

**TURNKEY TENDER DOCUMENT FOR
DESIGN, ENGINEERING, MANUFACTURE, SUPPLY,
ERECTION, TESTING & COMMISSIONING OF LILO TOWER,
OPGW FOR LILO OF EXISTING MSETCL 220kV TROMBAY-
NERUL LINE AT EXISTING AEML 220kV CHEMBUR
SUBSTATION**

**DOCUMENT No. TD-SD- LILO TOWER, OPGW FOR CHEMBUR
SECOND FEED ON TURNKEY BASIS-351-R1**



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1 INTRODUCTION

- 1.1. Adani Electricity Mumbai Limited (AEML) operates 3 Nos. of 220/33kV AIS EHV Sub-Stations (at Aarey, Versova and Ghodbunder) commissioned around 1995 and 5 Nos. of 220/33kV GIS EHV Sub-Stations (at Goregaon, Saki, Chembur, Gorai, Borivali) commissioned around FY 2011/ 2012/ 2013 in Mumbai, Maharashtra.
- 1.2. Presently AEML 220kV Chembur Substation is connected with Double Circuit 220kV MSETCL Trombay Substation. Considering the reliability, load & network expansion, 2nd feed to AEML 220kV Chembur Substation is vital
- 1.3. Accordingly, AEML is undertaking a project to establish LILO connectivity of existing MSETCL 220kV Trombay – Nerul line at existing AEML 220kV Chembur Substation.

2 PROJECT INFORMATION

Ambient conditions	
Design ambient temperature	45 °C
Primary power supply	
Incoming supply	220KV, 3PH, 3W, 50Hz, Effectively grounded
Incoming supply system fault level	40 KA for 3 sec
Distribution voltage for system	415 V, 3 ph, 4 W, 50 Hz
Auxiliary Power supply	
Lighting fixture, space heater, (1- ph- motors, 1- ph receptacle)	240 V, 1 PH, 50 Hz. (tapped from phase and neutral)
Control supply	
For 220 kV System	220 V, DC supply from battery
For LT breaker	240 V, 1 PH, 50 Hz. tapped from incomer side between phase and neutral
Supply voltage and frequency variation	

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Voltage variation	± 10%
Frequency variation	± 5%
Combined voltage and frequency variation	± 10%
Nearest airport	MUMBAI
Project: LILO OF EXISTING MSETCL 220kV Trombay – Nerul AT Existing AEML 220kV Chembur SUBSTATION	<p><u>AEML 220kV Chembur Substation:</u> 220/33 Substation Station, Borla Village, near Bhavna Trust, Chembur, Mumbai-400071.</p> <p><u>MSETCL 220kV Trombay Substation:</u> Trombay Substation Station, Trombay, Near TPC Trombay, Mumbai-400088.</p> <p><u>MSETCL 220kV Nerul Substation:</u> Nerul Substation Station, Near Wonder Park, Nerul, Navi Mumbai-400706.</p>

3 SCOPE

To establish LILO connectivity of existing MSETCL 220kV Trombay– Nerul line at existing AEML 220kV Chembur Substation following work is required.

- a. Construction of LILO tower near tower no 720 on MSETCL 220kV Trombay – Nerul line with necessary civil works .
- b. Removal of existing Earth Guard Wire of 220kV transmission line between MSETCL Trombay to MSETCL Nerul Substation and replace it with OPGW .
- c. Exclusion - Supply and laying of 220kV Cable from LILO tower to EHV Chembur is not in the part of this specification.

3.1 Tower Works:

- 3.1.1 MSETCL Tower No. 720 shall be modified / altered to adopt overhead connectivity to proposed new CTT (Cable Termination Tower) which is proposed to be located near this

existing MSETCL Tower. All the necessary fittings and hardware shall be changed to take the mechanical & electrical load of all the accessories.

- 3.1.2 Design, manufacture, supply, erection & commissioning of CTT near above mentioned MSETCL Tower. CTT may be lattice tower/Monopole. The CTT shall be provided with necessary arrangements to install 6 nos of 220 kV 1c X2500 sq mm cable terminations , 6 nos of 220kV lightning arresters and 6 nos of optical Current transformers. (Refer Annexure for general arrangement of CTT Annexure 6) PI refer attached annexure for specification of lattice tower (Annexure 3 ...) or Specifications of Monopole (Annexure 2) .
- 3.1.3 Design, manufacture, supply, erection & commissioning of HTLS ACCC drake conductor alongwith associated accessories /hardware to make LILO arrangement at existing Tower No 720 of MSETCL Trombay –Nerul line to proposed CTT. Please refer attached specification of HTLS conductor and hardware (Annexure--4). We propose use of polymer long rod insulator alongwith suitable hardware for this arrangement. PI refer specification of polymer long rod insulator (Annexure 4A)
- 3.1.4 The bidder shall carry out required civil work for installation of CTT as per our specification (Annexure 17 :Specification for Civil Works)
- 3.1.5 Fencing /protection wall (of minimum 2m height) arrangement for proposed CTT tower.
- 3.1.6 Design, manufacture, supply, erection & commissioning of 220kV Lightening arrestors alongwith Surge counter with suitable mounting arrangement, current leakage indicator with suitable mounting arrangement. These shall be mounted on above mentioned CTT at the Height @45m . (Refer Annexure12 for Technical Specification & BoQ for 220kV Class Lightening Arrestor System. Refer Annexure 6 for general arrangement of CTT)
- 3.1.7 Attachments :
- 3.1.7.1 Annexure 2.: specification of Monopole
 - 3.1.7.2 Annexure 3: specification of lattice tower
 - 3.1.7.3 Annexure 4: HTLS conductor and hardware

3.1.7.4 Annexure 4 A: specification of polymer long rod insulator

3.1.7.5 Annexure 6A: for general arrangement of CTT (Elevation)

3.1.7.6 Annexure 6B: for general arrangement of CTT (Plan)

3.1.7.7 Annexure 12: 220kV Lightning Arrestor System

3.1.7.8 Annexure 10: FQAP Format No. 21.20.21-Tower Construction

3.1.7.9 Annexure 16 : Existing MSETCL 220kV D/C Transmission line tower schedule

3.1.7.10 Annexure 17 : Specification for Civil Works

3.2 OPGW works:

3.2.1 De-commissioning, dismantling & removal of existing Earth Guard Wire of 220kV transmission line between MSETCL Trombay to MSETCL Nerul Substation by live line method as per specification TD-SP-OPGW(48F)-226-R0 (Annexure -1)

3.2.2 Design, manufacture, supply, erection & commissioning of associated hardware fitting required for replacing existing Earth Guard wire with proposed OPGW (refer Annexure1 for Hardware details)

3.2.3 Design, manufacture, supply, erection & commissioning 24 core OPGW (refer Technical Specifications, TD-SP-OPGW(48F)-226-R0... (Annexure -1)

3.2.4 Coordination with M/s MSETCL for installation of OPGW by replacing earthwire using live line method.

3.2.5 Existing MSETCL Trombay to MSETCL Nerul transmission line tower design validation for installation of OPGW. Tower strengthening shall be done if required as per validation report.

3.2.6 Attachments :

3.2.6.1 Annexure-1 Specification for OPGW (TD-SP-OPGW (48F)-226-R0)

3.3 Technical Requirements :

3.3.1 Cable tray & fittings:

3.3.1.1 Cable trays shall be designed for a uniformly distributed load of 250 Kg per sq. meter plus a concentrated moving load of 100 Kg moving along the tray length. The maximum deflection admissible with this loading is 10 mm. Cable trays and fittings shall be fabricated out of minimum 2.5 mm thick MS sheet free from any flaws and conforming to the relevant Indian Standards. Supply of cable trays shall include supply of all the cable tray fittings and accessories as needed for the cable trays installation. Measurement will be made along the centre line of the cable tray.

3.3.2 Ladder type cable trays & fittings:

3.3.2.1 Ladder type cable trays & fittings shall consist of side rails and horizontal ladder rungs. Side rails shall be formed to channel shape. All corners shall be as smooth as possible with radius not exceeding 6 mm.

3.3.2.2 Spacing between ladder runs shall be 250 mm. Alternate rung shall be slotted and each rung shall be spot welded to side rail.

3.3.2.3 Straight, sections shall be 2.5 m in length.

3.3.2.4 Elbows, reducers, tees, crosses etc shall comprise of MS sheet side rails and ladder rungs. Their various parts shall be spot welded. Side rails shall have two (2) holes of 10 mm diameter at each end of straight sections, elbows, crosses etc for fixing side couplers.

3.3.3 Perforated type cable trays and fittings

3.3.3.1 Perforated type cable trays and fittings shall be fabricated out of single 2.5 asmm thick MS sheet with perforations at the bottom. All burrs and sharp edges shall be ground and filed after making perforations so that cable trays have a smooth surface for easy cable pulling/laying.

3.3.3.2 All fittings such as elbows, reducers, tees, crosses, etc shall also be made out of MS

sheet steel with perforations at the bottom.

3.3.3.3 Straight sections shall be supplied in 2.5 m Lengths.

3.3.3.4 Dimensions of fittings shall be same as for the ladder type tray fittings except that ladder rungs shall be substituted by perforated MS sheet. The side rails shall have two (2) holes of 10 mm diameter at each end of straight sections, elbows, tees, crosses etc for fixing side couplers.

3.3.4 Side couplers:

3.3.4.1 Each 2.5 m section of the cable tray and each elbow, reducers, tee, cross etc. shall be provided with four side coupler plates and associated bolts, nuts & washers. The side coupler shall consist of 2.5mm thick MS plates with two circular holes and two elliptical holes.

3.3.5 Galvanising:

3.3.5.1 All cable trays and their fittings as well as cable tray covers shall be hot dip galvanized after fabrication according to IS: 2629. Galvanizing shall be uniform, clean smooth, and continuous and free from acid spots. Galvanizing found defective, the entire batch shall be re-galvanized at no extra cost. The zinc coating shall be uniform, clean and smooth and free from spangle. The zinc coating shall not be less than 90 micron in thickness and shall weigh not less than 600 gm/sq. meter not area covered.

3.4 **Galvanized structural works**

3.4.1 The minimum thickness by hot dip galvanizing shall be 90 microns and material shall be offered for inspection at galvanizing works before final dispatch to site.

3.4.2 All site cutting, welding shall be suitably treated with cold galvanizing paint. For galvanizing works, factory approval shall be taken from AEML EIC. After approval of final drawings work can be initiated at site.

- 3.4.3 Payment will be made based on theoretical consumption of materials worked out from construction drawings or measured as actual if drawings are not available on weight basis by multiplying length / size of the section with standard unit weight as per IS.
- 3.4.4 Rolling margins and wastages will not be paid separately and quoted rates deemed to be included the same. (For all types of structural steel sections).
- 3.4.5 The Contractor shall carry out the painting work in all respects with the best quality of approved materials (conforming to relevant IS Codes) and workmanship in accordance with the best engineering practice. The Contractor shall furnish characteristics of paints (to be used) indicating the suitability for the required service conditions. The paint manufacturer's instructions shall always be followed as far as practicable .
- 3.4.6 All the Supply items shall have necessary transit & erection insurance.
- 3.4.7 During the erection stage, the entire work shall be audited as per AEML field quality plan. (Refer Field Quality Plan Document in Annexure 8).
- 3.4.8 The bidder shall depute qualified Safety officer during the site works.
- 3.4.9 Project Management to ensure complete safety of the personnel and commissioning of the station as per the schedule.
- 3.4.10 Electrical Inspector approval for the commissioning of equipments in this tender are under scope of bidder, support from AEML shall be provided.
- 3.4.11 The scope covers submission of following design documents / drawings for approval before taking up for manufacturing, construction, erection and as built drawings later.
- 3.4.11.1 Design basis reports
 - 3.4.11.2 General Arrangement drawings (plan, section, elevations)
 - 3.4.11.3 Single Line Diagrams & Schematic drawings
 - 3.4.11.4 Layout drawings

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3.4.11.5 RCC drawings

3.4.11.6 Quality Acceptance Plans / Material Quality Plans, FAT/SAT Plans

The successful bidder will submit the cost split up in following format.

Sr. No.	Description of Items	Total Quantity required	Unit	Unit Rate	Amount
	Scope for Tower End Support for LILO upto existing AEML Chembur EHV Substation				
1	Supply, Design, Engineering, Manufacturing, Inspection, Transportation, Unloading, Storage, Erection, Testing, Commissioning, Complete Insurance (from Manufacturing to Commissioning) for Tower/Gantry structure, OPGW and spares as per technical specifications document no. TD-SD- LILO OF EXISTING MSETCL 220KV TROMBAY – NERUL AT EXISTING AEML 220KV CHEMBUR SUBSTATION ON TURNKEY BASIS -351-RO	1.00	No.		-
2	Civil Services for Tower/Gantry Structure	1.00	Lot		-
Total cost Rs.					

4 GENERAL AND ELECTRICAL SAFETY PRECAUTIONS

4.1 BIDDER shall pay particular attention to ensure safety of his staff and workmen and others in the vicinity and shall be responsible for any loss of life or injury to persons due to negligence or any other causes whatsoever except natural causes. He shall provide all necessary fencing and lights required to prevent accident and shall be bound to bear the expenses of defense of every suit, action or other proceedings at law that may be brought by any person for injury sustained owing to neglect of the above precautions and to pay any damages and casts which may be awarded in any such suit, action or proceedings to any

such person or which may with consent of the BIDDER be paid to compromise any claim of any such person.

- 4.2 The BIDDER shall reinstate all damage of every sort mentioned in this clause so as to deliver the whole of the Contract work complete and perfect in every respect and so as to make good or otherwise satisfy all claims for damage to the property of third parties.
- 4.3 The BIDDER shall take all precautions necessary and shall be responsible for the safety of the work and shall maintain all lights, guards, sign boards, temporary passages, or other protection necessary for the purpose. All work shall be done at the BIDDER'S risk, and if any loss or damage shall result from fire or from other cause, the BIDDER shall promptly repair or replace such loss or damage free from all expenses. The BIDDER shall be responsible for any loss or damage to material, tools or other articles used or held for use in connection with the work. The work shall be carried on to completion without damage to any work or property of the AEML-T or MSETCL or of others and without interference with the operation of existing machinery or equipment.
- 4.4 In no circumstances will the BIDDER interfere with fuses and electrical equipment belonging to the AEML or MSETCL or of others
- 4.5 Before the BIDDER connects any electrical appliances to any plug or socket belonging to the other BIDDER or AEML or MSETCL or of others, he shall:
- 4.5.1 Satisfy the AEML or MSETCL or others that the appliance is in good working condition.
- 4.5.2 Inform AEML or MSETCL others of the maximum current rating, voltage and phases of the appliances.
- 4.5.3 Obtain permission of AEML or MSETCL or others detailing the sockets to which the appliances may be connected.
- 4.5.4 AEML or MSETCL or others will not grant permission to plug-in, until they are satisfied that the appliance is in good condition and is fitted with a suitable plug. The appliance is fitted with suitable cable having two earthing conductors, one of which shall be an earth metal sheath surrounding the cores.

4.5.5 No electric cable in use by AEML or MSETCL or others shall be disturbed without prior permission. No weight of any description will be imposed on any such cable and no ladder or similar equipment will rest against or be attached to it.

4.5.6 No work shall be carried out on any live equipment. The equipment must be made safe by AEML or MSETCL and a permit to work is issued before any work is carried out.

5 SCHEDULE OF QUANTITIES - NO CLAIM BECAUSE ACTUAL QUANTITIES DIFFER FROM PRELIMINARY STATEMENT

5.1 The quantities of the various kinds of work to be done and materials to be furnished under this Contract which have been estimated and are set forth in the proposal or the Agreement or the lists of Contract Prices, are the best available, but may not be accurate in any or all particulars and are only for the purpose of comparing on a uniform basis the bids offered for the work under this Contract.

5.2 The BIDDER agrees that neither the AEML nor the ENGINEER nor any of the employees shall be held responsible if any of the said estimated quantities should be found to be not even approximately correct in the construction of the work and that he will not at any time dispute or complain of such statement nor assert that there was any misunderstanding in regard to the size and type of work to be done or the kind or amount of the materials to be furnished or work to be done. Further, the BIDDER shall make no claim for anticipated profits, for loss of profit or for damages because of a difference between the quantities of the various kinds of work to be done or materials actually delivered and the estimated quantities set forth by the AEML-T or the ENGINEER.

5.3 The rates/prices quoted by the BIDDER in the schedule of rates/prices, shall be firm irrespective of any variation in the quantities of individual items of work and/or in the total Contract Price.

6 GENERAL INSTRUCTIONS

6.1 This tender is EPC - lump sum tender. The scope broadly describes the equipment and systems as mentioned in SCOPE. EPC Bidder to study and confirm the scope. In case the Bidder feels that a particular equipment./system required for completing the project are not

covered, he shall notify the required item / parts for successful operation of any of the above given system. EPC Bidder shall clearly indicate such part / items in bid for further clarification from AEML. Any such part not indicated by the Bidder in bid shall be responsibility of Bidder to supply as a requirement for system operation. Extra cost for such system after award of job will not be entertained.

- 6.2 Bidder to submit site test reports & its test procedures, test equipment used, wiring diagram & sketch in printed format with sufficient no of copies along with originals.
- 6.3 AEML-T, MSETCL concerned Engineer-Incharge shall have full authority to reject all/ any portion of the work that is considered bad in quality or workmanship. The rejected work shall be made good by the Bidder free of cost. In this regard the decision of the AEML would be final and binding.
- 6.4 All materials and equipment shall be installed in strict accordance with the manufacturer's recommendation(s). Installation shall be considered as being the erection of equipment at its permanent location. Thus, unless otherwise specified shall include unpacking, cleaning and lifting into position, grouting, leveling, aligning, coupling of or bolting down to previously installed equipment bases/ foundations, performing the alignment check and final adjustment prior to initial operation, testing & commissioning in accordance with manufacturers tolerances, instructions and the specifications.
- 6.5 The design, procurement, supply & erection of the equipment/ systems being supplied by the Bidder shall be as per this specification, drawings, IEC requirement, applicable Indian standards, Indian Electricity Rules etc. In case of conflict between standards and specifications, specifications shall govern. In case of conflict between specifications and drawings, AEML decision shall govern. Any discrepancy between specification and the

catalogues or the Bid, if not clearly brought out in the specific requisite schedule, will not be considered as valid deviation.

- 6.6 Pre-commissioning checks and the final testing & commissioning of the equipment/ systems supplied by the Bidder, shall be as specified in the enclosed Commissioning Checklist/ Data Sheets/ as per AEML specifications shall be carried out by Bidder.
- 6.7 Material or equipment supplied shall be conforming to the applicable standards and shall be of approved make and shall be subject AEML Engineer-Incharge approval.
- 6.8 Bidder shall ensure that all waste removal shall be stored & disposed from all working sites with laid methodology of pollution control board (MPCB).
- 6.9 References to workmanship, equipment, materials and components of the covered equipment must be of highest grade of best quality of their kind conforming to best engineering practice and suitable for the purpose for which they are intended, if not given in specification.
- 6.10 The design of the works shall be such that installation, future expansions, replacements and general maintenance may be undertaken with a minimum time and expenses.
- 6.11 All Bids shall be prepared and submitted in accordance with these instructions.
- 6.12 Any and all the exceptions which the BIDDER may have to any of the clauses in the technical specifications and the general conditions of contract shall be clearly outlined in the corresponding schedules of deviations failing which, the offer will be deemed to conform

fully with each and every clause in all sections of this specification. Any subsequent deviation, however minor, will not be acceptable.

7 DOCUMENTS REQUIRED ALONGWITH BID SUBMISSION

7.1 Bidder shall submit completely filled GTP in editable format provided by AEML

7.2 Qualifying requirements documents required by AEML-T (refer Annexure-18)

8 PROJECT SCHEDULE

8.1 The entire scope of contract shall be successfully commissioned & handover to AEML by March 2020.

9 DEFECT LIABILITY PERIOD

9.1 Seller shall guarantee goods against any defect or failure which arise due to faulty material, workmanship, design, services seller's guarantee shall expire Sixty (60) Months after the date of successful commissioning and handing over to commissioned assets.

10 PAYMENT SCHEDULE & TERMS

10.1 10% advance payment shall be done on acceptance of Purchase Order against submission of Advance Bank Guarantee of equivalent amount valid till 90 days from commissioning and completion of all works mentioned in the scope.

10.2 70% payment against supply shall be made within 90 days from the date of supply on prorata basis.

10.3 10% payment shall be made within 90 days from successful commissioning on prorata basis.

10.4 Balance 10% payment shall be made within 90 days against completion of warranty period.

11 NOTE

11.1 The above is only a brief of indicative scope of work which helps to understand the nature of works involved in this project. The bidder is advised to thoroughly refer to the Bill of

Quantities, technical specifications and tender purpose drawings / documents before submitting the bid documents to the AEML.

12 OTHER ATTACHMENTS

- 12.1 Prebid meeting format (Annexure –14)
- 12.2 Qualifying Requirements of the Bidder (Annexure –18)
- 12.3 General BOQ
- 12.4 Taking Over Certificate (Annexure –20)