Environmental Assessment and Review Framework

May 2016

PAK: Proposed Multitranche Financing Facility Second Power Transmission Enhancement Investment Program

Prepared by National Transmission and Despatch Company Limited for the Asian Development Bank.

Environment Assessment and Review Framework (EARF)

For Pakistan Power Transmission Enhancement Investment Program II

Submitted to

ASIAN DEVELOPMENT BANK

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Submitted by

National Transmission and Despatch Company (NTDC)

PMU, Wapda House, Lahore

ABBREVIATIONS

ADB	Asian Development Bank
BOD	Biochemical Oxygen Demand
DO	Dissolved Oxygen
DFO	Divisional Forest Officer
EPA	Environnent Protection Agency
E&SIC	Environmental & Social Impact Cell
EA	Executing Agency
EARF	Environment Assessment & Review Framework
EC	Environmental Clearance
EIA	Environment Impact Assessment
EMP	Environmental Management Plan
GoP	Government of Pakistan
G/S	Grid Station
IA	Implementing Agency
LARP	Land Acquisition and Resettlement Plan
MPL	Maximum permissible level
MFF	Multi Tranche Financing Faculty
NEQS	National Environmental Quality Standards
NGO	Non-Governmental Organization
NTDC	National Transmission & Dispatch Company
PC	Public Consultation
PEPA	Pakistan Environment Protection Act, 1997
PSC	Project Supervision Consultant
PMU	Project Management Unit
PMC	Project Management Consultants
PIU	Project Implementation Unit
IEE	Initial Environmental Examination
REA	Rapid Environmental Assessment
SIA	Social Impact Assessment
SIEE	Summary Initial Environmental Examination
SP	Subproject
SPM	Suspended Particulate Matter
SPS	Safeguard Policy Statement
SR	Sensitive Receiver
T/L	Transmission Line
ToR	Terms of Reference
TSS	Total Suspended Solid

I. INTRODUCTION

1. Government of Pakistan (GoP) had requested the Asian Development Bank (ADB) for a Multi-tranche Financing Facility (MFF) to provide financial assistance for second power transmission enhancement investment program (PTEIP II) in the state of Pakistan. The PTEIP II will consist of staged physical investments in the high-voltage transmission system, including the rehabilitation, augmentation and expansion of transmission lines, substations and supporting infrastructure. The physical investments will increase transmission capacity to meet growing demand, improve reliability and system security, and evacuate additional sources of power. Nonphysical investments will increase institutional efficiency, cost recovery, competition, transparency, and good governance within the sector. National Transmission and Dispatch Company (NTDC) is the Executing Agency (EA) and Implementing Agency (IA) for MFF II, and Tranche 1 subprojects. The PTEIP II aims at achieving sustainable power transmission enhancement in Pakistan.

2. This Environmental Assessment and Review Framework (EARF) is applicable for subprojects under PTEIP II and Tranche-I, funded by ADB. The EARF outlines the policy, procedures, and institutional requirements for preparing the subprojects. These subprojects will be processed under ADB's new Safeguards Policy Statement, 2009 (SPS, 2009), which is also incorporated in this document. NTDC is responsible for preparing the required environmental assessments and obtaining ADB concurrence.

3. The EARF is endorsed by the GoP and provincial governments, and will be translated and disclosed on the NTDC websites.

4. The subprojects under MFF II will be prepared in a manner consistent with the government's strategy for development plan through investments for transmission networks enhancement program and substations under the supervision and coordination of the Executing Agency (EA), National Transmission and Dispatch Company (NTDC).

II. ASSESSMENT OF LEGAL FRAMEWORK AND INSTITUTIONAL CAPACITY

5. All subprojects undertaken as part of PTEIP II will be screened, classified and assessed based on ADB's Safeguard Policy Statement (SPS) 2009, and GoP's environmental legislation. Post the adoption of the 18th Constitutional Amendment in 2010, the subject of environment has been devolved and the provinces have been empowered for environmental protection and conservation. Subsequently the provinces have amended the Pakistan Environmental Protection Act (PEPA) 1997 to formulate provincial environmental protection acts. The Punjab government has amended PEPA 1997 as Punjab Environmental Protection Act 1997 (Amended 2012), and the

Environment Protection Department (EPD) Punjab is responsible for ensuring the implementation of provisions of the Act in Punjab's territorial jurisdiction.

6. All development initiatives undertaken in Pakistan, according to the PEPA 1997 and provincial/state legislation are required to undergo an Initial Environmental Examination (IEE), or where the project is likely to cause significant adverse environmental impacts, an Environmental Impact Assessment (EIA). The environmental reports are filed with the relevant provincial Environmental Protection Agencies (EPAs) for review and approval prior to project construction.

7. To facilitate the IEE/EIA preparation process the Federal Ministry of Climate Change has provided general policy/guidelines to guide and inform developers regarding the preparation of environmental assessment reports, environmental clearance of ADB is stipulated in the SPS 2009

III. ANTICIPATED ENVIRONMENTAL IMPACTS

A Description of the Project

8. The proposed investment program is driven by the National Power Policy. NTDC's investment and power procurement program, as approved by the National Electric Power Regulatory Authority prior to the commencement of each year, forms the basis for the physical portion of the investment program,. Specific projects to be selected based on their alignment with the the investment and power procurement program, project readiness (including technical, economic, and financial feasibility), and compliance with ADB's safeguard requirements as in SPS 2009. The projects proposed and the scope of work for MFF II-Tranche-I are presented as below:

List of Subprojects proposed for Tranche 1

Contract Package	Subprojects		Technical Justification
Subproject 1: Expansion and augmentation of three 500/220 kV grid stations			
ADB-100	Extension of Sahiwal substation	Procurement and installation of one 600MVA, 500/220kV transformer along with allied equipment and accessories.	Allow the evacuation of power from new grid connected generation, reduce the loading on the existing grid stations and transmission losses, and improve the system reliability.
	Extension of Lahore South substation	Procurement and installation of one 750MVA 500/220kV Transformer and two 500kV Line Bays, along with allied equipment and accessories.	
ADB-101	Extension and augmentation of Rewat substation	Procurement and installation of one 220/132kV 250MVA transformer along with allied equipment, and the replacement of one existing 220/132kV 160MVA transformers by one 220/132kV 250MVA transformer.	

Contract Package	Subprojects		Technical Justification
Subproject 2: Protection rehabilitation in south area			
ADB-102 and ADB-103	Protection rehabilitation in south area.	Procurement and installation a shunt reactor (ADB-102); and additional protection equipment such as protection relays, fault recorders, fault locators & event recorders (ADB-103) in 11 substations in the southern region.	Improve the system reliability and reduce frequent tripping in southern region.
Subproject 3: Faisalabad West (Phase-II) 500 kV substation			
ADB-104 and ADB-105	Faisalabad West (Phase-II) 500 kV substation	Procurement and installation of the: (i) 500 kV double circuit transmission line in/out of 500 kV Multan-Gatti transmission line at 500 kV Faisalabad West (30 km); (ii) 220 kV double circuit transmission line from 500 kV Faisalabad West to 220 kV Lalian New (80 km); and (iii) extension at 500 kV Faisalabad West substation for two 500 kV line bays and two 220 kV line bays; and extension at 220 kV Lalian substation for two 220 line bays.	Meet additional demand of Faisalabad electricity supply company (distribution) and reduced losses.
Subproject 4: Guddu power dispersal			
ADB-106 (ADB-81 in MFF I T4	Guddu power dispersal	Installation of (i) 500kV transmission lines for lopping in/out of the D. G. Khan – Multan 500kV Muzaffargarh substation (10 + 10km); and (ii) 500kV Guddu New – Muzaffargarh transmission line (261km)	Dispersal of power from the Guddu power station, reducing the severe load shedding in the country.

D/C =Double circuit, km = kilometer, kV = kilovolt, MVA = megavolt-ampere, MVAR = megavolt-ampere reactive, MW = megawatt, SAS = Substation automation system , T/L = transmission lines.

B Environmental Impacts

9. The adverse environmental impacts associated with the construction of grid stations and transmission lines mostly occur during the construction phase. However, since most of the land for grid stations is already under the possession of NTDC, no significant impact is anticipated on biodiversity or physical cultural resources. Other important environmental problems, which need to be carefully addressed, are the disposal of waste materials from earth works and restoration of sites to their original condition after completion of the construction works. It is important that the contractor should prepare a plan for disposing waste materials, which should not allow disposal in the forest areas, nearby water bodies and agriculture land without adequate protection. It is also expected that the contractor will adopt safe construction practices and ensure use of requisite personnel protective equipment to protect occupational health of labor and nearby community. Although the environmental impacts related with the project are manageable, monitoring the implementation of the mitigation measures and monitoring

of the environmental conditions should be done systematically so that any unexpected environmental impacts could be properly mitigated in a timely manner.

10. Given the nature and magnitude of the proposed power transmission subproject along with existing environmental conditions, impacts are expected to be minor and could be readily mitigated. Augmentation/extension of transformers in existing Grid Station (G/S) are expected to cause only very minor impacts during site works which could be easily mitigated. Earth works, dust emission and dust generation will be minimal during tower installation since excavation will be covering a small area of a few square meters per excavation.

11. Environmental impacts of subprojects will involve construction activities, the size, type and scope of which will be different. The pre-construction and construction related impacts are:

    i. Removal of vegetation/trees

    ii. Dust from construction activity

    iii. Air emissions from construction equipment and vehicles

    iv. Noise from construction vehicles and heavy equipment

    v. Sediment run-off from construction sites

    vi. Disposal of spoils and waste materials

12. These are considered as possible impacts and will need to be addressed through carefully designed mitigation measures.

IV. ENVIRONMENTAL ASSESSMENT FOR SUBPROJECTS

13. All subprojects will be subject to the environmental assessment process. This is a process of environmental analysis and planning to address the environmental impacts and risks associated with a project. PTEIP MFF 2 tranche 1 has been categorized as Environment Category B, which requires conducting an Initial Environmental Examination (IEE). However, in the case of a future subproject falling under Environment Category A the assessment may comprise a full-scale environmental impact assessment (EIA).

14. Potential adverse environmental impacts of future subprojects can be avoided or minimized through carefully selecting the subproject location, design, and route. All subprojects will be screened for likely impacts using ADB's REA Checklist. The subprojects should:

(i) not disturb any cultural heritage areas designated by the government or international agencies, such as UNESCO, and shall avoid any monuments of cultural or historical importance;

(ii) not be located within or near the biodiversity core zone of any protected areas such as national parks, nature reserves, or wildlife sanctuaries;

(iii) avoid clearing of any existing forest resources, and if unavoidable, clearing will be minimized and compensatory planting included in the environmental management plan and budget for each subproject;

(iv) only involve activities that follow the government's laws and regulations, and will not involve ADB's list of prohibited activities;

(v) not use Polychlorinated biphenyl (PCB)-based oils in any activity, or otherwise, appropriate disposal plans will be made following national legal requirements; and

(vi) not likely to be classified as environment category A.

A. Requirements for Environmental Screening and Classification

14. All subprojects will be screened to determine their environmental category based on the ADB's Rapid Environmental Assessment (REA) Checklist for Power Transmission and Substation projects. A template of the REA Checklist is given in Annex I. Categorization is to be based on the most environmentally sensitive component, which implies that if any one component of a subproject has potential of significant adverse environmental impacts, then the project is to be classified as Category A regardless of potential environmental impacts of other aspects of the project. In general, a project will be classified as 'Category A' if the project:

i. Has a significant level of environmental impacts requiring complex mitigation measures needing to be prepared through an in depth assessment of the impacts and detailed study for preparing mitigation measures; and

ii. Will generate impact on an ecologically sensitive area, particularly if the project is located in buffer or core zone of any designated specially protected areas, or area of international significance (such as Ramsar site) or cultural heritage and archeological sites.

15. Other subprojects that do not fall into the above category are typically classified as Category B or C depending upon the scale of impacts.

B. Requirements for Environmental Assessments and Environmental Management Plans

15. Category A subprojects will require an Environmental Impact Assessment (EIA) to be conducted, while Category B subprojects require an Initial Environmental Examination (IEE) to be conducted. The EIA and IEE reports should include an Environmental Management Plan (EMP) along with its implementation budget. For Category C subprojects no EIA or IEE is required, although environmental implications are still reviewed. The guideline for the preparation of environmental assessment report is attached as Annex II.

16. Impacts and risks will be analyzed in the context of each subproject's area that encompasses:

    i. the primary subproject site(s) and related facilities;

    ii. associated facilities that are not funded as part of the subproject, and whose viability and existence depend exclusively on the subproject and whose goods or services are essential for successful operation of the subproject; and

    iii. areas and communities potentially affected by impacts from unplanned but predictable developments caused by the subproject that may occur later or at a different location.

17. Environmental impacts and risks will also be analyzed for all relevant stages of the project cycle, including preconstruction, construction, operations, decommissioning, and post-closure activities such as rehabilitation or restoration.

18. The IA will prepare an Environmental Management Plan (EMP) that addresses the potential impacts and risks identified by the environmental assessment. The EMP will include the proposed mitigation measures, environmental monitoring and reporting requirements, emergency response procedures, related institutional or organizational arrangements, capacity development and training measures, implementation schedule, cost estimates, and performance indicators.

19. The IA should ensure that ADB be given access to undertake environmental due diligence for all subprojects. However, the IA has the main responsibility for undertaking environmental due diligence and monitoring the implementation of environmental mitigation measures for all subprojects. The due diligence report as well as monitoring reports on implementation of the environmental management plan needs to be documented systematically and be available to the public.

V. CONSULTATION, INFORMATION DISCLOSURE AND GRIEVANCE REDRESS MECHANISM

A. Public Consultation

20. The borrower/Client will carry out meaningful consultation with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation. According to ADB's SPS 2009, public consultation is mandatory as part of environmental assessment of Category A and Category B projects. Consultation will be based on the following principles:

i). Early start in the individual project preparation stage and continuation throughout the project cycle;
ii). Timely disclosure of relevant information in a comprehensible and readily accessible to affected people format;
iii). Ensuring the absence of intimidation or coercion during public consultation;
iv). Gender inclusive and responsive with focus on disadvantaged and vulnerable groups, and
v). Enabling the integration of all relevant views of affected people and stakeholders into decision-making.

B. Information Disclosure

21. Overall responsibility for ensuring that the environmental requirements of the Project set forth in ADB's Safeguard Policy Statement 2009, PEPA 1997 and provincial environmental legislation lies with the IA implementing the projects.

- All environmental documents are subject to public disclosure, and are therefore to be made available to public;
- All environmental assessment documentation for Category B subprojects (IEEs) will be posted on the ADB website;
- Under the SPS (2009), If any Category A subprojects are identified, the first working Draft EIA is to be prepared, and posted on the ADB website 120 days before board approval.
- All IEE/EIAs have to be reviewed by ADB before being disclosed to the public; and,
- The Government will ensure that meaningful public consultations are undertaken during the assessment process for the subprojects.

C. Grievance Redress Mechanism

22. The Executing Agency will establish a mechanism to receive and facilitate the resolution of affected peoples' concerns, complaints, and grievances about the project's environmental performance. The Executing Agency at site will be the Project Implementation Unit (PIU). The PIU will overall be responsible for executing the work at site. The Executive Engineer/Resident engineer will be in

charge of the project. The Executive Engineer will be supported with Sub Divisional Officers and other supporting staff.

23. The GRM will be established at each project location as described below:

24. Prior to the contractor's mobilization to the project site NTDC's Environment and Social Impact Cell (E&SIC) will assist the affected communities to establish a Grievance Redress Committee (GRC) and identify local representatives to act as Grievance Focal Points (GFP) for that community. The Grievance Redress Committee (GRC) will comprise of:

    (i) Executive Engineer (NTDC) for the project;
    (ii) Representative of E&SIC (Assistant Manager (Environment));
    (iii) Environment Specialist CSC;
    (iv) Representative of Contractor; and
    (v) GFP of relevant community.

25. The function 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 procedure.

26. The Grievance Focal Points (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, CSC, Assistant Manager (Environment), E&SIC 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.

    (i) A pre-mobilization public consultation meeting will be convened by E&SIC and attended by GFPs, contractor, CSC, E&SIC representatives and other interested parties (e.g. District level representatives, NGOs). The objectives of the meeting will be as follows: Introduction of key personnel of each stakeholder including roles and responsibilities,

    (ii) 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;

    (iii) Establishment and clarification of the GRM to be implemented during project implementation including routine (proactive) public relations activities proposed by the project team (contractor, CSC, E&SIC) to ensure communities are continually advised of project progress and associated constraints throughout project implementation;

    (iv) Identification of members of the Grievance Redress Committee (GRC)

    (v) Elicit and address the immediate concerns of the community based on information provided above.

27. 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 schematically in Figure 1:

    (i) Individuals will lodge their environmental complaint/grievance with their respective community's nominated GFP.

    (ii) The GFP will bring the individual's complaint to the attention of the Contractor.

    (iii) The Contractor will record the complaint in the onsite Environmental Complaints Register (ECR) in the presence of the GFP.

    (iv) The GFP will discuss the complaint with the Contractor and have it resolved;

    (v) If the Contractor does not resolve the complaint within one week, then the GFP will bring the complaint to the attention of the CSC's Environmental Specialist. The SC's Environment Specialist will then be responsible for coordinating with the Contractor in solving the issue.

    (vi) If the Complaint is not resolved within 2 weeks the GFP will present the complaint to the Grievance Redress Committee (GRC).

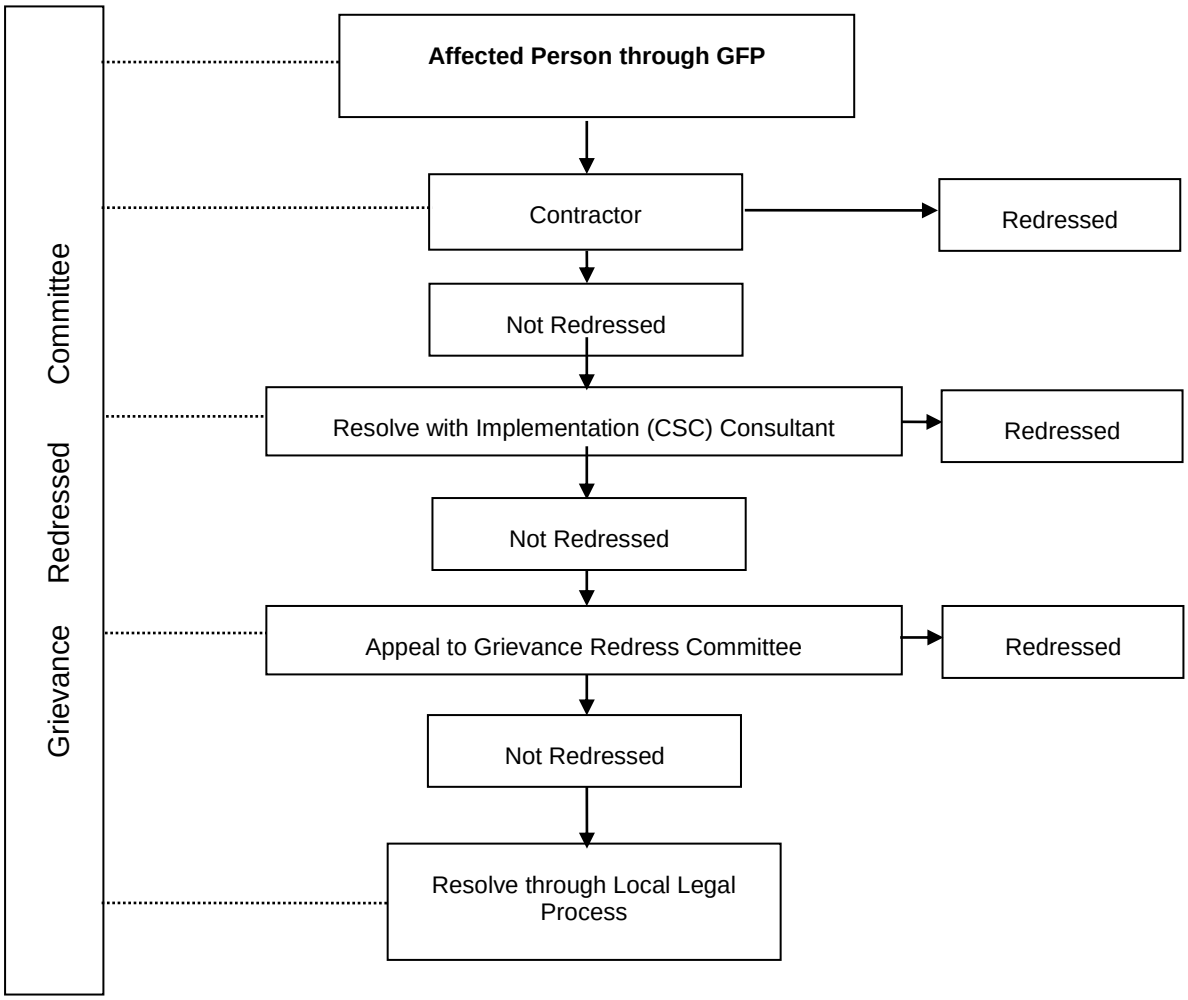
    (vii) The GRC will have to resolve the complaint within a period of 2 weeks and the resolved complaint will have to be communicated back to the community. The Contractor will then record the complaint as resolved and closed in the Environmental Complaints Register.

    (viii) Should the complaint not be resolved through the GRC, the issue will be adjudicated through local legal processes.

    (ix) 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.

    (x) E&SIC will also keep track of the status of all complaints through the Monthly Environmental Monitoring Report submitted by the Contractor to the SC and will ensure that they are resolved in a timely manner.

Figure 1: Grievance Redress Mechanism



VI. INSTITUTIONAL ARRANGEMENT AND RESPONSIBILITIES

28. The Implementing Agency (IA) for the project is the National Transmission and Despatch Company (NTDC). A Project Management Unit (PMU) has been established, which contains an Environment and Social Impacts Cell (E&SIC). The E&SIC is staffed by 1 Manager (Env. and Social Safeguards), 1 Deputy Manager (Env.) and 1 Assistant Manager (Env.) in addition to social safeguard staff. Further resources for env. safeguards management will be provided by Consultants as appropriate and required.
29. The E&SIC within the PMU, with the assistance of Consultants, will be responsible for:

- Appointing an environment specialist to monitor the implementation of environmental management measures required for each subproject.
- Preparing environmental screening checklists and classifying subprojects that have not been yet classified.
- Based on the checklist and as per the requirements of ADB SPS (2009), PEPA 1997 and relevant provincial Environmental Protection Acts, preparing IEEs and EMPs.
- Submitting the checklists and IEE reports to ADB as part of the approval of subproject.
- Ensuring that EMPs are included in Tender documents.
- Ensuring that all regulatory clearances are obtained before starting civil works for the subproject.
- Ensuring that the EMPs, including all proposed mitigation measures and monitoring programs are properly implemented.
- Undertaking monitoring of subprojects and preparing environmental monitoring reports every six, to be delivered to ADB.
- In the case of unpredicted environmental impacts occurring during project implementation, preparing and implementing a Corrective Action Plan (CAP).
- In the case that a Category B subproject needs to have its siting or alignment changed or its environmental classification reconfirmed, reviewing it to determine whether a supplementary study is required. If so, carry out the study and implement any amendments to the original EMP.
- Preparing a project specific EMP for the operations that includes a Site Specific EMP for each of the work areas.
- Providing awareness training in environmental management for all employees working on the subproject.
- Ensuring that meaningful public consultations (including both men and women) are undertaken with affected groups and local NGOs. The list of people attending the consultation, time and locations, subjects discussed during consultation will be recorded in a systematic manner.
- Sharing information and disclosure of environmental safeguard documents (including any Corrective Action Plans prepared in cases of change to original project design) as required.

30. ADB will take the following responsibilities:

- Review project IEEs as a basis for the approval of subprojects.
- Publicly disclose the final IEE before project appraisal, a new or updated IEE and corrective action plan prepared during project implementation, if any, as well as environmental monitoring reports on the ADB website.
- Monitor the implementation of the EMP and due diligence as part of overall project review mission.
- Provide assistance to the EA/IA, if required, in carrying out its responsibilities and safeguard capacity building.

VII. MONITORING AND REPORTING

31. Implementation of the EMP during construction will be done by the contractors and supervised by supervisory consultant and E&SIC. The parameters to be monitored, frequency and duration of monitoring as well as the locations to be monitored will be as per the monitoring plan prepared as part of the EMP. The PIU and contractors will report the results and conclusions of EMP implementation and environmental monitoring to the PMU quarterly. The PMU will consolidate such reports and submit Bi-annual Environmental Monitoring reports to ADB on prescribed template (attached as Annex IV). A section on environment will also be included in the quarterly monitoring reports submitted to ADB. The budget for environmental monitoring shall be included as part of civil works contracts.

32. Environmental assessment will include environmental monitoring plans identifying environmental monitoring activities to ensure that negative environmental impacts are addressed properly. It will identify environmental parameters to be monitored, frequency of monitoring, applicable standards, agencies and institutions responsible for monitoring; and provide indicative monitoring costs. The Project Management Consultants will assist the PMU in this regard. During construction monitoring will be undertaken by contractors. PIUs will monitor contractor's environmental performance. During the operation stage, monitoring will be the responsibility of the EA or the respective IAs. ADB will categorize each tranche of the proposed MFF based on the subprojects.

33. ADB will require the EA through its PMU to:

i. Establish and maintain procedures to monitor the progress of implementation of EMPs;

ii. Verify the compliance with environmental measures and their progress toward intended outcomes;

iii. Document and disclose monitoring results and identify necessary corrective and preventive actions in the periodic monitoring reports;

iv. Follow up on these actions to ensure progress toward the desired outcomes,

v. Use independent consultant (external monitor) to monitor project implementation for highly complex and sensitive projects; and

vi. Submit periodic monitoring reports on environmental safeguard measures as agreed with ADB.

33. During review missions, ADB will assess environmental compliance with environmental requirements. ADB will monitor projects on an ongoing basis until a project completion report is issued. ADB will carry out the following monitoring actions to supervise project implementation:

i. Conduct periodic site visits for projects with adverse environmental or social impacts;

ii. Conduct supervision missions with detailed review by ADB's safeguard specialists/officers or consultants for projects with significant adverse social or environmental impacts;

iii. Review the periodic monitoring reports submitted by borrowers/clients to ensure that adverse impacts and risks are mitigated as planned and as agreed with ADB;

iv. Work with the IA to rectify to the extent possible failures to comply with their safeguard commitments, as covenanted in the legal agreements;

v. Exercise remedies to re-establish compliance as appropriate; and

vi. Prepare a project completion report that assesses whether the objective and desired outcomes of the safeguard plans have been achieved, taking into account the baseline conditions and the results of monitoring.

34. The mitigation measures identified through IEE/EIA are incorporated into the project cycle. Mitigation measures, which are implemented by the Contractor, shall form part of the Contract Documents. The other mitigation measures are undertaken by the PMU (itself or in assistance with Project Consultants) as specified in the IEE/EIA.

35. As per SPS the borrower is required to engage external monitor to verify its monitoring information for projects likely to have significant adverse environmental impacts (category A projects)

TABLE: MINIMUM PROVISIONS FOR ENVIRONMENTAL MONITORING

Project Stage	Mitigation Measure	Parameters to be Monitored	Location	Measurements	Frequency	Responsibility	Cost
Pre-Construction	Route survey to define alternative alignments	Possible encroachment on reserved forests	All transmission and Substation and transmission line sites	Field mapping with Global Positioning System (GPS) Equipment preferable	1-time survey to finalize design	NTDC / PIU through route survey contractor	n/a
Construction	Dust, equipment emissions, erosion, and noise control Waste management	Incorporation of appropriate clauses in construction contracts	All construction contracts for all substation and transmission line sites	Field inspections to ensure that appropriate measures are implemented and facilities are installed	Quarterly	NTDC and PMU to include in bidding documents. ADB to verify through review of bidding documents.	Included in construction contract (estimated at < 0.5% of total contract value)
	Noise, Dust, equipment emissions, and erosion control Waste Management	Suspended particulate matter (SPM) Noise Water: pH, dissolved oxygen (DO), biochemical oxygen demand (BOD), total suspended solids (TSS), hydrocarbon	All substation sites and selected transmission lines	"Grab" samples for air and water Spot check for noise using portable monitoring device Spot check for solid waste generation and disposal	Every 6 months, beginning with initial activity, for total of 24 Months Monitoring will be extended if Necessary Spot checks for solid	Contractors to implement, PMU staff to provide oversight via regular field inspections; ADB to audit during project review missions NTDC has responsibility for s	Cost to be included in contract documents

		and PCBs Solid waste generation and disposal			waste activities	solid waste management	
Operations and Maintenance	Dust, equipment emissions, and erosion control Waste management	Same parameters as during construction period	All substations And transmission lines	Spot checks based on visual inspections and any complaints	As necessary based on inspections and complaints	NTDC through PMU ADB to audit during project review missions	Cost to be included in contract documents

ANNEXURES

ANNEX-I RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST FOR POWER TRANSMISSION AND SUBSTATION SUBPROJECT

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to Environment and Safeguards Division (RSES) for endorsement by Director, RSES and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title:

Sector Division: Power Transmission

Screening Questions	Yes	No	Remarks
A. Project Siting Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
▪ Cultural heritage site			
▪ Protected Area			
▪ Wetland			
▪ Mangrove			
▪ Estuarine			

Screening Questions	Yes	No	Remarks
▪ Buffer zone of protected area			
▪ Special area for protecting biodiversity			
▪ B. Potential Environmental Impacts ▪ Will the Project cause…			
▪ encroachment on historical/cultural areas, disfiguration of landscape and increased waste generation?			
▪ encroachment on precious ecosystem (e.g. sensitive or protected areas)?			
▪ alteration of surface water hydrology of waterways crossed by roads and resulting in increased sediment in streams affected by increased soil erosion at the construction site?			
▪ damage to sensitive coastal/marine habitats by construction of submarine cables?			
▪ deterioration of surface water quality due to silt runoff, sanitary wastes from worker-based camps and chemicals used in construction?			
▪ increased local air pollution due to rock crushing, cutting and filling?			
▪ risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?			
▪ chemical pollution resulting from chemical clearing of vegetation for construction site?			
▪ noise and vibration due to blasting and other civil works?			
▪ dislocation or involuntary resettlement of people?			

Screening Questions	Yes	No	Remarks
▪ disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?			
▪ social conflicts relating to inconveniences in living conditions where construction interferes with pre-existing roads?			
▪ hazardous driving conditions where construction interferes with pre-existing roads?			
▪ creation of temporary breeding habitats for vectors of disease such as mosquitoes and rodents?			
▪ dislocation and compulsory resettlement of people living in right-of-way of the power transmission lines?			
▪ environmental disturbances associated with the maintenance of lines (e.g. routine control of vegetative height under the lines)?			
▪ facilitation of access to protected areas in case corridors traverse protected areas?			
▪ disturbances (e.g. noise and chemical pollutants) if herbicides are used to control vegetative height?			
▪ large population influx during project construction and operation that cause increased burden on social infrastructure and services (such as water supply and sanitation systems)?			
▪ social conflicts if workers from other regions or countries are hired?			
▪ poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases from workers to local populations?			

Screening Questions	Yes	No	Remarks
▪ risks to community safety associated with maintenance of lines and related facilities?			
▪ community health hazards due to electromagnetic fields, land subsidence, lowered groundwater table, and salinization?			
▪ risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?			
▪ community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project (e.g., high voltage wires, and transmission towers and lines) are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?			

A Checklist for Preliminary Climate Risk Screening

Country/Project Title:

Sector : Power Transmission

Subsector:

Division/Department:

Screening Questions		Score	Remarks[1]
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides?		
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?		
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?		
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?		
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?		

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be

[1] If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response, will be categorized as high risk project.

Result of Initial Screening (Low, Medium, High): Low

Other Comments:

Prepared by:

Appendix I: Environments, Hazards and Climate Changes

Environment	Natural Hazards and Climate Change
Arid/Semi-arid and desert environments	Low erratic rainfall of up to 500 mm rainfall per annum with periodic droughts and high rainfall variability. Low vegetative cover. Resilient ecosystems & complex pastoral and systems, but medium certainty that 10–20% of drylands degraded; 10-30% projected decrease in water availability in next 40 years; projected increase in drought duration and severity under climate change. Increased mobilization of sand dunes and other soils as vegetation cover declines; likely overall decrease in agricultural productivity, with rain-fed agriculture yield reduced by 30% or more by 2020. Earthquakes and other geophysical hazards may also occur in these environments.
Humid and sub-humid plains, foothills and hill country	More than 500 mm precipitation/yr. Resilient ecosystems & complex human pastoral and cropping systems. 10-30% projected decrease in water availability in next 40 years; projected increase in droughts, heatwaves and floods; increased erosion of loess-mantled landscapes by wind and water; increased gully erosion; landslides likely on steeper slopes. Likely overall decrease in agricultural productivity & compromised food production from variability, with rain-fed agriculture yield reduced by 30% or more by 2020. Increased incidence of forest and agriculture-based insect infestations. Earthquakes and other geophysical hazards may also occur in these environments.
River valleys/ deltas and estuaries and other low-lying coastal areas	River basins, deltas and estuaries in low-lying areas are vulnerable to riverine floods, storm surges associated with tropical cyclones/typhoons and sea level rise; natural (and human-induced) subsidence resulting from sediment compaction and ground water extraction; liquefaction of soft sediments as result of earthquake ground shaking. Tsunami possible/likely on some coasts. Lowland agri-business and subsistence farming in these regions at significant risk.
Small islands	Small islands generally have land areas of less than 10,000km^2 in area, though Papua New Guinea and Timor with much larger land areas are commonly included in lists of small island developing states. Low-lying islands are especially vulnerable to storm surge, tsunami and sea-

	level rise and, frequently, coastal erosion, with coral reefs threatened by ocean warming in some areas. Sea level rise is likely to threaten the limited ground water resources. High islands often experience high rainfall intensities, frequent landslides and tectonic environments in which landslides and earthquakes are not uncommon with (occasional) volcanic eruptions. Small islands may have low adaptive capacity and high adaptation costs relative to GDP.
Mountain ecosystems	Accelerated glacial melting, rockfalls/landslides and glacial lake outburst floods, leading to increased debris flows, river bank erosion and floods and more extensive outwash plains and, possibly, more frequent wind erosion in intermontane valleys. Enhanced snow melt and fluctuating stream flows may produce seasonal floods and droughts. Melting of permafrost in some environments. Faunal and floral species migration. Earthquakes, landslides and other geophysical hazards may also occur in these environments.
Volcanic environments	Recently active volcanoes (erupted in last 10,000 years – see www.volcano.si.edu). Often fertile soils with intensive agriculture and landslides on steep slopes. Subject to earthquakes and volcanic eruptions including pyroclastic flows and mudflows/lahars and/or gas emissions and occasionally widespread ashfall.

ANNEX-II OUTLINE OF AN ENVIRONMENTAL IMPACT ASSESSMENT REPORT

This outline is part of the Safeguard Requirements 1. An environmental assessment report is required for all environment category A and B projects. Its level of detail and comprehensiveness is commensurate with the significance of potential environmental impacts and risks. A typical EIA report contains the following major elements, and an IEE may have a narrower scope depending on the nature of the project. The substantive aspects of this outline will guide the preparation of environmental impact assessment reports, although not necessarily in the order shown.

A. Executive Summary

This section describes concisely the critical facts, significant findings, and recommended actions.

B. Policy, Legal, and Administrative Framework

This section discusses the national and local legal and institutional framework within which the environmental assessment is carried out. It also identifies project-relevant international environmental agreements to which the country is a party.

C. Description of the Project

This section describes the proposed project; its major components; and its geographic, ecological, social, and temporal context, including any associated facility required by and for the project (for example, access roads, power plants, water supply, quarries and borrow pits, and spoil disposal). It normally includes drawings and maps showing the project's layout and components, the project site, and the project's area of influence.

D. Description of the Environment (Baseline Data)

This section describes relevant physical, biological, and socioeconomic conditions within the study area. It also looks at current and proposed development activities within the project's area of influence, including those not directly connected to the project. It indicates the accuracy, reliability, and sources of the data.

E. Anticipated Environmental Impacts and Mitigation Measures

This section predicts and assesses the project's likely positive and negative direct and indirect impacts to physical, biological, socioeconomic (including occupational health and safety, community health and safety, vulnerable groups and gender issues, and impacts on livelihoods through environmental media [Appendix 2, para. 6]), and physical cultural resources in the project's area of influence, in quantitative terms to the extent possible; identifies mitigation measures and any residual

negative impacts that cannot be mitigated; explores opportunities for enhancement; identifies and estimates the extent and quality of available data, key data gaps, and uncertainties associated with predictions and specifies topics that do not require further attention; and examines global, trans boundary, and cumulative impacts as appropriate.

F. Analysis of Alternatives

This section examines alternatives to the proposed project site, technology, design, and operation—including the no project alternative—in terms of their potential environmental impacts; the feasibility of mitigating these impacts; their capital and recurrent costs; their suitability under local conditions; and their institutional, training, and monitoring requirements. It also states the basis for selecting the particular project design proposed and, justifies recommended emission levels and approaches to pollution prevention and abatement.

G. Information Disclosure, Consultation, and Participation

This section:

(i) describes the process undertaken during project design and preparation for engaging stakeholders, including information disclosure and consultation with affected people and other stakeholders;

(ii) summarizes comments and concerns received from affected people and other stakeholders and how these comments have been addressed in project design and mitigation measures, with special attention paid to the needs and concerns of vulnerable groups, including women, the poor, and Indigenous Peoples; and

(iii) describes the planned information disclosure measures (including the type of information to be disseminated and the method of dissemination) and the process for carrying out consultation with affected people and facilitating their participation during project implementation.

H. Grievance Redress Mechanism

This section describes the grievance redress framework (both informal and formal channels), setting out the time frame and mechanisms for resolving complaints about environmental performance.

I. Environmental Management Plan

This section deals with the set of mitigation and management measures to be taken during project implementation to avoid, reduce, mitigate, or compensate for adverse environmental impacts (in that order of priority). It may include multiple management plans and actions. It includes the following key components (with the level of detail commensurate with the project's impacts and risks):

i. Mitigation:

(a) identifies and summarizes anticipated significant adverse environmental impacts and risks;

(b) describes each mitigation measure with technical details, including the type of impact to which it relates and the conditions under which it is required (for instance, continuously or in the event of contingencies), together with designs, equipment descriptions, and operating procedures, as appropriate; and

(c) provides links to any other mitigation plans (for example, for involuntary resettlement, Indigenous Peoples, or emergency response) required for the project.

ii. Monitoring:

(a) describes monitoring measures with technical details, including parameters to be measured, methods to be used, sampling locations, frequency of measurements, detection limits and definition of thresholds that will signal the need for corrective actions;

(b) describes monitoring and reporting procedures to ensure early detection of conditions that necessitate particular mitigation measures and document the progress and results of mitigation.

iii. Implementation arrangements:

(a) specifies the implementation schedule showing phasing and coordination with overall project implementation;

(b) describes institutional or organizational arrangements, namely, who is responsible for carrying out the mitigation and monitoring measures, which may include one or more of the following additional topics to strengthen environmental management capability: technical assistance programs, training programs, procurement of equipment and supplies related to environmental management and monitoring, and organizational changes; and

(c) estimates capital and recurrent costs and describes sources of funds for implementing the environmental management plan.

(d) Performance indicators: describes the desired outcomes as measurable events to the extent possible, such as performance indicators, targets, or acceptance criteria that can be tracked over defined time periods.

J. Conclusion and Recommendation

This section provides the conclusions drawn from the assessment and provides recommendations.

ANNEX - III TEMPLATE FOR BI-ANNUAL ENVIRONMENTAL MONITORING REPORT

Project Number: {XXXXX}

{Month Year}

{Full Country Name}: {Project Title}

{(Financed by the <source of funding>)}

Prepared by {author(s)}

{Firm name}

{City, country}

For {Executing agency}

{Implementing agency}

TABLE OF CONTENTS

Part I Introduction

- Construction activities and Project Progress during previous 6 months
- Changes in project organization and Environmental management team
- Relationships with Contractors, owner, lender, etc.

Part II Environmental Monitoring

Environmental monitoring summary – summarize the previous six months monitoring data and provide explanations of any instances where environmental standards or guidelines are exceeded. Typically this will cover:

- Noise and Vibration
- Water Quality
- Air Quality
- Flora and fauna monitoring

Recommendations are required to show how any exceeding will be prevented in the future. Graphs can be used in this section to show trends, however large tables of data or multiple graphs should be attached as an appendix.

Part III Environmental Management

- EMS, SSEMP and work plans. Report on delivery of documents, required amendments etc.
- Site Inspections and audits – summarize the number and type of site visits
- Non-compliance notices – summarize the details on the number of notices given out and the issues covered. Summaries the ranking of issues.
- Corrective action plans - report on timeliness of preparation and completion
- Consultation and complaints – report on any consultation undertaken and list any complaints received.

Annexes

- Monitoring data
- Photographs
- Implementation report on EIA/IEE mitigation requirements

Reference	Requirement	Action to date	Action required/comment

ANNEX-IV ENVIRONMENTAL MONITORING PLAN

1	**Design Phase**		
1.1	Audit project bidding documents to ensure IEE/EIA and EMP is included	NTDC through project implementation unit	Prior to issue of bidding documents.
1.2	Monitor final site selection process and final alignment selection process and its environmental compliance with EMP	NTDC with the assistance of an external environmental consultant	Prior to NTDC approval of contractor's detailed alignment survey.
1.3	Review the implementation of the Land Acquisition Plan and expropriation, including considerations concerning vulnerable groups among land-owners, farmers, and farm workers	NTDC with the assistance of an external environmental consultant	Prior to NTDC approval of contractor's detailed alignment survey.
1.4	Monitor contractor's detailed project design to ensure relevant environmental mitigation measures in EMP have been included	NTDC with assistance of project implementation unit	Prior to NTDC approval of contractor's detailed alignment survey.
1.5	Monitor the thorough implementation of detailed Environmental Guidelines for Construction Works, including procurement, management, works, closing operations	NTDC with the assistance of an external environmental consultant	Prior to NTDC approval of contractor's detailed designs.
1.6	Review the management plan for mineral construction materials and waste management	NTDC with the assistance of an external environmental consultant	Prior to NTDC approval of contractor's detailed designs.
1.7	Audit detailed designs of facilities and installations to ensure standard environmental safeguards/ mitigation measures (as identified in EMP) have been included	NTDC with assistance of project implementation unit	Prior to NTDC approval of contractor's detailed designs.

1.8	Review landscape design plan, including compensatory planting	NTDC with the assistance of an external environmental consultant	Prior to NTDC approval of contractor's detailed designs.
1.9	Monitor the performance of environmental training and briefings and of the environmental awareness of project staff and NTDC	NTDC with the assistance of an external environmental consultant	Continuous throughout the entire project period.
2	**Construction Phase**		
2.1	Regular (monthly) monitoring and reporting (quarterly) of contractor's compliance with contractual environmental mitigation measures	NTDC with assistance of project implementation unit	Continuous throughout construction period.
2.2	Monitoring of the implementation of the Landscape Design Plan	NTDC with the assistance of an external environmental consultant	During the last phase of construction works
2.3	Commissioning phase monitoring of as built equipment versus environmental performance criteria	NTDC	At commissioning
3	**Operation and Maintenance Phase**		
3.1	Observations during routine maintenance inspections of facilities and transmission lines rows. Inspections will include monitoring implementation of operational mitigation measures versus environmental criteria specified in EMP, waste management and operational noise.	NTDC	As per NTDC inspection schedules
3.2	Monitoring of the implementation of the Landscape Design Plan	NTDC with the assistance of an external environmental consultant	Twice per year for three years of operation.
3.3	Monitoring decommissioning of other plant required for installation of MFF funded components and waste disposal	NTDC	During the life of the project