

SCOPE OF WORK (SOW)

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1. GENERAL

Patran Transmission Company Limited ("PTCL") is implementing Augmentation of Transformation Capacity by 1x500 MVA, 400/220 kV ICT (3rd) at 400/220 kV Patran (GIS) S/s along with GIS duct (at 400 kV and 220 kV) in new diameter of ICT-Tie-Line ("Project").

1.1. Associated Transmission System:

The following transmission system is envisaged under the scheme:

- 500 MVA, 400/220 kV ICT - 1 no.
- 400 kV ICT bay (GIS) - 1 no.
- 400 kV bay (GIS) for diameter completion for future line (duct up to outside GIS Hall) - 1 no.
- 220 kV ICT bay (GIS) - 1 no.

2. SCOPE OF WORK

The scope of work shall cover following:

Design, engineering, supply, testing at manufacturer's works, transportation, unloading and delivery at site including insurance & storage, all associated civil works including PEB (Extension of existing GIS Hall PEB with protection & communication panels room for 220kV and 400kV respectively), transformer oil collecting pit, dismantling and diversion of internal roads, erection, testing and commissioning at site along with all equipments, fittings, accessories, foundation bolts (if any) cables and Mandatory Spare Parts and Condition Monitoring Instruments for Augmentation of Transformation capacity at Patran (GIS) S/s on LSTK basis as per the details given below:

- 500 MVA, 400/220 kV ICT - 1 no.
- 400 kV ICT bay (GIS) - 1 no.
- 400 kV bay (GIS) for diameter completion for future line (duct up to outside GIS Hall) - 1 no.
- 220 kV ICT bay (GIS) - 1 no.

3. BID PRICE SCHEDULE:

The Bid Price Schedule is attached separately in Volume-III.

4. PHYSICAL AND OTHER PARAMETERS

4.1.Location of the substation - The location of substation is indicated below:

Name of Substation	Tentative Co-ordinates	Name of State	Address
Patran (GIS) S/s	<ul style="list-style-type: none">• 29°57'25.69" N, 76°06'26.63" E• 29°57'25.59" N 76°06'28.92" E• 29°57'25.64" N, 76°06'33.65" E• 29°57'22.38" N, 76°06'33.02" E• 29°57'22.23" N, 76°06'30.58" E• 29°57'22.25" N, 76°06'27.87" E• 29°57'23.04" N, 76°06'26.43" E• 29°57'24.84" N, 76°06'26.47" E	Punjab	Vill-Banwala, Drauli link road, near peer ki samadhi, Patran, Patiala Pin- 147105

4.2.Access to Site -

PTCL to provide land for the said augmentation work at Patran (GIS) S/s ("Site") with non-exclusive access and handover such portion of the Site to Contractor on as is basis to commence the services under the Contract.

The Contractor shall (and shall cause all its sub-contractors) to use only the entrance(s) to the Site specified by PTCL for ingress and egress of all Contractor's and its sub-contractors' personnel, the Services, Contractor's Equipment, vehicles and the like.

The Contractor shall be responsible for planning and conducting its operations and those of its sub-contractors so that neither the Contractor nor any of its sub-contractor shall (a) enter upon lands (other than the designated Site) or waterbodies in their natural state unless authorized by the Project Manager and or appropriate person; (b) close or obstruct any utility installation, highway, waterway, harbor, road or other property unless applicable permits are obtained and authorized by the Project Manager and or appropriate person; or (c) disrupt or otherwise interfere with the operation of any portion of any pipeline, telephone, conduit or electric transmission line, ditch, navigational aid, dock or structure unless otherwise specifically authorized by the appropriate Person.

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

Altitude	Less than 1000 meter above mean sea level (MSL)
Snow Fall	NIL
Seismic Zone	As per IS 1893
Wind Zone	Wind map as per National Building Code – 2016 (Volume-I)
Min./Max. Design Ambient Temperature	0/50 degree centigrade
Creepage Requirement	As per Technical Specification

4.4. Fault Level- The system fault level is as mentioned below:

Sl. No	Substation	400 kV	220 kV
1	Patran (GIS) S/s	63kA for 1 second	50kA for 1 second

5. SCHEDULE OF QUANTITIES

This work is to be awarded on LSTK basis including design, engineering, supply, manufacturing, testing at manufacturer's works, supply, transportation, unloading and delivery at site including insurance & storage, all associated civil works including PEB (Extension of existing GIS Hall PEB with protection & communication panels room for 220kV and 400kV respectively), transformer oil collecting pit, dismantling and diversion of internal roads, erection, testing and commissioning at site along with all equipments, fittings, accessories, foundation bolts (if any) cables and Mandatory Spare Parts and Condition Monitoring Instruments.

The Contractor shall submit a detailed BOQ/ Billing Breakup, for Employer's review and approval, within 15 days of the Effective Date for billing and invoicing purpose, however the total price shall be restricted to the Contract Price.

The bidder is required to estimate the quantities required for entire execution and completion of works and incorporate their price in respective Bid Price Schedule. Bidder shall include all such items in the BOQ / Billing Breakup, which are not specifically mentioned but are essential for the execution of the contract. Items which are not mentioned in the BOQ/ Billing Breakup and required for successful commissioning of the Facilities shall be included in the Bid Price quoted by the bidder and shall be provided at no extra cost to Employer.

The Format for BOQ/ Billing Breakup has been annexed as Annexure- A(SOW).

6. REFERENCE DRAWINGS

The following drawings are enclosed for reference purpose of the Bidder.

1. Tentative Plan Layout for Augmentation at Patran
2. Tentative SLD for Augmentation at Patran
3. Existing Outdoor Cable Trench Layout
4. Existing DSLP Layout for Switchyard
5. Existing Earthmat Layout for Switchyard
6. Existing Equipment Layout in CRB
7. Existing Cable Trench Layout in 400 kV GIS Hall
8. Existing Cable Trench Layout in 220 kV GIS Hall
9. Existing SAS Architecture
10. Indicative Drawings – Civil Works

Note: The layout of autotransformers 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.

7. DIFFERENT SECTIONS OF TECHNICAL SPECIFICATION

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

1. Technical Specification for Substation – Civil Works.
2. Technical Specification for Substation – Electrical Works.

8. MANDATORY SPARE PARTS AND CONDITION MONITORING INSTRUMENTS

The Mandatory Spare Parts and Condition Monitoring Instruments shall be included in the bid proposal by the bidder. The prices of these spares/ instruments

(as the case may be) shall be quoted by the Bidder in the Bid Price Schedule and shall be considered for evaluation of bid. The Bidder shall submit the detailed Price breakup in the BOQ/ Billing Breakup. The list of Mandatory Spare Parts and Condition Monitoring Instruments is attached at Annexure- B (SOW) and Annexure-C (SOW) respectively.

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.

9. SPECIFIC REQUIREMENT

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10. ANNEXURES

ANNEXURE- A(SOW)

Supply:

<u>S. No.</u>	<u>Item Description</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Rate (including Freight and Insurance)</u>	<u>GST (INR)</u>	<u>Total Amount (INR)</u>

Service:

<u>S. No.</u>	<u>Item Description</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Rate</u>	<u>GST (INR)</u>	<u>Total Amount (INR)</u>

ANNEXURE- B(SOW)

List of Mandatory Spare Parts

S. No.	Description of Spare	Qty. (in No.)
1	420kV GIS	
1.1	Rubber gasket, 'O' rings and seal of SF6 Gas (For Complete replacement for one phase) (Shell life should be more than 3 years)	1
1.2	Density Monitor for Breaker	1
1.3	Density Monitor for other Gas Compartments - Indoor	1
1.4	Density Monitor for other Gas Compartments - outdoor	1
1.5	Pressure Relief Device	2
1.6	Molecular filter (For Complete replacement for one phase)	2
1.7	SF6 to air bushing for 1 phase enclosure	1
1.8	SF6 gas (20% of total Gas of a 400kV GIS Bays) in a cylinder	1
1.9	PD sensor	1
2	420kV GIS Circuit Breaker	
2.1	Circuit Breaker 1 phase pole complete with an interrupter, main circuit, and enclosure with operating mechanism (without drive)	1
2.2	Trip coil assembly with resistor, as applicable	1
2.3	Closing coil assembly with resistor, as applicable	1
2.4	Spare Motor for hydraulic spring-operated mechanism	1
3	420kV GIS Disconnecter & Earth Switch	
3.1	Single phase disconnecter including main circuit, enclosure and driving mechanism	1
4	420kV GIS Current Transformer	
4.1	Current Transformer (Type1); 1-ph CT with complete assembly as per inventory	1
4.2	Current Transformer (Type2); 1-ph CT with complete assembly as per inventory	1
5	245kV GIS	
5.1	Rubber gasket, 'O' rings and seal of SF6 Gas (For Complete replacement for one phase) (Shell life should be more than 3 years)	1
5.2	SF6 gas Pressure Relief Device	1
5.3	SF6 Pressure gauge with coupling device cum switch or density monitors and pressure gauge, as applicable	1
5.4	Density Monitor (700 kpa)	1
5.5	Density Monitor (600 kpa)	1
5.6	Indoor Compartment-density Monitor	1
5.7	Support Insulators	1
5.8	SF6 to air bushing for 1 phase enclosure, if applicable	1
6	245kV GIS Circuit Breaker	
6.1	Circuit Breaker 1 phase pole complete with an interrupter, main circuit, and enclosure with operating mechanism	1
6.2	Trip coil assembly with resistor as applicable	3
6.3	Closing coil assembly with resistor as applicable	3
6.4	CB Spring Charging Motor	1

S. No.	Description of Spare	Qty. (in No.)
6.5	Hydraulic Motor for CB Drive	1
7	245kV GIS Disconnecter and Earth Switch	
7.1	Complete set of single phase disconnector including main circuit, enclosure, and driving mechanism	1
8	245kV GIS Current Transformer	
8.1	Complete 1 phase CT, as applicable, with enclosure,	1
9	500MVA 400/220kV 3-ph Transformer	
9.1	Oil cooler pumps with motor (complete assembly)	1
9.2	Buchholz relay complete (main tank)	1
9.3	Local Winding temperature indicator	1
9.4	Remote winding temperature indicator with sensing device and matching unit	1
9.5	Oil temperature indicator	1
9.6	Pressure relief device	1
9.7	Magnetic oil level gauge	1
9.8	Cooler Fan with motor	1
9.9	Set of Valves	1 No. of each size and type
9.10	Set of starters, contactors, relays, and switches for electrical control panel	1 set
9.11	Remote tap position indicator	1
9.12	Oil flow indicator with flow switch	1 set
9.13	Breather assembly for the main conservator and OLTC Conservator	1 Each
9.14	Terminal connector	1 set
9.15	Oil surge relay for OLTC	1
9.16	400 kV Bushing	1
9.17	245kV Bushing	1
9.18	72.5/52 KV bushings for tertiary	1
9.19	Insulating Oil	10% of the oil quantity in the transformer (20% in case imported oil is used)

ANNEXURE -C(SOW)

List of Condition Monitoring Instruments

S. No.	Name of the Device	Qty. (in No.)	Application
1	12kL Oil Filtration Machine	1	Oil Filtration of Transformer & Reactor
2	Vacuum Plant	1	Vacuuming of Transformer & Reactor, during oil filtration/repair /replacement
3	Oil Tank (20kL) with Tires	1	Storage of oil in case of ICT Replacement / Repair / Inspection.
4	Handheld PPM & Dew Point Meter	1	Time to time transformer Oil PPM & dry air dew point measurement
5	Protection Relay Test Kit with Advanced Distance, Advanced Differential & Transplay	1	For Testing of Protection Relays
6	Online Bushing tan delta measurement	1	For continuous monitoring of bushing tan delta.

----- End of Scope of Work -----