



NIGERIA ELECTRICITY TRANSMISSION PROJECT (NETAP)

TERMS OF REFERENCE (TOR)

For

TECHNICAL ASSISTANCE FOR ENGINEERING SUPERVISION AND SITE MANAGEMENT OF REHABILITATION & REINFORCEMENT OF 330/132kV & 132/33kV TRANSMISSION SUBSTATIONS (PACKAGE 1)

1 BACKGROUND

The Federal Government of Nigeria has received a credit on behalf of Transmission Company of Nigeria (TCN) from the International Development Association (IDA) under the World Bank towards the cost of Nigeria Electricity Transmission Project (NETAP). The Company therefore intends to apply part of the proceeds of this credit for payments under the contract for Technical Assistance for Engineering Supervision and Site Management of Rehabilitation & Reinforcement of 330/132kV & 132/33kV Transmission Substations (Package 1).

- 1.1 The Transmission Company of Nigeria (TCN) which is a vertically integrated utility whose Head Office is in Abuja, Nigeria, has a mission to transmit throughout the Nigeria territory.
- 1.2 The Nigeria Electricity Transmission Project (NETAP) seeks to redress certain deficiencies and operational constraints of the Nigeria Power Transmission System so as to allow the efficient dispatch and transmission of Power in the National Grid through additional transformer capacity. In particular, it will complement efforts underway for both emergency and long term measures now being taken to increase generation.
- 1.3 Part of the NETAP investment component includes the contracts for the Rehabilitation and Reinforcement of 330/132kV & 132/33kV Transmission Substations: NTP-TR1. An Engineering Consultancy Services is therefore required to manage and supervise the works covered under the aforementioned contracts.
- 1.4 The summary of the scope of works in the contracts NTP-TR1 which are in two (2) Lots shall be managed and supervised by the consultant under the project assignment as given below:

Supply and installation contract which is required for the augmentation of Reinforcement works, Replacement and Upgrade of existing Transmission substation in Kaduna, Shiroro and Abuja Regions. The Stations includes;

S/N	SUBSTATION	LOCATION
1.	Kumbotso 330/132/33kV TS	It is located in Kano State about 15km to the city center and about 30km from Kano Airport.
2.	Dakata 132/33kV Substation	It is located in Kano City about 10mins drive from Kano Airport.
3.	Kankia 132/33kV Substation	It is located in Kastina the state capital, by NAPTIN training center about 30mins drive from Kastina Airport and Katsina town.
4.	Dan Agundi 132/33kV Substation	It is about 5km from Kano City Center and about 30km from Kano Airport.
5.	Birnin Kebbi 330/132kV Substation	It is located in Kebbi State, about 40min drive from Mando TS
6.	Shiroro 330/132/33kV Substation	Shiroro Substation is located in Shiroro Generating Station in Niger State. The station is about 1hrs drive from Minna, the capital of Niger State
7.	Abuja Central Area 132/33kV Substation	It is located in the Federal Capital Territory. About 40minutes drive from Abuja Airport
8.	Kainji 330/132/33kV Substation	Kainji Substation is located in Kainji Generating Station in Niger State. The station is about 4hrs drive from Minna the capital of Niger State

1. Kumbotsho 330/132/33kV Substation

- Reinforcement of 1x300MVA Power Transformer
 - Decommission of existing faulty 150MVA Power Transformer, Demolish and reconstruct a new Transformer plinth, Supply and Installation of 1x 300MVA 330/132kV Power Transformer with all associated 330kV Switchgears and accessories.
 - Test and commissioning of Equipment.
- Supply & Installation of Control and Relays Panels with Digital Control System
 - Decommission the existing Control and Relay Panels, and Supply & Installation of Digital Control System.
 - Testing and Commissioning.
- Rehabilitation of Control Room
 - General renovation of the control room, which includes: Toilet & Bathroom facilities, Floor tiles, Ceiling, Painting. Painting, Air-conditioning system etc.
- Supply & Installation of 3Nos, 132kV Circuit Breaker
 - Decommissioning and replacement of old CB with new ones.

- Testing and Commissioning
- Supply & Installation of 7Nos, 132kV Disconnect Switches plus Earthing Switch
 - Decommissioning and replacement of old Isolators with new ones.
 - Testing and Commissioning
- Supply & Installation of 19Nos, 132kV Current Transformer
 - Decommissioning and replacement of old CT with new ones.
 - Testing and Commissioning
- Civil works (equipment foundation, transformer plinth, cable trench etc)
 - Demolition and reconstruction of 330kV Disconnect switch foundations.
 - Demolition and reconstruction of 330KV Circuit breaker foundation.
 - Demolition and reconstruction of 132kV equipment foundations for Circuit breaker
 - Demolition and reconstruction of 132kV equipment foundations for the Disconnect switch.
 - Construction and replacement of broken cable trench covering slabs
 - Re-gravelling of total work area.

2. Dakata 132/33kV Substation

- Reinforcement with 1 x 100MVA 132/33kV Power Transformer with High Voltage Switchgears and Associated Equipment.
 - Construction of a new 100MVA 132/33kV Power Transformer plinth with High Voltage associated switchgears.
 - Install and assembled the transformer
 - Testing and commissioning of the equipment
- Supply & Installation of Control and Relays Panels with Digital Control System
 - Supply, installation and commissioning of newly procured Control and Relay panels for the new bay.
- Supply & Installation of Additional 3 No. Feeders Bay
 - Construct a new equipment foundation and gantry structure for the support of the 3Nos. 33kV Feeders.
 - Install and terminate the new 3Nos. 33kV Feeders on the gantry structures.
 - Test and commission it
- Rehabilitation of Control Room
 - Expansion of existing control room to accommodate the new control and protection panels.
 - Complete renovation by painting, tiling, ceiling and replacement of faulty toilet facility.
 - Replacement of Air condition, lighting system

- Supply & Installation of 1No, 132kV Circuit Breaker
 - Construct a new 132kV Circuit breaker foundation with support structure.
 - Install and terminate the new 1Nos. 132kV Circuit breaker with support structures.
 - Test and commission it

- Supply & Installation of 5Nos, 33kV Circuit Breaker.
 - Construct 5Nos 132kV Circuit breaker foundation with support structure.
 - Install and terminate the 5Nos. 132kV Circuit breaker with support structures.
 - Test and commission it

- Supply & Installation of 2Nos, 132kV Disconnect Switches plus Earthing Switch
 - Construct 2Nos 132kV Disconnect Switch foundation with support structure.
 - Install and terminate the 2Nos. 132kV Disconnect Switch with support structures.
 - Test and commission it

- Supply & Installation of 10Nos, 33kV Disconnect Switches plus Earthing Switch
 - Construct 10Nos 33kV Disconnect Switch foundation with support structure.
 - Install and terminate the 10Nos. 33kV Disconnect Switch with support structures.
 - Test and commission it

- Supply & Installation of 4Nos, 132kV Current Transformer
 - Construct 4Nos 132kV Current Transformer foundation with support structure.
 - Install and terminate the 4Nos 132kV Current Transformer with support structures.
 - Test and commission it

- Supply & Installation of 16Nos, 33kV Current Transformer
 - Construct 16Nos 33kV Current Transformer foundation with support structure.
 - Install and terminate the 16Nos 33kV Current Transformer with support structures.
 - Test and commission it

- Supply & Installation of 3Nos, 132kV Capacitor Voltage Transformer
 - Construct 3Nos 132kV Capacitor Voltage Transformer foundation with support structure.
 - Install and terminate the 3Nos 132kV Capacitor Voltage Transformer with support structures.
 - Test and commission it

- Supply & Installation of 15Nos, 33kV Voltage Transformer
 - Construct 15Nos 33kV Voltage Transformer foundation with support structure.
 - Install and terminate the 15Nos 33kV Voltage Transformer with support structures.
 - Test and commission it

- Civil works (Construction of cable trench with trays, re-gravelling of work area, etc)

3. Kankia 132/33kV Substation

- Replacement of 30MVA and Upgrading 30MVA to 2X60MVA Transformers.
 - To Decouple/removal 1no existing 30MVA.
 - To installed 2X60MVA transformers and commission same.
 - To reinforce the transformer plinth
- Supply and Installation DCS panels.
 - Installation and commissioning of same equipment panels
- Supply and Installation 132/KV CBs/Disconnectors/CT and CVTs.
 - To install the new Circuit Breakers,
 - To commission same.
 - To provide the equipment plinth for CB and Isolators.
- 23Nos Supply and Installation 132/KV CT/CVT
 - To provide the equipment plinth for CB and Isolators
 - Installation and commissioning of same equipment
 - To commission same.
- 28Nos. Supply and Installation 33KV CT/CVT
 - To provide the equipment plinth for CT/CVTs.
 - Installation and commissioning of same equipment
 - To commission same.
- 5Nos Supply and Installation 33KV CB
 - Installation and commissioning of same equipment.
- Civil work (equip foundation, cable trenches and trans plinth construction)
 - To provide designs before construction.
 - To construct according to standard of TCN.

4. Dan Agundi 132/33kV Substation

- Reinforcement of 1X100MVA, 132/33KV
 - To provide all designs for the installation of the transformer.
 - To construct all the civil works.
 - Installation and commissioning of same equipment
- Supply and Installation DCS panels.
 - Installation and commissioning of same equipment
- Rehabilitation of Control Room

- General Rehabilitation of the control room Building.
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- 1No Supply and Installation of 132KV CB/Isolators
 - To install the new Circuit Breakers,
 - To commission same.
 - To provide the equipment plinth for CB and Isolators.
- Supply and Installation of 132KV, CT/CVT
 - To provide the equipment plinth for CT and CVTs.
 - Installation and commissioning of same equipment
 - To commission same
- Supply and Installation 33KV CT/CVT
 - To provide the equipment plinth for CT/CVTs.
 - Installation and commissioning of same equipment
 - To commission same.
- Supply and Installation 33KV CB/Isolators
 - To provide Designs
 - Installed and commissioned same equipment
 - To provide Designs before construction.
- Civil works
 - To provide Designs before construction.
 - To construct according to standard of TCN.

5. Birnin Kebbi 330/132kV Substation

- Reinforcement with 2 x150MVA 330/132kV Transformer
 - Decommissioning and removal of the 2 x 90MVA power transformer ,demolishing and reconstructing of new transformer plinths for 2 x 150MVA power transformer, supply and commissioning of 2x 150MVA power transformer .
 - Testing and commissioning of the equipment
- Reinforcement with 1 x60MVA 330/132kV Transformer
 - Decommissioning and removal of the 30MVA power transformer ,demolishing and reconstructing of new transformer plinths for 1 x 60MVA power transformer ,supply and commissioning of 1x 60MVA power transformer .
 - Testing and commissioning of the equipment
- Installation of 1 x 60MVA 132/33kV Power Transformers with associated 3no. Outgoing 33kV Feeders
 - Construction of a new 60MVA 132/33kV Power Transformer plinth with High Voltage associated switchgears.
 - Install and assembled the transformer
 - Testing and commissioning of the equipment

- Supply & Installation of Control and Relays Panels with Digital Control System
 - Supply, installation and commissioning of newly procured Control and Relay panels for the new bays.

- Supply & Installation of Additional 3 No. Feeders Bay
 - Construct a new equipment foundation and gantry structure for the support of the 3Nos. 33kV Feeders.
 - Install and terminate the new 3Nos. 33kV Feeders on the gantry structures.
 - Test and commission it

- Rehabilitation of Control Room
 - Complete renovation by painting, tiling, ceiling and replacement of faulty toilet facility.
 - Replacement of Air condition, lighting system

- Supply & Installation of 1No, 330kV Circuit Breaker
 - Construct a new 330kV Circuit breaker foundation with support structure.
 - Install and terminate the new 1Nos. 330kV Circuit breaker with support structures.
 - Test and commission it

- Supply & Installation of 3No, 132kV Circuit Breaker
 - Construct 3Nos. 132kV Circuit breaker foundation with support structure.
 - Install and terminate the new 3Nos. 132kV Circuit breaker with support structures.
 - Test and commission it

- Supply & Installation of 1Nos, 33kV Circuit Breaker.
 - Construct 1Nos 132kV Circuit breaker foundation with support structure.
 - Install and terminate the 1Nos. 132kV Circuit breaker with support structures.
 - Test and commission it

- Supply & Installation of 1Nos, 330kV Disconnect Switches plus Earthing Switch
 - Construct 1Nos 330kV Disconnect Switch foundation with support structure.
 - Install and terminate the 1Nos. 330kV Disconnect Switch with support structures.
 - Test and commission it.

- Supply & Installation of 8Nos, 132kV Disconnect Switches plus Earthing Switch
 - Construct 8Nos 132kV Disconnect Switch foundation with support structure.
 - Install and terminate the 8Nos. 132kV Disconnect Switch with support structures.
 - Test and commission it

- Supply & Installation of 2Nos, 33kV Disconnect Switches plus Earthing Switch
 - Construct 10Nos 33kV Disconnect Switch foundation with support structure.
 - Install and terminate the 10Nos. 33kV Disconnect Switch with support structures.

- Test and commission it
- Supply & Installation of 3Nos, 330kV Current Transformer
 - Construct 3Nos 330kV Current Transformer foundation with support structure.
 - Install and terminate the 3Nos. 330kV Current Transformer foundation with support structure.
 - Test and commission it.
- Supply & Installation of 12Nos, 132kV Current Transformer
 - Construct 12Nos 132kV Current Transformer foundation with support structure.
 - Install and terminate the 12Nos. 132kV Current Transformer foundation with support structure.
 - Test and commission it
- Supply & Installation of 3Nos, 33kV Current Transformer
 - Construct 3Nos 33kV Current Transformer foundation with support structure.
 - Install and terminate the 3Nos 33kV Current Transformer with support structures.
 - Test and commission it
- Supply & Installation of 9Nos, 132kV Capacitor Voltage Transformer
 - Construct 9Nos 132kV Capacitor Voltage Transformer foundation with support structure.
 - Install and terminate the 9Nos 132kV Capacitor Voltage Transformer with support structures.
 - Test and commission it
- Supply & Installation of 3Nos, 33kV Voltage Transformer
 - Construct 3Nos 33kV Voltage Transformer foundation with support structure.
 - Install and terminate the 15Nos 33kV Voltage Transformer with support structures.
 - Test and commission it
- Civil works (Construction of cable trench with trays, re-gravelling of work area, etc)

6. Shiroro 330/132/33kV Substation

- Supply & Installation of Control and Relays Panels with Digital Control System
 - Decommission the existing Control and Relay Panels, and Supply & Installation of Digital Control System.
 - Testing and Commissioning.
- Rehabilitation of Control Room
 - General renovation of the control room, which includes: Toilet & Bathroom facilities, Floor tiles, Ceiling, Painting, Air-conditioning system etc.
- Supply & Installation of 14Nos, 132kV Circuit Breaker
 - Decommissioning and replacement of old CB with new ones.
 - Testing and Commissioning

- Supply & Installation of 7Nos, 132kV Disconnect Switches plus Earthing Switch
 - Decommissioning and replacement of old Isolators with new ones.
 - Testing and Commissioning
- Supply & Installation of 19Nos, 132kV Current Transformer
 - Decommissioning and replacement of old CT with new ones.
 - Testing and Commissioning
- Civil works (equipment foundation, transformer plinth, cable trench etc)
 - Demolition and reconstruction of 132KV Circuit breaker foundation.
 - Rehabilitation of 33kV equipment foundations for the Disconnect switch.
 - Rehabilitation of 33kV equipment foundations for the Current Transformer.
 - Construction and replacement of broken cable trench covering slabs

7. Abuja Central Area 132/33kV Substation

- Reinforcement of 2x100MVA Power Transformer
 - Decommission of existing 2x60MVA Power Transformer, Demolish and reconstruct a new Transformer plinths, Supply and Installation of 2 x 100MVA 132/33kV Power Transformer with all associated 132kV Switchgears and accessories.
 - Test and commissioning of Equipment.
- Supply & Installation of Control and Relays Panels with Digital Control System
 - Decommission the existing Control and Relay Panels, and Supply & Installation of Digital Control System.
 - Testing and Commissioning.
- Rehabilitation of Control Room
 - General renovation of the control room, which includes: Toilet & Bathroom facilities, Floor tiles, Ceiling, Painting. Painting, Air-conditioning system etc.
- Supply & Installation of 2Nos, 132kV Circuit Breaker
 - Decommissioning and replacement of old CB with new ones.
 - Testing and Commissioning
- Supply & Installation of 10Nos, 33kV Disconnect Switches plus Earthing Switch
 - Decommissioning and replacement of old Isolators with new ones.
 - Testing and Commissioning
- Supply & Installation of 8Nos, 33kV Current Transformer
 - Decommissioning and replacement of old CT with new ones.
 - Testing and Commissioning
- Supply & Installation of 6Nos, 33kV Voltage Transformer

- Decommissioning and replacement of old CT with new ones.
- Testing and Commissioning
- Civil works (equipment foundation, transformer plinth, cable trench etc)
 - Demolition and reconstruction of 132KV Circuit breaker foundation.
 - Demolition and reconstruction of 132kV Disconnect switch foundations.
 - Demolition and reconstruction of 132kV Current Transformer foundations.
 - Demolition and reconstruction of 132kV CVT foundations.
 - Construction and replacement of broken cable trench covering slabs
 - Re-gravelling of total work area if applicable.

8. Kainji 330/132/33kV Substation

- Supply and Installation of 48Nos 330kV Isolator
 - Decoupling of existing equipment,
 - Reinforcing Equipment Foundation,
 - Erection, Installation and commissioning of Equipment.
- Supply and Installation of 1No 62kV Circuit Breaker
 - Decoupling of existing equipment,
 - Reinforcing Equipment Foundation,
 - Erection, Installation and commissioning of Equipment.
- Supply and Installation of 21Nos 330kV Current Transformer
 - Decoupling of existing equipment,
 - Reinforcing Equipment Foundation,
 - Erection, Installation and commissioning of Equipment.
- 12Nos 330KV Voltage Capacity Transformer
 - Decoupling of existing equipment,
 - Reinforcing Equipment Foundation,
 - Erection, Installation and commissioning of Equipment.
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- Rehabilitation of Existing Control
 - To remove all the obsolete equipment in the control room.
 - To paint and renovate the control room.
- Rehabilitation of 330KV Substation
 - Complete fencing of Switch yard,
 - Gravelling of the entire switch yard.
 - Building Gate man shelter.
 - Construction of Drainages in the switch yard.
- Supply and Installation of control Panels, Digital control system.
 - Installation and commissioning of same equipment.

NTP-TR1 LOT 2

Supply and installation contract which is required for the augmentation of Reinforcement works, Replacement and Upgrade of existing Transmission substations in Ijora, Lekki, Alagbon, Alausa, Akoka, Amuwo Odofin, Itire, Itire, Otta, Maryland and Egbin in Lagos Region and it includes;

S/N	SUBSTATION	LOCATION
1	Ijora 132/33kV Substation	Ijora Substation is located in Lagos (close to Ido Railway Terminus) Nigeria. It is about 1hr drive from Lagos Airport
2	Lekki 330/132/33kV Substation	Lekki Substation is located at Ajah in Lagos State. About 2hrs drive from Lagos Airport
3	Alagbon 330/132/33kV Substation	Alagbon Substation is located at Ikoyi in Lagos State. About 1hr 30min drive from Lagos Airport
4	Alausa 132/33kV Substation	Alausa Substation is located at Ikeja in Lagos State. About 30mins drive from Lagos Airport
5	Akoka 132/33kV Substation	Akoka Substation is located in Lagos. About 1hr drive from Lagos Airport
6	Amuwo Odofin 132/33kV Substation	Amuwo Odofin Substation is located in Lagos State. About 30mins drive from Lagos Airport
7	Itire 132/33kV Substation	Itire Substation is located in Lagos State. About 40mins drive from Lagos Airport
8	Otta TS 132/33kV Substation	Otta Substation is located in Ogun State. About 1hr 30min drive from Lagos Airport
9	Maryland 132/33kV Substation	Maryland Substation is located in Lagos About 30mins drive from Lagos Airport
10	Egbin 330/132/33kV Substation	Egbin Substation is located opposite Egbin Generating Station at Ijede in Lagos State About 2hrs drive from Lagos Airport

1. Ijora 132/33kV Substation

- Upgrading of 2 x 30MVA with 2 x 100MVA 132/33kV Transformer with High Voltage Switchgears and Associated Equipment.
 - Decommissioning and removal of the 2 x 30MVA power transformer ,demolishing and reconstructing of new transformer plinths for 2 x 100MVA power transformer ,supply and commissioning of 2x 100MVA power transformer .
 - Testing and commissioning of the equipment
- Supply & Installation of Control and Relays Panels with Digital Control System
 - Removal of Old electromechanical panel with digital system (SCADA)
 - Supply, installation and commissioning of newly procured Control and Relay panels.

- Rehabilitation of Control Room
 - Expansion of existing control room to accommodate the new control and protection panels.
 - Complete renovation by painting, tiling, ceiling and replacement of faulty toilet facility.
 - Replacement of Air condition, lighting system

- Supply & Installation of 3Nos, 132kV Circuit Breaker
 - Construct 3Nos. 132kV Circuit breaker foundation with support structure.
 - Install and terminate the 3Nos. 132kV Circuit breaker with support structures.
 - Test and commission it

- Supply & Installation of 17Nos, 33kV Circuit Breaker
 - Construct 17Nos. 33kV Circuit breaker foundation with support structure.
 - Install and terminate the 17Nos. 33kV Circuit breaker with support structures.
 - Test and commission it

- Supply & Installation of 4Nos, 132kV Disconnect Switches plus Earthing Switch
 - Construct 4Nos 132kV Disconnect Switch foundation with support structure.
 - Install and terminate the 4Nos. 132kV Disconnect Switch with support structures.
 - Test and commission it

- Supply & Installation of 36Nos, 33kV Disconnect Switches plus Earthing Switch
 - Construct 36Nos 33kV Disconnect Switch foundation with support structure.
 - Install and terminate the 36Nos. 33kV Disconnect Switch with support structures.
 - Test and commission it

- Supply & Installation of 8Nos, 132kV Current Transformer
 - Construct 8Nos 132kV Current Transformer foundation with support structure.
 - Install and terminate the 8Nos 132kV Current Transformer with support structures.
 - Test and commission it

- Supply & Installation of 53Nos, 33kV Current Transformer
 - Construct 53Nos 33kV Current Transformer foundation with support structure.
 - Install and terminate the 53Nos 33kV Current Transformer with support structures.
 - Test and commission it

- Supply & Installation of 6Nos, 132kV Capacitor Voltage Transformer
 - Construct 6Nos 132kV Capacitor Voltage Transformer foundation with support structure.
 - Install and terminate the 6Nos 132kV Capacitor Voltage Transformer with support structures.
 - Test and commission it

- Supply & Installation of 54Nos, 33kV Voltage Transformer
 - Construct 54Nos 33kV Voltage Transformer foundation with support structure.
 - Install and terminate the 54Nos 33kV Voltage Transformer with support structures.
 - Test and commission it
- Civil works (two (2) bay 33kV equipment foundation is required to be modified to accommodate the new 33KV equipment, Construction of cable trench with trays and re-gravelling of affected work area etc)

2. Lekki 330/132/33kV Substation

- Supply & Installation of 1 x300MVA 330/132/33kV Power Transformer.
 - Using the existing transformer plinth constructed by NIPP
 - Erect and Installation of 1x 300MVA 330/132/33kV Transformer on the existing transformer plinth.
 - Terminate the transformer primary on the 330kV GIS connecting links via the surge arrester.
 - Connect and terminate the 132kV XLPE power cable between the transformer secondary and the 132kV GIS switch room.
 - Install 1x 500KVA Earthing transformer and associated equipment on the plinth.
 - Provide and erect the gantry structure for transformers associated equipment ((NCT, surge arresters)
 - Provide and erect 132kV XLPE Cable support gantry structures.
 - Cutting, Lay and termination of power cable with standard Raychem terminating kits.
 - Test and commission each of the equipment.
- Supply & Installation of 2 x 60MVA 132/33kV Power Transformers with high Voltage Switchgears and Associated Equipment
 - Using the existing transformer plinth constructed by NIPP
 - Erection and Installation of 2x 60MVA 132/33kV Transformer on the existing transformer plinth. (plinth designed for 60MVA with 132kV GIS component ratings)
 - Connect and terminate the 132kV XLPE power cable between the 132kV GIS switch room and the 60MVA transformer primary via Surge arrester
 - Install 2x 300KVA Earthing transformers on the plinth and associated equipment on the respective gantry support structures.
 - Provide and erect the gantry support structure for transformers associated equipment ((NCT, Surge Arresters)
 - Connect and terminate the XLPE power cable between the transformer secondary and the newly provided 33kV Metal clad indoor switchgears'
 - Provide and erect 33kV and 132kV XLPE Cable support gantry structures.
 - Cutting, Lay and termination of power cable with standard Raychem terminating kits.
 - Test and commission each of the equipment.

- Supply & Installation of Control and Relays Panels with Digital Control System
 - Install the new digital/ numeric relays, SCADA and digital control system in the new control room.
 - Supply and lay protection cables between the tra he control room acontrol cable b et to the new control room.
 - Prepare and connect the control and protection, SCADA cable to each equipment and devices.
 - Test and commission them

- Supply and Installation of 10No, 33kV Metal Clad Switchgears (MCSG) including CB, DC, ES, CT, VT and protection relays
 - Modify the 33kV switch room concrete flooring to accommodate the MCSG
 - Arrange 1No Incoming 33kV bay and 3no Outgoing 33kv feeder bay for each transformer.
 - Interconnect the existing transformer incoming bay with new transformer T3 with 33kv Bus coupler
 - Interconnect Transformer T3 incoming bay with new transformer T4 with 33kv Bus coupler.
 - Connect and terminate the XLPE power cable between the transformer secondary and the newly provided 33kV Metal clad indoor switchgears’
 - Provide and connect Alarm signaling and indication between the 33kv switch room and control room.

- Civil works (equipment foundation, transformer plinth, cable trench etc)
 - Construct equipment foundations for the 330kv Surge arrester gantry structure
 - Construct equipment foundations for the 33kvand 132kV Surge arrester gantry structure
 - Construct equipment foundations for the 33kV and 132kV power cable support gantry structure.
 - Construct cable Trenches and duct for control and protection cables.
 - Construct cable ducts for 33KV and 132KV.
 - Gravelling of the transformer surroundings measuring up to a thickness of 15cm. Spreading of special polythene material (underlay) against dampness and weed growth in the specified area

3. Alagbaon 330/132/33kV Substation

- Supply & Installation of 1 x300MVA 330/132kV Transformer
 - Construction of 1 x300MVA 132/33kV Power Transformer plinth with High Voltage associated switchgears.
 - Install and assembled the transformer
 - Testing and commissioning of the equipment
- Supply & Installation of 2 x 100MVA 132/33kV Power Transformers with high Voltage Switchgears and Associated Equipment

- Construction of 2 x100MVA 132/33kV Power Transformer plinth with High Voltage associated switchgears.
 - Install and assembled the transformer
 - Testing and commissioning of the equipment

- Supply & Installation of Control and Relays Panels with Digital Control System
 - Supply, installation and commissioning of newly procured Control and Relay panels for the new bay.

- Supply & Installation of 2Nos, 132kV Circuit Breaker
 - Construct 2Nos. 132kV Circuit breaker foundation with support structure.
 - Install and terminate the 2Nos. 132kV Circuit breaker with support structures.
 - Test and commission it

- Supply & Installation of 9Nos, 33kV Circuit Breaker
 - Construct 9Nos. 33kV Circuit breaker foundation with support structure.
 - Install and terminate the 9Nos. 33kV Circuit breaker with support structures.
 - Test and commission it

- Supply & Installation of Nos, 132kV Disconnect Switches plus Earthing Switch
 - Construct 18Nos 132kV Disconnect Switch foundation with support structure.
 - Install and terminate the 4Nos. 132kV Disconnect Switch with support structures.
 - Test and commission it

- Supply & Installation of 18Nos, 33kV Disconnect Switches plus Earthing Switch
 - Construct 18Nos 33kV Disconnect Switch foundation with support structure.
 - Install and terminate the 18Nos. 33kV Disconnect Switch with support structures.
 - Test and commission it

- Supply & Installation of 1Nos, 132kV Current Transformer
 - Construct 1Nos 132kV Current Transformer foundation with support structure.
 - Install and terminate the 1Nos 132kV Current Transformer with support structures.
 - Test and commission it

- Supply & Installation of 29Nos, 33kV Current Transformer
 - Construct 29Nos 33kV Current Transformer foundation with support structure.
 - Install and terminate the 29Nos 33kV Current Transformer with support structures.
 - Test and commission it

- Supply & Installation of 30Nos, 33kV Voltage Transformer
 - Construct 30Nos 33kV Voltage Transformer foundation with support structure.
 - Install and terminate the 30Nos 33kV Voltage Transformer with support structures.
 - Test and commission it

- Civil works (Construction of cable trench with trays and re-gravelling of affected work area etc)

4. Alausa 132/33kV Substation

- Reinforcement of 1 x 100MVA 132/33kV Power Transformer with high Voltage Switchgears and Associated Equipment
 - Decommissioning and removal of the 1 x 30MVA power transformer ,demolishing and reconstructing of new transformer plinths for 1 x 100MVA power transformer ,supply and commissioning of 1x 100MVA power transformer .
 - Testing and commissioning of the equipment
- Supply & Installation of Control and Relays Panels with Digital Control System
 - Supply, installation and commissioning of newly procured Control and Relay panels for the new bay.
- Rehabilitation of Control Room
 - Complete renovation by painting, tiling, ceiling and replacement of faulty toilet facility.
 - Replacement of Air condition, lighting system
- Supply & Installation of 1Nos, 132kV Circuit Breaker
 - Modification of existing foundation to accommodate 1Nos. 132kV Circuit breaker foundation with support structure.
 - Install and terminate the 1Nos. 132kV Circuit breaker with support structures.
 - Test and commission it
- Supply & Installation of 4Nos, 33kV Circuit Breaker
 - Construct 4Nos. 33kV Circuit breaker foundation with support structure.
 - Install and terminate the 4Nos. 33kV Circuit breaker with support structures.
 - Test and commission it
- Supply & Installation of 3Nos, 132kV Disconnect Switches plus Earthing Switch
 - Construct 3Nos 132kV Disconnect Switch foundation with support structure.
 - Install and terminate the 3Nos. 132kV Disconnect Switch with support structures.
 - Test and commission it
- Supply & Installation of 8Nos, 33kV Disconnect Switches plus Earthing Switch
 - Construct 8Nos 33kV Disconnect Switch foundation with support structure.
 - Install and terminate the 8Nos. 33kV Disconnect Switch with support structures.
 - Test and commission it
- Supply & Installation of 4Nos, 132kV Current Transformer
 - Construct 4Nos 132kV Current Transformer foundation with support structure.
 - Install and terminate the 4Nos 132kV Current Transformer with support structures.
 - Test and commission it

- Supply & Installation of 13Nos, 33kV Current Transformer
 - Construct 13Nos 33kV Current Transformer foundation with support structure.
 - Install and terminate the 13Nos 33kV Current Transformer with support structures.
 - Test and commission it
- Supply & Installation of 6Nos, 132kV Capacitor Voltage Transformer
 - Construct 6Nos 132kV Capacitor Voltage Transformer foundation with support structure.
 - Install and terminate the 6Nos 132kV Capacitor Voltage Transformer with support structures.
 - Test and commission it
- Supply & Installation of 12Nos, 33kV Voltage Transformer
 - Construct 12Nos 33kV Voltage Transformer foundation with support structure.
 - Install and terminate the 12Nos 33kV Voltage Transformer with support structures.
 - Test and commission it
- Civil works (Construction of cable trench with trays and re-gravelling of affected work area etc)

5. Akoka 132/33kV Substation

- Reinforcement with 1x 60MVA 132/33KV Power Transformer-
 - Replace the existing 15MVA 33/11kV distribution Transformer from the 3rd transformer Plinth and reinforcing the plinth subject to integrity test of the existing plinth.
 - Install the new 60MVA 132/33kV Transformer on the plinth, extend and connect to the existing 132kV GIS terminal connector.
 - Connect and terminate the XLPE power cable between the transformer secondary and the newly provided 33kv Metal clad indoor switchgears'
 - Test and commission them.
- Refurbishment of the 2x 45MVA transformers-
 - Supply and Replacement of HV and LV bushing where necessary.
 - Replacing gasket and sealing oil leakages around the transformer
 - Painting of Transformer
 - On line regeneration of the transformer oil to be done by TCN
- Supply & Installation of Control and Relays Panels with Digital Control System-
 - Decommission of the existing electromechanical protection relay & control panel.
 - Remove the decommissioned C R P from the control room to a designated place
 - Install the new digital/ numeric relays, SCADA and digital control system.
 - Supply and lay control cable to replace the old ones where applicable.

- Prepare and connect the control and protection, SCADA cable to each equipment and devices.
 - Test and commission them
- Rehabilitation of the existing 132kV GIS (replacement of 1No faulty and adaptation of 4No Circuit Breakers for Line bays).
 - Decommission 1No faulty 132kV GIS circuit breaker (T1) from the existing 132kV GIS unit.
 - Replace the faulty CB with new one, test and commission.
 - Decommission 2No faulty 132kV GIS Disconnect switch (T1) from the existing 132kV GIS unit (T1E1-Q1 and T1E1-Q2)
 - Replace the faulty Disconnect switches with new one, test and commission
 - Insertion of 4No. 132kV GIS Circuit breakers each on the 132kV Lines bays of the GIS to provide complete isolation from the Incoming/ Outgoing Lines.
 - Insertion of 4No. 132kV GIS Disconnect switches each on the 132kV Lines bays of the GIS to provide complete isolation from the Incoming/ Outgoing Lines
- Supply and Installation of 1No complete 132kV GIS (including CB, DS, ES, CT, CVT)
 - Incorporation of a complete component unit of 132kV GIS (including CB, CT, DS, ES and CVT) as spare bay.
 - Modification of the existing 132kV GIS component unit to accommodate the new spare unit.
 - Provide and install the local and remote control cubicle for the new unit.
 - Test and commission it
- Supply and Installation of 14No, 33kV Metal Clad Switchgears (MCSG) including CB, DC, ES, CT and VT-
 - Carefully decommission the 6No existing borrowed metal clad switchgears, package properly and store in a designated place in the Control building.
 - Modify the switch room space and basement to accommodate the MCSG.
 - Install the 33kV indoor Metal Clad switchgear
 - Terminate and connect the 33kV XLPE power cable to each bays
 - Terminate and connect the control and power supply cable.
 - Test and commission it
 - Remove the old decommissioned Metal clad indoor switchgears from the switch room to designated place.
- Supply & Installation of 1No. 33kV and 132kV Current Transformer
 - Construct a new equipment foundation and gantry structure for the support of the 33kV and 132kV CT.
 - Install and terminate the new 33kV and 132kV CVT on the gantry structures.
 - Test and commission it
- Supply & Installation of 12Nos, 132kV Capacitor Voltage Transformer and Surge arrester-
 - Decommission and remove the existing 132kV CVT

- Install and terminate the new 132kV CVT existing gantry structures
 - Disconnect and dismantle the existing 132kV Surge arresters
 - Install and terminate the new 132kV Surge arresters existing gantry structures.
 - Test and commission it.
- Rehabilitation of Control Room building structure and Sinking surrounding area-
 - Complete rehabilitation of building (including part replacement of Roofing sheets of the surrounding wall and the main control building.
 - Repair and replace the Electrical Wiring /fittings and installation of Air Conditions
 - Replace the toilet facilities and floor Tiles.
 - General Painting of the control building and the steel structure.
 - Sealing of the leakages emanating from the roof top switch place and removal of water blockage from top of the building.
 - Repair or replace bad doors and windows where necessary.
 - Making good GIS, 33kV switchgears, control and protection rooms
 - Civil works –
 - Remove the interlocking of the surrounding sinking ground level of the access road and back-fill with sand, compacting, replaced the interlocking.
 - Sand fill, compacting the sinking sand within the spacing of pile foundation under the control building.
 - Reconstruction of base foundations for the cable support
 - Reconstruction of the falling parts of the perimeter fencing (70m x 67m)
 - Demolition and reconstruction of the existing sinking gate house
 - Construction of generator house
 - Construction of water borehole with 2000ltrs overhead water tank, and replace the plumbing system position.

6. Amuwo Odofin 132/33kV Substation

- Reinforcement with 2x 60MVA 132/33KV Power Transformer
 - Decommission and remove the existing 2X 30MVA 132/33kV Transformer from the Plinth and reinforcing the plinths subject to integrity test of the existing plinth.
 - Install the new 2x 60MVA 132/33kV Transformer on the plinths, extend and connect to the existing 132kV GIS terminal connector.
 - Connect and terminate the XLPE power cable between the transformer secondary and the newly provided 33kv Metal clad indoor switchgears'
 - Test and commission them
- Supply & Installation of Control and Relays Panels with Digital Control System
 - Decommission of the existing electromechanical protection relay & control panels.
 - Remove the decommissioned C R P from the control room to a designated place
 - Install the new digital/ numeric relays, SCADA and digital control system.
 - Supply and lay control cable to replace the old ones where applicable.

- Prepare and connect the control and protection, SCADA cable to each equipment and devices.
- Test and commission them.
- Rehabilitation of the existing 132kV GIS (Adaptation of 4No Circuit Breakers for Line bays).
 - Decommission 2No faulty 132kV GIS Disconnect switch (T2 and T3) from the existing 132kV GIS unit
 - Replace the faulty Disconnect switches with new one, test and commission
 - Insertion of 4No. 132kV GIS Circuit breakers each on the 132kV Lines bays of the GIS to provide complete isolation from the Incoming/ Outgoing Lines.
 - Insertion of 4No. 132kV GIS Disconnect switches each on the 132kV Lines bays of the GIS to provide complete isolation from the Incoming/ Outgoing Lines
- Supply and Installation of 1No complete 132kV GIS (including CB, DS, ES, CT, CVT)
 - Incorporation of a complete component unit of 132kV GIS (including CB, CT, DS, ES and CVT) as spare bay.
 - Modification of the existing 132kV GIS component unit to accommodate the new spare unit.
 - Provide and install the local and remote control cubicle for the new unit.
 - Test and commission it
- Supply and Installation of 12No, 33kV Metal Clad Switchgears (MCSG) including CB, DC, ES, CT and VT
 - Carefully decommission the 7Nos existing borrowed metal clad switchgears, package properly and store in a designated place in the Control building.
 - Modify the switch room space and basement to accommodate the MCSG.
 - Install the 33kV indoor Metal Clad switchgear
 - Terminate and connect the 33kV XLPE power cable to each bays
 - Terminate and connect the control and power supply cable.
 - Test and commission it
 - Remove the old decommissioned Metal clad indoor switchgears from the switch room to designated place.
- Supply & Installation of 1No. 33kV and 132kV Current Transformer
 - Construct a new equipment foundation and gantry structure for the support of the 33kV and 132kV CT.
 - Install and terminate the new 33kV and 132kV CVT on the gantry structures.
 - Test and commission it

Note: subject to availability of space. However, Transformer bushing NCT can be used

- Supply & Installation of 12Nos, 132kV Capacitor Voltage Transformers and Surge Arresters.
 - Decommission and remove the existing 132kV CVT
 - Install and terminate the new 132kV CVT existing gantry structures
 - Disconnect and dismantle the existing 132kV Surge arresters

- Install and terminate the new 132kV Surge arresters existing gantry structures.
- Test and commission it
- Rehabilitation of Control Room building structure and Sinking surrounding area
 - Complete rehabilitation of building (including part replacement of Roofing sheets of the surrounding wall and the main control building.
 - Repair and replace the Electrical Wiring /fittings and installation of Air Conditions.
 - Replace the toilet facilities and floor Tiles.
 - General Painting of the control building and the steel structure.
 - Sealing of the leakages emanating from the roof top switch point and removal of water blockage from top of the building.
 - Repair or replace bad doors and windows where necessary.
 - Making good GIS, 33kV switchgears, control and protection rooms
- Civil works –
 - Crack down /demolish the Sinking concrete base (ground level) access road flooring of the building surrounding and remove them.
 - Back-fill with sand, compacting and relay the concrete the access road
 - Sand fill, compacting the sinking sand within the spacing of pile foundation under the control building.
 - Reconstruction of base foundations for the cable support
 - Reconstruction of the falling parts of the perimeter fencing (70m)
 - Construction of generator house
 - Construction of water borehole with 2000ltrs overhead water tank, and replace the plumbing system position

7. Itire 132/33kV Substation

- Rehabilitation of Control Room building structure and Sinking surrounding area
 - Complete rehabilitation of building (including part replacement of Roofing sheets of the surrounding wall and the main control building.
 - Repair and replace the Electrical Wiring /fittings and installation of Air Conditions.
 - Replace the toilet facilities and floor Tiles.
 - General Painting of the control building and the steel structure.
 - Sealing of the leakages emanating from the roof top switch point and removal of water blockage from top of the building.
 - Repair or replace bad doors and windows where necessary.
 - Making good GIS, 33kV switchgears, control and protection rooms
- Reinforcement with 1x 60MVA 132/33KV Power Transformer
 - Decommission and remove the existing 1X 30MVA 132/33kV Transformer from the Plinth and reinforcing the plinths subject to integrity test of the existing plinth.
 - Install the new 1x 60MVA 132/33kV Transformer on the plinths, extend and connect to the existing 132kV GIS terminal connector.

- Connect and terminate the XLPE power cable between the transformer secondary and the newly provided 33kv Metal clad indoor switchgears'
 - Test and commission them
- Refurbishment of the 1 x 40 & 60MVA transformers and GIS components
 - Supply and Replacement of HV and LV bushing where necessary.
 - Replacing gasket and sealing oil leakages around the transformer
 - Painting of Transformer
 - On line regeneration of the transformer oil to be done by TCN
- Supply & Installation of Control and Relays Panels with Digital Control System
 - Decommission of the existing electromechanical protection relay & control panels.
 - Remove the decommissioned C R P from the control room to a designated place.
 - Install the new digital/ numeric relays, SCADA and digital control system.
 - Supply and lay control cable to replace the old ones where applicable.
 - Prepare and connect the control and protection, SCADA cable to each equipment and devices.
 - Test and commission them.
- Rehabilitation of the existing 132kV GIS (replacement of 1No faulty and adaptation of 4No Circuit Breakers for Line bays).
 - Decommission 1No faulty 132kV GIS circuit breaker (T1) from the existing 132kV GIS unit.
 - Replace the faulty CB with new one, test and commission.
 - Decommission 2No faulty 132kV GIS Disconnect switch (T2) from the existing 132kV GIS unit.
 - Replace the faulty Disconnect switches with new one, test and commission
 - Insertion of 4No. 132kV GIS Circuit breakers each on the 132kV Lines bays of the GIS to provide complete isolation from the Incoming/ Outgoing Lines.
 - Insertion of 4No. 132kV GIS Disconnect switches each on the 132kV Lines bays of the GIS to provide complete isolation from the Incoming/ Outgoing Lines
- Supply and Installation of 1No. complete component 132kV GIS unit (including CB, DS, ES, CT, CVT)
 - Incorporation of a complete component unit of 132kV GIS (including CB, CT, DS, ES and CVT) as spare bay.
 - Modification of the existing 132kV GIS component unit to accommodate the new spare unit.
 - Provide and install the local and remote control cubicle for the new unit.
 - Test and commission it
- Supply and Installation of 14No, 33kV Metal Clad Switchgears (MCSG) including CB, DC, ES, CT, VT.
 - Carefully decommission the 6Nos existing borrowed Metal clad switchgears, package properly and store in a designated place in the Control building.

- Modify the switch room space and basement to accommodate the MCSG.
- Install the 33kV indoor Metal Clad switchgear
- Terminate and connect the 33kV XLPE power cable to each bays
- Terminate and connect the control and power supply cable.
- Test and commission it
- Remove the old decommissioned Metal clad indoor switchgears from the switch room to designated place.
- Supply & Installation of 1No. 33kV & 132kV Current Transformer
 - Construct a new equipment foundation and gantry structure for the support of the 33kV and 132kV CT.
 - Install and terminate the new 33kV and 132kV CVT on the gantry structures.
 - Test and commission it

Note: subject to availability of space. However, Transformer bushing NCT can be used

- Supply & Installation of 12Nos, 132kV Capacitor Voltage Transformer
 - Decommission and remove the existing 132kV CVT
 - Install and terminate the new 132kV CVT existing gantry structures
 - Disconnect and dismantle the existing 132kV Surge arresters
 - Install and terminate the new 132kV Surge arresters existing gantry structures.
 - Test and commission it
- Civil works –
 - Crack down/ demolish the Sinking concrete base (ground level) access road flooring of the building surrounding and remove them.
 - Back-fill with sand, compacting and relay the concrete on the access road.
 - Sand fill, compacting the sinking sand within the spacing of pile foundation under the control building.
 - Reconstruction of base foundations for the cable support
 - Construction block perimeter fencing to replace the existing chain links in the three corner of the building.
 - Extending the perimeter fence to the uncovered additional land around the swampy area of the substation.
 - Construction of generator house
 - Construction of water borehole with 2000ltrs overhead water tank, and replace the plumbing system position.
 - Rehabilitation of the security gate house (including replacement of Toilet facility, plumbing works, Electrical system and replacement windows & door).

8. Otta TS 132/33kV Substation

- Upgrading of the 1 x 30MVA and 1 x 40 MVA with 2 x 100MVA 132/33kV Power Transformers with high Voltage Switchgears and Associated Equipment.
 - Decommissioning and removal of 1 x 30MVA and 1 x 40MVA power transformers, demolishing and reconstructing of new transformer plinths for 2 x

100MVA power transformer ,supply and commissioning of 2x 100MVA power transformer .

- Testing and commissioning of the equipment

- Supply & Installation of Control and Relays Panels with Digital Control System
 - Supply, installation and commissioning of newly procured Control and Relay panels for the new bays and updating existing SCADA at the station.
 - Rehabilitation of Control Room
 - Complete renovation by painting, tiling, ceiling and replacement of faulty toilet facility.
 - Replacement of Air condition, lighting system

- Supply & Installation of 1Nos, 132kV Circuit Breaker
 - Modification of existing foundation to accommodate 1Nos. 132kV Circuit breaker foundation with support structure.
 - Install and terminate the 1Nos. 132kV Circuit breaker with support structures.
 - Test and commission it

- Supply & Installation of 5Nos, 33kV Circuit Breaker
 - Construct 5Nos. 33kV Circuit breaker foundation with support structure.
 - Install and terminate the 5Nos. 33kV Circuit breaker with support structures.
 - Test and commission it

- Supply & Installation of 2Nos, 132kV Disconnect Switches plus Earthing Switch
 - Construct 2Nos 132kV Disconnect Switch foundation with support structure.
 - Install and terminate the 2Nos. 132kV Disconnect Switch with support structures.
 - Test and commission it

- Supply & Installation of 1Nos, 33kV Disconnect Switches plus Earthing Switch
 - Construct 1Nos 33kV Disconnect Switch foundation with support structure.
 - Install and terminate the 10Nos. 33kV Disconnect Switch with support structures.
 - Test and commission it

- Supply & Installation of 4Nos, 132kV Current Transformer
 - Construct 4Nos 132kV Current Transformer foundation with support structure.
 - Install and terminate the 8Nos 132kV Current Transformer with support structures.
 - Test and commission it

- Supply & Installation of 16Nos, 33kV Current Transformer
 - Construct 16Nos 33kV Current Transformer foundation with support structure.
 - Install and terminate the 16Nos 33kV Current Transformer with support structures.
 - Test and commission it

- Supply & Installation of 18Nos, 33kV Voltage Transformer

- Construct 18Nos 33kV Voltage Transformer foundation with support structure.
 - Install and terminate the 18Nos 33kV Voltage Transformer with support structures.
 - Test and commission it
- Civil works (Construction of cable trench with trays and re-gravelling of affected work area etc)

9. Maryland 132/33kV Substation

- Upgrading of 2 x 30MVA to 2 x 100MVA 132/33kV Power Transformers with high Voltage Switchgears and Associated Equipment
 - Decommissioning and removal of the 2 x 30MVA power transformer ,demolishing and reconstructing of new transformer plinths for 2 x 100MVA power transformer ,supply and commissioning of 2x 100MVA power transformer .
 - Testing and commissioning of the equipment
- Supply & Installation of Control and Relays Panels with Digital Control System
 - Supply, installation and commissioning of newly procured Control and Relay panels for the new bays and updating existing SCADA at the station.
- Rehabilitation of Control Room
 - Complete renovation by painting, tiling, ceiling and replacement of faulty toilet facility.
 - Replacement of Air condition, lighting system
- Supply & Installation of 2Nos, 132kV Circuit Breaker
 - Modification of existing foundation to accommodate 2Nos. 132kV Circuit breaker foundation with support structure.
 - Install and terminate the 2Nos. 132kV Circuit breaker with support structures.
 - Test and commission it
- Supply & Installation of 5Nos, 33kV Circuit Breaker
 - Construct 5Nos. 33kV Circuit breaker foundation with support structure.
 - Install and terminate the 5Nos. 33kV Circuit breaker with support structures.
 - Test and commission it
- Supply & Installation of 2Nos, 132kV Disconnect Switches plus Earthing Switch
 - Construct 2Nos 132kV Disconnect Switch foundation with support structure.
 - Install and terminate the 2Nos. 132kV Disconnect Switch with support structures.
 - Test and commission it
- Supply & Installation of 10Nos, 33kV Disconnect Switches plus Earthing Switch
 - Construct 10Nos 33kV Disconnect Switch foundation with support structure.

- Install and terminate the 10Nos. 33kV Disconnect Switch with support structures.
- Test and commission it

- Supply & Installation of 8Nos, 132kV Current Transformer
 - Construct 8Nos 132kV Current Transformer foundation with support structure.
 - Install and terminate the 8Nos 132kV Current Transformer with support structures.
 - Test and commission it

- Supply & Installation of 17Nos, 33kV Current Transformer
 - Construct 17Nos 33kV Current Transformer foundation with support structure.
 - Install and terminate the 17Nos 33kV Current Transformer with support structures.
 - Test and commission it

- Supply & Installation of 15Nos, 33kV Voltage Transformer
 - Construct 15Nos 33kV Voltage Transformer foundation with support structure.
 - Install and terminate the 12Nos 33kV Voltage Transformer with support structures.
 - Test and commission it

- Civil works (Construction of cable trench with trays and re-gravelling of affected work area etc)

10 Egbin 330/132/33kV Substation

- Supply & Installation of Control and Relays Panels with Digital Control System
 - De-energize and Decommission of the existing electromechanical protection relay & control panels in Lagos Thermal station building.
 - Install the new digital/ numeric relays, SCADA and digital control system in the new control room.
 - Supply and lay control cable to replace the old ones and re-route to the new control room.
 - Prepare and connect the control and protection, SCADA cable to each equipment and devices.
 - Test and commission them

NOTE;

The above removal may not be necessary (until need for its use is required) but installation of the newly procured items can be done in the new control room under construction.

- Rehabilitation of Control Room-
 - New control room is under construction by another EPC now.
 - Rehabilitation of the existing Lagos Thermal station is not required.

- Supply & Installation of 6Nos 132kV and 16Nos, 330kV Circuit Breakers -:
 - Decommission the circuit breakers.
 - Packaging and removal of the decommissioned Circuit breakers to the designated location within the station.
 - Demolition of existing foundation and construction of a new foundation
 - Installation of the new CB with complete support structure
 - Test and Commission.

- Supply & Installation of 12Nos 132kV and 26Nos, 330kV Disconnect Switches plus Earthing Switch
 - Decommission the Disconnect Switches
 - Packaging and removal of the decommissioned Disconnect Switches to the designated location within the station.
 - Demolition of existing foundation and construction of a new foundation
 - Installation of the new Disconnect Switches with complete support structure
 - Installation of the new Disconnect Switches with complete support structure
 - Test and Commission.

- Supply & Installation of 24Nos 132kV and 66Nos, 330kV Current Transformer -:
 - Decommission the current transformers
 - Packaging and removal of the decommissioned current transformers to the designated location within the station.
 - Modification and reconstruction of Gantry structure of 330kV Current Transformer
 - Modification and reconstruction of Gantry structure of 132kV Current Transformer CT
 - Installation of the new Current transformers on the modified support structure
 - Test and Commission.

- Supply & Installation of 12Nos, 132kV and 54Nos, 330kV Capacitor Current Transformer (CVT)- :
 - Decommission the capacitor voltage transformers (CVT).
 - Packaging and removal of the decommissioned capacitor voltage transformers (CVT) to the designated location within the station.
 - Modification and reconstruction of Gantry structure of 330kV capacitor voltage transformers (CVT).
 - Modification and reconstruction of Gantry structure of 132kV capacitor voltage transformers (CVT).
 - Installation of the new capacitor voltage transformers (CVT) on the modified support structure
 - Test and Commission

- Refurbishment of the 2x 500kVA Earthing transformers and 2x 150MVA Transformers-
 - Supply and Replacement of HV and LV bushing where necessary.
 - Replacing gasket and sealing oil leakages around the transformer
 - Clean off the corrosion/ rust from the transformer.

- Painting of Transformers.
- On line regeneration of the transformer oil to be done by TCN
- Civil works (equipment foundation, transformer plinth, cable trench etc)
 - Demolition and reconstruction of 330kV Disconnect switch foundations.
 - Demolition and reconstruction of 330KV Circuit breaker foundation.
 - Demolition and reconstruction of 132kV equipment foundations for Circuit breaker
 - Demolition and reconstruction of 132kV equipment foundations for the Disconnect switch.
 - Construction and replacement of broken cable trench covering **slabs**
 - Construction of water borehole and overhead storage tank, connect to link the office premises.

2. Objective of Consultant's Assignment

2.1 The objective of the Consultant's assignment is to assist in the management and supervision of works required in the contracts implementation for the Rehabilitation & Reinforcement of 330/132kV and 132/33kV Transmission Substations (Package 1) under NTP-TR1 contracts.

Generally, the Consultant shall work hand in hand with the Employer's Engineers in the execution of all aspects of the assignment. Certifications made on documents and drawings by the Consultant shall be endorsed by the Employer.

2.2 During the execution of this assignment, the Consultant will be required to make inputs from a broad field of expertise covering the following:

- Project Administration and Control
- Supervision of the Performance of the Contractors handling NTP-TR1 contracts.
- Supervision of installations up to commissioning and handing over of works under NTP-TR1 contracts.
- Training of TCN staff and transfer of technology.

2.3 The Consultant's works shall be executed in accordance with requirements of the tender documents for Rehabilitation & Reinforcement of 330/132kV and 132/33kV Transmission Substations (Package 1) in NTP-TR1.

2.4 The Consultant will be required in the course of carrying out this assignment to coordinate and monitor all other project works associated with the contracts NTP-TR1 which shall be executed concurrently at the affected sites.

- 2.5 The Consultant shall perform his assignment until the end of defects liability period of twelve (12) months after the provisory take-over from the Contractors of the project works carried out under NTP-TR1 contracts.

3.0 Scope of Assignment

The scope of works covered under NTP-TR1 contracts which is in two (2) Lots. The Consultant's assignments and responsibilities are as follows:

3.1 Project Management and Supervision

The consultant shall:

- Manage overall liaison between the Employer and the Contractors
- Review and approve all the engineering drawings, diagrams and documents submitted for approvals on the Contracts for NTP-TR1 project works in accordance with contractual and engineering specifications
- Assist the Employer in any issues relating to contract, especially compliance with the matters with performance bond, insurance and claims; and to prepare certain documents that may be required by the World Bank.
- Lead progress and site meetings, prepare agendas and write minutes of meetings, periodical follow-up reports and take-over reports.
- To be in charge of follow-up, periodical updating and coordinate work schedules of the contractors handling other related projects in the eighteen (18) substations.
- Prepare monthly, quarterly progress and project completion reports for the contracts in accordance with the World Bank requirements.
- Verify quantities of works performed and shall certify invoices issued by contractors in conjunction with the Employer's Engineer on the project.
- Make sure that supplies and works planning comply with schedules in the Contract actual supply and work progress on site in accordance with contract Schedule and determine where necessary, suggest measures to be taken to speed up the works.
- Examine any change/deviation of specifications or variations in scope of work as stipulated in the tender documents which are proposed by the Contractors and make recommendations to the Employer for approval of the change of specifications and variation of scope with the resultant cost adjustment.

- Follow-up damage reports and ensures that damaged materials are subsequently replaced.
- Check and approve the Contractors quality assurance applied by all the contractors during works execution
- Monitor the implementation of social, environmental, health and safety standards and requirements as specified in the ESMPs, and RAPs, if applicable, and monitoring any instance of gender based violence, and reporting non-compliance to the owner and proposing mitigation measures
- Issue Provisional Acceptance Certificate after commissioning and the Final Acceptance Certificate after the expiration of the Guarantee Period.

3.2 Technical Control of Designs

The Consultant will verify if calculations and hypotheses used, construction drawings, diagrams and documents submitted for his approval are worked out in accordance with contractual and engineering specifications. A special emphasis shall be put on the following tasks:

- Inspection of shipped materials before their use
 - Verification of preliminary testing prior to formulation and utilization in works (concrete) proposed by the contractor
 - Checking of the reinforced concrete and erection drawings
 - Checking the final technical as-built documentation prepared by the Contractors.

3.3 Receipt of the equipment in factory and supplies to site

The Consultant shall:

- Verify conformity of equipment with contract specifications
 - Examine any change/deviation to the contract specifications that might be proposed by the Contractors
 - Check and approve the Contractor's Quality Assurance Plan
 - Check and approve factory testing and inspection program in factory proposed by the Contractors/Suppliers
 - Ensure that main equipment has undergone testing as requested in the Contract and that the Contractor submits test certificate to the Consultant for approval.
 - Plan and supervise all Factory Acceptance Test (FAT) and all tests carried out by the Contractors at site and sign such test reports.
 - Participate in "routine testing" for major equipment together with the Employer's Engineer at the manufacturer's works

- Regularly check the program for production and delivery to site of main equipment to ensure timely completion of the contract according to schedule.
- Review the operation and maintenance manuals provided

At the commencement of project, the Employer shall specify to the Consultant, list of the main materials that must be inspected by them in the factory together with the Employer's Engineers.

3.4 Pre-Commissioning Tests And Commissioning Upon Works Completion

On works completion, the Consultant shall supervise the pre-commissioning tests and the final commissioning of all works. The Consultant shall be assisted by Employer's Engineers.

The Consultant shall establish with each of the contractors and with approval of Employer, a commissioning and testing procedures for each of the concerned project defining:

- The role and the responsibility of each of contracting parties:
- Tests to be carried out for the projects
- The detailed program of the commissioning and testing of works in accordance with the contractor implementation program;
- The conditions of commissioning such as the state and the availability of the electric network, interface with other works in progress
- Environmental, health and safety standards and procedures to be adopted.
- Planning of outages required for pre-commissioning, spot checks and other site tests

During commissioning, the Consultant shall also:

- Co-ordinate all testing to be done by the contractors, approve the procedures and results announced;
- Ensure that the contractors conform to the quality and methodology requirement for the presentation of the commissioning test reports
- Approve the commissioning test report prepared by the contractors
- Ensure that the commissioning test report shall be signed jointly by the Consultant, the Client and the contractor
- Collect set of documents of the recorded commissioning test results.
- Issue Interim Work Completion Certificate for the project works carried out under NTP-TR1 Contracts.

After completion of commissioning works, the Consultant shall have to:

- Verify and approve the "as built" drawings provided by the contractors

- Examine and confirm adequacy of the operating and maintenance manuals provided by the contractors.
- Issue Final Work Completion Certificate for the project works carried out under NTP-TR1 Contracts.

3.5 Transfer of Know-How

The transfer of know-how shall be carried out at different levels, e.g.:

- (I) Transfer of know-how through the work on site of Employer's engineers working with the Consultant's experts.
- (II) Transfer of know-how by means of training sessions or lectures conducted ;
 - In Nigeria, by the Consultant's engineers on site that would ensure active participation of TCN engineer's throughout the duration of the project assignment.
 - A well-organized one (1) week Class Room Training of twenty (20) Employer's staff on all aspects of Project Management and Contract Administration

3.6 Defects Liability Period (DLP)

The Defect liability period (DLP) is planned to be twelve (12) months after provisory take-over. During this period, the Consultant shall from his head office answer questions via e-mail and fax correspondence from home office.

By the end of the DLP the Consultant and his specialists shall be present for the final take-over of the completed project works carried out under NTP-TR1 Contracts separately. The Consultant shall be consulted on matters related to the execution of the two contracts throughout the DLP.

4.0 Requirements for the Firm

The firm is required to possess the following:

- a) The Firm's general experience and overall competence, including relevance of the applicant firm's area of core business to the assignment envisaged;
- b) Firm's good reputation, strong institutional capacity and capability in terms of technical, managerial, expertise, quality management system, number of technical staff and financial soundness etc.
- c) The extent of specific experience in assignments of similar nature and complexity in construction management and supervision of substations (132/33 kVs and above), including review of design, supervision of EPC contractor's quality, schedule, environmental, safety and health compliance, verification of equipment quality, certification of variation

- orders etc. (relevant completion certificates and/or letters of recommendations from former clients to be provided if available);
- d) The extent of specific experience in assignments of similar nature and complexity in construction management and supervision of substations in sub-Africa region would be a plus.
 - e) Evidence and certification of quality and environmental management

5.0 Requirements of Key Personnel.

- (I) The **Project Manager** shall be an electrical engineer with at **least 15 years** experience in substation works. He should have carried out projects in the past, similar in nature and complexity to the one he will be in charge of, under this contract assignment.
- (II) **Substation Specialist:** Shall be an Electrical Engineer with at **least 10 years** experience in substation turnkey installations for similar project in nature and complexity.
- (III) SCADA / Communication Engineer. Shall be an Electrical Engineer with at **least 10 years** experience in substation turnkey installations for similar project in nature and complexity.

5.1 Key Staff

- Project Manager (Electrical Engineer) 1No.
Must have the following:

- a minimum of 15 years general experience in substation works,
- MSc. degree
- a minimum of 10 years documentary experience in successful project management and contract supervision of similar nature in developing countries
- Must be present in Nigeria at all times for the duration of the project duration, unless otherwise explicitly agreed .

- Substation Specialist (Electrical Engineer) 1No.
- Must have the following:

- Minimum of 10 years experience in the construction and/ or supervision of turnkey substation project of similar nature
- Must be present in Nigeria at all times for the duration of the project duration, unless otherwise explicitly agreed

- SCADA / Communication Engineer – 1No.
- Must have the following:

- Minimum of 10 years experience in the construction and/ or supervision of turnkey substation project of similar nature
- Must be present in Nigeria at all times for the duration of the project duration, unless otherwise explicitly agreed

5.2 Key Staff (Local)

(I)	Site Electrical Engineer (Local engineer)	5Nos.
(II)	Site Civil Engineer (Local engineer)	5Nos.
(III)	Health and Safety/Environmental Specialist	2Nos.
(IV)	Planning/Contract Manager (Supervisor)	1No.

Above mentioned key staff must all have a minimum of 10 years' experience in the construction and/ or supervision of turnkey substation project of similar nature.

The Consultant shall provide experienced personnel to carry out the assignment throughout the duration of the project management services in accordance with task/requirement of the project.

These personnel shall be supported by other experts on call (who shall visit the sites as need be).

At his head office, the Consultant must have a team of specialists, especially in substation projects. Head office team shall permanently assist the personnel on site.

6.0 Reports and Time Schedule

The Consultant shall be required to submit project monthly, quarterly and completion reports for works carried out under NTP-TR1 Contracts in accordance with time schedules.

6.1 Project Monthly Report

The Consultant shall send monthly report for each of the contracts to the Employer on progress of work, including minutes of meetings if the regular site meetings were held for the projects. This report shall be issued in five (5) copies with one (1) electronic copy.

6.2 Quarterly Progress Report

The Consultant shall send a quarterly report for the projects on progress of works including the technical execution of the project; and on the implementation of the environmental measures, the effectiveness and the response of the measures adopted and proposals to amend same if the environmental measures implemented are not given desired results.

The Consultant shall include also in the quarterly progress report, financial reports on expenditure & payments made to contractors.

This report will be issued in five (5) copies with one (1) electronic copy.

6.3 Project Completion Report for NTP-TR1

The Consultant shall prepare a draft Project Completion Report not later than two (2) months after completion of the contracts works. This report shall include technical and financial aspects and shall be provided first in six (6) copies with soft copies. The Consultant shall submit for approval to the Employer the texture of this report. The Employer shall then use one month to make observations which will be incorporated into the draft report before a final version is issued in ten (10) copies together with electronic copies.

After the end of the Defects Liability Period, and after final take-over, the consultant shall update the Project Completion report that shall become the Final Completion Report which shall be provided in Six (6) copies with electronic copies.

7.0 Deadline and Local Services

The works required to be carried out under NTP-TR1 Contracts until provisory take-over is estimated to be twenty four (24) months for the contracts. The Defects Liability Period shall last for twelve (12) months for the contracts after which the Consultant's services shall be due for completion.

8.0 Facilities to Be Provided By the Consultant

8.1 Office and Residential Accommodation

The Consultant shall be responsible for the provision of both office and residential accommodation for their staff.

8.2 Transportation

The consultant shall be responsible for their transportation during the course of the project.

9.0 Facilities to Be Provided By Employer

The following shall be provided by the Employer to the Consultant:

- a) Site offices.
- b) Drawings and documents, such as previous studies, design reports, design calculations, network calculations, etc established by TCN, the Supplier or other Consultants, prior to commencement of the Consultant's works which may be required for the performance of the services if available.
- c) Assistance in obtaining permission, licenses for telephones, working permits, residence visas, re-entry and exit visas for the Consultant's staff and families respectively.

- d) Assistance in facilitating and expediting customs procedures in connection with importation of equipment and materials necessary for the Consultant's services and for the house-hold of the Consultant's key staff and families.

10.0 Effort Level

The expected effort level required for the assignment is **266** man months