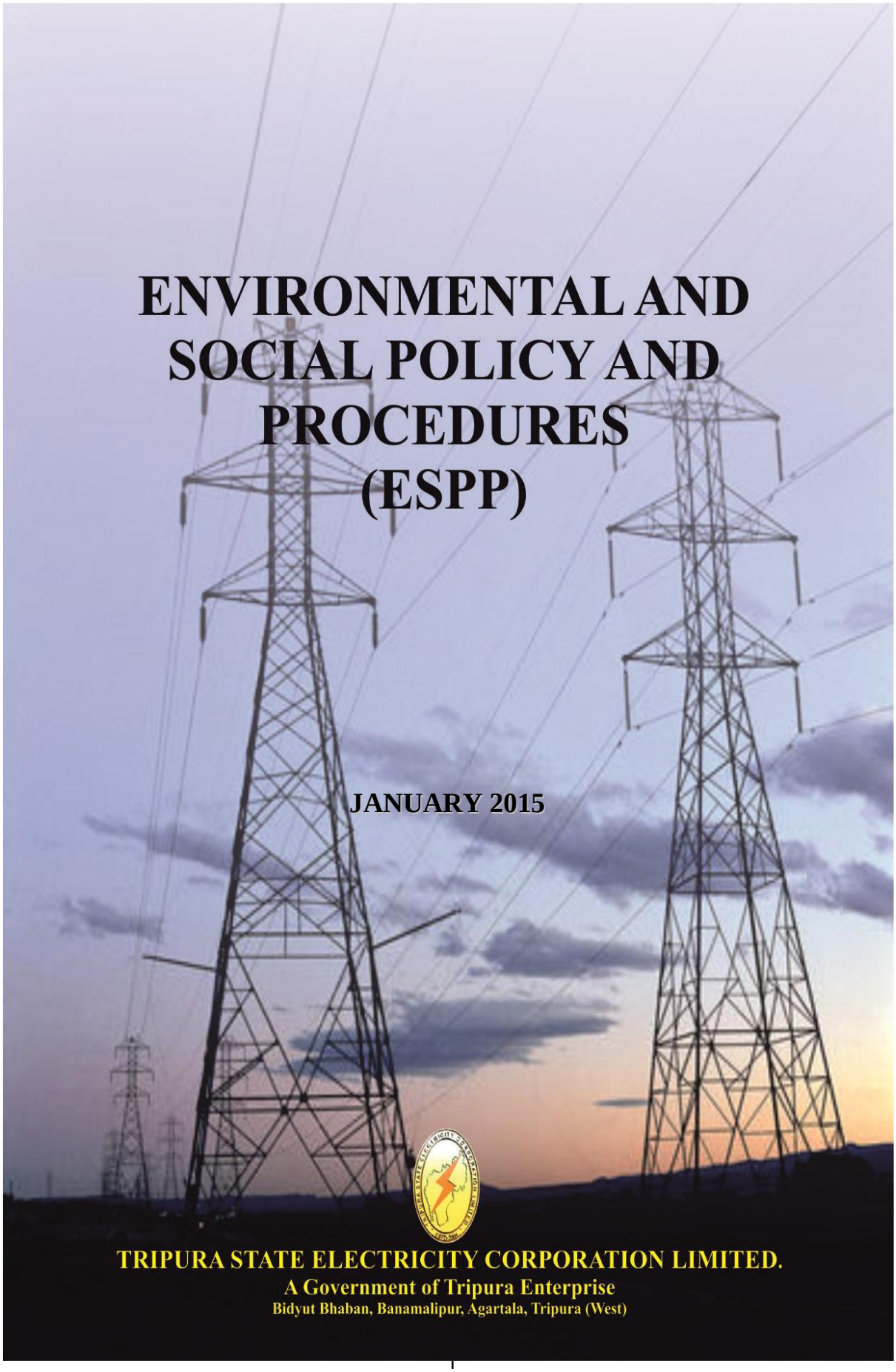


ENVIRONMENTAL AND SOCIAL POLICY AND PROCEDURES (ESPP)

JANUARY 2015

TRIPURA STATE ELECTRICITY CORPORATION LIMITED.
A Government of Tripura Enterprise
Bidyut Bhaban, Banamalipur, Agartala, Tripura (West)

Executive Summary

Abbreviations

ADB	Asian Development Bank
ADC	Autonomous District Councils
AMI	Automated Metering Infrastructure
APDRP	Accelerated Power Development and Reform Program
ARR	Annual Revenue Requirement
ASI	Archaeological Survey of India
CEA	Central Electric Authority
CEO	Chief Executive Officer
CF	Conservator of Forests
CGS	Central Generating Stations
Ckm	Circuit kms
CMD	Chairman cum Management Director
CPCB	Central Pollution Control Board
CPIU	Central Project Implementation Unit
CPTD	Compensation Plan for Temporary Damages
DC	Deputy Commissioner
DL	Distribution Line
DM	District Magistrate
DoP	Department of Power
DPR	Detailed Project Report
DTs	Distribution Transformers
EA	Environmental Assessment
EAMP	Environment Assessment Management Plan
EIA	Environmental Impact Assessment
EMF	Electro Magnetic Fields
EMP	Environment Management Plan
EPA	Environment Protection Act
ESMC	Environment and Social Management Cell
ESMF	Environment and Social Management Framework
ESPP	Environment and Social Policy and Procedures
FAC	Forest Advisory Committee
FEAR	Final Environment Assessment Report
GHG	Green House Gas
GoI	Government of India
GoT	Government of Tripura
GRC	Grievance Redressal Committee
GRM	Grievance Redressal Mechanism
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IEAR	Initial Environment Assessment Report
IEE	Initial Environment Examination
LAA	Land Acquisition Act
MDoNER	Ministry of Development of North East Region

MIS	Management Information System
MoEF & CC	Ministry of Environment Forests and Climate Change
MoP	Ministry of Power
NCR	National Council on Radiation
NEC	North East Council
NER	North Eastern Region
NERPSIP	North Eastern Region Power System Improvement Project
NEP	National Environment Policy
NLCPR	Non-lapsable Central Pool of Resources
NOC	No objection certificate
NPV	Net Present Value
O&M	Operation and Maintenance
ODS	Ozone Depleting Substances
OP	Operational Policy
PAF	Project Affected Family
PAP	Project Affected Persons
PCCF	Principal Chief Conservator of Forests
PMC	Project Management Consultant
PPIU	PMC Project Implementation Unit
R&R	Rehabilitation and Resettlement
RAPDRP	Restructured Accelerated Power Development Reform Programme
RFCTLARRA	Right to Fair Compensation and Transparency in Land Acquisition Rehabilitation and Resettlement Act, 2013
RGGVY	Rajiv Gandhi Grameen Vidyutikaran Yojana
RTI	Right of Information
SAG	State Advisory Group
SEBs	State Electricity Boards
SF6	Sulphur Hexafluoride
SIA	Social Impact Assessments
SIMP	Social Impact Assessment and Management Plan
SoI	Survey of India
SPCB	State Pollution Control Board
SPCU	State Project Implementation Unit
SPS	Safeguard Policy Statement
T&D	Transmission & Distribution
TC	Transmission Circle
TERC	Tripura Electricity Regulatory Commission
TL	Transmission Line
ToR	Terms of Reference
TPDP	Tribal Peoples' Development Plan
TSECL	Tripura State Electricity Corporation Limited
TTAADC	Tripura Tribal Areas Autonomous District Council
WB	World Bank

EXECUTIVE SUMMARY

1 India's North East Region (NER) stretches across the eastern foothills of the Himalayan mountain range and is comprised of seven states including Assam, Manipur, Meghalaya, Mizoram, Nagaland, and Tripura. Geographically the region is connected to the other parts of the country through a small "chicken neck" corridor in the State of West Bengal. With a total population of 45.6 million (2011 census), the sparsely populated NER accounts for about 3.7 percent of India's total population and covers 7.9 percent of India's total geographical area. The vast majority of the region's population lives in rural areas, accounting for 82 percent of the total population as against compared to the national average of 69 percent (2011). A large part of the NER is hilly and, recognized as one of the globe's biodiversity hotspots. Forests cover over 2/3rd of the area, twice exceeding the policy target of 33%. This sparsely populated region is characterized by extraordinary ethnic, cultural, religious and linguistic diversity, with more than 160 Scheduled Tribes (out of 630 in the country) comprising over 400 distinct sub tribal groups, and a large and diverse non-tribal population as well.

2 **Regional Power Transmission and Distribution**. The North Eastern Region (NER) in India is endowed with rich energy resources but faces significant bottlenecks in electricity access and availability levels. The per capita power consumption in NER is one-third of the national average. The region has a shortfall of about 500 MW installed capacity against peak demand of about 1950 MW. No significant generation capacity has been added in the recent past. Therefore, inadequate power supply continues a critical constraint to sustainable growth and economic development in the NER. Some states are generally not able to draw even their allocated share of power from the Central Generating Stations (CGS) through the grid due to poor/ inadequate intra/ interstate transmission and distribution network and no capacity addition towards transmission/distribution power system not done due to fund constraints. The transmission and distribution (T&D) losses are also drastically high (up to 50%) across most of the States as a large number of remote hilly areas are connected through long low tension lines, resulting in low voltages and poor quality of power at consumer end. While generation capacity addition of about 4000 MW program over present installed capacity is already underway, adequate transmission and distribution infrastructure to transmit and distribute this power to consumers within the North-Eastern States is the need of the day.

Project Context

3 In order to create/ augment proper infrastructure of T&D in NER. Government of India (GoI) has formulated a "Composite scheme for transmission and distribution (T&D) in NER" capable of delivering adequate power to most consumers with reliability, aiming to improve the inter-state and intra-state transmission and sub-transmission infrastructure and reduce system losses in all the NER states. The Govt. of India (GoI) has approached the World Bank to provide US$ 1500 million of IBRD funding support to portion of the scheme **"NER Power System Improvement Project (NERPSIP)"** in three investment tranches each being US$ 500 million for strengthening, augmentation of the intra-state and interstate transmission and distribution schemes (33kV and above and above) and undertake capacity building initiatives across six NER States of Assam, Manipur, Mizoram, Meghalaya, Tripura and Nagaland for World Bank & GoI funding. Ministry of Power (MoP), GoI has appointed POWERGRID, as the Central Implementing Agency (IA) to the six North East States for the Project. However, the ownership of the assets shall be with the respective State Governments/ State Utilities, which upon progressive commissioning shall be handed over to them for taking care of Operation and Maintenance of Assets at their own cost.

4 The project's first investment tranche would be implemented over a seven year period (2014-2021) and has two major components, namely:

a) Priority investments for strengthening of intra-state transmission and distribution systems;
b) Technical Assistance for Institutional Strengthening and Capacity Building of power utilities and departments.

5 **Tripura.** In the above background, Tripura state, one of the states in NER, is contemplating major expansion and augmentation of its transmission & distribution network in near future by implementing projects with the help/grant from GoI and other Multilateral Funding Agencies like the World Bank and ADB. Given the unique socio-economic, cultural and environmental resources, Tripura State Electricity Corporation Limited (TSECL) in Tripura is committed to manage them highly sustainably. Towards this, plans have been made by TESCL to prepare an Environment and Social Policy and Procedures (ESPP) to serve as a guiding instrument. TSECL assimilates environmental and social management procedures into its corporate functioning and also layout management procedures and protocol to address them. It outlines TSECL's commitment to deal with environmental and social issues relating to its transmission & distribution projects with a framework for identification, assessment and management of environmental and social concerns at both organizational as well as project levels. For this, POWERGRID, with proven credentials in management of environmental and social issues of large number of power transmission projects both within and outside the country has been mandated to prepare an ESPP for TSECL. Thus, it enables TSECL;

- To establish clear procedures and methodologies for the environmental and social screening, planning, review, approval and implementation of subprojects to be financed under the Project;
- To specify appropriate roles and responsibilities, and outline the necessary reporting procedures, for managing and monitoring environmental and social concerns related to sub-projects;
- To determine the training, capacity building and technical assistance needed to successfully implement the provisions of the ESPP;
- To ensure adequate financial provisions to meet the management measures to be undertaken to mitigate the impacts.

TSECL also believes that the ESPP is dynamic and living document, which shall be further upgraded in light of the experiences gained from field implementation and other relevant factors while mainstreaming the environmental and social concerns in its corporate functioning.

TSECL's Environment & Social Policy

Environment & Social Policy Statement of TSECL

"TSECL aspires to achieve the goal of sustainable development through identification, assessment and management of social and environmental issues at both project planning and implementation stages, through use of state of the art system, following of statute and principles of Avoidance, Minimization and Mitigation of inescapable issues with complete transparency and due social responsibilities".

6 The key principles of TSECL's Environmental and Social Policy are:

- Avoidance of environmentally and socially sensitive areas while planning project activities;
- Minimization of impacts when project activities occur in environmentally and socially sensitive areas;
- Mitigation of any unavoidable negative impacts arising out of its projects.

Methodology & Approach

7 The ESPP has been prepared following a region/ state specific environmental and social assessments which involved generating information through both primary and secondary sources including consultations and library research. The methodology adopted to identify the potential environment and social impacts is based on experience gained from implementation of similar projects and baseline assessments of work activities anticipated in this proposed project. The methodology takes in to account wide range of receptors:

- Physical & chemical environment (e.g. water, soil, etc.);
- Biological environment (forest, animals, birds, etc.); and
- Communities, social groups and individuals (loss of land, loss of agricultural production, tribal, vulnerable groups (women and backward classes), socio-economic condition, health and safety risks).

8 The basic approach involved broadly the following:

- Review of environment & social baseline information from secondary source of the project area;
- Review of existing national & state specific legislations and policy and procedures of multilateral agencies;
- Review of project related documents; and
- Stakeholders' consultations.

Consultation/ Participation

9 Consultations with key stakeholders including local, state, regional, central government entities and key ministries at the state level and central level as well as with World Bank officials were undertaken to know views and concerns about environmental and social issues/ concerns of the project. This activity ensured appropriate participation and gathering views from the environment and social perspective of all the stakeholders' which is integrated in this ESPP to be adopted during different stages of the project implementation.

Tripura at a Glance

10 Tripura situated between latitudes 22°56' and 24°32' north, and longitudes 91°09' and 92°20' east is a land-locked Indian North Eastern State. It has an area of 10,491.69 sq. km and surrounded by Bangladesh on its north, south and west. The State has rich natural resources which includes gas and forests. The local flora and fauna bear a very close affinity and resemblance with the floral and faunal

components of the Indo-Malayan and Indo-Chinese sub-regions. The State is located in the bio-geographic zone of 9B-North-East hills and possesses an extremely rich bio-diversity. About 60% of the area is classified as forests. A third of the population belongs to Schedule Tribes whose lives are intrinsically woven with that of the forests.

11 Tripura presently has 8 districts, 23 subdivisions, 58 development blocks and 32 revenue circles having 4 nos. Panchayati Raj Institutions (PRI). The Sixth Schedule of the Constitution applies to a large part of the state, which is under the jurisdiction of the ***"Tripura Tribal Areas Autonomous District Council"*** (TTAADC). Out of the total geographical area of 10,491 sq. km, 7,133 sq. km (about 68%) is under the TTAADC. The Sixth Schedule areas are governed through ***"Autonomous District Councils"*** (ADC) that has wide-ranging legislative and executive powers. However, the State is unique and distinguished by the existence of separate legislative, governance and judiciary systems for tribal areas.

12 The population of Tripura as per census 2011 was 36, 71, 032, out of which 18, 71,867 were males and 17, 99,165 were females. The Scheduled Castes (SCs) and Scheduled Tribes (STs) population consists nearly 17.37% and 31.13% of the total population in the State. There are 19 sub tribes among the ST population of the State with their own cultural identity; Tripura is predominantly a rural state as about 83% of population lives in rural areas.

13 Forest is an integral part of the culture and tradition of Tripura as its protection maintains the ecology of the State. The State has a geographical area of 10,491 sq. km. of which 6,294 sq.km. (60.02%) is the recorded forest area; Reserved Forests constitute 66.33%, Protected Forests 0.03% and Un-classed Forests constitute 33.64%. The forest cover in the state, based on interpretation of satellite data of 2011, is 7,866 km² which is 76.98% of the State's geographical area. A significant number of families in Tripura continue to depend on forests particularly on Jhum (shifting or slash and burn) cultivation as their main source of cultivation. Almost 10 percent forests area is under Jhum cultivation in the State.

14 Tripura has two National Parks and four Wildlife Sanctuaries covering an area of 603.64 km², constituting 5.75% of the total geographical area of the State. There are about 408 Wetlands in Tripura covering an area of 98.58 sq.km. The Rudrasagar lake of State is also covered under International Convention (Ramsar Convention on wet land) by MoEF & CC. Details of protected area including its size, location and important flora & fauna are presented in Table 1 below:

Table 1: Protected Area Network in Tripura

No.	Name of the Sanctuary/ National Park	Area in km²	Location/ District	Important Flora and Fauna found
1.	Sepahijala Wildlife Sanctuary	18.54	Sepahijala	Birds and Primates, Migratory Birds in the winter, Spectacled Monkey.
2.	Gomati Wildlife Sanctuary	389.54	Dhalai, Gomati	Elephant, Samber, Barking Deer, Wild Goats, Serrow etc.
3.	Trishna Wildlife Sanctuary	194.71	South Tripura	Bison, Leopard, Barking Deer, Wild Dog, Capped Langur, King Cobra, Spectacled Monkey, Slow Lorries

No.	Name of the Sanctuary/ National Park	Area in km²	Location/ District	Important Flora and Fauna found
4.	Rowa Wildlife Sanctuary	0.86	North Tripura	Many species of Birds and Primates
5.	Bison (Rajbari) National Park	31.63	South Tripura	Bisons and many species of Birds
6.	Clouded Leopard National Park	5.08	West Tripura	Clouded Leopard, Spectacled Langur and many Birds

15 Presently the Tripura has a generation capacity of 110 MW from 3 generating stations viz. Gomuti Hydroelectric Project, Baramura and Rokhia Gas based Thermal Power Stations. In addition to this, it has diesel based generating units of about 1.0 MW which is now used only during exigency**.** As on March, 2014 there are about 6.1 lakh total consumers out of which about 89% are domestic, about 10.18% Commercial and only 0.82% Industrial. TSECL operates 1120 Ckm of 132 kV and 66 kV with 26 nos. 132/66 kV substations having transformation capacity of over 721 MVA. It has Over 31,481 Ckm of 33 kV & 11 kV HT and LT lines (400V) with 9,863 of Distribution Transformers (DTs) of 33/11 kV and 11/0.4 kV with transformation capacity of more than 799 MVA. The present peak demand of the State is 266 MW. Own generation from three generating stations for the state is 93 MW (+ 20MW for Mizoram & Manipur). TSECL gets about 80 MW from Palatana as its share and about 60 MW is imported during peak load period from North Eastern Grid. There remains a shortfall of about 40-45 MW. Efforts are underway not only to bridge the gap but also ensure that adequate power is made available to enable boosting of State economy. An abstract of subprojects for the tranche-1 under expansion/augmentation of power system network in the State of Tripura is presented in **Table 2**.

Table 2: Summary of subprojects in Tranche- I under NERPSIP

Sl. No.	Name of the subproject	Quantity (Nos.)	Capacity Addition (Ckt. Km/MVA)	Estimated Cost (in Millions)*
1.	132 kV Transmission lines (New)	11	503 Ckt.km.	6971.50
2	132/33kV substations (New/Augmentation)	16	1306 MVA	
3.	33 kV Distribution lines (New Strengthening/Re-conductoring)	72	1096 Ckt.km.	5615.80
4.	33/11kV substations (New)	34	360 MVA	

****The estimated cost includes consultancy fees, contingencies and IDC***

Stakeholder analysis

16 Stakeholder's analysis has been undertaken to identify the issues and the concerns of various stakeholders who are supposed to be either directly or indirectly impacted/benefited or assume a position wherein they can have a significant role to influence the project. The Stakeholder's analysis has been carried out to identify existing relationship and also to understand the roles, responsibilities and relations of these stakeholders in context of shaping the environment and social issues with respect to proposed project. The details of the key stakeholders identified at various levels from national level up to village/panchayat level and their issues & expectations with respect to proposed project. The process of consultation with stakeholders involves formal and informal discussion.

A wide range of issues were discussed with various stakeholders that might have environmental / social concern. Some of the key issues are listed below:

17 **Environment Issues.**

- Impact on forest and biodiversity area e.g. national parks, sanctuary, bio-reserves, etc.
- Impact due to waste (Used Oil or E-waste), oil spills, sanitation;
- Occupational health and safety during implementation (labor camps including HIV/ AIDS issues), operation and maintenance phases of the project;
- Soil erosion and slope un-stability;
- Leakage of SF6 gas, the potent greenhouse gas; and
- Any other adverse environment issues.

18 **Social and Institutional Issues.**

- Securing land for substation;
- Temporary damages to land, crops, trees or other vegetation or other than forestland or structures during construction;
- Community participation involvement of the during planning, implementation and operation phases of the project/sub-project cycle;
- Health and Safety risk including HIV/AIDS;
- Tribal/vulnerable groups;
- Gender / Women participation; and
- Participation and inter-agency coordination.

Impacts – Social

19 This section identifies the potential social impacts of the proposed projects in terms of the nature, magnitude, extent and location, timing and duration of the anticipated impacts. These impacts are both positive or negative relating to the project design stage, construction stage or the project operation and decommissioning stage.

i. Positive Impacts

- Employment creation;
- Improved and reliability of power supply;
- Increased economic activity;
- Improved road infrastructure;
- Gender Issues – more opportunities to women during construction phase as laborers and also for catering, etc. activities around the camp site;
- Less reliance of fossil fuels like firewood, charcoal etc.;
- Capacity Building.

ii. Negative Impacts

- Loss of land;
- Restriction of land use and land rights;
- Health and Safety risk including HIV/AIDS.

Impacts - Environment

20 This section identifies the potential environmental impacts of the proposed projects. These impacts are both positive or negative relating to the project design stage, construction stage or the project operation and decommissioning stage.

i. Positive Impacts

- Less dependence on fossil fuels including firewood, charcoal etc.

ii. Negative Impacts

- Impacts on Vegetation/forest
- Impacts on Wildlife Habitats and Migratory Birds
- Impacts on Drainage, Soil erosion Water Resources
- Impacts on Traffic and Road Infrastructure
- Impacts from Solid/ Liquid Wastes, Oil spillage
- Effect of Electric and Magnetic Fields
- Air Quality, Noise and Vibration
- SF6 Gas leakage to atmosphere
- Health & hygiene
- Impacts on Aviation and Communication

The issues identified and impacts likely to occur are to be managed with the regional, national and international legal and regulatory framework.

Policy, Legal and Regulatory Framework

21 TSECL undertakes its Transmission/ Distribution system (33 kV and above) activities within the purview of Constitutional provisions, Policy, Legal, and Regulatory Framework for environmental and social issues applicable to power transmission & distribution. In addition, the requirements of multilateral funding agencies are also considered in the management procedures for addressing environmental and social issues.

22 The Constitution of India provides for protection of the environment and its improvement as a fundamental duty and the Directive Principles of State Policy under Article 51 A (g) and Article 48 A respectively. The Apex Court has widened the scope of Article 21 (Right to Life) bringing environmental impacts under its ambit. Similarly, the constitutional provisions in regard to social safeguards are enshrined in the Preamble to the Constitution, such as justice, social, economic and political; liberty of thought, expression, belief, faith and worship; equality of status and of opportunity; fraternity assuring the dignity of the individual and the unity and integrity of the Nation. Fundamental Rights and Directive Principles guarantee the right to life and liberty. Health, safety and livelihood been interpreted as part of this larger framework. The provisions on social safeguards are contained in Articles 14, 15, 17, 23, 24, 25, 46, 330, 332, etc.

23 **Sixth Schedule:** In addition to basic fundamental rights, special provisions have been extended to the Tribal Areas in the North Eastern region under the 6th Schedule [Articles 244(2) and 275(1)] in addition to basic fundamental rights.. The Sixth Schedule safeguards the protection of tribal areas and provides for administration of tribal areas as autonomous entities, self-governance through constitutional institutions at the district or regional level. These institutions are entrusted with the twin task of protecting tribal cultures and customs and undertaking development tasks. Accordingly, Tripura Panchayats (Second Amendment) Act, 1998 of Principal Act, 1993 includes Autonomous District Council (ADC) in governance and administration.

24 **Environment :** Mandatory environmental requirements for TSECL at state level include: sanction of GoT under section 68(1) of the Electricity Act, 2003; Forest clearance under the Forest (Conservation) Act, 1980; During the currency of operations, Regulations on Batteries (Management and handling) Rules, 2001 regarding disposal of used batteries, Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008 regarding disposal of used transformer oil, Ozone Depleting Substances (Regulation and Control) Rules, 2000 putting restrictions on use of ozone depleting substances come into force and required voluntary enforcement and provisions under Biological Diversity Act, 2002, E-waste (Management and Handling) Rules, 2011 regarding maintaining records & handling of electronic wastes, and the Scheduled Tribes & Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006.

25 The Forest (Conservation) Act, 1980 is the key legislation through which the environmental impacts of transmission projects are managed since the current regulation does not require an Environmental Impact Assessment for transmission lines. The legislation requires compensatory afforestation for any forest land diverted for non-forest use in twice the area diverted with afforestation undertaken by the respective state Forest Department. A national fund CAMPA has been created for this purpose. In case projects pass through or are located in designated protected areas, clearances from the Wildlife Board are also required. TSECL has decided to undertake assessment of environmental impacts even for cases where not statutorily mandated in order to confirm compliance with its own policy highlighted in paragraph 6 above.

26 **Social:** Mandatory Social requirements for TSECL at State level include provisions of section 67 & 68 (5 & 6) of the Electricity Act, 2003 for the calculation of compensation for any temporary damages. Involuntary land acquisitions, if any done, for securing private lands for construction of sub-stations, fall under the realm of The Right to Fair Compensation and Transparency in Land Acquisition Rehabilitation and Resettlement Act, 2013 (RFCTLARRA). The provisions of Indian Treasure Trove Act, 1878 as amended in 1949 covers chance finds. The Right to Information Act, 2005 (RTI) ensures citizens to access information under the control of public authorities.

27 **The World Bank** (WB) Operational Policies OP 4.01, 4.04, 4.11 & 4.36/ADB's Safeguard Policy Statement 2009 (SPS 2009) for Environmental and Social Considerations outline funding agencies policy and procedures for Environmental Assessment (EA) of different developmental projects. Depending upon the issues and impacts, the projects are categorized as A, B, and C warranting larger and specialized focus for A and the least for C. This project, as per the WB guidelines, is categorized as A. Likewise, OP 4.10 and 4.12 outlines policy guidelines for managing issues related to tribal people and involuntary resettlement.

28 **RFCTLARRA, 2013** has replaced the old Land Acquisition Act, 1894 and has come into force from 1st January 2014. The new act i.e. RFCTLARRA, 2013 authorizes State Govt. (i.e. GoT) or its authorized Government agency to complete the whole process of acquisition of private land including Social Impact Assessment (SIA), Action Plan for R&R (i.e. Rehabilitation and Resettlement) & its implementation and the TSECL's responsibility is limited to identification and selection of suitable land based on technical requirement and ensuring budget allocation.

29 **Safeguards against land acquisition**: Conducting Social Impact Assessments (SIA) has been made mandatory under this new act and results of these assessments are shared with all the stakeholders and public hearing held which makes the process transparent and informed. Subsequently, an entitlement package that includes both compensation (for land/structure and assets to land and structure) and R&R as necessary is prepared. Further to this, individual awards are passed and all documents are disclosed in the public domain through local administration and internet.

30 The flow chart of the land acquisition process with schedule prescribed for various activities is illustrated in Figure 1 below. The entitlements with regard to compensation and assistances towards land acquisition or loss of any assets or livelihood for all categories of people being affected due to land acquisition is briefly outlined in Table 3 & 4 below:

Table 3: Minimum Compensation for Land Acquisition

<table>
<tr><th colspan="2">A. Comprehensive Compensation Package (First Schedule)</th></tr>
<tr><th>Eligibility for Entitlement</th><th>Provisions</th></tr>
<tr><td>The affected families
▪ Land Owners:
1. Family or company whose land/other immovable properties have been acquired;

2.Those who are assigned land by the Governments under various schemes;

3.Right holders under the Forest Rights Act, 2006</td><td>Determination of Compensation :
1. Market value of the land
• as specified in the Indian Stamp Act, 1899
or
• the average of the sale price for similar type of land situated in the village or vicinity,
or
• consented amount of compensation as agreed in case of acquisition of lands for private companies or for public private partnership project.
whichever is higher
Market value x Multiplier* between 1 to 2 in rural areas only (No multiplier in urban areas).
2. Value of the assets attached to land:
Building/Trees/Wells/Crop etc. as valued by relevant govt. authority;
Total compensation = 1+2
3. Solatium: 100% of total compensation</td></tr>
<tr><td colspan="2">(*) Precise scale shall be determined by the State Govt.
The indicative values of multiplier factor based on distance from urban areas as provided in the act.</td></tr>
</table>

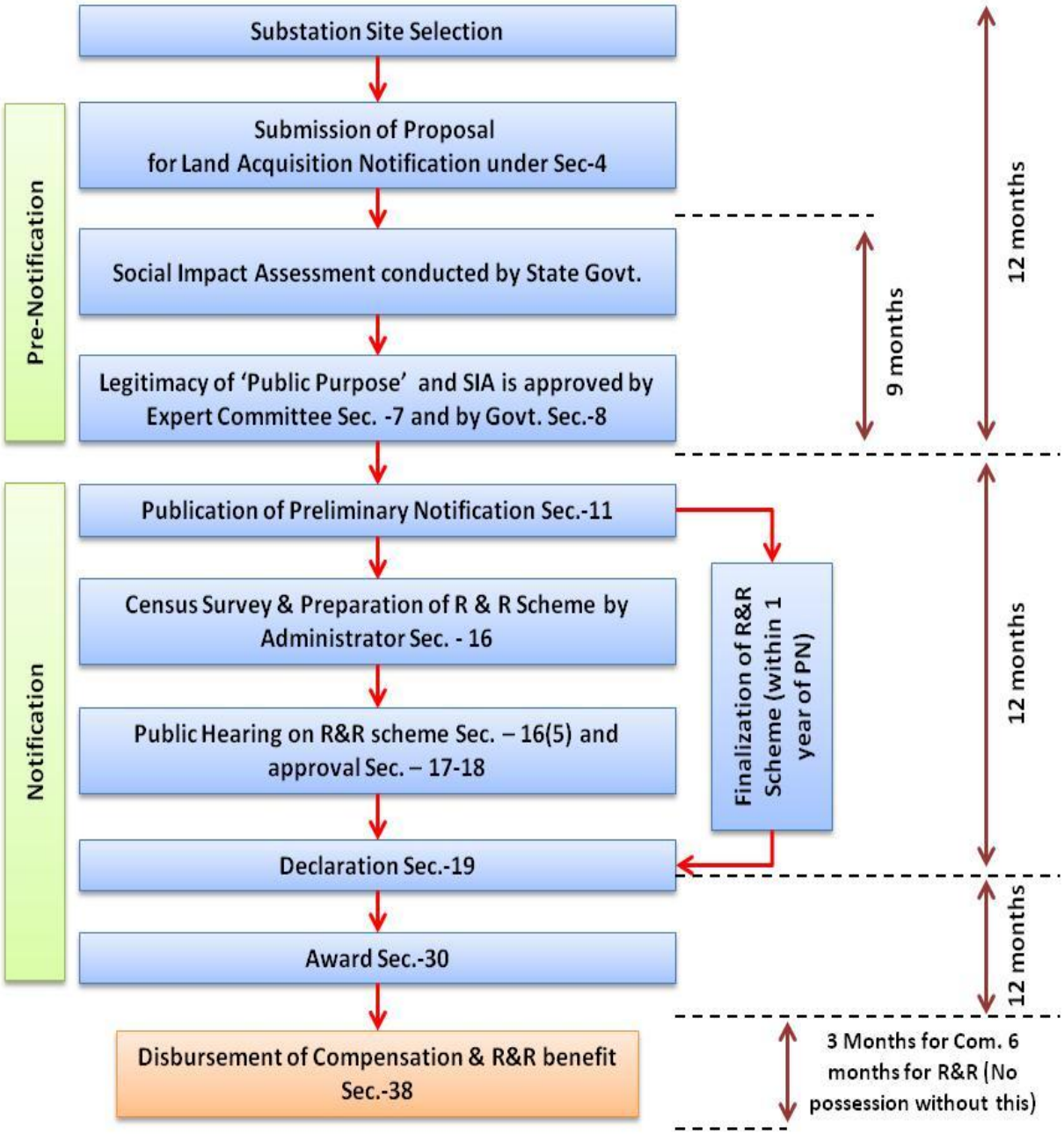
A. Comprehensive Compensation Package (First Schedule)	
Eligibility for Entitlement	**Provisions**
Radial Distance from Urban area (Km)	**Multiplier Factor**
0-10	1.00
10-20	1.20
20-30	1.40
30-40	1.80
40-50	2.00

Table 4: Minimum R&R Entitlement Framework

A Comprehensive R&R Package (Second Schedule)		
Sl. No.	**Elements of R& R Entitlements**	**Provision**
1.	Subsistence grant/ allowance for displaced families	Rs. 3000 per month per family for 12 months
2.	The affected families shall be entitled to:	(a) Where jobs are created through the project, mandatory employment for one member per affected family **or** (b) Rupees 5 lakhs per family; or (c) Rupees 2000 per month per family as annuity for 20 years, with appropriate index for inflation; **The option of availing (a) or (b) or (c) shall be that of the affected family**
3.	Housing units for displacement: i) If a house is lost in rural areas: ii) If a house is lost in urban areas	i) A constructed house shall be provided as per the Indira Awas Yojana specifications. ii) A constructed house shall be provided, which will be not less than 50 sq. mts. in plinth area. In either case the equivalent cost of the house may also be provided in lieu of the house as per the preference of the project affected family. The stamp duty and other fees payable for registration of the house allotted to the affected families shall be borne by the Requiring Body.
4.	Transportation cost for displaced families	Rs 50,000/- per affected family
5.	Resettlement Allowance (for displaced families)	Onetime Rs 50,000/- per affected family
6.	Cattle shed/ petty shop cost	Onetime financial assistance as appropriate for construction as decided by St. Govt. subject to minimum of Rs.25,000/-
7.	Artisan/small traders/others (in case of displacement)	Onetime financial assistance as appropriate as decided by St. Govt. subject to minimum of Rs.25,000/-
Special Provisions for SCs/STs: In addition to the R&R package, *SC/ST families will be entitled to the following additional benefits:* **1.** One time financial assistance of Rs. 50,000 per family;		

A Comprehensive R&R Package (Second Schedule)		
Sl. No.	**Elements of R& R Entitlements**	**Provision**
2.	Families settled outside the district shall be entitled to an additional 25% R&R benefits;	
3.	Payment of one third of the compensation amount at very outset;	
4.	Preference in relocation and resettlement in area in same compact block;	
5.	Free land for community and social gatherings;	
6.	In case of displacement, a Development Plan is to *be prepared*	
7.	*Continuation of reservation and other Schedule V and Schedule VI area benefits from displaced area to resettlement area.*	

FIGURE 1: ACTIVITY CHART RFCTLARRA**, 2013**



Project Cycle – Integrating Environment and Social Issues/ Concerns and Mitigatory Measures

31. Stakeholder analysis and impact assessments had enabled identifying issues. The same are now placed in the project cycle so as to draw management measures for addressing the same. Key milestones in TSECL's transmission/Distribution (33 kV and above) projects are;

i) Project Conceptualization
ii) Project Planning
iii) Approval
iv) Detailed Design and Tendering
v) Project Implementation
vi) Operation & Maintenance
vii) Review and Monitoring and Evaluation.

Environmental and Social Concerns

32. Environmental Concerns.

- Clearing/lopping of Trees within Right of Way (RoW);
- Clearing of Ground Vegetation for Movement of Machinery;
- Disposal of Used Transformer Oil;
- Disposal of Used Battery;
- Disposal of E-waste; and
- Leakage/use of SF_6 gas.

33. Social Concerns

- Loss to Standing Crop;
- Change in Land Prices;
- Temporary Loss of Access to Common Property Resources;
- Restriction on Land Use;
- Loss of livelihood due to acquisition of private agricultural land;
- Loss of common property resources due to acquisition of revenue land; and
- Loss of homestead, if any.

34. Management measures to address the issues and concerns in respect of social and environment are presented in Tables 5 and 6 respectively.

Table 5: Social Management Measures

No	Potential Issues	Management Measures
1	Loss of land	For Tranche-1, this is not an issue as TSCEL has lands required for construction of substations and no lands are to be acquired.
2	Change in land use and population relocation due to towers/ poles	As per existing law, land for tower/pole and right of way is not acquired and agricultural activities are allowed to continue after construction activity and TSECL pays compensation for all damages including cost of land below tower to its owner

No	Potential Issues	Management Measures
		without acquiring it. Hence change in land use and resultant relocation of people is not envisaged in T&D projects.
3	Change in land use and population relocation for substations	Due to inherent flexibility in locating substation and very small size of land, TSECL avoids habituated area completely hence no relocation of population on account of setting up of substation is envisaged. Moreover, as brought out above all such lands are available in the instant case and no fresh acquisition of land is planned for project covered under Tranche-1, hence no such issue is anticipated. However, securing lands may be an issue for subsequent investments under future tranches as well as those supported with other sources of finance. Keeping in this in view, and in case, lands may have to be secured, the same it can be accomplished through following three methods; (i) Purchase of land on willing buyer & Willing Seller basis on negotiated rate; (ii) Voluntary Donation; and (iii) Involuntary Acquisition. In case of procurement of land through private purchase, TSECL shall ensure that compensation/rate for land is not less than the rate provided in the new land acquisition act, 2013. In order to comply with this provision TSECL may organize an awareness camp where provisions of new act in respect of basis/modalities of compensation calculation shall be explained to land owners with specific State provision if any. In the case of voluntary donation of land, the following shall be ensured: • The land user(s) will not be subjected to undue pressure for parting of land; • All out efforts shall be made to avoid any physical relocation/displacement due to loss of land; • The TSECL shall facilitate in extending 'gratitude' to the land donor(s) in lieu of the 'contribution' if so agreed. The same shall be documented and monitored for compliance. • All land donations (as well as purchases) will be subject to a review/ approval from a committee comprising representatives of different sections including those from the IA and GoT. Involuntary Land Acquisitions will be made deploying the GOI's new RFCTLARR Act, 2013.
4	Right of Way	Land for tower and right of way is not acquired as agricultural activities can continue. However, the project shall pay full

No	Potential Issues	Management Measures
		compensation to all the affected persons/ community for any damages sustained during the execution of work. Accordingly, TSECL has formulated appropriate management plan in the form of Compensation Plan for Temporary Damage (CPTD) to minimize the damages and provide compensation plan for temporary damages in consultation with the state government and affected persons and/ or community.
5	Impact on Tribal	The population of Tripura as per census 2011 was 36, 71,032. The Scheduled Tribes (STs) population consists nearly 31.13 %of the total population in the State. There are 19- sub tribes among the ST population of the State with their own cultural identity. The project is being implemented in the tribal areas (Sixth Schedule provision of the Indian Constitution) of Tripura and bulk of the beneficiaries are expected to be tribal. Thus, the need for a separate Tribal Peoples' Development Framework/ Plan (TPDP) as per O.P.4.10 is not required under this project. Irrespective of this, Sixth Schedule provision stipulates that all projects do need to secure prior consent by TTAADS who in turn will consult and secure consent from the village councils. Further Tribal Development Framework as well as Tribal Development Plan is enshrined in RFCTLARRA, 2013 which makes consultations in tribal areas mandatory and provides for enhanced entitlements for the tribal people.
6	Gender/ women participation	Women involvement will be planned through formal and informal group consultations so that their participation is ensured during preparation and implementation of the project.
7	Induced secondary development during construction	TSECL operations are short-lived and do not induce secondary developments during construction.
8	Health and safety of worker/employee/community	During construction the health and safety aspects of workers and nearby community shall be implemented through contractors with due diligence and compliance of required regulation/guideline through a safety plan TSECL uses best available technology for lines and do not cause any hazards to health and safety.
9	"Chance finds" or discovery of any archaeological artifacts, treasure etc. during excavation	Possibilities of such phenomenon in T&D project are quite remote due to limited and shallow excavations. However, in case of such findings, TSECL will follow the laid down procedure in the Section-4 of Indian Treasure Trove Act, 1878 as amended in1949.

Table 6 : Environment Management Measures

No	Potential Issues	Management Measures
A	Minimising adverse impact on natural forests	TSECL endeavors to circumvent / lessen environmentally sensitive areas such as forest and other ecologically fragile/ sensitive areas through optimization of route including use of modern tools like GIS/GPS and other modern techniques.
	Lopping of trees	Use of extended/special tower to reduce RoW and impact on trees.
	▪ Vegetation damage ▪ Habited Loss	To minimise damage to vegetation and habitat fragmentation, TSECL utilizes hand clearing and transportation of tower material by head loads into forestland and other land as well, wherever possible.
	▪ Habitat fragmentation ▪ Edge effect on flora & fauna	TSECL maintains only a 3m wide strip for O&M and allows for regeneration of vegetation in the other one or two strips and beneath the transmission lines to avoid habitat fragmentation and edge effect. In hilly area this can possibly be totally avoided.
	Chances of accident involving elephant in the specified corridor due to placing of poles	There is no elephant corridor as such in Tripura. But it is reported elephant sometimes stray over/cross/migrate from Bangladesh in the area Gumati river. However, in case poles are sited in that area TSECL shall try suitable design modification in the pole of 33kV line, like provision of spike guards, barbed wire fencing or any other arrangement and shall incorporate the same in any location, if required.
B	Chemical contamination from chemical maintenance techniques	TSECL does not use chemicals for forest clearance/ RoW maintenance.
	Poly-Chloro-Biphenyls (PCBs) in electrical equipment.	TSECL use mineral oil in electrical equipments. Specification of oil containing PCB less 2 mg/kg (non –detectable level) stated in the tender document.
C	Change in land use and population relocation due to towers/poles	TSECL does not acquire land for its transmission towers. It pays compensation for any crop loss and damage caused during its activities. TSECL allows regeneration and cultivation beneath the towers for Transmission Line (TL) around poles/ structures and lines.
	Induced secondary development during construction	TSECL operations are short-lived and do not induce secondary developments during construction.
	Erosion of soil and drainage along the cut and fill slopes in hilly areas	TSECL would ensure that all cut and fill slopes in TL/ Distribution Line (DL) are adequately protected using standard engineering practices including bio-engineering techniques wherever feasible. All drainage channels along or inside substations shall be trained and connected to main or existing drainage to avoid any erosion due to uncontrolled flow of water.

No	Potential Issues	Management Measures
D	Avian hazards from transmission/distribution lines and towers	Avian hazards mostly encountered in bird sanctuaries area and fly path of migratory bird predominantly related to nesting site. Although the incidence of avian hazards is rare due to the distance between the conductors. TSECL shall take all possible precaution to avoid these areas by careful route selection. However, bird guards are provided to prevent any avian hazards.
	Air craft hazards from transmission lines and towers	TSECL as per the requirement of IS 5613 of July'94 provides aviation markers, night-lights for easy identification of towers in notified/selected areas.
	Health and safety of worker/employee/community	During construction the health and safety aspects of workers and nearby community shall be implemented through contractors with due diligence and compliance of required regulation/guideline through a safety. TSECL uses best available technology for lines and do not cause any hazards to health and safety.
	Fire Hazards	Fire hazards are mostly occurred in forest area. However, TSECL uses state of art automatic tripping mechanism for its transmission/distribution and substations that disconnect the line in fraction of seconds to prevent fire hazards. The Forest Department also take precaution like maintaining fire line in the cleared forest area to avoid spread of fire.
		Firefighting instruments including fire extinguishers are kept in appropriate place for immediate action in case of any fire hazard.
	Pollution	Although pollution is not an issue with transmission/ distribution projects still TSECL will make efforts to further minimise it. Sites are cleared of all the leftover materials and debris to avoid any chance of pollution.
	GHG (SF_6 Gas)	Although leakage of SF6 is not a major issue, TSECL will make efforts to reduce the leakage through regular monitoring installing gas pressure monitor/ leak detectors in Circuit Breakers.

35 Other potential environmental and social issues/ concerns and their management measures are described in an EMP, a sample of which is in the Annex to the summary. It will be implemented during the execution of the project. Since many provisions of the EMP are to be implemented by the Contractor, to ensure its proper implementation and monitoring, the EMP forms a part of the contract document.

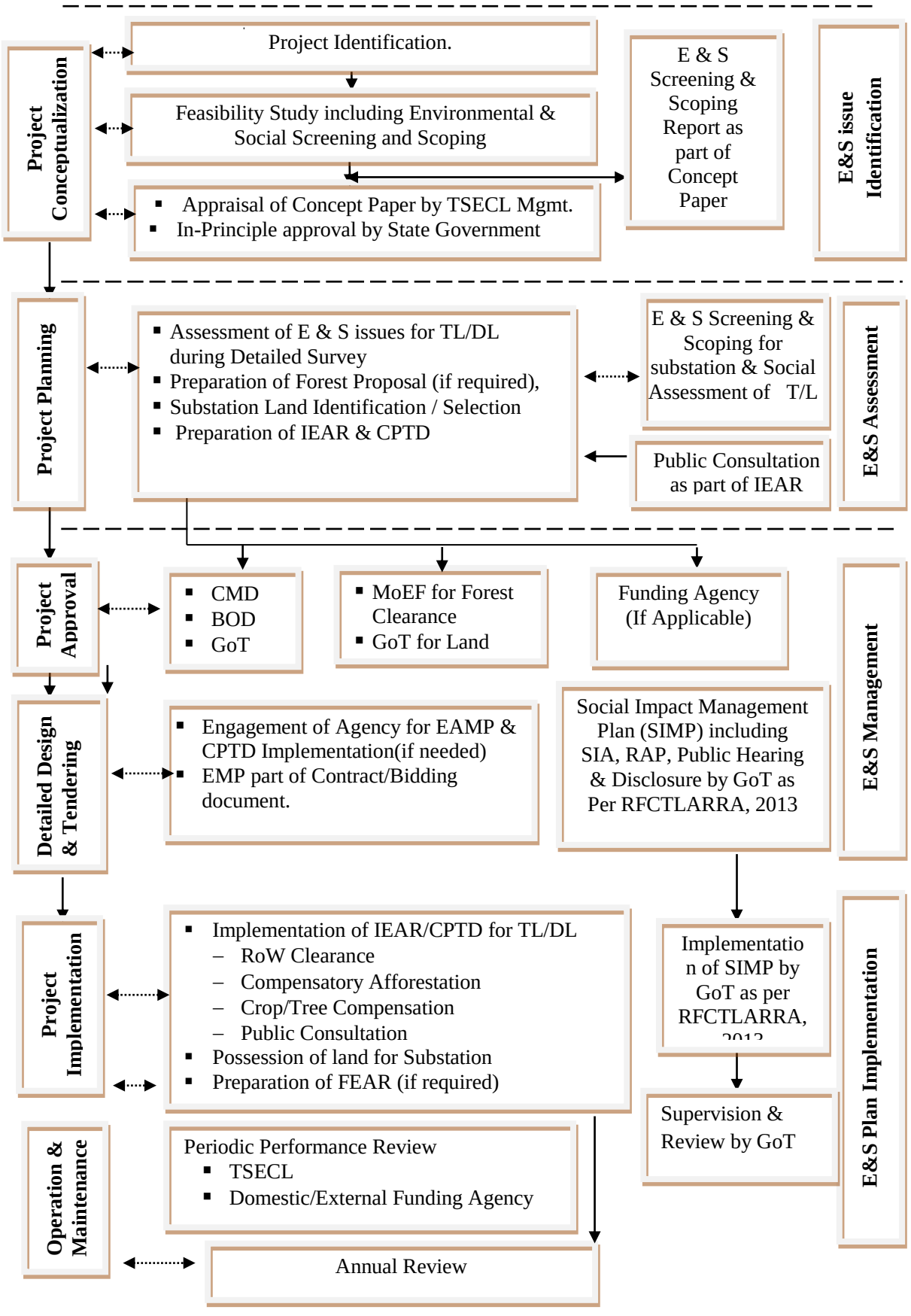
TSECL's Environment and Social Management Procedures (ESPP)

36 TSECL has developed comprehensive Environment and Social (E&S) management procedures and incorporated them to its project cycle, to ensure that its operation eliminates or minimizes adverse environmental and social impacts. The E&S management procedures identify the relevant issues at early stage of project cycle and follow the basic philosophy of sustainable development along with Principles of Avoidance, Minimization and Mitigation. These three guiding principles are employed in a project right from very beginning i.e. at the time of Project

conceptualization & Planning Stage by studying different alternatives line routes for selection of most optimum route to avoid involvement of forests/ biodiversity/Eco-sensitive zone including animal/bird path, protected areas, human habitations etc. to the extent possible. If necessary/required, tall towers are also provided to avoid/minimize the impact. In case it becomes unavoidable due to terrain and line route passes through protected areas additional studies would be conducted by independent agencies to ascertain the impacts and to plan management measures to minimize/mitigate such impacts. A Terms of Reference (ToR), for such assessment, which can be customized for a particular situation/ location/ concern has been prepared and is placed at Annexure-19 of the main report.

37 Likewise for substation land, TSECL identifies number of potential substation sites based on data collected as per the checklist (Annexure-15 of the main report) and a comprehensive analysis for each alternative site is carried out. The analysis considers various site specific parameters that includes infrastructure facilities such as access roads, railheads, type of land viz. Govt., revenue, private land, agricultural land; social impacts such as number of families getting affected; and cost of compensation and rehabilitation giving due weightage to each. Environmental & Social Management process dovetailed in project cycle for appropriate and timely action is outlined in Figure 2.

Figure – 2: Environment and Social Management Procedures



Environmental and Social Risk assessment

38 Environmental and Social Risk Assessment is a vital part of TSECL's environmental and social management strategies. The risk assessment process identifies existing risks, and forecast future potential risks in its power transmission/distribution projects. It is a scientific process that includes cost benefit analysis. The environment and social management procedures developed by TSECL evaluate these risks, both qualitatively and quantitatively, and prioritise them. Based on prioritisation, environment and social management options are selected. TSECL's Risk Management process involves risk preparedness, risk mitigation and the sharing of liabilities (via internal arrangements and insurance). Responsibilities in the event of occurrence of a risk have been illustrated in Table 7.

Table 7: TSECL's Risk Responsibility Framework

Risk	Government of Tripura (GoT)	TSECL	Contractor	Insurers
Non-compliance Regulatory	✓	✓	✓	-
Non-compliance Contractual	-	-	✓	-
Major hazards, e.g. tower fall during construction	-	✓	✓	✓
During O&M	-	✓	-	-
Impacts on health etc.	-	✓	-	-
Force Majeure: Insurable	-	-	-	✓
Force Majeure: Non-Insurable	✓	✓	-	-
Inclusion/ Exclusion of concerned Communities/ NGOs	✓	✓	-	-
Public Interest Litigation	✓	✓	-	-

Implementation Arrangements

39 To ensure quality and enabling organizational support structure for effective implementation of the ESPP, TSECL shall set out procedures and work culture which will promote total involvement of all its personnel. To attain assigned goal following shall be ensured:

- ✓ A coordinated system of functioning to be adopted by Corporate Planning who is the spokesperson of CMD/Chief Executive Officer (CEO) of TSECL .
- ✓ An emphasis on intra-departmental approach, demarcation of departmental responsibilities and the delegation of authority which will upshot quick response and amendment to change.
- ✓ A commitment to provide at all times the best possible time bound quality service in all areas of its operations.

40 TSECL's commitment to the ESPP shall have to be developed with these principles. To ensure effective implementation of its ESPP, TSECL will focus on:

- ✓ Strengthening the implementation of the ESPP by deploying specialist or redeployment of appropriately trained personnel at key levels;

- ✓ Placing dedicated manpower with specialization in the respective field to deal and manage the environment and social issues;
- ✓ Reinforcing in-house capabilities by working with specialized external agencies;
- ✓ Frequent/ regular review by higher management;
- ✓ Annual review of the ESPP implementation and problem faced to start with internally or through external agencies as necessary.
- ✓ A robust objective oriented M&E system tracking performance of key indicators.

Corporate office will have overall responsibility for construction, operation, and maintenance of transmission/ distribution systems apart from providing necessary support services.

41 For the NERPSIP, the implementing agency (IA) is POWERGRID with its mandate for design and implementation supervision for the project. In consultations with the states, it has put up a tiered structure as follows:

- **Central Project Implementation Unit (CPIU)** - A body responsible for coordinating the preparation and implementation of the project and shall be housed within the IA's offices at Guwahati. The "Project-In-Charge" of IA & Head of each of the SPCU shall be a member of CPIU.
- **State Project Coordination Unit (SPCU)** – A body formed by the Utility and responsible for coordinating with IA in preparing and implementing the project at the State level. It consist of experts across different areas from the Utility and shall be headed by an officer of the rank not below Chief Engineer, from TSECL.
- **PMC Project Implementation Unit (PPIU)** – A body formed by the IA, including members of TSECL on deputation, and responsible for implementing the Project across the State, with its personnel being distributed over work site & working in close association with the SPCU/ CPIU. PPIU report to State level "Project Manager" nominated by the Project-in-Charge of IA. The IA will have a Core team stationed at the CPIU on permanent basis and other PMC officers (with required skills) will visit as and when required by this core team.

Grievance Redressal Mechanism (GRM)

42 GRM has been made an integral part during planning, survey, implementation, operation and maintenance stage of the project. TSECL shall constitute a Grievance Redressal Committee (GRC) headed by Additional General Manager (AGM) to address the grievances that may arise during the planning, implementation and operation phases of the project. The GRC includes members from the utility which includes the AGM and others comprising of Local Administration, Village Panchayat Members, Affected Families representative and reputed persons from the society.

43 In case of transmission/ distribution line, GRM is built in the tree & crop compensation process where affected persons are given a chance to place their grievances after issuance of notice by revenue officials on the basis of assessment of actual damages. For substation and DTs (where land acquisition is involved), GRM is an integral part under the RFCTLARRA, 2013. Public hearings shall be held in the affected areas to bring out the main findings of the SIA, to seek feedback on the findings and to seek additional information and views for incorporating the same in the final documents. Detailed procedure of the same has been given under RFCTLARRA, 2013. TSECL will interact closely with the State authorities and district administration during implementation of SIMP.

Annex – Sample Environmental Management Plan

Project activity/ stage	Potential impact	Proposed mitigation measure	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule
Pre-construction						
Location of overhead line towers/ underground distribution lines and alignment & design	Exposure to safety related risks	Setback of dwellings to overhead line route designed in accordance with permitted level of power frequency and the regulation of supervision at sites.	Tower location and overhead/underground alignment selection with respect to nearest dwellings	Setback distances to nearest houses – once	Executing Agency (EA)	Part of overhead lines tower/laying of underground cable sitting survey and detailed alignment survey and design
Equipment specifications and design parameters	Release of chemicals and gases in receptors (air, water, land)	PCBs not used in substation transformers or other project facilities or equipment.	Transformer design	Exclusion of PCBs in transformers stated in tender specification - once	EA	Part of tender specifications for the equipment
		Processes, equipment and systems not to use chlorofluorocarbons (CFCs), including halon, and their use, if any, in existing processes and systems should be phased out and to be disposed of in a manner consistent with the requirements of the Government	Process, equipment and system design	Exclusion of CFCs stated in tender specification – once	EA	Part of tender specifications for the equipment
				Phase out schedule to be prepared in case still in use – once		Part of equipment and process design
Transmission/ Distribution line design	Exposure to electromagnetic interference	Line design to comply with the limits of electromagnetic interference from overhead power lines	Electromagnetic field strength for proposed line design	Line design compliance with relevant standards – once	EA	Part of design parameters
Substation location and design	Exposure to noise	Design of plant enclosures to comply with noise regulations.	Expected noise emissions based on substation design	Compliance with regulations - once	EA	Part of detailed siting survey and design

Project activity/ stage	Potential impact	Proposed mitigation measure	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule
	Social inequities	Careful selection of site to avoid encroachment of socially, culturally and archaeological sensitive areas (i. g. sacred groves, graveyard, religious worship place, monuments etc.)	Selection of substation location (distance to sensitive area).	Consultation with local authorities/ autonomous councils -once		Part of detailed siting survey and design
Location of overhead line towers/laying of underground distribution line & alignment and design	Impact on water bodies	Avoidance of such water bodies to the extent possible. Avoidance of placement of tower inside water bodies to the extent of possible	Tower location and overhead/underground line alignment selection (distance to water bodies)	Consultation with local authorities– once	EA	Part of tower sitting survey and detailed underground /overhead line alignment survey and design
	Social inequities	Careful route selection to avoid existing settlements and sensitive locations	Tower location and overhead/underground line alignment selection (distance to nearest dwellings or social	Consultation with local authorities/ autonomous councils and land owners – once	EA	Part of detailed tower sitting and overhead/undergrou nd alignment survey and design
		Minimise impact on agricultural land	Tower location and overhead/underground line alignment selection (distance to agricultural land)	Consultation with local authorities/ autonomous councils and land owners – once	EA	Part of detailed tower sitting and overhead/undergrou nd alignment survey and design
		Careful selection of site and route alignment to avoid encroachment of socially, culturally and archaeological sensitive areas (i. g. sacred groves, graveyard, religious worship place, monuments etc.)	Tower location and overhead/underground line alignment selection (distance to sensitive area)	Consultation with local authorities/ autonomous councils -once	EA	Part of detailed tower sitting and overhead/undergrou nd alignment survey and design

Project activity/ stage	Potential impact	Proposed mitigation measure	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule
Involuntary resettlement or land acquisition	Social inequities	Compensation paid for temporary/ permanent loss of productive land as per law of land and its process	R&R measures implementation*	Consultation with affected parties – once in a quarter	EA	Prior to construction phase
Encroachment into protected area/ precious ecological area	Loss of precious ecological values/ damage to precious species	Avoid encroachment such areas by careful site and alignment selection (National Parks, Wildlife Sanctuary, Biosphere Reserves/Biodiversity Hotspots)	Tower location and overhead/underground line alignment selection (distance to nearest designated ecological protected/ sensitive areas)	Consultation with local forest authorities - once	EA	Part of detailed siting and alignment survey /design
		Minimize the need by using RoW wherever possible	Tower location and overhead/underground line alignment selection	Consultation with local authorities and design engineers - once	EA	Part of detailed sitting and alignment survey /design
Line through identified Elephant corridor / Migratory bird	Damage to the Wildlife/ Birds and also to line	Study of earmarked elephant corridors to avoid such corridors, Adequate ground clearance, Fault clearing by Circuit Breaker, Barbed wire wrapping on towers, reduced spans etc., if applicable	Tower location and overhead/underground line alignment selection. Minimum/maximum ground clearance	Consultation with local forest authorities – once. Monitoring – quarterly basis	EA	Part of detailed sitting and alignment survey /design and Operation
		Avoidance of established/identified migration path (Birds & Bats). Provision of flight diverter/reflectors, elevated perches, insulating jumper loops, obstructive perch deterrents, raptor hoods etc., if applicable	Tower location and overhead/underground line alignment selection	Consultation with local forest authorities - once	EA	Part of detailed sitting and alignment survey /design and Operation

*** As per new act R & R is under the scope of State**

Project activity/ stage	Potential impact	Proposed mitigation measure	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule
Line through forestland	Deforestation and loss of biodiversity, edge effect	Avoid encroachment by careful site and alignment selection	Tower location and overhead/underground line alignment selection (distance to nearest protected or reserved forest)	Consultation with local authorities – once	EA	Part of detailed sitting and alignment survey/design
		Minimise the need by using existing towers, tall towers and RoW, wherever possible		Consultation with local authorities and design engineers – once		
		Measures to avoid invasion of alien species	Intrusion of invasive species	Consultation with local forest authorities - once		
		Obtain statutory clearances from the Government	Statutory approvals from Government	Compliance with regulations – once for each subproject		
		Consultation with autonomous councils wherever required	Permission/ NOC from autonomous councils	Consultation with autonomous councils – once during tower placement		
Encroachment into farmland	Loss of agricultural productivity	Use existing tower or footings wherever possible	Tower location and overhead/underground line alignment selection	Consultation with local authorities and design engineers – once	EA	Part of detailed alignment survey and design
		Avoid sitting new towers on farmland wherever feasible	Tower location and overhead/underground line alignment selection	Consultation with local authorities and design engineers – once		Part of detailed sitting and alignment survey /design

Project activity/ stage	Potential impact	Proposed mitigation measure	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule
		Farmers compensated for any permanent loss of productive land	Process of Crop/tree compensation in consultation with forest dept.(for timber yielding tree) and Horticulture deptt.(for fruit bearing tree)	Consultation with affected parties – once in a quarter		Prior to construction phase
		Farmers/landowners compensated for significant trees that need to be trimmed/ removed along RoW.	Process of tree compensation in consultation with Horticulture deptt.	Consultation with affected parties – once in a quarter		Prior to construction phase
			Statutory approvals for tree trimming /removal	Compliance with regulations – once for each subproject		Part of detailed sitting and alignment survey /design
Noise related	Nuisance to neighbouring properties	Substations sited and designed to ensure noise will not be a nuisance.	Noise levels	Noise levels to be specified in tender documents – once	EA	Part of detailed equipment design
Interference with drainage patterns/Irrigation channels	Flooding hazards/ loss of agricultural production	Appropriate sitting of towers to avoid channel interference	Tower location and overhead/underground line alignment selection (distance to nearest flood zone)	Consultation with local authorities and design engineers – once	EA	Part of detailed alignment survey and design
Escape of polluting materials	Environmental pollution	Transformers designed with oil spill containment systems, and purpose-built oil, lubricant and fuel storage system, complete with spill cleanup equipment.	Equipment specifications with respect to potential pollutants	Tender document to mention specifications – once	EA	Part of detailed equipment design /drawings

Project activity/ stage	Potential impact	Proposed mitigation measure	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule
		Substations to include drainage and sewage disposal systems to avoid offsite land and water pollution.	Substation sewage design	Tender document to mention detailed specifications – once	EA	Part of detailed substation layout and design /drawings
Equipments submerged under flood	Contamination of receptors	Substations constructed above the high flood level(HFL) by raising the foundation pad	Substation design to account for HFL (elevation with respect to HFL elevation)	Base height as per flood design- once	EA	Part of detailed substation layout and design /drawings
Explosions /Fire	Hazards to life	Design of substations to include modern fire fighting equipments Provision of fire fighting equipment to be located close to transformers.	Substation design compliance with fire prevention and control codes	Tender document to mention detailed specifications – once	EA	Part of detailed substation layout and design /drawings
Construction						
Equipment layout and installation	Noise and vibrations	Construction techniques and machinery selection seeking to minimize ground disturbance.	Construction techniques and machinery	Construction techniques and machinery creating minimal ground disturbance- once at the start of each construction phase	EA (Contractor through contract provisions)	Construction period
Physical construction	Disturbed farming activity	Construction activities on cropping land timed to avoid disturbance of field crops (within one month of harvest wherever possible).	Timing of start of construction	Crop disturbance – Post harvest as soon as possible but before next crop – once per site	EA (Contractor through contract provisions)	Construction period

Project activity/ stage	Potential impact	Proposed mitigation measure	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule
Mechanized construction	Noise, vibration and operator safety, efficient operation	Construction equipment to be well maintained.	Construction equipment – estimated noise emissions	Complaints received by local authorities – every 2 weeks	EA (Contractor through contract provisions)	Construction period
	Noise, vibration, equipment wear and tear	Turning off plant not in use.	Construction equipment – estimated noise emissions and operating schedules	Complaints received by local authorities – every 2 weeks	EA (Contractor through contract provisions)	Construction period
Construction of roads for accessibility	Increase in airborne dust particles	Existing roads and tracks used for construction and maintenance access to the line wherever possible.	Access roads, routes (length and width of new access roads to be constructed)	Use of established roads wherever possible – every 2 weeks	EA (Contractor through contract provisions)	Construction period
	Increased land requirement for temporary accessibility	New access ways restricted to a single carriageway width within the RoW.	Access width (meters)	Access restricted to single carriage –way width within RoW – every 2 weeks	EA (Contractor through contract provisions)	Construction period
Construction activities	Safety of local villagers	Coordination with local communities for construction schedules, Barricading the construction area and spreading awareness among locals	Periodic and regular reporting /supervision of safety arrangement	No. of incidents- once every week	EA (Contractor through contract provisions)	Construction period
	Local traffic obstruction	Coordination with local authority/ requisite permission for smooth flow of traffic	Traffic flow (Interruption of traffic)	Frequency (time span)- on daily basis	EA (Contractor through contract provisions)	Construction period

Project activity/ stage	Potential impact	Proposed mitigation measure	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule
Temporary blockage of utilities	Overflows, reduced discharge	Measure in place to avoid dumping of fill materials in sensitive drainage area	Temporary fill placement (m^3)	Absence of fill in sensitive drainage areas – every 4 weeks	EA (Contractor through contract provisions)	Construction period
Site clearance	Vegetation	Marking of vegetation to be removed prior to clearance, and strict control on clearing activities to ensure minimal clearance.	Vegetation marking and clearance control (area in m^2)	Clearance strictly limited to target vegetation – every 2 weeks	EA (Contractor through contract provisions)	Construction period
		No use of herbicides and pesticides				
Trimming /cutting of trees within RoW	Fire hazards	Trees allowed growing up to a height within the RoW by maintaining adequate clearance between the top of tree and the conductor as per the regulations.	Species-specific tree retention as approved by statutory authorities (average and maximum tree height at maturity, in meters)	Presence of target species in RoW following vegetation clearance – once per site	EA (Contractor through contract provisions)	Construction period
	Loss of vegetation and deforestation	Trees that can survive pruning to comply should be pruned instead of cleared.	Species-specific tree retention as approved by statutory authorities	Presence of target species in RoW following vegetation clearance – once per site	EA (Contractor through contract provisions)	Construction period
		Felled trees and other cleared or pruned vegetation to be disposed of as authorized by the statutory bodies.	Disposal of cleared vegetation as approved by the statutory authorities (area cleared in m^2)	Use or intended use of vegetation as approved by the statutory authorities – once per site	EA (Contractor through contract provisions)	Construction period
Wood/ vegetation harvesting	Loss of vegetation and	Construction workers prohibited from harvesting wood in the project area during their employment, (apart from locally	Illegal wood /vegetation harvesting (area in m^2, number of incidents	Complaints by local people or other evidence of illegal	EA (Contractor through	Construction period

Project activity/ stage	Potential impact	Proposed mitigation measure	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule
	deforestation	employed staff continuing current legal activities)	reported)	harvesting – every 2 weeks	contract provisions)	
Surplus earthwork/soil	Runoff to cause water pollution, solid waste disposal	Soil excavated from tower footings disposed of by placement along roadsides, or at nearby house blocks if requested by landowners	Soil disposal locations and volume (m^3)	Acceptable soil disposal sites – every 2 weeks	EA (Contractor through contract provisions)	Construction period
Substation construction	Loss of soil	Fill for the substation foundations obtained by creating or improving local water supply ponds or drains, with agreement of local communities	Borrow area sitting (area of site in m^2 and estimated volume in m^2)	Acceptable soil borrow areas that provide a benefit - every 2 weeks	EA (Contractor through contract provisions)	Construction period
	Water pollution	Construction activities involving significant ground disturbance (i.e. substation land forming) not undertaken during the monsoon season	Seasonal start and finish of major earthworks(P^H, BOD/ COD, Suspended solids, others)	Timing of major disturbance activities –prior to start of construction activities	EA (Contractor through contract provisions)	Construction period
Site clearance	Vegetation	Tree clearances for easement establishment to only involve cutting trees off at ground level or pruning as appropriate, with tree stumps and roots left in place and ground cover left undisturbed	Ground disturbance during vegetation clearance (area, m^2)	Amount of ground disturbance – every 2 weeks	EA (Contractor through contract provisions)	Construction period
			Statutory approvals	Statutory approvals for tree clearances – once for each site		
Tower erection disposal of surplus earthwork/fill	Waste disposal	Excess fill from tower foundation excavation disposed of next to roads or around houses, in agreement with the local community or landowner	Location and amount (m^3)of fill disposal	Appropriate fill disposal locations – every 2 weeks	EA (Contractor through contract provisions)	Construction period

Project activity/ stage	Potential impact	Proposed mitigation measure	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule
Storage of chemicals and materials	Contamination of receptors (land, water, air)	Fuel and other hazardous materials securely stored above high flood level.	Location of hazardous material storage; spill reports (type of material spilled, amount (kg or m^3) and action taken to control and clean up spill)	Fuel storage in appropriate locations and receptacles – every 2 weeks	EA (Contractor through contract provisions)	Construction period
Construction schedules	Noise nuisance to neighbouring properties	Construction activities only undertaken during the day and local communities informed of the construction schedule.	Timing of construction (noise emissions, [Db(A)])	Daytime construction only – every 2 weeks	EA (Contractor through contract provisions)	Construction period
Provision of facilities for construction workers	Contamination of receptors (land, water, air)	Construction workforce facilities to include proper sanitation, water supply and waste disposal facilities.	Amenities for Workforce facilities	Presence of proper sanitation, water supply and waste disposal facilities – once each new facility	EA (Contractor through contract provisions)	Construction period
Influx of migratory workers	Conflict with local population to share local resources	Using local workers for appropriate tasks	Avoidance/reduction of conflict through enhancement/ augmentation of resource requirements	Observation & supervision–on weekly basis	EA (Contractor through contract provisions)	Construction period
Encroachment into farmland	Loss of agricultural productivity	Use existing access roads wherever possible	Usage of existing utilities	Complaints received by local people /authorities - every 4 weeks	EA (Contractor through contract provisions)	Construction period
		Ensure existing irrigation facilities are maintained in working condition	Status of existing facilities			
		Protect /preserve topsoil and reinstate after construction completed	Status of facilities (earthwork in m^3)			

Project activity/ stage	Potential impact	Proposed mitigation measure	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule
		Repair /reinstate damaged bunds etc after construction completed	Status of facilities (earthwork in m^3)			
	Social inequities	Compensation for temporary loss in agricultural production	Implementation of Crop compensation (amount paid, dates, etc.)	Consultation with affected parties – once in a quarter	EA (Contractor through contract provisions)	Prior to construction
Uncontrolled erosion/silt runoff	Soil loss, downstream siltation	Need for access tracks minimised, use of existing roads.	Design basis and construction procedures (suspended solids in receiving waters; area re-vegetated in m^2; amount of bunds constructed [length in meter, area in m^2, or volume in m^3])	Incorporating good design and construction management practices – once for each site	EA (Contractor through contract provisions)	Construction period
		Limit site clearing to work areas				
		Regeneration of vegetation to stabilise works areas on completion (where applicable)				
		Avoidance of excavation in wet season				
		Water courses protected from siltation through use of bunds and sediment ponds				
Nuisance to nearby properties	Losses to neighbouring land uses/ values	Contract clauses specifying careful construction practices.	Contract clauses	Incorporating good construction management practices – once for each site	EA (Contractor through contract provisions)	Construction period
		As much as possible existing access ways will be used	Design basis and layout	Incorporating good design engineering practices– once for each site		

Project activity/ stage	Potential impact	Proposed mitigation measure	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule
		Productive land will be reinstated following completion of construction	Reinstatement of land status (area affected, m^2)	Consultation with affected parties – twice – immediately after completion of construction and after the first harvest		
	Social inequities	Compensation will be paid for loss of production, if any.	Implementation of Tree/Crop compensation (amount paid)	Consultation with affected parties – once in a quarter	EA	Prior to construction
Flooding hazards due to construction impediments of natural drainage	Flooding and loss of soils, contamination of receptors (land, water)	Avoid natural drainage pattern/ facilities being disturbed/blocked/ diverted by ongoing construction activities	Contract clauses (e.g. suspended solids and BOD/COD in receiving water)	Incorporating good construction management practices-once for each site	EA (Contractor through contract provisions)	Construction period
Equipment submerged under flood	Contamination of receptors (land, water)	Equipment stored at secure place above the high flood level(HFL)	Store room level to be above HFL (elevation difference in meters)	Store room level as per flood design-once	EA	Construction period
Inadequate siting of borrow areas (quarry areas)	Loss of land values	Existing borrow sites will be used to source aggregates, therefore, no need to develop new sources of aggregates	Contract clauses	Incorporating good construction management practices – once for each site	EA (Contractor through contract provisions)	Construction period
Health and safety	Injury and sickness of workers and members of the	Safety equipment's (PPEs) for construction workers Contract provisions specifying minimum requirements for construction camps	Contract clauses (number of incidents and total lost-work days caused by injuries and sickness)	Contract clauses compliance – once every quarter	EA (Contractor through contract	Construction period

Project activity/ stage	Potential impact	Proposed mitigation measure	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule
	public	Contractor to prepare and implement a health and safety plan.			provisions)	
		Contractor to arrange for health and safety training sessions				
Inadequate construction stage monitoring	Likely to maximise damages	Training of environmental monitoring personnel	Training schedules	Number of programs attended by each person – once a year	EA	Routinely throughout construction period
		Implementation of effective environmental monitoring and reporting system using checklist of all contractual environmental requirements	Respective contract checklists and remedial actions taken thereof.	Submission of duly completed checklists of all contracts for each site - once		
		Appropriate contact clauses to ensure satisfactory implementation of contractual environmental mitigation measures.	Compliance report related to environmental aspects for the contract	Submission of duly completed compliance report for each contract – once		
Operation and Maintenance						
Location of line towers and overhead/underground line alignment & design	Exposure to safety related risks	Setback of dwellings to overhead line route designed in accordance with permitted level of power frequency and the regulation of supervision at sites.	Compliance with setback distances ("as-built" diagrams)	Setback distances to nearest houses – once in quarter	EA	During operations
Line through identified bird flyways, migratory path	Injury/ mortality to birds, bats etc due to collision and electrocution	Avoidance of established/identified migration path (Birds & Bats). Provision of flight diverter/reflectors, elevated perches, insulating jumper loops, obstructive perch deterrents, raptor hoods etc., if applicable	Regular monitoring for any incident of injury/mortality	No. of incidents- once every month	EA	Part of detailed siting and alignment survey /design and Operation

Project activity/ stage	Potential impact	Proposed mitigation measure	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule
Equipment submerged under flood	Contamination of receptors (land, water)	Equipment installed above the high flood level (HFL) by raising the foundation pad.	Substation design to account for HFL ("as-built" diagrams)	Base height as per flood design – once	EA	During operations
Oil spillage	Contamination of land/nearby water bodies	Substation transformers located within secure and impervious sump areas with a storage capacity of at least 100% of the capacity of oil in transformers and associated reserve tanks.	Substation bunding (Oil sump) ("as-built" diagrams)	Bunding (Oil sump) capacity and permeability - once	EA	During operations
Inadequate provision of staff/workers health and safety during operations	Injury and sickness of staff /workers	Careful design using appropriate technologies to minimise hazards	Usage of appropriate technologies (lost work days due to illness and injuries)	Preparedness level for using these technologies in crisis – once each year	EA	Design and operation
		Safety awareness raising for staff.	Training/awareness programs and mock drills	Number of programs and percent of staff /workers covered – once each year		
		Preparation of fire emergency action plan and training given to staff on implementing emergency action plan				
		Provide adequate sanitation and water supply facilities	Provision of facilities	Complaints received from staff /workers every 2 weeks		
Electric Shock Hazards	Injury/ mortality to staff and public	Careful design using appropriate technologies to minimise hazards	Usage of appropriate technologies (number of injury incidents, lost work days)	Preparedness level for using these technology in crisis – once a month	EA	Design and Operation
		Security fences around substations	Maintenance of fences	Report on maintenance – every		

Project activity/ stage	Potential impact	Proposed mitigation measure	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule
		Barriers to prevent climbing on/ dismantling of transmission towers	Maintenance of barriers	2 weeks		
		Appropriate warning signs on facilities	Maintenance of warning signs			
		Electricity safety awareness raising in project areas	Training /awareness programs and mock drills for all concerned parties	Number of programs and percent of total persons covered – once each year	EA	
Operations and maintenance staff skills less than acceptable	Unnecessary environmental losses of various types	Adequate training in O&M to all relevant staff of substations & transmission/distribution line maintenance crews.	Training/awareness programs and mock drills for all relevant staff	Number of programs and percent of staff covered – once each year	EA	Operation
		Preparation and training in the use of O&M manuals and standard operating practices.				
Inadequate periodic environmental monitoring.	Diminished ecological and social values.	Staff to receive training in environmental monitoring of project operations and maintenance activities.	Training/awareness programs and mock drills for all relevant staff	Number of programs and percent of staff covered – once each year	EA	Operation
Equipment specifications and design parameters	Release of chemicals and gases in receptors (air, water, land)	Processes, equipment and systems using cholofluorocarbons (CFCs), including halon, should be phased out and to be disposed of in a manner consistent with the requirements of the Govt.	Process, equipment and system design	Phase out schedule to be prepared in case still in use – once in a quarter	EA	Operations
Transmission/ distribution line maintenance	Exposure to electromagnetic interference	Transmission/ distribution line design to comply with the limits of electromagnetic interference from overhead power lines	Required ground clearance (meters)	Ground clearance - once	EA	Operations

Project activity/ stage	Potential impact	Proposed mitigation measure	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule
	Fire hazard due to growth of tree/shrub /bamboo along RoW	Periodic pruning of vegetation to maintain requisite electrical clearance. No use of herbicides/pesticides	Requisite clearance (meters)	Assessment in consultation with forest authorities - once a year(pre-monsoon/post-monsoon	EA	Operations
Noise related	Nuisance to neighbouring properties	Substations sited and designed to ensure noise will not be a nuisance.	Noise levels (dB(A))	Noise levels at boundary nearest to properties and consultation with affected parties if any - once	EA	Operations