# Environmental Assessment and Review Framework

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# India: Assam Power Sector Investment Program

**Prepared by Assam Power Generation Corporation (APGC), Assam Power Distribution Company (APDC), Government of Assam.**

## ABBREVIATIONS

| | | |
|---|---|---|
| ADB | – | Asian Development Bank |
| AEGCL | – | Assam Electricity Grid Corporation |
| AERC | – | Assam Electricity Regulatory Commission |
| APGC | – | Assam Power Generation Corporation |
| APDC | – | Assam Power Distribution Company |
| APCB | – | Assam Pollution Control Board |
| ASEB | – | Assam State Electricity Board |
| CEA | – | Central Electricity Authority |
| CERC | – | Central Electricity Regulatory Commission |
| DC or D/C | – | Double Circuit |
| DPR | – | Detailed Project Report |
| EA | – | Executing Agency |
| EARF | – | Environmental Assessment and Review Framework |
| EIA | – | Environmental Impact Assessment |
| EMoP | – | Environmental Monitoring Plan |
| EMP | – | Environmental Management Plan |
| EHV | – | Extra High Voltage |
| GHG | – | Green House Gas |
| GOA | – | Government of Assam |
| GoI | – | Government of India |
| GRM | – | Grievance Redress Mechanism |
| IA | – | Implementing Agency |
| IEE | – | Initial Environmental Examination |
| LILO | – | Line – in- Line- out |
| LTPS | – | Lakwa Thermal Power Station |
| LKHEP | – | Lower Kopili Hydroelectric Power Project |
| MFF | – | Multi-tranche Financing Facility |
| MOEF | – | Ministry of Environment and Forests, Government of India |
| PCB | – | Poly Chlorinated Biphenyl |
| PGCIL | – | Power Grid Corporation of India |
| PMU | – | Project Management Unit |
| ROW | – | Right of Way |
| RP | – | Resettlement Plan |
| SC or S/C | – | Single Circuit |
| $SF_6$ | – | Sulphur Hexafluoride |

## WEIGHTS AND MEASURES

| | | |
|---|---|---|
| ha (hectare) | – | Unit of area |
| km (kilometer) | – | 1,000 meters |
| kV | – | kilovolt (1,000 volts) |
| kW | – | kilowatt (1,000 watts) |
| MW | – | Mega Watt |

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## A. Introduction

1. The Assam Power Sector Investment Program (the Investment Program) is intended to finance a series of investments via a $300 million Multi-tranche Financing Facility (MFF) in the state of Assam, India including generation capacity enhancement and distribution system strengthening, repair and maintenance (R&M) infrastructure. The Investment Program will also finance a number of "softer" activities, including improvements of power utility companies in operational and financial capacity, and training. The objective of the investment will be to achieve increased adequacy and efficiency of power system, including renewable energy in Assam.

2. The MFF will combine finance to support physical and nonphysical investments, including reforms and capacity building. Funding will be structured into three tranches[1]. The Investment Program will be implemented during 2013 – 2020. The financing plan is given below in **Table 1**.

**Table 1: Sub-Project Costs and Financing Plan ($ million)**

| Item | APGC (Equity) | APDC (Equity) | ADB (Loan) | Total |
|---|---|---|---|---|
| Lakwa Replacement Power Project | 20 | | 45 | 65 |
| Lower Kopili hydroelectric project (HEP) | 90 | | 200 | 290 |
| Distribution System Strengthening and R&M | | 20 | 50 | 70 |
| Capacity development, project preparation and project implementation support | | | 5 | 5 |
| **Total** | **110** | **20** | **300** | **430** |

Source: Discussions with APGC in February 2013 R&M=repair and maintenance

3. Broadly, the APSIP will finance the following sub-project components - Tranche 1 investment components include (i) Lakwa Replacement Power Project – replacement of 4 x 15 MW of Open Cycle Gas Turbines plant in Lakwa Thermal Power Station (LTPS) (with a heat rate above 3,500 Kcal/Kwh) with 70 MW (nominal capacity) Gas based Internal Combustion Engine plants (with heat rate 1,950 – 2,000 kcal/kWh). The investment will also fund capacity development, project preparation and project implementation support. Future tranches will finance the construction of (i) Lower Kopili hydroelectric power (LKHEP), a run of the river, 120 MW ($200 million), and (ii) distribution efficiency improvements ($50 million). The tranche-wise financing plan is given in **Table 2** below.

**Table 2: MFF Cost and Financing Plan ($ million)**

| Financier | Tranche 1 | Tranche2 | Tranche 3 | Total |
|---|---|---|---|---|
| ADB | 50 | 200 | 50 | 300 |
| APGC | 20 | 90 | | 110 |
| APDC | | | 20 | 20 |
| **Total** | **70** | **290** | **70** | **430** |

Source: Discussions with APGC in July 2013

4. **Table 3** provides a list of ADB funded sub-projects for all Tranches.

[1] In comparison with the MFF financing modality, policy-based lending helps with policy reforms, but does not finance investments. Sector development program loans combine policy reforms with financing for generally smaller projects. A sector loan provides financing for a series of repetitive small investment projects spread over a shorter period. The subprojects financed by a sector loan are generally "anticipated" or profiled in advance, based on a study of sample subprojects. Tranches of the MFF will finance slices of the Investment Program, but each tranche is substantial and clearly identified at the outset.

**Table 3: Investment Sub-Projects Funded under Investment Program**

| S No | Items | Tranche | EA/IA Responsible |
|---|---|---|---|
| 1 | Replacement of 30 year old 60 MW Gas turbines with 70 MW gas engines at Lakwa Thermal Power Station, Shivsagar. | Tranche 1 | APGC |
| 2 | Construction 120 MW Lower Kopili Hydropower project | Tranche 2 | APGC |
| 3 | Distribution System Strengthening and R&M | Tranche 3 | APDC |
| 4 | Capacity development | Tranche 1 | PMU/APGC/APDC |

5. The impact of the Investment Program will be increased access to energy in Assam. This will increase economic opportunities, including jobs. The outcome will be increased adequacy and efficiency of power system, including clean energy development in Assam. **Table 4** provides performance targets for the investment program.

**Table 4: Outcomes and Indicators**

| Outputs | Performance Targets and Indicators |
|---|---|
| 1. Generation and transmission capacity and efficiency increased; | Generation capacity augmentation by 120 MW from hydropower and additional 30 MW through replace of old gas turbines |
| 2. Distribution network efficiency in selected urban Assam areas improved; | Associated transmission lines, substations and infrastructure for enabling 120 MW of additional capacity to be transmitted.<br>Upgradation of distribution system and introduction of HVDS system |
| 3. Institutional capacity of APGC & APDC developed and project implementation supported. | Staff trained on financial management and project implementation by 2017<br>Development of IT based systems for systems management at EAs |

6. A tentative list of type of infrastructure sub-projects under the 3 tranches of proposed MFF is presented in **Table 5**.

**Table 5: Type of Sub-projects and their components**

| Type of Sub-projects | Main Components | Infrastructure |
|---|---|---|
| 1. Gas Engines – 70 MW<br>2. Gas Compressors<br>3. 11/33/132 kV lines, substation<br>4. 120 MW Hydropower project<br>5. Facilities, buildings<br>6. ERP at APGC<br>7. Capacity Building | Electrical and Mechanical Equipment | Gas Engines, Water and Oil Cooling system, Generators, Air compressors, Control Room Panels, Turbines, Switchyard equipment, Transformers. |
| | Steel/Concrete structures | Transmission towers, conductors Powerhouse, water conductor, water diversion structures, oil, water and gas piping to supply compressors and engines, distribution lines. |
| | Civil Works | Buildings- power house, gas engine and compressor housing facility, stacks for exhaust, storage for water and new and used oil, control room, other equipment housing facilities. |

7. Consistent with ADB's Safeguard Policy Statement (SPS 2009), this Environmental Assessment and Review Framework (EARF) covers the MFF as a whole and that it provides guidance to be followed for those tranches, sub-projects and/or components that are prepared after MFF approval. The purpose of this Environmental Assessment and Review Framework (EARF) is to guide the project proponent to comply with all national environmental laws and regulations and ADB Safeguard Policy Statement 2009 for all future tranches 2 and 3 under the program.

8. This EARF has been developed and agreed with APGC/APDC to ensure that the Program complies with the provisions of ADB's SPS 2009 and Indian laws (described in section B below). Tranche 2 and Tranche 3 cannot be assessed prior to MFF approval as these scope of the subprojects/components to be funded are finalized. The EARF provisions shall guide APGC/APDC in the selection, screening and categorization, environmental assessment, and preparation and implementation of safeguard plans (such as an environmental management plan or EMP) of Tranche 2 and 3 sub-projects. Since the environmental assessment reports and environmental management plans to be prepared for subsequent tranches are the borrower's documents, these documents shall be officially endorsed by APGC/APDC and will be submitted to ADB.

## B. Assessment of Legal Framework and Institutional Capacity

### Environmental Regulatory and Policy Framework for Subproject Selection

9. GoI and GoA laws, regulations, policies and guidelines and ADB's environment policies and procedures will be applicable to all sub-projects in the MFF based on the location, design and operation of sub-projects which are mostly yet to be determined for future tranches. For each Category A or B tranche, an Initial Environmental Examination (IEE) or and Environment Impact Assessment (EIA) will be prepared by APGC/APDC following ADB's Safeguard Policy Statement, 2009, Environmental Assessment Guidelines, 2003 and applicable National environmental laws and regulations:

### B.1 National/Local Government Environment Classification

10. Under the GoI Environment Impact Assessment (EIA) Notification 2009, the environmental classification of sub-projects is determined by Ministry of Forest and Environment (MoEF), GoI and there are two possible outcomes:

**Category A**: A project is classified as Category A if it is likely to have significant negative impacts and is thus one of the types of project listed in this category in the EIA Notification. Such projects require EIA, plus Environmental Clearance (EC) from MoEF;

**Category B**: A project is classified as Category B if it is likely to have fewer negative impacts and is listed in this category in the EIA Notification. These projects require EC from the State Environment Impact Assessment Authority (SEIAA), who classify the project as B1 (requiring EIA) or B2 (not requiring EIA), depending on the level of potential impacts. Projects classified as B2 require no further study.

11. With a view to expedite the process of obtaining environment clearance for category 'B' type projects and activities in Assam, the Union Ministry of Environment and Forests has constituted the State Level Environment Assessment Authority (SEIAA) and State Level Expert Appraisal Committee (SEAC) in May 2013. The 'B' category projects which will be cleared by SEIAA and SEAC include: mining up to 50 hectare area; hydroelectric power projects up to 50mw; thermal power plants up to 500 mw; state highway up to 30 km of length and state highway and national highway widening projects up to 20 meters of width; construction projects up to 20,000 sq.m. (<1,50,000 sq.m. of built up area); township projects up to 50 ha (>1,50,000 sq.m. of built up area), etc. Clearance from Forest department is required in all cases where project is constructed on forest land or requires cutting of any forest tree/trees or passes through buffer zone of a sanctuary and/or national park.

12. Some of the relevant **Government of India Regulations and Acts** are as follows:

(i) The Electricity Act, 2003
(ii) The Water (Prevention and Control of Pollution) Act, 1974, amended 1988
(iii) The Water (Prevention and Control of Pollution) Rules, 1975
(iv) The Air (Prevention and Control of Pollution) Act 1981, amended 1987
(v) The Air (Prevention and Control of Pollution) Rules, 1982
(vi) The Environment (Protection) Act, 1986, amended 1991 and including the following Rules/Notification issued under this Act.

- The Environment (Protection) Rules, 1986, including amendments
- The Municipal Solid Wastes (Management and Handling) Rules, 2000
- The Hazardous Wastes (Management and Handling) Rules, 2003
- The Hazardous Wastes (Management, Handling and Trans-boundary Movement) Rules 2009
- The Bio-Medical Waste (Management and Handling) Rules, 1998
- Noise Pollution (Regulation and Control) Rules, 2000,
- Wild Life (Protection) Amendment Act, 2002
- Ozone Depleting Substances (Regulation & Control) Rules, 2000.

- The Biological Diversity Act, 2002;
- The Environment Impact Assessment Notification, 1994; amended up to 2009;
- Batteries (Management & Handling) Rules, 2001
- The Environmental Clearance Notification, 1994

(vii) Noise Pollution (Regulation and Control) Rules, 2000
(viii) The Indian Wildlife (Protection) Act, 1972, amended 1993
(ix) The Wildlife (Protection) Rules, 1995
(x) The Indian Forest Act, 1927
(xi) Forest (Conservation) Act, 1980, amended 1988 (National Forest Policy, 1988)

- Forest (Conservation) Rules, 1981 amended 1992 and 2003
- Guidelines for diversion of forest lands for non-forest purpose under the Forest (Conservation) Act, 1980

(xii) The National Environmental Appellate Authority Act, 1997
(xiii) The National Green Tribunal Act, 2010

13. Other relevant **Acts of Government of Assam**

(i) Assam Ancient Monuments and Records Act, 1959.
(ii) Assam Forest Regulation, 1891 (Assam Regulation 7 of 1891) as applied vide Meghalaya Forest Regulation (Application & Amendment) Act, 1973 (Meghalaya Act 9 of 1973)
(iii) Assam National Park Act, 1968
(iv) Assam Land and Revenue Regulation, 1886
(v) Assam Irrigation Act, 1983
(vi) Assam Fishery Rules, 1953
(vii) Assam Forest Policy, 2004
(viii) Assam Government's Guidelines for Compensatory Afforestation, 2000
(ix) Assam Panchayat Act, 1994
(x) Assam Khadi and Village Industries Board Act, 1955
(xi) Assam Forest Protection Force Act 1986
(xii) Assam Cooperative Agriculture and Rural Development Act 1960

14. Some of the relevant **International Treaties / Conventions / Declarations** to which Government of India is a signatory are as follows:

(i) Agenda 21.
(ii) Rio Declaration on Environment and Development.
(iii) The Ramsar Convention on Wetlands.
(iv) The Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and their Disposal.
(v) The Rotterdam Convention on the Prior Informed Consent (PIC) Procedure for Certain Hazardous Chemicals & Pesticides in International Trade.
(vi) The Stockholm Convention on Persistent Organic Pollutants (POPs).
(vii) Convention on Biological Diversity.
(viii) Convention to Combat Desertification.
(ix) Cartagena Protocol on Biosafety.
(x) Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
(xi) Helsinki Protocol to LRTAP on the Reduction of Sulphur Emissions or their Transboundary Fluxes.
(xii) Sofia Protocol to LRTAP concerning the Control of Emissions of Nitrogen Oxides or their Transboundary Fluxes (NOx Protocol).
(xiii) Geneva Protocol to LRTAP concerning the Control of Emissions of Volatile Organic Compounds or their Transboundary Fluxes (VOCs Protocol).

15. **Annexure 1** gives the Regulatory requirements and procedures followed by APGC/ADPCL for sub-project preparation.

## B.2 ADB Policy

16. The objective of ADB's due diligence for the MFF is that EA ensures the environmental soundness and sustainability of projects and to support the integration of environmental considerations into the project decision-making process. Environmental safeguards are triggered if a project is likely to have potential environmental risks and impacts.

17. The SPS Requirements (SR1): Environment are based on the following policy principles:

- Use screening process for each proposed project to determine the appropriate extent and type of environmental assessment so that appropriate studies are undertaken commensurate with the significance of potential impacts and risks.
- Conduct an environmental assessment for each proposed project to identify potential direct, indirect, cumulative, and induced impacts and risks to physical, biological, socioeconomic (including impacts on livelihood through environmental media, health and safety, vulnerable groups, and gender issues), and physical cultural resources in the context of the project's area of influence. Assess potential transboundary and global impacts, including climate change. Use strategic environmental assessment where appropriate.
- Examine alternatives to the project's location, design, technology, and components and their potential environmental and social impacts and document the rationale for selecting the particular alternative proposed. Also consider the no project alternative.
- Avoid, and where avoidance is not possible, minimize, mitigate, and/or offset adverse impacts and enhance positive impacts by means of environmental planning and management. Prepare an environmental management plan (EMP) that includes the proposed mitigation measures, environmental monitoring and reporting requirements, related institutional or organizational arrangements, capacity development and training measures, implementation schedule, cost estimates, and performance indicators. Key considerations for EMP preparation include mitigation of potential adverse impacts to the level of no significant harm to third parties, and the polluter pays principle.
- Carry out meaningful consultation with affected people and facilitate their informed participation. Ensure women's participation in consultation. Involve stakeholders, including affected people and concerned nongovernment organizations, early in the project preparation process and ensure that their views and concerns are made known to and understood by decision makers and taken into account. Continue consultations with stakeholders throughout project implementation as necessary to address issues related to environmental assessment. Establish a grievance redress mechanism to receive and facilitate resolution of the affected people's concerns and grievances regarding the project's environmental performance.
- Disclose a draft environmental assessment (including the EMP) in a timely manner, before project appraisal, in an accessible place and in a form and language(s) understandable to affected people and other stakeholders. Disclose the final environmental assessment, and its updates if any, to affected people and other stakeholders.
- Implement the EMP and monitor its effectiveness. Document monitoring results, including the development and implementation of corrective actions, and disclose monitoring reports.
- Do not implement project activities in areas of critical habitats, unless (i) there are no measurable adverse impacts on the critical habitat that could impair its ability to function, (ii) there is no reduction in the population of any recognized endangered or critically endangered species, and (iii) any lesser impacts are mitigated. If a project is located within a legally protected area, implement additional programs to promote and enhance the conservation aims of the protected area. In an area of natural habitats, there must be no significant conversion or degradation, unless (i) alternatives are not available, (ii) the overall benefits from the project substantially outweigh the environmental costs, and (iii) any conversion or degradation is appropriately mitigated. Use a precautionary approach to the use, development, and management of renewable natural resources.

- Apply pollution prevention and control technologies and practices consistent with international good practices as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety Guidelines. Adopt cleaner production processes and good energy efficiency practices. Avoid pollution, or, when avoidance is not possible, minimize or control the intensity or load of pollutant emissions and discharges, including direct and indirect greenhouse gases emissions, waste generation, and release of hazardous materials from their production, transportation, handling, and storage. Avoid the use of hazardous materials subject to international bans or phase-outs. Purchase, use, and manage pesticides based on integrated pest management approaches and reduce reliance on synthetic chemical pesticides.
- Provide workers with safe and healthy working conditions and prevent accidents, injuries, and disease. Establish preventive and emergency preparedness and response measures to avoid, and where avoidance is not possible, to minimize, adverse impacts and risks to the health and safety of local communities.
- Conserve physical cultural resources and avoid destroying or damaging them by using field-based surveys that employ qualified and experienced experts during environmental assessment. Provide for the use of "chance find" procedures that include a pre-approved management and conservation approach for materials that may be discovered during project implementation

**Screening and Categorization**

18. ADB will carry out project screening and categorization at the earliest stage of project preparation when sufficient information is available for this purpose. Screening and categorization is undertaken to (i) reflect the significance of potential impacts or risks that a project might present; (ii) identify the level of assessment and institutional resources required for the safeguard measures; and (iii) determine disclosure requirements.

**Environment Categorization**

19. ADB uses a classification system to reflect the significance of a project's potential environmental impacts. A project's category is determined by the category of its most environmentally sensitive component, including direct, indirect, cumulative, and induced impacts in the project's area of influence. Each proposed project is scrutinized as to its type, location, scale, and sensitivity and the magnitude of its potential environmental impacts. Projects are assigned to one of the following four categories:

(i) Category A - A proposed project is classified as category A if it is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An environmental impact assessment is required. Category A may apply to projects located in environmentally sensitive areas[2].

(ii) Category B - A proposed project is classified as category B if its potential adverse environmental impacts are less adverse than those of category A projects. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. An initial environmental examination is required.

(iii) Category C - A proposed project is classified as category C if it is likely to have minimal or no adverse environmental impacts. No environmental assessment is required although environmental implications need to be reviewed.

(iv) Category FI - A proposed project is classified as category FI if it involves investment of ADB funds to or through a FI.

[2] Environmentally-sensitive areas include National Parks, Wildlife Sanctuaries, Bio-reserve zones, Eco-sensitive Zones, or wetlands as declared by GoI and areas declared as heritage sites. Environment and wildlife Department's approval is required for right-of-way and sites located in reserved forests, wildlife preserves, national parks, and other designated sensitive areas.

### B.3 Equivalence of ADB SPS 2009 with Government of India laws, regulations

20. **Table 6** provides a brief write up on the equivalence of the current GoI Environmental Rules and Regulations and ADB Safeguard Policy Statement 2009. This equivalence table is taken from ADB's document - TA 6285-REG: Strengthening Country Safeguard Systems - Preliminary Country Safeguard Review for India: Environmental Safeguard (February 2011).

### B.4. Institutional Capacity

21. APGC will be the Executing agency (EA) and the Implementing Agency (IA) for generation projects (Tranches 1 and 2) and APDC is the EA and IA for the Tranche 3 investment for distribution system strengthening and R&M projects. A fully functional Project Management Unit[3] headed by a Project Director which reports to the Chairman of APGC and APDC with appropriate staffing to represent both EAs since the time of erstwhile ASEB. APGC will establish a Project Implementation Unit (PIU) as required whereas APDC already has one. Both APGC and APDC will establish Project Implementation Units (PIUs) comprising of dedicated senior staff who would be responsible to deal with (a) project preparatory activities including providing information and overseeing the development of bid documents; (b) financial matters including agreeing with ADB on financial covenants; (c) supervision and implementation of the environmental and social safeguards requirements, as well as any corporate social responsibility plans.

22. APGC and APDC, through the PMU, is responsible for the design and environmental assessment of sub-projects and monitoring their environmental management during construction and operation. APGC and APDC staff expertise will be complemented by a network of qualified consultancies that will be utilized to assist in preparing the pipeline of sub-projects as required, including sub-project feasibility studies, safeguard assessments, environmental management plans (EMPs) and monitoring reports. Most of the required technical and human resources to design and construct the subprojects will be hired through EPC contracts and monitored by AGPCL/ADPCL staff.

23. Since APDC has been working as the implementing agency for other ADB loans over a number of years, it has developed a strong in-house capacity to identify, appraise, supervise installation, monitor operation and report on the types of sub-projects that will be funded under the MFF. APGC, a new EA for ADB loans, is under the process of developing similar capacity on the lines similar to ADPDCL. Appropriate capacity development interventions such as training on all aspects such as appraisal, supervision, installation, project monitoring operation, environment and social assessment and monitoring shall be developed through the ADB funded project. Capacity development activities will be implemented through participation in relevant courses and seminars, provision of handholding through consultants and technical backstopping by PMU.

24. This will ensure that both APGC and APDC will follow a well-established procedure for feasibility analysis, sub-project design, and environmental and social impact assessment, including procedures for implementation. It should be ensured that staff are recruited and trained by both agencies so that the environmental and social safeguards management is carried out in full compliance with the ADB's Safeguards Policy Statement, 2009 and applicable regulations of the state and central governments.

## C. Anticipated Environmental Impacts

25. **Table 7** below illustrates anticipated impacts on the environmental resources for proposed MFF program subprojects in the project affected area. The impacts for tranche 1 (**Table 7.I**) and other tranches (**Table 7.II**) are listed separately.

[3] PMU provides Institutional support for financial management and institutional capacity development to all EAs.

**Table 6: Equivalence of the GoI Environmental Rules and Regulations and ADB Safeguards Policy Statement 2009**

| No | ADB's SPS 2009 | Indian Laws | Equivalence | Comments | Changes recommended for full equivalence |
|---|---|---|---|---|---|
| 1 | Use a screening process for each proposed project, as early as possible, to determine the appropriate extent and type of environmental assessment, so that appropriate studies are undertaken commensurate to the significance of potential impacts and risks. | The Environment (Protection) Act, 1986.<br>National Environmental Policy 2006.<br>The Environment Impact Assessment Notification, 1994 and amended up to 2009.<br>National Environmental (Ambient Air, Water Quality and Noise) Standards, CPCB. | Full | The Environment (Protection) Act, 1986.<br>National Environmental Policy 2006.<br>The Environment Impact Assessment Notification, 1994 and amended up to 2009.<br>National Environmental (Ambient Air, Water Quality and Noise) Standards, CPCB. | |
| 2 | Conduct an environmental assessment for each proposed project to identify potential impacts and risks on physical, biological, socio-economic (including health and safety), and physical cultural resources in the context of the project's area of influence. Assess potential trans-boundary and global impacts, including climate change. Use strategic environmental assessment where appropriate. | The Environment Impact Assessment Notification, 1994 and amended up to 2009. | Partial | The EPA and EIA Notification do not require that an environmental assessment address impacts on physical cultural resources, trans-boundary and global impacts, including climate change. Nor are there any provisions for use of strategic environmental assessment where appropriate. | The legal framework should be revised to require that the EIA process addresses impacts on physical cultural resources, trans-boundary and global impacts, including climate change and to use strategic environmental assessment where appropriate. |
| 3 | Examine financially and technically feasible alternatives to the project location, design, technology and components, their potential environmental and social impacts, and document the rationale for selecting the particular alternative(s) proposed, where relevant. The no project alternative will be also considered. | National Environmental Policy, 2006.<br>The Environment Impact Assessment Notification, 1994 and amended up to 2009. | Partial | Although the EIA Notification requires that the EIA document examine alternatives and provide an overall justification for the project it does not require consideration of the environmental implications of the "no project" alternative. | The legal framework should be revised to require consideration of the no project alternative as part of the EIA process and documentation. |
| 4 | Avoid and, where avoidance is not feasible, minimize, mitigate and/or offset for adverse impacts and enhance positive impacts through environmental planning and management. Prepare an environmental management plan (EMP) or equivalent planning document(s) that includes the proposed mitigation measures, environmental monitoring and reporting requirements, related institutional or organizational arrangements, capacity development and training measures, implementation schedule, cost estimates and performance indicators. | National Environmental Policy, 2006. | Partial | Although the EIA Notification requires that the EMP address the "administrative aspects" of proposed that mitigative measures, it does not require that the EMP address reporting requirements, capacity development and training measures, implementation schedule, cost estimates or performance indicators | The legal framework should be revised to require that the EMP address reporting requirements, capacity development and training measures, implementation schedule, cost estimates or performance indicators |
| 5 | Carry out free, prior and informed consultation with affected people and facilitate their informed participation. Ensure women's participation in consultation. Involve | The Environment Impact Assessment Notification, 2006 and amended up to 2009.<br>The National Environment Appellate Authority Act, 1997 | Partial | The EIA Notification is fully equivalent with this Policy Principle with the exception of any specific provisions to | The legal framework should be revised to include specific provisions to ensure women's participation in the EIA |

| No | ADB's SPS 2009 | Indian Laws | Equivalence | Comments | Changes recommended for full equivalence |
|---|---|---|---|---|---|
| | stakeholders, including project-affected people and concerned NGOs early in the project preparation and ensure that their views and concerns are made known and understood by decision makers and taken into account. Continue consultations with stakeholders throughout project implementation as necessary to address environmental assessment-related issues. Establish a grievance mechanism to receive and facilitate resolution of the affected people's concerns and grievances regarding the project's environmental performance. | | | ensure women's participation in the consultation process | consultation process |
| 6 | Disclose draft environmental assessments (including EMP) before project appraisal, in a form, manner and language(s) accessible to affected people and other stakeholders. | The Environment Impact Assessment Notification, 1994 and amended up to 2009. | Full | Executing Agency to facilitate resolution of affected people's concerns.<br>Component of IEE report.<br>Grievance redress mechanism-addressed in accordance with the ADB requirement. | |
| 7 | Implement the EMP and monitor its effectiveness. Document monitoring results, including development and implementation of corrective actions, and disclose periodic progress reports. | Public consultation and disclosure as per Indian EIA Act 2006.<br>The Environment (Protection) Act, 1986 | Partial | There is no requirement for public disclosure of EMP monitoring results. Public consultation and disclosure as per Indian EIA Act 2006.<br>ADB's SPS 2009 requires disclosure of EIA[4], IEE, Environmental Assessment and Review Framework (EARF) and Environmental Monitoring Reports | The legal framework should be revised to include a requirement for periodical disclosure of monitoring results |
| 8 | Do not implement project activities that involve or are likely to result directly or indirectly in the significant conversion or degradation of critical habitats. If a project is located within a legally protected area, implement additional programs to promote and enhance the conservation aims of the protected area. If the project has the potential to adversely impact non-critical habitats, proceed only if there are no technically and financially feasible alternatives, overall benefits from the project | Environmental Protection Rules 1986 (EPR)<br>Indian Forest Act of 1927 (Forest Act)<br>The Forest (Conservation) Act, 1980<br>The Wild Life (Protection) Act, 1972<br>Biodiversity Act of 2002<br>The Biological Diversity Act, 2002 | Full | ADB requires Environmental Monitoring Plan for monitoring of mitigation of environmental impacts.<br>State Environmental Appraisal Committee (SEAC) releases guidelines and recommendations for the mitigating environmental impacts. | |

[4] a draft full EIA (including the draft EMP) at least 120 days prior to ADB Board consideration, and/or environmental assessment and review frameworks before project appraisal,

| No | ADB's SPS 2009 | Indian Laws | Equivalence | Comments | Changes recommended for full equivalence |
|---|---|---|---|---|---|
| | substantially outweigh the environmental costs, and any conversion or degradation is appropriately mitigated. Use a precautionary approach to the use, development and management of renewable natural resources. | | | | |
| 9 | Application of pollution prevention and control technologies | The Water (Prevention and Control of Pollution) Act, 1974 as amended;<br>The Air (Prevention and Control of Pollution) Act, 1981 as amended<br>Environmental Standards published by Central Pollution Control Board (CPCB) and State Pollution Control Board (SPCB)<br>Water (Prevention And Control Of Pollution) Rules, 1975<br>Insecticide Act of 1968<br>Ministry of Commerce and Industry (Department of Commerce) Directorate General of Foreign Trade Public Notice No 72 (Re-2003)/2002-2007, July 2004 | Full | ADB requires Environmental Monitoring Plan for monitoring and mitigation of environmental impacts and risks.<br>SEAC releases specific guidelines and recommendations for the mitigation of environmental impacts relevant to each sub project | |
| 10 | Provide workers with safe and healthy working conditions, and prevent accidents, injury, and disease. Establish preventive and emergency preparedness and response measures to avoid, and where avoidance is not feasible, to minimize the adverse impacts and risks to the health and safety of the local communities. | The Environment Impact Assessment Notification, 1994 and amended up to 2009.<br>National Policy on Safety, Health and Environment at Work Place<br>The Public Liability Insurance Act, 1991 | Full | Appropriate extent of workers safety and the health discussed under the EMP | |
| 11 | Conserve physical cultural resources (PCR) and avoid their destruction or damage by using field based surveys with qualified and experienced expert(s) during environmental assessment. Provide for the use of "chance find" procedures that include a pre-approved management and conservation approach for materials that may be discovered during project implementation. | Environmental Protection Rules 1986<br>The Environment Impact Assessment Notification, 1994 and amended up to 2009.<br>The Ancient Monument and Archaeological Sites and remains (Amendment and Validation) Act, 2010 | Partial | There are no provisions that require pre-approved procedures for "chance finds" for chance finds within the EIA or PCR legal framework. | The EIA Notification should be revised to include a provision requiring pre-approved procedures for "chance finds" of PCR. |

## Table 7: Summary of Potential Environmental Impacts

### TABLE 7.I. TRANCHE 1 (APGC)

| SNº | Environmental attribute | Potential impacts | Nature of impact | Magnitude of impacts | | | Management Plan | Sub-Project Phase |
|---|---|---|---|---|---|---|---|---|
| | | | | Low | Medium | High | | |
| **A.** | **Physical Resources** | | | | | | | |
| 1. | Topography | Change in the surface features and present aesthetics due to the construction of the project. | Direct/Local/ irreversible | | | X | Greenbelt surrounding the power plant area to improve aesthetics. No other mitigation required | Construction |
| 2. | Climate | Impact on the climatic conditions | Indirect/Local/ irreversible | X | | | No visible impact | Construction |
| | | | Indirect/Local/ irreversible | | X | | Due to stack emissions | Operation |
| | | Monitoring of $SF_6$ gas from Electrical equipment. | Direct/Local/ irreversible | X | | | Switchgear equipment | Operation |
| **B.** | **Environmental Resources** | | | | | | | |
| 1. | Air Quality | Impact on air quality during the construction period due to increase in the dust emission. | Direct/Local/ reversible | | | X | Watering at construction site, limited bare soils, maintenance of project vehicles etc. | Construction |
| | | Stack emission control and monitoring is required. | Direct/Local/ reversible | | | X | Proper stack emission monitoring. | Operations |
| 2. | Noise | Noise due to general construction activities. | Direct/Local/ reversible | | X | | Restriction of noise generating activities at night and use of personal protective equipment like ear plugs, mufflers etc. | Construction |
| | | Noise arising from operation of gas engines and compressors | Direct/Local/ reversible | | | X | Proper maintenance of equipment/ machineries so the ambient noise standard is met. | Operation |
| 3. | Surface and Ground Water quality | Wastewater from the construction site. | Direct/Local/ reversible | | | X | Domestic waste treatment at construction site required using separation tanks. | Construction |
| | | Oil spillage | Indirect/Local/reversible | X | | | Containment structures, oil water separation, adopting good practices for oil handling and maintenance works. | During construction and operation |
| | | Oil contamination during maintenance | Indirect/Local/reversible | | X | | Oil trap installation for separation of oil from water. | During operation |
| | | Water treatment for make-up water for radiators | Direct/Local/ reversible | X | | | Water drain-out is minimal as all of it is evaporated in the radiators. | Operation |
| 4. | Soils and Geology | Digging and pile foundations for engines, generators, compressors etc. | Direct/Local/ reversible | X | | | Avoiding sites, which are prone to the soil erosion. Leveling of construction sites. | Construction |
| | | Improper debris removal/accumulation | Direct/local/reversible | | X | | Proper planning for debris removal from power plant area to be stored temporarily/used for site reclamation | Design and construction |
| | | Damage due to seismic activity. | Direct/regional/ reversible | | X | | Site selection and design considering the geological conditions and seismicity. | Construction/Operation |
| **C. Ecological Resources** | | | | | | | | |
| 1. | Terrestrial Ecology | Loss of vegetation. | Direct/Local/ irreversible | X | | | Location of power plant is a the thinly vegetated area and waste lands. | Construction |
| 2. | Terrestrial | Disturbance to the local fauna | Direct/Local/ | X | | | Some wildlife species are reported to be seen about 4 km | Construction |

| SNº | Environmental attribute | Potential impacts | Nature of impact | Magnitude of impacts | | | Management Plan | Sub-Project Phase |
|---|---|---|---|---|---|---|---|---|
| | | | | Low | Medium | High | | |
| | Fauna | during construction. | reversible | | | | away from the plant. | |
| | Avifauna | Disturbance to the local fauna during operation. | Direct/Local/ reversible | X | | | Hot effluent gases from the stack will harm avifauna in the area | Operation |
| 3. | Aquatic Ecology | Disturbance to fish | Direct/Local/ reversible | | | X | Runoff from construction site from construction material and spillage oils etc. | Construction |
| | | | Direct/Local/ reversible | | X | | Effluent water laced with oil and chemicals during wastewater discharge | Operation |
| **D. Human Environment** | | | | | | | | |
| 1 | Fire Safety | Fires, explosion and other accidents at the Power generation plant site | Indirect/Local | X | | | Use of personal protective equipment during construction and maintenance. Prepare and implement safety and emergency manual at plant site. Regular inspection of equipment for faults prone to accidents. | Construction |
| | | | Direct/Local | X | | | | Operation |
| 2. | Health and Safety | Exposure to electromagnetic fields | Direct/Local/ continuous | X | | | Manpower at site of operation. No houses near the plant. | Operation |
| 3. | Agriculture | Permanent and temporary loss of agriculture land. | Direct/Local/ reversible | X | | | No agricultural land used for construction. | Construction |
| 4. | Socio-economics | Beneficial impacts job opportunities | Direct/regional | X | | | Hiring for temporary construction jobs | Construction |
| | | | Direct/regional | | | | Overall industrial and economic growth of the region. | Operation |
| 5. | Resettlement | Resettlement of any household | Direct/Local/ reversible | X | | | Resettlement issues and mitigation measures are separately discussed in the Social Assessment Report. | Construction/ Operation |
| 6. | Cultural sites | Archaeological, historical or cultural important sites are affected by the construction of gas based generation plant. | Direct/Local/ reversible | X | | | No mitigation required | Design |
| 7. | Traffic and Transportation | Traffic congestion due to movement of construction vehicles. | Direct/Local/ reversible | X | | | Avoid high density areas, proper traffic signs at the construction site, ensuring proper access roads | Construction |
| 8. | Solid Waste Generation | Probability of surface and ground water pollution. | Direct/Local/ reversible | | X | | Spillage of Oil from dismantling of equipment | Construction |
| | | | Direct/Local/ reversible | | X | | The oil sludge should be separately stored in the containers. Used oil to be collected and reclaimed by contractors through the Office of Stores and Purchase. Separated oily waste and scrap will be collected and disposed of in compliance with the Environmental Protection Act, 1986, and applicable regulations and rules. | Operation |

## TABLE 7.II. FUTURE TRANCHES 2 &3 (APGC & APDC)[5]

| Sr. No. | Environmental attribute | Potential impacts | Nature of Impact | Magnitude of Impacts | | | Management Plan | Sub-Project Phase |
|---|---|---|---|---|---|---|---|---|
| | | | | Low | Medium | High | | |
| **A.** | **Physical Resources** | | | | | | | |
| 1. | Topography | Change in the surface features and present aesthetics due to the construction at various sub-project sites | Direct/Local/ irreversible | X | | | Plantation surrounding the power house area to improve aesthetics. No other mitigation required | Operation phase |
| 2. | Climate | Impacts on the climatic conditions unknown as removal of trees along alignment and HEPs to be done | Direct/Local/ irreversible | X | -- | -- | Compensatory afforestation | Construction and Operation |
| 3 | Hydrology | Operation of headworks | Direct/Local/irreversible | X | | | Construction of Trench type weir | Operation |
| | | Ground water table | Indirect/Local/reversible | X | | | Better water table in the area | Operation |
| | | Dewatered river bed (during lean period) due to stream diversion | Direct/Local/irreversible | X | | | Since rivers are fed by snowmelt/rain, even during lean period flow would be optimum. Only one turbine operation during lean period | Operation |
| | | Change in flow regime (during lean period) due to stream diversion | Direct/Local/irreversible | X | | | Since rivers are fed by snowmelt/rain, even during lean period flow would be optimum. Only one turbine operation during lean period | Operation |
| | | Flow disruption (during lean period) due to ponding at diversion | Direct/Local/irreversible | X | | | Since rivers are snowmelt/rain, even during lean period flow would be optimum | Operation |
| | | Change in land use by submergence of land due to ponding at diversion | Direct/Local/irreversible | | | X | Land to be submerged quite large | Operation |
| | | Sedimentation | No impact | X | | | Volume of sedimentation reduces the water in reservoir | Operation |
| | | River morphology | Direct/Local/irreversible | X | | | Blocks/boulders get dumped in river bed due to change of gradient | Operation |
| | | Pests & Weeds | Indirect/Local/reversible | X | | | Grown in the reservoir area | Operation |
| **B.** | **Environmental Resources** | | | | | | | |
| 1. | Air Quality | Project will have marginal impact on air quality during the construction period due to dust emission. | Direct/Local/ reversible | X | | | Watering at construction site, limited bare soils, maintenance of project vehicles etc. | Construction |
| 2. | Noise | Noise due to general construction activities | Direct/Local/ reversible | X | | | Restriction of noise generating activities at night and use of personal protective equipment like ear plugs, mufflers etc. | Construction |
| | | Noise arising from switch yard operation and corona noise from | Direct/Local/ permanent | X | | | Locate transformers away from the settlement area. Monitoring of possible corona noise to identify and correct | Operation |

[5] The nature and magnitude of all anticipated impacts is only indicative and will need to be assessed in detail as part of the EIA/IEE.

| Sr. No. | Environmental attribute | Potential impacts | Nature of Impact | Magnitude of Impacts | | | Management Plan | Sub-Project Phase |
|---|---|---|---|---|---|---|---|---|
| | | | | Low | Medium | High | | |
| | | conductors. | | | | | problems. Proper maintenance of equipment/ machineries so the ambient noise standard is met. | |
| 3. | Surface and Ground Water quality | Runoff from the construction site leading to increase in COD, BOD, oil & grease, etc. | Direct/Local/ reversible | X | | | Careful siting of access roads.<br>Sedimentation ponds. | Before construction activity |
| | | Domestic wastewater from construction sites and during operation leading to increase in COD, BOD, oil & grease, etc. | Direct/Local/ reversible | X | | | Domestic waste treatment by providing septic tank. | During construction and operation |
| | | Oil spillage | Indirect/Local/reversible | X | | | Containment structures, oil water separation, adopting good practices for oil handling and maintenance works . | During construction and operation |
| | | Oil contamination during maintenance | Indirect/Local/reversible | | X | | Oil trap installation for separation of oil from water. | During operation |
| 4. | Soils and Geology | Soil erosion due to clearing of vegetation in access roads | Direct/Local/reversible | X | | | Avoiding sites, which are prone to the soil erosion. Leveling of construction sites. Use of few access roads/power evacuation lines. Rehabilitation and stabilization of disturbed land. | During and after the construction activity |
| | | Soil erosion due to tunnel excavation and clearing of vegetation in the powerhouse and power evacuation line and access roads | Direct/Local/reversible | X | | | Avoiding sites, which are prone to the soil erosion. Leveling of powerhouse construction sites. Use of few access roads. Rehabilitation and stabilization of disturbed land. | During and after the construction activity |
| | | Improper Debris removal/accumulation | Direct/local/reversible | | X | | Proper planning for debris removal from tunnel, powerhouse to be stored temporarily/used for site reclamation | Pre-construction and construction |
| | | Damage due to seismic activity | Direct/regional /reversible | | X | | Site selection and design considering the geological conditions and seismicity. | Before the construction activity |
| **C.** | **Ecological Resources** | | | | | | | |
| 1. | Terrestrial Ecology | Loss of vegetation | Direct/Local/Irreversible | | X | | Minimum corridor width for power evacuation line, access roads. Location of power house at the thinly vegetated area and waste lands which will minimize tree loss. Compensatory afforestation. | Before the construction Phase |
| 2. | Terrestrial Fauna | Disturbance to the local fauna during construction | Indirect/Local/reversible | | X | | Some wildlife species are reported to be seen | During construction phase |
| | | Disturbance to the local fauna during operation | Indirect/Local/reversible | X | | | Monitoring of power evacuation lines especially for bird strikes during the operation and deflectors will be added if required. | During operation phase |
| 3. | Aquatic Ecology | Disturbance to fish during construction of trench weir and impact on downstream fish | Indirect/Local/irreversible | X | | | No mitigative impact required. Since the river is quite acidic, even during the lean period, minimum flow is there; hence aquatic ecology will have no impact. | During construction/operation phase |
| **D.** | **Human Environment** | | | | | | | |
| 1. | Health and Safety | Exposure to electromagnetic fields | Direct/Local/continuous | X | | | Alignment route away from the settlement. No houses will be allowed near power houses | Before and after the construction phase. |

| Sr. No. | Environmental attribute | Potential impacts | Nature of Impact | Magnitude of Impacts | | | Management Plan | Sub-Project Phase |
|---|---|---|---|---|---|---|---|---|
| | | | | Low | Medium | High | | |
| | | Fires, explosion and other accidents at the substations/power house. | Direct/Local | X | | | Use of personal protective equipment during construction and maintenance. Prepare and implement safety and emergency manual at substation. Regular inspection of lines for faults prone to accidents. | During operation phase |
| 2. | Agriculture | Permanent and temporary loss of agriculture land due to powerhouse and due to access routes | Direct/Local/reversible | X | | | Avoid prime agriculture land. Assessment of land required and compensation. Construction activity after crop harvesting and selection of few access routes. | Before construction phase |
| 3. | Socio-economics | Beneficial impacts from rural and urban electrification. Job opportunities during construction phase | Direct/regional | | | X | Overall industrial and economic growth of the region. | During operational phase |
| 4. | Resettlement | Resettlement of the house falling in project area. | Direct/Local/reversible | X | | | Resettlement issues and mitigation measures are separately discussed in the Social Assessment Report. | Before the construction phase |
| 5. | Cultural sites | No archaeological, historical or cultural important sites are affected by the construction of the sub-project. | -- | -- | -- | -- | No mitigation required | -- |
| 6 | Traffic and Transportation | Traffic congestion due to movement of construction vehicles | Direct/Local/Reversible | X | | | Avoid high density areas, proper traffic signs at the construction site, ensuring proper access roads | During construction Phase |
| 7 | Solid Waste Generation | Probability of surface and ground water pollution | Indirect/Local/reversible | X | | | The oil sludge should be separately stored in the containers. Used oil to be collected and reclaimed by contractors through the Office of Stores and Purchase. Separated oily waste and scrap will be collected and disposed of in compliance with the Environmental Protection Act, 1986, and applicable regulations and rules. | During operation phase |

## D. Environmental Assessment for Subprojects and/or Components

### D.I Screening and Classification

#### D.I.1 Selection Criteria

26. Subprojects that involve any one of the ten activities in the ADB Prohibited Investment Activities List (*Appendix 5 of the Safeguard Policy Statement, 2009*) shall be excluded.

27. Additional subprojects proposed under the MFF will be screened for compliance with selection criteria listed below prior to additional analysis. Sub-projects that will be planned and implemented shall meet the following specific environmental criteria:

a. Not located within national parks, wildlife sanctuaries and nature reserves, or wetlands, unless unavoidable for technical reasons.
b. Any monument of cultural or historical importance is not affected by the subproject.
c. Do not create any threat to the survival of any community with special reference to tribal community.
d. Minimises impacts to large habitations, densely populated areas, crossings of national highways, railway lines, and airport areas, other EHV lines, hydrocarbon pipelines etc. to the extent possible.
e. Requires minimal clearing of any existing forest resources in the project affected area – wherever it is unavoidable, can be minimized and compensated as per regulatory criteria.
f. Any community utility services like playgrounds, schools, cemetery etc. and any other similar establishments etc. will not be adversely affected.

#### D.I.2 Biodiversity

28. As per ADB SPS requirements[6] APGC/ADPCL will assess the significance of project impacts and risks on biodiversity[7] and natural resources as an integral part of the environmental assessment process. The assessment will focus on the major threats to biodiversity, which include destruction of habitat and introduction of invasive alien species, and on the use of natural resources in an unsustainable manner. APGC/ADPCL will need to identify measures to avoid, minimize, or mitigate potentially adverse impacts and risks, propose compensatory measures, such as biodiversity offsets, to achieve no net loss or a net gain of the affected biodiversity. The topics of concern are modified habitats, natural habitats, critical habitats, legally protected areas, invasive alien species, and management/use of renewable natural resources. APGC/APDC will screen the sub-projects for exclusion from environmentally sensitive areas as described below:

**a. Modified Habitats**

29. In areas of modified habitat, where the natural habitat has apparently been altered, often through the introduction of alien species of plants and animals, such as in agricultural areas, AGPCL/ADPCL will exercise care to minimize any further conversion or degradation of such habitat, and will, depending on the nature and scale of the project, identify opportunities to enhance habitat and protect and conserve biodiversity as part of project operations.

**b. Natural Habitats**

30. In areas of natural habitat,[8] the project will not significantly convert or degrade[9]

[6] Appendix 1 of SPS 2009 (Sections 8-11)
[7] The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.
[8] Land and water areas where the biological communities are formed largely by native plant and animal species, and where human activity has not essentially modified the area's primary ecological functions.
[9] Significant conversion or degradation is (i) the elimination or severe diminution of the integrity of a habitat caused by a major, long-term change in land or water use; or (ii) the modification of a habitat that substantially reduces the habitat's ability to maintain viable populations of its native species. Significant conversion may include, for example, land clearing; replacement of natural vegetation (for example, by crops or tree plantations); permanent flooding (by a reservoir for instance); drainage, dredging, filling, or canalization of wetlands; or surface mining.

such habitat, unless the following conditions are met:

- No alternatives are available.
- A comprehensive analysis demonstrates that the overall benefits from the project will substantially outweigh the project costs, including environmental costs.
- Any conversion or degradation is appropriately mitigated.

31. Mitigation measures will be designed to achieve at least no net loss of biodiversity. They may include a combination of actions, such as post project restoration of habitats, offset of losses through the creation or effective conservation of ecologically comparable areas that are managed for biodiversity while respecting the on-going use of such biodiversity by Indigenous Peoples or traditional communities, and compensation to direct users of biodiversity.

**c. Critical Habitats**

32. No project activity will be implemented in areas of critical habitat[10] unless the following requirements are met:

- There are no measurable adverse impacts, or likelihood of such, on the critical habitat which could impair its high biodiversity value or the ability to function.
- The project is not anticipated to lead to a reduction in the population of any recognized endangered or critically endangered species[11] or a loss in area of the habitat concerned such that the persistence of a viable and representative host ecosystem be compromised.
- Any lesser impacts are mitigated in accordance with para. 30.

33. When the project involves activities in a critical habitat, the borrower/client will retain qualified and experienced external experts to assist in conducting the assessment.

**d. Legally Protected Areas**

34. In circumstances where some project activities are located within a legally protected area, in addition to the requirement specified in para. 31, APGC/APDC will meet the following requirements:

- Act in a manner consistent with defined protected area management plans.
- Consult protected area sponsors and managers, local communities, and other key stakeholders on the proposed project.
- Implement additional programs, as appropriate, to promote and enhance the conservation aims of the protected area.

**e. Invasive Alien Species**

35. APGC/APDC will not intentionally introduce any new alien species (that is, species not currently established in the country or region of the project) unless carried out in accordance with the existing regulatory framework for such introduction, if such a framework is present, or unless the introduction is subject to a risk assessment (as part of the environmental assessment) to determine the potential for invasive behavior. Under no circumstances must species known to be invasive be introduced into new environments. The borrower/client will undertake assessment of the possibility of accidental or unintended introduction of such invasive alien species and identify measures to minimize the potential for release.

[10] Critical habitat is a subset of both natural and modified habitat that deserves particular attention. Critical habitat includes areas with high biodiversity value, including habitat required for the survival of critically endangered or endangered species; areas having special significance for endemic or restricted-range species; sites that are critical for the survival of migratory species; areas supporting globally significant concentrations or numbers of individuals of congregatory species; areas with unique assemblages of species or that are associated with key evolutionary processes or provide key ecosystem services; and areas having biodiversity of significant social, economic, or cultural importance to local communities. Critical habitats include those areas either legally protected or officially proposed for protection, such as areas that meet the criteria of the World Conservation Union classification, the Ramsar List of Wetlands of International Importance, and the United Nations Educational, Scientific, and Cultural Organization's world natural heritage sites

[11] As defined by the Word Conservation Union's Red List of Threatened Species or as defined in any national legislation

**f. Management and Use of Renewable Natural Resources**

36. Renewable natural resources will be managed in a sustainable manner. Sustainable resource management is management of the use, development, and protection of resources in a way, or at a rate, that enables people and communities, including Indigenous Peoples, to provide for their current social, economic, and cultural well-being while also sustaining the potential of those resources to meet the reasonably foreseeable needs of future generations. This includes safeguarding the life-supporting capacity of air, water, and soil ecosystems. Where possible, the borrower/client will demonstrate the sustainable management of resources through an appropriate system of independent certification.

37. APGC/APDC will assess the following safeguards as a standard practice for the sub-project design, construction and operation stages:

- **Pollution Prevention and Abatement**. During the design, construction, and operation of the subproject, APGC/APDC will apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environment, Health and Safety Guidelines.[12] APGC/ADPCL, while designing the sub-projects shall endeavor to ensure pollution prevention, resource conservation, energy efficiency, reduce all types of wastes generation, avoid use of hazardous materials, pesticides and reduce greenhouse gas emissions.
- **Health and Safety**. APGC/APDC will apply preventive and protective measures consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environment, Health and Safety Guidelines for occupational health and safety and community health and safety concerns.
- **Physical Cultural Resources**. The borrower/client is responsible for siting and designing the subproject to avoid significant damage to physical cultural resources.[13] Such resources likely to be affected by the subproject will be identified, and qualified and experienced experts will assess the subproject's potential impacts on these resources using field-based surveys as an integral part of the environmental assessment process. The subproject will not remove any physical cultural resources unless the following conditions are met:
  - No alternatives to removal are available.
  - The overall benefits of the subproject substantially outweigh the anticipated cultural heritage loss from removal.
  - Any removal is conducted in accordance with relevant provisions of national and/or local laws, regulations, and protected area management plans and national obligations under international laws, and employs the best available techniques.

**D.I.3 Screening Categorisation**

38. As soon as sufficient information on subprojects is available, APGC/APDC will screen them to determine the environmental category by completing ADB's rapid environmental assessment (REA) checklist in **Annexure 2** (for hydro power sub-projects) and **Annexure 3** (power transmission/distribution sub-projects) for and submitting this to the ADB for review. The category for each tranche will be established based on the category of the most environmentally sensitive sub-project/component including the direct, indirect, cumulative, and induced impacts within the sub-project's area of influence.

39. Environmental categories will be assigned using the rapid environmental

[12] World Bank Group, 2007. *Environmental, Health, and Safety General Guidelines.* Washington, DC

[13] Defined as movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Physical cultural resources may be located in urban or rural settings and may be above or below ground or under water. Their cultural interest may be at the local, provincial, national, or international level.

assessment checklist (as described in ADB Environmental Assessment Guidelines 2003) and adhering to the ADB Safeguard Policy Statement (SPS) 2009[14]. Sub-projects that do not conform to the above criteria shall be dropped or design changes will be suggested and/or required by ADB and GoI.

## II. Preparation of environmental assessments and environmental management plans

### D.II.1 Preparation of IEEs and EIAs

40. After categorization, IEE (or full EIA for category A projects) including an EMP with implementation budget will be prepared[15] according to both ADB and MoEF guidelines. IEE and EIA should be prepared in accordance with Safeguard Requirements 1 (SR 1) in Appendix 1 of the SPS 2009. The outline for preparation of an EIA is attached as **Annexure 4** (the IEE may have narrower scope depending on nature of sub-project). IEEs and EIAs report the assessment of impacts based on studies conducted to identify the potential environmental impacts.

41. At least one public consultation will be conducted with local community and potentially affected people during IEE preparation, and two public consultations will be conducted during EIA preparation. IEE and EIAs will be reviewed and approved by ADB and GOI before commencement of detailed design while IEE results will be communicated to the local community before commencement of construction

42. IEEs/EIAs will need to be prepared and disclosed in accordance with ADB's Public Communication Policy 2011. For Category A subprojects, the EIA shall be made available to general public (in English and local language) and the ADB Board of Directors at least 120 days before the subproject approval by ADB. For Category B subprojects, the IEE need to be disclosed on the ADB, APGC/APDC websites.

43. Based on the environmental assessment of the subproject activities, an Environment Management Plan (EMP) will be developed for the subproject to mitigate the adverse environmental impacts. The EMP will set out the mitigation measures, mitigation cost, monitoring requirements and responsible authorities for implementation in order to ensure that adverse effects are minimized or avoided.

### D.II.2 Responsibilities/Authorities of various agencies

#### a. Responsibility of APGC/APDC

44. APGC/APDC will be responsible for the implementation of the environmental assessment and review procedures for their respective components as laid down by Government of India as well as this EARF document. This includes, among others, ensuring that the selection criteria are adhered to, the preparation of IEEs/EIAs be done in a timely and adequate manner, environmental monitoring and institutional requirements be fully met while public consultations be carried out satisfactorily. The APGC/APDC will submit the Rapid Environmental Assessment (REA) Checklists, EIAs/IEEs for each tranche and submit monitoring reports of each subprojects every six monthly to ADB for review. APGC/APDC will also be responsible for obtaining regulatory approval of the environmental protection agencies, if required as per GoI and GoA environmental regulations.

45. APGC/APDC will be responsible for preparing the required environmental assessments and obtaining ADB concurrence prior to implementation. APGC/APDC shall ensure that implementation of environmental/mitigation measures as per EMP and their

[14] ADB's Safeguards Policy Statement-2009 includes safeguard requirements for environment, involuntary resettlement and indigenous people. Softcopy available at http://www.adb.org/documents/safeguard-policy-statement

[15] In the case of Category C, an environmental review is required.

periodic/specific accountability/monitoring and reporting requirements are managed effectively. Also, APGC/APDC will ensure all Corporate Social Responsibility (CSR) actions for all sub-projects are monitored in compliance with corporate policy as well as adhere to any regulatory pre-requisite for approvals to any sub-project.

**b. Responsibility of ADB**

46. ADB will be responsible for regular review and timely approval of checklists, IEEs and/or EIAs. Technical guidance will be provided by ADB to APGC/APDC as needed. ADB will also be responsible for reviewing regular monitoring reports and officially disclosing the IEEs and/or EIAs on its website.

### D.II.3 Preparation of detailed design

47. Detailed design work for each additional subproject will follow the recommendations of the IEE/EIA. APGC/APDC will review detailed designs before contracts are finalized and modifications will be incorporated if considered necessary. During the detailed design, the APGC/APDC will update the EMP as deemed necessary. Certification to ADB that the detailed designs will comply with IEE/EIA (including EMP) recommendations will be required before contracts can be made effective.

### D.II.4 Preparation of Construction Contracts

48. Construction contracts will incorporate the Environmental Management Plan (EMP) for environmental safeguards compliance. APGC/APDC shall prepare bidding documents that take into account the relevant provisions in the EMP to ensure contract documents reflect the relevant provisions of the EMP. All applicable mandatory regulatory approvals including from forest department must be in place prior to finalization of contracts and commencement of works.

### D.II.5 Environmental Management Plan

49. An environmental management plan (EMP) will be developed for each sub-project[16]. The mitigation measures for subsequent sub-projects will be developed in the spirit of the principles agreed upon in this EARF framework. Any unanticipated consequences due to sub-project activities are identified during project implementation, they will be documented and the EIA/IEE (including EMP) will need to be updated to reflect the mitigation measures needed to address them.

50. **Table 8** provides the Minimum Provisions for implementing mitigation measures as per the Environmental Management Plan (EMP).

### D.II.6 Environmental Monitoring Plan

51. Environmental monitoring plan will need to be developed for the specific sub-project, type of mitigation, monitoring and frequency of monitoring will depend on the impacts predicted. Environmental monitoring will consist of routine systematic checking that the environmental management measures have been implemented effectively during each stage of the subproject.

52. Monitoring contractor's implementation of the EMP mitigation measures as stipulated in the works contracts will be the responsibility of APGC/APDC. Monitoring will be sufficient to confirm that construction activities meet contractual requirements, determine that the environmental resources are not impacted negatively, and to determine the effectiveness of mitigation measures.

53. If monitoring identifies a problem during implementation, APGC/APDC shall of a corrective action plan by APGLC or APDC if monitoring identifies a problem. Report to ADB and the relevant environmental agencies on specified intervals (e.g. on a six monthly basis

[16]EMP could vary from project to project due to variation in terms of environmental attributes and sensitivity on account of change in location.

for Category B subproject) will be provided by APGC/APDC. These monitoring reports will be disclosed on ADB and APGC/APDC websites.

54. **Table 9** presents the summary environmental monitoring plan for sub-projects to be funded under the MFF.

**Table 8: Minimum Provisions for implementing mitigation measures for Environmental Management Plan (EMP)**[17]

| Project Stage | Mitigation Measures | Monitoring Scope | Location | Measurements | Frequency | Responsibility | Cost |
|---|---|---|---|---|---|---|---|
| Pre- construction | Site survey to define alternative subproject sites/alignments. | Any encroachment on reserved forests or sanctuary, populated areas. | Gas power generation station/hydropower/ substation/selected locations along lines. | Field mapping with Global Positioning System (GPS) equipment. | One time survey to finalize design. | APGC/AETCL/APDC's field office through survey contractor. | Included in construction contract. |
| | Dust, equipment emissions, erosion, and noise control.<br>Waste management. | Incorporation of appropriate clauses in construction contracts. | All construction contracts for all subproject sites. | Field inspection to ensure that appropriate measures are implemented and facilities are installed. | Once in 3 months. | APGC/APDC to include in bidding documents, monitor through field office.<br><br>ADB to verify through review of bidding documents.[18] | Included in construction contract. |
| Construction | Dust, equipment emissions, and erosion control Waste management.<br><br>Noise, Heat, GHG related Equipment emissions.<br><br>Waste Water management. | Suspended particulate matter (SPM) Noise Water: pH, dissolved oxygen (DO), biochemical oxygen demand (BOD), total suspended solids (TSS), Solid waste generation and disposal.<br><br>$SF_6$ gas leakage, oil leakages.<br><br>Disposal of all types of waste water. | Gas power generation station/hydropower/ substation/selected locations along lines. | Field mapping with Global Positioning System (GPS) equipment. | Every 6 months, beginning with initial activity, for the length of subproject.<br><br>Monitoring will be extended if necessary. | Contractors to implement, field office to provide oversight via regular field inspections.<br><br>ADB to review during review missions.<br><br>APGC/APDC to have responsibility for waste management. | Included in construction contract |
| Operations and Maintenance | GHG related equipment emissions, and erosion control, Waste management.<br><br>Monitoring of excessive Noise, Heat, Oil leakage, $SF_6$ leakage.<br><br>Waste Water management. | Same parameters as during construction period. | Gas power generation station/hydropower/ substation/selected locations along lines. | Field mapping with Global Positioning System (GPS) equipment. | As necessary based on inspections and complaints[19].<br><br>Standard O&M schedules of APGC/APDC for $SF_6$, oil, water, and noise. | APGC/APDC through field office.<br><br>ADB to verify during review missions. | Included in construction contracts.<br><br>Thereafter in O&M schedules and standard operating procedures |

ADB = Asian Development Bank, BOD = biochemical oxygen demand, DO = dissolved oxygen, SPM = suspended particulate matter, TSS = total suspended solids, $SF_6$ – Sulphur Hexafluoride gas, a highly non-toxic GHG gas

[17] For issues related to compensation of landowners for land acquisition will be included in the resettlement plan.
[18] ADB will review documents and provide "no objection" at each stage of bidding, contract evaluation, and contract award.
[19] Parameters should be monitored if warranted based on visual observations or complaints.

## Table 9: Summary Environmental Monitoring Plan

| Environmental Monitoring Tasks[20] | Implementation Responsibility | Implementation Schedule |
|---|---|---|
| **Pre-Construction Phase** | | |
| Verify subproject bidding documents to ensure EMP is included. | PMU, APGC/APDC | Prior to issue of bidding documents |
| Monitor contractor's detailed alignment survey to ensure relevant environmental mitigation measures in EMP have been included. | PMU, APGC/APDC | Prior to APGC/APDC approval of Contractor's detailed alignment survey. |
| Verify detailed design of facilities to ensure standard environmental safeguards/mitigation measures (as identified in EMP) have been included. | PMU, APGC/APDC | Prior to APGC/APDC approval of contractor's detailed designs. |
| Approvals from GoA/GoI agencies such as forest department, roads, railways etc. as required before finalization. | APGC/APDC | Prior to APGC/APDC approval of contractor's detailed designs. |
| Ensure all Corporate Social Responsibility related activities are incorporated in the design | APGC/APDC | Prior to issue of bidding documents |
| **Construction Phase** | | |
| Regular monitoring and reporting of contractor's compliance with contractual environmental mitigation measures. | PMU/PIU through field office/EPC* | Continuous throughout the construction period. |
| Ensure all types of waste materials generated during construction is disposed of as per mandatory GOI/ADB norms. | PIUs through EPC | Continuous throughout the construction period. |
| Ensure that all types of pollution caused due to construction is minimized and kept within regulatory norms of the GoI and GoA. | PIUs through EPC | Continuous throughout the construction period. |
| **Operation and Maintenance** | | |
| Observations during routine maintenance inspections which will include monitoring implementation status of mitigation measures specified in EMP. | PIUs | As per APGC/APDC inspection schedules |
| Handling of waste oil/sludge from transformers/engines to be handled by certified agencies. | PIUs/PMU | Inspection schedule and reporting as per GoI/GoA statutory requirements |
| Monitoring of Noise, air and water pollution levels at sites | PIUs/PMU | Inspection schedule and reporting as per GoI/GoA statutory requirements |
| Monitoring $SF_6$ leakages in switchgear equipment. | PIUs/PMU | Inspection schedule and reporting as per GoI/GoA statutory requirements |

(EPC) - Engineering, Procurement and Construction Contractor, PMU- Project Management Unit; ESMU-Environmental and Social Management Unit, PIU – Project Implementing Unit

[20] Monitoring of issues related to compensation of landowners for land acquisition and loss of production, etc. are addressed in the Resettlement Plan.

## E. Consultation, Information Disclosure, and Grievance Redress Mechanism

### E.1 Information Disclosure

55. APGC/APDC will submit to ADB the following documents for disclosure on ADB's website:

(i) a draft full EIA (including the draft EMP) at least 120 days prior to ADB Board consideration, and/or environmental assessment and review frameworks before subproject appraisal, where applicable;
(ii) the final EIA/IEE;
(iii) a new or updated EIA/IEE and corrective action plan prepared during subproject implementation, if any; and
(iv) the environmental monitoring reports.

56. APGC/APDC will provide relevant environmental information, including information from the above documents in a timely manner, in an accessible place and in a form and local language(s) understandable to affected people and other stakeholders in accordance with the *ADB Public Communications Policy 2011.* For illiterate people, other suitable communication methods will be used.

57. IEE/EIA results will also be communicated to the local community before commencement of construction through their posting on the websites of AGPCL and ADPCL as well as providing a mechanism for the receipt of comments.

### E.2 Consultation and Participation

58. APGC/APDC will carry out meaningful consultation with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation. Consultation process undertaken under the directions of the ESMU (i) will begin in the subproject preparation stage and will carried out on an on-going basis throughout the subproject cycle[21]; (ii) will provide timely disclosure of relevant information that is understandable and readily accessible to groups and individuals, and specially women; (iii) is undertaken in an atmosphere free of intimidation or coercion; (iv) will be gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups; and (v) shall enable the incorporation of all relevant views of affected people and other stakeholders into decision making, such as subproject design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues. Consultation will be carried out in a manner commensurate with the impacts on affected communities. The consultation process and its results will be documented and reflected in the environmental assessment report.

59. The APGC/APDC may also hold public hearings[22] as per the GOI environmental clearance norms to determine or investigate any matter that it considers necessary in the public interest conducted prior to construction regarding the scope of the subproject, procedure of construction activities, utility of resources, identified impacts and mitigation measures..

### E.3 Grievance Redress Mechanism (GRM)

60. APGC/APDC does not have any specific Environment or Social Safeguards Policy regarding generation/distribution subprojects currently. ADB procedures require APGC/APDC to establish a Grievance Redress Mechanism (GRM) having suitable grievance redress procedure to receive and facilitate resolution of affected peoples' concerns, complaints, and grievances about the subproject's environmental performance.

[21] For environment category A projects, such consultations will necessarily include consultations at the early stage of EIA field work and when the draft EIA report is available during project preparation, and before project appraisal by ADB.
[22] A public hearing is a public investigation or inquiry which is held in a public forum and in which those who are affected by the matter(s) being heard or investigated.

The grievance mechanism will be scaled to the risks and adverse impacts on environment due the subproject type, size, type of area (sensitive area) and impacts. It should address affected people's concerns and complaints promptly, using a transparent process that is gender responsive, culturally appropriate, and readily accessible to all segments of the affected people at no costs and without retribution. This GRM would consist of a Grievance Redress Committee (GRC) headed by the Project Head. The committee would consist of the following constitution as listed in **Table 10**.

**Table 10: Constitution of Grievance Redress Committee**

| | |
|---|---|
| 1 | Project Head, APGC/APDC |
| 2 | Sub District Magistrate/District Revenue Officer or their nominee |
| 3 | Representative of local Panchayat/Council |
| 4 | Women representative of village/council |
| 5 | Representative of EPC* contractor |
| 6 | AGM of Environment and Social Management Unit (ESMU) at PMU or nominee |

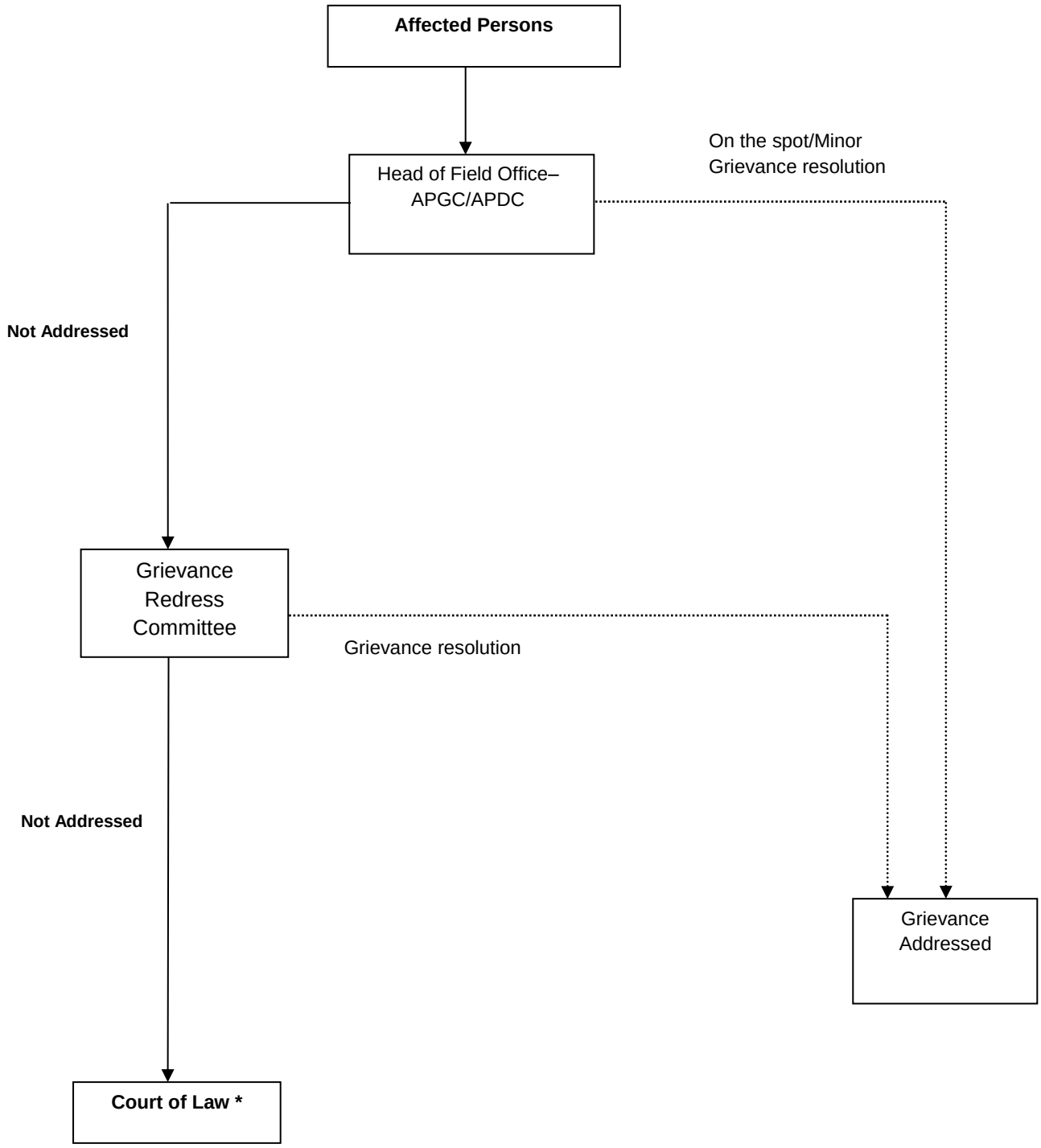
* (EPC) - Engineering, Procurement and Construction Contractor
AGM=Assistant General Manager

61. This Grievance Redress Mechanism (GRM) would provide an effective approach for resolution of complaints and issues of the affected person/community. Project Management Unit (PMU) shall formulate procedures for implementing the GRM, while the PIUs shall undertake GRM's initiatives that include procedures of taking/recording complaints, handling of on-the-spot resolution of minor problems, taking care of complainants and provisions of responses to distressed stakeholders etc. paying particular attention to the impacts on vulnerable groups.

62. Grievances of affected persons (APs) will first be brought to the attention of the Project head of the PIU. Grievances not redressed by the PIU will be brought to the Grievance Redress Committee (GRC) set up to monitor subproject Implementation for each subproject affected area. The GRC will determine the merit of each grievance, and resolve grievances within an outer time limit of three months of receiving the complaint. The proposed mechanism does not impede access to the country's judicial or administrative remedies. The AP has the right to refer the grievances to an appropriate courts of law if not satisfied with the redress at any stage of the process.

63. The PIU will keep records of all grievances received including: contact details of complainant, date that the complaint was received, nature of grievance, agreed corrective actions and the date these were effected, and final outcome. The flow chart showing Grievance Redress Mechanism is presented in **Figure 1**.

**Figure: 1: Flow chart showing Grievance Redress Mechanism**




( * ) Affected Persons can approach the court of law at time during the Grievance redress process.

## F. Institutional Arrangement and Responsibilities

64. The Steering Committee for the MFF which would include representatives from Government of Assam and the state government. The key institutions involved in project management and implementation, including the environmental assessment and review process for sub-projects are PMU, APGC, APDC and their PIUs as described below.

### F.1 PMU

65. The PMU will be responsible for overseeing sub-project compliance with environmental and social safeguard requirements based on the EARF provisions that include: (i) sub-project selection taking into account environmental screening criteria; (ii) sub-project environmental assessments prepared in accordance with the requirements set out in this EARF; (iii) appropriate public consultations and disclosures; (iv) effective management of the grievance redress mechanism; and (v) EARF compliance reported in the environmental monitoring report. The PMU or its appointed technical consultants will conduct routine visual inspections of construction activities, including site pegging, vegetation clearance, earthworks, etc.

66. The PMU structure is shown in **Figure 2**. The PMU Director will be responsible for coordinating all external functions with ADB, GOI, DEA, GOA as well as coordinates the internal functions through Deputy General Manager (DGM) level person for coordination of Environment and Social/R&R reporting, Legal, Finance and Accounts, PIU monitoring and reporting, Procurement and Contracts, and other functions from within APGC/APDC.

67. PMU has designated one Assistant General Manager (AGM) incharge of Environment and Social Management Unit (ESMU) who has oversight responsibilities for monitoring for all sub-projects in areas such as Environment, R&R and Social safeguards. To assist ESMU in these specialist functions, APGC/APDC will hire appropriate Environment and Social Consultants at PIU level, as deemed necessary or as stipulated by MoEF's environmental clearance to assist ESMU in day-to-day coordination and reporting for various subproject activities.

68. The duties of the ESMU will include at a minimum: (i) oversight of field offices and construction contractors for monitoring and implementing mitigation measures; (ii) liaising with the field offices and contractors and seeking their help to solve the environment-related issues of subproject implementation; and (iii) preparation of environmental management reports every 6 months (as required by ADB). ESMU must coordinate with PIUs for monitoring as well as designing appropriate mitigation measures to address environmental and social issues[23].

### F.2 APGC/APDC/PIUs

69. The PMU shall implement the ADB loan at the corporate level and the PMU will be supported for implementation activities through the APGC/APDC field offices/ Project Implementing Units (PIUs). The PIU/field offices of APGC/APDC will assume primary responsibility for the environmental assessment as well as implementation of EMPs through contractors or third party consultants in consultation with ESMU. The PIU/Project Head will be assisted by the ESMU.

70. The PIU/field offices of APGC/APDC will have overall responsibility to manage the site activities. For management of EMPs, APGC/APDC will conduct overall coordination,

[23] ADB advises that all EAs develop in-house capability for environmental, health, and safety (EHS) program consistent with international best practices. The EHS program should include accounting for environmental benefits resulting from investment projects within three months of loan approval. The monitoring agency shall report on semi-annual basis directly to ADB and determine whether sound environmental management practices have been achieved, and suggest suitable recommendations and remedial measures for midterm correction and improvement.

preparation, planning, implementation, and financing of all field level activities. Keeping in view to enhance the planning implementation, environment and social safeguard skills at the PIU level, PIU staff shall be sent for capacity building training programs periodically by ADB and others in consultation with ESMU. These trainings will be identified by PMU in consultation with ADB.

Consultants, Construction Contractors, Equipment Suppliers, and Other Service Providers

71. APGC/APDC will ensure that contractors engaged for each sub-project are engaged in regular EMP monitoring and implementation. Consultants will be contracted by AGPCL and AGDCL as required to assist in the preparation of the pipeline of sub-projects. This will include consulting services to complete IEEs and environmental assessments for individual sub-projects. The construction contractor will have primary responsibility for environmental and social management, and worker health and safety at sub-project construction sites under their control. They will be required to adhere to all national and state level environmental, health, and safety (EHS) guidelines and implement relevant sub-project environmental and social management measures prior to and during construction.

### F.3 Asian Development Bank

72. ADB will (i) review the EARF and its subsequent update as necessary; (ii) review the subproject IEE prior to ADB Board consideration; (iii) periodically review sample sub-project IEEs and desktop environmental assessments; (iv) review Project monitoring reports; and (v) officially disclose environmental safeguards documents on its web site in accordance with the ADB *Public Communications Policy* (2011). ADB will also review REA Checklists for proposed sub-projects to enable it to provide guidance to APGC/APDC/PMU on SPS (2009) requirements

73. Further details on agencies responsible for EMP implementation activities are shown in **Table 11.**

**Table 11: Institutional Roles and Responsibilities for EMP Implementation Activities**

| Activity | Responsible Agency |
|---|---|
| **Project Initiation Stage** | |
| Assign field offices for each subproject | APGC/APDC |
| Clearances/approvals from relevant GOI/GoA agencies-forest, roads, rivers, railways, telecom etc. | APGC/APDC/ESMU |
| Disclosure of subproject EMP details on APGC/APDC website | PMU/ESMU/APGC/APDC |
| Conducting discussions/meetings/workshops with APs and other stakeholders | PMU/ESMU/APGC/APDC |
| Updating of EMP mitigation measures based on discussions | PMU/ESMU |
| **EMP Implementation Stage** | |
| Meetings at community/household level with APs | Field Office/ESMU/Contractor |
| Implementation of proposed EMP mitigation measures | Field Office/ESMU/Contractor |
| Consultations with APs during EMP mitigation measures implementation | Field Office/ESMU/Contractor |
| Grievances Redress | PMU/ ESMU/ District Authorities/ Council Administration |
| Internal monitoring | PMU/ESMU |
| External monitoring* | External Experts |

ADB-Asian Development Bank; AP-Affected Persons; EA-Executing Agency; EMP-Environmental Management Plan; PMU- Project Management Unit; ESMU-Environmental and Social Management Unit

*Note –External monitoring only required when projects are noticed to have significant adverse environmental impacts.

### F.4 Staffing Requirements and Budget

74. Costs required for operating the Environmental Assessment and Review Framework should cover the following –

i). Conducting IEE/EIA studies, preparing and submitting reports and public consultation and disclosure, which involves collection and analysis of data of proposed subproject, assessment and mitigation of impacts, preparation of the EMP, budget, public

consultation, and preparation of the IEE/EIA report and the summary;

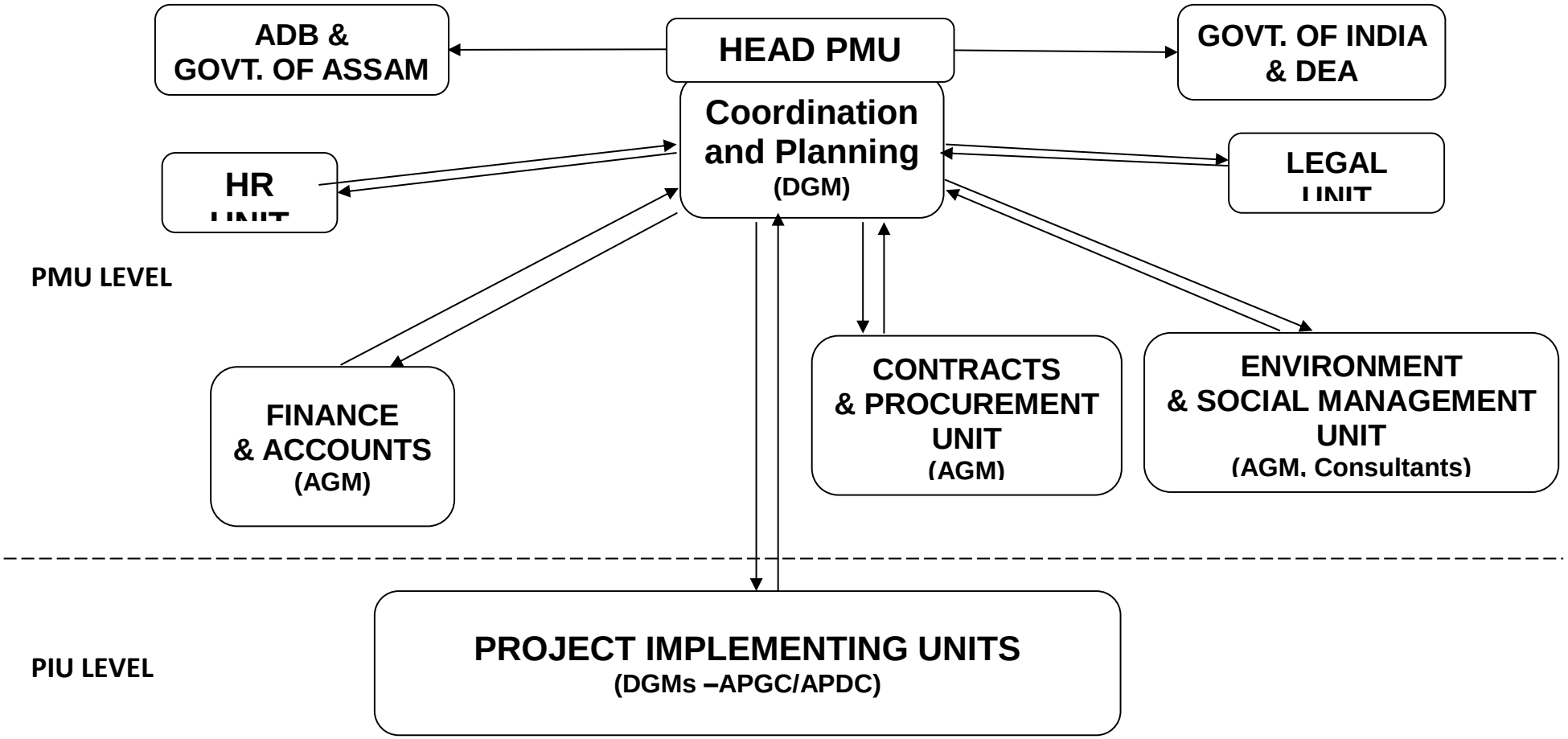
ii). Implementation of EMP mitigation measures by Engineering, Procurement and Construction (EPC) contractor, the cost of which is included in the construction contracts. PMU will make necessary budgetary provision and staffing requirement for preparation of IEE/EIA and its due monitoring for the future tranches.

iii). Certain mandatory mitigation measures and CSR initiatives might have to be undertaken to adhere to the Environmental Clearance/Consent to Establish conditions as prescribed by MoEF, GOI at the cost of APGC or APGC. Other costs that need to be added may include, but not limited to, training for HIV/AIDS prevention and independent audit.

75. About 1% of the total project costs would be included as the EMP mitigation and monitoring costs which include both one time and recurring[24].

[24] Since the sub-projects in Tranches 2 & 3 are not yet scoped out entirely, separate cost estimation is not done at this stage.

# Figure 2: PMU STRUCTURE



## G. Monitoring and Reporting

76. The EMP will have both internal and external monitoring. The field office will be responsible for internal monitoring of the EMP implementation, and will forward quarterly progress reports to the PMU with details of activities and progress made during EMP implementation. The PMU will submit semi-annual monitoring reports to ADB.

77. The PMU will prepare subproject monitoring reports every six months during subproject implementation for submission to ADB. The PMU will also prepare environmental management reports in accordance with the subproject specific IEEs and environmental management plan every six months during construction (or at the end of construction when it takes less than six months), and once between 6-12 months after the commencement of sub-project operation. The environmental management reports will cover EMP implementation, focusing on compliance and any needed corrective actions. Public consultation will be conducted as necessary during construction by APGC and APDC. ADB will conduct periodic review missions which will include a review of safeguard implementation issues and make suitable recommendations for undertaking remedial measures for mid-term correction and improvement, if required.

78. If subproject activities are noticed to have significant adverse environmental impacts, ADB requires APGC/APDC to retain qualified and experienced experts[25] or qualified Non-Government Organisation (NGO) or Community Based Organization (CBO) to verify the report. If required, these external experts/NGO or CBO will report on a semi-annual basis directly to ADB to verify if sound environmental management practices were followed during implementation. In case the implementation of EMP measures is not satisfactory, the external experts/NGO or CBO will recommend actions to enhance environmental compliance.

[25] External expert who is not involved in day-to-day project implementation or supervision

## Annexure 1: GOI and Local Regulatory Requirements and Procedures Followed by EAs

### Land Acquisition

1. Under the Indian Telegraph Act, transmission towers can be erected on private land where the ownership of the land is not transferred. The ownership of land is normally transferred for construction of substation or a power generation facility.

The project proponent follows the provisions of the Land Acquisition Act of 1894 and all other land related enactments. The Act stipulates that the state government or any agency thereof (such as the Collector) can declare a certain piece of private land is required for public purpose. The project proponent may submit a request to the Collector for acquisition of land for project sites. The same act requires the state government to publish a gazette notification regarding the acquisition of land where the interested or affected person is given the opportunity to record objection to the land acquisition within thirty days of the publication of the notice. The District Collector would then enquire into the matter and may give the award.

2. Under Act, the project proponent (or any public agency) must have the land to be acquired surveyed in the presence of the Collector or his nominee, and the owner of the land or the owner's authorized representative. The project proponent would also be required to make payment for damages; such payment is at the market value of the land on the date of notification. The Act provides that the Collector may take possession of the land after he has made the award, and payment has been made.

3. In case of urgency, the state government can issue a Notification under the Act, to take over the land within 15 days of the notification, irrespective of the compensation award. Compensation is decided subsequently by the Collector as described above; but tender payment of 80% of the compensation is to be made immediately.

### Forest Clearance

4. The Ministry of Environment and Forests (MOEF) has gazetted a statutory notification called the Forest (Conservation) Act, 1980. According to this act permission of MoEF is required for use of any forest land for construction of power lines. In case the forest land is involved in a planned project, the project proponent must show that the power line routing involves a minimum of forest land and that alternative routes have been considered. The application form for forest clearance includes: project description; detailed map; alternatives and reasons for rejection of alternatives; population benefited; employment granted; details of flora and fauna in the area; density and other specific details of vegetation; status as wildlife sanctuary, biosphere reserve, national park, nature reserve; rare or endangered species; habitat for migrating fauna; vulnerability to erosion; number of displaced families; scheduled caste/scheduled tribes involved in displacement; rehabilitation plan; and details of the compensatory afforestation scheme. The application includes a detailed route marked on Survey of India map. The project proponent submits forest Clearance applications to the concerned Divisional Forest Officer. The locations of reserved and protected forest are checked and marked on a map, and the forest clearance application in the required format is prepared jointly by project proponent and the Forest Department.

5. During the application review and approval process the review agencies comment on the application, and can return it to project proponent for required modifications. After review, the application is forwarded to the Conservator of Forests. The application requires a detailed opinion of the Chief Conservator of Forests/Head of Forest Department with regard to: self sufficiency of the district in fuel wood and timber; the effect of the proposal on rural fuel wood supply, the economy and livelihood of tribal and backward communities; and a certification that all other alternatives for the purpose have been explored, and the demand for the required area is the minimum with respect to demand for forest land. Forest areas can be cleared and used only after payment for compensatory afforestation is made as

detailed in the Forest clearance and final approval is obtained thereafter from the MoEF.

**Procedure for submission of forest diversion case**

6. The proposals relating to diversion of forest land should be submitted in prescribed performa (available on forest department website) or directly to the Nodal officer (Additional Principal Chief Conservator of Forests (Protection)). The Nodal officer will send the proposals to the concerned DFO/DCF's for completion of necessary formalities. These papers will be returned through Conservator of Forests.

7. However, for diversion of forestland in sanctuaries/national parks, in view of the orders of the Supreme Court of India, the State Governments have been advised not to submit any proposal for diversion of forestland under FCA, 1980 without seeking prior permission of the Supreme Court. For seeking permission of Supreme Court, the project proponent should submit the proposal to the Chief, Wild Life Warden (CWLW) in the prescribed Performa.

8. For small development and public utility projects involving diversion of forest land up to 5 Ha, the state government may authorize the Nodal Officer or any other officer to submit the proposals directly to the Regional Office of the MoEF. All proposals relating to diversion of forest land upto 40 hectares shall be sent directly to the concerned Regional office of the MOEF by the State Government. All other proposals shall be sent by the State Government to the Secretary, MoEF, Government of India.

**Crop Compensation**

9. Project Proponent normally pays compensation to farmers whose crops are damaged during construction which is normally done during the non-crop season; however, when a crop is in the ground and any damage is caused, compensation is paid to the farmer as decided by the revenue authorities of the government, such as Tehsildar. Compensation applications are requested from the farmers in the subdivisions where work has been carried out. The applications are verified by the Sarpanch or Patwari. The area of land where the crop has been damaged is calculated and checked by the Governmental Subdivision Officer in charge personally and the yield of the crop is calculated on the yield declared by the Agriculture Department. The monetary value of the crop is calculated from rates declared by the Market Committee, or the agency of the district, and compensation is paid to the farmers.

**Indian Electricity Act and the Indian Telegraph Act**

10. On finalization of the transmission line route, a gazette notification is published in the state gazette concerning the right of way for the line, mentioning the revenue villages through which the line will pass. This notification is issued to meet the requirements of the Indian Electricity Act and the Indian Telegraph Act.

**Power Telecommunication coordination Committee**

11. Project Proponent has to apply to the Power Telecommunication Coordination Committee to clear all transmission line projects. Interference through EMF effects could occur where the planned transmission lines would run in close proximity to telecommunications lines. The induced voltages on the communications circuits are limited to prescribed safe values. Telecommunications circuits are to be crossed at not less than a 60 degree angle, and guards are provided at the crossings of telecommunications and power lines of voltages of 33 kV and below. These approvals are issued only after the line survey work is completed.

**Airport Authority**

12. Project Proponent would apply to the Airport Authority for clearance if any power lines are planned within 15 km of an existing airport; however, transmission lines are not routed in the vicinity of airports.

**Railway Authority**

13. Project Proponent has to apply to the Railway Authority for clearance should any power lines are planned that cross railways. In cases where planned lines would cross railways, detailed applications, including maps, showing tower locations on either side of the railway and vertical clearances are submitted. Railway lines are crossed at right angles to the extent possible. All stipulations of the railway authorities are to be followed by project proponent and the work is undertaken only after obtaining approval, and under supervision of the railway authority.

## Annexure 2: Rapid Environmental Assessment (REA) Checklist - Hydropower

**Instructions:**

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 the Environment and Safeguards Division (RSES) for endorsement by Director, RSES and for approval by the Chief Compliance Officer.

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.

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:** _____

A. Basic Project Design Data

1. Dam height, m =_____
2. Surface area of reservoir, (ha) =_____
3. Estimated number of people to be displaced =_____
4. Rated power output, (MW) =_____

Other Considerations:

1. Water storage type: ___ reservoir ___ run of river
   ___ pumped storage
2. River diversion scheme: ___ trans-basin diversion ___ in-stream flow regulation
   ___ in-stream diversion
3. Type of power demand to address: ___ peak load ___ base load

| Screening Questions | Yes | No | Remarks |
|---|---|---|---|
| **B. Project Location**<br>Is the dam and/or Project facilities adjacent to or within any of the following areas? | | | |
| Unregulated river | | | |
| Undammed river tributaries below the proposed dam | | | |
| Unique or aesthetically valuable land or water form | | | |
| Special area for protecting biodiversity | | | |
| Protected Area | | | |
| Buffer zone of protected area | | | |
| Primary forest | | | |
| Range of endangered or threatened animals | | | |
| Area used by indigenous peoples | | | |
| Cultural heritage site | | | |
| Wetland | | | |
| Mangrove | | | |
| Estuary | | | |

| Screening Questions | Yes | No | Remarks |
|---|---|---|---|
| **C. Potential Environmental Impacts**<br>Will the Project cause… | | | |
| short-term construction impacts such as soil erosion, deterioration of water and air quality, noise and vibration from construction equipment? | | | |
| disturbance of large areas due to material quarrying? | | | |
| disposal of large quantities of construction spoils? | | | |
| clearing of large forested area for ancillary facilities and access road? | | | |
| impounding of a long river stretch? | | | |
| dryness (less than 50% of dry season mean flow) over a long downstream river stretch? | | | |
| construction of permanent access road near or through forests? | | | |
| creation of barriers for migratory land animals | | | |
| loss of precious ecological values due to flooding of agricultural/forest areas, and wild lands and wildlife habitat; destruction of fish spawning/breeding and nursery grounds? | | | |
| deterioration of downstream water quality due to anoxic water from the reservoir and sediments due to soil erosion? | | | |
| significant diversion of water from one basin to another? | | | |
| alternating dry and wet downstream conditions due to peaking operation of powerhouse? | | | |
| significant modification of annual flood cycle affecting downstream ecosystem, people's sustenance and livelihoods? | | | |
| loss or destruction of unique or aesthetically valuable land or water forms? | | | |
| proliferation of aquatic weeds in reservoir and downstream impairing dam discharge, irrigation systems, navigation and fisheries, and increasing water loss through transpiration? | | | |
| scouring of riverbed below dam? | | | |
| downstream erosion of recipient river in trans-basin diversion? | | | |
| increased flooding risk of recipient river in trans-basin diversion? | | | |
| decreased groundwater recharge of downstream areas? | | | |
| draining of downstream wetlands and riparian areas? | | | |
| decline or change in fisheries below the dam due to reduced peak flows and floods, submersion of river stretches and resultant destruction of fish breeding and nursery grounds, and water quality changes? | | | |
| loss of migratory fish species due to barrier imposed by the dam? | | | |
| formation of sediment deposits at reservoir entrance, creating backwater effect and flooding and waterlogging upstream? | | | |
| significant disruption of river sediment transport downstream due to trapping in reservoir? | | | |
| environmental risk due to potential toxicity of sediments trapped behind the dams? | | | |
| increased saltwater intrusion in estuary and low lands due to reduced river flows? | | | |
| significant induced seismicity due to large reservoir size and potential environmental hazard from catastrophic failure of the dam? | | | |
| cumulative effects due to its role as part of a cascade of dams/ reservoirs? | | | |
| depletion of dissolved oxygen by large quantities of decaying plant material, fish mortality due to reduced dissolved oxygen content in water, algal blooms causing successive and temporary eutrophication, growth and proliferation of aquatic weeds? | | | |
| risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation? | | | |

| Screening Questions | Yes | No | Remarks |
|---|---|---|---|
| large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)? | | | |
| creation of community slums following construction of the hydropower plant and its facilities? | | | |
| social conflicts if workers from other regions or countries are hired? | | | |
| uncontrolled human migration into the area, made possible by access roads and transmission lines? | | | |
| disproportionate impacts on the poor, women, children or other vulnerable groups? | | | |
| community health and safety risks due to the transport, storage, and use and/or disposal of materials likely to create physical, chemical and biological hazards? | | | |
| risks to community safety due to both accidental and natural hazards, especially where the structural elements or components of the project (e.g., dams) 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? | | | |

| **Climate Change and Disaster Risk Questions**<br>The following questions are not for environmental categorization. They are included in this checklist to help identify potential climate and disaster risks. | **Yes** | **No** | **Remarks** |
|---|---|---|---|
| Is the Project area subject to hazards such as earthquakes, floods, landslides, tropical cyclone winds, storm surges, tsunami or volcanic eruptions and climate changes (see Appendix I)? | | | |
| Does the Project use or depend on resources which could be affected by climate change such as changes in temperature, precipitation, or extreme events (e.g increased erosion which reduces generation efficiency, glacial melt which could affect generation potential)? | | | |
| Are there any demographic or socio-economic aspects of the Project area that are already vulnerable (e.g. high incidence of marginalized populations, rural-urban migrants, illegal settlements, ethnic minorities, women or children)? | | | |
| Could the Project potentially increase the climate or disaster vulnerability of the surrounding area (e.g.. by diverting water from areas where drought is increasing, or encouraging settlement in earthquake zones)? | | | |

Note: Hazards are potentially damaging physical events.

**Appendix I: Environments, Hazards and Climate Changes**

| Environment | Natural Hazards and Climate Change | Example Impact on Hydropower |
|---|---|---|
| **Arid/Semi-arid and desert environment** | 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. | Temperature increases reduce overall thermoelectric power generation efficiencies as well as water availability |
| **Humid and sub-humid plains, foothills** | 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 sediment load from intense rainfall events may result in rapid |

| Environment | Natural Hazards and Climate Change | Example Impact on Hydropower |
|---|---|---|
| **and hill country** | 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. | sedimentation of water reservoirs, causing reduced storage capacity of large hydropower projects. |
| **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. | Increased sediment load may result in greater turbine erosion and lower turbine and generator efficiency, leading to less power generation, Changes to the hydrologic cycle and river runoff can result in changes in hydropower potential for electricity generation, |
| **Small islands** | Small islands generally have land areas of less than 10,000km2 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. | Oil and gas refineries, storage infrastructure, transmissions lines, and other infrastructure in low lying coastal locations are increasingly at risk of damage, disruption and higher maintenance costs. |
| **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. | The retreat of glaciers may increase water discharge and consequent power generation in the short term, and then be followed by a drastic reduction in summer flows and hence power generation. |
| **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. | Volcanic deposits in watersheds and reservoirs may educe hydro-potential |

## Annexure 3: Rapid Environmental Assessment (REA) Checklist – Power Transmission/Distribution

**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:**

| Screening Questions | Yes | No | Remarks |
|---|---|---|---|
| **A. Project Siting**<br>Is the Project area adjacent to or within any of the following environmentally sensitive areas? | | | |
| ▪ Cultural heritage site | | | |
| ▪ Protected Area | | | |
| ▪ Wetland | | | |
| ▪ Mangrove | | | |
| ▪ Estuarine | | | |
| ▪ Buffer zone of protected area | | | |
| ▪ Special area for protecting biodiversity | | | |
| **B. Potential Environmental Impacts**<br>Will the Project cause… | | | |
| ▪ encroachment on historical/cultural areas, disfiguration of landscape and increased waste generation?<br>▪ | | | |
| ▪ encroachment on precious ecosystem (e.g. sensitive or protected areas)?<br>▪ | | | |
| ▪ 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?<br>▪ | | | |
| ▪ increased local air pollution due to rock crushing, cutting and filling? | | | |

| Screening Questions | Yes | No | Remarks |
|---|---|---|---|
| ▪ 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? | | | |
| ▪ 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)?<br>▪ | | | |
| ▪ 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? | | | |
| ▪ 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? | | | |

| Screening Questions | Yes | No | Remarks |
|---|---|---|---|
| ▪ 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? | | | |

| Climate Change and Disaster Risk Questions<br>The following questions are not for environmental categorization. They are included in this checklist to help identify potential climate and disaster risks. | Yes | No | Remarks |
|---|---|---|---|
| ▪ Is the Project area subject to hazards such as earthquakes, floods, landslides, tropical cyclone winds, storm surges, tsunami or volcanic eruptions and climate changes (see Appendix I)? | | | |
| ▪ Could changes in precipitation, temperature, salinity, or extreme events over the Project lifespan affect its sustainability or cost? | | | |
| ▪ Are there any demographic or socio-economic aspects of the Project area that are already vulnerable (e.g. high incidence of marginalized populations, rural-urban migrants, illegal settlements, ethnic minorities, women or children)? | | | |
| ▪ Could the Project potentially increase the climate or disaster vulnerability of the surrounding area (e.g., increasing traffic or housing in areas that will be more prone to flooding, by encouraging settlement in earthquake zones)? | | | |

**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 10,000km2 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. |

## Annexure 4: Outline of Environmental Impact Assessment Report

This outline is Annex 1 of Safeguard Requirements 1: Environment (Appendix 1 of ADB's Safeguard Policy Statement, June 2009). 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, transboundary, and cumulative impacts as appropriate.

**F. 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.

**G. 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; and
   (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.

(iv) 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.