

**SCHEDULE NO. 1**  
**PLANT, EQUIPMENT AND MANDATORY SPARE PARTS SUPPLIED FROM ABROAD**  
**FOR RUMURUTI 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	3	4	5	6	7	8	9
Item No	Description	Country of Origin	Unit	Estimated Quantity	Foreign Currency (FC1) = USD (FC2) = EURO Foreign Manufacture Unit Price (CIP)		Total Price  Foreign Manufacture (Quantity x Unit Price)	
					FC1	FC2	FC2	FC1
					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) 3150A, 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,3150A,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				
1.13	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 (460 Sqmm- AAAC400)		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				
	<b>TOTAL PRICE ITEM 1</b>							
2	<b>33kV PRIMARY PLANT</b>							
2.1	33kV Circuit Breaker (3 phase) 1250A, 25kA		No.	4				
2.2	Motorized disconnect (3-phase), without earth switch, with earth mat		No.	5				
2.3	Motorized disconnect (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, three cores (1-phase)		No.	3				

2.9	Voltage transformer Protection and metering Two Cores (1-phase)		No.	12				
2.10	40.5kV, 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				
	<b>TOTAL PRICE ITEM 2</b>							

3	<b>POWER TRANSFORMER (P.TR.)</b>							
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	Fire Detection and Protection System (Firewall, oil drain pit, dry-powder/CO2 fire extinguisher)		Lot	1				
3.3	50 kg wheeled Dry-Powder Fire extinguisher for Power Transformer		No.	1				
	<b>TOTAL PRICE ITEM 3</b>							
4	<b>AUXILIARY TRANSFORMER</b>							
4.1	Auxiliary transformer three phase units HV33/LV0.415kV, 315KVA including all accessories as required		No.	2				
4.2	40.5kV, 9A 1-phase cut off fuse		No.	6				
4.3	50 kg wheeled Dry-Powder Fire extinguisher for Auxiliary transformer		No.	2				
	<b>TOTAL PRICE ITEM 4</b>							
5	<b>132kV PROTECTION SYSTEMS</b>							
5.1	<b>132kV OHL Protection System including:</b>							
5.1.1	Main 1 21L Protection Panel (with all required functions as per PSLD)		No.	2				
5.1.2	Main 2 87L Protection Panel (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				
5.2	<b>Transformer 132kV Side Protection System including:</b>							

5.2.1	Main 87T+87NT Protection Panel(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	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				
5.2.4	Panels including all accessories, e.g. trip circuit supervision, trip relays, test terminal blocks, wiring etc. to make the system complete		No.	1				
<b>5.3</b>	<b>Completion and Modification of 132kV Low Impedance Type Busbar Protection System</b>							
5.3.1	132kV Low Impedance type Busbar Protection Relay with Check zone ACC. To PSLD drawing and considering future extension		No.	2				
5.3.2	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.	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				
<b>5.4</b>	<b>132kV Coupler Protection System including:</b>							
5.4.1	Over Current 50/51(N) (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	<b>Miscellaneous modification works as necessary to make a complete functional 132kV protection system</b>		Lot	1				
	<b>TOTAL PRICE ITEM 5</b>							
6	<b>33kV PROTECTION SYSTEMS</b>							
6.1	<b>Transformer 33kV Side Protection System including:</b>							
6.1.1	50/51, 50N/51N Protection (with all required functions as per PSLD)		No.	1				
6.1.2	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				
6.1.3	Earth Fault 50N/51N (SBEF) Protection (with all required functions as per PSLD)		No.	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	<b>Power Transformer Automatic Voltage Regulation System including:</b>							
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	<b>33kV Coupler/Sectionalizer Protection System Including:</b>							

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				
6.3.2	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				
6.3.3	Panels including all accessories, e.g. trip circuit supervision, trip relays, test terminal blocks, wiring etc. to make the system complete		No.	1				
<b>6.4</b>	<b>Completion and Modification 33kV Low Impedance Type Busbar Protection System</b>							
6.4.1	33kV Low Impedance type Busbar Protection Relay ACC. To PSLD drawing and considering future extension		No.	2				
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.	2				
<b>6.5</b>	<b>33kV Feeder Protection System Including:</b>							
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 integrated 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				
<b>6.6</b>	<b>Miscellaneous modification works as necessary to make a complete functional 33kV protection system</b>		<b>Lot</b>	<b>1</b>				
	<b>TOTAL PRICE ITEM 6</b>							
<b>7</b>	<b>132/33kV SUBSTATION CONTROL SYSTEM</b>							
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				
	<b>TOTAL PRICE ITEM 7</b>							
<b>8</b>	<b>CONTROL AND PROTECTION SYSTEM IN EXISTING REMOTE SUBSTATIONS</b>							
8.1	Equipment for Modification works at Remote substations (Already considered at Kabarnet)		Lot	0				
	<b>TOTAL PRICE ITEM 8</b>							
<b>9</b>	<b>TELECOMMUNICATION &amp; NCC/RCC/NSCC</b>							
9.1	Required equipment for modification works at existing Rumuruti 132/33kV substation Telecommunication and Teleprotection Signalling System							
9.1.1	Required equipment for modification works at existing Telecommunication SDH System in 132/33kV Substation		Lot	1				
9.1.2	Required equipment for 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	Required equipment for incorporating new and modified substation equipment into the SCADA/EMS System at the NCC/RCC/NSCC		Lot	1				
9.4	Required equipment for modifications to NCC/RCC/NSCC mimic board (if any)		Lot	1				
9.5	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 Rumuruti 132/33kV Substation and other Substation to the NCC/RCC/NSCC		Lot	1				
9.6	Required equipment to 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				
9.7	<b>Required equipment and accessories for interconnection between the OPGW and fibre optic cable in communication room</b>							
9.7.1	Optical Distribution panel for Main Communication room		No	1				
9.7.2	Optical Distribution Unit (OCDF) 48 cores fiber for Main Communication room		Set	2				
9.7.3	Digital Distribution Unit (ODF) for 48 cores fiber		Set	5				
9.7.4	Tail Optical Fiber		Lot	1				
9.7.5	48 cores Optical Cable		Lot	1				
9.7.6	2M Coaxial Cable		Lot	1				
9.7.7	PVC Pipe suitable for the distance between entry gantry and communication room		Lot	1				
9.7.8	Optical Cable plane		Lot	1				
9.7.9	Steel Tube from junction box to entry of cable channel		Lot	1				
9.7.10	OPGW Splice Closures joint box with all accessories		Set	3				
9.8	<b>EPABX system for communication between guard house and individual Staff housings including:</b>							
9.8.1	Exchange		Lot	1				
9.8.2	Telephone Equipment		No.	16				
9.8.3	Junction Boxes		Lot	1				
9.8.4	Cabling		Lot	1				
9.8.5	Power supply with backup battery		Lot	1				
9.9	VHF System included a station set and at least 4 portable handsets and batteries and battery chargers, suitable antenna with all accessories (RG, Heliac cabling, AC & DC cabling, indication lamp), supported tower with suitable height		Lot	1				
9.1	Any other material for full functionality of the Telecommunication System		Lot.	1				

	<b>TOTAL PRICE ITEM 9</b>							
<b>10</b>	<b>LV CABLES AND ACCESSORIES</b>							
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				
	<b>TOTAL PRICE ITEM 10</b>							
<b>11</b>	<b>EARTHING &amp; LIGHTNING PROTECTION AND LIGHTING SYSTEMS</b>							
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	Extension of existing outdoor and indoor control building substation lighting		Lot.	1				
11.4	Earth mat for the existing DS(E) and ES		Lot	1				
	<b>TOTAL PRICE ITEM 11</b>							
<b>12</b>	<b>SUPPORT STRUCTURES</b>							
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				
	<b>TOTAL PRICE ITEM 12</b>							
<b>13</b>	<b>AUXILIARY SUPPLY</b>							
<b>13.1</b>	<b>LVAC system</b>							
13.1.1	AC Main and distribution panels, AC distribution outdoor cubicles, fuse box for oil treatment socket with all required equipment and accessories (including CBs, Contactors, Metering and Protection, Fuses, Aux. Relays and etc.)		Lot.	1				
13.1.2	Oil treatment panel and accessories (including heavy duty outlet socket, fuses, glands, etc.)		No.	1				
13.1.3	Diesel Generator 315kVA including generator control and protection panel and all peripheral equipment, reservior(s), (foundations, structure), and accessories.		No.	1				
13.1.4	Any other material for full functionality of the LVAC System		Lot.	1				
<b>13.2</b>	<b>LVDC system</b>							
13.2.1	Modification, wiring and integration of 110Vdc Main and distribution panels, fuse boxes, with all required accessories (including CBs, Contactors, Metering and Protection, Fuses, Aux. Relays and etc.)		Lot	1				
13.2.2	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				
13.3	Any other material for full functionality of the LVDC System		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				
	<b>TOTAL PRICE ITEM 13</b>							
<b>14</b>	<b>TARIFF METERING</b>							

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 and 33kV feeders, 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.	3				
14.3	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				
14.4	Metering panel with all accessories and auxiliaries, lighting, heating, socket, wiring, terminals, test facilities, and all other switches, labels, test block/plug , Labels, etc.		No.	2				
14.5	All other related relays, racks, Voltage/Current test block, cubicles, terminals, As needed to complete the metering system.		Lot	1				
	<b>TOTAL PRICE ITEM 14</b>							
<b>15</b>	<b>MISCELLANEOUS</b>							
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 20.1 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 (Refelling Unit)		Lot	1				
15.8	Project Laptops with all required software as per Client's requirimenets in Part 2-A, clause 21		No.	4				
15.9	Laptop tablets with all required softwares as per Client Requirements in Part 2-A, clause 21		No.	4				
15.10	Rugged/Industrial Laptop for substation protection and control system (CRP/SAS) with all required softwareas, as per Client's requirimenets in Part 2-A, clause 21		No.	1				
15.11	Mobile Lifting Crane (at least 5 Tons) as stated in Clause 21 of Part 2-A of the Employer's Requirements		No.	1				
15.12	Satellite phones as specified in employers requirement (satellite phone, approved by the Employer)		No.	5				
15.13	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				
15.14	Environmental and Social Equipment requirements							
15.14.1	Portable multi-parameter water meters-HACC MP-6p Portable Meter		No	2				
15.14.2	Portable data Loggers for ambient Temp & Humidity, Lascar Temperature & Humidity Data Logger		No	2				
15.14.3	Binoculars- K&F Concept 20×50 High Power Binoculars-		No	2				
15.14.4	Velocity Meters- Scarlet WR3 Anemometer		No	2				
15.14.5	EMF meters- Extech 480836 RF EM		No	2				
15.14.6	Noise/Sound meters. - Reed R8050 Sound Level Meter		No	2				
15.14.7	Bosch GLM 50-27 CG Laser Distance Meter		No	2				

15.15	50 Mbps symmetric internet bandwidth in the control room building and in the regional office separately 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				
	<b>TOTAL PRICE ITEM 15</b>							
<b>16</b>	<b>SITE TRANSPORT and SITE OFFICE Provision as per Employer's Requirements, Clause 27 &amp; 28 of Part 2-A of Employer's Requirements</b>							
16.1	Vehicles as per part 2-A, Clause 28							
16.1.1	Vehicle Type 1		No.	4				
16.1.2	Vehicle Type 2		No	2				
16.1.2	Vehicle Type 3		No	1				
16.1.3	Project communication devices (mobile phones) as per cl. 28.2		set	10				
	<b>TOTAL PRICE ITEM 16</b>							
<b>MANDATORY SPARES</b>								
17	<b>132kV PRIMARY PLANT</b>							
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				
	<b>Relevant Peripheral Devices/ Material</b>							
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 measuring 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	Disconnector (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 disconnector (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.T.R.)							
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				
	<b>Relevant Peripheral Material</b>							
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	<b>Transformer 132kV Side Protection System including:</b>							
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							
	<b>Main Equipment</b>							
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 1 RUMURUTI SUBSTATION							
	<b>Note:</b> Contractor shall include all equipment and materials in his proposal, which are necessary to complete the works.							
	TOTAL PRICE SCHEDULE 1 RUMURUTI SUBSTATION Spare Parts							