

Note1: Item number 15 on the “ANNEX 2A – BILL OF QUANTITIES FOR ELECTRICAL GRID CONNECTION” is to be changed as follows:

Supply & installation of 2000kVA, 0.415kV to 11kV, Dyn11, ground mounted immersed transformers with copper winding in accordance with the specifications in Annex 2D

Note 2: Furthermore, **the Item number 1 on “ANNEX 2A – BILL OF QUANTITIES FOR ELECTRICAL GRID CONNECTION” has to be approved by the Maldives Energy Authority before commencement of supply and delivery works.**

ANNEX 2A – BILL OF QUANTITIES FOR ELECTRICAL GRID CONNECTION

Item	Description	Qty	Unit	Rate USD	Amount USD
1	Supply & installation of Synchronizing panel including below switchgear & accessories in powder coated, metal, free standing enclosure (Form 3b) with necessary internal wiring approved by the Maldives Energy Authority	1	Item		
	01 no. 1600Amp 4P 70kA adjustable motorized ACB complete with shunt, UVT and auxiliary For G1 (Diesel Generator 01)				
	01 no. 630Amp 4P 36kA adjustable motorized MCCB complete with shunt, UVT and auxiliary For G2 (Diesel Generator 02)				
	01 no. 3200Amp 4P 70kA adjustable motorized ACB complete with shunt, UVT and auxiliary For G3 W2E Turbine				
	01 no. 3200Amp 4P 70kA adjustable ACB complete with shunt, UVT				
	For 1000kW Load (outgoing feeder for step up TF)				
	01 no. 1250Amp 4P 70kA adjustable MCCB complete with shunt, UVT				
	For 600kW Load				
	01 no. 125Amp 4P 25kA adjustable MCCB complete with shunt, UVT				
	For 60kW Load				
	01 no. 250Amp 4P 36kA adjustable MCCB complete with shunt, UVT				
	For 100kW Load				
	01 no. 63Amp 4P 18kA adjustable MCCB complete with shunt, UVT				
	For 25kW Load				
	01 no. 250Amp 4P 36kA adjustable MCCB complete with shunt, UVT				
	For Spare 1 - 100kW Load				
	01 no. 125Amp 4P 25kA adjustable MCCB complete with shunt, UVT				
	For Spare 2 - 60kW Load				
	01 no. 63Amp 4P 18kA adjustable MCCB complete with shunt, UVT				
	For Spare 3 - 25kW Load				
	11 nos. Earth Fault Relays				
	11 nos. Phase Failure Relay				
	11 nos. Digital Power Analyzer				
	11 nos. Over Current Relay				
	04 nos. Hour meter				
	04 nos. Power factory meter				
	04 nos. Frequency meter				

	04 nos. Synchronizing and load sharing module Deep Sea 8810				
	04 nos. RPM meter				
	12 nos. Digital ammeters AC				
	12 nos. Digital voltmeters AC				
	04 nos. Analogue ammeter DC				
	04 nos. Analogue voltmeter DC				
	03 nos. KRAL flow meter				
	04 nos. CT type analogue kW meter				
	04 nos. CT type analogue kWh meter				
	04 nos. Emergency push button				
	1 lot.. LED indicators				
	01 lot. AC current transformers				
	01 lot. DC current transformers				
	04 nos. 100kA TPN surge arrestors with 125A HRC fuses				
	01 lot. 150mmx12.5mm TPN+E tinned copper bus bar for main chamber				
	01 lot. Suitable sizes of TPN tinned copper bus bar for outgoing feeders				

* Programming of Deep Sea units, testing & commissioning of complete panel (Sync & distribution)

2	<p>Supply, lay & connect feeder cable from Sync. panel to G1 using with 4x4C 240sq.mm CU/XLPE/SWA/PVC + 25mmx3mm copper tape in cable trench.</p> <p>Rate should includes charges for excavation, backfilling, laying of sand bed, concrete</p> <p>tiles, warning tapes, lugs, gland, vynil end caps, nut & bolts, ties, crimping etc.</p>	36	Mts		
3	<p>Supply, lay & connect feeder cable from Sync. panel to G2 using with 2x4C 240sq.mm CU/XLPE/SWA/PVC + 25mmx3mm copper tape in cable trench.</p> <p>Rate should includes charges for excavation, backfilling, laying of sand bed, concrete</p> <p>tiles, warning tapes, lugs, gland, vynil end caps, nut & bolts, ties, crimping etc.</p>	36	Mts		
4	<p>Supply, lay & connect feeder cable from Sync. Panel to G3 turbine using with 7x4C 300sq.mm CU/XLPE/SWA/PVC + 25mmx3mm copper tape in cable trench.</p> <p>Rate should includes charges for excavation, backfilling, laying of sand bed, concrete</p> <p>tiles, warning tapes, lugs, gland, vynil end caps, nut & bolts, ties, crimping etc.</p>	66	Mts		
5	<p>Supply, lay & connect feeder cable from Sync. Panel to 1500kW feeder (step up TF) using with 7x4C 300sq.mm CU/XLPE/SWA/PVC + 25mmx3mm copper tape in cable trench.</p> <p>Rate should includes charges for excavation, backfilling, laying of sand bed, concrete</p> <p>tiles, warning tapes, lugs, gland, vynil end caps, nut & bolts, ties, crimping etc.</p>	70	Mts		
6	<p>Supply, lay & connect feeder cable from Sync. Panel to 600kW feeder using with 3x4C 240sq.mm CU/XLPE/SWA/PVC + 25mmx3mm copper tape in cable trench.</p> <p>Rate should includes charges for excavation, backfilling, laying of sand bed, concrete</p> <p>tiles, warning tapes, lugs, gland, vynil end caps, nut & bolts, ties, crimping etc.</p>	0	Mts	Length to be finalized in Future but please mentioned the rate per meter	
7	<p>Supply, lay & connect feeder cable from Sync. Panel to 60kW feeder using with 4C 50sq.mm CU/XLPE/SWA/PVC + 25mmx3mm copper tape in cable trench.</p>	0	Mts	Length to be finalised in Future but please	

	Rate should includes charges for excavation, backfilling, laying of sand bed, concrete tiles, warning tapes, lugs, gland, vinyl end caps, nut & bolts, ties, crimping etc.			mentioned the rate per meter	
8	Supply, lay & connect feeder cable from Sync.panel to 100kW feeder using with 4C 120sq.mm CU/XLPE/SWA/PVC + 25mmx3mm copper tape in cable trench. Rate includes charges for excavation, backfilling, laying of sand bed, concrete tiles, warning tapes, lugs, gland, vinyl end caps, nut & bolts, ties, crimping etc.	0	Mts	Length to be finalised in Future but please mentioned the rate per meter	
9	Supply, lay & connect feeder cable from Sync.panel to 25kW feeder using with 4C 25sq.mm CU/XLPE/SWA/PVC + 25mmx3mm copper tape in cable trench. Rate should includes charges for excavation, backfilling, laying of sand bed, concrete tiles, warning tapes, lugs, gland, vinyl end caps, nut & bolts, ties, crimping etc.	0	Mts	Length to be finalised in Future but please mentioned the rate per meter	
10	Supply, lay & connect feeder cable from Sync.panel to Spare Feeder 1 - 100kW using with 4C 120sq.mm CU/XLPE/SWA/PVC + 25mmx3mm copper tape in cable trench. Rate should includes charges for excavation, backfilling, laying of sand bed, concrete tiles, warning tapes, lugs, gland, vinyl end caps, nut & bolts, ties, crimping etc.	0	Mts	Length to be finalised in Future but please mentioned the rate per meter	
11	Supply, lay & connect feeder cable from Sync.panel to Spare Feeder 2 - 60kW using with 4C 50sq.mm CU/XLPE/SWA/PVC + 25mmx3mm copper tape in cable trench. Rate should includes charges for excavation, backfilling, laying of sand bed, concrete tiles, warning tapes, lugs, gland, vinyl end caps, nut & bolts, ties, crimping etc.	0	Mts	Length to be finalised in Future but please mentioned the rate per meter	
12	Supply, lay & connect feeder cable from Sync.panel to Spare Feeder 3 - 25kW using with 4C 25sq.mm CU/XLPE/SWA/PVC + 25mmx3mm copper tape in	0	Mts	Length to be finalised in	

	<p>cable trench.</p> <p>Rate should includes charges for excavation, backfilling, laying of sand bed, concrete</p> <p>tiles, warning tapes, lugs, gland, vynil end caps, nut & bolts, ties, crimping etc.</p>			Future but please mentioned the rate per meter	
13	<p>Supply, lay & connect control cables from Sync. panel to G1, G2, G3 and 1500kW Load feeder using with 3C 1.5sq.mm CU/PVC/SWA/PVC in cable trench.</p>	1	Lot		
14	<p>Supply & installation of earth electrode 16mmDx3000mmL solid copper rods in radial arrangement (as per the recommended procedure) and connecting same to Synchronising panel & step up transformer using 25mmx3mmT copper tape. Earth resisittance should be below 5 Ohms as per the IEE regulation</p>	2	No.		
15	<p>Supply & installation of 2000kVA, 0.415kV to 11kV, Dyn11, ground mounted immersed transformers with copper winding in accordance with the specifications in Annex 2D</p>	1	Item		
16	<p>Supply & installation of 11kV, 630Amp, 21kA for 3 seconds, indoor type, motorised operated, extensible Ring Main Unit with over current / earth fault.</p> <p>Type : two motorised vaccum circuit breakers feeders</p>	1	Item		
17	<p>End termination & commissioning of step up Transformer & Ring mains unit</p>	1	Item		

ANNEX 2D

HV/LV distribution transformers

ground mounted immersed transformers

from 100 to 3150 kVA - insulation ≤ 24 kV / 400 V

IEC standards

electrical characteristics

rated power (kVA) ⁽¹⁾	100	160	250	315*	400	500*	630	800	1000	1250	1600	2000	2500	3150
rated voltage	primary ⁽¹⁾ 15 or 20 kV													
	secondary at no-load ⁽¹⁾ 400 V between phases, 231 V phase to neutral													
rated insulation level ⁽³⁾	primary 17.5 kV for 15 kV, 24 kV for 20 kV													
HV tapping range (off voltage)	$\pm 2.5\%$ or $\pm 5\%$ or $\pm 2.5\% \pm 5\%$ ⁽¹⁾													
vector group	Dyn 11 ⁽¹⁾ (delta ; star neutral brought-out)													

description

- three-phase transformers, for indoor or outdoor use (installation to be specified);
- step-down type ⁽¹⁾;
- rated frequency : 50 Hz ⁽¹⁾;
- maximum ambient temperature : 40°C ⁽¹⁾;
- mineral oil immersed ⁽¹⁾;
- hermetically sealed with integral filling ⁽⁴⁾;
- cover bolted on tank;
- ONAN type natural cooling;
- standard anti-corrosion surface treatment and coating ⁽¹⁾;
- final colour grey RAL 7033 ⁽¹⁾.

basic fittings

- 1 off-circuit tappings switch with padlocking located on the cover; this switch operates on the highest rated voltage to bring the transformer to the supply voltage-actual value;
- 3 fixed plug-in connectors 250 A / 24 kV - HV side;
- 4 LV flat-bars, from 250 kVA only; for 100 and 160 kVA: 4 LV porcelain bushings;
- 2 earthing terminals on the cover;
- 4 bi-directional flat rollers from 160 kVA;
- 1 draining device;
- 2 lifting and untanking lugs;
- 1 rating plate to be fixed on 1 of the 4 sides;
- 1 filling plug;
- protection index IP 00.

Winding should be COPPER not ALUMINIUM