

Hyderabad Electric Supply Company



HESCO 6th STG Project

Environmental and Social Guidelines

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éLAN

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Executive Summary

The Hyderabad Electric Supply Company (HESCO) is planning to undertake the 6th Secondary Transmission and Grid (STG) project in various parts of its territory. HESCO is seeking financing from the World Bank (WB) for a portion of this 5-year project. In line with the prevailing legislation in the country, and the WB safeguard policies, an environmental and social assessment (ESA) for the first year of the project has been carried out.

In addition to the ESA, the environmental and social guidelines (ESG) have also been developed for the project components to be undertaken during the subsequent years of the project, for which enough details are not known at this stage. This document presents the ESG for the proposed project.

Legislative and Policy Framework

The Pakistan Environmental Protection Act, 1997 (PEPA 1997) requires the proponents of every development project in the country to conduct environmental assessment and submit its report to the environmental protection agency.

In addition, the World Bank Operational Policy 4.01 (OP 4.01) requires that environmental assessment be carried out before commencing projects such as the 6th STG. Other OPs relevant to this project include OP 4.12, OP 4.04, OP 4.36, OP 4.10, OP 4.11, and OP 7.60.

Project Overview

The overall objective of the HESCO's 6th STG project is to help increase the efficiency, reliability, and quality of its electricity supply. The project seeks to decrease technical as well as commercial losses, increase electricity availability, and improve the voltage profile within the HESCO's electricity network.

In its total span of five years, the 6th STG project envisages establishment of fifteen new grid stations, in addition to converting seven, augmenting nineteen, rehabilitating 216, and extending another ten of the existing grid stations. The project also includes laying of 451 km of new and rehabilitation of 2,980 km of existing transmission lines.

ESA

An ESA has been conducted for the project components that will be undertaken during the Year 2006-07. The STG works for this year include the establishment of four new grid stations, in addition to the extension of one and conversion of four existing grid stations. A total of about 111 km of new transmission lines will also be added to the existing HESCO system during this period.

The ESA identifies the potential impacts of the proposed activities on the social, physical as well as biological environment of the area, and also recommends mitigation measures to minimize these impacts. The ESA includes an environmental and social management

plan (ESMP), which provides the implementation mechanism for the mitigation measures identified during the assessment. A Resettlement Plan (RP) has also been prepared to address the involuntary resettlement issues identified during the ESA.

The ESA and RP are stand-alone documents and provided under separate covers.

ESG

As described above, the ESA has been conducted for the project components to be undertaken during the first year of the WB financing. For the remaining period of the proposed project, for which project details are not known at this stage, the present ESG has been prepared. The ESG provides a broad framework to address the environmental and social concerns during the years 2007-08 and 2008-09 of the 6th STG project.

The ESG includes guidelines for stakeholder consultation, impact assessment, analysis of alternatives, preparing environmental management plan and developing resettlement plan/resettlement policy framework. The ESG will essentially guide HESCO and its consultants to perform the site-specific environmental and social assessment of the 6th STG project (2007-08 and 2009-09), once the project details are known in sufficient detail. The ESG also includes an environmental and social management framework, which provides an outline of the environmental and social management system to be implemented during project execution.

Acronyms

ADB	Asian Development Bank
AJK	Azad Jammu and Kashmir
BOD	Biological Oxygen Demand
CITES	Convention on International Trade in Endangered Species
COD	Chemical Oxygen Demand
dB(A)	Decibels ('A' scale)
DISCO	Distribution Company
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
ESA	Environmental and Social Assessment
ESG	Environmental and Social Guidelines
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
FESCO	Faisalabad Electric Supply Company
GENCO	Generating Companies
GEPCO	Gujranwala Electric Power Company
GoP	Government of Pakistan
GRM	Grievance Redressal Mechanism
GS	Grid Station
HESCO	Hyderabad Electric Supply Company
ICT	Islamabad Capital Territory
IEE	Initial Environmental Examination
IESCO	Islamabad Electric Supply Company
KESC	Karachi Electric Supply Company
KV	Kilo volts
KWh	Kilo watt hour
LAA	Land Acquisition Act (of 1894)
LESCO	Lahore Electric Supply Company

LOS	Law of Seas
MEA	Multilateral Environmental Agreements
MEPCO	Multan Electric Power Company
NEQS	National Environmental Quality Standards
NGO	Non Governmental Organization
NOx	Oxides of nitrogen
NTDC	National Transmission and Dispatch Company
NWFP	North Western Frontier Province
OP	Operational Policy
O&M	Operation and Maintenance
PAPs	Project Affected Persons
PCB	Poly Chlorinated Biphenyl
PEPC	Pakistan Encl Protection Council
PESCO	Peshawar Electric Supply Company
PEPA	Pakistan Environmental Protection Act
PM	Particulate matter
POP	Persistent Organic Pollutants
QESCO	Quetta Electric Supply Company
RP	Resettlement Plan
RPF	Resettlement Policy Framework
STG	Secondary transmission and grid
ToR	Terms of Reference
UNFCCC	UN Framework Convention on Climate Change
USEPA	United States Environmental Protection Agency
WAPDA	Water and Power Development Authority
WB	World Bank
WBG	World Bank Group
WHO	World Health Organization

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1 Introduction

The Hyderabad Electric Supply Company (HESCO) is planning to undertake the 6th Secondary Transmission and Grid (STG) project in various parts of its territory. HESCO is seeking finances from the World Bank (WB) for a portion of this 5-year project. In line with the prevailing legislation in the country and the WB safeguard policies, an environmental and social assessment (ESA) of the project's components to be undertaken during the year 2006-07 has been carried out.

In addition to the ESA (ESA report provided under separate cover), the environmental and social guidelines (ESG) have also been developed for the project components to be undertaken during the subsequent years of the project, for which enough details are not known at this stage. This document presents the ESG for the proposed project.

1.1 Project Proponent

HESCO is a public utility company, providing electricity to the entire Sindh province, except for Karachi and parts of the Thatta district. HESCO was incorporated in 1998 under the Companies Ordinance 1984. Before this, it was one of the eight Area Electricity Boards of the Water and Power Development Authority (WAPDA).

Established in 1958, WAPDA had two wings: Water and Power. The Water Wing was (and still is) responsible for developing and managing large water reservoirs and barrages, while its Power Wing was a vertically integrated utility, responsible for generation, transmission and distribution of electricity throughout Pakistan (except for the City of Karachi, where the Karachi Electric Supply Company – KESC - performed a similar function).

Under its un-bundling and restructuring program, WAPDA's Power Wing has been broken down into eight distribution companies collectively called DISCOs, three generating companies collectively called GENCOs and a transmission company called National Transmission and Dispatch Company (NTDC). HESCO is one of the eight DISCOs.

1.2 Project Background and Justification

Pakistan as a whole is an energy-deficient country and per capita electricity generation has traditionally been low (581 KWh as against the World average of 2,657 KWh¹). The electricity demand in the country has grown at a rapid pace since 1985. Consumption of electricity increased from 17,608 GWh in 1985 to 55,507 GWh in 2004, representing an annual average growth rate of 6.2%. The growth in the electricity demand has however been uneven over the years. The consumption grew at a rate of 11% during 1985-99, the growth rate slowed down to 6.9% during 1990-95 and 2.5% during 1996-2000. Since the year 2000 however, the trend has reversed and electricity demand has picked up,

¹ Source: Medium Term Development Framework 2005-10. Government of Pakistan. 2005

mirroring the overall economic growth in the country. During the period 2001-04, the electricity demand grew at a rate of 3.3% (NEPRA 2005).

HESCO is also experiencing growth in the electricity demand. In order to meet the increasing electricity demand, the existing secondary transmission and grid system (132 and 66 KV) has to be expanded, in addition to the increased generation and primary transmission (500 KV and 220 KV) capacity. Towards this end, HESCO, being responsible for the expansion, operation and maintenance of the secondary transmission and grid (STG) system within its territory, has developed the 6th STG project.

The project includes establishment of new grid stations, extension / conversion / augmentation of existing grid stations, laying of new transmission lines and replacing weaker/undersized transmission lines. The project will ensure supply of electricity in new areas, load reduction on presently overloaded grid stations and transmission lines, and improvement in the voltage profile as well as the system reliability.

1.3 Project Overview

The overall objective of the 6th STG project is to help increase the efficiency, reliability and quality of the electricity supply. The project seeks to decrease the technical as well as commercial losses, increase the electricity availability, and improve the voltage profile, within the HESCO's electricity network.

The 6th STG is a 5-year project, from 2005-6 to 2009-10², and has been broken down in five distinct year-wise phases. Each phase of the project consists of establishing new grid stations, extending/upgrading/augmenting existing grid stations, and laying transmission lines. The key components of these phases are tabulated below.³

	2006-07	2007-08	2008-09	2009-10	2010-11	Total
New Grid Stations (GS)	4	2	4	3	2	15
GS Conversion	4	1	0	0	2	7
GS Augmentation	4	1	4	6	4	19
GS Extension	16	13	14	9	4	56
Rehabilitation of GS	60	50	52	26	28	216
Transmission Lines (km)	111	170	130	27	13	451
Rehabilitation of Transmission Lines (km)	868	686	629	586	211	2,980

HESCO is seeking the WB financing for a portion of the 6th STG project.

² The original PC1 was prepared for the project duration from 2003-04 to 2007-08.

³ The original year-wise distribution of work within the total project duration as given in the PC1 has subsequently been revised, based upon changing load demand and priorities.

1.4 Environmental and Socioeconomic Overview

The project area lies in the Lower Indus Plain, which essentially forms the western extension of Indo-Gangetic Plain. The Indus Plain has been made up of the silt brought by the Indus and its numerous tributaries, such as Jhelum, Chenab, Ravi and Sutlej on the east bank, and Kabul, Kurram, Tochi, and others on the west bank. The Indus Plain is known for its agricultural fertility and cultural development throughout history. The Lower Indus Plain is very flat, generally sloping to the south with an average gradient of 95 mm per km (6 inches per mile). In addition to the Indus Delta, two landforms – meanders and cover flood plains - are predominant. In the northeast, the meander flood plain is more extensive, while in the central and lower Indus Plain, the cover flood plain is more prominent.

The Lower Indus Plain can be divided in five distinct micro-relief land forms: active flood plain; meander flood plain; cover flood plain; scalloped interfluves; and the Indus delta. Indus River is the only river in the Lower Indus Plain.

The agriculture is by far the main economic activity in the project area, which lies within the Indus Basin Irrigation system – one of the most extensive canal irrigation systems in the world. The groundwater extraction augments the canal water for irrigation in the area.

Ecologically, the project area was once part of the thorn forest ecozone. However, urban centers, villages and agriculture activities have greatly modified this ecozone in most parts of the project area. Whatever wild species now found in the area are essentially those which have adapted to the modified conditions and presence of human beings.

Administratively, the project area falls under various districts of Sindh. These include Jacobabad, Shikarpur, Larkana, Sanghar, Hyderabad, Mirpur Khas, Badin and Thatta.

1.5 Key Environmental and Socioeconomic Issues

The key environmental and socioeconomic issues that could arise as a result of the proposed project include:

- Design Phase:
 - ▶ Soil erosion and contamination
 - ▶ Water contamination
 - ▶ Loss of natural vegetation
 - ▶ Threat to wildlife
 - ▶ Land acquisition issues
 - ▶ Blocked access
 - ▶ Safety hazards and public health concerns
 - ▶ Aesthetic value.
- Construction Phase:

- ▶ Soil erosion, degradation
 - ▶ Air quality deterioration
 - ▶ Water contamination and consumption
 - ▶ Loss of/damage to the floral resources (natural vegetation) of the area
 - ▶ Loss of/damage to faunal resources (wildlife) of the area
 - ▶ Land acquisition, compensation and resettlement
 - ▶ Loss of agriculture
 - ▶ Blocked access
 - ▶ Noise and vibration
 - ▶ Safety hazard and public health
 - ▶ Damage to infrastructure
 - ▶ Gender issues
 - ▶ Impacts on archeological, cultural, historical or religious significance.
- Operation and Maintenance Phase
 - ▶ Contamination of soil and water as a result of inappropriate waste disposal
 - ▶ Contamination of soil and water as a result of leakage of transformer oil.
 - ▶ Damage to natural vegetation and wildlife during the transmission line patrolling and maintenance activities
 - ▶ Safety hazards and public health
 - ▶ Loss of agriculture.

The above issues were identified by the ESA of the 6th STG, year 2006-07 (ESA report provided under separate cover). In order to identify the impacts more precisely for project components to be carried out during the subsequent years (ie, 2007-08 and 2008-09), a separate ESA for this period will have to be performed.

1.6 ESA and RP

In accordance with the WB's safeguard policies and the relevant national legislation, an environmental and social assessment (ESA) of the 6th STG project's components to be undertaken during the year 2006-07 has been carried out. The ESA has predicted the potential environmental as well as socioeconomic impacts of the proposed project, and recommended the mitigation measures to reduce if not eliminate these impacts. The ultimate aim for conducting the ESA has been to ensure that the project design and implementation are socially responsive and environmentally sound.

The ESA includes an environmental and social management plan (ESMP), which provides the implementation mechanism for the mitigation measures identified during the assessment. An RP has also been prepared to address the involuntary resettlement issues identified during the ESA.

The ESA and RP are stand-alone documents and provided under separate covers.

1.7 ESG

The ESA has been conducted for the first year (2006-07) of the WB financing, as described above. For the project components to be undertaken during the subsequent years of the project, the details, such as grid station locations and transmission line routes, are not known at this stage. Consequently, the exact nature and extent of the impacts cannot be predicted. For these project components, the present ESG has been prepared.

The ESG provides a broad framework to address the environmental and socioeconomic concerns of the project activities of years 2007-08 and 2008-09, and identifies generic issues that may be encountered during the project. For site specific and exact impact assessment/mitigation, a separate ESA will have to be conducted for the project components under discussion, in accordance with the WB safeguard policies and national legislation.

The ESA's terms of reference (ToR), appended with the ESA report, addresses the ESG as well.

1.8 Study Team

The study team consisted of environmental and socioeconomic experts having considerable experience in their respective field of expertise. The list of the experts is provided in the ESA report.

1.9 Document Structure

Chapter 2 discusses the World Bank's safeguard policies, as well as the regulatory, legislative and institutional setup in the country, relevant to the environmental and social aspects of the project. **Chapter 3** provides the environmental and social guidelines. The guidelines address stakeholder consultation, impact assessment, analysis of alternatives, preparing environmental management plan and developing resettlement plan/resettlement policy framework. Finally, **Chapter 4** provides the environmental and social management framework.

2 Policy, Legal and Administrative Framework

This Chapter discusses the policy, legal and administrative framework and institutional set-up relevant to the proposed project. Also included in the Chapter are the guidelines from the national agencies as well as international donors and other organizations.

2.1 The World Bank Operational Policies

Relevance of the WB Operational Policies (OPs) with respect to the environmental and social issues associated with the proposed project is tabulated below.

Environmental Assessment (OP 4.01)	Relevant.
Involuntary Resettlement (OP 4.12)	Likely to be relevant, though ESA will determine the type and magnitude of involuntary resettlement.
Forestry (OP 4.36)	Not known at this stage.
Natural Habitat (OP 4.04)	Not known at this stage.
Pest Management (OP 4.09)	Unlikely to be relevant.
Safety of Dams (OP 4.37)	Unlikely to be relevant.
Projects in International Waters (OP 7.50)	Unlikely to be relevant.
Cultural Property (OP 4.11)	Not known at this stage.
Indigenous People (OP 4.10)	Not known at this stage.
Projects in Disputed Area (7.60)	Unlikely to be relevant.

These policies are discussed in the following sections.

2.1.1 Environmental Assessment (OP 4.01)

The World Bank requires environmental assessment (EA) of projects proposed for Bank financing to help ensure that they are environmentally sound and sustainable, and thus to improve decision making.⁴ The OP defines the EA process and various types of the EA instruments.

The proposed project consists of activities which are likely to have environmental and social consequences, such as:

- Damage to assets (such as crops),
- Deterioration of air quality
- Water contamination and consumption

⁴ Excerpts from WB OP 4.12. WB Operational Manual. January 1999.

- Damage to top soil, land erosion
- Safety hazard.

To identify the extent and consequences of these impacts, and to develop an ESMP for their mitigation, an ESA will have to be carried out, in accordance with this OP.

2.1.2 Involuntary Resettlement (OP 4.12)

The WB's experience indicates that involuntary resettlement under development projects, if unmitigated, often gives rise to severe economic, social, and environmental risks: production systems are dismantled; people face impoverishment when their productive assets or income sources are lost; people are relocated to environments where their productive skills may be less applicable and the competition for resources greater; community institutions and social networks are weakened; kin groups are dispersed; and cultural identity, traditional authority, and the potential for mutual help are diminished or lost. This policy includes safeguards to address and mitigate these impoverishment risks.⁵

The overall objectives of the Policy are given below.

- Involuntary resettlement should be avoided where feasible, or minimized, exploring all viable alternative project designs.
- Where it is not feasible to avoid resettlement, resettlement activities should be conceived and executed as sustainable development programs, providing sufficient investment resources to enable the persons displaced by the project to share in project benefits. Displaced persons should be meaningfully consulted and should have opportunities to participate in planning and implementing resettlement programs.
- Displaced persons should be assisted in their efforts to improve their livelihoods and standards of living or at least to restore them, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.

The Policy defines the requirement of preparing a resettlement plan or a resettlement policy framework, in order to address the involuntary resettlement.

For the proposed project, land will need to be acquired for the establishment of the new grid stations. During the site/route selection, settlements are generally avoided, however at some places acquisition of cultivable land – though temporary - cannot be ruled out.

Similarly, crops along the proposed transmission lines may be damaged during the construction and operation phases of the proposed project.

In view of the above, the OP 4.12 is likely to be triggered. Based upon the findings of the ESA – which needs to be carried out for this phase of the 6th STG project, as mentioned earlier – a resettlement policy framework (RPF) or a resettlement plan (RP) will be developed, in accordance with this OP.

5 Excerpts from WB OP 4.12. WB Operational Manual. December 2001.

2.1.3 Forestry (OP 4.36)

The objective of this Policy is to assist the WB's borrowers to harness the potential of forests to reduce poverty in a sustainable manner, integrate forests effectively into sustainable economic development, and protect the vital local and global environmental services and values of forests.

Since the project details, such as the proposed grid station locations and transmission line routes, are not known at this stage, it cannot be ascertained whether this OP is triggered or not. Once the ESA of the years 3 and 4 of the 6th STG project is performed, and its findings known, only then the status of the project with respect to this OP would be determined.

2.1.4 Natural Habitat (OP 4.04)

The conservation of natural habitats, like other measures that protect and enhance the environment, is essential for long-term sustainable development. The Bank therefore supports the protection, maintenance, and rehabilitation of natural habitats and their functions ...⁶

As mentioned earlier as well, the details for the years 3 and 4 of the 6th STG project are not known at this stage. Therefore it cannot be ascertained whether this OP is triggered or not. Once the ESA of the specified period of the 6th STG project is performed, and its findings known, only then the status of the project with respect to this OP would be determined.

2.1.5 Pest Management (OP 4.09)

Through this OP, the WB supports a strategy that promotes the use of biological or environmental control methods and reduces reliance on synthetic chemical pesticides.

This OP is not triggered since the proposed project does not involve usage of pesticides. (Usage of the chemical herbicides to clear vegetation under the transmission lines will not be allowed during the proposed project.)

2.1.6 Safety of Dams (OP 4.37)

The Policy seeks to ensure that appropriate measures are taken and sufficient resources provided for the safety of dams the WB finances. However this OP is not relevant since the proposed project does not involve construction of dams.

2.1.7 Projects on International Waterways (OP 7.50)

This OP defines the procedure to be followed for projects the WB finances that are located on any water body that forms a boundary between, or flows through two or more states. However, the proposed project does not involve any works on such waterways, hence this OP is not triggered.

6 Excerpts from WB OP 4.04. WB Operational Manual. June 2001.

2.1.8 Cultural Property (OP 4.11)

The World Bank's general policy regarding cultural properties is to assist in their preservation, and to seek to avoid their elimination. The specific aspects of the Policy are given below.⁷

- The Bank normally declines to finance projects that will significantly damage non-replicable cultural property, and will assist only those projects that are sited or designed so as to prevent such damage.
- The Bank will assist in the protection and enhancement of cultural properties encountered in Bank-financed projects, rather than leaving that protection to chance. In some cases, the project is best relocated in order that sites and structures can be preserved, studied, and restored intact in situ. In other cases, structures can be relocated, preserved, studied, and restored on alternate sites. Often, scientific study, selective salvage, and museum preservation before destruction is all that is necessary. Most such projects should include the training and strengthening of institutions entrusted with safeguarding a nation's cultural patrimony. Such activities should be directly included in the scope of the project, rather than being postponed for some possible future action, and the costs are to be internalized in computing overall project costs.
- Deviations from this policy may be justified only where expected project benefits are great, and the loss of or damage to cultural property is judged by competent authorities to be unavoidable, minor, or otherwise acceptable. Specific details of the justification should be discussed in project documents.
- This policy pertains to any project in which the Bank is involved, irrespective of whether the Bank is itself financing the part of the project that may affect cultural property.

Much like in the case of OPs 4.36 and OP 4.04 discussed above, the proposed ESA of the years 3 and 4 of the project will determine whether any of the project components would be located at or near any sites of archeological, cultural, historical or religious significance.

2.1.9 Indigenous People (OP 4.10)

For purposes of this policy, the term "Indigenous Peoples" is used in a generic sense to refer to a distinct, vulnerable, social and cultural group possessing the following characteristics in varying degrees:⁸

- self-identification as members of a distinct indigenous cultural group and recognition of this identity by others;
- collective attachment to geographically distinct habitats or ancestral territories in the project area and to the natural resources in these habitats and territories;

7 Excerpts from the OPN 11.03. WB Operational Manual. September 1986.

8 Excerpts from the OP 4.10. WB Operational Manual. July 2005.

- customary cultural, economic, social, or political institutions that are separate from those of the dominant society and culture; and
- an indigenous language, often different from the official language of the country or region.

The OP defines the process to be followed if the project affects the indigenous people.

The ESA of the years 3 and 4 of the project will identify the presence of indigenous people, if any, at or near the proposed project sites.

2.1.10 Projects in Disputed Areas (OP 7.60)

Projects in disputed areas may raise a number of delicate problems affecting relations not only between the Bank and its member countries, but also between the borrower and one or more neighboring countries. In order not to prejudice the position of either the Bank or the countries concerned, any dispute over an area in which a proposed project is located is dealt with at the earliest possible stage.

The Bank may proceed with a project in a disputed area if the governments concerned agree that, pending the settlement of the dispute, the project proposed for country A should go forward without prejudice to the claims of country B.⁹

The HESCO territory does not include any disputed areas, hence this OP will not be triggered.

2.2 Laws and Regulations

Pakistan's statute books contain a number of laws concerned with the regulation and control of the environmental and social aspects. However, the enactment of comprehensive legislation on the environment, in the form of an act of parliament, is a relatively new phenomenon. Most of the existing laws on environmental and social issues have been enforced over an extended period of time, and are context-specific. The laws relevant to the developmental projects are briefly reviewed below.

2.2.1 Pakistan Environmental Protection Act, 1997

The Pakistan Environmental Protection Act, 1997 (the Act) is the basic legislative tool empowering the government to frame regulations for the protection of the environment (*the 'environment' has been defined in the Act as: (a) air, water and land; (b) all layers of the atmosphere; (c) all organic and inorganic matter and living organisms; (d) the ecosystem and ecological relationships; (e) buildings, structures, roads, facilities and works; (f) all social and economic conditions affecting community life; and (g) the inter-relationships between any of the factors specified in sub-clauses 'a' to 'f'*). The Act is applicable to a broad range of issues and extends to socioeconomic aspects, land acquisition, air, water, soil, marine and noise pollution, as well as the handling of hazardous waste. The discharge or emission of any effluent, waste, air pollutant or noise in an amount, concentration or level in excess of the National Environmental Quality Standards (NEQS) specified by the Pakistan Environmental Protection Agency (Pak-

⁹ Excerpts from the OP 7.60. WB Operational Manual. November 1994.

EPA) has been prohibited under the Act, and penalties have been prescribed for those contravening the provisions of the Act. The powers of the federal and provincial Environmental Protection Agencies (EPAs), established under the Pakistan Environmental Protection Ordinance 1983,¹⁰ have also been considerably enhanced under this legislation and they have been given the power to conduct inquiries into possible breaches of environmental law either of their own accord, or upon the registration of a complaint.

The requirement for environmental assessment is laid out in Section 12 (1) of the Act. Under this section, no project involving construction activities or any change in the physical environment can be undertaken unless an initial environmental examination (IEE) or an environmental impact assessment (EIA) is conducted, and approval is received from the federal or relevant provincial EPA. Section 12 (6) of the Act states that this provision is applicable only to such categories of projects as may be prescribed. The categories are defined in the Pakistan Environmental Protection Agency Review of IEE and EIA Regulations, 2000 and are discussed in **Section 2.2.2** below.

The requirement of conducting an environmental assessment of the proposed project emanates from this Act.

2.2.2 Pakistan Environmental Protection Agency Review of IEE and EIA Regulations, 2000

The Pakistan Environmental Protection Agency Review of IEE and EIA Regulations, 2000 (the 'Regulations'), developed by the Pak-EPA under the powers conferred upon it by the Act, provide the necessary details on preparation, submission and review of the initial environmental examination (IEE) and the EIA. Categorization of projects for IEE and EIA is one of the main components of the Regulations. Projects have been classified on the basis of expected degree of adverse environmental impacts. Project types listed in Schedule I are designated as potentially less damaging to the environment, and those listed in Schedule II as having potentially serious adverse effects. Schedule I projects require an IEE to be conducted, provided they are not located in environmentally sensitive areas. For the Schedule II projects, conducting an EIA is necessary.

The proposed project falls under the Schedule II of the Regulations, hence an EIA has to be conducted for it.

2.2.3 National and International Environmental Standards

National Standards

The National Environmental Quality Standards (NEQS), promulgated under the PEPA 1997, specify the following standards:

- Maximum allowable concentration of pollutants (16 parameters) in gaseous emissions from industrial sources,
- For power plants operating on oil and coal:

¹⁰ Superseded by the Pakistan environmental Protection Act, 1997.

- ▶ Maximum allowable emission of sulfur dioxide,
 - ▶ Maximum allowable increment in concentration of sulfur dioxide in ambient air,
 - ▶ Maximum allowable concentration of nitrogen oxides in ambient air, and
 - ▶ Maximum allowable emission of nitrogen oxide for steam generators as function of heat input.
- Maximum allowable concentration of pollutants (32 parameters) in municipal and liquid industrial effluents discharged to inland waters, sewage treatment and sea (three separate set of numbers).

Selected NEQS for liquid effluents discharged to inland waters, gaseous emission from industrial sources and emissions from motor vehicles are provided in **Exhibits 2.1, 2.2 and 2.3**, respectively. These standards will be applicable to the gaseous emissions and liquid effluents discharged to the environment from the proposed project.

International Standards

The NEQS do not cover the ambient air quality or water quality standards. The international standards for ambient air quality and drinking water quality are presented in **Exhibits 2.4 and 2.5**.

For noise, the NEQS are limited to the vehicular noise. For noise generated by other sources, the WB standards are usually applied. The allowable noise limits per these standards are 55 dB(A) for daytime and 45 dB(A) for nighttime, measured at the receptor.

2.2.4 Land Acquisition Act, 1894

The Land Acquisition Act (LAA) of 1894 amended from time to time has been the de-facto policy governing land acquisition and compensation in the country. The LAA is the most commonly used law for acquisition of land and other properties for development projects. It comprises of 55 sections pertaining to area notifications and surveys, acquisition, compensation and apportionment awards and disputes resolution, penalties and exemptions.

WAPDA has been acquiring land for the grid stations under the provisions of this Act. For the proposed project as well, the grid station sites will be acquired in accordance with this Act. However, the Urgency/Emergency Clause (Section 17) will not be used, in the absence of an urgency or emergency.

2.2.5 National Resettlement Policy / Ordinance

The Ministry of Environment, Local Government and Rural Development formulated a draft policy in 2004 on involuntary resettlement with technical assistance from ADB. The policy aims to compensate for the loss of income to those who suffer loss of communal property including common assets, productive assets, structures, other fixed assets, income and employment, loss of community networks and services, pasture, water rights, public infrastructure like mosques, shrines, schools and graveyards.

The government has also developed a document entitled "*Project Implementation and Resettlement of the Affected Persons Ordinance, 2002*", later referred to as the

"*Resettlement Ordinance*", for enactment by provincial and local governments, after incorporating local requirements. The Ordinance, being a new law, shall be supplementary to the LAA as well as other laws of Pakistan, and wherever applicable under this policy. However, if necessary, appropriate amendments to the LAA 1894 will also be proposed to facilitate the application of the Resettlement Ordinance.

There has not been much progress on the enactment of the Resettlement Ordinance; hence this is not relevant for the proposed project.

2.2.6 Telegraph Act, 1885

This law was enacted to define the authority and responsibility of the Telegraph authority. The law covers, among other activities, installation and maintenance of telegraph lines and posts (poles). The Act defines the mechanism to determine and make payment of compensation associated with the installation of these lines and posts.

Under this Act, the land required for the poles is not acquired (or purchased) from the owner, nor the title of the land transferred. Compensation is paid to the owner for any structure, crop or tree that exists on the land; cost of the land is not paid to the owner.

WAPDA has been installing the transmission lines and their towers, and determining the associated compensation, on the basis of this Act. For the proposed project as well, HESCO will use this Act. However, the land under the towers will be acquired if there is loss of access, and productive use of the land by the landowners/affectedees is impacted.

2.2.7 Sindh Wildlife Protection Act, 1972

This law was enacted to protect the province's wildlife resources directly and other natural resources indirectly. It classifies wildlife by degree of protection, ie, animals that may be hunted on a permit or special license, and species that are protected and cannot be hunted under any circumstances. The Act specifies restrictions on hunting and trade in animals, trophies, or meat. The Act also defines various categories of wildlife protected areas, ie, National Parks, Wildlife Sanctuaries and Game Reserve.

This Act will be applicable to the construction as well as operation and maintenance (O&M) activities of the proposed project.

2.2.8 Forest Act, 1927

The Act authorizes Provincial Forest Departments to establish forest reserves and protected forests. The Act prohibits any person to set fire in the forest, quarries stone, removes any forest-produce or cause any damage to the forest by cutting trees or clearing up area for cultivation or any other purpose.

2.2.9 Provincial Local Government Ordinances, 2001

These ordinances were issued under the devolution process and define the roles of the district governments. These ordinances also address the land use, conservation of natural vegetation, air, water and land pollution, disposal of solid waste and wastewater effluents, as well as matters relating to public health.

2.2.10 Antiquity Act, 1975

The Antiquities Act of 1975 ensures the protection of cultural resources in Pakistan. The Act is designed to protect 'antiquities' from destruction, theft, negligence, unlawful excavation, trade and export. Antiquities have been defined in the Act as ancient products of human activity, historical sites, or sites of anthropological or cultural interest, national monuments, etc. The law prohibits new construction in the proximity of a protected antiquity and empowers the Government of Pakistan to prohibit excavation in any area that may contain articles of archeological significance.

Under this Act, the project proponents are obligated to:

- Ensure that no activity is undertaken in the proximity of a protected antiquity, and
- If during the course of the project an archeological discovery is made, it should be reported to the Department of Archeology, Government of Pakistan.

2.2.11 Mines, Oil Fields and Mineral Development Act, 1948

This legislation provides procedures for quarrying and mining of construction material from state-owned as well as private land. These procedures will have to be followed during the proposed project.

2.2.12 Factories Act, 1934

The clauses relevant to the HESCO's proposed project are those that address the health, safety and welfare of the workers, disposal of solid waste and effluents, and damage to private and public property. The Act also provides regulations for handling and disposing toxic and hazardous substances. The Pakistan Environmental Protection Act of 1997 (discussed above), supersedes parts of this Act pertaining to environment and environmental degradation.

2.2.13 Pakistan Explosive Act, 1884

This Act provides regulations for the handling, transportation and use of explosives during quarrying, blasting and other purposes. The transmission line tower installation may need blasting at rocky/mountainous areas, thus these regulations will be applicable for the proposed project.

2.2.14 Employment of Child Act, 1991

Article 11(3) of the Constitution of Pakistan prohibits employment of children below the age of 14 years in any factory, mines or any other hazardous employment. In accordance with this Article, the Employment of Child Act (ECA) 1991 disallows the child labor in the country. The ECA defines a child to mean a person who has not completed his/her fourteenth years of age. The ECA states that no child shall be employed or permitted to work in any of the occupation set forth in the ECA (such as transport sector, railways, construction, and ports) or in any workshop wherein any of the processes defined in the Act is carried out. The processes defined in the Act include carpet weaving, bidi (kind of a cigarette) making, cement manufacturing, textile, construction and others).

2.2.15 Pakistan Penal Code, 1860

The Code deals with the offences where public or private property or human lives are affected due to intentional or accidental misconduct of an individual or organization. The Code also addresses control of noise, noxious emissions and disposal of effluents. Most of the environmental aspects of the Code have been superseded by the Pakistan Environmental Protection Act, 1997.

2.3 Obligations under International Treaties

Pakistan is signatory of several MEAs, including:

- Basel Convention,
- Convention on Biological Diversity, Convention on Wetlands (Ramsar),
- Convention on International Trade in Endangered Species (CITES),
- UN Framework Convention on Climate Change (UNFCCC),
- Kyoto Protocol,
- Montreal Protocol,
- UN Convention to Combat Desertification,
- Convention for the Prevention of Pollution from Ships (MARPOL),
- UN Convention on the Law of Seas (LOS),
- Stockholm Convention on Persistent Organic Pollutants (POPs),
- Cartina Protocol.

These MEAs impose requirements and restrictions of varying degrees upon the member countries, in order to meet the objectives of these agreements. However, the implementation mechanism for most of these MEAs is weak in Pakistan and institutional setup non-existent.

In order to address this state of affairs, the GoP has recently approved a PC1 for the establishment of the National MEA Secretariat under the Ministry of Environment in Islamabad. The Secretariat will handle and coordinate activities, and develop action plans for each MEA vis-à-vis the country's obligation under these agreements. The Secretariat will then be responsible to ensure implementation of these action plans. The Secretariat will also evaluate future MEAs and advise the Government for acceding (or otherwise) these agreements.

For the proposed project, the Stockholm Convention has the direct relevance. The Convention addresses the eradication of the persistent organic pollutants (POPs). The transformer oil used to contain poly-chlorinated biphenyl (PCB), which is one of the POPs. Though now its usage has been abandoned, old transformers in Pakistan still contain oil containing PCB.

2.4 Institutional Setup for Environmental Management

The apex environmental body in the country is the Pakistan Environmental Protection Council (PEPC), which is presided by the Chief Executive of the Country. Other bodies include the Pakistan Environmental Protection Agency (Pak-EPA), provincial EPAs (for four provinces, AJK and Northern Areas), and environmental tribunals.

The EPAs were first established under the 1983 Environmental Protection Ordinance; the PEPA 1997 further strengthened their powers. The EPAs have been empowered to receive and review the environmental assessment reports (IEEs and EIAs) of the proposed projects, and provide their approval (or otherwise).

All of the components of the proposed projects would be located in Punjab Province. Hence this ESA report will be sent to the Punjab EPA for review.

2.5 Environmental and Social Guidelines

Two sets of guidelines, the Pak-EPA's guidelines and the World Bank Environmental Guidelines are reviewed here. These guidelines address the environmental as well as social aspects.

2.5.1 Environmental Protection Agency's Environmental and Social Guidelines

The Federal EPA has prepared a set of guidelines for conducting environmental assessments. The guidelines derive from much of the existing work done by international donor agencies and NGOs. The package of regulations, of which the guidelines form a part, includes the PEPA 1997 and the NEQS. These guidelines are listed below.

- Guidelines for the Preparation and Review of Environmental Reports,
- Guidelines for Public Consultation,
- Guidelines for Sensitive and Critical Areas,
- Sectoral Guidelines.

It is stated in the Pakistan Environmental Protection Agency Review of IEE and EIA Regulations, 2000 that the EIA or IEE must be prepared, to the extent practicable, in accordance with the Pakistan Environmental Protection Agency Environmental Guidelines.

2.5.2 World Bank Environmental and Social Guidelines

The principal World Bank publications that contain environmental and social guidelines are listed below.

- Pollution Prevention and Abatement Handbook 1998: Towards Cleaner Production
- Environmental Assessment Sourcebook, Volume I: Policies, Procedures, and Cross-Sectoral Issues.
- Social Analysis Sourcebook.
- WB environmental and social safeguard policies.

Exhibit 2.1: Selected NEQS for Waste Effluents

Parameter	Unit	Standards (maximum allowable limit)
Temperature increase	°C	< 3
pH value (acidity/basicity)	pH	6-9
5-day biochemical oxygen demand (BOD) at 20 °C	mg/l	80
Chemical oxygen demand (COD)	mg/l	150
Total suspended solids	mg/l	200
Total dissolved solids	mg/l	3,500
Grease and oil	mg/l	10
Phenolic compounds (as phenol)	mg/l	0.1
Chloride (as Cl)	mg/l	1,000
Fluoride (as F)	mg/l	10
Sulfate (SO ₄)	mg/l	600
Sulfide (S)	mg/l	1.0
Ammonia (NH ₃)	mg/l	40
Cadmium	mg/l	0.1
Chromium (trivalent and hexavalent)	mg/l	1.0
Copper	mg/l	1.0
Lead	mg/l	0.5
Mercury	mg/l	0.01
Selenium	mg/l	0.5
Nickel	mg/l	1.0
Silver	mg/l	1.0
Total toxic metals	mg/l	2.0
Zinc	mg/l	5
Arsenic	mg/l	1.0
Barium	mg/l	1.5
Iron	mg/l	8.0
Manganese	mg/l	1.5
Boron	mg/l	6.0
Chlorine	mg/l	1.0

Source: Government of Pakistan (2000).

Notes:

1. The standard assumes that dilution of 1:10 on discharge is available. That is, for each cubic meter of treated effluent, the recipient water body should have 10 m³ of water for dilution of this effluent.
2. Toxic metals include cadmium, chromium, copper, lead, mercury, selenium, nickel and silver. The effluent should meet the individual standards for these metals as well as the standard for total toxic metal concentration.

Exhibit 2.2: NEQS for Industrial Gaseous Emissions

mg/Nm³ unless otherwise stated

Parameter	Source of Emission	Standards (maximum allowable limit)
Smoke	Smoke opacity not to exceed	40% or 2 Ringlemann Scale or equivalent smoke number
Particulate matter ¹	(a) Boilers and furnaces:	
	i. Oil fired	300
	ii. Coal fired	500
	iii. Cement Kilns	300
	(b) Grinding, crushing, clinker coolers and related processes, metallurgical processes, converters, blast furnaces and cupolas	500
Hydrogen Chloride	Any	400
Chlorine	Any	150
Hydrogen fluoride	Any	150
Hydrogen sulphide	Any	10
Sulphur Oxides ^{2,3}	Sulfuric acid/Sulphonic acid plants	5,000
	Other Plants except power Plants operating on oil and coal	1,700
Carbon Monoxide	Any	800
Lead	Any	50
Mercury	Any	10
Cadmium	Any	20
Arsenic	Any	20
Copper	Any	50
Antimony	Any	20
Zinc	Any	200
Oxides of Nitrogen ³	Nitric acid manufacturing unit	3,000
	Other plants except power plants operating on oil or coal:	
	i. Gas fired	400
	ii. Oil fired	600
	iii. Coal fired	1,200

Source: Government of Pakistan (2000).

Explanations:

1. Based on the assumption that the size of the particulate is 10 micron or more.
2. Based on 1% sulphur content in fuel oil. Higher content of sulphur will cause standards to be pro-rated.
3. In respect of emissions of sulphur dioxide and nitrogen oxides, the power plants operating on oil and coal as fuel shall in addition to NEQS specified above, comply with the standards provided separately.

Exhibit 2.3: NEQS for Motor Vehicles Exhaust and Noise

Parameter	Standards (maximum permissible limit)	Measuring Method
Smoke	40% or 2 on the Ringlemann Scale during engine acceleration mode.	To be compared with Ringlemann Chart at a distance of 6 meters or more.
Carbon Monoxide.	New Vehicle = 4.5% Used Vehicle = 6%	Under idling conditions: non-dispersive infrared detection through gas analyzer.
Noise	85 db(A)	Sound meter at 7.5 meter from the source.

Source: Government of Pakistan (2000).

Exhibit 2.4: WHO Ambient Air Quality Standards

Pollutant	Maximum Allowable Limit	Units	Averaging Time
CO	35	ppm	1 hour
NO _x	106	ppb	1 hour
SO ₂	134	ppb	1 hour
PM ₁₀	70	µg/m ³	24 hours

Exhibit 2.5: WHO Drinking Water Quality Standards

Element/ Substance	Symbol/ Formula	Normally Found in Freshwater/Surface Water/Groundwater	Health Based WHO Guideline
Aluminium	Al		0.2 mg/l
Ammonia	NH ₄	< 0.2 mg/l (up to 0.3 mg/l in anaerobic waters)	No guideline
Antimony	Sb	< 4 µg/l	0.005 mg/l
Arsenic	As		0.01 mg/l
Asbestos			No guideline
Barium	Ba		0.3 mg/l
Beryllium	Be	< 1 µg/l	No guideline
Boron	B	< 1 mg/l	0.3 mg/l
Cadmium	Cd	< 1 µg/l	0.003 mg/l
Chloride	Cl		250 mg/l
Chromium	Cr ⁺³ , Cr ⁺⁶	< 2 µg/l	0.05 mg/l
Color			Not mentioned
Copper	Cu		2 mg/l
Cyanide	CN ⁻		0.07 mg/l
Dissolved oxygen	O ₂		No guideline
Fluoride	F	< 1.5 mg/l (up to 10)	1.5 mg/l
Hardness	mg/l CaCO ₃		No guideline
Hydrogen sulfide	H ₂ S		No guideline
Iron	Fe	0.5 - 50 mg/l	No guideline
Lead	Pb		0.01 mg/l
Manganese	Mn		0.5 mg/l
Mercury	Hg	< 0.5 µg/l	0.001 mg/l
Molybdenum	Mb	< 0.01 mg/l	0.07 mg/l
Nickel	Ni	< 0.02 mg/l	0.02 mg/l
Nitrate and nitrite	NO ₃ , NO ₂		50 mg/l total nitrogen
Turbidity			Not mentioned
pH			No guideline
Selenium	Se	< < 0.01 mg/l	0.01 mg/l
Silver	Ag	5 – 50 µg/l	No guideline
Sodium	Na	< 20 mg/l	200 mg/l
Sulfate	SO ₄		500 mg/l
Inorganic tin	Sn		No guideline
TDS			No guideline
Uranium	U		1.4 mg/l
Zinc	Zn		3 mg/l

3 Environmental and Social Guidelines

This Chapter provides guidelines and checklists for the environmental and social assessment for the 6th STG project components to be executed during the years 2007-08 and 2008-09.

3.1 Regulatory and Policy Review

3.1.1 World Bank Operational Policies

The WB operational policies that could be relevant to the proposed activities have been discussed in **Section 2.1** of this document. Once the project details are finalized in sufficient details, ESA of the proposed activities will determine which of the operational policies would be triggered. The ESA will identify the specific actions the Project will have to take for each triggered operational policy.

3.1.2 National Legislation and Regulations

The ESA will also assess the project with respect to the applicability of various national laws and regulations discussed in **Section 2.2** of this document. The ESA will identify the specific actions the Project will be liable to take for each relevant/applicable law or regulation.

3.2 Environmental Baseline Conditions

The environmental baseline condition will record the conditions of the various aspects of the environment before the commencement of the project. The following aspects of the environment will be covered.

3.2.1 Physiography of the Project Area

The ESA will describe the topography, geography, relief and geology of the project area. Where relevant, site-specific information will also be provided. This information will mostly be obtained through secondary literature sources. Photographic record will also be included in the ESA report where necessary.

3.2.2 Climate, Meteorological Conditions and Ambient Air Quality

The ESA will provide the climate and meteorological data of the project area. The source of this information will also be published data.

The ambient air quality information will be site specific as far as possible. Where required, primary data will be collected to record the ambient air quality at the key project sites.

3.2.3 Surface Water, Groundwater and Water Quality

The ESA will report the surface water bodies of the project area. The description will be augmented by appropriate maps showing the key surface water resources of the area.

Data will also be presented on the surface water quality of the area, and if required, water analysis will be carried out at the project sites. Any significant water bodies at or around the project sites will be described in greater detail.

Much like the surface water, the groundwater resources of the project area will be described. The key data will be obtained including availability, depth to water table, and quality of the groundwater. Most of this information will be obtained from the available secondary literature. Site specific information will include the water usage, depth to water table, and water quality analysis carried out at the project sites.

3.2.4 Biological Environment

The ESA will provide description of the ecological conditions of the region, ecozones of the project area, the key floral and faunal resources of the area, and the prevailing threats to these resources, if any. Site-specific information will be provided in greater detail. The description will focus on the biological resources which can be potentially impacted by the proposed activities. A suitable expert (ie, a biologist) will be part of the ESA team to develop this baseline description of the biological resources of the project area.

The ESA will also identify any wildlife protected areas at or in the vicinity of the project sites (ie, grid station locations and transmission line routes). A list of these protected areas is provided in **Exhibit 3.1**.

3.2.5 Environmental Hotspots

The ESA will also identify environmental hotspots at or around the project sites. These will be in addition to the protected areas mentioned above (and listed in **Exhibit 3.1**). The description will focus on the aspects of these hotspots which are vulnerable to be affected as a result of the project activities.

3.3 Socioeconomic Baseline Conditions

The socioeconomic baseline condition will record the conditions of the various aspects of the human and social environment before the commencement of the project. A suitable socioeconomic expert will be included in the ESA team to undertake this aspect of the ESA.

The following aspects of the human and social environment will be covered.

3.3.1 Social Setup

The ESA will include an overview of the social setup, ethnic mix up, family structure and castes/tribes of the project area. This information will mostly be based upon the secondary literature.

3.3.2 Economic Conditions

This aspect of the socioeconomic baseline will address the economic activities, main occupations and poverty situation of the area. The agricultural activities, main crops and

cultivation patterns will also be reported. An overview of the industrial setups in the area will also be provided. Most of this information will be obtained from the available secondary resources.

3.3.3 Demographic Data

The ESA will report the key demographic data of the project area. The key aspects of the demographic data will include the population, housing, literacy and basic amenities. This information will also be obtained from the published literature and reports.

3.3.4 Social Infrastructure

The baseline description of the project area will also include information on educational institutes and health facilities available in the area.

3.3.5 Administrative Setup

An overview of the administrative setup(s) prevailing in different parts of the project area will be provided in the ESA. The description will focus on the aspects which are relevant to the proposed project.

3.3.6 Site Specific Information

The aspects of human and social environment discussed in **Sections 3.3.1 to 3.3.5** above would primarily cover the entire project area, and would mostly draw from the secondary resources. Detailed primary data will be collected at the project sites (grid station locations and transmission line routes), and reported in the ESA. This data will focus on the project affected persons (PAPs). The income/asset survey of the PAPs will also be carried out where necessary.

3.3.7 Sites of Archeological, Cultural, Historical or Religious Significance

The ESA will also identify any sites of archeological, cultural, historical or religious significance at or in the vicinity of the project sites (ie, grid station locations and transmission line routes). A list of these sites that have been notified/documentated is provided in **Exhibit 3.2**.

3.4 Analysis of Alternatives

3.4.1 No-Project Alternative

The ESA will evaluate the 'no-project' situation and report the justification for rejecting this alternative.

3.4.2 Siting Alternatives

The siting alternatives for the grid stations and transmission line routes will be analyzed. The environmental and social aspects of these alternatives will be particularly described. The description will also include the siting process, selection criteria and justification for the selected options. While considering various alternatives sites for grid stations and routes for transmission lines, efforts will be made to minimize the environmental as well

as socioeconomic impacts of the selected options. For this task, close coordination with the HESCO staff, particularly the route survey teams, will be essentially required.

3.4.3 Technical Alternatives

The ESA will analyze the environmental and socioeconomic aspects of various technical options available for the Project. For this task as well, close liaison with the HESCO technical staff will be required,.

3.5 Stakeholder Consultation

3.5.1 Participation Framework

The ESA will define the participation and consultation requirements during different phases of the project. The framework will include information pertaining to the stakeholder consultation, particularly 'what', 'who', 'how', 'by whom' and 'when'.

3.5.2 Stakeholder Analysis

The ESA will define the process to be used for the identification and classification of various stakeholders of the proposed project. The outcome of the process in terms of the identified stakeholders will also be documented during the ESA.

3.5.3 Institutional Consultations

During the ESA, consultations and meetings will be held with the institutional stakeholders. These will include the HESCO staff, regulatory agency staff, local administration and prominent/relevant NGOs. The salient project information and the key social as well as environmental aspects of the project will be explained to the participants during these meetings. The ESA team will record the participants' comments, observations, apprehensions and recommendations.

The ESA report will include the process and outcome of the institutional stakeholder consultations.

3.5.4 Grass Root Consultation

The ESA team will conduct comprehensive consultations with the grass route stakeholders, focusing on the PAPs. These consultations will be carried out at the grid station sites and along the transmission line routes. Much like the institutional consultations, the ESA team will provide the salient project information to the participants, focusing on the project's impacts on the communities, such as land acquisition and crop damage. The ESA team will record the feedback, comments, concerns, apprehensions and recommendations of the participants.

The ESA report will include the process and outcome of the grass root stakeholder consultations.

3.6 Environmental Impacts and their Mitigation

The environment impact assessment will be the key element of the ESA study. The suggested methodology for the impact assessment, followed by the application of this methodology for different project phases, is described below.

3.6.1 Environmental Impact Assessment Methodology

The ESA will use a screening matrix tailored specifically to the proposed project, focusing the potential environmental impacts during the design, construction and operation phases. The matrix will examine the interaction of project activities with various components of the environment. The potential impacts thus predicted will be characterized as follows:

- High negative (adverse) impact,
- Low negative impact,
- Insignificant impact,
- High positive (beneficial) impact,
- Low positive impact, and
- No impact.

The suggested matrix is provided in **Exhibit 3.3**. However this matrix can be modified, if required, while performing the ESA.

Once the potentially adverse impacts are identified as discussed above, these impacts will be characterized. Various aspects of the impact characterization will include:

- Nature (direct/indirect)
- Duration of impact (short term, medium term, long term)
- Geographical extent (local, regional)
- Timing (project phase: before, during and after construction)
- Reversibility of impact (reversible/irreversible)
- Likelihood of the impact (certain, likely, unlikely, rare)
- Impact consequence severity (severe, moderate, mild)
- Significance of impact (High, medium, low).

3.6.2 Design Phase Environmental Impacts and Mitigation

The ESA will identify the potential environmental impacts associated with the design phase of the project. The key design aspects with environmental significance that will be considered during the ESA will include:

- Soil Erosion
- Soil and Water Contamination

- Loss of natural vegetation
- Threat to wildlife.

However the ESA may identify additional environmental impacts during the assessment.

The ESA will recommend mitigation measures to address the above concerns.

3.6.3 Construction Phase Environmental Impacts and Mitigation

The ESA will also identify the potential environmental impacts associated with the construction phase of the project. The key environmental issues that are likely to arise during the construction activities include:

- Physical Environment
 - ▶ Soil erosion, degradation
 - ▶ Air quality deterioration
 - ▶ Water contamination and consumption
- Biological Environment
 - ▶ Loss of/damage to the floral resources (natural vegetation) of the area
 - ▶ Loss of/damage to faunal resources (wildlife) of the area.

However the ESA may identify additional environmental impacts during the assessment.

The ESA will recommend mitigation measures to address the above concerns. The residual impacts will also be identified, which will be experienced after the implementation of the mitigation measures.

3.6.4 Operation Phase Environmental Impacts and Mitigation

The ESA will also identify the potential environmental impacts associated with the operation and maintenance (O&M) phase of the project. The key environmental issues that are likely to arise during this phase include:

- Contamination of soil and water as a result of inappropriate waste disposal at the grid stations
- Contamination of soil and water as a result of leakage of transformer oil.
- Damage to natural vegetation and wildlife during the transmission line patrolling and maintenance activities.

However the ESA may identify additional environmental impacts during the assessment.

The ESA will recommend mitigation measures to address the above concerns. The residual impacts will also be identified, which will be experienced after the implementation of the mitigation measures.

3.7 Social Impacts and their Mitigation

The social impact assessment will focus on identification of the PAPs and the compensation arrangements, though there will also be some secondary concerns. The methodology and various elements of the social impact assessment is discussed below.

3.7.1 Social Impact Assessment Methodology

The screening matrix discussed in **Section 3.6.1** above and presented in **Exhibit 3.3** addresses the socioeconomic aspects as well. In addition, a checklist will also be used to identify the key social aspects of the proposed project. The checklist is provided in **Exhibit 3.4**.

3.7.2 Design Phase Social Impacts and Mitigation

The ESA will identify the potential social impacts associated with the design phase of the project. The key design aspects with social significance that will be considered during the ESA will include:

- Resettlement issues
- Safety hazards
- Public health concerns
- Aesthetic value.

However the ESA may identify additional social impacts during the assessment.

The ESA will recommend mitigation measures to address the above concerns.

3.7.3 Construction Phase Social Impacts and Mitigation

The ESA will also identify the potential social impacts associated with the construction phase of the project. Involuntary resettlement will be the key social issue that will arise as a result of the proposed project. During the resettlement impact assessment, PAPs will be identified, along with the determination of extent and magnitude of resettlement impact. The compensation amount for each PAP will also be estimated during this task.

Other social issues that are likely to arise during the construction activities include:

- Damage to infrastructure
- Blocked access
- Noise and vibration
- Safety hazard
- Public health
- Gender issues.

However the ESA may identify additional social impacts during the assessment.

The ESA will recommend mitigation measures to address the above concerns. The residual impacts will also be identified, which will be experienced after the implementation of the mitigation measures.

3.7.4 Operation Phase Social Impacts and Mitigation

The ESA will also identify the potential social impacts associated with the operation and maintenance (O&M) phase of the project. The key social issues that are likely to arise during this phase include:

- Safety hazards
- Public health
- Loss of agricultures.

However the ESA may identify additional social impacts during the assessment.

The ESA will recommend mitigation measures to address the above concerns. The residual impacts will also be identified, which will be experienced after the implementation of the mitigation measures.

3.8 Environmental and Social Management Plan

An environmental and social management plan (ESMP) will be developed while performing the ESA. The ESMP will provide the delivery mechanism to address the adverse environmental as well as social impacts of the proposed project during its execution, to enhance project benefits, and to introduce standards of good practice to be adopted for all project works. The outline ESMP, in the shape of the environmental and social management framework, is provided in the next Chapter.

The key aspects of the ESMP are discussed below.

3.8.1 Organizational Structure

The ESMP will recommend the organizational structure required for managing the environmental as well as social aspects of the proposed project. The description will be augmented with an organizational chart for the proposed project, focusing on the environmental and social management of the project.

3.8.2 Roles and Responsibilities

The ESMP will define the roles and responsibilities of the various role players during the project. The roles and responsibilities will be defined for the HESCO staff, contractors' staff and environmental and social personnel.

3.8.3 Mitigation Plan

The ESA will develop a mitigation plan as a part of the ESMP. The Plan will list all the potential effects of each activity of the project and their associated mitigation measures identified in the ESA. For each project activity, the following information will be presented in the plan:

- A listing of the potential impact associated with that project activity,
- A comprehensive listing of mitigation measures (actions),
- The person(s) responsible for ensuring the full implementation of the action,
- The person(s) responsible for monitoring the action,
- The timing of the implementation of the action to ensure that the objectives of mitigation are fully met.

3.8.4 Monitoring Plan

The ESA will develop a monitoring plan as a part of the ESMP. The objective of environmental and social monitoring during the various phases of the proposed project will be as follows:

- Ensuring that the mitigation measures included in the ESA are being implemented completely.
- Ensuring the effectiveness of the mitigation measures in minimizing the project's impacts on social and environmental resources.

To achieve these objectives the following monitoring program will be implemented.

- Compliance monitoring
- Effects monitoring
- External monitoring

The monitoring plan will provide details of the above types of monitoring, including the procedures, responsibility, timeframe and reporting requirements.

3.8.5 Communication and Documentation

The ESA will propose an effective mechanism for storing and communicating environmental and social information during the project. The key features of such a mechanism will be:

- Recording and maintenance of all information generated during the monitoring in a predetermined format.
- Communicating the information to a central location.
- Storing raw information in a central database.
- Processing the information to produce periodic reports.

The ESMP will provide details of each of the above aspects of the communication and documentation system.

3.8.6 Grievance Redressal Mechanism

The ESA will develop a comprehensive grievance redressal mechanism (GRM), in order to address the grievances of the stakeholders, particularly the PAPs. The key reasons of these grievances may include

- PAPs not enlisted,
- Losses (such as damaged crops) not identified correctly,
- Compensation inadequate or inappropriate,
- Dispute about ownership,
- Delay in disbursement of compensation,
- Improper distribution of compensation in case of joint ownership.

The GRM, developed as part of the ESA, will define tools, procedures, roles and responsibilities for actions, roles and responsibilities for action monitoring, timeframe and documentation requirements.

The GRM will be an informal, project-specific mechanism to enable the project to move forward, avoiding lengthy judicial recourse. The system will include representatives of the project, government, civil society, affectees and any other stakeholder considered relevant.

3.8.7 Change Management

The ESMP will propose a change management system that will define course of actions in case of changes in the project components and their siting. Such changes may have environmental and/or social implications. The change management system will address such eventualities and will define course of action, ensuring that the project remains environmentally and socially compliant to the WB's OPs and national legislation/regulations.

3.8.8 Environmental and Social Trainings

The ESMP will propose an environmental and social training program. The program will identify various types of trainings, the staff to be trained, responsibility of conducting the trainings and timeframe.

3.8.9 Environmental and Social Management Budget

The ESMP will also provide an estimate of the environmental and social management of the proposed project. The budget will include personnel cost, environmental and social monitoring cost, environmental and social training cost, compensation amounts to be paid to PAPs, and any other expenses related to the ESA and ESMP implementation.

3.9 Resettlement Plan/Resettlement Policy Framework

During the ESA, an RP or RPF will be developed, depending upon the total number of PAPs, in accordance with the OP 4.12. The key elements of the RP/RPF are discussed below.

3.9.1 Regulatory and Policy Framework

The RP/RPF will provide a review of the national legislation/regulations and WB's safeguard policies relevant to the resettlement and other social issues.

3.9.2 Entitlement Framework

This will be the key element of the RP/RPF, and will provide the entitlement criteria for various types of resettlement impacts, define various PAPs categories, and determine the compensation basis for each category. The framework will be developed in accordance with the provisions of the WB OP 4.12 and the national laws.

3.9.3 Assessment of Involuntary Resettlement

The RP/RPF will provide details of the resettlement impacts, with type, extent and magnitude of the impact. The PAPs will be identified, with estimates of compensation to be paid for each PAP.

3.9.4 Institutional and Implementation Arrangements

The RP/RPF will define the institutional as well as implementation arrangements for the resettlement mitigation actions to be carried out during the proposed project. Roles and responsibilities of various project personnel will be defined for the RP implementation. Discussions with the relevant HESCO staff will also be taken place in order to incorporate their inputs in the proposed system.

3.9.5 Monitoring Requirements

The RP/RPF will also include a monitoring system to ensure effective implementation of the resettlement mitigation. The system will monitor the process as well as effects/outcome of the mitigation measures. A set of monitoring indicators will also be identified.

3.9.6 Grievance Redressal Mechanism

Much like the GRM defined under the ESMP, the RP/RPF will also have a GRM in place, that will ensure that the grievance of the stakeholders - particularly the project affectees - are recorded and addressed in a timely and effective manner during the RP/RPF implementation. The GRM will provide a step-wise procedure to be implemented to address the grievances communicated by the project affectees. Roles and responsibility of various project personnel will be defined for the grievance redressal.

3.9.7 Communication and Documentation Requirements

A communication and documentation system will be developed under the RP/RPF. The system will define meeting schedules, provide communication protocol and describe documentation procedures.

3.9.8 Resettlement Budget

The RP/RPF will also provide the resettlement budget. The budget will include all types of compensations to be paid to the PAPs during the project execution.

Exhibit 3.1: Wildlife Protected Areas in HESCO Area

Protected Area Name	Area (ha)	Classification	Coordinates
Bijoro Chach	121	Wildlife Sanctuary	Not Recorded
Cut Munarki Chach	405	Wildlife Sanctuary	Not Recorded
Deh Akro/Nara Canal	20,000	Wildlife Sanctuary	27/42 N. 68/52 E.
Deh Jangisar	314	Game Reserve	Not Recorded
Deh Khalifa	429	Game Reserve	Not Recorded
Deh Sahib Saman	349	Game Reserve	Not Recorded