Environmental Assessment Report

Environmental Assessment and Review Framework
Project Number: 42051

Pakistan: Energy Efficiency Investment Program

PAKISTAN: ENERGY EFFICIENCY INVESTMENT PROGRAM
ENVIRONMENTAL ASSESSMENT AND REVIEW FRAMEWORK

A. INTRODUCTION

1. The Government of Pakistan (GoP) has requested the Asian Development Bank (ADB) to provide a multitranche financing facility (MFF) to implement a systemic energy efficiency investment program under a flexible public sector financing mechanism to (i) scale up the deployment of proven energy efficiency technologies in energy supply and use, and (ii) establish a viable energy efficiency market. The proposed MFF will establish a dynamic business environment and transform the energy efficiency market in Pakistan. This MFF will finance priority projects that (i) increase energy supply and (ii) reduce peak loads. This will help strengthen Pakistan's energy security, optimize the energy mix and balance energy demand and supply.

2. This Environmental Assessment and Review Framework (EARF) identifies the broad scope of the MFF and outlines the policy, procedures, and institutional requirements for preparing the environmental assessments of the subsequent projects under the MFF loan. This EARF shall apply to all projects under the MFF, so as to ensure that the environmental impacts are appropriately addressed and mitigated to acceptable levels.

3. The MFF funding from the ADB is expected to be released in stages (tranches). Under the MFF loan procedures of the ADB, implementation of safeguards is to be achieved by environmental assessment of every project to be undertaken following the ADB's *Environment Policy 2002*. The constituent projects in the Program generally concern investments in existing institutions and are not be likely to affect sensitive areas, forests or wetlands, and might typically be expected to been classified as Category B or C under the ADB's *Environmental Assessment Guidelines 2003* that will be followed for all projects.

4. GoP regulations (*Pakistan Environmental Protection Agency Review of Initial Environmental Examination and Environmental Impact Assessment Regulations 2000)* categorize development projects into two schedules, according to their potential environmental impacts. Proponents of projects that have reasonably foreseeable impacts are required to submit an initial environmental examination (IEE) for their respective projects (Schedule I). Projects that have potentially more adverse environmental impact (Schedule II) are required to submit an environmental impact assessment (EIA) to the respective provincial Environmental Protection Agency (EPA). The requirements for EIA and IEE for different projects under the EEIP Program will vary.

B. INVESTMENT PROGRAM DESCRIPTION

5. Since 2006, Pakistan has been facing an acute energy crisis caused by (i) insufficient energy supply capacity, (ii) poor sector performance, (iii) increasing demand, and (iv) inefficient use of energy resources. The Government of Pakistan is struggling to resolve the crisis. Currently planned capacity additions will take at least another five years to start coming online. Ad hoc measures are therefore being taken, to little immediate avail, while more shortages loom over an already overstretched energy system. As Pakistan's economy grows and industrializes, standards of living continue to improve consequently. Coupled with rapid population growth, this is causing a steep increase in energy demand. Energy efficiency is identified as the least-cost

short- to medium-term solution and a more sustainable development trajectory for the longer run.

6. The MFF will finance a time-slice of the energy efficiency investment program in tranches. The proposed projects will utilize technologies that are used successfully internationally and are available commercially. Projects to be financed under the MFF include:

i. National Compact Fluorescent Lamp (CFL) Project
ii. Loss reduction in gas transmission and distribution networks
iii. Replacement of inefficient thermal power generation units
iv. Public buildings energy efficiency retrofits
v. Financing of industrial energy efficiency investments, and
vi. Domestic gas appliance upgrades and replacements.

C. ENVIRONMENTAL ASPECTS OF PROPOSED PROJECTS

7. The domestic sector CFL distribution project is to be implemented under Tranche-1 of the MFF. An IEE has been carried out for the project following the ADB's *Environment Policy 2002* and *Environmental Assessment Guidelines 2003* and GoP's environmental assessment regulations and guidelines. The environmental assessment of projects in remaining tranches will use Tranche 1 IEEs and EMPs for guidance on how to scope, assess, mitigate, and monitor environmental impacts. Further generic guidance on preparing EMPs is given in Attachment 1. The projects identified for investment under the MFF are listed in Table 1 and discussed below.

Table 1: Proposed MFF Projects

Project	EPA IEE/EIA Schedule*	Estimated ADB Category*
First Tranche		
Part A: National CFL Distribution	NA**	B
Part B Investment Program Support		
A. PMO Operations	NA	C
B. Investment Program Management/Preparations	NA	C
C. Strengthening of National Standards and Testing Facilities	NA	C
D. Institutional Capacity Development	NA	C
E. Lamp Waste Management facility	IEE/EIA***	B
Future Tranches		
Gas T&D Upgrades	NA	B
Thermal Power Plant Loss Reduction	EIA	A/B
Government Buildings Retrofit	NA	C
Domestic Appliance Replacement	NA	C
Industrial EE Financing Facility	NA	C

* Categorization and reports required to be confirmed by the ADB and EPA during tranche period.
** NA = not applicable.
*** Categorization will depend on the size of the facility.

8. **National CFL Project**: This project will replace 30 million incandescent bulbs in the domestic sector with efficient, high-quality CFLs. The project will accelerate CFL market penetration and will result in around 1,094 MW reduction the evening peak electricity demand and yearly savings in electricity consumption of 2310.5 GWh by 2011, thus alleviating much of the current power supply deficits. An IEE of the CFL program has been undertaken that concludes that the procurement, distribution, and use of the CFLs will not have any significant adverse environmental and social impact.

9. CFLs typically contain 3 to 4 milligrams (mg) of mercury, which is a highly toxic substance. The harmful impact of mercury on human health is caused by long-term, low-level, or 'chronic' exposure, which affects the kidneys, nervous system, and the female reproductive system. Spent CFLs are therefore potentially hazardous. As there is presently no hazardous waste handling regulations and disposal facilities in the country, facilities dedicated to the handling and disposal of spent CFLs will need to be organized on a commercial basis to properly dispose off the CFLs distributed under the project (in addition to other CFLs and FTLs in use in the country) after they have expired. The lamp waste management system would need to be in place by the fourth year of the program as the CFLs distributed under the program begin to reach the end of their operating lifetimes (a 10,000-hour rated lamp, used on average for less than three hours a day, could last for ten years). However, the program could be started even earlier to help manage current CFL/FTL disposal needs, as well as to establish and test an effective recycling regime and create the necessary public awareness levels. The facilities to be developed fall under Category B under the ADB's environmental guidelines, and consequently an initial environmental examination (IEE) for the facility will be undertaken. Under the environmental regulations of Pakistan, "a waste disposal facility for domestic or industrial wastes, with annual capacity of less than ten thousand cubic meters" requires an IEE. It is expected that the facilities will be developed in the private sector and therefore the IEE shall be the responsibility of the project owners. However, as there is a risk that the facility may not be commercially viable for the private sector, a contingency provision has been kept in the project budget to establish it in the public sector. In this case, the EA for the project will be responsible for ensuring that the IEE is undertaken and approved.

10. **Gas Transmission and Distribution Upgrades:** In the natural gas transmission system, gas compressors are used to increase the upstream pipeline pressure of the gas by compressing it into smaller volumes. The increased pressure allows the transport of the gas through the transmission and distribution pipeline network. Currently, Sui Northern Gas Pipelines Limited (SNGPL) operates 11 compressor stations that use natural gas as fuel. SNGPL proposes to replace the existing outdated compressors with new, more efficient, and larger machines to enhance compression capacity and improve system reliability. Installation of more efficient compressors will reduce the consumption of gas and consequently the emission of air pollutants. The new compressors will replace existing compressors and will be installed within the premises of the existing facilities. No new land will be acquired for the purpose. This component is categorized under Category C and therefore no environmental assessment is required.

11. **Thermal Power Plant Loss Reduction:** There are four public sector power generation companies (GENCOs) in Pakistan that operate 13 power units based mainly on steam-cycle and combined-cycle technologies. Due to various reasons, mainly associated with the financial constraints faced by these companies, these plants are being operated at derated capacities nearly 25% below their nameplate ratings. The average forced outage rate for the GENCOs, at 12%, has been high compared with 6% for IPPs in the country. Nearly all GENCO plants are operating at much lower efficiency than the industry benchmark levels for plants of similar ages and configurations. Due to the aging of several plants, all of the derated capacity and efficiency cannot be economically restored. It is proposed that the existing units at three plants—Guddu Steam, Faisalabad Steam, and Multan Steam—be replaced by modern combined-cycle plants. The plant at Guddu is gas-fired and can use the same gas already allocated to the existing power plant to fuel the replacement plant. At the other two plants, the less efficient steam-cycle plant will be replaced by high efficiency combined-cycle plants. This will increase the power generation capacities of the plants by improving the efficiencies from the existing 22% to 31% to about 43% to 48%. The installation of the more efficient plants will also result in overall

environmental benefits. These include reduced air pollution, reduced global warming and climate change impact, and less water consumption. The new units will be installed at the existing plant sites. This will avoid the requirement of purchasing new land, consequently eliminating the environmental and social issues associated with land acquisition and resettlement, and land use conversion. Lower emissions will also benefit the communities living around the plants by reducing potential health risks to them. Good environmental practice demands that the operation of the entire facility comply with applicable environmental standards. Thus, the modification the plants will also address the environmental and social issues associated with the existing plants, and will bring the plants at par with modern power plants in terms of their environmental performance. This will be an added benefit to the local community and the environment. Nevertheless, activities associated with the construction of power plants, particularly near built-up areas, have potential environmental impacts. These are categorized as Category A projects and will require environmental impact assessments (EIA) to meet the ADB's environmental guidelines. Under the environmental regulations of Pakistan, thermal power plants exceeding 200 MW in size require an EIA. Construction-related impacts of the power plant installation include generation of new employment opportunities, issues associated with migrant workers, such as cultural conflicts between local and non-local workers, and traffic impact and community safety hazards caused by construction vehicles. The EIA of projects will include a full-scale community consultation plan for the design, construction, and operational phases of the plants.

12. **Public Buildings Retrofits:** This program aims at improving the energy efficiency through system upgrades of three targeted groups of government buildings—offices, hospitals, and educational institutions. The component includes creation of a new national Energy Efficiency Center (EEC) under the management of the Planning Commission, the executing agency (EA) for EEIP. It includes a detailed study of selected buildings, energy audits, purchase of energy audit tools, data loggers and energy analysis software tools for undertaking building energy use analysis. It also includes the financing for implementation of EE retrofits for the buildings selected for efficiency upgrades. The nature of activities in this component is such that no environmental assessments are required as the component is categorized as Category C under ADB guidelines.

13. **Industrial Energy Efficiency Financing**: An industrial sector EE fund will be established to provide loans, contingency loans, or leases for the purchase of energy-efficient equipment by industrial plants, especially electrical motors, boilers and furnaces, and other large- to medium-scale investments, although small cogeneration units, HVAC, lighting retrofits, process controls, and other measures could be financed as well. Retrofits and expansions would be supported through working-capital and bridge-funding arrangements with Pakistani commercial banks, supplemented by equity financing from owners. Other than benefits associated with energy conservation, these measures often result in the installation of modern technologies that also have localized benefits, particularly in terms of occupational health and safety for the workers and the local community. Due to their scale and nature, these measures generally fall into Category C assessment and do not require specific environmental assessments.

14. **Domestic Gas Appliance Upgrades:** The energy efficiency potential in gas used for domestic water heating in Pakistan is estimated to be 30%, which can be achieved by retrofitting existing water heating appliances. The gas utilities, SSGC and SNGPL, have devised some of these retrofits in collaboration with local technical partners. These retrofits include a) timing device to switch off the heater during parts of the day when hot water is not required; b) de-scaling to improve heating efficiency; and c) flue gas control to minimize heat loss from the

exhaust. The potential for improvement in energy efficiency in space heating appliances is similarly estimated at 36%, which can be achieved by replacing them with more efficient ones.

15. The retrofits could be developed and provided by the gas utility companies, or alternatively utility companies could involve the private sector in their commercial development and marketing. This type of activity is unlikely to involve any significant environmental impact and is therefore categorized as C under the ADB's environmental guidelines.

D. ENVIRONMENTAL CRITERIA FOR ADDITIONAL PROJECT SELECTION

16. Specific environmental criteria for project selection are:

(i) The projects shall not disturb any cultural heritage designated by the Government or by international agencies, such as UNESCO, and shall avoid any monuments of cultural or historical importance.

(ii) The projects shall not be located within or near any national park, wildlife sanctuary, or game reserve as designated by the concerned regulatory authorities.

(iii) The projects shall have a government and ADB-approved EMP prior to letting of any construction contract associated with the project. The EMP must be consistent with Attachment 1 of this EARF. Any departure from the EMP shall be approved by the ADB prior to commencement of the project.

(iv) The projects shall not clear any existing forest resources classified by the Government as forest or watershed with any kind of protected status. Where unavoidable, tree-cutting outside said forest resource areas will be minimized and compensatory planting will be conducted in at least a 7:1 ratio (three saplings planted and tended for five years for every one tree cut greater than 10 cm in diameter). The budget for compensatory planting shall be included in the EMP.

(v) The projects shall only involve activities that follow GoP laws and regulations, ADB's *Environment Policy (2002)* and ADB *Environmental Assessment Guidelines (2003)*, and this EARF.

E. ENVIRONMENTAL ASSESSMENT AND REVIEW PROCEDURES OF ADDITIONAL PROJECTS

1. Application of Selection Criteria

17. Any additional project not meeting the criteria listed above will not be put forward for consideration or inclusion under the MFF tranches. The environmental assessment of the projects will be conducted by the IA prior to the submission of the PFR for subsequent tranches and in line with the requirements of the FFA. A final check on conformity with the selection criteria will be made at the submission of IEEs or EIAs of additional projects for ADB's clearance.

2. Environmental Classification

18. The Government will propose, and the ADB will confirm, environmental categorization using the Rapid Environmental Assessment checklist approach in compliance with the ADB's *Environment Policy 2002* and *Environmental Assessment Guidelines 2003*, or their successor policies and guidelines.

3. Land Acquisition

19. It is expected that all the proposed projects involving physical investments will be undertaken on existing facilities and no land acquisition will be necessary. However, if for a particular project acquisition of land is required, the ADB's *Resettlement Policy* will be triggered. The EA may be required to prepare a Land Acquisitioned Resettlement Framework (LARF) and a Land Acquisitioned Resettlement Plan (LARP). Prior to any land acquisition, the EA will seek advice of the ADB on documentation requirements.

4. Preparation of Detailed Design

20. Detailed design work for each additional project will include and follow the recommendations of the environmental assessments. The EA will include the requirements of the EMP, as required, in the bid documents and ensure the detailed designs include such requirements before contracts are finalized. Where modifications to designs are incorporated at a later stage, the requirements of the IEE/EIAs as needed and EMP will also be included. Certification to the ADB that the detailed designs were drawn in accordance with IEE/EIA (including EMP) recommendations will be required before contracts may be signed and made effective.

5. Environmental Monitoring

21. Environmental monitoring will be undertaken for projects that require physical investment in developing new facilities. Monitoring consists of regular systematic checking that the above-mentioned environmental management measures have been implemented effectively during each stage of the project. Table 2 presents the key tasks for the Project's environmental monitoring plan.

22. Some of the projects that fall in Category C, may also require environmental monitoring or monitoring of occupation health and safety. Such requirements will be identified prior to the approval of the financing by the ADB.

23. Monitoring during construction will be the responsibility of the EA. Monitoring will relate to compliance with construction contracts, and the effectiveness of mitigation measures and complaints (also known as 'project performance monitoring'), and the state and health of nearby environmental resources (also known as 'ambient environmental monitoring'). Ambient monitoring will follow the approach to selecting quantitative standards, as recommended in the ADB's *Environment Policy 2003* or its successor(s). Reporting will be to the relevant provincial or federal EPA on a regular basis (at least quarterly) and to the ADB semi-annually.

24. Monitoring during operation should be conducted on an as-needed basis. For example, some aspects of additional project design may require continuous operations-phase monitoring to guard against negative environmental impacts. Reporting will be to the relevant provincial or federal EPA on a quarterly basis and to the ADB semi-annually.

Table 2: Key Tasks for Environmental Monitoring Plan

No.	Environmental Monitoring Tasks*	Implementation Responsibility	Implementation Schedule
1	**Design Phase**		

No.	Environmental Monitoring Tasks*	Implementation Responsibility	Implementation Schedule
1.1	Audit project bidding documents to ensure IEE and EMP are included	EA	Prior to issue of bidding documents
1.2	Disclosure of project to EPA	EA	Prior to construction
1.3	Monitor final site selection and its environmental compliance with EMP	EA	Prior to approval of detailed designs
2	**Construction Phase**		
2.1	Regular (monthly) monitoring and reporting (quarterly) of contractor's compliance with statutory environmental requirements	EA	Continuous throughout construction period
2.2	Regular monitoring and reporting of contractor's compliance with contractual environmental mitigation measures	EA	Continuous throughout construction period
2.3	Regular monitoring and reporting of complaints and responses or environmental mitigation measures	EA	Continuous throughout construction period
2.4	Monitor adjustments to the EMP and the thorough implementation of detailed EMP	EA	During all phases of the projects
2.5	Commissioning phase monitoring of as built equipment and facilities versus environmental contractual performance criteria	EA	At commissioning
3	**Operation and Maintenance Phase**		
3.1	Observations during routine maintenance inspections of facilities. Inspections will include monitoring implementation of operational mitigation measures versus environmental criteria specified in EMP for operational impacts	EA	As per agreed inspection schedules
3.2	Monitoring impact on the ambient environment such as air quality, noise and water quality	EA	During the life of the project

*Additional monitoring requirements related to land acquisition and resettlement may be required that are addressed in the LARF and LARP.

6. Public Disclosure and Consultation

25. **Public Disclosure:** In all projects for which an environmental assessment is carried out, disclosing the environmental document to the public will be the responsibility of the EA. The EA will be responsible for ensuring that all environmental assessment documentation, including environmental due diligence and monitoring reports, are properly and systematically kept as part of the project-specific record. All environmental documents are subject to public disclosure, and therefore will be made available to the public, upon request. For category A and B-sensitive projects, the SEIA/SIEE will be publicly disclosed through the ADB's websites 120 days before a PFR is submitted to the ADB, while the SEIA/SIEE be reviewed by the ADB prior to disclosure.

The EA will consult the public, particularly with project-affected persons, as required in the ADB's *Environment Policy 2003* and *Public Communications Policy 2005*, or their successors.

26. **Public Consultation:** Where a project requires an IEE, at least one public consultation will be conducted with the local community and potentially affected people. The IEE will be approved before commencement of detailed design, while IEE results will be communicated to the local community before commencement of construction. Any projects that are categorised 'A' will require full environmental impact assessment (EIA) and will include two rounds of public consultations. The second consultation will be conducted after the draft EIA is prepared, which will include the EMP. A summary EIA (SEIA) will be made available to the general public at least 120 days before project approval by the ADB. Similar disclosure procedures will also apply to Category B sensitive projects, with an IEE and SIEE (including an EMP) posted on the website at least 120 days before the PFR is submitted to the ADB.

7. Environmental Management Plans

27. Attachment 1 summarizes an environmental management plan in matrix form. This is a generic EMP that will be used to develop future projects requiring physical investments. Additional requirements may be necessary for some projects. The matrix is developed on the basis of typical environmental impacts of development projects. Mitigation measures for the additional projects will be developed in the spirit of the principles agreed upon in this EMP. However the EMP for all projects will be a working document and any unanticipated consequence(s) of the project will be documented in the regular quarterly reports, while environmental mitigation measures will be modified to take account of unexpected impacts, as necessary, throughout the implementation period.

8. Institutional Arrangements

28. The executing agency (EA) for the MFF is the Planning Commission. The IA for the projects will depend on the sector in which the project falls. The IA will be responsible for implementing most of the project's environmental tasks. IA's overall responsibilities will include (i) ensuring that project selection criteria are strictly adhered to; (ii) ensuring that preparation of IEEs/SIEE or EIA/SEIA will be carried out in a manner consistent with this EARF; (iii) ensuring that environmental monitoring and institutional requirements are fully met; (iv) ensuring that meaningful public consultations are carried out in a manner consistent with Government and ADB policy; and (v) ensuring the categorization checklists, IEE/SIEEs and EIA/SEIAs, and monitoring reports are submitted to the ADB for review.

29. Prior to the submission of the PFR for a tranche of projects, the IA will:

(i) Prepare an environmental screening checklist to classify the projects in each tranche.

(ii) Prepare the terms of reference for environmental consultants to conduct environmental assessments, prepare environmental assessments, IEE/EIA reports including an EMP, and SIEE/SEIA for Category A and B sensitive for public disclosure.

(iii) Ensure that adequate public consultation has been undertaken with affected groups and local NGOs, review the environmental assessments, and submit the IEE/EIAs, EMPs, SIEE/SEIA documents as required, to the ADB.

30. Prior to the letting of civil works for projects in a tranche, the IA will:

(i) Submit the IEE/EIAs for regulatory approval of the relevant environmental protection agency and obtain approval.

(ii) Ensure that all regulatory clearances for the project that are obtained from the relevant government authorities are submitted promptly to the ADB.

(iii) Ensure that the required mitigation measures during construction and the EMP are included in the bidding document of the project and that all bidding contractors have access to the EIA/IEE and EMP.

31. During the implementation of civil works for projects in a tranche, the IA will:

(i) Ensure that an environmental management plan, including all proposed mitigation measures and monitoring programs, as required, are implemented as per the requirements and guidance of the EMP.

(ii) Monitor the implementation of EMP and prepare the monitoring reports.

(iii) In case unpredicted environmental impacts occur during project implementation, inform the ADB, review the EMP with the contractor, and implement alternative environmental mitigation program.

(iv) In case a project has a major change in scope[1], inform the ADB and reconfirm the environmental classification, determine whether a supplementary IEE or EIA study is required with the ADB, and carry out the appropriate study.

(v) Submit the requisite reports on social and environmental compliance and implement the EMP as required by the Pakistan EPA and the ADB.

(vi) Undertake environmental due diligence and monitoring of all the projects. The due diligence report as well as monitoring reports on EMP, as required, will be systematically prepared and be available to the public, if requested. If the ADB decides to undertake environmental due diligence and monitoring, then support the ADB and provide information and coordination assistance, as requested.

32. The ADB will be responsible for regular review and timely approval of project IEE/SIEEs and EIA/SEIAs. Technical guidance will be provided by the ADB to the IA as needed. The ADB will also be responsible for reviewing regular monitoring reports and officially disclosing the summary environmental assessments for selected projects (Category A and B sensitive) on the the ADB website. During the MFF, ADB will:

(i) Review environmental assessment reports as a basis for project and tranche approvals.

(ii) Publicly disclose the SIEE and SEIA for Category B sensitive and A projects, respectively, 120 days via ADB websites before a PFR is submitted to the ADB.

(iii) Monitor the EMP through due diligence missions or as part of MFF reviews.

(iv) Provide assistance to the IA, if required, in carrying out its responsibilities and for building capacity for safeguards compliance.

(v) Ensure that the IA will conduct the required consultations with project-affected groups and local NGOS, and that the borrower or project sponsor provides relevant

[1] A major change in scope is a change that materially alters or fundamentally affects the project's purpose (immediate objectives) components, costs, benefits, procurement, or other implementation arrangements as approved by the ADB. It is not necessarily accompanied by a significant cost impact. Example of major changes in scope include changing the route of a road, shifting the project site, or changing the project's stakeholders.

information on the project's environmental issues in a form and language(s) accessible to those being consulted.

(vi) Publicly disclose monitoring reports received by the Government in accordance with the ADB's *Environment Policy 2003* and *Public Communications Policy 2005*, if not already done so by the Government.

(vi) Guide the IA on the format, content, and scope of semi-annual reports submitted to the ADB.

33. Where necessary, the IA will establish an Environmental Cell. The Cell's main responsibility will be to ensure that the environmental assessment and review framework is strictly implemented.

34. The Environmental Cell Leader will prepare the detailed TORs, assist in selection, oversee daily tasks, and report on the progress of all environmental consulting contracts. The Environmental Cell Leader will be responsible for coordinating environmental monitoring, quality control, supervising the monitoring, and writing the quarterly progress reports on implementation of the EMP and semi-annual reporting to the ADB. The Environmental Cell Leader will be responsible for writing the quarterly progress reports on implementation of the project EMP.

35. The Environmental Cell Leader will be designated by the IA before the loan becomes effective. The IA will further ensure the release of resources for environmental management and that monitoring budgets are made available for timely EMP implementation

36. The Environmental Cell Leader will be in post for the duration of the financing and will report directly to the head of the IA, who will be accountable and responsible for implementation of the EARF and project EMPs.

9. Disclosure, Consultation and Grievances

37. Where necessary, the EMP (as part of the IEE) prepared for additional projects will be translated into local language(s) and made available to the public. Public disclosure and a complaints contact person will be designated for each project to help address all concerns and grievances of the local communities and affected parties.

10. Monitoring and Reporting

38. The EMP will have both internal and external monitoring. Internal monitoring will be the responsibility of the Environmental Cell Leader. Internal monitoring reports will be prepared quarterly and submitted to the IA. These reports will document progress made in EMP implementation, with particular attention to compliance with the principles and matrix set out in the EMP. The IA will submit a semi-annual monitoring report to the ADB.

39. External monitoring will be conducted by the ADB via safeguard review missions. These missions may occur at any time during the loan period. They will compare the project's progress in achieving environmental covenants, mitigation measures of the EMP, and implementation of the EARF. Safeguard review missions will submit an aide memoir of its findings to government prior to mission completion.

ATTACHMENT 1:

Sample Environmental Management Plan for Future Projects

Environmental Concern	Objectives	Mitigation Measures (MM) Recommended	Timing to Implement MM	Locations to Implement MM	Responsible to Implement MM	Responsible to Monitor MM
DESIGN STAGE						
1. Project disclosure	Ensure statutory compliance with PEPA 1997	Disclose project & design to the provincial environmental protection agency & clarify what documents are required to be filed (if any) to ensure compliance with sec. 12(1) of the PEPA 1997.	Commencement of detailed design	All projects	Design consultant/IA	IA - ADB
2. Project boundaries change	Ensure EMP sufficient to control impacts and compliance with statutory requirements PEPA 1997.	Review IEE and EMP and confirm findings and recommendations. Submit REA, revised IEE/EIA and EMP to the ADB. Complete the environmental assessment process in line with EPA and ADB Guidelines.	Completion of detailed design.	All projects	Design consultant/IA	IA - ADB
3. Waste Disposal	Ensure sufficient disposal space for cut surface materials and avoid fly-tipping.	1. Design consultants to identify reuse options and sufficient stockpiling and disposal locations for site clearance of scrabbled and cut surface materials and bored piles or caissons and include disposal locations and requirements in contracts. 2. Before works commence selected contractor to prepare Waste Management Plan with disposal sites identified for agreement by construction supervision consultants and IA.	1. Detailed design output. 2. Within one month of award of contract or earlier	All projects	Design consultant/IA	IA
4. Hydrological Impacts	To minimize hydrological and drainage impacts during constructions.	Design of adequate major and minor lead off drainage facilities will be completed in detailed design.	1, 2.During detailed design.	Areas considered prone to flooding, bridges and culverts	IA with DDC	IA
5. Retain trees and landscape designs	To avoid negative impacts due to unnecessary removing of trees	1. Identify all trees>10cm DBH (diameter at breast height) in alignment. 2. Detailed design to avoid tree removal unless justified on engineering, safety and environmental grounds. 3. Identification of off-site landscape opportunity	1. Detailed design output.	All routes	Design consultant/IA	IA

Environmental Concern	Objectives	Mitigation Measures (MM) Recommended	Timing to Implement MM	Locations to Implement MM	Responsible to Implement MM	Responsible to Monitor MM
		spaces in liaison with local community for planting with trees and shrubs and spaces for compensatory planting to be included in detailed designs. 4. Include tree protection and mitigation requirements in tender and contract documentation as milestone payments. 5. Landscaping with trees and shrubs shall take place at all stations and verges included in detailed designs. Planting of trees/shrubs/ornamental plants to contribute to aesthetic value.				
6. Enhance landscape by including trees in landscape designs	To provide enhancements in line with ADB policy on environmental ly responsible procurement and avoid negative impacts due to unnecessary removing of trees	1. Opportunity spaces for landscape planting to be identified along side of highway to provide visual interest in line with best international practice for highway design. Locations may provide a chance to create landscaping where successful planting of trees and shrubs could be accomplished. This practice should be encouraged as far as practicable. Other opportunities for enhancements can be assessed prior to construction and proposed enhancements should be discussed with the local population with respect to available water supply during establishment and protection to avoid cutting for fuel. 2. Detailed designs to avoid tree removal unless justified and include tree protection and mitigation requirements in tender and contract documentation.	1. Detailed design output.	Project sites	IA with DDC	IA
7. Noise barriers	Ensure noise impacts are acceptable in operational phase.	1. Detailed design stage, with the benefit of traffic flow forecasts, acoustical assessments should be made to determine if noise mitigation at source (noise barriers/low noise road surfacing) are required near any sensitive receivers. 2. Near schools, hospitals and places of worship make detailed assessment of noise climate and conduct detailed acoustic assessment	During designing stage no later than pre-qualification or tender negotiations..	Noise sensitive locations to be reconfirmed and checked in the EMP.	IA with the design consult-ant.	IA

Environmental Concern	Objectives	Mitigation Measures (MM) Recommended	Timing to Implement MM	Locations to Implement MM	Responsible to Implement MM	Responsible to Monitor MM
		3. if predicted noise at sensitive receiver exceeds agreed criterion [e.g., 3dB(A) above baseline or leq67dB(A) if who criterion acceptable] design and include construction of acoustic measures to control noise at source, e.g., solid barrier to attenuate noise to below agreed criterion.				
8. Air quality benchmark	Predict possible future deterioration of air quality. Avoid environmental being undetected due to lack to baseline data.	Use USEPA models or equivalent to predict air quality impact. Sample to obtain benchmark levels of heavy metals and hydrocarbons in air and soil at locations near the alignments.	Prior to construction activity Submission to the ADB	Two locations on each route	IA with the design consult-ant.	IA
9. Environ-mentally responsible procurement	Avoid operational environmental pollution and impacts upon decommissionin g.	1. Contractor to submit Method Statement and schedule of environmental mitigation measures with tender. Techniques and machinery selection to minimize impacts and duration of works. 2. Choose non-polluting equipment. 3. Specify equipment not to contain POP, asbestos, other hazardous or toxic components.	During product acquisition, prior to purchase	Tender evaluators to check contractors Method Statements and proposed mitigation measures and timing. Equipment specifications and performance with company certificates/ accreditations.	Tender evaluators	IA
CONSTRUCTION STAGE						
1. Loss of trees and vegetation cover of the areas work areas and	To avoid several negative impacts due to unnecessary removing of	1. Removal of trees >10 cm DBH (diameter at breast height) to be justified on engineering and safety grounds in tree removal plan. 2. Clearing of trees for construction, cutting trees and other important vegetation during	One month prior to and during construction of relevant activities	All routes especially where trees can remain under elevated sections.	Contractor and CSC	IA/ CSC

Environmental Concern	Objectives	Mitigation Measures (MM) Recommended	Timing to Implement MM	Locations to Implement MM	Responsible to Implement MM	Responsible to Monitor MM
aesthetics	trees and other street foliage.	construction should be minimized. 3. Trees that are unavoidably to be removed for construction shall have compensatory planting and replacement and establishment plans for trees that shall be approved by the contractor one month before existing trees are cut. 4. Payments for site clearance shall be withheld until compensatory tree planting is complete for that sector and payment therefore linked to tree reestablishment not removal as one of the milestone payments. 5. At lease seven (7) new trees shall replace each cut tree and maintained alive for three years as part of the contractual agreement and milestone payments. 6. Landscaping with trees and shrubs shall take place to contribute to the aesthetic value of the area. 7. At conclusion of the project, all debris and waste shall be removed. All temporary structures, including office buildings, shelters and toilets shall be removed.				
2. Orientation for contractor, and workers and construction management plans	Ensure that the CSC + Contractor and workers understand and have the capacity to ensure that the environmental requirements and mitigation measures must be implemented by them.	1. Contractors tenders shall be required to separate clearly the resources and funds to be applied to the mitigation measures for environmental impacts 2. Contractual clauses shall be included to tie the implementation of environmental mitigation measures in the above plans to milestone payments. 3. Contractual clauses shall require Contractors to conduct special induction briefing and/or on-site training for the contractor's management, contractor's staff, subcontractors and workers to cover the environmental requirement of the project. Contractors shall record and report regularly on record attendance and achievement test for all staff and managers.	Induction for all site agents and above including all CSC staff new staff before commencement of work. Weekly tool box talks and refreshers at early stages of construction for all construction employees as far as reasonably practicable. Include with	All site agent staff. Monthly induction and six month refresher course as necessary until contractors comply/ improve.	contractor management with the CSC and record details and report quarterly	IA & to observe and record success.

Environmental Concern	Objectives	Mitigation Measures (MM) Recommended	Timing to Implement MM	Locations to Implement MM	Responsible to Implement MM	Responsible to Monitor MM
		4. Contractual clauses shall be included to require contractors to employ dedicated environmental management staff to conduct/oversee the environmental orientation sessions and the implementation of environmental mitigation measures so as to facilitate checking for milestone payments. 5. Contractual clauses shall emphasize that financial compensation shall not be allowed as mitigation for environmental impacts or environmental nuisance without written and environmentally justifiable agreement from the relevant environmental authorities. 6. Engineering controls shall be promulgated by the construction contractors and shall be designed as mitigation measures to control the impacts at source in the first place. The CSC shall be responsible to approve the measures and report the update of EMP.	safety talks.			
3. Exploitation handling, transportation and storage of construction materials	To minimize and or avoid adverse environmental impacts arising out of construction material exploitation, handling, transportation and storage. To minimize contamination of the surroundings	Contracts to include specifications for 1. Selecting sites for material exploitation as approved by IA. 2. Maintain vehicles used in material transport in good condition and covered with tarpaulins. 3 Specify sites for material storage at a safe distance from sensitive receptors 4. Excavation of earth fill to be limited to an approximate depth of 50 cm. In case of deep ditching, the top 1 m layer of the ditching area to be stripped and stockpiled. Ditch initially to be filled with scrap material from construction and then levelled with the stockpiled topsoil. 5. Ditches or borrow pits be revegetated and landscaped to minimize erosion and to avoid creating surface hazards for people and livestock. 6. Update materials management plan monthly and include in progress report.	update monthly	1. List the borrow areas to be prepared one month prior to commencement of contracts 2. A map of locations of storage is prepared by the contractor.	Contractor and CSC to agree	IA

Environmental Concern	Objectives	Mitigation Measures (MM) Recommended	Timing to Implement MM	Locations to Implement MM	Responsible to Implement MM	Responsible to Monitor MM
4. Noise/Ground Vibration	To minimize noise level increases and ground vibrations during construction operations.	1. Install, maintain and monitor all requisite mitigation as per contract 2. All heavy equipment and machinery shall be fitted in full compliance with the national and local regulations. 3. As a rule, the operation of heavy equipment shall be conducted in daylight hours. 4. Hammer-type pile driving operations shall be avoided during night time. 5. Construction equipment, which generates excessive noise, shall be enclosed. Well-maintained haulage trucks with speed controls will be used. 6. Performance criteria shall during night time (10 pm to 7 am) the measured impact noise at the residential or hospital sensitive receiver shall not be more than 3dB above background noise levels measured at the nearest sensitive receiver ($Leq_{15minutes}$) two weeks prior to the commencement of works. The contractor shall also maintain and service all equipment to minimize noise levels.	Maximum allowable noise levels at the façade of the sensitive receiver are 1. 70dB(A)L_{EQ} or 2. 3dB(A)L_{EQ} above the background (measured no more than 2 weeks before the commencement of work).		Contractor should monitor and maintain the accepted standards) CSC should monitor relevant activities.	IA/ CSC
5. Construction Waste Disposal	To minimize the impacts from the disposal of construction waste.	1. Estimating the amounts and types of construction waste to be generated by the project. 2. Investigating whether the waste can be reused in the project or by other interested parties. 3. Identifying potential safe disposal sites close to the project.. 4. Investigating the environmental conditions of the disposal sites and recommendation of most suitable and safest sites. 5. Used oil and lubricants shall be recovered and reused or removed from the site in full compliance with the national and local regulations.Oil wasted must not be burned. 6. Machinery should be properly maintained to minimize oil spill during the construction.	Update once a month and report quarterly	The list of waste sites to be reconfirmed and that dumping areas is available as identified by detailed design engineer.	1. Contractor 2. CSC should supervise and take action to ensure completion of Contractor's relevant activities according to environmental standards.	IA/ CSC

Environmental Concern	Objectives	Mitigation Measures (MM) Recommended	Timing to Implement MM	Locations to Implement MM	Responsible to Implement MM	Responsible to Monitor MM
		7. Solid waste should be disposed at an approved solid waste facility.				
6. Worker canteen and toilet facilities	To ensure that the operation of the works and worker facilities does not adversely affect the surrounding environment and residents in the area.	1. Identify location of worker canteen and toilet facilities in consultation with local communities. Location subject to approval by the IA. If possible, canteen and toilet facilities shall include drinking water supplies. 2. In order to maintain proper sanitation around construction routes, temporary toilets will need to be provided. Waste shall not be buried (see above) 3. Drinking water and sanitary facilities shall be provided for employees. 4. Solid waste and sewage shall be managed according to the national and local regulations. 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 in a particular sector, all debris and waste shall be removed. All temporary structures, including office buildings, shelters, waste receptacles and toilets shall be removed. 8. Exposed areas shall be replanted with suitable vegetation in line with the landscape plans and be inspected by IA and CSC shall inspect and report that the site has been vacated and restored to pre-project conditions or as agreed with IA.	Update once a month	Location map is prepared by the Contractor.	Contractor	IA/ CSC
7. Safety Precautions for the Workers and	To ensure safety of workers	1. Providing adequate warning signs. 2. Providing workers with skull guard or hard hat. 3. Contractor shall instruct his workers in health and	During construction	Relevant canteen and worker sanitation	Contractor and CSC	IA/ CSC

Environmental Concern	Objectives	Mitigation Measures (MM) Recommended	Timing to Implement MM	Locations to Implement MM	Responsible to Implement MM	Responsible to Monitor MM
first aid		safety matters, weekly, and require the workers to use the provided safety equipment. 4. Establish all relevant safety measures as required by law and good engineering practices. 5. Contractor shall provide first aid facilities for the workers on the site and at the worker canteens with at least one qualified first-aider or nurse present at all times. It is recommended that the workforce be given access to a trained doctor at least once per two weeks for routine checks and medical examinations if necessary.		facilities.		
8. Nuisance to nearby properties	Control nuisances and reduce impacts on property value or interruption to neighbouring land uses.	1. Contract clauses to specify acceptable construction practices to mitigate nuisances, noise, vibration and dust impacts and liaison with local community on approach to mitigation. 2. No payment in lieu of environmental mitigation measures and penalty clauses in contract. 3. Incorporating good construction management practices – complaints reported once per month for each site/km of line under construction. 4. Compensation will be paid for loss of livelihood due to construction disruption in line with ADB guidelines. 5. Set up complaints hot line, recording, response and resolution monitoring	At all times	All Routes Within 50m of all hospitals schools and colleges	CSC To Monitor and enforce implementation of contract clauses versus milestone payments. Complaints response time to rerecord, respond and resolve complaints.	CSC/ IA (Contractor through contract provisions)
OPERATIONAL STAGE						
1. Monitoring Air Quality	To monitor pollution level in surrounding areas.	Monitor air quality parameters such as NOx, SO2, and PM10 and feedback results to IA.	After commissioning and periodically	Surrounding areas	IA	IA
2. Noise	Control noise from exceeding tolerable levels within a 100m corridor by decrease of	1. Establishing standards and regulations for noise levels emanating from vehicles. 2. Strict enforcement of regulations, subsequent to an awareness programme. 3. Establishing a national policy on vehicle imports – noise levels, too, increase with age of vehicles.	During operation	Surrounding areas	IA	IA

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	traffic flow.	4. In sensitive areas such as schools, places of worship, hospitals and libraries, sound barriers including to be employed.				
3. Noise monitoring	To monitor the noise level	1. Monitor noise annually at plant fence and in SR. 2. Compare to base line. 3. Review strategy and policy on noise pollution.	Three months after commencement of operations	Surrounding areas	IA	IA

SRs = Sensitive receivers, residences, schools, hospitals, mosques.
PC = Public consultation.
CSC = Construction supervision consultant .
IA = Implementing agency.