

## SCOPE OF WORK FOR

### Construction of ~~or diversion of~~ -220- KV Transmission Line:

Sl. No.	Description of Line	Type & Configuration of conductors proposed/Used	Line Length in Km
1	<b>220 KV LILO Transmission line from existing 220KV Atri-Narendrapur DC line(Ckt-II) to proposed 220/33KV Sub-station at Mundamba, Khurda (Approx Line Length = 8KM)</b>	ACSR Zebra	08.0 (Route KM)

- (a) Type of Tower & Line: Type: Lattice ~~or Monopole~~ --220 KV & D/C ~~or S/C~~ Line with D/C Tower.
- (b) Line Length: 08.0 Route KM
- (c) Detail location of Line: ~~Origin:----- & Termination:-----~~ Mentioned above
- (d) Nos. of Tower: (i) Tangent: 12 Nos. (ii) Angle: 15 Nos.
- (e) Type of Structure: Hot Dip Galvanised -Mild Steel (HT & Non-HT)
- (f) Type of Insulator: Long Rod or Disc (Antifog/~~Non-Antifog~~): Porcelain ~~or Composite~~.
- (g) Conductor: ACSR-Zebra ~~or AAAC~~ ~~or HTLS~~
- (h) Earth wire: OPGW ~~or HDG MS Earth wire~~.

### 1.0 General Information:

Purpose of the project: The proposed Transmission line shall connect between ----- & ----- Grid Sub-station or ~~required for line diversion from ----- location to ----- location (at ----- (name of the village/town))~~. This shall improve the power quality in and around Mundamba area. This project will be beneficial to the public as well as industrial Hubs of **upcoming IDCO Industrial Park** area of Khurda and will help in development of this region of Odisha State. The project has been approved by BoD, OPTCL, OERC & Govt. of Odisha.

Construction of 220 kV Transmission Line (Name:-mentioned above)~~or Diversion of -----KV Transmission Line (Name:-----)~~, including supply of towers, conductor, Porcelain-long rod/~~composite DISC~~ insulators, ~~earth wire/~~ OPGW, hardware & associated accessories, destringing/ dismantling works (if required), etc. associated with for diversion /shifting of various Transmission Lines infringing, ROW solving, obtaining Forest clearances(if required), making tower foundation, tower erection, conductor stringing and other related works for construction of Transmission line on turnkey basis. Site and other details are as per below Table-1.0:

TABLE-1.0

Name of Transmission Line	Line Length	S/C Line or D/C Line	No. of tower	Type of towers	In case of Diversion: Location of Tower	Type of Conductor & its Stringing (in Kms)	Work supervision by OPTCL officials: Name of: Sub-Division----: Division----: Circle----: Zone----

220 KV LILO Transmission line from existing 220KV Atri-Narendrapur DC line(Ckt-II) to proposed 220/33KV Sub-station at Mundamba, Khurda (Approx Line Length = 8KM)	08	DC	27	(OA, OB, OC, UR)	ACSR Zebra	S/D: Bhubaneswar Division: Bhubaneswar Circle: Bhubaneswar

## 2.0 Engineer-In-Charge (EIC):

A. DGM, EHT (C) Division, Bhubaneswar

B. -----

## 3.0 Scope of Work:

following scope of works:

- (i) Detailed survey including route alignment, profiling, tower/ monopole structure spotting, optimization of tower/monopole structure locations, soil resistivity measurement & geotechnical investigation (including special foundation locations viz. pile/well foundation locations, whenever applicable & covered under BPS);
- (ii) Check survey;
- (iii) Details of Transmission Line Routes and Terrain:
  - The detailed survey shall be carried out by using Total stations along the approved route alignment. As an alternative, the contractor may also use ALTM (Airborne Laser Terrain Modeling)/DGPS techniques of equal or better accuracy for the detailed survey.
  - Quantity of detailed survey including route alignment, profiling, tower/ monopole structure spotting, optimization of tower/ monopole structure locations, soil resistivity measurement & geotechnical investigation etc. of lines have been indicated in the BPS.
  - Bidders may visit the line route to acquaint themselves with terrain conditions and associated details of the proposed transmission lines. For this purpose, they are requested to contact OPTCL officials.
  - Survey & profiling of existing line route shall be carried out using Total stations. Verification of availability of statutory electrical clearances shall be made using PLS-CADD software.

- (iv) Design and Proto type testing of transmission line towers (if required)
- (v) Design and Proto type testing of monopole structures (if required)
- (vi) Fabrication and supply of all type of transmission line Towers as per Employer's design/drawings including River crossing towers (wherever applicable) including fasteners, step bolts, hangers, D-shackles etc. (as per requirement).
- (vii) Fabrication and supply of all type of transmission line Towers as per Contractor's design/drawings (including River crossing towers (wherever applicable) as per Employer's design/ drawings) including fasteners, step bolts, hangers, D-shackles etc. (as per requirement).
- (viii) Fabrication and supply of transmission line monopole structures along with cross arms, earth wire peaks, base plates and anchor bolts for foundations, as per Employer's design/ drawings including required fasteners i.e. bolts, nuts, spring washers, etc., and other accessories including step bolts/ hooks/ ladder, hangers, D-shackles/ fixtures etc. as may be required for monopole structure
- (ix) Fabrication and supply of transmission line monopole structures along with cross arms, earth wire peaks, base plates and anchor bolts for foundations, as per Contractor's design/ drawings including required fasteners i.e. bolts, nuts, spring washers, etc., and other accessories including step bolts/ hooks/ ladder, hangers, D-shackles/ fixtures etc. as may be required for monopole structure
- (x) Supply of all types of tower accessories like phase plate, circuit plate (where ever applicable), number plate, pole plate (where ever applicable), danger plate, anti-climbing device, Bird guard, (where ever applicable);
- (xi) Supply of
  - a) Earth wire
  - b) Hardware Fittings and accessories for Conductor/\*Earth wire
  - c) Conductor
  - d) Insulators
  - e) OPGW & associated fittings & accessories.
- (xii) Classification of foundations for different type of towers and Casting of Foundations for tower/ pole structure footings as per Employer's foundation design/ drawing;
- (xiii) Classification of foundations for different type of towers and Casting of Foundations for tower/ pole structure footings as per Contractor's foundation design/ drawing;
- (xiv) Supply & Installation of Tower/ Pole structure Earthing.
- (xv) For transmission lines, to promote mechanization and safe working conditions, use of crane is being promoted. Erection of towers/ monopole structures by using crane (wherever feasible), tack welding of bolts and nuts including supply and application of zinc rich paint, fixing of insulator strings, stringing of conductors and earth wires/OPGW along with all necessary line accessories. However, where usage of crane is not possible, erection of towers has to be carried out by conventional method i.e using Gin pole, Derrick, Centre mast etc. through usage of Power Operated Winch Machines. No tractor shall be allowed for tower/ monopole structure erection.;
- (xvi) De-stringing & dismantling of Transmission line. (Whenever applicable & covered under BPS)
- (xvii) Stringing of Power line crossing section under Live Line Condition (where ever applicable & covered under BPS);

- (xviii) Painting of towers/ monopole structures & supply and erection of span markers, obstruction lights (wherever applicable) for aviation requirements (as required)
- (xix) Testing and commissioning of the erected transmission lines and
- (xx) Other items not specifically mentioned in this Specification and/or BPS but are required for the successful commissioning of the transmission line, unless specifically excluded in the Specification.
- (xxi) The installation/stringing of OPGW cable along with associated fittings & accessories shall be carried out by the contractor. The scope of installation/stringing shall include splicing, termination, testing, demonstration for acceptance & commissioning as well as documentation. Splicing is preferred to be carried out at Tension towers locations. However, it shall be permitted at Suspension Tower locations also as required due to site conditions. The installation/stringing and splicing shall be carried out as per owner guidelines. The FODP & Approach cable shall also be installed by the Contractor (where ever applicable as per BPS).

#### **4.0 Special Requirement of works:**

- 4.1 Supply of materials required for construction / diversion works shall be ensured within stipulated time as per the program from the date of LOA. BOMs, Structural drawings, Shop drawings of Transmission Line Tower shall be supplied by the contractor. The contractor shall be fully responsible for Supply and services as per Technical Specifications attached in bid.
- 4.2 It shall be safe to use crane of suitable capacity for erection of towers to optimize the shutdown period of TL therefore, all expenditure related to hiring of crane, transportation etc. shall be included in the erection price and no extra payment shall be made for the same.
- 4.3 Use of tractor for final sagging shall not be permitted. The Contractor shall use power operated hydraulic/ motorized winch machines or and Tension puller. At least 02 power winch machines shall be deployed at every location.
- 4.4 De-stringing & dismantling of existing Transmission Line towers which infringe the corridor of modified TL shall be dismantled during shutdown within time schedule as given. Enough skilled manpower shall be deployed by the contractor to execute the work within time schedule. 02 Nos erection gangs (each gang of 35-40 skilled person) shall be deployed for erection of towers during shut down period (At each site) and 01 No. Stringing gang shall be deployed to complete the stringing of Conductor /Earth wire/OPGW (at each Site).
- 4.5 Testing and commissioning of the erected transmission lines: The contractor is liable to conduct Tower Footing Resistance (TFR) measurement of each location, accordingly the TFR testing kit (shall be taken back by the contractor once the measurement work is completed) shall be arranged by the contractor without any additional cost to OPTCL. Thermo vision scanning of modified parts shall be carried out by OPTCL according to maintenance guideline, if any fault observed the same shall be attended by contractor during defect liability period.
- 4.6 The scope of works includes stringing/de-stringing of conductor, earth wire & or OPGW, erection/removal of hardware fittings, insulators, conductor, earth wire & or OPGW accessories, etc. and erection/dismantling of towers of -----kV line. Loading, transportation & unloading of transmission line materials from the designated store to the site suitably so that the damage can be prevented.

- 4.7 Contractor should plan their execution and resources so that new/diversion works of Transmission Lines shall be completed within the stipulated period as below;

<b>Construction of New/diversion of Transmission Line</b>	<b>Work completion Period</b>
Name:-----	Within
Name:-----	Within -----

In case of line diversion work, the Employer shall arrange shut down of charged section of existing transmission lines, if required, before carrying out de-stringing & dismantling works as per program finalized in co-ordination with site. The contractor shall erect the towers under existing TL corridor up to safe distance, as decided by the OPTCL official thereafter, shutdown shall be availed. Shutdown shall be for a limited period therefore proper planning in consultation with OPTCL shall be required.

- 4.8 Appropriate safety measures along with necessary safety tools and equipment to carry out stringing and de-stringing operations under the above conditions including mechanical/ structural safety of the towers shall be the responsibility of the contractor. The entire quantity of dismantled line materials viz. tower parts, conductor, earth wire, OPGW, hardware fittings, insulators and conductor, earth wire & OPGW accessories removed from the existing line shall be transported to the designated nearest OPTCL store by the contractor at his own cost. The Bidder shall submit his offer taking into consideration of all those aspects, which are necessary to meet the requirement.
- 4.9 Erection contractor is required to return the empty steel drums of conductor, OPGW and earth wire to OPTCL designated store. All balance material if any as per the contract shall be handed over to OPTCL in good condition.
- 4.10 On completion of all physical work, inspection shall be carried out by designated electrical inspector of Govt. of Odisha. The contract shall be liable to comply all observations raised during inspection. OPTCL will assist whenever responsibility of owner exists. All required documents shall be furnished by contractor during such inspection of CEI.
- 4.11 The contractor shall be responsible to secure compliance with all Central & State Government laws as well as rules, regulations, Bye-laws and other of the local authorities and statutory bodies as may be in force from time to time as applicable. The agency shall also be responsible for giving the required notice to any statutory or local bodies as required by law and obtain all requisite license / permission as applicable to the agency for carrying out the work envisaged in the contract. OPTCL shall bear no liability whatsoever towards any violations by the agency in this regard.
- 4.12 The agency shall comply with all labour laws applicable to workmen engaged by them for carrying out the work and OPTCL shall bear no liability whatsoever towards any violations by the agency in this regard. Detailed instructions on compliance to some of these labour laws are enumerated in the ensuing paragraphs.
- 4.13 Other items not specifically mentioned in this Specification and/or BPS but are required for the successful commissioning of the transmission line, unless specifically excluded in the Specification to be considered.
- 4.14 **Completion of Work:** The work under this contract shall be completed within ----- (in word-----) month from the date of LOA. L2 network shall be submitted within ----- month from the date of LOA.

- 4.15 The responsibilities of acquiring Right of Way (ROW) for transmission line (tower foundation, tower erection & stringing of conductors etc.) corridor lies with the contractor. Whereas, the Contractor shall be responsible for securing, for getting clearances from Railway, NHAI, Forest, Water, and other Govt./Statutory bodies. All statutory fees for getting clearance shall be to OPTCL's account against documentary evidence.
- 4.16 It is the responsibility of the contractor to strictly adhere the procedure as required for obtaining clearances from Railway, NHAI, Forest, Water, and other Govt./Statutory bodies etc.

## **5.0 Electrical Clearances**

### **5.1 Ground Clearance**

The minimum ground clearance from the bottom conductor shall not be less than **18000 mm for 765 KV, 8840 mm for 400KV, 7015 mm for 220KV and 6100 mm for 132KV** lines at the maximum sag conditions i.e. at max temperature as indicated in tower spotting data and still air.

- a) An allowance of 150mm shall be provided to account for errors in stringing.
- b) Conductor creep shall be compensated by over tensioning the conductor suitably to meet the requirement.
- 5.2 Clearance between lines crossing each other shall be kept in accordance with the CEA (Measures Relating to Safety and Electric Supply) Regulations, 2010 as amended up-to-date. In order to reduce the height of the crossing towers, it may be advantageous to remove the ground-wire of the line to be crossed (if this is possible and permitted by the Employer of the line to be crossed).

### **Following scope of activities against obtaining Forest Clearances are highlighted:**

- (a) Getting Permission for Survey from Forest Authorities and Collection of Coordinates from ORSAC and submission of both soft copy & hard copy of Forest Diversion Proposal Map to concerned DFO and DFO office will forward the same to ORSAC for verification and validation. Certification of Map of forest land by representative of different departments as per statutory requirements of Odisha Government is to be submitted in 06sets of hard copy and one soft copy and a separate map to this effect duly certified by representatives of different departments as per statutory requirements of Odisha Government is to be submitted in 6sets of hard copy & one soft copy.
- (b) Documentation and E-filing of FC application (Form-A, Part-I).
- (c) Field Verification report of DFOs (Form A, Part-II).
- (d) Inspection report by RCCF (Form-A, Part-III).
- (e) Recommendation by Nodal officer (FC Act, O/o PCCF (Form-A, Part-IV).
- (f) Recommendations and submission for forest Clearance by State Forest and Environment Dept. to MoEF, Govt. of Odisha (Form-A, Part-V).
- (g) Stage-I Clearance (With conditions) by MoEF, GOI (Form-A, Part-VI).
- (h) Complying the stipulations of stage-I clearance).
- (i) Stage-II clearance by MoEF, GOI.

**However any other activities other than above required for obtaining Forest clearance are also to be considered**

