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TENDER NO. BHEL: NR(SCT):CHIMNEY:KOSTI:441

TENDER SPECIFICATIONS

FOR

“CONSTRUCTION OF TWO NUMBERS 101 MTR HIGH REINFORCED CONCRETE TWIN FLUE STEEL LINED CHIMNEYS AND FOUR SETS OF INDUCED DRAUGHT REINFORCED CONCRETE COOLING TOWERS INCLUDING SUPPLY OF ALL MATERIALS EXCEPT THOSE PROPOSED TO BE SUPPLIED BY BHEL FOR 4 X 125 MW UNITS AT KOSTI TPP, SUDAN OF M/S NEC, SUDAN”

PART II – PRICE BID



Bharat Heavy Electricals Limited
(A Govt. Of India Undertaking)
Power Sector – Northern Region,
Plot No. 25 , Sector - 16A ,
Distt. Gautam Budh Nagar, NOIDA – 201 301 (INDIA)



ISO 9001-2000, ISO 14001
and OHSAS 18001 certified
company
SubContract and Purchase
Deptt.

Bharat Heavy Electricals Limited
(A Govt. Of India Undertaking)
Power Sector – Northren Region,
Plot No. 25 , Sector - 16A ,
Distt. Gautam Budh Nagar, NOIDA – 201 301.INDIA
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IMPORTANT NOTE

PURCHASER OF THIS TENDER DOCUMENT IS ADVISED TO CHECK AND ENSURE COMPLETION OF ALL PAGES OF TENDER DOCUMENT AND REPORT ANY DISCREPANCY TIMELY FOR CORRECTIVE ACTION, IF ANY, TO THE ISSUING AUTHORITY BEFORE THE BIDS ARE SUBMITTED. ORIGINAL COPY OF TENDER DOCUMENT COMPLETE IN ALL RESPECTS MUST BE SUBMITTED BACK AS PART OF THE BID WITHOUT WHICH THE SAME IS LIABLE TO BE REJECTED BY BHEL.

THIS TENDER SPECIFICATION ISSUED TO:

M/S-----

Bharat Heavy Electricals Limited
(A Govt. Of India Undertaking)
Power Sector – Northren Region,
Plot No. 25 , Sector - 16A ,
Distt. Gautam Budh Nagar, NOIDA – 201 301.INDIA

PROCEDURE FOR SUBMISSION OF SEALED TENDERS:

The tenderers must submit their tenders as required in two parts in separate sealed covers prominently superscribed as Part-I Technical bid and Part-II ,Price bid also indicating on each of the cover tender specification no., date and time as mentioned in tender notice.

TECHNICAL BID (COVER-I)

Except Price bid Part-II, complete set of tender document consisting of General conditions of Contract, “Technical specification & Special terms and condition” (Part-I) issued by BHEL shall be enclosed in Part I Technical Bid only. All schedules, data sheets and details called for in the specification shall also be submitted along with technical bid. All details / Data / Schedules including offer letter duly signed and stamped are to be submitted in duplicate.

PRICE BID (COVER-II)

Tenderers may please note that price bid is to be submitted only in original copy of Tender i.e. Price bid (Part-II) issued by BHEL and no duplicate copy of same is required.

These Two separate covers i.e. cover I & II shall together be enclosed in a third envelope (Cover-III) and this sealed cover shall be superscribed with tender specification No., due date, time and submitted to officer inviting tender as indicated in tender notice on or before due date as indicated.

4X125 MW KOSTI Thermal Power Plant, Sudan		RATE SCHEDULE CUM BILL OF QUANTITIES			
		TOTAL CIVIL WORKS FOR 2 NOS. 101 mtrs TWIN STEEL FLUE RCC CHIMNIES AND 4 NOS IDCTS			
S.NO	DESCRIPTION	UNIT	QTY.	UNIT RATE IN EUROS	TOTAL RATE IN EUROS
AA : ITEMS FOR 2 NOS 101 MTRS TWIN STEEL FLUE CHIMNEY					
1	EARTH WORK IN EXCAVATION, BACKFILLING AND DISPOSAL AS PER SPECIFICATION AND DRAWINGS				
(i)	Excavation including providing cofferdams, shoring, strutting, sheeting, bracing, draining and pumping out water other than water below ground water table, clearing all grass, vegetation etc. including trimming of excavation bottom, staking, levelling, grading etc. of excavated materials all complete as per specifications, drawings and instructions of the engineer, including a lead up to 100 meters and a lift up to 2.0 meters.				
a)	In all types of soils including ash, morrum, laterite or weathered rock	CUM	3000		
2	Extra over item 1 above, for all types of soil/rock, for additional lifts beyond the initial lift of 2 meters (included in item 1 above) all complete as per specifications, drawings and instructions of the engineer for the following lifts:				
i)	In all types of soils				
a	beyond 2 m and upto 4 m	CUM	2000		
b	beyond 4 m and upto 8 m	CUM	500		
ii)	In all types of rocks				
a	beyond 2 m and upto 4 m	CUM	20		
b	beyond 4 m and upto 8 m	CUM	100		

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3	Extra over item 1 above for excavation below ground water table including lowering of ground water table to maintain dry working conditions for all activities up to filling/testing, water proofing all complete as per specifications, drawings and instructions of the engineer.	CUM	20		
4	Extra over item 1 above for carriage of all types of excavated materials beyond the initial lead of 100 m (included in item 1 above) all complete as per specifications, drawings and instructions of the engineer for the following leads				
i)	Carriage beyond initial lead of 100 m but not exceeding 500 m	CUM	1000		
ii)	Carriage beyond initial lead of 500 m but not exceeding 2 Km	CUM	1000		
5	Filling using selected excavated materials in trenches, plinths, sides of foundations and other underground structures, pipes etc., in layers not exceeding 200 mm loose thickness for all leads and lifts and including loading from stock pile, carting, unloading, filling, watering and compacting / ramming each layer, all complete as per Specifications, drawings and as directed by the Engineer to achieve With selected soil non expansive soil brought from borrow areas arranged by contractor including royalties,fees if any etc.				

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S.NO	DESCRIPTION	UNIT	QTY.	UNIT RATE IN EUROS	TOTAL RATE IN EUROS
(I)	Minimum 90% Standard Proctor density	CU.M	500		
(II)	Minimum 95% Standard Proctor density	CU.M	2000		
(III)	With selected sand brought from quarries/river bed arranged by contractor including royalties, fees if any and compacting to minimum 80% relative density etc.	CU.M	500		
(IV)	Levelling and compacting the surplus excavated earth obtained from Item No. 1 including all lifts & as per specifications and as directed by the Engineer with the cost of all labour, material and equipment complete.	CU.M	2200		
6	Supplying and laying (inside chimney in the space below the grade level below the grade level slab) crushed rock and sand fill in layers no more than 150 mm thick each and thoroughly compacted by compacting equipment and by water flooding to achieve maximum density for all leads and lifts including all labour, materials, equipment etc. complete as per drawings specifications and directions of the Engineer.	CU.M	1500		

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7	Providing and laying Nominal Mix plain cement concrete (1:3:6) with graded aggregate (with maximum size of coarse aggregate not exceeding 40 mm) at all levels for all kinds of work like mass concrete, lean concrete, mudmat, filling etc. including labour, materials, equipment, handling, transporting, batching, curing, testing etc. all complete as per specifications, drawings and instructions of the engineer.	CU.M	70		
8	Providing and laying design mix cement concrete with graded aggregate (maximum size of coarse aggregate not exceeding 20 mm) for reinforced concrete work at all levels for all kinds of work, including labour, materials, equipment, handling, transporting, batching, mixing, placing, leveling, compacting, curing, testing etc. and rendering or cleaning and finishing the exposed surface with cement mortar (1:3) to give smooth and even surface, all complete as per specifications, drawings and instructions of the Engineer, but excluding all formwork and reinforcing steel:				
	i) For works below ground level				
	a) Grade M-25 (sulphate resistant concrete for foundations, etc)	CU.M	850		
	ii) For works above ground level				
	a) Grade M-20 (grade level slab)	CU.M	55		
	b) Grade M-30 for chimney shell, corbels and other shell attachments.	CU.M	3100		
	c) Grade M30 for chimney shell, corbels and external platforms and other shell attachments.	CU.M	100		
	d) Grade M30 for all other components of the super structure, roof slab, mini-shells, beams, columns, wall etc	CU.M	100		

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9	Providing and placing reinforcement, for reinforced concrete work, at all levels, for all kinds of work, including transportation, cleaning, derusting, straightening, cutting, bending, binding in position with annealed wire and/or welding, providing concrete cover blocks, pins, separators, chairs, supports for reinforcement, etc. with all materials, labour, equipment handling, transporting, testing, etc. preparation of bar bending schedules, all complete as per specifications, drawings and instructions of the Engineer. (Steel shall be supplied free of cost by BHEL as per Clause 39.1)				
	i) For works below ground level				
	a) High strength deformed bars	MT	80		
	ii) For works above ground level				
	a) Mild steel reinforcement bars	MT	5		
	b) High strength deformed bars	MT	300		
10	Providing and fixing formwork of approved quality for cast-in-situ, plain or reinforced concrete works of any type and section (including curved surfaces and chimney shell) for all elevations, including labour, materials, equipment, waste of forms, shoring, strutting, scaffolding, staging, tying, nailing, caulking, bolting etc. and removal of form work and staging etc. all complete as per specifications, drawings and instructions of the Engineer.				
	i) For works below ground level	SQ.M	400		
	ii) For works above ground level				
	a) Inner and outer faces of wind shield with slip form shuttering	SQ.M	18000		

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	b) All other components of the superstructure including slabs, beams, columns, walls, enclosures, mini shells, external platforms, corbels, other shell attachments, chases/recesses in shell etc.	SQ.M	400		
11	Providing and fixing formwork in shell openings (above 0.1 sq.m surface area) including cutting, formation of shapes and all other operations required for making the required shape and size, removal of formwork, all complete as per specifications, drawings and instructions of the Engineer.	SQ.M	10		
12	Providing and placing in position at all levels, building paper (kraft paper), between concrete surfaces including the cost of labour, material, etc. complete as per drawings and instruction of the Engineer.	SQ.M	20		
13	Providing and installing, at all levels, bitumen impregnated fibre boards, 12 mm thick, conforming to IS:1838 or equivalent, as joint filler at joints in concrete, including nailing, coating of both faces with coal tar pitch/bitumen, including the cost of all labour, material and equipments etc., complete as per drawings and specifications and instructions of the Engineer.	SQ.M	15		
14	Providing and filling, at all levels, bitumen sealing compound (hot applied type) conforming to IS:1834 or equivalent, for sealing gaps and joints in concrete, including cleaning, mixing, heating, pouring or injecting, application of primer, cost of all labour, material and equipments etc., complete as per drawings, specifications and instructions of the Engineer.	Kg	80		

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15	Preparing detailed fabrication drawings and after approval by the Engineer, supplying, fabricating,erecting and installing miscellaneous steel parts to be embedded/ cast in concrete (like staircase embedments,corbel face plates, etc) at all positions and levels including the cost of all labour, materials and equipments labour,for setting materials in concrete,grouting, welding, bolts & bolting, expansion anchors, drilling, cutting, etc. complete as per drawings and specification (Steel shall be supplied free of cost by BHEL as per Clause 39.1)	MT	4		
16	Preparing detailed fabrication drawings after approval by the Engineer, providing, fabricating and erecting mild structural steel work for the stair case from grade level to roof level including brackets, kick plates all fittings and fixtures etc., including the cost of all labour, material and equipment, transporting, lifting to all heights, setting in place,drilling, bolts and bolting, anchor fasteners, welding, primer and finish touch painting,etc.,complete as per drawing and specifications. (Steel shall be supplied free of cost by BHEL as per Clause 39.1)	MT	50		

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17	Preparing detailed fabrication drawings, and after approval by the Engineer, providing, fabricating and erecting at all levels, internal platform and walkway gallery structures complete including all structural members, connections with HSFG bolts, beam support bearings on the shell, wstiffeners, wseats, brackets, all other fittings and fixuttore, blockouts, etc. including the cost of all labour, material and equipment, transporting, lifting to all heights, setting in place, high strength grout and grouting, anchor bolts, welding to cast-in fixing plates, cutting, grinding, drillingl, bolts and bolting, welding, preheating and post-heating for welding, testing, grinding smooth or machining the support bearing plates, primer and finish painting, etc. complete as per drawings and specifications. (Steel shall be supplied free of cost by BHEL as per Clause 39.1)	MT	125		
18	Preparing detailed fabrication drawings, and after approval by the Engineer, providing, fabricating and erecting at all levels, chequered plate panels for floors of internal and external platforms and treads and landings of the staircase complete with stiffeners, brackets, ready to bolt fixtures, etc. including the cost of all labour, material and equipment, transporting, lifting to all heights, setting in place, cutting, grinding, finishing, drilling, bolts and bolting, welding, testing, primer and finish painting, etc. complete as per drawings and specifications. (Steel shall be supplied free of cost by BHEL as per Clause 39.1)	MT	30		

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19	Preparing detailed fabrication drawings and after approval by the Engineer, providing, fabricating and erecting, at all levels, structural steel flues (liners) mild steel complete with all bends, flanges, stiffeners, all other flue attachments, support, system, collars, access manholes and gas sampling ports alongwith gaskets and other accessories, staying system, including the cost of all labour, material and equipment, transporting, lifting to all heights, setting in place, cutting, grinding, drillings, bending, bolts and bolting, welding, preheating and post-heating for welding, testing, etc. complete as per drawings and specifications. (Steel shall be supplied free of cost by BHEL as per Clause 39.1)	MT	325		
20	Preparing detailed fabrication drawings and after approval by the Engineer, providing, fabricating and erecting, at all levels, stainless plates (including stainless steel screws and fasteners) as per relevent IS and lead sheets beams and over the mild steel in the platform beam bearing, flue supports bearings, flue restraints brackets/ buffers , ladders, sealing, crowning, railing at terrace, ventilation louvers at top etc. including the cost of all labour, material & equipment, transporting, lifting to all heights, setting in place, cutting, grinding, drilling, welding of stainless steel using compatible & approved stainless steel electrodes, testing & machining flat and polishing the contact surfaces of stainless steel, coating the polished surfaces with silicone, grease, etc., complete as per drawings and specifications.				
	(a) Stainless steel components	MT	0.5		
	(b) Lead Sheets	Kg	100		

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21	Preparing detailed fabrication drawings and after approval by the Engineer, providing, fabricating and installing expansion compensator joints including bolster in the flue liner including all labour, material and equipment transporting, hoisting, fixing in position, drilling, cutting, bolts and bolting, etc. along with the user handbooks (giving details of installation, dismantling and maintainance procedures for the expansion joints), testing, etc complete as per drawings and specifications.	SQ.M.	44 (For 8 nos.)		
22	Supplying "Fabricated Ready to Install" spare expansion compensators alongwith bolster including the cost of all labour, material and equipment,accessories, transporting, proper packaging (for several years of storage), and delivery to site store complete in all respects as store complete in all respects as per drawings and specification.	SQ.M.	11 (for2 nos)		
23	Providing and installing, at all levels, resin bonded glass wool insulation slabs of density not less than 64 kg/m ³ or resin bonded rock wool insulation slabs of density not less than 100 kg/cu.m with an installed thickness of not less than 100 mm, on the outside surface of steel flue liners, inside surface of concrete minishells, under the cast iron caps and wherever as directed by the Engineer, in two layers (each 50 mm thick) including the cost of all labour, material and equipment, transporting, lifting to all heights, etc., inclusive of plated or galvanised accessories such as pins/studs/anchors/wire netting, speed washers, tying wires, etc. welding of pins/studs to steel surfaces or embedding of pins/studs/anchors in concrete surfaces, fixing, cutting, cutting, lapping, binding, testing, etc. complete as per drawings and specifications.	Sq.M	4400		

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S.NO	DESCRIPTION	UNIT	QTY.	UNIT RATE IN EUROS	TOTAL RATE IN EUROS
24	Providing and packing, at all levels, loose glass wool insulation to a density not less than 64 kg/cu.m or loose rock wool insulation to a density not less than 100 kg/cu.m between the insulated minishells and brick liners at expansion-joints between the lining segments and wherever as directed by the Engineer including the cost of all labour, material and equipment, filling, ramming, testing, etc. complete as per drawings and specifications.	Cu. M	4		
25	Providing and painting, at all levels, the part inside surface of chimney shell, inside and outside surfaces of minishells, underside of roof slab and other concrete components/surfaces of the chimney as indicated in the drawings and wherever as directed by the Engineer, with acid and heat resisting black bituminous paint in as many number of coats (not less than four coats in any case) as required to give a paint DFT of not less than 150 microns including the cost of all labour, materials, equipment, surface preparation, primer and finish painting, protecting, cleaning etc. complete as per drawings and specifications.	SQ.M	8600		
26	Providing and painting, at all levels, the external surfaces of chimney shell and wherever as directed by the Engineer, with synthetic enamel paint in alternate bands of colours 'signal red' and 'pure/bright white including the cost of all labours, material and " & equipment, surface preparation, primer and finish painting, protecting, cleaning etc.complete as per drawings and specifications.	SQ.M	8600		

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S.NO	DESCRIPTION	UNIT	QTY.	UNIT RATE IN EUROS	TOTAL RATE IN EUROS
27	Proving and laying over the chimney roof, a composite acid and heat protection treatment including providing of slopes for roof drainage including the cost of all labour, material and equipment, etc., complete as required for preparing the roof concrete, laying under bed of plain cement concrete screed to slopes, preparation of screed surface for painting, painting the screed surface with black bituminous paint, applying bitumenmastic in layers, laying acid resisting (A/R) mortar bed and laying acid resisting(A/R) bricks with A/R mortar, curing, pointing (with phenolic based A/R cement), protection and cleaning, finishing, etc., complete as per drawing and specifications.	SQ.M	200		
28	Providing, fabricating and installing at various locations and elevations of the chimney system the following miscellaneous mild steel items complete with the cost of all labour, material and equipment, transporting, lifting, setting in place, cutting, grinding, drilling, welding, bolts and bolting, anchor fasteners and anchoring, priming, painting or galvanising, grouting etc. complete as per drawings and specifications:				
	a) Mild steel ladders with cage, hood access hatch, louvers, bird screens, hood drain basin covers and other miscellaneous mild steel items not specifically mentioned.	MT	1		
	b) Galvanised 32 mm nominal bore tubular hand railing for stair case and internal and external platforms	MT	6		

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29	Providing, fitting& fixing, outlet and overflow, cast iron roof drain heads (with gratings) in chimney roof including sockets, adapters, brackets, hangers, supports, etc., casting-in and jointing to 150 mm nominal bore rainwater pipes, grouting, etc. including the cost of all labour material and equipment, transporting, lifting, setting in place, painting, etc. complete as per drawing and specifications.	ITEM	8		
30	Providing, fitting and fixing rainwater pipes at all levels internally from the chimney roof to ground level upto the hood drain basin including shoes, bends, junctions, flanges, hoppers, sockets, adaptors, brackets, hangers, supports, anchor fasteners, spacers, pipe sleeve through shell, silicon or vulcanised butyl seaant, foam backing material, jointing, socketing, grouting, caulking, primer and finish painting etc. complete including the cost of all labour, material and equipment, complete as per drawing and specifications:				
	a) 150 mm nominal bore cast iron pipes.	RM	50		
	b) 150 mm nominal bore medium class galvanised mild steel pipes.	RM	400		
31	Providing and laying 50 mm thick cement concrete flooring (comprising of 12 mm thick mettalic concrete hardener topping over a38 mm thick under bed of concrete) over the grade level slab inside the chimney, including the cost of all labour, material and equipment, etc. complete as required for preparation of base, laying underbed and topping, finishing, rounding of edges, corners and junctions, curing, testing, etc. complete as per drawing and specifications.	SQM	350		

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32	Providing and installing an electrically operated grill type steel roll-up door (with the bottom 0.5 metres of the curtain in solid type) at chimney base, in opening of size 4 m by 6 m, with all hardware and mechanisms, fittings and fixtures, locking arrangements, frames, fasteners, gear handle arrangement for standby manual operation, all electrical accessories such as motors, control systems, cables, etc. including the cost of all labour, material and equipment, fixing in position, grouting primer and finish painting, testing, etc., complete as per drawing and specifications.	Item	2		
33	Providing and installing at any level and location, mild steel, double plate, personnel access doors, in shell openings of size 1.1m by 2.15m, complete with all fittings and fixtures, locking arrangements, frames, fasteners including the cost all labour, material and equipment, lifting to all heights, setting in place, grouting primer and finish painting, etc., complete as per drawing and specifications.	Item	8		
34	Preparing detailed fabrication drawings after approval by the Engineer, providing, fabricating and erecting, at all levels, mild steel strakes complete with all stiffeners, attachments, fasteners, pipe sleeves, etc. including the cost of all labour, material and equipment, transporting, lifting to all heights, setting in place, embedding components in concrete, fixing to castin embedments, cutting, grinding, drilling, bolts and bolting welding preheating and post heating for welding , testing, grouting, galvanising components to be embeded in concrete, primer and finish painting of exposed components, etc. complete as per drawing and specifications.	MT	10		

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36	Providing and painting, at all levels, the external surfaces of chimney shell and wherever as directed by the Engineer, with Acid & Heat Resistant Polurethane paint in alternate bands of colours 'signal red' and 'pure/bright white including the cost of all equipment, surface preparation, primer and finish painting, protecting, cleaning etc. complete as per drawings and specifications.	Sq. M	300		
36	Supplying and laying in position shaped acid resisting bricks conforming to class - I of IS:4860) for liner construction (with sloped A/R mortar toppings over brick work) complete including the cost,of all labour, material and equipment, raking joints, flush pointing, cleaning, curing, etc. complete as per drawings and specifications.	CuM	20		
37	Supplying, fabricating & installing, at all levels mild steel circumferential reinforcing bands around the brick liners at all elevations including the cost of all labour, transportation, materials & equipments, lifting to all heights, setting in place, a/r mortar fill behind bands, cutting, bending, drilling, grinding, bolts and bolting, priming, finish painting, etc. complete as per drawings and specification	MT	2		
38	Providing, fabricating and installing, at all levels, chemical lead sheet (2 mm thick) at expansion joints between brick lining segments including the cost of all labour, transportation, material & equipments, cutting, soldering of joints, testing etc. complete as per drawings and specifications.	Kg	300		

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39	Providing, fabricating and laying in position asbestos mill boards, over the mini shells below the cast iron cap segments, in between the cap segments and wherever as directed by the engineer, including the cost of all labours, material and equipment, cutting, drilling, etc., complete as per drawings and specifications				
	(a) 25 mm thick asbestos mill boards	SQ.M	5		
	(b) 3 mm thick asbestos mill boards	SQ.M	1		
40	Supplying, fabricating and installing, on top of the mini shells, grey cast iron caps complete including the cost of all labour, material and equipment, transporting, test assembling, drilling, lifting to position, setting in place, bolts and bolting, inclusive of bronze rag bolts bronze bolts and nuts, brass washers, non-shrink grout, primer and finish painting, etc., complete as per drawings and specifications.	MT	4		
41	Supply / installation/ commissioning of rack & pillon type chimney internal elevator(with total travel of 120 m & 6 numbers of landing in travel)	Sets	2		
42	Supply / installation/ commissioning of 400V, 100A, 4 wire AC Distribution Board alongwith 50KVA lighting transformer (400/420 V, Dyn11, Z=4%, ±2x2.5% Off Ckt. Tap) with 1No. incomer (SFU) & 8 nos. of 63A (TPN) outgoing complete in all respects (In case load requirement of chimney cannot be met with 50 kVA lighting transformer after considering loading of 80 to 85% on the transformer, 100 kVA lighting transformer shall be provided along with suitably rated components without any commercial implications)	NOS	2		

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43	Supply / installation/ commissioning of 400V, 100A, 4 wire AC Emergency Lighting distribution board alongwith 50KVA lighting transformer (400/420 V, Dyn11, Z=4%, ±2x2.5% Off Ckt. Tap) with 2 nos. of incomers and 8 nos. 63A SFU (TPN) outgoing complete in all respects (In case load requirement of chimney cannot be met with 50 kVA lighting transformer after considering loading of 80 to 85% on the transformer, 100 kVA lighting transformer shall be provided along with suitably rated components without any commercial implications)	NOS	2		
44	Supply / installation/ commissioning of Normal AC lighting panel outdoor type with degree of protection IP 55 with one no. 63A SFU (TPN) Incomer				
a	18 outgoing (16A SP MCBs)	NOS	4		
b	12 outgoing (16A SP MCBs)	NOS	2		
45	Emergency lighting panel outdoor type with degree of protection IP 55 with One no. of 63A TPN/SFU incomer and 12 outgoing (16A, SP MCBs)	NOS	4		
46	Supply / installation/ commissioning of Aviation lighting panel outdoor type with degree of protection IP 55 with one no. 63A SFU (TPN) Incomer , 6 outgoing 32A SFU(TPN) photodetector and timer circuit along with 63A contactor to control Aviation lighting systems.	NOS	2		
47	Supply / installation/ commissioning of Aviation obstruction lights :				
a	Medium intensity Type-A flashing white light having intensity of 2000 to 20000 candles depending upon background luminance & flashing frequency 20-60/min.	NOS	16		
b	Flood light with 250W HPSV lamps with all control gears & accessories	NOS	8		

4X125 MW KOSTI Thermal Power Plant, Sudan		RATE SCHEDULE CUM BILL OF QUANTITIES			
		TOTAL CIVIL WORKS FOR 2 NOS. 101 mtrs TWIN STEEL FLUE RCC CHIMNIES AND 4 NOS IDCTS			
S.NO	DESCRIPTION	UNIT	QTY.	UNIT RATE IN EUROS	TOTAL RATE IN EUROS
c	Well glass type luminaries with 70W/HPSV lamp with all control gears & accessories	NOS	120		
d	Well glass type luminaries with 150W/HPSV lamp with all control gears & accessories	SETS	72		
48	Supply / installation/ commissioning of 63Amp welding switch socket with plug & other Mounting accessories	NOS	14		
49	Supply / installation/ commissioning of 3 pin, 1 ph, 240V,15Amp. Power sockets complete with plug Switches etc.	NOS	16		
50	Supply / installation/ commissioning of Al conductor, PVC insulated, Armoured, , PVC outer sheath, FRLS type 1100V grade conforming to IS-1554 Part I.				
a	a. 3½ C x70 mm ² Cu for connection between ACDB/ELDB/ welding sockets	RM	500		
b	b. 3½ Cx25mm ² Cu for Lighting panel incoming supply	RM	1300		
c	c. 4C'16mm ² Cu conductor, PVC insulated,Armoured, PVC outer sheath,FRLS type 1100V grade conforming to IS-1554 part-1	RM	1100		
51	Supply / installation/ commissioning of PVC insulated 650/1100V grand stranded Cu conductor lighting wires conforming to IS-694				
a	(a) 2.5 sqmm	RM	1600		
b	(b) 4.0 sqmm	RM	5000		
52	Supply / installation/ commissioning of GI conduit 25mm dia with junction boxes ,pull boxes & accessories	RM	3300		
53	Supply / installation/ commissioning of Lightning protection Air terminal	RM	25		
54	Supply / installation/ commissioning of Earthing materials as per drawing& specification				

4X125 MW KOSTI Thermal Power Plant, Sudan		RATE SCHEDULE CUM BILL OF QUANTITIES			
		TOTAL CIVIL WORKS FOR 2 NOS. 101 mtrs TWIN STEEL FLUE RCC CHIMNIES AND 4 NOS IDCTS			
S.NO	DESCRIPTION	UNIT	QTY.	UNIT RATE IN EUROS	TOTAL RATE IN EUROS
a	(a) Below ground earthing system	MT	2		
b	(b) Above Ground earthing system	MT	5		
55	Supply / installation/ commissioning of GS cable trays shall be of ladder type constructed of minimum 2 mm thick mild steel hot dip galvanised.				
a	(a) 600 mm wide.	RM	200		
b	(b) 300 mm wide.	RM	130		
c	(c) 150 mm wide.	RM	70		
56	Supply / installation/ commissioning of Aviation distribution board (ADB) with one no. 32A SFU (TPN) Incomer and 6 nos. SP 20A MCB. Construction is same as LP.	NOS	2		
57	Rebate to item no. 49(a) for Supply / installation/ commissioning of Medium intensity Type-B flashing red light having intensity of 2000 candles & flashing frequency 20-60/min.	NOS	16		
58	Rebate to item no. 49(a) Supply / installation/ commissioning of Low intensity Type-B fixed red light having intensity of 32 candles	NOS	16		

4X125 MW KOSTI Thermal Power Plant, Sudan		RATE SCHEDULE CUM BILL OF QUANTITIES			
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S.NO	DESCRIPTION	UNIT	QTY.	UNIT RATE IN EUROS	TOTAL RATE IN EUROS
BB : ITEMS FOR 4 NOS INDUCED DRAFT COOLING TOWERS					
100	EARTH WORK IN EXCAVATION, BACKFILLING AND DISPOSAL AS PER SPECIFICATION AND DRAWINGS				
101	Excavation including providing coffer dams, shoring, strutting, sheeting, bracing, draining and pumping out water other than water below ground water table, clearing all grass, vegetation etc. including trimming of excavation bottom, staking, levelling, grading etc. of excavated materials all complete as per specifications, drawings and instructions of the engineer, including a lead(disposal) up to 100 meters and a lift up to 2.0 meters.				
i)	In all types of soils including expansive soil, ash, morrum, laterite	CUM	34000		
102	Extra over item 101 above, for all types of soil/rock, for additional lifts beyond the initial lift of 2 meters (included in item 1 above) all complete as per specifications, drawings and instructions of the engineer for the following lifts:				
i)	In all types of soils				
a	beyond 2 m and upto 4 m	CUM	16000		
b	beyond 4 m and upto 7 m	CUM	2000		
103	Extra over item 101 above for excavation below ground water table including lowering of ground water table to maintain dry working conditions for all activities up to filling/testing, water proofing all complete as per specifications, drawings and instructions of the engineer.	CUM	2000		

4X125 MW KOSTI Thermal Power Plant, Sudan		RATE SCHEDULE CUM BILL OF QUANTITIES			
		TOTAL CIVIL WORKS FOR 2 NOS. 101 mtrs TWIN STEEL FLUE RCC CHIMNIES AND 4 NOS IDCTS			
S.NO	DESCRIPTION	UNIT	QTY.	UNIT RATE IN EUROS	TOTAL RATE IN EUROS
104	Extra over item 101 above for carriage of all types of excavated materials beyond the initial lead of 100 m (included in item 1 above) all complete as per specifications, drawings and instructions of the engineer for the following leads				
i)	Carriage beyond initial lead of 100 m but not exceeding 500 m	CUM	4000		
ii)	Carriage beyond initial lead of 500 m but not exceeding 2 Km	CUM	8000		
iii)	Carriage beyond initial lead of 2 Km but not exceeding 5 Km	CUM	8000		
iv)	Carriage beyond initial lead of 5 Km but not exceeding 10 Km	CUM	8000		
105	BACK Filling using selected excavated materials in trenches, plinths, foundations and other underground structures, pipes, etc. in layers not exceeding 200 mm thickness including re-excavation and loading from stock pile, transporting, unloading, filling, watering and compacting/ramming each layer to required degree as mentioned below for all leads and lifts all complete as per specifications, drawings and as directed by the engineer to achieve the following densities:				
i)	Minimum 85% Standard Proctor density	CUM	200		
ii)	Minimum 90% Standard Proctor density	CUM	200		
iii)	Minimum 95% Standard Proctor density	CUM	200		

4X125 MW KOSTI Thermal Power Plant, Sudan		RATE SCHEDULE CUM BILL OF QUANTITIES			
		TOTAL CIVIL WORKS FOR 2 NOS. 101 mtrs TWIN STEEL FLUE RCC CHIMNIES AND 4 NOS IDCTS			
S.NO	DESCRIPTION	UNIT	QTY.	UNIT RATE IN EUROS	TOTAL RATE IN EUROS
106	BACKFilling in trenches, plinths, foundations, and other under ground structures, pipes etc using selected soil from borrow areas in layers not exceeding 200 mm in thickness and including excavating, loading, unloading, transporting, filling, watering and compacting/ramming each layer to required degree for all lead and lifts etc all complete as per specifications, drawings and as directed by the engineer to achieve the following densities:				
i)	With selected soil non expansive soil brought from borow areas arranged by contractor including royalties, fees if any etc.				
a	Minimum 90% Standard Proctor density	CUM	1000		
b	Minimum 95% Standard Proctor density	CUM	1000		
ii)	With selected sand brought from quarries/river bed arranged by contractor including royalties, fees if any and compacting to minimum 80% relative density etc.	CUM	1000		
106A	Filling using selected materials from borrow areas below foundations and other under ground structures, pipes etc. in layers not exceeding 200 mm in thickness including excavating, loading, unloading, transporting, filling, watering and compacting/ramming each layer etc for all leads and lifts all complete as per specifications, drawings and as directed by the engineer for the following .With selected non expansive soil brought from borow areas arranged by contractor, including royalties, fees etc. if any compacted to 100% Standard Proctor Density	CUM	200		
110	Cutting of trees, including transportation, stacking at storage yard and disposal of unused material as per the direction of engineer in charge.				

4X125 MW KOSTI Thermal Power Plant, Sudan		RATE SCHEDULE CUM BILL OF QUANTITIES			
		TOTAL CIVIL WORKS FOR 2 NOS. 101 mtrs TWIN STEEL FLUE RCC CHIMNIES AND 4 NOS IDCTs			
S.NO	DESCRIPTION	UNIT	QTY.	UNIT RATE IN EUROS	TOTAL RATE IN EUROS
i)	300 mm upto 600 mm girth	Nos.	20		
ii)	601 mm upto 900 mm girth	Nos.	20		
200	PROVIDING AND PLACING CONCRETE WORK INCLUDING COST OF LABOUR, MATERIALS AND EQUIPMENT FOR HANDLING, TRANSPORTATION, BATCHING, MIXING, PLACING, VIBRATING AND CURING, (EXCLUDING COST OF CENTERING, SHUTTERING AND REINFORCEMENT) COMPLETE AS PER DRAWING AND SPECIFICATIONS UNLESS SPECIFIED OTHERWISE FOR THE FOLLOWING: (IN CASE OF UNDERGROUND WATER AGRESSIVENES, SPECIAL CORRESPONDING CEMENT TO BE USED)				
202 A	Concrete of grade M15 as levelling course , under and around foundations/floors etc with 40 mm nominal size graded aggregate.	CUM	1400		
209	Concrete of grade M-25 in precast works like roof slabs/trench covers, fins, lintels, chajas, beams, columns, wall panels, facias etc.at all levels in all kinds of work including formwork/moulds, curing, rendering the top exposed surface with cement sand mortar (1:3), handling, storing, transpoting, all leads, erection without damage, setting in position with cement sand mortar (1:3), filling the gaps between adjusant precast units with M30 concrete or cement sand mortar (1:3) and including making of holes for bolts for fixing, welding etc.complete with graded aggregate (20/12.5/10 mm).	CUM	1080		

4X125 MW KOSTI Thermal Power Plant, Sudan		RATE SCHEDULE CUM BILL OF QUANTITIES			
		TOTAL CIVIL WORKS FOR 2 NOS. 101 mtrs TWIN STEEL FLUE RCC CHIMNIES AND 4 NOS IDCTS			
S.NO	DESCRIPTION	UNIT	QTY.	UNIT RATE IN EUROS	TOTAL RATE IN EUROS
210	Concrete of grade M30 in foundation, superstructure of water retaining structures either below or above finished floor level including addition of suitable plastisizer confirming to IS 9103 latest to achieve a slump more than 125 mm in concrete as per manufacturers recommendation and subsequent reduction in cement content upto a maximum 10% complete etc. as per specification with 20 mm nominal size graded aggregate.	CUM	11800		
214 A	Providing and laying 50mm thick lime powder below earth fill complete as per specifications	SQM	2400		
300	SUPPLYING, FIXING AND REMOVING FORMWORK AT ANY ELEVATIONS FOR ALL STRUCTURES, AS PER SPECIFICATIONS AND INCLUDING ALL LABOUR MATERIAL, SCAFFOLDINGS AND CENTEREING COMPLETE INCLUDING POCKETS ETC. FOR THE FOLLOWING:				
301	Ordinary form work below finished ground floor level for foundations, footings, bases of columns, walls, columns, pilasters, beams, mass concrete, trenches etc.	SQM	16000		
302	Fairface form work below finished ground floor level for foundations, footings, base of columns, walls, columns, pilasters, beams, mass concrete, trenches etc. for exposed concrete works.	SQM	4000		
303	Ordinary form work above finished ground floor level for columns, beams, suspended floors, roofs, lintels, cantilevers, staircases, landings, balconies, domes, arches etc. for all heights.	SQM	12000		

4X125 MW KOSTI Thermal Power Plant, Sudan		RATE SCHEDULE CUM BILL OF QUANTITIES			
		TOTAL CIVIL WORKS FOR 2 NOS. 101 mtrs TWIN STEEL FLUE RCC CHIMNIES AND 4 NOS IDCTS			
S.NO	DESCRIPTION	UNIT	QTY.	UNIT RATE IN EUROS	TOTAL RATE IN EUROS
304	Fairface form work above finished ground floor level for columns, beams, suspended floors, roofs, lintels, cantilevers, staircases, landings, balconies, domes, arches etc. for all heights.	SQM	56000		
306	Providing, fixing and removing formwork in block-outs/pockets and openings (below 0.1 sqm contact surface area with concrete) at all elevations including cutting, formation of all shapes and all other operations required for making the required shape and size all complete as per specification, drawing and instruction of engineer in charge.				
i)	Upto 300 mm depth	Nos.	40		
ii)	From 301 mm upto 600 mm depth	Nos.	40		
iii)	From 601 mm upto 1000 mm depth	Nos.	40		
400	REINFORCEMENTS				
401	Providing, straightening cutting, bending, placing in position at any level, binding of mild steel reinforcements in concrete including cost of reinforcement and binding wire, labour etc. complete all as per specifications & drawings. (Steel shall be supplied free of cost by BHEL as per Clause 39.1)	MT	100		
402	Providing, straightening, cutting, bending, placing at any level, binding in position high yield strength steel reinforcements in concrete including cost of reinforcement and binding wire, labour etc. complete all as per specifications & drawings. (Steel shall be supplied free of cost by BHEL as per Clause 39.1)	MT	1300		

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		TOTAL CIVIL WORKS FOR 2 NOS. 101 mtrs TWIN STEEL FLUE RCC CHIMNIES AND 4 NOS IDCTs			
S.NO	DESCRIPTION	UNIT	QTY.	UNIT RATE IN EUROS	TOTAL RATE IN EUROS
600	SUPPLYING & INSTALLATION OF JOINT FILLER AND SEALING COMPOUND:				
601	Supplying & installation of bitumin impregnated fibre board confirming to IS 1838 as joint filler at joints in concrete including nailing, coating of both faces with coal tar pitch/bitumin, labour, material, equipments etc all complete at all levels as per specification, drawings and instruction of engineer in charge:				
a	12mm thick joints.	SQM	20		
b	20mm thick joints.	SQM	20		
c	25mm thick joints.	SQM	20		
d	50mm thick joints.	SQM	20		
700	M.S. EMBEDMENTS				
701	Supply, fabricating and fixing of embedments , MS inserts, pipe sleeves, guide rails, angle pieces, foundation bolts, anchor bolts, rungs of various diameters, plates of dimensions as required including cost of all labour, materials and equipment, transportation, loading, unloading, handling, welding, rivetting, bolting, cutting, drilling, scaffolding and setting as per specifications and drawings. (Steel shall be supplied free of cost by BHEL as per Clause 39.1)	MT	20		

4X125 MW KOSTI Thermal Power Plant, Sudan		RATE SCHEDULE CUM BILL OF QUANTITIES			
		TOTAL CIVIL WORKS FOR 2 NOS. 101 mtrs TWIN STEEL FLUE RCC CHIMNIES AND 4 NOS IDCTs			
S.NO	DESCRIPTION	UNIT	QTY.	UNIT RATE IN EUROS	TOTAL RATE IN EUROS
702	Fixing of embedments, MS inserts, pipe sleeves, rails, guide rails angle pieces, anchor bolts of various diameters, plates of dimensions as required including cost of all labour, materials and equipment for fixing in position, scaffolding and setting in position, transportation from stores within the plant boundary to work spot, loading, unloading etc. complete as per specifications and drawings.	MT	20		
703	Providing, fabricating, transporting, erecting and installing at all elevations miscellaneous steel/PVC pipes, expansion fasteners in concrete/brickwall, for all kind of works, including the cost of labour, material and equipment, setting material in concrete, layout, scaffolding, handling at site, cutting, forming, grinding, drilling, bolting, welding, jointing, testing etc. all complete as per drawings and specifications and instructions of engineer.				
i	MS pipes of all diameters	Quintal	40		
ii	PVC conduits of all sizes	Quintal	40		
iii	Expansion fasteners (galvanised) of HILTI make or equivalent of safe tension capacity as specified below:				
	250 kg	Each	40		
	500 kg	Each	40		
	750 kg	Each	40		

4X125 MW KOSTI Thermal Power Plant, Sudan		RATE SCHEDULE CUM BILL OF QUANTITIES			
		TOTAL CIVIL WORKS FOR 2 NOS. 101 mtrs TWIN STEEL FLUE RCC CHIMNIES AND 4 NOS IDCTS			
S.NO	DESCRIPTION	UNIT	QTY.	UNIT RATE IN EUROS	TOTAL RATE IN EUROS
704	Supply, fabrication, transportation, delivery at site, erection, installation and alignment of MS foundation bolt (Grade-1 of IS:432 & IS:2062) assembly in concrete along with nuts, lock nuts (IS:1363, IS:1364 & IS:3138), anchor plates, stiffner plates, protective tape etc. upto and including 80 mm dia, 3000 mm long including furnishing of labour, materials, equipments, welding, cutting, grinding, threading, drilling, pipe sleeves etc. all complete as per specification, drawing and instruction of the engineer.	MT	8		
800	GROUTING AS PER SPECIFICATION FOR THE FOLLOWING:				
801	Providing & grouting cement slurry mix at any elevation/depth with pressure pump for water retaining concrete structures, including fixing nozzles, cost of approved cement, admixture, curing, etc all complete as per specification and as directed by the Engineer.	SQM	8		
802	Providing and grouting of pocket holes, pipe sleeves of any shape and size under base plates after erection of necessary structural steel work, machinery with mix 1:1:2 (one part Cement : 1part Sand : 2 parts of 6mm down graded stone chips) at any elevation including roughening surface, cleaning, ramming, curing etc. complete (non-shrink hand grout using approved admixture) as per specification and as directed by the Engineer.	CUM	8		

4X125 MW KOSTI Thermal Power Plant, Sudan		RATE SCHEDULE CUM BILL OF QUANTITIES			
		TOTAL CIVIL WORKS FOR 2 NOS. 101 mtrs TWIN STEEL FLUE RCC CHIMNIES AND 4 NOS IDCTS			
S.NO	DESCRIPTION	UNIT	QTY.	UNIT RATE IN EUROS	TOTAL RATE IN EUROS
803	Providing & grouting of pocket holes, pipe sleeves of any shape and size under base plates after erection of necessary structural steel work, machinery with mix 1:1(1 part cement : 1part sand) at any elevation including roughening surface, cleaning, ramming, curing etc complete (non-shrink flowable grout as per specification using approved admixture) as per specification and as directed by the Engineer.	CUM	4		
804	Providing & grouting of pocket holes, pipe sleeves of any shape and size under base plate after erection and alignment if necessary, structural steel work, machinery at any elevations including roughening surface, cleaning, ramming, curing, etc. with CobextraGP-2/CobextraGP-1/Pidigrout10/Pagel or equivalent all complete as per specifications. (Cost of all material and clearing the pocket by compressed air shall be in the scope of the contractor).	CUM	4		
1300	FINISHES, PAINTING TO CONCRETE, PLASTERED SURFACES, SURFACE PREPARATION INCLUDING ALL MATERIALS, LABOUR, SCAFFOLDING ETC. ALL COMPLETE				
1305	Two or more coats of cement paint (for internal use) of approved brand and manufacture to give an even shade including priming coat complete.	SQM	30000		
1312	Providing and applying 2 or more coats of water proof cement paint of approved make and color on exterior surface at all heights including material, labour, scaffolding, curing etc complete as per specification.	SQM	28000		

4X125 MW KOSTI Thermal Power Plant, Sudan		RATE SCHEDULE CUM BILL OF QUANTITIES			
		TOTAL CIVIL WORKS FOR 2 NOS. 101 mtrs TWIN STEEL FLUE RCC CHIMNIES AND 4 NOS IDCTS			
S.NO	DESCRIPTION	UNIT	QTY.	UNIT RATE IN EUROS	TOTAL RATE IN EUROS
1400	FLOORING AND SKIRTING INCLUDING ALL MATERIALS, LABOUR, CURING, POLISHING, FINISHING, EXPANSION JOINTS, GROOVES, ETC. COMPLETE IN ALL RESPECTS AS SHOWN ON DRAWINGS AND DESCRIBED IN SPECIFICATIONS.				
1412	Providing and laying polished Kota stone 20 mm thk in flooring . The kota stone slabs/tiles laid over under bed, pressed and tapped down with wooden mallet to the proper level, lifted and pressed again with thick cement slurry spread over the surface with fine joint finished including pigments, curing, grinding, granite polishing etc. complete.	SQM	200		
1413	Providing polished Kota stone 20 mm thk in skirting projecting 6mm from adjacent plaster all complete .	SQM	20		
1500	PROVIDING AND ERECTING ROOFING/SIDE CLADDING INCLUDING LAPS, SCAFFOLDING HOOKS, WASHERS, CORNER PIECES, ETC. COST OF ALL MATERIAL, LABOUR, EQUIPMENT, CLEATS, SHEETING RUNNER, RAILS MILD STEEL WIND TIES (HORIZONTAL/VERTICAL) AND ANY OTHER STEEL WORKS ETC. COMPLETE FOR THE FOLLOWING:				
1507 A	"Providing and fixing corrugated 18 gauge GI sheet as cladding/ roofing as per IS 277 and min grade of galvanization shall be 450 gms/Sqm including all fixing accessories, labour, material, scaffolding etc. all complete as per spec. drawing and instruction of engineer incharge"	SQM	3000		

4X125 MW KOSTI Thermal Power Plant, Sudan		RATE SCHEDULE CUM BILL OF QUANTITIES			
		TOTAL CIVIL WORKS FOR 2 NOS. 101 mtrs TWIN STEEL FLUE RCC CHIMNIES AND 4 NOS IDCTS			
S.NO	DESCRIPTION	UNIT	QTY.	UNIT RATE IN EUROS	TOTAL RATE IN EUROS
1700	PROVIDING AND FIXING RAIN WATER DOWN TAKE PIPES INCLUDING 2 COATS OF APPROVED PAINT OVER A PRIMARY COAT, ALL SPECIALS AND ACCESSORIES ETC. COMPLETE AS PER SPECIFICATION.				
1701	GI down take pipes conforming to IS1239/IS3589 as per specification of following dia.				
i)	100 mm dia	RM	20		
ii)	150 mm dia	RM	40		
iii)	200 mm dia	RM	40		
1702	CI down take pipes conforming to IS1230 with lead joints as per specification of following dia.				
i)	100 mm dia	RM	20		
ii)	150 mm dia	RM	40		
iii)	200 mm dia	RM	40		
1800	MISCELLANEOUS				
	Providing and fixing PVC water stops 230mm wide	SQM	1000		
				Total	

4X125 MW KOSTI Thermal Power Plant, Sudan		RATE SCHEDULE CUM BILL OF QUANTITIES			
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S.NO	DESCRIPTION	UNIT	QTY.	UNIT RATE IN EUROS	TOTAL RATE IN EUROS

NOTES:

1	In case of omission in quoting any rate, the evaluation will be done considering the highest quoted rate obtained against that item but the work, if awarded, will be on the lowest quoted rate obtained against that item.
2	The rate shall be entered in figures as well as in words. In case of difference in rates between words and figures, the lesser of the two will be treated as valid rate.
3	The bidders shall enter both 'Unit Rate' & 'Amount'. In case of any mismatch between 'Total Amount based on Unit Rate' & 'Total Amount as quoted', the lower of the two shall be considered for evaluation and award.
4	The quantities indicated against each item above are tentative and are liable to vary depending upon the site requirement. The contractor has to supply / install actual quantities as per advice of BHEL Engineer and accordingly the final contract price sha
5	Evaluation of the bids shall be done based on total price against this BOQ.
6	Unit Rate' as well as 'Amount' against each item to be quoted in EUROS only.
7	The price of all the necessary hardware (like cable glands, lugs, cable tray supports / brackets, clamps etc.) required to make the installation complete in all respects shall be deemed to be included in the prices of the electrical items indicated above