**MULTANELECTRIC POWER COMPANY LIMITED**

**GOVERNMENT OF PAKISTAN**

**ENVIRONMENTAL IMPACT ASSESSMENT (EIA)**

**of**

**Power Distribution Enhancement Investment Project (PDEIP) – TRANCHE – IV (Savings)**

**EIA Report**

**Submited to**

**Environmental Protection Agency (EPA), Punjab**

**Submitted By**

|  |  |
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| **D:\Office Work 18-08-2013\MEPCO logo Final.jpg** | **Chief Engineer Development,PMU**  **Multan Electric Power Company**  **Government of Pakistan** |

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**ABBREVIATIONS**

|  |  |
| --- | --- |
| ADB | Asian Development Bank |
| CO | Carbon Mono-Oxide |
| COI | Corridor of Influence |
| DISCO | Distribution Company |
| DGS | Distribution Grid Station |
| DFO | Divisional Forest Officer |
| DIZ | Direct Impact Zone |
| DoF | Department of Forests |
| E&SS | Environment & Social Safeguards |
| EA | Environnemental Assessment |
| EARF | Environment Assessment Review Framework |
| EIA | Environment Impact Assessment |
| EMP | Environmental Management Plan |
| EPA | Environmental Protection Agency |
| GDP | Gross Domestic Product |
| GIS | Gas Insulated Switchgear |
| GOP | Government of Pakistan |
| GS | Grid Station |
| GSO | Grid System Operation |
| LARP | Land Acquisition and Resettlement Plan |
| LB | Left Bank |
| MFF | Mult-itranche Financing Facility |
| MPL | Maximum permissible level |
| NEQS | National Environmental Quality Standards |
| NGO | Non Governmental Organization |
| NO | Nitrogen Oxide |
| NO2 | Nitrogen Di-Oxide |
| NTDC | National Transmission & Dispatch Company |
| PC | Public Consultation |
| PCB | Poly cholrinated Bi-Phenyls |
| PDEIP | Power Distribution Enhancment Investment Project (Program) |
| PDEMFF | Power Distribution & Enahancment Mult-itranche Financing Facility |
| PEPAct | Pakistan Environment Protection Act 1997 (as regulated and amended) |
| PEPCO | Pakistan Electric Power Company |
| PMU | Project Management Unit |
| PPMS | Project Performance Monitoring System |
| RB | Right Bank |
| SIA | Social Impact Assessment |
| SO2 | Sulpher Di-Oxide |
| SR | Sensitive Receiver |
| TL, T/line | Transmission Line |
| TSG | Technical Srvice Group |
| TSP | Total Suspended Particals |
| WAPDA | Water & Power Development Authority |
| WASA | Water And Sanitation Authority |
| WHO | World Health Organization |

**UNITS**

|  |  |
| --- | --- |
| Cu. M | Cubic Meter |
| dB(A) | Decibel (Sound Pressure Level) |
| KM, km | Kilo-Meter |
| KV | Kilo Volt |
| Mg | Milli-gram |
| m3 | Cubic Meter |
| Leq | Equivalent sound pressure level |
| Rupee, PKR | Pakistani Ruppes, Unit of Pakistan currency. $US approx Rs. 79.8 |
| Sq. m | Square Meter |

**EXECUTIVE SUMMARY**

**INTRODUCTION**

1. The Multan Electric Power Company (MEPCO) is a Public Limited Utility Company, established in 1998 under Companies Ordinance 1984 and is responsible for distribution of Electric Power within its territorial jurisdiction in South Punjab (i.e. Bahawalpur, Bahawalnagar, DG Khan, Khanewal, Layyah, Lodhran, Multan, Muzafargarh, Pakpattan, RY Khan, Sahiwal,& Vehari districts).
2. The Multan Electric Power Company (MEPCO) is planning to undertake the Power Distribution Enhancement Investment Project (PDEIP) TRANCHE – IV (Savings) to enhance the capacity of its system and to facilitate consumers in various parts of its territory. MEPCO is seeking financing from the Asian Development Bank (ADB) for financing of this project. In line with the prevailing legislation in the country, and ADB safeguard policies, an Environmental Impact Assessment (EIA) of the project has been carried out.
3. The TRANCHE – IV (Savings) subprojects under multitranche facility project are located in Multan, Bahawalpur, D. G. Khan &Rahim Yar Khan districts.
4. In order to comply with the regulatory requirements, the PEPCO acquired the services of SMEC International Pvt. Limited, Lahore to assess the potential impacts of the project.
5. This report gives an overview of project description, impact identification, their assessment and mitigation measures through environmental and social assessment study process and methodology.

**THE PROJECT OVERVIEW**

1. The objectives of the Project is to help increase the efficiency, reliability, and quality of electricity Power in terms of the overall technical and commercial losses reduction, continuous availability and the improved voltage profile of electricity. The Project shall also facilitate electricity sector reforms, investment planning, financing and technical assistance.
2. This document is the Environmental Impact Assessment (EIA) Study for the “Power Distribution Enhancement Investment Project (PDEIP) – TRANCHE – IV (Savings)” of Multan Electric Power Company (MEPCO). The TRANCHE – IV (Savings) Subprojects under the concerned EPA (Punjab) consist of:
3. The Construction of New 132 KV Punjab Government Employees Housing Scheme Grid Station along with 3.4 KM Transmission Line
4. The Construction of New 132KV Buch Villas Grid Station along with 5.5 KM Transmission Line.
5. The Construction of New 132KV Sanjarpur Grid Station alongwith 0.5 KM Transmission Line
6. The Conversion of 66KV to 132 KV Choti Grid Station along with associated 132 KV 20 KM SDT Transmission Line
7. The Conversion of 66 KV to 132 KV Yazman Grid Station along with associated 18 KM SDT Transmission Line
8. The project is located in Punjab and the estimated costs of Power Distribution Enhancement Investment Project (PDEIP) – TRANCHE – IV (Savings) is Rs1,673 Million PKR.

**POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORKS**

1. The National Environmental Policy had been announced by Government of Pakistan in the year 2005. Pakistan Environmental Protection Council is the apex decision making body of the country. Submission of the Environmental Impact Assessment report to the concerned Environmental Protection Agency is mandatory under the Pakistan Environmental Protection Act, 1997. Similarly the global financial institution and donor agencies also demand for undertaking the ESA studies respecting the developmental projects.

**PROJECT ENVIRONMENT**

1. The project area occupies plain land area in Punjab having no mountainous region. The soil of the area is generally loamy and clayey and has been formed from Indus River alluvial deposits. It is fine in texture, rich in organic matter and nutrients. The climate in winters is very dry and cold and wind and storms are quite uncommon during the summers.
2. The summer season starts from April and continues till October. May, June and July are the hottest months. The winter season on the other hand starts from November and continues till March. December and January are the coldest months when the temperature drops to the extent of 20C or even minimum. The climate is typical of that of the southern Punjab.The rainy season starts in July and ends in September. Annual rainfall is about 170mm. The water resources are dependent on the canals, but tube wells have also been sunk in the areas where water is fit for irrigation. Irrigation supplies are perennial and tube wells have been installed to make up the deficiencies.There is a potable piped water supply in the areas around most MEPCO subprojects. Due to scarcity of drinking water people living in grid station colony and nearby vicinities have been drinking canal water as ground water is not suitable for drinking.
3. There is wild growth of mesquite bushes, and some Sirin and Kikar trees in the areas near the works, but natural forest cover in the district has been significantly reduced in the past due to clearance for cultivation. Total number of project affected households falling within the RoW of transmission lines sites is 100 households. Census of these affectees was carried out on 100 percent level to account for their type of assets, loss of assets, number of dependents, affected incomes, etc. 70% income in this area is from agricultural activities however in urban areas business is the main source of income.
4. Air quality measurements in major urban centers, carried out by Pak-EPA, revealed that CO, SO2 and NO levels were in excess of the acceptable levels in some areas but the average levels were found below WHO standards. The flora at the subproject sites includes Shisham (Dalbergia sissoo), Kikar (Acacia arbica), Eucalyptus, Mango, Pomegranate, Sharin (Albizzia lebbek), Jand (Prospopis spicigera), Beri (Zizyphus jajaba), Phog, Talhi (Dalbergia sissoo) and Sharin (Albizzia lebbek).Fauna and Wild life of the district is very few and mostly confined to the wetland area. Various species of fauna include hog, pig, Black and gray partridges, ungle cat, mongoose, porcupine, fox, jackal, wild boar, house rat, hare, frogs, toads, Gecko, Indian cobra, variety of lizards, krait and viper. The birds’ species comprise of Dove, sparrow, Hooper, wood packer, pewit, crow and parrot, Blue rock Pigeon, Peacock, Hooper, Sparrow, Kualil, Kingrow, Kal Kurchhi, Parrot Egrate & Paddy bird, Kite King Fisher, Sallow Amadvat, Coot, Laghar, Shikra and Owl. There are also different snake species in the area. There are no areas of wildlife significance near the subproject area. The wild animals are very few and are almost entirely confined to the wetland area.

**ENVIRONMENTAL IMPACT ASSESSMENT**

1. As a first step, the screening of the Project was done considering the Asian Development Banks guidelines. The project falls in Environmental Category B under Pak EPA IEE & EIA comprehensive regulations 2000; the project contains carrying of environmental impact assessment, as the project falls in schedule – II. To ensure participation of local communities and Project stakeholders, consultative meetings, scoping sessions and group discussions were held with the local community. The participants were of the view that Project should be implemented as early as possible. The main concerns of the participants were that the transmission line should not pass over the private houses, local people should be provided jobs during construction, load shedding should be minimized, electricity /voltage should be stabilized, and load shedding causes disruption in water supply and burning of electronic appliances. Considering these difficulties, the participants were of the view that improvement of electricity supply through up – gradation of grid station and construction of new transmission lines is the need of the day.

**Major Negative Impacts**

1. There are no major negative impacts of this project. Most of the negative impacts are localized and limited to project sites. Proper mitigation measures adopted as per provided EMMP will surely reduce the negative impacts. Post mitigated impacts will be negligible.

**Major Positive Impacts**

1. The major positive impacts include improvement in power supply in old areas and provision of power supply to new areas, improved reliability and stability of electricity, improvement in voltage profile, control existing load shedding and creation of jobs during construction.

**MITIGATION MEASURES**

1. Mitigation measures for negative impacts include compensation to Project Affected Persons for the loss of standing crops / trees as per entitlements of Resettlement Plan. The noise can be mitigated by using silencers and earmuffs. The dust pollution can be mitigated by sprinkling water 2 to 3 times a day and controlling of speed of moving vehicles. Planting of compensatory trees, careful driving in work areas, avoidance of vehicle and machinery movements during peak hours, careful collection and disposal of oils and lubricants, proper waste disposal and safety precautions of workers etc. A comprehensive Environmental Mangement Plan (EMP) has been prepared to mitigate alll the environmental impacts during construction and operational phase of the project.

**RESETTLEMENT PLAN**

1. The Resettlement Plan (RP) provides the basis for the mitigation of social impacts. It has been developed in accordance with the requirements of the Asian Development Bank. This Policy of the Bank endorses the eligibility of all the categories of persons, whether with formal legal rights or without these rights, in a project, but payment of crop compensation is prior to the cut-off date established by the borrower and acceptable to the Bank.
2. The governing legislation regarding land acquisition and compensation is the Land Acquisition Act (LAA), 1894. The LAA is limited to a cash compensation policy for the acquisition of land and built-up property, and damage to other assets such as crops, trees, infrastructure, etc. The LAA does not take into account the rehabilitation and resettlement of displaced populations and the restoration of their livelihoods. The Bank’s policy, however, provides full protection to the people affected by a Project. Accordingly, RP defines the compensation for the crops/assets of the PAPs falling within the ROW of the transmission lines.

**ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN (EMMP)**

1. A comprehensive EMMP has been prepared for the projects ***(Annex-2 & Annex-3)***. It includes actions proposed for mitigation of negative impacts and effective monitoring of the implementation of proposed mitigation measures during pre-construction, construction and operation phases. This will form part of contract. The contractor will be responsible for implementation of mitigation and monitoring measures through Bill of Quantities (BOQ) in the bidding documents. MEPCO will also carry out its internal monitoring.

**CONCLUSIONS AND RECOMMENDATIONS**

1. The proposed project interventions will cause few environmental and social impacts mostly during construction phase and very limited during operational phase.
2. The construction stage will face negative impacts in form of dust, smoke and noise on account of employment of vehicles, machinery and equipment. The generation of construction waste, solid waste and oil spills/seepage will have negative impacts on land and air resources. Further, the stringing process may involve traffic congestion. All such impacts are temporary and are of minor nature. The mitigation measures have been suggested in the EMMP.
3. The project operation phase may cause issues such as clearance of ROW, leakage/seepage of transformer oil, generation of noise from transformers and waste management. Accordingly mitigation measures have been given in the EMMP.

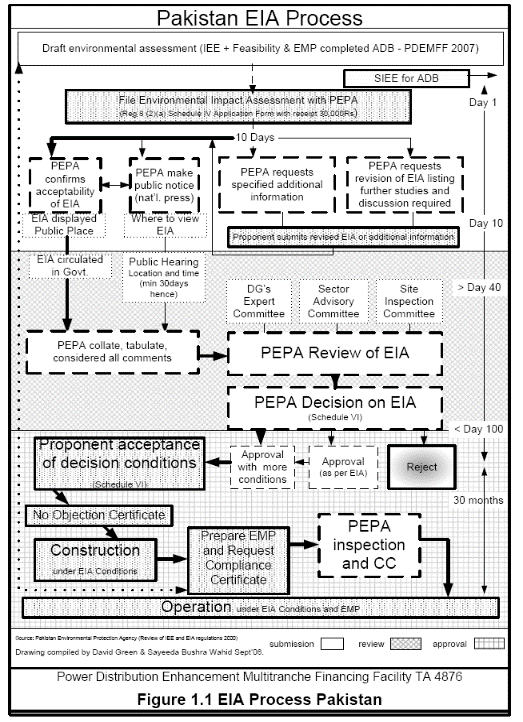
* Land has been donated for new 132KV Grid Station Punjab Government Employees Housing Scheme, Multanand for new 132 KV Buch Villas, Multan grid station by the respective management of Housing Schemes. Whereas land for Sanjarpur has been purchased by MEPCO on willing-seller willing-buyer basis. Project affectees will be compensated for the loss of their crops/assets and livelihood according to the provisions of the entitlement matrix.
* Private and forest owned almost 50 trees will need removalfor which three (03) times compensation tree plantation has been suggested.
* The impacts identified are mainly of temporary nature which will automatically vanish with the completion of construction phase.
* Most of the impacts could be prevented or mitigated by adopting the mitigation measures suggested in the EMMP.
* Major Positive Impacts are:

1. Significant improvement in reliability and stability of electric supply system.
2. Improvement in voltage profile.
3. Control of existing load shedding.
4. There is insignificant environmental damage to local land, water and biological resources

# INTRODUCTION

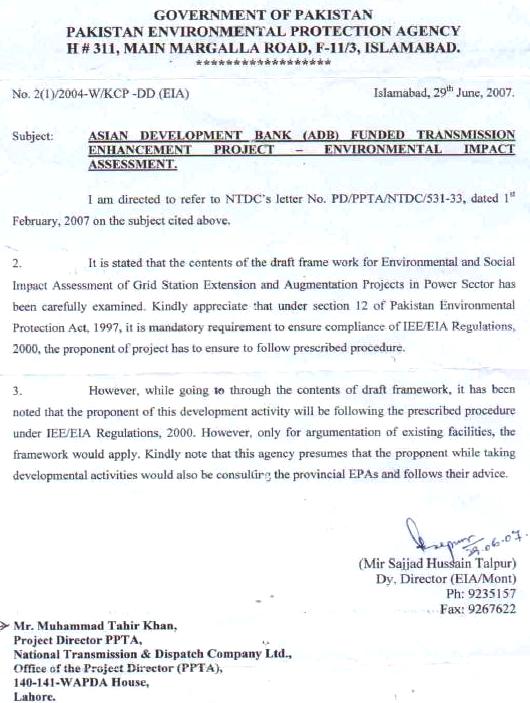
## **OVERVIEW**

1. This document is the Environmental Impact Assessment (EIA) Studyfor the “Power Distribution Enhancement Investment Project (PDEIP) - Tranche-4 (Savings)” of Multan Electric Power Company (MEPCO). The TRANCHE – IV (Savings) Subprojects**(See Section 3 & Annex-1)** under concerned EPA (Punjab) consists of:
2. The Construction of New 132 KV Punjab Government Employees Housing Scheme Grid Station along with 3.4 Km Double Circuit Transmission Line
3. The Construction of New 132KV Buch Villas Grid Station along with 5.5 KM associated Single Circuit Transmission Line from Multan
4. The Construction of New 132KV Sanjarpur Grid Station alongwith 0.5 KM associated Transmission Line
5. The Conversion of 66KV to 132 KV Choti Grid Station along with associated 132 KV 20 KM SDT Transmission Line
6. The Conversion of 66 KV to 132 KV Yazman Grid Station along with associated 18 KM SDT Transmission Line
7. The project is funded by Asian Development Bank (ADB) under Power Distribution and Enhancement Multi-tranche Finance Facility (PDEMFF).
8. Government of Pakistan (GoP) has requested ADB to provide the PDEMFF to facilitate investments in power distribution and development of networks of eight independent distribution companies (DISCOs) that distribute power to end user consumers. The funding from ADB is expected to be released in stages (tranches). The Power Distribution Enhancement Investment Program (PDEIP) is part of the GoP long term energy security strategy. The proposed ADB intervention will finance new investments in PDE and assist capacity building of sector related agencies. The investment program will cover necessary PDE development activities in secondary transmission / distribution networks of eight DISCOs. The PDEMFF activities include extension (additional transformers) and augmentation (replacement of transformers with higher capacity) distribution line extensions, new and replacement distribution lines, additional substations, transformer protection and other non network activities such as automatic meter reading, construction equipment and computerized accounting. New distribution lines to and from various network facilities and some of the above activities will also be included in the later trenches. The proposed PDEMFF facility has been designed to address both investment and institutional aspects in the electrical power sector.
9. This EIA Report covers the environmental assessment of PDEIP - Tranche-4 (Savings) of MEPCO. PEPCO has been nominated by Ministry of Water and Power (MoWP) to act as the Executing Agency (EA) with MEPCO being the Implementing Agency (IA) for work in its own area.
10. Under GoP regulations, the Pakistan Environmental Protection Agency Review of Initial Environmental Examination and Environmental Impact Assessment Regulations (2000) categorizes development subprojects into two schedules according to their potential environmental impact. The proponents of subprojects that have reasonably foreseeable impacts are required to submit an Initial Environmental Examination Report for their respective subprojects (Schedule I). The proponents of subprojects that have more adverse environmental impacts (Schedule II) are required to submit an Environmental Impact Assessment (EIA). The graphic representation of EIA process in pakistan is provided as **Figure 1.1**. EIA is required by GoP for all subprojects involving sub transmission / distribution lines of 11 KV and above and for Grid Station [DGS] substations (Schedule II).



**Figure 1.1:**EIA Process - Pakistan

1. Most of the construction impacts will take place with only local impacts and there are no potential significant environmental impacts associated with the TRANCHE – IV (Savings) sub-subproject construction. A Framework of Environmental Assessment (FEA) power extensions and augmentation subprojects was prepared by consultants and submitted to the Pakistan EPA, after hearings with provincial EPAs. In response to the FEA submitted by MEPCO to the Pakistan EPA[[1]](#footnote-2)it has been clarified that all proponents must follow section 12 of the Pakistan Environmental Protection Act for all subprojects – **Figure 1.2** (below).



**Figure 1.2:**Pak-EPA letter dated 29th June, 2007

## SCOPE OF THE EIA STUDY AND PERSONNEL

1. The Study Area included the identification of irrigation facilities, water supply, habitable structures, schools, health facilities, hospitals, religious places and sites of heritage or archaeological importance and critical areas (if any) within about 100m of the Transmission Line and Grid Station boundary.The TRANCHE – IV (Savings) haveconstruction of 03 new DGS substation (New 132 KV Punjab Government Employees Housing Scheme DGS in Multan District, New 132KV Buch Villas DGS in Multan District and New 132 KV Sanjarpur Grid Station in Sadiqabad, Rahim Yar Khan District), Conversion from 66KV to 132KV of 02 existing DGS substations (Choti and Yazman), construction of 05 new double circuit transmission line (Feed for PGEHS, Feed for Buch Villas, Feed for Sanjarpur, Feed for Yazman and Feed for Choti Grid Stations. Construction of the bases, foundation pads and towers to support the distribution line will be carried out also under the same subproject by MEPCO and supervised by the MEPCO management.
2. The field studies were undertaken by the subproject’s environment team with experience of environmental assessment for power subprojects in Pakistan. MEPCO and SMEC International Environment & Social Team conducted preliminary scoping, survey and assessment activities, coordinated the field sampling and analysis, and were also responsible to supervise collection of information and co-ordinate the various public consultation activities. The team conducted preliminary scoping, survey and assessment activities, and carried out the report writing. Facility Management Consultant (SMEC International Pty. Ltd Team) provided leadership and guidance in planning the field work and in finalization of the report. The environmental team also benefited from technical support and other information on the impacts of the proposed power works provided in feasibility summaries prepared with MEPCO by expert Facility Management Consultants (SMEC) dealing with engineering, designing, power distribution, socio-economic, re-settlement and institutional aspects.
3. A scoping and field reconnaissance was conducted on the subproject sites, during which Environmental Assessment was carried out to establish the potential impacts and categorization of subproject activities. The methodology of the Environmental Impact Assessment study was then elaborated in order to address all interests. Subsequently primary and secondary baseline environmental data was collected from possible sources, and the intensity and likely location of impacts were identified with relation the sensitive receivers; based on the work expected to be carried out. The significance of impacts from construction of the project was then assessed and, for those impacts requiring mitigation, measures were proposed to reduce impacts to within acceptable limits.
4. Public consultation (PC) for the project was carried out in July-August 2016.The Public Consultation process included verbal disclosure of the sub-subproject works as a vehicle for discussion. Consultations were conducted with local families and communities along transmission line and around proposed project sites and staff of the subproject management. The responses from correspondents have been included in **Annex - 4** and summarized in **Section 7** of this Environmental Impact Assessment Report.
5. Resettlment Planshave been prepared as a separate document for TRANCHE – IV (Savings) subprojects.

# POLICY AND STATUARY REQUIREMENTS IN PAKISTAN

1. Direct legislation on environmental protection is contained in several statutes, namely; the Pakistan Environmental Protection Act (1997); the Forest Act (1927); the Punjab Wildlife Act (1974). In addition the Land Acquisition Act (1894) also provides powers in respect of land acquisition for public purposes. There are also several other items of legislation and regulations which have an indirect bearing on the subproject or general environmental measures.

## STATUTORY FRAMEWORK

1. The Constitution of Pakistan distributes legislative powers between the federal and the provincial governments through two ‘lists’ attached to the Constitution as Schedules. The Federal List covers the subjects over which the federal government has exclusive legislative power, while the Concurrent List contains subjects regarding which both the federal and provincial governments can enact laws. “Environmental pollution and ecology” is included in the concurrent list, hence both the federal and the provincial governments can enact laws on this subject. However, to date, only the federal government has enacted laws on environment, and the provincial environmental institutions derive their power from the federal law. The key environmental laws affecting this subproject are discussed below.

### Punjab Environmental Protection Act, 1997 (Amended, 2012)

1. The Punjab Environmental Protection Act, 1997(Amended, 2012) is the basic legislative tool empowering the government to frame regulations for the protection of the environment. The act is applicable to a wide range of issues and extends to air, water, soil, marine, and noise pollution, as well as to the handling of hazardous wastes. The key features of the law that have a direct bearing on the proposed subproject relate to the requirement for an initial environmental examination (IEE) and environmental impact assessment (EIA) for development subprojects. Section 12(1) requires that: *“No proponent of a subproject shall commence construction or operation unless he has filed with the Federal Agency an initial environmental examination [IEE] or, where the subproject is likely to cause an adverse environmental effect, an environmental impact assessment [EIA], and has obtained from the Federal Agency approval in respect thereof”*. The Pakistan Environmental Protection Agency has delegated the power of review and approval of environmental assessments to the provincial environmental protection agencies.

### Pakistan Environmental Protection Agency Review of Environmental Assessment Study and EIA Regulations, 2000

1. The Pakistan Environmental Protection Act, 1997 (PEPAct- 1997) provides for two types of environmental assessments: initial environmental examinations (IEE) and environment impact assessments (EIA). EIAs are carried out for subprojects that have a potentially ‘significant’ environmental impact, whereas IEEs are conducted for relatively smaller subprojects with a relatively less significant impact. The Pakistan Environmental Protection Agency Review of IEE and EIA Regulations, 2002 (the ‘Regulations’), prepared by the concerned EPA under the powers conferred upon it by the PEPAct - 1997, categorizes subprojects for IEE and EIA. Schedules I and II, attached to the Regulations, list the subprojects that require IEE and EIA, respectively.
2. The Regulations also provide the necessary details on the preparation, submission, and review of IEEs and EIAs. The following is a brief step-wise description of the approval process (see also **Figure 1.1**).
3. A subproject is categorized as requiring an IEE or EIA using the two schedules attached to the Regulations.
4. An EIA or IEE is conducted as per the requirement and following the Pak-EPA guidelines.
5. The EIA or IEE is submitted to the ConcernedEPA. The Fee (depending on the cost of the subproject and the type of the report) is submitted along with the document.
6. The IEE/EIA is also accompanied by an application in the format prescribed in Schedule IV of the Regulations.
7. The EPA conducts a preliminary scrutiny and replies within 10 days of the submittal of a report, a) confirming completeness, or b) asking for additional information, if needed, or c) returning the report requiring additional studies, if necessary.
8. The EPA is required to make every effort to complete the IEE and EIA review process within 45 and 90 days, respectively, of the issue of confirmation of completeness.
9. Then the EPA accords their approval subject to certain conditions:
10. Before commencing construction of the subproject, the proponent is required to submit an undertaking accepting the conditions.
11. Before commencing operation of the subproject, the proponent is required to obtain from the EPA a written confirmation of compliance with the approval conditions and requirements of the IEE/EIA.
12. An EMP is to be submitted with a request for obtaining confirmation of compliance.
13. The EPAs are required to issue confirmation of compliance within 15 days of the receipt of request and complete documentation.
14. The IEE/EIA approval is valid for three years from the date of accord.
15. A monitoring report is to be submitted to the EPA after completion of construction, followed by annual monitoring reports during operation.
16. Distribution lines and grid substations of 11 KV and above are included under section A-1 of Schedule II, requiring an EIA to be carried out by the proponents.

### National Environmental Quality Standards

1. The National Environmental Quality Standards (NEQS) were first promulgated in 1993 and have been amended in 1995 and 2000. The following standards that are specified in the NEQS may be relevant to the Tranche-4 (Savings) subprojects:
2. Maximum allowable concentration of pollutants (32 parameters) in municipal and liquid industrial effluents discharged to inland waters, sewage treatment facilities, and the sea (three separate sets of numbers)
3. Maximum allowable concentration of pollutants (2 parameters) in gaseous emissions from vehicle exhaust and noise emission from vehicles.

### Other Relevant Laws

1. There are a number of other federal and provincial laws that are important in the context of environmental management. The main laws potentially affecting subprojects in this MFF are listed below.
2. **The Punjab Wildlife Protection Ordinance, 1972**
3. The Punjab Wildlife Protection Ordinance, 1972 empowers the government to declare certain areas reserved for the protection of wildlife and control activities within in these areas. It also provides protection to endangered species of wildlife. As no activities are planned in these areas, no provision of this law is applicable to the proposed subproject.
4. **The Forestry Act, 1927**
5. It empowers the government to declare certain areas reserved forest. As no reserved forest exists in the vicinity of the proposed subproject, this law will not affect to the proposed subproject.
6. **The Antiquities Act of 1975**
7. It ensures the protection of Pakistan’s cultural resources. The Act defines ‘antiquities’ as ancient products of human activity, historical sites, or sites of anthropological or cultural interest, national monuments, etc. The Act is designed to protect these antiquities from destruction, theft, negligence, unlawful excavation, trade, and export. The law prohibits new construction in the proximity of a protected antiquity and empowers the Government of Pakistan to prohibit excavation in any area that may contain articles of archaeological significance. Under the Act, the subproject proponents are obligated to ensure that no activity is undertaken in the proximity of a protected antiquity, report to the Department of Archaeology, Government of Pakistan, any archaeological discovery made during the course of the subproject.

## STRUCTURE OF REPORT

1. This Environmental Impact Assessment Report reviews information on existing environmental attributes of the Study Area. Geological, hydrological and ecological features, air quality, noise, water quality, soils, social and economic aspects and cultural resources are included. The report predicts the probable impacts on the environment due to the proposed subproject enhancement and expansion. This Environmental Assessment Report also proposes various environmental management measures. Following this introduction the report includes:

* Description of the Subproject
* Description of Environmental and Social Conditions
* Assessment of Environmental Impacts and Mitigation Measures
* Environmental Monitoring Plan
* Public Consultation
* Recommendations and Conclusions

# 

# DESCRIPTION OF THE PROJECT

## TYPE OF PROJECT

### The Construction of New 132 KV Punjab Government Employees Housing Scheme, Multan Grid Station along with 3.4 Km Double Circuit Transmission Line

1. The subproject will be the DGS and T/L i.e. the construction of New 132KV Punjab Government Employees Housing Scheme, Multan grid station and 2km double circuit transmission line to feed Punjab Government Employees Housing Scheme, Multan. The scope of work includes addition of 2X26 MVA, 132/11 kV Power Transformers and allied equipment and buildings.

### The Construction of New 132KV Buch Villas Grid Station along with 5.5 KM associated Single Circuit Transmission Line

1. The subproject will be the DGS and T/L i.e. the construction ofNew 132KV Buch Villas grid station and 5.5 km single circuit transmission line. The scope of work includes addition of 2X26 MVA, 132/11 KV Power Transformers and allied equipment and buildings.

### The Construction of New 132KV Sanjarpur Grid Station along with 0.5 KM associated Single Circuit Transmission Line

1. The subproject will be the DGS and T/L i.e. the construction ofNew 132KV Sanjapur grid station and 0.5 km single circuit transmission line. The scope of work includes addition of 2X26 MVA, 132/11 KV Power Transformers and allied equipment and buildings.

### Conversion of 66KV to 132 KV Choti Grid Station along with 20 KM associated 132 KV SDT Transmission Line

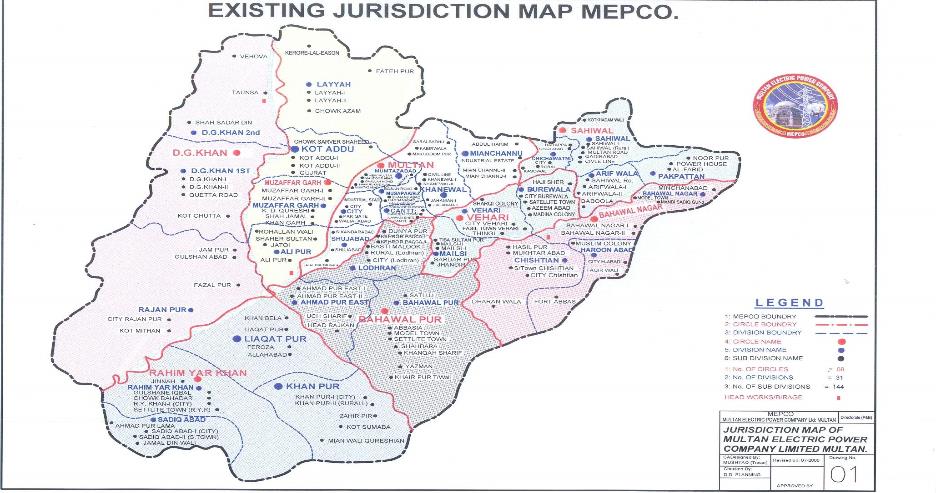
1. The subproject will involve the development of the DGS and T/L. The DGS will require conversion of 66KV Choti grid station into 132KV grid station and construction of 20km double circuit transmission line. The scope of work includes addition of 2X 26 MVA, 132/11 kV power transformers and allied equipment and buildings.

### The Conversion of 66 KV to 132 KV Yazman Grid Station along with 18 KM associated SDT Transmission Line from Chishtian to Yazman

1. The subproject will be the DGS and T/L. The DGS will require conversion of 66KV Yazman grid station into 132KV grid station and construction of 18 km double circuit transmission line. The scope of work includes addition of 2X 26 MVA, 132/11 kV Power Transformers and allied equipment and buildings.

## CATEGORIZATION OF THE PROJECT

1. The Power Distribution Enhancment Investment Project – TRANCHE – IV (Savings) falls in schedule II of Review of IEE and EIA Regulations 2000, and this Environmental Impact Assessment Report is based on that categorization.
2. Categorization is based on the environmentally most sensitive component of a subproject. The aspects of the subproject with potential for significant environmental impacts need to be assessed in detail and this environmental assessment has therefore focused on the significant impacts possible from the construction activities of the subproject.
3. The subprojects are categorized as a Category B sub-subproject under ADB requirements and this EIA report is based on that assumption.Refer to the **Figure 3.1** Jurisdiction of MEPCO**.**



**Figure 3.1:** MEPCO Jurisdiction (Service Area)

## NEED FOR THE PROJECT

1. Pakistan is a country with an economy of improving performance with a wide network of power distribution. However the standards and conditions of the power distribution are inadequate to meet rapidly growing power demand. This situation limits reliable power distribution and therefore the contribution of the power sector to national development and economic growth. To cope with the constraints, the existing power distribution infrastructure has to be improved and upgraded. The overall contribution of power infrastructure also requires institutional arrangements and capacity that support strategic management of the sector, and planning and management of investments. Overall the proposed PDEMFF Project has been designed in addressing both investment and institutional aspects in the sector.
2. The TRANCHE – IV (Savings) projects will contribute to the improvement of the overall performance of the power distribution sector, improving distribution efficiency, broadly widening access to power to drive economic opportunities. The beneficiaries of the sub-projects will be people, companies, and government and non-government agencies in Pakistan that use power distribution services directly and indirectly. Communities indirectly served by the sub-projects will benefit from improved, secure faster distribution services. Power users will benefit in terms of secure power and improved power safety and potentially increased productivity.

## LOCATION AND SCALE OF THE PROJECT

### New Substations, Conversions and Transmission Lines Subprojects

1. This EIA has included field reconnaissance of the site and surroundings of the new substations, conversions and transmission lines. Substation site location is determined by a committee, comprising of professionals from: planning; design; construction; operation; and social formations of the DISCO. The committee selects the best site based, from a number of alternatives, on the following considerations: Least cost technically and socially acceptable alternative; least social impacts; soil; and atmospheric conditions that are not likely to impose a higher cost or damage the planed facilities; acceptable living conditions for staff members (health, education, water etc.); reasonable access conditions to allow movement of heavy equipment; reasonable access conditions to allow incoming and outgoing transmission lines Right of Way (RoW).
2. This EIA hasbeen conducted based on the assumptions available in July-August 2016, when the preliminary design for the new substation & feeding transmission line subproject was completed and the overall requirements for installation of the equipment had been identified. The detailed designs are currently being progressed by MEPCO. At this stage, the construction activities under the SP are expected to include the usual localized civil works such as extension of the main yard, including excavation and concreting of foundations for the new transformers, capacitor banks, cable trays and terminal tower (within the DGS compound),installation of the transformers, equipment and fittings, erection of the towers, cabling, construction of the control rooms and installation of allied equipment, and construction of the offices and residences.
3. The designs for the TRANCHE – IV (Savings)subprojects will be developed under the subproject support component of the MFF. This EIA, however, is based on line route surveys (which includes alternative routes and the route which minimizes the social impacts is chosen). The line route is then submitted to the design formation which determines the line profiles and tower locations, these towers are then located on ground. The transmission line design is based on the given below parameters extracted from different studies in **Table 3.2.**

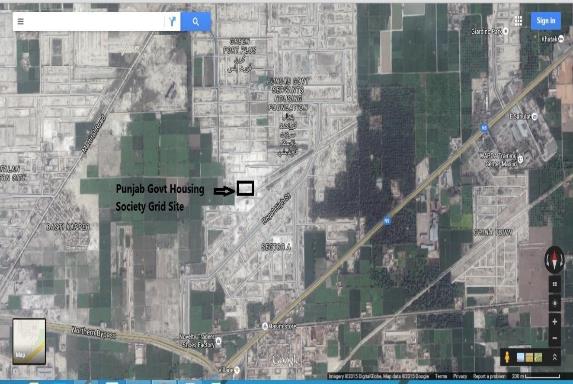
**Table 3.2: Permissible Conductor Clearances at 65°C**

|  |  |  |
| --- | --- | --- |
| **Sr. No.** | **Description** | **Clearances (m)** |
| 1 | Cultivated land traversed by vehicles | 6.7 |
| 2 | Roads & Streets | 7.9 |
| 3 | Communication and power lines (up to 66 KV) | 2.7 |
| 4 | Highways | 7.9 |
| 5 | Railroads | 7.9 |
| 6 | Electrified railroads trolley wire | 3.85 |
| 7 | River at high flood | 9.1 |
| 8 | Places accessible to pedestrians only | 7.9 |
| 9 | Building roofs not accessible to people | 5.2 |
| 10 | Tops of trees (Orchards) | 5 |
| 11 | Canals | 9.1 |

1. Impacts from construction of the new substation, conversions& feeding transmission line subprojects are envisaged to be minor as land for DGS is already owned by MEPCO and no additional land needs to be acquired for construction of the grid stations. No additional land needs to be acquired for construction of the towers because the towers will mostly be erected in the existing route of 132 KV TL. The new towers would transverse very small area of cultivated land and mostly barren area.

### The Construction of New 132 KV Punjab Government Employees Housing Scheme, Multan Grid Station along with 3.4 Km Double Circuit Transmission Line

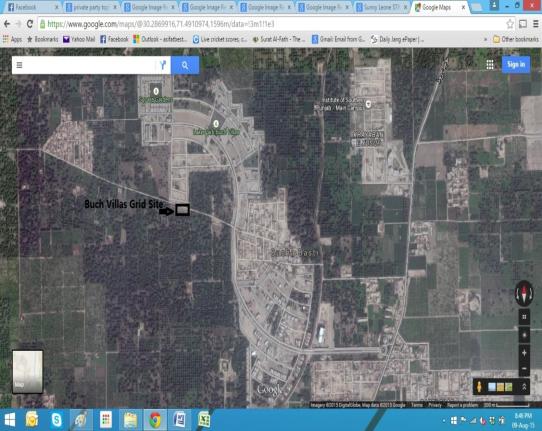
1. The Punjab Government Employees Housing Scheme, Multan subproject will involve the construction of New DGS and construction of a 132kV T/L. The proposed route to the nearest 132kV line appears to be environmentally feasible and technically appropriate and will join the DGS with an existing 132kV line at about 3.4 km from the DGS.The connecting line from Punjab Government Employees Housing Scheme, Multan SP to the network will involve erection of towers that will be strung with the new T/L.



**Figure 3.1:** Google Earth map of Punjab Government Employees Housing Scheme, Multan Sub Station

### The Construction of New 132KV Buch Villas Grid Station along with 5.5KM associated Single Circuit Transmission Line

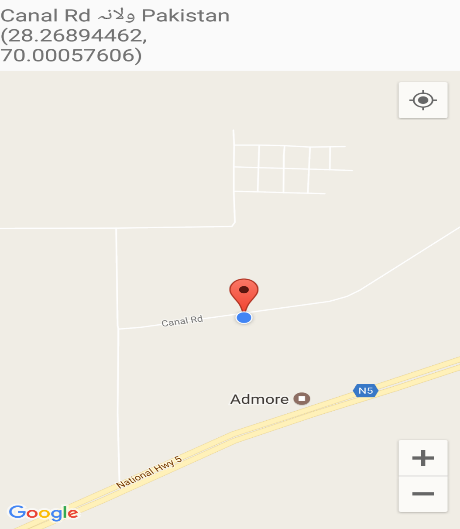
1. The Buch Villas subproject will involve the construction of a New 132KV DGS and T/L. The proposed route to the nearest 132KV line appears to be environmentally feasible and technically appropriate and will join the DGS with an existing 132KV line at about 15km from the DGS.



**Figure 3.2:** Location Buch Villas Sub Station

### The Construction of New 132KV Sanjarpur Grid Station along with 0.5 KM associated Single Circuit Transmission Line

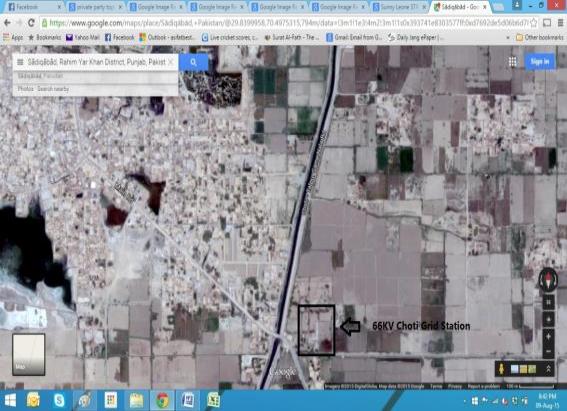
1. The Buch Villas subproject will involve the construction of a New 132KV DGS and T/L. The proposed route to the nearest 132KV line appears to be environmentally feasible and technically appropriate and will join the DGS with an existing 132KV line at about 0.5 km from the DGS.



**Figure 3.3:** Location Sanjarpur Sub Station

### Conversion of 66KV to 132 KV Choti Grid Station along with 20 KM associated 132 KV SDT Transmission Line

1. The Choti subproject will involve the conversion of 66KV DGS into 132KV DGS and construction of a 132KV T/L. The proposed route to the nearest 132KV line appears to be environmentally feasible and technically appropriate and will join the DGS with an existing 132KV line at about 20km from the DGS.

**Figure 3.4:** Location of Choti Sub Station

### The Conversion of 66 KV to 132 KV Yazman Grid Station along with 18 KM associated SDT Transmission Line from Chishtian to Yazman

1. The Yazman subproject will involve the conversion of 66KV DGS into 132KV DGS and construction of a 132kV TXL (43 towers). The proposed route to the nearest 132kV line appears to be environmentally feasible and technically appropriate and will join the DGS with an existing 132kV line at about 18 km from the DGS.



**Figure 3.5:** Location of Yazman Grid Station (Sub-Project)

1. **PROJECT ALTERNATIVES**
2. **Management Alternatives**
3. ***No project alternative:***Electricity demand has been increasing during the past several years, and this trend is expected to continue as a result of the on-going economic uplift in the country. The key factors fueling the increasing power demand include increasing population, rapid urbanization, industrialization, improvement in per capita income and village electrification. In order to match the increasing trend in the power demand, regular investments in various segments of the power network generation, transmission, and distribution is vitally important. Otherwise, the gap between the supply and demand will keep on increasing.
4. The proposed project seeks to upgrade the extension bays of the MEPCO system. Construction of new DGS, Transmission Lines and conversion/up gradation of the existing grid stations & transmission lines will providethe requisiterelief to the over-loaded system, while also accommodating additional load.
5. In case the proposed projects under TRANCHE – IV (Savings) are not undertaken, the MEPCO system will not be able to cope with the increasing demand, the existing system will remain over-loaded, line losses willalsoremainhigh,andthesystemreliabilitywillprogressivelydecrease, with increasing pressure on the system. The Utility will also forego the opportunity of increasing its consumers as well as revenue associated with the system expansion. *In view of the above, the* ***“no project”*** *option is not a preferred alternative.*
6. **Siting Alternative**
7. The proposed subprojects will be done in the best suitable and feasible sites so no siting issues. The sites selected for the TRANCHE – IV (Savings) subprojects are most suitable and have negligible impacts to the nearby communities. For Transmission lines the Route of Transmission Line will be selected in such a way that minimum disturbance to stakeholders occurs. Transmission Line will be away from settled areas, mosques, Schools & hospitals.
8. **Technical Alternatives**
9. **Type of Circuit Breaker**
10. Traditionally, oil-filled circuit breakers used to be installed at the 132- KV and 11- KV levels. At 66 KV Grid Station Circuit Breakers of 70 KV are installed. For conversion to 132 KV Grid Station, Circuit Breakers of 140 or 145 KV would be required. Under TRANCHE – IV (Savings) subprojects, vacuum type Sulfur Hexafluoride circuit breakers will be procured for installation at 132 KV converted Grid Stations. These breakers have very effective arc-quenching characteristics, compared to the old oil-type breakers. Therefore, these modern circuit breakers are the preferred option for the proposed project.
11. The environment aspects of the oil-filled circuit breakers essentially pertain of soil and water containment caused by the possible oil leakage. For the MEPCO’s proposed Projects, vacuum type Sulfur Hexafluoride circuit breakers would be installed at the grid stations.
12. The transmission lines connect to the network will involve erection of towers that will be strung with the new distribution transmission lines. The designs for the TRANCHE – IV (Savings) subprojects will be developed under the subproject support component of the MFF. The EIA study is, therefore is not based on line design which is final (barring any unforeseen occurrence) and only is changed at implementation stage if so warranted by new developments.
13. **Type of transformer Oil**
14. Traditionally transformers oil is meant for providing insulation and cooling of the transformers winding – used to contain poly-chlorinated biphenyls (PCB), a man-made chemical known for its highly toxicity, and more importantly, chemically very stable. Hence this chemical would not decompose or disintegrate naturally. Due to this property of PCB, it was included in a group of chemicals collectively known as persistent organic pollutants (POP’s). Although, production and use of the PCB containing transformer oil is not allowed anymore in the west, it is still being used locally. In view of their extremely harmful effects however, use of this oil is not preferred option for all applications, including the proposed project. MEPCO’s specifications for the procurement of transformers clearly mention that the transformer oil should be PCB-free. Hence the equipment purchased as part of this project would be PCB-free
15. **DECOMMISSIONING AND DISPOSAL OF MATERIALS**
16. Decommissioning and disposal of discarded material of the project will be recycled and reused within the MEPCO system. And no waste will be generated that can be classified as hazardous and requiring special disposal.
17. The discarded transformers are not going to be disposed off or discarded. The transformers would be reused and recycled within the PEPCO system. As a policy, WAPDA had stopped using transformers which contain PCBs since 1969.
18. Decommissioning and disposal of discarded material from the project will be recycled and reused within the PEPCO system. No waste will be generated that can be classified as hazardous and requiring special disposal. In addition, in case any old transformers are to be replaced, they are not going to be disposed off or discarded and would be recycled and reused within the PEPCO system.  As a policy, WAPDA has stopped using transformers that contain PCBs since 1969.
19. **PROPOSED SCHEDULE FOR IMPLEMENTATION**
20. Designs of power transmission arrangements, access, review of environmental management and construction processes could take several months. When the detailed designs are completed, tendering and award of contract can also take place over about three to six months. Then construction period will follow, and best estimates indicate about eighteen to twenty four months.**Annex-5**presents the sub project implementation schedule. The TRANCHE – IV (Savings) implementation schedule is presented as follows in **Table 3.3**.

**Table 3.3: Time Schedule for Power Distribution Enhancment Investment Project –TRANCHE – IV (Savings)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **LARP Activity/Task** | | **Responsibility** | | **2016** | | | | **2017** | | | | **2018** | | | |
| **Primary** | **Secondary** | **I** | **II** | **III** | **IV** | **I** | **II** | **III** | **IV** | **I** | **II** | **III** | **IV** |
| **Preparation** | Initial Resettlement SurveyLARP preparation | MEPCO | Consultants |  |  |  |  |  |  |  |  |  |  |  |  |
| Review of TL Alignment; Diversions to Avoid Resettlement Impacts; and Revision of LARP | MEPCO | Consultants |  |  |  |  |  |  |  |  |  |  |  |  |
| Design finalized by MEPCO; approved by ADB. | MEPCO | CE Dev |  |  |  |  |  |  |  |  |  |  |  |  |
| LARP disclosure - Brochure in UrduMEPCO | MEPCO-PMU | CE DEV. |  |  |  |  |  |  |  |  |  |  |  |  |
| Requests to Relevant Govt. Deptts. for NOCs | MEPCO-PMU | CE DEV. |  |  |  |  |  |  |  |  |  |  |  |  |
| Tender Preparation and Tendering of Works. | MEPCO-PMU | CE DEV. |  |  |  |  |  |  |  |  |  |  |  |  |
| Environmental Assessment report /LARP Revision - Updating of Prices and Resettlement Costs (if necessary) | MEPCO-PMU | CE DEV. |  |  |  |  |  |  |  |  |  |  |  |  |
| **Implementation** | Mobilize project supervision consultant | Government | MEPCO |  |  |  |  |  |  |  |  |  |  |  |  |
| Information dissemination regarding compensation payment & evacuation dates | MEPCO-PMU | CE DEV. |  |  |  |  |  |  |  |  |  |  |  |  |
| Adjust compensation rates & rehabilitation costs for inflation (if necessary) | MEPCO-PMU | CE DEV. |  |  |  |  |  |  |  |  |  |  |  |  |
| Submit revised Environmental Assessment Report /LARP to EPA/ADB. LARP Approval prior to Award of Contract for civil works .Ensure contracts reflect EMP | Govt/ADB | MEPCO-PMU |  |  |  |  |  |  |  |  |  |  |  |  |
| Delivery of compensation. Payments to be made prior to the start of Civil Works | MEPCO-PMU | CE DEV. |  |  |  |  |  |  |  |  |  |  |  |  |
| Grievance Redress Process | MEPCO-PMU | CE DEV. |  |  |  |  |  |  |  |  |  |  |  |  |
| Environmental Assessment Report /LARP monitoring (internal, and mobilization of EMA & updating of baseline survey) | MEPCO-PMU | EMA |  |  |  |  |  |  |  |  |  |  |  |  |
| **Construction** | Possession of land for starting works | MEPCO-PMU | Contractor |  |  |  |  |  |  |  |  |  |  |  |  |
| Site Demarcation of Affected Lands |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Contractor mobilized, civil works commenced | Contractor | Consultant |  |  |  |  |  |  |  |  |  |  |  |  |
| Final payment of crop compensation | PMU | CE DEV. |  |  |  |  |  |  |  |  |  |  |  |  |
| LARP monitoring; post-evaluation report | EMA | MEPCO/ADB |  |  |  |  |  |  |  |  |  |  |  |  |

# DESCRIPTION OF THE ENVIRONMENT

1. The Subprojects of MEPCO TRANCHE – IV (Savings) are located in four (4) districts (i.e Bahawalpur, Multan, D. G. Khan& Rahim Yar Khan) of Punjab Province.Hence, the subprojects’ environment is described.

## CONSTRUCTION OF NEW SUBSTATIONS ALONG ASSOCIATED TRANSMISSION LINE AND CONVERSION SUBPROJECTS ALONGWITH ASSOCIATED TRANSMISSION LINES.

1. The TRANCHE – IV (Savings) subprojects comprise of three (3)new substations along withDouble Circuit Transmission Lines;and two conversion subprojects:
2. The description of the environment is as follows:

### General Characteristics of the Project Area

1. Two new 132kV DGS subprojects will be constructed at about 6 Acres and 8 Acres of land in Multan Punjab Government Employees Housing Scheme, Multan (on northern bypas of Multan) and Mouza Buch Villas (Near DHA Multan)in Multan. Whereas, at about 6 Acres of land in Mouza Sanjarpur Distrcti Rahim Yar Khan, Sanjarpur Grid Station will be constructed. The proposed sitesare donated in Multan and for Sanjarpur located in an agricultural area is purchased on willing seller willing buyer bases. There are no fruit or non-fruit trees in the DGS site, which would need to be removed.

### Affected Administrative Units

1. This subproject will pass through different villages affecting trees (*number will be identified when final line route will be identified*). The area to be affected by the New works for the Punjab Government Employees Housing Scheme, Multanand Buch Villas DGS falls in DistirctMultan. Interviews were conducted with the public near the DGS site and T/L proposed corridor to obtain their views on the subproject and any perceived impacts.

### Physical Resources

### Topography, Geography, Geology, and Soils

1. Multan is located in the southeast of Punjab province, the capital; Multan City is 999 km from Karachi. The region surrounding Multan to the west, called the Sindh, is a fertile alluvial tract in the Channab River valley that is irrigated by floodwaters, planted with groves of date palms, and thickly populated. The chief crops are wheat, gram, cotton, sugarcane, and dates. Sheep and cattle are raised for export of wool and hides. East of Multan is the Pat, or Bar, a tract of land considerably higher than the adjoining valley. The principal inhabitants of the region surrounding Multan are Seraiki and Punjabi peoples. There are many historical sites in the area, including Uch, southwest of Multan, an ancient town dating from Indo-Scythian (Yüeh-chih) settlement (c. 128 BC to AD 450). Pop. (1981) City, 180,263; (1981 prelim.)
2. Multan is also an important agricultural training and educational center. Soap making and cotton ginning are important enterprises; cotton, silk, embroidery, carpets, and extraordinarily delicate pottery are produced. Factories producing cottonseed oil and cottonseed cake were built in the 1970s. It is an important marketing centre for the surrounding areas and is located on the crossroads between Peshawar, Lahore, Quetta and Karachi. Multan is also known for its distinctly embroidered slippers and shoes and the filigree pottery which is made here.
3. The City is located favorably for commerce, lying at the junction of trade routes from the east, south-east, and south. It is a centre for trade in wheat, cotton, millet, and rice grown in the surrounding region. Dates and mangoes are also grown here. Canals supply water for irrigation. The principal industries are cotton ginning, rice and flour milling, and the hand weaving of textiles. The Biggest and Oldest Ghala Mandi is located in the Ghalla Mandi Multan.

### Climate and Hydrology

1. There is no variation of altitude above sea level in the land along the alignment and the short length of the distribution line means no variation of the climate of the sub-project area. The climate at SP is typical of that of the southern Punjab.
2. East of Multan is Khanewal city. There is little variation of altitude above sea level in the land along the alignment. The small change and short length of the transmission line means no variation between the climates of the project area. The climate at proposed site is typical of that of the South Punjab.
3. The maximum temperature in summer reaches 42OC. In winter the minimum is 5OC. The mean maximum and minimum temperatures in summer are 39OC and 28OC; and in winter 21OC and 5OC respectively. The summer season starts from April and continues till October. May, June and July are the hottest months. The winter season on the other hand starts from November and continues till March, December, January and February are the coldest months. The rainy season starts in July and ends in September. Annual rainfall is 71 millimeter. More rains occur in July and August than any other months. Most of the winter rains are received in the months of January, February and March.

### Groundwater and Water Supply

1. Irrigation is largely dependent on the canals, but tube wells have also been sunk in the areas where water is fit for irrigation. The chemical quality of ground water in the district varies in different areas and at different depths. According to KCP Feasibility Study carried out by WAPDA 2003, Potable water is available in a belt along Shuria Canal. Irrigation supplies are perennial and tube wells have been installed to make up the deficiencies. The strata near the DGS and DGL are water bearing and alluvial deposits, giving groundwater potential throughout the sub-project area and the water table is about seven to eight meters below the surface. The water table is not seasonal and dug wells do not generally run dry. Groundwater sources exist in the area and there are tube wells within 500 m of the proposed DGL towers. The local population near most of the DGS & DGL is generally reliant on supply from tube wells. Piped water supply is available in 100,569 housing units of Multan. There should be no impact on these sources of water during the constructionis largely dependent on the canals, but tube wells have also been sunk in the areas where water is fit for irrigation.

### Air Quality

1. Air quality in the sub-project area appears good based on observation during the study period. Domestic sources of air pollution, such as emissions from wood and kerosene burning stoves as well as small diesel standby generators in some households, are well dissipated. There are no other industrial pollution sources present in the vicinity.
2. The other major source of air pollution is dust arising from construction and other ground or soil disturbance. Near the access roads, when vehicles pass, dust levels will increase. The nearby road is paved but dust levels are elevated when vehicles pass intermittently over the roads based on field observations and may be high enough to obscure vision significantly based on observations

### Noise

1. Noise from vehicles and other powered mechanical equipment is intermittent. There are also the occasional calls to prayer from the PA systems at the local mosques but there are no significant disturbances to the quiet rural setting. However the construction from the proposed power expansion will use powered mechanical equipment. Subjective observations were made of background noise and also of individual vehicle pass by events. Based on professional experience background daytime noise levels are probably well below 55dB(A) L90.

### Biological Resources

### Wildlife, Fisheries and Aquatic Biology

1. There are no areas of wildlife significance near the sub-project area. Pig and hog deer are found in woodland near the river and hares are fairly common. Black and gray partridges are also found. Migratory birds use the Indus valley and in cold weather many varieties of duck and teal visit the district. The Indus contains a variety of fish. In the winter months when the river recedes, fish are caught in greater quantity.

### Terrestrial Habitats, Forests and Protected Species

1. The sub-project area, which is dry, is dominated by rural suburbs and with various productive fields of monocultures that now dominate the agro-ecosystems present in the sub-project area. Common floral species with rooted vegetation are also present near most of the water bodies of the area.
2. However there is very little vegetation in the RoW for the line. Just either side of the distribution line alignment semi-natural vegetation consists of the trees and scrub areas that have not been cultivated. Amongst the trees, Jand (Prosopis spicigera) Frash (Tamarix articutlata), Shisham (Dalbergia sisso), Sirin (Albizia lebbek) and Kikar (Accacia arabica) are most common.
3. There is wild growth of mesquite bushes, and some Sirin and Kikar trees in the areas near the works, but natural forest cover in the district has been significantly reduced in the past due to clearance for cultivation.
4. There is a protected forest at Lal Suhanra, about 50km north of Bahawalpur for Yazman subproject and that is the nearest and largest in the Bahawalpur district. There are also planted trees along canals and roads. The major trees grown in the forest are Shisham (Dalbergia sissoo), Kikar (Acacia arbica) and Eucalyptus. There are many trees along the RoW but these are on private land. In general permission should be sought from the local tree owners for the felling of any trees. An Land Acquisition and Resettlement plan (LARP) for the SLSP will make provision for compensation of local people for the loss of trees, if needed after detailed study. The works must deal with trees that need to be lopped or removed for safety reasons with the necessary permissions.

### Protected Areas / National Sanctuaries

1. **In Pakistan there are several areas of land devoted to the preservation of biodiversity through the dedication of national parks and wildlife sanctuaries. One national park Lal Sunhara 50 km from the sub-project site. This provides excellent feeding, breeding and resting habitats to numerous migratory as well as resident birds. The national park is located on one of the major bird migration routes of the world.**

### Economic Development

### Agriculture, Crops, Horticulture and Industries

1. **Agriculture**: The main crops in the sub-project area during winter are wheat, gram, barley, oil seeds, Taramira, Sarson and Toria. In summer sugarcane, cotton, Jawar, Bajra and rice are grown.
2. **Horticulture:**The main fruits grown in the area are date, orange and mango.
3. **Industry:**There are nine (9) major Industrial units of cotton ginning and pressing, cotton textiles, a cement factory and vegetable oil factory. Area is well known for lacquered articles such as wooden/electric lamps, mirror frames, pottery, furniture and several other articles of decoration. There are cotton seed oil factories at 3 km from the DGS.
4. **Transportation and Tourism**: Project Area is linked with the rest of the country by rail and roads. It lies on the National Highway, (Now Motorway) National Indus Highway, which connects Karachi with rest of the country. The ares is connected with metalled roads to all its subsidiary headquarters. The eastern and south-eastern belt of the area is comparatively developed with good road transportation. All major villages are connected with the district headquarters through metaled roads.
5. Also served by railway line which runs north-south near the main road of this district. Bahawalpur is connected with rest of the country by air.

### Energy Sources

1. The distribution lines for electrical power run to a main grid sub-stations. The existing 220kV Grid Stations owned by NTDC and 132 KV grid stations owned by MEPCO, transmit power to the load centers.
2. Reserves of fossil fuels the main sources of energy in Pakistan. In the study area there is no source of hydropower and other energy sources are progressively more common further away from the major towns. The biomass sourcing is concentrated on home garden production of fuel wood, the extraction of wood from forests, woodland, crop plantations and agricultural residues. The other significant energy sources in the area are kerosene and LPG. There are numerous petrol stations and LPG dealers in the district.

### Social and Cultural Resources

### Administrative Setup

1. The MEPCO area consists of thirteen districts the southern Punjab i.e. Multan, Lodhran, Sahiwal, Khanewal, Bahawalpur, Bahawalnagar, Pakpattan, Layyah, Muzaffargarh, Rahim Yar Khan, Dera Ghazi Khan, Rajanpur and Vehari.

### Population and Communities/Population Communities and Employment

1. The total population of south Punjab is estimated at around 41,433,092 population showed the area is predominantly (99%) Muslim. The next higher percentage is of Ahmadis with 0.2%, followed by scheduled castes 0.1%. Other minorities like Christians, Hindu (jati) etc. are small in number. The proportion of population of Muslims in rural and urban areas is over 99%. Ahmadis in urban areas are 0.43 per cent and rural areas 0.16 per cent. Christians are more in urban areas as compared to their proportion in rural areas. Siraiki is the predominant language being spoken in the district, representing 80% of the population, followed by Baluchi spoken by 14%, Urdu 3% and Punjabi 1%. Others speak Sindhi, Pashto, Baravi and Dari.
2. Of the total economically active population 75.2 per cent were registered as employed in 1998. Nearly three-quarters (72.6%) were self employed, 10% were private employees and 6% government employees. Unpaid family helpers were recorded as 10%. The difference in proportions of employed population was significant between the genders in both urban and rural residences.
3. The main occupation of women in rural areas of South Punjab is house-keeping which includes attending to the cattle, extracting butter and Ghee from milk, weaving and sewing of family clothes. In addition women generally help the men on farmswith the lighter duties like transplanting of seedlings, threshing and winnowing of grains and sometimes they also help in harvesting. In the cities women are housewives or work as professional’s doctors, nurses, teaching.
4. Seraiki, Riyasati and Majhi Dialects of Punjabi language is mostly widely spoken and understood, however Haryanvi dialect (5%) of Eastern Punjab are also spoken by a huge population. In Cholistan area Cholistani dialect of Rajhistani is spoken. English is only understood by the educated.

### Education and Literacy

1. The literacy ratio in South Punjab increased from 16% in 1981 to 31% in 1998. The literacy ratio for males is 42% and 18% for females. Literacy rate of household members aged 10 years or more who are literate according to MICS Punjab, 2007-08 is 55.2% for male and 34.4% for females. Literacy is much higher in urban areas compared with rural areas for male and female.

### Health Facilities

Sufficient health facilities are available. The detail of health facilitiesis given in the Table-4.1.

**Table 4.1: Healthcare Facilities in Southern Punjab**

| **District** | **Hospital(s) (150 beds & above)** | **District**  **Head-quarter (s)** | **Tehsil Head-quarter (s)** | **Basic Health Unit (s)** | **Rural Health Centre (s)** | **Maternity Community Health Centre (s)** | **T.B Clinic (s)** | **Others (sub health centers, dispensaries and private facilities)** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pakpattan | - | 1 | 1 | 74 | 6 | 1 | 1 | - |
| Lodhran | - | 1 | 2 | 50 | 4 | - | - | - |
| Bahawalnagar | - | 1 | 4 | 101 | 10 | 7 | 3 | 91 |
| Bahawalpur | 8 | - | - | 73 | 12 | 2 | 3 | 95 |
| Multan | 14 | - | 2 | 67 | 8 | 13 | 3 | 91 |
| Vehari | - | 1 | 2 | 76 | 6 | 3 | - | 4 |
| Khanewal | 8 | - | - | 82 | 4 | 11 | 2 | 29 |
| Sahiwal | 9 | 1 | - | 74 | 9 | 9 | 1 | 47 |
| Rajanpur | - | 1 | - | 32 | 6 | 1 | - | 2 |
| Rahim Yar Khan | 4 | - | - | 102 | 17 | - | - | - |
| Muzaffargarh | - | 1 | 2 | 71 | 20 | 4 | - | 3 |
| D.G. Khan | 6 | - | - | 52 | 9 | 6 | 1 | 69 |
| Layyah | - | 1 | 2 | 42 | 3 | 1 | - | 10 |

### Cultural Heritage and Community Structure

1. There are no officially protected heritage sites or historic, religious or archeologically important sites located in the sub-project works areas. There are no major historic or archaeological features of note but there are a few places of worship within about 500 m of the works.

# SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

## IMPACT ASSESSMENT AND MITIGATION

1. The PDEIP TRANCHE – IV (Savings) has 03 new DGS substation (New 132 KV Punjab Government Employees Housing Scheme DGS, New 132KV Buch Villas DGS& New 132KV Sanjarpur DGS), Conversion from 66KV to 132KV of 02 existing DGS substations (Choti, Yazman) , construction of 05 SDT transmission lines (for PGEHS, Buch Villas, Sanjapur, Choti, Yazman).The sensitive receivers (SR), structures of houses, schools, colleges, factories, are more than 125m away from the TL RoW and there are no sensitive receivers or structures close to the TL RoW which could be possibly affected by certain activities of the subprojects works.
2. The location and scale of the works are very important in predicting the environmental impacts. This process of impact prediction is the core of the EIA process and it is critical that the recommendations and mitigation measures are carried out accordingly with reference to the conditions on the ground in the affected areas in the spirit of the environmental assessments process. In this section the potential environmental impacts are reviewed. If impacts are predicted to be significant enough to exceed accepted environmental standards, mitigation is proposed in order to reduce residual impact to acceptable levels and achieve the expected outcomes of the project being implemented. Therefore, it is essential that a proper analysis is carried out during the project planning period. In this regard, the impact prediction plays a vital role as these predictions are used for developing mitigation measures and any alternative options, if appropriate. When the detailed designs are completed the impacts and mitigation measures will need to be further reviewed to take account of how the contracts are set up and in the light of any fine tuning of the sub-projects.
3. The environmental management plan (**Section 6**and **Annex-2**) has been compiled based on the available information and shall be reviewed in due course at project inception and through construction in order to feed back and [provide revised mitigation for any significant unpredicted impacts. The analysis primarily the key environmental issues likely to arise from sub-project implementation, to prescribe mitigation measures to be integrated in the project design, to design monitoring and evaluation schedules to be implemented during sub-project construction and operation, and to estimate costs required for implementing sub-project mitigation measures. The EMP plan must be reviewed when the sub-projects reach the inception stage by the project management and be approved before any construction activity is initiated, to take account of any subsequent changes and fine tuning of the proposals.

## GENERAL APPROACH TO MITIGATION

1. During the preparation for the sub-project construction phase the future contractors must be notified and prepared to co-operate with the executing agency, project management, supervising consultants and local population in the mitigation of impacts. Furthermore the contractor must be primed through bidding stages and the contract documentation to implement the EMP in full and be ready to engage trained environmental management staff to audit the effectiveness and review mitigation measures as the project proceeds. The effective implementation of the EMP will be audited as part of the loan conditions and the executing agency (PEPCO) must be prepared for this. In this regard the MEPCO must fulfill the requirements of the law and guidance prepared by Pak-EPA on the environmental aspects of power projects and the recommendations already made for sub-projects in this EIA report and under Pakistan’s Environmental Protection Act.
2. The location of the residences, temples, schools, hospitals and civic cultural and other heritage sites has been reviewed in **Section 3& 4**. There could be some potential impacts in the construction stage from disturbance and significant noise and dust. However, the alignment is through cultivated fields and or hilly barren area, and no receptors such as residences, mosques or schools close enough to the alignment to be significantly affected by the works.
3. Work on the tower sites could cause some generation of air borne dust, but any nuisance from this is likely to be very localized and temporary. Other project activities, e.g. movement of heavy vehicles on unpaved tracks during the works, could generate considerable dust. Water is available in the study area, although surplus water may not always be available to suppress dust at vulnerable locations in the dry season. Therefore as a general approach it is recommended that where works are within 15m of any residential sensitive receivers, the contractor should install segregation between the works and the edge of the sensitive receivers. The segregation should be easily erectable 2.5m high tarpaulin sheet and designed to retain dust and provide a temporary visual barrier to the works. Where dust is the major consideration the barrier can take the form of tarpaulins strung between two poles mounted on a concrete base. These can be moved along from tower base to tower base as the work proceeds.
4. Noise from the construction of the towers should not be a major consideration unless very close to schools or hospitals where construction should be avoided at sensitive times. In addition to the physical effect of mitigating dust and noise with barriers installation of such measures should be discussed with the local population and serve as a vehicle for further public consultation at the implementation stage to assist in public relations.The location of mosques and other cultural and other heritage SR sites has been reviewed in **Section 4**. There are no mosques or other religious sites close to the TL RoW.

## POTENTIAL ENVIRONMENTAL IMPACTS IN CONSTRUCTION

### Encroachment, Landscape and Physical Disfiguration

1. The extent of TRANCHE – IV (Savings) is well within the existing landscape or impacts associated with physical disfiguration of the urban cityscape or rural landscape are expected from construction.The extent of the proposed power expansion is moderate and should not extend beyond the power corridor (RoW) created by the subproject. Therefore, no significant landscape impacts are expected from construction of the four Transmission Lines.
2. Potential disfiguration of the landscape can however result from the uncontrolled excavation of raw materials such as rock, gravel and sand from neighboring areas. Extraction of rock based materials is not necessary on these sub-projects and is already banned by the authorities except under license.

### Cut and Fill and Waste Disposal

1. The TRANCHE – IV (Savings)conversion and new construction sub-projects should not require any significant cutting and filling but minor excavations and piling will be required in the DGS where the new transformers are to be located to create the footings. The Transmission Line Subproject work should not involve any significant cutting and filling but minor excavations (down to 4m) and piling may be required to create the foundations for the towers. It is envisaged (depending on the mode of contract) that the surface under the towers will need to be scrabbled to remove unstable materials, or to stockpile topsoil.
2. Mitigation measures must focus on the minimization of impacts. In order to allow the proper functioning of the settlement sites (access to villages) during construction it is recommended that consideration be given to erect temporary hoardings immediately adjacent to the nearest houses and shops if they are within 15m of the power distribution line tower construction.
3. If surplus materials arise from the removal of the existing surfaces these can be used elsewhere on the sub-projects before additional soil rock, gravel or sand extraction is considered. The use of this immediately available material will minimize the need for additional rock based materials extraction. The extraction of raw materials should be minimized by the re-use on-site for landscaping of all rock and soil based materials extracted for excavation of foundations etc. The subproject detailed designers have so far estimated that no substantial additional materials will be required.
4. The material (cement, sand and aggregate) requirement of a typical 132 KV sub station (about 150 cu.m) and a 132 KV transmission tower (4.8 cu.m, or 40 bags of cement per tower) are not large. In transmission line construction sand and aggregate are delivered directly to the tower location from the quarry / source, there is no intermediate or bulk storage of these materials.Similarly construction materials for the sub station are stored within the sub station site are scheduled as per the work progress (which is staggered as the buildings which require bulk of the construction materials are built in phases over 6 to 12 months period), which means that at any given point in time the amount of construction material stored is not significant. The quantities of construction material required for a typical sub station or transmission tower are not so larger that they potentially represent a traffic hazard , these requirements are time dispersed in case of sub stations and time and space dispersed in case of transmission lines. Contractual clauses should be included to require each contractor to produce a materials management plan (one month before construction commences) to identify all sources of cement and aggregates and to balance cut and fill.
5. Mitigation measures shall seek to control the impacts at source in the first place. The construction supervising consultant (engineer) shall be responsible to update the cut and fill estimates and create Materials Master Plan to facilitate materials exchange between the different contracts in the TRANCHE – IV (Savings) sub-projects to provide an overall balance for materials and minimize impacts on local resources.
6. Decommissioning and disposal of discarded material for the subproject will be recycled and reused within the PEPCO system. And no waste will be generated that can be classified as hazardous and requiring special disposal.

### Trees, Ecology and Protected Areas

1. Surveys have been made at all sub-project locations and whereas trees are present in some sub-stations there should not be any need for disturbance of trees in the Tranche-4 (Savings) extension and .
2. There are no reserved or protected forests or trees near the GS site or TL alignment. The Transmission lines will require the installation of towerswhich will be installed for TL route and will not affect many trees. However, in case of removal of any tree on private or forest land during the works, written permission should be sought.
3. If for some unforeseen reason or change of alignment, any trees with religious significance or other trees need to be removed, written permission should be obtained from the forest authority and the owner after written justification by MEPCO. Trees shall be planted to replace the lost trees with three trees planted to replace every cut tree (3:1) or more as agreed with the authority.
4. At this stage no areas require removal of woodland. However if specimen trees of religious plantations are affected the owners should be given the resources and opportunity to reinstate the woodland long term and a plantation compensation plan should be drawn up to replant the woodland/trees. In the event that the land is not suitable for plantation then other areas should be identified to replace the cut trees and sufficient areas should be identified to allow plantation of trees at a rate of say 3:1. The replacement ration should allow for a high mortality rate among the newly planted trees in the dry environment or otherwise as based on advice from the forest authority.
5. A requirement shall be inserted in the contracts that no trees are to be cut within the Grid Stations, on the Transmission Line route or outside without the written permission from the Supervising Consultant who may permit the removal of trees if unavoidable on safety, technical or engineering grounds after written justification.

### Hydrology, Sedimentation, Soil Erosion

1. The TRANCHE – IV (Savings) are all on flat sites and should only require minor excavations and piling. Therefore there is little potential for the works to have impact on local water resources. There should be no need for erosion control and there should not be any significant runoff from stockpiles.
2. The drainage streams en-route of the Transmission Line subprojects should not be impeded by the works. The scale of the works does not warrant hydrological monitoring.

### Air Pollution from Earth Works and Transport

1. Field observations indicate that ambient air quality is generally acceptable and that emissions from traffic and other powered mechanical equipment in the area are rapidly dispersed. There will be a few items of powered mechanical equipment to be used in the construction of the distribution line works that may give rise gaseous emissions. However these should be well dissipated. The major sources of complaint will likely be any necessary earthworks and local soil compaction.
2. Major earthworks are not envisaged but minor excavations and piling will be required which can contribute to increasing dust. However the scale of the works at any one location is not likely to cause excessive dust. Therefore dust control from works at this scale should be easy to achieve at little extra cost. In order to avoid complaints of dust nuisances the following mitigation measures should be carried out as a matter of good housekeeping:
3. Dust suppression facilities (back pack water sprayer) shall be available where earth and cement works are required.
4. Areas of construction (especially where the works are within 20m of the SRs) shall be maintained damp by watering the construction area.
5. Construction materials (sand, gravel, and rocks) and spoil materials will be transported trucks covered with tarpaulins.
6. Storage piles will be at least 30m downwind of the nearest human settlements.
7. All vehicles (e.g., trucks, equipment, and other vehicles that support construction works) shall be well maintained and not emit dark or smoky emissions in excess of the limits described in the NEQS.
8. At any given point in time the amount of construction material stored is not significant. The quantities of construction material required for a typical substation or transmission tower are not so large that they potentially represent a traffic hazard, these requirements are time dispersed in case of substations and time and space dispersed in case of transmission lines
9. The need for large stockpiles should be minimized by careful planning of the supply of materials from controlled sources. If large stockpiles (>25m3) are necessary they should be enclosed with side barriers and covered with tarpaulins when not in use and at the end of the working day to enclose dust.

### Noise, Vibration and Blasting

1. It is anticipated that powered mechanical equipment and some local labour with hand tool methods will be used to construct the subproject works. No blasting is anticipated. Powered mechanical equipment can generate significant noise and vibration. The cumulative effects from several machines can be significant. To minimize such impacts, the contractor for subproject should be requested by the construction supervision consultants (engineer) to provide evidence and certification that all equipment to be used for construction is fitted with the necessary air pollution and noise dampening devices to meet NEQS requirements.

**Table 5.1 National Environmental Quality Standards for Noise**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S No.** | **Category of Area/Zone** | **Effective from 1st July, 2010** | | **Effective from 1st July, 2012** | |
|  |  | **Limit in dB(A) Leq\*** | | | |
|  |  | Day time | Night time | Day time | Night time |
| 1. | Residential are (A) | 65 | 50 | 55 | 45 |
| 2. | Commercial area (B) | 70 | 60 | 65 | 55 |
| 3. | Industrial area (C) | 80 | 75 | 75 | 65 |
| 4. | Silence zone (D) | 55 | 45 | 50 | 45 |

Note:

1. Day time hours: 6 .00 am to 10.00 pm
2. Night Time hours: 10.00 pm to 6.00 am
3. Silence zone: Zones which are declared as such by the competent authority. An area comprising not less than 100 meters around hospitals, educational institutions and courts and courts.
4. Mixed categories of areas may be declared as one of the four above-mentioned categories by the competent authority.
5. dB(A) Leq: time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.
6. Noise will be monitored at a distance of 100m from the boundary wall of any residential unit and should follow the NEQS of 45dB(A).
7. It is recommended that no construction should be allowed during nighttime (9 PM to 6 AM) Any noisy equipment should be located within DGS or as far from SRs as possible to prevent nuisances to dwellings and other structures from operation. However, if the noise still exceeds NEQS then noise barriers will be installed around the equipment to reduce the effects of the noise.
8. Vibration from construction of piles to support pads may be required for some tower construction and may be a significant impact but this should be short duration. Where vibration could become a major consideration (within say 100m of schools, religious premises, hospitals or residences) a building condition survey should take place prior to construction. The physical effect of piling should be assessed prior to construction and measures should be discussed with the local population as well as timing of the works to serve as a vehicle for further public consultation at the implementation stage and to assist in public relations. At nearby schools, the contractor shall discuss with the school principals the agreed time for operating these machines and completely avoid machine use near schools during examination times, if such a need arises.

### Sanitation, Solid Waste Disposal, Communicable Diseases

1. The main issues of concern are uncontrolled disposal of waste by construction workers, unmanaged disposal of solid and liquid wastes into watercourses and natural drains. In order to maintain proper sanitation around construction sites the workforce will be allowed to use the flush toilets in the sub-station control facilities.
2. Construction worker camps will not be necessary, based on the scale of the works needed. If for some unforeseen reason a larger workforce is needed any construction camp should not be located in settlement areas or near sensitive water resources and portable lavatories or at least pit latrines should be provided.
3. There should not be any significant amounts of waste from the works and because the works will be under close supervision of the MEPCO authority, these issues can be controlled at source.
4. Wherever water is allowed to accumulate, in temporary drainage facilities, due to improper storm water management, or improper disposal of wastewater generated from the site, it can offer a breeding site for mosquitoes and other insects. Vectors such as mosquitoes may be encountered if open water is allowed to accumulate at the subproject site. Temporary and permanent drainage facilities should therefore be designed to facilitate the rapid removal of surface water from all areas and prevent the accumulation of surface water ponds.

## POTENTIAL IMPACTS IN THE OPERATIONAL STAGE

### Air Pollution and Noise from the Enhanced Operations

1. Based on observations of many different types of transformer at TRANCHE – IV (Savings) extension, new DGS and T/line sub-projects sites, noise and vibration should not be a nuisance to any nearby SRs. Although one transformer will be added for the extension projects the incremental addition to noise levels will not cause a significant disturbing effect for the SRs in the vicinity of the sub-projects.
2. Some switchgear that may be installed may contain SF6. Typically losses of the SF6 gas are very minor in the operational phase but it is noted that all halogenated gases can potentially accrue “greenhouse gas effects” if they are released in significant quantities. However well installed SF6 equipment should not leak significant amounts of gas and in leakage is checked routinely from all such equipment. If there is a suspicion that there has been a leak of sulphur hexafluoride or by products at any substation the immediate substation area should be evacuated, the controlling engineer must be informed, pending investigation by an authorized person. Thus atmospheric environmental impacts from SF6 can be mitigated and are not expected to be significant.
3. The new substationconstruction and the extended level of operation of the facility is not likely to cause any appreciable increase in the noise level already generated by the existing equipment. However, it is recommended that an acoustical check be made on the detailed design to determine of any noise barriers are required.
4. The Transmission Line subproject works will extend the power distribution lines but no houses, mosques or schools will be close to the new TL in the operational phase. There should be no source of atmospheric pollution from the subproject.
5. In the operational phase any nearby industrial facilities with fuel powered mechanical equipment will be the main polluters. All such emissions will be very well dissipated in the open terrain and there will be no cumulative effect from the subproject.

### Pollution from Oily Run-off, Fuel Spills and Dangerous Goods

1. No significant impacts from oily residues such as transformer oil and lubricants are expected to arise in this subproject. However control measures will be needed for oily residues such as transformer oil and lubricants in the case of accidental or unexpected release. Transformer oil is supplied in drums from an imported source and tap tanks are topped up as necessary on site. There are facilities in some sub-project DGS maintenance yards for recycling (dehydrating) oil for breakers. However the areas upon which these recycling facilities are located have no dedicated drainage which can capture run-off. Oily residues and fuel should be captured at source and refueling and maintenance should take place in dedicated areas away from surface water resources.
2. No significant impacts should be allowed to arise in sub-projects. However control measures will be needed for oily residues such as transformer oil and lubricants in the case of accidental or unexpected release. Transformer oil is supplied in drums from an imported source and tap tanks are topped up as necessary on site. There are facilities in some subproject DGS maintenance yards for recycling (dehydrating) oil from breakers. However the areas upon which these recycling facilities are located have no dedicated drainage which can capture run-off. Oily residues and fuel and any contaminated soil residues should be captured at source and refueling and maintenance should take place in dedicated areas away from surface water resources. Contaminated residues and waste oily residues should be disposed at a site agreed with the local authority. DISCOs are served by the Technical Services Group (TSG), TSG prepare a detailed routine maintenance schedule for each piece of hardware.TSG also supervise and monitors the implementation of this schedule by Grid System Operation (GSO). Transformer oil has a long life (typically over 15 years, which depends upon the level of load the transformer serves). Oil spills are very rare and are should preempted by routine maintenance. TSG and GSO have a written down procedure to deal with oil spills.
3. If for some reason there are oily releases, they be cleaned up immediately. TSG ensure that the maintenance schedule of each piece of hardware is adhered to. DISCOs have also established a safety unit, which among other tasks , investigates all accidents .Frequency of accidents, on average is about 1 per DISCO per year (based on last 4 years record), about 60% of these are non-fatal. Most accidents occur due to staff and supervision negligence. Detailed report of each accident is prepared.
4. MEPCO already prohibits use of PCBs in new power transformers, there is however, need to prepare an inventory of any PCB carrying equipment in the system and all such equipment be replaced. The maintenance instructions prepared by the Technical Services Group needs to be reviewed and revised to add PCB based equipment maintenance and a procedure for handling any PCB spills. The Kot Lakhpat and Shalimar workshops already follow such procedures, however, these needs to be reviewed and upgraded in the light of best international practice. This would include provision of special clothing availability of oil absorptive solvents, availability of steel containers. Training to staff on oil spills and special care during transportation of equipment using PCB’s is required.

### Prevention of Ground Contamination

1. Transformer oil and lubricants that may be released in the operational stage from maintenance and from a catastrophic failure would result in loss of all transformer oil. Transformer oil is supplied in drums from an imported source and tap tanks are topped up as necessary on site. The transformers, transformer oil stocks and the transformer oil dehydration machines are not installed on impervious surfaces. Therefore in order to be in line with best international practice some mitigation measures are required to prevent soil contamination.
2. The areas upon which the new transformers, transformer oil stocks and the transformer oil dehydration machines located should have an impervious surface with bunding and high enough edges to capture 110% of the total volume of oil that is housed within the bunded area. Oil and oily residues should therefore be captured at source and maintenance should take place in these dedicated areas away from surface water resources. With such mitigation installed no impacts should arise in sub-projects. A programme to introduce bunding in all substations should be introduced in the medium to long term as the transformers are upgraded or replaced as resources permit.

### Enhancement

1. Environmental enhancements are not a major consideration within the numerous TRANCHE – IV (Savings) project sites. However it is noted that it is common practice at many such sites to create some local hard and soft landscaping and successful planting of fruit trees and shrubs has been accomplished in many sites. This practice should be encouraged as far as practicable.
2. Other opportunities for enhancements can be assessed prior to construction and proposed enhancements should be discussed with the local population to serve as a vehicle for further public consultation at the implementation stage and to assist in public relations. Trees removed for construction purposes should be replaced as compensation in line with best practice at ratio of three replaced for one removed however additional trees should be planted as enhancements where there is space in the DGS and along the Transmission Line.

# INSTITUTIONAL REQUIREMENTS & ENVIRONMENTAL MANAGEMENT PLAN (EMP)

1. In this section, the mitigation measures that are required for the TRANCHE – IV (Savings) subprojects, to reduce residual impact to acceptable levels and achieve the expected outcomes of the project, are discussed. The Environmental Management Plan is based on the type, extent and duration of the identified environmental impacts for the under study TRANCHE – IV (Savings) subprojects. The EMP has been prepared following best practice and by reference to the National Law ADB Safeguards Policy Statement (SPS, 2009).
2. It is important that the recommendations and mitigation measures are carried out according to the spirit of the environmental assessment process and in line with the guidelines. The EMP matrix is presented as **Annex-2.** The impact prediction (**Section-4&5**) has played a vital role in reconfirming typical mitigation measures and in identifying any different approaches based on the feasibility and detailed design assumptions and any alternatives available at this stage.
3. Prior to implementation and construction of the subprojects the EMP shall be amended and reviewed by the MEPCO in due course after detailed designs are complete. Such a review shall be based on reconfirmation and additional information on the assumptions made at this feasibility stage on positioning, alignment, location scale and expected operating conditions of the subprojects. For example, in this case if there are any additional transmission lines or extension of the substation boundaries to be included, the designs may be amended and then the performance and evaluation schedules to be implemented during project construction and operation can be updated and costs estimates can be revised. The Environmental Assessment Report and EMP should than be revised on a subproject by subproject basis.
4. The Environmental Impact Assessment Report and EMP must be reviewed by the project management and approved by the concerned EPA before any construction activity is initiated. This is also an ADB requirement in order to take account of any sub-sequent changes and fine tuning of the proposals. It is recommended that, before the works contract is worked out in detail and before pre-qualification of contractors, a full extent of EMP is included in the bidding documents. Professional experience indicates that past environmental performance of contractors and their awareness of environmentally responsible procurement should also be used as indicator criteria for the prequalification of contractors.
5. In order to facilitate the implementation of the EMP, during the preparation for the construction phase the MEPCO must prepare the future contractors to co-operate with all stakeholders in the mitigation of impacts. Furthermore the contractor must be primed through the contract documentation and ready to implement all the mitigation measures. MEPCO will need to engage at least one trained environmental management staff and the staff should audit the effectiveness and review mitigation measures as the subprojects are rolled out. The effective implementation of the EMP will be audited as part of the midterm review of loan conditions and the executing agency must prepare for this at the inception stage.
6. The detailed EMP is given in the **Annex-2.**The impacts have been classified into those relevant to the design/preparation stage, construction stage and operation and maintenance stage. The matrix provides details of the mitigation measures recommended for each of the identified impacts, time span of the implementation of mitigation measures, an analysis of the associated costs and the responsibility of the institution. The institutional responsibility has been specified for the purpose of the implementation and the supervision. The matrix is supplemented with a monitoring plan **(Annex-3)** for the performance indicators. An estimation of the associated costs for the monitoring is given with the plan. The EMP has been prepared following best practice and the ADB’sSafeguard Policy Statement (SPS), 2009.
7. Prior to implementation of the subproject, the MEPCO needs to comply with several environmental requirements, such as submitting of EIA report to concerned EPA and obtaining EPA clearance (“No Objection Certificate” compiling acceptable EMP and Clearance Certificate) under PEPAct-1997 (guidelines and regulations 2000) and any other permissions required from other authorities. MEPCO will also need to confirm that contractors and their suppliers have complied with all statutory requirements and have appropriate and valid licenses and permits for all powered mechanical equipment and to operate in line with local authority conditions.
8. MEPCO has only one(01) Assistant Manager (Social) who also looking after the charge of Deputy Manager (Environment& Safeguard) while the seat of Assistant Manager (Environment) is vacant.The Environment & Social Safeguard (E&SS) Section of MEPCO is fully functional. It is envisaged that experience in this field should therefore develop in the near future. However it is also strongly recommended that for subprojects in future the MEPCO shall be prepared to engage more support where necessary. The appointed staff has to have a good level of awareness and will be responsible for addressing environmental concerns for subprojects potentially involving hundreds kilometers of distribution lines and DGS. Whereas some of their work may in future be delegated to consultants they will need more training and resources if they are effectively provide quality control and oversight for the EMP implementation. They will require robust support from senior management staff members and the management consultant if they are to address all environmental concerns for the subprojects effectively. Specific areas for immediate attention are in EMP auditing, environmentally responsible procurement, air, water and noise pollution management and ecological impact mitigation.
9. It is also recommended that MEPCO Board allow direct reporting to Board level from the in-house Environmental and Social Safeguard Unit (E&SS). If the E&SS Section requires resources for larger subprojects then environmental specialist consultants could be appointed through the project implementation unit to address all environmental aspects in the detailed design. It is recommended that the project management unit (PMU) should liaise directly with the E&SS to address all environmental aspects in the detailed design and contracting stages.
10. Overall implementation of the EMP will become MEPCO’s responsibility. MEPCO and other parties to be involved in implementing the EMP are as follows:
11. ***Contractors*:** responsible for carrying out the contractual obligations, implementing all EMP measures required to mitigate environmental impacts during construction;
12. The ***MEPCO Board of Directors*** will be responsible to ensure that sufficient timely resources are allocated to process the environmental assessments and to monitor implementation of all construction and operational mitigation measures required to mitigate environmental impacts.
13. Other ***government agencies*** such as the Pak-PEPA, Punjab - EPA and state pollution authorities, Department of Forests, Department of Wildlife Services, who will be responsible for monitoring the implementation of environmental conditions and compliance with statutory requirements in their respective areas and local land use groups at the local levels.
14. Considering that other government agencies that need to be involved in implementing the EMP, training or harmonization workshops should be conducted for all Environmental and Social Safeguard Section (E&SS) in all DISCOS every six months, for the first 2 years (and annually thereafter) to share the monitoring report on the implementation of the EMP in each DISCO and to share lessons learned in the implementation and to achieve a consistent approach decide on remedial actions, if unexpected environmental impacts occur.
15. The monitoring plan **(Annex-3 & 5)** was designed based on the project cycle. During the preconstruction period, the monitoring activities will focus on (i) checking the contractor’s bidding documents, particularly to ensure that all necessary environmental requirements have been included; and (ii) checking that the contract documents’ references to environmental mitigation measures requirements have been incorporated as part of contractor’s assignment and making sure that any advance works are carried out in good time. Where detailed design is required (e.g. for power distribution lines and avoidance of other resources) the inclusion and checking of designs must be carried out. During the construction period, the monitoring activities will focus on ensuring that environmental mitigation measures are implemented, and some performance indicators will be monitored to record the Subprojects environmental performance and to guide any remedial action to address unexpected impacts.
16. At this stage, due to the modest scale of the new power distribution projects and by generally keeping to non-sensitive and non-critical areas, the construction and operational impacts will be manageable. No insurmountable impacts are predicted providing that the EMP is implemented to its full extent and required in the contract documents. However experience suggests that some contractors may not be familiar with this approach or may be reluctant to carry out some measures. In order that the contractors are fully aware of the implications of the EMP and to ensure compliance, it is recommended that environmental measures be coasted separately in the tender documentation and that payment milestones are linked to environmental performance, *viza viz*the carrying out of the EMP.
17. The effective implementation of the EMP will be audited as part of the ADB loan conditions and the executing agency must be prepared for this. In this regard the MEPCO (the IA) must be prepared to guide the design engineers and contractors on the environmental aspects.

**Summary of Estimated Costs for EMP**

**Implementation for TRANCHE – IV (Savings)**

|  |  |  |  |
| --- | --- | --- | --- |
| Activities | Description | Estimated Cost | |
| **Pak. Rs.** | US $ |
| **Monitoring activities** | As detailed under EMP | 9314375 | **87,500** |
| **Mitigation measures** | As prescribed under EMP and EIA | 3193500 | **30,000** |
| **Capacity building Program** | Training for Staff & Management | 2448350 | **23,000** |
| **Transport** | Dedicated vehicle for ESC | 1999131 | **18,780** |
| **Contingency** | Contingency | 809020 | **7,600** |
| Total |  | 17,764,376 | 1,66,880 |

1 US$ = 106.45 Pak. Rupees (13-03-2017)

# PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

## APPROACH TO PUBLIC CONSULTATION

1. The public consultation (PC) process with various stakeholders for TRANCHE – IV (Savings) has been approached so as to involve public and other stakeholders from the earliest stages. Public consultation has taken place during the planning and design and viewpoints of the stakeholders have been taken into account and their concerns and suggestions for possible improvements have been included where appropriate. Much of the PC process to date has revolved around concerns for the mitigation of construction impacts and the possible side effects from the proximity of high voltage power linesand the GS and its equipment. PC has therefore been conducted for the sub-station and line sub-projects that may incur some impacts over land outside existing sub-stations.
2. There is also a requirement for ongoing consultation for land acquisition and resettlement plan (LARP). In this case Resettlement Plan (RP) is documented separately. It is expected that this process will continue through all stages of the subproject in order to accommodate stakeholders' aspirations and to orient the stakeholders positively towards the project implementation and where possible to harness cooperation over access issues in order to facilitate timely completion.

## PUBLIC CONSULTATION PROCESS

1. The public consultation process has commenced in the initial feasibility stages (prior to construction) in order to disclose the project information to the stakeholders and record feedback regarding the proposed project and preferences. The stakeholders involved in the process were the population likely to be impacted along the route of the proposed power lines; the village leaders and school teachers.
2. Prior to the implementation of the consultation, feedback, etc. has been carried out to support this EIA and recorded. The focus of attention has been the population near the proposed TL that may be affected by the Subproject implementation. The level of engagement varied from the stakeholder to stakeholder with some registering no major comment but it is noted that none registered any outright opposition to the subproject.
3. The disclosure of the enhancement project in advance and subsequent consultation with stake holders has advantages in the environmental assessment and mitigation of impacts. Public consultation can also provide a conduit for the improvement of the project implementation to better serve the stakeholders.
4. The environmental impact assessment process under the Pakistan Environmental Protection Act only requires the disclosure to the public after the statutory EIA has been accepted by the relevant EPA to be in strict adherence to the rules. In this Environmental Assessment Report, the consultation process was performed to satisfy the ADB requirements. The locations of consultation and people consulted are listed in the full table of public consultation presented in **Annex-4**.

## RESULTS OF PUBLIC CONSULTATION

1. The TRANCHE – IV (Savings) extension and in design, construction and operational stages is only likely to affect the areas within the DGS premises. There are unlikely to be any significant impacts outside the DGS except for perhaps temporary minor inconveniences to traffic when new transformers are transported to site. Therefore MEPCO is the major relevant stakeholder and MEPCO are in favour of and support their own sub-project proposals. However some consultation was also conducted with residents and other stakeholders near the MEPCO extension and augmentation subprojects (**Annex-4**) and the major concerns of the public, based on consultation at the substation projects, seems to be to get employment in the construction phases.
2. The consultations along the transmission line routes identified some potential environmental and social impacts and perceptions of the affected communities. (**Annex-4**). The community generally supports the construction of the GS and transmission lines. The local poor people predominantly requested for unskilled and semi skilled jobs on priority basis with the contractors during implementation of the project.
3. Land acquisition is involved for new 132 KV grid station for subprojects. However, compensation will be paid to the concerned parties / owners of land under the towers and where the loss of some trees and for damage to crops is expected.
4. On the basis of the consultations so far, it appears that the project will have no insurmountable environmental and social impacts but MEPCO will have to make sure that compensation and assistance amounts are assessed justly and that skilled and unskilled employment should be preferentially given to the AP as far as is reasonably practicable.

## Grievance Redress Mechanism

1. In order to receive and facilitate the resolution of affected peoples’ concerns, complaints, and grievances about the project’s environmental performance an Environmental Grievance Redress Mechanism (GRM) will be established for the project. The mechanism will be used for addressing any complaints that arise during the implementation of projects. In addition, the GRM will include a proactive component whereby at the commencement of construction of each project (prior to mobilization) the community will be formally advised of project implementation details by Environment Specialist of DISCO, Environment Specialist of SMEC, the Design and Supervision Consultant (DSC) and Environmental Specialist of the contractor (designs, scheduled activities, access constraints etc.) so that all necessary project information is communicated effectively to the community and their immediate concerns can be addressed. This proactive approach with communities will be pursued throughout the implementation of each project.
2. The GRM will address affected people's concerns and complaints proactively and promptly, using an understandable and transparent process that is gender responsive, culturally appropriate, and readily accessible to all segments of the affected people at no costs and without retribution. The mechanism will not impede access to the Country’s judicial or administrative remedies.
3. **Redress Committee, Focal Points, Complaints Reporting, Recording and Monitoring**
4. The Grievance Redress Mechanism (GRM), which will be established at each project level is described below:
5. EA will facilitate the establishment of a Grievance Redress Committee (GRC) and Grievance Focal Points (GFPs) at project location prior to the Contractor’s mobilization to site. The functions of the GRC and GFPs are to address concerns and grievances of the local communities and affected parties as necessary.
6. The GRC will comprise representatives from local authorities, affected parties, and other well-reputed persons as mutually agreed with the local authorities and affected persons. It will also comprise the Contractor’s Environmental Specialist, SMEC’s Environmental Specialist and PIU Safeguards/Environmental Specialist. The role of the GRC is to address the Project related grievances of the affected parties that are unable to be resolved satisfactorily through the initial stages of the GRM.
7. EA will assist affected communities/villages identify local representatives to act as Grievance Focal Points (GFP) for each community/village.
8. GFPs are designated personnel from within the community who will be responsible for i) acting as community representatives in formal meetings between the project team (contractor, DSC, PIU) and the local community he/she represents and ii) communicating community members’ grievances and concerns to the contractor during project implementation. The number of GFPs to be identified for each project will depend on the number and distribution of affected communities.
9. A pre-mobilization public consultation meeting will be convened by the EA Environment Specialist and attended by GFPs, contractor, DSC, PIU representative and other interested parties (e.g. District level representatives, NGOs). The objectives of the meeting will be as follows:
10. Introduction of key personnel of each stakeholder including roles and responsibilities;
11. Presentation of project information of immediate concern to the communities by the contractor (timing and location of specific construction activities, design issues, access constraints etc.) This will include a brief summary of the EMP - its purpose and implementation arrangements;
12. Establishment and clarification of the GRM to be implemented during project implementation including routine (proactive) public relations activities proposed by the project team (contractor, DSC, PIU) to ensure communities are continually advised of project progress and associated constraints throughout project implementation;
13. Identification of members of the Grievance Redress Committee, and
14. Elicit and address the immediate concerns of the community based on information provided above.
15. Following the pre-mobilization public consultation meeting, environmental complaints associated with the construction activity will be routinely handled through the GRM as explained below and shown on **Figure 7.1**.
16. Individuals will lodge their environmental complaint/grievance with their respective community’s nominated GFP.
17. The GFP will bring the individual’s complaint to the attention of the Contractor.
18. The Contractor will record the complaint in the onsite Environmental Complaints Register (ECR) in the presence of the GFP.
19. The GFP will discuss the complaint with the Contractor and have it resolved;
20. If the Contractor does not resolve the complaint within one week, then the GFP will bring the complaint to the attention of the DSC’s Environmental Specialist. The DSC’s Environment Specialist will then be responsible for coordinating with the Contractor in solving the issue.
21. If the Complaint is not resolved within 2 weeks the GFP will present the complaint to the GRC.
22. The GRC will have to resolve the complaint within a period of 2 weeks and the resolved complaint will have to be communicated back to the community. The Contractor will then record the complaint as resolved and closed in the Environmental Complaints Register.
23. Should the complaint not be resolved through the GRC, the issue will be adjudicated through local legal processes.
24. In parallel to the ECR placed with the Contractor, each GFP will maintain a record of the complaints received and will follow up on their rapid resolution.
25. EA will also keep track of the status of all complaints through the Monthly Environmental Monitoring Report submitted by the Contractor to the DSC and will ensure that they are resolved in a timely manner.

***Grievance Redress Committee***

**Affected Person through GFP**

Contractor

Not Redressed

Resolve through Local Legal Process

Redressed

Resolve with Implementation (DSC)Consultant

Redressed

Not Redressed

Appeal to Grievance Redress Committee

Redressed

Not Redressed

**Figure 7.1 Grievance Redress Mechanism**

# FINDINGS, RECOMMENDATIONS AND CONCLUSIONS

## FINDINGS AND RECOMMENDATIONS

1. This study was carried out at the planning stage of the project. Predominantly secondary data and site reconnaissance were used to assess the environmental impacts. The potential environmental impacts were assessed in a comprehensive manner. The report has provided a picture of all potential environmental impacts associated with the sub-projects, and recommended suitable mitigation measures.
2. There are some further considerations for the planning stages such as obtaining clearance for the project under the Punjab Environmental Protection Act (1997) (Amended 2012) but environmental impacts from the TRANCHE – IV (Savings) Power Distribution Enhancement Investment Project will mostly take place during the construction stage. There are also some waste management issues for the construction and operational stage that must be addressed in the detailed design and through environmentally responsible procurement. The impacts are likely to be broadly similar at most locations and impacts have been reviewed in the environmental impact section of this EIA report.
3. There are a number of key actions required in the detailed design phase. Prior to construction the MEPCO must receive clearance certification from the PEPA and MEPCO must complete an EMP that will be accepted by the PEPA and agreed by the contractor prior to signing the contract.
4. Land acquisition for new grid station is involved. However, some trees will be compensated to the concerned parties, if needed. However, provisions may be made in LARP, based on the proposed alignments these should not be difficult tasks and can be conducted as the detailed designs are worked out and to dovetail with the existing system and minimize adverse impacts and maximize benefits. A social impact assessment and resettlement action plan (LARP) has been completed in tandem with this Environmental Assessment report for the whole subproject. The study has:
   1. Examined and assessed the overall social and poverty profile of the project area on the basis of the primary and secondary data sources and preparation of a socio-economic profile of the project districts.
   2. Prepared a social and poverty analysis, taking into account socio-economic and poverty status of the project area of influence, including the nature, extent and determinants of poverty in the project area including assessment. In addition, estimation of the likely socioeconomic and poverty reduction impacts of the project should be included.
   3. Held consultations with relevant officials from the government and other relevant officials, including consultation with affected communities to assess responses to the project and ascertain the nature and scope of local participation in project planning and implementation.
   4. Identified, analyzed and, where appropriate, quantified the potential resettlement impacts (minimal) of the proposed Project on the area and the population.
5. Baseline monitoring activities should be carried out to establish the baseline of parameters for checking during the construction stage. The monitoring schedule (**Annex-5**) recommends monitoring on two occasions at the site location. The results should be integrated with the contract documentation to establish performance action thresholds, pollution limits and contingency plans for the contractor’s performance.
6. During the commissioning phase waste disposal monitoring should ensure that statutory requirements have been met. Monitoring activities during project operation will focus on periodic recording environmental performance and proposing remedial actions to address any unexpected impacts.

## CONCLUSION

1. There are no insurmountable environmental impacts for the TRANCHE – IV (Savings) Sub-Projects that are feasible and sustainable options from the power distribution, engineering, environmental, and socioeconomic points of view. Implementation of the EMP is required and the environmental impacts associated with the sub-project need to be properly mitigated, and the existing institutional arrangements are available. Additional human and financial resources will be required by the MEPCO to complete the designs and incorporate the recommendations effectively and efficiently in the contract documents, which should be linked to payment milestones. The proposed mitigation and management plans are practicable but require additional resources.
2. This Environmental Assessment, including the EMP, should be used as a basis for an environmental compliance program and be included as an appendix to the contracts. In addition, any subsequent conditions issued by concerned EPA as part of the environmental clearance should also be included in the environmental compliance program. Therefore, continued monitoring of the implementation of mitigation measures, the implementation of the environmental conditions for work and environmental clearance, and monitoring of the environmental impact related to the operation of the TRANCHE – IV (Savings) sub-projects should be properly carried out and reported at least twice per year as part of the project performance reports.

**MULTAN ELECTRIC POWER COMPANY**

**GOVERNMENT OF PAKISTAN**

**ENVIRONMENTAL IMPACT ASSESSMENT (EIA)**

**Of**

**Power Distribution Enhancement Investment Project (PDEIP) – Tranche – IV (Savings)**

**(ANNEXES)**

**Submitted to**

**Environmental Protection Agency (EPA), Punjab**

**Submitted By**

|  |  |
| --- | --- |
| **D:\Office Work 18-08-2013\MEPCO logo Final.jpg** | **Chief Engineer Development, PMU**  **Multan Electric Power Company**  **Government of Pakistan** |

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# ANNEX – 1

# LIST OF MEPCOSUBPROJECTS UNDER TRANCHE – IV (SAVINGS)

| **Project Number** | **Associated Project** | **Project Name** | **Type of Project** | **Quantity of Projects** | **Circuit Length** | **DISCO Estimated Cost (Millions PKR)** | **SMEC Estimated Cost excluding administrative costs** | **Transformers** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **New Substations** | | | | | | | | |
| M1 | M6 | PGEHS | New Substation | 1 |  | 338 |  | 2 X 26 MVA |
| M2 | M7 | Buch Villas | New Substation | 1 | 239 | 2 X 26 MVA |
| M3 | M8 | Sanjarpur | New Substation | 1 | 214 | 2 X 26 MVA |
|  |  |  | **Total New Substation** | **3** | **791** |  |
| **Conversion Subprojects** | | | | | | | | |
| M4 | M9 | Choti | Conversion from 66kV to 132kV | 1 |  | 228 |  | 2 X 26 MVA |
| M5 | M10 | Yazman | Conversion from 66kV to 132kV | 1 | 162 | 2 X 26 MVA |
|  |  |  | **Total Conversion from 66kV to 132kV** | **2** | **390** |  |
| **SDT Transmission Lines** | | | | | | | | |
| M1 | M6 | Feed for PGEHS | SDT | 1 | 3.4 | 42 |  |  |
| M2 | M7 | Feed for Buch Villas | SDT | 1 | 5.5 | 66 |  |
| M3 | M8 | Feed for Sanjarpur | SDT | 1 | 0.5 | 6 |  |
| M4 | M9 | Feed for Choti | SDT | 1 | 20 | 160 |  |
| M5 | M10 | Feed for Yazman | SDT | 1 | 18 | 218 |  |
|  |  |  | **Total SDT Transmission Line** | **5** | **47.4** | **492** |  |

# ANNEX - 2

# ENVIRONMENTAL MANAGEMENT PLAN – MATRIX

| **Environmental concern** | ***Objectives*** | **Mitigation Measures recommended** | **Timing to implement MM** | **Locations to implement MM** | ***Resp Imp MM*** | **Resp mon MM** |
| --- | --- | --- | --- | --- | --- | --- |
| ***DESIGN STAGE*** | | | | | | |
| ***1. Flora and Fauna*** | *To minimize damage to flora and fauna* | *1. Ensure that minimal flora is damaged*  *2. Ensure that fauna especially bird nesting’s are not damaged* | *Before the commencement of construction activities/during design stage* | *Flora and Fauna sensitive locations* | *ES SMEC* | *ES MEPCO* |
| ***2. Hydrological Impacts*** | *To minimize hydrological and drainage impacts during constructions.* | *1. Hydrological flow in areas where it is sensitive, such as water courses or bridges and culverts.*  *2. Design of adequate major and minor culverts facilities will be completed* | *Before the commencement of construction activities/during design stage* | *If lines or substation are relocated near water courses, culverts or bridges in the design stage reports* | *ES MEPCO with the ES SMEC (Design Consultant)* | *ES MEPCO* |
| **3. Noise barriers** | Ensure cumulative noise impacts are acceptable in construction and operational phase. | 1. Conduct detailed acoustic assessment for all residential, school, (other sensitive structures) within 50m of DGS and line.  2. If noise at sensitive receiver exceeds the permissible limit, the construction activities should be mitigated, monitored and controlled.  3. If noise at sensitive receiver exceeds the permissible limit, the design to include acoustic mitigation (noise barrier or relocation of noisy equipment) and monitoring. | 1. During detailed design stage. No later than pre-qualification or tender negotiations.  2. Include acoustic specification in the contract. | Noise sensitive locations identified in the IEE/EIA/EMP or as required / approved by PEPA. | *ES MEPCO with the ES SMEC (Design Consultant)* | ES MEPCO and ES SMEC |
| **4. Waste disposal** | Ensure adequate disposal options for all waste including transformer oil, residually contaminated soils, scrap metal. | 1. Create waste management policy and plan to identify sufficient locations for, storage and reuse of transformers and recycling of breaker oils and disposal of transformer oil, residually contaminated soils and scrap metal “cradle to grave”.  2. Include in contracts for unit rates for re-measurement for disposal.  3. Designate disposal sites in the contract and cost unit disposal rates accordingly. | 1.Prior to detailed design stage no later than pre-qualification or tender negotiations  2. Include in contract. | MEPCO ESU. Locations approved by EPA and MEPCO and local waste disposal authorities. | *ES MEPCO with the ES SMEC (Design Consultant)* | *ES MEPCO with the ES SMEC* |
| **5. Temporary drainage and erosion control** | Include mitigation in preliminary designs for erosion control and temporary drainage. | 1. Identify locations where drainage or irrigation crossing RoW may be affected by works.  2. Include protection works in contract as a payment milestone(s). | During designing stage no later than pre-qualification or tender negotiations. | Locations based on drainage or irrigation crossing RoW near DGS. | *ES MEPCO with the ES SMEC* | *ES MEPCO with the ES SMEC* |
| **6. Contract clauses** | Ensure requirements and recommendations of environmental assessment are included in the contracts. | 1. Include EMP Matrix in tender documentation and make contractors responsible to implement mitigation measures by reference to EIA/IEE in contract. 2. Include preparation of EMP review and method statement WM plan, TD and EC Plan in contract as a payment milestone(s). 3. Require e*nvironmental accident checklist and a list of controlled chemicals / substances to be included in the contractor’s work method statement and tender documentation.* | 1. During tender preparation. 2. No later than pre-qualification or tender negotiations 3. In bidding documents as evaluation criteria. | Noise sensitive locations identified in the IEE/EIA/EMP or as required / approved by PEPA. | *ES MEPCO with the ES SMEC* | *ES MEPCO with the ES SMEC* |
| ***CONSTRUCTION STAGE*** | | | | | | |
| 1. ***Hydrology And Drainage Aspects*** | *To ensure the proper implementation of any requirements mentioned in EPA conditions of approval letter in relation to Hydrology of the project.* | *1. Consideration of weather conditions when particular construction activities are undertaken.*  *2. Limitations on excavation depths in use of recharge areas for material exploitation or spoil disposal.*  *3. Use of landscaping as an integrated component of construction activity as an erosion control measure.*  *4. Minimizing the removal of vegetative cover as much as possible and providing for it s restoration where construction sites have been cleared of such areas.* | *Prepare a thorough drainage management plan to be approved by CSC one month prior to a commencement of construction*  *Proper timetable prepared in consideration with the climatic conditions of the area, the different construction activities mentioned here to be guided.* | *1. Locations of each construction activity to be listed by the CSC engineer.*  *2. Special locations are identified on the site by the contractor to minimize disturbances.*  *3. A list of locations of irrigation channels / drains to be compiled and included in the contract.* | *ES Contractor* | *ES SMEC and*  *ES MEPCO* |
| ***2. Orientation for Contractor, and Workers*** | *To ensure that the CSC contractor and workers understand and have the capacity to ensure the environmental requirements and implementation of mitigation measures.* | *1. MEPCO ESU environmental specialist to monitor and progress all environmental statutory and recommended obligations.*  *2 Conduct special briefing for managers and / or on-site training for the contractors and workers on the environmental requirement of the project. Record attendance and achievement test for contractors site agents.*  *3. Agreement on critical areas to be considered and necessary mitigation measures, among all parties who are involved in project activities.*  *4. Continuous progress review and refresher sessions to be followed.* | *Induction course for all site agents and above including all relevant MEPCO staff / new project staff before commencement of work.*  *At early stages of construction for all construction employees as far as reasonably practicable.* | *All staff members in all categories. Monthly induction and six month refresher course as necessary until contractor complies.* | *MEPCO ES, Contractor and ES SMEC* | *ES MEPCO with the ES SMEC .* |
| ***3. Water quality*** | *To prevent adverse water quality impacts due to negligence and ensure unavoidable impacts are managed effectively. Ensure adverse impacts on water quality caused by construction activities are minimized.* | *Compile temporary drainage management plan one month before commencement of works.*  *1. Proper installation of temporary drainage and erosion control before works within 50m of water bodies.*  *2. Proper maintenance and management construction of TD and EC measures, including training of operators and other workers to avoid pollution of water bodies by the considerate operation of construction machinery and equipment.*  *3. Storage of lubricants, fuels and other hydrocarbons in self-contained dedicated enclosures >50m away from water bodies.*  *4. Proper disposal of solid waste from construction activities.*  *5. Cover the construction material and spoil stockpiles with a suitable material to reduce material loss and sedimentation and avoid stockpiling near to water bodies.*  *6. Topsoil stripped material shall not be stored where natural drainage will be disrupted.*  *7. Borrow sites (if required) should not be close to sources of drinking water.* | *1 month prior to construction.* | *1. 50m from water bodies 2. Relevant locations to be determined in the detailed project design.* | *1.ES Contractor*  *2. Contractor has to check water quality and report to MEPCO.* | *ES SMEC and ES MEPCO*  *review results* |
| ***4. Air quality*** | *To minimize dust effectively and avoid complaints due to the airborne particulate matter released to the atmosphere.* | *CONTROL ALL DUSTY MATERIALS AT SOURCE.*  *1. All heavy equipment and machinery shall be fitted in full compliance with the national and local regulations.(Relevant regulations are in the Motor vehicles fitness rules and Road Act).*  *2. Stockpiled soil and sand shall be slightly wetted before loading, particularly in windy conditions.*  *3. Fuel-efficient and well-maintained haulage trucks shall be employed to minimize exhaust emissions.*  *4. Vehicles transporting soil, sand and other construction materials shall be covered. Limitations to speeds of such vehicles necessary. Transport through densely populated area should be avoided.*  *5. To plan to minimize the dust within the vicinity of orchards and fruit farms.*  *6. Spraying of bare areas with water.*  *7. Concrete plants. to be controlled in line with statutory requirements should not be close to sensitive receptors.* | *During all construction.* | *1.Construction sites within 100m of sensitive receivers.*  *2. A list of locations to be included in contract and other sensitive areas identified by the CSC along the ROW during works.* | *Contractor should maintain acceptable standard.*  *ES SMEC to supervise activities.* | *MEPCO ES / ES SMEC* |
| ***5. Ground Vibration*** | *To minimize ground vibrations during construction.* | *1. Review requirements for piling and use of powered mechanical equipment within 100m of SRs.*  *2. Review conditions of buildings and conduct public consultation with SRs to establish less sensitive time for works involving piling and schedule works accordingly.*  *3. Non-percussive piling methods to be used wherever practicable.*  *4. Percussive piling shall be conducted in daylight hours.*  *5. Hammer- type percussive pile driving operations shall not be allowed at night time.* | *1 month prior to construction.* | *1.Construction sites within 100m of sensitive receivers.*  *2. A list of locations to be included in contract and other sensitive areas identified by the CSC along the ROW during works.* | *Contractor should maintain the acceptable standards*  *ES SMEC to supervise relevant activities.* | *MEPCO ES / SMEC ES* |
| ***6. Noise*** | *To minimize noise increases during construction.* | *1. Review requirements for use of powered mechanical equipment within 100m of SRs.*  *2. Conduct public consultation with SRs to establish less sensitive time for works and schedule works accordingly.*  *3. All heavy equipment and machinery shall be fitted in full compliance with the national and local regulations and with effective silencing apparatus to minimize noise.*  *4. Heavy equipment shall be operated only in daylight hours.*  *5. Construction equipment, which generates excessive noise, shall be enclosed or fitted with effective silencing apparatus to minimize noise.*  *7. Well-maintained haulage trucks will be used with speed controls.*  *8. Contractor shall take adequate measures to minimize noise nuisance in the vicinity of construction sites by way of adopting available acoustic methods.* | *1 month prior to construction.* | *1.Construction sites within 100m of sensitive receivers.*  *2. A list of locations to be included in contract and other sensitive areas identified by the CSC along the ROW during works.* | *Contractor should maintain the acceptable standards*  *ES SMEC to supervise relevant activities.* | *MEPCO ES / SMEC* |
| ***7. Soil Erosion / Surface Run-off*** | *Prevent adverse water quality impacts due to negligence and ensure unavoidable impacts are managed effectively.*  *To minimize soil erosion due to the construction activities of towers, stringing of conductors and creation of access tracks for project vehicles.* | *SCHEDULE WORKS IN SENSITIVE AREAS (e.g. NEAR RIVERS) FOR DRY SEASON*  *1. In the short-term, temporary drainage and erosion control plan to be presented with tender. Temporary drainage and erosion control plan one month before commencement of works to protect all areas susceptible to erosion. (Permanent drainage works shall be in the final design).*  *2. Installation of TD and EC before works construction within 50m of water bodies.*  *3. Clearing of green surface cover to be minimized during site preparation.*  *5. Meaningful water quality monitoring up and downstream at any tower site during construction within a river or stream bed. Rapid reporting and feedback to CSC.*  *5. Back-fill should be compacted properly in accordance with MEPCO design standards and graded to original contours where possible.*  *6. Cut areas should be treated against flow acceleration while filled areas should be carefully designed to avoid improper drainage.*  *7. Stockpiles should not be formed within such distances behind excavated or natural slopes that would reduce the stability of the slopes or cause slippage.*  *8. Measures shall be taken to prevent ponds of surface water and scouring of slopes. Newly eroded channels shall be backfilled and restored to natural contours.*  *9. Contractor should arrange to monitor and adjust working and adopt suitable measures to minimize soil erosion during the construction period. Contractor’s TD and EC plan should be endorsed and monitored but CSC after consulting with concerned. authorities.*  *10. Replanting trees to be done before the site is vacated and handed back to MEPCO with appropriate trees (other vegetation cover as appropriate) to ensure interception of rainwater and the deceleration of surface run-off.* | *1 month prior to construction because the area can be subject to unseasonal heavy rain Plan before and during construction (cut and fill, land reclamation etc.) while considering the climatic conditions.* | *1. Locations based on history of flooding problems indicated by local authorities*.  *2. A list of sensitive areas during construction to be prepared by the detail design consultant in consideration with the cut and fill, land reclamation, borrow areas etc.*  *3. Locations of all rivers, streams, culverts, irrigation channels, roads and roads.* | *ES Contractor and ES SMEC* | *MEPCO ES /*  *SMEC ES* |
| ***8. Exploitation, Handling, Transportation and Storage of Construction materials*** | *To minimize disruption and contamination of the surroundings,*  *minimize and or avoid adverse environ-mental impacts arising out of construction material exploitation, handling, transportation and storage by using sources that comply with EPA license conditions* | *(consider also for future trances if civil works)*  *1. Use only EPA licensed sites for raw materials in order to minimize adverse environmental impacts.*  *2. Measures to be taken in line with any EPA license conditions, recommendations and approval to be applied to the subproject activities using the licensed source including:*   1. *Conditions that apply for selecting sites for material exploitation.* 2. *Conditions that apply to timing and use of roads for material transport.* 3. *Conditions that apply for maintenance of vehicles used in material transport or construction.* 4. *Conditions that apply for selection of sites for material storage.* 5. *Conditions that apply for aggregate production.* 6. *Conditions that apply for handling hazardous or dangerous materials such as oil, lubricants and toxic chemicals.* | *month prior to starting of works. Update monthly.* | *1. List of borrow areas to be prepared with tender stage contractors method statement and updated one month prior to construction.*  *2.List of routes of transport of construction material is to be prepared for the contract and agreed one month prior to construction.*  *3. Map of locations of storage is prepared by the contractor.* | *ES Contractor and SMEC to agree format of reporting* | *MEPCO ES / SMEC ES* |
| ***9.Decommision and Waste Management*** | *Minimize the impacts from the disposal of construction waste.* | *1. Waste management plan to be submitted to the CSC and approved by MEPCO ESU one month prior to starting of works. WMP shall estimate the amounts and types of construction and decommissioning waste to be generated by the project.*  *2. Investigate ways and means of reusing/recycling decommissioned material from the project within PEPCO without any residual environmental impact.*  *3 Identifying potential safe disposal sites close to the project, or those designated sites in the contract.*  *4 Investigating the environmental conditions of the disposal sites and recommendation of most suitable and safest sites.*  *5. Piling up of loose material should be done in segregated areas to arrest washing out of soil. Debris shall not be left where it may be carried by water to downstream flood plains, dams, lagoons or other water bodies.*  *6. Used oil and lubricants shall be recovered and reused or removed from the site in full compliance with the national and local regulations.*  *7. Oily wastes must not be burned. Disposal location to be agreed with local authorities/EPA.*  *8. Waste breaker insulating oil to be recycled, reconditioned, or reused at DISCO’s facility.*  *9. Machinery should be properly maintained to minimize oil spill during the construction.*  *10. Machinery should be maintained in a dedicated area over drip trays to avoid soil contamination from residual oil spill during maintenance.*  *11 Solid waste should be disposed at an approved solid waste facility and not by open burning which is illegal and contrary to good environmental practice.* | *One month prior to starting of works. Update monthly*  *One month prior to starting of works. Update monthly* | *1.Dumping:*  *A list of temporary stockpiling areas and more permanent dumping areas to be prepared at the contract stage for agreement*  *A list of temporary stockpiling areas and more permanent dumping areas to be prepared at the contract stage for agreement (in W M Plan)* | *1.Contractor*  *2. SMEC ES and MEPCO ESU should supervise and take action to ensure that contractor’s complete relevant activities according to EIA / IEE /*  *EMP requirement & NEQS.* | *MEPCO/*  *ES SMEC* |
| ***10.Work Camp Operation and Location***  ***(if required)*** | *To ensure that the operation of work camps does not adversely affect the surrounding environment and residents in the area.* | *1. Identify location of work camps in consultation with local authorities. The location shall be subject to approval by the MEPCO. If possible, camps shall not be located near settlements or near drinking water supply intakes.*  *2. Cutting of trees shall not b permitted and removal of vegetation shall be minimized.*  *3. Water and sanitary facilities (at least pit latrines) shall be provided for employees. Worker camp and latrine sites to be backfilled and marked upon vacation of the sites.*  *4. Solid waste and sewage shall be managed according to the national and local regulations. As a rule, solid waste must not be dumped, buried or burned at or near the project site, but shall be disposed of to the nearest sanitary landfill or site having complied with the necessary permits of local authority permission.*  *5. The Contractor shall organize and maintain a waste separation, collection and transport system.*  *6. The Contractor shall document that all liquid and solid hazardous and non-hazardous waste are separated, collected and disposed of according to the given requirements and regulations.*  *7. At the conclusion of the project, all debris and waste shall be removed. All temporary structures, including office buildings, shelters and toilets shall be removed.*  *8 Exposed areas shall be planted with suitable vegetation.*  *9.MEPCO and Construction Supervising Consultant shall inspect and report that the camp has been vacated and restored to pre-project conditions.* | *UPDATE Once a month* | *Location Map is prepared by the Contractor.* | *Contractor* | *MEPCO ESU / CSC* |
| ***11. Loss of Trees and Vegetation Cover of the Areas for Towers and Temporary Work-space*** | *To avoid negative impacts due to removing of landmark, sentinel and specimen trees as well as green vegetation and surface cover.* | 1. *Tree location and condition survey to be completed one month before tender.* 2. *The route for the distribution line should be selected so as to prevent the loss or damage to any orchard trees or other trees. Use of higher towers to be preferred to avoid trees cutting.* 3. *Clearing of green surface vegetation cover for construction, borrow of soil for development, cutting trees and other important vegetation during construction should be minimized by careful alignment. Written technical Justification for tree felling included in tree survey.* 4. *At completion all debris and waste shall be removed and not burned.* 5. *The contractor’s staff and labour will be strictly directed not to damage any vegetation such as trees or bushes outside immediate work areas. Trees shall not be cut for fuel or works timber.* 6. *Land holders will be paid compensation for their standing trees in accordance with prevailing market rates (LARP). The land holders will be allowed to salvage the wood of the affected trees.* 7. *The contractor will plant three (3) suitable new trees outside the 30 meter corridor of the transmission line in lieu of one (1) tree removed.* 8. *Landscaping and road verges to be re-installed on completion.* 9. *Compensatory planting of trees/shrubs/ornamental plants (at a rate of 3:1) in line with best international practice.* 10. *After work completion all temporary structures, including office buildings, shelters and toilets shall be removed.* | *Route design and site identification (1 & 2) during design stage and other matters during construction of relevant activities* | Tree survey to be completed one month before tender at relevant *Locations with a Map to be compiled prior to tender by the design consultant / MEPCO ESU during detailed design and CSC to update as necessary.* | *SMEC ES and ES Contractor* | *MEPCO ES / SMEC ES* |
| ***12. Safety Precautions for the Workers*** | *To ensure safety of workers* | 1. *Providing induction safety training for all staff adequate warning signs in health and safety matters, and require the workers to use the provided safety equipment.* 2. *Providing workers with skull guard or hard hat and hard toe shoes.* | *Prior to commencement and during construction* | *Location to be identified by the CSC with contractor.* | *ES Contractor* | *ES MEPCO/*  *ES SMEC* |
| ***13.***  ***Traffic Condition*** | *Minimize disturbance of vehicular traffic and pedestrians during haulage of construction materials and equipment.* | 1. *Submit temporary haul and access routes plan one month prior to start of works.* 2. *Routes in vicinity of schools and hospitals to be avoided.* | *Prior to and throughout the construction.* | *The most important locations to be identified and listed. Relevant plans of the Contractor on traffic arrangements to be made available.* | *ES Contractor* | *MEPCO ESU / CSC* |
| ***14.Social Impacts*** | *To ensure minimum impacts from construction labour force. on public health.* | 1. *Potential for spread of vector borne and communicable diseases from labour camps shall be avoided (worker awareness orientation and appropriate sanitation should be maintained).* 2. *Complaints of the people on construction nuisance / damage close to ROW to be considered and responded to promptly.* 3. *Contractor should make alternative arrangements to avoid local community impacts.* | *Complaints of public to be solved as soon as possible* | *All subprojects all tranches* | *ES Contractor ES MEPCO* | *ES MEPCO* |
| ***15. Institutional Strengthening and Capacity Building*** | *To ensure that MEPCO officials are trained to understand and to appreciate EMP* | *Capacity building activities were taken by Environmental Officer in Tranche 1. Environmental Management Unit (EMU) was setup with in MEPCO under Director Operations in Tranche 1. Development of strengthening plan for the EMU should be taken up with resources.* | *Initiate preconstruction and continue beyond project completion.* | *Awareness training for all management and senior staff in MEPCO at senior engineer and above in PMU and related units.* | *MEPCO ESU* | *MEPCO & ADB* |
| ***OPERATIONAL STAGE*** | | | | | | |
| ***1. Air Quality*** | *Minimize air quality impacts* | *No significant Impacts Tranche 1.Monitor designs and plans for all future tranches.* | *Operational phase* | *all subprojects in future tranches* | *ES MEPCO* | *MEPCO ESU* |
| ***2.Noise*** | *Minimize noise impacts* | *No significant Impacts Tranche 1. Acoustic designs checking and plan for all future tranches.* | *Operational phase* | *all subprojects in future tranches* | *ES MEPCO* | *MEPCO ESU* |
| ***3. Waste disposal*** | *Minimize improper waste disposal* | *Continue waste management arrangements in operational phase of all subprojects and MEPCO activities.* | *Operational phase* | *all subprojects in future tranches* | *ES MEPCO* | *MEPCO ESU* |
| ***3. Compensatory tree planting*** | *Maintain survival of trees planted* | *Employ landscaping contractor to monitor, water and feed replacement saplings and replace dead specimens as necessary.* | *Operational phase* | *all subprojects in future tranches* | *ES MEPCO* | *MEPCO ESU* |
| ***4.Landslides and soil erosion*** | *Avoid landslips and loss of productive land* | *No significant Impacts in Tranche 1. Review designs checking and plan for all future tranches.* | *Operational phase* | *all subprojects in future tranches* | *ES MEPCO* | *MEPCO ESU* |
| ***5. Water quality*** | *Minimize water quality impacts* | *No significant Impacts in Tranche 1. Review designs checking and plan for all future tranches.* | *Operational phase* | *all subprojects in future tranches* | *ES MEPCO* | *MEPCO ESU* |
| ***6 Crops and vegetation*** | *Monitor impacts from maintaining tree clearance under transmission lines* | *Track growth of large trees under the conductors.* | *Operational phase* | *all subprojects in future tranches* | *ES MEPCO* | *MEPCO ESU* |
| ***7. Social safety Impacts*** | *Ensure no encroachments / construction under the transmission line. No violation of clearance spaces.* | *Necessary signboards with limits of height clearances to be placed all along the line.*  *Identify and prevent any illegal encroachments under the DXLs..* | *Operational phase* | *all subprojects in future tranches* | *ES MEPCO* | *MEPCO ESU* |

ADB: Asian Development Bank (the financer) CFCs: Chloro-Floro-Carbons E&SS: Environment & Social Safeguard Section of PMU MEPCO

EC: Erosion control EIA: Environmental Impact Assessment EMP: Environmental Management Plan

EPA: Environmental Protection Agency, MEPCO: Islamabad Electric Supply Company NGO: Non-Government Organization

RoW: Right of Way TD: Temporary Drainage

# ANNEX - 3

# MONITORING PLAN FOR PERFORMANCE INDICATORS

1. **Summary of Environmental Monitoring Plan (Matrix)**

| **Environmental concern** | **Performance indicator (PI)** | **Frequency to monitor** | **Timing to check PI** | **Locations to implement PI** | **Responsible to implement PI** | **Cost of Implementation** | **Resp PI supervision** | **Cost of Supervision** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***DESIGN AND PRECONSTRUCTION STAGE*** | | | | | | | | |
| **1. Review of EMAP** | Environmental Management Action Plan (EMAP) is reviewed | During detailed design (later monthly by Contractor to cover any unidentified impacts) | By completion of detailed design. | All project alignment | Contractor | Initially DISCO’S Cell / later Contractor cost | DISCO’S, ESIC cell / ADB\* | ESIC cell staff cost |
| **2. Social Impacts and Resettlement** | Inventory of losses, Property acquisition, compensation and resettlement completed to RP requirements. | *Completed prior to commencement of construction* | Before removal of houses and structures. | APs according to RP & LAFC. | DISCO’S Cell | DISCO’S Cell staff cost | DISCO’S /ADB\* | ESIC cell staff cost |
| **3. Project disclosure** | Design changes notified | During detailed design by Contractor to cover any access roads and alignment changes, additional Villages. | Completion of detailed design. | All project alignment. | Contractor | Contractor cost | DISCO’S & ESIC cell / ADB\* | ESIC cell staff cost |
| **4. Environmentally Responsible Procurement. (ERP)** | Contract follows ADB Guidelines on ERP. Performance bond. Deposited  Contractual clauses include implementation of environmental mitigation measures tied to a *performance bond*. | Once, before Contract is signed. | Before Contract is signed. | Method Statements include resources for mitigation measures. | DISCO’S Project Cell. | Contractor cost | DISCO’S ESIC cell / ADB\*. | DISCO’S Cell staff cost |
| **5. Waste disposal** | Disposal options for all waste transformer oil, residually contaminated soils, scrap metal agreed with DISCO’S and local authority.. | Monthly or as required in waste management plan to identify sufficient locations for, storage and reuse of transformers and recycling of breaker oils and disposal of transformer oil, residually contaminated soils and scrap metal “cradle to grave”.  2. Include in contracts for unit rates for re-measurement for disposal.  3. After agreement with local authority, designate disposal sites in the contract and cost unit disposal rates accordingly. | 1.Prior to detailed design stage no later than pre-qualification or tender negotiations  2. Include in contract. | Locations approved by local waste disposal authorities. | DISCO’S cell with the design consultant. | ESIC cell | ESIC cell | DISCO’S |
| **6. Noise and air quality mitigation in design.** | Design changes included in EIA (supplementary) & EMAP approved by MOEST. | During detailed design by Contractor. | Completion of detailed design. | As defined in EIA (supplementary) & EMAP. | DISCO’S Cell / Contractor | Contractor cost | DISCO’S / /ADB\* | DISCO’S Cell staff cost |
| **7. Hydrological Impacts** | Temporary Drainage Management plan. | During detailed design by Contractor and monthly to cover any unidentified impacts | One month before commencement of construction | Considered locations to be as identified in the Detailed Drainage Report. | Contractor | Contractor cost | DISCO’S / and DISCO’S Project Cell. | DISCO’S Cell staff cost |
| **9. Temporary drainage and erosion control** | Erosion Control and Temporary Drainage completed. | During detailed design updated by Contractor monthly to cover any unidentified impacts. | One month before construction commences. | All stream and river crossings and where slopes indicate erosion will be a problem. | Contractor. | Contractor cost | DISCO’S / and DISCO’S Project Cell. | DISCO’S Cell staff cost |
| **10. Planning construction camps** | Use of land agreed with surrounding residents & Villages. | During detailed design updated by Contractor monthly to cover any unidentified impacts. | One month before construction commences. | Locations agreed DISCO’S cell in consultation with community and the Contractor. | Contractor DISCO’S Cell facilitates. | Contractor cost | DISCO’S / and DISCO’S Project Cell. | DISCO’S Cell staff cost |
| **13.Traffic Condition** | Temporary Pedestrian and Traffic Management Plan agreed. | During detailed design updated by Contractor monthly to cover any unidentified impacts. | One month before construction commences. | Locations agreed with DISCO’S cell in consultation with community and the Contractor. | Contractor | Contractor cost | DISCO’S / and DISCO’S Project Cell. | DISCO’S Cell staff cost |
| **15. Institutional strengthening and capacity building** | 1. Strengthening plan agreed for DISCO’S cell.  2. International environment specialist (IES)  3. Increase staffing of DISCO’S Cell.  4. Train DISCO’S Cell officials. | 1. Once,  2. Once  3. Ongoing  4. Ongoing | 1. As soon as practicable  2, 3, 4. No later than one month before Contract award. | Throughout the project | DISCO’S Project Cell. | DISCO’S Cell staff cost | DISCO’S / and /ADB\*. | /ADB cost of IES & support for 1 month ***US$25,000*** |
| ***CONSTRUCTION STAGE*** | | | | | | | | |
| **1.Orientation for Contractor, and Workers** | 1. Contractor agreed to provide training to professional staff and workers.  2. Special briefing and training for Contractor completed.  3. Periodic progress review sessions. | 1. Once  2. Ongoing  3. Ongoing | 1. Before contract is signed  2. Before construction areas are opened up  3. Every six months | All BOT staff members in all categories. monthly induction and six month refresher course | Contractor with IES assistance and record details. | Contractor cost | DISCO’S and DISCO’S to observe and record success | DISCO’S Cell staff cost |
| **2. Plans to control environmental impacts** | 1. Drainage Management plan  2. Temp. Pedestrian & Traffic Management plan,  3. Erosion Control & Temp. Drainage plan  4. Materials Management plan,  5. Waste Management plan;  6. Noise and Dust Control plan,  7. Safety Plan  8. Agreed schedule of costs for environmental mitigation.*{N.B. Forest Clearance and Compensatory Planting plan is prepared by DISCO’S cell}* | Deliverable in final form to DISCO’S cell one month before construction commences for any given stretch. | One month before construction commences. | All of DISCO’S alignment. | Contractor | Contractor cost | DISCO’S Project Cell. | DISCO’S Cell staff cost |
| **5. Water quality** | Meaningful water quality monitoring up and downstream during construction within 100m of rivers. Rapid reporting and feedback by DISCO’S. | Once (line item when opening up construction near water bodies). | During detailed design by Contractor and update to cover any unidentified impacts. | Locations to be provided with the detailed designs including all bridges during construction within 100m of rivers | Independent experienced laboratory. | Contractor cost | DISCO’S / DISCO’S Cell. | DISCO’S Cell staff cost |
| **6. Water Resources** | 1. Availability of water acceptable to community. No complaints.  2. Guidelines established to minimize the water wastage during construction operations and at worker camps. | 1. Monthly  2. Monthly | Prior to submission of progress reports. | All local water supply resources and rivers. | Contractor | Contractor cost | DISCO’S and DISCO’S Cell | DISCO’S Cell staff cost |
| **8. Spoil disposal and construction waste disposal** | 1. Use of land agreed with surrounding residents & Villages.  2. Waste Management Plan implemented.  3 No open burning | Monthly (line item when opening up construction). | Prior to construction.  Update monthly. | All DISCO’S alignment. | Contractor | Contractor cost | DISCO’S and DISCO’S Cell | DISCO’S Cell staff cost |
| **10. Noise** | Noise mitigation measures implemented in line with guidelines for noise reduction from ISO/TR11688-1:1995(E) | Monthly (line item when opening up construction). | Maximum allowable noise levels are 45dB(A)LEQ. | All DISCO’S alignment. | Contractor should maintain the accepted standards | Contractor cost | DISCO’S / DISCO’S Project Cell will monitor sample activities. | DISCO’S Cell staff cost |
| **11. Air quality** | Noise and dust control plan implemented. | Monthly (line item when opening up construction). | Prior to construction.  Update monthly. | All DISCO’S alignment. | Contractor | Contractor cost | DISCO’S and DISCO’S Cell | DISCO’S Cell staff cost |
| **13..Soil Contamination** | Contractors workforce to instructed and train handling of chemicals | Monthly (line item when opening up construction). | Prior to construction.  Update monthly. | All DISCO’S alignment. | Contractor | Contractor cost | DISCO’S and DISCO’S Cell | DISCO’S Cell staff cost |
| **14. Work Camp Location and Operation** | 1. Use of land agreed with surrounding residents & Villages.  2. Waste Management Plan implemented.  3 No open burning | Monthly (line item when opening up construction). | Prior to construction.  Update monthly. | All DISCO’S alignment. | Contractor | Contractor cost | DISCO’S and DISCO’S Cell | DISCO’S Cell staff cost |
| **19. Safety Precautions for Workers** | Safety Plan submitted | Once (update monthly as necessary) | One month before construction and update quarterly. | All DISCO’S alignment. | Contractor. | Contractor cost | *DISCO’S /* (ESIC cellto actively supervise and enforce. | DISCO’S Cell staff cost |
| **20. Social Impacts** | 1. Local labour is used and workforce  2. Local educated people for office work.  3. Complaints on construction nuisance damages close to ROW are responded to promptly by the Contractor.  4. Quarterly meetings with local VILLAGE for liaison purposes to monitor complaints. | Monthly (line item when opening up construction). | During construction.  Update monthly. | All DISCO’S alignment. | Contractor | Contractor cost | DISCO’S and DISCO’S Cell | DISCO’S Cell staff cost |
| **21. Enhancements** | Contractor has included for some enhancements in detailed designs Including planting of trees in addition to bioengineering such as in median | Once (update monthly as necessary) | One month before construction and update quarterly. | All DISCO’S alignment. | Contractor. | Contractor cost | *DISCO’S /* (DISCO’S Cell to actively supervise and enforce. | DISCO’S Cell staff cost |
| ***OPERATIONAL STAGE*** | | | | | | | | |
| ***1. Air Quality*** | *1. Roadworthiness of vehicles on DISCO’S.*  *2. Monitor NO2 and PM10 as indicators.* | *1. Roadworthiness of vehicles on DISCO’S Daily during operations*  *2. Yearly intervals for 3 years after opening for reassurance.* | *During operation.* | 5 locations on DISCO’S alignment nearest settlements. | Contractor | Contractor cost | DISCO’S / and ESIC Cell | DISCO’S Cell staff cost |
| **2. crops and vegetation** | 1. Follow up on Tree Clearance and Compensatory Planting Plan.  2. Records on survival of planted trees.  3. The compensatory planting maintained  4. Audited report by ESIC cell for on site and off-site compensatory planting*.* | 1) Quarterly  2) Quarterly  3) Quarterly  4) Quarterly | 1) Throughout project  2) Each of three years after initial planting.  3) Continuous for three years after project completion  4) For four years after initial clearance of the forest. | All DISCO’S alignment. | Contractor | ESIC Cell | DISCO’S | MOFSC and DISCO’S Cell staff cost. |

Note:

**LARP** = Land Acquisition and Resettlement Plan. **AP** = Affected Persons. **LAC** = Local Authority Council.

**TD** = Temporary Drainage. **EC** = Erosion Control. **WM** = Waste Management.

**GSC** = Construction Supervision Consultant or Equivalent. **TXL** = Transmission Line. **GSS** = Grid substation.

**DDS** =Detailed design stage. Based on EIA/IEE reports to be revised at DDS, RAP, SIA and other engineering considerations may change. **EIA** = Environmental impact Assessment.

**EMP** =environmental management action plan = environmental management plan, **EPA** = Environmental protection Agency

**EC** = Erosion control. NGO = non-government organization **NEQS** = National Environmental Quality Standards **TD**  = Temporary drainage.

**ADB \*** =ADB checks that processes have been completed and signed off by DISCO before moving to construction stage

**ADB** =Asian Development Bank (the financer) **E&SS** =Environment & Social Safeguard Section of PMU MEPCO

# ANNEX 4:

# SUMMARY OF THE PUBLIC CONSULTATION

### List of Participants in Consultation Sessions (PGEHS, Multan) (05-08-2015)

| **No.** | **Name** | | **Status** |
| --- | --- | --- | --- |
| 01 | | Muhammad Rizwan | Asst. Director (audit) Punjab Housing |
| 02 | | Muhammad Akhtar | Sub Engineer, Punjab Housing |
| 03 | | Liaqat Ali | Electrical Engineer, Punjab Housing |
| 04 | | Zeshan Haider | Security guard |
| 05 | | Muhammad Aslam | Zmindar |
| 06 | | Naveed Akbar | Shopkeeper |
| 07 | | Atta Muhammad | Zamindar, Matital Road |
| 08 | | Khalid Ahmad | Labour |
| 09 | | Mukhtar Ahmad | Labour |

### List of Participants in Consultation Sessions (Buch Villas, Multan) (05-08-2015)

|  |  |  |
| --- | --- | --- |
| **AH No.** | **Name of Affected Farmer**  **(Head of Household)** | **Tenurial Status** |
|
| 1 | Muhammad Ishaq Bucha | Landowner |
| 2 | Muhammad Wajhat Bucha | Landowner |
| 3 | Noor Asghar Bucha | Landowner |
| 4 | Muhammad Asif | Electrical Supervisor (Buch Villas) |
| 5 | Rana Muhammad Akram | Govt. Employee |
| 6 | Zurgham Khan | Landowner |
| 7 | Malik Awais Wains | Landowner |
| 8 | Qamar Iqbal | Shop keeper |
| 9 | Hazor Bux Massan | Landowner |
| 10 | Noor Mohammad Lodhar | Landowner |
| 11 | Rao Luqman | Landowner |

### List of Participants in Consultation Sessions (Choti MEPCO) (06-08-2015)

|  |  |  |
| --- | --- | --- |
| **No.** | **Name** | **Status** |
| 1 | Sardar Haji Shabir Hussain Laghari | Landowner |
| 2 | Haji Muhammad Tahir | Landowner |
| 3 | Muhammad Imran | Govt. Employee |
| 4 | Khalil Ahmed | Teacher |
| 5 | Naseem Abbas | Trader |
| 6 | Mulazim Hussain | Landowner |
| 7 | Abdul Ghafoor | Landowner |
| 8 | Shahid Iqbal | LO + Business |
| 9 | Abdul Kareem | Landowner |
| 10 | Faiz Bux | Landowner |

### List of Participants in Consultation Sessions (Sanjarpur, MEPCO) (07-08-15, 21.3.17 & 13.4.17)

|  |  |  |  |
| --- | --- | --- | --- |
| **AH No.** | **Name of Affected Farmer**  **(Head of Household)** | **Name of Hamlet/Village** | **Tenurial Status** |
|
| 1 | Muhammad Yousaf | Chak No. 32 NP | Landowner |
| 2 | Muhammad Hassan | Chak No. 32 NP | Landowner |
| 3 | Abdul Khaliq | Chak No. 32 NP | Landowner |
| 4 | Muhammad Boota | Chak No. 32 NP | Landowner |
| 5 | Muhammad Arif | Chak No. 32 NP | Landowner |
| 6 | Rana Muhammad Javid | Chak No. 32 NP | Landowner |
| 7 | Bejal | Chak No. 32 NP | Tenant |
| 8 | Shahroo Jevan Kosh | Chak No. 32 NP | Tenant |
| 9 | Mukhtar Kosh | Chak No. 32 NP | Tenant |
| 10 | Jam Aslam Walan | Chak No. 32 NP | Landowner |
| 11 | Shair Zaman | Chak No. 32 NP | Landowner |
| 12 | Shah Wazeer Khan | Chak No. 32 NP | Landowner |
| 13 | Ghulam Mustafa | Chak No. 32 NP | Manager |
| 14 | Jam Sher Somro | Basti Walana | Landowner |
| 15 | Imran Walan | Basti Walana | Landowner |
| 16 | Muhammad Shafiq | Basti Walana | Landowner |
| 17 | Naseer Ahmad | Basti Walana | Landowner |
| 18 | Hafiz Muhammad Zahid | Bast Walana | Landowner |
| 19 | Nazeer Ahmed | Chak 32 East | Landowner |

# ANNEX - 5

# IMPLEMENTATION SCHEDULE – PDEIP TRANCHE-IV (Savings)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **LARP Activity/Task** | | **Responsibility** | | **2016** | | | | **2017** | | | | **2018** | | | |
| **Primary** | **Secondary** | **I** | **II** | **III** | **IV** | **I** | **II** | **III** | **IV** | **I** | **II** | **III** | **IV** |
| **Preparation** | Initial Resettlement Survey LARP preparation | MEPCO | Consultants |  |  |  |  |  |  |  |  |  |  |  |  |
| Review of TL Alignment; Diversions to Avoid Resettlement Impacts; and Revision of LARP | MEPCO | Consultants |  |  |  |  |  |  |  |  |  |  |  |  |
| Design finalized by MEPCO; approved by ADB. | MEPCO | CE DEV. |  |  |  |  |  |  |  |  |  |  |  |  |
| LARP disclosure - Brochure in Urdu | MEPCO-PMU | CE DEV. |  |  |  |  |  |  |  |  |  |  |  |  |
| Requests to Relevant Govt. Depts. for NOCs | MEPCO-PMU | CE DEV. |  |  |  |  |  |  |  |  |  |  |  |  |
| Tender Preparation and Tendering of Works. | MEPCO-PMU | CE DEV. |  |  |  |  |  |  |  |  |  |  |  |  |
| Environmental Assessment report /LARP Revision - Updating of Prices and Resettlement Costs (if necessary) | MEPCO-PMU | CE DEV. |  |  |  |  |  |  |  |  |  |  |  |  |
| **Implementation** | Mobilize project supervision consultant | Government | MEPCO |  |  |  |  |  |  |  |  |  |  |  |  |
| Information dissemination regarding compensation payment & evacuation dates | MEPCO-PMU | CE DEV. |  |  |  |  |  |  |  |  |  |  |  |  |
| Adjust compensation rates & rehabilitation costs for inflation (if necessary) | MEPCO-PMU | CE DEV. |  |  |  |  |  |  |  |  |  |  |  |  |
| Submit revised Environmental Assessment Report /LARP to EPA/ADB. LARP Approval prior to Award of Contract for civil works .Ensure contracts reflect EMP | Govt./ADB | MEPCO-PMU |  |  |  |  |  |  |  |  |  |  |  |  |
| Delivery of compensation. Payments to be made prior to the start of Civil Works | MEPCO-PMU | CE DEV. |  |  |  |  |  |  |  |  |  |  |  |  |
| Grievance Redress Process | MEPCO-PMU | CE DEV. |  |  |  |  |  |  |  |  |  |  |  |  |
| Environmental Assessment Report /LARP monitoring (internal, and mobilization of EMA & updating of baseline survey) | MEPCO-PMU | EMA |  |  |  |  |  |  |  |  |  |  |  |  |
| **Construction** | Possession of land for starting works | MEPCO-PMU | Contractor |  |  |  |  |  |  |  |  |  |  |  |  |
| Site Demarcation of Affected Lands |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Contractor mobilized, civil works commenced | Contractor | Consultant |  |  |  |  |  |  |  |  |  |  |  |  |
| Final payment of crop compensation | PMU | CE DEV. |  |  |  |  |  |  |  |  |  |  |  |  |
| LARP monitoring; post-evaluation report | EMA | MEPCO/ADB |  |  |  |  |  |  |  |  |  |  |  |  |

**PHOTOGHAPHIC PROFILE**



Site view before construction of boundary wall at proposed Buch Villas Grid



Site view after construction of boundary wall Buch Villas Grid



Map of Buch Villas Housing Society Multan



Consultation meeting with representative of Buch Villas, Multan



Site View before construction of boundary wall at PGEHS Grid



Site view after construction of Boundary wall and site view of PGEHS Grid



Consultation meeting with PGEHS representative sub engineer.



Site view of existing 66 KV grid station to be converted into 132KV at Yazman



Public Consultation of proposed 132KV Yazman Grid & Transmission line



Site view of existing 66 KV grid station to be converted into 132KV at Choti, DG Khan



Site View after construction of boundary wall at New 132 KV Grid Station, Sanjarpur

1. Letter dated 29th June 2007 – Ref 2(1)2004-W/KCP-DD from Pak EPA Sajjad Hussein Talpur, Dy Director (EIA/Mont) to LESCO, Muhammad Tahir Khan, Subproject Director PPTA, LESCO, WAPDA House, Lahore. [↑](#footnote-ref-2)