

## HT Transformer & DG Works BOQ

### SCOPE OF WORK

**1). Scope:** All items or components listed herein are for supply, installation, testing and commissioning unless explicitly stated otherwise. All works shall be read in conjunction with relevant drawings, technical specifications & applicable Indian/IEC standards.

**2). Civil Works:** All primary civil works (cable trenches, transformer foundations & DG foundations) are excluded from this scope unless they are specifically included.

**3). Transformers:** Vendor to give base channel frame, wheel stoppers, anti-vibration pads (min. 3mm rubber). Include 2 coats primer and 2 coats enamel paint for all fabrication work.

**4). Relays:** All protection relays shall be Numerical/Microprocessor type with BMS/SCADA compatibility that is (Modbus/DNP3 protocol).

**5). CTs:** All CTs in VCBs shall be dual core type (one core for metering and another one for protection).

**6). Batteries:** All DC batteries for panel & relay operation shall be Sealed Maintenance Free (SMF) type.

**7). Prices:** All rates may be inclusive of all applicable taxes, duties (GST, customs & excise), transportation, loading/unloading, insurance, all tools & consumables and overheads.

**8). Approvals:** In order to get the power sanction and the safety certificate, the vendor must create the plans and communicate with the CEIG, the Multistory Building Act authorities, and DISCOM.

**9). Fabrication:** 2 coats primer + 2 coats enamel paint (shade/colour as approved by Architect/Consultant) for all fabricated steelwork.

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<b>ABSTRACT — SUMMARY OF COSTS</b>				
<b>S.No.</b>	<b>Description</b>	<b>Supply Amount ( )</b>	<b>Installation Amount ( )</b>	<b>Total Amount ( )</b>
1	<b>HT Panel Works</b>			
2	<b>HT Cable Works</b>			
3	<b>Transformer Works</b>			
4	<b>LT Panel and Bus Duct Works</b>			
5	<b>DG Set Works</b>			
6	<b>Earthing and Lightning Protection</b>			
7	<b>Cable Tray &amp; Conduit</b>			
8	<b>Testing, Commissioning &amp; Approvals</b>			
<b>GRAND TOTAL</b>				

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DETAILED BILL OF QUANTITIES — HT ELECTRICAL WORKS								
S.No.	Description of Work	Unit	Qty.	Supply Rate ( )	Supply Amt. ( )	Inst. Rate ( )	Inst. Amt. ( )	Total Amt. ( )
<b>SECTION I — 11 kV HT PANEL WORKS</b>								
<b>1.0 11 kV Outdoor HT Panels, Metering Cubicle &amp; Accessories</b>								
1.1	Supply, Installation, Testing & Commissioning of 11 kV, 1-Module Outdoor HT Panel with Incomer VCB of 630A, 18.3kA, 350MVA rating, Horizontal Draw-out type. Complete with all protections, relays, instruments, bus bars, earthing, wiring and accessories as per specification.	No.	1					
1.2	Supply, Installation, Testing & Commissioning of 11 kV, 4-Module Outdoor HT Panel with Incomer 1No. VCB of 630A and outgoing 3 Nos. VCB of 400A, 18.3kA, 350MVA rating, Horizontal Draw-out type. Complete with all protections, relays, instruments, bus bars, earthing, wiring and accessories as per specification.	No.	1					
1.3	Supply, Installation, Testing & Commissioning of Outdoor Metering Cubicle made of 2mm thick CRCA sheet steel, free standing, IP65	No.	1					

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	protection, suitable for mounting State Electricity Board Tri-Vector meter. Includes pedestal mounting, necessary wiring and accessories as per DISCOM norms.							
1.4	Supply & Installation of HT Panel Battery Charger with SMF type batteries, complete with accessories, wiring and connections.	Set	1					
1.5	Supply & Installation of HT Panel Base Frame fabricated from ISMC channel, with anti-vibration pads, grouting bolts, painting (2 coats primer + 2 coats enamel) as approved by Consultant.	Set	1					
<b>SECTION I TOTAL</b>								
<b>SECTION II — 11 kV HT CABLE WORKS</b>								
<b>2.0 11 kV XLPE Cables, Control Cables, Terminations &amp; Accessories</b>								
2.1	Supply, Unloading, Storage and Laying of 11 kV, 3-Core 95 Sq.mm XLPE Aluminium (E) armoured cable in ground/ceiling, including necessary mechanical protection, sand bedding, route markers, warning tape, final refilling and making good the surface as required.	Rmt	80					
2.2	Supply, Unloading, Storage and Laying of 11 kV, 3-Core 120 Sq.mm XLPE Aluminium (E)	Rmt	80					

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	armoured cable in ground/ceiling, including necessary mechanical protection, sand bedding, route markers, warning tape, final refilling and making good the surface as required.							
2.3	Supply and Installation of 11 kV cable route markers (concrete/CI type) as per specification.	Nos.	4					
2.4	Supply and Laying of 24-Core x 2.5 Sq.mm PVC insulated, steel armoured copper conductor control cable (YFY/YRY type) for protection and relay wiring.	Rmt	100					
2.5	Supply and Laying of 12-Core x 2.5 Sq.mm PVC insulated, steel armoured copper conductor control cable (YFY/YRY type) for protection and relay wiring.	Rmt	80					
2.6	Supply and Installation of HT Cable End Termination Kit (Heat Shrink type) for 11 kV 3-Core cable, including all accessories.	Set	4					
2.7	Supply and Installation of HT Cable Straight Through Joint Kit (Heat Shrink type) for 11 kV 3-Core cable, including all accessories.	Set	2					

**SECTION II TOTAL**

**SECTION III — TRANSFORMER WORKS**

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3.0 Distribution Transformer, Base Frame & Accessories								
3.1	Supply, Installation, Testing & Commissioning of 11/0.433 kV, Oil-Cooled (ONAN) Distribution Transformer, complete with conservator, Buchholz relay, temperature indicators (OTI & WTI), pressure relief device, silica gel breather, oil drain valve, wheels, earthing terminals, rating plate and all standard accessories. Vector group: Dyn11, impedance 4.5%, IS:2026 compliant.	No.	1					
3.2	Supply, Installation, Testing & Commissioning of 11/0.433 kV, Dry-Type (CRHE/VPI) Distribution Transformer, complete with temperature monitoring, PT100 sensors, anti-condensation heaters, rating plate, earthing terminals and all standard accessories as per specification.	No.	1					
3.3	Supply and Installation of Transformer Base Channel Frame (ISMC section) with MS wheel stoppers, 3mm thick anti-vibration rubber pads, grouting bolts, painting (2 coats primer + 2 coats enamel) as approved.	Set	2					

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3.4	Supply and Installation of Buchholz Relay including piping and connections for oil-filled transformer.	No.	1					
3.5	Supply and Installation of Transformer Earthing including GI flat/strip, earth pits, accessories and connections as per IS:3043.	Set	2					
3.6	Transformer Oil Testing as per IS:335 (dielectric strength, moisture content, tan delta) before and after commissioning, including report.	Set	1					
<b>SECTION III TOTAL</b>								
<b>SECTION IV — LT PANEL &amp; BUS DUCT WORKS</b>								
<b>4.0 Main Distribution Board (MDB), Bus Duct &amp; LT Power Cables</b>								
4.1	Supply, Installation, Testing & Commissioning of Main LT Panel (MDB) – 415V, 3Ph, 4W, 50Hz, with ACB/MCCB incomer, busbar chamber, outgoing feeders, metering, protection relays, surge protection, power factor improvement (APFC) and all accessories as per single line diagram.	No.	1					
4.2	Supply, Installation, Testing & Commissioning of LT Bus Duct (Sandwich/Air Insulated) between transformer LT terminals and MDB incomer, including all supporting structures, expansion joints and	Rmt	10					

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	accessories as per specification.							
4.3	Supply and Laying of 1100V grade, 4-Core x 300 Sq.mm Al. conductor, XLPE insulated, PVC outer sheathed, armoured power cable from transformer to LT panel, including cable lugs, glands, saddles/clamps.	Rmt	30					
<b>SECTION IV TOTAL</b>								
<b>SECTION V — DIESEL GENERATOR SET WORKS</b>								
<b>5.0 DG Set, AMF Panel, Cables, Exhaust, Fuel System &amp; Accessories</b>								
5.1	Supply, Installation, Testing & Commissioning of Diesel Generator Set (Acoustic Enclosed type, CPCB-II compliant) with synchronous alternator, AMF panel, fuel tank (990 ltr integrated), base frame anti-vibration mounts, exhaust system with silencer, battery with charger, cooling system and all standard accessories as per specification.	No.	1					
5.2	Supply, Installation, Testing & Commissioning of DG Set AMF (Automatic Mains Failure) Control Panel, 415V, 3Ph, 4W, complete with ACB/MCCB, interlocks, auto-start logic, battery charger and all accessories.	No.	1					
5.3	Supply and Laying of 1100V grade, 4-Core x	Rmt	30					

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	300 Sq.mm Al. conductor, XLPE insulated, PVC outer sheathed, armoured power cable from DG incomer to LT panel bus, including cable lugs, glands and clamps.							
5.4	Supply and Installation of DG Exhaust Pipe (insulated MS/SS, suitable diameter) from engine outlet to outside of building including supports, expansion bellows, rain cap and painting.	Rmt	15					
5.5	Supply and Installation of HSD (High Speed Diesel) Fuel Line piping from underground/day tank to DG set, including valves, flow meter, fuel filter and all accessories.	Set	1					
5.6	Supply and Installation of DG Set Foundation/Base Slab with anti-vibration isolators (spring or pad type), grouting bolts and accessories. (Civil works for foundation under civil package.)	Set	1					
5.7	Supply and Installation of DG Earthing including GI flat/strip, earth pits and connections as per IS:3043.	Set	1					

**SECTION V TOTAL**

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### SECTION VI — EARTHING & LIGHTNING PROTECTION

#### 6.0 Earth Pits, GI Flat Earthing, Lightning Arresters & SPD

6.1	Supply and Installation of Earth Pit (Chemical/Maintenance-free type) with GI pipe/plate electrode, earth enhancement compound, CI cover frame, inspection chamber and all accessories as per IS:3043.	No.	6					
6.2	Supply and Laying of GI Flat 50x6mm as earth mat/ring earthing in ground, including connections to equipment.	Rmt	200					
6.3	Supply and Installation of Lightning Arrester (LA) for 11 kV system (ZnO type, 9kV rated), including mounting hardware and connections.	No.	3					
6.4	Supply and Installation of Surge Protection Device (SPD) for LT panel, Type-1/Type-2 as per IEC 61643.	Set	1					

#### SECTION VI TOTAL

### SECTION VII — CABLE TRAY, SUPPORTS & CONDUIT

#### 7.0 HDG Cable Tray, MS Supports & Conduit Works

7.1	Supply and Erection of Hot Dip Galvanised (HDG) Perforated Cable Tray of appropriate width and depth, with necessary bends, tees, reducers, coupler plates,	Rmt	150					
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	hold down clamps and all fixing accessories on MS/GI supports as per drawing.							
7.2	Supply and Erection of MS Cable Tray Support Structure (fabricated from MS channels/angles), with 2 coats primer and 2 coats enamel paint.	Set	1					
7.3	Supply and Installation of MS GI Conduit (32/50mm dia) concealed/surface as required, with bends, junction boxes, PVC saddles and all accessories.	Rmt	200					
<b>SECTION VII TOTAL</b>								
<b>SECTION VIII — TESTING, COMMISSIONING &amp; STATUTORY APPROVALS</b>								
<b>8.0 T&amp;C, Test Reports, CEIG Approval &amp; DISCOM Liaison</b>								
8.1	Testing and Commissioning of entire HT/LT installation including HT panel, transformer, LT panel, bus duct, all protection relays (numerical type), metering, earthing continuity test, insulation resistance test, high voltage test, ratio test and all other tests as per IS/IEC standards. Submission of test reports in bound volume.	Set	1					
8.2	Obtaining approvals from CEIG (Chief Electrical Inspector to Government) including preparation of	Set	1					

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	required drawings, liasoning with authorities, safety certificate and all other statutory clearances.							
8.3	Obtaining power sanction and liasoning with DISCOM/Electricity Board including deposit/connection charges documentation assistance.	Set	1					
<b>SECTION VIII TOTAL</b>								
<b>GRAND TOTAL (Sections I through VIII)</b>								

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EXCLUSIONS	INCLUSIONS
<ol style="list-style-type: none"> <li>1. Cost of bringing Grid/EB power to site</li> <li>2. DISCOM deposit &amp; service connection charges</li> <li>3. Floor distribution panels and related cabling</li> <li>4. Facade and landscape lighting, wiring &amp; DBs</li> <li>5. UPS systems and associated works</li> <li>6. EPABX / PA system</li> <li>7. Low voltage / security / BMS / CCTV systems</li> <li>8. Temporary power supply for construction</li> <li>9. Civil works — trenches, transformer/DG foundations (civil package)</li> <li>10. Fire, PHE, STP, HVAC panels &amp; related electrical works</li> <li>11. False ceiling light fixtures</li> <li>12. Lift lobby / entrance lobby fixtures (subject to finalisation)</li> <li>13. Fire suppression system for LT panels</li> <li>14. Kitchen panel, lighting and wiring (by Kitchen Consultant)</li> </ol>	<ol style="list-style-type: none"> <li>15. Complete HT panel supply, installation, testing and commissioning</li> <li>16. Complete transformer supply, installation, testing and commissioning</li> <li>17. DG set supply, installation, testing and commissioning</li> <li>18. All HT and LT power cables within scope</li> <li>19. Earthing system and lightning protection</li> <li>20. HT and LT cable terminations and jointing kits</li> <li>21. Electrical scope for HSD works — cables up to panels</li> <li>22. Electrical scope for PHE works — cables up to PHE panel incomer</li> <li>23. Electrical scope for fire fighting — cables up to fire panel incomer</li> <li>24. CEIG approvals and Safety Certificate</li> <li>25. Testing, commissioning and submission of test reports</li> <li>26. All fabrication works with painting as specified</li> <li>27. Control and protection relay wiring</li> <li>28. Cable trays, supports and conduit works</li> </ol>

<b>Prepared By</b>	<b>Checked By (Consultant)</b>	<b>Approved By (Client)</b>
Name: _____ Sign & Stamp: _____ Date: _____	Name: _____ Sign & Stamp: _____ Date: _____	Name: _____ Sign & Stamp: _____ Date: _____