GUARANTEE SPECIFICATIONS

Part A: LV board requirements

S/N	ITEM	TECHNICAL REQUIREMENTS	MODEL/COUNTRY OF ORIGIN	BIDDERS COMPLIANCE
1.	Switchboard Panel	Free-standing purpose made front access Main LV Switchboard (Fully Type-Tested Assemblies – TTA), Form 3bi, modular, metal clad, dustproof cubicle type suitable for floor mounting, IP 54, manufactured in 12 SWG galvanised mild steel sheet and finished in cream (or appropriate colour) powder coating as shown on the schematic. The Low Voltage Switchboard should consist of a PLC section, allowing for priority switching.		
2.	1250 A TPN MCCB	Be adjustable with over current settings and having a short-circuit breaking capacity of 50KA at 415Vac, 50Hz, with shunt trip coil for fireman's switch. The MCCB to be adjustable in 600-1250A range, set at 1000A. The MCCBs to be motorized with both electrical and mechanical inter-lock with the Tie breaker/Coupler, with an automatic control system. Allow for manual override and remote monitored, Modbus TCP/IP, Ethernet enabled.		
3.	1000Amp MCCB	Of type NS 1000N with adjustable over current settings and having a short-circuit breaking capacity of 50KA at 415Vac, 50Hz. The MCCB to be adjustable in 600-1000A range, set at 600A. The MCCBs to be motorized.		
4.	Change Over	2No x 1000 A TPN MCCB main incomer (for the existing 630KVA transformer and genset type NS 1000N with adjustable over current settings and having a short-circuit breaking capacity of 50KA at 415Vac, 50Hz, with shunt trip coil for fireman's switch. The MCCB to be adjustable in 600-1000A range, set at 1000A. The MCCBs to be motorized with		

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		both electrical and mechanical inter-lock with the Tie breaker/Coupler, with an automatic control system. Allow for manual override and remote monitored, Modbus TCP/IP, Ethernet enabled. Operational Condition • Be remote monitored. • Ethernet enabled • Genset run command • On load and off load test functions • Schedule starts • voltage and frequency thresholds • Load shedding Should have an inbuilt Power Quality Analyzer to detect • Frequency • Phase sequence • Power fluctuations		
5.	Automatic Change-over Contactor Unit	**General** The Contractor shall supply and install complete, an automatic changeover Contactor to operate in conjunction with the KPLC supply and the standby diesel plant. The automatic changeover Contactor shall be housed within a cubicle type L.V. switchboard. **Contactor Unit** The automatic changeover Contactor Unit shall consist of contactors feeding a common bus-bar system to which the loads are directly connected. One contactor shall control the normal mains supply and the other controls the standby diesel supply. Substantial mechanical and electrical interlocks shall be provided so that both supplies cannot be operated at the same time and shall be suitable for continuous rating and robust		

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		construction.		
		Manual Change-Over Switches Manual changeover switches shall be provided so that the supply can be maintained from source, normal or standby in the event of a Contactor failure. These shall be suitable for continuous rating and of robust construction. They shall be installed in a separate compartment in the L.V. Switchboard, or elsewhere to be agreed with the Engineer. **Operation** The Contractor shall ensure that in the event of a KPLC mains power supply failure, the automatic changeover contactor break the connections of the Mains Supply and make the connections to the standby diesel generator set supply. When the normal supply is restored the reverse action should take place. The standby generator also operates if there is loss of one or more phase on the incoming KPLC mains supply cable. The automatic changeover unit shall come into operation in the event of one or more of the following occurring: - • Loss of KPLC mains supply • Loss of one or more phases; • Under-voltage, within prescribed limits; • Over-voltage, within prescribed limits; • Any other additional feature offered by the specialist manufacturers. With the restoration of the KPLC mains supply to the normal voltage, frequency and regulation, the automatic changeover unit shall again, automatically connect the loads back onto the main supply. This taking place after a prescribed time to prevent		

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		the continual starting and stopping of the diesel generating plant, in the event of there being intermittent KPLC mains supply interruptions. Suitable timers shall be provided so that the change-back period can be adjusted and agreed with the Client. The protection relays and monitoring device shall be suitably mounted and located on the incoming supply with signal cables extended to the Diesel Generator Control Panel. The Diesel Generator shall continue to run for a pre-determined period after the restoration of the mains supply, and then stop and revert automatically to a standby power unit ready to start-up in the event of future loss of KPLC main supply. Full operational details shall be agreed with the Engineer.		
6.	GENSET control module	Provide appropriate module.		
7.	415V three-phase surge diverter	Type Furse ESP 415, wired as shown, complete with enclosure with viewing window.		
8.	PFCU	150kVAR power factor correction capacitor bank with the following parameters 1 x 50 KVAr's 415 V,50Hz, 3-Phase 2 x 25 KVAr's 415 V,50Hz, 3-Phase 2 x 20 KVAr's 415 V,50Hz, 3-Phase 1 x 10 KVAr's 415 V,50Hz, 3-Phase 12 x Special contactors for capacitor switching 12 x Fuse bases and fuses for each capacitor protection 12 x Step indicator lamps 1 x Control circuit protection fuse/fuse holder 1 x 12-Step automatic control regulator for maintaining power factor at the set level and regulating the switching of capacitor steps 1 x 1500/5A Current transformer (to be mounted after the		

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		mains incoming circuit breaker) The bank to be made from low-loss bio-degradable capacitive units, complete with earthed enclosure.		
9.	CT three phase digital check meters	Digital multimeter of type PM820/METSEPM5320 with CTs and fuse protection capable of measuring voltage in the range 0 – 1000V, 3-phase, current in the range 0-2000A, 3-phase, and all power system parameters (KW, KVA, KWHr, KVArs, Frequency, P.F., harmonics and all the parameters). The multimeter to have an accessible terminal for connecting an external printer, and should be complete with selector switches for viewing / displaying the various parameters. Digital multimeter should be Ethernet enable, with Modbus TCP/IP port.		
10.	Automatic Voltage Regulator	Rating: 630KVA Audible Noise : <60dB High Reliability : >100,000 MTBF Input operating voltages : 3 Phase, 415V/240V Input Voltage Tolerance : 20% i.e. from 365-505V 3 Phase, from 192-288V 1 Phase; Frequency 50/60Hz + 5% Output Voltage Adjustment Range : from 210V- 255V (L-N) from 360V - 440V (L-L) Admitted load variations: 300% for 2 mins – 150% for 10 mins Input Power Factor at full linear load : >0.9 Operation: Independent correction for each Phase Total Harmonic Distortion THD under linear load : < 5% Coupling : Star connection Input & output multimetre		

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		Cooling : Natural air ventilation (Aided with fans > 45oC) Ambient temperature : -20 +45C° Communication : Modbus TCP/IP, ethernet enable IP21 rating Product life span : 20 years Warranty: **Not less than 2 Years** State Dimensions/Weight of the AVR (WxDxH) State Protection degree of the AVR. State Make, country of origin and model of the AVR.		
11.	Protection & Earthing requirement	All MCCBs should have adjustable over current settings, selectivity observed. Comprehensive protective multiple earthling of the above board in 1200mm long 12mm diameter pure electrolytic copper earth rod deep driven to permanent moisture level, copper clamp. 50mm² green earth lead complete with all accessories. (Note: Use parallel rods if effective earthing cannot be achieved with 1).		
12.	Civil/Building works requirements	Civil works to ensure good ventilation in both the LV Switchroom and transformer room. Supply and install Evacuations fans/units 2 in the LV Switchroom, Units auto control with temperature sensors i.e. temp >30°C. All cables to be secure on appropriate cable trays Supply and install Light units. Paint the whole area with fire rated paints and ensure no dust.		

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		Label of rooms with KPLC logo's.		
13.	Riser boards	Replacement of existing Distribution boards, Fuses and tiding the risers, Painting. Tracing of line and ensuring retouch of existing circuits. Making good all electrical wiring and electrical fittings, Labelling of all circuits and painting.		
14.	Communication	• All MCCBs for incomers and AVRs to be remotely monitored (using appropriate branch circuit monitor) • When generator kicks in a SMS alert is sent • Monitoring software to be supplied.		
15.	Layout drawings	Bidders to provide proposed layout drawings Switchboard working drawings to be prepared with full site understanding as to how the existing cables will be terminated into the proposed positions of the various outgoing circuit breakers)		
16.	Work schedule	Bidders to provide work schedule detailing all activities.		

PART B: RISER BOARD REQUIREMENTS

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1.	Riser/Sub Main Distribution boards	The riser/sub main boards shall be connected to a supply voltage system of 415/240V, 3 phase, 4 wire and 50 Hz. • Fully type tested conditional short circuit rating of 25kA to BS EN 61439-3 (Submit test certificate) • High performance MCB 10kA BS EN 60898 15kA BS EN 60947-2; 1, 2, 3 pole • 250A busbar rating • Interlocked switch disconnection to BS EN 60947-3 ensuring unused outgoing ways are isolated • Switching outgoing neutral on all boards using distributed neutral kit • Terminal block for feeding up to 100A • Incomer: mccb; padlockable in the off position only • Device accessories and auxiliaries: add-on earth leakage modules • Knockouts for cable gland and conduit mixed to suit the installation needs without loss of space • Removable insulated pan assembly • Fully shrouded neutral • Split neutral bars • Removable gland plates • IP 55		
2.	Layout drawings	Bidders to provide proposed layout drawings Sub main board working drawings to be prepared with full site understanding as to how the existing cables will be terminated into the proposed positions of the various outgoing circuit breakers		
3.	Work schedule	Bidders to provide work schedule detailing all activities.		