BEFORE THE HON'BLE UTTAR PRADESH ELECTRICITY REGULATORY COMMISSION, LUCKNOW

PETITION NO. _/TL/2024

IN THE MATTER OF

Application under Section 14, 15 (1), 86(1)(d) of the Electricity Act, 2003 read with Uttar Pradesh Electricity Regulatory Commission (Conduct of Business) Regulation, 2019 and Uttar Pradesh Electricity Regulatory Commission (General Conditions of Transmission License) Regulations, 2005 seeking Transmission License for Jewar Transmission Ltd.

AND IN THE MATTER OF

Jewar Transmission Ltd. . **... APPLICANT/PETITIONER**

AND

PFC Consulting Ltd. & Ors. **...RESPONDENTS**

INDEX

Sr. No.	Particulars	Page No.
1.	Application for the Submission of Additional Documents along with affidavit.	1-8
2.	**Annexure A-18** Amended petition for Transmission License by the Jewar Transmission Limited.	9-28
3.	**Annexure A-19** A Copy of Form-I along with relevant documents.	28-43
4.	**Annexure A-20** Copies of the certified report or result of the Net Worth of the Parent/ Holding Company of the Applicant for the immediate preceding five Financial Years.	44-45
5.	**Annexure A-21** Copies of the certified report or result of Annual turnover of the Parent/ Holding Company of the Applicant for the immediate preceding five Financial Years.	45-45
6.	**Annexure A-22** A Copy of the Credit Rating of the Parent/ holding Company of the Applicant issued by India Rating and Research.	46-48
7.	**Annexure A-23 (Colly.)** A Copy of the document containing relevant information of Organisational and Management	49-52

JEWAR TRANSMISSION LIMITED NEW DELHI

	capability of the Applicant and Approach and Methodology of the Petitioner.	
8.	**Annexure A-24** Copies of the documents or directory of documents required as per Regulation 3.2.2 of the Transmission License Regulations	53-59
9.	**Annexure A-25** A copy of detailed project report in relation to the construction, operation and maintenance of the transmission system proposed to be undertaken by the Applicant/Petitioner.	60-226

10. Annexure A-26
A copy of Auditor's Report

THROUGH

Place:-
Date:-

Abiha Zaidi
COUNSEL FOR THE APPLICANT
S-387, GF, GREATER KAILASH-I
NEW DELHI-110048
PHONE:+91 9599337516
E-mail: office@abihazaidi.com

JEWAR TRANSMISSION LIMITED
NEW DELHI

BEFORE THE HON'BLE UTTAR PRADESH ELECTRICITY REGULATORY COMMISSION, LUCKNOW

PETITION NO. _/TL/2024

IN THE MATTER OF

Application under Section 14, 15 (1), 86(1)(d) of the Electricity Act, 2003 read with Uttar Pradesh Electricity Regulatory Commission (Conduct of Business) Regulation, 2019 and Uttar Pradesh Electricity Regulatory Commission (General Conditions of Transmission License) Regulations, 2005 seeking Transmission License for Jewar Transmission Ltd.

AND IN THE MATTER OF

Jewar Transmission Ltd. . **... APPLICANT/PETITIONER**

AND

PFC Consulting Ltd. & Ors. **...RESPONDENTS**

APPLICATION FOR SUBMISSION OF ADDITIONAL DOCUMENTS

1. Jewar Transmission Limited ("Applicant") has approached this Hon'ble Commission by way of the present petition filed under Section 14, 15 and 86(1)(d) of the Electricity Act, 2003 ("Electricity Act") read with Uttar Pradesh Electricity Regulatory Commission (Conduct of Business) Regulation, 2019 and Uttar Pradesh Electricity Regulatory Commission (General Conditions of Transmission License) Regulations, 2005 ("UPERC Transmission Licence Regulations") for grant of Transmission Licence to establish Intra-State Transmission System for "**Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA G/S substation Cantt (Chaukaghat) Varanasi, 220/3,3 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated line**" ("Transmission System") on Build, Own, Operate and Transfer basis in accordance with the Guidelines issued by the Central Government.
2. The Uttar Pradesh Power Transmission Corporation Limited ("UPPTCL") had appointed PFC Consulting Limited ("PFCCL") as Bid Process Coordinator ("BPC") vide letter dated 23.02.2023. PFCCL has conducted the bid process in accordance with Tariff Based Competitive Bidding ("TBCB") and Megha Engineering and Infrastructure Limited ("MEIL") was given Letter of Intent ("LoI") dated 16.02.2024 as a successful bidder. The Petitioner/ Applicant company was purchased by the MEIL as a successful

JEWAR TRANSMISSION LIMITED NEW DELHI

bidder from the PFCCL in accordance with the requirements of the Request for Proposal, LoI and Share Purchase Agreement.

3. After completion of all the required obligations in LoI and RFP the Applicant has filed the Petitions/Applications before this Hon'ble Commission for the grant of the Transmission License (TL) and Adoption of the Transmission Charges (AT) on 14.06.2024.
4. The Hon'ble Commission by letter dated 22.08.2024 conveyed few discrepancies or deficiencies in the petition/ application. Hence the present Application.
5. In response to the letter dated 22.08.2024 the Applicant/ Petitioner company has attempted to cure the discrepancies/ deficiencies raised.
6. The Hon'ble Commissioned highlighted that the Petition has not complied with the requirements of Regulations 3.2 and 3.3 of the Uttar Pradesh Regulatory Commission (General Conditions of Transmission License), 2005. Further, the Hon'ble Commission further asked to furnish the remaining documents.
7. The Applicant as per the letter has made the following amendments in the petition/ application for Transmission License (TL) dated 14.06.2024 keeping the original page numbering. The modifications are as follows,

Sr. No.	Modifications to The Petition/ Application	Modified Document Annexed as
1.	Change in the Cause Title and Memo of Parties to reflect the correct Bid Process Coordinator as PFC Consulting Limited (PFCCL).	**Annexure A-18**
2.	Change in Paragraph Number 26 of the Petition/ Application to reflect the correct Transmission Utility as State Transmission Utility i.e. UPPTCL as per Section 15(3) of the Electricity Act, 2003.	**Annexure A-18**

8. Further, it is humbly submitted before this Hon'ble Commission that, in pursuant of the letter of the Hon'ble Commission the requisite amendments are made to Form-I and the amended Form-I is attached with requisite documents.
   The amended Form-I is annexed herein and marked as **Annexure A-19.**

JEWAR TRANSMISSION LIMITED NEW DELHI

9. Further, it is humbly submitted before this Hon'ble Commission that, in pursuant to the letter of the Hon'ble Commission the requisite modifications are made in the Draft License in accordance with Regulation 3.3.3.

   The modified Draft License is attached along with the Form-I annexed herein and marked as **Annexure-A-19 Enclosure-2.**

10. Further, it is humbly submitted before this Hon'ble Commission that, in pursuant to the letter of the Hon'ble Commission, the documents required along with the Form-I are attached in the petition and indicated and identified in the **Form-I** by the annexure markings. Additional documents required in Form-I are attached in the Form-I as follows,

Sr. No.	Additional Documents Required along with Form-I	Document Annexed as
1.	Copies of the certified report or result of the Net Worth of the Parent/ Holding Company of the Applicant for immediate preceding five Financial years.	**Annexure A-20**
2.	Copies of the certified report or result of Annual turnover of the Parent/ Holding Company of the Applicant for the immediate preceding five Financial Years.	**Annexure A-21**
3.	Copies of Annual Reports or Certified Audited Results for the Annual turnover of the Parent/ Holding Company/ Successful Bidder	**Annexure A-22**

11. Further, it is humbly submitted before this Hon'ble Commission that, in pursuant to the letter of the Hon'ble Commission, to fulfil the requirements of Regulation 3.2 the information and documents are submitted as follows,

Clause Number of Reg. 3.2.2	Detailed Description	Document Annexed as

JEWAR TRANSMISSION LIMITED NEW DELHI

(a)	The 'Draft Licence' as proposed by the Applicant/Petitioner with the name and address of the Applicant/Petitioner and of his agent (if any) printed on the outside of the draft.	**Attached with Form-I in Annexure A-19 as Enclosure -2.**
(b)	Maps of the proposed area of licence showing the route of the transmission line, locations of sub-stations and such other details as the Commission may specify on a scale of (i) not less than 10 Centimetres to a Kilometre, or (ii) if no such maps are available, of not less than that of the largest scale ordinance maps available, or (iii) on such other scales as may be approved by the Commission.	**Maps are annexed in DPR marked as Annexure A-25**
(c)	A detailed description of the existing transmission network within the licensee's proposed Area of Activity, including the single line diagram of the transmission network along-with an executive summary of the existing facilities, details of other equipment/apparatus in his area including number and details of sub-stations, details of power transformers, a description of the metering mechanism and other relevant details of the system including details of ownership of the said facilities.	**Annexure A-24**
(d)	A detailed project report in-relation to the construction, operation and maintenance of	**Annexure A- 25**

JEWAR TRANSMISSION LIMITED NEW DELHI

	the transmission system proposed to be undertaken by the Applicant/Petitioner	
(e)	A list of all the local authorities vested with the administration of any portion in the proposed Area of Licence	**Annexure A-24**
(f)	An approximate statement describing any land which the Applicant/Petitioner proposes to acquire for the purpose of the Licensed Business and the means of such acquisition.	**Annexure A-24**
(g)	An approximate statement of the capital proposed to be expended in the Area of Licence and such other particulars as the Commission may require	**Annexure A-24**
(h)	Relevant information pertaining to the availability of adequate number of competent personnel to construct, operate and maintain the transmission system effectively and efficiently, the availability of infrastructure facilities and the financial capacity of the Applicant/Petitioner to carry out the project.	**Annexure A-23**
(i)	A copy of the Memorandum and Articles of Association, if the Applicant/Petitioner is a body corporate and similar constitutional documents in all other cases	**Annexure A-5**
(j)	The application for grant of licence for intra-state transmission, along with annexures and enclosures thereto, shall also be submitted to this Hon'ble Commission on a compact disc (CD)	**Attached with this Application**



12. It is Humbly submitted before this Hon'ble Commission that, the additional information, requisite modifications and additional documents are submitted before this Hon'ble Commissions mentioned above.

13. The present Application is filed bona fide and in the interest of justice.

PRAYER

14. The Applicant hereby humbly prays before this Hon'ble Commission to:

a) Condone any inadvertent errors omissions/ errors/ shortcomings and permit the Applicant to add/change/ modify/ alter these filings and make further submissions as may be required at a future date; and

b) Take on record the additional/ modified information submitted, additional documents supplied; and

c) Consider the modified/ additional information submitted and additional documents supplied through this Application along with the information submitted and documents supplied through the original Petition/Application for Transmission License; and/or

d) Pass any such other order orders, as may be deemed fit and proper in the facts and circumstances of the case.

THROUGH

Place:- New Delhi
Date:-

Abiha Zaidi
COUNSEL FOR THE APPLICANT
S-387, GF, GREATER KAILASH-I
NEW DELHI-110048
PHONE:+91 9599337516
E-mail: office@abihazaidi.com

JEWAR TRANSMISSION LIMITED NEW DELHI

BEFORE THE HON'BLE UTTAR PRADESH ELECTRICITY REGULATORY COMMISSION, LUCKNOW

PETITION NO. _/TL/2024

IN THE MATTER OF

Application under Section 14, 15 (1), 86(1)(d) of the Electricity Act, 2003 read with Uttar Pradesh Electricity Regulatory Commission (Conduct of Business) Regulation, 2019 and Uttar Pradesh Electricity Regulatory Commission (General Conditions of Transmission License) Regulations, 2005 seeking Transmission License for Jewar Transmission Ltd.

AND IN THE MATTER OF

Jewar Transmission Ltd. . **... APPLICANT/PETITIONER**

AND

PFC Consulting Ltd. & Ors. **...RESPONDENTS**

AFFIDAVIT

I, Mandalaparthi Raghu Kumar, son of Shri M. Venkata Chalam, aged about 53 years, r /o flat No.104 JMR Spring Avenue, M J Colony Street No. 2 near Xavier school, Malkangiri, Secunderabad, Hyderabad, le Moulali, Andhra Pradesh, 500040, do hereby solemnly state and affirm as under:-

1. That I am duly authorized Representative of Jewar Transmission Limited, the Petitioner in the above mentioned matter, and I am competent to affirm this Affidavit on its behalf. I say that the facts stated herein are based on record of the Petitioner Company maintained in the ordinary course of business and believed to be true.
2. That I have read the accompanying Petition being submitted on behalf of Petitioner and have understood the contents thereof and that the contents therein are true and correct to the best of my knowledge and belief.
3. That the Annexures filed along with the accompanying Petition are true copies of their respective originals.
4. That the facts stated above are true and correct to my knowledge. No part of the same is false and nothing material has been concealed therefrom

DEPONENT

JEWAR TRANSMISSION LIMITED NEW DELHI

M. SADA SIVA KUMAR REDDY, ADVOCATE ★ SARASWATHI ENCLAVE, BHAGYANAGAR COLONY ★ F-102, KUKATPALLY, HYDERABAD, TS, INDIA ★ NOTARY Regn. No. 198.

ATTESTED

M. SADA SIVA KUMAR REDDY, B.Com., B.L.,
ADVOCATE & NOTARY
Appointed by Govt., India
G.O.Ms.No.198, Rev (Regn-II), dt. 11.04.2000
102, Saraswathi Enclave, Bhagyanagar Colony,
Kukatpally, Hyderabad, TS, India (Ph:98480 44395)

VERIFICATION

I, the above named deponent do hereby verify that the contents of this affidavit are true and correct to the best of my knowledge and belief, no part of it is false and nothing material has been concealed therefrom.

Verified at Hyderabad on this 11th day of September, 2024.

DEPONENT

ATTESTED

M. SADA SIVA KUMAR REDDY, B.Com., B.L.,
ADVOCATE & NOTARY
Appointed by Govt., India
G.O.Ms.No.198, Rev (Regn-II), dt. 11.04.2000
102, Saraswathi Enclave, Bhagyanagar Colony,
Kukatpally, Hyderabad, TS, India (Ph:98480 44395)

Annexure A-18

BEFORE THE HON'BLE UTTAR PRADESH ELECTRICITY REGULATORY COMMISSION, LUCKNOW

PETITION NO. __/TL/2024

IN THE MATTER OF

Application under Section 14, 15 (1), 86(1)(d) of the Electricity Act, 2003 read with Uttar Pradesh Electricity Regulatory Commission (Conduct of Business) Regulation, 2019 and Uttar Pradesh Electricity Regulatory Commission (General Conditions of Transmission License) Regulations, 2005 seeking Transmission License for Jewar Transmission Ltd.

AND IN THE MATTER OF

Jewar Transmission Ltd. ...APPLICANT

AND

PFC Consulting Ltd. & Ors. ...RESPONDENTS

INDEX

S. No.	Particulars	Page No
1.	Memo of Parties	1-3
2.	Affidavit on behalf of the Applicant	4-5
3.	Application under Section 14, 15, 79 (1) (e) of the Electricity Act, 2003 for Grant of Transmission License.	6-19
4.	**Annexure A-1** A copy of the Letter of Intent dated 23.02.2023	20-24
5.	**Annexure A-2**	25-37

JEWAR TRANSMISSION LIMITED NEW DELHI

S. No.	Particulars	Page No
	A copy of the single line diagram of the transmission networks	
6.	**Annexure A-3** A copy of the RFP dated 04.05.2023 along with letter dated 15.05.2023	38-322
7.	**Annexure A-4** A copy of the Certificate of Incorporation of the Applicant Company	323
8.	**Annexure A-5** A copy of the Memorandum of Association along with the Articles of Association of the Applicant Company.	324-356
9.	**Annexure A-6** A copy of the LOI dated 16.02.2024	357-360
10.	**Annexure A-7** A copy of the letter dated 20.02.2024 issued by Megha Engineering and Infrastructures Ltd.	361
11.	**Annexure A-8** A copy of the Bid Evaluation Certificate dated 19.10.2023	362
12.	**Annexure A-9** A copy of letter dated 07.03.2024 for time extension issued by BPC.	363
13.	**Annexure A-10 (Colly)** Copy of the Contract Performance Guarantee (CPG) dated 07.03.2024 issued in favour of CTU	364-378
14.	**Annexure A-11** A copy of the TSA dated 05.03.2024 signed between Jewar Transmission Limited. and Central Transmission Utility	379-704

S. No.	Particulars	Page No
15.	**Annexure A-12** A copy of the Share Purchase Agreement dated 07.03.2024	705-720
16.	**Annexure-13** A copy of available personnel to construct, operate and maintain the transmission system.	721-722
17.	**Annexure A-14** Copy of duly filled Form-I along with Resolution passed by the Board of Directors.	723

THROUGH

PLACE: NEW DELHI

DATED: .09.2024

ABIHA ZAIDI

COUNSEL FOR THE APPLICANT

S-387, GF, GREATER KAILASH – I

NEW DELHI – 110048

PHONE: +91 9599337516

E-mail: office@abihazaidi.com

JEWAR TRANSMISSION LIMITED NEW DELHI

BEFORE THE HON'BLE UTTAR PRADESH ELECTRICITY REGULATORY COMMISSION, LUCKNOW

PETITION NO. __/TL/2024

IN THE MATTER OF

Application under Section 14, 15 (1), 86(1)(d) of the Electricity Act, 2003 read with Uttar Pradesh Electricity Regulatory Commission (Conduct of Business) Regulation, 2019 and Uttar Pradesh Electricity Regulatory Commission (General Conditions of Transmission License) Regulations, 2005 seeking Transmission License for Jewar Transmission Ltd.

AND IN THE MATTER OF

Jewar Transmission Ltd. **...APPLICANT**

AND

PFC Consulting Ltd. & Ors. **...RESPONDENTS**

MEMO OF PARTIES

1. **Jewar Transmission Ltd.**
   2nd Floor, Niryat Bhawan,
   Rao Tularam Marg, Vasant Vihar,
   Opposite Army Hospital & Referral,
   New Delhi – 110 057, India.
   Through its Authorized Representative **...APPLICANT**

AND

1. PFC Consulting Limited

JEWAR TRANSMISSION LIMITED NEW DELHI

First Floor 'Urjanidhi', 1, Barakhamba Lane
Conaught Place, New Delhi-110003
Through its Chief Executive Officer

2. Uttar Pradesh Power Corporation Limited
   Shakti Bhawan 14 Ashok Marg
   Lucknow-226001, Uttar Pradesh
   Through its Chairman

3. Dakshinanchal Vidhyut Vitran Nigam Limited
   Urja Bhawan, NH-2 (Agre-Delhi Bypass Road)
   Sikandra, Agra-282007, Uttar Pradesh
   Through its Managing Director

4. Kanpur Electricity Supply Company Limited
   Headquarters, Kesa House, 14/71 Civil Lines,
   Kanpur-209601, Uttar Pradesh
   Through its Managing Director

5. Uttar Pradesh Power Transmission Corporation Limited
   Shakti Bhawan 14 Ashok Marg,
   Lucknow-226001, Uttar Pradesh
   Through its Chairman

6. Madhyanchal Vidyut Vitaran Niga, Limited
   Head Office 4-A, Gokhale Marg,
   Lucknow- 226001, Uttar Pradesh
   Through its Managing Director

7. Purvanchal Vidut Vitaran Nigam Limited
   Vidyut Nagar, Bhikaripur



P.O – DLW, Varanasi-221010, Uttar Pradesh
Through its Managing Director

8. Paschimanchal Vidyut Vitran Nigam Limited
Urja Bhawan Victoria Park, Meerut- 250001, Uttar Pradesh
Through its managing Director

...RESPONDENTS

THROUGH

PLACE: NEW DELHI
DATED: .0 9.2024

ABIHA ZAIDI
COUNSEL FOR THE APPLICANT
S-387, GF, GREATER KAILASH – I
NEW DELHI – 110048
PHONE: +91 9599337516
E-mail: office@abihazaidi.com

BEFORE THE HON'BLE UTTAR PRADESH ELECTRICITY REGULATORY COMMISSION, LUCKNOW

PETITION NO. _/TL/2024

IN THE MATTER OF

Application under Section 14, 15 (1), 86(1)(d) of the Electricity Act, 2003 read with Uttar Pradesh Electricity Regulatory Commission (Conduct of Business) Regulation, 2019 and Uttar Pradesh Electricity Regulatory Commission (General Conditions of Transmission License) Regulations, 2005 seeking Transmission License for Jewar Transmission Ltd.

AND IN THE MATTER OF:

Jewar Transmission Ltd. ...APPLICANT

AND

PFC Consulting Ltd. & Ors. ...RESPONDENTS

APPLICATION UNDER SECTION 14, 15, 86 (1) (d) OF THE ELECTRICITY ACT, 2003 FOR GRANT OF TRANSMISSION LICENSE

A. INTRODUCTION

JEWAR TRANSMISSION LIMITED NEW DELHI

1. Jewar Transmission Limited (*"Applicant"*) has approached this Hon'ble Commission by way of the present petition filed under Section 14, 15 and 86(1)(d) of the Electricity Act, 2003 ("**Electricity Act**") read with Uttar Pradesh Electricity Regulatory Commission (Conduct of Business) Regulation, 2019 and Uttar Pradesh Electricity Regulatory Commission (General Conditions of Transmission License) Regulations, 2005 ("**UPERC Transmission Licence Regulations**") for grant of Transmission Licence to establish Intra-State Transmission System for "*Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/3,3 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated line*" ("**Transmission System**") on Build, Own, Operate and Transfer basis in accordance with the Guidelines issued by the Central Government.

2. Pursuant to the Tariff Based Competitive Bidding ("***TBCB***") process conducted in terms of the Request for Proposal dated 04.05.2023 ("***RFP***") and the Guidelines issued by the Ministry of Power, Govt. of India under Section 63 of the Electricity Act, on 19.10.2023, holding company of the Applicant, Megha Engineering and Infrastructures Ltd. was declared as the successful bidder by the Bid Process Co-ordinator i.e. Respondent No. 1/ PFC Consulting Limited ("***BPC***"/"***PFCCL***"), with the lowest transmission charges of INR 795.85 million per annum for implementation of the Transmission System.

3. As per Clause 2 of RFP issued by BPC/ PFCCL, the Transmission System which is to be executed by the Applicant, comprises of the following elements:

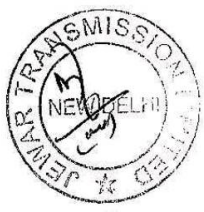
JEWAR TRANSMISSION LIMITED NEW DELHI

Transmission System for Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation Khaga (Fatehpur) with associated lines.

S. No.	Name of Transmission Element	Scheduled COD in months from Effective Date
A.	**Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar (Gautam Budh Nagar) with Associated lines**	
1.	Construction of 400/220 kV, 2×500MVA GIS substation Jewar (Gautam Budh Nagar) (along with 125MVAR reactor) 400 kV GIS feeder bay – 02 Nos. 400 kV GIS Bus Coupler bay – 01 No. 400 kV GIS Bus reactor bay – 01 No. 400 kV GIS ICT bay – 02 Nos. 220 kV GIS feeder bay – 02 Nos. 220 kV GIS Bus Coupler bay – 01 No. 220 kV GIS ICT bay – 02 Nos. 220 kV GIS Interconnecting (220 kV S/S Jewar) bay – 02 Nos. 220 kV GIS Feeder (220 kV S/S Sector-28 YEIDA) bay – 02 Nos.	18 Months
2.	LILO of one ckt. of 400 kV Greater Noida (765 kV) – Sector -148 (400), Noida DC line at 400/220 kV GIS Substation Jewar (Gautam Budh Nagar) (for LILO, twin HTLS conductor and OPGW stringing work on narrow base multi circuit towers)	
B.	**Construction of 220/33 kV, 2x60 MVA GIS substation Cantt, (Chaukaghat) Varanasi with associated lines**	
1.	Construction of 220/33 kV, GIS Substation Cantt, (Chaukaghat) Varanasi 220 kV GIS feeder bay – 02 Nos. 220 kV GIS Bus Coupler bay – 01 No. 220 kV GIS ICT bay – 02 Nos. 33 kV GIS feeder bay – 12 Nos. 33 kV GIS Transfer Bus Coupler bay – 01 No. 33 kV GIS ICT bay – 02 Nos.	18 Months
2.	LILO of one ckt, of 220 kV Satnath (400)-Gajokhar DC line at Cantt. (Chaukaghat) Varanasi construction of 41.5 Km (37 Km overhead line (Zebra Conductor) on Lattice Tower and	

JEWAR TRANSMISSION LIMITED NEW DELHI

	construction of 4.5 Km 630 mm2 line with copper XLPE cable.	
C.	**Construction of 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad) with associated lines**	
1.	Construction of 220/33 kV GIS substation Vasundhara (Ghaziabad) 220 kV GIS feeder bay – 03 Nos. 220 kV GIS feeder bay (spare) – 01 No. 220kV GIS Bus Coupler Bay- 01 No. 220 kV GIS ICT bay – 03 Nos. 33 kV GIS feeder bay – 10 Nos. 33 kV GIS Transfer Bus Coupler bay – 01 No. 33 kV GIS bus sectionalized bay – 02 Nos. 33 kV capacitor bank bay (1x10 MVAR)– 03 Nos. 33 kV GIS ICT bay – 03 Nos. 33/0.4 kV Station transformer bay – 02 Nos.	18 Months
2.	LILO of one ckt, of 220 kV Muradnagar (400)-Sahibabad (220) SC line at 220 kV Substation Vasundhara (Ghaziabad) (Multi Ckt. / Monopole Tower) (Zebra conductor)	
3.	220 kV Indirapuram (400) – Vasundhara SC line (Monopole and Narrow base multi circuit tower)	
D.	**Construction of 220/132/33 kV, 2x160+2x40 MVA Substation Khaga (Fatehpur) with associated lines**	
1	Construction of 220/132/33 kV, Substation Khaga (Fatehpur) 220 kV feeder bay – 02 Nos. 220 kV spare feeder bay – 02 Nos. 220 kV bus coupler – 01 No. 220 kV transfer bus coupler – 01 No 220 kV ICT bay – 02 Nos. 132 kV feeder bay – 03 Nos. 132 kV spare feeder bay – 01 No. 132 kV bus coupler – 01 No. 132 kV transfer bus coupler – 01 No 132 kV ICT bay – 04 Nos. 33 kV Feeder Bay – 07 Nos. 33 kV Transfer Bus Coupler bay – 01 No. 33 kV ICT bay – 02 Nos.	1 8 Months
2	220 kV Fatehpur (765) PG -Khaga DC line (Zebra Conductor)	
3	132 kV Khaga (220) – Khaga DC line	
4	132 kV Khaga (220) — Hussainganj SC line	
5	132 kV Bay 132 kV Substation Khaga-02 Nos.	



6	132 kV Hybrid Bay at 132 kV substation Hussainganj-01 No.

Note:

1. UPPTCL to provide adequate land for construction of 400/220 kV, 2x500 MVA GIS Substation at Jewar (Gautam Budh Nagar) free of cost and shall be handed over to TSP as is where basis.

2. UPPTCL to provide adequate land for construction of 220/33 kV, 2x60 MVA GIS substation at Cantt, (Chaukaghat) Varanasi free of cost and shall be handed over to TSP as is where basis.

3. UPPTCL to provide adequate land for construction of 220/33 kV, 3x60 MVA GIS substation at Vasundhara (Ghaziabad) free of cost and shall be handed over to TSP as is where basis.

4. UPPTCL to provide adequate land for construction of 220/132/33 kV, 2x160+2x40 MVA Substation at Khaga (Fatehpur) free of cost and shall be handed over to TSP as is where basis.

5. 02 Nos., 220 kV Bay at Fatehpur (765) PG shall be under scope of developer.

6. 02 Nos., 132 kV Bay at 132 kV S/s Khaga shall be under scope of developer.

7. 01 No., 132 kV Hybrid Bay at 132 kV S/s Husainganj shall be under scope of developer.

4. As per Clause 2 of RFP read with Schedule 2 of Transmission Service Agreement, the Scheduled Commercial Operation Date (SCOD) of the Transmission System is 18 months from the effective date.

5. In order to implement the aforementioned Intra-State Transmission System, the Applicant is obligated to approach this Hon'ble Commission in terms of Sections 14 and 15 of the Electricity Act read with UPERC Transmission

JEWAR TRANSMISSION LIMITED NEW DELHI

License Regulations for grant of transmission license. Hence, the present petition is preferred by the Applicant before this Hon'ble Commission seeking transmission license under the provisions of the aforesaid statutory provisions.

B. BACKGROUND FACTS

6. UP Power Transmission Corporation Limited ("**UPPTCL**") through its Letter of Intent ("**LOI to UPPTCL**") dated 23.02.2023 has appointed PFC Consulting Ltd. to be the Bid Process Coordinator ("**BPC**") for the purpose of selection of Bidder as Transmission Service Provider ("**TSP**") for establishing the Transmission System *"Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/3,3 kV, 3x60 MVA GIS substation Vasundhara (G.haziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated lines"* through tariff based competitive bidding process.

A copy of the Notification dated 23.02.2023 is annexed herewith and marked as **Annexure A-1**.

A copy of the single line diagram of the transmission networks is enclosed in **Annexure A-2**

7. Pursuant to the LOI to UPPTCL, BPC issued the RFP dated 04.05.2023 for inviting the bids and thereby selecting the prospective TSP, in accordance with the *"Tariff Based Competitive-Bidding Guidelines for Transmission Service"* and *"Guidelines for Encouraging Competition in Development of Transmission Projects"* issued by the Government of India, Ministry of Power under Section 63 of the Electricity Act. The said RFP was duly forwarded by BPC to Uttar Pradesh Electricity Regulatory Commission ("**UPERC**") *vide* letter dated 15.05.2023.

JEWAR TRANSMISSION LIMITED NEW DELHI

A copy of the RFP dated 04.05.2023 along with letter dated 15.05.2023, are annexed herewith and marked as **Annexure A-3 (Colly).**

8. As per the LOI to UPPTCL, BPC was required to select the TSP having prescribed technical and financial capability for establishing transmission system for *Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/3,3 kV, 3x60 MVA GIS substation Vasundhara (G.haziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated line.* As per the RFP, TSP was required to make the Project available against payment of Transmission Charges, as adopted by this Hon'ble Commission under Section 63 of the Electricity Act and the Central Electricity Regulatory Commission (Sharing of Intra-State Transmission Charges and Losses) Regulations as amended from time to time.

9. In pursuance thereof, 06.07.2023 a company in the form of Special Purpose Vehicle ("***SPV***") and by the name of "Jewar Transmission Ltd." i.e., the Applicant herein, was incorporated under the Companies Act, 2013 by BPC as its 100% wholly owned subsidiary to initiate the activities for execution of the Project and subsequently to act as Transmission Service Provider after being acquired by the successful bidder selected through Tariff Based Competitive Bidding process.

A copy of the Certificate of Incorporation dated 06.07.2023 of the Applicant Company is enclosed herewith and marked as **Annexure A-4.**

A copy of the Memorandum of Association along with the Articles of Association of the Applicant Company is annexed herewith and marked as **Annexure A-5 (Colly).**

10. Pursuant to the issuance of RFP, BPC initiated the process of TBCB for selection of the successful bidder, as per the Guidelines issued by the Government of India under Section 63 of Electricity Act.



11. In accordance with the provisions of RFP and the timeline provided therein, Megha Engineering and Infrastructures Ltd. submitted its technical and financial bid to BPC by due date and time i.e. 07.07.2023.

12. Further, BPC after evaluating the bids submitted by the several bidders, declared Megha Engineering and Infrastructures Ltd. as a successful bidder in terms of Clause 3.6.1 of RFP. Accordingly, BPC vide letter dated 16.02.2024 issued a Letter of Intent to Megha Engineering and Infrastructures Ltd (**"LOI to MEIL"**). The terms contained in the said LOI to MEIL were unconditionally accepted by Megha Engineering and Infrastructures Ltd. *vide* letter dated 20.02.2024. In addition to the LOI to MEIL, the Bid Evaluation Committee also issued the certificate dated 19.10.2023 certifying Megha Engineering and Infrastructures Ltd. as the successful bidder.

    A copy of the LOI dated 16.02.2024 is annexed herewith and marked as **Annexure A-6.**

    A copy of the letter dated 20.02.2024 issued by Megha Engineering and Infrastructures Ltd. is annexed herewith and marked as **Annexure A-7.**

    A copy of the Bid Evaluation Certificate dated 19.10.2023 is annexed herewith and marked as **Annexure A-8.**

13. Further, as per the LOI and Clauses 2.15.2 and 2.15.4 of RFP, the successful bidder was required to fulfil inter-alia the following obligations within the period of 10 days from the issuance of LOI:

    (i) Provide the Contract Performance Guarantee in favour of the Nodal Agency as per the provision of Clause 2.12 of RFP;

    (ii) Execute the Share Purchase Agreement with BPC/PFCL and the Applicant in order to acquire 100% equity shareholding of the SPV/

JEWAR TRANSMISSION LIMITED NEW DELHI

the Applicant which shall act as a TSP for execution of the Transmission Project;

(iii) Execute all other documents provided under RFP relating to the Transmission System;

(iv) To make an application before the Appropriate Commission seeking adoption of transmission charges as required under Section 63 of Electricity Act;

(v) Subsequent to execution of Share Purchase Agreement, approach the Appropriate Commission for grant of transmission license.

It is submitted that in terms of the obligations contained under the provisions of RFP, the TSP/Applicant was required to fulfil the said obligations within 10 days of issuance of LOI dated 16.02.2024. The said date was extended by BPC/PFCCL from 26.02.2024 to 18.03.2024 by its letter dated 07.03.2024.

A copy of letter dated 07.03.2024 for time extension issued by BPC. is annexed herewith and marked as **Annexure A-9.**

14. Further, on 07.03.2024, in compliance with the LOI and Clause 2.12 of RFP, Megha Engineering and Infrastructures Ltd. furnished the following five Contract Performance Guarantees (CPG) of total 17,10,00,000/- (Seventeen Crores 10 Lakhs Only) in favour of Nodal Agency, CTU as listed out in Annexure-17 of the RFP documents.

Sr. No.	Bank Guarantee No.	Date	Amount
a.	2268IGPER000924	07.03.2024	Rs. 4,10,40,000/- (Rupees Four Crores Ten Lakh Forty Thousand only)
b.	2268IGPER001024	07.03.2024	Rs. 5,30,10,000/- (Rupees Five

JEWAR TRANSMISSION LIMITED NEW DELHI

			Crores Thirty Lakh Ten Thousand only)
c.	2268IGPER001124	07.03.2024	Rs. 3,59,10,000/- (Rupees Three Crores Fifty-Nine Lakh Ten Thousand only)
d.	2268IGPER001224	07.03.2024	Rs. 51,30,000/- (Rupees Fifty-One Lakh Thirty Thousand only)
e.	2268IGPER001324	07.03.2024	Rs. 3,59,10,000/- (Rupees Three Crores Fifty-Nine Lakh Ten Thousand only)
			TOTAL: 17,10,00,000

Copy of the five CPG dated 07.03.2024 is enclosed herewith and marked as **Annexure A-10(Colly).**

15. On 05.03.2024, SPV that acts as a Transmission Service Provider at subsequent stage after having been acquired by the successful bidder, executed a Transmission Service Agreement (***"TSA"***) with the Nodal Agency, Respondent No. 2.

A copy of the TSA dated 05.03.2024 is annexed herewith and marked as **Annexure A-11.**

16. In compliance with the obligations provided under Clause 1.5 of RFP, on 07.03.2024, Megha Engineering and Infrastructures Ltd. executed the Share Purchase Agreement with BPC/PFCCL and the SPV. Pursuant to execution of the said Agreement, Megha Engineering and Infrastructures Ltd. acquired the 100% shareholding in the Applicant company/ TSP.

A copy of the Share Purchase Agreement dated 07.03.2024 is enclosed herewith and marked as **Annexure A-12.**

JEWAR TRANSMISSION LIMITED NEW DELHI

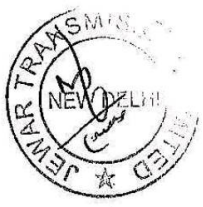
17. The financial capacity to carry out the Jewar Transmission Limited - EPC project is INR 791.81 Cr.

18. Relevant information pertaining to the availability of number of competent personnel to construct, operate and maintain the transmission system effectively and efficiently is enclosed in **Annexure A-13.**

19. After complying with all the aforesaid obligations, the Applicant *vide* the present Application has approached this Hon'ble Commission for grant of a transmission license in order to execute the Transmission System as a TSP in terms of the RFP and the TSA.

20. It is submitted that Section 14 of the Electricity Act provides that the Appropriate Commission may, on an application made under Section 15 of the Act, grant a Licence to any person to transmit electricity as a transmission licensee in any area as may be specified in the Licence. The word 'person' has been defined in Section 2(49) of the Electricity Act to include any company or body corporate or association or body of individuals, whether incorporated or not, artificial or juridical person. Therefore, the Applicant in accordance with the obligations provided under TSA and in terms of Section 14, 15 (1), 86(1)(d) of the Electricity Act is filing the present Application inter-alia seeking grant of Transmission Licence for the Transmission System explained above.

21. Section 15(1) of the Electricity Act provides that every application under Section 14 shall be made in such manner and in such form as may be specified by the Appropriate Commission and shall be accompanied with such fees as may be prescribed by Uttar Pradesh Electricity Regulatory Commission (Fees and Fines) Regulations, 2010. Having regard to the provisions of the parent Act, this Hon'ble Commission has enacted Uttar Pradesh Electricity Regulatory Commission (Conduct of Business) Regulation, 2019 and Uttar Pradesh Electricity Regulatory Commission (General Conditions of Transmission License) Regulations, 2005. As per the



aforementioned Regulation, a person selected through the process under the guidelines for competitive bidding is eligible for grant of licence. Accordingly, the Applicant after possessing the necessary eligibility criterion, has approached this Hon'ble Commission *vide* the present Application.

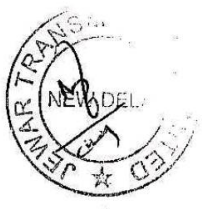
22. That, the Applicant i.e., Jewar Transmission Ltd., incorporated under the Companies Act, 2013, is a 100% wholly owned subsidiary of Megha Engineering and Infrastructures Ltd. which has been selected as a successful bidder on the basis of the Tariff Based Competitive Bidding conducted as per the Tariff Based Bidding Guidelines for Transmission Service issued by the Ministry of Power, Government of India and thus eligible for issuance of transmission licence under UPERC Transmission Licence Regulations.

23. It is submitted that the grant of transmission license is a pre-condition under the Transmission Service Agreement and is also a requirement in law without which the Applicant cannot proceed with the establishment of the Transmission System as a TSP.

24. This Hon'ble Commission in UPERC Transmission Licence Regulations, 2005 had prescribed the form of Application and also the amount of fee for making an application for grant of Transmission Licence. Accordingly, the Applicant is submitting the present Application in such prescribed format along with the fees as per the Uttar Pradesh Electricity Regulatory Commission (Fees and Fines) Regulations, 2010.

    A Copy of the duly filled Form-I along with the Resolution passed by the Board of Directors of Jewar Transmission Ltd. is enclosed herewith and marked as **Annexure A-14**.

25. It is submitted that a copy of the Application for grant of Transmission Licence is being forwarded to each of the Respondents in terms of UPERC Transmission Licence Regulations.



26. It is further submitted that the Applicant is simultaneously submitting/furnishing a copy of the instant Application to State Transmission Utility, as required under Section 15 (3) of the Electricity Act and UPERC Transmission Licence Regulations, 2005 seeking appropriate recommendations, if any, in accordance with Section 15 (4) of the Act. In addition, UPPTCL is also a party Respondent in the present petition.

27. The present Application/ petition for grant of Transmission Licence is being posted on its website http://jtl.in.net/ as per UPERC Transmission Licence Regulations so as to facilitate the access of the Application by any person through internet.

28. Having regard to the above submissions, the Applicant submits that it possesses the requisite eligibility criteria for grant of transmission licence as stipulated under UPERC Transmission Licence Regulations and therefore this Hon'ble Commission may grant the prayer as prayed for. The Applicant further craves leave of this Hon'ble Commission to submit relevant information/ documents as and when required to comply with the obligations under the provisions of law.

29. The present Application is being made bona-fide and in the interest of justice.

PRAYER

The Applicant hereby humbly prays the Hon'ble Commission to:

a) **Issue the Transmission License to the Applicant for establishing, operating and maintaining the Transmission System of "*Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/3,3 kV, 3x60 MVA GIS substation Vasundhara***

JEWAR TRANSMISSION LIMITED NEW DELHI

(G.haziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated lines", comprising of assets elements as detailed in the present petition, in terms of the provisions of RFP and Transmission Service Agreement read with Section 14, 15 and 86 (1) (d) of the Electricity Act;

b) Allow the Transmission System, as detailed in the present Application to be part of the Intra-State Transmission System and direct that the recovery of transmission charges shall be in accordance with the terms of the Uttar Pradesh Electricity Regulatory Commission (Terms and Conditions for Determination of Transmission Tariff) Regulations, 2006;

c) Condone any inadvertent errors omissions/ errors / shortcomings and permit the Applicant to add/change/modify/alter these pleadings and make further submissions as may be required at a future date;

d) Pass any such other order / orders, as may be deemed fit and proper in the facts and circumstances of the case.

JEWAR TRANSMISSION LIMITED NEW DELHI

APPLICANT

THROUGH

PLACE: NEW DELHI
DATED:

ABIHA ZAIDI
ADVOCATE FOR THE PETITIONER
S-387, GF, GREATER KAILASH – I
NEW DELHI – 110048
PHONE: +91 9599337516
E-mail: office@abihazaidi.com

JEWAR TRANSMISSION LIMITED NEW DELHI

FORM-I

Application form for grant of transmission Licensee

Particulars of the Applicant:

1.	Name of the Applicant:	Jewar Transmission Limited
2.	Name of the Company:	Jewar Transmission Limited
3.	Registered Address:	2nd Floor, Niryat Bhawan, Rao Tularam Marg, Vasant Vihar, Opposite Army Hospital & Referral, New Delhi- 110057, India.
4.	Name, Designation & Address of the Contact Person:	Mandalaparthi Raghu Kumar - Director (Authorized Representative) r/o Flat no. 104, JMR Spring Avenue, MJ Colony Street No. 1, Le Moulali, Secunderabad, Hyderabad, Telangana- 500040.
5.	Contact Tel. No.	+91 9676902243
6.	Fax No.	040-44336800
7.	Email Id:	nfo@jtl.in.net
8.	Place of Incorporation/ Registration:	Urjanidhi, First Floor, 1, Barakhamba Lane, Cannaught Place, New Delhi, Central Delhi-110001, Delhi.
9.	Date of Incorporation/ Registration	2023.07.06
10.	Geographical Area within which Applicant proposes to undertake transmission of electricity: In accordance with the Transmission Service Agreement furnished as a part of the bidding document, the applicant company is to establish and operate the intra-state transmission system for construction of "400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt {Chaukaghat} Varanasi, 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/130/33 kV, 2xl 60+2x40 MVA substation Khaga {Fatehpur} with associated line." The Intra-State transmission system will be developed in Jewar - Gautam Buddha Nagar, Varanasi, Ghaziabad and Khaga.	

JEWAR TRANSMISSION LIMITED NEW DELHI

<table>
<tr><td></td><td colspan="4">The detail Scope of the project is attached herein as Enclosure-1.</td></tr>
<tr><td>11.</td><td colspan="4">Following documents are enclosed
a) Certificate of Registration/ Incorporation- Annexure A-4
b) Certificate of Commencement of Bussiness- Annexure A-15
c) MoA and AoA- Annexure A-5
d) Original power of Attorney of the signatory to commit the applicant or its promoter- Annexure A-16
e)Income Tax Registration- Annexure A-17
f) Draft License – Attached herein with the form as Enclosure-2.
g) All the documents mentioned in the Regulation- All documents are duly attached along with this application/petition and Form-I.</td></tr>
<tr><td>12.</td><td colspan="4">Net worth (in equivalent Indian Rupees-conversion to be done at the rate of the exchange rate prevailing at the end of each Year) for immediate past Five Financial years.</td></tr>
<tr><td></td><td>DD/MM/YY</td><td>In Home Currency</td><td>Exchange Rate used</td><td>In equivalent Indian Rupees</td></tr>
<tr><td></td><td>01.04.2019 - 31.03.2020</td><td>Rs.13570.68 Cr.</td><td></td><td></td></tr>
<tr><td></td><td>01.04.2020 – 31.03.2021</td><td>Rs. 15,936.87 Cr.</td><td></td><td></td></tr>
<tr><td></td><td>01.04.2021 – 31.03.2022</td><td>Rs. 18,942.20 Cr.</td><td></td><td></td></tr>
<tr><td></td><td>01.04.2022 – 31.03.2023</td><td>Rs. 21,262.73 Cr.</td><td></td><td></td></tr>
<tr><td></td><td>01.4.2023 – 31.03.2024 (Provisional)</td><td>Rs. 202.19 Cr.</td><td></td><td></td></tr>
<tr><td></td><td colspan="4">A Copy of Annual reports are annexed and marked as Annexure A-20.</td></tr>
<tr><td>13.</td><td colspan="4">Annual Turnover (in equivalent Indian Rupees - conversion to be done at the rate of exchange prevailing at the end of each year) for immediate past 5 financial years.</td></tr>
<tr><td></td><td>DD/MM/YY to DD/ MM/ YY</td><td>In Home Currency</td><td>Exchange Rate used</td><td>In equivalent Indian Rupees</td></tr>
<tr><td></td><td>01.04.2019 - 31.03.2020</td><td>Rs. 18,486.15 Cr..</td><td></td><td></td></tr>
<tr><td></td><td>01.04.2020 – 31.03.2021</td><td>Rs. 19,145.60 Cr.</td><td></td><td></td></tr>
<tr><td></td><td>01.04.2021 – 31.03.2022</td><td>Rs. 26,828.80 Cr.</td><td></td><td></td></tr>
<tr><td></td><td>01.04.2022 – 31.03.2023</td><td>Rs. 25,837.68 Cr.</td><td></td><td></td></tr>
<tr><td></td><td>01.4.2023 – 31.03.2024 (Provisional)</td><td>Rs. 117.64 Cr.</td><td></td><td></td></tr>
<tr><td></td><td colspan="4">A Copy of Annual reports are annexed and marked as Annexure A-21.</td></tr>
<tr><td>14.</td><td colspan="4">Certificate of Credit Rating

The Applicant company is a Special Purpose Vehicle (SPV) incorporated by the</td></tr>
</table>

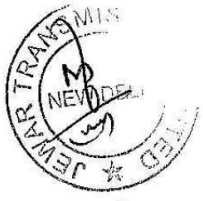
JEWAR TRANSMISSION LIMITED NEW DELHI

	PFC Consulting Ltd., the bid process Coordinator (BPC) and acquired by the successful bidder i.e. Megha Engineering and Infrastructures Ltd. to set up Transmission Project through Tariff Based Competitive Bidding guidelines notified by Ministry of Power, GOI. The Project is in the initial stage for commencing activities. However Credit rating of parent company is provided. Copy of the Credit Rating of the MEIL is annexed herein and marked as **Annexure A-22.**
15.	Certificate of Standard borrower account The Applicant company is a Special Purpose Vehicle (SPV) incorporated by the PFC Consulting Ltd., the bid process Coordinator (BPC) and acquired by the successful bidder i.e. Megha Engineering and Infrastructures Ltd. to set up Transmission Project through Tariff Based Competitive Bidding guidelines notified by Ministry of Power, GOI. **The Project is in the initial stage for commencing activities. The Applicant Company has not raised loan from any source and hence the Certificate of Standard Borrower account is not available.**
16.	Certificate stating that RBI has not classified the Applicant as a 'wilful defaulter' The Applicant company is a Special Purpose Vehicle (SPV) incorporated by the PFC Consulting Ltd , the bid process Coordinator (BPC) and acquired by the successful bidder i.e. The Megha Engineering and Infrastructures Ltd to set up Transmission Project through Tariff Based Competitive Bidding guidelines notified by Ministry of Power, GOI. **The Project is in the initial stage for commencing activities. The Applicant Company has not taken any loan from any lender and hence the Certificate of RBI is not applicable.**
17.	List of documents enclosed in support of Sl. Nos. (10), (11) and (14) above:

Sr. No.	Name of Document	Enclosure
1.	Scope of Projcet	**Annexure – 19 Enclosure-1.**
2.	Certificate of Registration/Incorporation	**Annexure A-4.**
3.	Certificate of Commencemnt of Bussiness	**Annexure A-15.**
4.	Memorandum of Association and Articles of Association	**Annexure A-5.**
5.	Original Power of Attorney of the signatory to commit the Application or its propmoter	**Annexure A-16.**
6.	Details of Income Tax Registration	**Annexure A-17.**
7.	Draft License	**Annexure A-19- Enclosure-2**
8.	Copies of Annual Reports or Certified Audited Results for Net Worth of the Parent/ Holding Company/ Successful Bidder	**Annexure A-20.**
9.	Copies of Annual Reports or Certified Audited Results for the Annual	**Annexure A-21.**

JEMAR TRANSMISSION LIMITED NEW DELHI

		turnover of the Parent/ Holding Company/ Successful Bidder	
	10.	Credit Rating of the MEIl, Holding company of the applicant	**Annexure A-22**
	11.	All documents required in the Regulation	**All necessary documents are duly attached along with petition/application and the Form-I.**
18.	(a) Whether Applicant himself shall be financing the proposed transmission of electricity fully on its own balance sheet: The Applicant Company shall finance the proposed Transmission Project through funding of Debt and Equity. The Project is in initial stage for commencing activities and the Debt and Equity shall be known on completion of the Project. (b) If, yes, proposed equity from the Applicant: The Project is in in itial stage for commencing activities and the quantum of Equity shall be known on completion of the Project. However, l 00% of the equity shall be funded by The Megha Engineering and Infrastructures Ltd.		
19.	In case the Applicant proposes to tie up with some other Agency for equity, then name & address of such agency: **NOT APPLICABLE**		
20.	Details of the debt proposed for the Transmission activity: **NOT APPLICABLE**		
21.	Organisational & Managerial Capability of the Applicant: The Organisational & Managerial Capability is enclosed as **Annexure A-23 (Colly)**		
22.	Approach & Methodology The Approach & Methodology is enclosed as **Annexure A-23 (Colly)**		

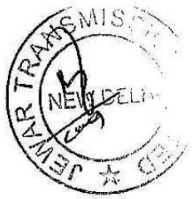


Enclosure-1

Scope of The Work

To establish following Intra State Transmission System "**Construction of 400 /220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated lines.**" on build, own, operate & transfer (BOOT) basis, and to provide transmission service.

Sr. No.	Name of Transmission Element	SCOD in months from Effective Date
A. Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar (Gautam Budh Nagar) with Associated lines		
1.	Construction of 400/220 kV, 2x500MVA GIS substation Jewar (Gautam Budh Nagar) (along with 125MVAR reactor) 400 kV GIS feeder bay- 02 Nos. 400 kV GIS Bus Coupler bay - 01 No. 400 kV GIS Bus reactor bay - 01 No. 400 kV GIS ICT bay - 02 Nos. 220 kV GIS feeder bay - 02 Nos. 220 kV GIS Bus Coupler bay - 01 No. 220 kV GIS ICT bay- 02 Nos. 220 kV GIS Interconnecting (220 kV S/S Jewar) bay- 02 Nos. 220 kV GIS Feeder (220 kV S/S Sector-28 YEIDA) bay - 02 Nos.	18 Months
2.	LILO of one ckt of 400 kV Greater Noida (765 kV) - Sector-148 (400), Noida DC line at 400/220 kV GIS Substation Jewar (Gautam Budh Nagar) (for LILO, twin HTLS conductor and OPGW stringing work on narrow base multi circuit towers)	
B. Construction of 220/33 kV, 2x60 MVA GIS substation Cantt, (Chaukaghat) Varanasi with associated lines		
1.	Construction of 220/33 kV, GIS Substation Cantt, (Chaukaghat) Varanasi 220 kV GIS feeder bay- 02 Nos. 220 kV GIS Bus Coupler bay - 01 No. 220 kV GIS ICT bay- 02 Nos. 33 kV GIS feeder bay - 12 Nos. 33 kV GIS Transfer Bus Coupler bay – 01 No. 33 kV GIS ICT bay - 02 Nos.	18 Months
2.	LILO of one ckt, of 220 kV Satnath (400)Gajokhar DC line at Cantt. (Chaukaghat) Varanasi construction of 41.5 Km (37 Km overhead line (Zebra Conductor) on	



	Lattice Tower and construction of 4.5 Km 630 mm2 line with copper XLPE cable.	
C. Construction of 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad) with associated lines		
1.	Construction of 220/33 kV GIS substation Vasundhara (Ghaziabad) 220 kV GIS feeder bay- 03 Nos. 18 Months 220 kV GJS feeder bay (spare) - 01 No. 220kV GIS Bus Coupler Bay- 01 No. 220 kV GJS JCT bay - 03 Nos. 33 kV GJS feeder bay -10 Nos. 33 kV GIS Transfer Bus Coupler bay – 01 No. 33 kV GIS bus sectionalized bay - 02 Nos. 33 kV capacitor bank bay (1x10 MVAR)- 03 Nos. 33 kV GIS ICT bay- 03 Nos. 33/0.4 kV Station transformer bay- 02 Nos.	18 Months
2.	LILO of one ckt, of 220 kV Muradnagar (400)Sahibabad (220) SC line at 220 kV Substation Vasundhara (Ghaziabad) (Multi Ckt. / Monopole Tower) (Zebra conductor)	
3.	220 kV Indirapuram (400) - Vasundhara SC line (Monopole and Narrow base multi circuit tower)	
D. Construction of220/132/33 kV, 2x160+2x40 MVA Substation Khaga (Fatehpur) with associated lines		
1	Construction of 220/132/33 kV, Substation 1 8 Months Khaga (Fatehpur) 220 kV feeder bay - 02 Nos. 220 kV spare feeder bay - 02 Nos. 220 kV bus coupler - 01 No. 220 kV transfer bus coupler - 01 No 220 kV JCT bay - 02 Nos. 132 kV feeder bay - 03 Nos. 132 kV spare feeder bay - 01 No. 132 kV bus coupler - 01 No. 132 kV transfer bus coupler - 01 No. 132 kV JCT bay- 04 Nos. 33 kV Feeder Bay- 07 Nos. 33 kV Transfer Bus Coupler bay - 01 No. 33 kV ICT bay - 02 Nos.	18 Months
2	220 kV Fatehpur (765) PG -Khaga DC line (Zebra Conductor)	
3	132 kV Khaga (220) - Khaga DC line	
4	132 kV Khaga (220) - Hussainganj SC line	
5	132 kV Bay 132 kV Substation Khaga-02 Nos.	
6	132 kV Hybrid Bay at 132 kV substation Hussainganj-01 No.	

Note-



1. UPPTCL to provide adequate land for construction of 400/220 kV, 2x500 MVA GIS Substation at Jewar (Gautam Budh Nagar) free of cost and shall be handed over to TSP as is where basis.

2. UPPTCL to provide adequate land for construction of 220/33 kV, 2x60 MVA GIS substation at Cantt, (Chaukaghat) Varanasi free of cost and shall be handed over to TSP as is where basis.

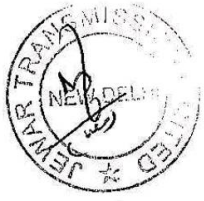
3. UPPTCL to provide adequate land for construction of 220/33 kV, 3x60 MVA GIS substation at Vasundhara (Ghaziabad) free of cost and shall be handed over to TSP as is where basis.

4. UPPTCL to provide adequate land for construction of 220/132/33 kV, 2x160+2x40 MVA Substation at Khaga (Fatehpur) free of cost and shall be handed over to TSP as is where basis.

5. 02 Nos., 220 kV Bay at Fatehpur (765) PG shall be under scope of developer.

6. 02 Nos., 132 kV Bay at 132 kV S/s Khaga shall be under scope of developer.

7. 01 No., 132 kV Hybrid Bay at 132 kV S/s Husainganj shall be under scope of developer.



Enclosure-2

DRAFT TRANSMISSION LICENSE

Applicant:- Jewar Transmission Ltd

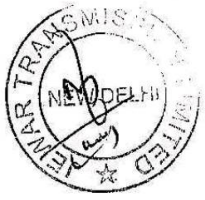
Address:- 2nd Floor, Niryat Bhawan, Rao Tularam Marg, Vasant Vihar, Opposite Army Hospital Referral, New Delhi

DRAFT TRANSMISSION LICENSE

TRANSMISSION LICENSE, 2024 UNDER ELECTRICITY ACT-2003

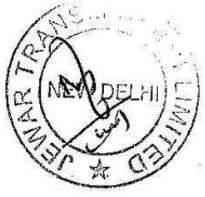
(License No ..... of 2024)

1.Details of Applicant:	Jewar Transmission Ltd., based at 2nd Floor, Niryat Bhawan, Rao Tularam Marg, Vasant Vihar, Opposite Army Hospital Referral, New Delhi-110057 was incorporated under the Companies Act, , 2013 by Bid Process Coordinator as its 100% wholly owned subsidiary.
2. Details of the Project	Transmission Service for transmission system "Construction of 400/220 kV, 2x500 MVA GJS Substation Jewar, 220/33 kV, 2x60 MVA GJS substation Cantt {Chaukaghat} Varanasi, 220/33 kV, 3x60 MVA GJS substation Vasundhara (Ghaziabad), 220/130/33 kV, 2x160+2x40 MVA substation Khaga {Fatehpur} with associated lines.
3. Managing directors/ Directors of the Company	1. Mrs. Sudharani Puritipati 2. Mr. Venkatesh Palimpati 3. Mr. Madalaparthi Raghu Kumar
4. Type of License	Transmission License
5. Location of the Proposed Area	Jewar (Gautam Budh Nagar), (Chaukaghat) Varanasi, Vasundhara (Ghaziabad), Khaga (Fatehpur), with associated lines.
6. Description of the Proposed Area	1. Constmction of 400/220 kV, 2x500MVA GIS substation Jewar (Gautam Budh Nagar) (along with 125 MVAR reactor). LILO of one ckt. Of 400 kV Greater Noida (765 kV)Sector 148 (400), Noida DC line at 400/220 kV GIS Substation Jewar (Gautam Budh Nagar) (for LILO, twin HTLS conductor and OPGW stringing work on narrow base multi circuit towers). 2. Construction of 220/33 kV, GIS Substation Cantt, (Chaukaghat) Varanasi. LILO of one ckt, of 220 kV Satnath (400)- Gajokhar DC line at Cantt. (Chaukaghat) Varanasi construction of 41.5 km [3 7 km overhead line (Zebra Conductor) on Lattice Tower and construction of 4.5 km 630 mm2 line with copper XLPE cable. 3. Construction of 220/33 kV GIS substation Vasundhara (Ghaziabad). LILO of one ckt, of 220 kV Muradnagar (400)- Sahibabad (220) SC line at 220 kV Substation Vasundhara (Ghaziabad) (Multi Ckt. / Monopole Tower) (Zebra conductor). 220 kV Indirapuram (400)Vasundhara SC line (Monopole and Narrow base multi circuit tower).



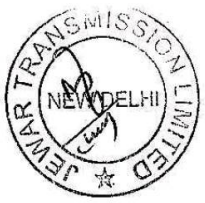
4. Construction of 220/ 132/33 kV, substation Khaga (Fatehpur). 220 kV Fatehpur (765) PG-Khaga DC line (Zebra Conductor). 132 kV Khaga (220)- Khaga DC line. 132 kV Khaga (220)-Hussainganj SC line. 132 kV Bay 132 kV Substation Khaga. 132 kV Hybrid Bay at 132 kV substation Hussainganj.

7. The Uttar Pradesh Electricity Regulatory Commission (hereinafter referred to as "the Commission"), in exercise of the powers under Section 14 of the Electricity Act, 2003 (hereinafter referred to as "the Act"), hereby grants the transmission license to Jewar Transmission Ltd. (hereinafter referred to as 'JTL' or "the licensee"), a company incorporated under the Companies Act, 2013 and having its registered office at 2nd Floor, Niryat Bhawan, Rao Tularam Marg, Vasant Vihar, Opposite Army Hospital & Referral, New Delhi -110 057, India. (hereinafter referred as 'Licensee") to establish Intra State Transmission System "Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA G/S substation Cantt (Chaukaghat) Varanasi, 220/3,3 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated line" on Build, Own, Operate and Transfer (BOOT) basis in accordance with the Guidelines issued by the Central Government., more specifically described in the Schedule attached to this license, which shall be read as part and parcel of this license, subject to the act, the rules and conditions specified under the General Conditions of Transmission License Regulation No. UPERC/ Secy.05-0931 dated December 14, 2005.
8. The Licensee may be called "Jewar Transmission Limited (JTL) Transmission License, 2024 (License No ..... of2024)".
9.
    a. The transmission license shall, unless revoked earlier, remain in force for a period of 25 years; with effect from date of issue of this license.;
    b. As the Tariff Stream in TSA is for 35 years, JTL shall make an application two years prior to the expiry of the initial period of license for the grant of license for a further period of 10 years, which shall be appropriately considered by the Commission in accordance with the then prevailing laws.
10. JTL shall remain bound by the provision of the Act, the rules and regulations framed there under, in particular the transmission license regulations, Indian



Electricity Grid Code, UP Electricity Grid Code, the Standards specified by the Central Electricity Authority and the orders & directions of the Commission issued from time to time.

11. JTL, as Transmission Licensee, shall carry out the responsibilities conferred upon it, under UP Electricity Grid Code, UPERC (Terms & Conditions for Open Access) Regulations, 2004, UPERC (Grant of connectivity to Intra State Transmission System) Regulations, 2010 including their amendments and modifications as and when carried out. JTL shall provide non-discriminatory open access to its transmission system for use by any other licensee, including a distribution licensee or an electricity trader, or generating company or any other person in accordance with the Uttar Pradesh Electricity Regulatory Commission (Open Access in intra-State Transmission) Regulations, as amended from time to time.
12. The licensee shall comply with the directions of the Regional Load Dispatch Centre under Sub-section (3) of Section 28 or Subsection (1) of Section 29 of the Act and the directions of the State Load Dispatch Centre under Section (2) of Section 32 or subsection (1) of Section 33 of the Act, as may be issued from time to time for maintaining the availability of transmission system.
13. The Transmission Service Agreement (TSA) entered into between the licensee and long-term transmission customers shall be honoured by the parties involved in TSA.
14. The applicant shall not enter into contract or otherwise engage in the business of trading in electricity during the period of subsistence of the transmission license.
15. Unless otherwise specified by the Commission, the licensee shall pay an annual license fee in accordance with UPERC (Fee & Fine) Regulations, 2010 and amendments/reenactments made thereof. The License fee for a part of the year shall be paid on prorate basis. The year for the purpose of this clause shall mean a financial year i.e., a period of twelve months from 1 April of a year to 31 March of the following year.
16. The Licensee may lay down or place electricity supply lines and other installations subject to provisions of Section 67 to 69 and 159 to 161 of the Electricity Act, 2003.
17. The licensee shall ensure adherence with the requirement laid down under Section 164 of Electricity Act, 2003.

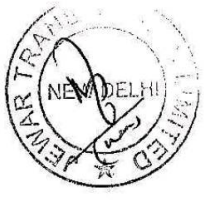


18. The license may be revoked subject to Section 19 of Electricity Act, 2003 at any time during its period of operation as specified in Electricity Act, 2003.

Secretary

Dated: ..... .

Place: .. ..



SCOPE OF THE PROJECT & SCHEDULE

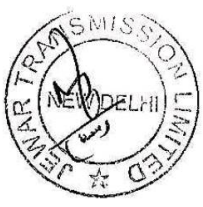
Sr. No.	Name of Transmission Element	SCOD in months from Effective Date	Percentage of Quoted transmission Charges recoverable on Scheduled COD of the Element of the Project
A. Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar (Gautam Budh Nagar) with Associated lines			
1.	Construction of 400/220 kV, 2x500MVA GIS substation Jewar (Gautam Budh Nagar) (along with 125MVAR reactor) 400 kV GIS feeder bay- 02 Nos. 400 kV GIS Bus Coupler bay - 01 No. 400 kV GIS Bus reactor bay - 01 No. 400 kV GIS ICT bay - 02 Nos. 220 kV GIS feeder bay - 02 Nos. 220 kV GIS Bus Coupler bay - 01 No. 220 kV GIS ICT bay- 02 Nos. 220 kV GIS Interconnecting (220 kV S/S Jewar) bay- 02 Nos. 220 kV GIS Feeder (220 kV S/S Sector-28 YEIDA) bay - 02 Nos.	18 Months	30.85%
2.	LILO of one ckt of 400 kV Greater Noida (765 kV) - Sector-148 (400), Noida DC line at 400/220 kV GIS Substation Jewar (Gautam Budh Nagar) (for LILO, twin HTLS conductor and OPGW stringing work on narrow base multi circuit towers)		
B. Construction of 220/33 kV, 2x60 MVA GIS substation Cantt, (Chaukaghat) Varanasi with associated lines			
1.	Construction of 220/33 kV, GIS Substation Cantt, (Chaukaghat) Varanasi 220 kV GIS feeder bay- 02 Nos. 220 kV GIS Bus Coupler bay - 01 No. 220 kV GIS ICT bay- 02 Nos. 33 kV GIS feeder bay - 12 Nos. 33 kV GIS Transfer Bus Coupler bay – 01 No. 33 kV GIS ICT bay - 02 Nos.	18 Months	26.78%
2.	LILO of one ckt, of 220 kV Satnath (400)Gajokhar DC line at Cantt.		

JEWAR TRANSMISSION LIMITED NEW DELHI

	(Chaukaghat) Varanasi construction of 41.5 Km (37 Km overhead line (Zebra Conductor) on Lattice Tower and construction of 4.5 Km 630 mm2 line with copper XLPE cable.		
C. Construction of 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad) with associated lines			
1.	Construction of 220/33 kV GIS substation Vasundhara (Ghaziabad) 220 kV GIS feeder bay- 03 Nos. 18 Months 220 kV GJS feeder bay (spare) - 01 No. 220kV GIS Bus Coupler Bay- 01 No. 220 kV GJS JCT bay - 03 Nos. 33 kV GJS feeder bay -10 Nos. 33 kV GIS Transfer Bus Coupler bay – 01 No. 33 kV GIS bus sectionalized bay - 02 Nos. 33 kV capacitor bank bay (1x10 MVAR)- 03 Nos. 33 kV GIS ICT bay- 03 Nos. 33/0.4 kV Station transformer bay- 02 Nos.	18 Months	17.11%
2.	LILO of one ckt, of 220 kV Muradnagar (400)Sahibabad (220) SC line at 220 kV Substation Vasundhara (Ghaziabad) (Multi Ckt. / Monopole Tower) (Zebra conductor)		
3.	220 kV Indirapuram (400) - Vasundhara SC line (Monopole and Narrow base multi circuit tower)		
D. Construction of220/132/33 kV, 2x160+2x40 MVA Substation Khaga (Fatehpur) with associated lines			
1	Construction of 220/132/33 kV, Substation 1 8 Months Khaga (Fatehpur) 220 kV feeder bay - 02 Nos. 220 kV spare feeder bay - 02 Nos. 220 kV bus coupler - 01 No. 220 kV transfer bus coupler - 01 No 220 kV JCT bay - 02 Nos. 132 kV feeder bay - 03 Nos. 132 kV spare feeder bay - 01 No. 132 kV bus coupler - 01 No. 132 kV transfer bus coupler - 01 No. 132 kV JCT bay- 04 Nos. 33 kV Feeder Bay- 07 Nos. 33 kV Transfer Bus Coupler bay - 01 No. 33 kV ICT bay - 02 Nos.	18 Months	25.26%
2	220 kV Fatehpur (765) PG -Khaga DC line (Zebra Conductor)		
3	132 kV Khaga (220) - Khaga DC line		

JEMAR TRANSMISSION LIMITED NEW DELHI

4	132 kV Khaga (220) - Hussainganj SC line		
5	132 kV Bay 132 kV Substation Khaga-02 Nos.		
6	132 kV Hybrid Bay at 132 kV substation Hussainganj-01 No.		



Financial Particulars of MEIL for Last five years

Annexure A-20 – Annual Net worth &

Annexure A-21 – Annual Turnover

Annexure A-20
Annexure A-21

Megha Engineering & Infrastructures Ltd.
An ISO 9001-2015 Company
S-2, Technocrat Indl. Estate, Balanagar, Hyderabad-500037, Telangana, INDIA
Tel: +91-40-44336700 Fax: +91-40-44336800
E-mail: info@meil.in Visit us: www.meil.in U45202TG2006PLC050271

This is to certify that **M/s. MEGHA ENGINEERING & INFRASTRUCTURES LIMITED (MEIL)** bearing CIN: U45202TG2006PLC050271 having registered office at S2, Technocrat Industrial Estate, Balanagar, Hyderabad 500037, Telangana and the Financial Particulars for the last five years are as under:

(Amount in Rs. Crores)

Particulars	**FY 19-20**	**FY 20-21**	**FY 21-22**	**FY 22-23**	**FY 23-24 (Provisional)**
Annual Turnover	18,486.15	19,145.60	26,828.80	25,837.68	30,117.64
Net worth	13,570.68	15,936.87	18,942.40	21,262.73	24,202.19

Place: Hyderabad
Date: 11.09.2024

N. Thirupathi Rao
Director-Finance

MEGHA ENGINEERING & INFRASTRUCTURES LTD. S-2, TIE, Balanagar, Hyd-37, T.S.

India Ratings & Research
A Fitch Group Company

Fitch Group

Mr. N. Thirupathi Rao
Director-Finance
Megha Engineering & Infrastructures Ltd
S-2, Technocrat industrial Estate, Balanagar,
Hyderabad-500037

October 30, 2023

Dear Sir/Madam,

Re: Rating Letter for BLR & NCDs of Megha Engineering & Infrastructures Ltd

India Ratings and Research (Ind-Ra) has affirmed Megha Engineering & Infrastructures Ltd's (MEIL) debt instruments as follows:

Instrument Type	Size of Issue (billion)	Rating/Outlook	Rating Action
Proposed non-convertible debentures (NCDs)	INR2	IND AA/Positive	Affirmed
Fund-based working capital limits	INR3.2825	IND AA/Positive/IND A1+	Affirmed
Fund-based working capital limits	INR0.0687	IND AA/Positive/IND A1+	Assigned
Proposed fund-based working capital limits	INR0.9313 (reduced from INR1)	IND AA/Positive/IND A1+	Affirmed
Non-fund-based working capital limits	INR139.127	IND AA/Positive/IND A1+	Affirmed
Non-fund-based working capital limits	INR10	IND AA/Positive/IND A1+	Assigned
Proposed non-fund based working capital limits	INR31 (reduced from INR41)	IND AA/Positive/IND A1+	Affirmed

In issuing and maintaining its ratings, India Ratings relies on factual information it receives from issuers and underwriters and from other sources India Ratings believes to be credible. India Ratings conducts a reasonable investigation of the factual information relied upon by it in accordance with its ratings methodology, and obtains reasonable verification of that information from independent sources, to the extent such sources are available for a given security.

The manner of India Ratings factual investigation and the scope of the third-party verification it obtains will vary depending on the nature of the rated security and its issuer, the requirements and practices in India where the rated security is offered and sold, the availability and nature of relevant public information, access to the management of the issuer and its advisers, the availability of pre-existing third-party verifications such as audit reports, agreed-upon procedures letters, appraisals, actuarial reports, engineering reports, legal opinions and other reports provided by third parties, the availability of independent and competent third-party verification sources with respect to the particular security or in the particular jurisdiction of the issuer, and a variety of other factors.

Users of India Ratings ratings should understand that neither an enhanced factual investigation nor any third-party verification can ensure that all of the information India Ratings relies on in connection with a rating will be accurate and complete. Ultimately, the issuer and its advisers are responsible for the accuracy of the information they provide to India Ratings and to the market in offering documents and other reports. In issuing

NEWAR TRANSMISSION LIMITED NEW DELHI

India Ratings & Research
A Fitch Group Company

Fitch Group

its ratings India Ratings must rely on the work of experts, including independent auditors with respect to financial statements and attorneys with respect to legal and tax matters. Further, ratings are inherently forward-looking and embody assumptions and predictions about future events that by their nature cannot be verified as facts. As a result, despite any verification of current facts, ratings can be affected by future events or conditions that were not anticipated at the time a rating was issued or affirmed.

India Ratings seeks to continuously improve its ratings criteria and methodologies, and periodically updates the descriptions on its website of its criteria and methodologies for securities of a given type. The criteria and methodology used to determine a rating action are those in effect at the time the rating action is taken, which for public ratings is the date of the related rating action commentary. Each rating action commentary provides information about the criteria and methodology used to arrive at the stated rating, which may differ from the general criteria and methodology for the applicable security type posted on the website at a given time. For this reason, you should always consult the applicable rating action commentary for the most accurate information on the basis of any given public rating.

Ratings are based on established criteria and methodologies that India Ratings is continuously evaluating and updating. Therefore, ratings are the collective work product of India Ratings and no individual, or group of individuals, is solely responsible for a rating. All India Ratings reports have shared authorship. Individuals identified in an India Ratings report were involved in, but are not solely responsible for, the opinions stated therein. The individuals are named for contact purposes only.

Ratings are not a recommendation or suggestion, directly or indirectly, to you or any other person, to buy, sell, make or hold any investment, loan or security or to undertake any investment strategy with respect to any investment, loan or security or any issuer. Ratings do not comment on the adequacy of market price, the suitability of any investment, loan or security for a particular investor (including without limitation, any accounting and/or regulatory treatment), or the tax-exempt nature or taxability of payments made in respect of any investment, loan or security. India Ratings is not your advisor, nor is India Ratings providing to you or any other party any financial advice, or any legal, auditing, accounting, appraisal, valuation or actuarial services. A rating should not be viewed as a replacement for such advice or services. Investors may find India Ratings ratings to be important information, and India Ratings notes that you are responsible for communicating the contents of this letter, and any changes with respect to the rating, to investors.

It will be important that you promptly provide us with all information that may be material to the ratings so that our ratings continue to be appropriate. Ratings may be raised, lowered, withdrawn, or placed on Rating Watch due to changes in, additions to, accuracy of or the inadequacy of information or for any other reason India Ratings deems sufficient.

Nothing in this letter is intended to or should be construed as creating a fiduciary relationship between India Ratings and you or between India Ratings and any user of the ratings.

In this letter, "India Ratings" means India Ratings & Research Pvt. Ltd. and any successor in interest.

We are pleased to have had the opportunity to be of service to you. If we can be of further assistance, please email us at infogrp@indiaratings.co.in

Sincerely,

India Ratings

Dr Devendra Pant
Senior Director

SEWAR TRANSMISSION LIMITED NEW DELHI

India Ratings & Research
A Fitch Group Company

Fitch Group

Annexure: Facilities Breakup

Instrument Description	Banks Name	Ratings	Outstanding/Rated Amount(INR million)
Fund Based Working Capital Limit	Union Bank of India	IND AA/Stable/IND A1+	350.00
Fund Based Working Capital Limit	State Bank of India	IND AA/Stable/IND A1+	720.00
Fund Based Working Capital Limit	Yes Bank Ltd	IND AA/Stable/IND A1+	50.00
Fund Based Working Capital Limit	Punjab National Bank	IND AA/Stable/IND A1+	600.00
Fund Based Working Capital Limit	Canara Bank	IND AA/Stable/IND A1+	400.00
Fund Based Working Capital Limit	Bank of Baroda	IND AA/Stable/IND A1+	50.00
Fund Based Working Capital Limit	Indian Overseas Bank	IND AA/Stable/IND A1+	132.50
Fund Based Working Capital Limit	Bank of India	IND AA/Stable/IND A1+	300.00
Fund Based Working Capital Limit	IDBI Bank	IND AA/Stable/IND A1+	150.00
Fund Based Working Capital Limit	Bank of Maharashtra	IND AA/Stable/IND A1+	150.00
Fund Based Working Capital Limit	UCO Bank	IND AA/Stable/IND A1+	148.70
Fund Based Working Capital Limit	Karnataka Bank Ltd	IND AA/Stable/IND A1+	300.00
Non-Fund Based Working Capital Limit	State Bank of India	IND AA/Stable/IND A1+	49960.00
Non-Fund Based Working Capital Limit	Union Bank of India	IND AA/Stable/IND A1+	21250.00
Non-Fund Based Working Capital Limit	Yes Bank Ltd	IND AA/Stable/IND A1+	10000.00
Non-Fund Based Working Capital Limit	Punjab National Bank	IND AA/Stable/IND A1+	16337.00
Non-Fund Based Working Capital Limit	Canara Bank	IND AA/Stable/IND A1+	16450.00
Non-Fund Based Working Capital Limit	Bank of Baroda	IND AA/Stable/IND A1+	5950.00
Non-Fund Based Working Capital Limit	Indian Overseas Bank	IND AA/Stable/IND A1+	6430.00
Non-Fund Based Working Capital Limit	Bank of India	IND AA/Stable/IND A1+	4100.00
Non-Fund Based Working Capital Limit	IDBI Bank	IND AA/Stable/IND A1+	4850.00
Non-Fund Based Working Capital Limit	ICICI Bank	IND AA/Stable/IND A1+	1500.00
Non-Fund Based Working Capital Limit	Bank of Maharashtra	IND AA/Stable/IND A1+	1100.00
Non-Fund Based Working Capital Limit	UCO Bank	IND AA/Stable/IND A1+	4500.00
Non-Fund Based Working Capital Limit	Karnataka Bank Ltd	IND AA/Stable/IND A1+	1700.00
Proposed Fund Based Working Capital Limit	NA	IND AA/Stable/IND A1+	931.30
Proposed Non-Fund Based Working Capital Limit	NA	IND AA/Stable/IND A1+	31000.00
Non-Fund Based Working Capital Limit	EXIM Bank	IND AA/Stable/IND A1+	5000.00

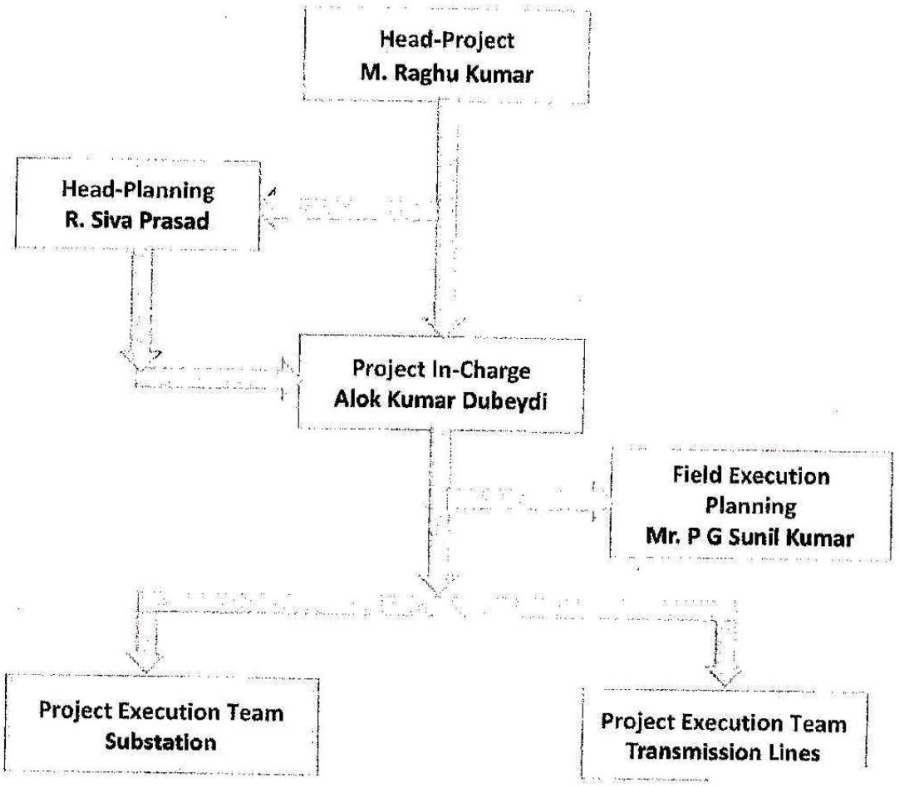
JEWAR TRANSMISSION LIMITED NEW DELHI

Managerial Capability

A) Profile of Key Members of the Project Team:

S.No	Name	Position	Qualification	Area of Expertise	Experience
1	M Raghu Kumar	Project Head (Assoc. Vice President)	MBA	EHV SS, Tr. Lines	32 Years
2	Alok Kumar Dubeydi	In-charge – Project (General Manager)	B.Tech Electrical & MBA in Project Management	EHV SS, Tr. Lines	20 Years
3	R Siva Prasad	Planning Head – Project (Assoc. General Manager)	B.Tech Electrical	EHV SS, Tr. Lines & Distribution	20 Years

B) **Organization chart**



JEWAR TRANSMISSION LIMITED NEW DELHI

Approach & Methodology

(Project Execution and Operation)

Megha Engineering & Infrastructures Limited

1. Brief history of the Company

Megha Engineering & Infrastructures Ltd (MEIL) is a multi-sector infrastructure company with a strong footprint across various sectors like hydrocarbons, electric buses, defence, telecom, power, transport, manufacturing, general and social infrastructure, irrigation, and drinking water. This $5bn company is taking giant strides globally. Leveraging the advantage of its strength in having a diversified portfolio in multifarious sectors, the company has made its presence felt in areas that have been key drivers of growth.

The company began as a fabrication unit with a few employees and has grown into a global engineering and infrastructure conglomerate. The company has, in its 32-year-journey, executed award-winning and record-breaking infrastructure marvels across different realms, and it sure has carved a niche for itself. Making innovation its middle name and adopting internationally proven technology to match Indian conditions, the company has blended technological excellence into its projects, leaving an indelible.

As a result, the MEIL has placed itself in a numero uno position by proving its capabilities in executing several engineering and infrastructure projects in the public and private sectors at a breakneck speed without compromising on quality. The MEIL grew multi-fold by acquiring different companies across the globe, over the years.

2. Vision / Mission

Engineering Excellence, Empowering Lives

MEIL envisions empowering lives through an uncompromising commitment to superior infrastructure. We envision a future where every individual enjoys an enhanced quality of life, driven by our relentless pursuit of excellence in core infrastructure. Fueled by teamwork, respect for new ideas, and a passion for innovation, we incorporate integrity in all we do. Our foundation rests on superior engineering, environmental responsibility, and social impact, propelling us towards a brighter tomorrow.

3. Business Operations

Innovation is at the heart of everything we do, and we are passionate about creating a sustainable and brighter future. In order to deliver cutting-edge technologies, we always welcome technological advancements and be at the forefront of industry trends.

We are into multiple sectors like hydrocarbons, electric buses, communications, power, transport, manufacturing, general and social infrastructure, irrigation and last but not least drinking water

JEWAR TRANSMISSION LIMITED NEW DELHI

4. **Performance**

Megha Engineering & Infrastructures Limited (MEIL) was awarded with 'Best Debutant Award' by Power Grid Corporation of India Limited (PGCIL) upon completion of the project '400/220kV NP Kunta Substation' in merely seven months and PGCIL appreciated the quality standards maintained while executing the project.

Our experience in the installation of power transmission, distribution and substations is made clear by our record-breaking achievements and efficiency in completing projects. MEIL continues to change the future of the energy sector by bringing light to millions of people and by implementing innovative solutions.

5. **Operational Excellence**

Megha Engineering & Infrastructures Limited along with WUPPTCL operates about 694 CKMs of transmission line and EHV GIS & AIS receiving substations as of Jul'2024. MEIL has maintained the transmission system's availability at over 99% consistently.

6. **Project Implementation**

In order to extract the maximum commercial benefits by implementing the transmission projects within the timelines, detailed planning to handle complex projects. Besides regular project review meetings at different levels of the management, have helped to identify any hindrances well in advance to enable timely corrective actions.

7. **Manpower in Different Categories**

MEIL is a people-centric organization having 50,000 plus workforce fulfilling its business strategic objectives in different categories. Our people continuously strive to turn our Vision into reality "to provide a superior quality of life to common man by continuous improvement of core infrastructure".

Our Human Capital Management envisages people are the most important asset and take good care of employees, which includes plans for recruiting top talent, providing career outlook and managing all aspects related the employee life cycle to can ensure workforce is happy, growing and productive.

8. **Organizational set-up of TSP**

Jewar Transmission Limited has been entrusted the responsibility of Project Execution as per schedule timelines and O&M for 35 years.

9. **Project Management**

The project team responsible for execution will comprise of domain experts with project management skills and prior experience of carrying out similar projects. The project will be completed as per

JEWAR TRANSMISSION LIMITED NEW DELHI

applicable rules and regulations as stipulated in the RFP and other applicable codes. The project team will be assisted by Engineering, Quality, Testing and Safety support functions for quality execution within stipulated timelines.

The Project team includes Project Management experts and proven project management tools like Primavera will be used during execution for monitoring & controlling the activities.

10. Project Implementation Review

A robust review mechanism is in place to ensure that project is implemented as per required quality and within scheduled timelines.

A review mechanism comprises of weekly and Fortnightly reviews by Working team and Monitoring team respectively. These teams are constituted with members from Project, Engineering, Testing, Contracts, Quality and Business Associates.

11. Quality Management

Quality assurance will be ensured by a joint team of quality experts of TSP and Business Associates by strict adherence to FQP and MQP and periodic Site quality and Safety audits.

Compliance to observations related to quality and safety shall be ensured.

The TSP shall ensure that design, construction and testing of all equipment facilities, components and systems of the project shall be in accordance with Indian Standards and Codes issued by Bureau of Indian Standards and only in Transmission Service Agreement, Jewar Transmission Limited. In case they are not applicable under certain conditions, the other equivalent internationally recognized Standards and Codes shall be followed.

12. Operation & Maintenance

Megha Engineering & Infrastructures Limited which is the parent company of Western Uttar Pradesh Power Transmission Limited (WUPPTCL), is already maintaining EHV Transmission assets like Transmission Lines, EHV GIS & AIS Substations and Cables and associated equipment and has a pool of skilled human resource with prior experience.

For Jewar Transmission Limited (JTL), after commissioning phase is over, a team will be set up for overlooking the operation & maintenance of the assets for 35 years as per the conditions of the TSA. Support functions like HR, Admin, and Engineering shall be available for the TSP during the O&M phase.

Necessary facilities like local offices, stores facility, spares for GIS & Termination Lines shall be ensured for reliable operation of Transmission System.



DOCUMENTS REQUIRED AS PER REGULATION 3.2.2 OF THE UPERC (GENERAL CONDITIONS OF TRANSMISSION LICENSE) REGULATION NO. UPERC/SECY.-05-931

- In accordance with 3.2.2 of UPERC (General Conditions of Transmission License) regulation No. UPERC/Secy.-05-931, the details of information/documents are as under:

a. The 'Draft Licence' as proposed by the applicant with the name and address of the applicant.

Draft License is enclosed as **Enclosure-2** in **Form I** annexed and marked as **Annexure A-19.**

b. Maps of the proposed area of licence showing the route of the transmission line, locations of sub-stations and such other details as the Commission may specify on a scale of-

i. not less than 10 Centimeters to a Kilometer, or

ii. if no such maps are available, of not less than that of the largest scale ordinance maps available, or

iii. on such other scales as may be approved by the Commission;

Maps of the proposed area of license are enclosed in Detailed Project Report annexed and marked as **Annexure A-25.**

c. A detailed description of the existing transmission network within the licensee's proposed Area of Activity, including the single line diagram of the transmission network along-with a executive summary of the existing facilities, details of other equipment/apparatus in his area including number and details of substations, details of power transformers, a description of the metering mechanism and other relevant details of the system including details of ownership of the said facilities;

The requirement of Transmission Scheme has been evolved by UPPTCL with the project description provided in the bidding documents as under.

The proposed Transmission System is aimed to achieve following objectives,

JEWAR TRANSMISSION LIMITED NEW DELHI

i. Data Centers under construction in Noida/Greater Noida has to be supplied power from two separate sources as per the data center policy approved by the Government.

ii. To provide smooth power supply to the under construction International Airport Jewar.

iii. Proposed high speed train and industrial activities in the area.

iv. To strengthen the existing transmission system to provide a strong secondary source to 220 KV sub-stations.

v. Constriction of 220 kV GIS S/s Cantt Chaukaghat, Varanasi will provide support to 33 kV substation of the distribution area like Chaukaghat, Kashi Vidyapeeth,Municipal corporation, cultural complex, Chaukaghat (S.T.P.), Pandepur (proposed), Dhel Bairiya (proposed) etc.

vi. Construction of 200 Kv GIS S/s Vasundhara (Ghaziabad), will provide support to 33 kV substations of the distribution unit like Vasundhara Sector -2, Sector-7, sector- 8, Sector-10, Sector-16, sector-19 & sector-16 (old) etc.

vii. Construction of 220 kV S/s Khaga (Fatehpur) will provide second source to 132 kV Hussainganj S/s and 33kV sub-stations of PuVVNL such as Thariav, Ashothar, Jaroli, Mahichamandir, Haswa, Faridpur, Naraini & Dharampursato etc.

The detailed scope of the project is as follows,

Sr. No.	Name of Transmission Element	SCOD in months from Effective Date
A. Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar (Gautam Budh Nagar) with Associated lines		
1.	Construction of 400/220 kV, 2x500MVA GIS substation Jewar (Gautam Budh Nagar) (along with 125MVAR reactor) 400 kV GIS feeder bay- 02 Nos. 400 kV GIS Bus Coupler bay - 01 No. 400 kV GIS Bus reactor bay - 01 No. 400 kV GIS ICT bay - 02 Nos.	18 Months

JEWAR TRANSMISSION LIMITED NEW DELHI

	220 kV GIS feeder bay - 02 Nos. 220 kV GIS Bus Coupler bay - 01 No. 220 kV GIS ICT bay- 02 Nos. 220 kV GIS Interconnecting (220 kV S/S Jewar) bay- 02 Nos. 220 kV GIS Feeder (220 kV S/S Sector-28 YEIDA) bay - 02 Nos.	
2.	LILO of one ckt of 400 kV Greater Noida (765 kV) - Sector-148 (400), Noida DC line at 400/220 kV GIS Substation Jewar (Gautam Budh Nagar) (for LILO, twin HTLS conductor and OPGW stringing work on narrow base multi circuit towers)	
B. Construction of 220/33 kV, 2x60 MVA GIS substation Cantt, (Chaukaghat) Varanasi with associated lines		
1.	Construction of 220/33 kV, GIS Substation Cantt, (Chaukaghat) Varanasi 220 kV GIS feeder bay- 02 Nos. 220 kV GIS Bus Coupler bay - 01 No. 220 kV GIS ICT bay- 02 Nos. 33 kV GIS feeder bay - 12 Nos. 33 kV GIS Transfer Bus Coupler bay – 01 No. 33 kV GIS ICT bay - 02 Nos.	18 Months
2.	LILO of one ckt, of 220 kV Satnath (400)Gajokhar DC line at Cantt. (Chaukaghat) Varanasi construction of 41.5 Km (37 Km overhead line (Zebra Conductor) on Lattice Tower and construction of 4.5 Km 630 mm2 line with copper XLPE cable.	
C. Construction of 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad) with associated lines		
1.	Construction of 220/33 kV GIS substation Vasundhara (Ghaziabad) 220 kV GIS feeder bay- 03 Nos. 18 Months	18 Months

JEWAR TRANSMISSION LIMITED NEW DELHI

	220 kV GJS feeder bay (spare) - 01 No. 220kV GIS Bus Coupler Bay- 01 No. 220 kV GJS JCT bay - 03 Nos. 33 kV GJS feeder bay -10 Nos. 33 kV GIS Transfer Bus Coupler bay – 01 No. 33 kV GIS bus sectionalized bay - 02 Nos. 33 kV capacitor bank bay (1x10 MVAR)- 03 Nos. 33 kV GIS ICT bay- 03 Nos. 33/0.4 kV Station transformer bay- 02 Nos.	
2.	LILO of one ckt, of 220 kV Muradnagar (400)Sahibabad (220) SC line at 220 kV Substation Vasundhara (Ghaziabad) (Multi Ckt. / Monopole Tower) (Zebra conductor)	
3.	220 kV Indirapuram (400) - Vasundhara SC line (Monopole and Narrow base multi circuit tower)	
D. Construction of220/132/33 kV, 2x160+2x40 MVA Substation Khaga (Fatehpur) with associated lines		
1	Construction of 220/132/33 kV, Substation 1 8 Months Khaga (Fatehpur) 220 kV feeder bay - 02 Nos. 220 kV spare feeder bay - 02 Nos. 220 kV bus coupler - 01 No. 220 kV transfer bus coupler - 01 No 220 kV JCT bay - 02 Nos. 132 kV feeder bay - 03 Nos. 132 kV spare feeder bay - 01 No. 132 kV bus coupler - 01 No. 132 kV transfer bus coupler - 01 No. 132 kV JCT bay- 04 Nos. 33 kV Feeder Bay- 07 Nos. 33 kV Transfer Bus Coupler bay - 01 No. 33 kV ICT bay - 02 Nos.	18 Months

JEWAR TRANSMISSION LIMITED NEW DELHI

2	220 kV Fatehpur (765) PG -Khaga DC line (Zebra Conductor)	
3	132 kV Khaga (220) - Khaga DC line	
4	132 kV Khaga (220) - Hussainganj SC line	
5	132 kV Bay 132 kV Substation Khaga-02 Nos.	
6	132 kV Hybrid Bay at 132 kV substation Hussainganj-01 No.	

d. A detailed project report in relation to the construction, operation and maintenance of the transmission system proposed to be undertaken by the Applicant;

The Detailed Project Report is annexed and marked as **Annexure A-25.**

e. A list of all the local authorities vested with the administration of any portion in the proposed Area of Licence;

1 Revenue Department, Govt. of Uttar Pradesh
2 Dept. of Energy, Govt. of Uttar Pradesh
3 Greater Noida Industrial Development Authority
4 National Highway Authority of India
5 Public Works Department, Govt. of Uttar Pradesh
6 Ministry of Railways, Govt. of India
7 Power and Telecom Coordination Committee
8 Ministry of Civil Aviation, Govt. of India
9 Central Transmission Utility and State Transmission Utility
10 Ministry of Environment and Forest Clearance
11 Central Electricity Authority
12 All Municipal Corporation and village Panchayat falling under area of work
13 Inland Waterway Authority of India, Ministry of Shipping, GoI
14 Ministry of Defence

JEWAR TRANSMISSION LIMITED NEW DELHI

15 Any other relevant Authority required for Development, Financing, Construction, maintaining/ renewing all such Consents and Clearances/ Permit in order to carry out obligation under TSA.

f. An approximate statement describing any land which the applicant proposes to acquire for the purpose of the Licensed Business and the means of such acquisition;

i. UPPTCL to provide adequate land for construction of 400/220 kV, 2x500 MVA GJS Substation at Jewar (Gautam Budh Nagar) free of cost and shall be handed over to TSP as is where basis.

ii. UPPTCL to provide adequate land for construction of 220/33 kV, 2x60 MVA GJS substation at Cantt, (Chaukaghat) Varanasi free of cost and shall be handed over to TSP as is where basis.

iii. UPPTCL to provide adequate land for construction of 220/33 kV, 3x60 MVA GIS substation at Vasundhara (Ghaziabad) free of cost and shall be handed over to TSP as is where basis.

iv. UPPTCL to provide adequate land for construction of 220/132/33 kV, 2x160+2x40 MVA Substation at Khaga (Fatehpur) free of cost and shall be handed over to TSP as is where basis.

g. An approximate statement of the capital proposed to be expended in the Area of License and such other particulars as the Commission may require;

The estimated project cost of the project is about Rs. 713.7/- Cr as per the estimate provided as part of the bidding process. The actual cost may however be known after completion of the project.

JEWAR TRANSMISSION LIMITED NEW DELHI

h. **Relevant information pertaining to the availability of adequate number of competent personnel to construct, operate and maintain the transmission system**

effectively and efficiently, the availability of infrastructure facilities and the financial capacity to carry out the project;

The details are annexed and marked as **Annexure A-23(Colly).**

i. **A copy of the Memorandum and Articles of Association, if the applicant is a body corporate and similar constitutional documents in all other cases;**

The details are enclosed as **Annexure A-5** of the original application/petition.

j. **The application for grant of licence for intra-state transmission, along with annexures and enclosures thereto, shall also be submitted to the Commission on a compact disc (CD).**

(Enclosed with the Application)



Detailed Project Report

CONSTRUCTION OF 400/220 KV, 2X500 MVA GIS SUBSTATION JEWAR, 220/33 KV, 2X60 MVA GIS SUBSTATION CANTT (CHAUKAGHAT) VARANASI, 220/33 KV, 3X60 MVA GIS SUBSTATION VASUNDHARA (GHAZIABAD), 220/132/33 KV, 2X160+2X40 MVA SUBSTATION KHAGA (FATEHPUR) WITH ASSOCIATED LINES

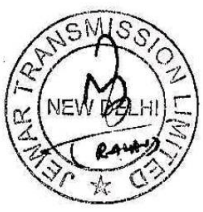
1. Project Details

1.1 Introduction

UP Power Transmission Corporation Limited (UPPTCL) has placed Letter of Intent (LoI) dated 23.02.2023 for appointing PFC Consulting Limited (PFCCL) to be the Bid Process Coordinator (BPC) for the purpose of selection of Bidder as Transmission Service Provider (TSP) to establish Intra-State transmission system for **"Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated lines"** through tariff based competitive bidding process.

The BPC hereby invites Bids from all prospective Bidders in accordance with this Request for Proposal (RFP) to select prospective Transmission Service Provider (TSP) in accordance with the "Tariff Based Competitive-Bidding Guidelines for Transmission Service" and "Guidelines for Encouraging Competition in Development of Transmission Projects" issued by Government of India, Ministry of Power under Section – 63 of the Electricity Act. The BPC shall select the Bidder having the prescribed technical and financial capability to become TSP and be responsible for establishing the Project in the state(s) of Uttar Pradesh. The TSP will make the Project available against payment of Transmission Charges, as adopted by the Commission, payable to the TSP, as per provisions of Transmission Service Agreement.

1.2 The TSP will be required to establish the following Inter State Transmission System for **Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar, 220/33 kV, 2x60 MVA GIS substation Cantt (Chaukaghat) Varanasi, 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad), 220/132/33 kV, 2x160+2x40 MVA substation khaga (Fatehpur) with associated lines** (hereinafter referred to as 'Project') on build, own, operate and transfer basis, and to provide transmission service.



S. No	Name of the Transmission Element	Scheduled COD from Effective Date
A.	**Construction of 400/220 kV, 2x500 MVA GIS Substation Jewar (Gautam Budh Nagar) with Associated lines**	
1	Construction of 400/220 kV, 2×500MVA GIS substation Jewar (Gautam Budh Nagar) (along with 125MVAR reactor) • 400 kV GIS feeder bay – 02 Nos. • 400 kV GIS Bus Coupler bay – 01 No. • 400 kV GIS Bus reactor bay – 01 No. • 400 kV GIS ICT bay – 02 Nos. • 220 kV GIS feeder bay – 02 Nos. • 220 kV GIS Bus Coupler bay – 01 No. • 220 kV GIS ICT bay – 02 Nos. • 220 kV GIS Interconnecting (220 kV S/S Jewar) bay – 02 Nos. • 220 kV GIS Feeder (220 kV S/S Sector-28 YEIDA) bay – 02 Nos.	18 Months
2	LILO of one ckt. of 400 kV Greater Noida (765 kV) – Sector -148 (400), Noida DC line at 400/220 kV GIS Substation Jewar (Gautam Budh Nagar) (for LILO, twin HTLS conductor and OPGW stringing work on narrow base multi circuit towers)	
B.	**Construction of 220/33 kV, 2x60 MVA GIS substation Cantt, (Chaukaghat) Varanasi with associated lines**	
1	Construction of 220/33 kV, GIS Substation Cantt, (Chaukaghat) Varanasi • 220 kV GIS feeder bay – 02 Nos. • 220 kV GIS Bus Coupler bay – 01 No. • 220 kV GIS ICT bay – 02 Nos. • 33 kV GIS feeder bay – 12 Nos. • 33 kV GIS Transfer Bus Coupler bay – 01 No. • 33 kV GIS ICT bay – 02 Nos.	18 Months
2	LILO of one ckt, of 220 kV Satnath (400)- Gajokhar DC line at Cantt.(Chaukaghat) Varanasi construction of 41.5 Km (37 Km overhead line (Zebra Conductor) on Lattice Tower and construction of 4.5 Km 630 mm^2 line with copper XLPE cable	
C	**Construction of 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad) with associated lines**	
1	Construction of 220/33 kV GIS substation Vasundhara (Ghaziabad) • 220 kV GIS feeder bay – 03 Nos. • 220 kV GIS feeder bay (spare) – 01 No. • 220kV GIS Bus Coupler Bay- 01 No. • 220 kV GIS ICT bay – 03 Nos. • 33 kV GIS feeder bay – 10 Nos. • 33 kV GIS Transfer Bus Coupler bay – 01 No. • 33 kV GIS bus sectionalized bay – 02 Nos. • 33 kV capacitor bank bay (1x10 MVAR)– 03 Nos. • 33 kV GIS ICT bay – 03 Nos. • 33/0.4 kV Station transformer bay – 02 Nos.	18 Months

JEWAR TRANSMISSION LIMITED NEW DELHI

2	LILO of one ckt, of 220 kV Muradnagar(400)- Sahibabad (220) SC line at 220 kV Substation Vasundhara (Ghaziabad) (Multi Ckt. / Monopole Tower) (Zebra conductor)	
3	220 kV Indirapuram (400) – Vasundhara SC line (Monopole and Narrowbase multi ciruit tower)	
D	**Construction of 220/132/33 kV, 2x160+2x40 MVA Substation Khaga (Fatehpur) with associated lines**	
1	Construction of 220/132/33 kV, Substation Khaga (Fatehpur) • 220 kV feeder bay – 02 Nos. • 220 kV spare feeder bay – 02 Nos. • 220 kV bus coupler – 01 No. • 220 kV transfer bus coupler – 01 No • 220 kV ICT bay – 02 Nos. • 132 kV feeder bay – 03 Nos. • 132 kV spare feeder bay – 01 No. • 132 kV bus coupler – 01 No. • 132 kV transfer bus coupler – 01 No • 132 kV ICT bay – 04 Nos. • 33 kV Feeder Bay – 07 Nos. • 33 kV Transfer Bus Coupler bay – 01 No. • 33 kV ICT bay – 02 Nos.	18 Months
2	220 kV Fatehpur (765) PG -Khaga DC line (Zebra Conductor)	
3	132 kV Khaga (220) – Khaga DC line	
4	132 kV Khaga (220) — Hussainganj SC line	

Note:

1. *UPPTCL to provide adequate land for construction of 400/220 kV, 2x500 MVA GIS Substation at Jewar (Gautam Budh Nagar) free of cost and shall be handed over to TSP as is where basis.*
2. *UPPTCL to provide adequate land for construction of 220/33 kV, 2x60 MVA GIS substation at Cantt, (Chaukaghat) Varanasi free of cost and shall be handed over to TSP as is where basis.*
3. *UPPTCL to provide adequate land for construction of 220/33 kV, 3x60 MVA GIS substation at Vasundhara (Ghaziabad) free of cost and shall be handed over to TSP as is where basis.*
4. *UPPTCL to provide adequate land for construction of 220/132/33 kV, 2x160+2x40 MVA Substation at Khaga (Fatehpur) free of cost and shall be handed over to TSP as is where basis.*
5. *02 Nos., 220 kV Bay at Fatehpur (765) PG shall be under scope of developer.*
6. *02 Nos., 132 kV Bay at 132 kV S/s Khaga shall be under scope of developer.*
7. *01 No., 132 kV Hybrid Bay at 132 kV S/s Husainganj shall be under scope of developer.*

1.3 Project Description

- Data Centers under construction in Noida/Greater Noida has to be supplied power from two separate sources as per the data center policy approved by the Government.

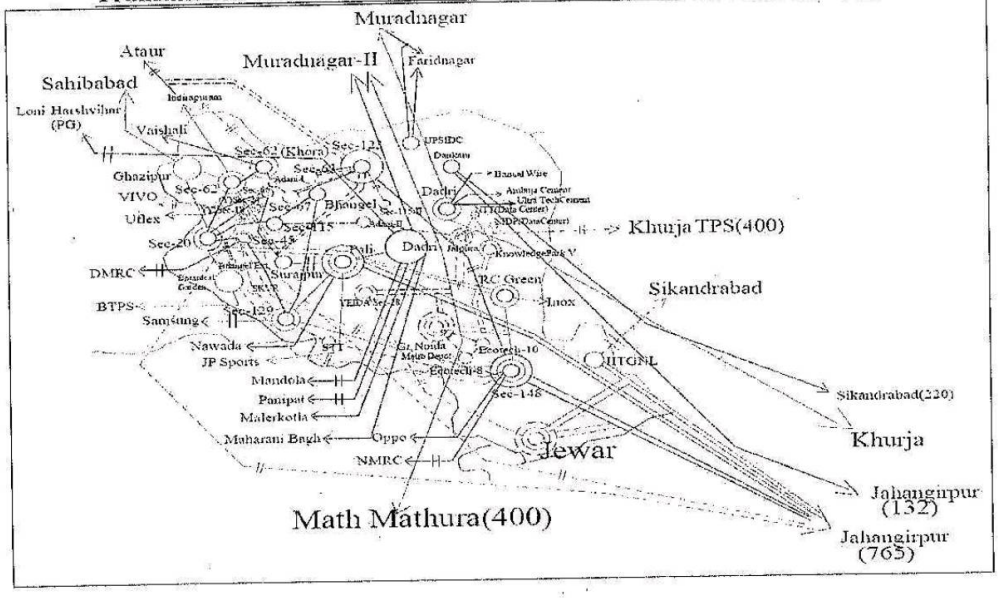


- To provide smooth power supply to the under construction International Airport Jewar.
- Proposed high speed train and industrial activities in the area.
- To strengthen the existing transmission system to provide a strong secondary source to 220 KV sub-stations.
- Constriction of 220 kV GIS S/s Cantt Chaukaghat, Varanasi will provide support to 33 kV substation of the distribution area like Chaukaghat, Kashi Vidyapeeth,Municipal corporation, cultural complex, Chaukaghat (S.T.P.), Pandepur (proposed), Dhel Bairiya (proposed) etc.
- Construction of 200 Kv GIS S/s Vasundhara (Ghaziabad), will provide support to 33 kV sub-stations of the distribution unit like Vasundhara Sector -2, Sector-7, sector- 8, Sector-10, Sector-16, sector-19 & sector-16 (old) etc.
- Construction of 220 kV S/s Khaga (Fatehpur) will provide second source to 132 kV Hussainganj S/s and 33kV sub-stations of PuVVNL such as Thariav, Ashothar, Jaroli, Mahichamandir, Haswa, Faridpur, Naraini & Dharampursato etc.

1.4 Transmission Grid Map

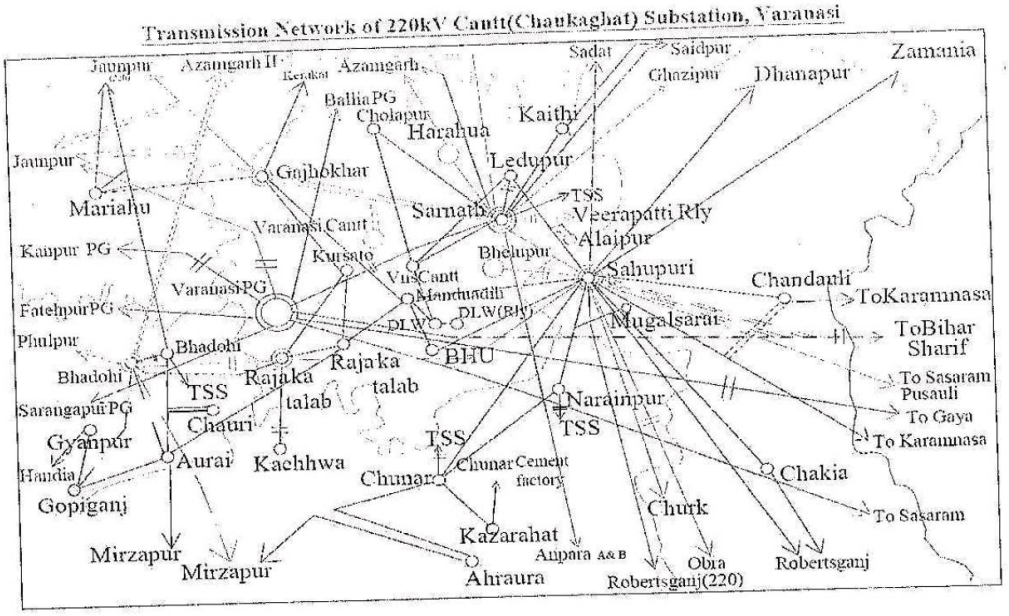
Transmission Grid Map indicating the location of the Project is enclosed for information and reference.

Transmission Network of 400kV Jewar Substation(Gautam Budh Nagar)

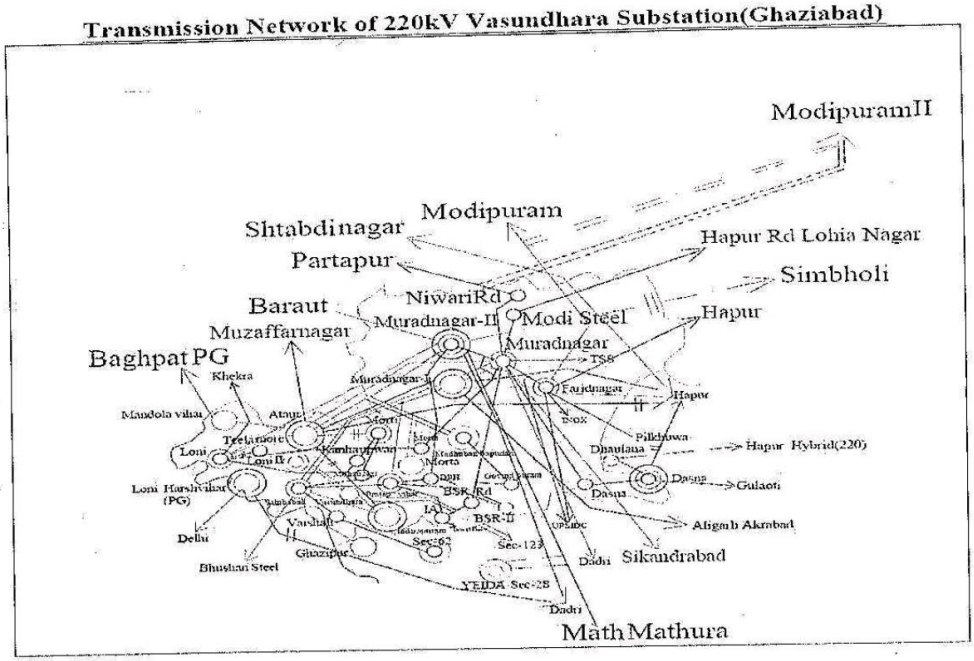




Transmission Network of 220kV Cantt(Chaukaghat) Substation, Varanasi

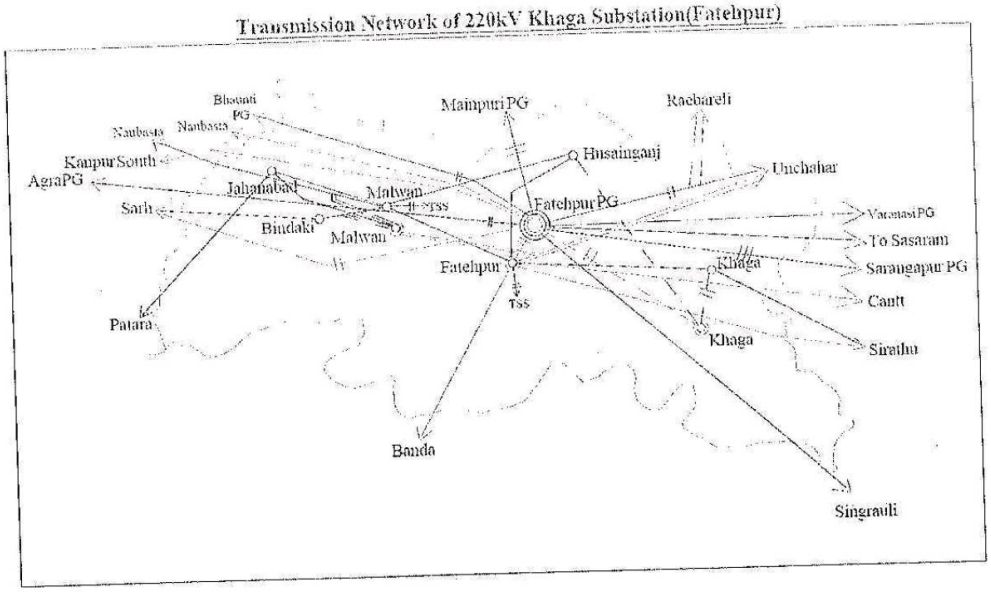


Transmission Network of 220kV Vasundhara Substation(Ghaziabad)



JEMAR TRANSMISSION LIMITED
NEW DELHI

Transmission Network of 220kV Khaga Substation(Fatehpur)



2. Estimated Project Cost:

The estimated Project Cost is about Rs. 791.81 Cr as per the estimate provided as part of the bidding process. The actual cost may however be known after completion of the project.

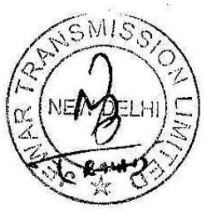
3. Project Approval and payment of Transmission charges:

3.1 Approval u/s 68

Vide Energy department letter dated 16.02.2024 approval of the Government of Uttar Pradesh under Section 68 of the Electricity Act, 2003 for the subject project has been furnished by BPC (copy of approval u/s 68 is enclosed)

3.2 Payment of Transmission Charges

As per the Schedule-10 of Transmission Service Agreement (TSA) provided by BPC, Transmission Charges are payable to TSP by Long Term Transmission Customers (LTTCs) in proportion mentioned therein. Details of the Long Term Transmission Customers along with the percentage of Transmission charges as provided in the bidding document are as below.



S.No	Name of the Long Term Transmission Customer	Address of Registered Office	Allocated Project Capacity (in %)
1	Paschimanchal Vidyut Vitran Nigam Ltd.	Hydel Colony, Victoria Park, Meerut-250001 E-mail: md@pvvnl.org Fax: 0121-2666062 Phone: 0121-2665734	31%
2	Madhyanchal Vidyut Vitran Nigam Ltd.	4A Gokhale Marg, Lucknow-226001 E-mail: md.mvvnl2010@gmail.com Fax: 0522-2208769 Phone: 0522-2208737	21%
3	Purvanchal Vidyut Vitran Nigam Ltd.	Vidyut Nagar, Bhikharipur, P.O. DLW, Varanasi-221010 E-mail: mdpurvanchalvvnl@gmail.com Fax: 0542-2319158 Phone: 0542-2318437	24%
4	Dakshinanchal Vidyut Vitran Nigam Ltd.	Urja Bhawan, NH-2 (AgraDelhi bypass Road) Sikandra Agra-282002 E-mail: dvvnlmd@gmail.com Fax: 0562-2605465 Phone: 0562-2605699	21%
5	Kanpur Electricity Supply Co. Ltd.	Kesa House, 14/17 Civil Lines, Kanpur – 208001 E-mail: md@kesco.co.in Phone: 0512-2530832	3%

3.3 Holding Company – Megha Engineering and Infrastructures Limited

Megha Engineering & Infrastructures Limited holding company of WUPPTCL operates about 694 CKMs of transmission lines 765/400kV and EHV GIS & AIS substations as of Jul'2024. WUPPTCL has maintained the transmission system's availability at over 99% consistently.

Megha Engineering & Infrastructures Limited (MEIL) was awarded with 'Best Debutant Award' by Power Grid Corporation of India Limited (PGCIL) upon completion of the project '400/220kV NP Kunta Substation' in merely seven months and PGCIL appreciated the quality standards maintained while executing the project.

Our experience in the installation of power transmission, distribution and substations is made clear by our record-breaking achievements and efficiency in completing projects. MEIL continues to change the future of the energy sector by bringing light to millions of people and by implementing innovative solutions.



4. Geographical Information of proposed area of utility

4.1 Location

Jewar - Gautam Buddha Nagar

Jewar is a town and a Nagar Panchayat in Gautam Buddha Nagar district in the Indian state of Uttar Pradesh. Noida, Dadri and Jewar are the 3 sub-divisions of GB Nagar district. Greater Noida is the administrative headquarters of Gautam Buddha Nagar district. Noida, Greater Noida, Dadri, Jewar and Dankaur fall under this district Industry.

Geography

Jewar is located at 28.12°N 77.33°E. It has an average elevation of 195 metres (640 ft). It is located between 28.13° north latitude and 77.55° east longitude at an elevation of 195 metres (640 ft). It is on the northeast bank of the Yamuna River.

It is located in the outskirts of Greater Noida, the district headquarters. It is about 60 km (37 mi) from Noida, 40 km (25 mi) from Greater Noida, 33 km (21 mi) from Gautam Buddha University and 35 km (22 mi) from Khair.

Varanasi

Varanasi or Benaras or Kashi is a city located at in the middle-Ganges valley in the southeastern part of the state of Uttar Pradesh, Varanasi lies on the left bank of the river. It is 692 kilometres (430 mi) to the southeast of India's capital New Delhi and 320 kilometres (200 mi) to the southeast of the state capital, Lucknow. It lies 121 kilometres (75 mi) downstream of Prayagraj, where the confluence with the Yamuna river.

Geography

Varanasi is located at 25°19′08″N 83°00′46″E. It has an elevation of 80.71 metres (264.8 ft) in the centre of the Ganges valley of North India, in the Eastern part of the state of Uttar Pradesh, along the left crescent-shaped bank of the Ganges, averaging between 15 metres (50 ft) and 21 metres (70 ft) above the river. The city is the headquarters of Varanasi district. By road, Varanasi is located 797 kilometres (495 mi) south-east of New Delhi, 320 kilometres (200 mi) south-east of Lucknow, 121 kilometres (75 mi) east of Prayagraj, and 63 kilometres (39 mi) south of Jaunpur.

Ghaziabad

Vasundhara is a township within the jurisdiction of U.P. Housing & Development Board Ghaziabad Circle (Vasundhara Zone) in Ghaziabad District of Uttar Pradesh, India. It falls in Delhi's National Capital Region. Ghaziabad is a city in the Indian state of Uttar Pradesh and a

JEWAR TRANSMISSION LIMITED NEW DELHI

part of Delhi NCR. It is the administrative headquarters of Ghaziabad district and is the largest city in Western Uttar Pradesh.

Geography

Ghaziabad is located at the coordinates 28.67°N 77.42°E District Ghaziabad on the western edge of Uttar Pradesh, is located between Ganges and Yamuna, the two main rivers of the country, and between 770 to 780, Eastern Longitude and 280 to 290 North latitudes. The boundaries of this district are in Meerut and Baghpat in the north, Gautam Buddha Nagar and Bulandshahr in the south, Hapur in the east and cross Yamuna river in the west and meet the boundaries of Delhi region and Haryana. Due to well connected from Delhi, the main road of entry into Uttar Pradesh, Ghaziabad is said to be the gateway of Uttar Pradesh. The Geographical Area of District Ghaziabad is 777.9 sq km on the basis of 2011 census.

Khaga

Khaga is a Town and a Sub-district in Fatehpur district in the Indian state of Uttar Pradesh. It is situated on NH 19 between the cities of Prayagraj and Kanpur. Fatehpur is a city in the state of Uttar Pradesh, India. Situated between the rivers Ganga and Yamuna, the city is named after Babu Fateh Chandra, who helped Rani Lakshmi Bai in the freedom struggle. It is located 120 km (75 mi) south of the state capital Lucknow

Geography

Khaga is located at 25.78°N 81.12°E has an average elevation of 107 metres (351 feet). Fatehpur is located at 25.93°N 80.8°E. It has an average elevation of 110 metres (360 feet). Kanpur Airport is the nearest airport which is about 70 kilometres away. Allahabad Airport is the second nearest airport about 117 kilometres away.

4.2 Climate of Uttar Pradesh

Within the Indian state of Uttar Pradesh, there are many climates. The predominant climate type is humid subtropical with dry winters, with semiarid conditions in some areas of U.P.

Throughout the year, the temperature changes. In many areas, the extreme low and high temperatures are often between 0°C and 50°C.

4.3 Types of Soil

Soil, consisting of inorganic particles and organic matter, is the fertile alluvium soil of Aligarh district is brought by Ganga and Yamuna rivers. The older alluvium soils cover maximum area in Aligarh and their texture varies from good quality to sandy. This is the most fertile soil and

JAIWAR TRANSMISSION LIMITED NEW DELHI

maximum cultivation of crops is in this area. In Kannuaj district, the soil is White Sand Mix. Though the soil is little sandy but highly fertile and was used for farming of Potatoes, Mustard, Wheat, Maize, etc.

4.4 Agriculture:

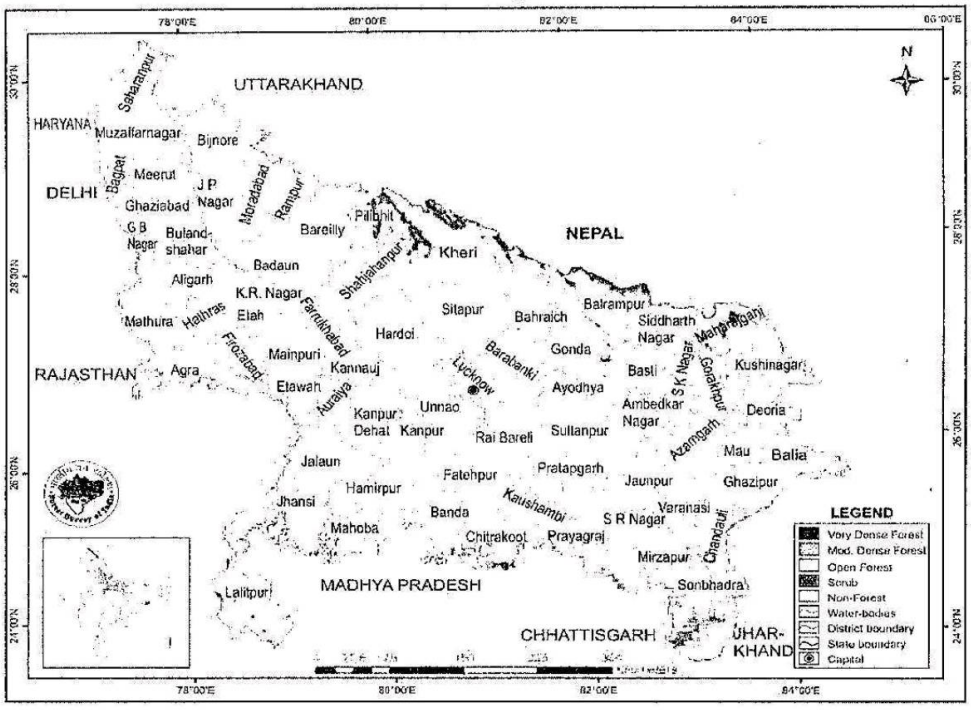
There are major crops include Pulses, Wheat, Rice, Oil seeds, Potatoes, Mustard, Maize.

4.5 Minerals found in Uttar Pradesh:

There are no minerals found in within the proposed substation and route corridor.

4.6 Reserved / Protected Forest area:

As per the attached Forest map of Uttar Pradesh, the proposed Substation area and route of Transmission Lines does not fall in any Reserved / Protected Forest Area.

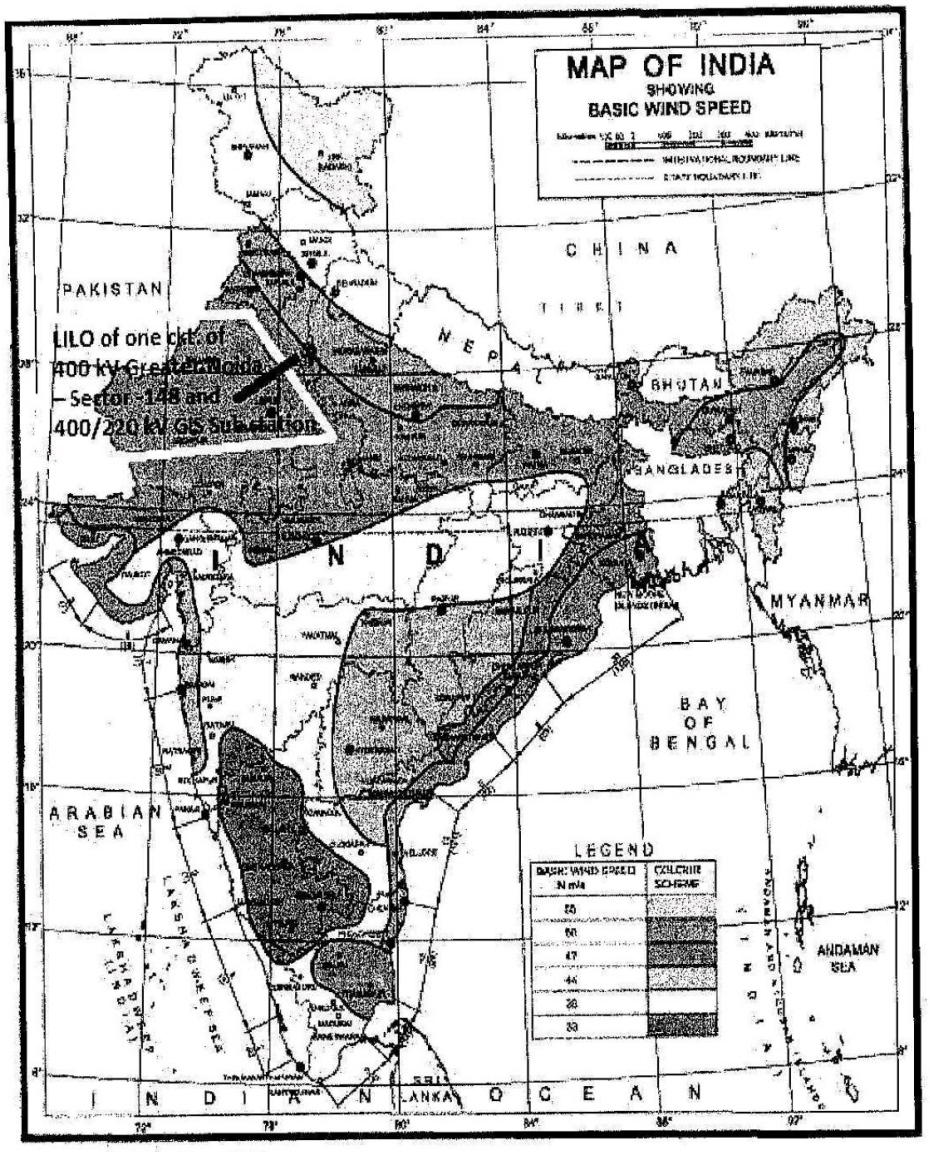


NEW DELHI

4.7 Details of Wind Zone

A. Jewar Substation and Connecting lines

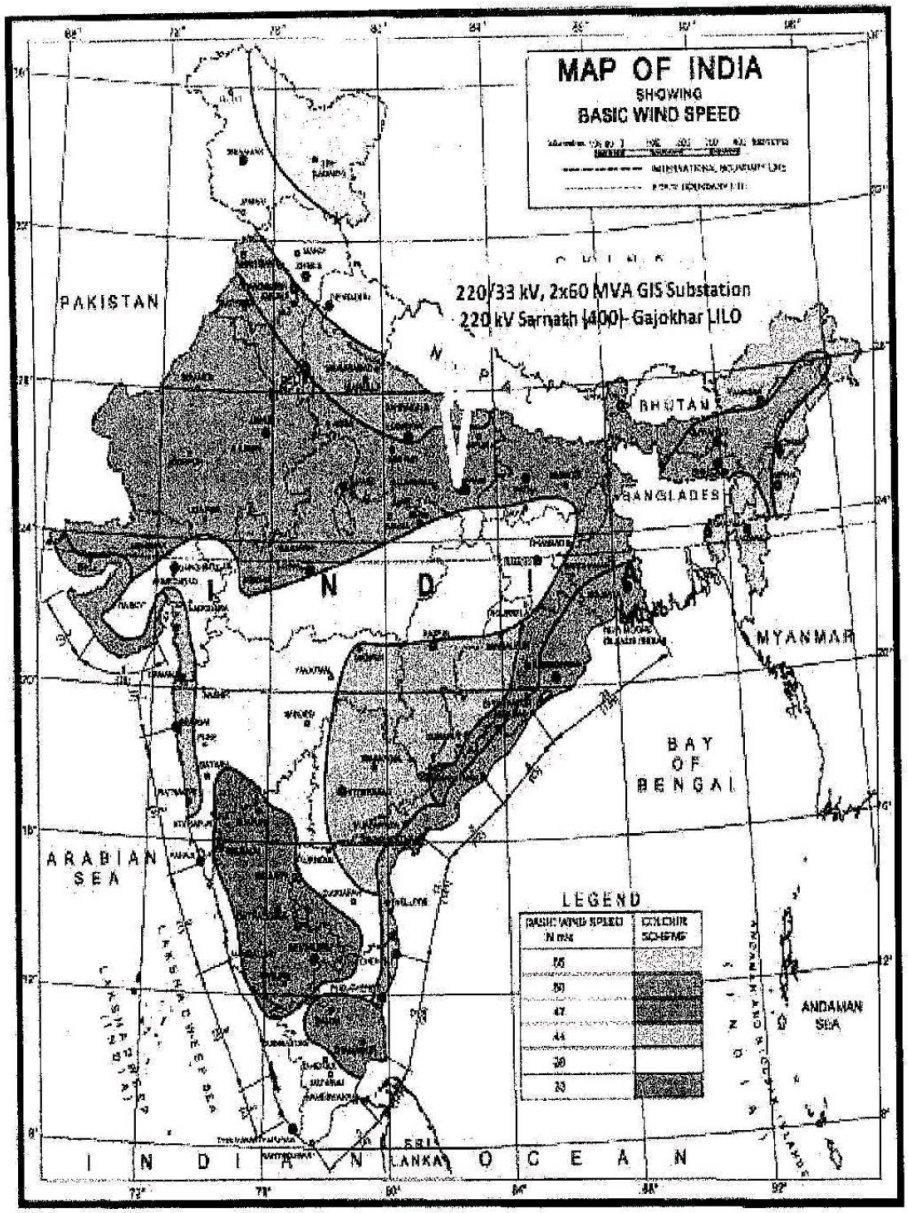
The proposed Substation and Transmission Lines of this project are falling under Wind Zone-IV (47m/s) as per Wind map given.



JEWAR TRANSMISSION LIMITED
NEW DELHI

B. Varanasi SS and Connecting Lines

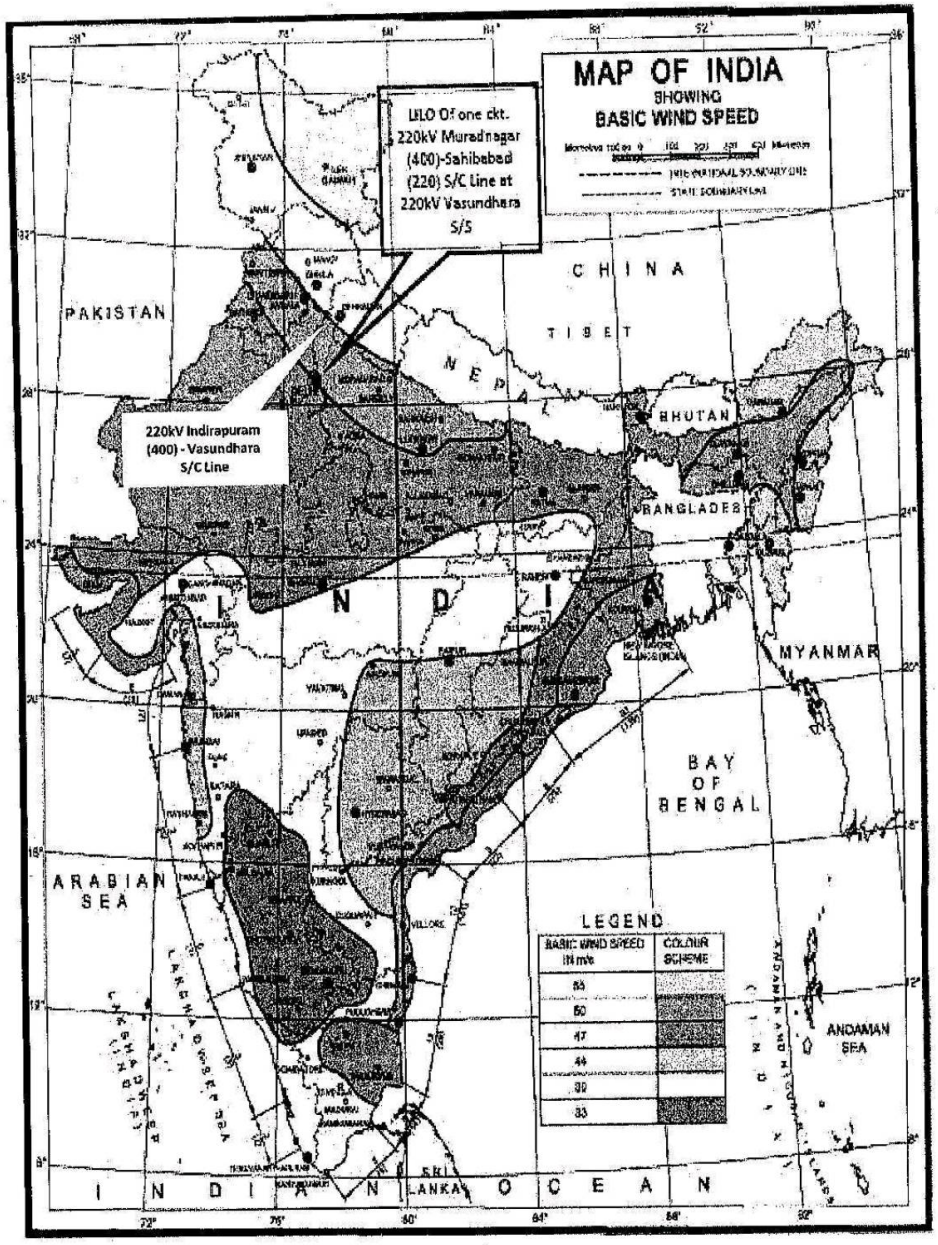
The proposed Substation and Transmission Lines of this project are falling under Wind Zone-IV (47m/s) as per Wind map given.



JEWAR TRANSMISSION LIMITED
NEW DELHI

C. Vasundhara SS & Connecting Lines

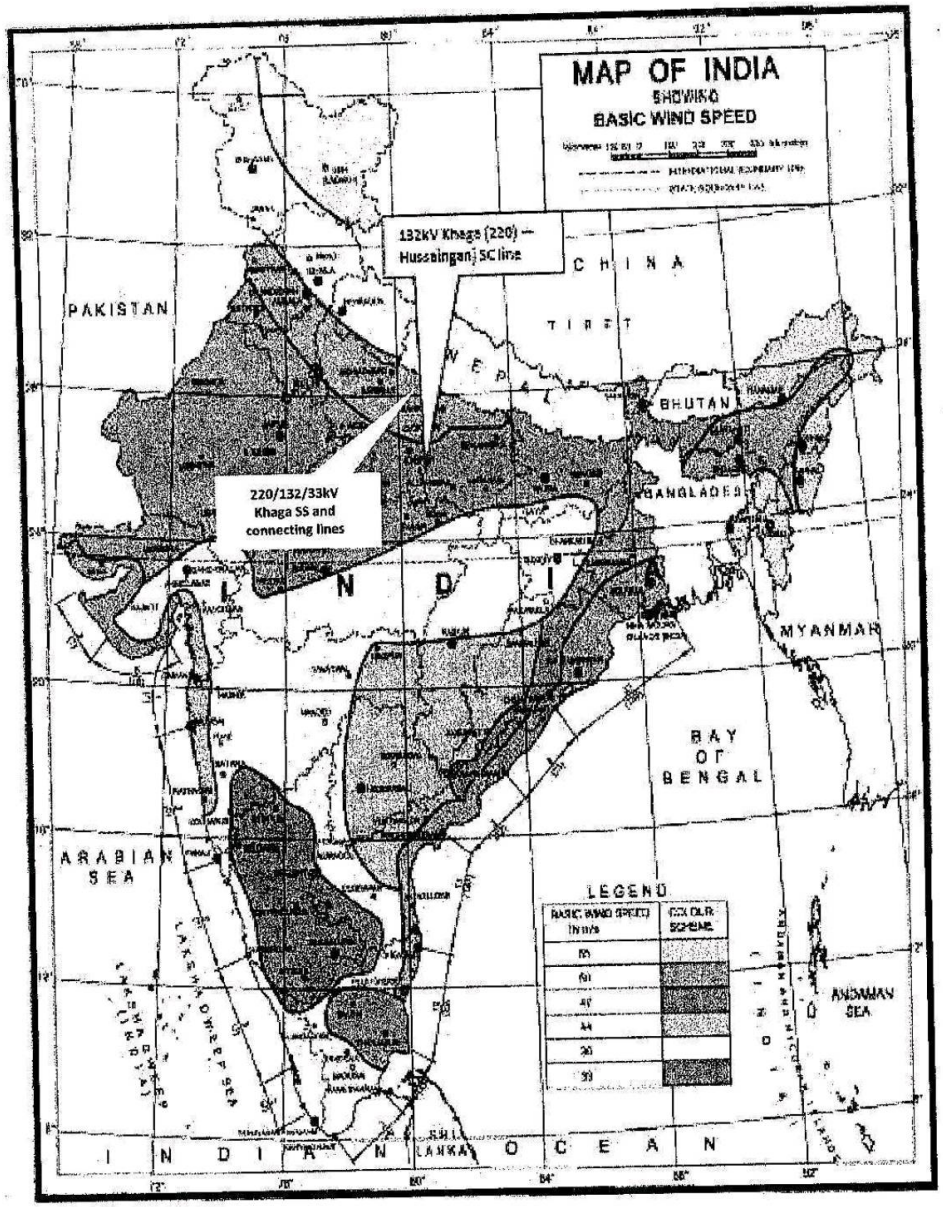
The proposed Substation and Transmission Lines of this project are falling under Wind Zone-V (50m/s) as per Wind map given.



JEWAR TRANSMISSION LIMITED
NEW DELHI

D. Khaga SS & Connecting Lines

The proposed Substation and Transmission Lines of this project are falling under Wind Zone-IV (47m/s) as per Wind map given



JEMAR TRANSMISSION LIMITED
NEW DELHI

5. Methodology of Survey and Route Identification

As per the survey report of BPC, all the Survey of India TOPO sheets were geo-referenced with respect to Latitude Longitude of TOPO sheets under following projection system to keep uniformity with respect to GPS co-ordinates. Survey of India TOPO sheets on 1:50,000 scale.

1. Projection : UTM
2. Spheroid : WGS84
3. Datum : WGS84
4. Zone : 43, 44
5. North or South : North

These were used to update the base map features extracted from TOPO sheets. The features extracted from SOI TOPO sheets.

- City and village sprawl
- Contours
- Spot Heights and Bench Marks
- Railway lines (MG/BG)
- Metalled Roads (National/State Highways),
- Major Rivers (width > 500 m)
- Canals
- Nallah/Drain crossings
- Forest (Reserved/Protected)
- Protected areas (Cantonments, Air fields)
- Main power lines (EHV) and other electrical power lines
- Telephone lines
- Angle points
- Lakes, Reservoirs and Ponds
- Swamp

5.1 Selection Criteria for Transmission Line Route

1. The alignment of the transmission line should be most economical from the point of view of construction and maintenance.



2. The alignment of the transmission line selected should be the shortest possible one.
3. Routing of transmission line through protected/reserved forest area should be avoided. In case it is not possible to avoid the forests or areas having large trees completely, and then keeping in view of the overall economy, the route should be aligned in such a way that cutting of trees is minimums.
4. The route should have minimum crossings of Major rivers, Railway lines, National/State highways, overhead EHV power line and communication lines.
5. The number of angle points shall be kept to a minimum.
6. Marshy and low lying areas, river beds and earth slip zones shall be avoided to minimize risk to the foundations.
7. It would be preferable to utilize level ground for the alignment.
8. Crossing of power lines shall be minimums. Alignment will be kept at a minimum distance of 300 m from power lines to avoid induction problems on the lower voltage lines.
9. Crossing of communication line shall be minimized and it shall be preferably at right angle. Proximity and parallelism with telecom lines shall be eliminated to avoid danger of induction to them.
10. Areas subjected to flooding such as nalla shall be avoided.
11. Restricted areas such as civil and military airfield shall be avoided. Care shall also be taken to avoid aircraft landing approaches.
12. All alignment should be easily accessible both in dry and rainy seasons to enable maintenance throughout the year.
13. Certain areas such as quarry sites, tea, tobacco and saffron fields and rich plantations, gardens & nurseries which will present the Owner problems in acquisition of right of way and way leave clearance during construction and maintenance should be avoided.
14. Angle points should be selected such that shifting of the point within 100 m radius is possible at the time of construction of the line.
15. The line routing should avoid large habitations, densely populated areas, Forest, Animal/Bird sanctuary, reserve coal belt areas, oil pipe line/underground inflammable pipe lines etc. to the extent possible.
16. The areas requiring special foundations and those prone to flooding should be avoided.

5.2 Based on the information provided by BPC as per their survey report, details of infrastructure along the selected route and location of substations is as follows.

JEWAR TRANSMISSION LIMITED NEW DELHI

5.2.1 400/220 kV, 2×500MVA GIS substation Jewar (Gautam Budh Nagar)

S. No.	Criterion	Site-I
1.0	Land Co-ordinates	
a)	Corner 1	28°13'23.00"N, 77°36'38.34"E
b)	Corner 2	28°13'22.94"N, 77°36'45.49"E
c)	Corner 3	28°13'19.67"N, 77°36'38.26"E
d)	Corner 4	28°13'19.62"N, 77°36'45.68"E
1.1	Size (Acre) (Mtr x Mtr)	5 Acre (100x200)
1.2	Govt. /Private/Forest land	Govt.
1.3	Agriculture/Waste land	Agriculture Land
1.4	Development	No
1.5	Approximate cost a. Circle rate per acre b. Market rate per acre c. Approx. cost of the land	Govt. Land (Land provide by Noida Authority)
1.6	Type of soil	White sand Mix
1.7	No. of Owners	-
1.8	Environment/Pollution in the vicinity	Good
1.9	Location with reference to nearest town	Jewar
1.10	H.F.L. Data	-
1.11	Diversion of Nallah/Canal required	No
1.12	Slope	No
1.13	Approximate Extent of leveling required (in meter)	1meter UP To Road Level
1.14	Land acquisition feasibility	Yes
1.15	Rate of Govt. Land	-
1.16	No. of Owners	-
1.17	Extent of approach	No
1.18	Planned/unplanned development	Unplanned
1.19	Size of sites (m x m)	100x200
1.20	No. of families to be displaced	No
1.21	Level of site with reference to road level	1m
	a. Level of road	217M
	b. Level of site	216M
1.22	Distance from sea shore	965km
1.23	Approach	Yes
2.0	Obstacles in reaching site	No
2.1	Nearby main road	4km (Noida- Agra)
2.2	Length of approach road to be constructed	No
2.3	Name of nearest airport	5km (Jewar)
2.4	Name of nearest Rail head	Khurja
2.5	Availability of ground water	Yes
2.6	Availability of transmission corridor (Three /four sides)	Two
2.7	Existence of structures/dwelling units in the land of the proposed site	No



2.8	Availability of disposal of rain/storm water	Yes
2.9	Crops grown and types (Multi- crop/single crop)	Multi-Crop
2.10	Distance from main road	4km (Noida- Agra)
2.11	Nearest railway station (BG/MG)	Khurja (BG)
2.12	Unloading facility at railway station	Yes
2.13	No. of Culverts required for approach	No
2.14	Nearest EHV line	0.0 km
2.15	Length of line between this site & nearest substation for construction power at 33/11kV	Jewar Sub-Station 0Km
2.16	Frontage for line take off	Yes
2.17	Telephone/Telegraph line	No
3.0	Community Facilities	No
3.1	Drinking Water	Yes
3.2	Drainage	No
3.3	Distance from **a.** Post Office **b.** Telephone **c.** School **d.** Market	12km (Jewar)
3.4	Security	Yes
3.5	Availability of construction water	Yes
3.6	Availability of drinking water	Yes
4.0	Seismic zones	Zone-IV(least Active)
5.0	Others	Site-1

5.2.2 LILO of one ckt. of 400 kV Greater Noida (765 kV) – Sector -148 (400), Noida DC line at 400/220 kV GIS Substation Jewar (Gautam Budh Nagar)

Detailed Summary of Proposed Route

S.No.	Particulars	Outlook					
1.	**Start Point**	**400kV Lilo Tower No.26**					
		Latitude			**Longitude**		
		Deg.	**Min.**	**Sec.**	**Deg.**	**Min.**	**Sec.**
		28°	14'	18.0672"	77°	37'	05.5620"
2.	**END Point**	**Proposed Jewar S/S**					
		Latitude			**Longitude**		
		Deg.	**Min.**	**Sec.**	**Deg.**	**Min.**	**Sec.**
		28°	13'	22.3790"	77°	36'	43.9656"
3.	**Route Particulars**						
	(i) Bee Line (KM)	1.811 km					
	(ii) Length (KM)	2.168 km					
	(iii) Angle Points	10Nos.					

JEWAR TRANSMISSION LIMITED NEW DELHI

	(iv) Wind Zone	Wind Zone 4
4.	States	Uttar Pradesh
5.	Environmental Impact	Nil
	(i) Houses within R.O.W.	Nil
	(ii) Forest involvement	Nil
	a) Length of forest area (km)	
	Reserved Forest (km)	Nil
	Protected Forest (km)	Nil
	Open Scrub (km)	Nil
6.	Details of Crossing	
	a) Coal mines	Nil
7.	a) Nos. Railway Crossing	Nil
	b) Nos. Power Line Crossing	Nil
	c) Nos. NH/SH Crossing	Nil
	e) Wild Life Sanctuary	Nil
	f) Nos. River Crossing	Nil
	g) Military Area (km)	Nil
	Availability of Accommodation	Available
	Airport	Jewar
8.	Cities & Town	Gautam Budh Nagar (Greater Noida)
	Approaches along the route	Available
9.	Monsoon	Medium Rainfall
10.	Type of Soil	White Sand Mix
11.	Type of standing crops	---

5.2.3 220/33 kV, GIS Substation Cantt, (Chaukaghat) Varanasi

Detailed Summary of Proposed Route		
S. No	Particulars	Outlook
1.0	Land Co-ordinates	
a)	Corner 1	25°19'56.18"N, 82°59'48.45"E
b)	Corner 2	25°19'54.53"N, 82°59'48.89"E
c)	Corner 3	25°19'55.34"N, 82°59'53.16"E
d)	Corner 4	25°19'58.81"N, 82°59'53.14"E
1.1	Size (Acre) (Mtr x Mtr)	2.5 Acre (150x75)
1.2	Govt. /Private/Forest land	Govt.
1.3	Agriculture/Waste land	Waste land
1.4	Development	No
1.5	Approximate cost	
1.6	a. Circle rate per acre	Govt. Land (Land provide by UPPTCL)
1.7	b. Market rate per acre	
	c. Approx. cost of the land	Nil
	Type of soil	Black sand Mix
	No. of Owners	-



1.8	Environment/Pollution in the vicinity	Good
1.9	Location with reference to nearest town	Varanasi
1.10	H.F.L. Data	-
1.11	Diversion of Nallah/Canal required	Yes
1.12	Slope	No
1.13	Approximate Extent of leveling required (in meter)	2.5meter UP To Road Level
1.14	Land acquisition feasibility	Yes
1.15	Rate of Govt. Land	-
1.16	No. of Owners	-
1.17	Extent of approach	No
1.18	Planned/unplanned development	Unplanned
1.19	Size of sites (m x m)	150x75
1.20	No. of families to be displaced	No
1.21	Level of site with reference to road level	2.5m
	a. Level of road	95M
	b. Level of site	93M
1.22	Distance from sea shore	640km
1.23	Approach	Yes
2.0	Obstacles in reaching site	No
2.1	Nearby main road	0km (Varanasi Cantt Over bridge)
2.2	Length of approach road to be constructed	No
2.3	Name of nearest airport	2km (Varanasi)
2.4	Name of nearest Rail head	Varanasi
2.5	Availability of ground water	Yes
2.6	Availability of transmission corridor (Three /four sides)	Three
2.7	Existence of structures/dwelling units in the land of the proposed site	No
2.8	Availability of disposal of rain/storm water	Yes
2.9	Crops grown and types (Multi-crop/single crop)	Wast Land
2.10	Distance from main road	0km (Varanasi Cantt Over bridge)
2.11	Nearest railway station (BG/MG)	Varanasi (BG)
2.12	Unloading facility at railway station	Yes
2.13	No. of Culverts required for approach	Yes
2.14	Nearest EHV line	0.0 km
2.15	Length of line between this site & nearest substation for construction power at 33/11kV	Cantt Sub-Station 0Km
2.16	Frontage for line take off	Yes
2.17	Telephone/Telegraph line	No

JEWAR TRANSMISSION LIMITED NEW DELHI

3.0	Community Facilities	No
3.1	Drinking Water	Yes
3.2	Drainage	No
3.3	Distance from a. Post Office b. Telephone c. School d. Market	1km (Varanasi)
3.4	Security	Yes
3.5	Availability of construction water	Yes
3.6	Availability of drinking water	Yes
4.0	Seismic zones	Zone-IV(least Active)
5.0	Others	Site-1

5.2.4 LILO of one ckt, of 220 kV Sarnath (400)- Gajokhar DC line at Cantt.(Chaukaghat) Varanasi

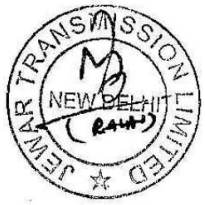
Detailed Summary of Proposed Route								
Sl.No.	Particulars	Outlook						
1.	Start Point	220kV LILO Tower No.62						
		Latitude			Longitude			
		Deg.	Min.	Sec.	Deg.	Min.	Sec.	
		25°	29'	11.6605"	82°	56'	0.3538"	
2.	END Point	Proposed CanttS/S						
		Latitude			Longitude			
		Deg.	Min.	Sec.	Deg.	Min.	Sec.	
		25°	19'	57.8147"	82°	59'	52.1807"	
3.	Route Particulars							
	(i) Bee Line (KM)	18.224 km						
	(ii) Length (KM)	35.274 km						
	(iii) Angle Points	74Nos.(44TP)						
	(iv) Wind Zone	Wind Zone 4						
4.	States	Uttar Pradesh						
5.	Environmental Impact	Nil						
	(i) Houses within R.O.W.	Nil						
	(ii) Forest involvement	Nil						
	a) Length of forest area (km)							
	Reserved Forest (km)	Nil						
	Protected Forest (km)	Nil						
	Open Scrub (km)	Nil						
6.	Details of Crossing							
	a) Coal mines	Nil						
	a) Nos. Railway Crossing	3Nos.						
	b) Nos. Power Line Crossing	3Nos.						



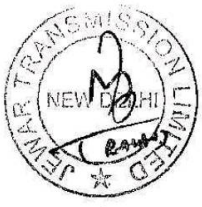
	c) Nos. NH/SH Crossing	1Nos.
	e) Wild Life Sanctuary	Nil
	f) Nos. River Crossing	Nil
	g) Military Area (km)	3.5km
7.	Availability of Accommodation	Available
	Airport	Varanasi
8.	Cities & Town	Varanasi
	Approaches along the route	Available
9.	Monsoon	Medium Rainfall
10.	Type of Soil	White Sand Mix
11.	Type of standing crops	---
11.	Type of standing crops	Wheat, Sarso & Ganna

5.2.5 220/33 kV, 3x60 MVA GIS Substation Vasundhara (Ghaziabad)

S. No.	Criterion	Site-1
1.0	Land Co-ordinates	
a)	Corner 1	28°40'6.50"N, 77°23'7.74"E
b)	Corner 2	28°40'8.60"N, 77°23'8.49"E
c)	Corner 3	28°40'7.84"N, 77°23'11.01"E
d)	Corner 4	28°40'8.58"N, 77°23'11.32"E
e)	Corner 5	28°40'8.13"N, 77°23'12.49"E
f)	Corner 6	28°40'5.36"N, 77°23'11.36"E
1.1	Size (Acre) (Mtr x Mtr)	2Acre 150x200
1.2	Govt. /Private/Forest land	Govt...
1.3	Agriculture/Waste land	Waste Land
1.4	Development	No
1.5	Approximate cost	
	a. Circle rate per acre	(Land Provide by UPPTCL)
	b. Market rate per acre	
	c. Approx. cost of the land	
1.6	Type of soil	White sand Mix
1.7	No. of Owners	
1.8	Environment/Pollution in the vicinity	Good
1.9	Location with reference to nearest town	Ghaziabad
1.10	H.F.L. Data	
1.11	Diversion of Nallah/Canal required	No
1.12	Slope	Yes
1.13	Approximate Extent of leveling required (in meter)	1meter UP To Road Level
1.14	Land acquisition feasibility	Yes
1.15	Rate of Govt. Land	-
1.16	No. of Owners	
1.17	Extent of approach	No
1.18	Planned/unplanned development	Unplanned
1.19	Size of sites (m x m)	150x200
1.20	No. of families to be displaced	



1.21	Level of site with reference to road level	1m
	a. Level of road	224M
	b. Level of site	223M
1.22	Distance from sea shore	1050km
1.23	Approach	Yes
2.0	Obstacles in reaching site	No
2.1	Nearby main road	1km (Delhi- Ghaziabad)
2.2	Length of approach road to be constructed	No
2.3	Name of nearest airport	4.5km (Hindan Air force Station))
2.4	Name of nearest Rail head	Ghaziabad
2.5	Availability of ground water	Yes
2.6	Availability of transmission corridor (Three /four sides)	Three
2.7	Existence of structures/dwelling units in the land of the proposed site	No
2.8	Availability of disposal of rain/storm water	Yes
2.9	Crops grown and types (Multi-crop/single crop)	No
2.10	Distance from main road	1km (Delhi- Ghaziabad)
2.11	Nearest railway station (BG/MG)	Ghaziabad (BG)
2.12	Unloading facility at railway station	Yes
2.13	No. of Culverts required for approach	No
2.14	Nearest EHV line	0.0 km
2.15	Length of line between this site & nearest substation for construction power at 33/11kV	
2.16	Frontage for line take off	Yes
2.17	Telephone/Telegraph line	No
3.0	Community Facilities	No
3.1	Drinking Water	Yes
3.2	Drainage	No
3.3	Distance from	
	a. Post Office b. Telephone	2km (Ghaziabad)
	c. School	
	d. Market	
3.4	Security	Yes
3.5	Availability of construction water	Yes
3.6	Availability of drinking water	Yes
4.0	Seismic zones	Zone-V(least Active)
5.0	Others	Site-1



5.2.6 LILO Of one ckt. 220kV Muradnagar (400)-Sahibabad (220) S/C Line at 220kV Vasundhara S/S

Detailed Summary of Proposed Route								
Sl. No.	**Particulars**	**Outlook**						
1.	**Start Point**	**Exist Lilo Tower**						
		Latitude			**Longitude**			
		Deg.	**Min.**	**Sec.**	**Deg.**	**Min.**	**Sec.**	
		28°	40'	8.7274"	77°	23'	13.9547"	
2.	**END Point**	**Proposed Vasundhara(220) S/S**						
		Latitude			**Longitude**			
		Deg.	**Min.**	**Sec.**	**Deg.**	**Min.**	**Sec.**	
		28°	40'	6.7891"	77°	23'	11.6137"	
3.	**Route Particulars**							
	(i) Bee Line (KM)	0.086 km						
	(ii) Length (KM)	0.124 km						
	(iii) Angle Points	3Nos.						
	(iv) Wind Zone	Wind Zone 5						
4.	**States**	Uttar Pradesh						
5.	**Environmental Impact**	Nil						
	(i) Houses within R.O.W.	Nil						
	(ii) Forest involvement	Nil						
	a) Length of forest area (km)							
	Reserved Forest (km)	Nil						
	Protected Forest (km)	Nil						
	Open Scrub (km)	Nil						
6.	**Details of Crossing**							
	a) Coal mines	Nil						
	a) Nos. Railway Crossing	Nil						
	b) Nos. Power Line Crossing	Nil						
	c) Nos. NH/SH Crossing	2 Nos.						
	e) Wild Life Sanctuary	Nil						
	f) Nos. River Crossing	Nil						
	g) Military Area (km)	Nil						
7.	**Availability of Accommodation**	Available						
	Airport	Hindan Air Force Station 4.5km						
	Cities & Town	Ghaziabad						
8.	**Approaches along the route**	Available						
9.	**Monsoon**	Medium Rainfall						
10.	**Type of Soil**	Mix White Sand						
11.	**Type of standing crops**	Waste Land						



5.2.7 220kV Indirapuram (400) - Vasundhara S/C Line

Detailed Summary of Proposed Route		
Sl. No.	**Particulars**	**Outlook**
1.	**Start Point**	**Existing Indirapuram(400)S/S** **Latitude**: **Deg.** 28° **Min.** 37' **Sec.** 58.0120"; **Longitude**: **Deg.** 77° **Min.** 21' **Sec.** 43.7581"
2.	**END Point**	**Proposed Vasundhara(220) S/S** **Latitude**: **Deg.** 28° **Min.** 40' **Sec.** 6.2843"; **Longitude**: **Deg.** 77° **Min.** 23' **Sec.** 11.2302"
3.	**Route Particulars**	
	(i) Bee Line (KM)	4.610Kms.
	(ii) Length (KM)	6.281kms.
	(iii) Angle Points	40 Nos.
	(iv) Wind Zone	Wind Zone 5
4.	**States**	Uttar Pradesh
5.	**Environmental Impact**	Nil
	(i) Houses within R.O.W.	Yes
	(ii) Forest involvement	
	a) Length of forest area (km)	
	Reserved Forest (km)	
	Protected Forest (km)	
	Open Scrub (km)	
6.	**Details of Crossing**	
	a) Coal mines	Nil
	a) Nos. Railway Crossing	Nil Nil
	b) Nos. Power Line Crossing	2 Nos.
	c) Nos. NH & SH Crossing	Nil
	e) Wild Life Sanctuary	Nil
	f) Nos. River Crossing	Nil
	g) Military Area (km)	Nil
7.	**Availability of Accommodation**	Available
	Airport	Hindan Air Force Station 4.5km
	Railway Station	Ghaziabad
	Cities & Town	Ghaziabad
8.	**Approaches along the route**	Available
9.	**Monsoon**	Medium Rainfall
10.	**Type of Soil**	Mix White Sand
11.	**Type of standing crops**	Waste Land

JEYPORE KOLAR TRANSMISSION LIMITED NEW DELHI

5.2.8 220/132/33 kV, 2X160+2X40MVA Substation Khaga (Fatehpur)

S. No.	Criterion	Site-1
1.0	Land Co-ordinates	
a)	Corner 1	25°47'35.68"N, 80°56'34.71"E
b)	Corner 2	25°47'31.68"N, 80°56'32.31"E
c)	Corner 3	25°47'29.48"N, 80°56'46.07"E
d)	Corner 4	25°47'25.35"N, 80°56'43.60"E
1.1	Size (Acre) (Mtr x Mtr)	13Acre (140x365)
1.2	Govt. /Private/Forest land	Govt...
1.3	Agriculture/Waste land	Waste Land
1.4	Development	No
1.5	Approximate cost	
	a. Circle rate per acre	(Land Provide by UPPTCL)
	b. Market rate per acre	
	c. Approx. cost of the land	
1.6	Type of soil	White sand Mix
1.7	No. of Owners	
1.8	Environment/Pollution in the vicinity	Good
1.9	Location with reference to nearest town	Khaga
1.10	H.F.L. Data	
1.11	Diversion of Nallah/Canal required	No
1.12	Slope	Yes
1.13	Approximate Extent of leveling required (inmeter)	1meter UP To Road Level
1.14	Land acquisition feasibility	Yes
1.15	Rate of Govt. Land	-
1.16	No. of Owners	
1.17	Extent of approach	No
1.18	Planned/unplanned development	Unplanned
1.19	Size of sites (m x m)	140x365
1.20	No. of families to be displaced	
1.21	Level of site with reference to road level	1m
	a. Level of road	131M
	b. Level of site	130M
1.22	Distance from sea shore	820km
1.23	Approach	Yes
2.0	Obstacles in reaching site	No
2.1	Nearby main road	8km (Kanpur- Prayagraj)
2.2	Length of approach road to be constructed	No
2.3	Name of nearest airport	86km (Kanpur)
2.4	Name of nearest Rail head	Fatehpur
2.5	Availability of ground water	Yes
2.6	Availability of transmission corridor (Three /four sides)	Four
2.7	Existence of structures/dwelling units in theland of the proposed site	No
2.8	Availability of disposal of rain/storm	Yes

JEWAR TRANSMISSION LIMITED NEW DELHI

	water	
2.9	Crops grown and types (Multi-crop/singlecrop)	No
2.10	Distance from main road	8km (Kanpur- Prayagraj)
2.11	Nearest railway station (BG/MG)	Khaga (BG)
2.12	Unloading facility at railway station	Yes
2.13	No. of Culverts required for approach	No
2.14	Nearest EHV line	0.0 km
2.15	Length of line between this site & nearest substation for construction power at33/11kV	Khaga Sub-Station 16Km by Road
2.16	Frontage for line take off	Yes
2.17	Telephonc/Telegraph line	No
3.0	Community Facilities	No
3.1	Drinking Water	Yes
3.2	Drainage	No
3.3	Distance from a. Post Office b. Telephone c. School d. Market	16km (Khaga)
3.4	Security	Yes
3.5	Availability of construction water	Yes
3.6	Availability of drinking water	Yes
4.0	Seismic zones	Zone-IV(least Active)
5.0	Others	Site-1

5.2.9 220 kV Fatehpur (765) PG -Khaga D/C line

Detailed Summary of Proposed Route							
Sl. No.	Particulars	Outlook					
1.	Start Point	Gantry Fatehpur(765) S/S					
		Latitude			Longitude		
		Deg.	Min.	Sec.	Deg.	Min.	Sec.
		25°	57'	29.7183"	80°	51'	20.1842"
2.	END Point	Proposed Khaga(220) S/S					
		Latitude			Longitude		
		Deg.	Min.	Sec.	Deg.	Min.	Sec.
		25°	47'	30.9855"	80°	56'	35.3007"
3.	Route Particulars						
	(i) Bee Line (KM)	20.405 km					
	(ii) Length (KM)	25.685 km					
	(iii) Angle Points	54Nos.					
	(iv) Wind Zone	Wind Zone 4					
4.	States	Uttar Pradesh					
5.	Environmental Impact	Nil					
	(i) Houses within R.O.W.	Nil					
	(ii) Forest involvement	Nil					
	a) Length of forest area (km)						

JEMAR TRANSMISSION LIMITED NEW DELHI

	Reserved Forest (km)	Nil
	Protected Forest (km)	Nil
	Open Scrub (km)	Nil
6.	Details of Crossing	
	a) Coal mines	Nil
	a) Nos. Railway Crossing	1 Nos.
	b) Nos. Power Line Crossing	10 Nos.
	c) Nos. NH/SH Crossing	2 Nos.
	e) Wild Life Sanctuary	Nil
	f) Nos. River Crossing	Nil
	g) Military Area (km)	Nil
7.	Availability of Accommodation	Available
	Airport	Kanpur
	Cities & Town	Fatehpur
8.	Approaches along the route	Available
9.	Monsoon	Medium Rainfall
10.	Type of Soil	Mix Black Cotton
11.	Type of standing crops	Makka, Rice

5.2.10 132 kV Khaga – Khaga(220) D/C line

Detailed Summary of Proposed Route							
Sl. No.	Particulars	Outlook					
1.	Start Point	Existing Khaga(132)S/S					
		Latitude			Longitude		
		Deg.	Min.	Sec.	Deg.	Min.	Sec.
		25°	46'	1.8412"	81°	07'	38.0953"
2.	END Point	Proposed Khaga(220) S/S					
		Latitude			Longitude		
		Deg.	Min.	Sec.	Deg.	Min.	Sec.
		25°	47'	28.6118"	80°	56'	43.4384"
3.	Route Particulars						
	(i) Bee Line (KM)	18.435Kms.					
	(ii) Length (KM)	22.821kms.					
	(iii) Angle Points	36 Nos.					
	(iv) Wind Zone	Wind Zone 4					
4.	States	Uttar Pradesh					
5.	Environmental Impact	Nil					
	(i) Houses within R.O.W.	Yes					
	(ii) Forest involvement	Nil					
	a) Length of forest area (km)						
	Reserved Forest (km)						
	Protected Forest (km)						
	Open Scrub (km)						
6.	Details of Crossing						
	a) Coal mines	Nil					
		Nil					

JEWAR TRANSMISSION LIMITED NEW DELHI

	a) Nos. Railway Crossing	1 Nos.
	b) Nos. Power Line Crossing	3 Nos.
	c) Nos. NH & SH Crossing	1Nos.
	e) Wild Life Sanctuary	Nil
	f) Nos. River Crossing	Nil
	g) Military Area (km)	Nil
7.	Availability of Accommodation	Available
	Airport	Kanpur 85km
	Railway Station	Khaga
	Cities & Town	Fatehpur
8.	Approaches along the route	Available
9.	Monsoon	Medium Rainfall
10.	Type of Soil	Mix Black Cotton
11.	Type of standing crops	Rice, Makka Bajra

5.2.11 132 kV Khaga (220) — Hussainganj S/C line

Detailed Summary of Proposed Route							
Sl. No.	Particulars	Outlook					
1.	Start Point	Proposed Khaga(220) S/S					
		Latitude			Longitude		
		Deg.	Min.	Sec.	Deg.	Min.	Sec.
		25°	47'	33.1995"	80°	56'	37.0943"
2.	End Point	Exist. Hussainganj S/S					
3.	Route Particulars						
	(i) Bee Line (KM)	20.683 kms.					
	(ii) Length (KM)	22.961 kms.					
	(iii) Angle Points	49 Nos.					
	(iv) Wind Zone	Wind Zone 4					
4.	States	Uttar Pradesh					
5.	Environmental Impact	Nil					
	(i) Houses within R.O.W.						
	(ii) Forest involvement	Nil					
	a) Length of forest area (km)						
	Reserved Forest (km)						
	Protected Forest (km)						
	Open Scrub (km)						
6.	Details of Crossing						
	a) Coal mines	Nil					
	a) Nos. Railway Crossing	1 Nos.					
	b) Nos. Power Line Crossing	12 Nos.					
	c) Nos. NH/SH Crossing	1Nos.					
	e) Wild Life Sanctuary						
	f) Nos. River Crossing	Nil					
	g) Military Area (km)	Nil					
7.	Availability of Accommodation	Available					
	Airport	Kanpur 85km					
	Railway Station	Khaga					



	Cities & Town	Fatehpur
8.	**Approaches along the route**	Available
9.	**Monsoon**	Medium Rainfall
10.	**Type of Soil**	Mix Black Cotton
11.	**Type of standing crops**	Rice, Makka, Bajra

6. Legal Frame Work

It is proposed to execute the above entire transmission scheme as per the provisions contained in Transmission Service Agreement signed between LTTCs and TSP and in accordance with the "Tariff Based Competitive Bidding Guidelines for Transmission Service" and "Guidelines for Encouraging Competition in Development of Transmission Projects" issued by Government of India, Ministry of Power, Indian Electricity Act, 2003 and the rules made there-under.

The following Regulatory and Government approval shall be taken:

* Transmission License from Uttar Pradesh Electricity Regulatory commission (UPERC)
* Adoption of Tariff from UPERC
* Authorization under section 164 as per the EA 2003
* Or any other such approval required from Govt. or its authorized Agency

7. Management Arrangements

Organizational set-up of TSP

Jewar Transmission Limited has been entrusted the responsibility of Project Execution as per schedule timelines and O&M for 35 years

7.1 Project Management

The project team responsible for execution will comprise of domain experts with project management skills and prior experience of carrying out similar projects. The project will be completed as per applicable rules and regulations as stipulated in the RFP and other applicable codes. The project team will be assisted by Engineering, Quality, Testing and Safety support functions for quality execution within stipulated timelines.

The Project team includes Project Management experts and proven project management tools like Primavera will be used during execution for monitoring & controlling the activities.

JEWAR TRANSMISSION LIMITED NEW DELHI

7.2 Project Implementation Review

A robust review mechanism is in place to ensure that project is implemented as per required quality and within scheduled timelines.

A review mechanism comprises of weekly and Fortnightly reviews by Working team and Monitoring team respectively. These teams are constituted with members from Project, Engineering, Testing, Contracts, Quality and Business Associates.

7.3 Quality Management

Quality assurance will be ensured by a joint team of quality experts of TSP and Business Associates by strict adherence to FQP and MQP and periodic Site quality and Safety audits. Compliance to observations related to quality and safety shall be ensured.

The TSP shall ensure that design, construction and testing of all equipment facilities, components and systems of the project shall be in accordance with Indian Standards and Codes issued by Bureau of Indian Standards and only in Transmission Service Agreement, Jewar Transmission Limited. In case they are not applicable under certain conditions, the other equivalent internationally recognized Standards and Codes shall be followed.

7.4 Operation & Maintenance

Megha Engineering & Infrastructures Limited which is the parent company of Western Uttar Pradesh Power Transmission Limited (WUPPTCL), is already maintaining EHV Transmission assets like Transmission Lines, EHV GIS & AIS Substations and Cables and associated equipment and has a pool of skilled human resource with prior experience.

For Jewar Transmission Limited (JTL), after commissioning phase is over, a team will be set up for overlooking the operation & maintenance of the assets for 35 years as per the conditions of the TSA. Support functions like HR, Admin, and Engineering shall be available for the TSP during the O&M phase.

Necessary facilities like local offices, stores facility, spares for GIS & Termination Lines shall be ensured for reliable operation of Transmission System.

8. Time Frame

Transmission system for the project is scheduled to be commissioned as per the conditions of TSA, subject to compliance of other obligations by statutory authorities including BPC, Energy Department of Govt. of UP etc.

JEWAR TRANSMISSION LIMITED NEW DELHI

Technical Specifications of Transmission System

SPECIFIC TECHNICAL REQUIREMNETS FOR 220 KV AND 132 KV TRANSMISSION LINES

1. GENERAL INFORMATION

The transmission line shall be constructed on self supporting 132kV Galvanized Latticed Steel Double circuit towers and Narrow base Double circuit tower. The phase conductor shall be ACSR PANTHER in vertical formation with three phase of one Circuits being on one side of the tower of 132kV lines respectively. The 7/10 or 7/9 SWG Earth wire/OPGW shall be provided above the conductors for effective shielding of 132KV lines respectively.

2. SERVICE CONDITION

i.	Nominal system voltage	132KV
ii.	Rated highest system voltage	145
iii.	System frequency	50 Hz
iv.	No. of phase	3
v.	Phase configuration	Vertical
vi.	Neutral earthling	Effectively earthed
vii.	BIL	550 kV
viii	Power frequency withstand voltage (wet condition)	230 kV
ix.	Variation in system voltage	+10% to -15%
x.	Variation in system frequency	± 5%

TECHNICAL CONDITIONS (TOWERS)

STEEL

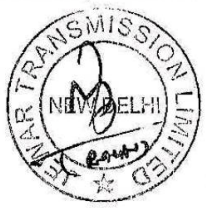
- Tower members shall be fabricated out of steel conforming to IS:226/1975 or IS: 2062/1999 with the latest revision thereof.
- The tower members shall be fabricated in accordance with IS: 802(Part –II)-1978 with the latest revision thereof.

Tolerance:

- The following fabrication tolerances shall be allowed as per IS : 7215-1974.
- The maximum allowable difference in diameter of the hole on the two sides of plate or angle shall not exceed 0.8 mm i.e. allowable taper in punched hole shall not exceed 0.8 mm on diameter.
- The tolerance cumulative and between consecutive holes shall be within + 0.5mm.
- The tolerance on the overall length of members shall be within +1.6 mm.
- The tolerance on back mark shall be within +0.5 mm.

TECHNICAL REQUIREMENTS FOR BOLTS

- The bolts shall be hot dip galvanized, Hexagon round hexagon head transmission tower



bolts of size M16 for use in construction of transmission towers and sub stations. These must confirm to IS: 12477/1988.

- The dimensions of the M16 shall be as per IS: 12427-1988.

3. *INSULATORS*

The specification covers design, manufacture, testing and supply and delivery of following insulators suitable for hardware fitting of Zebra ACSR Conductor for 220 kV and Panther ACSR for 132 kV transmission lines.

The equipment offered, shall be complete with all components which are necessary or usually used for their efficient performance and satisfactory maintenance

3.1 DETAILS OF DISC INSULATORS

3.1.1 The insulators of the string shall consist of standard discs for 3 phase 50 Hz effectively earthed system which can be operated at a voltage ten (10) percent higher than the rated system voltage in moderately polluted atmospheric conditions.

3.1.2 The disc insulators shall be made of electro-porcelain. The disc insulators shall be of cap and pin, ball and socket type. porcelain shall be sound, free from defects, thoroughly vitrified and smoothly glazed.

3.1.3 The disc insulators shall be used on 220 KV /132 KV transmission lines in form of single tension/double tension strings.

3.1.4 The design of the insulators shall be such that stresses due to expansion and contraction in any part of the insulators shall not lead to deterioration. Special care should be taken in use of very low autoclave expansion cement to curb the unpredictable cement growth which leads to ageing. The limit of autoclave cement expansion should be as mentioned with the details in relevant standard.

3.1.5 The number of Disc Insulators of each Single suspension/ Single Tension and Double Suspension
/ Tension insulator string in 220 KV line shall be as follow:-

S. N.	Insulators Strings	No. of Disc Insulators per strings 220 KV	No. of Disc Insulators per strings 132 KV
1	Single Suspension	14	9
2	Double Suspension	2X14	2X9
3	Single Tension	16	10
4	Double Tension	2X16	2X10

3.1.6 The size, minimum creepage distance and EM (Electro mechanical) strength of disc insulators shall be as follows:

S N	Type of Disc (B-Type)	Size (mm)	Min. Creepage distance -mm	EM strength -KN



1	70 KN	255x145	292	70
2	120 KN	280/255 x 145	330	120
3	160 KN	280 x 170	330	160

3.2 *TECHNICAL PARTICULARS OF INSULATORS*

The insulators to be supplied must fulfill the minimum technical particulars as mentioned below:-

S N	Description	70KN	120 KN	160KN
(A)	**General**			
1.	Type of Insulators (B&S Type)	**16 mm**	**20 mm**	**20 mm**
2.	Outside diameter of disc with tolerance (mm)	**255**	**280/255**	**280**
3.	Distance between centers of disc with tolerance (mm)	**145**	**145**	**170**
4.	Color of glazing of porcelain of Insulators	**Brown**	**Brown**	**Brown**
(B)	**Mechanical Values**			
1.	Electro-Mechanical Strength of single disc (KN)	**70**	**120**	**160**
2.	Breaking strength of single disc not less than (KN)	**70**	**120**	**160**
(C)	**Electrical Values**			
1.	Usual working System voltage (KV)	132/220	132	220
2.	Minimum Creepage distance of single disc (mm)	292	330	330
3.	Power Frequency Puncture Voltage of single Disc (KV) rms.	120	120	125
4.	Power Frequency and minute withstand voltage of single disc (KV) rms. Dry Wet	 70 40	 75 45	 75 45
5.	Impulse withstand voltage (KV) Peak (± wave)	110	120	122
(D)	**Complete string Values (132 KV)**			
	(a) Suspension (b) Tension	9(132KV) 10(220KV)	- 10	- 16
1.	Power frequency withstand voltage (KV)			
	with arcing horn on both side (i) Dry (132 KV/220 KV) (ii) Wet(132 KV/220 KV)	 350/490 230/395	 380 250	 550 460
	without arcing horn (iii) Dry(132 KV/220 KV) (iv) Wet(132 KV/220 KV)	 260/500 240/405	 400 290	 600 500
2.	Power frequency flashover voltage (KV)			
	(a) with arcing horn on both side (v) Dry(132 KV/220 KV)			



S N	Description	70KN	120 KN	160KN
	(vi) Wet(132 KV/220 KV)	420/560 300/430	450 320	590 520
	(b) without arcing horn (vii) Dry(132 KV/220 KV) (viii) Wet(132 KV/220 KV)	430/560 310/440	480 330	650 560
3.	Impulse withstand voltage (KV)			
	(a) with arcing horn on both side (i) +ive(132 KV/220 KV) (ii) -ive(132 KV/220 KV)	550/900 550/900	570 570	1050 1050
	(b) without arcing horn (i) +ive(132 KV/220 KV) (ii) -ive(132 KV/220 KV)	560/910 560/910	650 650	1150 1150
4.	Impulse flashover voltage (KV)			
	(a) with arcing horn on both side (i) +ive(132 KV/220 KV) (ii) -ive(132 KV/220 KV)	600/975 600/975	620 620	1150 1150
	(b) without arcing horn (i) +ive(132 KV/220 KV) (ii) -ive(132 KV/220 KV)	610/985 610/985	700 700	1200 1200
5.	Maxm. percentage of line to earth voltage distribution of insulator with normal fittings (%)(132 KV/220 KV)	22	20	14.14
6.	Mechanical failing load (kg.) Single Suspension Double Suspension Single Tension Double Tension	7000 14000 - -	- - 16500 33000	- - 16500 33000
7.	No deformation load (kg f)	67% of load at 6 above		

4. *CONDUCTOR HARDWARES*

4.1 The specification covers design, manufacture, testing & supply and delivery of following hardware fitting suitable for Zebra/Panther ACSR conductor for 220KV/132 KV transmission line. The equipment offered, shall be complete with all components which are necessary or usually used for their efficient performance and satisfactory maintenance.

1- Single Suspension
2- Single Tension
3- Single suspension Pilot fittings
4- Double Suspension
5- Double Tension

4.2 The hardware fittings shall be suitable for three phase, 50 Hz effectively earthed system in moderately polluted atmosphere and for operation at voltage 10% higher than the rated service voltage. The edges, lips etc of all hardware components shall be so rounded as to reduce



corona loss and radio interference voltage to a minimum. The hardware fitting shall be complete with all components which are necessary or usually used for their efficient performance and satisfactory maintenance.

5. *CONDUCTOR AND INSULATOR PARTICULARS:*

5.1 **CONDUCTOR**

5.1.1 The hardware fitting for 220 KV lines shall be suitable for Zebra & for 132 KV lines shall be suitable for Panther conductor having particulars as hereunder –

	Code Name	**Zebra**	**Panther**
a	Copper Equivalent Area mm sq.	260	130
b	Total area mm sq.	484.5	261.30
c	No. of Strands	61	37
d	Stranding & wire diameter (mm) Aluminium (mm) Steel (mm)	 54/3.18 7/3.18	 30/3.00 7/3.00
e	Overall dia (mm)	28.62	21.00
f	DC Resistance at 20°C (ohm/Km	0.06868	0.3497
g	Ultimate tensile strength (KN)	130.32	89.67
h	Conductor per phase	Single	Single

5.2 DISC INSULATORS PARTICULARS

		Zebra	**Panther**
1	**70 KN**		
a	Size (mm)	255x145	255x145
b	E&M Strength KN	70	70
c	Discs in string (Nos.)	14	9
d	Ball & Socket (mm)	16/16B	16/16B
II	**Tension string single or Double**		
e	Size (mm)	280x170	255x145
f	E&M Strength mm	160	120
g	Discs in string (Nos.)	16	10
h	Ball & Socket (mm)	20	20

Note – Ball & Socket as per IS: 2486 Part-II

5.3 LENGTH OF FITTINGS WITH INSULATORS

		Zebra	**Panther**
1	Single Suspension (a) Minimum - mm	 2055	 1330



	(b) Maximum - mm	2415	1650
II	Single Tension (a) Minimum - mm (b) Maximum - mm	 2860 3260	 1620 2000
E	Ruling Span – Meters (a) Single Circuit (b) Double Circuit	 380 365	 360 350
F	Configuration (a) Single Circuit (b) Double Circuit	 Delta Vertical	 Delta Vertical
G	Conductor Tension At 32° C	22% of UTS of conductor	22% of UTS of conductor

6. CONDUCTOR ACCESSORIES

The specification covers design, manufacture, testing and supply and delivery of following conductor accessories suitable for Zebra ACSR Conductor for 220 kV transmission line and ACSR Panther Conductor for 132 kV transmission line. The equipment offered, shall be complete with all components which are necessary or usually used for their efficient performance and satisfactory maintenance.

i- Preformed Amour Rods
ii- Vibration Damper
iii- Repair sleeves
iv- Mid span Compression Joints

7. *CONDUCTOR AND LINE DATA*

The conductor accessories shall be suitable for Zebra/Panther, ACSR. The conductor and line data are as under :-

For Zebra For Panther

S N	Configuration	Vertical/Triangular	Vertical/Triangular
1.	Number of phases	Three /Six	Three /Six
2.	Size of conductor		
	i) Aluminium	54/3.18 mm	30/3.00 mm
	ii) Steel	7/3.18 mm	7/3.30 mm
3	Over diameter	28.62 mm	21.00 mm
4	Weight per meter	1.621 kg	0.974 kg
5	Ultimate tensile strength	130.32 KN	89.67
6	Normal span		

JEWAR TRANSMISSION LIMITED NEW DELHI

	(i) Single Circuit (ii) Double Circuit	380 m 365 m	365 m 380m
7	Maximum Conductor tension at 32^{0}C without external load.		
	i. Initial unloaded tension	35 % of UTS.	35 % of UTS.
	ii. Final unloaded tension	25% of UTS.	25% of UTS.
8	Nature of terrain	Generally flat with cultivated fields	
9	i) No. of performed Armour rods used	12 nos	11 nos
	ii) Dia of each rod	7.87 mm	6.35 mm
	iii) Dia of conductor with Armour rods	44.36 mm	33.70 mm
10	Max. permissible dynamic strain after damping	150 Microns	150 Microns

PREFORMED AMOUR RODS:

Preformed Armour Road shall line conform to IS:2121.The technical particulars are given as here under
:-

S N		For Zebra	For Panther
i)	Material (IS: 739-1977)	Aluminium Alloy	Aluminium Alloy
ii)	Number of Rod per set	12	11
ii)	Diameter of each rod (mm)	7.87+0 / -0.1	6.35+0 / -0.1
iii)	Length of each rod (mm)	2540± 25	1950± 25
iv)	Difference between the longest rod and the shortest rod in each set (mm)	16	16
v)	Electrical conductivity at 20^{0}C	Not less than 39% of IACS (International Annealed Copper standards	
vi)	Ultimate strength of each rod (kg/mm2)	35 Kg	35 Kg
vii)	Marking	Centre line to be marked with black point	
viii)	Shape of end	Parrot bill ended	

8. *EARTHWIRE ACCESSORIES*

The specification covers design, manufacture, testing and supply of delivery of following earthwire accessories suitable for 7/3.67 mm. Earthwire for 220 KV lines and 7/3.25 mm. Earthwire for 132 KV lines. The equipment offered, shall be complete with all components which are necessary or usually used for their efficient performance and satisfactory maintenance.

JEWAR TRANSMISSION LIMITED NEW DELHI

i) Suspension clamp (Free centre type)
ii) Tension clamp
iii) Mid span compression joints
iv) Vibration damper

9. *SUSPENSION CLAMPS : (FREE CENTER TYPE)*

9.1 At all suspension towers suitable suspension clamps shall be used to support the earthwire. The suspension clamps shall hang from U-bolt which is fixed vertically downwards in the ground wire peak of suspension tower. The U-bolt is fixed in the direction of run of the line. This U-bolt is part of tower.

9.2 Necessary arrangement for hanging the suspension clamp form U-bolt shall be supplied along with the suspension clamp and shall be considered as a part of clamp.

9.3 The clamps shall conform to general requirement of IS : 2486 (Part -I) with latest revision thereof.

9.4 The suspension clamps (Complete assembly) shall consist of the following components:

i) Suspension Clamps
ii) Keeper piece
iii) U-bolts
iv) Anchor shackle to be used for suspending the suspension clamp form U-bolt of earthwire peak of the tower.
v) Nuts, bolts, washers and split pins etc.

9.5 The clamping piece and the clamp body shall be clamped by at least two U-bolts of size not less than M-10 diameter having one nut and one 3.5 mm. thick spring lock washer on each of its limbs. Suspension clamps shall be provided with inverted type U-bolts. The limb of one of the U- Bolts shall be long enough to accommodate the lug of the flexible copper bond.

9.6 Total length of suspension clamps assembly between tower peak and axis of earthwire at clamp (including one 65 mm long U-bolt which is already fixed in tower peak) shall be 200 mm.

9.7 The material for the suspension clamps shall be such that it gives the required mechanical strength with specified dimensions. The clamp may be made of either forged steel (as per IS : 2004) or malleable cast iron (as per IS: 2107 and IS: 2108) having good finish. The clamps shall be free from all internal defects like shrinkage inclusion, blow holes etc. and quality of the product shall be uniform throughout.

9.8 There shall be no sharp points in the clamps coming in contact with earthwire.

9.9 All the ferrous parts of compete assembly including bolts, nutsan lock washers shall be hot dip galvanised as per IS: 2633/1972. Spring washer should be electro-galvanised. The female thread of nuts should be oiled only.

JEWAR TRANSMISSION LIMITED NEW DELHI

9.10 The assembly shall give adequate area of support to the earthwire . The groove of the clamp shall be smooth finished in uniform circular or oval shape and shall slope downwards in a smooth curve in 25 mm length at either end to avoid sharp support for the earthwire and to reduce the intensity of bending moment at the clamp edge due to vertical load. There shallnot be any displacement in the configuration of the earthwire standards nor shall these be unduly stressed in final assembly.

9.11 The suspension assembly shall be guarantied for the following values:-

1. Slip strength : 8-15%of breaking load of earthwire

2. Minimum failing load : Not less than breaking load of earthwire.

10. *TENSION CLAMPS*

10.1 At all the tension towers, suitable compression type tension clamps shall be used to hold 7/9 SWG galvanised steel earth wire in case of 220 KV lines and 7/10 SWG galvanised steel earth wire in case of 132 KV lines.

10.2 The tension assembly shall consist of the following component parts :

i) Dead and End
ii) Jumper tube.
iii) Anchor D-Shackles
iv) Rivet, washer & cotter pins etc.

10.3 The compression tube & Jumper tube shall give adequate area of support without any slip to the earthwire under normal working tension and vibration conditions.

10.4 The dead end tubes and jumper tubes of tension clamps shall be made of Forged steed as per IS
: 2004 with latest revision thereof.

10.5 All the forgings shall be of good finish and free from flaws and other defects. There shall be no sharp points in the tube coming in contact with the earthwire. There shall also not be any displacement in the configuration of the earthwirestrands nor shall they be un-duly stressed in the final assembly. The tube shall be such as to give smooth surface after compression. The complete assembly shall be so designed as to avoid un-due bending in any part of assembly and shall not produce any hindrance to the movement of the clamp in horizontal or vertical directions.

10.6 Suitable lugs for jumper connection shall also be supplied along with necessary bolts and nuts.

10.7 All ferrous parts of complete assembly including bolts, nuts and washers shall be hot dip galvanised as per IS: 2633. Spring washers may be electro galvanised. The female thread of the nuts may be oiled only.

10.8 The assembly shall be connected to horizontal strain plates of the tower body by means of D- Shackle or eye link.

JEWAR TRANSMISSION LIMITED NEW DELHI

10.9 The jumper terminal plates shall be welded with dead end at an angle of 30^0 from the vertical plane. The jumper shall pass in a vertical plane.

10.10 The assembly shall be supplied complete with dead and jumper tubes, Anchor shokles bolts. nuts and washers .

10.11 The dimensions and the dimensional tolerances of the compressible tube shall be as under :-

(i) Before compression		**For 7/3.67 mm EW**	**For 7/3.25 mm EW**
(a) Inner dia (mm)	:	11.5 ± 0.2	10.3 ± 0.2
(b) Outer dia (mm)	:	20.0 ± 0.5	18.0 ± 0.2
(ii) After the compression:			
(a) Width (corner to corner) (mm)	:	20.0± 0.5	17.4 ± 0.5
(b) Width (flat to flat) (mm)	:	17.5± 05	15.1 ± 0.5

10.12 The slip strength of the assembly shall not be less than the 95% of the ultimate tensile strength of the earthwire. The ultimate strengths of clamp shall not be less than that of earthwire. The method of testing shall conform to IS: 2121 (part -3) and IS: 2486 (part -I) or an equivalent standards amended upto -date.

11. *MID SPAN COMPRESSION JOINTS*

11.1 These joints shall be suitable for joining two length of earthwire.

11.2 These shall be made of high strength of mild steel tubes and shall be easily compressible without any crack or failure with 100 ton capacity hydraulic compressor.

11.3 The minimum failing load (slip strength) of the joint shall not be less than 95% of the ultimate tensile strength of the earthwire.

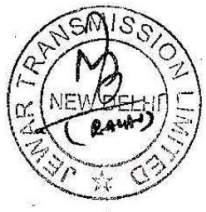
11.4 The joints shall have the same conductivity as the earthwire.

11.5 The dimensions and the dimensional tolerances of the joints shall be as under :-

(i) Before compression :		**For 7/3.67 mm EW**	**For 7/3.25 mm EW**
(a) Inner dia (mm)	:	11.5 ± 0.2	10.3 ± 0.2
(b) Outer dia (mm)	:	20.0 ± 0.5	18.0 ± 0.2
(c) Length (mm)	:	230± 0.5	203 ± 0.2
(ii) After the compression:			
(a) Width (corner to corner) (mm)	:	20.0± 0.5	17.4 ± 0.2
(b) Width (flat to flat) (mm)	:	17.5± 05	15.1 ± 0.2
(c) Length (mm)	:	262± 0.5	220± 0.2

12. VIBRATION DAMPERS

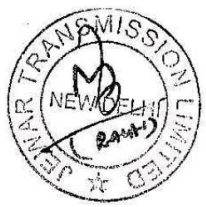
12.1 Stock bridge 4R type vibration damper suitable for 7/3.67 mm earth wire shall be



provided at all tension and suspension points on each span (at least one at each end of each earthwire spans of up to 450 meter) to damp out the vibration up to a limit of 150 micro strains on 220 KV lines.. The dampers shall effectively damp out the vibration of the earthwire for the full frequency range experienced in the earthwire for spans from 200 to 450 meter and wind velocity of 0-30 km per hour. Vibration Dampers shall not be installed on 132 KV Lines

12.2 The necessary technical particulars of dampers design are as given below: -

Sl. No.	Particulars	Details
1.	Configuration	Single steel stranded earthwire at the peak of tower
2.	Height of cable support under every day condition above	
	a)tower	36.5 m
	b)mid span	27 m
3.	Size of cable	7/9 SWG
4.	Span length in meters	
	i) Ruling Span for design	400 m
	ii) Maximum span	450 m
	iii) Minimum span	250 m
5.	Maximum earthwire tension at 32°C without external load.	
	i. Initial unloaded tension	35 % of UTS.
	ii. Final unloaded tension	25% of UTS.
6.	Nature of terrain	Centrally flat with cultivated fields
7.	If armour rods used	No
8.	Maximum permissible dynamics strain after damping	150 micro strains
9..	Minimum no of cycles for fatigue performance	10 million
10.	Amplitude for fatigue test	±50 mm at the highest resonant frequency
11.	Slip strength of clamp	1. Not less than 250 kg. when an untested vibration demure is installed at the recommended bolt torque on the earthwire. 2. Not less than 200 kg. without retightening the bolts after concocting the Fatigue test.
12.	Max. Wind load	45 kg/m² on full projected area



12.3 The clamp of the vibration damper shall be made of permanent mould cast high strength aluminium alloy. It shall be capable of supporting the damper during installation and to prevent any damage or chafing of the earthwire during fitting and during continued operation which would produce high electrical and mechanical stresses in normal working. If there are any chances of the clamp chafing the earthwire in service, suitable remedial devices shall be provided by the vendor free of cost.

The clamp shall have sufficient grip to maintain the damper in position on the earthwire without damaging the strands or causing premature fatigue. The groove of the clamp body and clamp cap shall be smooth, free of projections, grit or other material which could cause damage to the earthwire when the clamp is installed. Clamping bolts shall be provided with self locking nuts and designed to prevent corrosion of the threads or loosening during service.

12.4 The messenger cable of the damper shall comprise of high strength steel strength which shall be hot dip galvanised as per IS 4826. The steel strands shall be pre-formed and suitably protected against loosening of its standards in order to prevent subsequent droop of weight in service and to maintain consistent flexural stiffness of the cable while in service. The messenger cable shall be suitably and effectively sealed to prevent corrosion.

12.5 The damper mass shall be made of hot dip galvanised mild steel/ cast iron. All castings shall be free from defects such as cracks, shrinkages, inclusions and blow holes etc. The inside and outside surfaces of the damper masses shall be smooth.

The damper mass shall be fixed permanently to the messenger cable with suitable non ferrous sleeves or compound. The damper mass shall not droop more than 5 degrees from the centre of the damper. Each damper mass shall be designed so as to avoid accumulation of rain waters.

12.6 The vibration damper shall be capable of being installed and removed from energized line by means of hot line technique without completely separating components . In addition, the clamp shall be capable of being removed and reinstalled on the conductor at the design torque without damaging the fasteners and conductor surface. The damper assembly shall be electrically conductive.

12.7 The approved vendor shall give full details of the damping characteristics and energy dissipation curve of the dampers and guarantee their effectiveness for the earthwire for damping design.

12.8 The vibration damper shall also conform to IS : 9708-1980 and technical particular given hereunder:-

i) Type	Stock Bridge type 4R
ii) Materials a) Clamps b) Messenger cable	Aluminium Alloy High tensile steel of strength 140 kg/mm² (19 strands wire)



c) Damper masses	H.D.G. cast Iron
iii) Mass pull off strength	500 kg.
iv) Clamp slip strength	250 kg
v) Maximum permissible dynamic strain	Less than 150 micro -strains
vi) Minimum number of cycles for fatigue performance	10 million cycles at highest resonant frequency at ± 0.5

1. *ERECTION GENERAL*

The line shall be constructed on self supporting, latticed steel towers. The phase conductors shall be in triangular formation (right angle or equi-lateral triangle) in case of Single Circuit line(s) and in vertical formation in case of Double circuit lines. Earthwire shall be provided above the conductors for effective shielding. The construction details shall comply in all respects with the specifications given herein.

The towers shall be fully galvanised including stubs and cleats by hot dip galvanising. The tower members shall be fabricated using structural mild steel sections as per IS: 226/2062. Hexagonal round head galvanised M.S. bolts and nuts with flat washers of 5 mm thick shall be used for connections.

1.1 *CLASSIFICATION OF TOWERS :*

(a) 'A2' Type Suspension Towers :

The suspension type towers are designed with suspension strings and 2^0 line deviation with design span.

(b) 'B30' Type Tension Towers :

To be used for angle of line deviation up to 30^0 with design span and shall also be suitable for section conditions.

(c) 'C60' Type Tension Towers :

To be used for angle of line deviation up to 60^0 with design span.

(d) Dead end Towers :

Normally 'C' type towers are used as dead end towers. However, in exceptional circumstances a dead end tower may be different from 'C' type tower.

132 KV Narrow Base Tower

(a) 'NBDA' Type Suspension Towers :



The suspension type towers are designed with suspension strings and 2^0 line deviation
with design span.

(b) 'NBDB' Type Tension Towers :

To be used for angle of line deviation up to 15^0 with design span and shall also be suitable for section conditions.

(c) 'NBDC' Type Tension Towers :

To be used for angle of line deviation up to 30^0 with design span.

(d) 'NBDD' Type Tension Towers :

- To be used for angle of line deviation up to 60^0 with design span.
- To be used Dead End tower.
- These towers can also be used for longer spans with reduced angle of deviation with limitations of ground clearance and wind/weight span as per tower spotting data.

1.2 SPECIAL TOWERS

1.2.1 In addition to standard towers and extensions specified, erection of special structures, if any, required for major river crossings, power line crossings very long spans etc. shall be carried out

1.2.2 EXTENSIONS :

- Extensions in the towers may also be used wherever required.
- Such extension shall be used where ground clearance and inter circuit clearances are found to be inadequate.
- Tower foundations may be suitable with or without extensions depending upon foundation design.

1.2.3 TOWER LOCATION

1.2.4 SAG TEMPLATES

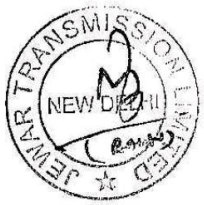
The TSP shall prepare the sag template for tower spotting.

1.2.5 TOWER SPOTTING

With the help of tower spotting data and approved sag templates, tower locations shall be marked on the profiles. While locating the towers on survey charts, the following points shall be borne in mind –

(a) Towers shall be located within its design parameters.

(b) Towers shall be placed at mid bisection of deviation angle.



(c) Dead end tower shall be square to the line side and may have a deviation upto 15^0 on slack span side.

(d) There shall not be any upward force on suspension towers under normal working conditions and the suspension towers shall support at least the minimum weight span as provided in the designs. In case uplift is unavoidable, it will be examined if the same can be over come by adding standard body extensions to the towers, failing which tension towers designed for the purpose shall be employed at such positions.

(e) An individual span shall be as near to the normal design span as possible. In case an individual span becomes too short with normal supports on account of undulations in ground profile, one or both line supports of the span may be extended by inserting standard body extension, designed for the purpose.

(f) The number of consecutive spans between the section points shall not exceed 15 spans. A sectional point shall be taken to comprise a tension point with a B-type or C-type tower.

(g) *ROAD CROSSING*

At all important road crossings, the tower shall be located in such manner that the ground clearance at the roads under maximum temperature and in still air shall be such that even with a conductor broken in adjacent span the ground clearance of the conductor from the road surface will not be less than that required under Indian Electricity Rules l956. Road crossing span shall not exceed to 250 meter.

(h) *RAILWAY CROSSING*

Railway crossings shall be constructed in conformity with the specifications laid down by the Railway Authorities. The angle of crossing shall be as near 90^0 as possible. The railway crossing towers shall have double tension insulator strings.

(i) *POWER LINE CROSSING*

Where the line under construction is to cross over another line of the same voltage or lower voltage, tower with suitable extensions shall be used. Provision to prevent the possibility of its coming into contact with the other overhead lines, shall be made in accordance with the Indian Electricity Rules, 1956.

(j) *TELECOMMUNICATION LINES CROSSING*

The angle of crossing between telecommunication line and power line shall be as near 90^0 as possible. However, deviation to the extent of 60^0 may be permitted under exceptionally difficult situations. When the angle of crossing has to be below 60^0 the matter will be referred to the authority in charge of the telecommunication system. Also in the crossing span, power line supports will be

as near the telecommunication line as possible, to obtain increased vertical clearance between the wires.

(k) TRANSPOSITION

No transposition of the conductors shall be carried out in the line.

(l) RIVER CROSSING

Small rivers shall be crossed with normal A, B & C towers with or without extension. Major rivers may be crossed either with normal A, B, C towers with or without extension or special river crossing towers.

(m) APPROACH SPANS

On approach line towers upto 1.5 Km from the terminal structures on either end of the line, insulator strings suitable for graded insulation with arcing horns on both sides with the number of insulator discs one less then those in the normal line, suspension and tension insulator strings shall be used.

Latitude and longitude of each location of the lines shall be captured and KML file for each line shall also be prepare and submit for ready reference.

2. CONSTRUCTION OF TOWER FOUNDATION, STUB SETTING & EARTHING

Cement concrete footings shall be used for all types of towers, in conformity with the present day practice followed in the country, and specifications laid herein. RCC foundations may be used for locations where cement concrete footings are not possible to be laid. All the footings of the tower shall be similar.

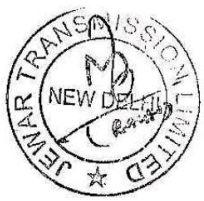
2.1 FOUNDATION DEPTH

The depth of the foundation may vary from 1.5metres to 3.5 meters.

2.1.1 CLASSIFICATION OF FOUNDATION

- Depending on the type of soil, the sub-soil water table and the presence of surface water, four types of foundation will be used for each type of tower locations, classified in the following manner –

(a)	Normal dry type	To be used for location in normal dry cohesive or non-cohesive soils.
(b)	Wet type Or and	To be used for locations – i) Where sub-soil water is met at 1.5m or more below the ground line. ii) Which are in surface water for long periods with water penetration not exceeding one metre below the ground line. iii) In black cotton soils.



(c)	Partially submerged type	To be used on locations where sub-soil water table is met between 0.75 meter to 1.5 meter below the ground line.
(d)	Fully submerged type	To be used at locations where sub-soil water is met at less than 0.75 meter below the ground line.

- In addition to the above, depending on the site conditions other types of foundations may be introduced suitable for –

i) Intermediate conditions under the above classifications to effect more economy, or

ii) for locations in hilly and rocky areas.

2.2 *EARTHING*

The footing resistance of all towers shall be measured by the TSP in dry weather after their erection before the stringing of earth wire. In case the tower footing resistance exceeds 10 ohms, pipe type earthing/counterpoise earthing, wherever required shall be done in accordance with stipulation made in this contract

2.3 *PIPE EARTHING*

The grounding shall be effected by making about 300mm dia 3750mm deep pit at a distance of not less than 3650mm away from the stubs and filling in the pit with finely broken coke having the granule sizes not more than 25mm and salt in such a way that minimum cover of 125mm thick salt-mixed-coke shall be maintained from the pipe on all sides and that the top edge of the pipe shall be at least 600mm below the ground line. The GS strip shall be buried not less than 600mm from the ground line.

2.4 *COUNTERPOISE EARTHING*

In place of high resistivity soil, special earthing arrangement shall be employed in the form of counterpoise earth to bring down the tower footing resistance to 10 ohms. The counterpoise earth shall be composed of 7/9 SWG galvanized steel wire having suitable GS lugs soldered or compressed at its one end complete with 16mm dia bolts & nuts, required for connecting the earthing to the tower end. The counterpoise shall be buried radially away from the tower base at 600mm below ground level. The lug should preferably be buried in the chimney portion of the foundation to avoid pilferage.

2.5 *STRING OF CONDUCTOR & EARTHWIRE :*

2.5.1 The stringing of the conductors and earth wire shall be done in a most standard method used for such lines.

2.5.2 On certain 220KV or 132KV lines, UPPTCL may opt to use earthwire in place of OPGW.In that case TSP will be required to lay Earthwire on 132KV or 220kV towers in place of with all related hardwares.

2.5.3 The TSP shall be entirely responsible for any damage to the towers or the conductors



during stringing. The damaged items shall be replaced without extra charges to the UPPTCL.

3. *OPGW : TECHNICAL SPECIFICATIONS OF OPGWAND ITS ACCESSORIES*

Technical specifications for procurement of overhead fibre optic cable (OPGW) for 220 & 132 kV SC/DC Transmission system.

3.1 Introduction

UPPTCL is constructing 220KV & 132 kV SC/DC transmission lines with ACSR Zebra/Panther. 24/48 Fibre (DWSM, G.652D) Optical Ground Wire (OPGW) cable shall be laid on these lines. The Installation, Erection, Splicing, Termination, Testing and Commissioning of OPGW cable & OFAC upto end to end connectivity shall also be carried out by the TSP.

Specifications and Functional Description

Table 2-1(a): DWSM Optical Fibre Characteristics	
Fibre Description:	Dual-Window Single-Mode
Mode Field Diameter:	8.6 to 9.5 (m (± 0.6(m)
Cladding Diameter:	125.0 (m ± 1 (m
Mode field concentricity error	0.6(m
Cladding non-circularity	
Cable Cut-off Wavelength λ_{cc}	1260 nm
1550 nm loss performance	As per G.652 D
Proof Test Level	0.69 Gpa
Attenuation Coefficient:	@ 1310 nm 0.35 dB/km @ 1550 nm 0.21 dB/km
Chromatic Dispersion; **Maximum:** **Zero Dispersion** **Wavelength: Zero** **Dispersion Slope:**	18 ps/(nm x km) @ 1550 nm 3.5 ps/(nm x km) 1288-1339nm 5.3 ps/(nm x km) 1271-1360nm 1300 to 1324nm 0.092 ps/(nm^{2}xkm) maximum
Polarization mode dispersion coefficient	0.2 ps/km^½
Temperature Dependence:	Induced attenuation 0.05 dB (60C +85C)
Bend Performance:	@ 1310 nm (75±2 mm dia Mandrel), 100 turns; Attenuation Rise 0.05 dB/km @ 1550 nm (75±2 mm dia Mandrel), 100 turns; Attenuation Rise 0.10 dB/km @ 1550 nm (32±0.5 mm dia Mandrel, 1 turn; Attenuation Rise 0.50 dB/km

JEWAR TRANSMISSION LIMITED NEW DELHI

The size of OPGW shall be selected such that max tension and sag at specified temperature and wind condition remain within the limits indicated below:

S. No.	Parameter	For 47 m/sec Wind Zone
1.	Basic Span	380 m
2.	Wind Pressure	189.64 kg/sq-m
3.	Overall Diameter	0.011010 m
4.	Unit Weight	0.583 kg/m
5.	Ultimate Tensile Strength	7030 kg
6.	Tension at 32° C & Full wind	3200 kg
7.	Sag at 53° C & no wind	9.507 m
8.	Sag at 0° C & no wind	7.745 m

The above cases shall be considered for the spans from 100 m to 600 m in the range of 50 m spans. The full wind load shall be considered as the design wind load for all the specified transmission lines as per relevant IS 802 version and the sag-tension chart shall be submitted considering the transmission lines.

4. Electrical and Mechanical Requirements

Table 2-2(a) provides OPGW Electrical and Mechanical Requirements for the minimum performance characteristics. For the purposes of determining the appropriate Max Working Tension limit for the OPGW cable IS 802:1995 and IS 875: 1987 shall be applied. However the OPGW installation sag & tension charts shall be based on IS 802 version to which the line is originally designed. For the OPGW cable design selection and preparation of sag tension charts, the limits specified in clause 2.1.2.5 shall also be satisfied. The Bidder shall submit sag-tension charts for the above cases with their bids.

Table 2.2(a) : OPGW Electrical and Mechanical Requirements		
(1)	Everyday Tension	20% of UTS of OPGW
(2)	D.C. Resistance at 20C:	< 1.0 ohm/Km
(3)	Short Circuit Current:	6.32 kA for 1.0 second

TECHNICAL PARTICULARS OF CONDUCTOR AND EARTHWIRE

Technical particular of Conductor

S N	Code Name	Zebra	Panther
1	Copper Equivalent Area mm sq.	260	130
2	Total area mm sq.	484.5	261.30
3	No. of Strands	61	37



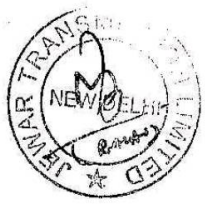
4	Stranding & wire diameter (mm) Aluminium (mm) Steel (mm)	 54/3.18 7/3.18	 30/3.00 7/3.00
5	Overall dia (mm)	28.62	21.00
6	Ultimate tensile strength (KN)	130.32	89.67
7	Conductor per phase	Single	Single
8	Weight (Kg/km)	1623	974
9	Final modulus of elasticity GN/mm2	69	80
10	Coff. Of linear expansion (0C)	19.3X10-6	17.8X10-6

Technical particular of Earthwire

SN	Code Name	7/9 SWG	7/10 SWG
1	Type (Galvanized steel)	95 kg/mm2	95 kg/mm2
3	No. of Strands	7	7
4	Stranding /diameter (mm) Steel (mm)	 7/3.66	 7/3.25
5	Overall dia (mm)	10.98	9.75
6	Ultimate tensile strength (Kg)	7030	5510
7	Weight (Kg/km)	580.5	460
8	Coff. Of linear expansion (0C)	11.5X10-6	11.5X10-6

TECHNICAL PARTICULARS OF INSULATOR STRING (FOR 132 KV LINES)

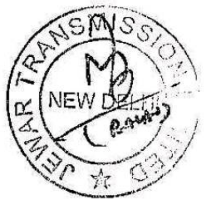
SN	String particular	Electro-mech strength(KN)	Weight of each disc (kgs)	Size of brown glazes insulator disc(kgs)
1	9 unit single suspension string	70	5.25	280X145
2	2X9 unit Double suspension string	70	5.25	280X145
3	10 unit single tension string	120	9.00	280X145
4	2X 10 unit double tension string	120	9.00	280X145



SPECIFIC TECHNICAL REQUIREMNETS FOR 220/132/33 kV AIS SUBSTATION

1. *GENERAL TECHNICAL REQUIREMENTS OF SPECIFICATIONS*

	SYSTEM PARTICULARS				
(i)	Rated System voltage				245KV, 145KV, 36KV
(ii)	System frequency & Number of phases				50 Hz, This may vary by ± 5% & Three
(iii)	Neutral				Effectively Earthed
(iv)	Auxiliary power supply:-				245KV, 145KV, 36KV
	Auxiliary electrical equipment shall be suitable for operation on the following supply system.				
	(a)	Power device(Like drive motors)			400V, 3Phase, 4Wire 50Hz Effectively earthed AC system.
	(b)	Lighting fixtures, space heaters, fractional Horse Power motors and control devices.			250V, 2wire, 50Hz, AC supply with one point grounded.
	(c)	DC alarm, Control and Protective			2wire ungrounded DC supplies
		Devices from sub station batteries as under			
	(i)	220/132KV S/S : 110V DC			
	(ii)	Communication equipment : 48 V DC			
	The above supply voltage is subject to variation as follows :				
	All devices must be suitable for a continuous operation over the entire range of voltage variations :				
	(i)	AC			Voltage may vary by ± 10%.
					Frequency by ± 5%
					Combined Voltage & frequency by ±10%.
	(ii)	DC			
				a)	220 V may vary between 187& 242 V
				b)	110 V may vary between 93 & 121 V
				c)	48 V may vary between 41 & 53 V
	SYSTEM PARAMETERS: The following system parameters shall prevail.				
	Nominal system voltage		**220KV**	**132 kV**	**33 kV**
	Nominal system voltage		**220KV**	**132 kV**	**33 kV**
	Highest system & Frequency		245KV & 50Hz	145 Kv & 50Hz	36 kV & 50Hz
	Rated short time current		40KA for 3 Sec.	31.5 kA for 3 sec	25 kA for 3 sec



	SYSTEM PARTICULARS			
	Dry and wet one minute power frequency withstand voltage	460KV	275 kV	95 kV
	Dry and wet impulse withstand voltage positive and negative	1050KVp	650 kVp	250 kVp
	System Earthing	Effectively Earthed	Effectively Earthed	Un- effectively

General criteria for using the conductors at 220/132/33 KV substations is as under :

S. No.	Bus/ Feeder	220kV Switch yard	132kV Switch yard	33kV Switch yard
1	Main Bus	Tarantulla	Tarantulla	Tarantulla
2	Transfer Bus/Auxiliary bus	Zebra	Zebra	Zebra
3	Jack Bus/Jumpers/Equipment Interconnection for			
A	Feeder	Zebra	zebra	2x Panther
B	160 MVA T/F	zebra	tarantula	
C	60 MVA T/F	Zebra	-	2x Zebra
D	40 MVA T/F		zebra	2x Zebra
E	TBC	Zebra	Zebra	Zebra
Sizes (Diameter in mm) for various conductors are as follows :				
	Moose -	31.775	Panther -	21.00
	Zebra -	28.575	Tarantulla -	36.61

2. *CONTROL CABINETS, JUNCTION BOXES, TERMINAL BOXES & MARSHALLING BOXES FOR OUTDOOR EQUIPMENT*

All types of boxes, cabinets etc. shall generally conform to in accordance with IS-5039/ IS- 8623, IEC-439, as applicable.

Control cabinets, junction boxes, marshalling boxes & terminal boxes shall be made of sheet steel or aluminum enclosure and shall be dust, water and vermin proof. Sheet steel used shall be at least 2.0 mm thick cold rolled or 2.5 mm hot rolled. The box shall be properly braces to prevent wobbling. There shall be sufficient reinforcement to provide level surfaces, resistance to vibrations and rigidity during transportation and installation. In case of aluminum enclosed box, the thickness of aluminum shall be such that it provides adequate rigidity and long life as

JEMAR TRANSMISSION LIMITED NEW DELHI

comparable with sheet steel of specified thickness.

3. *EARTHING*

Positive earthing of the cabinet shall be ensured by providing two separate earthing pads. The earth wire/ strip shall be terminated on to the earthing pad and secured by the use of self etching washer. Earthing of hinged door shall be done by using a separate earth wire.

4. TECHNICAL SPECIFICATION FOR 250 KVA 33/0.4 kV CLASS POWER TRANSFORMERS

The materials shall conform in all respects to the relevant Indian Standard Specifications with latest amendments indicated below:

Indian Standard	Title	International & Internationally Recognized Standard
ISS – 2026	Specification for Power Transformer	IEC 76
ISS – 3347/1967	Specification for Transformer's Porcelain Bushings	DIN 42531,2,3
ISS – 335	Specification for Transformer Oil	BS 148, IEC 296
IS-4237	General requirement for switch-gear & control gear for voltages not exceeding 1000 V.	
ISS-6600/1972	Guide for Loading of Oil immersed transformers	IEC 76
ISS – 1271	Insulating Material	
ISS-2099/1973	Specification for high voltage Porcelain Bushings.	BS 148 IEC 36 A
ISS-2393/1980	Cylindrical pins	
ISS-2633/1986	Methods of testing uniformity of zinc coated articles	
ISS – 5	Colours of Ready Mixed Paints.	

Equipment conforming to other internationally accepted standards, which ensure equal or higher quality than the standards mentioned above would also be acceptable. In case the Bidder who wish to offer material conforming to the other standards, salient points of difference between the standards adopted and the specific standards shall be clearly brought out in relevant schedule. Four copies of such standards with authentic English Translations shall be furnished alongwith the offer.

JEWAR TRANSMISSION LIMITED NEW DELHI

Principal Parameters

The transformer shall be suitable for outdoor installation with three phase, 50 Hz, conventional type copper wound distribution transformer ,Core type, Oil immersed and naturally cooled (Type ON), 33 kV system in which Neutral is effectively earthed and they should be suitable for service under fluctuation in supply voltage from +10% to – 15%. The transformer shall conform to the following specific parameters.

1. Continuous rated capacity	250 kVA
2. Rated Voltage HV	33 kV
3. Rated Voltage LV	0.4 kV
4. Frequency	50 Hz ±5%
5. No. of phase	Three
6. Method of connection HV	Delta
LV	Star
7. Vector Group	Dyll
8. Type of cooling	ONAN
9. Percentage impedance voltage on normal tap on kVA base corresponding to HV/LV rating and applicable tolerance as per ISS .	% impedance
(a) For 250 kVA (Tolerance ± 10%)	4.75%
10. Permissible temperature rise over ambient.	
i. of top oil measured by thermometer.	40 deg. C.
ii. of winding measured by resistance	50 deg. C
11. Tap changing gear	
i. Type	Off Load
ii. Provided on	HV winding
iii. Tap range	-5% to + 10%
iv. Tap steps	2.5%
12. Insulation Levels for windings	33 kV
a) 1.2/50 micro second wave shape impulse withstand (kVp)	170
b) Power frequency withstand voltage (kV rms)	70
c) Maximum continuous operating system voltage (kV rms)	36
13. Bushings	
(i) Voltage rating (amps)	36



(ii)	Current rating (amps)	As per required
(iii)	Insulation Level	
(a)	Lightening impulse withstand (kVp)	170
(b)	One minute power frequency withstand voltage (kV rms)	70

5. *TECHNICAL SPECIFICATION OF 245KV &145 KV SF6 CIRCUIT BREAKERS*

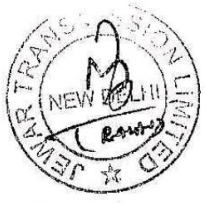
Standard	Title
IEC 62271-100 and IS-13118	Specification for alternating current circuit Breakers.
IEC – 376	Specification for acceptance of new supply of SF6.
IEC – 137	Bushing for A.C. Voltage.
IEC – 71	Electrical Clearances.
IEC – 694	Common clause for high voltage switch gear and control gear standard.
IS – 2147	Degree of Protection Provided for enclosures for low voltage switch gear and control gear.
IS – 2516	Specification for circuit Breaker
IS – 5578 & 11353	Making and arrangement for switch gear bus bar, Main Connections and auxiliary wiring.
IS – 2629	Recommended Practice for hot dip galvanizing of iron and steel.
IS – 2099	High voltage Porcelain bushings.
IS – 4379	Identification of the contents of Industrial Gas Cylinders.
IS – 7285	Seamless high carbon steel cylinders for permanent and high pressure liquefiable gas.

PRINCIPAL PARAMETERS

FOR 245 kV SF6 Circuit Breakers	
Rated nominal system voltage	220KV
Rated voltage	245KV
Rating of C.B.	MVA
Rated frequency	50 Hz
System neutral earthing	Effectively earthed
Type of C.B.	SF 6



FOR 245 kV SF6 Circuit Breakers	
No. of poles	3 – (pole operated)
Installation	Outdoor
Rated normal current	3150 Amp.
Rated short circuit breaking	RMS value of A.C. component current of the rated short circuit breaking current 40 kA for 3 Sec.
	D.C. component as per IEC-62210
Rated duration of short circuit	3 Sec.
Transient frequency voltage	The rated transient recovery voltage of the breaker shall be used on 4 parameter method as defined in IEC 62210
Terminal faults	1st pole of clear factor 1.3 value of 4 parameter as per IEC62210
Short line fault	As per IEC
Rated short circuit making capacity (peak)	100 kA
Operation duly cycle	0-t-co-t1 -co
	t = 0.3 Sec.
	t1 = 3 min.
Total breaking time	3 cycles
1.2/50 microsecond lightning impulse withstand voltage to earth	1050 KV (min.)
One minute power frequency dry withstand voltage to earth	460 KV (RMS)
Temperature rise	Final Steady State Temperature rise of current carrying part shall not exceed the limits specified in IEC 62210 with a site reference ambient temperature of 500C
Operating mechanism	Spring/Electro pneumatic.
Type of tripping	Trip free
Number of auxiliary contacts	12 Nos NO. and 12 Nos NC
No. of trip coils	2 Nos.
No. of closing coils	1 No.
Breaking line charging current	125 Amps. at 245KV



FOR 245 kV SF6 Circuit Breakers	
Interrupting capacity in KA for kilometric faults	40 KA (RMS)
Arcing time (at 100% interruption capacity)	25 milliseconds.
Minimum dead time	300 milliseconds.
No. of break per phase	One
Tripping and closing control circuit voltage	110 V.DC
First pole to clear factor	1.3
FOR 145 kV SF6 Circuit Breakers	
Rated nominal system voltage	132KV
Rated voltage	145KV
Rating of C.B.	7900 MVA
Rated frequency	50 Hz
System neutral earthing	Effectively earthed
Type of C.B.	SF 6
No. of poles	3 – (gang operated)
Installation	Outdoor
Rated normal current	1250 Amp.
Rated short circuit breaking	RMS value of A.C. component current of the rated short circuit breaking current 31.5KV for 3 Sec.
	D.C.component as per IEC-62271 – 100
Rated duration of short circuit	3 Sec.
Transient frequency voltage	The rated transient recovery voltage of the breaker shall be used on 4 parameters method as defined in IEC 62271-100
Terminal faults	1st pole of clear factor 1.5 value of 4 parameter as per IEC62210
Short line fault	As per IEC
Rated short circuit making capacity (peak)	80 KA
Operation duly cycle	0-t-co-t1 -co
	t = 0.3 Sec.
	t1 = 3 min.



FOR 245 kV SF6 Circuit Breakers	
Total breaking time	3 cycles
1.2/50 microsecond lightning impulse withstand voltage to earth	650 KV (min.)
One minute power frequency dry withstand voltage to earth	275 KV (RMS)
Temperature rise	Final Steady State Temperature rise of current carrying part shall not exceed the limits specified in IEC 62271-100 with a site reference ambient temperature of 500C
Operating mechanism	Mechanical spring/Electro pneumatic.
Type of tripping	Trip free
Number of auxiliary contacts	12 Nos NO. and 12 Nos NC
No. of trip coils	2 Nos.
No. of closing coils	1 No.
Breaking line charging current	50 Amps. at 145KV
Interrupting capacity in KA for kilometric faults	31.5 KA (RMS)
Arcing time (at 100% interruption capacity)	25 milliseconds.
Minimum dead time	300 milliseconds.
No. of break per phase	One
Tripping and closing control circuit voltage	110 V.DC
AUTOMATIC RAPID RECLOSING	
The operating duty of the circuit breaker shall be "O-Dead Time-CO-Re-closing Time-CO" in accordance with latest edition of IEC-62271-100. The values of dead time and reclaiming time shall be 0.3 second and 3 min. respectively.	

6. *TECHNICAL SPECIFICATIONS OF 36 KV VACUUM CIRCUIT BREAKERS*

STANDARD

The 36KV Vacuum circuit breaker shall comply with the requirements of latest issue of **IEC- 62210** except where specified otherwise in this specification. Equipment having better quality than the standards mentioned may also be considered provided documentary evidences are furnished.

PRINCIPLE PARAMETERS



The 36KV Vacuum circuit breaker shall be suitable for outdoor operation in solidly grounded system under climatic conditions specified and should have the following ratings:-		
i)	Nominal system voltage	33 KV
ii)	Highest system voltage	36 KV
iii)	Rates voltage	36 KV
iv)	Interrupting capacity	1000 KVA
v)	Rated normal current	1250 A
vi)	Rated frequency	50 c/s
vii)	Rated basic insulation level	170 KV
viii)	Rated short circuit current	25 KA
ix)	Rated short circuit making current	35 KA
x)	Rated operating sequence	0-0. 3 Sec.-Co-3 min-Co
xi)	Total break time for any current up to the rated breaking current	5-6 c/s
xii)	Control circuit voltage	110 VDC

GENERAL

The Vacuum circuit breakers shall provide for rapid and smooth interruption of current under all conditions, completely suppressing all undesirable phenomenons, even under the most severe conditions or while interrupting small currents, loading or logging reactive currents. The rate of rise of restriking voltage across the circuit breaker, switching on inductive or capacitive load, should not exceed 2,5 times the normal phase to neutral voltage. The total break time for the circuit breaker throughout the range of their operating duly shall be stated in the Bid and guaranteed particulars of the breaker.

7. *TECHNICAL SPECIFICATION OF 245 KV/145KV/36KV CURRENT TRANSFORMERS*

1.0	**STANDARDS :**		
1.1	Except as modified in this specification, the Current Transformers and accessories shall be in accordance with the latest editions of the following standards :-		
1.	IEC Publication 185	:	Current Transformers
2.	Draft Supplement to IEC publication 185 (1966)	:	CTs for protection system for which transient performance is significant.
3.	IS:2705 (Part-I to IV) 1991 & IEC 60444-1	:	Specification for CTs.
4.	IS : 2099	:	High voltage porcelain bushing.



5.	IS : 3347	:	Dimension for porcelain T/F
6.	IEC : 60-1973	:	High voltage test techniques.
7.	IS : 335	:	Insulating oil for T/F and switchgear.
8.	IS : 3202	:	Code of practice : climate proofing of electrical equipment.
9.	IEC-270-1968	:	Partial discharge measure-ment.
10.	IEC-44(4)-1980	:	Instrument transformers measurement of partial discharge.

TYPE & RATING :

The CTs should be of the outdoor type, single phase, 50 c/s, oil immersed, self cooled, hermetically sealed, suitable for operation in humid atmosphere in the tropical sun with climatic conditions as indicated in Clause 4.0 of General Technical Requirements. The CTs should also be suitable for use in area subject to heavy lightning storms. The CTs shall comply with requirements indicted below :-

S. No.	Particulars	245 KV CTs	145 KV CTs	36 KV CTs
1.	Nominal system voltage	220 KV (r.m.s.)	132 KV (r.m.s.)	33 KV(r.m.s.)
2.	Highest system voltage	245 KV (r.m.s.)	145 KV (r.m.s.)	36 KV(r.m.s.)
3.	Frequency	50 Hz	50 Hz	50 Hz
4.	Earthing of system	Effective	Effective	Effective
5.	Insulation level (BIL)	1050 KV (peak)	650 KV (peak)	170 KV (peak)
6.	Transformation ratio	1000/800/500/300/1A	800- 500/1A (For160MVA T/F) 400-200-100/1A (For 40 MVA T/F) 800-400-200/1A (For Feeders)	400-200/1A (For Feeders) Two cores. 800-400/1A(For T/F) Three cores.
7.	No. of cores	Five	Three	Two /Three
8.	Short time current rating (Corresponding to 6500 MVA-fault level)	40 KA for 3 sec.	31.5 KA for 3 sec.	25 KA for 3 sec.
9.	Creepage distance of bushing.	6125 mm (min.)	3625 mm (min.)	900 mm (min)
10.	Ratio selection	Primary reconnection & Secondary tapings.	Primary reconnection & secondary tapings	Primary reconnection & secondary tapings.

JEWAR TRANSMISSION LIMITED NEW DELHI

S. No.	Particulars	245 KV CTs	145 KV CTs	36 KV CTs
11.	Continuous primary current	120% of rated primary current.	125% of rated Primary current.	120% of rated primary current.
12.	Short time primary current.	Twice rated current.	Twice the rated current.	Twice the rated current.
13.	Continuous secondary current rating.	120%	2 Amps.	2 Amps. (min.)
14.	Rated withstand dynamic current (2.5) times of short time current rating.	100 KA (peak)	78.5 KA (peak)	62.5 KA (Peak)
15.	One minute power frequency withstand voltage (KV)	460 KV	275 KV	70 KV

245 KV C.T. REQUIREMENT

Core No.	Application	Current Ratio (A/A)	Output Burden (VA)	Accuracy Class	Values at Maximum Tap		
					Min. Knee point Voltage (Volts)	Max. Exciting current (mA)	Max. CT Secondary winding Resistance (Ohms)
1	2	3	4	5	6	7	8
I	Transformer Diff. I/ Distance Protection Main-I	1000-800-500-300/1	-	PS	1100	80	5 Ω
II	Transformer Diff.II /Distance protection Main-II	- do -	-	PS	1100	80	5 Ω
III	Metering*	- do -	30 VA	0.2	-	-	-
IV	Bus Bar Diff. Main	- do -	-	PS	1100	80	5 Ω
V	Bus Bar Diff.	- do -	-	PS	1100	80	5 Ω

**** Instrument Security Factor for Metering Core should not exceed 5.***

JEWAR TRANSMISSION LIMITED NEW DELHI

145 KV C.Ts REQUIREMENTS

TYPE- A (For 132 kV Feeders)

Core No.	Application	Current Ratio (A/A)	Output Burden (VA)	Accuracy Class as per IEC-185	Minimum Knee point Voltage (Volts)	Max.Exciting current at half knee point voltage (mA)	Maximum CT secondary winding Resistance at 75 deg C (Ohms)
I	Distance Protection	800/1	-	PS	1100	20 at VK/2	5 Ω
		400 /1	-	PS	1100	20 at VK/2	5 Ω
		200/1	-	PS	550	40 at VK/2	2.5Ω
II	Over Current & E/F Protection	800/1	-	PS	1100	20 at VK/2	5 Ω
		400 /1	-	PS	1100	20 at VK/2	5 Ω
		200/1	-	PS	550	40 at VK/2	2.5Ω
III	Metering*	800/1	20	0.2	-	-	-
		400/1	20	0.2	-	-	-
		200/ 1	20	0.2	-	-	-

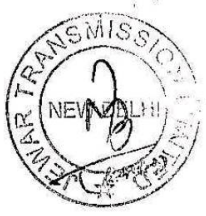
**** Instrument Security Factor for Metering Core should not exceed 5.***

TYPE- B (For 132 kV side of 160 MVA 220/132 kV Transformers)

1	2	3	4	5	6	7	8
I	Differential Protection	800-500/1	-	PS	1100	20 at VK	5 Ω
II	Over Current & E/F	800-500/1	-	PS	1100	20 at VK	5 Ω
III	Metering*	800-500/1	20 VA	0.2	-	-	-

TYPE- C (For 132 kV side of 40 MVA 132/33kV kV Transformers)

1	2	3	4	5	6	7	8
I	Differential Protection	400/1	-	PS	1100	20 at VK/2	5 Ω
		200 /1	-	PS	550	40 at VK/2	2.5 Ω
		100/1	-	PS	550	40 at VK/2	2.5Ω
II		400/1	-	PS	1100	20 VK/2	5 Ω



	Over Current & E/F Protn.	200 /1	-	PS	550	40 VK/2	2.5 Ω
		100/1	-	PS	550	40 VK/2	2.5 Ω
III	Metering*	400/1	20	0.2	-	-	-
		200/1	20	0.2	-	-	-
		100/ 1	20	0.2	-	-	-

**** Instrument Security Factor for Metering Core should not exceed 5.***

36 KV C.T. REQUIREMENTS

TYPE- A (For 40 MVA Transformers)

1	2	3	4	5	6	7	8
I	Metering*	800/1	10	0.2	-	-	-
		400/1	10	0.2	-	-	-
II	Protection	800/1	-	PS	400	30	4 Ω
		400 /1	-	PS	400	30	4 Ω
III	Protection	800/1	-	PS	400	30	4 Ω
		400 /1	-	PS	400	30	4 Ω

TYPE- B (For 33 kV Feeders)

1	2	3	4	5	6	7	8
I	Metering*	400/1	10	0.2	-	-	-
		200/1	10	0.2	-	-	-
II	Protection	400/1	20	5P10	-	-	-
		200 /1	20	5P10	-	-	-

**** Instrument Security Factor for Metering Core should not exceed 5.***

8. TECHNICAL SPECIFICATION OF 245 KV CAPACITOR VOLTAGE TRANSFORMERS

STANDARDS:

Unless otherwise specified elsewhere in this specification, the rating as well as performance and testing of the 245 KV Capacitor Voltage Transformers along with associated accessories shall conform but not limited to the latest issues/amendments of standards available at the time of placement of order of all the relevant standards as listed hereunder.

Sl. No.	Standard No.	Title
1.	IS: 3156 (part IV)	Capacitor Voltage Transformers



2.	IS: 2099	High voltage porcelain Bushings
3.	IS: 2071	Method of High voltage testing
4.	IS: 335	Insulating oil for transformers and switching
5.	IS: 2165	Insulation Co-ordination for equipment of 100 kV and above.
6.	IEC-186	Voltage Transformers: Chapter-III Capacitor Voltage Transformers: Chapter-IV
7.	IEC-186A	First supplement to IEC Publication:186
8.	IEC-270	Partial Discharge Measurement.
9.	IEC-171	Insulation co-ordination
10.	IEC-358	Coupling capacitor divider.
11.	IEC-60	High Voltage Testing Techniques.
12.	IS: 9348	Coupling capacitors and capacitor dividers.

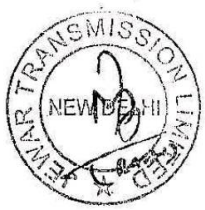
PRINCIPAL TECHNICAL PARAMETERS

8.1 The Voltage Transformers shall conform to the following specific parameters:

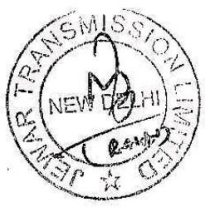
S. No	Parameters	Specification
1	2	3
1.	Type of installation	Single Phase, Oil filled hermetically sealed and outdoor types
2.	Type of mounting	Pedestal type
3.	Suitable for system frequency	50 Hz ± 5%
4.	Highest system Voltage	245 Kv
5.	Transformation ratio on all windings	$\frac{220,000}{\sqrt{3}} / \frac{110}{\sqrt{3}}$
6.	Method of earthing	Effectively earthed
7.	1.2/50 micro second lightning impulse withstand voltage kV (peak)	1050
8.	1 minute dry power frequency withstand voltage kV (rms)	460
9.	Min. Creepage Distance mm.	6125
10.	Radio interference Voltage at 266 kV	Not exceeding 500 micro volts

9. REQUIREMENT OF 245 KV CVT

S. No.	DETAILS	PARTICULARS
1.	Transformation ratio on all windings	$\frac{220,000}{\sqrt{3}} / \frac{110}{\sqrt{3}}$ (No. of secondary windings 3)
2.	Supply frequency	50 Hz.
3.	Type	Capacitor voltage type.
4.	Rated voltage factor	1.2 continuous 1.5 for 30 seconds.



5.	Application	Winding I Protection	Winding II Protection	Winding III Metering/Synchro.
6.	Accuracy	3P	3P	0.2
7.	Phase angle error	--------- As per IS ----------		
8.	Output burden	150 VA	150 VA	50 VA
9.	Rated capacitance	4400 + 10% - 5%		
10.	Rated total thermal burden	750 VA		
11.	Standard reference range of frequency for which the accuracies are valid.	97% to 103% for protection & 99% to 101% for measurement.		
12. a)	One minute power frequency test on secondary winding.	3 KV (r.m.s.)		



S. No.	DETAILS	PARTICULARS
b)	Withstand voltage between low voltage terminal and earth terminal	4 KV (r.m.s.)
(Note : This test voltage shall be 10 KV (r.m.s.) in the low voltage terminal exposed to weather).		
c)	Radio interference voltage of 266 KV (r.m.s.)	Not exceeding 500 microvolts.
13.	Corona extinction voltage.	320 KV (r.m.s.)
15.	Partial discharge level at rated voltage for capacitor divider.	Less than 10 pico coulombs

10. TECHNICAL SPECIFICATION OF 145 KV POTENTIAL TRANSFORMERS

STANDARDS :

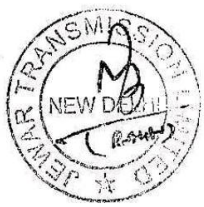
Unless otherwise specified elsewhere in this specification, the rating as well as performance and testing of the 145 KV Potential Transformers along with associated accessories shall conform but not limited to the latest issues/ amendments of standards available at the time of placement of order of all the relevant standards as listed hereunder.

Standard No.	Title
IS:3156:1992) Transformers	Specification for Voltage (Part I to III) & IEC 186: 1987
IS:2099	Specification for High Voltage porcelain bushing
IS:335	Specification for Insulating oil for T/F & Switchgear
IS:3202	Code of practice: climate proofing of Electrical equipment
IS:4146: 1983	Application Guide for Voltage Transformers.
IS: 2629	Recommended practice for hot dip galvanizing of iron & steel.

PRINCIPAL TECHNICAL PARAMETERS

The Potential Transformers shall conform to the following specific parameters:

Parameters	Specification 145 kV
Type of installation	Single phase, Oil immersed, self cooled, Hermetically sealed, Outdoor type.
Type of mounting	Mounting on steel structures
Suitable for system frequency	50 Hz ± 5%
Highest system voltage	145 kV
Transformation ratio on all windings	$\frac{132,000}{\sqrt{3}} / \frac{110}{\sqrt{3}}$
Method of earthing	Solidly Grounded



Parameters	Specification 145 kV
1.2/50 micro second lightning impulse withstand voltage kV (peak)	650
1 minute dry power frequency withstand voltage kV (rms)	275
One minute power frequency withstand voltage on secondary	3 kV
Min. Creepage Distance mm.	3625
Voltage ratios and other requirements of the Voltage Transformers shall comply with the requirement indicated in Annexure-I (B) for 145kV PTs respectively.	
Maximum permissible temperature rise of windings of voltage transformers shall be 45 ^{0}C over an ambient of 50^{0}C.	

REQUIREMENT OF 145 KV PT

S. No.	DETAILS	PARTICULARS		
1.	Transformation ratio on all windings	$\frac{132,000}{\sqrt{3}} / \frac{110}{\sqrt{3}}$ (No. of secondary windings 3)		
2.	Supply frequency	50 Hz.		
3.	Type	Single phase, Oil immersed, self cooled, Hermetically sealed, Outdoor type.		
4.	Rated voltage factor	1.2 continuous and 1.5 for 30 seconds.		
5.	Application	Winding I Protection	Winding II Protection	Winding III Metering
6.	Accuracy	3P	3P	0.2 Note : Acc. of 0.2 to be maintained up to and including a total simultaneous burden of 100 VA on all the windings.
7.	Phase angle error	As per relevant IS		
8.	Output burden	50 VA	50 VA	50 VA
9.	Creepage distance of bushing	3625 mm (minimum).		
10.	Total simultaneous burden	100 VA		
11.	One minute power frequency withstand voltage on secondary.	3 KV (r.m.s.)		
12.	Rated Power Factor	0.8		
13.	Class of insulation in windings	A		



11. TECHNICAL SPECIFICATION OF 36KV POTENTIAL TRANSFORMERS

SCOPE :

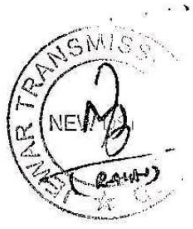
This Specification covers the design, manufacture, assembling, testing at manufacturers' works, supply and delivery of single phase Potential Transformers with terminal connectors and junction boxes for service in 33 KV, three phase system.

Type & Rating :

The potential transformers shall be outdoor type, single phase, oil immersed, self cooled, suitable for operation on three phase, 50 c/s, 33 KV Solidly Grounded system where the short circuit level of the system is of the order of 1000 MVA under the tropical climate conditions specified under General Requirement of Specification.

The potential transformers should have the following ratings:-

1. Rated Voltage	33 KV
2. Nominal System Voltage	33 KV
3. Highest System Voltage	36 KV
4. Type of Supply	3- Phase A.C.
5. Frequency	50 Cycles/sec.
6. Earthing	Solidly Grounded
7. No. of Secondary Windings	Two
8. Transformation Ratio:	Winding – I & II 33 KV/√3 / 110 Volt/√3
9. Rated Burden:	
Winding – I	50 VA each
Winding –II	50 VA each
10. Accuracy Class:	
Winding – I	0.2 for metering
Winding – II	3P for protection
11. Basic Insulation Level (Impulse)	170 KV (Peak)
12. Creepage distance	900 mm (minimum)
13. Rated Voltage Factor:	
	(a) Continuous 1.1
	(b) 30 seconds 1.5
14. Service Conditions	Outdoor, direct in Sun service.
STANDARDS:	
The potential transformers should confirm in all respects to latest edition of ISS: 3156/1965 except wherein specified otherwise.	
1. Rated Voltage	33 KV
2. Nominal System Voltage	33 KV
3. Highest System Voltage	36 KV
4. Type of Supply	3- Phase A.C.



5. Frequency	50 Cycles/sec.
6. Earthing	Solidly Grounded
7. No. of Secondary Windings	Two
8. Transformation Ratio:	Winding – I & II 33 KV/√3 / 110 Volt/√3

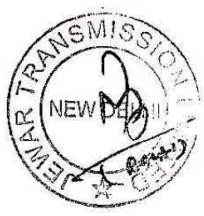
REQUIREMENT OF 36 KV PT

S. No.	DETAILS	PARTICULARS	
1.	Transformation ratio on all windings	$\frac{33,000}{\sqrt{3}} / \frac{110}{\sqrt{3}}$ (No. of secondary windings 2)	
2.	Supply frequency	50 Hz.	
3.	Type	Single Phase wound electromagnetic type PT	
4.	Rated voltage factor	1.1 continuous 1.5 for 30 seconds.	
5.	Application	Winding I Metering	Winding II Protection
6.	Accuracy	0.20 Note : Acc of 0.2 to be maintained up to and including a total simultaneous burden of 75 VA on all the three windings.	3P
7.	Phase angle error	As per relevant IS	
8.	Output burden	50 VA	50 VA
9.	Total simultaneous burden	75 VA	
10.	One minute power frequency withstand voltage on secondary.	3 KV (r.m.s.)	
11.	Rated Power Factor	0.8	
12.	Class of insulation in windings	A	
13.	Method connection which will be adopted		
	-Primary winding	Star/earthed	
	-Secondary winding I	Star/earthed	
	-Secondary winding II	Open delta	

12. **TECHNICAL SPECIFICATION FOR 245 AND 145 KV MOTOR OPERATED**

ISOLATORS STANDARDS

The Isolators shall conform to the latest revisions with amendments available of relevant standards, rules and codes, some of which are listed herein for ready reference.



Sl. No.	Standard	Title
1.	IEC-168	Tests on indoor and outdoor post insulators of ceramic material or glass for systems with nominal voltages greater than 100
2.	IEC-129	Alternating Current disconnectors and earthing switches.
3.	IS-1818	Specification for alternating current isolators (disconnectors) and earthing switches.
4.	IS-9921	Specification for outdoor air break isolators and earthing switches for voltages up to 220 kV.
5.	IS-5561	Electrical power connectors
6.	IS-325	Specification for three phase induction motors.
7.	IS-3202	Code of practice for climate proofing of electrical equipment
8.	IS-2544	Specification for porcelain post insulators (3.3 kV and above)

TECHNICAL SPECIFICATIONS FOR 36 kV ISOLATORS

1.0	TYPE OF ISOLATORS	
	a) Three phase, 1250 A, 36 kV manually operated, Standard isolators without earth switch.	
	b) Three phase, 1250 A, 36 kV manually operated, Standard isolators with one earth switch.	
2.0	PRINCIPAL PARAMETERS	
Sl. No.	Details	36 kV Isolator
1	Rated Voltage	36 kV
2	System frequency	50 Hz
3	System Earthing	Effectively earthed
4	Type of Isolator	Outdoor, Horizontal air break suitable for upright mounting
5	Continuous current rating	1250 A
6	Operating mechanism	Manual
7	Phase to phase spacing	1500 mm
8	Rated short time withstand current	25 kA (rms)
9	Rated peak short circuit current	62.5 kA (peak)
10	Temperature rise	As per IEC-129 derated for an ambient of 50^0C
11	Seismic co-efficient	0.3 g.



12.	1.2/50 microsecond full wave positive and negative impulse withstand voltage to earth	70 kV (peak)
13.	One minute power frequency withstand voltage dry & wet to earth	70 kV (rms)

14.	Auxiliary Contacts	4 normally open and 4 normally closed.
15	Insulation level of insulators	
	i) Impulse voltage withstand test (1.2/50 micro second full wave)	170 kV (peak)
	ii) Power frequency withstand voltage to earth (dry & wet)	70 kV (rms)
16	Creepage distance of insulators :	
	i) Total	900 mm
	ii) Protected	450 mm
17	Minimum strength :	Suitable to withstand wind, short circuit and operating forces
	i) Torsional	
	ii) Cantilever	
18	Interlocks with circuit breaker	1 set of electrical and castel type interlocks.
19	Type of contacts	Hard drawn electrolytic copper with silver plating
20	Conductor take off	Horizontal/vertical according to actual requirement.
21.	Phase-to phase clearance	1500 mm

TECHNICAL SPECIFICATION FOR 245/145/36KV SOLID CORE POST INSULATORS

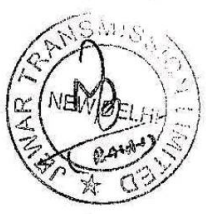
STANDARDS

Insulators should conform to the latest publications of IS 2544 & IEC in all respects except BIL which should be 1050Kvpfor 245 kV, and 650 kVp for 145 kV withstand. Equipment meeting any other authoritative standards which ensures equal or better quality than the IS mentioned above, is also acceptable.

REQUIREMENT FOR INSULATORS



FOR 245 AND 145 KV POST INSULATORS			
Nominal voltage	:	245 KV	145 kV
Highest system voltage	:	245 KV	145 kV
Sytem frequency	:	50Hz.	50 Hz.
Number of phases	:	3 (Three)	3 (Three)
Neutral	:	Effectively earthed	Effectively earthed
Short circuit current	:	40.0 KA	31.5 KA
Phase to phase spacing	:	4.5 meters	3.0 meters



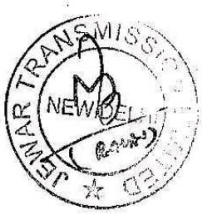
Height of the insulator support structure.	:	2750 mm.	2750 mm
PCD of Top Flange	:	127 mm.	127 mm
PCD of Bottom Flange	:	184 ± .2 mm.	184± .2 mm
BIL	:	1050 KV	650 mm
Height of insulator	:	2300.00mm	1500 mm
FOR 36 KV POST INSULATORS			
Nominal voltage	:	36 KV	
Highest system voltage	:	36 KV	
Sytem frequency	:	50Hz.	
Number of phases	:	3 (Three)	
Neutral	:	Effectively earthed.	
Short circuit current	:	25.0 KA	
Phase to phase spacing	:	1.5 meters	
Height of the insulator support structure.	:	2750 mm.	
PCD of Top Flange	:	127 mm.	
BIL	:	250 KV	
Height of insulator	:	508.00 mm	

13. **TECHNICAL SPECIFICATIONS OF 198 KV/120 KV/30 KV 10KA METAL OXIDE GAPLESS SURGE ARRESTERS**

STANDARDS

The Lightning Arrester shall conform to the latest revision with amendments available of the relevant standards, rules and codes some of which are listed herein for ready reference:

Sl. No.	Standard	Title
1.	IEC 99 – 4	Specification Part – 4 for Lightning Arrester without gap for AC system
2.	IS: 3070	Specification for lightning Arrester for alternating current system Part
3.	IS: 2629	Recommended Practice for hot dip galvanizing of iron and steel
4.	IS: 2633	Method for testing uniformity of coating on Zinc coated articles
5.	IS: 5621	Specification for large hollow porcelain for use in electrical installation
6.	IS: 2174	Degree of protection provided by enclosure for low voltage switch-gear and control
7.	IEC: 71	Electrical Clearances



Sl. No.	Standard	Title			
8.	IS: 12063	Classification of degree of protection provided by enclosure of electrical equipment.			
	PRINCIPAL PARAMETERS				
•	Rated system voltage		245 KV	145 KV	36 KV
•	System neutral earthing		Effectively earthed		
•	Installation		Outdoor		
•	Rated arrester voltage		198 KV	120 KV	30 KV
•	Max. continuous operating voltage (MCOV) at 50^0C		168 KV	102 KV	24 KV
•	Nominal discharge current		10 KA (8/20 microwave)		
•	Rated frequency		50 Hz		
•	Minimum line discharge capacity		2 KJ / KV		
•	Power frequency reference voltage		Not less than MCOV		
•	Max. Residual voltage at nominal discharge current of 10 KA and 8/20 Micro Sec.		550 KV_P	400 KV_P	100 KV_P
•	Peak & value of high current (4/10 Microwave)		100 KA		
•	Creepage distance		25 mm/KV		
•	Partial discharge test on 1.05 MCOV		Net more than 50 Pico coulombs		
•	One minute power frequency voltage of arrester housing		460 KV	275 KV	70 KV
•	Impulse withstand voltage of arrester housing with 1.2/50 micro second wave.		1050 KV_P	650 KV_P	170 KV_P
•	Minimum prospective fault current.		40 KA		
•	Radio interference voltage		Not more than 500 micro volts.		
•	Pressure relief class		Class-A		
•	Current for pressure relief.		40 KA		
•	Seismic acceleration		0.3 g.		
•	Long duration discharge class		Class 3 (as per IEC)		

The details of the equipments to be protected by these surge arresters are as under :-

Equipment	Basic Insulation level		
	220 KV	132 KV	33 KV
Transformer 220 KV side	950 KV_P	550 KV_P	170 KV_P
Switchgears, CTs and CVTs	1050 KV_P	650 KV_P	170 KV_P

JEWAR TRANSMISSION NEW DELHI

RELAYS:

All relays shall conform to the requirements of IS: 3231 or other applicable approved standards. Relays shall be suitable for flush or semi-flush mounting on the front with connections from the rear. Relays shall be rectangular in shape and shall have dust tight, dull black or egg shell black enamel painted cases with transparent cover removable from the front.

TRANSMISSION LINE PROTECTION:

The Line Protection Relays are required to protect the line and clear the faults on line within shortest possible time with reliability, selectivity and full sensitivity to all type of faults on lines. The general concept is to have primary & back up protection having equal performance requirement specially in respect of time as provided by Main protection called Main and Backup Protection.

APPLICABLE STANDARDS

IS 14697: 1999	Specification for A.C Static Transformer operated Watt Hour & VAR – Hour meters, class 0.2S & 0.5S
CBIP Technical Report No. 88 (Revised July 1996 and Amendments & Errata issued in April - 1999 and September'99)	Specification for A.C. Static Electrical Energy Meters.
IEC – 687	Alternating current static watt-hour meters for measurement of active energy, class 0.2
IS- 3202	Climatic proofing of electrical equipment.

STANDARDS:

The design, manufacture and performance of all the equipment and material provided under this specification shall generally conform to the latest issues of the following:-

Indian Standard	Title	International & Internationally Recognized standards
IS: 3231	Electrical Relays for Power system Protection	IEC-255 Part 1 to 3, BS:142
IS: 1248 & IS: 419	Indicating Instruments	BS: 89
IS: 6236	Recorders	BS: 90
IS: 722 (Part-I to IX)	Energy Meters	BS: 37/IEC-521
IS: 6875	Control Switches (LV switching devices for Control and Auxiliary circuits)	IEC: 337 & 337-1
IS: 1885 (Part-I & II)	Electro-Technical Vocabulary, Electrical Relays & Electrical Power System Protection	
IS: 2705	Current Transformers	IEC: 185
IS: 3156	Voltage Transformers	IEC-186

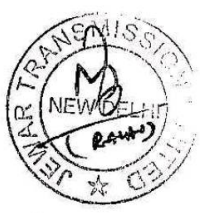


Indian Standard	Title	International & Internationally Recognized standards
IS: 375	Marking & Arrangements for Switchgear, Busbar, Main connection and Auxiliary wiring	
IS: 5	Colours for ready mixed paints and channels stability tests	BS: 142
IS: 1554 (Part)	PVC insulated cables upto and including 1000 Volts.	
IS: 3842 (Part-I to VIII)	Application guide for Protective Relays	
IS: 4483 (Part-I & II)	Preferred Panel Controls and Dimensions	
IS: 9224 (Part-II)	HRC Cartridge fuse links	
IS: 2147	Degrees of Protection provided by enclosures for LV switchgear and control gear	
IS: 6005	Code of Practice for Phosphating Iron and Steel	
IS: 8686	Specification for static protective relays & tests	IEC-255 Part-V & VI, IEC-801-4
IS: 4237	General requirement of switchgear and control gear for voltages not excluding 1.1 kV	
IS: 5578	Guide for marking of insulated conductors	
IS: 11353	Guide for uniform system of marking and identification of conductor & apparatus terminals	
IS: 13010	Energy Meters	
CBIP Pub No.274	Manual on Protection of Generators, Generator Transformers and 220kV & 400kV network	
CBIP Pub No: 296	Manual on Reliable fault clearance and Back up protection of EHV & UHV Transmission Networks	
IEC 60870	Communication Protocol	IEC 60870
IEC 61850	Substation Automation Protocol	IEC 61850

PLCC

Power line carrier communication (PLCC) equipment complete for speech transmission line, tele-protection commands and data channels shall be provided on each 220 kV and 132 kV transmission lines. The protection for transmission line and the line compensated equipment shall have 100% backup communication channels. The PLCC equipments shall in brief include the following :-

Coupling Device, line traps, carrier terminals, protection couplers, HF cables, PABX and maintains and testing instruments.



A telephone exchange (PABX) of 24 lines shall be provided at new substation as meansof effective communication among various buildings of the substation, remote end substation and with controls centres (RLDC/SLDC) etc.

Coupling Devices shall be suitable for 220 kV and 132 kV. Phase to Phase coupling for 220 kV and 132 kV single circuit line shall be provide. For Double circuit line inter circuit coupling can be provided. The pass band of coupling devices shall have sufficient margin for adding communication channel in future if required. Necessary protection devices for safety of personal and low voltage part against power frequency voltages and transient voltage shall also be provided.

The line traps shall be broad band turned suitable for blocking the complete range of carrier frequencies. Line trap shall have the necessary protective devices such as lighting arresters for the protection of tuning device and shall be equipped with corona rings. Decoupling network consisting of line traps and coupling capacitors may also be required at certain substation in case of extreme frequency congestion.

Wherever Fiber Optic/OPGW based telecommunication terminal equipment (i.e. SDH/MUX) are being provided, the same shall be utilized for Data, Voice and line protection applications. For protection purposes, both end Digital ProtectionCouplers (DPCs) shall be included at both ends. However, for line protection application, back up communication channel/link may be considered as perrequirement so as to take care of OPGW/ telecommunication equipment outage.

Addition/Modification/Shifting/Re-commissioning etc. as required of PLCC due to LILO of transmission lines shall be covered under the scope according to element wise detailed given below:-

S. No.	Details of element (line)	Coverage under the scope
1	LILO of one ckt. of 220 kV Sarnath (400) – Gajokhar DC line at Cantt. (Chaukaghat) Varanasi. Construction of 41.5 Km (37 Km overhead line (Zebra Conductor) on Lattice Tower and construction of 4.5 Km 630 mm2 line with copper XLPE cable	Addition/Modification/Shiftin g/Re- commissioning of PLCC shall be covered under the scope
2	LILO of one ckt. of 220 kV Muradnagar (400) – Sahibabad (220) SC line at 220 kV substation Vasundhara (Ghaziabad) (Multi Ckt./Monopole Tower) (Zebra conductor)	Addition/Modification/Shiftin g/Re-commissioning of PLCC shall be covered under the scope



PLCC equipment for the transmission lines at serial 01 & 02 covered under the package (Consisting of one set of analog PLCC channel along with circuit protection coupler and one set of Digital Protection Coupler for both ends of one line segment due to LILO of existing line) shall be provided by the bidder. All other associated equipment for ends cabling, coupling device and HF cable shall be provided by the bidder. 48 kV DC Power supply for PLCC panels shall be provided by the respective substation bay owner. The wave traps, CVTs required for communications from PLCC shall be provided by respective substation owner.

Fire Fighting System

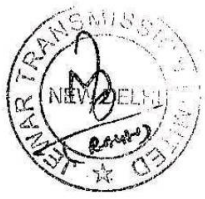
Fire Fighting System is general conforms to fire insurance regulations of India. The fire fighting system is proposed with both AC motor & diesel engine driven pumps housed in a fire fighting pump house building along with water storage tank of adequate capacity. Automatic heat actuated mulsifying system us proposed for transformers & reactors. In addition for alarm system based on heat/smoke detectors are proposed to be installed at sensitive points in a substation e.g. Cable Vault, Control Room building and other building etc. further, adequate water hydrants and portable fire extinguishers shall be provided in the substations. At existing substations the fire fighting system if already available, would be extended for meeting the additional requirements.

Illumination

Adequate normal & emergency AC & DC illumination shall be provided in the control room, GIS hall & other building of the substation. The switchyard shall also be provided with adequate illumination. The entire control room building, fire fighting pump house lighting shall be done by LED based low power consumption luminaries.

Control Room

Substation control room would be provided to house substation work station for station level control along with its peripheral and recording equipment, AC & DC distribution boards, DC batteries & associated battery chargers, Fire Protection panels, Telecommunication panels & other panels as per requirements. Air conditioning will be provided in the building as functional requirements.



SPECIFIC TECHNICAL REQUIREMENT FOR COMMUNICATION FOR

220 KV AND 132 KV LINES

In order to meet the requirement for grid management and operation of substations, Transmission Service Provider (TSP) shall conform to the following requirements.

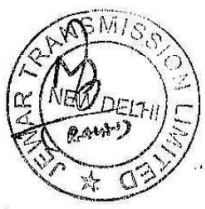
On 220 kV and 132 kV D/C lines one OPGW containing 24 fibers is to be installed in place of conventional earth wire for grid management and substation operationpurpose by STU/CTU and 48 fibers to be installed on LILO lines.

220 kV, 132 kV, 66 kV, 33 kV & 11 kV System

SL No	Description of parameters	220 kV System	132 kV System	66 kV System	33 kV System	11kV System
1.	System operating voltage	220 kV	132 kV	66 kV	33 kV	11 kV
2.	Maximum operating voltage of the system (rms)	245 kV	145 kV	72.5 kV	36 kV	12 kV
3.	Rated frequency	50	50 Hz	50 Hz	50 Hz	50 Hz
4.	No. of phase	3	3	3	3	3
5.	Rated Insulation levels					
	i. Full wave impulse withstand voltage (1.2/50 micro sec.)	1050 kVp	650 kVp	325 kVp	170 kVp	75 kVp
	ii. One minute power frequencydry and wet withstand voltage (rms)	-	275 kV	140 kV	70 kV	28 kV
6.	Corona extinction voltage	156 kV	105 kV	-	-	-
7.	Max. radio interference voltage for frequencybetween 0.5 MHz and 2MHz at 92 kV rms for132 kV system	1000 micro-volts	500 micro-volts	-	-	-
8.	Minimum creepage distance (25mm/kV)	6125mm	3625mm	1813mm	900mm	300mm
9.	Min. Clearances					
	i. Phase to phase	2100mm	1300mm	750mm	320mm	280mm
	ii. Phase to earth	2100mm	1300mm	630mm	320mm	140mm



	iii. Sectional clearances	5000mm	4000mm	3000mm	3000mm	3000mm
10.	Rated short circuit current for1 sec. Duration	40kA/50kA (as applicable)	31.5 kA	31.5 kA	25 kA	25 kA
11.	System neutral earthing	Effectively earthed	Effectively earthed	Effectively earthed	Effectively earthed	Effectively earthed



TECHNICAL SPECIFICATION OF 220/33 kV SUBSTATION CANTT (CHAUKAGHAT), VARANASI & VASUNDHARA (GHAZIABAD)

SYSTEM PARTICULARS

(i) Rated System voltage	245kV, 36kV
(ii) System frequency	50 Hz, This may vary by ± 5%
(iii) Number of phases	Three
(iv) Neutral	Effectively Earthed

(v) **Auxiliary power supply:-**

Auxiliary electrical equipment shall be suitable for operation on the following supply system:

(a) Power device (Like drive motors)	400V, 3Phase, 4Wire 50Hz Effectively earthed AC system.
(b) Lighting fixtures, space heaters, fractional Horse Power motors and control devices.	250V, 2wire, 50Hz, AC supply with one point grounded.
(c) DC alarm, Control and Protective Devices	2wire ungrounded DC supplies from sub station batteries as under
(i) 220/132kV S/S :	110V DC
(ii) Communication : equipment	48 V DC

The above supply voltage is subject to variation as follows:

All devices must be suitable for a continuous operation over the entire range of voltage variations :
(i) AC Voltage may vary by ±

10%. Frequency by ± 5%

JEMAR TRANSMISSION LIMITED NEW DELHI

Combined Voltage & frequency by ±10%.

(ii) DC

a) 220 V may vary between 187 & 242 V

b) 110 V may vary between 93 & 121 V

c) 48 V may vary between 41 & 53 V

SYSTEM PARAMETERS

The following system parameters shall prevail:

Sl. No.	Description of Parameters	220 kV System	33 kV System
1	Nominal system voltage	220kV	33kV
2	Maximum operating voltage of the system(rms)	**245kV**	**36kV**
3	Rated frequency	50Hz	50Hz
4	No. of phase	**3**	**3**
5	Rated short time current	40 kA for 3 Sec	25 kA for 3 sec
6	Dry and wet one minute power frequency withstand voltage	460 kV	**95kV**
7	Dry and wet impulse withstand voltage positive and negative	1050 kVp	250 kVp
8	Corona extinction voltage	156 kV	-
9	Max. Radio interference voltage for frequency between 0.5 MHz and 2 MHz at 508 kV rms for 765kV, 320kV rms for 400kV system and 156kV rms for 220kV system & 92kV rms for 132kV system	1000 microvolt	-
10	Minimum total creepage	25mm /kV (6125 mm)	25mm/kV (1300 mm)
11	Min. clearances i. Phase to phase ii. Phase to earth iii) Sectional clearances	 2100 mm 2100 mm 5000 mm	 320 mm 320 mm 3000 mm
12	System neutral earthing	Effectively Earthed	Effectively Earthed

Major technical parameters of bushings/ hollow column/ support insulators are given below:

Sl. No.	Description of Parameters	220 kV System	33 kV System
1	Max. System voltage Um (kV)	245kV	36kV
2	Impulse withstand voltage (dry &	± 1050	± 170



	wet) (kVp)		
3	Switching surge withstand voltage (dry & wet) (kVp)	-	-
4	Power frequency withstand voltage (dry and wet) (kV rms)	460	75
5	Total creepage distance(min) (mm)	6125	900

Insulator shall also meet requirement of IEC- 815 for 245kV, 145kV and 36kV systems, as applicable having alternate long and short sheds.

CONTROL CABINETS, JUNCTION BOXES, TERMINAL BOXES AND MARSHALLING BOXES FOR OUTDOOR EQUIPMENT

All types of boxes, cabinets etc. shall generally conform to in accordance with IS- 5039/ IS-8623, IEC-60439, as applicable.
All doors, removable covers and plates shall be provided gasket all around with suitably profiled EPDM/Neoprene gaskets. The gasket shall be tested in accordance with approved quality plan, IS:11149 and IS:3400. The quality of gasket shall be such that it does not get damaged/cracked during ten years of operation of the equipment or its major overhaul whichever is earlier. All gasketed surfaces shall be smooth straight and reinforced if necessary to minimize distortion and to make a tight seal. Ventilating Louvers, if provided, shall have screen and filters, the screen shall be fine wire mesh made of brass.

BUSHINGS, HOLLOW COLUMN INSULATORS, SUPPORT INSULATORS

Bushings shall be manufactured and tested in accordance with IS: 2099 & IEC-60137 while hollow column insulators shall be manufactured and tested in accordance with IEC-62155/IS:5621. The support insulators shall be manufactured and tested as per IS:2544/IEC-60168 and IEC-60273. The insulators shall also conform to IEC-60815 as applicable.

TECHNICAL SPECIFICATION FOR SF6 GAS INSULATED METAL ENCLOSED SWITCHGEARS (GIS)

The GIS shall be double bus bar arrangement and each module shall be complete with SF6 breaker, disconnectors, current and voltage transformers, earthing swithes and all necessary components as detailed in this specification. All parts of the switchgear should be single phase/ three phases (segregated) enclosed for 220 kV GIS and single phase/ three phases encapsulated for 33 kV GIS.

REFERENCE STANDARDS

The metal-enclosed gas-insulated switchgear, including the operating devices, accessories and auxiliary equipment forming integral part thereof, shall be in accordance with the following International Electro-technical Commission (IEC) Publications including their parts and supplements as amended or revised to date:

IEC 62271-203	Gas Insulated metal-enclosed switchgear for rated voltages



	above 52kV
IEC 60376	New sulphur hexafluoride
IEC 62271- 100	High voltage alternating current Circuit breakers
IEC 60694	Common clauses for high voltage Switchgear and control-
	gear standards
IEC 62271-102	Alternating current disconnectors(isolators) and earthing
	switches
IEC 61128	Alternating current disconnectors. Bus-transfer current
	switching by disconnectors.
IEC 61129	Alternating current earthing switches. Induced current
	switching
IEC 66044-1	Current transformers
IEC 66044-2	Voltage transformers
IEC 60137	Bushings for alternating voltages above 1000 V
IEC 60859	Cable connections for gas-insulated switchgear
IEC 60480	Guide to checking of sulphur hexafluoride taken from
	electrical equipment
IEC 60099 -1/4	Non-linear resistor type arresters for AC systems
IEC 60439	Factory-built assemblies of low-voltage switchgear and
	control Gear.
IEC 60427	Report on synthetic testing of high-voltage alternating-
	current breaker.
IEEE 80 (2000)	IEEE Guide for Safety in AC Substation grounding.
CIGRE-44	Earthing of GIS- an application guide. (Electra no.151,Dec'93).
IEC 61639	Direct connection between Power Transformers and gas insulated metal
	enclosed switchgear for rated voltage 72.5 kV and above.

The components and devices which are not covered by the above standards shall conform to, and comply with, the latest applicable standards, rules, codes and regulations of the internationally recognized standardizing bodies.

PRINCIPAL PARAMETERS

The SF6 gas insulated metal enclosed switchgear shall be totally safe against inadvertent touch of any of it's live constituent parts. It should be designed for indoor/outdoor (as specified) application with meteorological conditions at site.

JEWAR TRANSMART LIMITED NEW DELHI

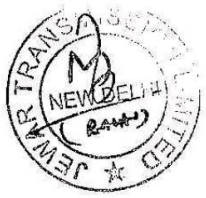
The metal-enclosed gas insulated switchgear, including the operating devices, accessories and auxiliary equipment forming integral part thereof, shall be in accordance with the IEC-62271-203 with latest amendments publications including their parts and supplements as amended or revised to date.

The required overall parameters of GIS are as follows:-

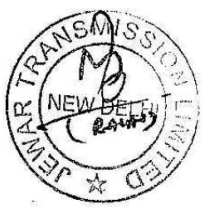
Sl. No.	Technical particulars	220 kV System	132 kV System	33 kV System
I	GIS			
1.	Type of GIS encapsulation	Single Phase /Thre Phase encapsulate	Single Phase /Three Phase encapsulated	Single/ Phase Three Phase encapsulated
2.	Location	Indoor	Indoor	Indoor
3.	Rated voltage	245kV rms	145kV rms	36 kV (rms)
4.	Rated frequency	50 HZ	50 HZ	50 HZ
5.	Number of Phases	3	3	3
6.	Grounding	Effectively Earthed	Effectively Earthed	Effectively Earthed
7.	Rated continuous current rating at design ambient temperature i.e. 50 ^{0}C			
	i) Busbar and Bus coupler Bay	2000 Amp.	1600 Amp.	2500 Amp.
	ii) Feeder and Transformer Bay	1600 Amp.	800 Amp.	1250/2500 Amp. (Feeder)/Transf
8.	Rated burn through time of enclosure due to internal arc to short circuit Current	According to IEC	According to IEC	According to IEC
9.	Rated lightning impuls (1.2/50 micro sec.) withstand voltage	± 1050 kV peak	± 650 kV peak	±170 kVp
10.	One minute power frequency withstand voltage	460 kV rms	275 kV rms	70 kV rms
11.	Rated short time withstand current (3 sec)	40 kA rms (As applicable)	40 kA rms (As applicable)	31.5 kA rms
12.	Rated peak withstand current	125/100 kA peak (As applicable)	125/100 kA peak (As applicable)	80 kA peak
13.	Material of enclosure	Aluminium alloy	Aluminium alloy	Aluminium alloy
14.	Minimum thickness of enclosure (mm)	As per IEC/CENELEC Standard	As per IEC/CENELEC Standard	As per IEC/CENELEC Standard
15.	Material of busbar	Aluminium and/or	Aluminium and/or	Aluminium and/or



	conductor	Copper	Copper	Copper
16.	Guaranteed maximum gas losses for complete installation as well as for all individual sections in %.	Less than 0.5% a per IEC-62271-203	Less than 0.5% as per IEC-62271-203	Less than 0.5% as per IEC- 62271-200
17.	Seismic level	Zone- IV, as per IS-1893, Year-2002	Zone- IV, as per IS-1893, Year-2002	Zone- IV, as per IS-1893, Year- 2002
II	**Circuit Breaker (CB)**			
1.	Rated voltage	245kV rms	145kV rms	36 kV rms
2.	Rated frequency	50 HZ	50 HZ	50 HZ
3.	Type of Circuit Breaker	SF6 insulated	SF6 insulated	SF6 insulated
4.	System neutral Earthing	Effectively earthed	Effectively earthed	Effectively earthed
5.	Rated continuous current rating at design ambient temperature i.e. 50 ^{o}C			
	-Feeder Bay	1600 Amp.	800 Amp.	1250 Amp.
	-Transformer Bay	1600 Amp.	800 Amp.	2500 Amp.
	-Bus coupler Bay	2000 Amp.	1600 Amp.	2500 Amp.
6.	No. of poles	3	3	3
7.	Type of operation	Single Phase Operation	Three Phase Gang Operation	Three Phase Gang Operation
8.	Operating Mechanism	Hydro-Mechanical spring drive/Hydraulic/Spring drive	Hydro-Mechanical spring drive/Hydraulic/ Spring drive	Hydro-Mechanical spring drive/Hydraulic/ Spring drive
9.	Auto re-closing duty	Three Phase/ Single Phase	Three Phase	
10.	Rated operating duty cycle	O-0.3 sec-CO-3 min CO	O-0.3 sec-CO-3 min-CO	O-0.3sec-CO-3 min-CO
11.	First pole to clea Factor	1.3	1.3	1.5
12.	Maximum closing time	Not more than 120 ms	Not more than 120 ms	Not more than 120 m
13.	Maximum breaking time at rated breaking capacity	65 ms	65 ms	80 ms
14.	Rated lighting impulse withstand			



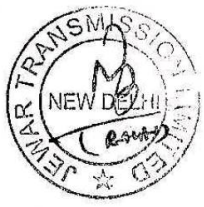
	voltage			
	-between line terminals and ground	±1050 kV peak	± 650 kV peak	±170 kV peak
	-between terminals with circuit breaker open	±1050 kV peak	± 650 kV peak	±195 kV peak
15.	One minute power frequency phase to earth voltage (kv rms)			
	- between line terminals and ground	460 kV rms	275 kV rms	As per IEC
	- betwwen terminals with circuit breaker open	530 kV rms	315 kV rms	As per IEC
16.	Rated breaking current capacity			
	i) Rated short circuit current withstand capacity (3 sec)	40 kA (As applicable)	40 kA (As applicable)	31.5 kA
	ii) Line charging curren	50 A rms/ As per IE	50 A rms/ As per IEC	As per IEC
	iii) Cable charging current	120 A rms	120 A rms	
	iv) Small indutive breaking current	10 A rms	10 A rms	
17.	Rated short time making current capacity	125/100 kA peak (As applicable)	125/100 kA peak (As applicable)	80 kA peak
18.	Max. radio interference voltage for frequency between 0.5 MHz and 2 MHz at 156kV	1000 Micro volts	500 Micro volts	___
19.	Max. difference in the instants of closing/opening of contacts (ms) between poles	As per IEC	As per IEC	As per IEC
20.	Trip coil and closing coil voltage	110 V DC with variation as specified in GTR	110 V DC with variation as specifie in GTR	110 V DC with variation as specified in GTR
21.	Auxiliary Contacts	Each circuit breaker	Each circuit breaker	Each circuit breaker



	Auxiliary switch shall also comply with requirements as given, independent single pole reversible contacts (from NO to NC & vice versa)	pole shall b provided with an auxiliary switch with 20% of spare – NO and 20 spare NC contact for use in future.	pole shall b provided with an auxiliary switch with 20% of spare – NO and 20% spare NC contact for use in future.	pole shall be provided with an auxiliary switch with 20% of spare – NO and 20% spare NC contact for
	Rating of auxliary contacts	10A at 110V DC	10A at 110V DC	10A at 110V DC
	Breaking capacity of Aux. Contacts less than 20 ms	2A DC with the circuit tim constant of not less than 2 ms	2A DC with the circuit time constant of not less than 20 ms	2A DC with the circuit time constant of not less than 20 ms
III	**Disconnectors (DS)**			
1.	Rated voltage	245kV rms	145kV rms	36 kV rms
2.	Rated frequency	50 HZ	50 HZ	50 HZ
3.	Type	SF6 insulated	SF6 insulated	SF6 insulated
4.	System Earthing	Effectively Earthed	Effectively Earthed	Effectively Earthed
5.	Rated short time withstand current (3 sec)	40 kA rms (As applicable)	40 kA rms (As applicable)	31.5 kA rms
6.	Rated short time making current capacity	125/100 kA peak (As applicable)	125/100 kA peak (As applicable)	80 kA peak
7.	No. of poles	3	3	3
8.	Rated continuous current rating at design ambient temperature i.e. 50 ^{0}C			
	Feeder Bay	1600 Amp.	800 Amp.	1250 Amp.
	Transformer Bay	1600 Amp.	800 Amp.	2500 Amp.
	Bus coupler Bay	2000 Amp.	1600 Amp.	2500 Amp.
9.	OperatingMechanism	Motor	Motor	Motor
10.	Operating time	Less than 12 sec.	Less than 12 sec.	Less than 12 sec.
11.	Rated lightning impulse withstand voltage			
	- Phase to earth	±1050 kV peak	±650 kV peak	±170 kV peak
	- Across the open contacts	±1200 kV peak	±750 kV peak	±195 kV peak
12.	One minute power			



	frequency withstand voltage			
	- Phase to earth	460 kV rms	275 kV rms	As per IEC
	- Across the open contacts	530 kV rms	315 kV rms	As per IEC
13.	Rated mechanical terminal load	As per IEC	As per IEC	As per IEC
14.	Rating of auxiliary contacts	10A at 110V DC	10A at 110V DC	10A at 110V DC
15.	Breaking capacity of auxiliary contacts	2 A	2 A	2 A
16.	No. of auxiliary contacts on each isolator	6 NO and 6 NC	6 NO and 6 NC	6 NO and 6 NC
17.	No. of auxiliary contacts on each earthing switch	6 NO and 6 NC	6 NO and 6 NC	6 NO and 6 NC
IV	**Earthig Switches (ES)**			
1.	Rated voltage	245kV rms	145kV rms	36kV rms
2.	Rated frequency	50 HZ	50 HZ	50 HZ
3.	Rated short time withstand current (3 sec)	40 kA rms (As applicable)	40 kA rms (As applicable)	31.5 kA rms
4.	Rated short time making current capacity -For high speed earthing switch	125/100 kA peak (As applicable)	125/100 kA peak (As applicable)	80 kA peak
5.	Rated lightning impulse withstand voltage	±1050 kV peak	±650 kV peak	±170 kV peak
6.	One minute power frequency withstand voltage	460 kV rms	275 kV rms	70 kV rms
7.	Operating Mechanism			
	- For maintenance earthing switch	Motor	Motor	Motor
	-For high speed earthing switch	Motor	Motor	Motor
8.	Operating time			
	-For maintenance earthing switch	Less than 12 sec.	Less than 12 sec.	Less than 12 sec.
	-For high speed earthing switch	Less than 300 m sec	Less than 300 m sec	Less than 300 m sec
V	**Current**			



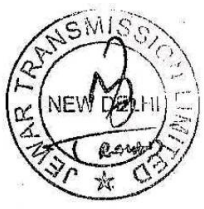
	Transformer (CT)			
1.	Rated voltage	245kV rms	145kV rms	36kV rms
2.	Rated frequency	50 HZ	50 HZ	50 HZ
3.	System neutral earthing	Effectively earthed	Effectively earthed	Effectively earthed
4.	Maximum temperature rise over an ambient temperature o 50^0C	As per IEC 60044-1	As per IEC 60044-1	As per IEC 60044-1
5.	Radio interference voltage at 1.1 Un/V3 and frequency rang 0.5 to 2 MHz	≤ 1000 micro-volts	≤ 500 micro-volts	-
6.	One minute power frequency withstand voltage between sec. Terminal & earth	5 kV (rms)	5 kV (rms)	5 kV (rms)
7.	Partial discharge level	≤ 10 pico coulombs	≤ 10 pico coulombs	-
8.	Rated insulation level			
	i) 1.2/50 micro second impulse voltage	±1050 kVp	± 650 kVp	± 170 kVp
	ii) 1 Minute powe frequency withstand voltage	460 kV (rms)	275 kV (rms)	70 kV (rms)
9.	Current Ratio For Feeders	1000-800-500-300/1A	800-400-200/1A	400-200/1A
	For Transformer	1000-800-500-300/1A	160MVA (800-400/1A), 100MVA (500/1A),	2000-1250/1A
	For bus coupler	1000-800-500-300/1A	800-400-200/1A	2000-1250/1A
10.	Ratio taps	On secondary side	On secondary side	On secondary side
11.	Accuracy Class			
	-For protection	PS	PS	PS
	-For metering	0.2	0.2	0.2
12.	Burden			



	-For protection	20 VA	20 VA	20 VA
	-For metering	20 VA	20 VA	10 VA
13.	Rated short time withstand current	40 kA rms (As applicable) for 3 Second.	40 kA rms (As applicable) for 3Second.	31.5 kA rms for 3 Second.
14.	Rated dynamic withstand current	125/100 kA peak (As applicable)) for 1 Second.	125/100 kA peak (As applicable) for 1 Second.	80 kA peak for 1 Second.
15.	Safety factor for metering	< 5	< 5	< 5
16.	Parameters/ Approval Finalization	Burden, Knee Point Voltage Rct, Excitation Current and other parameters shal be got approved by purchaser as per protection co-ordination/ scheme requirements during detailed engineering based on details/ calculations to be submitted by successful bidder	Burden, Knee Point Voltage Rct, Excitation Current and other parameters shall be got approved by purchaser as per protection co-ordination/ scheme requirements during detailed engineering based on details/ calculations to be submitted by successful bidder	Burden, Knee Point Voltage Rct, Excitation Current and other parameters shall be got approved by purchaser as per protection co-ordination/ scheme requirements during detailed engineering based on details/ calculations to be submitted by successful bidder
VI	**Voltage Transformers**			
1.	Rated System voltage	245kV rms	145kV rms	36kV rms
2.	Rated frequency	50 HZ	50 HZ	50 HZ
3.	Type	Electromagnetic	Electromagnetic	Electromagnetic
4.	System neutral earthing	Effectively earthed	Effectively earthed	Effectively earthed
5.	System fault level	40 kAp. (As applicable) for 3 Second.	40 kAp. (As applicable) for 3 Second.	31.5 kAp for 3 Second.
6.	Rated lightning impulse withstand voltage	± 1050 kV peak	± 650 kV peak	± 170 kV peak
7.	One minute power frequency withstand voltage	460 kV rms	275 kV rms	70 kV rms



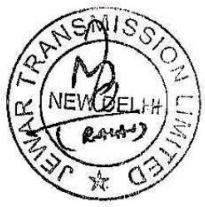
8.	One minute power frequency withstand voltage for secondary winding	3 kV rms			3 kV rms			3 kV rms		
9.	Radio interference voltage at 1.1 Un/√3 and frequency range 0. to 2 MHz	≤ 1000 micro volts			≤ 500 micro volts			-		
10.	Rated total therma burden	400 VA			100 VA			75 VA		
11.	Partial discharge level	≤ 10 pico coulombs			≤ 10 pico coulombs			-		
12.	Voltage Ratio	245/√3 :110 V/√3			145/√3 :110 V/√3			36/√3 :110 V/√3		
13.	Number of secondary winding	3			3			2 or 3		
14.	Rated voltage facto	1.5 for 30 seconds 1.2 continuous			1.5 for 30 seconds 1.2 continuous			1.5 for 30 second 1.2 continuous		
15.	Phase angle error	± 10 min (for metering core)			± 10 min (for metering core)			± 20 min (for metering core)		
16.	Rated voltage	Sec-I	Sec-II	Sec-III	Sec-I	Sec- II	Sec-III	Sec-I	Sec-II	
		110/ √3	110/√ 3	110/ √3	110/ 3	110/ √3	110/ √3	110/ √3	110/ √3	
		Prot.	Prot.	Meterin g	Prot.	Prot.	Meterin	Metering	Prot.	
	Accuracy	3P	3P	0.2	3P	3P	0.2	0.2	3P	
	Output Burden (Min.) VA	50	50	50	50	50	50	10	10	
VII	**Lightning Arresters (LA)**									
1.	Highest system voltage	245 kV rms			145 kV rms			36 kV rms		
2.	Rated arrester voltage	198 kV rms			120 kV rms			30 kV rms		
3.	Continuous operating voltage at 50 ^{0}C	168 kV			102 kV			25 kV		
4.	Type (Tank Type)	Gapless type/ Metal Zinc Oxide type			Gapless type/ Metal Zinc Oxide type			Gapless type/ Meta Zinc Oxide type		
5.	Long duration Discharge Class	Class 3			Class 3			Class 3		
6.	Nominal discharge current	10 kA rms			10 kA rms			10 kA rms		



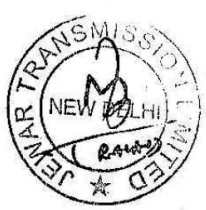
	corresponding to 8/20 microsec wav shape			
7.	Rated frequency	50 HZ	50 HZ	50 HZ
8.	Minimum discharg capability voltage corresponding to minimum discharge characterstic	5 kJ/kV (referred to rated arrester	5 kJ/kV (referred to rated arrester)	5 kJ/kV (referred to rated arrester)
9.	System neutral earthing	Effectively earthed	Effectively earthed	Effectively earthed
10.	Max. switching surge residual voltage(1 kA)	500 kVp	280 kVp	-
11.	Max. residual voltage at			
	i) 5 kA	560 kVp	310 kVp	-
	ii) 10 kA nominal discharge current	600 kVp	330 kVp	100 kVp
	iii) 20 kA nominal discharge current	-	-	-
12.	High current short duration test value (4/10 micro second wave)	100 kVp	100 kVp	100 kVp
13.	Current for pressur relief test	40 kA rms	40 kA rms	40 kA rms
14.	Prospective symmetrical fault current	40 kA rms for 0.2 Sec	40 kA rms for 0.2 Sec	40 kA rms
15.	Pressure relief clas	A	A	A
16.	RIV at 1.1 Un/V3 kV rms	Less than 500 (micro volts)	Less than 500 (micro volts)	-
17.	Partial discharge at 1.05 COV	Not more than 50 pc	Not more than 50 pc	Not more than 50 pc
18.	Low current long duration test value (2000 micro sec.)	As per IEC	As per IEC	As per IEC
19.	Discharge counter and leakage curren meter to be provided	Yes	Yes	Yes
VIII	**Busbar**			
1.	Rated voltage	245kV rms	145kV rms	36kV rms
2.	Rated frequency	50 HZ	50 HZ	50 HZ
3.	Rated current	2000 A rms	1600 A rms	2500 A rms
4.	Rated short time	40.0 kA rms/3sec	40.0 kA rms/3sec	31.5 kA rms



	withstand current			
5.	Temperature rise			
	-For enclosure	According to IEC	According to IEC	According to IEC
	-For conductor	According to IEC	According to IEC	According to IEC
6.	Rated lightning impulse withstand voltage	±1050 kV peak	±650 kV peak	±170 kVp
7.	One minute power frequency withstand voltage	460 kV (rms)	275 kV (rms)	70 kV (rms)
IX	**Bus Coupler**			
1.	Rated voltage	245kV rms	145kV rms	36kV rms
2.	Rated frequency	50 HZ	50 HZ	50 HZ
3.	Rated current	2000 A rms	1600 A rms	2500 A rms
4.	Rated short time withstand current	40.0 kA rms/3sec	40.0 kA rms/3sec	31.5 kA rms
5.	Temperature rise			
	-For enclosure	According to IEC	According to IEC	According to IEC
	-For conductor	According to IEC	According to IEC	According to IEC
6.	Rated lightning impulse withstand voltage	±1050 kV peak	±650 kV peak	±170 kV peak
7.	One minute power frequency withstand voltage	460 kV (rms)	275 kV (rms)	70 kV (rms)
X	**Cable Head (CHD)**			
1.	Rated voltage	245kV rms	145kV rms	36kV rms
2.	Rated frequency	50 HZ	50 HZ	50 HZ
3.	Rated current	2000 A rms	1600 A rms	2500 A rms
4.	Rated short time withstand current	40.0 kA rms	40.0 kA rms	31.5 kA rms
5.	Rated lightning impulse withstand voltage	±1050 kV peak	±650 kV peak	±170 kV peak
6.	One minute power frequency withstand voltage	460 kV (rms)	275 kV (rms)	70 kV (rms)
7.	Interface with power cable sealin end	According to IEC	According to IEC	According to IEC
XI	**SF6 Bus Interconnection Duct Termination Head**			
1.	Rated voltage	245kV rms	145kV rms	36kV rms
2.	Rated frequency	50 HZ	50 HZ	50 HZ
3.	Rated current	2000 A rms	1600 A rms	2500 A rms



4.	Rated short time withstand current	40.0 kA rms	40.0 kA rms	31.5 kA rms
5.	Rated lightning impulse withstand voltage	±1050 kV peak	±650 kV peak	±170 kV peak
6.	One minute power frequency withstand voltage	460 kV (rms)	275 kV (rms)	70 kV (rms)
7.	Interface with SF6 Duct end	According to IEC	According to IEC	According to IEC
XII	**Bus Sectionalizers**			
1.	Rated voltage	-	-	36kV rms
2.	Rated frequency	-	-	50
3.	Rated current	-	-	2500 A rms
4.	Rated short time withstand current	-	-	31.5 kA rms
5.	Temperature rise -For enclosure -For conductor	-	-	According to IEC
6.	Rated lightning impulse withstand voltage	-	-	±170 kV peak
7.	One minute power frequency withstand voltage	-	-	70 kV (rms)



CIRCUIT BREAKERS GENERAL

The circuit breakers and accessories shall conform to IEC: 62271-100, IEC: 62271-01 and other relevant IEC standards.

245/145/36 kV circuit breakers offered would be of sulphur hexafluoride (SF6) type only and of class C2-M2 as per IEC.

The support structure of circuit breaker as well as that of control cabinet shall be hot dip galvanised. All other parts shall be painted as per shade 697 of IS-5.

DISCONNECTORS (ISOLATORS)

General

Disconnectors shall be of the single-pole, group operated type, installed in the switchgear to provide electrical isolation of the circuit breakers, the transformers, double bus and transmission lines. The disconnectors shall conform to IEC-62271-102.

INSTRUMENT TRANSFORMERS

Current Transformers

The current transformers and accessories shall conform to IEC : 60044-1 and other relevant standards.

Voltage Transformers

The voltage transformers shall conform to IEC- 60044-2 and other relevant standards.

SURGE ARRESTERS

The surge arresters shall confirm in general to latest IEC –60099-4.

a) The surge arresters are being provided to protect the followings whose insulation levels are indicated in the table given below:-

Equipment to be protected	Lightning impulse (kVp) for 245 kV system	Lightning impulse (kVp) for 145 kV system	Lightning impulse (kVp) for 36 kV system
Power Transformer	± 950	± 550	± 170
Instrument Transformer	± 1050	± 650	± 170
CB/Isolator Phase to ground	± 1050	± 650	± 170
Across open contacts	± 1200	± 750	± 195

JEWAR TRANSMISSION LIMITED NEW DELHI

220/132/33KV GIS BUILDING

The buildings shall house 220kV, 132kV and 33kV Gas Insulated Switchgear (GIS) separately and other associated equipments inside in each of the GIS building. The building shall have arrangement to maintain pressurised air in order to prevent the ingress of dust in the GIS Hall.

The GIS hall shall have an independent ventilation system. Each ventilation system shall consist of two 100% capacity systems, one operating and one stand-by.

To ensure that the air being supplied to the GIS hall is free from dust particles, a minimum **two** stage dust filtration process shall be supplied. This shall consist of at least the following:

3.3.2 **Pre Filters:** To remove dust particles down to10 micron in sizewith at least95% efficiency.

3.3.3 **Fine Filters:** To remove dust particles down to5 microns in sizewith at least99% efficiency.

QUALITY OF SF6 GAS

a) The SF6 gas insulated metal-clad switchgear shall be designed for use with SF6 gas complying with the recommendations of IEC 376, 376A & 376B, at the time of the first charging with gas. All SF6 gas supplied as part of the contract shall comply with the requirements of IEC as above as a minimum & should be suitable in all respects for use in the switchgear under all operating conditions.

b) The high pressure cylinders in which SF6 gas is supplied & stored at site shall comply with the requirements of following standards & regulations:

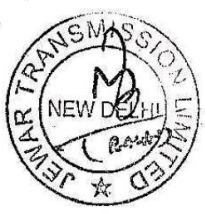
IS: 4379	Identification of the contents of industrial gas cylinders.
IS: 7311	Seamless high carbon steel cylinders for permanent & high pressure liquefiable gases. The cylinders shall also meet Indian Boilers Regulations. (Mandatory)

CIRCUIT BREAKERS

The circuit breakers and accessories shall conform to IEC: 62271-100, IEC: 62271-01 and other relevant IEC standards.

SULPHUR HEXAFLUORIDE GAS (SF6 GAS)

a) The SF6 gas shall comply with IEC 60376, 60376A and 60376B and shall be suitable in all respects for use in the switchgear under the operating conditions.



b) The high pressure cylinders in which the SF6 gas is shipped and stored at site shall comply with requirements of the relevant standards and regulations.

INSULATORS

All hollow insulators shall conform to IEC-62155.

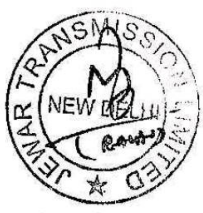
INTERPOLE CABLING

All cables to be used shall be armoured and shall be as per IS – 1554/ IEC-502 (1100 Volts Grade).

TECHNICAL PARAMETERS

I. 245 kV CIRCUIT BREAKER

1.	Rated continuous current(A) at design ambient temperature.	1600 (as applicable) -2000 for bus coupler bay.
2.	Rated short circuit current breaking capacity at rated voltage	40 kA (as applicable) with percentage DC component as per IEC: 62271-100 corresponding to minimum opening time under operating conditions specified.
3.	Symmetrical interrupting capability (kArms)	40 (as applicable)
4.	Rated short circuit making current (kAp)	125/ 100 (as applicable)
5.	Short time current carrying capability for 3 second (kArms)	40 (as applicable)
6.	Rated operating duty	O-0.3sec-CO-3min-CO cycle
7.	Reclosing	Single phase & three phase autoreclosing
8.	First pole to clear factor	1.3
9.	Rated line/cable charging	As per IEC



	interrupting current at 90 deg. leading power factor angle (A. rms)	
	(The breaker shall be able to interrupt the rated line/cable charging current with test voltage immediately before opening equal to the product of U/√3 & 1.4 as per IEC: 62271-100)	
10.	Temperature rise over the design ambient temperature	As per IEC: 62271-100
11.	i) Total break time as per Cl.3.0 of this specification (ms)	65
	ii) Rated break time as per IEC (ms)	60
12.	Total closing time (ms)	Not more than 120
13.	Operating mechanism	spring/hydraulic or a combination of these
14.	Max. difference in the instants of closing/ opening of contacts (ms)	
	i) Between poles (opening) 3.3 ii) Between poles (closing) 5.0	
	The above shall be at rated control voltage and rated operating and quenching media pressures.	
15.	Trip coil and closing coil voltage	110V DCwith variation as specified
16.	Noise level at base and upto 50 m (distance from base of breaker)	140 dB (Max.)
17.	Rated terminal load	As per IEC or as per the value calculated by GTR, whichever is higher.
18.	Auxiliary contacts	Besides requirement of specification, the bidder shall wire up 5 NO+5 NC



		contacts for future use of Purchaser.
19.	No of Terminals in common Control cabinet	All Contacts & control circuits to be wired out upto common control cabinet plus 24 terminals exclusively for Purchaser's use.
20.	Maximum allowable switching As per IEC overvoltage under any switching condition	(Auxiliary switch shall also comply with requirements stipulated under GTR).



DISCONNECTORS (ISOLATORS)

Disconnectors shall be of the single-pole, group operated type, installed in the switchgear to provide electrical isolation of the circuit breakers, the transformers, double bus and transmission lines/cables. The disconnectors shall conform to IEC: 62271-102 (or IS: 9921).

SAFETY GROUNDING SWITCHES

Three-pole, group operated, safety grounding switches shall be operated by electric motor for use on 110V DC ungrounded system and shall be equipped with a manual operating mechanism for emergency use. The motor shall be protected against over-current and short circuit.

The safety grounding switches shall conform to the requirements of IEC- 62271- 102

HIGH SPEED MAKE PROOF GROUNDING SWITCHES

Grounding switches located at the beginning of the feeder bay modules shall be of the high speed, make proof type and will be used to discharge the respective charging currents, in addition to their safety grounding function. These grounding switches shall be capable of interrupting the inductive currents and to withstand the associated TRV.

Single phase switches shall be provided with operating mechanism suitable for operation from a 110V DC.

The short circuit making current rating of each ground switch shall be at least equal to its peak withstand current rating. The switches shall have inductive/ capacitive current switching capacity as per IEC-62271-102.

The high speed make proof grounding switches shall conform to the requirements of IEC-62271- 102.

INSULATOR

The insulator shall conform to IS: 2544 and/or IEC-60168.

TECHNICAL PARAMETERS

1. 245 kV ISOLATORS

1.	Type	SF6 insulated
2.	Rated current at 50°C ambient temperature	1600/2000 (As applicable). -1600 for line and

JEMAR TRANSMISSION LIMITED NEW DELHI

		Transformer bays. - 2000 bus coupler bay.
1.	Rated short time withstand current of isolator and earth switch (for 3 Sec.)	40 kA / 50 kA (as applicable)
2	Rated dynamic short circuit withstand current of isolator and earth switch	IEC-694.
100 kAp / 125 kAp (as applicable)		IEC-62271-102
3	Temperature rise over design ambient temperature	
4	Rated mechanical terminal load	A.C. Motor operated
5	Operating mechanism of isolator/earth switch	
6	Operating time	12 sec. or less

JEWAR TRANSMISSION LIMITED NEW DELHI

INSTRUMENT TRANSFORMERS

The instrument transformers and accessories shall conform to the latest version of the standards specified below:-

Current transformers IEC: 60044-1 (or IS: 2705) Inductive Voltage Transformers IEC: 60044-

Insulating Oil

a) Insulating oil to be used for instrument transformers shall be of EHV grade and shall conform to IS-335/ IEC-60296 (required for first filling).

b) The SF6 gas shall comply with IEC-60376, 60376A and 60376B and shall be suitable in all respects for use in the switchgear under operating conditions. Suitable valve shall be provided for SF6 gas filling in the instrument transformers in live condition. A suitable Rupture Disc shall be provided on the SF6 filled instrument transformers to prevent any chance of explosion.

TECHNICAL PARAMETERS

A.	**245 kV CURRENT TRANSFORMERS**	
1.	Rated Primary current	
2.	Rated short time thermal current	1000A (as applicable)
3.	Rated dynamic current kA (peak)	40 kA for 3 sec./50 kA for 3 sec. (as applicable)
4.	Maximum temperature rise over design ambient temperature	100 / 125 (as applicable)
5.	One minute power frequency withstand voltage sec. terminal & earth	As per IEC:60044-1
6.	Number of terminals	All terminals of control circuits are to be wired upto marshaling box plus 20% spare terminals evenly distributed on all TBs.
7.	Type of insulation	Class A
B.	**245 KV INDUCTIVE VOLTAGE TRANSFORMERS**	
1.	System fault level(for 3 second)	40 kA / 50 kA (as applicable)
2.	Standard reference range of frequencies for which the accuracies are valid	96% to 102% for protection and 99% to 101% for measurement
3.	One minute power frequency withstand voltage :	
	i) For secondary winding	3 kV (rms)



4.	Maximum temperature rise over design ambient temperature	As per IEC:60044-2
5.	Number of terminals	All terminals of are wired upto marshaling box plus 12 terminals exclusively for Purchaser's use.
6.	Rated Total Thermal burden (VA)	300 (100VA/winding)

SURGE ARRESTERS

The Surge Arresters shall conform to IEC: 60099-4.
The surge arresters are being provided to protect the following equipment whose insulation levels are indicated in the table given below:-

Equipment to be protected	Lightning Impulse (kVp) for 245 kV system	Lightning Impulse (kVp) for 145 kV system	Lightning Impulse (kVp) for 36 kV system
Power transformer	± 950	± 550	± 170
Instrument Transformer	± 1050	± 650	± 170
CB/Isolator Phase to ground	± 1050	± 650	± 170
CB/Isolator Across open contacts	±1050 (for CB) ± 1200 (for Isolator)	± 750	± 195

TECHNICAL PARAMETERS:

A. 245 kV CLASS SURGE ARRESTER

(a)	Rated arrester voltage	198 kV
(b)	Nominal discharge current	10 kA of 8/20 microsecond wave
(c)	Minimum discharge capability	5kJ/kV (referred to rated arrester voltage correspondin to minimum discharge characteristics.
(d)	Continuous operating voltage at 50 deg.C	168 kV rms
(e)	Max. switching surge	500 kVp

JEWAR TRANSMISSION LIMITED NEW DELHI

	residual voltage (1kA)		
(f)	Max. residual voltage at		
	i) 5 kA		560 kVp
	ii) 10 kA nominal discharge current		600 kVp
(g)	Max. steep current impulse residual voltage at 10 kA.		650 kVp
(h)	Long duration discharge Class		3
(i)	High current short duration test value (4/10 micro second wave)		100 kAp
(j)	Current for pressure relief test		40 kA rms / 50 kA rms (as applicable)
(k)	Low current long duration test value (2400 micro sec)		As per IEC.
(l)	Pressure relief class		40 kA / 50 kA (as applicable)

B. 36 kV and 11 kV CLASS SURGE ARRESTER

		36 KV	**11 kV**
(a)	Rated arrester voltage	30 kV	9 kV
(b)	Nominal discharge Current	---10 kA of 8/20 microsecond wave ---	
(c)	Minimum discharge capability	5kJ/kV (referred to rated arreste voltage corresponding to minimum discharge characteristics.)	
(d)	Continuous operating voltage at 50 deg.C	25 kV rms	7.2 kV rms
(e)	Max. switching surge residual voltage (1kA)	72 kVp	22.4 kVp
(f)	Max. residual voltage at		

JEWAR TRANSMISSION LIMITED NEW DELHI

	i)	5 kA	85 kVp	26 kVp
	ii)	10 kA nominal discharge current	90 kVp	28 kVp
(g)	Long duration discharge Class		2	2
(h)	Pressure relief class		25kA	25 kA

TECHNICAL SPECIFICATION FOR 220 kV XLPE

CABLE STANDARDS

IEC-60228 Conductor for insulated cable. IEC-60229 Tests on cable over sheaths. IEC-60230 Impulse tests on cables and their accessories.

IEC-60270 Partial discharge measurements.

IEC-60287-1-1 Calculation of continuous current carrying capacity.

IEC-60502 Power Cables with extruded insulation and their accessories.

IEC-60067 Tests for Power cables with extruded insulation for rated voltage upto 500 kV.

BIS: 7098 XLPE Cable specification for working voltages from 66 kV upto and including 220 kV.

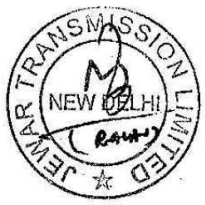
IEEE:48 Tests procedures and requirements for high voltage cable terminations.

DESIRED TECHNICAL PARTICULARS OF XLPE CABLE

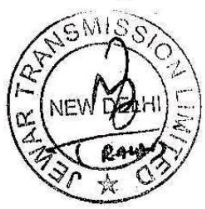
S.NO.	PARTICULARS	TECHNICAL DETAILS
1.	Cable Applicable Standard	Single Core, Copper Conductor XLPE cable. Conforming to IEC 60502 – 2 and IEC 60840: 2004-04 or IS 7098 (Part - 3) amended up to date.
2.	System voltage & frequency	220 ± 10% kV, 50Hz ± 3%
3.	Rated & Highest System Voltage	245 kV
4.	Suitable for earthed system	Yes
5.	**CONDUCTOR**	
(i)	Material	Annealed Plain Copper wires Conforming



S.NO.	PARTICULARS	TECHNICAL DETAILS
		to IEC 60228/ IS 8130 with latest amendments
(ii)	Nominal cross-sectional area	800 Sq. mm
(iii)	Construction of conductor / flexibility class	Class -2, IEC 228/ IS: 8130 with latest amendments
(iv)	Shape and formation	Circular, stranded & very well compacted
(v)	Approx. overall diameter of conductor	To be indicated
6.	**CONDUCTOR SCREENING**	
(i) (ii)	Material & Type Grade	Extruded, semi conducting compound layer As per IEC/ IS
(iii)	Thickness	1.0 mm
7.	**INSULATION**	
(i)	Material	Cross linked polyethylene (XLPE)
(ii)	Special Super clean grade Normal thickness of insulation	As per IEC 6207/ IS 7098 (Part-3) with latest amendments
8.	**INSULATION SCREENING**	
A.	Non-metallic part (extruded)	
(i)	Material	Extruded semi conducting compound layer
(ii)	Grade	As per IEC/ IS 7098 (Part-3) with latest amendments
(iii)	Min. Thickness	0.8 mm
B (i)	Non-metallic part (taped) longitudinal water barrier over insulation screen Material	Synthetic Non-woven semi conducting Water swell-able tape
(ii)	Min thickness	As per standard
C	**METALLIC SHEATH**	
(i)	Material	Corrugated Aluminium/ Lead alloy "E" sheath IS 692 with latest amendments
(ii)	Min. Thickness(mm)	Conforming to IEC 60502-2/ IS 7098
(iii)	Short Circuit Current Withstand (Metallic sheath, together with copper screen (if required)	40 kA for three second
(D)	Bedding over lead sheath	Semi conducting tape(s)
(E)	**CONCENTRIC COPPER WIRE SCREEN (IF REQUIRED)**	
(i)	Material and type	Annealed plain copper wires applied helically with gap followed by open helix



S.NO.	PARTICULARS	TECHNICAL DETAILS
		of copper tape binder.
(ii)	Min. area (sq. mm.)	This and lead alloy E sheath shall meet earth fault current of 40 kA for a duration of 3 second
9.	**OUTER SHEATH**	
(i)	Material	Extruded Layer of Black PE or PVC type ST-2 as per IEC 62067/ IS 7098 (Part-3)
(ii)	Min. thickness of outer sheath	As per standard
10.	Conducting layer over outer sheath	Graphite coating
11.	Approx. weight overall diameter of cable (mm)	To be indicated
12.	Approx. weight per meter of cable (kg/m)	To be indicated
13.	Recommended minimum installation radius.	To be indicated
14.	Maximum D.C. Resistance of conductor at 90°C in ohm/km	As per standard
15.	Minimum continuous current rating for each circuit when laid in ground in trefoil formation and other condition given in specification.	**1100 / 843 Amps. As applicable after all de-rated factors.**
16.	Maximum allowable temperature for cable and accessories.	
(i)	At rated full load and at site conditions.	90° C
(ii)	The conductor temperature after a short circuit for one second shall not exceed (with conductor temperature at start of short circuit as 90°C).	250°C
17.	Basic impulse insulation level (1.2 /	650 kV



S.NO.	PARTICULARS	TECHNICAL DETAILS
	50 micro second wave)	
18.	Power frequency withstand voltage	As per standard
19.	Symmetrical Short circuit rating for one second duration for lead sheath and copper screened combined	40 kA for 3 sec.
20.	Drum Length	500-600 mtr. / As per requirement.
21.	Expected cable life.	35 years.

TECHNICAL SPECIFICATION FOR 245kV CABLE TERMINATION AND JOINTINGKITS FOR 1 x 800 SQ. MM& 1x1000SQ.MM. XLPE CABLE

STANDARDS

IEC: 62067	Tests for power cables with extruded insulation for rated voltage above 150kV upto 500kV.
IEC: TS 60859	Cable connection for Gas insulated metal enclosed switchgear for rated voltages of 72.5 kV and above.
IEC: 62271-203	Gas-insulated metal enclosed switchgear for rated voltages of 72.5 kV and above.
IEC: 60228	Conductor for insulated cable
IEC: 60229	Tests on cable over sheaths
IEC: 60230	Impulse tests on cables and their
accessories IEC: 60270	Partial discharge measurements
IEC: 60287	Calculation of continuous current carrying
capacity IEC: 60502	Power Cables with extruded insulation
and their accessories.	
BIS: 7098 (Part-3)	XLPE cable specification for working voltages from 66 kV up to and including 220 kV.
IEEE 48- 1990	IEEE Standard Test, Procedure & requirement for high voltage alternating current cable terminations.

SYSTEM CONFIGURATION

The 220kV systems will be solidly grounded. Cables will be protected from over voltages caused by lighting strikes or switching surges by means of station type lighting arrestors located at terminal point/ substations. The terminal substation yard equipment and all overhead 220kV transmission lines will be shielded against direct lighting strokes by overhead ground wires.

JEWAR TRANSMISSION LIMITED NEW DELHI

EARTHING

Earthing of sheath/ screen at both of termination ends of 245kV cable using insulation sheath bonding (earthing) cable of required size through Link box with/ without surge limiter at terminations.

Earthing shall be as per relevant standards.

The sheath/ screen shall bound in the earth station through disconnecting type link boxes.

DESIRED TECHNICAL PARTICULARS OF XLPE CABLES KITS AND ACCESSORIES

A.	**OUTDOOR CABLE END TERMINATION**	
1.	Nominal System Voltage	220 kV (rms)
2.	Rated/ Highest System Voltage Um	245 kV (rms)
3.	Rated frequency & No. of phase	50 Hz ± 3%, Three (3)
4.	Installation	Outdoor
5.	Name and address of manufacturer of en termination	
6.	Nomenclature of kit	To be indicated
7.	Type of kit	Pre-molded
8.	Suitable for Single Core Copper Conductor XLPE cable Conforming to IEC 62067/ IS 7098 (pert-3) amendedupto date and as per specification.	Yes
9.	Maximum conductor size	To be indicated
10.	Rated continuous current	Maximum current of the cable
11.	Applicable standard for testing	IEC 62067
12.	Maximum allowable Pd-level	As per IEC
13.	Type o Insulator	Silicone/ Composite
14.	Creepage distance	25 mm/KV
15.	Colour	Brown
16.	Maximum allowable temperature for cable and accessories i) At rated full load and at site condition ii) The conductor temperature after a short circuit for one second shall not exceed (with conductor temperature at start of short circuits as 90°C).	 90°C 250°C
17.	Basic impulse insulation level (1.2/50 micro second wave)	1050 kV

JEWAR TRANSMISSION LIMITED NEW DELHI

A.	**OUTDOOR CABLE END TERMINATION**	
18.	Power frequency withstand voltage	As per standard
19.	Symmetrical Short circuit rating	40 kA for 3 sec.
20.	Power frequency withstand voltage (a) Dry (kV rms.) (b) Wet (kV rms.)	To be indicated
21.	Flashover voltage: (a) Dry (kV rms.) (b) Wet (kV rms.)	To be indicated
22.	Stress relief cone made of	Silicone rubber
23.	Net dimensions of kit (Length x Breadth x Width and Weight)	To be indicated
24.	Craft sensitivity and reliability	To be indicated
25.	Time required for energisation after completing the joint (curing period)	To be indicated
26.	Special storage condition. If any, upto an ambient temperature of 50 degree C and period.	To be indicated
27.	Whether provision made for: a) Stress relief b) Track resistance c) Sealing	Yes
28.	Whether any additional support is required for kit?	If so, give details
29.	Make, Type and Material of lugs provided with kits.	Details to be given by bidder.
30.	Class of Kits.	Details to be given by bidder
31.	Sectional Drawing Showing constructional details along with each item material, description enclosed.	Yes.
32.	Expected life of cable joint and cable.	35 years
33.	(a) Shelf life of the kit (years) (b) Design life of the kit (years)	To be indicated To be indicated
34.	Guarantee of kit.	Five (5) years from date of commissioning
35.	Details of terminal connector	
B.	**SF6 SWITCHGEAR TYPE CABLE END TERMINATION**	
1.	Nominal System Voltage U	220 kV (rms.)
2.	Rated/ Highest System Voltage Um	245 kV (rms.)
3.	Rated frequency & No. of phase	50 Hz ±3%, Three (3)
4.	Installation	Indoor/ Outdoor
5.	Name and address of manufacturer of en termination	
6.	Nomenclature of kit	To be indicated
7.	Type of kit	Premoulded, Plug in type
8.	Suitable for Single Core Copper Conductor XLPE cable Conforming to IEC 62067/ IS 7098 (Part-3)	Yes

JEVAR TRANSMISSION LIMITED NEW DELHI

A.	OUTDOOR CABLE END TERMINATION	
	amendedupto date and as per specification.	
9.	Maximum conductor size	To be indicated
10.	Rated continuous current	Maximum current of th cable
11.	Applicable standard for testing	IEC 62067
12.	Maximum allowable Pd-level	As per IEC
13.	Type of Insulator	Silicone/ Composite
14.	Creepage distance	25 mm/KV
15.	Colour	Brown
16.	Maximum allowable temperature for cable and accessories (i) At rated full load and at site condition (ii) The conductor temperature after a short circuit for one second shall not exceed (with conductor temperature at start of short circuits as 90°C).	 90°C 250°C
17.	Basic impulse insulation level (1.2 / 50 micro second wave)	1050 kV
18.	Power frequency withstand voltage	As per standard
19.	Symmetrical Short circuit rating	40 KA for 3 sec.
20.	Power frequency withstand voltage (a) Dry (kV rms.) (b) Wet (kV rms.)	To be indicated
21.	Flashover voltage: (a) Dry (kV rms.) (b) Wet (kV rms.)	To be indicated
22.	Stress relief cone made of	Silicon rubber
23.	Details of terminal connector	As applicable
24.	Net dimensions of kit (Length x Breadth x Width and Weight)	To be indicated
25.	Craft sensitivity and reliability	To be indicated
26.	Time required for energisation after completing the joint (curing period)	To be indicated
27.	Special storage condition. If any, upto an ambient temperature of 50°C and period.	To be indicated
28.	Whether provision made for: Stress relief Track resistance Sealing	Yes
29.	Whether any additional support is required for kit?	If so, give derails.
30.	Make, Type and Material of lugs provided with kits.	Details to be given by bidder.



A.	**OUTDOOR CABLE END TERMINATION**	
31.	Class of Kits.	Details to be given by bidder.
32.	Sectional Drawing Showing constructional details along with each item material, description enclosed.	Yes
33.	Expected life od Cable joint and cable.	30 years
34.	(a) Shelf life of the kit (years) (b) Design life of the kit (years)	To be indicated To be indicated
35.	Details of terminal connector	
36.	Guarantee of kit	Five (5) years from date of commissioning.
C.	**LINK BOX ROR EARTHING CABLE WITH PVC INSULATION**	
1.	Make	
2.	Type	
3.	Detailed dimension and internal arrangement of Single/ Three phase Link boxes with direct grounding	To be submitted
4.	Detailed dimension and internal arrangement o Three Phase Link boxes for cross bonding with SVL	To be submitted
5.	Earthing of sheath/ screen at cross bonding points an termination ends	Yes
6.	PVC insulated single core/ concentric/ coaxial cable to be used for sheath bonding (earthing) suitable for 40 kA for 3 second	Size, Type to be indicated
7.	Insulation of above a earthing cable	To be indicated (3 kV / 6 kV)
8.	Voltage rise of the insulation sheath controlled withi voltage	65 Volts.
9.	Surge voltage limiter	Required (3 kV / 6 kV)
D.	**SUPPORTING STRUCTURE & ANGLE BRACKET SUPPORTS FOR CABLE**	
1.	Detail drawing enclosed	Yes
2.	Overall height of structure	Shall be as per approved drawing.

33KV XLPE CABLE & ACCESSORIES

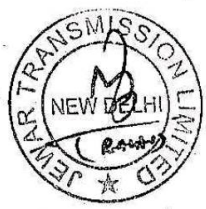
33 KV XLPE Cable

33KV XLPE cable shall be in accordance with the Internationally accepted standard and also conform to the requirement of IEC Publication 502.

TECHNICAL SPECIFICATION FOR 60 MVA 220/33 KV 3 PHASE POWER TRANSFORMER STANDARDS

The transformer should conform in all respect to latest addition of IS:2026 & CBIP.

PRINCIPAL PARAMETERS



The transformers shall be of core type constructions, three phase, oil immersed for outdoor service as both step up and step down transformers, with types of cooling mentioned below. The rating and electrical characteristics of transformers shall be as below :-

(i) Maximum continuous capacity	60MVA
(ii) Frequency	50 Hz
(iii) No. of Phase	Three
(iv) Rated Voltage of HV winding	220KV
(v) Rated Voltage of LV winding	33KV
(vi) Rated Voltage of Tertiary winding	11KV
(vii) Percentage impedance	
(viii) HV to LV at Normal tap No. 13 at 100% rating	12.5%
(ix) HV to Tertiary at Normal tap	12.5% (min.)
(x) LV to Tertiary at Normal tap	12.5% (min.)
(xi) a. No load loss at rated voltage and frequency at Principal Tap (KW)	25 (max)
b. No load loss at voltage corresponding to the highest tap (KW)	35 (max)
c. Tolerance if any on the above value	No tolerance
(xii) a. Load loss at rated output, rated frequency and corrected for 75 Deg C winding temperature at -Principal Tap (KW) - Highest Tap (KW) -Lower Tap (KW)	 150 KW (max) at 220/33 KV 126 KW (approx.) at 220/37.95 KV 161 KW (approx.) at 220/31.35 KV
b. Tolerance, if any, on the above value	No tolerance
(xiii) a. Auxiliary losses at rated output, normal, rated voltage, rated frequency and ambient temperature (KW)	3.0 KW (max)
b. Tolerance, if any, on the above value	NIL



(xix) Total Loss at normal ratio inclusive of auxiliary component losses (KW)	178 KW (Max.) at 220/33 KV@60MVA Base

NOTE : No reactor either inside or outside the tank shall be used to achieve above percentage impedance value.

(xx) Connections for :-	
a) HV Winding /LV Winding	Star / Star
b) Tertiary winding	Delta
(xxi) Reference Voltage group and terminal markings	HV/LV/Tertiary -YNynOd11
(xxii)On load tap on HV side neutral	- 5% to +15% in equal steps. of 1.25 % each for IV variations.
(xxiii) Type of cooling	ONAN/ONAF/OFAF.
(xxiv) Rating corresponding to cooling system :-	
a) ONAN Cooling	30 MVA
b) ONAF Cooling	42 MVA
c) OFAF Cooling	60 MVA
(xxv)Rated capacity of tertiary winding	18 MVA
(xxvi) D.C. Voltage for relays etc.	110V
(xxvii) Maximum Noise Level	75 dB

INSULATION

The di-electric strength of winding insulation and of the bushing shall conform to the value given in IS:2026-1977.

For rated system, Voltage of 245 KV, 36 KV and 11 KV following test voltage shall be provided.

SYSTEM VOLTAGE	IMPULSE TEST VOLTAGE	ONE MINUTE POWER FREQUENCY TESTS
245 KV	950 KV	395 KV
36 KV	170 KV	70 KV
11 KV	95 KV	38 KV

The HV and LV windings of transformers shall have graded insulation. The insulation class of the neutral of the winding shall be graded to 95 KV impulse and 38 KV Power frequency withstand.

JEMAR TRANSMISSION LIMITED NEW DELHI

FREQUENCY

The normal frequency of the system is 50 Hz. It may vary ±5%. The transformers shall be suitable for continuous operation at rated capacity without exceeding the specified temperature rise within this frequency range.

PARALLEL OPERATION

The transformer shall operate satisfactorily in parallel with similar units of different make having following parallel operation details:-

Sl.No.	Variable	Details
1	HV to IV %impedance of tap No.1(ëxtreme) of 100% rating	12.5%
2	HV to IV %impedance of tap No.13(Normal) of 100% rating	12.5%
3	HV to IV %impedance of tap No.17(2nd ëxtreme) of 100% rating	12.5%
4	Location of Tap Changer	HV side neutral
5	Voltage variation	-5% to + 15%
6	Step Voltage	1.25%
7	Vector group	YNyn0d11

CONSTRUCTION DETAILS

The features and construction details of power transformers shall be in accordance with the requirements stated hereunder:-

TANK AND TANK ACCESSORIES

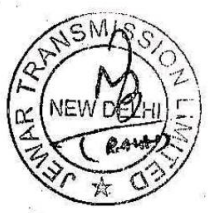
TANK :-

Tank shall be of welded construction and fabricated from tested quality low carbon steel of adequate thickness.

All seams and those joints not required to be opened at site shall be factory welded and wherever possible, they shall be double welded. After completion of tank construction and before painting, dye penetration test shall be carried out on welded parts of jacking bosses, lifting lugs and all load bearing members.
Tank stiffeners shall be provided for general rigidity and these shall be designed to prevent retention of water.
The tanks shall be designed to withstand :

i) Mechanical shocks during transportation.

ii) Vacuum filling of oil.



iii) Continuous internal pressured of 35 kN/m² over normal hydrostatic pressured of oil.

iv) Short circuit forces.

Wherever possible, the transformer tank and its accessories shall be designed without pockets, wherein, gas may collect. Where pockets can not be avoided, pipes shall be provided to vent the gas in to the main expansion pipes.

Adequate space shall be provided at the bottom of the tank for collection of sediments.

Lifting lug & eye bolts shall be so located that a safe clearance is obtained between slings and transformer bushings without use of spreader.

When transformers are provided with separately mounted radiators, flexible joints shall be provided on the main oil pipes connecting the transformer tank to the radiator banks to reduce vibration and facilitate erection and dismantling.

Transformer tank shall be of bell shape construction with an oil tight bolted flange joint near the base, such that during inspection or maintenance, it is possible to lift the upper portion of the tank to provide access to the core and coils.

The transformer tank shall be equipped with the following valves :-

One drain and lower filter valve located on low voltage side of transformer and placed to completely drain the tank.

One value at the top and one at the bottom of the tank mounted diagonally opposite to each other for filtration purpose.

One relief valve to operate at the pressure below the test pressure for the tank. One oil

filling valve (inlet).

One oil sampling valve with plug. Two nos. stop valves for each pump.

TANK COVER :-

- The tank cover shall be sloped to prevent retention of rain water and shall not distort when lifted.

JEWAR TRANSMISSION LIMITED NEW DELHI

- At least two adequately sized inspection openings, one at each end of the tank shall be provided for easy access to bushings and earth connections. The inspection covers shall not weigh more that 25 Kg. The inspection covers shall be provided with two handles.

- The tank covers shall be fitted with pockets at the position of maximum oil temperature of MCR (Maximum Continuous Rating) for bulbs of oil and winding temperature indicators. It shall be possible to remove these bulbs without lowering the oil in the tank.

- Bushings, turrets, covers of inspection openings, thermometer, pockets, etc. shall be designed to prevent ingress of water into or leakages of oil from the tank.

- All bolted connections shall be fitted with weather proof, hot oil resistant gasket in between, for complete oil tightness. If gasket is compressible, metallic stops shall be provided to prevent over compression.

AXELS AND WHEELS

- Transformer shall be provided with flanged bi-directional wheels for moving the transformer on rail tracks in directions parallel (X-X) and perpendicular (Y-Y) to the axis of HV bushings. Rail gauge for movement along the axis of HV bushing (i.e., X- X) shall be 1676.4 mm. The movement in direction perpendicular to transformer HV bushing (i.e., Y-Y axis) direction of rail gauge is 3048 mm.

- The transformer shall be rigidly mounted on wheels resting on rails in concrete foundations. The complete transformers shall be rigidly anchored through wheel assemblies to the foundation using anti-earthquake clamping and locking devices. Rails would be mounted flush with top surface of the foundations.
- Ladders with suitable locking arrangement shall be provided on the side of each transformer for purpose of maintenance.

ANTI EARTQUAKE CLAMPING DEVICE

- To prevent transformer movement during earthquake, clamping device shall be provided for fixing transformer to the foundation. The Supplier shall supply necessary bolts for embedding in the concrete foundation. The arrangements shall be such that the transformer can be fixed to or unfastened from these bolts as desired. The fixing of the transformers to the foundations shall be designed to withstand seismic events to the extent that a static co-efficient of 0.3 g., applied in the direction of least resistance to that loading will not cause the transformer or clamping devices as well as bolts to be over stressed.



- The details of the device used and its adequacy shall be brought out in the additional information schedule.

CONSERVATOR TANK

- The conservator tank shall have adequate capacity between highest and lowest visible level to meet the requirement of expansion of the total cold oil volume in the transformer and cooling equipment from minimum ambient temperature to 90 deg.C.

a) The conservator tank shall be bolted into position, so that it can be removed for cleaning purposes.

b) The conservator shall be fitted with magnetic oil level gauge with low level electrically alarm contact..
c) Conservator shall be provided in such a position as not to obstruct the electrical connections of the transformer.
d) Separate conservator shall be provided for OLTC.

PRESSURE RELIEF DEVICE

02Nos. of pressure relief devices may be provided at suitable locations, which shall be of sufficient size for rapid release of any pressure that may be generated in the tank and which may result in damage to the equipment. The device shall operate at a static pressure of less than the hydraulic test pressure of transformer tank, it shall be mounted direct on the tank. One set of electrically insulated contact shall be provided for alarm / tripping. Separate contact for N2 fire prevention system shall also be provided.

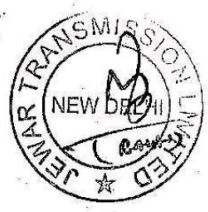
BUCHHOLZ RELAY

A double float type Buchholz relay shall be provided. All the gases evolved in the transformer shall collect in this relay. The relay shall be provided with a test cock suitable for flexible pipe connection for checking its operation and taking gas sample. A copper or stainless steel tube, shall be connected from the gas collector to a valve located about 1200 mm above ground level to facilitate sampling, with the transformer in service. The device shall be provided with two electrically independent ungrounded contacts, one for alarm on gas accumulation and the other for tripping on sudden rise of pressure. Separate contact for N2 fire prevention system shall also be provided.

TEMPERATURE INDICATOR

a) Oil Temperature Indicator (OTI)

Transformer shall be provided with a 150mm dial type thermometer for top oil



temperature indication. The thermometer shall have adjustable, electrically independent ungrounded alarm and trip contacts, maximum reading pointer and resetting device mounted in the cooler control cabinet. A temperature sensing element suitably located in a pocket on top oil shall be furnished. This shall be connected to the OTI by means of capillary tubing. Accuracy class of OTI shall be plus or minus 1.0% or better.

b) Winding Temperature Indicator (WTI)

A device for measuring the hot spot temperature of each of the windings shall be provided (HV, IV, Tertiary). It shall comprise of the following :-

i) Temperature sensing element.

ii) Image Coil.

iii) Auxiliary CTs, if required to match the image coil, shall be furnished and mounted in the cooler control cabinet.

iv) 150 mm dia local indicating instrument with maximum reading pointer mounted in cooler control cabinet and with two adjustable electrically independent ungrounded contacts (besides that required for control of cooling equipment), one for high winding temperature alarm and one for trip.

v) Calibration device.

vi) In addition to the above, the following indication equipment shall be provided for each winding.

a) Signal transmitter.

b) Remote winding temperature indicator, it shall be suitable for flush mounting on RTCC panel (this shall not be repeater dial of local WTI and shall operate by signal transmitter). The difference between local and remote WTI indication at any given time shall not exceed 1 deg. C. One RWTI with four point selector.

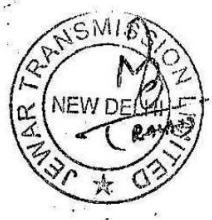
c) Switch shall be provided for all the three windings (HV, IV and Tertiary).

vii) Auxiliary supply, if required, in RTCC panel, for RWTI, shall be 110V DC only.

viii) Accuracy class of WTI shall be plus or minus 1.0% or better.

ix) Any special cables required for shielding purpose for connection between cooler control cabinet and remote winding temperature indicator control circuit shall be in supplier's scope of work.

x) Provide current transducer with OTI & WTI to monitor these parameters on SCADA.

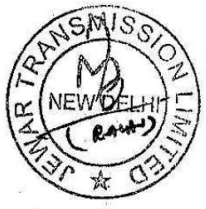


EARTHING TEMINALS

Two(2) earthing pads (each complete with two(2) Nos. tapped holes, M 10 bolts, plain and spring washers) suitable, for connection to 75 x 10 galvanized steel flat shall be provided each at position close to the two(2) diagonally bottom corners of tank. Earthing strip upto the ground level shall be provided by the Bidder.

CORE

- Core shall be constructed from high grade, non-ageing cold-rolled low loss and high Permeability grain oriented silicon steel laminations.
- Each lamination shall be insulated with a material that will not deteriorate due to pressure and the action of hot oil.
- Every care shall be exercised in the selection, treatment and handling core steel to ensure that as far as practicable the lamination are flat and the finally assembled core is free from distortion.
- Oil ducts shall be provided where necessary to ensure adequate cooling. The winding structure and major insulation shall not obstruct the free flow of oil through such ducts. Where the magnetic path is divided into packets by cooling ducts parallel to the plane of lamination or by insulating material above 0.254 mm thick, tinned copper strip bridging pieces shall be inserted to maintain electrical continuity between packets.
- All parts of the core shall be of robust design capable of withstanding any shocks to which they may be subjected to during lifting, transport. Installation and service. The bolts used in assembly of the core shall be suitably insulated and clamping structure shall be so constructed that the eddy currents are minimum.
- The core shall be provided with lugs suitable for lifting the complete core, coil, assembly of the transformers.
- Adequate provision shall be made to prevent movement of the transformer relative to the tank during transport and installation or while in service.
- The supporting frame work of the cores shall be so designed as to avoid the presence of pocket, which would prevent complete emptying of the tank through drain valve or trapping of air during filling.
- The maximum flux density in any part of the core and yoke at normal voltage and frequency and ratio must not exceed 1.53 Tesla.



WINDING

- The winding shall be so designed that all coil assemblies of identical voltage rating shall be inter-changeable and field repairs to the winding can be made readily without special equipment and also to reduce to a minimum the out of balances forces in transformer at all voltage ratios. The coils shall be supported between adjacent section by insulating spacers and the barriers, bracing and insulation used in the assembly of the windings shall be arranged to ensure a free circulation of oil and to reduced hot spots in the windings.

- Insulation of the coils shall be treated with a suitable insulating varnish or equivalent compound to develop the full electrical strength of the winding. All material used in the insulations and assembly of winding shall be insoluble, non- catalytic and chemically inactive in the hot transformer oil and shall be free from insulating composition liable to soften, doze out, shrink or collapse during service.

- All threaded connections shall be provided with locking facilities.

- All leads from the windings to the terminal Board and bushings shall be rigidly supported to prevent injury from vibration. Guide tubes shall be used where practicable.

- The windings shall be clamped securely in place, so that they will not displaced or deformed during transit or short circuits. The assembled core & winding shall be vacuum dried and suitably impregnated before removal from treating tank. The copper conductor used in the coil structure should be best suited to the requirements and all permanent current carrying joints in the windings and the leads shall be as per best manufacturing practice to given trouble free service.

- Any metal pieces in contact with laminated rings shall be so designed that they do not weaken the electrical or mechanical properties of the rings.

- Gasket joints shall be provided with mechanical steps to prevent crashing.

- It is desirable that the impulse voltage distribution is measured after the coils are wound (with the help of a surge oscilloscope) and compared with the design values and suitable modifications be done, if deviation found, so as to get stress relieved construction.

- To avoid damage to tertiary winding due to high stress at the time of severe short circuit, it is desirable the some special constructional features like encasing the tertiary winding in some epoxy compound etc., is done as per bidder practices. Suppliers shall elucidate the constructional features adopted by them for the same. Special constructional and design features

JEWAR TRANSMISSION LIMITED NEW DELHI

adopted for avoiding displacement of coils / clamping structures during dynamic short circuit condition be given.

INSULATING OIL

a) The quality of the oil supplied with transformer shall conform to the oil parameters specified below. No inhibitors shall be used in the oil. The oil used shall be non- PCB (Poly Chlorinated Biphenyl) type. The oil samples will be drawn as follows :-

i) Prior to filling.
ii) Before and after heat run test.
iii) Before energizing.

All tests as per IS: 335 shall be conducted on all samples.

NEUTRAL BUSHING CTs

CT	RATIO	PROTECTION	BUR-DEN	ACCURACY CLASS	MIN. KNEE POINT VOLTAGE	MAX. EXCITING CURRENT	MAX. SEC. RESIS-TANCE IN OHMS
1	2	3	4	5	6	7	8
220 KV	500 / 1 A	REF (Restricted earth fault).	-	PS	300 V	40mA at Vk/2	5.0
33 KV	2000 / 1 A	Earth Fault Protection	-	PS	300 V	40mA at Vk/4	5.0

1 All 60 MVA transformers are to be provided with bushing CT's of following ratio and Particulars :

2. The metering core of all CT's shall be of 30 VA burden, class of accuracy (as per BSS).

3. Over voltage protection devices shall be provided for all the cores of each CT to protect them against heavy current in CT primary, open circuiting or heavy burden of secondary.

4. All CTs shall have bar primaries.

5. Only molded epoxy terminations shall be provided on all the CTs secondary terminals with suitable terminal and cable glands.

JEWAR TRANSMISSION LIMITED NEW DELHI

SPECIFICATIONS

250 KVA 33/0.415 KV Station Transformers

STANDARDS

The transformers shall conform in all respects to IS:1180 (Part-1):-2014 subject to latest amendment and modifications. In case the provisions of ISS are not clear the provisions of IEC shall apply.

TECHNICAL SPECIFICATION FOR 245/145/36KV SOLID CORE POST INSULATORS

STANDARDS

Insulators should conform to the latest publications of IS 2544 & IEC in all respects except BIL which should be 1050Kvpfor 245 kV, and 650 kVp for 145 kV withstand. Equipment meeting any other authoritative standards which ensures equal or better quality than the IS mentioned above, is also acceptable.

REQUIREMENT FOR INSULATORS

FOR 245 AND 145 KV POST INSULATORS

(1)	Nominal voltage	:	245 KV	145 kV
(2)	Highest system voltage	:	245 KV	145 kV
(3)	Sytem frequency	:	50Hz.	50 Hz.
(4)	Number of phases	:	3 (Three)	3 (Three)
(5)	Neutral	:	Effectively earthed	Effectively earthed
(6)	Short circuit current	:	40.0 KA	31.5 KA
(7)	Phase to phase spacing	:	4.5 meters	3.0 meters
(8)	Height of the insulator support structure.	:	2750 mm.	2750 mm
(9)	PCD of Top Flange	:	127 mm.	127 mm
(10)	PCD of Bottom Flange	:	184 + .2 mm.	184+ .2 mm
(11)	BIL	:	1050 KV	650 mm
(12)	Height of insulator	:	2300.00mm	1500 mm
2.2	FOR 36 KV POSTINSULATORS			
(1)	Nominal voltage	:	36 KV	
(2)	Highest system voltage	:	36 KV	
(3)	Sytem frequency	:	50Hz.	
(4)	Number of phases	:	3 (Three)	
(5)	Neutral	:	Effectively earthed.	
(6)	Short circuit current	:	25.0 KA	

JEWAR TRANSMISSION LIMITED NEW DELHI

(7)	Phase to phase spacing	:	1.5 meters
(8)	Height of the insulator support structure.	:	2750 mm.
(9)	PCD of Top Flange	:	127 mm.
(10)	BIL	:	250 KV
(11)	Height of insulator	:	508.00 mm

VEJAR TRANSMISSION LIMITED NEW DELHI

TECHNICAL SPECIFICATIONS OF 198 KV/120 KV/30 KV 10KA METAL OXIDE GAPLESS SURGE ARRESTERS

PRINCIPAL PARAMETERS

•	Rated system voltage	245 KV	**145 KV**	**36 KV**
•	System neutral earthing	Effectively earthed		
•	Installation	Outdoor		
•	Rated arrester voltage	198 KV	**120 KV**	**30 KV**
•	Max. continuous operating voltage (MCOV) at 50^0C	168 KV	**102 KV**	**24 KV**
•	Nominal discharge current	10 KA (8/20 microwave)		
•	Rated frequency	50 Hz		
•	Minimum line discharge capacity	2 KJ / KV		
•	Power frequency reference voltage	Not less than MCOV		
•	Max. Residual voltage at nominal discharge current of 10 KA and 8/20 Micro Sec.	550 KV_P	**400 KV_P**	**100 KV_P**
•	Peak & value of high current (4/10 Microwave)	100 KA		
•	Creepage distance	25 mm/KV		
•	Partial discharge test on 1.05 MCOV	Net more than 50 Pico coulombs		
•	One minute power frequency voltage of arrester housing	460 KV	**275 KV**	**70 KV**
•	Impulse withstand voltage of arrester housing with 1.2/50 micro second wave.	1050 KV_P	**650 KV_P**	**170 KV_P**
•	Minimum prospective fault current.	40 KA		
•	Radio interference voltage	Not more than 500 micro volts.		
•	Pressure relief class	Class-A		
•	Current for pressure relief.	40 KA		
•	Seismic acceleration	0.3 g.		
•	Long duration discharge class	Class 3 (as per IEC)		

The details of the equipments to be protected by these surge arresters are as under:- Equipment Basic Insulation level

		220 KV	**132 KV**	**33 KV**
i)	**Transformer 220 KV side**	950 KV_P	550 KV_P	170 KV_P
ii)	**Switchgears, CTs and CVTs**	1050 KV_P	650 KV_P	170 KV_P

JEWAR TRANSMISSION LIMITED NEW DELHI

CONTROL AND RELAY PANELS

Control and Relay Panels shall consist of separate vertical stationary front panels with equipment mounted thereon and having wiring access from the rear. Each cubicle assembly shall be provided with doors on the rear having handles with built in locking facility. It shall have double leaf doors with lift off hinges at the back for panels of width more than 800 mm.

These panels shall be of the following approximate dimensions: -

Height: 2250mm + 15mm ant vibration pad + 50 mm
(base) Depth: 800mm to 1000mm
Width: 800 mm to 1000 mm

Metering Instruments:

APPLICABLE STANDARDS

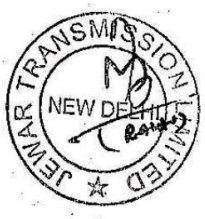
The CT PT operated HT energy meter shall be of accuracy Class 0.2s and conform to following standards-

- IS 14697: 1999 — Specification for A.C Static Transformer operated Watt Hour & VAR – Hour meters, class 0.2S & 0.5S
- CBIP Technical Report No. 88 (Revised July 1996 and Amendments & Errata issued in April - 1999 and September'99) — Specification for A.C. Static Electrical Energy Meters.
- IEC – 687 - Alternating current static watt-hour meters for measurement of active energy, class 0.2.
- IS- 3202 Climatic proofing of electrical equipment.
- CBIP technical report – 111 where ever applicable.

PRINCIPAL PARAMETERS

The energy meters shall be indoor/ out door type connected with the secondary side of out door current and voltage transformers.

Sl. No.	Item	Specification



i.	Type of Installation	Indoor (non AC) /Outdoor
ii.	CT secondary	1 A
iii.	VT secondary	110 V/ √3 Volts
iv.	Auxiliary AC Supply	230 V+ 10 % to –15%
v.	Auxiliary DC Supply	110 V/220V/ + 10%
vi.	System frequency	50HZ + 5%
vii.	Earthing System	Solidly Grounded

GENERAL TECHNICAL REQUIREMENT

i) Application: 3 phase 4 wire, -/01A

ii) Rated Secondary Voltage: -/110V AC, 63.5 Volts (Phase to Neutral)

iii) Rated secondary Current (I Basic): 1 Amp balanced & unbalanced load

iv) Maximum Current : 2 Amps.

v) Rated Frequency: 50 Hz.

vi) Accuracy class: 0.2s

vii) Power Factor: Unity to Zero (all power factor lag to lead).

viii) Power Consumption: Not more than 1.5Watt per phase(Active)

10 VA (Apparent) Apparent power consumption in each current circuit at basic current and reference frequency shall not exceed 1.0 VA

ix) Phase Sequence Immunity: Shall be unaffected to phase sequence.

x) Data Transfer Speed from meter to MRI and from MRI to BCS: at least 19200 kbps.

xi) Communication Port: Optical port for MRI and communication port for remote data transfer.

xii) Degree of protection of encapsulation : shall be at IP 51/IP 54 or better.

xiii) Minimum Starting Current – 0.1% of I basic.

JEWAR TRANSMISSION LIMITED NEW DELHI

RELAYS:

All relays shall conform to the requirements of IS: 3231 or other applicable approved standards. Relays shall be suitable for flush or semi-flush mounting on the front with connections from the rear. Relays shall be rectangular in shape and shall have dust tight, dull black or egg shell black enamel painted cases with transparent cover removable from the front.

TECHNICALSPECIFICATIONS FOR 110/30A 110V/30A BATTERY CHARGERS AND DC DISTRIBUTION BOARDS

REQUIREMENT OF BATTERY

CHARGER TYPE & RATING

Each battery charger shall be of 3 phase type which must be able to meet the above requirement plus 20 Amps station load current on both float and boost charging modes with a voltage variation from 350 V to 470 V A.C. 50 Hz ± 5% separately or simultaneously.

The charger shall be stand-alone, floor mounted indoor type. The panels shall consist of fabricated sheet steel enclosures on the sides, front, rear and top. The rear door of panel shall be in the form of lockable, hinged tight fitting flap door which should close and open without keys. The front and rear sheets shall be folded construction for providing rigidity and strength (without using any frame works or screwed & bolted sheet steel sections) of not less than 14 SWG. All the switches, knob should be such mounted that only their operating handles protrude out of the panel. Suitable support channels shall be provided inside the cubicle. The charger unit will be completely vermin proof and neoprene gaskets will be provided around the edges of the door.

Important identifications/ markings shall be made on anodized plate with etching process (not with screening process) which shall be riveted.

All screws, nuts and bolts shall be rust proof and spring washers shall be provided wherever required.

Terminal blocks should be easily accessible and transparent flexible top covers (easily removable) shall be provided to cover the live parts.

TECHNICAL SPECIFICATIONS OF D.C. DISTRIBUTION BOARDS

The D.C. distribution board shall be similar in construction to the charger having preferably the same height using 14SWG sheet steel. The DCDB shall have single aluminum bus bar arrangement and arrangement for connecting the out put of charger. Automatic switching of D.C.emergency light circuit in the event of A.C. failure shall also



be provided.

TECHNICAL SPECIFICATION OF DISC INSULATORS AND CONDUCTORS ETC

STANDARDS

The supply of accessory items covered by this specification shall comply with the latest editions of the Indian standards / IEC and codes of practice. Some of the applicable standards are given below :-

I.S.S No.	Particulars	Remarks
IS.731	Disc insulators	Or any other equivalent International standard
IS. 2544	Porcelain Insulators	- do -
IS. 6005	Code of practice for phosphating Iron & Steel	- do -
IS. 398	ACSR Conductor	- do -
IS. 226	M. S. Bars	- do -

REQUIREMENT OF ANTI-FOG TYPE DISC INSULATORS

A) 220 kV SWITCHYARD

(i) Single suspension string shall be complete with 14 nos. anti-fog type disc insulators and without suspension clamps & fittings.

(ii) Single strain string shall be complete with 16 nos. anti-fog type disc insulators and without strain clamps & fittings.

B) 132 kV SWITCHYARD (For 220 kV & 132 kV Substations)

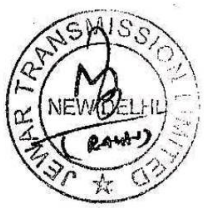
(i) Single suspension string shall be complete with 9 nos. anti-fog type disc insulators and without suspension clamps & fittings.

(ii) Single strain string shall be complete with 10 nos. anti-fog type disc insulators & without strain clamps & fittings.

PARAMETERS OF DISC INSULATORS

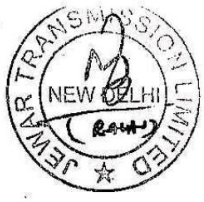
These are required for 220 kV, 132 kV and 33 kV tension and suspension strings. The minimum guaranteed requirements of one unit of each type of insulators shall be as follows :

Anti-fog type insulators shall be of ball and socket type.



For 220 kV &132 kV Busbar Strings

i)	Types of insulator	Anti-fog type
ii)	Electromechanical strength (kN)	70
iii)	Size of Insulator (mm)	280 x 146
iv)	Creepage distance	
	a) Total mm	430
	b) protected mm	290
v)	Power Frequency Flashover Voltage	
	a) Dry kV	100
	b) Wet kV	60
vii)	Power frequency with stand Test voltage	
	a) Dry kV.	85
	b) Wet kV.	50
vii)	50% Impulse 1.2/50 micro sec. Flashover voltage (dry)	
	a) Positive polarity / kV.	175
	b) Negative polarity/ kV.	170
viii)	Impulse 1.2 / 50 micro sec. withstand test voltage.	155
ix)	Power Frequency Puncture Voltage kV.	140
x)	Size of in ball shank in mm	16
xi)	Minimum corona extinction voltage kV. R.M.S.	18
xii)	Max. RIV at 10 kV. RMS.	50 micro Volt



BUS BAR CONDUCTORS

Aluminum strands for ACSR and all aluminum conductors shall be hard drawn from 99.5% pure electrolytic aluminum rods with 61% conductivity.

The steel wire for ACSR conductor shall be manufactured from high tensile steel of 134 to 143 kg. / Sq. mm. quality produced either by the acid or basic open hearth process or by electric process. It shall not contain sulphur or phosphorous exceeding 0.05 percent and total of sulphur or phosphorous shall not exceed 0.085 percent. No wires drawn from Bessemer process steel shall be used.

The surface of the conductor shall be clear and dry . The surface strands shall be smooth and free from burrs and other projections which may cause in creasing corona losses above those occurring on perfectly smooth conductor when used on extra high voltage lines.

TECHNICAL SPECIFICATIONS FOR 63KVA DIESEL GENERATOR

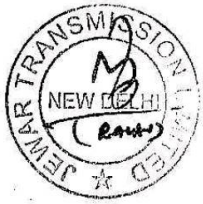
ELECTRICAL SUPPLY SPECIFICATIONS

Nominal voltage :
415V ±10% No. of Phases
: 3 +
Neutral
Frequency : 50Hz ±
5% Neutral earthing : Solidly
Grounded
Control supply : 12 / 24V, 2-wire DC

PRINCIPAL TECHNICAL PARAMETERS

The Voltage Transformers shall conform to the following specific parameters:

Sl. No	Parameters	Specification
1	2	3
1.	Type of installation	Single Phase, Oil filled hermetically sealed and outdoor types
2.	Type of mounting	Pedestal type
3.	Suitable for system frequency	50 Hz ± 5%
4.	Highest system Voltage	245 Kv
5.	Transformation ratio on all windings	**220,000 / 110** **√3 √3**
6.	Method of earthing	Effectively earthed
7.	1.2/50 micro second lightning impulse withstand voltage kV (peak)	1050



8.	1 minute dry power frequency withstand voltage kV (rms)	460
9.	Min. Creepage Distance mm.	6125
10.	Radio interference Voltage at 266 kV	Not exceeding 500 micro volts

REQUIREMENT OF 245 KV CVT

S.No.	DETAILS	PARTICULARS		
1.	Transformation ratio on all windings	220,000 / 110 / √3 √3 (No. of secondary windings 3)		
2.	Supply frequency	50 Hz.		
3.	Type	Capacitor voltage type.		
4.	Rated voltage factor	1.2 continuous 1.5 for 30 seconds.		
5.	Application	Winding I Protection	Winding II Protection	Winding III Metering/Synchro.
6.	Accuracy	3P	3P	0.2
7.	Phase angle error	--------- As per IS ----------		
8.	Output burden	150 VA	150 VA	50 VA
9.	Rated capacitance	4400 + 10% - 5%		
10.	Rated total thermal burden	750 VA		
11.	Standard reference range of frequency for which the accuracies are valid.	97% to 103% for protection & 99% to 101% for measurement.		
12. a)	One minute power frequency test on secondary winding.	3 KV (r.m.s.)		
b)	Withstand voltage between low voltage terminal and earth terminal	4 KV (r.m.s.)		
(Note : This test voltage shall be 10 KV (r.m.s.) in the low voltage terminal exposed to weather).				
c)	Radio interference voltage of 266 KV (r.m.s.)	Not exceeding 500 microvolts.		

JEWAR TRANSMISSION LIMITED NEW DELHI

13.	Corona extinction voltage.	320 KV (r.m.s.)
15.	Partial discharge level at rated voltage for capacitor divider.	Less than 10 pico coulombs

TECHNICAL SPECIFICATION FOR 160 MVA, 220/132/11KV, AUTOTRANSFORMERS.

STANDARDS

The transformers shall conform in all respect to latest edition of IS 2026 and CBIP specification.

TYPE RATING AND QUANTITY

The auto transformers shall be of core type constructions, three phase, oil immersed for outdoor service as both step up and step down transformers, with types of cooling mentioned below. The rating and electrical characteristics of transformers shall be as follows :-

i)	Maximum continuous capacity	160 MVA
ii)	Frequency	50 C/s
iii)	No. of phase	3
iv)	Rated Voltage of HV winding	220 KV
v)	Rated Voltage of IV winding	132 KV
vi)	Rated voltage of Auxiliary winding	11 KV
vii)	% age impedance	
	a) HV to IV at normal tap no. 13	10% at 100% rating.
	b) HV to IV at tap no. 1 at 100% rating.	11%
	c) HV to IV at Tap no. 17 at 100% rating.	11%
	d) HV to tertiary	60% (min.)

		(Offers with lower % impedance will not be considered)
	e) IV to tertiary	50% (min.)
		(Offers with lower % impedance will not be considered)

Note: No reactor either inside or outside the tank shall be used to achieve above %age impedance value.

viii)	Connections	
a)	Series and common winding	------Star-----
b)	Auxiliary winding	--------delta------

JEWAR TRANSMISSION LIMITED NEW DELHI

ix)	Reference voltage group and terminal HV/LV/Tertiary-- markings	--- YNaod1
	1.	
x)	On load taps equal steps of	---(-5%) to (+15%) in 1.25% each for IV variation.
xi)	Polarity	----Subtractive----
xii)	Type of Cooling	ONAN/ON AF/OFAF 80/ 112/ 160 MVA
xiii)	Rated capacity of auxiliary winding	45 MVA
xiv)	D.C. Voltage for relays etc.	110 V /220 Volt DC

All the transformers shall be oil immersed, weather proof Auto-type for outdoor installation in lightening areas. The windings of 3 phase transformers shall be connected Star/Star to conform to vector symbol YNaod11 group no. in accordance with IS 2026-1977 and any amendment thereof.

TECHNICAL SPECIFICATIONS FOR 36 kV

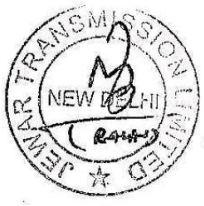
ISOLATORS TYPE OF ISOLATORS

a) Three phase, 1250 A, 36 kV manually operated, Standard isolators without earth switch.

b) Three phase, 1250 A, 36 kV manually operated, Standard isolators with one earth switch.

PRINCIPAL PARAMETERS

DETAILS	36 kV Isolator
Rated Voltage	36 kV
System frequency	50 Hz
System Earthing	Effectively earthed
Type of Isolator	Outdoor, Horizontal air break suitable for upright mounting
Continuous current rating	1250 A



Operating mechanism	Manual
Phase to phase spacing	1500 mm
Rated short time withstand current	25 kA (rms)
Rated peak short circuit current	62.5 kA (peak)
Temperature rise	As per IEC-129 derated for an ambient of 50^0C
Seismic co-efficient	0.3 g.
1.2/50 microsecond full wave positive and negative impulse withstand voltage to earth	70 kV (peak)
One minute power frequency withstand voltage dry & wet to earth	70 kV (rms)
Auxiliary Contacts	4 normally open and 4 normally closed.
Insulation level of insulators	
i) Impulse voltage withstand test (1.2/50 micro second full wave)	170 kV (peak)
ii) Power frequency withstand voltage to earth (dry & wet)	70 kV (rms)
Creepage distance of insulators :	
i) Total	900 mm
ii) Protected	450 mm
Minimum strength :	Suitable to withstand wind, short circuit and operating forces
i) Torsional	
ii) Cantilever	
Interlocks with circuit breaker	1 set of electrical and casteltype interlocks.
Type of contacts	Hard drawn electrolytic copper with silver plating
Conductor take off	Horizontal/vertical according to actual requirement.
Phase-to phase clearance	1500 mm

JEWAR TRANSMISSION LIMITED NEW DELHI

TECHNICAL SPECIFICATIONS FOR 10 MVAR,33KV CAPACITOR

BANK CAPACITOR BANKS

Capacitor banks detailed above shall be complete with the Capacitor unit controlling breaker, manually operated OFF load isolators without earthing switch at bus bar side and with earthing switch at capacitor side, CT, NCT, VT, switching reactors, control & relay panel, necessary mounting racks, insulators, interconnecting materials, bi-metallic terminal connectors, junction boxes and any other material required for satisfactory operation and installation. As per system condition, switching reactor for harmonic suppression are not required.

General arrangements

The capacitor banks shall be out door type suitable for operation in the climatic conditions as detailed on page S-2 Mounting steel racks to be supplied by the tenderer shall be suitable for mounting on plinth. The Tenderers should offer compact design to occupy minimum ground area with least possible height. The bank shall suitable for mounting under the bus bars drawn on ganturies having height as mentioned in clause 3.1.6 of technical specification with due consideration for required clearances. The tender shall be complete with drawing showings the arrangements.

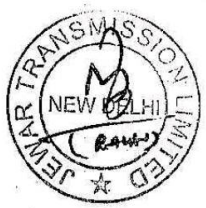
Each capacitor bank shall be in two double star groups of 5MVAR each with separate one number manually operated, OFF load type isolator with earthing switch for each group. Each group of 5MVAR shall be connected in double star formation with their neutral point ungrounded and protected through separate one number NCT. Each star formation shall be of 2.5 MVAR rating at 33KV.

Each capacitor bank shall be complete with all auxiliaries accessories and the following associated equipments:-

Sl. No.	Name of associated equipment	Qty. required for Bank
1	36KV, 3-ph, Circuit Breaker	1 No
2	36KV, 3-ph Isolator without earthing switch	1 No
3	36KV, 3-ph. Isolator with earthing switch	2 No
4	36KV, 1-ph. Current Transformer	3 No
5	36KV, 1-ph Neutral Current Transformer	2 No
6	3-ph. Switching reactor	4 Nos.
7	Control & Relay panel with relays	1 No
8	36KV, 3-ph/ 1-ph voltage Transformers	1/3 Nos.

The number of parallel units in each series group shall be such that failure of one unit shall not preferable creating.

i) More than 5% voltage rise with internal fuse on other units in the bank.



INDIVIDUAL CAPACITOR UNIT

Individual Capacitor Units of 5.485 KV, 276.25 KVAR, rating of Bank shall be self contained, outdoor types, having two bushing to give the required total Bank Capacity at 50Hz. And the Bank compact to occupy minimum ground area with least possible height. The bushing should be of metal coated porcelain and shall be joined to the case by solder sealing method. The Creepage distance of bushing shall not be less than 25mm/KV of voltage stress appearing between the terminal and the case. The bushing shall be suitable for heavily polluted. Atmospheric condition.

The impregnant used shall be non-PCB and the impregnation shall be carried out under high degree of vacuum and the unit shall be of totally sealed type.

Each capacitor unit shall be provided with internal discharge resistors designed to drain out the residual charge up- to 50 volts within less than 10 minutes after disconnection from supply.

Each capacitor unit shall be individually protected by fuse suitably rated for load current. Capacitor to be provided with additional external fuse should have arrangement for visual indication for detection of faulty units.

Each unit shall satisfactorily operate at 130% rated KVAR including the factor of over voltage (referred to rated voltage), harmonic currents and manufacturing tolerance.

Terminal and mounting arrangement may be in accordance with manufacturer's standard practice, but should be amply proportioned with adequate safety margins.

The Containers of capacitor units shall be of sufficiently thick sheet painted with suitable anti- rust synthetic enamel primer paint and the finishing coats of paint as per the standard practice.

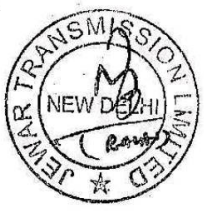
The Capacitor banks shall conform to latest edition of IS: 13925(Part-I: 1998/ IEC-70).

ISOLATORS (WITH AND WITHOUT EARTH SWITCH)

The isolators (with and without earthing switch both) shall be outdoor, manually gang operated, double break, OFF load type, 36kV, 800 amps, 1000MVA, 3 phase, 50 Hz triple pole complying in all respects with the requirements of the latest edition of IS: 9921-1981 and complete with insulators, mechanical and electrical inter locks, bi-metallic terminal connectors suitable for ACSR panther conductor all auxiliaries and accessories.

Current Transformers

The current transformers shall be of the outdoor dead tank type single phase, 50Hz, oil immersed self cooled.



The current transformers shall have following ratings:-

a	Nominal system voltage	33 KV
b	Highest system voltage	36 KV
c	No. of cores	Two
d	system earthing	Effective
e	Transformation ratio	400-200/1/1/A
f	Basic insulation level	170 KV (peak)
g	Short time current rating	25 KA
h	Fault level	1000 MVA
i	Rated output of each core	15 VA
j	Class of accuracy	5-P for protection, 1for metering
k	Max. resistance of secondary winding	5 ohms
l	Accuracy limit factor (protection core)	10
m	Instrument security factor (metering core)	5
n	Cree page distance a) Total b) Protected	 900 mm (Min) 450 mm (min)

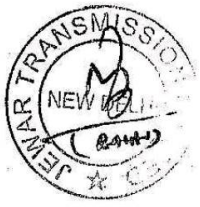
The core shall be of high grade, non- ageing electrical silicon laminated steel of low hysteresis loss and high permeability to ensure high accuracy at both normal and over current.

Voltage Transformers

The voltage transformer shall be of outdoor type, three phase / single phase, 50 Hz, oil immersed, self cooled.

The voltage transformer shall have the following ratings:-

a	Nominal system voltage	33 KV
b	Highest system voltage	36 KV
c	Frequency	50 Hz
d	System earthing	Effective
e	No. of secondary windings per phase	One
f	Ratio	33000/110 volts $\sqrt{3}$ / $\sqrt{3}$
g	Basic insulation level	170KV (peak)
h	Rated burden	100 VA
i	Rated voltage factor (continuous)	1.1.
j	Rated voltage factor (30sec.)	1.5
k	Class of accuracy	3.p



l	Creepage distance a) Total b) Protected	 900 mm (min) 450 mm (min)

The VTs shall conform to the latest edition of IS: 3156. The bushing shall comply with the latest edition of IS: 2099 and IS: 5347.

Neutral Current Transformer

Two NCT shall be required for one set of capacitor bank.

The neutral current transformer shall be as per specifications of CT except that it shall have single core, transformer ration 5/1 and accuracy class for the protection core shall 5 P 10.

Required number of suitable and matching bimetallic terminal connectors along- with required number of cable glands shall be supplied along- with the NCTs. And accordingly the prices may be quoted.

Control & Relay Panel (SAS Based)

The control and relay panels shall conform in all respects to relevant Indian standards. Equipment meeting any other authoritative standard which ensures an equal or better standard than mentioned above may also be considered.

The control and relay panel shall be of floor mounted, indoor free, standing cubicle type. The panels shall consist of fabricated sheet enclosures on the sides, front, rear and top.

The rear of the panels shall be in the form of lockable hinged flap door. The front and rear sheets shall be of folded construction for providing rigidity and strength without using any frame work or screwed or bolted sheet steel sections. The front of the panels which accommodates most of the mountings shall be fabricated with sheet steel of thickness not less than 10 SWG. For the rest of the panel which carries no weight of the mountings, sheet steel of thickness not less than 14 SWG should be used.

FIBRE OPTIC EQUIPMENTS

Network Configuration and Equipment

Characteristics Introduction

This section describes the Fibre Optic Communication network configuration and the equipment characteristics for communication system to be installed under the project. The sub-systems addressed within this section are:



(1) Fibre Optic Transmission System (FOTS)
(2) Termination equipment Subsystems
(3) Network Management System (NMS)
(4) MDF, DDF and Cabling

Digital Tele-Protection Coupler (Stand (Stand-Alone type)

Protection coupler shall be of modular type having independent Command interfaces.

- Each coupler shall have redundant power supply source.
- Protection command signals shall be suitable for 110/220V DC (site programmable) directly from station battery without involving any intermediate converter. **Opto-coupler Interface shall be provided suitable for 110Volt & 220Volt DC.**
- **Power supply source 110V DC with additional provision for operation on 48V DC.**

BUS SCHEME FOR SUBSTATIONS			
400/220kV Jewar	**220/33kV Cantt (Chaukaghat)**	**220/33kV Vasundhara**	**220/132/33kV Khaga**
400- Double Main Bus Scheme 220- Double Main Bus Scheme	220- DoubleMain Bus Scheme 33- Single Main & Transfer Bus Scheme	220- Double main Bus scheme 33- Single Main & Transfer Bus Scheme	220- Double main Bus & Transfer Scheme 132- Double main Bus & Transfer Scheme 33- Single Main & Transfer Bus Scheme.

JEWAR TRANSMISSION LIMITED NEW DELHI

SPECIFIC TECHNICAL REQUIREMENT FOR COMMUNICATION

IN 220 kV, 132 kV and 33 kV SUBSTATION

In order to meet the requirement for grid management and operation of substations, Transmission Service Provider (TSP) shall conform to the following requirements.

On 220 kV and 132 kV D/C lines one OPGW containing 24 fibers is to be installed in place of conventional earth wire for grid management and substation operation purpose by STU/CTU and 48 fibers to be installed on LILO lines.

220 kV, 132 kV, 66 kV, 33 kV & 11 kV System

SL No	Description of parameters	220 kV System	132 kV System	66 kV System	33 kV System	11kV System
1.	System operating voltage	220 kV	132 kV	66 kV	33 kV	11 kV
2.	Maximum operating voltage of the system (rms)	245 kV	145 kV	72.5 kV	36 kV	12 kV
3.	Rated frequency	50	50 Hz	50 Hz	50 Hz	50 Hz
4.	No. of phase	3	3	3	3	3
5.	Rated Insulation levels					
	i. Fullwave impulse withstand voltage (1.2/50 micro sec.)	1050 kVp	650 kVp	325 kVp	170 kVp	75 kVp
	ii. One minute power frequency dry and wet withstand voltage (rms)	-	275 kV	140 kV	70 kV	28 kV
6.	Corona extinction voltage	156 kV	105 kV	-	-	-
7.	Max. radio interference voltage for frequency between 0.5 MHz and 2 MHz at 92 kV rms for132 kV system	1000 micro- volts	500 micro-volts	-	-	-
8.	Minimum creepage distance (25mm/kV)	6125mm	3625mm	1813mm	900mm	300mm
9.	Min. Clearances					
	i. Phase to phase	2100mm	1300mm	750mm	320mm	280mm

JEWAR TRANSMISSION LIMITED NEW DELHI

SL No	Description of parameters	220 kV System	132 kV System	66 kV System	33 kV System	11kV System
	ii. Phase to earth	2100mm	1300mm	630mm	320mm	140mm
	iii. Sectional clearances	5000mm	4000mm	3000mm	3000mm	3000mm
10.	Rated short circuit currentfor1 sec. Duration	40kA/50kA (as applicable)	31.5 kA	31.5 kA	25 kA	25 kA
11.	System neutral earthing	Effectively earthed	Effectively earthed	Effectively earthed	Effectively earthed	Effectively earthed



SPECIFIC TECHNICAL REQUIREMENTS FOR 400 KV TRANSMISSION LINES

1.0 The Tower shall be fully galvanized using mild steel or/and high tensile steel sections. Bolts and nuts with spring washer are to be used for connection.

2.0 IS Steel section of tested quality in conformity with IS 2062:2011, grade E 250 (Designated Yield Strength 250 Mpa) and/or grade E 350 (Designated Yield Strength 350 MPa) are to be used in towers, extensions, gantry structures and stub setting templates. However, use of steel grade having designated yield strength more than 350 MPa is not permitted. The steel used for fabrication of towers shall be manufactured by primary steel producers only.

3.0 Towers shall be designed as per IS-802:1995 considering wind zone 4. However, drag coefficient of the tower shall be as follows:-

Solidity Ratio	Drag Coefficient
Upto 0.05	3.6
0.1	3.4
0.2	2.9
0.3	2.5
0.4	2.2
0.5 and above	2.0

As per Clause 12.1.2.1 b) 2) of IS 802:1995, Under security condition for tension and dead end towers, the transverse loads due to line deviation shall be the component of 100 percent mechanical tension of conductor and ground wire/ OPGW corresponding to 100% of design wind pressure at everyday temperature or 36% design wind pressure at minimum temperature after accounting for drag coefficient and gust response factor.

As per CEA's technical standards for construction of lines Regulation 2010, Transmission Service Provider (TSP) may adopt any additional loading/ design criteria for ensuring reliability of the line, if so desired and/ or deemed necessary.

4.0 The conductor configuration shall be as follows:-

4.1 **For transmission lines with ACSR conductor:-**

Transmission line	ACSR Conductor specified	Sub-conductor Spacing
400kV D/C (Twin Moose) transmission lines	Moose : Stranding 54/3.53mm-Al + 7/3.53 mm-Steel, 597sq mm, Total Sectional Area, 31.77mm diameter	450 mm
400kV D/C (Twin HTLS) transmission lines	HTLS. type- INVAR/ GAP/ Composite Core/ ACSS, 1596A ampacity, 28.62 mm diameter, 0.05552 (Ω/km) resistance	450 mm

JEWAR TRANSMISSION LIMITED NEW DELHI

Note: *The transmission lines shall have to be designed for a maximum operating conductor temperature of 85 deg C for ACSR only.*

5.0 The required phase to phase spacing and horizontal spacing for 400 kV D/C line shall be governed by the tower design as well as minimum live metal clearances for 400kV voltage level respectively under different insulator swing angles.

a) **For 400 kV transmission lines:**
The minimum live metal clearances for 400kV D/C transmission lines may be considered as follows:

(i) Under stationary conditions From tower body:
For 400 kV D/C: 3.05 m

(i) Under swing conditions

Wind pressure Condition	Minimum electrical clearance
a) Nil	3.05 mtrs
b) Swing angle (22º)	3.05 mtrs
c) Swing angle (44º)	1.86 mtrs

However the phase to phase spacing for 400kV D/C line shall not be less than 8.0 m

6.0 The minimum ground clearance for 400 kV D/C transmission lines shall be 8.84 m so that maximum electric field does not exceed 10kV/m within the ROW and does not exceed 5kV/m at the edge of the ROW as per international guidelines.

7.0 The minimum mid span separation between earth wire and conductor shall be 9.0 m for 400 kV D/C transmission lines. Shielding angle shall not exceed 20 deg for 400 kV D/C line D/C transmission lines.

8.0 Transposition is to be done for all transmission lines whose length is greater than 100 km. Transposition should be carried out at 1/3 and 2/3 of the line length tower positions. Transposition of the transmission line after the construction of LILO shall be maintained by the developer. Transposition disturbed from construction of LILO will be set right by the TSP in the resulting Loop in and Loop out Lines as per regulation issued by the competent authority.

9.0 The switching impulse withstands voltage (wet) for 400 kV line shall be 1050 kVp. Lightning impulse withstand voltage (dry) for 400kV line shall be 1550 kVp.

10.0 The Fault current for design of line shall be 63 kA for 1 sec for 400 kV.

11.0 The lines shall be designed for very heavy pollution level (creepage of 31mm/kV as per

JEMAR TRANSMISSION LIMITED NEW DELHI

IEC- 60815). Porcelain/ glass/ polymer insulators shall be used in the line as per requirement and site conditions for the transmission lines.

12.0 Each tower shall be earthed such that tower footing resistance does not exceed 10 ohms. Pipe type or Counterpoise type earthing shall be provided in accordance with relevant IS. If the value (before stringing) has been recorded higher than 10 ohm, earthing shall be changed to Counterpoise type. Additional earthing shall be provided on every 7 to 8 kms distance at tension tower for direct earthing of both shield wires.

13.0 The required grade of concreate and mix design for foundation of transmission line tower shall be as per relevant IS.

14.0 Technical specification for 400kv line on Monopole

i) The monopoles are of the

following types: 400 kV Double

Circuit (PA, PB, PC & PD)

Classification of

Monopole/Towers

The Pole for 400 kV Lines are classified as given below:-

a) For Suspension Pole PA (0-

2 deg.) Normal Span :

200m
Wind Span : 200m
Weight Span : 300m

b) For Tension Pole PB (2-

15 deg.) Normal Span :

200m
Wind Span : 200m
Weight Span : 300m

c) For Tension Pole PC (15-

30 deg.) Normal Span :

200m
Wind Span : 200m

JEMAR TRANSMISSION LIMITED NEW DELHI

Weight Span : 300m

d) For Tension Pole PD (30-

60 deg.) Normal Span :

200m
Wind Span : 200m
Weight Span : 300m

ii) **Broken wire Conditions:**

For Suspension pole (PA)	:	One Earthwire or One Conductor broken at a time, whichever is more stringent for a particular section.
For Tension pole (PB)	:	One Earthwire and any One Conductor broken or any two conductor broken at a time on same side, whichever is more stringent for a particular section.
For Tension pole (PC)	:	One Earthwire and any One Conductor broken or any two conductor broken at a time on same side, whichever is more stringent for a particular section.
For Tension pole (PD)	:	One Earthwire and any Two Conductor broken or any Thre conductor broken at a time on same side, whichever i more stringent for a particular section.

Code Reference

Load Calculation : IS 802

Sag & Clearance : IS: 5613 CBIP Manual

Deflection Criteria: 5% of height of pole @ ultimate load conditions and 2% of the height of pole @ everyday condition (safety normal)

iii) **Ground Clearance**

The minimum ground clearance from the bottom conductor shall not be less than 8840 mm for 400KV lines at the maximum sag conditions i.e. at 85° C and still air.

An allowance of 150mm shall be provided to account for errors in stringing.

Conductor creep shall be compensated by over tensioning the conductor at a temperature of 26°C lower than the stringing temperature for ACSR ,MOOSE conductor.

JEMAR TRANSMISSION LIMITED NEW DELHI

iv) **Electrical System Data for 400 kV line**

1.	Nominal Voltage	kV	400
2.	Maximum system voltage	kV	420
3.	BIL (Impulse)	kV (Peak)	1550
4.	Power frequency withstand voltage (Wet)	kV (rms)	680
5.	Switching surge withstand voltage (Wet)	kV (rms)	1050
6.	Minimum Corona extinction voltage at 50 Hz AC system under dry condition	kV (rms) phase to earth.	320(Min)
7.	Radio interference voltage at one MHz for phase to earth voltage of 305 KV under dry condition.	Micro Volts	1000 (Max)

v) **Details of line Material: earthwire & OPGW**

Sl. No.	**Description**	**Earthwire**	**OPGW (tentative)**
1.	Type	7/3.66mm GS Earthwire	24 fibre OPGW
2.	Stranding and wire diameter		
	Aluminium	-	
	Steel	7/3.66	
3.	Conductor per phase	NA	NA
4.	Spacing between conductor of same phase(sub conductor spacing)(mm)	NA	NA
5.	Configuration	One continuously to run horizontally on top of the towers and conductors.	One continuo-usly to run on top of the towers and conductors
6.	Overall Diameter (mm)	10.98	≈ 10.98
7.	Unit mass (kg/km)	583	≈ 583
8.	Min. UTS (kN)	68.4	Equivalent to earthwire

15.0 For crossings design, installation and maintenance of overhead power lines shall be as per IS:5613 or latest amendments.

JEWAR TRANSMISSION LIMITED NEW DELHI

SPECIFIC TECHNICAL REQUIREMENTS FOR 400/220 KV SUBSTATION

The proposed 400/220 kV Jewar (2x500 MVA) substation shall be Gas Insulated Switchgear (GIS) type generally confirming to the requirement of CEA regulation for construction of sub-station.

1.0 Salient features of 400/220kV GIS Substation Equipment and Facilities
The design and specification of substation equipment are to be governed by the following factors:

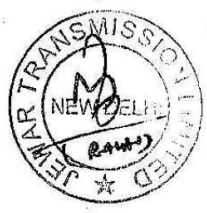
2.0 Insulation Coordination

400kV System would be designed to limit the Switching overvoltage to 2.5 pu and is expected to decay to 1.5 p.u. in 5 to 6 cycles. Consistent with these values and protective levels provided by lightning arrestors, the following insulation levels are proposed to be adopted for 400 KV & 220kV systems:

Sl. No.	Particulars	400kV	220kV
a.	Impulse withstand voltage for - Transformer and reactors - for Other Equipment - for insulator strings	 1300kVp 1425 kVp 1550kVp	 950kVp 1050 kVp 1050 kVp
b.	Switching surge withstand voltage	1050 kVp	-NA-
c.	Minimum creepage distance - for insulator strings - for other equipment	 13020mm 13020mm	 7595 mm 7595 mm
d.	Max. fault current	63 kA	40 kA
e.	Duration of fault	1 Sec	1 Sec
f.	Corona extinction voltage	320kV rms	156kV rms

3.0 Switching Schemes

It is essential that the system should remain secured even under conditions of major equipment or bus-bar failure. Sub-stations being the main connection points have large influence on the security of the system as a whole. The selection of the bus switching scheme is governed by the various technical and other related factors. One & Half breaker bus scheme has been considered for 400kV side of the substation due to their merits in terms of reliability, security, operational flexibility and ease of maintenance of equipment.



Substation	Bus Scheme
400/220 kV (2×500 MVA) GIS Substation at Jewar	400 kV- Double Main Bus Scheme 220 kV- Double Main Bus Scheme

4.0 Substation Equipment and Facilities

The switchgear shall be designed and specified to withstand operating conditions and duty requirements. All equipments shall be designed considering the transmission line capacity.

Current rating for various feeders & bus bar are as follows

Sl. No	Description of bay	400 kV	220 kV
1	Bus Bar	4000A	3000A
2	Line bays	3150	1600A
3	ICT bays	3150	1600A
4	Bus Reactor bays	3150	NA
5	Bus coupler bays	NA	2500A

4.1 400/220KV GIS Substation equipment

GIS (Gas Insulated Switchgear) shall be indoor type and in accordance to IEC: 62271-203. The switchgear shall be designed and specified to withstand operating conditions and duty requirements. All the switchgear such as Circuit Breaker, isolator, earth switch including CT, PT etc. shall be GIS type. Surge Arrestors used for transformer/Reactor connections will be AIS or GIS type. 400kV scheme shall be designed in such a way that it shall be possible to use line reactors (if provided) as bus reactors, in case of outage of line, to control bus voltage. Local control cabinets (LCC) shall be provided as per requirement. The alarm & annunciation of GIS equipment shall be wired to SCADA System.

4.1.1 Circuit Breakers

GIS Circuit breakers shall in general be of C2-M2 class and comply to IEC- 62271-100. The rated break time shall not exceed 40 ms for 420KV breaker and 60 ms for 245kV breaker. 420 kV & 245 kV Circuit breakers shall be provided with single phase and three phase auto reclosing. The Circuit breakers controlling 400kV lines of more than 200km length shall also be provided with pre insertion closing resistor of about 400 ohms maximum with 9 ms minimum insertion time. The short line fault capacity shall be same as the rated capacity and this is proposed to be achieved without use of opening resistors. The short line fault capacity shall be same as the rated capacity and this is proposed to be achieved without use of opening resistors. Control switching device shall be provided in Circuit breaker of switchable line reactor and in Main & Tie circuit breakers of Transformers, line with non- switchable line reactors and Bus reactors. Further, it shall be possible to use line reactors as bus reactors, in

JEWAR TRANSMISSION LIMITED NEW DELHI

case of outage of line.

4.1.2 Isolators

The isolators shall comply to IEC 62271-102 in general. Isolators shall be motor (DC powered) operated. Earth switches are provided at various locations to facilitate maintenance. Main blades and earth blades shall be interlocked and interlock shall be fail safe type. All earth switches shall be motor operated type.

4.1.3 Current Transformers

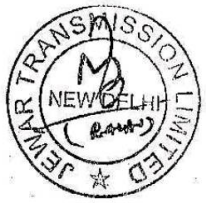
Current Transformers shall comply with IEC 61869 in general. All ratios shall be obtained by secondary taps. Generally, Current Transformers (CT) shall have five cores (four for protection and one for metering) whereas; CT in Tie bays shall have six cores (four for protections & two for metering) suitably distributed on both sides of CB. The burden and knee point voltage shall be in accordance with the requirements of the system including possible feeds for telemetry. Accuracy class for protection core shall be PX and for metering core it shall be 0.2S.

4.1.4 Voltage Transformer

The voltage transformers shall conform to IEC- 61869 Voltage transformers shall be of the electromagnetic type with SF6 gas insulation. The earth end of the high voltage winding and the ends of the secondary winding shall be brought out in the terminal box. The voltage transformers shall be located as a separate bay module and will be connected phase to ground and shall be used for protection, metering and synchronization. The voltage transformers shall be of inductive type, nonresistant and shall be contained in their own- SF6 compartment, separated from other parts of installation. The voltage transformers shall be effectively shielded against high frequency electromagnetic transients. The voltage transformers shall have three secondary windings. The voltage transformer should be thermally and dielectrically safe when the secondary terminals are loaded with the guaranteed thermal burdens. The accuracy class for core –I & II for 400 kV shall be 0.5/3P and for 220 kV shall be 3P. The accuracy of 0.2 on secondary III should be maintained throughout the entire burden range up to 50VA on all the three windings without any adjustments during operation.

4.1.5 SF6 to Air Bushing

Outdoor bushings, for the connection of conventional external conductors to the SF6 metal enclosed switchgear, shall be provided. Bushings shall generally be in accordance with the requirements of IEC -60137. The creepage distance over the external surface of outdoor bushings shall not be less than 31 mm/kV considering polluted area. SF6 to air Bushing shall be of Polymer / composite type and shall be robust and designed for adequate cantilever strength to meet the requirement of seismic condition. The electrical and mechanical characteristics of bushings shall be in



accordance with IEC: 60137. Polymer / composite insulator shall be seamless sheath of a silicone rubber compound. The housing & weather sheds should have silicon content of minimum 30% by weight. It should protect the bushing against environmental influences, external pollution and humidity. The hollow silicone composite insulators shall comply with the requirements of the IEC publications IEC 61462 and the relevant parts of IEC 62217.

4.1.6 Capacitor Voltage Transformers

Capacitive Voltage transformers shall comply to IEC 61869-1 & 61869-5 in general. These shall have three secondaries out of which two shall be used for protection and one for metering. Accuracy class for protection cores shall be 3P and for metering core shall be 0.2. The capacitive voltage transformers on lines shall be suitable for Carrier Coupling. The Capacitance of CVT for 400kV and 220kV shall be of 4400/8800 pF depending on PLCC requirements.

4.1.7 Surge Arresters

Station class current limiting, heavy duty gapless type Surge arresters conforming to IEC 60099-4 in general shall be provided.

The rated voltage of Surge arrester and other characteristics are chosen in accordance with system requirements. Surge arresters shall be provided near line entrances, transformers so as to achieve proper insulation coordination. Surge arrester should be providing with porcelain / polymer housing.

4.1.8 Power Transformers CODES AND STANDARDS

The latest revisions of the following Codes and Standards shall be applicable for the equipment/material covered in this Specification. In case of conflict, the manufacturer may propose equipment/material conforming to one group of Industry Codes and Standards quoted hereunder without jeopardizing the requirement of this specification:

IEC60044 Instruments transformers IEC60076 Power transformers

IEC60137 Insulating bushing for alternating voltages above 1000 V IEC60214 On-load tap-changers

IEC60273 Characteristics of indoor and outdoor post insulators for systems with nominal voltages greater than 1000V

IEC 60282-2 High-voltage fuses IEC60289 Reactors

IEC60529 Degrees of protection provided by enclosures (IPCode)

IEC60815 Guide for the selection of insulators in respect of polluted conditions

IEC60947 Low-voltage switchgear and control gear



Design and Construction Requirements Core

1. The core shall be assembled with oriented grain steel, cold rolled sheet, and treated with an insulating layer heat and oil resistant.
2. The core supports shall be designed to counter the effects of marine and overland transport under poor conditions. The air core reactance of the core shall be less than 20%.

Over Fluxing

The transformer shall withstand without injurious heating combined voltage and frequency fluctuations which produce the following overfluxing conditions and give desired performance:

- 105% for 10minutes
- 125% for 1minute
- 140% for 5seconds
- Bidder shall provide the overvoltage withstand time for 150% and 170% over fluxing

(a) Transformer shall conform to IEC 60076 in general. The transformer and all its accessories including bushing/ built in CTs etc shall be designed to withstand thermal and mechanical stresses caused by symmetrical or asymmetrical faults on any terminals. Mechanical strength of the transformer shall be such that it can withstand 3-phase and 1- phase through fault for transformer rated voltage applied to HV and / or IV terminals of transformer. The short circuit shall alternatively be considered to be applied to each of the HV, IV and tertiary (LV) transformer terminals. Tertiary is not considered to be connected to source.

Core shall be constructed from high grade, non-ageing cold rolled super grain oriented silicon steel laminations (HI-B or better grade). The maximum flux density in any part of the core and yoke at the rated MVA, voltage and frequency shall not exceed 1.9 Tesla at all tap positions during 10% continuous over voltage condition. Transformers shall withstand without damage and over-heating due to over fluxing conditions of 110 % for continuous, 125 % for 1 minute and 140 % for 5seconds.

All the windings shall be capable of withstanding the Dielectric, mechanical and thermal stresses which may be caused by switching, dead short circuit on its terminals. Transfer surge at tertiary shall not exceed 250kVp during impulse and switching impulse from HV & IV Terminals. The tertiary windings shall be suitable for connection of reactors or capacitors which would be subjected to frequent switching and shall be suitable for connection to LT Transformer for auxiliary supply. The air core reactance of HV winding of transformer shall not be less than 20% for 400kV

JEWAR TRANSMISSION LIMITED NEW DELHI

class Transformer. External or internal reactors shall not be used to achieve the specified HV/LV and IV/LV impedances.

Transformers shall be fitted with two cooler banks, each capable of dissipating 50 per cent of the loss at continuous maximum rating. Transformer shall be capable of operating at full load for 20 minutes in the event of failure of the oil circulating pump or blowers associated with one cooler bank and for at least ten (10) minutes in the event of total failure of power supply to cooling fans and oil pumps, without winding hot spot temperature exceeding 140 deg C. Transformer shall be designed so that tank hotspot shall not exceed 130 deg C, considering maximum ambient temperature of 50ºC.

The transformer shall be complete with all required accessories, Bushing CTs, Neutral CT (outdoor type), cooler control cabinet, individual and common marshalling box, RTCC etc as required for satisfactory operations of transformer. The transformer shall be provided with IEC 61850 compliant digital RTCC relay having automatic voltage regulating features to operate OLTC including parallel operation of transformers. Neutral of the transformer shall be solidly grounded.

HV and IV bushing shall be RIP (Resin Impregnated Paper)/RIS (Resin Impregnated Synthetic) with composite insulator type. LV bushing shall be OIP/RIP/RIS. 36kV Neutral bushing shall be solid porcelain or oil communicating type.

The major technical particulars / parameters of transformer are given below:

(A) 500MVA, 400/220/33kV, 3-Phase Auto transformer (applicable standard: IEC-60076)

Sl.No.	Description	Unit	Technical Parameters
1.	Rated Capacity: HV/IV/LV (Tertiary)	MVA	500/500/167 (Active loading of tertiary: 5 MVA)
2.	Voltage ratio (Line to Line)		400/220/33
3.	Frequency	Hz	50
4.	No. of Phase	Nos	3
5.	Vector Group (unless specified differently elsewhere)		YNa0d11
6.	Cooling		ONAN/ONAF/(OFAF or ODAF) OR ONAN/ONAF1/ONAF2
7.	Rating at different cooling above	%	60/80/100
8.	Type of Transformer		Constant Ohmic impedance type
9.	Impedance at 75 Deg C		



Sl.No.	Description	Unit	Technical Parameters
a)	HV – IV (with tolerance as per IEC)	%	At Max./ Principal/ Min. Voltage Tap: 10.3/12.5/15.4
b)	HV - LV	%	At Principal tap(minimum) : 60
c)	IV - LV	%	At Principal tap (minimum):
			45
10.	Losses		
a)	Maximum No-Load Loss at rated voltage and frequency	kW	90
b)	Maximum Load Loss at rated current and 75°C	kW	500
c)	Maximum I^2R Loss at rated current and frequency and at 75°C for HV and IV windings	kW	375
d)	Maximum Auxiliary Loss at rated voltage and frequency	kW	15
11.	Max. Temperature rise over 50 deg C ambient Temp	Deg. C	Top oil: 50 & Winding: 55
12.	Windings		
i)	Insulation Level (LI/SI/PF)		kVp/kVp/kVrms
	HV		1300/1050/570
	IV		950/-/395
	LV		250/-/95
	Neutral		95/-/38
ii)	Tan delta of winding	%	< 0.5
13.	Tap Changer & Tappings		OLTC with range ± 10% for HV variation in the step of 1.25%, 17 steps, on 220kV side of series winding
14.	Maximum Partial discharge (PD) level at 1.58*Ur/√3	pC	100
15.	Noise level at rated voltage and at principal tap at no load and all cooling active	dB	< 80
16.	Bushing		
i)	Rated voltage (HV/IV/LV/Neutral)	kV	420/245/52/36
ii)	Rated current(Min.) HV/IV/LV/Neutral	A	1250/2000/3150/2000
iii)	Insulation Level (LI/SI/PF)		kVp/ kVp/ kVrms
	HV		1425/ 1050/ 630

JEWAR TRANSMISSION LIMITED NEW DELHI

Sl.No.	Description	Unit	Technical Parameters
	IV		1050/ -/ 460
	LV		250/ -/ 95
	Neutral		170/ -/ 75
iv)	Tan delta of bushings HV/IV/LV	%	< 0.4
v)	Max. PD of bushings at level @ 1.5 pu	pC	100
17.	Insulating Oil		virgin high grade inhibited, conforming to IEC-60296

4.1.9 125 MVAR Bus Reactors

Reactor shall conform to IS:5553 and IEC 60076-6 in general.

The Technical Particulars / Parameters of Shunt Reactor are given below:

REACTOR (3-Phase)

(i)	Power	125 MVAR Bus Reactor
(ii)	Rated voltage	420 kV(1.0 p.u)
(iii)	System fault level	50 kA
(iv)	Connection	Star with neutral brought out
(v)	**Winding Insulation level**	
a)	Lightning impulse 1.2/50microseconds withstand voltage	1300 kV (peak)
b)	Switching surge withstand voltage	1050 kV (peak)
)`	One minute power frequency withstand voltage	NA
(vi)	Maximum admissible Temperature Rise over an ambient temp of 50 deg. C and at highest Voltage	
a)	Winding measured by resistance method	45 degree C
b)	Top oil measured by thermometer	40 degree C
(vii)	Cooling system	ONAN
(viii)	**Insulation level of Neutral**	
a)	Impulse withstand voltage	550 kV (peak)
b)	Power frequency voltage	230 kV (rms)
c)	Whether neutral is to be brought out	Yes (through 145kV class bushing)



(ix)	Ratio of zero sequence reactance to positive reactance (X0/X1)	Between 0.9 and 1.0 (The bidder must clearly specify the exact figure)
(x)	Range of constant impedance	Upto1.5p.u.voltage (The bidder shall furnish complete saturation characteristics of the reactor up-to 2.5 p.u. voltage).
(xi)	Tolerance on current	0 to +5%
(xii)	Harmonic content in phase	The crest value of the third harmonic current component in phase current not to exceed 3% of the crest value of fundamental, when reactor is energized at rated voltage with sinusoidal wave form.
(xiii)	Permissible current unbalance among different phases	±2%
(xiv)	Minimum clearance in air at rated voltage of 420 kV with terminal connector	
a)	Phase to Phase	4000mm
b)	Phase to ground	3500mm
(xv)	Noise level at rated voltage and frequency	80 db.
(xvi)	Vibration level at rated voltage and frequency	Not more than 200 microns peak. Average vibration shall not exceed 60 microns peak to peak Tank stresses shall not exceed 2.0 kg/mm² at any point on the tank

(xvii)

Bushings	Line side	Neutral side
a) Rated voltage	420 kV	145 kV
b)Creepage distance (total)	10500 mm	3625 mm
c)Mounting	Tank Cover	Tank Cover
d)Lightning impulse withstand voltage (kVp)	1425	650
e)Switching impulse withstand voltage (kVp	1175	-
f) Power frequency with stand voltage (kV) (rms)	630	275
g) Rated current (Amps)	800	800



4.1.10 Protection and Control

The protective relaying system proposed to be provided for transmission lines, auto-transformers, reactors and bus bars to minimize the damage to the equipments in the events of faults and abnormal conditions, is dealt in this section. All main protective relays shall be numerical type with IEC 61850 communication interface. All numerical relays shall have built in disturbance recording feature.

a) Transmission Line Protection

400 kV, 220 kV and 132 kV lines shall have MAIN-I numerical three zone distance protection scheme with carrier aided inter-tripping feature. 400 kV, 220 kV and 132 kV lines shall also have MAIN-II numerical distance protection scheme like Main-I but from different make that of MAIN-I. Line Current Differential as Main–I & Main-II may be considered, for short lines (line length below 30 km) having Fibre Optic communication link. In case of loop in loop out of transmission lines, the existing protection scheme shall be studied and suitable up-gradation (if required) shall be carried out.

All 400 kV lines shall also be provided with two stages over voltage protection. Further, all 400 lines shall be provided with single and three phase auto-reclosing facility to allow reclosing of circuit breakers in case of transient faults. These lines shall also be provided with distance to fault locators to identify the location of fault on transmission lines.

b) These shall have the following protections:

i) Numerical Differential protection
ii) Numerical Restricted earth fault protection
iii) Numerical Over-current and earth fault protection on HV & MV side
iv) Numerical Over fluxing protection on HV & MV side
v) Numerical Overload alarm

Besides these, power transformers shall also be provided with BUCHOLZ relay, protection against high oil and winding temperature and pressure relief device etc.

c) 420kV Reactor Protection

Reactor shall be provided with the following protections:

i) Numerical Differential protection

ii) Numerical Restricted earth fault protection

iii) Numerical Back-up impedance protection

Besides these, reactors shall also be provided with Bucholz relay, protection against oil and winding temperatures & pressure relief device etc.

JEWAR TRANSMISSION LIMITED NEW DELHI

d) Numerical Bus Bar Protection

The high speed bus bar differential protection, which is essential to minimize the damage and maintain system stability at the time of bus bar faults, shall be provided for 400kV, 220kV and 132kV buses. Duplicated busbar protection is envisaged for 400kV bus-bar protection. Bus bar protection scheme shall be such that it operates selectively for each bus and incorporate necessary features required for ensuring security. The scheme shall have the provision for future expansion. For existing substations, the existing bus bar protection shall be augmented wherever required.

e) Numerical Local Breaker Back up Protection

This shall be provided for each 420 kV, 245 kV and 145 kV breakers and will be connected to de-energize the affected stuck breaker from both sides.

f) Substation Automation System

For all the new substations, state of art Substation Automation System (SAS) conforming to IEC-61850 shall be provided. The distributed architecture shall be used for Substation Automation system, where the controls shall be provided through Bay control units. The Bay control unit is to be provided bay wise for voltage level 132kV and above. All bay control units as well as protection units are normally connected through an Optic fibre high speed network. The control and monitoring of circuit breaker, dis-connector, re-setting of relays etc. can be done from Human Machine Interface (HMI) from the control room. SAS shall be equipped with the facility of remote operation and by providing remote HMI and suitable communication link, the substation can be controlled from a remote location. Necessary gateway & modems (as required) shall be provided to send data to RLDC/SLDC.
The functions of control, annunciation, disturbance recording, event logging and measurement of electrical parameters shall be integrated in Substation Automation System. The Automation System shall be provided with the facility of communication and control for remote end operation. In existing Substations where Substation automation is not provided, control functions shall be done through control panels.

g) Time Synchronization Equipment

Time synchronization equipment complete in all respect including antenna, cable, processing equipment required to receive time signal through GPS or from National Physical Laboratory(NPL) through INSAT shall be provided. This equipment shall be used to synchronize SAS & IEDs etc.

4.1.11 Control Concept

All the EHV breakers in substation/switching stations shall be controlled



and synchronized from the switchyard control room and remote control centre. Each breaker would have two sets of trip circuits which would be connected to separately fused DC supplies for greater reliability. All the isolators shall have control from remote/local whereas the earth switches shall have local control only.

4.1.12 PLCC

Power line carrier communication (PLCC) equipment complete for speech transmission line, tele-protection commands and data channels shall be provided on each 400 KV , 220 kV and 132 kV transmission line. The protections for transmission line and the line compensating equipment shall have hundred percent back up communication channels. The PLCC equipment shall in brief include the following:-

Coupling device, line traps, carrier terminals, protection couplers, HF cables, PABX and maintenance and testing instruments.

A telephone exchange (PABX) of 24 lines shall be provided at new substations as means of effective communication among various buildings of the substation, remote end substations and with control centres (RLDC/SLDC) etc.

Coupling devices shall be suitable for 4400pF 400kV , 220 kV and 132 kV CVT. Phase to phase coupling for 400 kV line , 220 kV and 132 kV single circuit line shall be provided. For D/c line Inter circuit coupling can be provided. The pass band of coupling devices shall have sufficient margin for adding communication channel in future if required. Necessary protection devices for the safety of personnel and low voltage part against power frequency voltages and transient over voltage shall also be provided.

The line traps shall be broad band tuned suitable for blocking the complete range of carrier frequencies. Line Trap shall have the necessary protective devices such as lightning arresters for the protection of tuning device and shall be equipped with corona rings. Decoupling network consisting of line traps and coupling capacitors may also be required at certain substation in case of extreme frequency congestion.

The carrier terminals shall be of single side - band (SSB) amplitude modulation (AM) type and shall have 4 kHz band width. PLCC Carrier terminal & Protection coupler shall be considered at both ends of line.

Wherever Fiber Optic/OPGW based telecommunication terminal equipment (i.e. SDH/MUX) are being provided; the same shall be utilized for Data, Voice and line protection applications. For protection purposes, both end Digital Protection Couplers (DPCs) shall be included at both ends. However, for line protection application, back up communication channel/link may be considered as per requirement so as to take care of



OPGW/Telecommunication equipment outage.

Addition /Modification /shifting/re-commissioning etc. as required of PLCC due to LILO of transmission lines shall be covered under the scope according to element wise detailed given below:-

Sr. No	Detail of element (line)	Coverage under the scope
1	LILO of one ckt. of 400 kV Gr. Noida (765 kV) – Sector-148 (400) Noida DC line at 400/220 kV GIS substation Jewar (GautamBudh Nagar) (for LILO, twin HTLS conductor and OPGW stringing work on Narrowbase multi circuit towers)	Addition/Modification/ shifting/re-commissioning of PLCC shall be covered under the scope.

PLCC equipment for the transmission lines at serial 01 covered under the package (Consisting of one set of analog PLCC channel along with circuit protection coupler and one set of Digital Protection Coupler for both ends of one line segment due to LILO of existing line) shall be provided by the bidder. All other associated equipment for ends cabling, coupling device and HF cable shall also be provided by the bidder. 48 V DC Power supply for PLCC panels shall be provided by the respective substation bay owner. The wave traps, CVT's required for communications from PLCC shall be provided by respective substation owner.

4.1.13 Substation Support Facilities

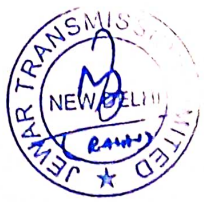
Certain facilities required for operation & maintenance of substations as described below shall be provided in new substation. In existing substation, these facilities have already been provided and would be extended/ augmented, wherever required.

4.1.14 AC & DC Power Supplies

For catering to the requirements of three phase & single phase AC supply and DC supply for various substation equipment, the following arrangement is envisaged:-

i) For LT Supply at each new Substation, two (2) nos. 630 kVA LT Transformers shall be provided out of which one shall be connected with SEB supply and other one shall be connected to tertiary of 400/220 kV transformer.

ii) SEB supply at 33kV level shall be connected to 630kVA LT transformer through 33kV AIS equipments i.e. LA, CT, PT, Isolators and breaker where as tertiary supply of 400/220kV transformer shall be connected to LT



transformer through 72.5kV AIS equipments.

iii) 2 Nos. batteries of 220V for control & protection and 2 Nos. 48V batteries for PLCC/ Communication equipment shall be provided at each new Substation. Each battery bank would have a float-cum-boost charger. Battery shall be of VRLA type.

iv) Suitable AC & DC distribution boards and associated LT Switchgear would be provided at new Substations. For Substation Extensions, existing facilities shall be augmented as required. For new substations following switch boards with minimum rating as is specified here under shall be considered with duplicate supply

a) 415V Main switch board – 1no.

b) AC distribution board – 1no.

c) Main lighting distribution board –1no.

d) Emergency lighting distribution board –1no.

e) 220 volt DC distribution board –2nos.

f) 48 volt DC distribution board –2nos.

v) In new Substations, one No. 250 KVA DG set shall be provided for emergency applications Sizing of Auxiliary system (like battery, charger, LT switchgear) may be done considering future bay requirements to avoid replacement in future with higher sizes.

4.1.15 Fire Fighting System

Fire fighting system in general conforms to fire insurance regulations of India. The fire fighting system is proposed with both AC motor & diesel engine driven pumps housed in a fire fighting pump house building along with water storage tank of adequate capacity. Automatic heat actuated mulsifying system is proposed for transformers & reactors. In addition for alarm system based on heat/smoke detectors are proposed to be installed at sensitive points in a substation e.g. Cable Vault, Control Room building and other buildings etc. Further, adequate water hydrants and portable fire extinguishers shall be provided in the substations. At existing substations the fire fighting systems if already available, would be extended for meeting the additional requirements.

4.1.16 Oil evacuating, filtering, testing & filling apparatus

To monitor the quality of oil for satisfactory performance of transformers, shunt reactors and for periodical maintenance necessary oil evacuating, filtering, testing and filling apparatus would be provided at new substations. Oil tanks of adequate capacities for storage of transformer oil would be provided.

JEWAR TRANSMISSION LIMITED NEW DELHI

4.1.17 Illumination

Adequate normal & emergency AC & DC illumination shall be provided in the control room, GIS hall & other buildings of the substation. The switchyard shall also be provided with adequate illumination. The entire control room building, fire fighting pump house lighting shall be done by LED based low power consumption luminaries

4.1.18 Control Room

Substation control room would be provided to house substation work station for station level control (SAS) along with its peripheral and recording equipments, AC & DC distribution boards, DC batteries & associated battery chargers, Fire Protection panels, Telecommunication panels & other panels as per requirements. Air conditioning will be provided in the building as functional requirements.

4.1.19 GIS Hall

The Gas Insulated Switchgear (GIS) of each voltage other associated equipment shall be housed separately and inside in the GIS buildings. The panels i.e. Bay level units, bay mimic, relay and protection panels, RTCC panels, PLCC panels etc. are to be placed in a separate room in the GIS building. The size of the room shall be such that all the panels for the future bays/ diameters shall be accommodated in the above room. The panel room shall be air-conditioned. Further, the temperature of the room shall be monitored through substation automation system by providing necessary temperature transducers.

One EOT Crane each for GIS hall of suitable capacity shall be provided for erection & maintenance of largest GIS component/assembly and all plant installed in the GIS switchgear room. The crane shall capable of fulfilling all special requirements for erection & maintenance of GIS equipment The capacity of the crane shall be sized to lift the heaviest GIS switchgear component.



SPECIFIC TECHNICAL REQUIREMENT FOR 400 KV and 220 KV COMMUNICATION

In order to meet the requirement for grid management and operation of substations, Transmission Service Provider (TSP) shall conform to the following requirements.

On 400 kV D/C transmission lines one earth wire and one OPGW containing 24 fibers is to be installed by the TSP in place of conventional earth wire during the construction of line for grid management and substation operation purpose by STU/CTU and 48 fibers to be installed on LILO lines. The installation of OPGW shall be done from gantry of one substation up to gantry of another substation and shall be terminated in a joint box by the TSP at both ends.

On 220 kV and 132 kV D/C lines one OPGW containing 24 fibers is to be installed in place of conventional earth wire for grid management and substation operation purpose by STU/CTU and 48 fibers to be installed on LILO lines.

400 kV & 220 kV System Parameters

Sr. No	Description of parameters	400 kV System	220 kV System
1.	System operating voltage	400 kV	220 kV
2.	Maximum operating voltage of the system	420 kV	245 kV
3.	Rated frequency	50 HZ	50 HZ
4.	No. of phase	3	3
5.	Rated Insulation levels		
	i. Full wave impulse withstand voltage (1.2/50 micro sec.)	1550 kVp	1050 kVp
	ii. Switching impulse withstand voltage (250/2500 micro sec.) dry and wet	1050 kVp	-
	iii. One minute power frequency dry withstand voltage (rms)	630 kV	-
	iv. One minute power frequency dryand wet withstand voltage (rms)	-	460 kV
6.	Corona extinction voltage	320 kV	156 kV
7.	Max. radio interference voltage for frequency between 0.5 MHz and 2 MHz at 508 kV rms for 765 kV system, 266kV rms for 400kV system and156kV rms for 220 kV system	1000 micro-volts	1000 micro-volts

JEWAR TRANSMISSION LIMITED NEW DELHI

8.	Minimum Creepage distage (25mm/kV)	10500 mm	6125 mm
9.	Min. Clearances		
	i. Phase to phase	4000mm	
		(for conductor-conductor configuration) 4200 mm (for rod- conductor configuration)	2100 mm
	ii. Phase to earth	3500 mm	2100mm
	iii. Sectional clearances	6500mm	5000rnm
10.	Rated short circuit current for 1 sec. duration	40kA/50kA /63kA(as applicable)	40kA/50kA (as applicable)
11.	System neutral earthing	Effectively earthed	Effectively earthed
12.	DC Voltage	220V	110V

Note:

1. The above parameters are applicable for installations up to an altitude of 1000m above mean sea level. For altitude exceeding 1000m, necessary altitude correction factor shall be applicable.
2. The insulation and RIV levels of the equipments shall be as per values given in the respective chapter of the equipments.



DARAPANENI & Co.,
CHARTERED ACCOUNTANTS
Flat No 1A, Rama Apartments, Plot No.84, Srinagar Colony, Hyderabad - 500073.

Tel: 040-23735095, 23736487
E-mail: darapaneni1986@gmail.com

INDEPENDENT AUDITOR'S REPORT

TO THE MEMBERS OF MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

Report on the Audit of the Standalone Financial Statements

Opinion

We have audited the accompanying standalone financial statements of M/s Megha Engineering & Infrastructures Limited (the "Company"), which comprise the Balance Sheet as at March 31, 2023, and the Statement of Profit and Loss (including Other Comprehensive Income), the Statement of Cash Flows and the Statement of Changes in Equity for the year then ended, and a summary of significant accounting policies and other explanatory information.

In our opinion and to the best of our information and according to the explanations given to us, the aforesaid standalone financial statements give the information required by the Companies Act, 2013 (the "Act") in the manner so required and give a true and fair view in conformity with the Indian Accounting Standards prescribed under section 133 of the Act read with the Companies (Indian Accounting Standards) Rules, 2015, as amended, ("Ind AS"), and other accounting principles generally accepted in India, of the state of affairs of the Company as at March 31, 2023, and its profit, total comprehensive income, its cash flows and the changes in equity for the year ended on that date.

Basis for Opinion

We conducted our audit of the standalone financial statements in accordance with the Standards on Auditing ("SA"s) specified under section 143(10) of the Companies Act, 2013 (the "Act"). Our responsibilities under those Standards are further described in the Auditor's Responsibility for the Audit of the Standalone Financial Statements section of our report.

We are independent of the Company in accordance with the Code of Ethics issued by the Institute of Chartered Accountants of India ("ICAI") together with the ethical requirements that are relevant to our audit of the standalone financial statements under the provisions of the Act and the Rules made thereunder, and we have fulfilled our other ethical responsibilities in accordance with these requirements and the ICAI's Code of Ethics. We believe that the audit evidence obtained by us and the audit evidence obtained by the other auditors in terms of their reports referred to in the Other Matters section below, is sufficient and appropriate to provide a basis for our audit opinion on the standalone financial statements.

Emphasis of Matters

We draw attention to Note 36(ii) of the standalone financial statements, wherein it is stated that the Company, along with certain other Group Companies and promoters, were subjected to Search and Survey operation by the Income Tax Departments u/s 132/132A of the Income Tax Act,1961 ("the Act"). Pending completion of the related proceedings, the effect thereof, if any, on the standalone financial statements cannot be ascertained at this stage.

Our opinion is not modified in respect of this matter.

Key Audit Matters

Key audit matters are those matters that, in our professional judgment, were of most significance in our audit of IND AS the standalone financial statements of the current financial year. These matters were addressed in the context of our audit of the standalone financial statements as a whole, and in forming our opinion thereon, and we do not provide a separate opinion on these matters. We have determined the matters described below to be the key audit matters to be communicated in our report.

JEWAR TRANSMISSION LIMITED NEW DELHI

DARAPANENI & Co. Hyderabad Chartered Accountants

S.No	Key Audit Matters	How our audit addressed the key audit matter
1	**Revenue recognition:** Accuracy of recognition, measurement, presentation and disclosures of revenues and other related balances in view of adoption of Ind AS 115.Accordingly we considered this as a Key audit matter.	Our audit procedures to address this key audit matter included, but were not limited to the following: • Verification of purchase order w.r.t. quantity, rate etc on test check basis. (ii) Delivery of the material, Collection w.r.t the bill etc on test check basis. • Obtained an understanding of the Company's revenue recognition processes and evaluated the appropriateness of the Company's accounting policy for revenue recognition in accordance with Ind AS 115 – Revenue from contracts with customers; • Evaluated the design and tested the operating effectiveness of key internal financial controls including those related to estimation of forecasted contract revenue and contracts costs; • For a sample of contracts, performed the following procedures: - inspected the underlying documents such as customer contract/ agreement and variation orders, if any, for the significant contract terms and conditions; - evaluated the identification of performance obligations of the contract; - obtained an understanding of and evaluated the reasonableness of the assumptions applied in determining the forecasted revenue and cost to complete; - tested the existence and valuation of variable consideration with respect to the contractual terms and conditions and inspected the correspondence with customers; and - reviewed the legal and contracting experts' note and/ or legal opinion from independent legal counsel obtained by the management, if any; - For cost incurred to date, tested samples to appropriate supporting documents and performed cut-off procedures; - Tested the forecasted cost by obtaining executed purchase orders/ agreements/ relevant documents and evaluated the reasonableness of management judgements/ estimates; and • Evaluated the appropriateness and adequacy of the disclosures related to contract revenue and costs in the standalone financial statements in accordance with the applicable accounting standards.
2	**Contingent liabilities relating to taxation, litigations and arbitrations:** The provisions and contingent liabilities relate to ongoing litigations and claims with various authorities and third parties. These relate to direct tax, indirect tax, claims and other general legal proceedings including arbitrations arising in the ordinary course of business. Accordingly, we considered this as a Key audit matter.	We have obtained an understanding of the process followed by the Management of the Company for assessment and determination of the amounts of provisions and contingent liabilities relating to taxation, litigations and claims. We have made inquiries about the status in respect of significant provisions and contingent liabilities with the Company's internal tax and legal team, including challenging the assumptions and critical judgements made by the Company which impacted the computation of the provisions and inspecting the computation. We have also assessed and validated the adequacy and appropriateness of the disclosures made by the Management in the Standalone Financial Statements.

JEWAR TRANSMISSION LIMITED NEW DELHI
DARAPANENI & Co. Hyderabad

3	**Significant judgement relating to impairment of investments and loans in subsidiaries, associates and jointly controlled entities** The Company has major investments in subsidiaries, associates and jointly controlled entities aggregating to Rs. 3,858.87 Crores and loans of Rs. 7,291.86 Crores as at 31st March, 2023. The Management assesses at least annually the existence of impairment indicators of each shareholding in such subsidiaries, associates and jointly controlled entities. Out of which as at March 31, 2023, the Company had carrying value of investment of 163.65 Crores in Equity of MEIL Holdings Ltd., UCCD of Rs. 1176.22 Crores and loans of 417.45 Crores (after impairment of Rs. 5.64 Crores; Refer note no. 58), a wholly owned subsidiary. This investment is carried at cost in the Company's standalone financial statements. Consequent to accumulation of losses incurred by the subsidiary, the Company's management has tested this investment for impairment in accordance with Ind AS 36 by comparing its recoverable amount with it carrying amount as at March 31, 2023. The recoverable amount of the investment in the subsidiary is assessed based on future discounted cash flows of the subsidiary. Accordingly, we considered this as a key audit matter due to significant judgement involved in estimating future cash flows of the subsidiary.	We obtained an understanding of the Company's policy on assessment of impairment of investment in subsidiaries, associates and jointly controlled entities and the criteria used by the Management for assessment of impairment. We have assessed the methodology used by the Management of the Company to estimate whether each of the investments is recoverable and compliance with Ind AS.36. As part of our audit procedures, we have evaluated the Balance Sheet of MEIL Holdings Ltd., the Subsidiary company with respect to its ability to service the loans and investments made by the parent company and assessed the impairment of Rs. 5.64 Crores provided by the Management in respect of the loans advanced to the subsidiary. We assessed the assumptions and cash flow forecasts made by the management's internal team of experts. Assessed the objectivity and competence of the team of Internal experts involved in the process. Reviewed the disclosures made by the Company in the financial statements.

We have determined that there are no other key audit matters to communicate in our report.

Information Other than the Financial Statements and Auditor's Report Thereon ('other information')

The Boards of Directors of the Company is responsible for the preparation of other information. The other information comprise the information included in the Management Discussion and Analysis, Board's Report including Annexures to Board's Report, but does not include the standalone financial statements and our auditor's report.

Our opinion on the standalone financial statements does not cover the other information and we do not express any form of assurance or conclusion thereon.

In connection with our audit of the standalone financial statements, our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the standalone financial statements or our knowledge obtained during the course of our audit or otherwise appears to be materially misstated.

If, based on the work we have performed, we conclude that there is material misstatement of this other information, we are required to report that fact. We have nothing to report in this regard.

JEWAR TRANSMISSION LIMITED NEW DELHI

DARAPANENI & Co. Hyderabad Chartered Accountants

Management's Responsibility for the Standalone Financial Statements

The Company's Board of Directors is responsible for the matters stated in section 134(5) of the Companies Act, 2013 (the "Act") with respect to the preparation of these standalone financial statements that give a true and fair view of the financial position, financial performance including other comprehensive income, cash flows and changes in equity of the Company in accordance with the Ind AS and other accounting principles generally accepted in India.

This responsibility also includes maintenance of adequate accounting records in accordance with the provisions of the Act for safeguarding the assets of the Company and for preventing and detecting frauds and other irregularities; selection and application of appropriate accounting policies; making judgments and estimates that are reasonable and prudent; and design, implementation and maintenance of adequate internal financial controls, that were operating effectively for ensuring the accuracy and completeness of the accounting records, relevant to the preparation and presentation of the standalone financial statement that give a true and fair view and are free from material misstatement, whether due to fraud or error.

In preparing the standalone financial statements, management is responsible for assessing the Company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the Company or to cease operations, or has no realistic alternative but to do so.

The Company's Board of Directors is also responsible for overseeing the Company's financial reporting process.

Auditor's Responsibility for the Audit of the Standalone Financial Statements

Our objectives are to obtain reasonable assurance about whether the standalone financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with SAs will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these standalone financial statements.

As part of an audit in accordance with SAs, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the standalone financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

- Obtain an understanding of internal financial control relevant to the audit in order to design audit procedures that are appropriate in the circumstances. Under section 143(3)(i) of the Act, we are also responsible for expressing our opinion on whether the Company has adequate internal financial controls system in place and the operating effectiveness of such controls.

- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the management.

- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Company's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the standalone financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Company to cease to continue as a going concern.

JEWAR TRANSMISSION LIMITED NEW DELHI
DARAPANENI & Co. Hyderabad Chartered Accountants

• Evaluate the overall presentation, structure and content of the standalone financial statements, including the disclosures, and whether the standalone financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

• Obtain sufficient appropriate audit evidence regarding the financial information of the Company to express an opinion on the standalone financial statements. We are responsible for the direction, supervision and performance of the audit of the financial statements of such entities included in the standalone financial statements of which we are the independent auditors. For the other entities included in the standalone financial statements, which have been audited by the other auditors, such other auditors remain responsible for the direction, supervision and performance of the audits carried out by them. We remain solely responsible for our audit opinion.

Materiality is the magnitude of misstatements in the standalone financial statements that, individually or in aggregate, makes it probable that the economic decisions of a reasonably knowledgeable user of the standalone financial statements may be influenced. We consider quantitative materiality and qualitative factors in (i) planning the scope of our audit work and in evaluating the results of our work; and (ii) to evaluate the effect of any identified misstatements in the standalone financial statements. We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit. We also provide those charged with governance with a statement that we have complied with relevant ethical requirements regarding independence, and to communicate with them all relationships and other matters that may reasonably be thought to bear on our independence, and where applicable, related safeguards. From the matters communicated with those charged with governance, we determine those matters that were of most significance in the audit of the standalone financial statements of the current period and are therefore the key audit matters. We describe these matters in our auditor's report unless law or regulation precludes public disclosure about the matter or when, in extremely rare circumstances, we determine that a matter should not be communicated in our report because the adverse consequences of doing so would reasonably be expected to outweigh the public interest benefits of such communication.

Report on Other Legal and Regulatory Requirements

1. As required by Section 143(3) of the Act, based on our audit we report, to the extent applicable that:

   a) We have sought and obtained all the information and explanations, which to the best of our knowledge and belief were necessary for the purposes of our audit.

   b) In our opinion, proper books of account as required by law have been kept by the Company so far as it appears from our examination of those books and the reports of the other auditors.

   c) The Balance Sheet, the Statement of Profit and Loss including Other Comprehensive Income, the Statement of Cash Flows and Statement of Changes in Equity dealt with by this Report are in agreement with the relevant books of account.

   d) In our opinion, the aforesaid standalone financial statements comply with the Ind AS specified under Section 133 of the Act.

   e) On the basis of the written representations received from the directors as on March 31, 2023 taken on record by the Board of Directors, none of the directors is disqualified as on March 31, 2023 from being appointed as a director in terms of Section 164(2) of the Act.

JEWAR TRANSMISSION LIMITED NEW DELHI

DARAPANENI & Co. Hyderabad Chartered Accountants

f) With respect to the adequacy of the internal financial controls over financial reporting of the Company and the operating effectiveness of such controls, refer to our separate Report in "Annexure A". Our report expresses an unmodified opinion on the adequacy and operating effectiveness of the Company's internal financial controls over financial reporting.

g) With respect to the other matters to be included in the Auditor's Report in accordance with the requirements of section 197(16) of the Act, as amended. In our opinion and to the best of our information and according to the explanations given to us, the remuneration paid by the Company to its directors during the year is in accordance with the provisions of section 197 of the Act.

h) With respect to the other matters to be included in the Auditor's Report in accordance with Rule 11 of the Companies (Audit and Auditors) Rules, 2014, as amended, in our opinion and to the best of our information and according to the explanations given to us:

i. The Company has disclosed the impact of pending litigations on its financial position in its standalone financial statements;

ii. The Company has made provision, as required under the applicable law or accounting standards, for material foreseeable losses, if any, on long-term contracts, including derivative contracts;

iii. There has been no delay in transferring amounts, required to be transferred, to the Investor Education and Protection Fund by the Company;

iv. a. The Management has represented that, to the best of its knowledge and belief, no funds (which are material either individually or in the aggregate) other than as disclosed in the notes on accounts, have been advanced or loaned or invested (either from borrowed funds or share premium or any other sources or kind of funds) by the Company to or in any other person(s) or entity(ies), including foreign entities ("Intermediaries"), with the understanding, whether recorded in writing or otherwise, that the Intermediary shall, directly or indirectly lend or invest in other persons or entities identified in any manner whatsoever by or on behalf of the Company ("Ultimate Beneficiaries") or provide any guarantee, security or the like on behalf of the Ultimate Beneficiaries;

b. The Management has represented, that, to the best of it's knowledge and belief, no funds (which are material either individually or in the aggregate) have been received by the Company from any person(s) or entity(ies), including foreign entities ("Funding Parties"), with the understanding, whether recorded in writing or otherwise, that the Company shall, directly or indirectly, lend or invest in other persons or entities identified in any manner whatsoever by or on behalf of the Funding Party ("Ultimate Beneficiaries") or provide any guarantee, security or the like on behalf of the Ultimate Beneficiaries; and

c. Based on the audit procedures that has been considered reasonable and appropriate in the circumstances, nothing has come to our notice that has caused us to believe that the representations under sub-clause (i) and (ii) of Rule 11(e) contain any material mis-statement; and

v. The amount of dividend is in accordance with Section 123 of the Act

a. The final dividend paid by the Company during the year in respect of the same declared for the previous year is in accordance with Section 123 of the Companies Act 2013 to the extent it applies to payment of dividend.

JEWAR TRANSMISSION LIMITED NEW DELHI

DARAPANENI & Co. Hyderabad Chartered Accountants

b. the Board of Directors of the Company have proposed final dividend for the year which is subject to the approval of the members at the ensuing Annual General Meeting. The amount of dividend declared is in accordance with section 123 of the Act to the extent it applies to declaration of dividend.

vi. Proviso to Rule 3(1) of the Companies (Accounts) Rules, 2014 for maintaining books of account using accounting software which has a feature of recording audit trail (edit log) facility is applicable to the company with effect from April 01, 2023, and accordingly, reporting under Rule 11(g) of Companies (Audit and Auditors) Rules, 2014 is not applicable for the financial year ended 31st March, 2023.

2. As required by the Companies (Auditor's Report) Order, 2020 ("the Order") issued by the Central Government in terms of Section 143(11) of the Act, we give in "Annexure B" a statement on the matters specified in paragraphs 3 and 4 of the Order.

For Darapaneni & Co.
Chartered Accountants,
FRN: 000685S

DARAPANENI & Co. Hyderabad Chartered Accountants

(D.C NAIDU)
Partner
M.No: 024643
UDIN: 23024643BGXSL15886

Date: 08/09/2023
Place: Hyderabad

JEWAR TRANSMISSION LIMITED NEW DELHI

ANNEXURE "A" TO THE INDEPENDENT AUDITOR'S REPORT

(Referred to in paragraph 1(f) under "Report on Other Legal and Regulatory Requirements" section of our report of even date)

Report on the Internal Financial Controls Over Financial Reporting under Clause (i) of Sub-section 3 of Section 143 of the Companies Act, 2013 (the "Act")

We have audited the internal financial controls over financial reporting of **M/s Megha Engineering & Infrastructures Limited** (the "Company") as of March 31, 2023 in conjunction with our audit of the standalone Ind AS financial statements of the Company for the year ended on that date which includes internal financial controls over financial reporting.

Management's Responsibility for Internal Financial Controls

The Company's Management is responsible for establishing and maintaining internal financial controls based on the internal control over financial reporting criteria established by the Company considering the essential components of internal control stated in the Guidance Note on Audit of Internal Financial Controls Over Financial Reporting issued by the Institute of Chartered Accountants of India ("ICAI"). These responsibilities include the design, implementation and maintenance of adequate internal financial controls that were operating effectively for ensuring the orderly and efficient conduct of its business, including adherence to respective company's policies, the safeguarding of its assets, the prevention and detection of frauds and errors, the accuracy and completeness of the accounting records, and the timely preparation of reliable financial information, as required under the Companies Act, 2013.

Auditor's Responsibility

Our responsibility is to express an opinion on the Company's internal financial controls over financial reporting of the Company, based on our audit.

We conducted our audit in accordance with the Guidance Note on Audit of Internal Financial Controls Over Financial Reporting (the "Guidance Note") issued by the ICAI and the Standards on Auditing ("SA"s) prescribed under Section 143(10) of the Companies Act, 2013 (the "Act"), to the extent applicable to an audit of internal financial controls. Those Standards and the Guidance Note require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether adequate internal financial controls over financial reporting was established and maintained and if such controls operated effectively in all material respects.

Our audit involves performing procedures to obtain audit evidence about the adequacy of the internal financial controls system over financial reporting and their operating effectiveness. Our audit of internal financial controls over financial reporting included obtaining an understanding of internal financial controls over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. The procedures selected depend on the auditor's judgement, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion on the Company's internal financial controls system over financial reporting.

DARAPANENI & Co. Hyderabad Chartered Accountants

JEWAR TRANSMISSION LIMITED NEW DELHI

Meaning of Internal Financial Controls Over Financial Reporting

A company's internal financial control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal financial control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorisations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorised acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Inherent Limitations of Internal Financial Controls Over Financial Reporting

Because of the inherent limitations of internal financial controls over financial reporting, including the possibility of collusion or improper management override of controls, material misstatements due to error or fraud may occur and not be detected. Also, projections of any evaluation of the internal financial controls over financial reporting to future periods are subject to the risk that the internal financial control over financial reporting may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Opinion

In our opinion, to the best of our information and according to the explanations given to us the Company has, in all material respects, an adequate internal financial controls system over financial reporting and such internal financial controls over financial reporting were operating effectively as at March 31, 2023, based on the criteria for internal financial control over financial reporting established by the respective Company considering the essential components of internal control stated in the Guidance Note on Audit of Internal Financial Controls Over Financial Reporting issued by the Institute of Chartered Accountants of India.

For Darapaneni & Co,
Chartered Accountants,
FRN: 000685S

DARAPANENI & Co. Hyderabad Chartered Accountants

(D.C NAIDU)
Partner
M. No: 024643
UDIN: 23024643BGXSLI5886

Date: 08/09/2023
Place: Hyderabad

JEWAR TRANSMISSION LIMITED NEW DELHI

ANNEXURE "B" TO THE INDEPENDENT AUDITORS' REPORT

(Referred to in paragraph 2 under 'Report on Other Legal and Regulatory Requirements' section of our report to the Members of **M/s Megha Engineering & Infrastructures Limited** of even date)

In terms of the information and explanations sought by us and given by the Company and the books of account and records examined by us in the normal course of audit and to the best of our knowledge and belief, we state that:

(i) In respect of the Company's property, plant and equipment and intangible assets:

(a) (A) The Company has maintained proper records showing full particulars, including quantitative details and situation of property, plant and equipment, capital work-in progress, investment properties and relevant details of right-of-use assets.

(B) The Company has maintained proper records showing full particulars of intangible assets.

(b) The Company has a program of physical verification of its major part of property, plant and equipment and investment properties in a phased manner over periodical intervals, in our opinion, is reasonable having regard to the size of the Company and the nature of its assets. Pursuant to the program, certain assets were due for verification during the year and were physically verified by the Management during the year. No material discrepancies were noticed on such verification.

(c) With respect to immovable properties (other than properties where the Company is the lessee and the lease agreements are duly executed in favour of the Company) disclosed in the financial statements as a part of property, plant and equipment, capital work-in progress and investment property and based on the examination of the registered sale deed / transfer deed /conveyance deed provided to us, we report that, the title deeds of such immovable properties are held in the name of the Company as at the balance sheet date except Rs 5.13 crores of freehold land transferred by way of scheme of merger.

Description of item of property	Gross carrying value	Title deeds held in the name of	Whether title deed holder is a promoter, director or relative# of promoter*/director or employee of promoter/director	Property held since which date **	Reason for not being held in the name of the company
Land	Rs 5.13 crores	Meil Green Power Limited	No	1st April 2015	Meil Green Power Ltd., a subsidiary Company of MEIL which was merged in to MEIL as on 01/04/2015 vide Honourable High court of AP and Telangana and the Company currently in the process of getting this Land Mutated.

** the above date is effective date of merger of Meil Green Power Limited

(d) The Company has not revalued any of its property, plant and equipment (including Right of Use assets) and intangible assets during the year.

(e) No proceedings have been initiated or is pending against the company as at March 31, 2023 for holding any benami property under the Benami Transactions (Prohibition) Act, 1988 (45 of 1988) and rules made thereunder.

JEWAR TRANSMISSION LIMITED NEW DELHI

DARAPANENI & Co. Hyderabad Chartered Accountants

(ii) In respect of the Company's inventories:

(a) The inventories were physically verified during the year by the Management at reasonable intervals. In our opinion, the coverage and procedure of such verification by the Management is appropriate having regard to the size of the Company and the nature of its operations. In respect of goods in transit, the goods have been received subsequent to the year end. No discrepancies of 10% or more in the aggregate for each class of inventories were noticed on such physical verification of inventories when compared with books of account.

(b) The Company has been sanctioned working capital limits in excess of Rs 5 crores, in aggregate, at points of time during the year, from banks or financial institutions on the basis of security of current assets. In our opinion, the quarterly returns filed by the Company with such banks or financial institutions are in agreement with the unaudited books of account of the Company of the respective quarters and no material discrepancies have been observed, except for the following:

(Rs in crores)

Name of the bank (Nature of current assets offered as security)	Working capital limit sanctioned	Quarter ended	Particulars	Value of Stock as per Stock Statements submitted with banks	Value of Stock disclosed audited Financial Statements	Variance	Remarks
SBI and its consortium banks	343.12	Q4	Inventory (including unbilled)	3165.11	3395.51	230.40	The stock statements were subsequently rectified after the year March 31, 2023 and submitted to the respective banks.
			Receivables	5131.19	5345.22	214.03	

(iii) The Company has made investments in, provided guarantee and granted loans, secured or unsecured, to companies or any other parties during the year, in respect of which:

(a) The Company has provided loans and stood guarantee during the year the details of which are given below:

(Rs in crores)

Particulars	Loans	Guarantees	Security
Aggregate amount granted / provided during the year		-	-
-Subsidiaries	1907.83	-	-
-Joint Venture	-	-	-
-Associates	-	-	-
-Others	(58.73)	-	
Balance Outstanding as at balance sheet date in respect of above cases			-
-Subsidiaries	7254.11	-	
-Joint Venture	-	-	-
-Associates	-	-	-
-Others	18.61	-	-

JEWAR TRANSMISSION LIMITED NEW DELHI

DARAPANENI & Co. Hyderabad Chartered Accountants

Further, the company has given Sponsor Shortfall Undertaking (SSU) for Rs 678.07 Crores to cover all the debts/monies for the loans availed by its subsidiary companies.

(b) The investments made, guarantees provided and the terms and conditions of the grant of all the above-mentioned loans and guarantees provided, during the year are, in our opinion, prima facie, not prejudicial to the Company's interest.

(c) In respect of loans granted by the Company, the schedule of repayment of principal and payment of interest has been stipulated and the repayments of principal amounts and receipts of interest are regular as per stipulation.

(d) In respect of loans granted by the Company, there is no amount overdue for more than 90 days at the balance sheet date.

(e) During the year, the company has not given any loans or advance in the nature of loan granted which has fallen due during the year. No loans have been renewed or extended or fresh loans granted to settle overdues of existing loans. Hence clause 3(e) of the order is not applicable.

(f) The Company has not granted any loans either repayable on demand or without specifying any terms or period of repayment during the year. Hence, reporting under clause (iii)(f) is not applicable.

(iv) The Company has complied with the provisions of Sections 185 and 186 of the Act, to the extent applicable, in respect of grant of loans, making investments and providing guarantees and securities during the year, as applicable.

(v) The Company has not accepted any deposit or amounts which are deemed to be deposits. Hence, reporting under clause (v) of the Order is not applicable.

(vi) The maintenance of cost records has been specified by the Central Government under section 148(1) of the Act. We have broadly reviewed the cost records maintained during the year by the Company pursuant to the Companies (Cost Records and Audit) Rules, 2014, as amended and prescribed by the Central Government under sub-section (1) of Section 148 of the Act, and are of the opinion that, prima facie, the prescribed cost records have been made and maintained by the company. We have, however, not made a detailed examination of the cost records with a view to determine whether they are accurate or complete.

(vii) In respect of statutory dues:

(a) The Company has generally been regular in depositing undisputed statutory dues, including Provident Fund, Employees' State Insurance, Income-tax, Goods and Service Tax, Sales Tax, duty of Custom, duty of Excise, Value Added Tax and corresponding cess and other material statutory dues applicable to it to the appropriate authorities.

(b) There were no undisputed amounts payable in respect of Provident Fund, Employees' State Insurance, Income-tax, Goods and Service Tax, Sales Tax, duty of Custom, duty of Excise, Value Added Tax and corresponding cess and other material statutory dues in arrears as at March 31, 2023 for a period of more than six months from the date they became payable.

(c) Details of statutory dues referred to in sub-clause (a) above which have not been deposited as on March 31, 2023 on account of disputes are given below:

DARAPANENI & Co. Hyderabad Chartered Accountants

JEWAR TRANSMISSION LIMITED NEW DELHI

Name of the statute	Nature of the dues	Amount (Rs in crores)	Period to which the amount relates	Forum where the dispute is pending
Central Sales Tax Act, 1956 and sales Tax Act of various states	Sales Tax/ VAT	48.11	April 2009 to March 2017	Hon'able High Courts and sales tax tribunals of Various states.

(viii) There were no transactions relating to previously unrecorded income that were surrendered or disclosed as income in the tax assessments under the Income Tax Act, 1961 (43 of 1961) during the year.

(ix) In respect of borrowings:

(a) In our opinion, during the year, the Company has not defaulted in the repayment of loans or other borrowings or in the payment of interest thereon to any lender during the year.

(b) The Company has not been declared wilful defaulter by any bank or financial institution or government or any government authority.

(c) The Company has not taken any term loan during the year and there are no unutilized term loans at the beginning of the year and hence, reporting under clause (ix)(c) of the Order is not applicable.

(d) On an overall examination of the financial statements of the Company, funds raised on short-term basis have, prima facie, not been used during the year for long-term purposes by the Company.

(e) On an overall examination of the financial statements of the Company, the Company has not taken any funds from any entity or person on account of or to meet the obligations of its subsidiaries or associates. or joint ventures.

(f) The Company has raised loans on the pledge of securities held in its subsidiaries as per details below. Further, the Company has not defaulted in repayment of such loans raised.

Nature of Loan Taken	Name of lender	Amount of loan as at 31st March'2023	Name of the subsidiary	Relation	Details of security pledged	Remarks
Cash Credit & Working Capital Demand Loans	Consortium banks	Rs 225.48 Crores	MEIL HOLDINGS LIMITED	100% Subsidiary	Pledge of 50% (8,18,27,060) no.s of equity shares with SBICAP Trustee Company Ltd for availing the working capital loans.	None

(x) In respect of issue of securities:

(a) The Company has not raised moneys by way of initial public offer or further public offer (including debt instruments) during the year and hence reporting under clause (x)(a) of the Order is not applicable.

DARAPANENI & Co. Hyderabad Chartered Accountants

JEWAR TRANSMISSION LIMITED NEW DELHI

(b) During the year, the Company has not made any preferential allotment or private placement of shares or convertible debentures (fully or partly or optionally) and hence, reporting under clause (x)(b) of the Order is not applicable to the Company.

(xi) In respect of fraud:

(a) No fraud by the Company and no material fraud on the Company has been noticed or reported during the year.

(b) No report under sub-section (12) of section 143 of the Companies Act has been filed in Form ADT-4 as prescribed under rule 13 of Companies (Audit and Auditors) Rules, 2014 with the Central Government, during the year and up to the date of this report.

(c) We have taken into consideration, the whistle blower complaints received by the company during the year and up to the date of this report and provided to us, when performing our audit.

(xii) The Company is not a Nidhi Company. Therefore, reporting under clause (xii) of the Order is not applicable.

(xiii) In our opinion, the Company is in compliance with Section 177 and 188 of the Act, where applicable, for all transactions with the related parties undertaken during the year and the details of such related party transactions have been disclosed in the standalone financial statements as required by the applicable accounting standards.

(xiv) In respect of internal audit:

(a) In our opinion the Company has an adequate internal audit system commensurate with the size and the nature of its business.

(b) We have considered, the internal audit reports for the year under audit, issued to the Company during the year and till date, in determining the nature, timing and extent of our audit procedures.

(xv) In our opinion, during the year the Company has not entered any non-cash transactions with its Directors or persons connected to its Directors and hence provisions of section 192 of the Act are not applicable.

(xvi) (a) The Company is not required to be registered under section 45-IA of the Reserve Bank of India Act, 1934. Hence, reporting under clause (xvi)(a), (b) and (c) of the Order is not applicable.

(b) The Company is not a Core Investment Company (CIC). Hence reporting under this clause is not applicable

(xvii) The Company has not incurred cash losses during the financial year covered by our audit and the immediately preceding financial year.

(xviii) There has been no resignation of the statutory auditors of the Company during the year.

(xix) On the basis of the financial ratios, ageing and expected dates of realization of financial assets and payment of financial liabilities, other information accompanying the financial statements and our knowledge of the Board of Directors and Management plans and based on our examination of the evidence supporting the assumptions, nothing has come to our attention, which causes us to believe that any material uncertainty exists as on the date of the audit report indicating that Company is not capable of meeting its liabilities existing at the date of balance sheet as and when they fall due within a period of one year from the balance sheet date. We, however, state that this is not an assurance as to the future viability of the Company. We further state that our reporting is based on the facts up to the date of the audit report and we neither give any guarantee nor any assurance that all liabilities falling due within a period of one year from the balance sheet date, will get discharged by the Company as and when they fall due.

JEWAR TRANSMISSION LIMITED NEW DELHI

DARAPANENI & Co. Hyderabad Chartered Accountants

(xx) The Company has fully discharged the required amount towards Corporate Social Responsibility (CSR) and there is no unspent CSR amount for the year requiring a transfer to a Fund specified in Schedule VII to the Companies Act or special account in compliance with the provision of sub-section (6) of section 135 of the said Act. Accordingly, reporting under clause (xx) of the Order is not applicable for the year.

For Darapaneni & Co,
Chartered Accountants
FRN: 000685S

DARAPANENI & Co. Hyderabad Chartered Accountants

(D.C NAIDU)
Partner
M. No: 024643
UDIN: 23024643BGXSLI5886

Date: 08/09/2023
Place: Hyderabad

JEWAR TRANSMISSION LIMITED NEW DELHI

MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

meil

STANDALONE BALANCE SHEET AS AT MARCH 31, 2023

(₹ in crores)

Particulars	Note	As at March 31, 2023	As at March 31, 2022
I. ASSETS			
1. Non-current assets			
(i) Property, Plant & Equipment	2.1	3,364.00	3,492.68
(ii) Intangible assets	2.2	5.83	6.53
(iii) Capital work-in-progress	2.3	211.30	145.50
(iv) Intangible asset under development		7.37	7.87
(v) Financial Assets			
(a) Investments	3	3,858.87	3,257.80
(b) Loans	4	3,451.81	2,712.00
(c) Other financial assets	5	1,291.56	1,266.95
(vi) Other non current assets	6	564.33	1,184.00
Total non-current assets		**12,755.07**	**12,073.33**
2. Current assets			
(i) Inventories	7	2,440.61	1,257.20
(ii) Financial Assets			
(a) Investments	8	25.65	19.70
(b) Trade receivables	9	5,326.85	4,791.24
(c) Cash and cash equivalents	10.1	1,619.35	3,217.68
(d) Bank balances other than above	10.2	981.03	2,342.41
(e) Loans	11	3,847.07	2,720.14
(f) Other financial assets	12	1,859.68	1,259.64
(iii) Other current assets	13	6,401.79	5,096.80
Total Current assets		**22,502.03**	**20,704.81**
Total Assets		**35,257.10**	**32,778.14**
II EQUITY AND LIABILITIES			
A. Equity			
(a) Equity Share Capital	14	156.01	156.01
(b) Other Equity	15	21,106.72	18,786.39
Total Equity		**21,262.73**	**18,942.40**
B. Liabilities			
1.Non-current liabilities			
(i) Financial liabilities			
(a) Borrowings	16	6.05	12.73
(b) Lease liabilities	17	0.39	0.98
(c) Other financial liabilities	18	1,207.83	1,443.85
(ii) Other non current liabilities	19	419.15	369.22
(iii) Provisions	20	30.42	46.17
(iv) Deferred tax liabilities (net)	21	122.87	100.86
Total Non-current liabilities		**1,786.71**	**1,973.81**
2. Current liabilities			
(i) Financial liabilities			
(a) Borrowings	22	282.46	325.39
(b) Trade payables	23		
Dues of Micro and small enterprises		28.44	16.95
Dues of others		5,490.44	4,788.51
(c) Lease liabilities	24	0.59	0.51
(d) Other financial liabilities	25	1,455.58	1,032.51
(ii) Other current liabilities	26	4,603.45	5,500.41
(iii) Provisions	27	346.70	197.65
Total Current liabilities		**12,207.66**	**11,861.93**
Total Liabilities		**13,994.37**	**13,835.74**
Total Equity & Liabilities		**35,257.10**	**32,778.14**
Notes forming part of the financial statements	1 to 64		

In terms of our report attached.

For Darapaneni & Co.
Chartered Accountants
Firm Registration No.000685S

CA D.C.Naidu
Partner
Membership No.024643

For and on behalf of the Board of Directors

P.P.Reddy
Executive Chairman
DIN:01450174

P.V.Krishna Reddy
Managing Director
DIN:01815061

N.Thirupathi Rao
Whole-time Director & CFO
DIN:00055610

N.Chandra Kala
Company Secretary
Membership No. ACS 32377

Place: Hyderabad
Date : September 08, 2023

JEWAR TRANSMISSION LIMITED NEW DELHI

MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

meil

STANDALONE STATEMENT OF PROFIT AND LOSS FOR THE YEAR ENDED MARCH 31 2023

(₹ in crores)

Particulars	Note	Year ended March 31 2023	Year ended March 31 2022
I Income			
(a) Revenue from operations	28	25,837.68	26,828.80
(b) Other income	29	701.70	469.07
Total Income		**26,539.38**	**27,297.87**
II Expenses			
(a) Cost of materials consumed	30	12,765.27	11,995.32
(b) Change in inventories	31	(658.29)	(28.64)
(c) Contract execution expenses	32	3,662.36	3,671.77
(d) Sub-contract expenses		4,552.36	4,171.41
(e) Employee benefits expense	33	1,220.25	1,183.92
(f) Finance costs	34	330.04	276.13
(g) Depreciation & Amortization expenses	2	427.40	363.30
(h) Other expenses	35	957.61	1,431.40
Total Expenses		**23,257.00**	**23,064.61**
III Profit before tax (PBT)		**3,282.38**	**4,233.26**
IV Tax expense			
(a) Current tax		928.59	737.65
Mat credit entitlement reversal		-	552.21
(b) Tax adjustment of earlier years		-	(124.64)
(c) Deferred tax (Net)		20.96	51.95
V Profit for the Year (PAT)		**2,332.83**	**3,016.09**
VI Other Comprehensive Income			
A. Items that will not be reclassified to profit or loss			
Gain/(loss) on re-measurements of defined benefit obligations		4.14	(2.07)
Income tax on re-measurements of defined benefit obligations		(1.04)	0.52
B. Items that will be reclassified to profit or loss			
VII Total Comprehensive Income for the year (Comprising Profit (Loss) and Other Comprehensive Income for the year)		**2,335.93**	**3,014.54**
VIII Earning per share in ₹			
(Equity shares per value ₹ 10 each)			
- Basic		149.53	198.64
- Diluted		149.53	198.64

In terms of our report attached.

For Darapaneni & Co.,
Chartered Accountants
Firm Registration No.000685S

DARAPANENI & CO. Hyderabad Chartered Accountants

CA D.C.Naidu
Partner
Membership No.016152

For and on behalf of the Board of Directors

P.P.Reddy
Executive Chairman
DIN:01450174

P.V.Krishna Reddy
Managing Director
DIN:01815061

N.Thirupathi Rao
Whole-time Director & CFO
DIN: 00055610

N.Chandra Kala
Company Secretary
Membership No. ACS 32377

Place : Hyderabad
Date : September 08, 2023

JEWAR TRANSMISSION LIMITED NEW DELHI

MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

meil

STATEMENT OF CHANGES IN EQUITY FOR THE YEAR ENDED MARCH 31, 2023

A. EQUITY SHARE CAPITAL (₹ in crores)

Balance as on April 01, 2021	Changes in equity share capital during the year	Balance as on 31st March,2022	Changes in equity share capital during the year	Balance as on 31st March,2023
150.01	6.00	156.01	-	156.01

B. OTHER EQUITY (₹ in crores)

Particulars	Other Equity					Total
	Reserves and surplus				Other Comprehensive Income	
	Securities premium	Retained earnings	Capital reserve	General reserve		
Balance as of April 01,2021	0.05	15,015.68	194.16	575.00	1.96	15,786.85
Changes in equity for the year 2021-22						
Transfer to general reserve	-	(50.00)	-	50.00	-	-
Dividends (including corporate dividend tax)	-	(15.00)	-	-	-	(15.00)
Profit for the year	-	3,016.09	-	-	(1.55)	3,014.54
Balance as of March 31, 2022	**0.05**	**17,966.77**	**194.16**	**625.00**	**0.41**	**18,786.39**
Changes in equity for the year 2022-23						
Profit for the year		2,332.83			**3.10**	2,335.93
Transfer to general reserve		(50.00)		50.00		-
Dividend paid		(15.60)				(15.60)
Balance as on March 31,2023	**0.05**	**20,234.00**	**194.16**	**675.00**	**3.51**	**21,106.72**

In terms of our report attached.
For Darapaneni & Co.,
Chartered Accountants
Firm Registration No.0006855

DARAPANENI & CO. Hyderabad Chartered Accountants

CA D.C.Naidu
Partner
Membership No.024643

For and on behalf of the Board of Directors

P.P.Reddy
Executive Chairman
DIN:01450174

P.V.Krishna Reddy
Managing Director
DIN:01815061

N.Thirupathi Rao
Whole-time Director & CFO
DIN: 00055610

N.Chandra Kala
Company Secretary
Membership No. ACS 32377

Place : Hyderabad
Date : September 08, 2023

JEMAR TRANSMISSION LIMITED NEW DELHI

MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

meil

CASH FLOW STATEMENT FOR THE YEAR ENDED MARCH 31, 2023

(₹ in crores)

	Particulars	Year ended March 31, 2023		Year ended March 31, 2022	
A	**Cash Flow From Operating Activities**				
	Profit Before Tax		3,282.38		4,233.26
	Adjustments For				
	Depreciation / Amortisation	427.40		363.30	
	Unrealised Exchange (Gain) / Loss - (Net)	(154.35)		(6.51)	
	Finance Cost	330.04		276.13	
	Interest income	(528.25)		(428.03)	
	Income on Mutual funds	(0.56)		(0.99)	
	Advances written-off / liabilites write back	2.48		638.97	
	Expected credit loss	18.37		-	
	(Profit)/Loss on Sale of Shares/assets (net)	41.13	136.26	(0.21)	842.66
	Operating Profit Before Working Capital Change		**3,418.64**		**5,075.92**
	Working Capital Change				
	Inventories	(1,183.41)		(478.16)	
	Trade receivables	(548.51)		1,331.55	
	Other current assets	(1,304.99)		(706.26)	
	Financial assets	(420.22)		(494.94)	
	Other non current assets	592.31		(30.12)	
	Other long term liabilities	49.93		(226.42)	
	Long-term provisions	(11.60)		9.38	
	Financial Liabilities	194.87		(74.59)	
	Short-Term Provisions	9.35		0.18	
	Trade payables	718.47		773.26	
	Other current liabilities	(896.96)		1,035.40	
			(2,800.76)		1,139.28
	Cash generated in Operations Before Taxes		617.88		6,215.20
	Taxes Paid(Net)		(788.89)		(629.93)
	Net Cash Flow from Operating Activities (A)		**(171.01)**		**5,585.27**
B	**Cash Flow From Investing Activities**				
	Expenses on PPE, Intangible assets, Capital WIP & Intangible assets under development		(892.51)		(1,263.41)
	Proceeds from Sale of PPE,Intangible assets, Capital WIP & Intangible assets under development		548.55		25.05
	Investment made in Subsidiary / Associate companies		(641.75)		(230.48)
	Investment in Current investments		(5.95)		(17.14)
	Income from current investments - MFs		0.56		0.99
	Inter-corporate deposits(Net)		(1,725.39)		(3,354.45)
	Proceeds from issue of Equity share capital		-		6.00
	Change in other bank balances		1,361.38		(273.54)
	Interest income		323.82		407.88
	Net cash Generated from Investing Activities (B)		**(1,031.29)**		**(4,699.10)**
C	**Cash Flow From Financing Activities**				
	Proceeds from long term & short term borrowings (Net)	(refer note no.48)	(49.61)		179.62
	Payment of lease liabilities		(0.78)		(19.19)
	Finance Cost		(330.04)		(276.71)
	Dividend/Distribution tax Paid		(15.60)		(15.00)
	Net cash from Financing Activities (C)		**(396.03)**		**(131.28)**
	Net Increase in Cash and Cash Equivalents (A)+(B)+(C)		(1,598.33)		754.89
	At the beginning of the year		3,217.68		2,462.79
	Closing Balance of cash and cash equivalents		**1,619.35**		**3,217.68**

Notes:

1) Statement of Cash Flows has been prepared under the indirect method as set out in the Indian Accounting Standard (Ind AS) 7 "Statement of Cash Flows" as specified in the Companies (Indian Accounting Standards) Rules, 2015.

2) Previous year's figures have been regrouped / reclassified wherever applicable.

In terms of our report attached.

For Darapaneni & Co.,
Chartered Accountants
Firm Registration No.000685S

CA D.C.Naidu
Partner
Membership No.024643

Place : Hyderabad
Date : September 08, 2023

For and on behalf of the Board of Directors

P.P.Reddy
Executive Chairman
DIN:01450174

P.V.Krishna Reddy
Managing Director
DIN:01815061

N.Thirupathi Rao
Whole Time Director &
DIN: 00055610

N.Chandra Kala
Company Secretary
Membership No. ACS 32377

JEWAR TRANSMISSION LIMITED NEW DELHI
DARAPANENI & CO. Hyderabad Chartered Accountants

MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

NOTES FORMING PART OF THE FINANCIAL STATEMENTS

Corporate Information

Megha Engineering & Infrastructures Limited (MEIL) is a Public Limited Company limited by shares incorporated under the provision of the Companies Act, 1956 having it's registered office at S-2, T.I.E, Balanagar, Hyderabad-500037, Telangana, India. The Company is in the business of providing infrastructure facilities like Irrigation, Drinking water supply, Power, Hydrocarbons, Transportation and manufacturing of Spiral welded pipes, HDPE Pipes, MDPE Pipes, Valves and Vessels.

1. **SIGNIFICANT ACCOUNTING POLICIES**

I. Basis of Preparation

- **Statement of compliance**

  The financial statements of the Company have been prepared in accordance with the provisions of the Companies Act,2013 and the Indian Accounting Standards ("Ind AS") notified under section 133 of the Companies Act, 2013 read with the Companies (Indian Accounting Standards) Rules, 2015 (as amended from time to time) and other accounting principles generally accepted in India. In addition, the guidance notes/announcements issued by the Institute of Chartered Accountants of India (ICAI) are also applied except where compliance with other statutory promulgations require a different treatment.

  The financial statements are presented in Indian rupees except when otherwise stated. All amounts have been rounded off to the nearest crores, unless otherwise indicated.

- **Basis of accounting**

  These financial statements are prepared in accordance with Indian Accounting Standards (Ind AS) under the historical cost convention on the accrual basis except for certain financial instruments which are required to be measured at fair values, the provisions of the Companies Act, 2013 ('Act').

  Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date, regardless of whether that price is directly observable or estimated using another valuation technique. In estimating the fair value of an asset or a liability, the Company takes into account the characteristics of the asset or liability if market participants would take those characteristics into account when pricing the asset or liability at the measurement date.

  Fair value measurements under Ind AS are categorized as below based on the degree to which the inputs to the fair value measurements are observable and the significance of the inputs to the fair value measurement in its entirety:

  - Level 1 inputs are quoted prices (unadjusted) in active markets for identical assets or liabilities that the company can access at measurement date;
  - Level 2 inputs are inputs, other than quoted prices included in level 1, that are observable for the asset or liability, either directly or indirectly; and
  - Level 3 inputs are unobservable inputs for the valuation of assets/liabilities

- **Presentation of financial statements**

  The Balance Sheet and the Statement of Profit and Loss account and the statement of changes in equity are prepared and presented in the format prescribed in the Schedule III to the Companies Act, 2013 ("the Act"). The statement of cash flows has been prepared and presented as per the requirements of Ind AS 7 "Statement of Cash flows". The disclosure requirements with respect to items

JEWAR TRANSMISSION LIMITED NEW DELHI

DARAPANENI & Co. Hyderabad Chartered Accountants

in the Balance Sheet and Statement of Profit and Loss, as prescribed in the Schedule III to the Act, are presented by way of notes forming part of the financial statements along with the other notes required to be disclosed under the notified Accounting Standards.

- **Operating cycle for current and non-current classification**

  Operating cycle for the business activities of the company covers the duration of the specific project/contract/product line/service including the defect liability period wherever applicable and extends up to the realization of receivables (including retention monies) within the agreed credit period normally applicable to the respective project.

Summary of Significant Accounting Policies

- **Revenue recognition**

  The Company recognizes revenue from contracts with customers is recognised when control of the goods or services are transferred to the customer at an amount that reflects the consideration to which the Company expects to be entitled in exchange for those goods or services.

  Performance obligations with reference to construction contracts are satisfied over the period of time, and accordingly, revenue from such contracts is recognized based on progress of performance determined using input method with reference to the cost incurred on contract and their estimated total costs. Revenue is the transaction price that the Company is entitled to. Variation in contract work and other claims are included to the extent that the amount can be measured reliably and it is agreed with customer. For performance obligation satisfied over time, the revenue recognition is done by measuring the progress towards complete satisfaction of performance obligation. The progress is measured in terms of a proportion of actual cost incurred to-date, to the total estimated cost attributable to the performance obligation. Transaction price is the amount of consideration to which the Company expects to be entitled in exchange for transferring good or service to a customer excluding amounts collected on behalf of a third party.

  Sale of goods

  Revenue from sale of manufactured and traded goods is recognised when the control of the same is transferred to the customer and it is probable that the entity will collect the consideration to which it is entitled for the exchanged goods. Performance obligations in respect of contracts for sale of manufactured and traded goods is considered as satisfied at a point in time when the control of the same is transferred to the customer and where there is an alternative use of the asset or the company does not have either explicit or implicit right of payment for performance completed till date. In case where there is no alternative use of the asset and the company has either explicit or implicit right of payment considering legal precedents, performance obligation is considered as satisfied over a period of time and revenue is recognized over time.

  Revenue from construction/project related activity is recognised as follows

  Contract revenue is recognised over time to the extent of performance obligation satisfied and control is transferred to the customer. Contract revenue is recognised at allocable transaction price which represents the cost of work performed on the contract plus proportionate margin, using the percentage of completion method. Percentage of completion is the proportion of cost of work performed to-date, to the total estimated contract costs.

  Estimates of revenue and costs are reviewed periodically and revised, wherever circumstances change, resulting increases or decreases in revenue determination, is recognized in the period in which estimates are revised.

  Contract costs are recognised as expenses as incurred unless they create an asset related to future contract activity. An expected loss on a contract is recognised immediately in statement of profit and loss.

JEWAR TRANSMISSION LIMITED NEW DELHI

DARAPANENI & CO. Hyderabad Chartered Accountants

Contract modifications are accounted for when additions, deletions or changes are approved either to the scope or price or both. Goods/services added that are not distinct are accounted for on a cumulative catch up basis. Goods / services those that are distinct are accounted for prospectively as a separate contract, if the additional goods/services are priced at the standalone selling price else as a termination of the existing contract and creation of a new contract. In cases where the additional work has been approved but the corresponding change in price has not been determined, the recognition of revenue is made for an amount with respect to which it is highly probable that a significant reversal will not occur.

If the consideration promised in a contract includes a variable amount, this amount is recognised only to the extent that it is highly probable that a significant reversal in the amount recognised will not occur.

Revenue is recognized based on nature of activity when consideration can be reasonably measured and recovered with reasonable certainty. Revenue is measured at the fair value of the consideration received or receivable and is reduced for estimated customer returns, rebates and other similar allowances.

For contracts where the amount received is more than the amount receivable for the identified performance obligations the excess amount is shown as contract liability and termed as "Advance from customers".

Service concession arrangements – Hybrid Annuity Projects (HAM):

Under Appendix C to Ind AS 115 – Service Concession Arrangements, these arrangements are accounted for based on the nature of the consideration. The intangible asset model is used to the extent that the operator receives a right (i.e. a concessionaire) to charge users of the public service. The financial model is used when the operator has an unconditional contractual right to receive cash or other financial assets from or at the direction of the grantor for the construction service. When the unconditional right to receive cash covers only part of the service, the two models are combined to account separately for each component. If the operator performs more than one service (i.e) construction, upgrade services and operation services) under a single contract or arrangement, consideration received or receivable is allocated by reference to the relative fair values of the service delivered, when the amount are not separately identifiable The Company has accounted the total amount due from the customer in accordance with Ind AS 109 as measured at Amortised cost and the interest is calculated using the effective interest method and recognized in profit or loss account.

The Company has recognised Financial asset for ORR 190 Villages and 5 Nagarpanchayat Projects which are executed under HAM model whose repayment will be made in next 7 years from completion of the Project including an IRR of 13.5%.

In accordance with the accounting policies adopted by the Company, pertaining to the HAM (Hybrid Annuity Model) projects involving the construction of 8 Sewage Treatment Plants (STPs) and 17 STPs, the Company has recognized 40% of the contract work billed as revenue, while the remaining portion of 60% work completed has been disclosed under Work-in-Progress (WIP) and upon the successful and final completion of these projects, the financial asset associated with the aforementioned projects shall be duly recognized in the Company's financial statements. The repayment will be made in 15 years from completion of the Project(COD) with an interest rate equals to 13.5% on reducing balance of completion cost.

Contract assets

A Contract asset is the right to consideration in exchange for goods or services transferred to the customer. If the Company performs by transferring goods or services to a customer before the customer pays consideration or before payment is due, a contract asset is recognized for the earned consideration that is conditional. The same is disclosed as "Unbilled Revenue" under Other Financial Assets –Current.

JEMAR TRANSMISSION LIMITED NEW DELHI

DARAPANENI & CO. Hyderabad Chartered Accountants

Unbilled revenue represents value of services performed in accordance with the contract terms but not billed.

- **Other income**

Interest income

Interest income from a financial asset is recognised when it is probable that the economic benefits will flow to the company and the amount of income can be measured reliably. Interest income is accrued on a time basis, by reference to the principal outstanding and at the effective interest rate applicable, which is the rate that exactly discounts estimated future cash receipts through the expected life of the financial asset to that asset's net carrying amount on initial recognition.

Dividend Income

Dividend income from Investments is recognised when the shareholder's right to receive payment has been established.

Rental income

Rental income from operating leases is generally recognised over the term of the relevant lease.

- **Exceptional Items**

Exceptional Items represents the nature of transactions which are not in recurring nature during the ordinary course of business but lead to increase / decrease in profit / loss for the year.

- **Property, Plant and Equipment (PPE)**

PPE is recognised when it is probable that future economic benefits associated with the item will flow to the company and the cost of the item can be measured reliably. PPE is stated at original cost net of tax/duty credits availed, if any, less accumulated depreciation and cumulative impairment, if any. Property, plant and equipment acquired on hire purchase basis are recognised at their cash values. Cost includes professional fees related to the acquisition of PPE and for qualifying assets, borrowing costs capitalised in accordance with the company's accounting policy.

For transition to Ind AS, the company has elected to adopt as deemed cost, the carrying value of PPE measured as per I-GAAP less accumulated depreciation and cumulative impairment on the transition date of April 1, 2015. In respect of revalued assets, the value as determined by valuers as reduced by accumulated depreciation and cumulative impairment is taken as cost on transition date.

Own manufactured PPE is capitalised at cost including an appropriate share of overheads. Administrative and other general overhead expenses that are specifically attributable to construction or acquisition of PPE or bringing the PPE to working condition are allocated and capitalised as a part of the cost of the PPE.

PPE not ready for the intended use on the date of the Balance Sheet are disclosed as "capital work-in-progress". (Also refer to policies on leases, borrowing costs, impairment of assets and foreign currency transactions infra).

Depreciation is recognised using straight line method so as to write off the cost of the assets (other than freehold land and properties under construction) less their residual values over their useful lives specified in Schedule II to the Companies Act, 2013, or in the case of assets where the useful life was determined by technical evaluation, over the useful life so determined.

Depreciation method is reviewed at each financial year end to reflect the expected pattern of consumption of the future economic benefits embodied in the asset. The estimated useful life and residual values are also reviewed at each financial year end and the effect of any change in the estimates of useful life/residual value is accounted on prospective basis.

SEMAR TRANSMISSION LIMITED NEW DELHI
DARAPANENI & CO. Hyderabad Chartered Accountants

Depreciation on additions to/deductions from, owned assets is calculated pro rata to the period of use. Extra shift depreciation is provided on a location basis.

Depreciation charge for impaired assets is adjusted in future periods in such a manner that the revised carrying amount of the asset is allocated over its remaining useful life.

Assets acquired under finance leases are depreciated on a straight line basis over the lease term. Where there is reasonable certainty that the company shall obtain ownership of the assets at the end of the lease term, such assets are depreciated based on the useful life prescribed under Schedule II to the Companies Act, 2013 or based on the useful life adopted by the company for similar assets.

Freehold land is not depreciated.

- **Investment property**

Investment properties are properties held to earn rentals and/or for capital appreciation (including property under construction for such purposes). Investment properties are measured initially at cost, including transaction costs. Subsequent to initial recognition, investment properties are measured in accordance with the Ind AS16's requirement for cost model. An investment property is derecognised upon disposal or when the investment property is permanently withdrawn from use and no further economic benefits expected from disposal. Any gain or loss arising on derecognition of the property is included in profit or loss in the period in which the property is derecognised.

- **Intangible assets**

Identifiable intangible assets are recognised when the Company controls the asset, it is probable that future economic benefits attributed to the asset will flow to the Company and the cost of the asset can be reliably measured.

At initial recognition, the separately acquired intangible assets are recognised at cost.

Following initial recognition, the intangible assets are carried at cost less any accumulated amortization and accumulated impairment losses, if any. The estimated useful life and amortization method reviewed at the end of each reporting period, with the effect of any changes in estimate being accounted for on a prospective basis.

Intangible assets are amortised on straight line basis over the estimated useful life. The method of amortisation and useful life is being reviewed at the end of each accounting year with the effect of any changes in the estimate being accounted for on a prospective basis.

- **Impairment of assets**

Intangible assets and property, plant and equipment:

Intangible assets and property, plant and equipment are evaluated for recoverability whenever events or changes in circumstances indicate that their carrying amounts may not be recoverable. For the purpose of impairment testing, the recoverable amount (i.e. the higher of the fair value less cost to sell and the value in use) is determined on an individual asset basis unless the asset does not generate cash flows that are largely independent of those from other assets. In such cases, the recoverable amount is determined for the cash generating units to which the asset belongs. If such assets are considered to be impaired, the impairment to be recognized in the statement of profit and loss is measured by the amount by which the carrying value of the assets exceeds the estimated recoverable amount of the asset. An impairment loss is reversed in the statement of profit and loss if there has been a change in the estimates used to determine the recoverable amount.

The carrying amount of the asset is increased to its revised recoverable amount, provided that this amount does not exceed the carrying amount that would have been determined (net of any accumulated amortization or depreciation) had no impairment loss been recognized for the asset in prior years.

JEMAR TRANSMISSION LIMITED NEW DELHI

DARAPANENI & Co. Hyderabad Chartered Accountants

- **Employee Benefits**

Short term employee benefits

Employee benefits such as salaries, wages, short term compensated absences, expected cost of bonus, ex-gratia and performance-linked rewards falling due wholly within twelve months of rendering the service are classified as short term employee benefits and are expensed in the period in which the employee renders the related service.

Post-employment benefits

Defined contribution plans

The Company's contributions to Superannuation fund and Provident fund to Regional Provident Fund Commissioner, are considered as defined contribution plans and are charged as an expense based on the amount of contribution required to be made and when services are rendered by the employees.

Defined benefit plans

Contribution to Gratuity fund is considered as defined benefit plan. the cost of providing benefits is determined using the projected unit credit method, with actuarial valuations being carried out at the end of each annual reporting period. Remeasurement, comprising actuarial gains and losses, the effect of the changes to the asset ceiling (if applicable) and the return on plan assets (excluding net interest), is reflected immediately in the balance sheet with a charge or credit recognised in other comprehensive income in the period in which they occur. Re measurement recognised in other comprehensive income is reflected immediately in retained earnings and is not reclassified to profit or loss. Past service cost is recognised in profit or loss in the period of a plan amendment. Net interest is calculated by applying the discount rate at the beginning of the period to the net defined benefit liability or asset.

Long term employee benefits

The obligation for long term employee benefits such as long term compensated absences, long service award etc. is measured at present value of estimated future cash flows expected to be made by the company and is recognised in a similar manner as in the case of defined benefit plans as given above. Long term employee benefit costs comprising current service cost and gains or losses on curtailments and settlements, remeasurements including actuarial gains and losses are recognised in the Statement of Profit and Loss as employee benefit expenses. Interest cost implicit in long term employee benefit cost is recognised in the Statement of Profit and Loss under finance cost.

- **Leases (as per IND AS 116)**

The determination of whether an agreement is, or contains, a lease is based on the substance of the agreement at the date of inception.

(i) **Finance leases**

a. Leases where the company has substantially all the risks and rewards of ownership of the related assets are classified as finance leases. Assets under finance leases are capitalised at the commencement of the lease at the lower of the fair value or the present value of minimum lease payments and a liability is created for an equivalent amount. Each lease rental paid is allocated between the liability and the interest cost, so as to obtain a constant periodic rate of interest on the outstanding liability for each period.

b. Assets given under a finance lease are recognised as a receivable at an amount equal to the net investment in the lease. Lease income is recognised over the period of the lease so as to yield a constant rate of return on the net investment in the lease.

(ii) **Operating leases**

The leases which are not classified as finance lease are operating leases.

The Company recognises a right-of-use asset and a lease liability at the lease commencement date. The right-of-use asset is initially measured at cost, which comprises the initial amount of the lease liability adjusted for any lease payments made at or before the commencement date, plus any initial

JEWAR TRANSMISSION LIMITED NEW DELHI

DARAPANENI & Co. Hyderabad Chartered Accountants

direct costs incurred and an estimate of costs to dismantle and remove the underlying asset or to restore the site on which it is located, less any lease incentives received.

Certain lease arrangements include the option to extend or terminate the lease before the end of the lease term. The right-of-use assets and lease liabilities include these options when it is reasonably certain that the option will be exercised.

The lease liability is initially measured at the present value of the lease payments, discounted using the Company's incremental borrowing rate. It is remeasured when there is a change in future lease payments arising from a change in an index or a rate, or a change in the estimate of the guaranteed residual value, or a change in the assessment of purchase, extension or termination option. When the lease liability is remeasured in this way, a corresponding adjustment is made to the carrying amount of the right of-use asset, or is recorded in the Statement of Profit and Loss if the carrying amount of the right-of-use asset has been reduced to zero.

The right-of-use asset is measured by applying cost model i.e. right-of-use asset at cost less accumulated depreciation and cumulative impairment, if any. The right-of-use asset is depreciated using the straight-line method from the commencement date to the end of the lease term or useful life of the underlying asset whichever is earlier. Carrying amount of lease liability is increased by interest on lease liability and reduced by lease payments made.

Lease payments associated with following leases are recognized as expenses on straight line basis:

1) Low value leases and 2) Leases which are short-term

Lease payments have been classified as financing activities in Statement of Cash Flow.

The Company has elected not to recognise right of-use assets and lease liabilities for short term leases that have a lease term of less than or equal to 12 months with no purchase option and assets with low value leases. The Company recognises the lease payments associated with these leases as an expense in statement of profit and loss over the lease term. The related cash flows are classified as operating activities.

The Company recognises lease payments in case of assets given on operating leases as income on a straight-line basis. The Company presents underlying assets subject to operating lease in its balance sheet under the respective class of asset.

- **Financial Instruments**

Financial assets and/or financial liabilities are recognised when the company becomes party to a contract embodying the related financial instruments. All financial assets, financial liabilities and financial guarantee contracts are initially measured at transaction values and where such values are different from the fair value, at fair value. Transaction costs that are attributable to the acquisition or issue of financial assets and financial liabilities (other than financial assets and financial liabilities at fair value through profit or loss) are added to or deducted from as the case may be, the fair value of such financial assets or liabilities, on initial recognition. Transaction costs directly attributable to the acquisition of financial assets or financial liabilities at fair value through profit or loss are recognised immediately in Profit or Loss.

In case of funding to subsidiary companies in the form of interest free or concession loans and preference shares, the excess of the actual amount of the funding over initially measured fair value is accounted as an equity investment.

A financial asset and a financial liability is offset and presented on net basis in the balance sheet when there is a current legally enforceable right to set-off the recognised amounts and it is intended to either settle on net basis or to realise the asset and settle the liability simultaneously.

JEMAR TRANSMISSION LIMITED NEW DELHI

DARAPANENI & CO. Hyderabad Chartered Accountants

(i) Financial assets

A. All recognised financial assets are subsequently measured in their entirety either at amortised cost or at fair value depending on the classification of the financial assets as follows:

1. Investments in debt instruments that are designated as fair value through profit or loss (FVTPL) - at fair value.
2. Investments in debt instruments that meet the following conditions are subsequently measured at - at amortised cost (unless the same designated as fair value through profit or loss):

    a. The asset is held within a business model whose objective is to hold assets in order to collect contractual cash flows; and
    b. The contractual terms of instrument give rise on specified dates to cash flows that are solely payments of principal and interest on the principal amount outstanding.

3. Investment in debt instruments that meet the following conditions are subsequently measured at fair value through other comprehensive income [FVTOCI] (unless the same are designated as fair value through profit or loss).

    a. The asset is held within a business model whose objective is achieved both by collecting contractual cash flows and selling financial assets; and
    b. The contractual terms of instrument give rise on specified dates to cash flows that are solely payments of principal and interest on the principal amount outstanding.

4. Debt instruments at FVTPL is a residual category for debt instruments, if any, and all changes are recognised in profit or loss.

5. Investment in equity instruments issued by subsidiary, associate and joint venture companies are measured at cost less impairment.

6. Investment in preference shares of the subsidiary companies are treated as equity instruments if the same are convertible into equity shares or are redeemable out of the proceeds of equity instruments issued for the purpose of redemption of such investments. Investment in preference shares not meeting the aforesaid conditions are classified as debt instruments at FVTPL.

7. Investments in equity instruments are classified as at FVTPL, unless the related instruments are not held for trading and the Company irrevocably elects on initial recognition to present subsequent changes in fair value in Other Comprehensive Income.

B. For financial assets that are measured at FVTOCI, income by way of interest and dividend, provision for impairment and exchange difference, if any, (on debt instrument) are recognised in profit or loss and changes in fair value (other than on account of above income or expense) are recognised in other comprehensive income and accumulated in other equity. On disposal of debt instruments at FVTOCI, the cumulative gain or loss previously accumulated in other equity is reclassified to profit or loss. In case of equity instruments at FVTOCI, such cumulative gain or loss is not reclassified to profit or loss on disposal of investments.

C. A financial asset is primarily derecognised when:

1. the right to receive cash flows from the asset has expired, or
2. the company has transferred its rights to receive cash flows from the asset or has assumed an obligation to pay the received cash flows in full without material delay to a third party under a pass-through arrangement; and (a)the company has transferred substantially all the risks and rewards of the asset, or (b) the company has neither transferred nor retained substantially all the risks and rewards of the asset, but has transferred control of the asset.

On derecognition of a financial asset in its entirety, the difference between the carrying amounts measured at the date of derecognition and the consideration received is recognised in Profit or Loss.

JEWAR TRANSMISSION LIMITED NEW DELHI

DARAPANENI & Co. Hyderabad Chartered Accountants

D. Impairment of financial assets: The Company recognises impairment loss on trade receivables using expected credit loss model, which involves use of a provision matrix constructed on the basis of historical credit loss experience as permitted under Ind AS 109. Impairment loss on investments is recognised when the carrying amount exceeds its recoverable amount.

E. The Company's decision to recognize an expected credit loss is driven by the delay in payments by various Clients and the inherent time value of money associated with the outstanding receivables.

The Company will continue to monitor the situation, assess any changes in operating results and payment behaviour, and adjust the provision for expected credit loss on a case-by-case basis as more information becomes available. At this time, the Company does not anticipate any default risk due to non-realization of trade receivables apart from the provision made by the delay in payment. This provision for expected credit loss serves as a prudent measure to account for the potential financial impact associated with delayed payments.

(ii) Financial liabilities

A. Financial liabilities, including derivatives and embedded derivatives, which are designated for measurement at FVTPL are subsequently measured at fair value. Financial guarantee contracts are subsequently measured at the amount of impairment loss allowance or the amount recognised at inception net of cumulative amortisation, whichever is higher. All other financial liabilities including loans and borrowings are measured at amortised cost using Effective Interest Rate (EIR) method.

B. A financial liability is derecognised when the related obligation expires or is discharged or cancelled.

1.1 **Fair value of financial instruments**
In determining the fair value of its financial instruments, the Company uses a variety of methods and assumptions that are based on market conditions and risks existing at each reporting date. The methods used to determine fair value include discounted cash flow analysis, available quoted market prices and dealer quotes. All methods of assessing fair value result in general approximation of value and such value may or may not be realized.

1.2 **Fair value measurement**
The Company measures certain financial instruments at fair value at each reporting date. Fair value is the price that would be received on sale of an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. The fair value measurement is based on the presumption that the transaction to sell the asset or transfer the liability takes place either:

a. In the principal market for the asset or liability, or
b. In the absence of principal market, in the most advantageous market for the asset or liability.

The fair value of an asset or a liability is measured using the assumptions that market participants would use when pricing the asset or liability, assuming that market participants act in their economic best interest. The Company uses valuation techniques that are appropriate in the circumstances and for which sufficient data are available to measure fair value, maximizing the use of relevant observable inputs and minimizing the use of unobservable inputs.

- **Inventories**

Inventories are valued after providing for obsolescence, as under:

a. Raw materials, components, construction materials, stores, spares and loose tools at lower of weighted average cost or net realisable value. However, these items are considered to be realisable at cost if the finished products in which they will be used, are expected to be sold at or above cost.

JEWAR TRANSMISSION LIMITED NEW DELHI
DARAPANENI & CO. Hyderabad

b. Manufacturing work-in-progress at lower of weighted average cost including related overheads or net realisable value. In some cases, manufacturing work-in-progress are valued at lower of specifically identifiable cost or net realisable value. In the case of qualifying assets, cost also includes applicable borrowing costs vide policy relating to borrowing costs.

c. Finished goods and stock-in-trade (in respect of goods acquired for trading) at lower of weighted average cost or net realisable value. Cost includes related overheads and excise duty paid/payable on such goods.

d. Completed property/work-in-progress (including land) in respect of property development activity at lower of specifically identifiable cost or net realisable value.

Assessment of net realisable value is made in each subsequent period and when the circumstances that previously caused inventories to be written-down below cost no longer exist or when there is clear evidence of an increase in net realisable value because of changed economic circumstances, the write-down, if any, in the past period is reversed to the extent of the original amount written-down so that the resultant carrying amount is the lower of the cost and the revised net realisable value.

- **Cash and bank balances**

Cash and bank balances also include fixed deposits, margin money deposits, earmarked balances with banks and other bank balances which have restrictions on repatriation. Short term and liquid investments being subject to more than insignificant risk of change in value, are not included as part of cash and cash equivalents.

- **Borrowing Costs**

Borrowing costs include interest expense calculated using the effective interest method, finance charges in respect of assets acquired on finance lease and exchange differences arising on foreign currency borrowings to the extent they are regarded as an adjustment to interest costs.

Borrowing costs net of any investment income from the temporary investment of related borrowings, that are attributable to the acquisition, construction or production of a qualifying asset are capitalised/inventoried as part of cost of such asset till such time the asset is ready for its intended use or sale. A qualifying asset is an asset that necessarily requires a substantial period of time to get ready for its intended use or sale. All other borrowing costs are recognised in profit or loss in the period in which they are incurred.

- **Securities premium account**

Securities premium includes the difference between the face value of the equity shares and the consideration received in respect of shares issued.

- **Foreign currencies**

i) The functional currency and presentation currency of the company is Indian Rupee.

ii) Transactions in currencies other than the company's functional currency are recorded on initial recognition using the exchange rate at the transaction date. At each Balance Sheet date, foreign currency monetary items are reported using the closing rate. Non-monetary items that are measured in terms of historical cost in foreign currency are not retranslated. Exchange differences that arise on settlement of monetary items or on reporting of monetary items at each Balance Sheet date at the closing spot rate are recognised in profit or loss in the period in which they arise except for:

a. exchange differences on foreign currency borrowings relating to assets under construction for future productive use, which are included in the cost of those assets when they are regarded as an adjustment to interest costs on those foreign currency borrowings; and

b. exchange differences on transactions entered into in order to hedge certain foreign currency risks.

JEWAR TRANSMISSION LIMITED NEW DELHI

DARAPANENI & CO. Hyderabad Chartered Accountants

iii) Financial statements of foreign operations whose functional currency is different than Indian Rupees are translated into Indian Rupees as follows:

A. assets and liabilities for each Balance Sheet presented are translated at the closing rate at the date of that Balance Sheet;

B. income and expenses for each income statement are translated at average exchange rates; and

C. all resulting exchange differences are recognised in Other Comprehensive Income and accumulated in equity as 'foreign currency translation reserve' for subsequent reclassification to Profit or Loss on disposal of such foreign operations.

- **Taxes on income**

Income tax expense represents sum of the tax currently payable and deferred tax

Current Tax

Current tax is the amount of tax payable on the taxable income for the year as determined in accordance with the applicable tax rates and the provisions of the Income Tax Act, 1961 and other applicable tax laws that have been enacted or substantively enacted by the end of the reporting period.

Deferred tax

Deferred tax is recognised on temporary differences between the carrying amounts of assets and liabilities in the financial statements and the corresponding tax bases used in the computation of taxable profit. Deferred tax liabilities are generally recognised for all taxable temporary differences. Deferred tax assets are generally recognised for all deductible temporary differences to the extent that it is probable that taxable profits will be available against which those deductible temporary differences can be utilized. Such deferred tax assets and liabilities are not recognised if the temporary differences arise from the initial recognition (other than in a business combination) of assets and liabilities in a transaction that In addition, deferred tax liabilities are not recognised if the temporary difference arises from the initial recognition of goodwill.

The carrying amount of deferred tax assets is reviewed at the end of each reporting period and reduced to the extent that it is no longer probable that sufficient taxable profits will be available to allow all or part of the asset to be recovered.
Deferred tax assets and liabilities are measured at the tax rates that are expected to apply in the period in which the liability is settled or the asset realized, based on tax rates (and tax laws) that have been enacted or substantively enacted by the end of the reporting period.

Current and deferred tax for the year

Current and deferred tax are recognised in profit or loss, except when they relate to items that are recognised in other comprehensive income or directly in equity, in which case, the current and deferred tax are also recognised in other comprehensive income or directly in equity respectively.

- **Interests in Joint operations**

The company as a joint operator recognises in relation to its interest in a joint operation, its share in the assets/liabilities held/ incurred jointly with the other parties of the joint arrangement. Revenue is recognised for its share of revenue from the sale of output by the joint venture. Expenses are recognised for its share of expenses incurred jointly with other parties as part of the joint arrangement.

Interests in joint operations are included in the segments to which they relate.

- **Provisions, contingent liabilities and contingent assets**

Provisions are recognised only when:

a. the company has a present obligation (legal or constructive) as a result of a past event;

JEMAR TRANSMISSION LIMITED NEW DELHI
DARAPANENI & Co Hyderabad Chartered Accountants

b. it is probable that an outflow of resources embodying economic benefits will be required to settle the obligation; and

c. a reliable estimate can be made of the amount of the obligation.

Provision is measured using the cash flows estimated to settle the present obligation and when the effect of time value of money is material, the carrying amount of the provision is the present value of those cash flows. Reimbursement expected in respect of expenditure required to settle a provision is recognised only when it is virtually certain that the reimbursement will be received.

Contingent liability is disclosed in case of:

a. a present obligation arising from past events, when it is not probable that an outflow of resources will be required to settle the obligation; and
b. a present obligation arising from past events, when no reliable estimate is possible.

Contingent assets are disclosed where an inflow of economic benefits is probable.

Provisions, contingent liabilities and contingent assets are reviewed at each Balance Sheet date.

Where the unavoidable costs of meeting the obligations under the contract exceed the economic benefits expected to be received under such contract, the present obligation under the contract is recognised and measured as a provision.

- **Commitments**

Commitments are future liabilities for contractual expenditure, classified and disclosed as follows:

a. estimated amount of contracts remaining to be executed on capital account and not provided for;
b. uncalled liability on shares and other investments partly paid;
c. funding related commitment to subsidiary, associate and joint venture companies; and
d. other non-cancellable commitments, if any, to the extent they are considered material and relevant in the opinion of management.

Other commitments related to sales/procurements made in the normal course of business are not disclosed to avoid excessive details.

- **Investments in Subsidiaries, Associates and Joint ventures**

On initial recognition, these investments are recognised at fair value plus any directly attributable transaction cost. Subsequently, they are measured at cost.

- **Statement of Cash Flows**

Statement of Cash Flows is prepared segregating the cash flows into operating, investing and financing activities based on the available information. Cash flow from operating activities is reported using indirect method, adjusting the net profit for the effects of:

i) changes during the period in inventories and operating receivables and payables transactions of a non-cash nature;
ii) non-cash items such as depreciation, provisions, deferred taxes, unrealised foreign currency gains and losses, and undistributed profits of associates; and
iii) all other items for which the cash effects are investing or financing cash flows.

Cash comprises cash on hand and demand deposits with banks.

Cash equivalents are short-term balances (with an original maturity of three months or less from the date of acquisition), highly liquid investments that are readily convertible into known amounts of cash and which are subject to insignificant risk of changes in value.

JEWAR TRANSMISSION LIMITED NEW DELHI

DARAPANENI & Co. Hyderabad Chartered Accountants

- **Earnings Per Share**

Basic earnings per equity share is computed by dividing the net profit for the year attributable to the Equity Shareholders by the weighted average number of equity shares outstanding during the year. Diluted earnings per share is computed by dividing the net profit for the year, adjusted for the effects of dilutive potential equity shares, attributable to the Equity Shareholders by the weighted average number of the equity shares and dilutive potential equity shares outstanding during the year except where the results are anti-dilutive.

- **Critical Accounting Judgements and key sources of estimation uncertainty**

Fair value measurements and valuation
In estimating the fair value of an asset or a liability, the Company uses market-observable data to the extent it is available. Where Level 1 inputs are not available, the Company engages third party / internal qualified valuers to perform the valuation. Finance team works closely with the qualified external / internal valuers to establish the appropriate valuation techniques and inputs to the model. The Chief Financial Officer reports the valuation committee's findings to the Board of Directors about the causes of fluctuations in the fair value of the assets and liabilities.

Provision for doubtful receivables and contract assets

In assessing the recoverability of the trade receivables and contracts assets, management's judgement involves consideration of aging status, evaluation of litigations and the likelihood of collection based on the terms of the contract.

Provision for employee benefits

The Company uses actuarial assumptions to determine the obligations for employee benefits at each reporting period . These assumptions include the discount rate, expected long-term rate of return on plan assets, rate of increase in compensation levels and mortality rates.

Provision for taxes

Significant judgements are required in determining the provision for income taxes, including the amount expected to be paid / recovered for uncertain tax positions. The company reviews the "MAT credit entitlement" asset at each reporting date and writes down the asset to the extent that it is no longer probable that it will pay normal tax during the specified period.

Indirect tax Litigations

The Company is subjected to VAT assessments in various states where projects were executed. Basing on applicable VAT rules of various states the Company estimated the VAT liability and provided in the book of accounts. The VAT assessments in different states are at different stages and on some of the assessment orders, the Company made appeals and they are at various tribunals and courts.

The preparation of financial statements in conformity with Ind AS requires that the management of the Company makes estimates and assumptions that affect the reported amounts of income and expenses of the period, the reported balances of assets and liabilities and the disclosures relating to contingent liabilities as of the date of the financial statements. The estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates include useful lives of property, plant and equipment & intangible assets, allowance for doubtful debts/advances, future obligations in respect of retirement benefit plans, expected cost of completion of contracts, provision for rectification costs, fair value measurement etc. Difference, if any, between the actual results and estimates is recognised in the period in which the results are known.

Recent pronouncements

On March 31, 2023, Ministry of Corporate Affairs amended the Companies (Indian Accounting Standards) Rules, 2015 by issuing the Companies (Indian Accounting Standards) Amendment Rules, 2023, which becomes effective from April 1, 2023. The gist of the amendments is as follows:

JEWAR TRANSMISSION LIMITED NEW DELHI
DARAPANENI & Co. Hyderabad Chartered Accountants

MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

- Ind AS 1, Presentation of Financial Statements - It is specified when the accounting policy information is material, and the requirement to disclose significant accounting policies is substituted with the disclosure of material accounting policy information.

- Ind AS 8, Accounting Policies, Changes in Accounting Estimates and Errors - The definition of "change in accounting estimate" is substituted with the definition of "accounting estimates". Accounting estimates are monetary amounts in financial statements that are subject to measurement uncertainty.

- Ind AS 12, Income Taxes – it is required to recognise deferred tax liability or asset for all temporary differences arising from initial recognition of an asset or liability in a transaction that gives rise to equal taxable and deductible temporary differences.

The above amendments will not have material impact on Company's Financial Statements.

DARAPANENI & CO. Hyderabad Chartered Accountants

JEWAR TRANSMISSION LIMITED NEW DELHI

MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

NOTES FORMING PART OF THE FINANCIAL STATEMENTS

Property, Plant & Equipment, ROU Assets and Intangible Assets

(₹ in crores)

Description	GROSS BLOCK				DEPRECIATION & AMORTISATION				NET BLOCK	
	As at April 01, 2022	Additions	Deletions / Adjustments	As at March 31, 2023	Up to March 31, 2022	during the period	Deletions/ Adjustments	Up to March 31, 2023	As at March 31, 2023	As at March 31, 2022
2.1 Property, Plant & Equipment										
Free hold land	127.72	18.21	-	145.93	-	-	-	-	145.93	127.72
Buildings	281.06	44.89	0.86	325.09	103.86	32.47	0.42	135.91	189.18	177.20
Plant and Equipment	3,697.88	533.57	881.09	3,350.36	1,177.34	256.19	350.39	1,083.14	2,267.22	2,520.54
Vehicles	915.54	203.84	21.59	1,097.79	338.13	109.00	5.22	441.91	655.88	577.41
Furniture and Fittings	81.44	13.92	1.07	94.29	30.43	7.60	0.28	37.75	56.54	51.01
Office Equipment	61.58	11.32	0.46	72.44	38.17	9.30	0.20	47.27	25.17	23.41
Data Processing Equipments	42.99	18.05	0.01	61.03	28.82	8.90	-	37.72	23.31	14.17
Fixtures in Leased Premises	0.14	-	0.14	-	0.14	-	0.14	-	-	-
Sheds in Leased Premises	1.92	-	1.92	-	1.92	-	1.92	-	-	-
Subtotal (i)	**5,210.27**	**843.80**	**907.14**	**5,146.93**	**1,718.81**	**423.46**	**358.57**	**1,783.70**	**3,363.23**	**3,491.46**
ROU ASSETS										
Land	2.95	-	-	2.95	1.71	0.47	-	2.18	0.77	1.24
Earth Moving Machinery	-	-	-	-	0.01	-	0.01	-	-	(0.01)
Heavy vehicles	-	-	-	-	0.01	-	0.01	-	-	(0.01)
Subtotal (ii)	**2.95**	**-**	**-**	**2.95**	**1.73**	**0.47**	**0.02**	**2.18**	**0.77**	**1.22**
Total (A) = (i) + (ii)	**5,213.22**	**843.80**	**907.14**	**5,149.88**	**1,720.54**	**423.93**	**358.59**	**1,785.88**	**3,364.00**	**3,492.68**
Previous year	4,023.66	1,256.92	67.36	5,213.22	1,403.67	359.39	42.52	1,720.54	3,492.68	2,619.99
2.2 Intangible Assets										
Software	21.26	2.77	-	24.03	14.73	3.47	-	18.20	5.83	6.53
Total (B)	**21.26**	**2.77**	**-**	**24.03**	**14.73**	**3.47**	**-**	**18.20**	**5.83**	**6.53**
Previous year	15.88	5.38	-	21.26	10.82	3.91	-	14.73	6.53	5.06
2.3 Capital work-in-progress										
Capital work-in-progress									211.30	145.50
Total (C)									**211.30**	**145.50**
Previous year									145.50	164.52

All title deeds of immovable property are in the name of the Company except ₹ 5.13 crore which are in the name of MEIL Green Power Ltd., a subsidiary Company of MEIL which was merged in to MEIL as on 01/04/2015 vide Honourable High court of AP and Telangana.

*No Impairment losses recognized during the year (March 31, 2021: Nil)

The Company has not revalued its property, plant and equipment (including right of use assets) and intangible assets during the current and previous year

meil

Title deeds of Immovable Properties not held in name of the Company

(₹ in crores)

Relevant line item in the Balance sheet	Description of item of property	Gross carrying value	Title deeds held in the name of	Whether title deed holder is a promoter, director or relative# of promoter*/director or employee of promoter/director	Property held since which date	Reason for not being held in the name of the company**
Property, Plant & Equipment	Land	5.13	MEIL Green Power Limited	No	01/04/2015	MEIL Green Power Ltd., a subsidiary Company of MEIL which was merged in to MEIL as on 01/04/2015 vide Honourable High court of AP and Telangana and the Company currently in the process of getting this Land Mutated.
	Building	-	-	-	-	-

Ageing schedule of Capital-Work-in Progress (CWIP)

(₹ in crores)

Particulars	Amount in CWIP for a period of				As at March 31, 2023	Amount in CWIP for a period of				As at March 31, 2022
	Less than 1 year	1-2 years	2-3 years	More than 3 years		Less than 1 year	1-2 years	2-3 years	More than 3 years	
Projects in progress	163.28	26.42	12.41	9.19	211.30	120.94	15.37	6.84	2.35	145.50
Projects temporarily suspended	-	-	-	-	-	-	-	-	-	-

During the current year and previous year, the Company did not have projects in Capital-Work-in Progress whose completion was overdue or projects whose cost had exceeded its cost as per its original plan.

Ageing schedule of Intangible asset under development (IAUD)

(₹ in crores)

Particulars	Amount in IAUD for a period of				As at March 31, 2023	Amount in IAUD for a period of				As at March 31, 2022
	Less than 1 year	1-2 years	2-3 years	More than 3 years		< 1 year	1-2 years	2-3 years	More than 3 years	
Projects in progress	(0.50)	5.64	2.23		7.37	5.64	2.23	-	-	7.87
Projects temporarily suspended	-	-	-	-	-	-	-	-	-	-

During the current year and previous year, the Company did not have projects in intangible assets under development whose completion was overdue or projects whose cost had exceeded its cost as per its original plan.





NOTES FORMING PART OF THE FINANCIAL STATEMENTS

(₹ in crores)

Particulars		As at March 31, 2023	As at March 31, 2022
3	**Investments - Non-current**		
	Investments measured at amortised cost		
	a) Investment in equity instruments		
	Subsidiaries		
	Unquoted investments - fully paid		
	MEIL Holdings Limited *	163.65	163.65
	16,36,54,120 Equity shares of ₹ 10 each fully paid up		
	MEIL Pura Limited	0.63	0.63
	6,33,894 Equity shares of ₹ 10 each fully paid up		
	MEIL Sai Rama Oil & Gas Private Limited	0.01	0.01
	10,000 Equity shares of ₹ 10 each fully paid up		
	TP Power Holdings Private Limited	113.38	113.38
	11,33,75,760 Equity shares of ₹ 10 each fully paid up		
	MEIL (Bhubaneswar) Bulk Water Project Private Limited	0.01	0.01
	7,400 Equity shares of ₹ 10 each fully paid up		
	MEIL Media Limited	0.53	0.53
	5,26,400 Equity shares of ₹ 10 each fully paid up		
	Meghavaram Power Private Limited	20.85	20.85
	2,08,53,452 Equity shares of ₹ 10 each fully paid up		
	Western U.P. Power Transmission Company Limited	10.34	10.34
	1,03,36,800 Equity shares of ₹ 10 each fully paid up		
	MEIL Aplus Engineering Private Limited	0.01	0.01
	9,500 Equity shares of ₹ 10 each fully paid up		
	MEIL International FZE	0.34	0.34
	100 Shares of AED 1850 each fully paid up		
	MEIL Advanced Technologies Private Limited	0.10	0.10
	100,000 Equity shares of ₹ 10 each fully paid up		
	MEIL Foundation	0.05	0.05
	49,980 Equity shares of ₹ 10 each fully paid up		
	MEIL Global Holdings	40.90	40.90
	50,00,100 Equity shares of 1 Euro each fully paid up		
	MEIL EV Trans Limited	0.10	0.10
	100,000 Equity shares of ₹ 10 each fully paid up		
	MEIL Investments (India) Limited	2.10	2.10
	21,00,000 Equity shares of ₹ 10 each fully paid up		
	MEIL Vijayawada By Pass Roadways Private Limited	0.01	0.01
	7,400 Equity shares of ₹ 10 each fully paid up		
	MEIL Neeleshwaram Roadways Private Limited	0.01	0.01
	10,000 Equity shares of ₹ 10 each fully paid up		
	MEIL Chengala Roadways Private Limited	0.01	0.01
	10,000 Equity shares of ₹ 10 each fully paid up		
	MEIL Renigunta Roadways Private Limited	0.01	0.01
	10,000 Equity shares of ₹ 10 each fully paid up		
	MEIL-ICOMM-TONBO Tech Private Limited	0.00	0.00
	4,800 Equity shares of ₹ 10 each fully paid up		
	Jetpur Industrial pipeline project Private Limited	0.01	0.01
	8,500 Equity shares of ₹ 10 each fully paid up		
	MEIL Balsua-Hiranagar Expressway Private Limited	0.05	0.05
	50,000 Equity shares of ₹ 10 each fully paid up		
	MEIL Amas Shivrampur Roadways Private Limited	0.01	-
	10,000 Equity shares of ₹ 10 each fully paid up		
	MEIL Appa Junction Manneguda Roadways Private Limited	0.01	-
	10,000 Equity shares of ₹ 10 each fully paid up		
	MEIL Gadwal Julekal Roadways Private Limited	0.01	-
	10,000 Equity shares of ₹ 10 each fully paid up		

JEWAR TRANSMISSION LIMITED NEW DELHI

DARAPANENI & CO. Hyderabad Chartered Accountants

(₹ in crores)

Particulars	As at March 31, 2023	As at March 31, 2022
MEIL Ghoman To Tanda Roadways Private Limited 10,000 Equity shares of ₹ 10 each fully paid up	0.01	-
MEIL Julekal Roadways Private Limited 10,000 Equity shares of ₹ 10 each fully paid up	0.01	-
MEIL Kalyanpur Roadways Private Limited 10,000 Equity shares of ₹ 10 each fully paid up	0.01	-
MEIL Kolhapur Roadways Private Limited 10,000 Equity shares of ₹ 10 each fully paid up	0.01	-
MEIL Pileru Kalur Roadways Private Limited 10,000 Equity shares of ₹ 10 each fully paid up	0.01	-
MEIL Ramnagar Four Lane Roadways Private Limited 10,000 Equity shares of ₹ 10 each fully paid up	0.01	-
MEIL Tejajinagar Balwara Roadways Private Limited 10,000 Equity shares of ₹ 10 each fully paid up	0.01	-
MEIL Anpara Power Private Limited 10,000 Equity shares of ₹ 10 each fully paid up	0.01	-
MEIL Energy Private Limited 10,000 Equity shares of ₹ 10 each fully paid up	0.01	-
MEIL Hydrogena Private Limited 10,000 Equity shares of ₹ 10 each fully paid up	0.01	-
MEIL Ananthapur Roadways Private Limited 10,000 Equity shares of ₹ 10 each fully paid up	0.01	-
MEIL Pharma Private Limited 10,000 Equity shares of ₹ 10 each fully paid up	0.01	-
MEIL Siwan Mashrakh Roadways Private Limited 10,000 Equity shares of ₹ 10 each fully paid up	0.01	-
Megha City Gas Distribution Private Limited 150,000 Equity shares of ₹ 10 each fully paid up	0.15	-
MEIL International LLC 10,000 Equity shares of MNT 34460 each fully paid up equals to USD 1,00,000	0.83	-
Khandukhal Rampura Transmission Limited 10,000 Equity shares of ₹ 10 each fully paid up	0.01	-
MP Power Transmission Package-I Limited 50,000 Equity shares of ₹ 10 each fully paid up	0.05	-
Associate		
Unquoted investments - fully paid		
Megha Fibre Glass Industries Limited 6,00,000 Equity shares of ₹ 10 each fully paid up	0.60	0.60
Others		
Unquoted investments - fully paid		
Gomti Power Infrastructure Private Limited 114 Equity shares of ₹ 10 each fully paid up	0.00	0.00
Total Investment in Equity instruments (a)	**354.90**	**353.70**
b) Investment in Preference shares		
Subsidiaries		
Unquoted investments - fully paid		
Western UP Power Transmission Company Limited 0.01% 7,20,91,650 Cum. Redeemable Preference shares of ₹ 100 each	720.92	720.92
Others		
Unquoted investments - fully paid		
HKR Roadways Limited 0.01% 12,50,141 Cumm. Redeemable Preference shares of ₹1000 each	-	125.01
Total Investment in Preference Shares (b)	**720.92**	**845.93**

JEWAR TRANSMISSION LIMITED NEW DELHI

DARAPANENI & CO Hyderabad Chartered Accountants

NOTES FORMING PART OF THE FINANCIAL STATEMENTS

(₹ in crores)

Particulars		As at March 31, 2023	As at March 31, 2022
	c) Investment in Debentures		
	Subsidiaries		
	Unquoted investments - fully paid		
	TP Power Holdings Private Limited		
	0.01% 15,55,725 Unsecured Compulsory convertible debentures of ₹ 1000 each	155.57	155.57
	0.01% 1,11,19,552 (previous year:39,70,802)Unsecured optionally convertible debentures of ₹ 1000 each	1,111.96	397.08
	MEIL Holdings Limited		
	0.01% 1,17,62,200 Unsecured Compulsorily Convertible debentures of ₹ 1000 each	1,176.22	1,176.22
	MEIL (Bhubaneswar) Bulk Water Project Private Limited		
	0.01% 9,77,020 Unsecured Compulsorily Convertible debentures of ₹ 1000 each	97.70	97.70
	MEIL Advanced Technologies Private Limited		
	0.01% 1,000 Unsecured Optionally convertible debentures of ₹ 100,000 each	10.00	-
	Others		
	Unquoted investments - fully paid		
	Pegasus Ventures Private Limited	231.60	231.60
	0% 23,16,000 Unsecured Optionally convertible debentures of ₹ 1000 each		
	Total Investment in Debentures (c)	**2,783.05**	**2,058.17**
	Total Non Current investments (a+b+c)	**3,858.87**	**3,257.80**
	*Pledge of 50% (8,18,27,060 nos) of equity shares with SBICAP Trustee Company Ltd for availing the working capital loans.		
4	**Loans - Non current**		
	Inter corporate deposits		
	Subsidiaries	3,451.81	2,712.00
	Total	**3,451.81**	**2,712.00**

4.1 Details of loans granted to related parties

Subsidiaries	As at March 31, 2023		As at March 31, 2022	
	Amount of outstanding loan	% of Total Loan	Amount of outstanding loan	% of Total Loan
	3,451.81	100	2,712.00	100

The Company has provided financial support to its Subsidiaries by way of loans for their operational needs. Hence, these loans are not considered to be prejudicial to the Company's interest.

5	**Other financial assets - Non current**		
	Receivables under Service Concession Arrangements	571.23	722.54
	Security and other Deposits	513.44	355.12
	In deposit accounts with banks remaining maturity for more than 12 months*	206.89	189.29
	Total	**1,291.56**	**1,266.95**
	* Held as margin money against bank guarantees and other deposits		
6	**Other Non current assets**		
	(Unsecured, Considered good)		
	Capital advances	360.98	388.34
	Retention money receivable	203.35	795.66
	Total	**564.33**	**1,184.00**
7	**Inventories**		
	Inventories (lower of cost or realisable value)		
	(a) Raw materials *	1,688.66	1,163.54
	(b) Work-in-progress	595.69	81.21
	(c) Finished goods	156.26	12.45
	Total	**2,440.61**	**1,257.20**
	* Includes Goods in transit of ₹ 411.59 (Previous year : ₹ 181.89)		

JEWAR TRANSMISSION LIMITED NEW DELHI

DARAPANENI & CO Hyderabad Chartered Accountants

NOTES FORMING PART OF THE FINANCIAL STATEMENTS

(₹ in crores)

	Particulars	As at March 31, 2023	As at March 31, 2022
8	**Investments - Current**		
	Investments measured at Fair Value through Profit and Loss account (FVTPL)		
	Investment in Mutual Funds		
	Quoted		
	Baroda Large and Mid Cap Fund - Regular Growth (19,99,890 units, NAV Value - 16.512)	3.20	3.31
	Union Multicap Fund Regular Plan - Growth ** (9,22,783.08 units, NAV Value - 9.38)	0.87	-
	Union Corporate Bond Fund Regular - Growth ** (1,67,50,204.01 units, NAV Value - 12.8829)	21.58	16.39
	Total aggregate Quoted Investments	**25.65**	**19.70**
	Aggregate cost of Quoted Investments	23.55	18.15
	Aggregate market value of Quoted Investments	25.65	19.70
	** This investment is held as margin money with banks		
9	**Trade receivables**		
	Trade receivables (Considered good,Unsecured)	5,345.22	4,791.24
	Less: Expected credit loss	18.37	-
	Total	**5,326.85**	**4,791.24**
9.1	**Trade Receivables ageing schedule**		

(a) Trade Receivables ageing schedule for the year ended March 31, 2023

Particulars	Less than 6 months	6 months - 1 year	1-2 years	2-3 years	More than 3 years	Total
Undisputed Trade receivables – considered good	3,647.44	1,192.16	255.67	244.61	5.34	5,345.22

(b) Trade Receivables ageing schedule for the year ended March 31, 2022

Particulars	Less than 6 months	6 months - 1 year	1-2 years	2-3 years	More than 3 years	Total
Undisputed Trade receivables – considered good	3,358.24	601.45	826.21	5.34	-	4,791.24

i The Company has no undisputed trade receivables which have significant increase in credit risk and credit impaired.

ii The Company does not have any disputed trade receivables.

Movement in the Expected credit loss

Particulars	As at March 31, 2023	As at March 31, 2022
Balance at the beginning of the year	-	-
Add: Expected credit loss during the year on Trade receivables	18.37	
Less: Utilisation during the year	-	-
Balance at the end of the year	18.37	-

10.1	**Cash and cash equivalents**		
	(i) Cash on hand	18.45	17.87
	(ii) Cheques on hand	0.51	0.04
	(iii) Balances with Banks		
	- In current accounts	551.88	907.46
	- In EEFC accounts	0.61	2.06
	(iv) Deposits with maturity less than 3 months (refer note 10.1.1 below)	1,047.90	2,290.25
	Total	**1,619.35**	**3,217.68**
10.1.1	**Note :** Deposits with maturity less than 3 months includes ₹ 1,023.92 held as margin money against bank guarantees, Letter of credit and other deposits		

JEMAR TRANSMISSION LIMITED NEW DELHI

DARAPANENI & CO. Hyderabad Chartered Accountants

NOTES FORMING PART OF THE FINANCIAL STATEMENTS

(₹ in crores)

	Particulars	As at March 31, 2023	As at March 31, 2022
10.2	**Bank balances other than above**		
	Deposits with maturity of more than 3 months and less than 12 months (refer note 10.2.1 below)	981.03	2,342.41
	Total	**981.03**	**2,342.41**
	Note :		
10.2.1	Deposits with maturity more than 3 months and less than 12 months held as margin money against bank guarantees, Letter of credit and other deposits		
11	**Loans - current**		
	Inter corporate deposits		
	Subsidiaries	3,802.30	2,634.28
	Others	18.61	77.34
	Loans to employees	26.16	8.52
	Total	**3,847.07**	**2,720.14**

11.1 **Details of loans granted to related parties**

Subsidiaries	As at March 31, 2023		As at March 31, 2022	
	Amount of outstanding loan	% of Total Loan	Amount of outstanding loan	% of Total Loan
	3,802.30	100	2,634.28	97

The Company has provided financial support to its Subsidiaries by way of loans for their operational needs. Hence, these loans are not considered to be prejudicial to the Company's interest.

12	**Other financial assets - Current**		
	Unbilled revenue *	1,366.44	1,028.62
	Interest accruals	362.87	158.44
	Security deposits	66.80	50.20
	Other receivables		
	-Related parties	55.16	22.28
	-Others	8.41	0.10
	Total	**1,859.68**	**1,259.64**
	* There is no disputed unbilled revenue during the current year and previous year		
13	**Other current assets**		
	(Unsecured and considered good)		
	(a) Advances to suppliers & subcontractors		
	- Subsidiaries & Associate	94.96	163.60
	- Others	2,880.64	2,008.89
	(b) Prepaid expenses	198.14	172.08
	(c) Balances with government authorities		
	- GST credit receivable	572.29	782.88
	- Sales Tax / Service Tax credit receivable	67.55	61.52
	- Mat credit entitlement	55.71	55.71
	(d) Mobilisation advances	36.83	41.16
	(e) Retention money receivable	2,440.51	1,759.80
	(f) Others	55.16	51.16
	Total	**6,401.79**	**5,096.80**

DARAPANENI & CO. Hyderabad Chartered Accountants

JEWAR TRANSMISSION LIMITED NEW DELHI

NOTES FORMING PART OF THE FINANCIAL STATEMENTS

14 Share capital

Particulars	As at March 31, 2023		As at March 31, 2022	
	Number of shares	₹ in crores	Number of shares	₹ in crores
(a) Authorised equity shares of ₹10 each	150,00,00,000	1,500.00	32,50,00,000	325.00
(b) Issued, Subscribed and fully Paid up Equity shares of ₹10 each	15,60,10,000	156.01	15,60,10,000	156.01
Total	**15,60,10,000**	**156.01**	**15,60,10,000**	**156.01**

14.1 Reconciliation of the shares outstanding at the beginning and at the end of the reporting period

Particulars	As at March 31, 2023		As at March 31, 2022	
	No.of Shares	₹ in crores	No.of Shares	₹ in crores
Shares Outstanding at the beginning of the year	15,60,10,000	156.01	15,00,10,000	150.01
Add: Shares Issued during the Year	-	-	60,00,000	6.00
Shares Outstanding at the end of the year	**15,60,10,000**	**156.01**	**15,60,10,000**	**156.01**

14.2 Terms/rights attached to equity shares

The company has only one class of equity share having par value of ₹ 10 per share. Each holder of equity share is entitled to one vote per share. The company declares and pays dividend in Indian Rupees. The dividend proposed by the Board of Directors is subject to the approval of the shareholders in the ensuing Annual General Meeting.

14.3 Details of shareholders holding more than 5% equity shares in the company

Name of Shareholder	As at March 31, 2023		As at March 31, 2022	
	Number of shares held	% holding	Number of shares held	% holding
P.V.Krishna Reddy	7,94,70,000	50.94	7,94,70,000	50.94
P.P.Reddy	7,64,83,875	49.02	7,64,83,875	49.02

14.4 Details of Equity shares held by promoters at the end of the year

Promoter Name	Number of shares	% of total shares	% Change during the year
P.V.Krishna Reddy	79,470,000	50.94	0.00
P.P.Reddy	76,483,875	49.02	0.00

14.5 There are no shares reserved for issue under Options.

DARAPANENI & CO. Hyderabad Chartered Accountants

JEWAR TRANSMISSION LIMITED NEW DELHI

NOTES FORMING PART OF THE FINANCIAL STATEMENTS

(₹ in crores)

Particulars		As at March 31, 2023	As at March 31, 2022
15	**Other Equity**		
15.1	**Capital reserve**		
	Balance at the beginning of the year	194.16	194.16
	Movement during the year	-	-
	Balance at the end of the year **Subtotal**	**194.16**	**194.16**
15.2	**General reserve**		
	Balance at the beginning of the year	625.00	575.00
	Movement during the year	50.00	50.00
	Balance at the end of the year **Subtotal**	**675.00**	**625.00**
	General Reserve represents transfers from retained earnings and is proposed to be used for appropriation purposes. As the general reserve is created by a transfer from one component of equity to another and is not an item of other comprehensive income, items included in the general reserve will not be reclassified subsequently to profit or loss.		
15.3	**Securities premium**		
	Balance at the beginning of the year	0.05	0.05
	Movement during the year		
	Balance at the end of the year **Subtotal**	**0.05**	**0.05**
	Securities Premium is used to record the premium on issue of shares. The reserve is utilized in accordance with the provisions of the Act.		
15.4	**Retained earnings**		
	Balance at the beginning of the year	17,966.77	15,015.68
	Add: Profit for the year	2,332.83	3,016.09
		20,299.60	**18,031.77**
	Less:		
	Transfer to General reserve	50.00	50.00
	Dividend paid for the previous year	15.60	15.00
		65.60	**65.00**
	Balance at the end of the year **Subtotal**	**20,234.00**	**17,966.77**
15.5	**Other Comprehensive Income (OCI)**		
	Re-measurements of defined benefit obligations	0.41	1.96
	Movement during the year	3.10	(1.55)
	Balance at the end of the year **Subtotal**	**3.51**	**0.41**
	Balance at the end of the year **Total**	**21,106.72**	**18,786.39**
16	**Borrowings - Non current**		
	From banks - Secured		
	Term loans	6.05	12.73
	Total	**6.05**	**12.73**
	Term loans are secured by hypothecation of Equipments purchased. These loans are repayable in 47 monthly installments. These loans carries an interest rate of 7.90% p.a.		
17	**Lease liabilities - Non current**		
	Lease liability (refer note : 38)	0.39	0.98
	Total	**0.39**	**0.98**

DARAPANENI & CO. Hyderabad Chartered Accountants

JEMAR TRANSMISSION LIMITED NEW DELHI

MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

meil

NOTES FORMING PART OF THE FINANCIAL STATEMENTS

(₹ in crores)

	Particulars	As at March 31, 2023	As at March 31, 2022
18	**Other financial liabilities - Non-current**		
	Retention money payable	746.37	982.39
	Other payables	461.46	461.46
		1,207.83	**1,443.85**
19	**Other non current liabilities**		
	Mobilisation advance	419.15	369.22
	Total	**419.15**	**369.22**
20	**Provisions - Non current**		
	Gratuity (refer note : 39)	23.00	30.96
	Leave encashment	7.42	15.21
	Total	**30.42**	**46.17**
21	**Deferred tax liabilities (net)**		
	Deferred Tax Liability		
	On account of property, plant and equipment	136.79	113.44
	Others	1.04	-
		137.83	**113.44**
	Deferred tax asset		
	On disallowances under Income tax Act	14.96	12.06
	Others	-	0.52
	Total	**122.87**	**100.86**
22	**Borrowings - Current**		
	Secured - at amortised cost		
	a) From Banks		
	- Cash credit facilities (refer note no. 22.1 below)	261.78	94.54
	- Working capital demand loans (refer note no. 22.1 below)	-	130.94
	- Loan against fixed deposits	14.00	93.74
	b) Current maturities of long term debt	6.68	6.17
	Total	**282.46**	**325.39**

22.1 Cash credit facilities and Working capital demand loans from banks are secured by

(a) First Charge by way of hypothecation of the company's entire Stocks of Raw Materials, Semi-finished and Finished goods, consumables stores and spares and such other movables including Book debts, bills whether documentary or clean, outstanding monies, receivables, and other Current Assets of the company both present and future ranking pari passu for all the bankers.

(b) Hypothecation/First Charge on all unencumbered Fixed assets of the company both present and future

(c) Equitable Mortgage of Land & Buildings in the name of the company

(d) Counter Guarantee of the Company, Personal guarantee of its directors and extension of First Charge on the Current assets

DARAPANENI & CO. Hyderabad Chartered Accountants

JEMAR TRANSMISSION LIMITED NEW DELHI

NOTES FORMING PART OF THE FINANCIAL STATEMENTS

(₹ in crores)

	Particulars	As at March 31, 2023	As at March 31, 2022
23	**Trade Payables**		
	Trade Payables		
	a) total outstanding dues to micro and small enterprises (refer note 49 & (i) below)	28.44	16.95
	b) total outstanding dues other than (a) above	5,490.44	4,788.51
	Total	**5,518.88**	**4,805.46**

Note :

i) The information has been given in respect of such vendors to the extent they could be identified as Micro and small enterprises on the basis of information given by respective vendors or available with the company on records.

23.1 **Trade Payables ageing schedule for the year ended March 31, 2023**

Particulars	Outstanding for the following periods from accounting date				
	Less than 1 year	1-2 years	2-3 years	More than 3 years	Total
(i) Micro and small enterprises	28.44	-	-	-	28.44
(ii) Others	4,878.25	206.56	97.46	308.17	5,490.44

23.2 **Trade Payables ageing schedule for the year ended March 31, 2022**

Particulars	Outstanding for the following periods from accounting date				
	Less than 1 year	1-2 years	2-3 years	More than 3 years	Total
(i) Micro and small enterprises	16.95	-	-	-	16.95
(ii) Others	4,216.95	169.69	166.32	235.55	4,788.51

23.3 The Company does not have any disputed trade payables.

24	**Lease liabilities - Current**		
	Current lease liability (refer note : 38)	0.59	0.51
	Total	**0.59**	**0.51**
25	**Other financial liabilities -Current**		
	Retention money payable	926.07	661.92
	Interest accrued	31.95	40.81
	Payable on purchase of property, plant and equipment	15.77	23.32
	Other payables	481.79	306.46
	Total	**1,455.58**	**1,032.51**
26	**Other current liabilities**		
	Advance from customers including Mobilisation advances	3,288.06	4,795.38
	Statutory dues	349.41	104.64
	Other payables	965.98	600.39
	Total	**4,603.45**	**5,500.41**
27	**Provisions**		
	Provision for employee benefits:		
	Gratuity	5.58	0.96
	Leave encashment	5.08	0.35
	Provision- others:		
	- Provision for Taxes	336.04	196.34
	Total	**346.70**	**197.65**

DARAPANENI & CO. Hyderabad Chartered Accountants

JEMAR TRANSMISSION LIMITED NEW DELHI

MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

meil

NOTES FORMING PART OF THE FINANCIAL STATEMENTS

(₹ in crores)

	Particulars	Year ended March 31, 2023	Year ended March 31, 2022
28	**Revenue from operations**		
	Income from EPC contracts	24,563.25	24,052.57
	Income from sale of products	704.48	1,973.47
	Income from sale of power	35.27	34.38
	Other operating revenue	534.68	768.38
	Total	**25,837.68**	**26,828.80**
29	**Other income**		
	a) Interest income from financial assets carried at amortised cost		
	On bank deposits	138.13	131.64
	Other financial assets	390.12	296.39
	b) Other Non operating income (Net of expenses directly attributable to income)		
	Income on Mutual Funds	0.56	0.99
	Net foreign exchange gains	154.35	6.51
	Profit on sale of assets	-	0.21
	Miscellaneous Income	18.54	33.33
	Total	**701.70**	**469.07**
30	**Cost of material consumed**		
	Opening stock	981.65	628.64
	Add: Purchases	13,060.69	12,348.33
	Less: Closing stock	1,277.07	981.65
	Total	**12,765.27**	**11,995.32**
31	**Change in inventories**		
	Inventories at the end of the year		
	Work-in-progress	595.69	81.21
	Finished goods	156.26	12.45
	Total (B)	751.95	93.66
	Inventories at the beginning of the year		
	Work-in-progress	81.21	57.69
	Finished goods	12.45	7.33
	Total (A)	93.66	65.02
	Net Increase (A)-(B)	**(658.29)**	**(28.64)**
32	**Contract execution expenses**		
	Machinery and Equipments Hire Charges	385.05	365.66
	Power and Fuel	1,136.91	1,118.50
	Rent	66.17	44.40
	Rates & taxes	264.75	240.80
	Insurance	83.81	56.15
	Repairs and Maintenance		
	Plant and Machinery	210.34	200.30
	Others	178.79	164.03
	Freight and Transportation	60.22	115.52
	Site and Work Expenses	623.38	499.94
	Testing, Consultancy & other Charges	620.63	456.04
	Contractee recoveries, claims & deductions	32.31	410.43
	Total	**3,662.36**	**3,671.77**

DARAPANENI & CO. Hyderabad Chartered Accountants

JEWAR TRANSMISSION LIMITED NEW DELHI

MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

meil

NOTES FORMING PART OF THE FINANCIAL STATEMENTS

(₹ in crores)

	Particulars	Year ended March 31, 2023	Year ended March 31, 2022
33	**Employee benefits expense**		
	Salaries and wages	1,006.68	1,002.69
	Contribution to provident fund and other funds	23.44	27.23
	Staff welfare expenses	190.13	154.00
	Total	**1,220.25**	**1,183.92**
34	**Finance cost**		
	Interest	91.97	81.81
	Other borrowing cost	238.07	194.32
	Total	**330.04**	**276.13**
35	**Other expenses**		
	Rent	5.34	4.04
	Rates and taxes	6.48	4.43
	Insurance	2.72	6.96
	Office maintenance	44.50	49.58
	Communication expenses	7.66	7.21
	Travelling and Conveyance	165.27	126.44
	Printing and stationery	10.95	9.09
	Legal and professional expenses	16.88	18.46
	Donations *	293.26	274.71
	Security charges	88.39	70.97
	Auditors' remuneration		
	Statutory audit	1.75	1.75
	Tax audit	0.50	-
	Other services	0.45	-
	Advertisement expenses	51.95	46.85
	Motor vehicle expenses	4.36	17.68
	Loss on sale of shares and assets	41.13	-
	Expected credit loss	18.37	-
	Business development expenses	32.52	26.92
	Bank charges	26.63	18.97
	Advances written off (refer note : 58)	7.95	638.97
	Corporate social responsibility expenses (refer note : 45)	65.55	72.73
	Miscellaneous expenses	65.00	35.64
	Total	**957.61**	**1,431.40**

* includes Electoral bonds of ₹ 280 crores , (Previous year ₹ 248 crores)

DARAPANENI & CO. Hyderabad Chartered Accountants

JEWAR TRANSMISSION LIMITED NEW DELHI

MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

NOTES FORMING PART OF THE FINANCIAL STATEMENTS

36 i) **Contingent Liabilities and Commitments not provided for**

(₹ in crores)

Particulars	As at March 31, 2023	As at March 31, 2022
(A) Contingent Liability		
(a) Customs duty/Sales tax/Income tax		
Customs duty		
Disputed Customs duty liability for which the company has filed an appeal with CESTAT and stay has been granted by Hon'ble CESTAT.	-	0.25
Sales tax		
Disputed VAT/CST liability for which the company has filed an appeal.	48.11	48.11
(b) Impact of pending legal suits in various courts:		
The Company is a party to several legal suits pending before various courts and arbitrators in India. It is not possible to make a fair assessment of liability until the cases are decided by the appropriate authorities. The company has carefully examined the suits pending, and it is of the view that even in case of unfavorable judgments, the total amount of pending litigations against the company is not significantly material and its impact does not affect the financial statement.		
(c) Guarantees		
Performance bank guarantees (PBG) given on behalf of the company/Joint ventures/consortiums and others etc.	8,470.10	7,028.69
(B) Commitments		
(a) Estimated amount of contracts remaining to be executed on capital account.	50.30	83.45
(b) Funding committed by way of equity/debentures/loans.	5,361.00	2,017.00
(c) Sponsor shortfall undertaking (SSU)	678.07	-

(ii) A search and survey was conducted by the competent authorities under section 132(1) and 133A of the Income Tax Act, 1961 ('the Act') at premises of the company and certain group companies in the previous year ended 31 March 2020. Pursuant to search /survey, the Assessing Officer has issued notices under relevant section of the Act to the company for some of the earlier financial years. Consequently in order to avoid protracted tax litigation, the Company has filed application under Section 245C(1) of the Act before Hon'ble interim board for Settlement .The Company has deposited the taxes including interest for the A.Y. 2014-15 to A.Y.2020-21 towards the proposed settlement which has been shown as a part of Income Tax in the F.Y 2020-21 as expenses under the head "Tax Expense" in the books of accounts. The matter is now pending before the Hon'ble IBS for final determination of tax. However, the Company does not envisage any material impact on its financial statements.

JEWAR TRANSMISSION LTD NEW DELHI

DARAPANENI & CO Hyderabad Chartered Accountants

37 During the year, the Company has entered a Business transfer agreement (BTA) with Megha City Gas Distribution Private Limited, a wholly owned subsidiary of MEIL for transfer of City Gas Distribution (CGD) business on Slump sale basis with effective date as on 01.09.2022 for a lump sum consideration of ₹ 614.93 Crores, the following assets and liabilities are transferred against the BTA agreement.

Particulars	(₹ in crores)
Assets	
Property, plant & Equipment	547.25
Capital work in progress	65.79
Trade Receivables	24.20
Other financial assets	2.20
Other current assets	0.08
Total Assets (A)	**639.51**
Liabilities	
Trade Payables	24.58
Total Liabilities (B)	**24.58**
Consideration Payable (A)-(B)	**614.93**

38 **Ind AS 116 'Leases'**

(₹ in crores)

Particulars	FY 2022-23	FY 2021-22
Lease Liability-Non current	0.39	0.98
Lease Liability- Current	0.59	0.51
Finance cost on Lease liability	0.12	3.50
Depreciation charge on ROU asset	0.47	19.94
Total Cash outflow for leases	0.78	19.19

Amounts recognized as expense in the Statement of Profit or loss during the year is towards Short-term leases and Low value leases amounts to ₹ 71.51 Crores (Previous year ₹ 48.44 Crores).

39 **Employee Benefits**

Disclosure pursuant to Ind AS 19 "Employee Benefits":

(i) Defined Contribution plans: Employers contribution to Provident fund: Amount of ₹ 15.75 crores (previous year: ₹ 17.30 crores) is recognised as an expense.

(ii) Defined Benefit plans: The amounts recognised in Balance Sheet are as follows:

Reconciliation of opening and closing balances of Obligation **(₹ in crores)**

Particulars	2022-23	2021-22
Present value of Obligation at beginning of the year	32.04	22.37
Interest Cost	2.16	1.41
Current service cost	6.55	5.41
Benefits paid (if any)	(3.66)	(3.15)
Actuarial (gain)/loss	(7.94)	5.99
Present value of the obligation at the end of the period	29.14	32.04

JEWAR TRANSMISSION LIMITED NEW DELHI

DARAPANENI & CO Hyderabad Chartered Accountants

MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

Reconciliation of opening and closing balances of fair value of Plan Assets

(₹ in crores)

Particulars	2022-23	2021-22
Fair value of plan assets at the beginning of the period	0.15	1.28
Expected return on plan assets(net)	0.02	-
Employer's Contribution	4.00	1.96
Benefits paid	(3.66)	(3.15)
Expenses/Others	-	0.03
Fair value of plan assets at the year end	0.56	0.12

Expenses recognised during the year

(₹ in crores)

Particulars	2022-23	2021-22
In Income Statement		
Interest cost (Net of investment income)	2.16	1.41
Current service cost	6.55	5.41
Expected return on plan asset	-	-
Net actuarial (gain)/loss recognized in the period	-	-
Expenses to be recognized in the statement of profit and loss accounts	8.69	6.84
In Other Comprehensive Income (OCI)		
Actuarial (Gain)/ Loss	(7.95)	5.99
Return on plan Assets	(0.07)	(0.06)
Re-measurement (gain)/loss arising because of change in effect of asset ceiling/expenses	-	-
Net (Income)/Expense for the year recognized in OCI	(8.02)	5.94

Reconciliation of fair value of assets and obligation

(₹ in crores)

Particulars	2022-23	2021-22
Present value of the obligation at the end of the period	29.14	32.04
Fair value of plan assets at end of period	0.56	0.12
Net liability/(asset) recognized in Balance Sheet and related analysis	28.58	31.92

Actuarial assumptions

Mortality Table	2022-23	2021-22
Discount Rate	7.38%	7.16%
Salary growth rate	4.00%	4.00%
Mortality (% of IALM 06-08)	100%	100%
Withdrawal rate (per annum)	Up to 3.00%	Up to 3.00%

a. The liability on account of gratuity is covered partially through a recognized Gratuity Fund managed by Life Insurance Corporation of India (LIC) and balance is provided on the basis of valuation of the liability by an independent actuary as at the year end.

b. The estimates of future salary increase, considered in actuarial valuation, take into account inflation, seniority, promotion and other relevant factors, such as supply and demand in the employment market. The above information is certified by the actuary.

DARAPANENI & CO. Hyderabad Chartered Accountants

JEWARTRANSMISSION LIMITED

c. **Sensitivity Analysis** **(₹ in crores)**

Particulars	As at March 31, 2023		As at March 31, 2022	
	Decrease	Increase	Decrease	Increase
Change in discounting rate (delta effect of +/- 1%)	32.14	26.63	35.49	(29.11)
(% change compared to base)	(10.30)%	8.60%	10.77%	(9.13)%
Change in rate of salary increase (delta effect of +/- 1%)	25.24	33.93	(26.27)	39.29
(% change compared to base)	13.40%	(16.50)%	(18.01)%	22.63%
Change in Attrition rate (delta effect of +/- 1%)	27.43	30.79	(28.47)	35.27
(% change compared to base)	5.90%	(5.70)%	(11.13)%	10.09%
Change in Mortality rate (delta effect of +/- 1%)	28.82	29.51	(31.96)	32.11
(% change compared to base)	1.10%	(1.30)%	(0.23)%	0.23%

40 Related Party disclosure

Disclosure of related parties/related party transactions pursuant to Ind AS 24 "Related Party Disclosures":

a. List of related parties over which control exist and status of transactions entered during the year:

a. **Key Management Personnel**

Name	Designation
P.P.Reddy	Executive Chairman
P.V.Krishna Reddy	Managing Director
N.Thirupathi Rao	Whole-time Director & CFO
P.Doraiah	Whole-time Director
B.Srinivas Reddy	Whole-time Director
Ch.P.Subbaiah	Whole-time Director
N.Chandra Kala	Company Secretary

b. Relatives of Key Management Personnel & their relationship

Name of the Relative	Nature of Relationship
P.Rama	Director and wife of P.P.Reddy
P.Sudharani	Director and wife of P.V.Krishna Reddy
P.V.Subba Reddy	Brother of P.V.Krishna Reddy
Prem Kumar Pandey	Son-in-Law of P.P.Reddy and P.Rama
N.Akhilesh Reddy	Son-in-Law of P.P.Reddy and P.Rama
P.Venkatesh	Son of P.Doraiah
N.Kiran	Son of N.Thirupathi Rao

DARAPANENI & Co. Hyderabad Chartered Accountants

JEWAR TRANSMISSION LIMITED NEW DELHI

MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

c. List of Related Parties where control exists and transactions taken place

Sl.No.	Name of the Company	Nature of Relationship
1	MEIL Media Limited	Subsidiary Company
2	MEIL Holdings Limited (MHL)	
3	MEIL Pura Limited	
4	Meghavaram Power Private Limited	
5	MEIL Advanced Technologies Private Limited	
6	TP Power Holdings Private Limited (TPPL)	
7	MEIL Sai Rama Oil & Gas Private Limited	
8	MEIL (Bhubaneswar) Bulk Water Project Private Limited	
9	MEIL Aplus Engineering Private Limited	
10	MEIL Foundation	
11	Western U.P. Power Transmission Co. Limited	
12	MEIL International FZE	
13	MEIL Investments (India) Limited	
14	MEIL Global Holdings. B.V.(MGH)	
15	MEIL EV Trans Limited	
16	MEIL Chengala Roadways Private Limited	
17	MEIL Neeleshwaram Roadways Private Limited	
18	MEIL Renigunta Roadways Private Limited	
19	MEIL Vijayawada Bypass Roadways Private Ltd.	
20	Jetpur industrial pipeline project private limited	
21	MEIL Balsua-Hiranagar Expressway Private Limited	
22	Khandukhal Rampura Transmission Limited	
23	Megha City Gas Distribution Private Limited	
24	MEIL Amas Shivrampur Roadways Private Limited	
25	MEIL Ananthapur Roadways Private Limited	
26	MEIL Anpara Power Private Limited	
27	MEIL Appa Junction Manneguda Roadways Private Limited	

DARAPANENI & Co. Hyderabad Chartered Accountants

JEWAR TRANSMISSION LIMITED NEW DELHI

MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

28	MEIL Energy Private Limited (MEPL)	Subsidiary Company
29	MEIL Gadwal Julekal Roadways Private Limited	
30	MEIL Ghoman To Tanda Roadways Private Limited	
31	MEIL Hydrogena Private Limited	
32	MEIL International LLC	
33	MEIL Julekal Roadways Private Limited	
34	MEIL Kalyanpur Roadways Private Limited	
35	MEIL Kolhapur Roadways Private Limited	
36	MEIL Pharma Private Limited	
37	MEIL Pileru Kalur Roadways Private Limited	
38	MEIL Ramnagar Four Lane Roadways Private Limited	
39	MEIL Siwan Mashrakh Roadways Private Limited	
40	MEIL Tejajinagar Balwara Roadways Private Limited	
41	MEIL Chillakuru Turpu Kanupur Roadways Private Limited	
42	Mp Power Transmission Package-I Limited	
43	Lanco Anpara Power Limited	Subsidiary of MEPL
44	JCE Engineering & Mgmt. Services Limited	Subsidiary of MHL
45	KU Power Projects Limited (KPPL)	
46	KU Dhauladhar Hydro Power Private Limited	
47	Mcleod Hydro Power Ventures Private Limited	
48	EVEY Trans Private Limited (ETPL)	
49	Bhadra Productions Limited	
50	Bhadra Entertainments Limited	
51	Olectra Greentech Limited (Olectra)	
52	ICOMM Tele Limited (ICOMM)	Subsidiary of MATPL
53	Himachal Consortium Power Projects Private Limited	Subsidiary of KPPL
54	KU Hydro Power Private Limited	
55	SEPC Power Private Limited	Subsidiary of TPPL

DARAPANENI & Co. Hyderabad Chartered Accountants

JEWAR TRANSMISSION LIMITED NEW DELHI

MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

56	MEIL Infrastructures DMCC	Subsidiary of MGH
57	MEIL INC, U.S.A	
58	Petreven S.P.A, Italy (Petreven)	
59	Drillmec S.P.A, Italy (Drillmec)	
60	Pretreven S.A, Argentina	Subsidiary of Petreven
61	Perforazioni Trevi Energie B.V. – Netherlands (PTE B.V)	
62	Petreven do Brasil Servicos Petroleo LTDA – Brazil	
63	Petreven Peru S.A, Peru	
64	Petreven Chile SPA Chile	
65	Petreven Servicios Y Perforaciones Petroleras C.A – Venezuela	Subsidiary of PTE B.V
66	OJSC Seismotekhnika – Belarus	Subsidiary of Drillmec
67	Idrogena SRL	
68	BLU Vector SRL	
69	Drillmec International Private Limited	
70	Drillmec R OOO – Russia	
71	Drillmec INC U.S.A	Subsidiary of MEIL Inc
72	Drillmec Argentina S.A	Subsidiary of Drillmec INC, U.S.A
73	Drillmec Mexico S. De R.L. De C.V.	
74	OHA Commute Private Limited	Subsidiary of ETPL
75	Evey Trans (IDR) Private Limited	
76	Evey Trans (KTC) Private Limited	
77	Evey Trans (SMC) Private Limited	
78	Evey Trans (MPS) Private Limited	
79	Evey Trans (NSK) Private Limited	
80	Evey Trans (SIL) Private Limited	
81	Evey Trans (UJJ) Private Limited	
82	Evey Trans (UKS) Private Limited	
83	Evey Trans (JAB) Private Limited	
84	Evey Trans (NGP) Private Limited	
85	Evey Trans (THA) Private Limited	
86	Evey Trans (TEL) Private Limited	

DARAPANENI & Co. Hyderabad Chartered Accountants

JEWAR TRANSMISSION LIMITED NEW DELHI

MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

87	Evey Trans (MHS) Private Limited	Subsidiary of ETPL
88	Evey Trans (BLR) Private Limited	
89	Evey Trans (GTC) Private Limited	Subsidiary of Olectra
90	ICOMM Energy Limited	Subsidiary of ICOMM
91	Vasitva Ispat Limited	
92	ICOMM Limited	
93	ICOMM Electronics Limited	
94	ICOMM International Nigeria Limited	
95	Megha Fibre Glass Industries Limited	Associate Companies
96	MEIL-ICOM-TONBO Tech Private Limited	
97	Rachana Televisions Private Limited	Associate Companies of MHL
98	Navayuga Machilipatnam Port Limited	
99	Megha Structures Private Limited	Enterprises over which Key Managerial Personnel or their relatives are able to exercise significant Influence
100	Mytri Aviation Private Limited	
101	Interactive Data Systems Limited	
102	Capital Region Developers LLP	
103	Capital Newgen Developers LLP	
104	Capital Parkland Developers LLP	
105	Capital Newgen Prime Developers LLP	
106	TPL Prime Developers LLP	
107	TPL Land Developers LLP	
108	PV Manas Prime Region Developers LLP	
109	PV Pranav Prime Region Developers LLP	
110	Camelot Wellness Resorts Private Limited	
111	Daksha Lifespaces LLP	
112	Madhuja Infrastructure LLP	
113	Pinkdiamond Infra LLP	
114	Sudhakrishna Infraventures LLP	
115	Vishwa Dharani Infracon LLP	
116	Megha Retailmart Private Limited	
117	Drillmec Oil And Gas Private Limited	
118	Prosperity Infra Developers LLP	
119	Spirit Venture Developers LLP	
120	Terrain Landmarks LLP	
121	Medhaglobal Infraventures LLP	
122	Countryside Region Developers LLP	
123	Evey Transport Limited	

DARAPANENI & Co. Hyderabad Chartered Accountants

SEWAR TRANSMISSION LIMITED NEW DELHI

MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

Sl. No.	Name of the Related Party	Relationship
1	MEIL-KBL-JV	
2	MEIL-PRASAD-KBL-JV	
3	MEIL-IVRCL-JV	
4	MEIL-MAYTAS-ABB-AAG	
5	AIPPL-MEIL-JV	
6	MEIL-MAYTAS-WPIL-JV	
7	KMC-MEIL-BEBL – JV	
8	MEIL-IVRCL-HCC-WPIL-JV	
9	IVRCL-MEIL-JV	
10	MEIL-PRASAD-JV	
11	NETAFIM-MEIL-JV	
12	MEIL-ZVS-PVSRSN-ITT	
13	CONSREE-MEIL-VOLGOGRAD	
14	HCC-MEIL-NCC-WPIL	
15	HCC-MEIL-CBE – JV	
16	MEIL-GAYATRI-ZVS-ITT	
17	MEIL-OCIPL-MSPL-JV	
18	MEIL-RATNA – JV	List of Joint Ventures
19	MEIL-RATNA CONSORTIUM	
20	KCEL-MEIL-JV	
21	MEIL-RATNA-KBL – JV	
22	MEIL-VARKS (JV)	
23	MEIL-BHEL (JV)	
24	MEIL-RVRPL (JV)	
25	MEIL-NETAFIM (JV)	
26	MAYTAS-MEIL-ABB-AAG(JV)	
27	MEIL-KCCPL-FLOWMORE JV	
28	MEIL-MAYTAS-KBL-JV	
29	MEIL-KBL-WEG CONSORTIUM	
30	OPTIMA-MEIL JV-PROJECT	
31	MEIL-SEW-MAYTAS-BHEL CONSORTIUM	
32	MEIL-SEW-ABB-AAG JV	
33	MEIL-BRCCPL-AIPPL JV	
34	MEIL-SMC-SNT JV	
35	MEIL-KBL(KDWSS) JV	

DARAPANENI & Co. Hyderabad Chartered Accountants

SEWAR TRANSMISSION LIMITED NEW DELHI

MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

36	MEIL-KCCL (KDWSP) JV	
37	MEIL-BRCCPL JV	
38	MEIL-SMC-WPIL JV	
39	MEIL-XYLEM-JV	
40	SEW-MEIL-JV	
41	IVRCL-MEIL- NC-28 JV	
42	IVRCL-MEIL- NC-33 JV	
43	MEIL-KEPCO JV	
44	MEIL-SMC JV	
45	EMCL-MEIL-JV	
46	SPML-MEIL JV	
47	MEIL-SPML JV	
48	MEIL-JYOTI JV	
49	MEIL-NCC JV	
50	HCC-SEW-MEIL-AAG JV	
51	MEIL-HES JV	
52	KBL-MEIL-KCCPL	
53	IVRCL-KBL-MEIL	List of Joint Ventures
54	NCC-MEIL-IHP	
55	SEW-MEIL-BHEL	
56	HCC-MEIL-BHEL	
57	MAYTAS-MEIL-KBL	
58	MEIL-SAI SUDHIR –PRATIBHA	
59	HCC-SEW-MEIL	
60	SEW-MEIL-ZVST-AAG	
61	PLR-MEIL-WPIL	
62	NCC-MEIL-ZVS-SIGMA	
63	JCPL-MEIL-KBL	
64	HES-MEIL-ZVS (JV)	
65	MEIL-JWIL (JV)	
66	SNC-MEIL (JV)	
67	MEIL-PVRPL JV	
68	MEIL-HES PSP PINNAPURAM (JV)	
69	SPML-NCC-MEIL	
70	MEIL-APL	

DARAPANENI & Co. Hyderabad Chartered Accountants

JEWAR TRANSMISSION LIMITED NEW DELHI

MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

d. Transactions with Related Parties

a. Key Management Personnel & their Relatives

(₹ in crores)

Particulars	Year	Remuneration paid and Lease Rent	Commission Paid	Balance outstanding payable/ (Receivable)
P.P.Reddy	2022-23	30.43	100.00	52.75
	2021-22	10.23	150.00	74.10
P.V.Krishna Reddy	2022-23	30.43	100.00	62.77
	2021-22	10.23	150.00	81.46
P.Doraiah	2022-23	4.59	3.00	2.07
	2021-22	2.54	-	0.20
Ch.P.Subbaiah	2022-23	5.52	5.00	2.71
	2021-22	3.45	-	0.25
B.Srinivas Reddy	2022-23	5.34	9.25	0.44
	2021-22	6.20	-	0.24
N.Thirupathi Rao	2022-23	2.90	2.75	1.82
	2021-22	2.03	-	0.14
P.V.Subba Reddy	2022-23	3.35	-	0.24
	2021-22	1.40	-	0.22
Premkumar Pandey	2022-23	2.21	-	0.15
	2021-22	0.66	-	0.08
N.Akhilesh Reddy	2022-23	2.28	-	0.15
	2021-22	0.57	-	0.08
P.Venkatesh	2022-23	-	-	(1.72)
	2021-22	0.22	-	(1.67)
N.Kiran	2022-23	0.12	-	0.01
	2021-22	0.11	-	0.01
N.Chandra Kala	2022-23	0.40	-	0.03
	2021-22	0.21	-	(0.11)

DARAPANENI & CO. Hyderabad Chartered Accountants

JEWAR TRANSMISSION LIMITED NEW DELHI

MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

b. Transactions with Subsidiaries, Associate Companies and Enterprises owned or Significantly influenced by Key Management Personnel or their Relatives

(₹ in crores)

Nature of transaction	Particulars	2022-23	2021-22
Sale of Goods	ICOMM Tele Limited	117.46	324.83
	SEPC Power Private Limited	-	230.48
	Drillmec International Private Limited	-	0.27
	Megha Fibre Glass Industries Limited	0.25	3.56
	Olectra Greentech Limited	0.14	0.69
Contract/EPC Revenue	Meil Balsua-Hiranagar Expressway Private Limited	51.58	-
	Western U.P. Power Transmission Co. Limited	60.00	60.00
	MEIL International FZE	98.24	93.22
	MEIL Vijayawada Bypass Roadways Private Limited	375.59	362.99
	Ku Hydro Power Private Limited	-	42.25
	Petreven Spa	-	11.39
	MEIL Neeleshwaram Roadways Private Limited	392.99	55.16
	MEIL Chengala Roadways Private Limited	434.23	81.39
	MEIL Renigunta Roadways Private Limited	452.34	64.64
	SEPC Power Private Limited	-	305.91
Other Operating Revenue	Megha City Gas Distribution Private Limited	137.80	-
	Interactive Data Systems Limited	0.03	-
	Petreven SPA	0.76	-
	Icomm Tele Limited	0.05	-
Interest Income	MEIL Advanced Technologies Private Limited	1.11	2.00
	MEIL Vijayawada Bypass Roadways Private Limited	20.33	2.77
	Western U.P. Power Transmission Co. Limited	-	175.68
	MEIL Global Holdings BV	57.13	29.20
	TP Power Holdings Private Limited	0.12	0.06
	MEIL Holdings Limited	12.71	0.12

DARAPANENI & Co. Hyderabad Chartered Accountants
JEWAR TRANSMISSION LIMITED NEW DELHI

MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

(₹ in crores)

Nature of transaction	Particulars	2022-23	2021-22
Interest Income	MEIL (Bhubaneswar) Bulk Water Projects Private Limited	0.01	0.01
	SEPC Power Private Limited.	279.20	37.28
	Daksha Lifespaces LLP	0.01	-
	Megha City Gas Distribution Private Limited	0.45	-
	MEIL Energy Private Limited	0.20	-
	ICOMM Tele Limited	14.26	21.90
Dividend Income	Western UP Power Transmission Company Limited	0.07	0.07
Purchase of Goods	ICOMM Tele Limited	86.83	426.81
	MEIL Infrastructures DMCC	319.88	641.65
	Drillmec International Private Limited	153.40	-
	Interactive Data Systems Limited	7.33	6.70
	Megha City Gas Distribution Private Limited	0.11	-
	Megha Fibre Glass Industries Limited	4.28	12.85
	Drillmec SPA	6.53	0.56
	Olectra Greentech Limited	1.21	3.05
Services received	JCE Engineering & Mgmt. Services Limited	0.50	0.40
	Icomm Tele Limited	49.59	-
	Olectra Greentech Limited	0.04	0.08
	Drillmec SPA	39.99	218.84
	Mytri Aviation Private Limited	74.05	71.50
	Interactive Data Systems Limited	18.95	16.16
	Capital Region Developers LLP	0.05	0.05
Corporate social responsibility expenses	MEIL Foundation	32.14	19.97
Contractee recoveries, claims & deductions	SEPC Power Private Limited	11.26	-
Advances written-off	MEIL Holdings Limited	5.64	570.65
Purchase of Capital goods	Icomm Tele Limited	28.82	-
	Olectra Greentech Limited	25.93	4.88
	Interactive Data Systems Limited	22.60	21.55
	Megha Fibre Glass Industries Limited	-	0.75
Investment in Equity	Khandukhal Rampura Transmission Limited	0.01	-
	Megha City Gas Distribution Private Limited	0.15	-
	Meil Amas Shivrampur Roadways Private Limited	0.01	-
	Meil Ananthapur Roadways Private Limited	0.01	

DARAPANENI & Co. Hyderabad Chartered Accountants

JEWAR TRANSMISSION LIMITED NEW DELHI

MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

(₹ in crores)

Nature of transaction	Particulars	2022-23	2021-22
Investment in Equity	Meil Anpara Power Private Limited	0.01	-
	Meil Appa Junction Manneguda Roadways Private Limited	0.01	-
	Meil Energy Private Limited	0.01	-
	Meil Gadwal Julekal Roadways Private Limited	0.01	-
	Meil Ghoman To Tanda Roadways Private Limited	0.01	-
	Meil Hydrogena Private Limited	0.01	-
	MEIL International LLC	0.83	-
	Meil Julekal Roadways Private Limited	0.01	-
	Meil Kalyanpur Roadways Private Limited	0.01	-
	Meil Kolhapur Roadways Private Limited	0.01	-
	Meil Pharma Private Limited	0.01	-
	Meil Pileru Kalur Roadways Private Limited	0.01	-
	Meil Ramnagar Four Lane Roadways Private Limited	0.01	-
	Meil Siwan Mashrakh Roadways Private Limited	0.01	-
	Meil Tejajinagar Balwara Roadways Private Limited	0.01	-
	MP Power Transmission Package-I Limited	0.05	-
	Jetpur Industrial Pipeline Project Private Limited	-	0.01
	MEIL Balsua-Hiranagar Expressway Private Limited	-	0.05
Investment in Optionally Convertible Debentures	MEIL Advanced Technologies Private Limited	10.00	-
	TP Power Holdings Private Limited	714.88	-
Net Loans & Advances given/(repaid)	MEIL Global Holdings BV	910.00	435.87
	MEIL Holdings Limited	254.96	232.79
	Evey Trans Private Limited	323.93	339.15
	MEIL Vijayawada Bypass Roadways Private Limited	(2.49)	216.43
	TP Power Holdings Private Limited (TPPL)	-	0.08
	KU Power Projects Limited (KPPL)	0.00	0.00
	MEIL Advanced Technologies Private Limited	(39.00)	-
	MEIL International FZE	-	-
	JCE Engineering & Mgmt. Services Limited	(0.40)	-
	ICOMM Tele Limited	(94.12)	-

DARAPANENI & CO. Hyderabad Chartered Accountants
JEWAR TRANSMISSION LIMITED NEW DELHI

MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

(₹ in crores)

Nature of transaction	Particulars	2022-23	2021-22
Net Loans & Advances given/(repaid)	Megha City Gas Distribution Private Limited	615.41	-
	Daksha Lifespaces LLP	0.63	-
	MEIL Energy Private Limited	620.00	-
	MEIL Kolhapur Roadways Private Limited	1.77	-
	MEIL Amas Shivrampur Roadways Private Limited	1.88	-
	MEIL Ramnagar Four Lane Roadways Private Limited	1.92	-
	MEIL Appa Junction Manneguda Roadways Private Limited	1.45	-
	SEPC Power Private Limited	(657.39)	2,208.43
	KU Hydro Power Private Limited	3.44	1.00
Loans & Advances incl. Accrued interest Receivable (Net)	ICOMM Tele Limited	219.43	294.79
	SEPC Power Private Limited	2272.33	2745.55
	MEIL Infrastructures DMCC	-	142.35
	Megha Fibre Glass Industries Limited	-	18.37
	MEIL Global Holdings B.V.	2345.57	1,464.77
	MEIL Holdings Limited	417.45	162.49
	Evey Trans Private Limited	731.50	407.57
	MEIL Vijayawada Bypass Roadways Private Limited	232.30	216.49
	MEIL Advanced Technologies Private Limited	4.30	42.30
	JCE Engineering & Mgmt. Services Limited	2.48	2.88
	TP Power Holdings Private Limited (TPPL)	-	0.37
	KU Power Projects Limited (KPPL)	22.04	22.04
	Megha City Gas Distribution Private Limited	615.41	-
	Daksha Lifespaces LLP	0.64	-
	MEIL Energy Private Limited	620.20	-
	Mytri Aviation Private Limited	260.00	260.00
	Olectra Greentech Limited	-	0.57
	MEIL Kolhapur Roadways Private Limited	1.77	-
	MEIL Amas Shivrampur Roadways Private Limited	1.88	-
	MEIL Ramnagar Four Lane Roadways Private Limited	1.92	-
	MEIL Appa Junction Manneguda Roadways Private Limited	1.45	-
	KU Hydro Power Private Limited	91.29	87.85

DARAPANENI & Co. Hyderabad Chartered Accountants

JEWAR TRANSMISSION LIMITED NEW DELHI

MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

(₹ in crores)

Nature of transaction	Particulars	2022-23	2021-22
Account Receivables Incl Retention	SEPC Power Private Limited	24.18	33.62
	Petreven Spa	37.30	36.40
	MEIL International FZE	212.45	336.09
	MEIL Vijayawada Bypass Roadways Private Limited	252.87	56.47
	MEIL Neeleshwaram Roadways Private Limited	299.88	60.12
	MEIL Chengala Roadways Private Limited	358.15	88.72
	MEIL Renigunta Roadways Private Limited	242.59	70.45
	Drillmec International Private Limited	-	7.84
	KU Hydro Power Private Limited	99.38	98.53
	MEIL (Bhubaneswar) Bulk Water Project Private Limited	10.76	-
	Meil Balsua-Hirnagar Expressway Private Limited	34.49	-
	Western U.P Power Transmission Co. Limited	61.29	(2145.45)
	Icomm Tele Limited	25.07	-
	KU Hydro Power Private Limited	-	-
Account Payables Incl Retention, other payables	Western U.P. Power Transmission Co. Limited	8.44	46.34
	Drillmec SPA	7.52	6.81
	MEIL Infrastructures DMCC	186.83	-
	Megha Fibre Glass Industries Limited	1.20	-
	Interactive Data Systems Limited	4.52	4.62
	Mytri Aviation Private Limited	28.50	0.38
	Icomm Tele Limited	-	86.07
	Olectra Greentech Limited	25.29	-
	JCE Engineering & Mgmt. Services Limited	0.38	0.37
	Capital Region Developers LLP	0.07	0.05
Reimbursement of expenses receivable	MEIL Vijayawada Bypass Roadways Private Limited	-	7.37
	MEIL Neeleshwaram Roadways Private Limited	-	2.57
	MEIL Chengala Roadways Private Limited	-	5.21

DARAPANENI & CO. Hyderabad Chartered Accountants

JEMAR TRANSMISSION LIMITED NEW DELHI

MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

(₹ in crores)

Nature of transaction	Particulars	2022-23	2021-22
Reimbursement of expenses receivable	MEIL Renigunta Roadways Private Limited	-	3.28
	Pv Manas Prime Region Developers LLP	-	0.67
	MEIL (Bhubaneswar) Bulk Water Project Private Limited	4.31	3.30
	TP Power Holdings Private Limited	0.56	-
	Bhadra Productions Limited	0.25	0.24
	Himachal Consortium Power Projects Private Limited	0.01	0.01
	Ku Dhauladhar Hydro Power Private Limited	-	0.00
	Evey Trans (IDR) Private Limited	0.01	0.01
	Evey Trans (SMC) Private Limited	0.00	0.00
	Evey Trans (NSK) Private Limited	0.00	0.00
	Evey Trans (UKS) Private Limited	0.00	0.00
	Evey Trans (MPS) Private Limited	0.00	0.00
	Evey Trans (KTC) Private Limited	0.00	0.00
	Evey Trans (UJJ) Private Limited	0.00	0.00
	Evey Trans (SIL) Private Limited	0.00	0.00
	Evey Trans (JAB) Private Limited	0.00	0.00
	Meil Balsua-Hiranagar Expressway Private Limited	0.00	0.00
	Jetpur Industrial Pipeline Project Private Limited	0.01	0.00
	Megha City Gas Distribution Private Limited	19.55	0.06
	Vishwa Dharani Infracon LLP	-	0.00
	Mcleod Hydro Power Ventures Private Limited	0.01	-
	MEIL Pura Limited	0.01	-
	MEIL Media Limited	0.01	-
	MEIL Aplus Engineering Private Limited	0.01	-
	MEIL Sai Rama Oil & Gas Private Limited	0.01	-
	MEIL Foundation	0.03	0.22
	Meil Kolhapur Roadways Private Limited	0.72	-
	Meil Amas Shivarampur Roadways Private Limited	0.61	-

DARAPANENI & Co. Hyderabad Chartered Accountants

JEWAR TRANSMISSION LIMITED NEW DELHI

MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

(₹ in crores)

Nature of transaction	Particulars	2022-23	2021-22
Reimbursement of expenses receivable	Meil Ramnagar Four Lane Roadways Private Limited	0.64	-
	Meil Gadwal Julekal Roadways Private Limited	2.22	-
	Meil Ghoman To Tanda Roadways Private Limited	0.71	-
	Meil Kalyanpur Roadways Private Limited	1.98	-
	Meil Pileru Kalur Roadways Private Limited	0.81	-
	Meil Appa Junction Manneguda Roadways Private Limited	0.05	-
	Meil Julekal Roadways Private Limited	2.25	-
	Khandukhal Rampura Transmission Limited	12.88	-
	MP Power Transmission Package-I Limited	6.71	
	Meil Tejajinagar Balwara Roadways Pvt Ltd	0.79	-
	Pinkdiamond Infra LLP	0.01	-
	Madhuja Infrastructure LLP	-	0.00

c. Major Transactions with Joint Ventures / Consortiums (₹ in crores)

Sl.No	Joint Venture consortium	Year	Contract Revenue	Mobilization Advance received	Mobilization Advance repaid	Retention money receivable from JV	Balance outstanding as on 31st March'23	DR/ CR
1	MEIL-KBL-JV	2022-23	-	-	-	0.21	0.01	DR
		2021-22	-	-	-	0.21	0.01	DR
2	MEIL-PRASAD-KBL-JV	2022-23	2.88	-	-	0.31	0.41	DR
		2021-22	1.06	-	-	0.29	0.40	DR
3	MEIL-IVRCL-JV	2022-23	1.13	-	-	16.22	10.21	DR
		2021-22	8.04	-	-	1.80	17.70	DR
4	MEIL-MAYTAS-ABB-AAG	2022-23	-	-	-	-	0.06	CR
		2021-22	-	-	-	-	0.08	CR
5	AIPPL-MEIL-JV	2022-23	-	-	-	1.11	0.10	DR
		2021-22	4.75	-	-	1.11	0.00	DR
6	MEIL-MAYTAS-WPIL-JV	2022-23	-	-	-	1.84	0.01	CR
		2021-22	-	-	-	1.84	0.01	CR
7	KMC-MEIL-BEBL - JV	2022-23	1.61	-	-	-	0.52	CR
		2021-22	1.44	-	-	-	0.18	DR
8	MEIL-IVRCL-HCC-WPIL-JV	2022-23	-	-	-	-	1.82	CR
		2021-22	-	-	-	-	1.82	CR
9	IVRCL-MEIL-JV	2022-23	-	-	-	11.00	2.00	CR
		2021-22	-	-	-	11.00	2.00	CR
10	MEIL-PRASAD-JV	2022-23	-	-	-	5.73	0.00	DR
		2021-22	-	-	-	5.73	0.00	DR
11	NETAFIM-MEIL-JV	2022-23	-	-	-	2.67	0.01	DR
		2021-22	-	-	-	2.67	0.01	DR

DARAPANENI & Co. Hyderabad Chartered Accountants

JEWAR TRANSMISS NEW DELH

MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

(₹ in crores)

Sl.No	Joint Venture consortium	Year	Contract Revenue	Mobilization Advance received	Mobilization Advance repaid	Retention money receivable from JV	Balance outstanding as on 31st March'23	DR/ CR
12	MEIL-ZVS-PVSRSN-ITT	2022-23	-	-	-	0.60	2.05	CR
		2021-22	-	-	-	0.60	2.09	CR
13	CONSREE-MEIL-VOLGOGRAD	2022-23	-	-	-	-	40.20	DR
		2021-22	-	-	-	-	40.20	DR
14	HCC-MEIL-NCC-WPIL	2022-23	4.70	-	-	-	1.84	DR
		2021-22	-	-	-	-	1.84	DR
15	HCC-MEIL-CBE – JV	2022-23	1.32	-	-	0.20	0.04	DR
		2021-22	4.44	-	-	32.73	0.04	DR
16	MEIL-GAYATRI-ZVS-ITT	2022-23	-	-	-	11.44	9.84	CR
		2021-22	27.28	-	-	11.44	9.84	CR
17	MEIL-OCIPL-MSPL-JV	2022-23	-	-	-	-	0.00	CR
		2021-22	-	-	-	-	0.45	CR
18	MEIL-RATNA – JV	2022-23	-	-	-	-	-	DR
		2021-22	-	-	-	-	-	DR
19	MEIL-RATNA CONSORTIUM	2022-23	-	-	-	-	-	DR
		2021-22	-	-	-	-	-	DR
20	KCEL-MEIL-JV	2022-23	-	-	-	-	-	DR
		2021-22	-	-	-	-	-	DR
21	MEIL-RATNA-KBL – JV	2022-23	-	-	-	-	0.01	DR
		2021-22	-	-	-	-	-	DR
22	MEIL VARKS (JV)	2022-23	201.60	-	-	3.16	1.41	CR
		2021-22	193.03	-	-	39.03	0.55	DR
23	MEIL-BHEL (JV)	2022-23	168.09	-	-	25.36	11.15	DR
		2021-22	2,390.13	-	-	24.52	271.84	DR
24	MEIL-RVRPL (JV)	2022-23	-	-	-	33.33	0.41	DR
		2021-22	-	-	-	-	0.41	DR
25	MEIL-NETAFIM JV	2022-23	405.00	-	-	146.74	339.34	DR
		2021-22	137.19	-	-	70.80	341.27	DR
26	MAYTAS-MEIL-ABB-AAG	2022-23	-	-	-	6.08	0.15	CR
		2021-22	-	-	-	4.56	5.45	DR
27	MEIL-KCCPL-FLOWMORE	2022-23	-	-	-	0.44	0.04	DR
		2021-22	-	-	-	0.44	0.04	DR
28	MEIL-MAYTAS-KBL	2022-23	-	-	-	17.19	0.94	CR
		2021-22	-	-	-	17.19	0.94	CR
29	MEIL-KBL-WEG	2022-23	-	-	-	0.04	0.38	CR
		2021-22	0.44	-	-	0.04	0.39	CR
30	OPTIMA-MEIL	2022-23	-	-	-	-	0.03	DR
		2021-22	-	-	-	-	-	DR
31	MEIL-SEW-MAYTAS-BHEL	2022-23	-	-	-	1.82	1.77	CR
		2021-22	-	-	-	-	121.73	DR

DARAPANENI & Co. Hyderabad Chartered Accountants

JEWAR TRANSMISSION LIMITED NEW DELHI

MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

(₹ in crores)

Sl.No	Joint Venture consortium	Year	Contract Revenue	Mobilization Advance received	Mobilization Advance repaid	Retention money receivable from JV	Balance outstanding as on 31st March'23	DR/ CR
32	MEIL-SEW-ABB-AAG	2022-23	32.11	-	-	14.38	16.00	DR
		2021-22	190.38	-	-	14.19	0.97	DR
33	MEIL-BRCPCL-AIPPL	2022-23	0.58	-	-	3.32	1.85	CR
		2021-22	-	-	-	3.32	1.85	CR
34	MEIL-SMC-SNT JV	2022-23	-	-	-	0.00	0.01	DR
		2021-22	-	-	-	0.00	0.01	DR
35	MEIL-KBL(KDWSP) JV	2022-23	-	-	-	-	0.19	CR
		2021-22	-	-	-	-	0.19	CR
36	MEIL-KCCL(KDWSP) JV	2022-23	-	-	-	-	0.94	CR
		2021-22	-	-	-	-	0.94	CR
37	MEIL-BRCCPL-JV	2022-23	-	-	-	-	0.26	CR
		2021-22	-	-	-	-	0.26	CR
38	MEIL-SMC-WPIL(DANTHIVADA)	2022-23	-	-	-	-	0.02	DR
		2021-22	-	-	-	-	0.02	DR
39	MEIL-XYLEM JV	2022-23	-	-	-	2.47	0.00	DR
		2021-22	1.46	-	-	7.14	0.00	DR
40	SEW-MEIL	2022-23	-	-	-	0.05	1.49	DR
		2021-22	1.20	-	-	0.01	0.04	DR
41	IVRCL-MEIL (NC-28)	2022-23	-	-	-	-	0.03	CR
		2021-22	0.30	-	-	0.04	0.03	CR
42	IVRCL-MEIL (NC-33)	2022-23	-	-	-	-	0.15	CR
		2021-22	2.51	-	-	-	0.15	CR
43	MEIL-KEPCO	2022-23	-	-	-	-	-	DR
		2021-22	-	-	-	-	-	DR
44	MEIL-SMC	2022-23	0.03	-	-	-	0.01	DR
		2021-22	0.14	-	-	-	0.08	DR
45	EMCL-MEIL	2022-23	-	-	-	3.72	0.56	DR
		2021-22	-	-	-	-	3.16	CR
46	SPML-MEIL	2022-23	-	-	-	1.05	0.00	DR
		2021-22	-	-	-	1.05	0.00	DR
47	MEIL-SPML	2022-23	6.14	-	-	2.65	1.52	DR
		2021-22	18.25	-	-	2.91	0.03	DR
48	MEIL-JYOTI	2022-23	7.69	-	-	5.57	0.07	DR
		2021-22	13.38	-	-	5.19	0.07	DR
49	MEIL-NCC	2022-23	-	-	-	20.31	2.50	DR
		2021-22	-	-	-	-	2.52	DR
50	HCC-SEW-MEIL-AAG	2022-23	176.05	-	-	7.40	0.56	CR
		2021-22	116.10	-	-	-	0.71	CR
51	MEIL-HES JV	2022-23	131.82	-	-	9.08	11.92	DR
		2021-22	91.50	-	-	8.39	18.71	DR

DARAPANENI & Co. Chartered Accountants Hyderabad

JEWAR TRANSMISSION LIMITED NEW DELHI

MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

(₹ in crores)

Sl.No	Joint Venture consortium	Year	Contract Revenue	Mobilization Advance received	Mobilization Advance repaid	Retention money receivable from JV	Balance outstanding as on 31st March'23	DR/ CR
52	MEIL-PVRPL JV	2022-23	4.88	-	-	8.76	17.36	DR
		2021-22	31.12	-	-	6.16	49.37	DR
53	SPML-NCC-MEIL	2022-23	452.66	-	-	9.05	9.86	DR
		2021-22	-	-	-	-	-	DR
54	MEIL-APL	2022-23	3.18	-	-	-	0.06	CR
		2021-22	-	-	-	-	-	DR
55	KBL-MEIL-KCCPL	2022-23	-	-	-	0.25	3.01	DR
		2021-22	-	-	-	0.23	3.04	DR
56	IVRCL-KBL-MEIL	2022-23	-	-	-	-	0.00	DR
		2021-22	-	-	-	0.24	0.00	DR
57	NCC-MEIL-IHP	2022-23	-	-	-	-	-	DR
		2021-22	-	-	-	-	-	DR
58	SEW-MEIL-BHEL	2022-23	-	-	-	13.78	1.39	CR
		2021-22	-	-	-	13.78	3.18	DR
59	HCC-MEIL-BHEL	2022-23	-	-	-	7.19	2.73	DR
		2021-22	-	-	-	7.19	2.57	DR
60	MAYTAS-MEIL-KBL	2022-23	-	-	-	1.75	0.30	DR
		2021-22	-	-	-	1.78	1.16	DR
61	MEIL-SAI SUDHIR - PRATIBHA	2022-23	-	-	-	3.12	5.42	DR
		2021-22	-	-	-	3.12	10.87	DR
62	HCC-SEW-MEIL	2022-23	-	-	-	-	0.02	CR
		2021-22	-	-	-	-	0.02	CR
63	SEW-MEIL-ZVST-AAG	2022-23	-	-	-	-	-	DR
		2021-22	-	-	-	-	-	DR
64	PLR-MEIL-WPIL	2022-23	-	-	-	-	-	DR
		2021-22	-	-	-	-	-	DR
65	NCC-MEIL-ZVS-SIGMA	2022-23	-	-	-	2.71	1.02	DR
		2021-22	-	-	-	2.70	2.68	DR
66	JCPL-MEIL-KBL	2022-23	-	-	-	-	-	DR
		2021-22	-	-	-	-	-	DR
67	HES-MEIL-ZVS (JV)	2022-23	-	-	-	0.43	1.40	CR
		2021-22	-	-	-	1.41	0.70	CR
68	MEIL-JWIL (JV)	2022-23	-	-	-	14.87	-	DR
		2021-22	-	-	-	14.87	-	DR
69	SNC-MEIL (JV)	2022-23	-	-	-	9.36	31.21	DR
		2021-22	-	-	-	10.76	79.58	DR
70	MEIL-HES PSP PINNAPURAM (JV)	2022-23	-	-	-	25.01	95.39	DR
		2021-22	-	-	-	-	4.01	CR

DARAPANENI & Co. Hyderabad Chartered Accountants

JEMAR TRANSMISSION LIMITED NEW DELHI

MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

41 Interest in Joint Ventures

(i) Joint Venture Entities

Sl. No.	Name of the Joint Venture/Consortium	Proportion of Share as on	
		31.03.2023 (%)	31.03.2022 (%)
1	MEIL-KBL-JV	75	75
2	MEIL-PRASAD-KBL-JV	90	90
3	MEIL-IVRCL-JV	61	61
4	MEIL-MAYTAS-ABB-AAG (NSP-01)	60	60
	MEIL-MAYTAS-ABB-AAG (PCL-05)	75	75
5	AIPPL-MEIL-JV	49	49
6	MEIL-MAYTAS-WPIL-JV	65	65
7	KMC-MEIL-BEBL – JV	25	25
8	MEIL-IVRCL-HCC-WPIL-JV	50	50
9	IVRCL-MEIL-JV	50	50
10	MEIL-PRASAD-JV	95	95
11	NETAFIM-MEIL-JV	65	65
12	MEIL-ZVS-PVSRSN-ITT	44.5	44.5
13	CONSREE-MEIL-VOLGOGRAD	92.5	92.5
14	HCC-MEIL-NCC-WPIL	50	50
15	HCC-MEIL-CBE – JV	50	50
16	MEIL-GAYATRI-ZVS-ITT	50	50
17	MEIL-OCIPL-MSPL-JV	55	55
18	MEIL-RATNA – JV	50	50
19	MEIL-RATNA CONSORTIUM	90	90
20	KCEL-MEIL-JV	70	70
21	MEIL-RATNA-KBL – JV	60	60
22	MEIL-VARKS (JV)	75	75
23	MEIL-BHEL (JV)	80	80
24	MEIL-RVRPL (JV)	51	51
25	MEIL-NETAFIM (JV)	66	66
26	MAYTAS-MEIL-ABB-AAG(JV) (NSP-04)	50	50
27	MEIL-KCCPL-FLOWMORE JV	85	85
28	MEIL-MAYTAS-KBL-JV	65	65
29	MEIL-KBL-WEG CONSORTIUM	80	80
30	OPTIMA-MEIL JV-PROJECT	98	98
31	MEIL-SEW-MAYTAS-BHEL CONSORTIUM	45	45
32	MEIL-SEW-ABB-AAG JV	65	65
33	MEIL-BRCCPL-AIPPL JV	51	51
34	MEIL-SMC-SNT JV	60	60





MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

Sl. No.	Name of the Joint Venture/Consortium	Proportion of Share as on	
		31.03.2023 (%)	31.03.2022 (%)
35	MEIL-KBL(KDWSS) JV	67	67
36	MEIL-KCCL (KDWSP) JV	80	80
37	MEIL-BRCCPL JV	76	76
38	MEIL-SMC-WPIL JV	70	70
39	MEIL-XYLEM-JV	80	80
40	SEW-MEIL-JV	14	14
41	IVRCL-MEIL- NC-28 JV	35	35
42	IVRCL-MEIL- NC-33 JV	35	35
43	MEIL-KEPCO JV	50	50
44	MEIL-SMC JV	70	70
45	EMCL-MEIL-JV	97.5	97.5
46	SPML-MEIL JV	97.25	97.25
47	MEIL-SPML JV	97.25	97.25
48	MEIL-JYOTI JV	70	70
49	MEIL-NCC JV	80	80
50	HCC-SEW-MEIL-AAG JV	15	15
51	MEIL-HES JV (RANGANAYAKA SAGAR)	80	80
52	MEIL-HES JV (KONDAMCHERU)	80	80
53	MEIL-HES JV (DINDI)	60	60
54	KBL-MEIL-KCCPL	33.5	33.5
54	IVRCL-KBL-MEIL (HNSS 02)	20	20
54	IVRCL-KBL-MEIL (PS0)	20	20
55	IVRCL-KBL-MEIL (KALESWARAM)	41	41
56	NCC-MEIL-IHP	35	35
56	SEW-MEIL-BHEL	25	25
56	HCC-MEIL-BHEL	40	40
57	MAYTAS-MEIL-KBL	40	40
58	MEIL-SAI SUDHIR –PRATIBHA	50	50
59	HCC-SEW-MEIL	24	24
60	SEW-MEIL-ZVST-AAG	58	58
61	PLR-MEIL-WPIL	4	4
62	NCC-MEIL-ZVS-SIGMA	45	45
63	JCPL-MEIL-KBL	30	30
64	HES-MEIL-ZVS (JV)	10	10
65	MEIL-JWIL (JV)	74	74
66	SNC-MEIL (JV)	40	40
67	MEIL-PVRPL JV	50	50
68	MEIL-HES PSP PINNAPURAM (JV)	50	50
69	SPML-NCC-MEIL	20	-
70	MEIL-APL	80	-

DARAPANENI & CO. Hyderabad Chartered Accountants

JEWAR TRANSMISSION NEW DELHI

MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

The above joint venture entities are established in India. The Company's share of assets and liabilities are as on March 31, 2023 and income and expenses for the year ended March 31, 2023 in respect of Joint Venture entities based on audited/unaudited accounts are given below:

(₹ in crores)

Sl.No	Joint Venture consortium	Year	Assets	Liabilities	Income	Expenses
1	MEIL-KBL-JV	2022-23	0.43	0.43	0.00	0.00
		2021-22	0.43	0.43	0.00	0.00
2	MEIL-PRASAD-KBL-JV	2022-23	3.23	3.23	2.89	2.89
		2021-22	3.12	3.12	1.07	1.07
3	MEIL-IVRCL-JV	2022-23	50.80	49.67	1.13	1.13
		2021-22	64.06	57.22	9.26	9.26
4	MEIL-MAYTAS-ABB-AAG	2022-23	65.53	61.95	0.00	0.00
		2021-22	65.53	65.42	0.00	0.00
5	AIPPL-MEIL-JV	2022-23	1.45	1.45	0.00	0.00
		2021-22	1.45	1.45	4.76	4.76
6	MEIL-MAYTAS-WPIL-JV	2022-23	3.01	3.00	0.00	0.00
		2021-22	3.01	3.00	0.07	0.07
7	KMC-MEIL-BEBL - JV	2022-23	1.86	1.92	1.61	1.61
		2021-22	1.49	1.67	2.85	2.85
8	MEIL-IVRCL-HCC-WPIL-JV	2022-23	1.51	0.00	0.00	0.00
		2021-22	1.51	0.00	0.00	0.00
9	IVRCL-MEIL-JV	2022-23	17.16	5.10	0.00	0.00
		2021-22	6.02	5.10	0.52	0.52
10	MEIL-PRASAD-JV	2022-23	23.13	23.13	0.02	0.02
		2021-22	23.31	23.31	0.00	0.00
11	NETAFIM-MEIL-JV	2022-23	15.83	15.83	0.00	0.00
		2021-22	15.83	15.83	0.01	0.01
12	MEIL-ZVS-PVSRSN-ITT	2022-23	0.12	0.28	0.00	0.00
		2021-22	0.12	0.28	0.01	0.01
13	CONSREE-MEIL-VOLGOGRAD	2022-23	103.88	91.32	0.00	0.00
		2021-22	103.52	95.42	0.00	0.00
14	HCC-MEIL-NCC-WPIL	2022-23	2.90	4.16	5.39	5.39
		2021-22	6.03	6.03	0.00	0.00
15	HCC-MEIL-CBE - JV	2022-23	0.66	0.66	1.66	1.66
		2021-22	0.77	0.77	4.78	4.78
16	MEIL-GAYATRI-ZVS-ITT	2022-23	19.39	9.33	0.00	0.00
		2021-22	19.21	9.33	27.28	27.28
17	MEIL-OCIPL-MSPL-JV	2022-23	4.26	4.25	0.00	0.00
		2021-22	4.26	4.25	0.00	0.00
18	MEIL-RATNA - JV	2022-23	0.56	0.56	0.00	0.00
		2021-22	0.56	0.56	0.00	0.00
19	MEIL-RATNA CONSORTIUM	2022-23	0.00	0.00	0.00	0.00
		2021-22	0.01	0.01	0.00	0.00
20	KCEL-MEIL-JV	2022-23	0.26	0.26	0.00	0.00
		2021-22	0.27	0.27	0.00	0.00

DARAPANENI & CO. Hyderabad Chartered Accountants

JEWAR TRANSMISSION LIMITED NEW DELHI

MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

(₹ in crores)

Sl.No	Joint Venture consortium	Year	Assets	Liabilities	Income	Expenses
21	MEIL-RATNA-KBL – JV	2022-23	1.37	1.37	0.00	0.00
		2021-22	1.37	1.37	0.00	0.00
22	MEIL VARKS (JV)	2022-23	64.07	61.25	201.69	201.69
		2021-22	55.92	54.52	193.03	193.03
23	MEIL-BHEL (JV)	2022-23	85.43	85.43	168.31	168.31
		2021-22	236.93	236.93	2,390.14	2,390.14
24	MEIL-RVRPL (JV)	2022-23	20.72	20.74	0.03	0.03
		2021-22	20.18	20.94	0.00	0.00
25	MEIL-NETAFIM JV	2022-23	607.85	607.85	405.91	405.91
		2021-22	589.15	589.15	138.65	138.65
26	MAYTAS-MEIL-ABB-AAG	2022-23	39.06	28.71	0.00	0.00
		2021-22	27.92	28.71	0.00	0.00
27	MEIL-KCCPL-FLOWMORE	2022-23	0.67	0.67	0.00	0.00
		2021-22	0.67	0.67	0.00	0.00
28	MEIL-MAYTAS-KBL	2022-23	20.25	18.32	0.59	0.59
		2021-22	19.94	19.09	0.59	0.59
29	MEIL-KBL-WEG	2022-23	0.23	0.23	0.00	0.00
		2021-22	0.23	0.29	0.44	0.44
30	OPTIMA-MEIL	2022-23	0.14	0.14	0.00	0.00
		2021-22	0.14	0.14	0.00	0.00
31	MEIL-SEW-MAYTAS-BHEL	2022-23	7.01	4.67	0.02	0.02
		2021-22	196.79	129.67	0.04	0.04
32	MEIL-SEW-ABB-AAG	2022-23	35.38	37.17	32.15	32.15
		2021-22	41.54	43.14	190.38	190.38
33	MEIL-BRCPCL-AIPPL	2022-23	3.51	1.65	0.59	0.59
		2021-22	3.50	1.64	0.00	0.00
34	MEIL-SMC-SNT JV	2022-23	0.20	0.20	0.00	0.00
		2021-22	0.20	0.20	0.00	0.00
35	MEIL-KBL(KDWSP) JV	2022-23	0.00	0.00	0.00	0.00
		2021-22	0.00	0.00	0.00	0.00
36	MEIL-KCCL(KDWSP) JV	2022-23	0.56	0.00	0.00	0.00
		2021-22	0.56	0.39	0.00	0.00
37	MEIL-BRCCPL-JV	2022-23	0.62	0.36	0.00	0.00
		2021-22	0.62	0.36	0.00	0.00
38	MEIL-SMC-WPIL(DANTHIVADA)	2022-23	2.33	2.33	0.00	0.00
		2021-22	2.33	2.33	0.00	0.00
39	MEIL-XYLEM JV	2022-23	8.09	8.09	0.20	0.20
		2021-22	15.11	15.11	1.87	1.87
40	SEW-MEIL	2022-23	2.38	2.38	0.06	0.06
		2021-22	2.96	2.95	1.21	1.21
41	IVRCL-MEIL (NC-28)	2022-23	2.09	2.09	0.00	0.00
		2021-22	2.20	2.20	0.30	0.30
42	IVRCL-MEIL (NC-33)	2022-23	2.00	2.00	0.01	0.01
		2021-22	2.05	2.05	2.51	2.51

DARAPANENI & CO. Hyderabad Chartered Accountants

JEWAR TRANSMISSION LIMITED NEW DELHI

(₹ in crores)

Sl.No	Joint Venture consortium	Year	Assets	Liabilities	Income	Expenses
43	MEIL-KEPCO	2022-23	1.47	1.47	0.00	0.00
		2021-22	1.47	1.47	0.00	0.00
44	MEIL-SMC	2022-23	0.25	0.25	0.03	0.03
		2021-22	0.52	0.52	0.15	0.15
45	EMCL-MEIL	2022-23	4.45	4.45	0.00	0.00
		2021-22	4.45	4.17	0.00	0.00
46	SPML-MEIL	2022-23	1.59	1.59	0.00	0.00
		2021-22	1.59	1.59	0.00	0.00
47	MEIL-SPML	2022-23	6.33	6.46	6.20	6.20
		2021-22	5.56	5.54	18.26	18.26
48	MEIL-JYOTI	2022-23	11.38	11.38	8.07	8.07
		2021-22	9.30	9.30	13.72	13.72
49	MEIL-NCC	2022-23	24.99	27.53	0.22	0.22
		2021-22	27.45	29.99	0.00	0.00
50	HCC-SEW-MEIL-AAG	2022-23	29.07	29.07	176.08	176.08
		2021-22	4.67	4.67	116.12	116.12
51	MEIL-HES JV	2022-23	12.33	12.33	132.10	132.10
		2021-22	35.88	35.88	98.73	98.73
52	MEIL-PVRPL JV	2022-23	35.21	34.12	5.14	5.14
		2021-22	72.04	71.28	31.19	31.19
53	SPML-NCC-MEIL	2022-23	85.90	81.62	452.67	452.67
		2021-22	-	-	-	-
54	MEIL-APL	2022-23	0.14	0.14	3.18	3.18
		2021-22	-	-	-	-

42 Financial instruments

Disclosure pursuant to Ind AS 107 "Financial Instruments: Disclosures"

Market risk

Market risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in market prices. Such changes in the values of financial instruments may result from changes in the foreign currency exchange rates, interest rates, credit, liquidity and other market changes. The company's exposure to market risk is primarily on account of foreign currency exchange rate risk.

- **Interest rate risk**

  The company total borrowings represents only short term borrowings (WCDL) and the interest rate primarily basing on the company's credit rating and also the changes in the financial market. Company continuously monitoring over all factors influence rating and also factors which influential the determination of the interest rates by the banks to minimize the interest rate risks.

- **Foreign currency risk**

  The company has several balances in foreign currency and consequently the company is exposed to foreign exchange risk. The risk on company's foreign currency changes is not material. The company evaluates exchange rate exposure arising from foreign currency transactions and follows established risk management policies.

JEWAR TRANSMISSION LIMITED NEW DELHI
DARAPANENI & CO. Hyderabad Chartered Accountants

We summarize below the financial instruments which have the foreign currency risks as at March 31, 2023 and March 31, 2022.

The exposure on foreign currency risk in respect of recognised financial assets and recognised financial liabilities is as follows:

(₹ in crores)

Currency	Liabilities		Assets	
	As at March 31, 2023	As at March 31, 2022	As at March 31, 2023	As at March 31, 2022
USD	0.79	0.73	0.44	1.10
INR	64.74	55.83	36.05	83.61
KWD	0.33	-	0.79	0.79
INR	87.52	-	212.45	196.13
EUR	0.92	0.32	-	-
INR	82.42	27.31	-	-
SEK	-	0.05	-	-
INR	-	0.44	-	-

Sensitivity analysis of 2% change in exchange rate at the end of reporting period

Particulars	Foreign Currency Sensitivity							
	As at March 31, 2023				As at March 31, 2022			
	USD	EUR	KWD	SEK	USD	EUR	KWD	SEK
2% Depreciation in INR								
Impact on P&L	0.57	1.65	(4.25)	-	(0.56)	0.55	(3.92)	0.01
Total	**0.57**	**1.65**	**(4.25)**	-	**(0.56)**	**0.55**	**(3.92)**	**0.01**
2% Appreciation in INR								
Impact on P&L	(0.57)	(1.65)	4.25	-	0.56	(0.55)	3.92	(0.01)
Total	**(0.57)**	**(1.65)**	**4.25**	-	**0.56**	**0.55**	**3.92**	**(0.01)**

Equity risks

The company is exposed only to non-listed equity investments and hence there is no significant equity risk on the company.

Credit risk management

Credit Risk is the risk that a customer or counterparty to a financial instrument fails to perform or pay the amount due causing financial loss to the company. The maximum exposure of the financial assets represents trade receivables, work in progress and receivables from group companies.

The company has a prudent and conservative process for managing its credit risk in the course of its business activities. The risk on trade receivables, work in progress is limited as the customers of the company mainly consists of the Government promoted entities having a strong credit worthiness.

Liquidity risk management

Liquidity risk arises from the company's inability to meet its cash flow commitments on time. The Company manages liquidity risk by maintaining adequate reserves, banking facilities and reserve borrowing facilities, by continuously monitoring forecast and actual cash flows, and by matching the

JEWAR TRANSMISSION LIMITED NEW DELHI

DARAPANENI & Co. Hyderabad Chartered Accountants

maturity profiles of financial assets and liabilities. Assessment of maturity profiles of financial assets and financial liabilities including debt financing plans and maintenance of Balance Sheet liquidity ratios are considered while reviewing the liquidity position.

The investments in mutual funds are for the purpose of liquidity management only and are held only overnight and hence not subject to any material price risk.

43 **Other disclosure pursuant to Ind AS 107 "Financial instruments: Disclosures":**

(i) **Category wise classification of applicable Financial Instruments:**

(₹ in crores)

Sl. No.	Particulars	As at March 31, 2023	As at March 31,2022
1	**Measured at fair value through Profit or Loss (FVTPL)**		
	(i) Financial Assets		
	a. Investment in Mutual Funds	25.65	19.70
2	**Measured at Amortised cost**		
	(i) Financial Assets		
	a. Investments	3858.87	3257.80
	b. Trade receivables	5326.85	4791.24
	c. Cash and Cash equivalents	1619.35	3217.68
	d. Bank balances other than above	981.03	2342.41
	e. Loans	7298.88	5432.14
	f. Other financial assets	3151.24	2526.59
	(ii) Financial Liabilities		
	Measured at Amortised cost		
	a. Borrowings	288.51	338.12
	b. Trade payables	5518.88	4805.46
	c. Lease liabilities	0.98	1.49
	d. Other financial liabilities	2663.41	2476.36

Items of income, expense, gains or losses related to financial instruments:

(₹ in crores)

Sl. No.	Particulars	2022-23	2021-22
1	**Other income/expense**		
	Income from Mutual funds		
	(i) Income from investments measured at FVTPL	0.56	0.99

JEMAR TRANSMISSION LIMITED NEW DELHI

DARAPANENI & Co. Hyderabad Chartered Accountants

(ii) **Fair value of financial assets and financial liabilities measured at amortised cost**
Financial assets measured at amortised cost:

The carrying amounts of trade receivables and cash and cash equivalents are considered to be the same as their fair values due to their short-term nature. The carrying amounts of long term loans given with floating rate of interest are considered to be close to the fair value.

Financial liabilities measured at amortised cost:

The carrying amounts of trade and other payables are considered to be the same as their fair values due to their short term nature. The carrying amounts of borrowings with floating rate of interest are considered to be close to the fair value.

(iii) **Fair value hierarchy of financial assets and liabilities measured at fair value**

(₹ in crores)

Sl. No.	Particulars	Investments at FVTPL
		Mutual Funds
1	**Financial Assets as at**	
	March 31,2023	25.65
	March 31,2022	19.70
	Fair value Hierarchy	Level 1
	Valuation techniques & key inputs used	Financial instruments are measured using quotes in active market

(iv) **Maturity profile of financial liabilities**

(₹ in crores)

Particulars	As at March 31, 2023			As at March 31, 2022		
	Within twelve months	After twelve months	Total	Within twelve months	After twelve months	Total
Borrowings	282.46	6.05	288.51	325.39	12.73	338.12
Trade payables	5518.88	-	5518.88	4805.46	-	4805.46
Lease liabilities	0.59	0.39	0.98	0.51	0.98	1.49
Other financial liabilities	1455.58	1207.83	2663.41	1032.51	1443.85	2476.36

44 **Deferred Tax**

Disclosure pursuant to Ind AS 12 "Income Taxes"
Tax charged to Profit and Loss account is after considering deferred tax impact for the timing difference between accounting income and taxable income.

The net deferred tax Asset/ (liability) as at March 31, 2023 comprise of the following:

(₹ in crores)

Particulars		As at March 31, 2023	As at March 31, 2022
A	**Deferred Tax Liability**		
	Related to Property, Plant and Equipment	136.79	113.44
	Others	1.04	(0.52)





(₹ in crores)

	Sub-Total	**137.83**	**112.92**
B	**Deferred Tax Asset**		
	Disallowances under Income tax Act	14.96	12.06
	Sub-Total	**14.96**	**12.06**
C	**Deferred tax (Asset)/Liability (net) (A-B)**	**122.87**	**100.86**

45 Corporate Social Responsibility (CSR)

(a) The Gross amount required to be spent as per section 135 of the Companies Act 2013 read with Schedule VII thereof by the Company during the year is ₹ 70.20 crores (Previous Year ₹ 64.17 crores)

(b) The amount spent in excess of mandatory requirement for FY 2020-21, 2021-22 and available for set off in succeeding financial years was ₹ 9.14 Crore. In FY 2022-23, an amount of ₹ 4.65 Crore was utilized against excess spent amount and balance of ₹ 4.49 Crore is carried forward to succeeding years.

(c) As per point (d) below, ₹ 31.99 Cr.(Previous year ₹ 19.97 Cr.) is contributed to MEIL Foundation which is a related party.

(d) Expenditure related to Corporate Social Responsibility is ₹ 65.55 crores (Previous Year ₹ 72.73 crores). The nature of amount spent towards CSR is given below:

(₹ in crores)

Particulars	**2022-23**	**2021-22**
Eradication of Hunger, Poverty, Providing health care, Water & Sanitation	13.68	12.10
Rural Development	4.26	2.33
Education & Self employment	7.52	27.43
Disaster Management – Covid 19 Support & others	-	30.87
Environmental sustainability	29.69	-
Promoting gender equality, empowering women, setting up old age homes, day care centers and such other facilities for senior citizens.	10.40	-
Total	**65.55**	**72.73**

46 Segment Reporting

In accordance with Ind AS 108 "Operating Segments", segment information has been given in the consolidated financial statements of Megha Engineering & Infrastructures Limited and therefore no separate disclosure on segment information is given in these financial statements.

47 Earnings Per Share

Particulars	**2022-23**	**2021-22**
Net Profit After Tax (₹ in crores)	2332.83	3016.09
Weighted Average Number of Equity shares of ₹ 10 each	15,60,10,000	15,18,34,658
Face value per share	₹ 10	₹ 10
Earnings Per Share (Basic & Diluted)	149.53	198.64

JEWAR TRANSMISSION LIMITED NEW DELHI

DARAPANENI & Co. Hyderabad

48 **Changes in liabilities arising from financing activities as required by Ind AS 7 "Statement of Cash Flows":**

(₹ in crores)

Particulars	Balance as at April 01,2022	Cash flows	As at March 31,2023
Current borrowings	319.22	(43.44)	275.78
Non-current borrowings (including current maturity)	18.90	(6.17)	12.73
Total	**338.12**	**(49.61)**	**288.51**

(₹ in crores)

Particulars	Balance as at April 01,2021	Cash flows	As at March 31,2022
Current borrowings	133.98	185.24	319.22
Non-current borrowings (including current maturity)	24.52	(5.62)	18.90
Total	**158.50**	**179.62**	**338.12**

49 In order to comply with the requirement of the Micro, Small and Medium Enterprises Development Act, 2006, Company has sought confirmation from the vendors whether they are falling in the category of Micro/Small/Medium Enterprises. Based on the information available, the required disclosures are given below:

(₹ in crores)

Particulars	As at March 31, 2023	As at March 31, 2022
Principal amount remaining unpaid	28.44	16.95
Interest due thereon	0.52	1.18
Interest paid by the Company in terms of Section 16 of Micro, Small and Medium Enterprises Development Act, 2006, along with the amount of the payment made to the supplier beyond the appointed day during the year.	-	-
Interest due and payable for the period of delay in making payment (which have been paid but beyond the appointed day during the year) but without adding the interest specified under Micro, Small and Medium Enterprises Development Act, 2006.	-	-
Interest accrued and remaining unpaid	2.71	2.19
Further interest remaining due and payable even in the succeeding years, until such date when the interest dues as above are actually paid to the small enterprise.	-	-

50 The Company has initiated legal proceedings against various parties for recovery of dues and such legal proceedings are pending at different stages as at the date of the Balance Sheet and are expected to materialize in recovering the dues in the future. Management is hopeful for their recovery. In the opinion of the management adequate balance is lying in General Reserve/ Retained earnings to meet the eventuality of such accounts being irrecoverable.

51 The Company has no transactions with the companies struck off under Companies Act, 2013 or Companies Act, 1956.

JEWAR TRANSMISSION LIMITED NEW DELHI

DARAPANENI & Co. Hyderabad Chartered Accountants

52 There is no income surrendered or disclosed as income during the current and previous year in the tax assessments under Income Tax Act, 1961, that has not been recorded in the books of account.

53 During the current year, there are no charges or satisfaction of charges which are yet to be registered with the Registrar of Companies beyond the statutory period.

54 No proceedings have been initiated on or are pending against the Company for holding any benami property under the Prohibition of Benami Transactions (Prohibition) Act, 1988 (as amended in 2016) (formerly Benami Transactions (Prohibition) Act, 1988) (45 of 1988) and Rules made there under.

55 The Company has not been declared wilful defaulter by any bank or financial institution or government or any government authority during the current year and previous year.

56 The Company has not traded or invested in crypto currency or virtual currency during the current and previous year.

57 The Company has borrowings from banks which are secured by a charge by way of hypothecation on the entire chargeable current assets of the Company. As per the terms of the sanction letters, the Company has filed monthly stock statements containing the closing stock and receivables details after the end of each month. The inventory and receivables values mentioned in monthly stock statements filed by the company with the banks are in agreement with the values of the books of account except for the following table and remarks

Period	Nature of the return or statement	Particulars	Amount submitted by the Company	Revised amount submitted by the Company	Difference	Remarks
Month ended March 2023	Monthly stock statement	Inventory value as at March 31,2023	3165.11	3395.51	230.4	The Inventory and receivables values provided to the banks initially on provisional basis on the due dates agreed with banks and the same got revised based on final balances post completion of year end finalisaiton.
Month ended March 2023	Monthly stock statement	Receivables values as at March 31, 2023	5131.19	5345.22	214.03	

58 The Company has written off Inter corporate deposit (ICD) for an amount of ₹ 5.64 Cr. given to MEIL Holdings Limited on account of losses incurred by its Subsidiary Bhadra Productions Limited (BPL) in its business operations.

59 The Company has complied with the number of layers prescribed under clause (87) of section 2 of the Companies Act, 2013, read with companies (Restriction on number of Layers) Rules 2017, and there are no Companies beyond the specified layers.

60 The Company has not entered into any scheme of arrangement which has an accounting impact on current and previous financial year.

61 The Company has not advanced or loaned or invested funds to related parties including foreign entities (Intermediaries) with the understanding that the Intermediary shall:

i. Directly or indirectly lend or invest in other persons or entities identified in any manner whatsoever by or on behalf of the Company (Ultimate Beneficiaries) or

ii. Provide any guarantee, security or the like to or on behalf of the ultimate beneficiary.

62 The Financial statements were approved for issue by the Board of directors on 08/09/2023.

JEMS TRANSMISSION LIMITED NEW DELHI

DARAPANENI & Co. Hyderabad Chartered Accountants

MEGHA ENGINEERING & INFRASTRUCTURES LIMITED

63 **Key Financial ratios:**
The ratios for the year ended Mar 31, 2023 and March 31, 2022 are as follows:

Particulars	Numerator	Denominator	March 31, 2023	March 31, 2022	Variance %
Current ratio (no of times)	Total Current assets	Total Current liabilities	1.84	1.75	6%
Debt equity ratio (no of times)	Borrowings (Current + Non-Current)	Equity Share capital + Other equity	0.01	0.02	-24%
Debt service coverage ratio (no of times) #	Profit after tax + Interest on Borrowings + Depreciation and amortisation expense + other non-cash items	Interest on Borrowings + Repayment of non-current Borrowings (including current maturities) during the current period/year	27.51	46.73	-41%
Return on Equity ratio (%) *	Profit/(loss) for the period	Average shareholders equity	11.60%	17.29%	-33%
Inventory turnover ratio (no of times) ##	Cost of material consumed + changes in inventories of finished goods and work-in-progress	Average Inventories	6.55	11.75	-44%
Trade Receivables turnover ratio (no of times)	Revenue from operations	Average Trade receivables (Non- current & Current)	5.11	4.92	4%
Trade payables turnover ratio (no of times)	Cost of material consumed + changes in inventories of finished goods and work in progress + Construction expenses + Sub-contract expenses + Other expenses	Average Trade payables	4.11	4.79	-14%
Net capital turnover ratio (no of times)	Revenue from operations	Average Working capital	2.70	2.92	-7%
Net profit ratio (%)	Profit/(loss) for the period	Revenue from operations	9.04%	11.24%	-20%
Return on Capital employed (%) *	Profit before tax + Interest on Borrowings	Tangible net worth@ + Total Debt+ Deferred tax liability	15.58%	22.28%	-30%
Return on investment (%) **	Earnings before Interest and Tax	Average Total assets	9.38%	13.65%	-31%

@Tangible Networth = Networth – Intangible assets – Intangible assets under development
Debt service coverage ratio is decreased due to decrease in profit after tax and one time write off of advances during previous year.
**The variance, which indicates a decrease in Return on Capital Employed (ROCE), and Return on Equity (ROE) when compared to the preceding year, can be attributed to a decline in pre-tax profit in the current year as compared to the previous year.
** Return on investment is decreased mainly due to increase in average total assets during the current year.
Inventory turnover ratio is decreased due to increase in average inventory while compared to the previous year.

JEWAR TRANSMISSION LIMITED NEW DELHI

DARAPANENI & Co Hyderabad Chartered Accountants

64 Figures for the previous year ended March 31, 2022, wherever necessary, have been regrouped, recast, rearranged to conform to the figures of the current year.

As per our report of even date
For Darapaneni & Co.,
Chartered Accountants
Firm Registration No.000685S

CA D.C.Naidu
Partner
Membership No:024643

For and on behalf of the Board of Directors

P.P.Reddy
Executive Chairman
DIN: 01450174

P.V.Krishna Reddy
Managing Director
DIN: 01815061

N.Thirupathi Rao
Whole-time Director & CFO
DIN: 00055610

N.Chandra Kala
Company Secretary
Membership No.ACS 32377

Place: Hyderabad
Date: September 08, 2023