

Points to be added (not limited to) in Project Feasibility Study Report

Appendix - A

Add to Section 2(c):

Finding Object of the study contents and methodology

- Study objective
- Study content
- Details study content
- Implementation schedule of the study
- Project Implementation schedule
- Recommended Technology of the project
- Financing option of the project
- Concrete schedule and Risk of realization
- Project implementation map of the projected Grid network Development Area

Add after Section 2 (d) as

- e. Poverty situation
- f. Sex disaggregated data for target population & constraints faced by women.
- g. Population Coverage
- h. Indicate which issue lead to make project successful.
- i. Indicate which issues did not work well
- j. The effect / impact, adaption and specific mitigation measures there off
 - i. Other projects/existing installation
 - ii. Future disaster management, climate change
 - iii. Employment
 - iv. Regional disparity
 - v. Population
- k. Indications the magnitude and cost (Involvement of compensation, Rehabilitations /Resettlements).
- l. Sustainability of the Project Benefit.

Add to Section 3 (e):

- i) Demand record for last ten years.
- ii) Demand forecast of the project area up to 2050 across the country
- iii) Power Generation development plan

Add before Section 4 (a) as 4 (A) System Analyses:

4(A).1 Conducting Survey

4(A).2 System study condition

- Planning and Security Standards as per Electricity Grid Code-2019 (*section-4.4*)
- Target year up to 2041
- Last Transmission Network Development project in project area
- Demand assumption
- Loading condition of Transmission line and Power Transformer
- Transmission line and Substation capacity of the projected area
- Other condition for the system analysis

4(A).3 Power flow analysis

- Result of power flow analysis before implementation of the project
- Result of power flow from N-1 contingency analysis before implementation of the project
- Result of power flow analysis after implementation of the project (several years timeline)
- Result of power flow from N-1 contingency analysis after implementation of the project (several years timeline).

4(A).4 Finding fault level

- Condition for fault current analysis
- Result of fault current analysis
- Overview of the result of fault current analysis

4(A).5 Finding measure to reduce fault current level.

4(A).6 Power Supply capability.

- Finding Maximum Power that can be served before implementation of the Project.

- Finding Maximum Power that can be served after implementation of the Project.

4(A).7 Recommendations.

4(B) Technical feasibility of the project

4(B).1 Scope of the project

4(B).2 Transmission line project

- Selecting of the method for new (Overhead or Underground) transmission line
- Selection of Transmission Line Route.
- Preparation of Survey Data Report
- Selecting of Transmission line Tower.
- Selecting insulator and fittings
- Selecting of conductor, underground cable and Earth wire/OPGW.
- Evaluating transmission losses
- Re-conductoring work and cost (if any)
- Construction schedule.

4(B).3 Substation project

- Overview of Existing Grid substations in projected area.
- Selecting of Substation of project area.
- Selecting appropriate analysis of selecting AIS or GIS type substation. Such analysis not limited to technical, financial and land saving etc. areas
- Choose appropriate Indoor or Outdoor type substation with proper justification
- Select transformer size based on study
- Preparing GPS data & access plan of selected Substation sight Site plan
- Prepare Layout of the substation & Line termination
- Selection of Substation equipment of project area.
- Selection of Up- gradation of Substation Switch Gear, Protection equipment and ground Grid.
- Construction schedule

Add to Section 4(d):

- For each Transmission line, Construction cost should include
 - ✓ Material Cost (equipment and Tools, Plants & Spare parts)

- ✓ Installation Cost (Survey, Testing fee, Foundation, Erection, Testing and Commissioning)
 - ✓ Compensation for Right of Way (RoW) including tower footing compensation as per electricity act 2020, with details (required footing area, Mouza Rate etc)
 - ✓ Land area for tower footing
 - ✓ Latest mouza price for each tower footing area
- For Substation, Construction cost should include
 - ✓ Material Cost (equipment and Tools, Plants & Spare parts)
 - ✓ Installation Cost (Foundation, Erection, Testing and Commissioning)
 - ✓ Civil Works cost (Equipment Foundation, Control Room, Boundary Wall, Approach Road, Surface Drain, Security post, Laying Gravel, Chain Link Fence, Pump House etc.) with quantity & unit rate
 - ✓ Land Acquisition Cost (with land area and latest mouza price from DC office)
 - ✓ Land Development Cost with quantity and rate of
 - Land Filling Depth (in meter)
 - Land Filling (in cubic meter)
 - Slope Protection or retention wall as necessary (if any in square meter) &
 - Mechanical Compaction (if any in cubic meter)
 - ✓ Ansar Barrack (with floor area in square foot and unit rate)
 - ✓ Dormitory Building (if any, with floor area in square foot and unit rate)
- ✓ include For Bay Extension in existing Substation, Construction cost should
 - ✓ Material Cost(equipment and Tools, Plants & Spare parts)
 - ✓ Installation Cost (Foundation, Erection, Testing and Commissioning)
- Total Project Cost should clearly identify and include the following:
 - Capital costs:
 - ✓ Turnkey cost (Land development also include in Turn key cost), Land acquisition etc.
 - Recurrent/ Revenue costs:
 - ✓ Overhead Cost, CD, VAT, Other VAT, Other Taxes, IDC etc.
 - Contingency costs:
 - ✓ Price contingency & Physical contingency.

N.B.: Please show unit, quantity, per unit cost and total cost for each item.

Appendix C

Add to Section 5.1 (not limited to)

- Environmental & Social Baseline
 - ✓ Physical Environment
 - ✓ Ecological Resources
- Environmental & Social Impact & Mitigation Measures
 - ✓ Summary of Potential Impacts
 - ✓ Important Environmental Components
 - ✓ Impacts during Construction Phase
 - ✓ Social resettlement
 - ✓ Electric and Magnetic field intensities
 - ✓ Corona Noise
 - ✓ Radio Noise
 - ✓ Mitigation Measures
- Guideline for Environmental & Social consideration
 - ✓ Assessment of Environmental check list.
 - ✓ Outline of Environmental related law and regulation of Bangladesh
 - ✓ Details of Environmental impact assessment of Bangladesh require for the project
- Information Disclosure, Stakeholder Consultations and Participations
- Grievance Redress Mechanism
- Environmental and Social Management Plan
- Summary budget for associated EMP should be included, which should follow WB ESS9.
- Proper risk and sensitivity analysis regarding environmental and social perspective

Add to Section 6.2:

- Overall Economic situation of Bangladesh
- Economic situation of the project area

N.B. Also follow guidelines of Planning Commission, GoB regarding project feasibility study report and WB guidelines. Also include following issues (not limited to):

-

Topographic Survey

TECHNICAL SPECIFICATIONS

The work shall consist of the following:

1. A detailed Topographic survey has to be conducted using any methods or combination of methods like Electronic Total Station, DGPS, High precision Laser Distometer Etc. to achieve the required accuracy showing the correct shape of land, adjacent roads, boundaries, drains, overhead lines, all structures including foundations, pipes and cable trenched etc. with GPS co-ordinate.
2. Plot All data on Mouza map indicating Dag and katian and Land Owner Information details.
3. The data from topographic survey shall be available in (x.y.z) format in 3 m intervals for use in a sophisticated digital terrain model (DTM)
4. Survey shall be conducted systematically and sequentially from one end covering details of all features such as structures, buildings, utilities, existing roads, electric and telephone installations (both overhead and underground), post & pipe lines open drains, artificial/natural ponds, culverts, canals, fencing, tress (with type & girth). Oil and gas lines, boundary lines, wells, slushy areas, survey stones etc falling within the extent of survey with height and depth.
5. The features covered during survey shall be well defined by proper descriptions.
6. The details of tress with reference number, type, girth, etc. shall be furnished in excel format in soft copy. The girths of tress are to be measured at 1'm above ground level.
7. The survey output shall be accurate and shall be compatible for developing a digital terrain model of the ground using latest software and the DTM so developed should give a true replica of the ground.
8. All physical features such as buildings, monuments, burial grounds, places of worship posts, pipelines and their supports and clearance from ground level, existing roads and railway lines open nallahs, waterways, bridges, culverts, canals, OH lines and their clearance above ground level, fences, tress, cultivation, boundary lines, wells slushy areas, survey stones, etc. are to be located legibly and accurately in the map.
9. Transferring and establishment of necessary bench marks from nearby available benchmarks shall be under the scope of the consultant. Average depth of the proposed site from both highest flood level and nearby national highway shall be separately reported in the survey.
10. The scale to be adopted for preparing the map shall be 1:250 or as directed by the Engineer-in-Charge and the survey map is to be prepared in one or more number of sheets as required.
11. Equipment's required for the work such as total stations and all accessories to complete the work within the specified time are to be arranged by the consultant.

12. The entire manpower required, both technical and non-technical for carrying out the fieldwork and preparations of drawings are arranged by the consultant.
13. The field work and the plotting work are to be carried out strictly in accordance with the instructions of the Engineer-in-charge.
14. All stationery required for the work is to be arranged by the consultant.
15. Latest Auto cad version of topographical survey along with other relevant digital information shall be provided to the client.
16. A latest (collected during survey) time stamped high resolution (at least 1 meter per pixel) aerial image (From satellite or unmanned aerial vehicle/UAV) of each of the proposed substation site with site boundary & important feature marking shall be provided to the client.

Route Survey for Transmission line

1.1 FIXING OF ROUTE ALIGNMENT:

- 1.1.1 The alignment of the line route is carried out by survey using any methods or combination of methods like Drone based aerial survey, Electronic Total Station, DGPS and High precision Laser Distometer Etc. to achieve the required accuracy showing the correct shape of land, adjacent roads, boundaries, drains, overhead lines, railway track, highways, rivers/water bodies trees and all structures including foundations/power lines.
- 1.1.2 Equipment's required for the work such as total stations and all accessories to complete the work within the specified time are to be arranged by the consulting firm.
- 1.1.3 At least three route profile will be studied.
- 1.1.4 The following positions are fixed during this survey
- 1.1.4.1 Fixing of angle tower positions / Bending position of Underground cable
- 1.1.4.2 Finalizing of crossing points of major EHV lines (11 kV and above) & for underground cable details of the lines/ Crossing point for sewerage system, water or gas distribution system, telephone wire, fiber optics ,any electrical underground cable
- 1.1.4.3 Finalizing of crossing points of Railway Tracks & details of such points.
- 1.1.4.4 Finalizing of crossing points of major rivers & details of such points.
- 1.1.5 Measurements of the angles of deviation at all angle / section points are made. Resurvey of parts of the line route is done wherever it is possible to reduce the number of angle points and/ or the magnitude of the angles of deviation.
- 1.1.6 For the purpose of guidance, the angles of deviation of the different types of towers are as below:

Tower type	Used as	Angle of deviation
VDL	Suspension tower	Up to 1 degree
VD1	Heavy Suspension tower	Up to 3 degrees
VD25	Medium angle tower	Up to 25 degrees
VDT60	Large angle & dead end tower	Up to 60 degrees and Dead end
VDR	River-Crossing Suspension Tower	Up to 0 degrees
VDAX	River-Crossing Anchor Tower	Up to 35 degrees

Double Circuit Towers

Four Circuit Towers

Tower type	Used as	Angle of deviation
VQL	Suspension tower	Up to 1 degree

VQ1	Heavy Suspension tower	Up to 3 degree
VQ15	Small angle tower	Up to 15 degrees
VQ30	Medium angle tower	Up to 30 degrees
VQT60	Large angle & dead end tower	Up to 60 degrees and Dead end

Note: V shall be replace by the left most digit of voltage level. For example, in 230kV lines, V shall be replaced by 2 and hence VDL shall be 2DL.

For existing transmission lines, tower nomenclature shall be as mentioned in number plate/tower schedule.

- 1.1.7 The length of the line route is also measured. This is done with the use of survey chains or with the theodolite
- 1.1.8 When using survey chains for measuring the length of the line route, the chain should be kept horizontal in uneven or undulating land so that horizontal distances are measured and not the distances along the contours of the land.
- 1.1.9 A span is the part of the line between any two adjacent towers. A section is the portion of the line route with a single span or with a number of consecutive spans between two tension points with "VD25", "VDT60","VDAX", "VQ15", "VQ30" or "VQT60" type towers, as applicable.
- 1.1.10 The number of consecutive spans between two angle / section points shall not exceed 15(fifteen) in plain terrain and 10 (ten) spans in hilly terrain.
- 1.1.11 The length of any section of the line, i.e., between two angle/section points, shall not exceed 5 km in plain terrain and 3 km in hilly terrain. In case longer sections are available, then cut points / section points shall be provided by using "VD25" type tower.
- 1.1.12 If the terrain & line route permit, attempts can be made so that the section lengths are, as far as possible, in multiples of the basic span of the towers for the relevant voltage class.
- 1.1.13 The consultant shall propose feasible basic spans and design span. However, typical basic spans of PGCB's approved towers for various voltage level are as below:

Voltage Level	Basic Span
400 kV	375 meters
230 kV	380 meters
132 kV	330 meters

In case of existing transmission lines, spans shall be measured from survey data.

- 1.1.14. In case of Underground Cable, width of road under which the cable will pass, chainage, bridge lengths, bend radius of the Underground Cable, presence of any Gas line, sewerage line, pipeline etc. are required to be surveyed and shown in the route map drawing.
- 1.1.15. If any river crossings exist in the route, then the consultant shall propose whether any morphological study is required or not. The consultant shall also propose whether it is feasible to cross the river with overhead transmission line or with submarine cable.
- 1.1.16. Highest flood level data shall be collected along the route during fixing of route alignment.

1.2 CROSSING OF POWER LINES:

- 1.2.1 The crossing of existing power lines shall be at an angle as close to 90 degrees as possible. Higher voltage lines shall be over the lower voltage line during crossing.
- 1.2.2 The crossing of the new line over an existing power line is preferably done in the middle of the span between towers of existing power line where there is maximum sag of the conductor. When the line to be constructed is crossing another important EHV line for which shut down may be difficult, suspension towers in combination with angle / dead end towers, with extensions as required, may be used.
- 1.2.3 The crossing of the new line below an existing power line shall be done at locations where adequate ground clearance for the new line and the specified clearance from the existing power line are available. Such crossing shall preferably be in the mid span between towers /structures of the new power line, where there is maximum sag of the conductor, and near one of the towers of the crossing span of the existing line for taking advantage of the higher height of the conductors. These measures reduce the requirement of increasing the height of the existing line for obtaining the requisite clearance.

1.3 CROSSING OF THE TELECOMMUNICATION LINES:

- 1.3.1 The crossing of such lines should preferably be at 90 degrees, but an angle less than 60 degrees is not permissible

1.4 CROSSING OF RAILWAY TRACKS:

- 1.4.1 The angle of crossing should preferably be 90 degrees, but an angle of upto 60 degrees maybe permitted in special cases.
- 1.4.2 The crossing span shall be restricted to 300 meters or to 80% of the basic span of the towers of the relevant voltage class, whichever is less. Angle towers are to be provided on both sides.
- 1.4.3 The minimum distance of the towers of the crossing span from the center of the nearest railway track shall be equal to the height of the tower in meters above normal ground level plus 6 meters.
- 1.4.4 The crossing span over already electrified railway track shall be located at the middle of overhead equipment span supported by two adjacent traction masts/ structures. The distance between any of the crossing conductors of

the line and the nearest traction mast or structure under the most adverse conditions shall not be less than 6 meters.

- 1.4.5 As far as possible, higher levels of land on both sides of the railway track are preferred at crossings so that there is minimum requirement for increase in the height of the towers. One tower of the crossing span is located nearer to the Railway track for taking advantage of the higher height of the conductor on the tower.
- 1.4.6 The above paras give only the salient requirements prescribed in the Regulations for PowerLine Crossings of Railway Tracks issued by the Railway Board. The latest issue of the above Regulations may be referred to for further details.

1.5 CROSSING OF ROADS:

- 1.5.1 Transmission line crossings across National Highways and major roads shall preferably be at right angles or as near to 90 degrees as possible.
- 1.5.2 For crossing of National Highways and major roads in case of lines up to 230 kV, it is advisable to provide at least one angle / section tower in the crossing span for the purpose of ease during stringing. For 400 kV lines, angle / section towers are to be provided on both sides in such cases.
- 1.5.3 The towers supporting the crossing span shall be located outside the National Highway land.

1.6 RIGHT OF WAY:

- 1.6.1 The width of the right of way should be kept as per the provisions of the applicable part /section of the Power Grid Company of Bangladesh Ltd (PGCB) Practice for Design, Installation and Maintenance of Overhead Power Lines.
- 1.6.2 For lines up to 230 kV, recommends the following right of way widths taking into consideration the theoretical requirement of right of way and transport requirements of maintenance:

Transmission Voltage Recommended	Width of Right of Way
132 kV	28 meters
230 kV	40 meters

- 1.6.3 For 400 kV lines, the following right of way width, as per PGCB practice, shall be maintained taking into consideration the theoretical requirement of right of way and transport requirements of maintenance:

- 1.6.4

Transmission Voltage Recommended	Width of Right of Way
400 kV	46 meters

1.7 MAINTAINING STATUTORY CLEARANCES:

- 1.7.1 The minimum clearances defined below shall not be infringed at the specified maximum operating temperature of the phase conductor with the suspension insulators hanging vertically or deflected to any angle up to 70° from the vertical.

Description of Clearance - Minimum Clearance

Description	Unit	132kV	230kV	400kV
Ground (see note d)	(m)	7.0	8.0	9.0
Roads	(m)	8.0	9.0	14.0
Buildings, structures, walls or other objects on which a person can stand or against which he can lean a ladder (see note b)	(m)	5.0	7.0	8.0
Trees (see note c)	(m)	3.5	5.5	6.5
Shrubs	(m)	3.0	5.5	6.5
Railways (measured from railway track)	(m)	15.6	18.26	18.5
River Crossing	(m)	23.0	25.0	26.0

Notes:

- a. Clearances are measured to the nearest projection of an object.
- b. These clearances also apply to earthed metal clad buildings.
- c. Clearances applicable to trees under the transmission line and to trees adjacent to the line. Clearances also applicable to trees falling, towards the line with conductors hanging in a vertical plane.
- d. The clearance shall be measured from the highest flood level or ground level whichever is higher.

1.8 RIGHT OF WAY:

- 1.8.1 While carrying out preliminary survey in forest areas, permission of the local forest Authorities should be obtained for trimming / lopping of tree branches which obstruct the line of sight of the survey instrument. This is a mandatory requirement and any such above activity without permission can result in criminal proceedings.
- 1.8.2 While carrying out preliminary survey the proposal for crossing of forest area is to be submitted in the prescribed forms / formats to the Forest Department for obtaining the requisite clearance.

1.9 MEASUREMENT OF EARTH RESISTIVITY:

- 1.9.1 Measurements of earth resistivity shall be done along the route of the transmission line.

1.10 PLOTTING OF THE ROUTE ON THE MAP:

- 1.10.1 The line as surveyed shall be plotted on the G. T. sheet maps indicating all the angle points. The line as surveyed shall also be plotted AutoCAD indicating all the angle points, obstacles, power lines, houses, roads, rivers, canals, trees/garden/forest etc.
- 1.10.2 Total Station (TS) and GPS data shall be prepared at a grid of 5m x 5m (along the transmission line Survey width) with reference to nearby established BM (3-D pillar) Pillar of either Survey of Bangladesh (SoB) or

Publics Works Division of Bangladesh. Both reference shall not be used for the same line.

- 1.10.3 The survey will cover X,Y, Z (RL) values of each and every Ground Control Point (GCP), structures and any other significant physical features exists above the surface, backlines of water bodies detail Route etc.
- 1.10.4 The data from Route survey shall be available in (x.y.z) format in 5m x 5m grids for use in a sophisticated digital terrain model (DTM) along the Survey width mentioned below:

Voltage Level	Survey Width
132kV	30m (15m from the centre line either side)
230kV	50m (25m from the centre line either side)
400 kV	60m (30 m from the centre line either side)

The data from route survey shall be presented in the PGCB's QF-DGN-13 format.

- 1.10.5 Prepare detail cartographical mapping (on GIS platform) of surveyed data, elevation models (DTM and DEM) with existing land uses, water bodies. The scale to be adopted for preparing the map shall be 1:1000 or as directed by the Engineer-in-Charge and the survey map is to be prepared in one or more number of sheets as require.
 - 1.10.6 For underground cable mark all obstacle with it route profile.
 - 1.10.7 Provide Elevation Profile and updated Flood level data along the Route.
 - 1.10.8 The scale to be adopted for preparing the map shall be 1:1000 or as directed by the Engineer-in-Charge and the survey map is to be prepared in one or more number of sheets as required.
 - 1.10.9 The data from Route Survey shall be encoded as per the feature codes mentioned in the PGCB's QF-DGN-14 format.
 - 1.10.10 Comparison of at least three surveyed route shall be presented in the format given in Annexure-1 of Attachment-4.
 - 1.10.11 The highest flood level shall be provided along with the survey data report. Benchmark reference of the Flood level data and benchmark reference of RL shall be equal.
- 1.11 APPROVAL OF THE LINE ROUTE:
- 1.11.1 In case there are major deviations in the route as surveyed and the deviations are likely to affect the induced voltages in the telecommunication / railway signal calculated earlier, this route of the line is sent to the Engineer-In-charge for review and intimating acceptability.
 - 1.11.2 In the above mentioned circumstances, this route of the line as surveyed is resubmitted to the Engineer In charge for according approval.

Annexure-1 of Attachment-4

Summary of Route Survey

Sl.	Description	Description
1.	Route particulars	
	i) Length in km	
	ii) Angle Point	

	iii) Terrain (km)– (a) Plain (b) Hilly	
2.	Environmental impact	
	i) Towns in alignment	
	ii) Forest involvement	
	iii) Historical/Cultural monument	
	iv) Type of Flora & Fauna	
	v) Endangered species, if any	
3.	Major Crossings:	
	i) River (Nos.)	
	a. BIWTA Class I	
	b. BIWTA Class II	
	c. BIWTA Class III	
	d. BIWTA Class IV	
	ii) Power line (Nos.)	
	132kV	
	230kV	
	400kV	
	iii) Railway line(Nos.)	
	iv) National/State Highway/Road (Nos.)	
	v) Canal (Nos.)	
4.	Construction problems	
5.	O&M problems	

Power Line Crossing Details

Sl. No.	Existing Line Name	Voltage Rating	Crossing Point Distance from Starting Substation	Crossing Section AP-AP
1				
2				
3				

River Crossing Details

Sl. No.	River Name	River width	Crossing Point Distance from Starting Substation	Crossing Section AP-AP
1				
2				
3				

SURVEY DATA SUBMISSION FORMAT

Name of line:
 Date of Survey:
 Equipment Model:

Coordinate to be matched with Google Earth

Point No.	Easting	Northing	Elevation (PWD)	Height	Feature Code	Comments on Plan	Highest flood level
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
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35							

FEATURE CODE TABLE

Sl. No.	Feature Code	Feature Description
1	101	Line angle more than 25deg (Angle Points)
2	102	Line angle less than 3deg (Suspension and Heavy Suspension Tower points)
3	200	Null land/Paddy Field/Open Field/Ground
4	210	Graveyard, Crematorium
5	10	EP Line (below 11kV)
6	215	Playground/ School Field
7	220	Cantonment Area/Restricted Area
8	11	11kV Line
9	33	33kV Line
10	132	132kV T/L
11	230	230kV T/L
12	400	400kV T/L
13	450	<i>Telecommunication Line</i>
14	6	Building/Tin sheds/Homestead/Religious Buildings/ Historical Buildings/Educational Institutions
15	7	<i>Housing Plot/Residential Area</i>
16	8	<i>Factory/Industry</i>
17	20	Gas Pipe line
18	30	Sewerage Line, Drain
19	40	Garden
20	44	Trees/Bamboo bush
21	45	Reserve Forrest/Sanctuary
22	46	Forrest
23	47	Elephant Corridor/Bird Migration Corridor
24	18	Railway Line
25	50	Highway
26	60	Paka Road/Concrete Road/Asphalt Road
27	65	<i>Kacha/HBB Road/Mud Road</i>
28	90	Bridge
29	70	Ditch/Low Land
30	80	Pond/Hatchery
31	75	Khal/Canal
32	25	River (BIWTA Class-I)
33	26	River (BIWTA Class-II)
34	27	River (BIWTA Class-III)
35	28	River (BIWTA Class-IV)
36	99	Gantry
37	250	<i>Highest Flood Level</i>

Environmental and Social Impact Assessment

Environmental and social impact assessment (ESIA) is an instrument to identify and assess the potential environmental and social impacts of a proposed project, evaluate alternatives, and design appropriate mitigation, management, and monitoring measures in compliance with ESS1 and with further requirements of ESS3, ESS4, ESS8 and ESS9 of the World Bank. Where an environmental and social impact assessment is prepared as part of the environmental and social assessment, it will include the following:

1. Executive summary

Concise discusses significant findings and recommended actions

2. Legal and institutional framework

This chapter analyzes the legal and institutional framework for the project, within which the environmental and social assessment is carried out, including the issues set out in ESS1, paragraph 26. Compares the Borrower's existing environmental and social framework and the ESSs and identifies the gaps between them. Identifies and assesses the environmental and social requirements of any co-financiers.

3. Project Description

This part concisely describes the proposed project and its geographic, environmental, social, and temporal context, including any offsite investments that may be required (e.g., dedicated pipelines, access roads, power supply, water supply, housing, and raw material and product storage facilities), as well as the project's primary suppliers. Through consideration of the details of the project, indicates the need for any plan to meet the requirements of ESS1 through 10. Includes a map of sufficient detail, showing the project site and the area that may be affected by the project's direct, indirect, and cumulative impacts.

4. Baseline Data

This sets out in detail the baseline data that is relevant to decisions about project location, design, operation, or mitigation measures. This should include a discussion of the accuracy, reliability, and sources of the data, as well as information about dates surrounding project identification, planning, and implementation. Identifies and estimates the extent and quality of available data, key data gaps, and uncertainties associated with predictions. Based on current information, assesses the scope of the area to be studied and describes relevant physical, biological, and socioeconomic conditions, including any changes anticipated before the project commences. Takes into account current and proposed development activities within the project area but not directly connected to the project.

5. Environmental And Social Risks and Impacts

This section takes into account all relevant environmental and social risks and impacts of the project. This will include the environmental and social risks and impacts specifically identified in ESSs2–8, and any other environmental and social risks and impacts arising as a consequence of the specific nature and context of the project, including the risks and impacts identified in ESS1, paragraph 28.

6. *Mitigation measures*

Identifies mitigation measures and significant residual negative impacts that cannot be mitigated and, to the extent possible, assess the acceptability of those residual negative impacts. It also identifies differentiated measures so that adverse impacts do not fall disproportionately on the disadvantaged or vulnerable.

Assesses the feasibility of mitigating the environmental and social impacts; the capital and recurrent costs of proposed mitigation measures, and their suitability under local conditions; the institutional, training, and monitoring requirements for the proposed mitigation measures. Specifies issues that do not require further attention, providing the basis for this determination.

7. *Analysis of alternatives*

Systematically compares feasible alternatives to the proposed project site, technology, design, and operation—including the "without project" situation—in terms of their potential environmental and social impacts. Assesses the alternatives' feasibility of mitigating the environmental and social impacts; the capital and recurrent costs of alternative mitigation measures, and their suitability under local conditions; the institutional, training, and monitoring requirements for the alternative mitigation measures. For each of the alternatives, quantifies the environmental and social impacts to the extent possible, and attaches economic values where feasible.

8. *Design measures*

Sets out the basis for selecting the particular project design proposed and specifies the applicable EHSs, or if the ESHs are determined to be inapplicable, justifies recommended emission levels and approaches to pollution prevention and abatement that are consistent with GIIP.

*Biodiversity 9. **Management Plan: A Biodiversity Management Plan (BMP):** typically includes key biodiversity objectives, activities to achieve the objectives, an implementation schedule, institutional and gender-inclusive responsibilities, and cost and resourcing estimates. The plan shall follow the World Bank ESS6 Guidelines and be applicable to all projects that potentially affect biodiversity or habitats, either positively or negatively, directly or indirectly, or that depend upon biodiversity for their success. Indicative content for such a plan may include the following:*

This needs to be carried out, along with any specific project requirements needed to achieve the intended BMP objectives. BMP activities may include, for example, new or expanded protected areas; site-specific habitat restoration, enhancement, or improved management; community benefit-sharing; livelihood restoration activities (to mitigate any negative socioeconomic impacts from newly restricted access to natural resources, in accordance with ESS5); species specific management interventions; monitoring of project implementation or biodiversity outcomes; or support for increased financial sustainability of conservation actions.

This part includes the company policy or national and international environmental standards/legislations implementing entities need to follow to achieve BMP objectives, such as biodiversity-related prohibitions or specific restrictions for civil works contractors and project workers. These may cover, for example, the clearing or burning of natural vegetation; off-road driving; hunting and fishing; wildlife capture and plant collection; purchase of bushmeat or other wildlife products; free-roaming pets (which can harm or conflict with wildlife); and/or firearms

possession. Seasonal or time-of-day restrictions may also be needed to minimize adverse biodiversity impacts during construction or operation. Examples include (i) limiting blasting or other noisy activities to the hours of the day when wildlife are least active; (ii) timing of construction to prevent disturbance during the nesting season for birds of conservation interest; (iii) timing of reservoir flushing to avoid harming key fish-breeding activities; or (iv) curtailment of wind turbine operation during peak bird migration periods.

1. Budget Analysis

Appendices

- I. Tree Management Plan (including associated budget plan)
- II. Biodiversity Management Plan
- III. List of the individuals or organizations that prepared or contributed to the environmental and social assessment.
- IV. References—set out the written materials, both published and unpublished, that have been used.
- V. Record of meetings, consultations, and surveys with stakeholders, including those with affected people and other interested parties. The record specifies the means of such stakeholder engagement that were used to obtain the views of affected people and other interested parties.
- VI. Tables presenting the relevant data referred to or summarized in the main text.
- VII. List of associated reports or plans.

Resettlement Action Plan (ESS5)

This report describes the elements of the plans addressing physical and/or economic displacement described in ESS5, which was enabled by Environmental and Social Framework (ESF) of World Bank from 2018. Resettlement action plans include measures to address physical and/or economic displacement, depending on the nature of the impacts expected from a project. This report outlines the framework referred to ESS5.

The scope of requirements and level of detail of the resettlement plan vary with the magnitude and complexity of resettlement. The plan is based on up-to-date and reliable information about (a) the proposed project and its potential impacts on the displaced persons and other adversely affected groups, (b) appropriate and feasible mitigation measures, and (c) the legal and institutional arrangements required for effective implementation of resettlement measures.

Minimum Elements of a Resettlement Plan

Description of the project

General description of the project and identification of the project area.

Potential impacts

Identification of: (a) The project components or activities that give rise to displacement, explaining why the selected land must be acquired for use within the time frame of the project; (b) The zone of impact of such components or activities; (c) The scope and scale of land acquisition and impacts on structures and other fixed assets; (d) Any project-imposed restrictions on use of, or access to, land or natural resources; (e) Alternatives considered to avoid or minimize displacement and why those were rejected; and (f) The mechanisms established to minimize displacement, to the extent possible, during project implementation.

Objectives

The main objectives of the resettlement program.

Census survey and baseline socioeconomic studies

The findings of a household-level census identifying and enumerating affected persons, and, with the involvement of affected persons, surveying land, structures, and other fixed assets to be affected by the project. The census survey also serves other essential functions: (a) Identifying characteristics of displaced households, including a description of production systems, labor, and household organization; and baseline information on livelihoods (including, as relevant, production levels and income derived from both formal and informal economic activities) and standards of living (including health status) of the displaced population; (b) Information on vulnerable groups or persons for whom special provisions may have to be made; (c) Identifying public or community infrastructure, property or services that may be affected; (d) Providing a basis for the design of, and budgeting for, the resettlement program; (e) In conjunction with establishment of a cut-off date, providing a basis for excluding ineligible people from compensation and resettlement assistance;

and (f) Establishing baseline conditions for monitoring and evaluation purposes. As the Bank may deem relevant, additional studies on the following subjects may be required to supplement or inform the census survey: (g) Land tenure and transfer systems, including an inventory of common property natural resources from which people derive their livelihoods and sustenance, nontitle-based usufruct systems (including fishing, grazing, or use of forest areas) governed by local recognized land allocation mechanisms, and any issues raised by different tenure systems in the project area; (h) The patterns of social interaction in the affected communities, including social networks and social support systems, and how they will be affected by the project; and (i) Social and cultural characteristics of displaced communities, including a description of formal and informal institutions (e.g., community organizations, ritual groups, nongovernmental organizations (NGOs)) that may be relevant to the consultation strategy and to designing and implementing the resettlement activities.

Legal framework

The findings of an analysis of the legal framework, covering: (a) The scope of the power of compulsory acquisition and imposition of land use restriction and the nature of compensation associated with it, in terms of both the valuation methodology and the timing of payment; (b) The applicable legal and administrative procedures, including a description of the remedies available to displaced persons in the judicial process and the normal time frame for such procedures, and any available grievance redress mechanisms that may be relevant to the project; (c) Laws and regulations relating to the agencies responsible for implementing resettlement activities; and (d) Gaps, if any, between local laws and practices covering compulsory acquisition, imposition of land use restrictions and provision of resettlement measures and ESS5, and the mechanisms to bridge such gaps.

Institutional framework

The findings of an analysis of the institutional framework covering: (a) The identification of agencies responsible for resettlement activities and NGOs/CSOs that may have a role in project implementation, including providing support for displaced persons; (b) An assessment of the institutional capacity of such agencies and NGOs/CSOs; and (c) Any steps that are proposed to enhance the institutional capacity of agencies and NGOs/CSOs responsible for resettlement implementation.

Eligibility

Definition of displaced persons and criteria for determining their eligibility for compensation and other resettlement assistance, including relevant cut-off dates.

Valuation of and compensation for losses

The methodology to be used in valuing losses to determine their replacement cost; and a description of the proposed types and levels of compensation for land, natural resources, and other assets under local law and such supplementary measures as are necessary to achieve replacement cost for them.

Community participation

Involvement of displaced persons (including host communities, where relevant): (a) A description of the strategy for consultation with, and participation of, displaced persons in the design and implementation of the resettlement activities; (b) A summary of the views expressed and how these views were taken into account in preparing the resettlement plan; (c) A review of the resettlement alternatives presented and the choices made by displaced persons regarding options available to them; and (d) Institutionalized arrangements by which displaced people can communicate their concerns to project authorities throughout planning and implementation, and measures to ensure that such vulnerable groups as Indigenous Peoples, ethnic minorities, the landless, and women are adequately represented.

Implementation schedule

An implementation schedule providing anticipated dates for displacement, and estimated initiation and completion dates for all resettlement plan activities. The schedule should indicate how the resettlement activities are linked to the implementation of the overall project.

Costs and budget

Tables showing categorized cost estimates for all resettlement activities, including allowances for inflation, population growth, and other contingencies; timetables for expenditures; sources of funds; and arrangements for timely flow of funds, and funding for resettlement, if any, in areas outside the jurisdiction of the implementing agencies.

Grievance redress mechanism

The plan describes affordable and accessible procedures for third party settlement of disputes arising from displacement or resettlement; such grievance mechanisms should take into account the availability of judicial recourse and community and traditional dispute settlement mechanisms.

Monitoring and evaluation

Arrangements for monitoring of displacement and resettlement activities by the implementing agency, supplemented by third-party monitors as considered appropriate by the Bank, to ensure complete and objective information; performance monitoring indicators to measure inputs, outputs, and outcomes for resettlement activities; involvement of the displaced persons in the monitoring process; evaluation of results for a reasonable period after all resettlement activities have been completed; using the results of resettlement monitoring to guide subsequent implementation.

Arrangements for adaptive management

The plan should include provisions for adapting resettlement implementation in response to unanticipated changes in project conditions, or unanticipated obstacles to achieving satisfactory resettlement outcomes.

Additional Planning Requirements Where Resettlement Involves Physical Displacement

When project circumstances require the physical relocation of residents (or businesses), resettlement plans require additional information and planning elements. Additional requirements include:

Transitional assistance

The plan describes assistance to be provided for relocation of household members and their possessions (or business equipment and inventory). The plan describes any additional assistance to be provided for households choosing cash compensation and securing their own replacement housing, including construction of new housing. If planned relocation sites (for residences or businesses) are not ready for occupancy at the time of physical displacement, the plan establishes a transitional allowance sufficient to meet temporary rental expenses and other costs until occupancy is available.

Site selection, site preparation, and relocation

When planned relocation sites are to be prepared, the resettlement plan describes the alternative relocation sites considered and explains sites selected, covering:

- a) Institutional and technical arrangements for identifying and preparing relocation sites, whether rural or urban, for which a combination of productive potential, locational advantages, and other factors is better or at least comparable to the advantages of the old sites, with an estimate of the time needed to acquire and transfer land and ancillary resources;
- b) Identification and consideration of opportunities to improve local living standards by supplemental investment (or through establishment of project benefit-sharing arrangements) in infrastructure, facilities, or services;
- c) Any measures necessary to prevent land speculation or influx of ineligible persons at the selected sites;
- d) Procedures for physical relocation under the project, including timetables for site preparation and transfer; and
- e) Legal arrangements for regularizing tenure and transferring titles to those resettled, including provision of security of tenure for those previously lacking full legal rights to land or structures.

Housing, infrastructure, and social services

Plans to provide (or to finance local community provision of) housing, infrastructure (e.g., water supply, feeder roads), and social services (e.g., schools, health services); plans to maintain or provide a comparable level of services to host populations; any necessary site development, engineering, and architectural designs for these facilities.

Environmental protection and management

A description of the boundaries of the planned relocation sites; and an assessment of the environmental impacts of the proposed resettlement and measures to mitigate and manage these impacts (coordinated as appropriate with the environmental assessment of the main investment requiring the resettlement).

Consultation on relocation arrangements

The plan describes methods of consultation with physically displaced persons on their preferences regarding relocation alternatives available to them, including, as relevant, choices related to forms of compensation and transitional assistance, to relocating as individual households, families, or with preexisting communities or kinship groups, to sustaining existing patterns of group organization, and for relocation of, or retaining access to, cultural property (e.g., places of worship, pilgrimage centers, cemeteries).

Integration with host populations

Measures to mitigate the impact of planned relocation sites on any host communities, including:

- (a) Consultations with host communities and local governments;
- (b) Arrangements for prompt tendering of any payment due the hosts for land or other assets provided in support of planned relocation sites;
- (c) Arrangements for identifying and addressing any conflict that may arise between those resettled and host communities; and
- (d) Any measures necessary to augment services (e.g., education, water, health, and production services) in host communities to meet increased demands upon them, or to make them at least comparable to services available within planned relocation sites.

Additional Planning Requirements Where Resettlement Involves Economic Displacement

If land acquisition or restrictions on use of, or access to, land or natural resources may cause significant economic displacement, arrangements to provide displaced persons with sufficient opportunity to improve, or at least restore, their livelihoods are also incorporated into the resettlement plan, or into a separate livelihoods' improvement plan. These include:

Direct land replacement

For those with agricultural livelihoods, the resettlement plan provides for an option to receive replacement land of equivalent productive value, or demonstrates that sufficient land of equivalent value is unavailable. Where replacement land is available, the plan describes methods and timing for its allocation to displaced persons.

Loss of access to land or resources

For those whose livelihood is affected by loss of land or resource use or access, including common property resources, the resettlement plan describes means to obtain substitutes or alternative resources, or otherwise provides support for alternative livelihoods.

Support for alternative livelihoods

For all other categories of economically displaced persons, the resettlement plan describes feasible arrangements for obtaining employment or for establishing a business, including provision of relevant supplemental assistance including skills training, credit, licenses or permits, or specialized

equipment. As warranted, livelihood planning provides special assistance to women, minorities, or vulnerable groups who may be disadvantaged in securing alternative livelihoods.

Consideration of economic development opportunities

The resettlement plan identifies and assesses any feasible opportunities to promote improved livelihoods as a result of resettlement processes. This may include, for example, preferential project employment arrangements, support for development of specialized products or markets, preferential commercial zoning and trading arrangements, or other measures. Where relevant, the plan should also assess the feasibility of prospects for financial distributions to communities, or directly to displaced persons, through establishment of project-based benefit-sharing arrangements.

Transitional support

The resettlement plan provides transitional support to those whose livelihoods will be disrupted. This may include payment for lost crops and lost natural resources, payment of lost profits for businesses, or payment of lost wages for employees affected by business relocation. The plan provides that the transitional support continues for the duration of the transition period.

Labor Management Procedures (ESS2)

This plan should be in compliance with World Bank ESS2. The labor management procedures help to identify the different types of project workers that are likely to be involved in the project, and set out the ways of meeting the requirements of ESS2 that apply to the different types of workers.

Overview of Labor Use

This section describes the following, based on available information: number of project workers, characteristics of project workers, timing of labor requirements, contracted workers, migrant workers.

Assessment of key potential labor risks

This section describes the following, based on available information. The key labor risks which may be associated with the project (for example, those identified in ESS2). These could include, for example: the conduct of hazardous work, such as working at heights or in confined spaces, use of heavy machinery, or use of hazardous materials Likely incidents of child labor or forced labor, with reference to the sector or locality Likely presence of migrants or seasonal workers Risks of labor influx or gender based violence Possible accidents or emergencies, with reference to the sector or locality General understanding and implementation of occupational health and safety requirements .

Brief Overview of Labor Legislation

a) Terms and conditions

This section sets out the key aspects of national labor legislation with regards to term and conditions of work, and how national legislation applies to different categories of workers identified in Section (a). The overview focuses on legislation which relates to the items set out in ESS2, paragraph 11 (i.e., wages, deductions and benefits). This section will include a gap analysis with ESS2.

b) Occupational Health and Safety

This section sets out the key aspects of the national labor legislation with regards to occupational health and safety, and how national legislation applies to the different categories of workers.

Responsible Staff

This section identifies the functions and/or individuals within the project responsible for (as relevant): engagement and management of project workers, engagement and management of contractors/subcontractors, occupational health and safety (OHS), training of workers and addressing worker grievances

Policies and Procedures

This section sets out information on OHS, reporting and monitoring and other general project policies. Where relevant, it identifies applicable national legislation. A Code of Conduct will be elaborated as part of the procedures. A code of Conduct for the workers and employers shall be developed for the Project, where it should emphasize labor, Health and Safety, environmental and

social issues, including gender-based violence (GBV) and violence against children. The Code of Conduct should be a summary document, written in simple language. It should be available in local language and, if applicable, in English, and should be explained orally to the worker in the local languages of the subproject region prior to signing.

A COVID-19 Prevention and mitigation policies and procedures will be included in this section.

Age of employment

This section sets out details regarding: (i) the minimum age for employment on the project (ii) the process that will be followed to verify the age of project workers (iii) the procedure that will be followed if underage workers are found working on the project (iv) the procedure for conducting risk assessments for workers aged between the minimum age and 18.

Terms and Conditions

This section sets out details regarding:

Specific wages, hours and other provisions that apply to the project; maximum number of hours that can be worked on the project; any collective agreements that apply to the project. When relevant, provide a list of agreements and describe key features and provisions Other specific terms and conditions

Grievance Mechanism

This section sets out details of the grievance mechanism that will be provided for direct and contracted workers, and describes the way in which these workers will be made aware of the mechanism. To avoid the risk of stigmatization, exacerbation of the mental/psychological harm and potential reprisal, the grievance mechanism shall have a different and sensitive approach to Gender based violence, sexual exploitation and abuse and sexual harassment related cases.

Contractor Management

This section sets out details regarding: The selection process for contractors; the contractual provisions that will put in place relating to contractors for the management of labor issues, including occupational health and safety; the procedure for managing and monitoring the performance of contractors.

Community Workers

Where community workers will be involved in the project, this section sets out details of the terms and conditions of work, and identifies measures to check that community labor is provided on a voluntary basis, Primary Supply Workers: Where a significant risk of child or forced labor or serious safety issues in relation to primary suppliers has been identified, this section sets out the procedure for monitoring and reporting on primary supply workers.

Stakeholder Engagement Plan (ESS10)

The Stakeholder Engagement Plan (SEP) will be developed and implemented in consultation with the Bank proportionate to the nature and scale of the project and its potential risks and impacts. A draft of the SEP will be disclosed as early as possible, and before project appraisal, and the Borrower. The SEP will describe the timing and methods of engagement with stakeholders throughout the life cycle of the project as agreed between Bank and Borrower, distinguishing between project-affected parties and other interested parties. The SEP will also describe the range and timing of information to be communicated to project-affected parties and other interested parties, as well as the type of information to be sought from them. This report shall be in compliance with the World Bank ESS10 and include the following headings (as minimum):

Introduction

Elements/process for the stakeholder engagement plan and consultations

a) Stakeholder Identification and mapping

This includes identification of all potential stakeholders at the initial/pre-preparatory stages of the Project, stakeholder mapping process, prioritization of identified stakeholders etc.

b) Methodology of engagement

Identifying nodes of project life cycle for engagement

Planned Stakeholder Engagement Program

The SEP will describe the timing and methods of engagement with stakeholders throughout the life cycle of the project as agreed between Bank and Borrower, distinguishing between project-affected parties and other interested parties. The SEP will also describe the range and timing of information to be communicated to project-affected parties and other interested parties, as well as the type of information to be sought from them.

Meaningful Consultation

Meaningful consultation is carried out in a manner that provides stakeholders with opportunities to express their views on project risks, impacts, and mitigation measures, and allows the Borrower to consider and respond to them. Meaningful consultation will be carried out on an ongoing basis as the nature of issues, impacts, and opportunities evolves.

Grievance Management Mechanism

The grievance mechanism will be proportionate to the potential risks and impacts of the project and will be accessible and inclusive. Where feasible and suitable for the project, the grievance mechanism will utilize existing formal or informal grievance mechanisms, supplemented as needed with project-specific arrangements.

Implementation Responsibilities and Budget

This section includes the details of designated qualified staff to design, implement, and monitor stakeholder engagement activities and, if necessary, considers support from the staff with external expert assistance. The number of staff should be proportionate to the nature of the project and the types and levels of risks and impacts that are anticipated.

Monitoring and Reporting

Appendices

I. Grievance Mechanism

The grievance mechanism may include the following:

- (a) Different ways in which users can submit their grievances, which may include submissions in person, by phone, text message, mail, e-mail or via a website;
- (b) A log where grievances are registered in writing and maintained as a database;
- (c) Publicly advertised procedures, setting out the length of time users can expect to wait for acknowledgment, response, and resolution of their grievances;
- (d) Transparency about the grievance procedure, governing structure, and decision-makers;
and
- (e) An appeals process (including the national judiciary) to which unsatisfied grievances may be referred when resolution of grievance has not been achieved.