



सत्यमेव जयते
भारत सरकार

Government of India

विद्युत मंत्रालय

Ministry of Power

केंद्रीय विद्युत प्राधिकरण

Central Electricity Authority

विद्युत प्रणाली योजना एवं मूल्यांकन प्रभाग- II

Power System Planning & Appraisal Division-II

सेवा में /To

As per list of Addresses

विषय: ट्रांसमिशन पर राष्ट्रीय समिति (एनसीटी) की पच्चीसवीं बैठक की कार्यसूची – के सम्बन्ध में।

Subject: Agenda for 25th Meeting of National Committee on Transmission (NCT) – regarding.

महोदया (Madam) / महोदय (Sir),

The 25th meeting of the "National Committee on Transmission" (NCT) has been scheduled as given below:

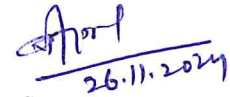
Date: 28th November, 2024

Time: 02:00 P.M.

Venue: Chintan, 2nd Floor, CEA, Sewa Bhawan, R.K. Puram Sector-1, New Delhi

Kindly make it convenient to attend the meeting.

भवदीय / Yours faithfully


26.11.2024

(बी.एस. बैरवा / B.S. Bairwa)

मुख्य अभियन्ता (इंचार्ज) एवं सदस्य सचिव, (एन.सी.टी.)/
Chief Engineer (I/C) & Member Secretary (NCT)

प्रतिलिपि / Copy to:

Joint Secretary (Trans), Ministry of Power, New Delhi

List of Addresses:

| | | | |
|---|--|----|--|
| 1 | Chairperson, Central Electricity Authority Sewa Bhawan, R.K. Puram, New Delhi – 110 066. | 2. | Member (Power Systems), Central Electricity Authority Sewa Bhawan, R.K. Puram, New Delhi – 110 066. |
| 3 | Member (Economic & Commercial), Central Electricity Authority Sewa Bhawan, R.K. Puram, New Delhi – 110 066. | 4. | Director (Trans), Ministry of Power Shram Shakti Bhawan, New Delhi-110001. |
| 5 | Sh. Lalit Bohra, Joint Secretary Room no 602, Atal Akshay Urja Bhawan Opposite CGO Complex gate no 2, Lodhi Road, New Delhi – 110003 | 6. | Chief Operating Officer, CTUIL, Floors No. 5-10, Tower 1, Plot No. 16, IRCON International Tower, Institutional Area, Sector 32, Gurugram, Haryana - 122001. |
| 7 | Sh. Rajnath Ram, Adviser (Energy), NITI Aayog, Parliament Street, New Delhi – 110 001. | 8. | CMD, Grid Controller of India, B-9 (1 st Floor), Qutub Institutional Area, Katwaria Sarai, New Delhi – 110016 |
| 9 | Sh. Ravinder Gupta Ex. Chief Engineer CEA | | |

Special Invitee

Chief Engineer (PCD), CEA

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Agenda for the 25th meeting of National Committee on Transmission

1 Confirmation of the minutes of the 24th meeting of National Committee on Transmission.

1.1 The minutes of the 24th meeting of NCT held on 23.10.2024 were issued on 22.11.2024 vide CEA letter No. CEA-PS-12-13/3/2019-PSPA-II. No comments have been received on the minutes.

1.2 Members may confirm the minutes.

2 Status of the transmission schemes noted/approved/recommended to MoP in the 24th meeting of NCT:

2.1 Status of new transmission schemes approved/recommended:

| Sr. No | Name of the Transmission Scheme | Noted/ Recommended/ Approved | Mode of Implementation | BPC | Award/ Gazette notification |
|--------|---|------------------------------|------------------------|----------------|---|
| 1. | Eastern Region Expansion Scheme-44 (ERES-44) | Approved | RTM | Not applicable | Informed to CTUIL vide letter dated 22.11.2024. CTUIL awarded the projects to the implementing agency on 25.11.2024 |
| 2. | Augmentation of transformation capacity at KPS3 (GIS) S/s under Khavda Phase-V Part B3 scheme | Approved | RTM | Not applicable | Informed to CTUIL vide letter dated 22.11.2024. CTUIL awarded the projects to the implementing agency on 25.11.2024 |
| 3. | Transmission system for Evacuation of Power from RE Projects in Rajgarh (1500 MW) SEZ in Madhya Pradesh-Phase III | Recommended | TBCB | RECPDCL | Informed to MoP vide letter dated 22.11.2024 |
| 4. | Transmission system for Evacuation of Power from RE Projects in Neemuch (1000 MW) SEZ in Madhya Pradesh-Phase II | Recommended | TBCB | PFCCCL | Informed to MoP vide letter dated 22.11.2024 |

| Sr. No | Name of the Transmission Scheme | Noted/ Recommended/ Approved | Mode of Implementation | BPC | Award/ Gazette notification |
|--------|---|------------------------------|------------------------|----------------|---|
| 5. | Supply and Installation of additional FOTE and Ethernet cards at AGC & Critical Nodes of SR Region | Approved | RTM | Not applicable | Informed to CTUIL vide letter dated 22.11.2024. CTUIL awarded the projects to the implementing agency on 25.11.2024 |
| 6. | Requirement of Additional FOTE at various ISTS nodes in ER due to exhaustion of existing capacity | Approved | RTM | Not applicable | Informed to CTUIL vide letter dated 22.11.2024. CTUIL awarded the projects to the implementing agency on 25.11.2024 |
| 7. | Deployment of FOTE (SDH Equipment) and amplifier solutions at Alipurduar S/s end for OPGW based communication and Teleprotection for 400 kV lines from PHEP-II, PHEP-I and Jigmeling of Bhutan to Alipurduar, India | Approved | RTM | Not applicable | Informed to CTUIL vide letter dated 22.11.2024. CTUIL awarded the projects to the implementing agency on 25.11.2024 |

2.2 Status of transmission schemes where modifications was suggested/approved in 24th NCT meeting:

| S. No. | Scheme where modifications was suggested | Status |
|--------|--|---|
| 1. | Revision in SCOD of 400 kV D/C Jhatikara-Dwarka line under REZ Phase-III Part-D Phase-II scheme | Informed to RECPDCL vide letter dated 22.11.2024 |
| 2. | Change in scope of Transmission system for evacuation of power from Rajasthan REZ Ph-V (Part-1: 4 GW) [Sirohi/Nagaur] Complex | Informed to RECPDCL vide letter dated 28.10.2024 |
| 3. | Bid process for selection of Bidder as Transmission Service Provider (TSP) to establish "Augmentation of transformation capacity at Bhuj-II PS (GIS)" and "Transmission system strengthening to facilitate evacuation of power from Bhadla/Bikaner complex | Minutes issued on 22.11.2024. Actions based on MoM will be sent to MoP shortly. |

3 Modifications in the earlier approved/notified transmission schemes

3.1 Post facto approval for modification in the scope of work of Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part 1) (Bikaner Complex) – Part-E

- 3.1.1 “Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part 1) (Bikaner Complex)” was deliberated in the 9th meeting of NCT held on 28.09.2022. NCT approved “Augmentation by 765/400 kV, 1x1500 MVA ICT (4th) at Bikaner (PG)” as Part E of the above scheme for implementation under RTM route by POWERGRID.
- 3.1.2 POWERGRID intimated CTUIL that there was space constraint and 765/400 kV ICT (4th) at Bikaner S/s can be accommodated after shifting of existing 01 No. of 765 kV bus reactor bank along with its spare, other related equipment and gantry towers (as required) to new diameter (to be constructed just after Adani line bays) on the other side of yard. However, this re-arrangement/shifting of 765/400 kV ICT (4th) was not mentioned in the minutes of 9th meeting of NCT and subsequently in the O.M. dated 15.11.2022 issued by CTUIL to POWERGRID. NRLDC while First Time Charging (FTC)/registration asked for the approval of above re-arrangement/shifting.
- 3.1.3 To discuss the issue, a meeting was held on 7th November, 2024 between CEA, CTUIL, Grid-India and POWERGRID. In the meeting, it was agreed that Shifting of existing 01 No. of 765 kV bus reactor bank along with its spare, other related equipment and gantry towers (as required) to new diameter (to be constructed just after Adani line bays) and thereafter the accommodation of 765/400 kV ICT (4th) in this vacant bay at Bikaner S/s may be completed by POWERGRID. Further, the matter will be taken up in forthcoming meeting of NCT for post facto approval for modification in the scope of work of Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part 1) (Bikaner Complex) – Part-E.
- 3.1.4 Members may approve.

4 New Transmission Schemes:

4.1 Augmentation of transformation capacity at 765/400 kV Sipat STPS in Chhattisgarh by 1x1500 MVA, 765/400 kV ICT (3rd).

- 4.1.1 NTPC Ltd. has applied for connectivity under GNA for its 800 MW Sipat Expansion project with start date requested from 31.08.2029. NTPC mentioned that the project will be at 765 kV switchyard (Bus Section-II, which is already connected with existing switchyard of Sipat STPS (3x660 MW + 2x500 MW).
- 4.1.2 CTUIL mentioned that existing 2x1000MVA, 765/400kV ICTs at Sipat STPS (implemented by NTPC) are observed to be critically loaded and also N-1 non-compliant in Solar Max Scenario even under reduced generation at Sipat STPS and without considering additional 800 MW Sipat Expansion project in 2028-29 timeframe. With the proposed 800 MW Sipat expansion project, loading on the ICTs are observed to be further aggravated.

4.1.3 Accordingly, CTUIL proposed that a transmission scheme “Augmentation of transformation capacity at 765/400 kV Sipat STPS switchyard in Chhattisgarh by 1x1500 MVA, 765/400kV ICT (3rd)” with following scope is proposed (detailed agenda is enclosed at (Annexure 4.1)

| Sl. No. | Scope of the Transmission Scheme | Capacity |
|---------|--|--|
| 1. | Augmentation of transformation capacity at Sipat STPS by 1x1500 MVA, 765/400 kV ICT (3 rd) | <ul style="list-style-type: none"> 1500 MVA, 765/400 kV ICT-1 No. (4x500 MVA Incl. spare) 765 kV ICT Bay: 1 No. 400 kV ICT Bay: 1 No. |

Note:

1. NTPC to provide space as well as unrestricted access to their switchyard for carrying out the above works
2. The ICT is to be placed at 765 kV Bus Section-II by utilising bay no. 23 at 765 kV side and Bay no. 21 on 400 kV side. For both these bays, tie bay is existing and Main bay is to be constructed. Further, Connection of 400 kV side of ICT-3 with associated 400 kV bay requires crossing under 765 kV Sipat-Bilaspur-1, 2 and 3 lines through BPIs at 8m equipment height or suitable gantry arrangement.

4.1.4 Estimated Cost of the scheme is INR 136 Crore with implementation timeframe of 24 months.

4.1.5 Members may deliberate.

4.2 Transmission system for proposed Green Hydrogen / Green Ammonia projects in Kakinada area, Andhra Pradesh (Phase-I)

4.2.1 About 6000 MW demand has been envisaged for the Green Hydrogen / Green Ammonia projects in Kakinada area. The details of the phased development are as follows:

| Year | Cumulative Electricity Demand (MW) |
|---------|------------------------------------|
| by 2027 | 1775 |
| by 2028 | 3275 |
| by 2029 | 4645 |
| by 2030 | 6015 |

4.2.2 Applications have been received by CTUIL from M/s AM Green Ammonia (India) Pvt. Ltd. seeking GNARE for 700 MW and 1300 MW as “Bulk Consumer seeking to connect to ISTS” in Kakinada area as per below details:

| Name of the Applicant | Application for | GNA Breakup (Within & outside region) | Location details of Connectivity GNA requested | Start date of Connectivity/ GNA (requested) |
|------------------------------------|-------------------|---------------------------------------|--|---|
| AM Green Ammonia (India) Pvt. Ltd. | GNA _{RE} | 700 (outside the region) | Kakinada | 01.07.2026 |
| AM Green Ammonia (India) Pvt. Ltd. | GNA _{RE} | 1300 (outside the region) | Kakinada | 01.01.2027 |

4.2.3 The applications are under discussion for grant of GNA in CMETS meeting. Further AM Green Ammonia (India) Private Limited vide email dated 20.01.2024 has indicated that they are in the process of developing a 2 MPTA Green Ammonia Project in Kakinada, Andhra Pradesh in phased manner. The total drawl requirement for the entire Green Ammonia Kakinada project capacity is 3370 MW.

4.2.4 In view of the upcoming Green Hydrogen / Green Ammonia plants / industries, planning of transmission system has been done for delivery of power to Green Hydrogen / Ammonia manufacturing projects at Kakinada in Andhra Pradesh. After discussion, CEA & CTU identified following transmission system for supply of power at Kakinada to potential Green Hydrogen / Green Ammonia projects

Transmission system for proposed Green Hydrogen / Green Ammonia projects in Kakinada area

Phase-I: 3000 MW

- Establishment of Kakinada 765/400 kV, 3x1500 MVA substation
- LILO of Vemagiri – Srikakulam 765 kV D/c line at Kakinada substation

Note*: Angul – Srikakulam 765 kV 2nd D/c line shall be required which is to be taken up for enhancement of TTC/ATC

Phase-II: Cumulative 6000 MW

- Augmentation by 3x1500 MVA, 765/400 kV ICTs at Kakinada substation
- Establishment of Khammam-II 765/400 kV, 3x1500 MVA substation
- Warangal – Khammam-II 765 kV D/c line
- Khammam-II – Vemagiri 765 kV D/c line
- Khammam-II – Khamman (existing) 400 kV D/c (quad) line
- Vemagiri – Kakinada 765 kV 2nd D/c line

4.2.5 Accordingly a transmission scheme “Transmission system for proposed Green Hydrogen / Green Ammonia projects in Kakinada area (Phase-I)” with following scope is proposed (detailed agenda is enclosed at (Annexure 4.2)

| Sl. No. | Scope of the Transmission Scheme | Capacity /km |
|---------|---|--|
| 1. | Establishment of Kakinada GH 765/400 kV, 3x1500 MVA substation alongwith 240 MVA bus reactor Future Space Provisions: <ul style="list-style-type: none"> • 765/400 kV, 1500 MVA, ICTs – 3 Nos. • 765 kV ICT bays – 3 Nos. • 400 kV ICT bays – 3 Nos. • 765 kV line bays – 8 Nos. (with provision for SLR) • 400 kV line bays – 12 Nos. (with provision for SLR) • 400 kV Bus Sectionalizer : 1 set | 3x1500 MVA, 765/400 kV ICT <ul style="list-style-type: none"> • 765 kV ICT bay – 3 Nos. • 400 kV ICT bay – 3 Nos. • 765 kV line bays – 4 Nos. (at Kakinada GH for termination of LILO of Srikakulam – Vemagiri 765 kV D/c line) • 765 kV, 240 MVA Bus Reactor – 1 Nos. (4x80 MVA inc. 1 switchable spare unit for both bus reactor and line reactor) |

| Sl. No. | Scope of the Transmission Scheme | Capacity /km |
|---------|---|---|
| | | <ul style="list-style-type: none"> • 765 kV Bus Reactor bays – 1 No. |
| 2. | LILO of Vemagiri – Srikakulam 765 kV D/c line at Kakinada GH substation (~20 km) {with 240 MVar SLR at Kakinada GH end on Srikakulam – Kakinada GH section (~334 km)} | ~20 km 765 kV, 240 MVar SLR at Kakinada GH – 2 Nos. (6x80 MVar switchable units) |

4.2.6 The transmission system was also deliberated and agreed in the 52nd SRPC meeting held on 03.08.2024 with a rider that bidding/execution/implementation of the transmission schemes shall be taken up only when the Green Hydrogen & Green Ammonia loads have entered into second stage like land tie up etc. or some level of certainty is attained.

4.2.7 Estimated Cost of the scheme is INR 1040 Crore with implementation timeframe of 24 months.

4.2.8 Members may deliberate.

4.3 Consideration of GIS station in place of AIS station for various transmission schemes:

- 4.3.1 Transmission System for Offshore wind farm in Tamil Nadu {500 MW VGF} was recommended under RTM to POWERGRID by NCT in its 20th meeting with tentative implementation timeframe of 31st March 2030. Scope of the scheme interalia includes Establishment of 2x500 MVA, 400/230 kV Onshore Pooling Station near Avaraikulam, Tirunelveli District in Tamil Nadu.
- 4.3.2 Subsequently, POWERGRID vide email dated 11.10.2024 has communicated that considering the location of proposed Onshore Pooling station which would be very close to the coastal area, there is a significant risk of equipment corrosion due to the presence of saline environment which may affect both the reliability and safety of the substation. Accordingly, POWERGRID have proposed that the above Onshore Pooling station may be developed with GIS technology for addressing the salinity issue of coastal zone as well as reduction of land requirements.
- 4.3.3 Further, transmission system for proposed Green Hydrogen I Green Ammonia projects in Tuticorin area was agreed for implementation through TBCB route in the 22nd NCT meeting held on 23.08.2024 with RECPDCL as BPC and the transmission scheme is under bidding stage. This transmission scheme involves establishment of 3x1500 MVA, 765/400 kV Tuticorin (GH) S/s (AIS). Further the Transmission system for proposed Green Hydrogen / Green Ammonia projects in Kakinada area, Andhra Pradesh (Phase-I) has been discussed above which involves establishment of 3x1500 MVA, 765/400 kV Kakinada GH S/s (AIS).
- 4.3.4 As per the Report of Task Force on Cyclone Resilient Robust Electricity Transmission and Distribution Infrastructure in the Coastal areas, May 2021, the measures recommended for future / new Transmission substations are as follows:
- a) The construction of compact & modular indoor GIS installations up to 60km from the coastline above the historical water stagnation / logging level (based on locally available data) or Highest Flood Level (HFL)
- 4.3.5 In view of the communication from POWERGRID and recommendations under the task force report, CTUIL has proposed to consider Avairakulam Onshore PS, Tuticorin GH 765/400kV S/s and Kakinada GH 765/400kV S/s as GIS station in place of AIS stations.
- 4.3.6 The estimated cost of the schemes considering AIS vis a vis GIS is as tabulated below:

| Sl. No. | Transmission scheme | Name of the Substation | Estimated cost (in Cr.) | | |
|---------|--|----------------------------|-------------------------|--------|------------|
| | | | AIS | GIS | Difference |
| 1. | Transmission System for Offshore wind farm in Tamil Nadu {500 MW VGF} | Avairakulam Onshore PS | 6242 | 6269 | 27 |
| 2. | Transmission system for proposed Green Hydrogen / Green Ammonia projects in Tuticorin area | Tuticorin GH 765/400kV S/s | 2617 | 2813 | 196 |
| 3. | Transmission system for proposed | Kakinada GH | 1040 | 1233.5 | 193.5 |

| Sl. No. | Transmission scheme | Name of the Substation | Estimated cost (in Cr.) | | |
|---------|--|------------------------|-------------------------|-----|------------|
| | | | AIS | GIS | Difference |
| | Green Hydrogen / Green Ammonia projects in Kakinada area, Andhra Pradesh (Phase-I) | 765/400kV S/s | | | |

4.3.7 Members may deliberate.

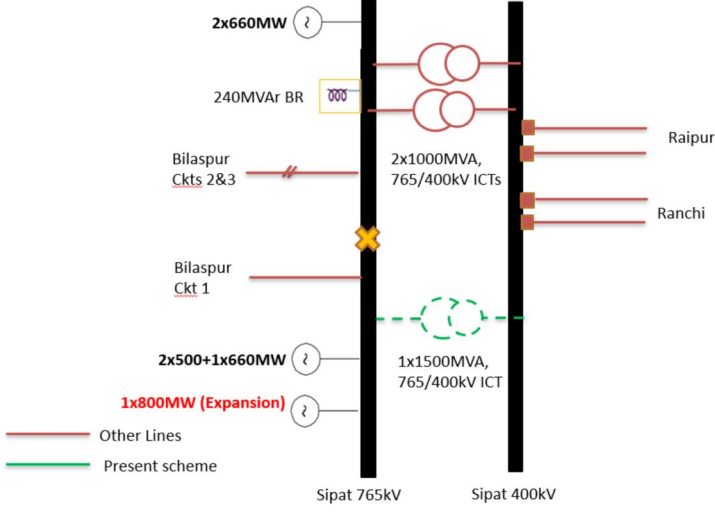
5 Status of the bids under process by BPCs

5.1 The BPCs (RECPDCL and PFCCL) to make presentations on status of bids under process.

6 Any other issues, with permission of chair

Annexure-4.1

| S. No. | Items | Details | | |
|--|---------------------|--|---|---|
| 1. | Name of Scheme | Augmentation of transformation capacity at 765/400kV Sipat STPS in Chhattisgarh by 1x1500 MVA, 765/400kV ICT (3rd) to cater to the N-1 contingency requirements | | |
| 2. | Scope of the scheme | Sl. No. | Scope of the Transmission Scheme | Capacity |
| | | 2. | Augmentation of transformation capacity at Sipat STPS by 1x1500MVA, 765/400kV ICT (3rd) | 1500MVA, 765/400kV ICT-1 No. (4x500MVA Incl. spare) 765kV ICT Bay: 1 No. 400kV ICT Bay: 1 No. |
| Note: | | | | |
| <p>3. NTPC to provide space as well as unrestricted access to their switchyard for carrying out the above works</p> <p>4. The ICT is to be placed at 765kV Bus Section-II by utilising bay no. 23 at 765kV side and Bay no. 21 on 400kV side. For both these bays, tie bay is existing and Main bay is to be constructed. Further, Connection of 400kV side of ICT-3 with associated 400kV bay requires crossing under 765kV Sipat-Bilaspur-1, 2 and 3 lines through BPIs at 8m equipment height or suitable gantry arrangement.</p> | | | | |

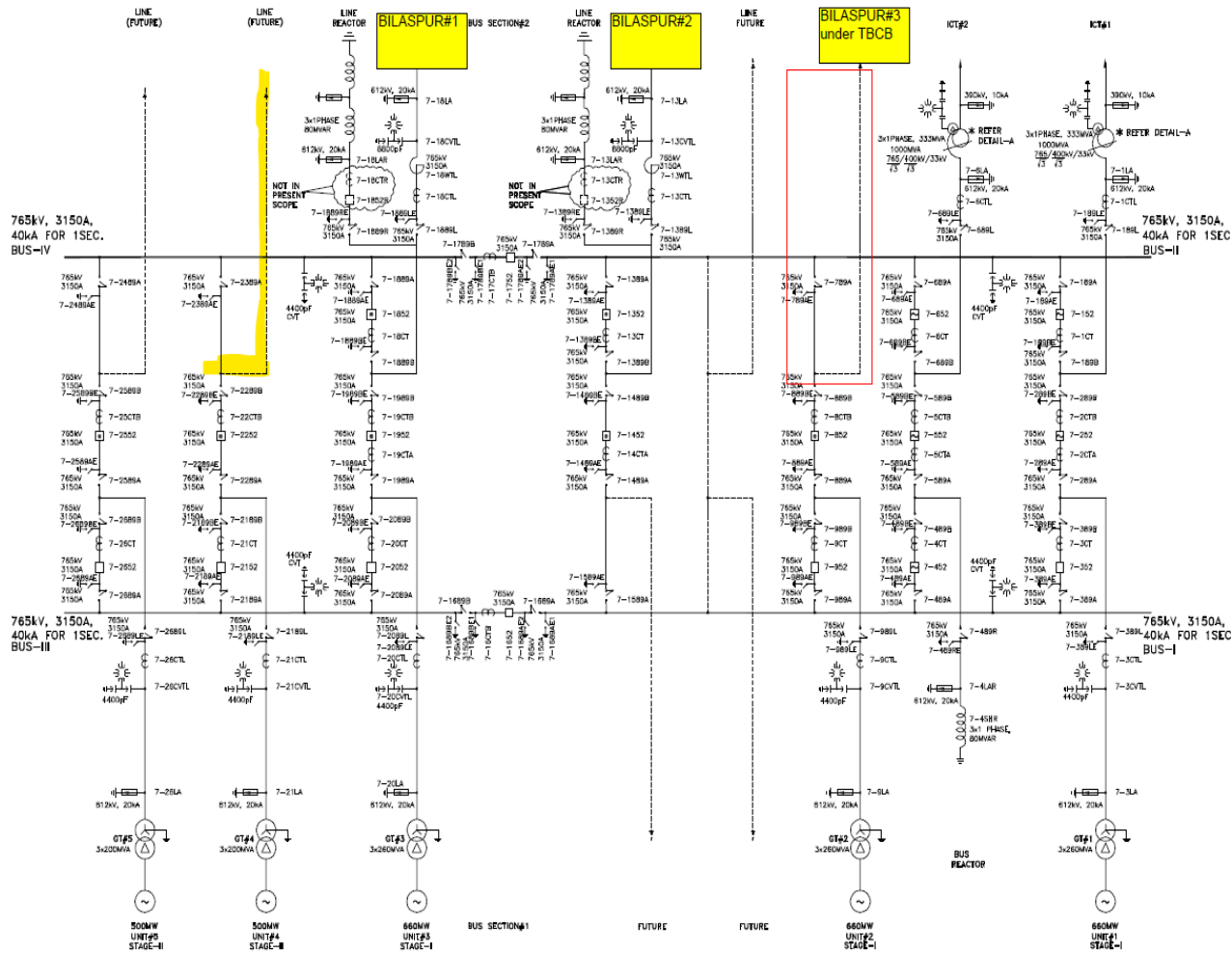
| S. No. | Items | Details |
|--------|--|--|
| 3. | Depiction of the scheme on Transmission Grid Map |  <p>The 765kV Switchyard SLD is enclosed at Exhibit-I. 765kV Sectionaliser remains normally closed.</p> |
| 4. | Upstream/downstream system associated with the scheme | <ul style="list-style-type: none"> • Sipat Super Thermal Power Station (or Rajiv Gandhi Super Thermal Power Station) is located at Sipat in Bilaspur district in state of Chhattisgarh. • The project has an installed capacity of 2980 MW consisting of two stages: <ul style="list-style-type: none"> o Stage-I (3x660MW) o Stage-II (2x500MW) • The 2x660MW units along with Bilaspur ckts 2&3 & 2x1000MVA 765/400kV ICTs are presently connected on 765kV Bus Section-I & 2x500+1x660MW Units along with Bilaspur ckt 1 are presently connected on 765kV Bus Section-II. • The Expansion project (1x800MW MW) is coming up at 765kV Bus Section-II. |
| 5. | Objective / Justification | <p>Existing 2x1000MVA, 765/400kV ICTs at Sipat STPS are seen to be overloaded in system studies in Solar Max Scenario even under reduced generation at Sipat STPS. NTPC Ltd. has also applied for connectivity under GNA for its 800MW Sipat Expansion project with start date requested from 31.08.2029 (as per e-mail dated 24.10.2024). NTPC has informed that the project will be at 765kV switchyard (Bus Section-II, which is already connected with existing switchyard of Sipat STPS (3x660MW +</p> |

| S. No. | Items | Details |
|--------|---|---|
| | | <p>2x500MW).</p> <p>The 2x1000MVA, 765/400kV ICTs at Sipat STPS have been implemented by NTPC themselves. However, in the studies in Solar Max Scenario, existing 2x1000MVA, 765/400kV ICTs are observed to be critically loaded & also N-1 non-compliant even without considering additional 800MW Sipat Expansion project. With the proposed 800MW Sipat expansion project, loading on the ICTs are observed to be further aggravated. Accordingly, the proposed network expansion scheme consisting of 1x1500MVA, 3rd ICT at Sipat STPS was discussed and agreed in 30th CMETS-WR meeting held on 02.07.2024. Subsequently, based on certain observations from CEA, a meeting was convened by CEA amongst CEA, CTU & GRID-India on 13.11.2024 wherein the proposed ICT augmentation at NTPC Sipat was agreed to cater to N-1 compliance of existing ICTs & also to serve as Common Transmission System Augmentation for Connectivity under GNA for Sipat STPS 800MW expansion project.</p> |
| 6. | Estimated Cost | Rs. 136 Cr. |
| 7. | Impact on the total Annual Transmission charges (ATC) in % along with the existing ATC | <p>A. ATC (considering levelized tariff @15% of estimated cost): about ₹20.4 Crs.</p> <p>B. Present ATC: ₹46892.34 Crore *</p> <p>C. A/B: about 0.0435%</p> |
| 8. | Need of phasing, if any | Not Applicable |
| 9. | Implementation timeframe | 24 months from date of allocation to implementing agency |
| 10. | Inclusion of any wildlife/protected area along the transmission line route | N.A. |
| 11. | Deliberations with RPC along with their | The estimated cost of the scheme is less than INR 500 Cr. Accordingly, the same is not required to be sent to WRPC |

| S. No. | Items | Details |
|--------|---|--|
| | comments | for deliberation in line with MoP office order no. 15/3/2018-Trans-Pt(5) dated 28-10-2021 regarding reconstitution of NCT. |
| 12. | System Study for evolution of the proposal | <ul style="list-style-type: none"> • Joint site visit to 765kV/400kV Sipat STPP generation switchyard was carried out on 20.06.2024 by representatives from CTUIL, NTPC Sipat EMD team and NTPC Engineering for space feasibility for installation of 1500MVA 765/400kV ICT (3rd) at Sipat STPP generation switchyard. • Based on findings of the site visit team, the scheme was discussed and agreed in the 30th CMETS-WR meeting held on 02.07.2024. <p>In the 30th CMETS-WR meeting, it emerged that since the Sipat expansion project of 800MW is coming on 765kV Bus Section-II (where 2x500+1x660MW Units along with Bilaspur ckt 1 are also connected & there is no 765/400kV ICT on this section), the 765/400kV ICT may be placed at Bus Section-II by utilising bay no. 23 at 765kV side and Bay no. 21 on 400kV side, as it helps to keep the current distribution even. The ICT shall ensure N-1 compliance of already existing 765/400kV, 2x1000MVA ICTs at Sipat STPS.</p> <ul style="list-style-type: none"> • Thereafter, the scheme was reviewed in a meeting held on 13.11.2024 convened by CEA with CTUIL & GRID-INDIA. |

**Total YTC allowed for Sep'24, as per notification of transmission charges payable by DICs for Billing Month of Nov, 2024 dated 25.10.2024 published on NLDC website (available at <https://posoco.in/transmission-pricing/notification-of-transmission-charges-for-the-dics/>).*

Exhibit-I



Annexure-4.2**Transmission system for proposed Green Hydrogen / Green Ammonia projects in Kakinada area (Phase-I)**

A meeting was held on 19.10.2023 chaired by Hon'ble Minister with Green Hydrogen stakeholders/association, wherein it was decided that developers shall share the details of year-wise planned Green Ammonia / Green Methanol capacities and corresponding drawl capacities desired at different locations. It was also decided that this information should be shared with CTU for planning the required substation capacities at these specified locations. MNRE vide letter dated 01.11.2023 has forwarded the consolidated information of the planned projects and drawl requirements of various developers, copy of letter enclosed at Annexure-I.

As per the Communication from MNRE and the meeting held in CEA, about 6000 MW demand has been envisaged for the Green Hydrogen / Green Ammonia projects in Kakinada area. The details of the phased development are as follows:

| Year | Cumulative Electricity Demand (MW) |
|---------|------------------------------------|
| by 2027 | 1775 |
| by 2028 | 3275 |
| by 2029 | 4645 |
| by 2030 | 6015 |

CTU has already received applications from M/s AM Green Ammonia (India) Pvt. Ltd. seeking GNARE for 700 MW and 1300 MW as "Bulk Consumer seeking to connect to ISTS" in Kakinada area as per below details:

| Name of the Applicant | Application for | GNA Breakup (Within outside region) & | Location details of Connectivity & GNA requested | Start date of Connectivity/ GNA (requested) |
|------------------------------------|-----------------|---------------------------------------|--|---|
| AM Green Ammonia (India) Pvt. Ltd. | GNARE | 700 (outside region) | the Kakinada | 01.07.2026 |
| AM Green Ammonia (India) Pvt. Ltd. | GNARE | 1300 (outside region) | the Kakinada | 01.01.2027 |

The applications are under discussion for grant of GNA in CMETS meeting. Further AM Green Ammonia (India) Private Limited vide email dated 20.01.2024 has indicated that they are in the

process of developing a 2 MPTA Green Ammonia Project in Kakinada, Andhra Pradesh in phased manner. The total drawl requirement for the entire Green Ammonia Kakinada project capacity is 3370 MW. The details of the phased development are as follows:

| Year | Electricity Demand (MW) |
|-----------|-------------------------|
| Phase I | 700 |
| Phase II | 700 |
| Phase III | 1300 |
| Phase IV | 660 |

In view of the upcoming Green Hydrogen / Green Ammonia plants / industries, planning of transmission system has been done for delivery of power to Green Hydrogen / Ammonia manufacturing projects at Kakinada in Andhra Pradesh. After discussion, CEA & CTU identified following transmission system for supply of power at Kakinada to potential Green Hydrogen / Green Ammonia projects :

Transmission system for proposed Green Hydrogen / Green Ammonia projects in Kakinada area

Phase-I : 3000 MW

- Establishment of Kakinada 765/400 kV, 3x1500 MVA substation
- LILO of Vemagiri – Srikakulam 765 kV D/c line at Kakinada substation

Note* : Angul – Srikakulam 765 kV 2nd D/c line shall be required which is to be taken up for enhancement of TTC/ATC

Phase-II : Cumulative 6000 MW

- Augmentation by 3x1500 MVA, 765/400 kV ICTs at Kakinada substation
- Establishment of Khammam-II 765/400 kV, 3x1500 MVA substation
- Warangal – Khammam-II 765 kV D/c line
- Khammam-II – Vemagiri 765 kV D/c line
- Khammam-II – Khammam (existing) 400 kV D/c (quad) line
- Vemagiri – Kakinada 765 kV 2nd D/c line

The transmission system for proposed Green Hydrogen / Green Ammonia projects in Kakinada area was deliberated in the 33rd CMETS-SR meeting held on 25.07.2024 and 31.07.2024. After detailed deliberations, the proposal for “Transmission system for proposed Green Hydrogen / Green Ammonia projects in Kakinada area, Andhra Pradesh (Phase-I)” was agreed, the details of the scheme are as below:

Transmission system for proposed Green Hydrogen / Green Ammonia projects in Kakinada area (Phase-I)

- Establishment of Kakinada 765/400 kV, 3x1500 MVA substation along with bus reactor
- LILO of Vemagiri – Srikakulam 765 kV D/c line at Kakinada substation

Note * : Angul – Srikakulam 765 kV 2nd D/c line shall be required which is to be taken up for enhancement of TTC / ATC

The Angul – Srikakulam 765 kV 2nd D/c line shall be required for meeting the Green Hydrogen / Green Ammonia demand in SR in general and Kakinada area in particular.

The transmission system was also deliberated and agreed in the 52nd SRPC meeting held on 03.08.2024 with a rider that bidding/execution/implementation of the transmission schemes shall be taken up only when the GH & GA loads have entered into second stage like land tie up etc. or some level of certainty is attained.

Further MS, SRPC vide letter dated 02.09.2024 has forwarded the views of SRPC.

Details of the scheme is summarized as below:

Transmission system for proposed Green Hydrogen / Green Ammonia projects in Kakinada area (Phase-I)

| Sl. No. | Items | Details | | | | | | |
|---------|--|--|---------|----------------------------------|--------------|----|--|---|
| 1 | Name of Scheme | Transmission system for proposed Green Hydrogen / Green Ammonia projects in Kakinada area (Phase-I) | | | | | | |
| 2 | Scope of the scheme | <table border="1"> <thead> <tr> <th>Sl. No.</th> <th>Scope of the Transmission Scheme</th> <th>Capacity /kM</th> </tr> </thead> <tbody> <tr> <td>3.</td> <td>Establishment of Kakinada GH 765/400 kV, 3x1500 MVA ICT substation alongwith 240 MVA bus reactor Future Space Provisions: <ul style="list-style-type: none"> 765/400kV, 1500 MVA, ICTs – 3 nos. 765kV ICT bays – 3 nos. 400kV ICT bays – 3 nos. 765kV line bays – 8 nos. (with provision for SLR) 400kV line bays – 12 nos. (with provision for SLR) </td> <td>3x1500 MVA, 765/400kV <ul style="list-style-type: none"> 765kV ICT bay – 3 Nos. 400kV ICT bay – 3 Nos. 765kV line bays – 4 nos. (at Kakinada GH for termination of LILO of Srikakulam – Vemagiri 765 kV D/c line) 765 kV, 240 MVA Bus Reactor – 1 nos. </td> </tr> </tbody> </table> | Sl. No. | Scope of the Transmission Scheme | Capacity /kM | 3. | Establishment of Kakinada GH 765/400 kV, 3x1500 MVA ICT substation alongwith 240 MVA bus reactor Future Space Provisions: <ul style="list-style-type: none"> 765/400kV, 1500 MVA, ICTs – 3 nos. 765kV ICT bays – 3 nos. 400kV ICT bays – 3 nos. 765kV line bays – 8 nos. (with provision for SLR) 400kV line bays – 12 nos. (with provision for SLR) | 3x1500 MVA, 765/400kV <ul style="list-style-type: none"> 765kV ICT bay – 3 Nos. 400kV ICT bay – 3 Nos. 765kV line bays – 4 nos. (at Kakinada GH for termination of LILO of Srikakulam – Vemagiri 765 kV D/c line) 765 kV, 240 MVA Bus Reactor – 1 nos. |
| Sl. No. | Scope of the Transmission Scheme | Capacity /kM | | | | | | |
| 3. | Establishment of Kakinada GH 765/400 kV, 3x1500 MVA ICT substation alongwith 240 MVA bus reactor Future Space Provisions: <ul style="list-style-type: none"> 765/400kV, 1500 MVA, ICTs – 3 nos. 765kV ICT bays – 3 nos. 400kV ICT bays – 3 nos. 765kV line bays – 8 nos. (with provision for SLR) 400kV line bays – 12 nos. (with provision for SLR) | 3x1500 MVA, 765/400kV <ul style="list-style-type: none"> 765kV ICT bay – 3 Nos. 400kV ICT bay – 3 Nos. 765kV line bays – 4 nos. (at Kakinada GH for termination of LILO of Srikakulam – Vemagiri 765 kV D/c line) 765 kV, 240 MVA Bus Reactor – 1 nos. | | | | | | |

| Sl. No. | Items | Details | |
|---------|---|--|---|
| | | <ul style="list-style-type: none"> 400kV Bus Sectionalizer : 1 set | <ul style="list-style-type: none"> (4x80 MVAR inc. 1 switchable spare unit for both bus reactor and line reactor) 765 kV Bus Reactor bays – 1 no. |
| | | <p>4. LILO of Vemagiri – Srikakulam 765 kV D/c line at Kakinada GH substation (~20 km) {with 240 MVAR SLR at Kakinada GH end on Srikakulam – Kakinada GH section (~334 km)}</p> | <p>~20 km 765 kV, 240 MVAR SLR at Kakinada GH – 2 nos. (6x80 MVAR switchable units)</p> |
| 3 | <p>Depiction of the scheme on Transmission Grid Map</p> | <p>Annexure-II</p> | |
| 4 | <p>Upstream/downstream system associated with the scheme</p> | <p>Not applicable</p> | |
| 5 | <p>Objective / Justification</p> | <p>A meeting was held on 19.10.2023 chaired by Hon'ble Minister with Green Hydrogen stakeholders/association, wherein it was decided that developers shall share the details of year-wise planned Green Ammonia / Green Methanol capacities and corresponding drawl capacities desired at different locations. It was also decided that this information should be shared with CTU for planning the required substation capacities at these specified locations. MNRE vide letter dated 01.11.2023 has forwarded the consolidated information of the planned projects and drawl requirements of various developers.</p> <p>As per the Communication from MNRE and the meeting held in CEA, about 6000 MW demand has been envisaged for the Green Hydrogen / Green Ammonia projects in Kakinada area.</p> | |

| Sl. No. | Items | Details | | | | | | | | | | |
|---------|------------------------------------|--|------|------------------------------------|---------|------|---------|------|---------|------|---------|------|
| | | <p>The details of the phased development are as follows:</p> <table border="1" data-bbox="616 389 1430 741"> <thead> <tr> <th data-bbox="616 389 844 461">Year</th> <th data-bbox="844 389 1430 461">Cumulative Electricity Demand (MW)</th> </tr> </thead> <tbody> <tr> <td data-bbox="616 461 844 533">by 2027</td> <td data-bbox="844 461 1430 533">1775</td> </tr> <tr> <td data-bbox="616 533 844 604">by 2028</td> <td data-bbox="844 533 1430 604">3275</td> </tr> <tr> <td data-bbox="616 604 844 676">by 2029</td> <td data-bbox="844 604 1430 676">4645</td> </tr> <tr> <td data-bbox="616 676 844 741">by 2030</td> <td data-bbox="844 676 1430 741">6015</td> </tr> </tbody> </table> <p>CTU has already received applications from M/s AM Green Ammonia (India) Pvt. Ltd. seeking GNARE for 700 MW and 1300 MW as “Bulk Consumer seeking to connect to ISTS” in Kakinada area. The applications are under discussion for grant of GNA in CMETS meeting. Further AM Green Ammonia (India) Private Limited vide email dated 20.01.2024 has indicated that they are in the process of developing a 2 MPTA Green Ammonia Project in Kakinada, Andhra Pradesh in phased manner. The total drawl requirement for the entire Green Ammonia Kakinada project capacity is 3370 MW.</p> <p>In view of the upcoming Green Hydrogen / Green Ammonia plants / industries, planning of transmission system has been done for delivery of power to Green Hydrogen / Ammonia manufacturing projects at Kakinada in Andhra Pradesh. After discussion, CEA & CTU identified following transmission system for supply of power at Kakinada to potential Green Hydrogen / Green Ammonia projects :</p> <p>Transmission system for proposed Green Hydrogen / Green Ammonia projects in Kakinada area</p> <p>Phase-I : 3000 MW</p> <ul style="list-style-type: none"> • Establishment of Kakinada 765/400 kV, 3x1500 MVA substation • LILO of Vemagiri – Srikakulam 765 kV D/c line at Kakinada substation <p>Note * : Angul – Srikakulam 765 kV 2nd D/c line shall be required which is to be taken up for enhancement of TTC/ATC</p> | Year | Cumulative Electricity Demand (MW) | by 2027 | 1775 | by 2028 | 3275 | by 2029 | 4645 | by 2030 | 6015 |
| Year | Cumulative Electricity Demand (MW) | | | | | | | | | | | |
| by 2027 | 1775 | | | | | | | | | | | |
| by 2028 | 3275 | | | | | | | | | | | |
| by 2029 | 4645 | | | | | | | | | | | |
| by 2030 | 6015 | | | | | | | | | | | |

| Sl. No. | Items | Details |
|---------|-------|--|
| | | <p>Phase-II : Cumulative 6000 MW</p> <ul style="list-style-type: none"> • Augmentation by 3x1500 MVA, 765/400 kV ICTs at Kakinada substation • Establishment of Khammam-II 765/400 kV, 3x1500 MVA substation • Warangal – Khammam-II 765 kV D/c line • Khammam-II – Vemagiri 765 kV D/c line • Khammam-II – Khamman (existing) 400 kV D/c (quad) line • Vemagiri – Kakinada 765 kV 2nd D/c line <p>The transmission system for proposed Green Hydrogen / Green Ammonia projects in Kakinada area was deliberated in the 33rd CMETS-SR meeting held on 25.07.2024 and 31.07.2024 (Copy of MoM attached at Annexure-III). After detailed deliberations, the proposal for “Transmission system for proposed Green Hydrogen / Green Ammonia projects in Kakinada area, Andhra Pradesh (Phase-I)” was agreed, the details of the scheme are as below:</p> <p>Transmission system for proposed Green Hydrogen / Green Ammonia projects in Kakinada area (Phase-I)</p> <ul style="list-style-type: none"> • Establishment of Kakinada 765/400 kV, 3x1500 MVA substation alongwith bus reactor • LILO of Vemagiri – Srikakulam 765 kV D/c line at Kakinada substation <p>Note * : Angul – Srikakulam 765 kV 2nd D/c line shall be required which is to be taken up for enhancement of TTC / ATC</p> <p>The Angul – Srikakulam 765 kV 2nd D/c line shall be required for meeting the Green Hydrogen / Green Ammonia demand in SR in general and Kakinada area in particular.</p> <p>The transmission system was also deliberated and agreed in the 52nd SRPC meeting held on 03.08.2024 with a rider that bidding / execution / implementation of the transmission schemes shall be taken up only when the GH & GA loads have entered into second stage like land tie up etc. or some level of certainty is attained.</p> <p>Further MS, SRPC vide letter dated 02.09.2024 has forwarded</p> |

| Sl. No. | Items | Details |
|---------|---|--|
| | | the views of SRPC |
| 6 | Estimated Cost | Rs. 1040 Crore |
| 7 | Impact on the total Annual Transmission charges in % along with the existing ATC | A. ATC (considering Levelized Tariff @15% of estimated cost): Rs. 156 Crore B. Present ATC: Rs. 46892.34 Crore * C. A/B (%): 0.332 % |
| 8 | Need of phasing, if any | Not Applicable |
| 9 | Implementation timeframe | 24 Months |
| 10 | Inclusion of any wild life/protected area along the transmission line route | No major National Park, Wildlife Sanctuary or other protected areas observed. However, for details of forest/protected areas, survey is required to be done. |
| 10.11 | Deliberations with RPC along with their comments | The scheme was discussed in the 52 nd SRPC meeting held on 03.08.2024 (Copy of SRPC MOM attached at Annexure-IV). SRPC vide letter dated 02.09.2024 has forwarded the views of Southern Region constituents (Copy of SRPC views attached at Annexure-V). |
| 11.12 | System Study for evolution of the proposal | Transmission System was agreed in the 33 rd CMETS-SR held on 25.07.2024 and 31.07.2024. |

**Total YTC allowed for Sep'24, as per notification of transmission charges payable by DICs for Billing Month of Nov, 2024 dated 25.10.2024 published on NLDC website (available at <https://posoco.in/transmission-pricing/notification-of-transmission-charges-for-the-dics/>).*

