SECTION- PROJECT

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1.0 GENERAL

1.1 Preamble

Power Grid Corporation of India Ltd. (POWERGRID), a Govt. of India Enterprise is responsible for bulk Power transmission of electrical energy from various Central Govt. Power Projects to various utilities/beneficiaries and interconnecting regional grids, operating and maintaining the National electrical grid of India. It is established with mandate of "We will become a Global Transmission Company with Dominant Leadership in Emerging Power Markets with World Class Capabilities by:

- World Class: Setting superior standards in capital project management and operations for the industry and ourselves.
- Global: Leveraging capabilities to consistently generate maximum value for all stakeholders in India and in emerging and growing economies.
- Inspiring, nurturing and empowering the next generation of professionals.
- Achieving continuous improvements through innovation and state of the art technology.
- Committing to highest standards in health, safety, security and environment." as its mission.

1.2 POWERGRID is implementing following transmission systems under RTM:

a) Augmentation of Transformation Capacity in Southern Region

b) Transmission System for Tirunelveli and Tuticorin Wind Energy Zone (Tamil Nadu) (500MW)

c) Extn. of 400/230kV Tuticorin-II GIS S/S for installation of 5th ICT

2.0 SCOPE

The broad scope of this specification covers Extension of following substations for elements detailed below:

S. No.	Scope
1.	**Augmentation of Transformation Capacity in Southern Region: -** **a) Augmentation by 1x500 MVA, 400/220kV Transformer (3rd) at Palakkad (PG) (2x315 MVA Transformers**

	already existing) • 1X500MVA, 400/220/33kV Three Phase Auto-transformer **b) Augmentation by 1x500 MVA, 400/220kV Transformer (3rd) at Kolar (PG) (2x500 MVA Transformers already existing)** • 1X500MVA, 400/220/33kV Three Phase Auto transformer 400kV and 220kV ICT bay works including civil works and HVWS system for above ICT are covered under separate package.
2.	**Extn. of 400/230kV Tuticorin-II GIS S/S for installation of 4th ICT under Transmission System for Tirunelveli and Tuticorin Wind Energy Zone (Tamil Nadu) (500MW)** • 1X500MVA, 400/230/33kV Three Phase Auto transformer 400kV and 230kV ICT bay works including civil works and HVWS system for above ICT are covered under separate package.
3.	**Extn. of 400/230kV Tuticorin-II GIS S/S for installation of 5th ICT** • 1X500MVA, 400/230/33kV Three Phase Auto transformer 400kV and 230kV ICT bay works including civil works and HVWS system for above ICT are covered under separate package.

2.1 The detailed scope of works is brought out in the subsequent clauses of this section.

It is the intent of this specification to describe primary features, materials, and design & performance requirements and to establish minimum standards for the work. The specification is not intended to specify the complete details of various practices of manufactures/ bidders, but to specify the requirements with regard to performance, durability and satisfactory operation under the specified site conditions

2.1.1 **Augmentation by 1x500 MVA, 400/220/33kV Transformer (3rd) at Palakkad (PG) under Augmentation of Transformation Capacity in Southern Region**

2.1.1.1 Design, engineering, manufacture, testing at manufacturer's works, supply, transportation, unloading and delivery at site including insurance & storage, erection, testing and commissioning at site for:

a. 400/220/33kV Auto-transformers along with insulating oil, all fittings & accessories including online Insulating oil drying system, all power, control & special cables between Transformer MB/OLTC DM to Digital RTCC panel

b. Digital RTCC panel:

Existing 02 nos. 400/220/33kV 3-ph auto-transformers at 400/220kV Palakkad substation commissioned with parallel operation using Analogue RTCC Panels. The digital RTCC panel under present scope shall comprise of 4 Numbers of Digital RTCC Relays {One(1) as spare, One (1) for present scope transformer & Two(2) for existing transformers}. The Present Scope shall include all the required power, control & special cables cabling (supply & installation) between existing transformer RTCC panels/OLTC MB/Transformer MB and the Digital RTCC panel, wiring modifications in existing panels as per RTCC scheme requirement so as to enable parallel operation of transformer under present scope with existing transformers through Digital RTCC relays.

2.1.2 **Augmentation by 1x500 MVA, 400/220/33kV Transformer (3rd) at Kolar (PG) under Augmentation of Transformation Capacity in Southern Region**

2.1.2.1 Design, engineering, manufacture, testing at manufacturer's works, supply, transportation, unloading and delivery at site including insurance & storage, erection, testing and commissioning at site for:

a. 400/220/33kV Auto-transformers along with insulating oil, all fittings & accessories including online Insulating oil drying system, all power, control & special cables between Transformer MB/OLTC DM to Digital RTCC panel

b. Digital RTCC panel - Existing 07 nos. (400/√3)/(220/√3)/33kV 167 MVA, 1-ph auto-transformers (forming 2 banks of 3ph. 500MVA ICT with 1 single phase unit as spare) at 400/220kV Kolar substation is commissioned with parallel operation using Analogue RTCC Panels. The digital RTCC panel under present scope shall comprise of 4 Number of Digital RTCC Relays {One(1) as spare, One (1) for present scope transformer & Two(2) for existing 2 banks of transformers}. The Present Scope shall include all the required power, control & special cables cabling (supply & installation) between existing transformer RTCC panels/OLTC MB/Transformer MB and the Digital RTCC panel, wiring modifications in existing panels as per RTCC

scheme requirement so as to enable parallel operation of transformer under present scope with existing transformers through Digital RTCC relays.

2.1.3 **Extn. of 400/230kV Tuticorin-II GIS S/S for installation of 4th ICT under Transmission System for Tirunelveli and Tuticorin Wind Energy Zone (Tamil Nadu) (500MW)**

2.1.3.1 Design, engineering, manufacture, testing at manufacturer's works, supply, transportation, unloading and delivery at site including insurance & storage, erection, testing and commissioning at site for:

a. 400/230/33kV Auto-transformers along with insulating oil, all fittings & accessories including online Insulating oil drying system. One Number of Digital RTCC relay (M/s a-eberle make) is existing at site mounted in existing digital RTCC panel to be integrated for the 4th ICT being supplied under present scope. Present scope includes cabling between Transformer MB/OLTC DM to Digital RTCC panel and commissioning of the digital RTCC relay for the present scope ICT.

2.1.4 **Extn. of 400/230kV Tuticorin-II GIS S/S for installation of 5th ICT**

2.1.4.1 Design, engineering, manufacture, testing at manufacturer's works, supply, transportation, unloading and delivery at site including insurance & storage, erection, testing and commissioning at site for:

a. 400/230/33kV Auto-transformers along with insulating oil, all fittings & accessories including online Insulating oil drying system, all power, control & special cables between Transformer MB/OLTC DM to Digital RTCC panel.

b. Digital RTCC panel – Presently, 5 nos. digital RTCC relay (M/s a-eberle make) are mounted on digital RTCC panel is available at site. Out of the five digital RTCC relays, 3 nos. relays are already in use for existing ICT-1, 2 and 3 and the fourth one shall be used for 4th ICT mentioned at Sl. no. 2.1.3 above and fifth one is kept as spare. Under present scope, contractor shall provide a new digital RTCC relay for the 5th ICT to be mounted in a new digital RTCC panel which shall be compatible with the existing digital RTCC relays. Present scope includes, wiring between existing and new digital RTCC panel, modifications in existing panels as per RTCC scheme requirement so as to enable parallel operation of transformer under present scope with all the existing transformers through Digital RTCC relays.

2.3 Design, engineering, manufacture, testing at manufacturer's works, supply, transportation, unloading and delivery at site including insurance & storage, testing at site of mandatory spares as per bid price schedule (BPS).

2.4 The contractor shall be fully responsible for providing all equipment, materials, system and services specified or otherwise which are required to complete the successful erection, testing and commissioning of the equipment in all respects.

2.5 Any other items not specifically mentioned in the specification but which is required for erection, testing and commissioning and satisfactory operation of equipment covered in this specification are deemed to be included in the scope of specification unless specifically excluded.

3.0 PHYSICAL AND OTHER PARAMETERS

3.1 Location of the substation - The location of substation is indicated below:

Sr. No	Name of Substation	Name of State	Nearest Rail Head	Short circuit rating
1.	400/220kV Kolar S/s	Karnataka	Kolar	400kV : 40KA for 1 sec 220kV : 40KA for 1 sec
2.	400/220kV Palakkad S/s	Kerala	Palakkad	400kV : 40KA for 1 sec 220kV : 40KA for 1 sec
3.	400/230kV Tuticorin-II GIS S/s	Tamil Nadu	Tuticorin	400kV : 63KA for 1 sec 230kV : 50KA for 1 sec

3.2 Meteorological data - For design purposes, meteorological data are as below:

Name of Substation	Palakkad and Kolar S/s	Tuticorin-II S/s
Altitude	Less than 1000 meter above mean sea level (MSL)	Less than 1000 meter above mean sea level (MSL)
Snow fall	NIL	NIL
Seismic Zone	As per IS 1893	As per IS 1893
Wind Zone	NBC 2016	NBC 2016
Min./Max. Design Ambient Temperature	0 / 50 degree centigrade	0 / 50 degree centigrade
Coastal area consideration	NO	Yes

4.0 SCHEDULE OF QUANTITIES

The bill of quantity is indicated in the Bid price Schedules. All equipment/items for which bill of quantity has been indicated in Bid price Schedules shall be

payable on unit rate basis. During actual execution, any variation in such quantities shall be paid based on the unit rate under each item incorporated in Letter of award.

Wherever the quantities of items/works are indicated in Lot/Set, the bidder is required to estimate the quantity required for entire execution and completion of works and incorporate their price in respective Bid price schedules. Bidder should include all such items in the bid proposal sheets, which are not specifically mentioned but are essential for the execution of the contract. Item which explicitly may not appear in various schedules and required for successful commissioning of autotransformers shall be included in the bid price and shall be provided at no extra cost to Employer.

5.0 REFERENCE DRAWINGS

The layout of auto-transformers shall depend on the substation layout arrangement and therefore shall be finalized during detailed engineering.

In case of any discrepancy between the drawings and text of specification, the requirements of text shall prevail in general. However, the bidder is advised to get these clarified from Employer.

6.0 DIFFERENT SECTIONS OF TECHNICAL SPECIFICATION

For the purpose of present scope of work, technical specification shall consist of following sections and they shall be read in conjunction with each other:

Sl. No.	Description	Rev. No.
1.	Section-Project	Rev-00
2.	Section-GTR	Rev-15
3.	Section-Transformer upto 400kV Class	Rev-13

In case of any discrepancy between Section-PROJECT and other sections, Section-PROJECT shall prevail over the other sections. In case of any discrepancy between Section-GTR and other individual sections, requirement of individual section shall prevail.

Above Technical Specifications (other than Section-Project) are standard sections for various equipment and works for different voltage levels. Items, which are not applicable for the scope of this package as per schedule of quantities described in BPS, the technical specification for such items should not be referred to.

7.0 MANDATORY SPARES

The Mandatory Spares shall be included in the bid proposal by the bidder. The prices of these spares shall be given by the bidder in the relevant schedule of BPS

and shall be considered for evaluation of bid. It shall not be binding on the Employer to procure all of these mandatory spares.

The bidder is clarified that no mandatory spares shall be used during the commissioning of the equipment. Any spares required for commissioning purpose shall be arranged by the Contractor. The unutilized spares, if any, brought for commissioning purpose shall be taken back by the Contractor.

Wherever spares in BPS/Technical Specification have been specified as "each type/each rating/each type & rating": If the offered spare/spares is sufficient to replace the respective main equipment of all types/ratings, then such offered spare/spares shall be acceptable. It implies that common spare/spare set fulfilling the spare requirement of all types/ratings shall also be acceptable, provided it is configurable at site itself without special assistance of OEM.

Mandatory Spares, wherever mentioned, are envisaged for the equipment/items being supplied under the main equipment heads under present scope meeting the requirements of Technical Specifications. The component/sub-component of an equipment/item specified in BPS/Break-up under Mandatory Spare, which is not applicable as per the offered design of respective main equipment, shall not be referred to.

8.0 EXCLUSIONS:

The following items of work are specifically excluded from the scope of this specification:

i) Earthing works and Civil foundation works for Transformers, its fittings & fire protection walls as applicable.

ii) Fire protection system (HVWS& Hydrant system) for Transformers

iii) Auxiliary power and control cables from control room/SPR to marshalling box of transformer

iv) Terminal connectors for Transformers

9.0 SPECIFIC REQUIREMENT

9.1 Digital RTCC Panel under present scope shall be of front opening type.

9.2 The specific requirements as mentioned at C/ENGG/SPEC/SEC-PROJECT/SPECIFIC REQUIREMENT REV NO 06 (attached as **Annexure-I**) shall also be referred for specified scope of work.

9.3 Following items for Auto-transformers are excluded from the scope of this

specification:

a. Online Dissolved Gas (Multi-gas) and Moisture Measuring Equipment
b. Temperature measuring unit
c. Ethernet switch, LIU patch cords etc. and associated cables

9.4 OTI & WTI shall be wired to Digital RTCC relay through 4-20 mA signals.

9.5 Tuticorin-II substation is situated in coastal area. Hence, all the specifications defined for coastal area in various sections of Technical specifications shall be applicable for Tuticorin-II substation.

9.6 For Tuticorin-II substation 52kV Bushing shall be RIP (Resin Impregnated paper) condenser type with composite polymer insulator (housing) or RIS (Resin Impregnated Synthetic) condenser type with composite polymer insulator (housing) or OIP (Oil impregnated Paper) with polymer housing type. **52kV bushing with porcelain housing is not envisaged.**

9.7 For Tuticorin-II substation, 36kV Neutral bushing shall be solid or oil communicating type with porcelain housing. Porcelain housing of 36kV bushing shall be provided with Silicon RTV coating as per Annexure-H of Section-GTR Rev-15.