

SCHEDULE NO. 2**PLANT, EQUIPMENT AND MANDATORY SPARE PARTS TO BE SUPPLIED FROM WITHIN THE
EMPLOYER'S COUNTRY
FOR KABARNET SUBSTATION**

Note 1: All proposed mandatory spare parts for each equipment or system shall be specified in detail by Bidders.

Note 2: All main and spare equipment shall be provided for proper operation in four altitude categories (to optimize main equipment/ spare parts and achieve interchangeability at country level), including 1000, 1500, 2000 and 2500 meter above sea level. In case of other range may has been mentioned in the schedules of technical information (Part 2-E), the higher altitude category shall be considered.

Note 3: All of the blank cells shall be filled with quoted price or "included". Any other alternation interpreted as "included". It means that relevant price has been included in other items.

1	2		4	6	7
Item No	Description	Unit	Estimated Quantity	Local Currency (Ksh) = KENYAN SHILLINGS Local Unit Price (DAP)	Total Price (Ksh) Local (Quantity x Unit Price)
EQUIPMENT AND MATERIAL					
1	132kV PRIMARY PLANT				
1.1	132kV Circuit Breaker (3 phase) 1600A, 31.5kA- Single pole	No.	2		
1.2	132kV Circuit Breaker (3 phase) 1600A, 31.5kA	No.	1		
1.3	132kV Circuit Breaker (3 phase) 2000A, 31.5kA	No.	1		
1.4	Motorized disconnecter (3-phase) 132kV,1600A,31.5kA, without earthing switch with earth mat	No.	3		
1.5	Motorized disconnecter (3-phase) 132kV,2000A,31.5kA, without earthing switch with earth mat	No.	2		
1.6	Motorized disconnecter (3-phase) 132kV,1600A,31.5kA, with one (1) earthing switch, and earth mat	No.	7		
1.7	Motorized disconnecter (3-phase) 132kV,1600A,31.5kA, with two (2) earthing switches, and earth mat	No.	1		
1.8	Motorized earthing switch (3-phase) with earth mat	No.	2		
1.9	Surge arrester 132kV (1-phase) including surge counter and earth leakage meter	No.	9		
1.10	Post Insulator	Lot	1		
1.11	Insulator string (suspension and strain types with hardware fitting)	Lot	1		
1.12	132 kV Post type current transformer, for protection and metering, six cores (1-phase)	No.	12		
7.13	132 kV Post type current transformer, for protection and metering, five cores (1-phase)	No.	3		
1.14	132 kV Post type current transformer, for protection and measuring, three cores (1-phase)	No.	3		

1.15	132 kV Post type current transformer, for protection, two cores (1-phase)	No.	3		
1.16	132 kV Capacitive voltage transformer protection and metering three cores (1-phase)	No.	6		
1.17	132 kV Capacitive voltage transformer protection and measuring two cores (1-phase)	No.	3		
1.18	Conductor - Tubular	Lot	1		
1.19	Conductor - Stranded	Lot	1		
1.20	Connectors and clamps for tubular conductors (together with stainless steel nuts, bolts, bimetal)	Lot	1		
1.21	Connectors and clamps for stranded conductors (together with stainless steel nuts, bolts, bimetal)	Lot	1		
	TOTAL PRICE ITEM 1				
2	33kV PRIMARY PLANT				
2.1	33kV Circuit Breaker (3 phase) 1600A, 31.5kA	No.	4		
2.2	Motorized disconnecter (3-phase), without earth switch, with earth mat	No.	5		
2.3	Motorized disconnecter (3-phase), complete with one integral motorised earth switch, and earth mat	No.	3		
2.4	Surge arrester (1-phase) including surge counter and earth leakage meter	No.	9		
2.5	Post insulator	Lot	1		
2.6	Insulator string (suspension and strain types with hardware fitting)	Lot	1		
2.7	Post type current transformer protection and metering four cores (1-phase)	No.	12		
2.8	Post type current transformer, for protection, two cores (1-phase)	No.	3		
2.9	Voltage transforme Protection and metering Two Cores (1-phase)	No.	12		
2.10	40.5kV, 0.5A 1phase cut off fuse	No.	3		
2.11	Conductor - Tubular	Lot	1		
2.12	Conductor - Stranded	Lot	1		
2.13	Connectors and clamps for tubular conductors (together with stainless steel nuts, bolts, bimetal)	Lot	1		
2.14	Connectors and clamps for stranded conductors (together with stainless steel nuts, bolts, bimetal)	Lot	1		
	TOTAL PRICE ITEM 2				

3	POWER TRANSFORMER (P.TR.)				
3.1	Power transformer three phase units HV132/LV33kV, 18-23MVA including HV/LV/Neutral Bushing CT's, OLTC, RTCC, Control Cabinet and all accessories as required acc. to Tech. Spec. and TDS	No.	1		
3.2.1	Fire Detection and Protection System (oil drain pit, dry-powder/CO2 fire extinguisher)	Lot	1		
3.2.2	50 kg wheeled Dry-Powder Fire extinguisher for Power Transformer	No.	1		
	TOTAL PRICE ITEM 3				
4	AUXILIARY TRANSFORMER				
4.1	Auxiliary transformer three phase units HV33/LV0.415kV, 250KVA including all accessories as required	No.	2		
4.2	40.5kV, 5A 1-phase cut off fuse	No.	6		
4.3	50 kg wheeled Dry-Powder Fire extinguisher for Auxiliary transformer	No.	2		
	TOTAL PRICE ITEM 4				
5	132kV PROTECTION SYSTEMS				
5.1	132kV OHL Protection System including:	No.			
5.1.1	Main 1 21L Protection(with all required functions as per PSLD)	No.	2		
5.1.2	Main 2 87L Protection(with all required functions as per PSLD)	No.	2		
5.1.3	Auto-Reclose Protection Relay(with all required functions and Voltage Selection Logic as per PSLD)	No.	2		
5.1.4	All other relays or functions such as over voltage; under voltage; trip relay; trip circuit supervision; pole discordance; synchro check; fuse failure; close relay; lockout relay; short zone, end zone; circuit breaker failure, cubicles, test blocks and test plugs, aux. relays, timers, terminals, Labels, etc. as needed to complete the full protection scheme.	Lot	1		
5.1.5	Panels including all accessories, e.g. trip circuit supervision, trip relays, test terminal blocks, wiring etc. to make the system complete	No.	4		
5.1.6	Equipment for Modification works in remote existing Rumuruti substation including name tags, differential relays settings and etc.(Already considered)	Lot	0		
5.2	Transformer 132kV Side Protection System including:				
5.2.1	Main 87T+87NT Protection(with all required functions as per PSLD)	No.	1		
5.2.2	Backup 50/51, 50N/51N Protection(with all required functions as per PSLD)	No.	1		
5.2.3	Earth Fault 50N/51N (SBEF) Protection (with all required functions as per PSLD)	No.	0		

5.2.4	All other relays or functions such as over voltage; under voltage; trip relay; trip circuit supervision; pole discordance; synchro check; fuse failure; close relay; lockout relay; short zone, end zone; circuit breaker failure, cubicles, test blocks and test plugs, aux. relays, timers, terminals, Labels, etc. as needed to complete the full protection scheme.	Lot	1		
5.2.5	Panels including all accessories, e.g. trip circuit supervision, trip relays, test terminal blocks, wiring etc. to make the system complete	No.	1		
5.3	Completion and Modification of 132kV Low Impedance Centralised Type Busbar Protection System				
5.3.1	132kV Low Impedance, Centralised type Busbar Protection Relay with Check zone ACC. To PSLD drawing and considering future extension of a minimum of 4 bays	No.	2		
5.3.2	Supply new panels for Busbar 1 and 2, including all accessories, e.g. trip circuit supervision, trip relays, aux relays, test and terminal blocks, timers, wiring etc. to make the system complete	No.	2		
5.3.3	Low impedance busbar protection system including panels, relays, auxiliary relays, and all accessories for double bus scheme extension/modification scope with complete retesting, recommissioning and all other modifications	Lot	1		
5.4	132kV Coupler Protection System including:				
5.4.1	Over Current 50/51, 50N/51N (with all required functions as per PSLD)	No.	1		
5.4.2	Bay Control Unit integrated with synchro-check function (with all required functions as per PSLD)	No.	1		
5.4.3	All other relays or functions such as over voltage; under voltage; trip relay; trip circuit supervision; pole discordance; synchro check; fuse failure; close relay; lockout relay; short zone, end zone; circuit breaker failure, cubicles, test blocks and test plugs, aux. relays, timers, terminals, Labels, etc. as needed to complete the full protection scheme.	Lot	1		
5.4.4	Panels including all accessories, e.g. trip circuit supervision, trip relays, test terminal blocks, wiring etc. to make the system complete	No.	1		
5.5	Miscellaneous modification works as necessary to make a complete functional 132kV protection system	Lot	1		
TOTAL PRICE ITEM 5					

6	33KV PROTECTION SYSTEMS				
6.1	Transformer 33kV Side Protection System including:				
6.1.1	50/51, 50N/51N Protection(with all required functions as per PSLD)	No.	2		
6.1.2	Earth Fault 50N/51N (SBEF) Protection (with all required functions as per PSLD)	No.	2		
6.1.3	All other relays or functions such as over voltage; under voltage; trip relay; trip/circuit supervision; pole discordance; synchro check; fuse failure; close relay; lockout relay; short zone, end zone; circuit breaker failure, cubicles, test blocks and test plugs, aux. relays, timers, terminals, Labels, etc. as needed to complete the full protection scheme.	Lot	1		
6.1.4	Panels including all accessories, e.g. trip circuit supervision, trip relays, test terminal blocks, wiring etc. to make the system complete	No.	1		
6.2	Power Transformer Automatic Voltage Regulation System including:				
6.2.1	Automatic Voltage Regulator Relay (AVR)	No.	1		
6.2.2	Panels with all accessories and auxiliaries, lighting, heating, socket, push buttons, wiring, terminals, test facilities, discrepancy and all other switches, labels, unit measurement indicating lamps, position indicators, alarm annunciators, temperature indicators, test block/plug, Labels, etc. and with the following equipment.	No.	1		
6.3	33kV Coupler Protection System Including:	No.	1		
6.3.1	Overcurrent 50/51 And Earth Fault 50N/51N Protection(with all required functions as per PSLD)	No.	1		
6.3.2	Bay Control Unit integrated with synchro-check function (with all required functions as per PSLD)	No.	1		
6.3.3	All other relays or functions such as over voltage; under voltage; trip relay; trip/circuit supervision; pole discordance; synchro check; fuse failure; close relay; lockout relay; short zone, end zone; circuit breaker failure, cubicles, test blocks and test plugs, aux. relays, timers, terminals, Labels, etc. as needed to complete the full protection scheme.	Lot	1		
6.3.4	Panels including all accessories, e.g. trip circuit supervision, trip relays, test terminal blocks, wiring etc. to make the system complete	No.	1		
6.4	Completion and Modification 33kV Low Impedance Type Busbar Protection System	No.	1		
6.4.1	33kV Low Impedance type Busbar Protection Relay ACC. To PSLD drawing and considering future extension	No.	1		

6.4.2	Panels including all accessories, e.g. trip circuit supervision, trip relays, aux relays, test and terminal blocks, timers, wiring etc. to make the system complete.	No.	1		
6.5	33kV Feeder Protection System Including:				
6.5.1	Main 1 21L Protection(with all required functions as per PSLD)	No.	2		
6.5.2	Bay control and protection unit with intergrated auto-reclose function(with all required functions as per PSLD)	No.	2		
6.5.3	All other relays or functions such as lockout; circuit breaker failure, cubicles, test blocks/plugs, aux. relays, timers, terminals, Labels, etc. as needed to complete the protection.	Lot	1		
6.5.4	Panels including all accessories, e.g. trip circuit supervision, trip relays, test terminal blocks, wiring etc. to make the system complete	No.	2		
6.6	Miscellaneous modification works as necessary to make a complete functional 33kV protection system	Lot	1		
	TOTAL PRICE ITEM 6				
7	132/33kV SUBSTATION CONTROL SYSTEM				
7.1	Substation automation system including:	Lot	1		
7.2	All software and license, Modifications in HMI	Lot	1		
7.3	Bay Control and Protection Units (BCU/BCPU)(with all required functions as per PSLD)	No.	3		
7.4	Bay Control Panels	No.	3		
7.5	Auxiliary and Common Services Bay Control Unit	Lot	1		
7.6	Auxiliary and Common Services Panel including all accessories	Lot	1		
7.7	Bay level LAN (Switches, Star-Coupler, Fibre Optic Cables etc.)	Lot	1		
7.8	Completion of Human Machine Interface Systems and Computers	No.	2		
7.9	Any other material for full functionality of the Substation Control System	Lot.	1		
	TOTAL PRICE ITEM 7				
8	CONTROL AND PROTECTION SYSTEM IN EXISTING REMOTE SUBSTATIONS				
8	Equipment for Modification works at Remote SS (Already considered at Rumuruti)	Lot	0		
	TOTAL PRICE ITEM 8				
9	TELECOMMUNICATION & NCC/RCC/NSCC				
9.1	Required equipment for modification works at existing Kabarnet 132/33kV substation Telecommunication and Teleprotection Signalling System				
9.1.1	Required equipment for upgrade and modification works at existing Telecommunication SDH System in 132/33kV Substation	Lot	1		

9.1.2	Required equipment for upgrade and modification works at existing Teleprotection Signalling Equipment Interface Board for Distance & Differential protection relay in 132/33kV Substation	Lot	1		
9.2	New Firewall system with all necessary Licenses	Lot	1		
9.3	Modification works at existing IP Phone including all necessary Licenses, Network switches and any other facilities for communication with NCC,RCC and NSCC	Lot	1		
9.4	Required equipment for incorporating new and modified substation equipment into the SCADA/EMS System at the NCC/RCC/NSCC	Lot	1		
9.5	Required equipment for modifications to NCC/RCC/NSCC mimic board (if any)	Lot	1		
9.6	All necessary licences, hardware, software and configuration needed for the existing network management system (NMS) to create the STM-1 link that forms part of the Optic network from Kabarnet 132/33kV Substation and other Substation to the NCC/RCC/NSCC	Lot	1		
9.7	Required equipment for modification works at existing PABX in Lessos RCC including all necessary Licenses, Network switches and any other facilities for communication with NCC,RCC and NSCC	Lot	1		
9.8	Required equipment and accessories for interconnection between the OPGW and fibre optic cable in communication room				
9.8.1	Optical Distribution panel for Main Communication room	No	1		
9.8.2	Optical Distribution Unit (OCDF) 48 cores fiber for Main Communication room	Set	1		
9.8.3	Digital Distribution Unit (ODF) for 48 cores fiber	Set	1		
9.8.4	Tail Optical Fiber	Lot	1		
9.8.5	48 cores Optical Cable	Lot	1		
9.8.6	2M Coaxial Cable	Lot	1		
9.8.7	PVC Pipe suitable for the distance between entry gantry and communication room	Lot	1		
9.8.8	Optical Cable plane	Lot	1		
9.8.9	Steel Tube from junction box to entry of cable channel	Lot	1		
9.8.10	OPGW Splice Closures joint box with all accessories	Set	3		
9.9	Any other material for full functionality of the Telecommunication System	Lot.	1		
	TOTAL PRICE ITEM 9				

10	LV CABLES AND ACCESSORIES				
10.1	Auxiliary power and control cabling including single and three phase power cables, control cables required for control; protection; metering and alarms, CTs and CVTs cable circuits, DC supply cables.	Lot	1		
10.2	Substation internal fibre optic cabling, coaxial cables.	Lot	1		
10.3	Cabling installation including, cable trays, ladders, supports & fixing calmps, accessories, glands, lugs, terminals, rails, labels, cable shoes, fire proof sealing of ducts/conduits/openings etc.	Lot	1		
	TOTAL PRICE ITEM 10				
11	EARTHING & LIGHTNING PROTECTION				
11.1	Earthing system (including main earth grid, earth mat, rizer, bonding, connector, clamp, fitting, earth rod and well, inspection earth pits etc. as required)	Lot	1		
11.2	Lightning protection system (including shield wire, air termination rod, down conductor, equipotential bonding, disconnecting link, etc. as required)	Lot	1		
11.3	Earth mat for the existing DS(E) and ES	Lot	1		
	TOTAL PRICE ITEM 11				
12	SUPPORT STRUCTURES				
12.1	Steel supports for 132kV equipment and accessories (including all the required hot dip galvanised steel, bolts, nuts, anchore bolts, plates and etc.)	Lot	1		
12.2	Steel supports for 33kV equipment and accessories (including all the required hot dip galvanised steel, bolts, nuts, anchore bolts, plates and etc.)	Lot	1		
12.3	Gantries and other structures within the Substation (including all the required hot dip galvanised steel, bolts, nuts, anchore bolts, plates and etc.)	Lot	1		
12.4	Structures for interconnecting 132kV and 33kV switchyards (including all the required hot dip galvanised steel, bolts, nuts, anchore bolts, plates and etc.)	Lot	1		
	TOTAL PRICE ITEM 12				
13	AUXILIARY SUPPLY				
13.1	LVAC system				
13.1.1	Completion & Modification, wiring and integration of LVAC system including AC distribution outdoor cubicles, AC Main and distribution panels in Control building, LVAC distributed panel/fuse box for oil treatment socket	Lot	1		
13.1.2	Oil treatment panel and accessories (including heavy duty outlet socket, fuses, glands, etc.)	No.	1		
13.1.3	Any other material for full functionality of the LVAC System	Lot.	1		
13.2	LVDC system				

13.2.1	110Vdc Main and distribution panels, fuse boxes, with all required accessories (including CBs, Contactors, Metering and Protection, Fuses, Aux. Relays and etc.)	No.	2		
13.2.2	110Vdc battery chargers with all required accessories (including CBs, Contactors, Metering and Protection, Fuses, Aux. Relays and etc.)	Sets	2		
13.2.3	110Vdc batteries with structures/frames with all accessories (including Connection Bars, Cables, Luges, Bolts, Nuts, Washers, anti-Acid covers, Themometer, Density Meter, tools for battery filling and etc.)	Sets	2		
13.2.4	Any other material for full functionality of the LVDC System	Lot.	1		
13.3	Modification, wiring and integration of 48Vdc distribution panel, fuse boxes, with all required accessories (including CBs, Contactors, Metering and Protection, Fuses, Aux. Relays and etc.)	Lot	1		
13.4	415V ac Uninterruptible Power Supply including isolating by-pass transformers, inverters, static switch, manual bypass switch, panels & distribution boards	Set	2		
	TOTAL PRICE ITEM 13				
14	TARIFF METERING				
14.1	Tariff metering System for 132kV OHL, complete with wiring, accessories and etc. including:				
14.1.1	Main Meter including Watthour-meter (Multi tariff), Varhour-meter (Multi tariff), with 0.2S class accuracy	No.	2		
14.1.2	Check Meter including Watthour-meter (Multi tariff), Varhour-meter (Multi tariff), with 0.2S class accuracy	No.	2		
14.2	Tariff metering System for Power Transformer, complete with wiring, accessories etc. and including:				
14.2.1	Main Meter including Watthour-meter (Multi tariff), Varhour-meter (Multi tariff), with 0.2S class accuracy	No.	1		
14.3	Tariff metering System for 33kV , complete with wiring, accessories and etc. including:				
14.3.1	Main Meter including Watthour-meter (Multi tariff), Varhour-meter (Multi tariff), with 0.2S class accuracy	No.	2		
14.4	Metering data collection and communication system, complete with fibre optic cabling, accessories, Each kind of energy meters software and communication ports. All media and accessories in order to transferring Energy meter measuring values to remote center according to both KETRACO and KPLC required specification.	Lot	1		
14.5	Metering panel with all accessories and auxiliaries, lighting, heating, socket, wiring, terminals, test facilities, and all other switches, labels, test block/plug , Labels, etc.	Lot	1		
14.6	All other related relays, racks, Voltage/Current test block, cubicles, terminals, As needed to complete the metering system.	Lot	1		
	TOTAL PRICE ITEM 14				

15	MISCELLANEOUS				
15.1	Required Bay Marshalling Kiosk	Lot	1		
15.2	CCTV System with all related equipment for indoor and outdoor, including Cameras of suitable type and required specifications with poles, recorder, storage, monitor, switch, cabling, boxes, fixings, brackets and etc. (acc. to technical specifications in part 2-B)	Lot	1		
15.3	Padlocks / Keys (for panels, outdoor equipments, doors, etc.)	Lot	1		
15.4	Equipment/Bay labels, safety warning plates, road signages, room name plates, etc.	Lot	1		
15.5	Tools and Appliances as stated in Clause 21 of Part 2-A of the Employer's Requirements	Lot	1		
15.6	Tools and Equipment as stated in part 2-A, Clause 21 of the Employers Requirements (Bidder shall submit relevant itemized list with quantity, description and breakdown price)	Lot	1		
15.7	Gas handling trolley including accessories	Lot	1		

15.80	Project Laptops with all required software as per Client's requirements in Part 2-A, clause 21	No.	4		
15.9	Rugged/Industrial Laptop for substation protection and control system (CRP/SAS) with all required software, as per Client's requirements in Part 2-A, clause 21	No.	1		
15.1	Laptop tablets as per Client Requirements in Part 2-A, clause 21	No	4		
15.11	mobile telephone sets per substation as specified in employers requirement (smart phone, approved by the Employer)	No	10		
15.12	Satellite phones as specified in employers requirement (satellite phone, approved by the Employer)	No	5		
15.13	Environmental and Social Equipment requirements				
15.13.1	Portable multi-parameter water meters-HACC MP-6p Portable Meter	No	2		
15.13.2	Portable data Loggers for ambient Temp & Humidity-Lascar Temperature & Humidity Data Logger	No	2		
15.13.3	Binoculars- K&F Concept 20x50 High Power Binoculars-	No	2		
15.13.4	Velocity Meters- Scarlet WR3 Anemometer	No	2		
15.13.5	EMF meters- Extech 480836 RF EM	No	2		
15.13.6	Noise/Sound meters. - Reed R8050 Sound Level Meter	No	2		
15.13.7	Bosch GLM 50-27 CG Laser Distance Meter	No	3		
15.14	Other Items in Clause 21 of Part 2-A	Lot	1		
15.15	50 Mbps symmetric internet bandwidth in the control room building for scalable and future-proof connectivity to support basic IT Functions (Email, ERP access, VoIP, Patch Management) and Video Surveillance Streaming and Remote Support Capabilities . Design should allow easy upgrades of bandwidth and hardware as needs evolve.	Lot	1		
15.16	Any other items not included above but required to complete the project successfully. (Tenderer shall specify and include breakdown of price in his proposal)	Lot	1		
	TOTAL PRICE ITEM 15				
16	Site Transport as per Employer's Requirements, Clause 28				
16.1	Vehicles as per part 2-A, Clause 28				
16.1.1	Vehicle Type 1 as per part 2-A, Clause 28	No.	4		

16.1.2	Vehicle Type 2 as per part 2-A, Clause 28	No.	2		
	TOTAL PRICE ITEM 16				
MANDATORY SPARES					
17	132kV PRIMARY PLANT				
17.1	132 kV Circuit Breaker (3-phase)				
17.1.1	Trip coil	No.	1		
17.1.2	Closing coil	No.	1		
17.1.3	Anti pumping relay	No.	1		
17.1.4	Density blocking relay	No.	1		
17.1.5	Density meter	No.	1		
17.1.6	Heater	No.	1		
17.1.7	Motor for operating mechanism	No.	1		
17.1.8	Complete pole including fixed and moving contacts, pull rod, etc.	No.	1		
	Relevant Peripheral Devices/ Material				
17.1.9	Gas filling devices	No.	1		
17.1.10	SF6 gas	Kg	20% of required volume for first filling of CBs		
17.1.11	SF6 gas leakage detector	No.	1		
17.2	Motorized disconnecter (3-phase), complete without integral motorised earth switch with earth mat				
17.2.1	Complete pole which includes current carrying parts, insulators & fixing part, suitable for DS (3-phase)	No.	1		
17.2.2	Operating mechanism (motor operated), suitable for DS	No.	1		
17.3	Motorized disconnecter (3-phase), complete with one integral motorised earth switch, and earth mat				
17.3.1	Complete pole which includes current carrying parts, insulators, fixing parts and earthing switch suitable for DS-ES (3-phase)	No.	1		
17.3.2	Motorized operating mechanism suitable for DS-ES	No.	1		
17.4	Motorized disconnecter (3-phase), complete with two integral motorised earth switches and earth mat	No.	1		
17.4.1	Complete pole which includes current carrying parts, insulators, fixing parts and earthing switch suitable for DS-2ES (3-phase)	No.	1		
17.4.2	Motorized operating mechanism suitable for DS-2ES	No.	1		
17.5	Surge arrester (1-phase) including surge counter and earth leakage meter	No.	1		
17.6	Post insulator of all types	%	10%		
17.7	Insulator string of all types (suspension and strain types with hardware fitting)	%	10%		
17.8	Post type current transformer, for protection and metering, six cores (1-phase)	No.	1		
17.9	Post type current transformer, for protection and metering, five cores (1-phase)	No.	1		
17.1	Post type current transformer, for protection and measuring, three cores (1-phase)	No.	1		
17.11	Post type current transformer, for protection, two cores (1-phase)	No.	1		
17.12	Capacitive voltage transformer protection and metering three cores (1-phase)	No.	1		
17.13	Capacitive voltage transformer protection and metering two cores (1-phase)	No.	1		
17.14	Conductor - Tubular of all types	%	10%		

17.15	Conductor - Stranded of all types	%	10%		
17.16	Connectors and clamps for tubular conductors of all types (together with stainless steel nuts, bolts, bimetal)	%	10%		
17.17	Connectors and clamps for stranded conductors of all types (together with stainless steel nuts, bolts, bimetal)	%	10%		
	TOTAL PRICE ITEM 17 Spares				
18	33kV PRIMARY PLANT				
18.1	Circuit breaker (3-phase)				
18.1.1	Trip coil	No.	2		
18.1.2	Closing coil	No.	1		
18.1.3	Density meter	No.	1		
18.1.4	Motor for operating mechanism	No.	1		
18.1.5	Complete pole including fixed and moving contacts, pull rod, etc.	No.	1		
18.2	Motorized disconnecter (3-phase), without earth switch, with earth mat				
18.2.1	Complete pole which includes current carrying parts, insulators & fixing part, suitable for DS (3-phase)	No.	1		
18.2.2	Operating mechanism (motor operated), suitable for DS	No.	1		
18.3	Disconnecter (3-phase), without earth switch, with earth mat				
18.3.1	Complete pole which includes current carrying parts, insulators & fixing part, suitable for DS (3-phase)	No.	1		
18.4	Motorized disconnecter (3-phase), complete with one integral motorised earth switch, and earth mat				
18.4.1	Complete pole which includes current carrying parts, insulators & fixing part & earthing switch, suitable for DS-ES (3-phase)	No.	1		
18.4.2	Operating mechanism (motor operated), suitable for DS-ES	No.	1		
18.5	Surge arrester (1-phase) including surge counter and earth leakage meter	No.	1		
18.6	Post insulator of all types	%	10%		
18.7	Insulator string of all types (suspension and strain types with hardware fitting)	%	10%		
18.8	Post type current transformer protection and metering four cores (1-phase)	No.	1		
18.9	Post type current transformer, for protection, two cores (1-phase)	No.	1		
18.1	Voltage transforme Protection and metering Two Cores (1-phase)	No.	1		
18.11	Conductor - Tubular of all types	%	10%		
18.12	Conductor - Stranded of all types	%	10%		
18.13	Connectors and clamps for tubular conductors of all types (together with stainless steel nuts, bolts, bimetal)	%	10%		
18.14	Connectors and clamps for stranded conductors of all types (together with stainless steel nuts, bolts, bimetal)	%	10%		
	TOTAL PRICE ITEM 18 Spares				
19	POWER TRANSFORMER (P.TR.)				
19.1	Power transformer three phase units HV132/LV33kV, 18-23MVA including HV/LV/Neutral Bushing CT's, OLTC, RTCC, Control Cabinet and all accessories as required acc. to Tech. Spec. and TDS				
19.1.1	Bushing for HV side	No.	1		
19.1.2	Bushing for LV side	No.	1		
19.1.3	Bushing for Neutral LV side	No.	1		
19.1.4	Oil directed pressure relief device (main tank)	No.	1		
19.1.5	Oil directed pressure relief device (OLTC)	No.	1		
19.1.6	Buchholz relay	No.	1		
19.1.7	Oil Level Indicator for main tank	No.	1		

19.1.8	Oil level indicator for OLTC	No.	1		
19.1.9	Oil surge relay for OLTC	No.	1		
19.1.10	Cooling fan	No.	4		
19.1.11	Winding temperature indicator	No.	1		
19.1.12	Oil temperature indicator	No.	1		
19.1.13	Valves for radiators	Set	1		
19.1.14	Contactors and required accessories eg. Aux. Relay, MCB, Control relay, and etc. (in Marshalling Kiosk)	No.	1		
19.1.15	Transducer of each type	Set	1		
19.1.16	Pre-stressed non-return valve (PNRV)	No.	1		
19.1.17	Complete set of gaskets	Set	1		
	Relevant Peripheral Material				
19.1.18	Transformer oil	Drum	10% of total transformer oil volume		
19.1.19	Silicagel	Kg	Equal to the quantity of the first filling		
	TOTAL PRICE ITEM 19_Spare Parts				

20	AUXILIARY TRANSFORMER				
20.1	Auxiliary transformer three phase units HV33/LV0.415kV, 250KVA including all accessories as required				
20.1.1	Oil Directed Pressure Relief Device	No.	1		
20.1.2	Buchholz Relay	No.	1		
20.1.3	Oil Level Indicator	No.	1		
20.1.4	Winding Temperature Indicator	No.	1		
20.1.5	Oil Temperature Indicator	No.	1		
20.1.6	Complete set of gaskets	Set	1		
	TOTAL PRICE ITEM 20 Spare Parts				
21	132kV PROTECTION SYSTEMS				
21.1	132kV OHL Protection System				
21.1.1.1	Main 1 21L Protection(with all required functions as per PSLD)	No.	1		
21.1.2.1	Main 2 87L Protection(with all required functions as per PSLD)	No.	1		
21.1.3	Accessories for all other relays or functions such as over voltage; under voltage; trip; trip circuit supervision; pole discordance; synchro check; fuse failure; close; lockout; short zone; circuit breaker failure, cubicles, test blocks/plugs, aux. relays, timers, terminals, Labels, etc. as needed to complete the protection.	%	20%		
21.1.4	Accessories for the panels including trip circuit supervision, trip relays, aux relays, test and terminal blocks, timers, wiring etc. to make the system complete	%	20%		
21.2	Transformer 132kV Side Protection System including:				
21.2.1	Main 87T+87NT Protection(with all required functions as per PSLD)	No.	1		
21.2.2	Backup 67/67(N) Protection(with all required functions as per PSLD)	No.	1		
21.2.3	Accessories for all other relays or functions such as over voltage; under voltage; trip; trip circuit supervision; pole discordance; synchro check; fuse failure; close; lockout; short zone; circuit breaker failure, cubicles, test blocks/plugs, aux. relays, timers, terminals, Labels, etc. as needed to complete the protection.	%	20%		
21.2.4	Accessories for the panels including trip circuit supervision, trip relays, aux relays, test and terminal blocks, timers, wiring etc. to make the system complete	%	20%		
21.3	Completion and Modification of 132kV Low Impedance Type Busbar Protection System				
21.3.1	Accessories for the panels including trip circuit supervision, trip relays, aux relays, test and terminal blocks, timers, wiring etc. to make the system complete	%	20%		
21.4	132kV Coupler Protection System				
21.4.1	Over Current 50/51(N) (with all required functions as per PSLD)				
21.4.1.1	Over Current 50/51(N) (with all required functions as per PSLD)	No.	1		
21.4.2	Accessories for all other relays or functions such as over voltage; under voltage; trip; trip circuit supervision; pole discordance; synchro check; fuse failure; close; lockout; short zone; circuit breaker failure, cubicles, test blocks/plugs, aux. relays, timers, terminals, Labels, etc. as needed to complete the protection.	%	20%		
21.4.3	Accessories for the panels including trip circuit supervision, trip relays, aux relays, test and terminal blocks, timers, wiring etc. to make the system complete	%	20%		
	TOTAL PRICE ITEM 21-Spare Parts				

22	33kV PROTECTION SYSTEMS				
	Main Equipment				
22.1	Transformer 33kV Side Protection System				
22.1.1.1	67/67(N) Protection(with all required functions as per PSLD)	No.	1		
22.1.2	All other relays or functions such as over voltage; under voltage; trip; trip circuit supervision; pole discordance; synchro check; fuse failure; close; lockout; short zone; circuit breaker failure, cubicles, test blocks/plugs, aux. relays, timers, terminals, Labels, etc. as needed to complete the protection.	%	20%		
22.1.3	Accessories for the panels including trip circuit supervision, trip relays, aux relays, test and terminal blocks, timers, wiring etc. to make the system complete	%	20%		
22.2	Power Transformer Automatic Voltage Regulation System				
22.2.1.1	Automatic Voltage Regulator Relay(AVR)	No.	1		
22.2.2	Accessories for the panels including trip circuit supervision, trip relays, aux relays, test and terminal blocks, timers, wiring etc. to make the system complete	%	20%		
22.3	33kV Coupler Protection System				
22.3.1.1	Overcurrent 50/51 And Earth Fault 50N/51N Protection(with all required functions as per PSLD)	No.	1		
22.3.2	Accessories for all other relays or functions such as over voltage; under voltage; trip; trip circuit supervision; pole discordance; synchro check; fuse failure; close; lockout; short zone; circuit breaker failure, cubicles, test blocks/plugs, aux. relays, timers, terminals, Labels, etc. as needed to complete the protection.	%	20%		
22.3.3	Accessories for the panels including trip circuit supervision, trip relays, test terminal blocks, wiring etc. to make the system complete	%	20%		
22.4	Completion and Modification 33kV Low Impedance Type Busbar Protection System				
22.4.2	Accessories for the panels including trip circuit supervision, trip relays, aux relays, test and terminal blocks, timers, wiring etc. to make the system complete	%	20%		
	TOTAL PRICE ITEM 22 Spare Parts				
23	132/33kV SUBSTATION CONTROL SYSTEM				
23.1	Bay level LAN (Switches, Star-Coupler, Fibre Optic Cables etc.)	No.	1		
	TOTAL PRICE ITEM 7 Spare Parts				
24	LV CABLES AND ACCESSORIES				
24.1	Auxiliary power and control cabling including single and three phase power cables, control cables required for control; protection; metering and alarms, CTs and CVTs cable circuits, DC supply cables.	%	10%		
24.2	Substation internal fibre optic cabling, coaxial cables.	%	10%		
24.3	Accessories for Cabling installation including, cable trays, ladders, supports & fixing clamps, accessories, glands, lugs, terminals, rails, labels, cable shoes, fire proof sealing of ducts/conduits/openings etc.	%	10%		
	TOTAL PRICE ITEM 24 Spare Parts				
25	AUXILIARY SUPPLY				
25.1	LVAC system				

25.1.1	Completion & Modification, wiring and integration of LVAC system including AC distribution outdoor cubicles, AC Main and distribution panels in Control building, LVAC distributed panel/fuse box for oil treatment socket	%	20%		
25.1.2	Oil treatment panel and accessories (including heavy duty outlet socket, fuses, glands, etc.)	No.	1		
25.2	LVDC system				
25.2.1	110Vdc Main and distribution panels, fuse boxes, with all required accessories (including CBs, Contactors, Metering and Protection, Fuses, Aux. Relays and etc.)	No.	1		
25.2.2	Accessories for 110Vdc battery chargers with all required accessories (including CBs, Contactors, Metering and Protection, Fuses, Aux. Relays and etc.)	Set	1		
25.2.3	Accessories for 110Vdc batteries with structures/frames with all accessories (including Connection Bars, Cables, Lugues, Bolts, Nuts, Washers, anti-Acid covers, Themometer, Density Meter, tools for battery filling and etc.)	Set	1		
25.3	Accessories for modification, wiring and integration of 48Vdc distribution panel, fuse boxes (including CBs, Contactors, Metering and Protection, Fuses, Aux. Relays and etc.)	%	20%		
25.4	Accessories for 415V ac Uninterruptible Power Supply including isolating by-pass transformers, inverters, static switch, manual bypass switch, panels & distribution boards	%	20%		
	TOTAL PRICE ITEM 25 Spare Parts				
26	TARIFF METERING				
26.1	Tariff metering System for 132kV OHL, complete with wiring, accessories and etc. including:				
26.1.1	Meter including Watthour-meter (Multi tariff), Varhour-meter (Multi tariff), with 0.2S class accuracy	No.	1		
26.2	Tariff metering System for Power Transformer, complete with wiring, accessories etc. and including:				
26.2.1	Meter including Watthour-meter (Multi tariff), Varhour-meter (Multi tariff), with 0.2S class accuracy	No.	1		
26.3	Accessories for metering data collection and communication system.	%	20%		
26.4	Accessories for the metering panel	%	20%		
26.5	Accessories for all other related relays, racks, Voltage/Current test block, cubicles, terminals, As needed to complete the metering system.	%	20%		
	TOTAL PRICE ITEM 26 Spare Parts				
27	MISCELLANEOUS				
27.1	Accessories for the CCTV System with all related equipment for indoor and outdoor.	%	20%		
	TOTAL PRICE ITEM 27 Spare Parts				
	TOTAL PRICE SCHEDULE 2 KABARNET SUBSTATION Note: Contractor shall include all equipment and materials in his proposal, which are necessary to complete the works.				
	TOTAL PRICE SCHEDULE 2 KABARNET SUBSTATION_Spare Parts				