.

Furthermore, the contract was executed with M/s Tyco instead of M/s Perwaiz Trading Corporation Pvt. Ltd. Karachi which submitted the bid. Hence, the execution of contract with the former one cannot be termed regular as it did not participate in the bidding process. It is pertinent to mention that no evidence found in the bidding documents regarding joint venture of firms or otherwise.

Non-adherence to PPR, 2004 resulted in unjustified award of contract to M/s Tyco Electronics amounting to Rs.1,439.731 million up to the financial year 2021-22.

The matter was taken up with the management in December, 2022. The management replied that HESCO Evaluation committee reviewed the bid evaluation report and contract was awarded to M/s Tyco Electronics with the approval of HESCO BoD after completing all codal formalities.

The DAC in its meeting held on 23rd January, 2023 directed the management to inquire the matter by GM (TS) at PPMCL level within 60 days.

Audit recommends that the management needs to ensure compliance with DAC’s decision.

(AIR Para No. 23 & 24)

4.22 Non-obtaining of insurance coverage from contractor – Rs.143.97 million

As per contract agreement dated June 25, 2010 between HESCO and M/s Tyco Electronic, Section-VIII of Special Conditions of Contract, the insurance coverage shall be in accordance with pursuant to GCC Sub-Clause-24.1, “the contractor shall at its expense take out and maintain in effect, or cause to be taken out and maintained in effect, during the performance of the contract, the insurances @ 110% of the contract price (US\$ or Euro) i.e transit insurance during transport of the plants and equipments, all risks insurance covering physical loss or damage to the facilities at the site, occurring prior to completion of the facilities”.

During Special Study on installation of AMR meters / AMI and ABC in HESCO, a contract valuing Pak Rs.1,439.731 million for Supply & Installation of ABC with Hardware and its Testing and Commissioning under Contract No. HESCO-WB-ELR-05 was awarded to M/s Tyco Electronics in December 16, 2011. The contract was completed in 2015 and defect liability period expired in 2016 and an amount of Rs.143.97 million paid to contractor but works were not get insured during execution. As such public exchequer has to bear a loss of Rs.143.97 million due to non-obtaining of insurance coverage from contractor.

Non-adherence to contract clause resulted in non-obtaining of insurance coverage amounting to Rs.143.97 million from contractor, which caused loss to national exchequer up to the financial year 2021-22.

The matter was taken up with the management in December, 2022. The management replied that proper revised reply would be submitted after consulting the record.

The DAC in its meeting held on 23rd January, 2023 directed the management to submit revised reply and get it verified from audit within 15 days.

Audit recommends that the management needs to ensure compliance with DAC’s decision besides fixing responsibility.

(AIR Para No. 28)

4.23 Inefficient utilization of World Bank Loan – US\$ 41.815 million

According to Rule-5(5) of Public Sector Companies Corporate Governance Rules-2013, “the Board shall establish a system of sound internal control, which

shall be effectively implemented at all levels within the Public Sector Company, to ensure compliance with the fundamental principles of probity and propriety; objectivity, integrity and honesty and relationship with the stakeholders”.

During Special Study on installation of AMR meters / AMI and ABC in HESCO, it was noticed that World Bank approved relented loan of US\$ 41.815 million on July 14, 2008 for supporting HESCO’s investment program in operational installations of sub-transmission lines & grid stations. The original loan closing date was June, 2012 which was extended up to June, 2014.

The tendering, bidding, and evaluation processes lingered for no sound reasons whatsoever except poor planning and execution of procurement processes. Due to these, out of World Bank loan of US\$ 41.815 million, US\$ 16.199 (39% of total loan) million could not be utilized. Incompetency and non-professionalism of HESCO could be gauged from the fact that the contract was awarded to M/s Tyco on December 16, 2011; only seven months before the original loan closing date i.e. June, 2012; an epitome of poor planning, execution and mismanagement.

Non-adherence to Corporate Governance Rules resulted in inefficient utilization of World Bank loan amounting of US\$ 41.815 million up to the financial year 2021-22.

The matter was taken up with the management in December, 2022. The management replied that US \$ 25.616 million was utilized out of total loan US \$ 41.815 million (61%). Audit contended that the management had admitted less utilizing of loan amount but no justification was provided in this regard.

The DAC in its meeting held on 23rd January, 2023 did not agree with the management reply and directed to inquire the matter at PPMCL level by GM(TS) and submit its report within 60 days.

Audit recommends to ensure compliance with DAC’s decision besides fixing responsibility.

(AIR Para No. 27)

4.24 Excess charging of overhead on works transferred to Operation Division – Rs.59.753 million

According to the instructions issued by WAPDA dated 01.07.2002,” installation charges were restricted to 20% instead of 26 % (12% for storage

and handling along with 8% charges for labor, overhead etc.)

During Special Study on installation of AMR meters / AMI and ABC in HESCO, it was observed that overhead charges amounting to Rs.121.240 million were included in the works completed and transferred to operation divisions through Debit Advices No. PMU-46/OPH-05 dated 02/2019, PMU-48/MOH-01 dated 02/2019, PMU-47/REH-05 dated 02/2019 & PMU-49/OQD-01 dated 02/2019. The material cost issued on these works was Rs.768.044 million as such the percentage of overhead becomes 15.78% instead of 8%. As such overhead charges Rs.59.753 million (7.78% x Rs.768.044 million) was charged in excess.

Non-adherence to authority's instructions resulted in excess charging of overhead amounting to Rs.59.753 million on works transferred to operation division up to the financial year 2021-22.

The matter was taken up with the management in December, 2022. The management replied that audit worked out overheads @ 15.78% instead of 8% against contract amount charged whereas the amount of overhead was calculated on actual basis. Hence this office has charged the overhead on actual basis. The reply was not tenable as excess overheads were charged on capitalized works.

The DAC in its meeting held on 23rd January, 2023 did not agree with the management reply and directed the management to inquire the matter at CEO level for fixing responsibility and submit report within 60 days.

Audit recommends ensuring compliance with DAC's decision.

(AIR Para No. 18)

4.25 Irrational charging of interest on works completed and transferred as capital expenditure – Rs.1,118.489 million

According to International Accounting Standards (IAS) - 23 regarding treatment of financial cost that borrowing costs that are directly attributable to the acquisition, construction or production of a qualifying asset from part of the cost of that asset and, therefore, should be capitalized. Other borrowing costs are recognized as an expense. b) World Bank approved relent loan under "Electricity Distribution Transmission and Improvement Project Loan-7565-PK". As per amortization schedule the detail of principal amount withdrawal and interest charges are as under:

Total loan proceeds	= US\$ 41.815 million
Withdrawal amount	= US\$ 25.616 million (Rs.2,332.524 million)
Accrued interest on loan upto 15.03.2016	= Rs. 905.705 million

During Special Study on installation of AMR meters / AMI and ABC in HESCO, it was observed that out of total loan proceeds, World Bank has allocated US\$ 20.00 million for installation of ABC on 39 feeders of Hyderabad city along with rehabilitation / bifurcation of these Feeders under Energy Loss Reduction (ELR) Project. Completed works amounting to Rs.2,504.720 million were capitalized in 02/2019 including interest charges Rs.1,118.489 million against loan. In this context it was added that M/s Tyco Electronics completed these works in 2015. The accrued interest charges upto 15.03.2016 on entire loan was Rs.905.705 million. Therefore, interest charges were to be apportioned as per IAS-23. The interest charges become 145.63% (1,118.489 / 768.044) of the material cost i.e. Rs.768.044 million and could not be justified.

Non adherence to International Accounting Standards resulted in irrational charging of interest amounting to Rs.1,118.489 million on works completed and transferred up to the financial year 2021-22.

The matter was taken up with the management in December, 2022. The management replied that the accrued amount of principle and markup for the loan 7565-PK was booked as per amortization schedule issued from Economic Affairs Division. The reply was not agreed to being not substantiated with documentary evidences.

The DAC in its meeting held on 23rd January, 2023 did not agree with the management reply and directed the management to submit the detailed /revised reply and get it verified from audit within 30 days.

Audit recommends implementation of DAC's decision.

(AIR Para No. 19)

4.26 Wasteful expenditure for removing ABC from LT Feeders - Rs.32.301 million

According to the instructions issued by WAPDA dated July 17, 1982, "All losses, whether of public money or of stores, shall be subjected to preliminary investigation by the officer in whose charge they were, to fix the cause of the loss and the amount involved".

During Special Study on installation of AMR meters / AMI and ABC in HESCO, expenditure amounting to Rs.32.301 million was incurred on eighteen (18) LT lines for rehabilitation. These LT lines were rehabilitated by removing already installed 11,617 meters ABC on the plea for provision of electricity to community through one-point supply. In most of the cases Benefit Cost (BC) Ratio worked out was less than 1. However, in some cases this ratio was ≥ 1 but cannot termed as genuine because the installed ABC was beneficial than barred conductor. Instead of controlling the theft of electricity by the Operational Field Staff, and opportunity for theft of electricity through barred conductor was given to consumer openly.

Non-adherence to Authority's instructions resulted in wasteful expenditure amounting to Rs.32.301 million for removing ABC from LT feeders up to the financial year 2021-22.

The matter was taken up with the management in December, 2022. The management replied that 18 LT proposals were rehabilitated by removing the installed ABC after approval and without considering BC Ratios being installed ABC were damaged, deteriorated, punctured and short circuit of transformers besides consumers were also involved in theft of electricity etc.

The DAC in its meeting held on 23rd January, 2023 did not accept the view point of management and directed to inquire the matter and fix responsibility within 60 days.

Audit recommends implementation of DAC's decision.

(AIR Para No. 22)

4.27 Non-return of dismantled / healthy conventional meters and material to store

According to Purchase Order No.17759-89/03/AMR/HESCO dated 02.03.2017 to M/s Accurate Contract Clause-20, "Disposal of removed materials, i) all materials, including meters and service drop cables removed during the work remain the property of HESCO. ii) Retired materials shall be safeguarded by the Contractor and returned to the HESCO stores by the installation team supervisor, preferably daily (or as otherwise arranged). It is the responsibility of the Contractor to obtain proper documentation or all returned material. Failure to return material shall result in the deduction of the value of the material from the Contractor's invoices. Further, according to

Contract Agreement between HESCO and M/s Sanaullah Khan & Co. dated December, 2016 Clause-8, “Dismantlement and Preparation of Material Return Note (MRN) and returning to designated store (Item 1 to 3)”.

During Special Study on installation of AMR meters / AMI and ABC in HESCO, 11,075 AMR meters (5,210 single phase, 4,716 three phase and 1,149 LT TOU meters) were installed for replacing conventional meters by the contractor M/s Accurate as per requirement of contract agreement clause-20. Neither the efforts were made for return of dismantled / healthy meters nor were the payments deducted from the contractor on this account. Furthermore, it was noticed that LT Conductor having length 75,000 meters, HT Structure 04, LT Structure 17, 2-Core 53,000 meters and 4-Core 4,000 meters were to be dismantled for completion of 50 Jobs by the contractor M/s Sanaullah Khan as per requirement of contract agreement. The said material was to be returned to store through MRN by the contractor. Neither any deduction was made from payment to the contractor nor any MRN was produced for justifying return of dismantled material.

Non-adherence to Contract Clause resulted in non-return of dismantled / healthy conventional meters and material to store upto the financial year 2021-22.

The matter was taken up with the management in December, 2022. The management replied that meters were installed on main site before the existing meters and all meters were installed in series so meters could not be removed to return to store. The reply was not tenable as after installation of AMR meters, should have been dismantled and returned to store.

The DAC in its meeting held on 23rd January, 2023 did not agree with management reply and directed to hold inquiry by GM (TS) at PPMCL to fix responsibility and submit its report within 60 days.

Audit recommends implementation of DAC’s decision.

(AIR Para No. 02 & 33)

4.28 Non-utilization of ABC stock dumped in Sukkur warehouse - US\$ 4,238,224.78 + Rs.2.42 million

According to Rule-5(c)(iii) of Public Sector Companies Corporate Governance Rules-2013 “ensure compliance with the law and the Public Sector Company’s internal rules and procedures relating to public procurement, tender

regulations, purchasing and technical standards, when dealing with suppliers of goods and services. The Board shall ensure that quality standards are followed with due diligence and that suppliers comply with the standards specified and are paid for supplies or services within the time agreed”.

During Special Study on installation of AMR meters / AMI and ABC in HESCO, it was observed that 2,716 KM ABC (600/1000 volts) of different specification with end caps were procured from M/s Peoples ELE, Appliance Group China through contract amounting US\$ 3,500,296.27 + Rs.1.5 million under Power Distribution Enhancement Investment Programme. Hardware Items / Accessories for use on ABC were also procured from M/s Tyco Electronics GmbH, Germany through contract valuing US \$ 737,928.51 + Rs.0.920 million. Both the consignments were delivered in Sukkur warehouse.

After creation of SEPCO from HESCO in 2011, HESCO did not consider the already procured huge inventory of ABC available in SEPCO warehouse and made a step forward to get executed its aimed project through World Bank Loan i.e. Electricity Distribution & Transmission Improvement Project (EDTIP) WB-7565-PK. Hence the material already procured under ADB loan remained dumped in said warehouse whereas the loan amount was continuously appearing in the financial statements of HESCO. The management was required to either shift the loan amount to SEPCO or to fetch the material to HESCO own store for utilization but no steps were taken. Even the management did not know its consumption or balances, leading to the chances of misappropriation and also a financial loss to company in shape of interest without any use of material procured from costly loan.

Non-adherence to Corporate Governance Rules resulted in non-utilization of ABC stock dumped in Sukkur Warehouse upto the financial year 2022-23.

The matter was taken up with the management in December, 2022. The management replied that for bifurcation of loans of ADB and World Bank including borrowing cost, M/s Ferguson Chartered Accountants had been engaged. The report was at final stage to be put up to BoDs of HESCO and SEPCO. Thereafter the cost of loan would be shared between HESCO and SEPCO as per BTA. The reply was not tenable as the material procured under loan facility should have been utilized in order to achieve the envisage benefits

of loan.

The DAC in its meeting held on 23rd January, 2023 directed the management to get finalized the M/s Ferguson Report and get the record verified from audit after making necessary amendments in accounts within 60 days.

Audit recommends implementation of DAC's decision besides fixing responsibility.

(AIR Para No. 34)

4.29 Unjustified transfer of expenditure through debit advice - Rs.12.404 million

According to Rule 2A (a) of Corporate Governance Rules sound and prudent management of the business of the public sector company is carried on with integrity, objectivity, due care and the professional skills appropriate to the nature and scale of its activities.

During Special Study on installation of AMR meters / AMI and ABC in HESCO, it was observed that 1,554 job orders were transferred to operation divisions (Qasimabad, Latifabad, Ghari Khata & Phuleli) with value Rs.2,504.720 million during the month 02/2019. Out of these job orders, 1,490 jobs were completed by M/s Tyco Germany whereas, 64 job orders were not done by contractor. Later on, these 64 leftover job orders were got completed by PMU through other contractors. As per record, payment of Rs.12.404 million was made to another contractor M/s Sanauilha Khan for 50 job orders, the cost of which was also transferred to these operation divisions through debit advice dated 06/2019. Audit is of the view that its double charging of expenditure relating to 50 Jobs as these works were already transferred to operation divisions in 02/2019. On pointing out the matter, the justification for these works were not provided by the management of PMU. Neither any detail of left over jobs was provided nor any details of 50 jobs made available to audit.

Non-adherence to Corporate Governance Rule resulted in unjustified transfer of expenditure amounting to Rs.12.404 million through debit advice up to the financial year 2021-22.

The matter was taken up with the management in December, 2022. The management replied that 50 Job orders having cost of Rs.12.404 million had never been double charged. The main contractor M/s Tyco has completed 1,490 job orders out of 1,554 job orders in 02/2019 thereafter; work was awarded to

M/s Sanaullah Khan Contractor for 50 job orders which were transferred to concerned divisions in 06/2019 through Debit Advices.

The DAC in its meeting held on 23rd January, 2023 directed the management to submit the revised reply and get the stance verified from audit within 15 days.

Audit recommends to ensure compliance with DAC's decision.

(AIR Para No. 25)

4.30 Irregular booking of capitalization cost of 1,554 instead of 1490 Job Orders

According to Fixed Assets Management (FAM-4) of Accounting Manual, after completion, the assets are transferred to the concerned operation division which in turn capitalizes the assets and fixed assets register is updated accordingly. Moreover, debit advice (s) is prepared for transfer of each project to concerned operation division with the supporting documents which include A-90 Form, AB 161 Form etc.”

During Special Study on installation of AMR meters / AMI and ABC in HESCO, four (04) debit advices for capitalization of 1,554 Job Orders were raised. In this context it is added that out of 1,554 Job Orders, 1,490 were completed. Further, the capitalization was to be made of only 1490 job orders whereas the company irregularly capitalized the whole 1554 job orders.

Audit is of the view that the material of sixty four (64) Job Orders, which remained uncompleted, must be returned to the store to avoid misappropriation of the same.

Non-adherence to the Accounting Manual resulted in irregular booking of capitalization on account of cost of 1,554 instead of 1490 Job Orders up to the financial year 2021-22.

The matter was taken up with the management in December, 2022. The management replied that four (04) debit advices for Rs.2,504.720 million for capitalization of 1,554 Job Orders were issued for ABC, to the main contractor M/s Tyco. It completed 1,490 jobs orders out of 1,554 jobs order in 02/2019. The work of 50 jobs was awarded to M/s Sanaullah Khan Contractor which were transferred in 06/2019 through Debit Advices. The reply was not tenable being not substantiated with documentary evidences.

The DAC in its meeting held on 23rd January, 2023 did not agree with the management reply and directed to submit revised reply along with A-90s and get the record verified from Audit within 30 days.

Audit recommends implementation of DAC's decision.

(AIR Para No. 29)

4.31 Irregular issuance of Project Acceptance Certificate to the contractor – Rs.302.56 million

According to Clause-10 "Payment" of Purchase Order dated 02.03.2017, "i) contractor will be paid 65% of the total value of AMI meters, on the receipt of meters in Regional Store HESCO Hyderabad & Nawabshah and issuance of GRN. ii) 10% of the value of the AMI Meters will be paid on Individual Meter Installation, Testing and Commissioning (Certificate to be issued by concerned SDO (Op) XEN (Op) & S.E. (Op), iii) 15% of the value of meters will be paid upon Successful Commissioning, Operation and Acceptance of AMI System, (Acceptance Certificate to be issued by committee constituted by CEO HESCO, iv) remaining 10% of the value of meters on completion of (01) year "Satisfactory Performance". Clause-23 of purchase order states that "Project Acceptance Certificate will be issued after completion of entire Project by the Committee constituted by Chief Executive Officer HESCO. However, partial acceptance certificate will be issued on each stage as per Clause 10 of this purchase order".

During Special Study on installation of AMR meters / AMI and ABC in HESCO, a Purchase / Work Order for design, supply, installation and commissioning of AMI was awarded to M/s Accurate (Pvt) Ltd, Lahore for an amount of Rs.302.56 million on 02.03.2017. The supplier was required to install 14,355 meters (6,992 Single Phase, 6,153 3-Phase & 1,210 Time of Use (TOU) Energy Meters) in various HESCO Operation Circles. The AMI system became successfully commissioned and operative as per Certificate issued by Manager (MIS) in May, 2019 whereas project acceptance Certificate / Acceptance of Completion of Project was issued on November 23, 2020. The issuance of Project Acceptance Certificate was irregular as the contractor completed installation of 11,075 AMR meters (5,210 single phase, 4,716 three phase and 1,149 LT TOU meters) whereas the said certificate was to be issued

on completion of entire project. Moreover, numbers of communicated and non-communicated AMR meters were as under:

Description	Year ending	Communicated AMR		Non-communicated AMR	
		Number	S. Load	Number	S. Load
At the time of successfully commissioning of AMI System	06/2019	8,863	138,371.2	2,281	24,179.5
At the time of Project Acceptance Certificate	06/2020	7,842	133,153.1	3,586	36,156.6

(Source: MIS Data)

Non-adherence to Clause of the Purchase Order resulted into irregular issuance of Project Acceptance Certificate to the contractor amounting to Rs.302.56 million up to the financial year 2021-22.

The matter was taken up with the management in December, 2022. The management replied that Project Acceptance Certificate was issued in compliance to PO Sub-Clause (a) (iii) of Clause 10 as against the payment claim of successful commissioning, operation and acceptance of the AMI System for meters that communicated successfully of the system. Whereas, the Project Acceptance Certificate was issued in compliance to P.O Sub-Clause (a) (iv) as one-year satisfactory performance period of installed meters had successfully been completed. These certificates were issued against the relevant payment clause for 11,075 AMR meters. Hence, neither the violation had been committed nor any loss had been incurred by HESCO. The reply was not acceptable as the project acceptance certificate was issued prior to project completion.

The DAC in its meeting held on 23rd January, 2023 did not agree with management reply and directed to inquire the matter at its own level and submit report within 60 days.

Audit recommends to ensure compliance with DAC's decision.

(AIR Para No. 03)

4.32 Overall Assessment

As pilot project, AMR meters were installed under USAID program with the creation of AMR Cell in HESCO. No recruitment of eligible staff was made despite its benefits and decrease in number of consumer complaints. The cell was closed without any reason. Again, after ECC decision, new AMI infrastructure was developed for installation of AMR meters in order to overcome the overbilling complaints of Sindh Government. After installation of AMR meter on the connections of GoS, billing assessment and recovery thereof is being made as per agreement. But there were some deficiencies observed in ECC decision during its implementation such as billing of non-communicated meters, damaged meters for which no defined mechanism or SOP was there due to which outstanding dues towards GoS were piling up. Further despite BoD approval, HESCO management was unable to extend / spread the AMR facility to industrial/ agricultural consumers. No proper staffing was made despite heavy investment and the cell is still working with officiating staff under the control of Manager MIS.

As far as the matter of ABC concerned, HESCO made efforts to eliminate theft and reduce energy losses by installing it on HT/ LT feeders but due to lack of proper administration and vigilance, these ABC were damaged and the field staff was put back on past track by removing these ABC for provision of electricity to consumer.

4.33 CONCLUSION

Audit could not ascertain the position of losses and preparation of feasibility before and after installation of ABC on specific feeder due to non-production of record pertaining to PC-I of Loan No. 7565-PK (ABC). Moreover, data pertaining to adoption of safety measures for installation of ABC was also not shared. However, on the basis of record produced, it is concluded that:

- i) The envisaged benefits of installation of AMR meters could not fully be achieved as 11,075 meters were installed instead of 14,355 meters. AMR meters were installed only in 13 colonies out of 57 housing colonies owned by GoS;

- ii) Public Procurement Rules, 2004 were not observed in the tendering process for supply, testing, commissioning and installation of ABC with hardware and the subsequent dismantling of the existing LT System;
- iii) Instances were observed where payment was made to the contractors regarding installation charges and cost of AMR meters having unknown whereabouts;
- iv) The closure of AMR Cell by the management without assigning any reason badly affected the agreed deliverables with network service providers. Hence, PITC's server was shut down due to non-payment which caused blockage of SIMs and stoppage of online billing. The AMR Cell was closed in April, 2016 despite successful online billing (70%) of USAID Financed AMR Project and
- v) The number of non-communicated meters increased from 2281 to 3586 upto June, 2020. It was impossible for the management to control the losses and make recovery from GoS due to rising trend of non-communicated AMR meters.

5. RECOMMENDATIONS

In view of the audit findings, following measures are recommended for improvement in the operational working of AMR meters, AMI infrastructure and strengthening the ABC network in order to eliminate the element of pilferage/theft of electricity and to achieve maximum benefits.

- Take strict disciplinary action against persons (officers / officials) at fault for non-production of record requisitioned for completion of assignment.
- Enquiry may be conducted to reconciled the contractor work and payments made to contractor i.e. M/s Accurate in the light of terms of agreement.
- Recovery needed to be made as per actual consumption from GoS regarding newly installed connections in light of ECC decision.
- Expedite converting the remaining bulk supply housing societies of

GoS to individual metering in compliance to ECC decision

- Delay in installation of AMRs against 4382 connections of GoS needs to be inquired for fixing responsibility besides expediting the installation of the same.
- Pursue the matter with GoS for recovery of electricity dues of Rs.17.170 billion in the light of ECC decision.
- Expedite the matter with MoE for adjustment of principal loan amount with interest against subsidy.
- Finalize the enquiry regarding closure of USAID, AMR project in HESCO and fix responsibility of loss upon the person(s) at fault.
- A proper mechanism / SoPs should be developed for recording and reading of non-communicated meters to curb accumulation of arrears²⁰.
- Adjustment of advances given to officers / officials / suppliers / contractors out of World Bank loan needs to be expedited.
- Loss on account of late repayment of principal as well as interest charges needs to be inquired for fixing responsibility.
- Expedite the inquiry proceedings for fixing responsibility regarding non-forfeiture of performance guarantees of contractors.
- Award of contract to M/s Tyco in violation of PPR, 2004 needs to be inquired into for fixing responsibility.
- Non-obtaining of insurance coverage from contractor needs to be inquired into for fixing responsibility.
- Inefficient utilization of World Bank loan needs to be inquired for fixing responsibility.
- Excess charging of overheads needs to be inquired for fixing responsibility to persons at fault.
- Irrational charging of interest as capital expenditure needs to be justified.
- Investigate and fix responsibility for losses incurred due to removal of ABC from LT feeders.

²⁰ Non communicated meter is one that is unable to communicate with remotely established metering data center through GSM/SIM Network.

- Fix responsibility for dumping of ABC material purchased out of World Bank loan at Sukkur warehouse.
- The management of the company did not make any efforts for fresh recruitment and training of personnel for this complicated and sophisticated project despite the fact that defect liability period of the contract is near to complete in 2023.
- The already installed AMR meters in Qasimabad Sub Division through USAID Grant needed to be properly utilized and inventory be reflected in the HESCO accounts.

ACKNOWLEDGEMENT

We wish to express our appreciation to the management and staff of Hyderabad Electric Supply Company (HESCO) for the assistance and cooperation extended to the auditors during this assignment.

List of MFDAC Paras

Sr.#	Para No.	Subject	Amount (in million)
1	4.15	Non clearance of IOT balance against loan No. 7565-PK	5,281.986

ANNEXES

Traditional Metering System VS Smart Metering System

Traditional meters are based on electromechanical System Reading is obtained by manual observation of the meter, therefore, to get meter reading we need additional resources and human employment. The company's appointed meter readers visit every home for reading and collecting energy consumption data for bill generation. This is a time-consuming and tedious job for meter readers. In addition, it is more tough and cumbersome in rainy days and restricted areas of country. **(Figure. 1)** shows that the electricity meter reader receiving electromechanical and digital meter reading manually on a paper and through infrared sensors. It causes human errors, commit the malpractices and manipulate consumer usage data and generate inaccurate bills. These meters only show and store the consumption of electricity units. In these meters, there is no anti-theft solution.²¹



Traditional meter reading system



Traditional Meter



Smart Meter

²¹ (Source: <https://www.linkedin.com/pulse/traditional-meter-vs-smart-overview-gokul-shrinivas>), (Source: https://www.researchgate.net/publication/325669617_Traditional_Vs_Smart_Electricity_Metering_Systems_A_Brief_Overview & (https://www.topsmetering.com/blog/traditional-smart-electricity-meters_b21)

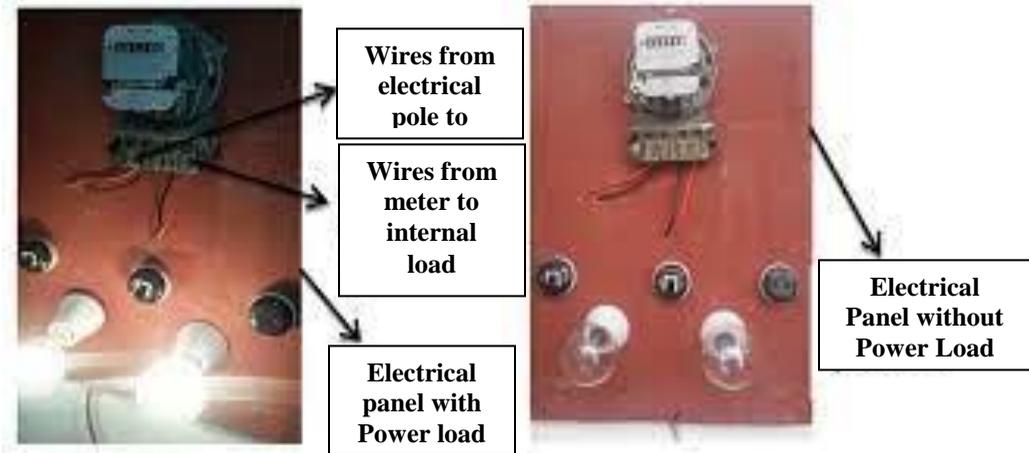
SM (Smart meter) is the next generation of metering technology, these SM are used to automatic meter reading, real time energy monitoring, send unit consumption information with the time of interval to ESP and also send different alerts to consumers. SM enables two-way communications between consumers and ESP. Some kind of SM sends the information on daily, quarterly and monthly bases. SM is commonly involving real time information transmission from the remote premises and performs a role of energy monitor and theft detector. Whenever intruder will try to tampering, SM sends alerts to ESP and some SM trip the electricity automatically.

Use of ABC for Reduction of Line Losses / Theft of Electricity



Before Installation of ABC at Site

To eliminate Theft of Electricity through Kunda Culture



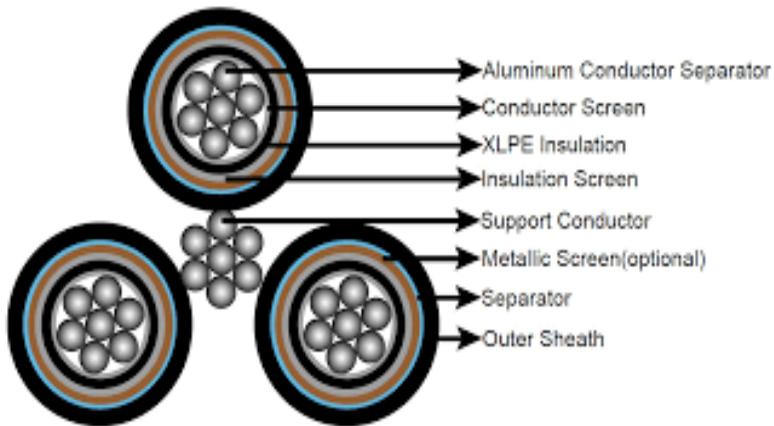
Theft of Electricity through changing of polarity of meter

(Source: <https://www.researchgate.net/publication/307868306> "Methods and Techniques of Electricity Thieving in Pakistan")

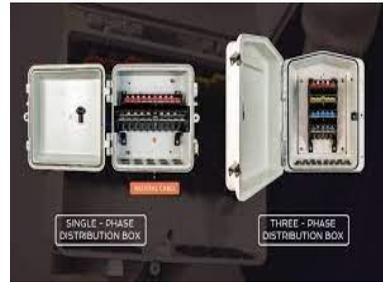
Types of ABC



Specification of ABC



After Installation of ABC at Site



DISTRIBUTION BOX FOR CONNECTIONS

- a. **Reduction in technical losses**
 - Reduction of line losses
 - Reduction of voltage drops
 - Improvement of power quality
 - Improvement of power factor
 - Improvement of operation and maintenance of power distribution equipment
 - Enhancement in equipment life
 - Increase in reliability
 - Reduction of unbalanced loading at the secondary of the distribution transformers
- b. **Reduction in non-technical losses**
 - Eliminate unauthorized connection
 - Eliminate Interference and by-passing energy meters
 - Reduce inaccurate meter reading and billing
 - Remove defective meters
 - Vanish power theft
 - Introduce IT application and automation
- c. **Reduction in management losses**
 - Improve customer accounting
 - Enhance revenue collection
 - Implement load management
 - Improve load forecasting
 - Implement HSE (Health, Safety & Environment)

(Source: Final Completion Report Simulation of Technical Losses by" Mehran University Centre for Energy & Development")

BRIEF OVERVIEW OF IMPLEMENTATION STATUS OF SMART METERING AND ABC

A-I US AID PILOT PROJECT - AMR CELL (FOR PRIVATE CONSUMERS) AND ITS CLOSURE

A project for replacement of conventional meters with more advanced AMR meters was initiated in HESCO under USAID Power Distribution Program (PDP) in the jurisdiction of Operation Sub Division Qasimabad, Hyderabad. This was a five year (2010-2015) program with US\$ 218 million USAID launched in September, 2010 in nine (09) government-owned DISCOs to improve intervention and projects addressing governance issues, technical and non-technical losses, and low revenue collection. The AMR head-end system was located at newly developed Network Operating Centre (NOC) managed by Power Information Technology Company (PITC). DISCOs were provided remote access through secure private and self-healing physical and logical Virtual Private Network (VPN) link to the meter data repository application hosted at NOC to use the meter reading for billing and analysis (**Annex-C-I**).

In HESCO, Power Distribution Program was initiated in April 2013. As per arrangement, all the meters and associated material would be supplied by USAID to HESCO store whereas HESCO was to make arrangement for installation of GPRS / GSM meters by engaging the contractor from own resources. AMR cell was also established in July 27, 2013 by HESCO for monitoring, commercial & technical issues before and after installation of AMR meters including correction of electricity bills.

At the time of completion of project, there were 1450 AMR meters on consumer premises and 519 meters at transformers in the field. USAID also arranged 15,049 GPRS SIMs from M/s Telenor and Bandwidth services (3 MB) from M/s Wateen in PITC for HESCO AMR communication. After completion of USAID contract on September 15, 2015 the system was handed over to PITC for its smooth operation. The ownership of sims was transferred to PITC.

USAID paid the communication charges of bandwidth upto September 30, 2015 and beyond that HESCO was to bear all the charges and PITC would continue to provide the technical and management support of the system. The annual cost for the services of AMI support and communication charges was above Rs.13.603 million for which a contract agreement between HESCO and PITC was signed in April 2016.

Successful billing was started in the month of September, 2015. After completion of project a research analysis was also made by a panel of Mehran UET Jomshoro titled “Impact Analysis of Automatic Meter Reading (AMR) Meters” (**Annex-C-II**) submitted in 2018. As per random analysis made by the panel on 15 consumers, an increase in monthly billed units was observed which resulted in reduction of energy losses and efficiency improvement of the system.

It was imperative to constitute an Automated Metering Infrastructure (AMI) Cell within the existing DISCO’s IT Department to undertake the responsibility of AMR System installation and smooth operation with a motive of sustainability (**Annex-C-III**). The AMR cell in HESCO remained operative uptill November, 2016 but the communication ratio declined from 70% to 34.62% in Nov, 2016. Communication ratio decreased day by day due to problem faced in field by PITC meter readers and AMR staff such as:

- a) the main side and load side of meter disconnected
- b) battery of meter found low
- c) meters stop or dead/on dial
- d) interruption of power supply during reading time
- e) tempering of meter (Shunt, Damage of screen, theft of Sims)
- f) installation of bogus / Non-AMR Meters against the AMR Meters
- g) meters found open

Though PITC provided Energy Accounting (EA software) tool for calculating HT/LT losses but due to non-communication of meters, the said tool

was not operated. PITC's server was eventually shut down due to nonpayment of its service and communication charges (Rs.5.622 million) upto April 2016 causing blockage of SIMs by PITC and stoppage of online billing.

For completion of AMR project in Qasimabad, about 7,000 single phase AMR, 2,000 three phase AMR meters and 50 CT operated meters were required. The management of the company didn't show any seriousness about the decision for speedy procurement rather the same was delayed. The said procurement was necessary for replacement of old AMR meter and for new connections in pilot project area.

In nutshell, the AMR project remained in dwindling condition throughout its short span of life. The payment to PITC was not on regular basis (only paid for September, 2015 to December, 2015) due to which online billing facilities was stopped in May, 2016 by keeping the server down. The management as well as the field staff including AMR Cell HESCO did not exercise their duties according to predetermined SoPs or pre-established protocols due to which the communication ratio of AMR meter dropped significantly. Of course, there were issues raised in field due to poor law & order situation like firing on staff, political influence, and threat to AMR personnel during installation of AMR meters, but those can be addressed with proper efficient management skills. Reason behind failure of AMR Cell HESCO and its closure can be summarized as below:

- Due control and ownership to run the project was not given to MIS HESCO.
- Lack of management control/monitoring over AMR Cell.
- Non-procurement of AMR meters for replacement of defective/non-communicated meters.
- Inefficient planning regarding up-gradation of AMR Cell to AMI Cell on the analogy of other DISCOs.
- Non- payment of communication and operational management charges to PITC.
- Increase in communication problem of AMR meter.

- Closure of project was made without any reason.

A-II AMR/ AMI SYSTEM IN HESCO / SEPCO (GOVT. OF SINDH CONNECTIONS)

A persistent issue was there among HESCO, SEPCO and GoS regarding overbilling to the connections owned by GoS. The GoS was not paying billing assessment since July, 2010. To resolve this long outstanding issue, Smart metering technology was again introduced in HESCO/ SEPCO in the light of Economic Coordination Committee (ECC) of Cabinet's decision in 2016 by introducing AMI system. A summary on "Resolution of Outstanding billing issues between connection of GoS department and HESCO / SEPCO for the period July, 2010 to July, 2016 was forwarded to ECC of the Cabinet for consideration. The committee in its meeting held on 25th November, 2016 considered the Summary and approved the proposal in para-10 read with the para-7 of the summary with certain modification (**Annex-C-IV**).

Soon after settlement agreement between HESCO and GoS, Purchase order In April 2017, the Energy Department of GoS released Rs 170.382 million (being 50% of total cost i.e Rs 340.764 million) to be incurred on purchase and installation of AMR/AMI Meters as per settlement agreement between GoS and HESCO.

B) ARIEL BUNDLED CABLE IN HESCO

The Hyderabad Electric Supply Company (HESCO) has started the installation of Ariel Bundle Conductor (ABC) cables, as power supply cables which used insulated conductors bundled together. HESCO was the first power distribution company (DISCO) in the country to introduce the ABC in the densely populated areas. The cables were made in a way to withstand storms, gusts and rains without breaking up. Therefore, the dangers of the wires tearing apart and falling down while endangering the people of being electrocuted would also be reduced. The installation of ABC was done through the loans of the World Bank and the Asian Development Bank to bring down the line losses which would help enhance the recovery as well as curtail the power theft. The

power lines connected with over 1,400 transformers and 39 feeders were to be replaced through the ABC over a period of time.

In November, 2008, a loan agreement 2438/2439(SF) with ADB was signed for Power Distribution Enhancement Investment Programme (PDEIP) Trench-1, Investment Project and Support Project. Under this program, 2,716 KMs ABC (600/1000 volts) of different specifications with end caps for ABC was procured from M/s Peoples ELE, Appliance Group China through contract amounting US\$ 3,500,296.27 plus Rs 1.5 million for related services awarded on July 12, 2010. Hardware Items / Accessories for use on ABC were also procured from M/s Tyco Electronics GmbH, Germany through contract valuing US\$ 737,928.51 plus Rs 0.920 million awarded on June 25, 2010. Both the consignments were delivered on CIP Ware house Sukkur but consumption of this procurement was not made available during study period. Even, the balances of that material are not known to the management of the company whereas the loan amount is continuously appearing in the financial statement of HESCO.

After creation of SEPCO from HESCO in 2011, HESCO did not consider the already procured huge inventory of ABC available in SEPCO warehouse and made a step forward to get executed the aimed project through World Bank Loan i.e. Electricity Distribution & Transmission Improvement Project (EDTIP) WB-7565-PK, signed in July, 2008. Under this project, the HESCO had to install ABC to replace the LT Bare Conductor of Hyderabad City (Gari Khata, Qasimabad, Latifabad and Phulleli Operation Divisions, along with replacing / shifting of conventional meters with solid state ones through contractor. The objective of this project was to implement the energy loss reduction scheme to reduce technical and non-technical losses and improve quality and reliability of services to the consumers.

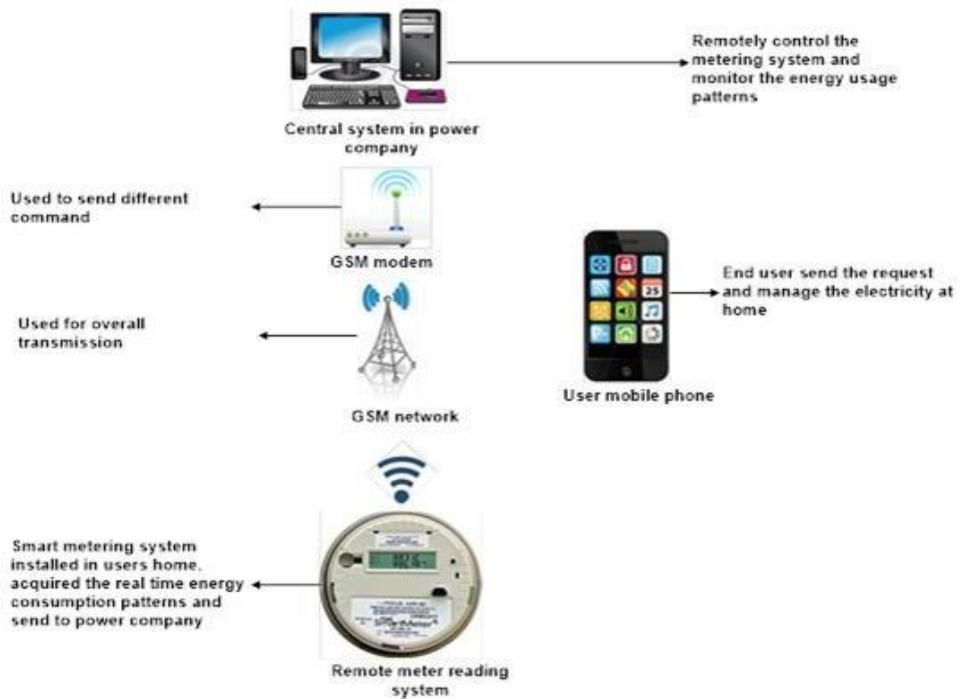
The project was got evaluated through consultant MUCED (Mehran University Centre for Energy & Development). The principal purpose of the consultancy was to ensure that the project was implemented satisfactorily with a high standard of workmanship and high quality of materials, within the scheduled contract times, and in conformity with the approved drawings and specifications, acceptable environmental standards, and in accordance with the WB / HESCO requirements.

Following observations were generally found by MUCED team during monitoring of energy loss reduction where ABC has been commissioned:

- Many consumers have been observed getting dual illegal electricity supply from the same / different feeders.
- Many consumers have been found getting electricity supply without energy meters
- Many consumers have been observed without account numbers or having more than one account numbers.
- Many PMTs were observed without proper job orders or having more than one job order.
- Differences have also been observed between meter readings of HESCO and MUCED energy monitors.
- Many connections observed to be permanently disconnected in HESCO records but found connected with healthy meters.
- Vague account numbers have been observed written at consumer premises therefore unable to be identified.
- Energy Meter readings are not visible due to dust covering the face of the meter.
- Meters are installed at height therefore unable to read the meter readings correctly.

Replacement of bare LT conductors was started from Qasimabad, Ghari Khata, Latifabad and Phulaili Divisions, feeder wise data was collected where ABC was installed. Summary of the technical losses before and after installation of ABC is given in **Annex-C-V**. Further, simulation results for 50 feeders before and after installation of ABC are given in **Annex-C-VI(a)(b)**.

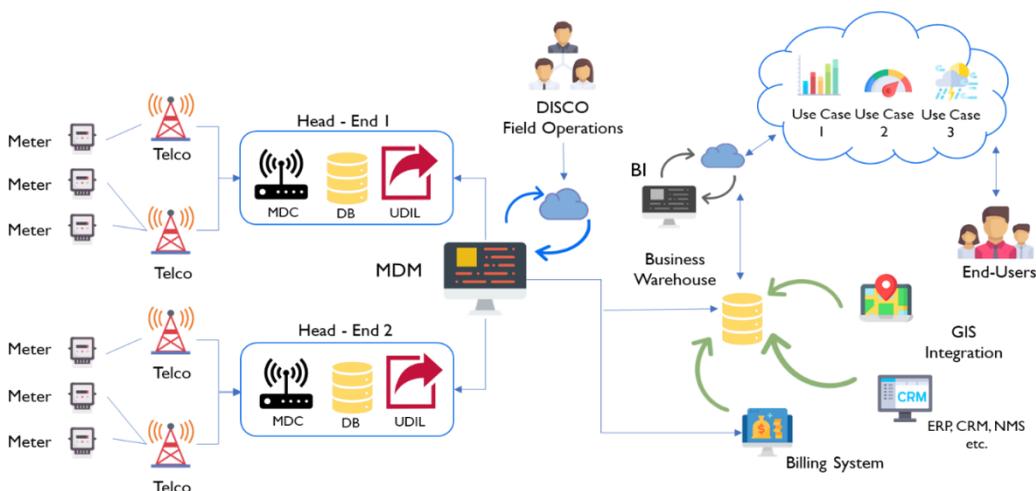
A) Open Architecture of AMI Based Information System for Single-vendor²²



²² (Source: Analysis of Smart Meters by Zahoor Shah, IICT, University of Sindh, Jamshoro, Pakistan)

B) Open architecture of AMI based information system for multi-vendor

In order to support DISCOs in gaining the benefits of a fully automated system, SEP developed and implemented an open architecture based multi-vendor compliant Advanced Metering Infrastructure (AMI) for DISCOs. This includes procurement of Meter Data Management (MDM) Software with a built-in BI (business intelligence) tool along with smart meters and associated communication head end systems for HESCO and SEPCO. The diagram below shows the design of the AMI enterprise landscape developed by SEP, under which MDM plays a pivotal role in transforming data into information while serving multiple operational entities:²³



The platform employs integrated middleware layer and standardized Universal Data Integration Layer (UDIL) to aggregate data received from various brands of smart meter, through individual Meter Data Collector / Head-End (MDCs/HEs) systems and integration with the DISCO billing system.

²³ (Source: USAID – Meter Data Management (MDM) Project Implementation Plan Sustainable Energy for Pakistan (SEP) Project October 15, 2020)

IMPACT ANALYSIS OF AUTOMATIC METER READING (AMR) METERS²⁴

Automatic meter reading (AMR) meters were installed in portion of Hyderabad city by Hyderabad Electric Supply Company (HESCO). Installation of AMR meters had initiated discussion on its effectiveness in the mentioned utility. In this research work, impacts of AMR was analyzed through data collection and analysis. Energy consumption was compared before and after AMR installation, which showed increase in billed energy units. Consumer survey was carried, which confirmed consumer positive response for AMR installation as consumer complaints regarding electricity bills had reduced significantly.

i) Introduction

Energy sector crises in Pakistan are affecting performance of electric utilities. Electricity consumers are facing power outages of more than 8 hours in urban areas and 12 hours in rural areas [1]. Owing to supply constraints an average deficit of 5000 MW was observed during last year with a peak deficit of 7000 MW. It was being reported that Pakistan GDP loss of 10% caused of power shortage. Electricity sector in Pakistan is in worst condition owing to technical and non-technical losses. Old aged network, overloading and under sized L.T conductors are some of the causes of the electricity sector downfall. Electricity theft is major consideration in some of the distribution utilities like Hyderabad Electric supply Company (HESCO) [2]. Consumer and utility meter reading staff were involved in meter tempering and incorrect reading resulted in electricity theft. Additionally, consumers were also billed incorrectly to compensate some of the losses. These in-corrected bills were not paid and thus recovery percentage went down. HESCO manages distribution system and billing procedures of consumers in Hyderabad, Mirpur Khas and Nawab Shah, divisions in province of Sindh. HESCO has annual transmission and Distribution losses above 25%. Electricity theft is considered major cause of high energy losses in HESCO. Common methods of electricity employed in

²⁴ (Source: *International Journal of Modern Research in Engineering & Management (IJMREM)* March, 2018 “www.ijmrem.com”)

HESCO include direct hooking, Meter Reversing, Shunt in meter, Neutral breaking [3].

Energy meter is the major source of revenue collection for utilities. Conventionally electromechanical meters were used to record consumed energy. These meters had numerous options for electricity theft and therefore, were replaced by static meters. Static meters were better in performance but options of meter change and tempering were still available in such meters. Fig. 1.²⁵ Shows some of the energy meter tempered at consumer sites in HESCO.



Fig. 1. Common Method of Theft in HESCO

Energy loss reduction and consumer satisfaction are performance indicators for any electric utility [4]. Different researchers have been working for analysis of the existing system and proposing new techniques for performance improvement of electricity consumers. Smith [5] analyzed electricity theft methods employed in different countries around the world, He suggested that secured meters and vigilance of distribution system will help minimize electricity theft and enhance revenue collection. Anas [6] suggested development of communication systems in meters can be used as a source to identify electricity theft and thus initiate mitigation techniques effectively.

Aguero [7] suggested automatic meter efficiency improvement. He suggested that automatic meter reading can help reduce electricity theft, ensure consumer satisfaction by reducing wrong reading complaints. Chauhan and

²⁵ (Source: *International Journal of Modern Research in Engineering & Management (IJMREM)* March, 2018 “www.ijmrem.com”)

Rajvanshi [8] analyzed different techniques used for electricity theft. They suggested that non-technical losses can be minimized using smart energy meters. Ahmed [9] analyzed different techniques used for electricity theft. She also investigated bribe taken by officials of K-Electric for reducing bills and providing other facilities. She concluded that large number of the electricity consumers are illegally billed and have to pay bribe for settlement of their legal issues. Mehmood [10] presented strategy for monitoring transformer loads by installing AMR meter on each transformer. His proposed scheme will help in monitoring operational conditions of transformer and thus causes of transformer failure can be determined. Additionally, he suggested that installation of AMR meter for each consumer supplied from transformer can help identify electricity theft carried out in consumers of those transformers. Sahito et.al. [3] Proposed prepaid meters for revenue enhancement of electric utilizes in Pakistan. They also designed a low cost pre-paid meter for installation in Pakistan to reduce initial investment.

ii) AUTOMATIC METER READING (AMR) IN HESCO²⁶

Automatic Meter Reading (AMR) is data collection technique automatically. Electricity consumption and statistics are easily available for analysis. AMR meters incorporates communication system in static energy meters thus consumption data is sent automatically to control center, Data sent can be set to any interval from second to month interval, any kind of tempering is automatically detected and indications are sent to control room, Automatic reading avoids over reading by meter reading staff. AMR meters are assumed to reduce these problems. Fig 2 shows a sample of AMR meter installed on the wall of consumers premises.

²⁶ (Source: *International Journal of Modern Research in Engineering & Management (IJMREM)* March, 2018 “www.ijmrem.com”)



Fig. 2. AMR Meter

Replacement of conventional meters with more advanced AMR meters in HESCO was initiated under USAID Power Distribution Program under the jurisdiction of Operation Sub-Division HESCO Qasimabad. Table 1 shows statistics for different feeders of the area indicating that majority of the consumers had been shifted to AMR meters. In this research work, analysis of randomly selected consumers was performed to observe impacts of AMR meters on electricity consumption. Additionally, consumer survey was also carried out to analyze consumer view for installation of AMR meters.

Table-1 Feeder wise data for AMR in Qasimabad Sub Division

Sr . #	Feeder Name	Total Connection	PD Connection	Total Running	AMR Connection	Non-AMR Connection
1	11 KV DUABA FEEDER	3564	250	3314	2644	670
2	11 KV MEHRAN FEEDER	2444	137	2307	2026	281
3	11 KV GOR FEEDER	2713	309	2404	1942	462
4	11 KV SHERISH NAGAR FEEDER	1408	202	1206	770	436
5	11 KV NASEEM NAGAR FEEDER	3806	327	3479	2440	1039
6	11 KV	2031	105	1926	1750	176

	QASIMABAD FEEDER					
7	11 KV ANWER VILLAZ FEEDER	2646	359	2287	1070	1217
		18612	1689	16923	12642	4281

(Source: Final Completion Report Simulation of Technical Losses by” Mehran University Centre for Energy & Development”)

ii) POWER LOSS ANALYSIS

AMR meters had installed in Qasimabad Sub Division of HESCO monthly billing data for different consumers was collected and compared for enhancement in energy consumption. Table 2 shows comparison of energy consumption for 15 consumers as sample cases. Energy consumption was increased for most of the consumers indicated a positive impact of AMR meters.

Table-2 Feeder wise data for AMR in Qasimabad Sub Division

Cons. No.	Energy Consumption before AMR			Energy Consumption after AMR			Rise / Fall	
	Oct	Nov	Dec	Total	Oct	Nov		Dec
1.	158	162	161	481	259	203	671	190
2.	288	296	293	877	292	370	1043	166
3.	142	146	144	432	213	182	583	151
4.	176	181	179	536	361	226	820	284
5.	276	284	281	841	305	355	1026	185
6.	454	467	463	1384	458	584	1644	260
7.	294	303	300	897	391	378	1159	262
8.	285	293	291	869	352	367	1097	228
9.	95	98	97	290	298	122	546	256
10.	213	220	218	651	241	275	799	148
11.	134	138	137	409	251	173	602	193
12.	140	144	143	427	180	180	546	119
13.	102	105	104	311	157	131	423	112
14.	45	47	46	138	156	58	274	136
15.	173	178	177	528	270	223	723	195

(Source: Final Completion Report Simulation of Technical Losses by” Mehran University Centre for Energy & Development”)

Field survey was conducted from the consumers to observe their point of view and analyze the impacts of AMR meters. Fig. 3 shows graphical summary of the consumer billing indicated that 136 of 150 consumers had increased in energy consumption, which corresponds to 90.67% consumers. Fig. 4 shows comparison of units for selected 150 consumers. It showed that

three month energy consumption for the selected group of consumers had increased from 57889 to 81567 units. An increase of 23678 units is 40.9% increase in consumption. Only 14 consumers show reduction in billed units while 136 consumers had an increase in billed units. This increase in billed units resulted in reduction of energy losses and efficiency improvement of the system.

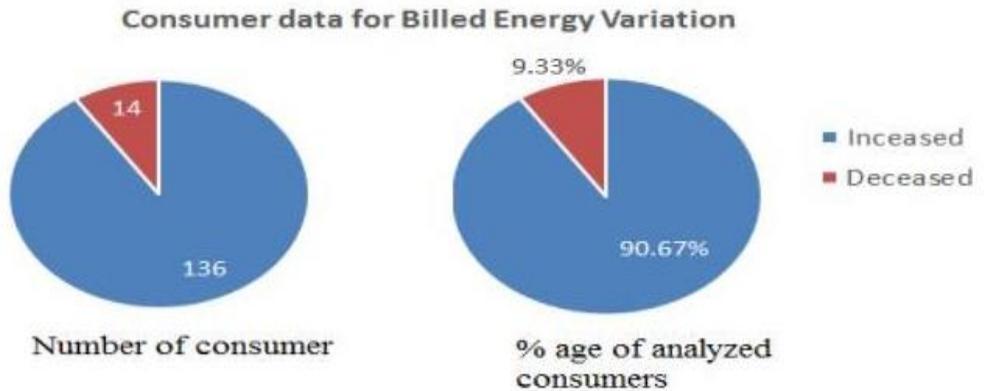


Fig. 3. Consumer data for change in energy consumption

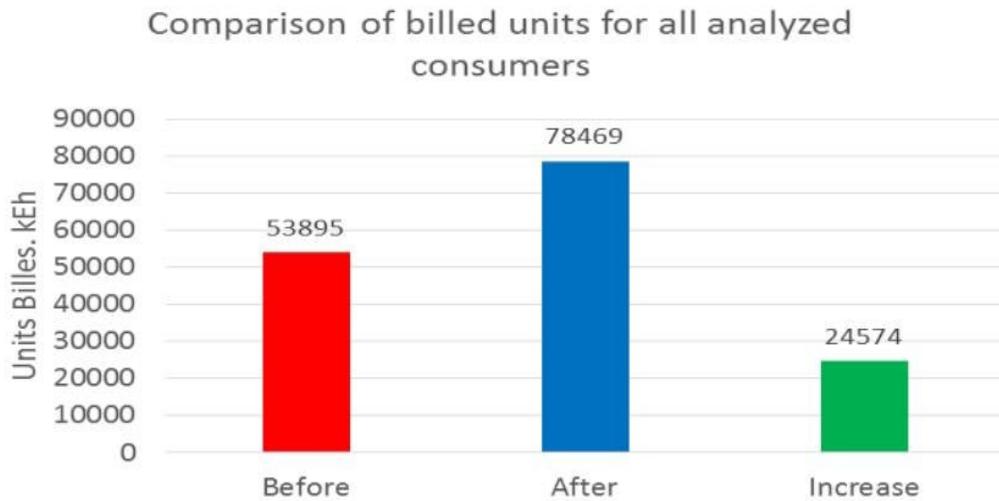


Fig. 4. Energy unit comparison

i) CONSUMER PROSPECTIVE ANALYSIS

Survey was carried out to observe consumer prospective for AMR meters. Fig. 5 shows comparison of consumers issued detection bill before and after AMR meters. After installation of AMR meters, only 4% of consumers were issued detection bills as compared to 38% before AMR. It indicated an accuracy of billing and consumer satisfaction. Fig. 6 shows consumer statistics

having bad experience with HESCO meter reading staff. 69% of consumers had bad experience with meter reading staff before AMR, which reduced to only 4% after installation of AMR meters. Fig. 7 shows comparison of consumers satisfied with location of installed meters indicated that 86% of surveyed consumers were satisfied with installation of AMR meters and its location.

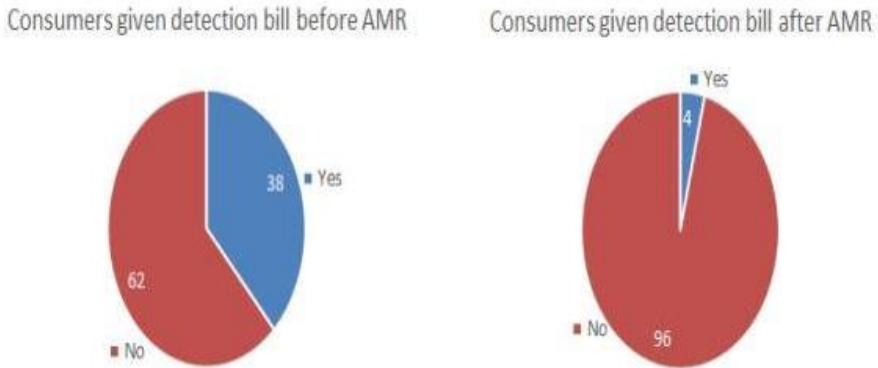


Fig. 5. Consumers given detection bills before and after AMR

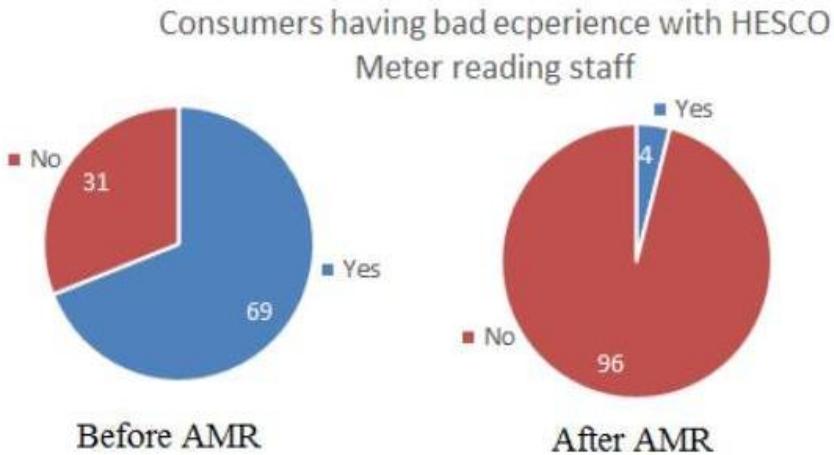


Fig. 6. Consumers having bad experience with HESCO staff before and after AMR

Consumers satisfied with location of AMR

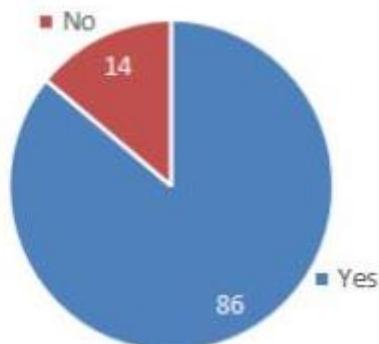


Fig. 7. Consumers satisfied with AMR meters

v) CONCLUSION

AMR meters are energy meters having automatic reading and data transfer facilities, HESCO had installed AMR meters in Qasimabad division under USAID project for Energy loss reduction. In this research work, consumer energy consumption was analyzed for observing impact of AMR on power loss reduction. Comparison of billed energy for 150 consumers for three months of two consecutive years showed improvement in billed units. Billed units of 150 analyzed consumers increased from 53895 to 78469 indicating an increase of 24574 units (40.9%). AMR meters provide automatic reading and therefore integration of consumer and meter reading staff is almost zero. 100 consumers were surveyed to find their impression for AMR meters Consumers were in favour of AMR meters as Wrong billing complains have reduced Number of consumers having detection bills reduced after AMR Number of consumer having bad experience with HESCO meter reading staff also reduced as interaction between consumer and HESCO staff is reduced most of consumers have shown satisfaction with AMR meters.

vi) ACKNOWLEDGMENTS

Authors are thankful to Mehran University of Engineering & Technology Jamshoro for providing necessary resources for carrying this research work.

ANNEX-C-III

METERING TECHNOLOGIES

SYSTEM ELEMENT/FEATURE	MANUAL	AUTOMATIC METER READING (AMR)	ADVANCED METERING INFRASTRUCTURE
Meters	Electromechanical	Hybrid	Hybrid or solid State
Data Collection	Manual, Monthly	Drive-by, monthly	Remote via communications network, daily or more often
Data recording	Total consumption	Total Consumption	Time-based (usage each hour or more often)
Primary Applications	Total consumption billing	Total consumption billing	Pricing options Customer option Utility Operations Emergency demand response
Key software interface	Billing and Customer information system	Billing and customer information system	billing AND CUSTOMER Information System Customer Data Display Outage Management Emergency demand response
Additional devices enabled (but not included in base infrastructure)	None	None	Smart thermostats In-home displays Appliance controllers
Current Penetration in California (residential and small commercial)	> 95%	>5%	None (Pilot Only)

(Source: Final Completion Report Simulation of Technical Losses by "Mehran University Centre for Energy & Development")

Para “7” of summary submitted to the ECC of the Cabinet on 14.11.2016

7. Following was decided in these meetings:

- i) The GoS shall make the payment of balance outstanding amount of Rs.27.398 billion, which will be treated as full and final settlement of all the dues as claimed by GoS and DISCOs, including all taxes, surcharges and other levies, for the period July 2010 till 31st July 2016. It was also agreed that the GoS and the DISCOs would not, after full and final payment, raise any outstanding issues, claims or other liabilities, whatsoever, in relation to settlement period, including relation to arrears of electricity bills, late payment surcharge, previously reconciled bills or write offs, electricity duty etc.
- ii) **In order to avoid such disputes in future, it was further agreed that:**
 - a) An Automatic Meter Reading System (AMR/AMI) would be installed on all connections owned by GoS by 31.12.2016, 50% of the cost of which would be borne by GoS. Online access would be provided to GoS (Energy Department) by the DISCOs to the AMR system. The Energy Department of the GoS will also prescribe a maximum limit of consumption for each connection/meter to the DISCOs, intimate to the respective DISCO when such limit is crossed and ask for disconnection of supplies of such consumer. On such intimation, the respective DISCO shall ensure that electricity supply is discontinued to those connections/meters which have so been intimated by the Energy Department.
 - b) The DISCOs will install individual meters in place of bulk supply meters in all housing colonies owned by GoS. In order to facilitate the DISCOs, the GoS would provide details of required individual connections/meters, and full cost of such individual meters as well as their installation would be borne by GoS. Any delay in identifying such connection shall be the responsibility of GoS which shall continue to pay the energy charges as reflected on the bulk meters, till installation of individual meters.

- iii) The agreed outstanding amount i.e. Rs. 27.398 shall be cleared by GoS in six equal monthly installments (of Rs. 4.566 billion each) starting from September, 2016. Further the GoS shall also pay the above mentioned amount along with 50% cost of AMR meters installed.
- iv)
 - a) The GoS shall make arrangement for the payment of all monthly bills as recorded on AMR/AMI system within 60 days of issuance of bill. If GoS fails to pay all the dues bills within 60 days, any outstanding amount thereafter will be subject to a late payment surcharge at the rate admissible. However, the GoS will not be liable to pay the monthly electricity due against those connections/meters where:
 - (b) Last paid amount has not been reflected in payment history of electricity bill;
 - (c) Reading on AMI/smart meter and bill differs.
- v) The remaining billing i.e. August 2016 till installation of AMR/AMI shall be paid by GoS on the basis of average agreed billing for the 67 months as given above, i.e. Rs. 513.73 million per month for the HESCO and Rs. 555.82 million per month for SEPCO, and these amounts will be cleared within 60 days from the date of issuance of particular bill.

The ECC of the Cabinet further decided as under:

- i) Directed the Ministry of Water and Power to ensure proposed installation of the Automatic Meter Reading system (AMR/AMI) on all connections owned by GoS within the period of four months.
- ii) The financial impact on the issues would be borne by the Ministry of Water and Power from its own sources and no consequential funds would be claimed from the Ministry of Finance and Federal Board of Revenue in the regard.
- iii) Directed that after implementation of the above, the Ministry of Water and Power will submit a summary to the Council of Common Interest (CCI) giving therein the details of resolved disputes regarding

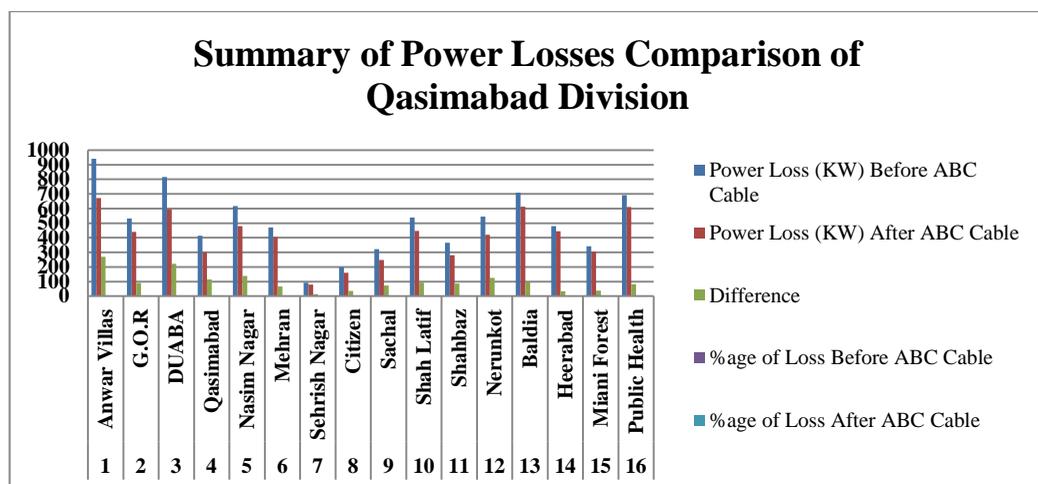
outstanding receivable between the province and the Ministry of Water and Power should also request the CCI for deletion of the reconciliation / dispute clause in the CCI's decision dated 29th May, 2016 and request for the following 75% at source deduction of the outstanding amount through the Federal Adjuster and non-resolution of different issues by Energy Department GoS, causing accumulation of arrears every month.

- iv) The cost of this project was to be shared by concerned DISCOs (HESCO & SEPCO) and GoS equally. Apart from that HESCO & SEPCO also took initiative to reduce line losses and theft of electricity by installing ABC on most un-economical feeders.

ANNEX-C-V

Table-1: Summary of Power Losses Comparison of Qasimabad Division²⁷

Sr. No.	Feeder	Power Loss (KW)			% age Loss		
		Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
1	Anwar Villas	940.8	671.79	269.01	18.96%	13.54%	5.42%
2	G.O.R	531.13	440.78	90.35	11.23%	9.38%	1.85%
3	DUABA	817.08	596.16	220.92	6.82%	4.97%	1.84%
4	Qasimabad	413.45	299.24	114.22	14.24%	10.30%	3.93%
5	Nasim Nagar	616.66	479.19	137.47	10.90%	8.47%	2.43%
6	Mehran	469.78	404.12	65.65	11.87%	10.21%	1.66%
7	Sehrish Nagar	92.33	78.6	13.73	5.04%	4.29%	0.75%
8	Citizen	197.67	161.2	36.46	8.30%	6.77%	1.53%
9	Sachal	321.73	248.24	73.49	9.03%	6.97%	2.06%
10	Shah Latif	538.21	446.91	91.3	13.57%	11.27%	2.30%
11	Shahbaz	364.93	279.77	85.16	8.64%	6.62%	2.02%
12	Nerunkot	545.35	420.13	125.21	7.15%	5.51%	1.64%
13	Baldia	708.19	612.67	95.51	14.19%	12.28%	1.91%
14	Heerabad	479.04	445.16	33.88	9.22%	8.57%	0.65%
15	Miani Forest	341.67	304.31	37.35	8.45%	7.52%	0.92%
16	Public Health	691.22	610.68	80.54	12.99%	11.47%	1.51%
Total		8069.24	6498.95	1570.25	10.66%	8.63%	2.03%

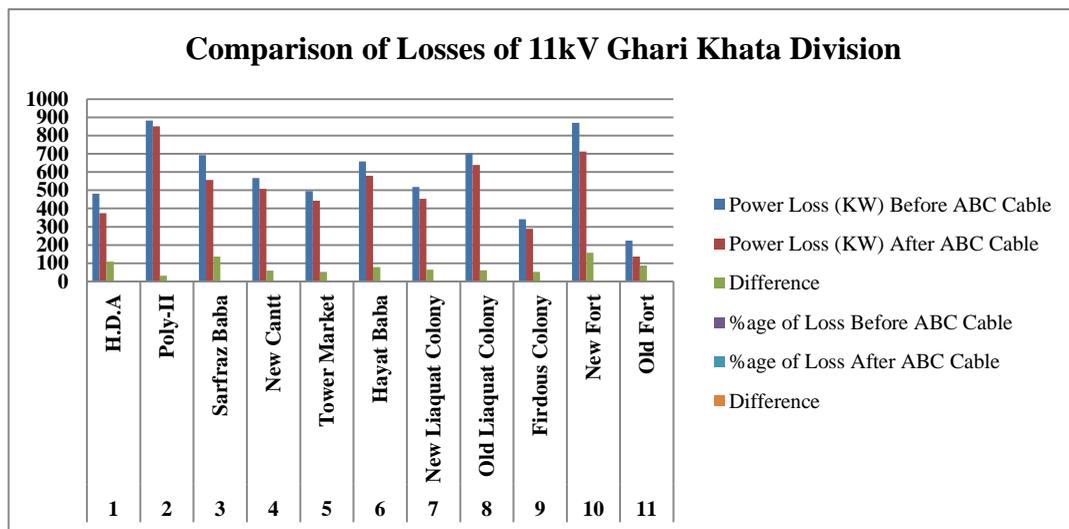


²⁷ (Source: Final Completion Report Simulation of Technical Losses by" Mehran University Centre for Energy & Development")

Summary of technical losses of 11feeder in Gari Khata division is in Table-2 and figure shows comparison of power losses in percentage for Gari Khata Division.

Table-2 Comparison of Losses of 11kV Ghari Khata Division²⁸

Sr. No.	Feeder	Power Loss (KW)			% age Loss		
		Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
1.	H.D.A	481.797	374.02	107.77	9.94%	7.72%	2.22%
2.	Poly-II	881.29	850.17	31.12	19.94%	19.23%	0.71%
3.	Sarfraz Baba	693.29	556.66	136.63	15.34%	12.32%	3.02%
4.	New Cantt	566.37	506.84	59.53	10.14%	9.07%	1.07%
5.	Tower Market	495.62	443.45	52.17	1.94%	1.73%	0.21%
6.	Hayat Baba	657.52	578.99	78.53	14.02%	12.35%	1.67%
7.	New Liaquat Colony	517.5	453.49	64.01	9.43%	8.26%	1.17%
8.	Old Liaquat Colony	701.31	639.4	61.91	14.02%	12.72%	1.3%
9.	Firdous Colony	340.46	288.71	51.75	10.12%	8.59%	1.53%
10.	New Fort	869.49	711.96	157.53	16.72%	13.69%	3.03%
11.	Old Fort	223.74	136.44	87.3	5.46%	3.33%	2.13%
		6428.56	5540.13	888.41	8.83%	7.61%	1.22%



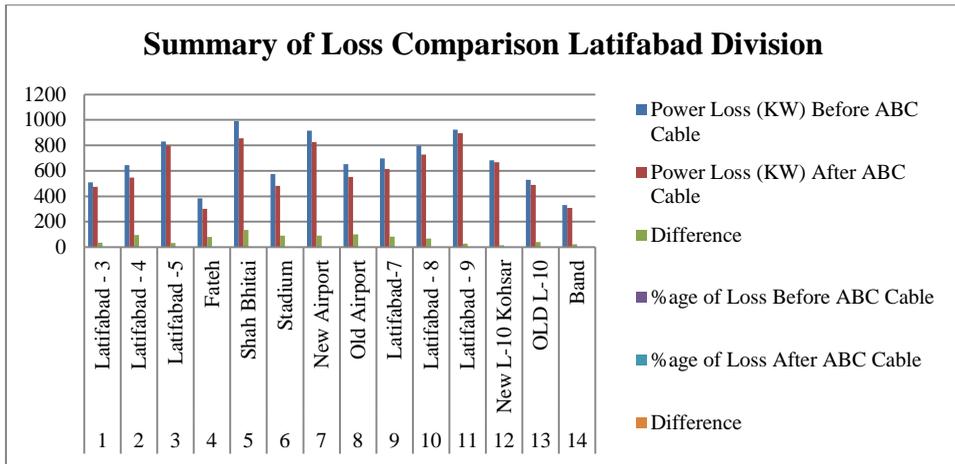
²⁸ (Source: Final Completion Report Simulation of Technical Losses by” Mehran University Centre for Energy & Development”)

Summary of technical losses of 14 feeders in Latifabad Division is in Table-3 and figure shows comparison of power losses in percentage for Latifabad Division

Table-3 Summary of Loss Comparison Latifabad Division²⁹

Sr. No.	Feeder	Power Loss (KW)			% age Loss		
		Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
1.	Latifabad - 3	510.4	475.07	35.33	16.21%	15.09%	1.12%
2.	Latifabad - 4	643.9	547.85	96.05	12.43%	10.58%	1.85%
3.	Latifabad -5	830.95	797.87	33.08	16.64%	15.97%	0.66%
4.	Fateh	383.24	302.44	80.79	8.42%	6.64%	1.78%
5.	Shah Bhitai	992.09	854.91	137.18	21.60%	18.61%	2.99%
6.	Stadium	573.65	482.6	91.05	6.22%	5.23%	0.99%
7.	New Airport	914.97	824.61	90.36	19.43%	17.52%	1.92%
8.	Old Airport	652.98	551.73	101.25	11.28%	9.53%	1.75%
9.	Latifabad-7	698.2	615.88	82.32	16.45%	14.51%	1.94%
10.	Latifabad - 8	795.45	727.81	67.64	14.72%	13.47%	1.25%
11.	Latifabad - 9	923.72	894.86	28.87	15.81%	15.32%	0.49%
12.	New L-10 Kohsar	682.88	667.14	15.75	12.14%	11.86%	0.28%
13.	OLD L-10	528.86	489.1	39.76	12.28%	11.36%	0.92%
14.	Band	332.17	308.68	23.48	8.74%	8.13%	0.62%
Total Technical (Losses)		9463.46	8540.55	922.91	13.25%	11.96%	1.29%

²⁹ (Source: Final Completion Report Simulation of Technical Losses by” Mehran University Centre for Energy & Development”)



Summary of technical losses of 9 feeders in Phulaili division is in table-4 and figure shows comparison of power losses in percentage for Phulaili division

Table 4 Comparison of Losses of 11kV Phulaili Division³⁰

Sr. No.	Feeder	Power Loss (KW)			% age Loss		
		Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
1.	Fakir ka Pir	715.15	677.23	37.92	12.55	11.89	0.66%
2.	OPH-I	382.42	344.97	37.45	8.58	7.74	0.84%
3.	Islamabad	769.28	711	58.28	13.14	12.15	0.99%
4.	City College	510.69	463.18	47.51	10.92	9.92	1.00%
5.	O.P.H -II	433.73	400.76	32.97	13.83	12.78	1.05%
6.	Pretabad-1	820.12	679.48	140.64	16.29	13.49	2.80%
7.	Pretabad-2	1045.47	883.65	161.82	19.33	16.33	3.00%
8.	Pretabad-3	107.25	67.98	39.27	6.18	3.91	2.27%
9.	Memon Hospital	635.28	574.59	60.69	11.86	10.73	1.13%
Total Losses		5419.39	4802.84	616.55	13.10%	11.61%	1.49%

³⁰ (Source: Final Completion Report Simulation of Technical Losses by "Mehran University Centre for Energy & Development")

Table 2 **11KV G.O.R 6 Feeder**

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	99.09	93.50	5.64	2.09%	1.99%	0.10%
LT Line Losses	275.10	194.94	80.16	5.81%	4.15%	1.67%
Transformer Losses	94.41	91	3.42	2%	1.94%	0.06%
Service Losses	62.53	61	1.13	1.32%	1.31%	.02%
Total	531.13	440	90.35	11.23%	9.38%	1.85%

Table 3 **11KV Duaba Feeder**

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	419.49	336.89	82.60	3.50%	2.81%	0.69%
LT Line Losses	161.89	114.04	47.85	1.35%	0.95%	0.40%
Transformer Losses	168.78	103.15	65.62	1.41%	0.86%	0.55%
Service Losses	66.92	42.08	24.84	0.56%	0.35%	0.21%
Total	817.08	596.16	220.92	6.82%	4.97%	1.84%

Table 4 **11KV Qasimabad Feeder³²**

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	98.75	70.01	28.74	3.40%	2.41%	0.99%
LT Line Losses	160.95	135.32	25.63	5.54%	4.66%	0.88%
Transformer Losses	108.39	64.24	44.15	3.73%	2.21%	1.52%
Service Losses	45.37	29.67	15.7	1.56%	1.02%	0.54%
Total	413.45	299.24	114.22	14.24%	10.30%	3.93%

Table 5 **11KV Nasim Nagar Feeder**

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	315.71	231.55	84.16	5.58%	4.09%	1.49%
LT Line Losses	152.03	133.95	18.08	2.69%	2.37%	0.32%
Transformer Losses	124.38	95.42	28.96	2.20%	1.69%	0.51%

³² (Source: Final Completion Report Simulation of Technical Losses by" Mehran University Centre for Energy & Development")

Service Losses	24.54	18.27	6.27	0.43%	0.32%	0.11%
Total	616.66	479.19	137.47	10.90%	8.47%	2.43%

Table 6 11KV Mehran Feeder

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	134.6	113.71	20.87	3.40%	2.87%	0.53%
LT Line Losses	172.05	156.34	15.71	4.35%	3.95%	0.40%
Transformer Losses	119.37	101.94	17.43	3.02%	2.58%	0.44%
Service Losses	43.78	32.14	11.64	1.11%	0.81%	0.29%
Total	469.78	404.12	65.65	11.87%	10.21%	1.66%

Table 7 11kV Segrish Nagar Feeder

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	30.43	26.71	3.72	1.66%	1.46%	0.20%
LT Line Losses	30.73	22.26	8.47	1.68%	1.21%	0.46%
Transformer Losses	28.28	27.77	0.51	1.54%	1.51%	0.03%
Service Losses	2.89	1.86	1.03	0.16%	0.10%	0.06%
Total	92.33	78.6	13.73	5.04%	4.29%	0.75%

Table 8 11kV Citizen Feeder³³

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	45.47	38.37	7.1	1.91%	1.61%	0.30%
LT Line Losses	74.98	58.38	16.6	3.15%	2.45%	0.70%
Transformer Losses	63.4	55.49	7.91	2.66%	2.33%	0.33%
Service Losses	13.82	8.96	4.86	0.58%	0.38%	0.20%
Total	197.67	161.2	36.46	8.30%	6.77%	1.53%

³³ (Source: Final Completion Report Simulation of Technical Losses by "Mehran University Centre for Energy & Development")

Table 9 **11kV Sachal Feeder³⁴**

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	43.83	37.58	6.25	1.23%	1.05%	0.18%
LT Line Losses	154.08	107.14	46.94	4.32%	3.01%	1.32%
Transformer Losses	90.55	81.15	9.4	2.54%	2.28%	0.26%
Service Losses	33.27	22.37	10.9	0.93%	0.63%	0.31%
Total	321.73	248.24	73.49	9.03%	6.97%	2.06%

Table 10 **11kV Shah Latif Feeder**

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	178.06	160.56	17.5	4.49%	4.05%	0.44%
LT Line Losses	233.08	174.35	58.73	5.88%	4.40%	1.48%
Transformer Losses	102.78	93.26	9.52	2.59%	2.35%	0.24%
Service Losses	24.29	18.75	5.54	0.61%	0.47%	0.14%
Total	538.21	446.91	91.3	13.57%	11.27%	2.30%

³⁴ (Source: Final Completion Report Simulation of Technical Losses by” Mehran University Centre for Energy & Development”)

Table 11 **11kV Shahbaz Feeder³⁵**

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	169.85	132.46	37.39	4.02%	3.14%	0.88%
LT Line Losses	76.64	56.18	20.46	1.81%	1.33%	0.48%
Transformer Losses	79.01	66.15	12.86	1.87%	1.57%	0.30%
Service Losses	39.43	24.98	14.45	0.93%	0.59%	0.34%
Total	364.93	279.77	85.16	8.64%	6.62%	2.02%

Table 12 **11kV Nerunkot Feeder**

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	129.46	115.09	14.37	3.20%	2.84%	0.36%
LT Line Losses	86	82.89	3.11	2.13%	2.05%	0.08%
Transformer Losses	103.26	89.76	13.50	2.55%	2.22%	0.33%
Service Losses	22.95	16.57	6.37	.57%	.41%	0.16%
Total	341.67	304.31	37.35	8.45%	7.52%	0.95%

Table 13 **11kV Baldia Feeder**

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	337.9	309.82	28.04	6.77%	6.21%	0.56%
LT Line Losses	209.45	166.85	42.6	14.20%	3.34%	0.85%
Transformer Losses	115.06	99.8	15.26	2.31%	2.00%	0.31%
Service Losses	45.82	36.21	9.61	10.92%	0.73%	0.19%
Total	708.19	612.67	95.51	14.19%	12.28%	1.91%

Table 14 **11kV Heerabad Feeder**

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	197.37	184.57	12.79	3.80%	3.55%	0.25%
LT Line Losses	152.82	140.34	12.48	2.94%	2.70%	0.24%

³⁵ (Source: Final Completion Report Simulation of Technical Losses by” Mehran University Centre for Energy & Development”)

Transformer Losses	107.25	101.62	5.63	2.06%	1.96%	0.11%
Service Losses	21.6	18.63	2.97	0.42%	0.36%	0.06%
Total	479.04	445.16	33.88	9.22%	8.57%	0.65%

Table 15 11kV Miani Forest Feeder³⁶

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	129.46	115.09	14.37	3.20%	2.84%	0.36%
LT Line Losses	86	82.89	3.11	2.13%	2.05%	0.08%
Transformer Losses	103.26	89.76	13.5	2.55%	2.22%	0.33%
Service Losses	22.95	16.57	6.37	0.57%	0.41%	0.16%
Total	341.67	304.31	37.35	8.45%	7.52%	0.92%

Table 16 11kV Public Health Feeder

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	259.19	221.16	38.03	4.87%	4.16%	0.71%
LT Line Losses	314.70	278.62	36.08	5.91%	5.23%	0.68%
Transformer Losses	92.03	88.83	3.20	1.73%	1.67%	0.06%
Service Losses	25.30	22.70	3.23	0.48%	0.41%	0.06%
Total	691.22	610.68	80.54	12.99%	11.47%	1.51

Table 17 11kV Public Health Feeder

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	259.19	221.16	38.03	4.87%	4.16%	0.71%
LT Line Losses	314.70	278.62	36.08	5.91%	5.23%	0.68%
Transformer Losses	92.03	88.83	3.20	1.73%	1.67%	0.06%
Service Losses	25.30	22.70	3.23	0.48%	0.41%	0.06%
Total	691.22	610.68	80.54	12.99%	11.47%	1.51

³⁶ (Source: Final Completion Report Simulation of Technical Losses by” Mehran University Centre for Energy & Development”)

Table 18 **11kV H.D.A Feeder³⁷**

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	171.58	132.36	39.22	3.54%	2.73%	0.84%
LT Line Losses	172.25	139.79	32.46	3.55%	2.88%	0.45%
Transformer Losses	110.89	88.85	22.04	2.29%	1.83%	0.45%
Service Losses	27.25	13.02	14.23	0.56%	0.27%	0.29%
Total	481.97	374.02	107.95	9.94%	7.72%	2.23%

Table 19 **11kV Poly-II Feeder**

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	624.13	605.24	18.89	14.12%	13.69%	0.43%
LT Line Losses	140.89	135.59	5.30	3.19%	3.07%	0.12%
Transformer Losses	97.56	93.52	4.04	2.21%	2.12%	0.09%
Service Losses	18.71	15.83	2.88	0.42%	0.36%	0.07%
Total	624.13	605.24	18.89	14.12%	13.69%	0.43%

Table 20 **11kV Sarfraz Baba Feeder**

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	240.85	195.34	45.51	5.33	4.32	1.01
LT Line Losses	331.99	271.95	60.04	7.35	6.02	1.33
Transformer Losses	98	72.61	25.39	2.17	1.61	.56
Service Losses	22.45	16.76	5.69	0.50	0.37	0.13
Total	693.29	556.66	136.63	15.34	12.32	3.02

Table 21 **11kV New Cantt Feeder**

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	296.60	280.24	16.35	5.31%	5.02%	0.29%

³⁷ (Source: Final Completion Report Simulation of Technical Losses by” Mehran University Centre for Energy & Development”)

LT Line Losses	120.62	103.74	16.43	2.15%	1.86%	0.29%
Transformer Losses	127.62	110.55	17.07	2.28%	1.98%	0.31%
Service Losses	21.98	12.31	9.67	0.39%	0.22%	0.17%
Total	566.98	506.84	59.52	10.14%	9.07%	1.07%

Table 22 11kV Tower Market Feeder³⁸

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	230.24	213.90	16.3	0.90%	0.84%	0.06%
LT Line Losses	133.95	118.30	15.65	0.52%	0.46%	0.06%
Transformer Losses	104.61	90.03	14.58	0.41%	0.35%	0.06%
Service Losses	26.82	21.21	5.61	0.10%	0.08%	0.02%
Total	495.62	443.45	52.17	1.94%	1.73%	0.20%

Table 23 11kV Hayat Baba Feeder

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	131.30	106.90	24.40	2.80	2.28	0.52
LT Line Losses	351.85	330.37	21.48	7.50	7.05	0.46
Transformer Losses	94.04	75.08	18.96	2.01	1.60	0.40
Service Losses	80.33	66.65	13.69	1.71	1.42	0.29
Total	657.52	578.99	78.53	14.02	12.35	1.67

Table 24 11kV New Liaqat Colony Feeder

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	262.39	249.39	13	4.78%	4.54%	0.24%
LT Line Losses	106.30	84.24	22.06	1.94%	1.53%	0.40%
Transformer Losses	117.23	99.23	18	2.14%	1.81%	0.33%
Service Losses	31.5	20.63	10.95	0.58%	0.38%	0.20%
Total	517.50	453.49	64.01	9.43%	8.26%	1.17%

³⁸ (Source: Final Completion Report Simulation of Technical Losses by” Mehran University Centre for Energy & Development”)

Table 25 **11kV Old Liaquat Colony Feeder³⁹**

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	220.08	200.02	20.06	4.40	4	0.40
LT Line Losses	319.69	298.27	21.42	6.39	5.96	0.43
Transformer Losses	139.60	124.96	14.64	2.79	2.50	0.29
Service Losses	21.94	16.16	5.78	0.44	0.32	0.12
Total	701.31	639.41	61.9	14.02	12.78	1.24

Table 26 **11kV Firdous Colony Feeder**

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	114.67	108.40	6.27	3.41	3.22	0.19
LT Line Losses	141.96	124.40	17.56	4.22	3.70	0.52
Transformer Losses	70.20	45.53	24.67	2.09	1.35	0.73
Service Losses	13.62	10.39	3.24	0.41	0.31	0.10
Total	340.46	288.71	51.74	10.12	8.59	1.54

Table 27 **11kV New Fort Feeder**

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	543.40	463.69	79.71	10.45%	8.92%	1.53%
LT Line Losses	176.91	124.86	52.05	3.40%	2.40%	1.00%
Transformer Losses	115.38	96.16	19.19	2.22%	1.85%	0.37%
Service Losses	33.80	27.22	6.58	0.65%	0.52%	0.13%
Total	869.49	711.96	157.53	16.72%	13.69%	3.03%

Table 28 **11kV Old Fort Feeder**

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	54.06	30.41	23.65	1.32%	0.74%	0.58%

³⁹ (Source: Final Completion Report Simulation of Technical Losses by” Mehran University Centre for Energy & Development”)

LT Line Losses	95.56	60.11	35.46	2.33%	1.47%	0.87%
Transformer Losses	62.59	39.90	22.69	1.53%	0.97%	0.55%
Service Losses	11.53	6.02	5.15	0.28%	0.15%	0.13%
Total	223.74	136.44	87.30	5.46%	3.33%	2.13%

Table 29 **11kV Latifabad – 3 Feeder⁴⁰**

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	373.66	358.36	15.30	11.87%	11.38%	0.49%
LT Line Losses	73.85	60.23	13.63	2.35%	1.91%	0.43%
Transformer Losses	55.15	51.09	4.06	1.75%	1.62%	0.13%
Service Losses	7.74	5.40	2.34	0.25%	0.17%	0.07%
Total	510.4	475.08	35.33	16.22%	15.08%	1.12%

Table 30 **11kV Latifabad – 4 Feeder**

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	248.15	236.64	11.51	4.79%	4.57%	0.22%
LT Line Losses	220.51	189.41	31.11	4.26%	3.66%	0.60%
Transformer Losses	139.88	108.08	31.80	2.70%	2.09%	0.61%
Service Losses	35.36	13.72	21.64	0.68%	0.26%	0.42%
Total	643.9	547.85	96.06	12.43%	10.58%	1.85%

Table 31 **11kV Latifabad – 5 Feeder**

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	303.20	287.44	15.76	6.07%	5.75%	0.32%
LT Line Losses	339.03	332.57	6.46	6.79%	6.66%	0.13%
Transformer Losses	131.60	122.57	9.30	2.63%	2.45%	0.18%
Service Losses	57.12	55.30	1.82	1.14%	1.11%	0.04%
Total	830.95	797.88	33.34	16.63%	15.97%	0.67%

⁴⁰ (Source: Final Completion Report Simulation of Technical Losses by” Mehran University Centre for Energy & Development”)

Table 32 **11kV Fateh Feeder⁴¹**

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	167.95	137.31	30.64	3.69	3.02	0.67%
LT Line Losses	109.65	76.18	33.47	2.41	1.67	0.74%
Transformer Losses	89.14	78.79	10.35	1.96	1.73	0.23%
Service Losses	16.5	10.16	6.34	0.36	0.22	0.14%
Total	383.24	302.44	80.80	8.42%	6.64%	1.78%

Table 33 **11kV Shah Bhitai Feeder**

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	707.02	622.75	84.27	15.39	13.56	1.83%
LT Line Losses	118.37	95.08	23.29	2.58	2.07	0.51%
Transformer Losses	132.86	112.87	19.99	2.89	2.46	0.43%
Service Losses	33.84	24.21	9.63	0.74	0.53	0.21%
Total	992.09	854.91	137.18	21.60%	18.62%	2.98%

Table 34 **11kV Stadium Feeder**

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	294.08	270.5	23.58	3.19	2.93	0.26%
LT Line Losses	190.95	160.03	30.92	2.07	1.74	0.33%
Transformer Losses	73.53	43.63	29.90	0.8	0.47	0.33%
Service Losses	15.1	8.44	6.66	0.16	0.09	0.07%
Total	573.66	482.6	91.06	6.22%	5.23%	0.99%

Table 35 **11kV New Airport Feeder**

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	364.86	340.16	24.700	7.75	7.23	0.52%
LT Line Losses	340.98	311.97	29.010	7.24	6.63	0.61%

⁴¹ (Source: Final Completion Report Simulation of Technical Losses by” Mehran University Centre for Energy & Development”)

Transformer Losses	165.49	145.29	20.200	3.52	3.09	0.43%
Service Losses	43.64	27.19	16.450	0.93	0.58	0.35%
Total	914.97	824.61	90.36	19.44%	17.53%	1.91%

Table 36 11kV Old Airport Feeder⁴²

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	111.71	93.85	17.86	1.93	1.62	0.31%
LT Line Losses	344.12	305.32	38.80	5.95	5.27	0.68%
Transformer Losses	168.82	130.75	38.07	2.92	2.26	0.66%
Service Losses	28.33	21.81	6.52	0.49	0.39	0.10%
Total	652.98	551.73	101.25	11.29%	9.54%	1.75%

Table 37 11kV Latifabad – 7 Feeder

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	197.84	172.51	25.33	4.66	4.06	0.60%
LT Line Losses	248.47	227.22	21.25	5.85	5.35	0.50%
Transformer Losses	124.85	107.99	16.86	2.94	2.54	0.40%
Service Losses	127.04	108.15	18.89	2.99	2.55	0.44%
Total	698.2	615.87	82.33	16.44%	14.50%	1.94%

Table 38 11kV Latifabad – 8 Feeder

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	172.34	162.82	9.52	3.19	3.01	0.18%
LT Line Losses	417.33	387.23	30.10	7.72	7.17	0.55%
Transformer Losses	171.36	160.34	11.02	3.17	2.97	0.20%
Service Losses	34.42	17.41	17.01	0.64	0.32	0.32%
Total	795.45	727.8	67.65	14.72%	13.47%	1.25%

⁴² (Source: Final Completion Report Simulation of Technical Losses by” Mehran University Centre for Energy & Development”)

Table 38 **11kV Latifabad – 9 Feeder⁴³**

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	332.922	315.76	17.16	5.7	5.41	0.29%
LT Line Losses	367.91	366.51	1.40	6.3	6.27	0.03%
Transformer Losses	177.03	167.81	9.22	3.03	2.87	0.16%
Service Losses	45.85	44.78	1.07	0.78	0.77	0.01%
Total	923.712	894.86	28.852	15.81%	15.32%	0.49%

Table 39 **11kV L – 10 Kohsar Feeder**

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	228.95	225.43	3.52	4.07	4.01	0.06%
LT Line Losses	242.01	238.67	3.34	4.3	4.24	0.06%
Transformer Losses	176.57	171.15	5.42	3.14	3.04	0.10%
Service Losses	35.35	31.89	3.46	0.63	0.57	0.06%
Total	682.88	667.14	15.74	12.14%	11.86%	0.28%

Table 40 **11kV Old L – 10 Feeder**

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	133.48	124.77	8.71	3.1	2.9	0.20%
LT Line Losses	245.31	233.9	11.41	5.7	5.43	0.27%
Transformer Losses	106.17	95.93	10.24	2.47	2.23	0.24%
Service Losses	43.9	34.5	9.40	1.08	0.8	0.28%
Total	528.86	489.1	39.76	12.35%	11.36%	0.99%

Table 41 **11kV Band Feeder**

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	143.59	132.96	10.63	3.78	3.5	0.28%

⁴³ (Source: Final Completion Report Simulation of Technical Losses by” Mehran University Centre for Energy & Development”)

LT Line Losses	102.5	98.92	3.58	2.7	2.6	0.10%
Transformer Losses	71.9	66.85	5.05	1.89	1.76	0.13%
Service Losses	14.18	9.95	4.23	0.37	0.26	0.11%
Total	332.17	308.68	23.49	8.74%	8.12%	0.62%

Table 42 11kV Fakir Ka Pir Feeder⁴⁴

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	139.57	131.67	7.90	2.45	2.31	0.14%
LT Line Losses	406.68	390.05	16.63	7.14	6.85	0.29%
Transformer Losses	138.15	131.23	6.92	2.43	2.3	0.13%
Service Losses	30.75	24.28	6.47	0.54	0.43	0.11%
Total	715.15	677.23	37.92	12.56%	11.89%	0.67%

Table 43 11kV Fakir OPH-1 Feeder

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	46.33	46.04	0.29	1.04	1.03	0.01%
LT Line Losses	204.95	197.96	6.99	4.6	4.44	0.16%
Transformer Losses	109.46	79.98	29.48	2.46	1.8	0.66%
Service Losses	21.68	20.99	0.69	0.49	0.47	0.02%
Total	382.42	344.97	37.45	8.59%	7.74%	0.85%

Table 44 11kV Islamabad Feeder

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	52.67	46.91	5.76	0.9	0.8	0.10%
LT Line Losses	540.36	519.15	21.21	9.23	8.87	0.36%
Transformer Losses	143.52	120.24	23.28	2.45	2.05	0.40%
Service Losses	32.73	24.69	8.04	0.56	0.42	0.14%
Total	769.28	711.0	58.29	13.14%	12.14%	1.00%

⁴⁴ (Source: Final Completion Report Simulation of Technical Losses by" Mehran University Centre for Energy & Development")

Table 45 **11kV City College Feeder⁴⁵**

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	211.09	193.33	17.76	4.52	4.14	0.38%
LT Line Losses	165.13	161.17	3.96	3.54	3.45	0.09%
Transformer Losses	103.04	84.44	18.60	2.21	1.81	0.40%
Service Losses	30.83	24.24	6.59	0.66	0.52	0.14%
Total	510.09	463.18	46.91	10.93%	9.92%	1.01%

Table 46 **11kV OPH-II Feeder**

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	95.63	84.98	10.65	3.05	2.71	0.34%
LT Line Losses	243.38	234.6	8.78	7.76	7.48	0.28%
Transformer Losses	76.01	67.91	8.10	2.42	2.17	0.25%
Service Losses	18.71	13.27	5.44	0.6	0.42	0.18%
Total	433.73	400.76	32.97	13.83%	12.78%	1.05%

Table 47 **11kV Pretabad - 1 Feeder**

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	313.69	255.85	57.84	6.23	5.08	1.15%
LT Line Losses	355.5	313.48	42.02	7.06	6.23	0.83%
Transformer Losses	128.27	96.02	32.25	2.55	1.91	0.64%
Service Losses	22.66	14.13	8.53	0.45	0.28	0.17%
Total	820.12	679.48	140.64	16.29%	13.50%	2.79%

Table 48 **11kV Pretabad - 2 Feeder**

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	313.69	255.85	57.84	6.23	5.08	1.15%
LT Line Losses	355.5	313.48	42.02	7.06	6.23	0.83%
Transformer Losses	128.27	96.02	32.25	2.55	1.91	0.64%

⁴⁵ (Source: Final Completion Report Simulation of Technical Losses by” Mehran University Centre for Energy & Development”)

Service Losses	22.66	14.13	8.53	0.45	0.28	0.17%
Total	820.12	679.48	140.64	16.29%	13.50%	2.79%

Table 49 11kV Pretabad - 3 Feeder⁴⁶

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	11.81	5.75	6.06	0.68	0.33	0.35%
LT Line Losses	57.52	35.91	21.61	3.31	2.07	1.24%
Transformer Losses	26.51	19.67	6.84	1.53	1.13	0.40%
Service Losses	11.41	6.65	4.76	0.66	0.38	0.28%
Total	107.25	67.98	39.27	6.18%	3.91%	2.27%

Table 50 11kV Hospital Feeder

Technical Losses	Power Loss (KW)			% age Loss		
	Before ABC	After ABC	Difference	Before ABC	After ABC	Difference
HT Line Losses	312.78	294.1	18.68	5.84	5.49	0.35%
LT Line Losses	141.86	125.68	16.18	2.65	2.35	0.30%
Transformer Losses	140.17	128.42	11.75	2.62	2.4	0.22%
Service Losses	40.47	26.39	14.08	0.76	0.49	0.27%
Total	635.28	574.59	60.69	11.87%	10.73%	1.14%

⁴⁶ (Source: Final Completion Report Simulation of Technical Losses by” Mehran University Centre for Energy & Development”)

ANNEX-C-VI(b)

Feeder wise energy meters monitored in all division and gives percentage of meters where consumption and units billed increased.⁴⁷

1:- Energy Monitoring for Qasimabad Division

Sr. No.	Feeder	No. of meters checked	Meters where Consumption increased		Units billed		
			Number	Age	Current year	Previous year	% age rise
1.	Anwer Villaz	682	374	54.84%	178198	150573	18.35%
2.	GOR	2053	859	41.84%	541112	651430	-16.93%
3.	Doabaa	3019	1404	46.51%	554593	396169	39.99%
4.	Qasimabad	380	305	80.26%	839329	555656	51.05%
5.	Naseem Nagar	1521	875	57.53%	517629	529190	-2.18%
6.	Mehran	1451	854	58.86%	506424	339473	49.18%
7.	Shehrish Nagar	995	391	39.30%	212126	303432	30.09%
8.	Citizen	173	136	78.61%	99530	43671	127.91%
9.	Baldia	741	407	54.93%	201508	161928	24.44%
10.	Miani Forest	150	121	80.67%	25995	19139	35.82%
TOTAL		11165	5726	51.29%	3676444	3150661	16.69%

2:- Energy Monitoring of Gari Khata Division

Sr. No.	Feeder	No. of meters checked	Meters where Consumption increased		Units billed		
			Number	Age	Current year	Previous year	% age rise
1	H.D.A	985	560	56.85%	329086	259369	26.88%
2	New Cantt	169	198	57.99%	37256	32382	15.05%
3	Market Tower	166	124	74.70%	36875	25270	45.92%
4	New Liaquat	807	669	82.90%	251132	101210	148.13%
5	Firdous Colony	24	18	75%	6370	4187	52.14
TOTAL		2151	1469	68.29	660719	422418	56.14

⁴⁷ (Source: Final Completion Report Simulation of Technical Losses by "Mehran University Centre for Energy & Development")

3:- Energy Monitoring of Latifabad Division⁴⁸

Sr. No.	Feeder	No. of meters checked	Meters where Consumption increased		Units billed		
			Number	Age	Current year	Prev. year	% age rise
1.	L-3	83	40	48.19%	30355	29091	4.34%
2.	L-4	443	196	44.24%	171502	106851	60.51%
3.	L-5	100	19	19.00%	9200	8326	10.50%
4.	Fateh	916	623	68.01%	301059	181312	66.04%
5.	Shah Bhitae	215	109	50.70%	82659	58950	40.22%
6.	Stadium	466	294	63.09%	177338	80104	121.38%
7.	New Airport	127	50	39.37%	23669	34300	-30.99%
8.	L-7	36	11	30.56%	9094	8528	6.64%
9.	L-9	55	13	23.64%	9966	12514	-20.36%
TOTAL		2441	1355	55.51%	814842	519976	56.71%

4:- Energy Monitoring of Phuleli Division

Sr. No.	Feeder	No. of meters checked	Meters where Consumption increased		Units billed		
			Number	Age	Current year	Previous year	% age rise
1.	OPH-I	179	124	69.27%	81527	54771	48.85%
2.	Islamabad	249	204	81.93%	169985	41331	311.28%
3.	City College	62	51	82.26%	26619	10956	142.96%
4.	OPH-II	322	297	92.24%	83964	19869	322.59%
5.	Preetabad - I	106	96	90.57%	43009	19705	118.26%
6.	Preetabad - II	408	386	94.61%	166342	59753	178.38%
7.	Memon Hospital	97	67	69.07%	21545	16162	33.31%
TOTAL		1423	1225	86.09%	592991	222547	166.46%

⁴⁸ (Source: Final Completion Report Simulation of Technical Losses by "Mehran University Centre for Energy & Development")

ANNEX-D
Para No. 4.3 (AIR Para No.05)

**STATEMENT SHOWING THE DETAIL OF RECOVERABLE
AMOUNT FROM NEWLY INSTALLED OF GOVT. OF SINDH
CONNECTIONS**

Sr. No.	Financial Year	Opening		Addition		Closing	
		No. of Connection	S/Load Kw	No. of Connection	S/Load Kw	No. of Connection	S/load Kw
1.	Upto 31.12.16	-	-	-	-	14828	193024.9
2.	30.06.17	14828	193024.9	10	154.0	14838	193178.9
3.	30.06.18	14838	193178.9	11	679.8	15195	203117.0
4.	30.06.19	15195	203117.0	11	324.6	15662	223823.2
5.	30.06.20	15662	223823.2	10	156.6	15802	229780.3
6.	30.06.21	15802	229780.3	13	1302.5	15902	234203.9
7.	30.06.22	15902	234203.9	10	200.6	15957	238158.4

(Source: MIS Data of HESCO) & (Source: Para "7" of Summary Submitted to the ECC of the Cabinet on 14.11.2016)

Per month billing of sanctioned load 193024.9 Kw = Rs.513.73 million
= Rs.2,661.47 per kw

Sr. No.	Financial Year	No. of Connection	S/Load Kw	Average month awaiting e-billing	Rs.2,661 x S/Load x Months
1.	Upto 31.12.16	-	-		
2.	30.06.17	10	154.0	27	11,064,438
3.	30.06.18	11	679.8	18	32,566,811
4.	30.06.19	11	324.6	06	5,182,563
Total					48,813,812
Say Rs. in million					48.813

(Source: MIS Data of HESCO) & (Source: Para "7" of Summary Submitted to the ECC of the Cabinet on 14.11.2016)

ANNEX-E**Para No. 4.14 (AIR Para No.16)****TABLE-A***(Rupees in Billions)*

Name of Company	Billing from July 2010 to January 2016	Verified Billing @ 60%	Amount to be adjusted	Amount already paid by GoS	Amount to be paid by GoS
HESCO	57.58	34.55	23.03	25.70	8.85
SEPCO	62.07	37.24	24.83	21.37	15.87
TOTAL	119.65	71.79	47.86	47.07	24.72

*(Source: Para "7" of Summary Submitted to the ECC of the Cabinet on 14.11.2016)***TABLE-B***(Rupees in Billions)*

Name of Company	Billing from February 2016 to July 2016	Billing as per agreed average of 67 months	Amount to be adjusted*	Amount already paid by GoS	Amount to be paid by GoS
HESCO	3.73	3.09	0.64	1.80	1.29
SEPCO	5.06	3.33	1.68	2.03	1.30
TOTAL	8.79	6.42	2.37	3.83	2.59

(Source: Para "7" of Summary Submitted to the ECC of the Cabinet on 14.11.2016)

* HESCO has already written off Rs.4.209 billion against WASA/HAD connection in February, 2016 & the remaining will be treated accordingly.

TABLE-C**For the Period July, 2010 till July, 2016***(Rupees in Billions)*

Name of Company	Billing from July 2010 to July 2016	Billing @ 60% and average of 67 months	Adjusted Amount	Amount already paid by GoS	Amount to be paid by GoS
HESCO	61.31	37.64	23.67	27.50	10.14
SEPCO	67.13	40.57	26.51	23.40	17.17
TOTAL	128.44	78.21	50.18	50.90	27.31

(Source: Para "7" of Summary Submitted to the ECC of the Cabinet on 14.11.2016)