

# **TENDER SPECIFICATION**

**BHEL: PSSR: SCT: 2055**

**FOR**

**Erection, Testing & Commissioning including Handling of materials at site BHEL stores / storage yard, transporting to site of erection and supply & application of final painting of HT Electrical works for Package -1 (Unit-1) and Package -2 (Unit-2) Of 2X660 MW Udangudi Super Critical Thermal Power Project at Tuticorin District, Tamil Nadu**

## **VOLUME –II PRICE BID**



**BHARAT HEAVY ELECTRICALS LIMITED**

(A Government of India Undertaking)

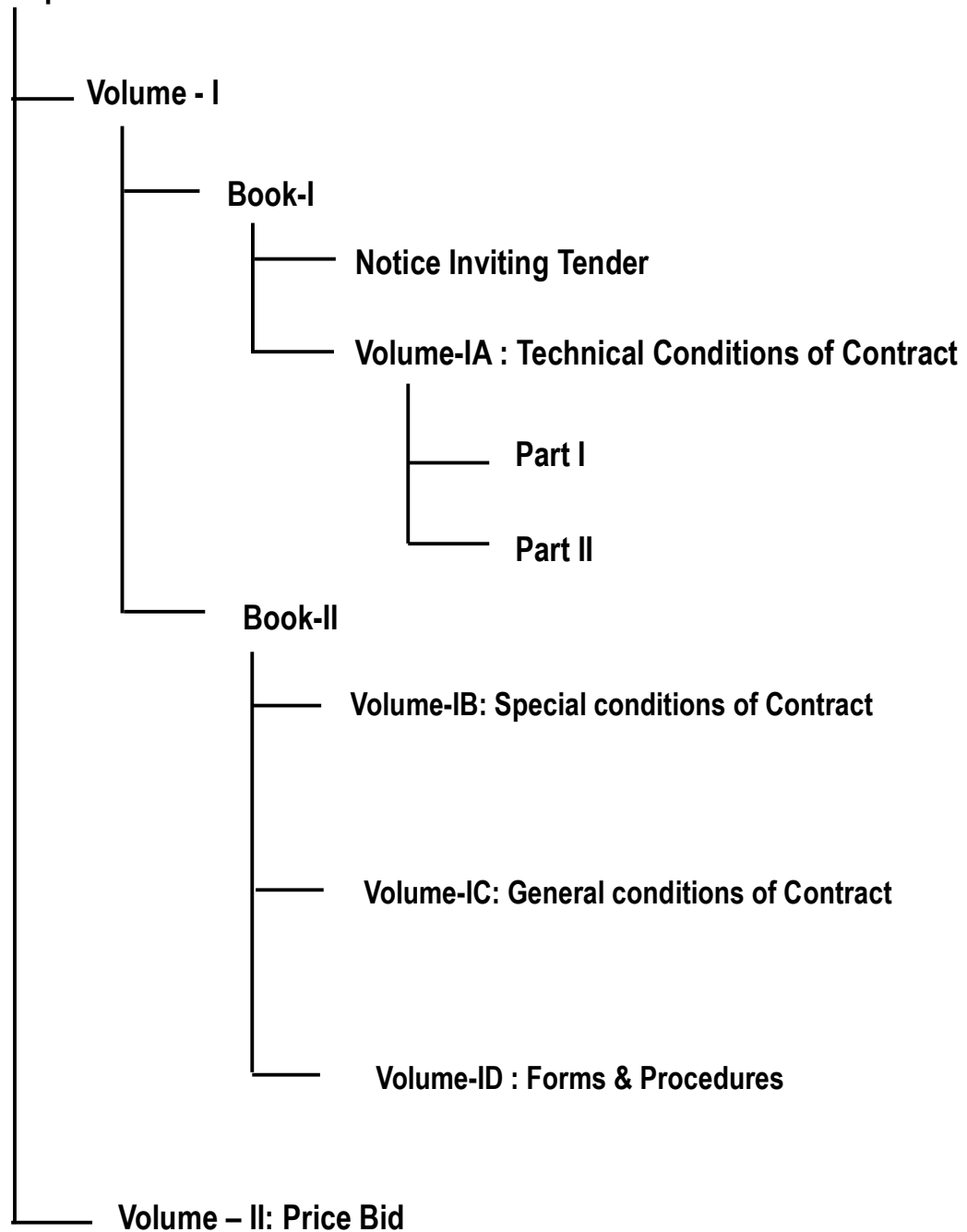
Power Sector – Southern Region

BHEL Integrated Office Complex, TNEB Road,

Pallikaranai, Chennai -600100

**TENDER SPECIFICATION CONSISTS OF**

**Tender Specification**



## PRICE BID

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### **PART A**

#### **Instruction to Bidders:**

1. The quantity indicated in the BOQ in Part C of Price Bid is approximate only and is liable for variation. Payment will be as per actual quantity executed and as certified by BHEL Engineer.
2. Tenderers are requested to affix their company seal and authorized signature in all pages.
3. The 'Total Amount' shall be quoted by the bidder for the entire scope of work, comprising of Package-1 (Unit-1) & Package-2 (Unit-2), as detailed in relevant chapters of Volume IA Technical Conditions of Contract.
4. **Both the packages (Package 1 and Package 2) will be awarded to only ONE successful bidder. However, Package 1 and Package 2 shall be treated as separate contracts.**
5. Bidders shall quote 'Total Amount for Package-1 (Unit-1) & Package-2 (Unit-2)' in the format enclosed as a separate Excel File in BHEL NIC e-Procurement portal for the subject tender and upload the same under 'Packet details - > Tender covers -> Finance '(Cover Type Description – Price Bid)' and same shall be taken into account for evaluation and awarding and hence, shall be complete in all respect for the full scope of work defined in specification and in accordance with terms & conditions of the tender. Any other entry elsewhere in the price bid shall be treated as Null and Void. Quoting of rates in any other form/formats will not be entertained.
6. The above mentioned 'Total amount' is for the entire Bill of Quantity (BOQ) given in Part -C of the Price Bid.
7. Based on the pre-fixed weightages, the amount for the individual items of the Bill of Quantity shall be arrived at. This amount shall be rounded off to the nearest rupee.
8. Based on the quantities of individual item and the amount arrived in Sl. No: 7 above, unit rate of individual items shall be derived. This unit rate shall be rounded off to four decimal places.
9. Bidders to note that this is an item rate contract. Payment shall be made for the actual quantities of work executed as certified by BHEL Engineer.
10. Bidders to also refer Terms of Payment in Chapter VII of Volume IA Part I, Technical Conditions of Contract.

## Part C : Bill of Quantities

**Tender Specification BHEL:PSSR:SCT:2055 for Package 1: Erection, Testing & Commissioning including Handling of materials at site BHEL stores / storage yard, transporting to site of erection and supply & application of final painting of HT Electrical works for Unit-1 of 2 x 660MW Udangudi Super Critical Thermal Power Project at Tuticorin Dt., TamilNadu**

### at Udangudi Thermal Power Station

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
I	ERECTION AND COMMISSIONING OF TRANSFORMERS	--		
A.1.1	Generator Transformer (GT#1) 275/220/165 MVA, (420/Sq.root(3))/21 kV, 1 phase, ONAN/ONAF/OFAF cooled, YNd11	SET	4	.0872294
B.1.1	Standby Maintenance Transformer (SBT) 110/55/55 MVA, 400/11.5 -11.5 KV, 3 Phase, with ONAN/ONAF/OFAF cooled, YNyn0yn0	SET	1	.017238
B.1.2, B.1.3	Station Transformer (ST#1) & Unit Transformer (UT#1A & 1B) 56/70 MVA, 21 KV/11.5KV, 3 Phase, ONAN/ONAF cooled, Dyn1	SET	3	.0197233
B.2.1	Sea Water Auxiliary Transformer, 28/35 MVA, 11/6.9 kV, 3 phase, ONAN/ONAF/Dyn1	SET	2	.0163039
B.2.2	External CHP Transformer 20/25 MVA, 11/36 kV, 3 phase, ONAN/ONAF/Ynd11	SET	2	.0153623
B.2.3	AHP Auxiliary Transformer 16 MVA, 11/6.9 kV, 3 phase, ONAN/Dyn1	SET	2	.0130076
B.2.4	Unit Auxiliary Transformer 12.5 MVA, 11/6.9 kV, 3 phase, ONAN/Dyn1	SET	2	.0130076
D.10.1	RO-DM AUXILIARY TRANSFORMER-6.3 MVA, 11/6.9 kV, 3 phase, ONAN/DyN1	SET	2	.0132886
D.10.2	STATION AUXILIARY TRANSFORMER- 5 MVA, 11/6.9 kV, 3 phase, ONAN/DyN1	SET	2	.0132886
B.2.5, B.2.6, B.2.7, B.2.8	2.5 MVA Cast Resin Dry Type Station Service Transformer Weight of Shipment: 8000 kg approx each.	SET	8	.0192233

## Part C : Bill of Quantities

**Tender Specification BHEL:PSSR:SCT:2055 for Package 1: Erection, Testing & Commissioning including Handling of materials at site BHEL stores / storage yard, transporting to site of erection and supply & application of final painting of HT Electrical works for Unit-1 of 2 x 660MW Udangudi Super Critical Thermal Power Project at Tuticorin Dt., TamilNadu**

**at Udangudi Thermal Power Station**

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
B.2.9	2 MVA Cast Resin Dry Type Station Service Transformer Weight of Shipment: 7000 kg approx each.	SET	2	.0042689
B.2.10 , B.2.11 , B.2.12 , B.2.13	1.6 MVA Cast Resin Dry Type Station Service Transformer Weight of Shipment: 6600 kg approx each.	SET	11	.0214696
B.2.14	0.63 MVA Cast Resin Dry Type Station Service Transformer Weight of Shipment: 3600 kg approx each.	SET	2	.0021333
II	ERECTION AND COMMISSIONING OF HT BUSDUCT	--		
II-A	IPBD	--		
C.1.1	27 kV IP Busduct (Maximum Voltage - 36kV) along with support structures	SET	1	.0541937
II-B	SPBD	--		
II-B-(i)	11 kV-4000/3150 A SPBD BUSDUCT, includes seal off bushing, rubber bellows, support steel structure, space heaters, grounding.	--		

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### at Udangudi Thermal Power Station

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
A.5.13 , A.5.14 , B.1.2, B.1.3, B.2.1, B.2.3	11 kV-4000/3150 Amp	Mtrs	497	.0235901
II-B-(ii)	6.6 kV-3150/1600/1250/630 A SPBD BUSDUCT includes Seal-off Bushing, Rubber Bellows, Aluminium Splice Plate & Flexibles, Copper Flexibles, Support Steel Structure, Space Heater arrangemnt, Grounding.	--		
C.2.3.1, C.2.3.2, C.2.4, C.2.5, C.2.6, C.2.7	6.6 kV-3150/1600/1250/630 Amp	Mtrs	240	.0112253
III	ERECTION AND COMMISSIONING OF HT SWITCHGEAR	--		
III-A	33 kV Switchgear	--		
A.2.1	ECHS Switchboard 0AA - 33KV, 630 A, 11 panels, 6 shipping sections. Over all panel sizes- 14300 (L) x 3248 (D) x2600(H) Weight of shipping for 1 panel - 1800 Kg(1300mm wide) aprox. for shipping two panel - 3600 Kg aprox.(1300mm + 1300mm wide)	SET	1	.0036456
III-B	11 kV Switchgear	--		

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#### at Udangudi Thermal Power Station

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
A.3.1	Unit Switchboard 1BA - 11KV, 4000 A, 22 panels, 12 shipping sections . Over all panel sizes- 18220 (L) x 2927(D)X2805 (H) Weight of shipping for 1 panel - 1300 Kg(820mm wide) aprox. for shipping two panel - 2600 Kg aprox.(820mm + 820mm wide)	SET	1	.0039223
A.3.2, A.3.5	Unit Switchboard 1BB/Standby Switchboard 0BC - 11KV,4000 A/3150 A, 21 panels, 11 shipping sections . Over all panel sizes- 17400/17720 (L) x 2887/2873 (D) x2805(H) Weight of shipping for 1 panel - 1300/1250 Kg(820mm wide) aprox.& for two panel - 2600/2500 kg (820mm + 820mm).	SET	2	.0075287
A.3.3, A.3.4	Station Switchboard 0BA/0BB - 11KV, 4000 A, 17 panels, 9 shipping sections . Over all panel sizes- 14120 (L) x 2873 (D) x2805(H) Weight of shipping for 1 panel - 1250/1300 Kg(820mm wide) aprox.for shipping two panel - 2600/2500 Kg aprox.(820 + 820mm wide)	SET	2	.0059903
A.3.6	Standby Switchboard 0BD - 11KV, 3150 A, 19 panels, 10 shipping sections . Over all panel sizes- 15580 (L) x 2873 (D) x2805(H) Weight of shipping for 1 panel - 1250 Kg(820mm wide) aprox.for shipping two panel - 2500 Kg aprox.(820 + 820mm wide)	SET	1	.0032869
III-C	6.6 kV Switchgear	--		
A.4.1	Unit Auxiliary Switchboard 1CA - 6.6 KV, 1250 A, 27 panels, 15 shipping sections . Over all panel sizes- 21920 (L) x 2873 (D) x2805(H) Weight of shipping for 1 panel - 1250 Kg(820mm wide) aprox.for shipping two panel - 2500 Kg aprox.(820 + 820mm wide)	SET	1	.0083947
A.4.2	Station Auxiliary Switchboard 0CA - 6.6 KV, 630 A, 20 panels, 11 shipping sections . Over all panel sizes- 16180 (L) x 2873 (D) x2805(H) Weight of shipping for 1 panel - 1300 Kg(820mm wide) aprox.for shipping two panel - 2600 Kg aprox.(820 + 820mm wide)	SET	1	.0061965



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### at Udangudi Thermal Power Station

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
A.4.3, A.4.8	CHP Auxiliary Switchboard OCB/ Sea Water intake Switchboard OCG, - 6.6 KV, 1600 A/630 A, 28 panels of suitable 15 shipping sections . Over all panel sizes- 22960 (L) x 2349 (D) x2805(H) Weight of shipping for 1 panel - 1300 Kg(820mm wide) aprox.for shipping two panel - 2600 Kg aprox.(820 + 820mm wide)	SET	2	.017586
A.4.4	AHP Auxiliary Switchboard OCC - 6.6 KV, 1250 A, 36 panels, 9 shipping sections . Over all panel sizes- 29300 (L) x 2873 (D) x2805(H) Weight of shipping for 1 panel - 1250 Kg(820mm wide) aprox.for shipping two panel - 2500 Kg aprox.(820 + 820mm wide)	SET	1	.0112211
A.4.5	RODM Auxiliary Switchboard OCD - 6.6 KV, 3500 A, 30 panels, 16 shipping sections . Over all panel sizes- 25580 (L) x 2873 (D) x2805(H) Weight of shipping for 1 panel - 1300 Kg(820mm wide) aprox.for shipping two panel - 2600 Kg aprox.(820 + 820mm wide)	SET	1	.0097964
A.4.6	CHP Bunker Switchboard OCE - 6.6 KV, 630 A, 21 panels, 11 shipping sections . Over all panel sizes- 17000 (L) x 2873 (D) x2805(H) Weight of shipping for 1 panel - 1300 Kg(820mm wide) aprox.for shipping two panel - 2600 Kg aprox.(820 + 820mm wide)	SET	1	.0065105
A.4.7	Ext.CHP Auxiliary Switchboard OCF - 6.6 KV, 1250 A, 22 panels, 11 shipping sections . Over all panel sizes- 17820 (L) x 2349 (D) x2805(H) Weight of shipping for 1 panel - 1300 Kg(820mm wide) aprox.for shipping two panel - 2600 Kg aprox.(820 + 820mm wide)	SET	1	.0068245
IV	ERECTION AND COMMISSIONING OF CONTROL PANEL SYSTEM	--		
A.5.1	Fast Bus Transfer System Panels for 11 KV SWGR size 800 (w) x 800 (d) x 2295 (h) weight 300 kg aprox, along with accessories computers, printers,table, checking of pre assembled LIUs, communication cables etc.	SET	2	.0011147
A.5.2	Protection panel for Generator/GT/UT/ST with associated loose supplied items such as Laptop, PC, Printer, UPS, interconnecting cables, RJ45 cables etc. Size of the Panel: 800 (W) x800 (D) x 2295 (H) mm Approximate weight of the panel : 450 kg. Lump sum rate to be quoted.	SET	8	.0016572

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### at Udangudi Thermal Power Station

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
A.5.3, A.5.4, A.5.5, A.5.6, A.5.7	Data concentrator panels along with loose items size 800mm(W) x800mm(D) x 2000mm(H) aprox weight 200kg along with Loose items of Data concentrator system - HMI OWS computer with monitor - 3 nos, console table 75 KG (1000mm x 750mm x 574 mm) - 1 no, A4 color printer - 1 no, UPS 1 KVA - 1 no, Ethernet switch - 12 nos, LIU - 10 nos, Laptop computer - 1 nos, Patch cards & RJ45 conecters reqd qty, GPS antanna alongwith cable, GPS receiver, GPS clock etc. Assembling of loose supply computer table, printer table, chairs etc	SET	4	.0032487
A.5.8, A.5.9, A.5.10 , A.5.11	Earthing Trucks (feeders and busbars) 33 kV/ 11 kV/ 6.6 kV	SET	22	.0017846
D.7.8	11 kV Neutral Ground Resistor (NGR) with NGR Cubicle of size 1200x1350x950 of weight app. 495 kg and with Supporting Structures	SET	4	.0022526
D.7.9	6.6 kV Neutral Ground Resistor (NGR) with NGR Cubicle of size 1000x900x800 of weight app. 290 kg and with Supporting Structures.	SET	6	.0033789
D.8.1	Generator circuit breaker (GCB) below generator Rating 27000 A, 21 kV size app. 6751mm x 4000 mm x 3535 mm along with centralizing cubicle and overall weight - 10288 kg.	SET	1	.0020259
E.6	Unit Control Panel(UCP)- approx panel size 2216(L) x1000(W) x 2355(H) approx weight 900 kg	No.	1	.0005632
E.7	Unit Electrical Control Panel(UECP)- approx panel size 2792 (L)x 1000(W) x 2355(H) , approx weight 900 kg	No.	1	.0005632
E.8, E.9, E.11, E.12	EDMS/IEMS (CYJ-01,CYJ-02 & CYJ03) electrical interface system panel size 750(L) x750(W) x 2067(H) approx weight 400 kg each along with HMI items i.e Server,OWS,EOWS,Printer,Cable ,etc.	SET	2	.0011354

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#### at Udangudi Thermal Power Station

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
E.1	Digital AVR consisting of 2No. Regulation cubicle, 1 No. Thyristor cubicle & 1 No. Field suppression cubicle, and associated loose supplied items including laying & termination of loose supplied power & control cables for DAVR system.DAVR Overall dimension: 4053 (L)x 800 (Wx 2465(H) mm Aproximate wt. : 3000 Kg. * Lump sum rate to be quoted.	SET	1	.0017813
V	LAYING OF HT CABLES	--		
V-A	LAYING OF HT CABLES 19/33KV (UE) ARMoured; ALUMINIUM CONDUCTOR ,XLPE INSULATED PVC/FRLS OUTER SHEATHED CABLE.	--		
G.1	1CX400 SQMM (AL)	Mtrs	700	.0008158
V-B	LAYING OF HT CABLES 11KV (UE) ARMoured; ALUMINIUM CONDUCTOR ,XLPE INSULATED PVC/FRLS OUTER SHEATHED CABLE.	--		
D.1.1	1C x 630 sqmm (AL)	Mtrs	34,500	.0402052
D.1.2	1C x 300 sqmm (AL)	Mtrs	15,000	.0101576
D.1.3	3C x 240 sqmm (AL)	Mtrs	7,750	.0104962
VI	LAYING OF HT CABLES 6.6 KV (UE) ARMoured; ALUMINIUM CONDUCTOR ,XLPE INSULATED PVC/FRLS OUTER SHEATHED CABLE.	--		
D.2.1	1C x 630 sqmm (AL)	Mtrs	14,500	.009134
D.2.2	3C x 150 sqmm (AL)	Mtrs	10,750	.0123584
VII	Installation of Cable termination and joint kits	--		
VII-A	Installation of Cable termination and joint kits for 33/33 KV (UE) GRADE, XLPE Insulated aluminium conductor armoured cables for the following sizes.	--		

## Part C : Bill of Quantities

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### at Udangudi Thermal Power Station

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
G.2	Termination Kit for 1C x 400 Sq. mm., 19/33kV(E) , Stranded Circular and compacted Aluminium Conductor, XLPE insulated, Armoured, FRLS PVC outer sheath Power Cable	Nos.	28	.0018582
VII-B	Installation of Cable termination and joint kits for 11/11 KV (UE) GRADE, XLPE Insulated aluminium conductor armoured cables for the following sizes.	--		
D.3.1, D.4.1	Termination/Joint KIT 11KV 1C-630 sqmm AL ARM (indoor) AL LUG	Nos.	94	.0062366
D.3.2, D.4.2	Termination/Joint KIT 11KV 1C-300 sqmm AL ARM (indoor) AL LUG	Nos.	143	.0057583
D.3.3, D.4.3	Termination/ Joint KIT 11KV 3C-240 sqmm AL ARM (indoor) AL LUG	Nos.	48	.0034077
VII-C	Installation of Cable termination kits and joint kit for 6.6 KV (UE) GRADE, XLPE Insulated aluminium conductor armoured cables for the following sizes.	--		
D.5.1	Termination KIT 6.6 KV 1C-630 sqmm AL ARM (indoor) AL LUG	Nos.	22	.0012244
D.5.2, D.6.1	Termination /Joint KIT 6.6 KV 3C-150 sqmm AL ARM (indoor) AL LUG	Nos.	85	.0057667
VIII	INSTALLATION OF HOT DIP GALVANIZED STEEL FLATS	--		
D.7.1	GS FLAT 65 X 8 mm	Mtrs	3,300	.0060284
D.7.2	GS FLAT 50 X 6 mm	Mtrs	2,750	.0032914
D.7.3	GS FLAT 25 X 6 mm	Mtrs	1,125	.0011693
D.7.4	GS FLAT 25 X 3 mm	Mtrs	330	.0003534

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#### at Udangudi Thermal Power Station

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
D.7.5	GI WIRE 14 SWG	Mtrs	1,700	.0001071
IX	FABRICATION & ERECTION OF STRUCTURAL STEEL	--		
D.11.1 , D.11.2 , D.11.3 , D.11.4	Structural Steel (ISMC, ISMB, ISA, etc)	MT	47	.0126827
X	COMMISSIONING OF THE FOLLOWING ERECTED BY MECHANICAL CONTRACTOR	--		
D.9.1	Generator 660 MW - H.V. testing, meggering of Bushings & Accessories, resistance measurement, meggering including dry out of Generator and as per field quality plan.	SET	1	.0026904
D.9.2	Exciter dryer / heater	No.	1	.000053
D.9.3	Generator Air Drier	No.	1	.000053
D.9.4	CO2 Vaporizer	No.	1	.0000453
D.9.5	Exciter Stroboscope	No.	1	.0000453
D.9.6	11 KV HT drives	Nos.	10	.0018699
D.9.7, D.9.8	6.6 KV HT Drives	Nos.	56	.0054863

## Part C : Bill of Quantities

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### at Udangudi Thermal Power Station

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
XI	LAYING OF LT POWER / CONTROL CABLES 1.1KV, XLPE INSULATED, GALVANISED STEEL ARMoured SINGLE/MULTICORE CABLES FRLS PVC. (AL/CU CABLES)	--		
E.2	3C x 50 sqmm copper (Excitation + power input)	Mtrs	800	.0002142
E.4	1Cx 70 sqmm copper (earthing)	Mtrs	100	.0000268
XII	END TERMINATION OF LT POWER / CONTROL CABLES -1.1KV PVC/FRLS ARMoured AL/CU CONDUCTOR PVC INSULATED, FRLS OUTER SHEATHED.	--		
E.3	3C x 50 sqmm copper (Excitation + power input)	Nos.	16	.0000698
E.5	1Cx 70 sqmm copper (earthing)	Nos.	4	.0000039
XIII	LAYING AND TERMINATION OF INSTRUMENTATION CABLES	--		
A.5.12	OFC cable includes fixing of fibre optic components and termination kits LIU, face plates,cabinets,SC coupler,grounding etc	Mtrs	11,000	.0038111
A.5.13	OFC Cable splicing	Nos.	75	.0001358
A.5.14	D link 4 pair PVC, CAT 5 Lan cable	Mtrs	6,000	.0005669
XIV	ERECTION OF MISCELLANEOUS ITEMS	--		
D.7.6, F.1	Flexible braided copper conductor with copper clamp for gate earthing & Earthing with MS earth rod 40 mm (Below ground earthing system)	Mtrs	158	.0001866

**Part C : Bill of Quantities**

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**at Udangudi Thermal Power Station**

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
D.7.7	Treated Earth pit of CI pipe 3000 m long with funnel and accessories including all civil works, filling of earth pit with alternate layer of chrcoal & salt as per IE specification and making of brick chamber, with both side plastering, supply and fising of manhole CI cover plate/RCC Slab etc. complete as per IS 3043 (only 100 mm CI pipe shall be supplied by BHEL)	SET	56	.0075517

## Part C : Bill of Quantities

**Tender Specification BHEL:PSSR:SCT:2055 for Package-2: Erection, Testing & Commissioning including Handling of materials at site BHEL stores / storage yard, transporting to site of erection and supply & application of final painting of HT Electrical works for Unit-2 of 2 x 660MW Udangudi Super Critical Thermal Power Project at Tuticorin Dt., TamilNadu**

### at Udangudi Thermal Power Station

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
I	ERECTION AND COMMISSIONING OF TRANSFORMERS	--		
H.1.1	Generator Transformer (GT#2) 275/220/165 MVA,(420/Sq.root(3))/21 kV, 1 phase, ONAN/ONAF/OFAF cooled,YNd11	SET	3	.065422
J.1.1, J.1.2	Station Transformer (ST#2) & Unit Transformer (UT#1A & 1B) 56/70 MVA, 21 KV/11.5KV, 3 Phase, ONAN/ONAF cooled, Dyn1	SET	3	.0197233
J.2.1	Unit Auxiliary Transformer 12.5 MVA, 11/6.9 kV, 3 phase, ONAN/Dyn1	SET	2	.0130076
J.2.2, J.2.3	2.5 MVA Cast Resin Dry Type Station Service Transformer Weight of Shipment: 8000 kg approx each.	SET	4	.0096116
J.2.4, J.2.5	2 MVA Cast Resin Dry Type Station Service Transformer Weight of Shipment: 7000 kg approx each.	SET	4	.0085379
J.2.6	1.6 MVA Cast Resin Dry Type Station Service Transformer Weight of Shipment: 6600 kg approx each.	SET	5	.0097589
II	ERECTION AND COMMISSIONING OF HT BUSDUCT	--		
II-A	IPBD	--		
K.1.1	27 kV IP Busduct (Maximum Voltage - 36kV) along with support structures	SET	1	.0541937
II-B	SPBD	--		
II-B-(i)	11 kV-4000/3150 A SPBD BUSDUCT, includes seal off bushing, rubber bellows, support steel structure, space heaters, grounding.	--		



### Part C : Bill of Quantities

**Tender Specification BHEL:PSSR:SCT:2055 for Package-2: Erection, Testing & Commissioning including Handling of materials at site BHEL stores / storage yard, transporting to site of erection and supply & application of final painting of HT Electrical works for Unit-2 of 2 x 660MW Udangudi Super Critical Thermal Power Project at Tuticorin Dt., TamilNadu**

**at Udangudi Thermal Power Station**

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
K.2.1.1, K.2.1.2, K.2.1.3, K.2.2.1, K.2.2.2, K.2.2.3, K.2.2.4, K.2.2.5, K.2.2.6	11 kV-4000/3150 Amp	Mtrs	531	.025204
II-B-(ii)	6.6 kV-1600 A SPBD BUSDUCT includes Seal-off Bushing, Rubber Bellows, Aluminium Splice Plate & Flexibles, Copper Flexibles, Support Steel Structure, Space Heater arrangemnt, Grounding.	--		
K.2.3.1, K.2.3.2	6.6 kV-1600 Amp	Mtrs	118	.0055191
III	ERECTION AND COMMISSIONING OF HT SWITCHGEAR	--		
III-A	11 kV Switchgear	--		

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### at Udangudi Thermal Power Station

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
H.2.1	Unit Switchboard 2BA - 11KV, 4000 A, 22 panels, 12 shipping sections . Over all panel sizes- 18220 (L) x 2927(D)X2805 (H) Weight of shipping for 1 panel - 1300 Kg(820mm wide) aprox. for shipping two panel - 2600 Kg aprox.(820mm + 820mm wide)	SET	1	.0039223
H.2.2	Unit Switchboard 2BB- 11KV,4000 A, 21 panels, 11 shipping sections . Over all panel sizes- 17400(L) x 2887(D) x2805(H) Weight of shipping for 1 panel - 1300 Kg(820mm wide) aprox.& for two panel - 2600 kg (820mm + 820mm).	SET	1	.0037186
III-B	6.6 kV Switchgear	--		
H.3.1	Unit Auxiliary Switchboard 1CA - 6.6 KV, 1250 A, 27 panels, 15 shipping sections . Over all panel sizes- 21920 (L) x 2873 (D) x2805(H) Weight of shipping for 1 panel - 1250 Kg(820mm wide) aprox.for shipping two panel - 2500 Kg aprox.(820 + 820mm wide)	SET	1	.0083947
IV	ERECTION AND COMMISSIONING OF CONTROL PANEL SYSTEM	--		
H.4.1	Fast Bus Transfer System Panels for 11 KV SWGR size 800 (w) x 800 (d) x 2295 (h) weight 300 kg aprox, along with accessories computers, printers,table, checking of pre assembled LIUs, communication cables etc.	SET	2	.0011147
H.4.2	Protection panel for Generator/GT/UT/ST with associated loose supplied items such as Laptop, PC, Printer, UPS, interconnecting cables, RJ45 cables etc. Size of the Panel: 800 (W) x800 (D) x 2295 (H) mm Approximate weight of the panel : 450 kg. Lump sum rate to be quoted.	SET	8	.0016572
H.4.3	Data concentrator panels along with loose items size 800mm(W) x800mm(D) x 2000mm(H) aprox weight 200kg along with Loose items of Data concentrator system - HMI OWS computer with monitor - 3 nos, console table 75 KG (1000mm x 750mm x 574 mm) - 1 no, A4 color printer - 1 no, UPS 1 KVA - 1 no, Ethernet switch - 12 nos, LIU - 10 nos, Laptop computer - 1 nos, Patch cards & RJ45 conecters reqd qty, GPS antanna alongwith cable, GPS receiver, GPS clock etc. Assembling of loose supply computer table, printer table, chairs etc	SET	1	.0008122

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#### at Udangudi Thermal Power Station

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
H.4.4, H.4.5, H.4.6	Earthing Trucks (feeders and busbars) 33 kV/ 11 kV/ 6.6 kV	SET	5	.0004056
L.7.8	11 kV Neutral Ground Resistor (NGR) with NGR Cubicle of size 1200x1350x950 of weight app. 495 kg and with Supporting Structures	SET	4	.0022526
L.7.9	6.6 kV Neutral Ground Resistor (NGR) with NGR Cubicle of size 1000x900x800 of weight app. 290 kg and with Supporting Structures.	SET	6	.0033789
L.8.1	Generator circuit breaker (GCB) below generator Rating 27000 A, 21 kV size app. 6751mm x 4000 mm x 3535 mm along with centralizing cubicle and overall weight - 10288 kg.	SET	1	.0020259
M.6	Unit Control Panel(UCP)- approx panel size 2216(L) x1000(W) x 2355(H) approx weight 900 kg	No.	1	.0005632
M.7	Unit Electrical Control Panel(UECP)- approx panel size 2792 (L)x 1000(W) x 2355(H) , approx weight 900 kg	No.	1	.0005632
M.10, M.11	EDMS/IEMS (CYJ-01,CYJ-02 & CYJ03) electrical interface system panel size 750(L) x750(W) x 2067(H) approx weight 400 kg each along with HMI items i.e Server,OWS,EOWS,Printer,Cable ,etc.	SET	1	.0005677
M.1	Digital AVR consisting of 2No. Regulation cubicle, 1 No. Thyristor cubicle & 1 No. Field suppression cubicle, and associated loose supplied items including laying & termination of loose supplied power & control cables for DAVR system.DAVR Overall dimension: 4053 (L)x 800 (Wx 2465(H) mm Aproximate wt. : 3000 Kg. * Lump sum rate to be quoted.	SET	1	.0017813
V	LAYING OF HT CABLES	--		
V-A	LAYING OF HT CABLES 11KV (UE) ARMoured; ALUMINIUM CONDUCTOR ,XLPE INSULATED PVC/FRLS OUTER SHEATHED CABLE.	--		

## Part C : Bill of Quantities

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### at Udangudi Thermal Power Station

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
L.1.1	1C x 630 sqmm (AL)	Mtrs	34,500	.0402052
L.1.2	1C x 300 sqmm (AL)	Mtrs	15,000	.0101576
L.1.3	3C x 240 sqmm (AL)	Mtrs	7,750	.0104962
VI	LAYING OF HT CABLES 6.6 KV (UE) ARMoured; ALUMINIUM CONDUCTOR ,XLPE INSULATED PVC/FRLS OUTER SHEATHED CABLE.	--		
L.2.1	1C x 630 sqmm (AL)	Mtrs	14,500	.009134
L.2.2	3C x 150 sqmm (AL)	Mtrs	10,750	.0123584
VII	Installation of Cable termination and joint kits	--		
VII-A	Installation of Cable termination and joint kits for 11/11 KV (UE) GRADE, XLPE Insulated aluminium conductor armoured cables for the following sizes.	--		
L.3.1, L.4.1	Termination/Joint KIT 11KV 1C-630 sqmm AL ARM (indoor) AL LUG	Nos.	92	.0061039
L.3.2, L.4.2	Termination/Joint KIT 11KV 1C-300 sqmm AL ARM (indoor) AL LUG	Nos.	142	.0057181
L.3.3, L.4.3	Termination/ Joint KIT 11KV 3C-240 sqmm AL ARM (indoor) AL LUG	Nos.	46	.0032657
VII-B	Installation of Cable termination kits and joint kit for 6.6 KV (UE) GRADE, XLPE Insulated aluminium conductor armoured cables for the following sizes.	--		
L.5.1	Termination KIT 6.6 KV 1C-630 sqmm AL ARM (indoor) AL LUG	Nos.	22	.0012244

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**at Udangudi Thermal Power Station**

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
L.5.2, L.6.1	Termination /Joint KIT 6.6 KV 3C-150 sqmm AL ARM (indoor) AL LUG	Nos.	84	.0056988
VIII	INSTALLATION OF HOT DIP GALVANIZED STEEL FLATS	--		
L.7.1	GS FLAT 65 X 8 mm	Mtrs	3,300	.0060284
L.7.2	GS FLAT 50 X 6 mm	Mtrs	2,750	.0032914
L.7.3	GS FLAT 25 X 6 mm	Mtrs	1,125	.0011693
L.7.4	GS FLAT 25 X 3 mm	Mtrs	330	.0003534
L.7.5	GI WIRE 14 SWG	Mtrs	1,700	.0001071
IX	FABRICATION & ERECTION OF STRUCTURAL STEEL	--		
L.11.1 , L.11.2 , L.11.3 , L.11.4	Structural Steel (ISMC, ISMB, ISA, etc)	MT	47	.0126827
X	COMMISSIONING OF THE FOLLOWING ERECTED BY MECHANICAL CONTRACTOR	--		
L.9.1	Generator 660 MW - H.V. testing, meggering of Bushings & Accessories, resistance measurement, meggering including dry out of Generator and as per field quality plan.	SET	1	.0026904
L.9.2	Exciter dryer / heater	No.	1	.000053

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**at Udangudi Thermal Power Station**

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
L.9.3	Generator Air Drier	No.	1	.000053
L.9.4	CO2 Vaporizer	No.	1	.0000453
L.9.5	Exciter Stroboscope	No.	1	.0000453
L.9.6	11 KV HT drives	Nos.	10	.0018699
L.9.7, L.9.8	6.6 KV HT Drives	Nos.	38	.0037228
XI	LAYING OF LT POWER / CONTROL CABLES 1.1KV, XLPE INSULATED, GALVANISED STEEL ARMOURED SINGLE/MULTICORE CABLES FRLS PVC. (AL/CU CABLES)	--		
M.2	3C x 50 sqmm copper (Excitation + power input)	Mtrs	800	.0002142
M.4	1Cx 70 sqmm copper (earthing)	Mtrs	100	.0000268
XII	END TERMINATION OF LT POWER / CONTROL CABLES -1.1KV PVC/FRLS ARMOURED AL/CU CONDUCTOR PVC INSULATED, FRLS OUTER SHEATHED.	--		
M.3	3C x 50 sqmm copper (Excitation + power input)	Nos.	16	.0000698
M.5	1Cx 70 sqmm copper (earthing)	Nos.	4	.0000039
XIII	LAYING AND TERMINATION OF INSTRUMENTATION CABLES	--		
H.4.7	OFC cable includes fixing of fibre optic components and termination kits LIU, face plates,cabinets,SC coupler,grounding etc	Mtrs	11,000	.0038111
H.4.8	OFC Cable splicing	Nos.	75	.0001358

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**at Udangudi Thermal Power Station**

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
H.4.9	D link 4 pair PVC, CAT 5 Lan cable	Mtrs	6,000	.0005669
XIV	ERECTION OF MISCELLANEOUS ITEMS	--		
L.7.6, N.1	Flexible braided copper conductor with copper clamp for gate earthing & Earthing with MS earth rod 40 mm (Below ground earthing system)	Mtrs	157	.0001854
L.7.7	Treated Earth pit of CI pipe 3000 m long with funnel and accessories including all civil works, filling of earth pit with alternate layer of chrcoal & salt as per IE specification and making of brick chamber, with both side plastering, supply and fising of manhole CI cover plate/RCC Slab etc. complete as per IS 3043 (only 100 mm CI pipe shall be supplied by BHEL)	SET	56	.0075517
<b>TOTAL Weightage</b>				1.0