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

विषयः ट्रांसमिशन पर राष्ट्रीय समिति (एनसीटी) की छत्तीसवी बैठक का कार्यवृत्त ।

Subject: Minutes of the 36th Meeting of the National Committee on Transmission (NCT)-reg.

महोदया (Madam) / महोदय (Sir),

The 36th meeting of the National Committee on Transmission (NCT) was held on 30th December, 2025 at New Delhi. The minutes of the meeting are enclosed herewith.

भवदीय / Yours faithfully

15-01-2026

(बी.एस.बैरवा / B.S. Bairwa)
मुख्य अभियन्ता एवं सदस्य सचिव,(एन.सी.टी.)/
Chief Engineer & Member Secretary (NCT)

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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.	Additional Secretary (Trans), Ministry of Power Shram Shakti Bhawan, New Delhi-110001.
5.	Sh, Abhay Bakre, Mission Director, MNRE Atal Akshay Urja Bhawan Opposite CGO Complex gate No. 2, Lodhi Road, New Delhi – 110003	6.	Chief Operating Officer, CTUIL, Floors Nos. 5-10, Tower 1, Plot Nos. 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 (1st Floor), Qutub Institutional Area, Katwaria Sarai, New Delhi – 110016
9.	Sh. Abhay Choudhary Expert Member	10.	Managing Director, Jammu Power Distribution Corporation Limited (JPDCL) Gladni Narwal, Jammu, Jammu & Kashmir, India - 180006
11.	Sh. S.R Narasimhan Expert Member	12.	Shri. Shivdas.S, Director (Transmission & System Operation) Vydyuthi Bhavanam, Pattom, Thiruvananthapuram, Kerala-695004
13.	Sh. Sabyasachi Roy, Director (Operations), WBSETCL	14.	Chairperson, North Eastern Region Power Committee Hon'ble Minister of Power, Govt. of Assam, Guwahati – 781 006
15.	Chairperson, Western Region Power Committee 2nd Floor, Vidyut Seva Bhavan, P.O. Sunder Nagar, Danganiya, Raipur: 492 013		

Special Invitee

i) Chief Engineer (PCD), CEA
ii) CEO, RECPDCL
iii) CEO, PFCCL

Table of Minutes

Minutes of the 36th meeting of National Committee on Transmission (NCT)

1. Confirmation of the minutes of the 34th and 35th meeting of National Committee on Transmission

1.1. The minutes of the 34th meeting of NCT held on 10.11.2025 were issued on 25.11.2025 vide CEA letter Nos. CEA-PS-12-13/3/2019-PSPA-II.

1.2. The minutes of the 35th meeting of NCT held on 19.11.2025 were issued on 02.12.2025 vide CEA letter no. CEA-PS-12-13/3/2019-PSPA-II Division/ I/53063/2025.

1.3. No comments have been received on the minutes.

1.4. Members confirmed the minutes of 34th and 35th meetings of NCT.

2. Status of the transmission schemes noted/approved/recommended to MoP in the 34th and 35th meeting of NCT:

2.1. NCT noted the following:

2.1.1. Status of transmission schemes approved/recommended in 34th and 35th NCT meetings:

Sl. No.	NCT meeting	Scheme where modifications was suggested	Status
1.	34th	Modification in "NERGS-III Siang Basin" Scheme	Communicated to MoP on 29.11.2025. Gazette Notification by MoP on 26.12.2025.
2.		Kurnool-IV REZ Phase-II (3 GW) Transmission system related to Shadnagar S/s and associated 400kV transmission lines	
3.	35th	"Transmission System for integration of Kurnool-V REZ Phase-I"	Informed to BPCs vide letter dated 09.12.2025 Gazette Notification by MoP on 26.12.2025.
4.		Transmission system strengthening at Tumkur-II for integration of additional RE potential (1.5 GW)	
5.		Transmission system for proposed Green Hydrogen / Green Ammonia projects in Vizag area, Andhra Pradesh (Phase-l)	
6.		Modification in the proposal for "WR–ER Inter-Regional Network Expansion Scheme – Part A	

3. Modifications in the earlier approved/notified transmission schemes

3.1. Augmentation at Bhadla III, Ramgarh PS and Kanpur (PG) Substation

A. Augmentation with 400/220 kV, 4x500 MVA (6th to 9th) ICTs, Implementation of 5 nos. of 220kV line bays & 1 no. of 400kV line bay at 765/400/220kV Bhadla-III PS

- The Transmission System requirement for additional 20 GW REZ in Northern Region (Phase-III) was approved in 5th meeting of NCT. As part of the above scheme, establishment of 765/400/220KV Bhadla-III PS (765/400kV: 2x1500MVA, 400/220kV: 3x500MVA) was approved in Phase-III Part B1 package, which is under implementation with Dec'25 schedule.

- Further, 7x500MVA ICTs (incl. 10 nos. of 220kV line bays & 220kV sectionalizer) were also approved under RTM in Phase-III Part B2 package with the following conditions:

  The implementation of number of 220 kV bays and 400/220 kV transformers to be taken up based on receipt of stage-II connectivity and commensurate LTA respectively (beyond 1500 MW at Bhadla-III).

  220 kV line bays and Transformer augmentations shall be reviewed based on stage-II connectivity at 220 kV voltage level and LTA applications respectively.

- Subsequently, augmentation of 2x500 MVA (4th & 5th) 400/220 kV ICTs at Bhadla-III PS, 220 kV bus sectionalizer (1 set) along with 220kV BC bay (1 no.) and 220kV TBC bay (1 no.) at Bhadla-III PS & augmentation of 2x1500 MVA 765/400kV (3rd & 4th) ICTs at Bhadla-III PS was approved in TBCB mode as part of Transmission system of "Additional Transmission system for evacuation of power from Bhadla-III PS as part of Rajasthan REZ Phase-III scheme (20GW)". The scheme is also under implementation with implementation schedule of Mar'26.

- Connectivity application of 6.5GW is already granted at 765/400/220kV Bhadla-III PS. Out of the above, RE application of about 3GW (400kV - 1GW, 220kV- 2GW) is granted through EHVAC system (Sch. Progressively from Feb'26) and balance 3.5GW (400kV – 1.45GW, 220kV- 2.06GW) is being granted on HVDC system (Sch.: Pole 1- Jan'29, Pole 2- Jul'29) at Bhadla-III PS.

3.1.1. With fulfilment of connectivity grant process, additional 4 nos. of 400/220kV ICTs along with 5 nos. of 220kV line bays & 1 no. of 400kV line bay are required for RE interconnection in matching timeframe of Transmission System for Evacuation of Power from REZ in Rajasthan (20 GW) under Phase III – Part I scheme (Bhadla-Fatehpur HVDC scheme (Pole 1)).

B. Augmentation with 765/400 kV, 2x1500 MVA (3rd & 4th) ICTs, 400/220 kV, 2x500 MVA (3rd & 4th) ICTs, Implementation of 2 nos. of 220kV line bays & 1 no. of 400kV line bay at 765/400/220kV Ramgarh PS

- Transmission System requirement for additional 20 GW REZ in Northern Region (Phase-III) was approved in 5th NCT meeting. As part of the above scheme, establishment of 765/400/220KV Ramgarh (765/400kV: 2x1500MVA, 400/220kV:

2x500MVA) was approved in Phase-III Part C1 package, which is under implementation with Dec'25 schedule.

- Further, Augmentation of 1x1500 MVA 765/400kV ICT at Ramgarh (incl. 3 nos. of 220kV line bays was also approved) under RTM in Phase-III Part C2 package with the following conditions:
  - The 220kV bays to be taken based on receipt of Stage-II connectivity (beyond 1200 MW at 220kV level) and the implementation of transformer to be taken up upon receipt of LTA beyond 1500MW at Ramgarh PS.
  - 220 kV line bays and Transformer augmentations shall be reviewed based on stage-II connectivity at 220 kV voltage level and LTA applications respectively.
- Connectivity application of about 4GW is already granted at 765/400/220kV Ramgarh PS out of which about 0.65GW (400kV – 0.65GW) is granted through EHVAC system (Sch. Progressively from Dec'25), 2.45GW (400kV – 1.25GW, 220kV- 1.2GW) is being granted on HVDC system (Sch.: Pole 1- Jan'29, Pole 2- Jul'29) and balance 0.9GW is granted on Ramgarh-II HVDC system (scheme is to be evolved).
- With fulfilment of connectivity grant process, additional 2 nos. of 765/400kV ICTs and 2 nos. of 400/220kV ICTs are required along with 2 nos. of 220kV line bays and 1 no. of 400kv line bay for RE interconnection in matching timeframe of Transmission System for Evacuation of Power from REZ in Rajasthan (20 GW) under Phase III – Part I scheme (Bhadla-Fatehpur HVDC scheme (Pole 1)).

C. Augmentation with 765/400 kV, 1x1500 MVA (3rd) ICT at 765/400kV Kanpur (PG) substation

- Augmentation with 765/400 kV, 1x1500 MVA, Transformer (3rd) at Kanpur(GIS) S/s was taken up for approval in in 5th NCT meeting as part of Transmission System requirement for additional 20 GW REZ in Northern Region (Phase-III), Part J scheme.
- In the meeting, it was decided that augmentation of 1x1500MVA ICT at 765/400kV Kanpur (GIS) substation is linked with HVDC system (LILO of Varanasi-Kanpur at Fatehpur) and since the timeframe of HVDC has now been delayed, therefore, this item could also be taken up later.
- Subsequently, HVDC transmission scheme (Bhadla-Fatehpur) was awarded and now is under implementation with commissioning schedule of Jan'29 (Pole 1) & Jul'29 (Pole 2). Considering the above, ICT augmentation is required in matching timeframe of Transmission System for Evacuation of Power from REZ in Rajasthan (20 GW) under Phase III – Part I scheme (Bhadla-Fatehpur HVDC scheme (Pole 1)).

3.1.2. CTUIL mentioned that augmentation at Bhadla III, Ramgarh PS and Kanpur (PG) Substation are required in matching timeframe of Transmission System for Evacuation of Power from REZ in Rajasthan (20 GW) under Phase III – Part I scheme (Bhadla-Fatehpur HVDC scheme (Pole 1)).

3.1.3. It was emphasized that the timelines of RE capacity addition should be aligned with the availability of transmission connectivity; otherwise, evacuation of large-scale RE

without matching connectivity may lead to congestion, especially considering the substantial capacity already in the pipeline.

3.1.4. After deliberations, it was decided that the above proposals linked with same HVDC system may be reviewed and put up in next NCT meeting together.

3.2. Modification in the Transmission scheme "Transmission system for proposed Green Hydrogen / Green Ammonia projects in Vizag area, Andhra Pradesh (Phase-I)

3.2.1. The scheme "Transmission System for Proposed Green Hydrogen / Green Ammonia Projects in Vizag Area, Andhra Pradesh (Phase-I)" was earlier discussed in the 32nd NCT meeting held on 12.08.2025 and the detailed scope of work was recorded in the minutes. Subsequently, the scheme was deliberated in the 35th NCT meeting held on 19.11.2025, wherein the NCT recommended the scheme to the Ministry of Power (MoP) for implementation.

3.2.2. Further, CTUIL suggested certain modifications, which were already communicated to MoP. The scheme incorporating these modifications is given below:

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

1	2	3
Scope of the Transmission Scheme	**Original Capacity/km as per 32nd NCT MoM**	**Revised Capacity /km**
Establishment of 4x1500 MVA, 765/400 kV Pendurthi (Vizag) GIS substation with 1x330 MVAr (765 kV) bus reactor with space provision for establishment of 220 kV switchyard **Future Space Provisions:** (i) 765/400kV, 1500 MVA, ICTs – 2 Nos. (ii) 765kV ICT bays – 2 Nos. (iii) 400kV ICT bays – 2 os. (iv) 765kV line bays – 8 os. (with provision for SLR) (v) 400kV line bays – 12	(i) 765/400kV, 1500 MVA, ICTs – 4 Nos. (13x500 MVA incl. 1 spare unit) (ii) 765kV ICT bay – 4 Nos. (iii) 400kV ICT bay – 4 Nos. (iv) 765kV line bays – 2 Nos. (at Pendurthi (Vizag) GIS for termination of Pendurthi (Vizag) – Srikakulam 765 kV D/c line) (v) 765kV line bays – 2 Nos. with provision of SLR (at Pendurthi (Vizag) GIS for termination of Khammam-II – Pendurthi (Vizag) –765 kV D/c line) (vi) 765 kV, 330 MVAr Bus Reactors – 1 no. (4x110	(i) 765/400kV, 1500 MVA, ICTs – 4 Nos. (13x500 MVA incl. 1 spare unit) (ii) 765kV ICT bay – 4 Nos. (iii) 400kV ICT bay – 4 Nos. (iv) 765kV line bays – 2 Nos. (at Pendurthi (Vizag) GIS for termination of Pendurthi (Vizag) – Srikakulam 765 kV D/c line) (v) 765kV line bays – 2 Nos. with provision of SLR (at Pendurthi (Vizag) GIS for termination of Khammam-II – Pendurthi (Vizag) –765 kV D/c line) (vi) 765 kV, 330 MVAr Bus

1	2	3
Scope of the Transmission Scheme	**Original Capacity/km as per 32nd NCT MoM**	**Revised Capacity /km**
nos. (with provision for SLR) (vi) 400kV Bus Sectionalizer : 1 set **Future Space Provisions for 220kV** **switchyard:** (i) 400/220kV, 500 MVA, ICTs – 10 Nos. (ii) 400kV ICT bays – 10 Nos. (iii) 220kV ICT bays – 10Nos. (iv) 220kV line bays – 16Nos. (v) 220kV Bus Sectionalizer : 3 set (vi) 220 kV Bus Coupler (BC) Bay – 4 Nos. (vii) 220 kV Transfer Bus Coupler (TBC) Bay – 4 Nos.	MVAr inc. 1 switchable spare unit for both bus reactor and line reactor) (vii) 765 kV Bus Reactor bays – 1 no. (viii) 400kV line bays – 4 nos. (at Pendurthi (Vizag) GIS for termination of LILO of Kalpakka – Maradam 400 kV (quad) D/c line at Pendurthi)	Reactors – 1 no. (4x110 MVAr inc. 1 switchable spare unit for both bus reactor and line reactor) (vii) 765 kV Bus Reactor bays – 1 no. (viii) 400kV line bays – 4Nos. (at Pendurthi (Vizag) GIS for termination of LILO of Kalpakka – Maradam 400 kV (quad) D/c line at Pendurthi)
(i) ± 300 MVAr STATCOM with 2x125 MVAr MSC at Pendurthi (Vizag) GIS with control switching arrangement for proposed 1x330 MVAr bus reactor (ii) Space provision for 2nd ± 300 MVAr STATCOM with 2x125 MVAr MSC at Pendurthi (Vizag) GIS	(i) 400kV bay – 1 no. (ii) ± 300 MVAr STATCOM with 2x125 MVAr MSC at Pendurthi (Vizag) GIS with control switching arrangement for proposed 1x330 MVAr bus reactor – 1 set	(i) 400kV bay – 1 no. (ii) ± 300 MVAr STATCOM with 2x125 MVAr MSC at Pendurthi (Vizag) GIS with control switching arrangement for proposed 1x330 MVAr bus reactor – 1 set
Pendurthi (Vizag) – Srikakulam 765 kV D/c line (about 200 km) with 330	~ 200 km (i) 765 kV line along with SLR GIS bays at Srikakulam - The	~ 200 km (i) 765 kV line along with SLR GIS bays at Srikakulam - The D/c

1	2	3
Scope of the Transmission Scheme	**Original Capacity/km as per 32nd NCT MoM**	**Revised Capacity /km**
MVAr SLR (convertible) at Srikakulam end on both circuits	D/c line to be terminated in the future line bays with SLR proposed under the scheme "Inter- Regional Strengthening between SR Grid and ER Grid" (ii) 765 kV, 330 MVAr SLR at Srikakulam – 2 Nos. (7x110 MVAr switchable units inc. 1 switchable spare unit)	line to be terminated in the future line bays with SLR proposed under the scheme "Inter- Regional Strengthening between SR Grid and ER Grid" (ii) 765 kV, 330 MVAr SLR at Srikakulam – 2 Nos. (7x110 MVAr switchable units inc. 1 switchable spare unit)
LILO of Kalpakka – Maradam 400 kV (quad) D/c line at Pendurthi (about 20 km)	~ 20 km	~ 20 km
Establishment of 3x1500 MVA, 765/400 kV Khammam-II substation with 1x330 MVAr (765 kV) bus reactor with space provision for establishment of 220 kV switchyard **Future Space Provisions:** (i) 765/400kV, 1500 MVA, ICTs – 3 Nos. (ii) 765kV ICT bays – 3 Nos. (iii) 400kV ICT bays – 3 Nos. (iv) 765kV line bays – 8 Nos. (with provision for SLR) (v) 400kV line bays – 10 Nos. (with provision for SLR) (vi) 400kV Bus Sectionalizer : 1 set **Future Space Provisions for 220kV**	(i) 765/400kV, 1500 MVA, ICTs – 3 Nos. (10x500 MVA incl. 1 spare unit) (ii) 765kV ICT bay – 3 Nos. (iii) 400kV ICT bay – 3 Nos. (iv) 765kV line bays – 4 Nos. (at Khammam-II for termination of Khammam-II – Pendurthi and Khammam-II – Warangal New 765 kV D/c lines) (v) 765 kV, 330 MVAr Bus Reactors – 1 no. (4x110 MVAr inc. 1 switchable spare unit for both bus reactor and line reactor) (vi) 765 kV Bus Reactor bays – 1 no. (vii) 400kV line bays – 2 Nos. (at Khammam-II for termination of Khammam-II – Khammam (existing) 400 kV (quad) D/c line)	(i) 765/400kV, 1500 MVA, ICTs – 3 Nos. (10x500 MVA incl. 1 spare unit) (ii) 765kV ICT bay – 3 Nos. (iii) 400kV ICT bay – 3 Nos. (iv) 765kV line bays – 4 Nos. (at Khammam-II for termination of Khammam-II – Pendurthi and Khammam-II – Warangal New 765 kV D/c lines) (v) 765 kV, 330 MVAr Bus Reactors – 1 no. (4x110 MVAr inc. 1 switchable spare unit for both bus reactor and line reactor) (vi) 765 kV Bus Reactor bays – 1 no. (vii) 400kV line bays – 2 Nos. (at Khammam-II for termination of Khammam-II – Khammam (existing) 400 kV (quad) D/c line)

1	2	3
Scope of the Transmission Scheme	**Original Capacity/km as per 32nd NCT MoM**	**Revised Capacity /km**
switchyard: (i) 400/220kV, 500 MVA, ICTs – 10 Nos. (ii) 400kV ICT bays – 10 Nos. (iii) 220kV ICT bays – 10Nos. (iv) 220kV line bays – 16Nos. (v) 220kV Bus Sectionalizer : 3 set (vi) 220 kV Bus Coupler (BC) Bay – 4 Nos. (vii) 220 kV Transfer Bus Coupler (TBC) Bay – 4 Nos.		
Khammam-II – Warangal New 765 kV D/c line (about 100 km)	~ 100 km 765 kV line bays – 2 Nos. (at Warangal New)	~ 100 km 765 kV line bays – 2 Nos. (at Warangal New)
Khammam-II – Pendurthi (Vizag) 765 kV D/c line (about 350 km) with 330 MVAr SLR (convertible) at both ends on both circuits	~ 350 km **(i) 765 kV line bays – 2 Nos. (GIS) (at Pendurthi(Vizag))** (ii) 765 kV, 330 MVAr SLR at Pendurthi (Vizag) – 2 Nos. (6x110 MVAr switchable units) (iii) Switching Equipment for 765 kV SLR at **Kadapa-II PS** – 2 Nos. (iv) 765 kV, 330 MVAr SLR at Khammam- II – 2 Nos. (6x110 MVAr switchable units) (v) Switching Equipment for 765 kV SLR at **Kadapa -II PS**	~ 350 km ~~3.2.2.1. **(i) 765 kV line bays – 2 Nos. (GIS) (at Pendurthi(Vizag))**~~ (i) 765 kV, 330 MVAr SLR at Pendurthi (Vizag) – 2 Nos. (6x110 MVAr switchable units) (ii) Switching Equipment for 765 kV SLR at **Pendurthi(Vizag) GIS** – 2 Nos. (iii) 765 kV, 330 MVAr SLR at Khammam- II – 2 Nos. (6x110 MVAr switchable units) (iv) Switching Equipment for

1	2	3
Scope of the Transmission Scheme	**Original Capacity/km as per 32nd NCT MoM**	**Revised Capacity /km**
	– 2 Nos.	765 kV SLR at **Khammam -II PS** – 2 Nos.
Khammam-II – Khammam (existing) 400 kV (quad) D/c line (about 20 km)	~ 20 km (i) 400kV line bays – 2 Nos. (at Khammam (existing))	~ 20 km (i) 400kV line bays – 2 Nos. (at Khammam (existing))

3.2.3. Members noted the same.

3.3. Transmission System for integration of Ananthapuram-III REZ - Phase-I

3.3.1. Representative of CTUIL stated that the "Transmission System for integration of Ananthapuram-III REZ - Phase-I" was discussed in the 32nd NCT meeting and NCT has recommended the implementation of the transmission scheme through TBCB with PFCCL as BPC.

3.3.2. Subsequently, the scheme was discussed in the 33rd NCT meeting wherein NCT opined that possibility may be explored for grant of additional connectivity for optimal utilization of the transmission system during non-solar hours. The scheme was also discussed in the 35th NCT meeting wherein it was decided that the transmission system for Ananthapuram-III shall be discussed again in the next NCT meeting.

3.3.3. It was informed that during the 55th SRPC meeting, KPTCL agreed to put up the proposal for requirement of additional land for upgradation to 765kV level to KPCL and KPCL concurred to look into matter.

3.3.4. Representative of CTUIL stated that PFCCL vide email dated 24.11.2025 communicated that requisite land is not available to the proximity of existing 400/220 kV Bidadi GIS. It was also mentioned that, KPCL informed that entire land has been allocated to various entities for waste-to-energy power plant, setting up of 20 MW solar power plant and future expansion of above projects and land is not available for any further allocations. Further, implementation of 765 kV Bidadi S/s and associated transmission lines identified to facilitate reliable power supply to increasing demand of Bangalore and nearby area of Bidadi seems to be difficult. Accordingly, proposed transmission system including location of 765 kV Bidadi S/s is required to be reviewed.

3.3.5. CTUIL proposed that the scheme may be bifurcated in two phases. In first phase, Ananthapuram-III PS and interconnection with Krishnagiri and in second phase interconnection of Ananthapuram-III PS with alternate location instead of Bidadi may be considered.

3.3.6. Members opined that it would be better if load side interconnections are also planned along with Generator.

3.3.7. After deliberations, it was decided that a meeting with KPTCL and other stakeholders

may be convened for firm commitment towards land or alternate location instead of Bidadi. Based on the outcome of the meeting, the matter will be again taken up in the NCT.

4. New Transmission Schemes

4.1. Transmission System for Redundant Power Supply to Dholera

4.1.1. Representative of CTUIL stated that a scheme for evacuation of 0.5 GW of Offshore wind power from Gujrat consisting of 2x1500 MVA 765/400 kV ICTs and 2 Nos. 400 kV bays at Vataman S/s was recommended for implementation under RTM in the 20th NCT meeting held on 25.06.2024.

4.1.2. MoP vide OM dated 20.08.2024 allocated the transmission schemes for implementation under RTM to POWERGRID. The implementation schedule for 0.5 GW Gujarat project was mentioned, as Matching with the associated RE generation (48 months from effective date of PPA), presently anticipated by 31st March, 2029.

4.1.3. In the 22nd NCT meeting, transmission system to provide redundant power supply to Dholera area (at Dholera-2 S/s of GETCO) was discussed. The interconnection of Vataman S/s (ISTS) with 220 kV Dholera-2 S/s of GETCO required preponement of 2x1500MVA 765/400kV ICTs (agreed for offshore wind projects), from March 2029 to an earlier time-frame as well as installation of 2x500 MVA 400/220 kV ICTs and 2 Nos. 220 kV line bays at Vataman S/s.

4.1.4. It was also mentioned that, NCT already approved the scheme "Additional Transmission System Proposed for redundant power supply to Dholera area" under RTM route to POWERGRID as mentioned below:

Sl. No.	Scope of the Transmission Scheme	Capacity (MVA) / Line length (km)/ Nos.
1.	Creation of 220 kV switchyard along with Installation of 2x500 MVA, 400/220 kV ICTs at Vataman (AIS)	• 400/220 kV, 500 MVA, ICTs – 2 Nos. • 400 kV ICT bays – 2 Nos. • 220 kV ICT bays – 2 Nos.
2.	2 Nos. 220 kV line bays for Vataman – Dholera-2 (GETCO) 220kV D/c line	• 220 kV line bays – 2 Nos.
Note: 1. GETCO shall implement Vataman – Dholera-2(GETCO) 220 kV D/c line in matching time-frame 2.TSP of Vataman S/s shall provide space for the associated works at Vataman S/s **Implementation timeframe:** 18 months matching with creation of 400kV switchyard along with Installation of 2x1500MVA, 765/400kV ICTs at Vataman (AIS) S/s being implemented under "Transmission system for offshore wind zone phase-1 (500MW VGF off coast of Gujarat for subzone B3)" scheme.		

4.1.5. Subsequently, MNRE vide e-mail dated 13.08.2025 informed that "the offshore wind 500 MW project tender has been cancelled, accordingly, PGCIL/CTUIL were requested to take necessary action to keep the transmission development activities in line with the progress made by SECI towards tendering for offshore wind projects.

4.1.6. POWERGRID vide e-mail dated 27.11.2025 to CTUIL has intimated that MOP has requested not to move forward with implementation of Offshore Wind Transmission Project in Gujarat. It was further mentioned that it will hinder the development of "Creation of 400 kV switchyard along with Installation of 2x1500 MVA, 765/400 kV ICTs at Vataman (AIS) with 2x125 MVAr (420 kV) Bus Reactors" which although a part of offshore scheme, was actually linked and accordingly expedited for catering to redundant power supply to Dholera area (18 months time-line).

4.1.7. CTUIL suggested that this system be segregated from the scope of "Transmission system for offshore wind zone phase -1 (500 MW VGF off coast of Gujarat for subzone B3)" and suitably renamed without any change in the implementation timeframe, as it is required to establish 400kV Level at Vataman S/s which is essential to provide redundant power supply to Dholera area.

4.1.8. After deliberations, it was decided to delink the scope of "Creation of 400 kV switchyard along with Installation of 2x1500 MVA, 765/400 kV ICTs at Vataman (AIS) with 2x125 MVAr (420 kV) Bus Reactors" from "Transmission system for offshore wind zone phase -1 (500 MW VGF off coast of Gujarat for subzone B3)" and continue implementation of the below stated scope of works with revised scheme name as 'Transmission System for redundant power supply to Dholera area' without any change to the implementation time-frame:

Scope	**Timeline / Cost**
1. Creation of 400 kV switchyard along with Installation of 2x1500 MVA, 765/400 kV ICTs at Vataman (AIS) with 2x125 MVAr (420 kV) Bus Reactors • 765/400 kV, 1500 MVA, ICTs – 2 Nos. (7x500MVA incl. spare unit) • 765 kV ICT bays – 2 nos. • 400 kV ICT bays – 2 nos. • 125 MVAR, 420 kV Bus Reactor – 2 Nos. • 400 kV Bus Reactor Bay – 2 Nos.	18 months from CTU letter dated 02.09.2024 to POWERGRID. **Cost: 308 Cr.**

4.2. Transmission system for Evacuation of Power from RE Projects for cumulative capacity of 24.5GW in Gujarat

4.2.1. Representative of CTUIL stated that Transmission system for Evacuation of Power from RE Projects for cumulative capacity of 24.5GW in Gujarat was taken up for deliberations in the 31st NCT meeting held on 14.07.2025 in the following pockets:

A. Jam Khambhaliya REZ -Phase II (4500MW)
B. Jamnagar REZ -Phase I (1000MW)
C. Lakadia REZ -Phase II (7500MW)
D. Khavda REZ- Phase VI (5500MW)
E. Khavda REZ- Phase VII (6000MW)

4.2.2. As the majority of the transmission schemes pertain to quantum beyond the potential already declared by MNRE/SECI, it was decided in that meeting that the schemes will be taken up for approval, only after assessment and declaration of such additional potential by MNRE.

4.2.3. Subsequently, MNRE, vide letter dated 28.08.2025, declared additional potential to the tune of 69.6GW in the state of Gujarat. The potential was later revised by GETCO / Govt of Gujarat to about 43GW (for planning under ISTS), comprising 20.2GW in Kutch area (namely Bhuj, Lakadia & Khavda); 7GW in Jamnagar, Porbandar and Dwarka areas; and balance 15.74GW in Amreli, Junagarh, Rajkot, Bhavnagar areas. With the declaration of this additional potential in Gujarat, sufficient potential now exists against the above planned transmission system for 24.5GW.

4.2.4. Further, following was mentioned:

a) Transmission system in Gujarat was planned assuming about 9.25GW Green Hydrogen load (3GW in Kandla and 6.25GW in Mundra), out of total anticipated capacity of 35.19GW (13.19GW in Kandla & 22GW in Mundra areas) by 2031. However, till date, only one Green Hydrogen application has been received from M/s L&T for 0.575GW at Kandla S/s. Hence, MNRE needs to indicate by what time by which at least ~9-10GW Green Hydrogen capacity can be anticipated in Gujarat.

b) The transmission system in Khavda area (Ph-I to Ph-V) is expected by Dec-29 without considering Green Hydrogen/Green Ammonia load. However, Khavda area (Ph-VI & Ph-VII) were planned for pre-dominantly harnessing solar potential with a timeframe of 2029-2030 considering the Green Hydrogen/Green Ammonia loads as mentioned above.

c) For evacuation of RE power from Jam Khambhaliya (90% Wind) / Lakadia (Hybrid with 37% wind) / Jamnagar (Hybrid with 58% wind) areas, the associated transmission system may be considered for approval so as to ensure optimal utilization of the transmission system during Solar/Non-Solar Hours without linking with the Green Hydrogen Capacity addition.

d) Further, transmission system in Khavda area (Ph-VI & Ph-VII) need to be reviewed based on MNRE inputs regarding establishment of Green Hydrogen/Green Ammonia in Gujarat.

4.2.5. Representative of CTUIL stated that, to optimize the system, the evacuation of power from Jam Khambhaliya is to be done through the Rajkot S/s, which is being constructed under Intra-state by GETCO. As the commissioning schedule of Rajkot S/s is March 2030, this system needs to align with that timeframe.

4.2.6. Chairperson, NCT suggested that the solar and wind connectivity applications in the respective areas may be optimized.

4.2.7. Considering the above deliberations, the following was decided:

a) MNRE was requested to revert with a timeline for green hydrogen projects for 9-10 GW Load in Mundra and Kandla areas of Gujarat.

b) Transmission system for Khavda Area- Phase VI (5.5GW) & Phase VII (6GW) to be taken up for approval only after assessment and confirmation of at least ~ 9-10 GW Green Hydrogen/Green Ammonia Load by MNRE in Mundra / Kandla areas of Gujarat.

c) Transmission system for below REZ pockets may be reviewed in consultation with GETCO, RE developers in Jam Khambhaliya/ Jamnagar areas and other stakeholders:

i) Jam Khambhaliya REZ -Phase II (4.5GW)

ii) Jamnagar REZ -Phase I (1GW)

iii) Lakadia REZ -Phase II (7.5GW)

4.3. Upgradation / Conversion of Udumalpet – Madurai 400kV S/c line to Udumalpet – Madurai 400kV (quad) D/c line

4.3.1. Representative of CTUIL stated that during the 221st OCC meeting of SRPC held on 10.12.2024, POWERGRID informed that Udumalpet – Madurai 400kV S/c line (127 km) is commissioned in April, 1993 and the line is operating close to the SIL limits during peak wind demand season. POWERGRID proposed to upgrade the Udumalpet – Madurai 400kV S/c line to D/c line. SRLDC informed that they have already highlighted the high loading on the line in its operational feedback and suggested for reconductoring of Udumalpet – Madurai 400kV S/c line.

4.3.2. Further, high loading on the Udumalpet – Madurai 400 kV S/c was also observed during the Joint Study meeting held in April 2025 and previous Rolling Plan exercises. Further, the line is a very old one and has completed more than 32 years of operation. The thermal loading of the line is about 850 MVA and under certain scenarios the maximum loading of about 750 MW has been observed on the line. POWERGRID has confirmed that space is available for additional bays at Udumalpet and Madurai substations.

4.3.3. It was informed that as more and more renewable energy capacities are being integrated to the Grid, Udumalpet – Madurai 400 kV S/c may be converted / upgraded to Udumalpet – Madurai 400 kV D/c line for enhanced reliability.

4.3.4. After deliberations, NCT recommended the scheme Upgradation / Conversion of Udumalpet – Madurai 400kV S/c line to Udumalpet – Madurai 400kV (quad) D/c line under RTM to POWERGRID with following scope:

Sl. No.	***Scope of the Transmission Scheme***	***Capacity /km***	***Estimated Cost (in Rs.) & Timeframe***
1.	Upgradation / Conversion of Udumalpet – Madurai 400kV S/c line to	~ 127 km • 400 kV line bays – 1 no. at Udumalpet	Rs. 643 crores Implementation timeframe-30

Sl. No.	*Scope of the Transmission Scheme*	*Capacity /km*	*Estimated Cost (in Rs.) & Timeframe*
	Udumalpet – Madurai 400kV (quad) D/c line along with associated bay upgradation works at Udumalpet and Madurai substations	• Upgradation of existing bay equipment at Udumalpet end • 400 kV line bays – 1 no. at Madurai • Upgradation of existing bay equipment at Madurai end	months

4.4. Reconductoring of Tirunelveli – Udumalpet and Pugalur – Madurai 400kV D/c lines with HTLS conductor

4.4.1. Representative of CTUIL stated that the proposal for reconductoring of Pugalur – Madurai 400kV D/c was discussed in the 221st OCC meeting of SRPC held on 10.12.2024. During the meeting, SRLDC informed that they have already provided, as part of feedback, to the planner regarding reconductoring of 400kV Udumalpet – Madurai S/c and 400kV Madurai-Pugalur D/c line. SRLDC have highlighted the high loading on Tirunelveli – Udumalpet and Pugalur – Madurai 400kV D/c lines during high RE season in Tamil Nadu in its operational feedback and informed that further addition of RE generation in the south Tamil Nadu and Kundankulam 3&4, this issue may become severe.

4.4.2. After deliberations, NCT recommended the scheme "Reconductoring of Tirunelveli – Udumalpet and Pugalur – Madurai 400kV D/c lines with HTLS conductor" under RTM to POWERGRID with following scope:

Sl. No.	**Scope of the Transmission Scheme**	**Capacity /km**	**Estimated Cost (in Rs.) & Timeframe**
1.	Reconductoring of Tirunelveli – Udumalpet 400kV D/c line with HTLS conductor. (Capacity 2100 MVA)	~ 265 km	Rs. **1193.5** crores Implementation timeframe-24 months
2.	Upgradation of bay equipments at Tirunelveli end		
3.	Upgradation of bay equipments at Udumalpet end		
4.	Reconductoring of Pugalur – Madurai 400kV D/c line with	~ 123.64 km	

Sl. No.	**Scope of the Transmission Scheme**	**Capacity /km**	**Estimated Cost (in Rs.) & Timeframe**
	HTLS conductor. (Capacity 2100 MVA)		
5.	Upgradation of bay equipments at Pugalur end		
6.	Upgradation of bay equipments at Madurai end		

4.5. Cost to be borne by bulk consumer entities for which transmission system is planned under ISTS

4.5.1. Representative of CTUIL stated that Bulk Consumers / Distribution licensees (under Reg. 17.1(iii) of GNA Regulations) may apply for GNA for 50 MW or above for drawl of power from ISTS. Under Reg. 12.5 of GNA Regulations, such Entities are responsible for construction and maintenance of the dedicated system connecting their facility to the ISTS along with any necessary augmentation of the ISTS network on its own cost for enabling connection. In a meeting held on 12-07-2023 under the chairpersonship of Chairperson, CEA it was decided that ISTS identified/planned for potential based bulk consumers including green hydrogen can be implemented under ISTS, provided that the potential site of such bulk consumers has been confirmed by the central/state government.

4.5.2. In such cases, security (BG) shall be taken from GH_2 developers towards development of ISTS is very low (i.e. only Rs. 2L/MW (Conn-BG3)) as compared to ISTS cost (i.e. about 1 Cr. / MW). Without adequate security, if GH_2 developers do not materialize, ISTS developed by Transmission Licensee would become redundant & cost would be borne by the DICs.

4.5.3. Now, CERC in order in Petition No. 426/TL/2024 (Navinal Transmission Limited) on 19.11.2025 has held that:

a. ICTs and associated bays at Navinal S/s shall be considered under 'necessary augmentation for providing the connection to ISTS' under Regulation 12.5 of the GNA Regulations, whose cost is to be borne by the entities covered under Regulation 17.1(iii).

b. The GNA/ GNA_{RE} grantee entities shall deposit the cost as intimated by CTUIL, within 30 days of intimation of such cost. In case of failure, GNA/ GNA_{RE} grants to such entities shall be cancelled, and available BGs shall be treated as per the extant GNA Regulations.

c. CTUIL shall itself calculate the cost to be collected from each of such entities that has been granted GNA/ GNA_{RE}, at the instant Navinal substation, in proportion to the quantum of GNA/ GNA_{RE} , based on the latest average estimated per MW cost (based on Voltage level) or do so in consultation with the NCT, if considered necessary.

d. CTUIL shall keep this amount in a separate account under an appropriate deposit scheme. Staff is directed to devise a mechanism for treating this amount and the charges for the Transformer component.

4.5.4. CTUIL also mentioned that similar directions have been issued by Hon'ble CERC for Eastern Region Expansion Scheme-XXXIV (ERES-XXXIV).

4.5.5. Representative from CTUIL informed that CTUIL has computed the latest cost of "Network Expansion Scheme in Navinal (Mundra) area of Gujarat for drawal of power in the area" scheme under which the 4x1500MVA, 765/400kV ICTs were being implemented at Navinal S/s for enabling drawal of up to 4500MW quantum from the substation for which the average per MW cost is about 23 Lakhs/MW. Further, detailed estimated cost for various probable combinations for drawal capacity of 1500MW at various voltage levels were worked, wherein average per MW cost (MAY'2025 Price level) is as follows:

- GIS: 39.4 Lakhs/MW
- AIS: 22 Lakhs/MW
- GIS-AIS average: 30.7 Lakhs/MW

4.5.6. CTUIL proposed that 30 lakh/MW may be taken from each applicantin lieu of Cost to be borne by he entities under Reg. 17.1 (iii) for which transmission system for GNA is being implemented / planned under ISTS.

4.5.7. NCT observed that the responsibility of CTU/STU is to provide connectivity at nearest technically feasible S/s and NCT does not have any mandate to formulate the cost.

4.5.8. It was observed that there is discrimination in grant of GNA to RE Generators vis-a-vis Bulk Consumer, which is creating the abnormality.

4.5.9. Members opined that cost recovery/security aspects are not in the purview of NCT. However, after discussion, following were decided:

i) RE generators and Bulk Consumers should be treated at par for the Connectivity/GNA.

ii) For security purpose, bank Guarantee can be taken from RE Generator as well as Bulk consumer in similar manner.

iii) In case this require any modification in the regulations, the same may be carried out.

4.6. Eastern Region Expansion Scheme-XXXIX (ERES-XXXIX)

4.6.1. Representative of CTUIL stated that Hon'ble CERC in petition no. 513/TL/2024 issued directions vide order dated 18-12-2025 which are as follows:

- Bulk Consumers / Distribution licensees [under Reg. 17.1 (iii) of GNA Regulations] may apply for GNA for 50 MW or above for drawl of power from ISTS. As per Reg.

12.5 of GNA Regulations, in case of an entity covered under Regulation 17.1(iii), the dedicated line to connect such an entity to the ISTS and necessary augmentation for providing connection to the ISTS, shall be constructed and maintained either by the entity itself or by a licensee at the cost of such entity.

- In this context, it was inter alia decided in a meeting held on 12-07-2023 under the chairpersonship of Chairperson, CEA that ISTS, identified/planned for potential based bulk consumers including green hydrogen can be implemented under ISTS, provided that the potential site of such bulk consumers has been confirmed by the central/state government.
- It has been observed that in cases of transmission system being implemented under ISTS for bulk consumers, security (BG) to be taken from the developers towards development of ISTS is very low [i.e. only Rs. 2 Lakh/MW (Conn-BG3)] as compared to ISTS cost [which is about 1 Cr. / MW]. Without adequate security, if bulk consumer / distribution licensee developers do not materialise, the ISTS scheme developed by Transmission Licensee would become redundant & cost would have to be borne by the DICs.
- CERC in order in Petition No. 513/TL/2024 dated 18-12-2025 has observed and directed following:

Quote

31. We have also considered the submissions of CTUIL to the effect that the instant scheme was planned as per the details of proposed drawal plans by the Green Hydrogen (GH)/ Green Ammonia (GA) manufacturers till 2030, provided by the MNRE.

As per the above, MNRE has just consolidated the information received from Green Ammonia/ Hydrogen manufacturers, which provides the anticipated demand for power for their projects. We observe that there is nothing on record to show that the MNRE assessed the potential of Green hydrogen/ Green ammonia at these locations, considering the feasibility of the locations or land availability.

33. We note that one applicant, namely ACME, has already withdrawn its application, and another applicant, AVAADA, suggested that it wishes to shift to the intra-State, leaving no one to utilise the instant scheme of approximately Rs. 2892 crore with yearly transmission charges of Rs. 289.73 crore per annum.

34. The Act mandates that an inter-State transmission system is required to be developed in an efficient and economical manner. However, the instant transmission scheme may result in a redundant transmission asset without any visibility of its utilisation. Therefore, we are of the considered view that it is premature to consider the grant of a transmission licence for the instant transmission scheme, as it does not fulfil the requirement prescribed under Section 38(2)(c) of the Act.Therefore, we find it appropriate to refer the proposal for the instant transmission scheme back to the NCT for reconsideration on the basis of

its likely utilisation and impact on the consumers in the absence of any application for its use by the bulk consumers. Accordingly, we direct the Petitioner and the CTUIL to approach the NCT with the observations as made in this Order. After the decision of the NCT, the Petitioner is granted liberty to approach the Commission, if so advised.

Unquote

4.6.2. As on date 700MW GNA_{RE} granted to M/s Avaada Greenh2 Private Limited still stands in force and the transmission system required is the instant scheme viz. ERES-XXXIX. Further, CTUIL is not in receipt of any formal request from grantee for withdrawal of granted GNA_{RE}.

4.6.3. OPTCL is also developing a 400/220/33kV S/s at Gopalpur (OPTCL) to meet planned drawal requirement in intra-state. The Gopalpur (OPTCL) S/s shall be meeting drawal requirements only through Gopalpur -(ISTS) - Gopalpur (OPTCL) 400kV D/c (Quad) line under ERES-39 scheme in initial years. In future, OPTCL shall be developing Pandiabili (POWERGRID) – Gopalpur (OPTCL) and Gopalpur (OPTCL) – Theruvali (OPTCL) – Jeypore (POWERGRID) 400kV corridors under intra state, however, these schemes are yet to be taken up for implementation by OPTCL. Further, OPTCL informed that Establishment of Gopalpur (OPTCL) 400/220/33kV GIS S/s in Tata SEZ area has been awarded on 01-12-2025 with SCoD of 24 months.

4.6.4. From the drawal data provided by OPTCL, it is observed that total 962MW drawal is planned by OPTCL in intra-state at their Gopalpur (OPTCL) S/s . Out of this, by Dec 2027 (viz. SCOD of ISTS ERES-39 scheme and intra-state Gopalpur (OPTCL) S/s), the drawal requirement under intra-state shall be 632MW (planned), out of which 159MW has already been granted access by OPTCL. Thus, total granted access by Dec 2027 (viz. SCoD of ISTS ERES-39 scheme and intra-state Gopalpur (OPTCL) S/s) is 859MW (700MW in ISTS + 159MW in intra-state by OPTCL). Further, additional 473MW is expected in intra-state by Dec 2027.

4.6.5. In ISTS, M/s Ocior Energy Gopalpur-1 Pvt. Ltd. vide application dated 09-12-2025 has applied for GNA_{RE} of 200MW (outside region: 200MW) at Gopalpur (ISTS) S/s for direct connection to ISTS with start date of 31-03-2029 and end date of 31-03-2054. The application is under scrutiny by CTUIL.

4.6.6. CMD, OPTCL informed that there is an upcoming demand of 1900 MW in Gopalpur area as more number of industries are coming up in future. Further, more Green Hydrogen developers are approaching them for connectivity.

4.6.7. It was discussed that there are delays in commissioning of transmission lines due to various issues including the ROW issues. Some of the lines are facing delays because of which the granted connectivity/GNA could not be operationalized which may lead to curtailment of renewable power.

4.6.8. Following opinion was emerged during the discussion:

(i). There is a process of approval of any transmission scheme, which includes due

scrutiny at the level of CTUIL, CMETS, Load flow studies, discussions in RPCs and then NCT. After having scrutiny by all these technical bodies duly supported by proper studies, the schemes are recommended by technical committee for its implementation.

(ii). The SPV was transferred on 14-11-2024 and CTUIL has sent license recommendation on 29-11-2024. The project is expected to be completed by Dec 2027 as per signed TSA. The grant of license is pending with CERC from more than 12 months. This leads to mismatch in process of implementation of transmission line. Further, the TSP has lost more than 12 months working time which could have been utilised for construction of the transmission lines.

(iii). The philosophy of the planning and start the implementation of the transmission line is based on the potential and not the actual applications; to take care of the mismatch of gestation period. The gestation period of the renewables and some of the loads are much less than the gestation period of the transmission lines. Hence many a times it is desirable to take decisions based on the identified potentials so that the two time frames match and the resources are not stressed and stranded.

4.6.9. After deliberations, NCT strongly recommended for early start of work of ERES-39 Scheme, upon grant of license by CERC, so that the line is completed within the scheduled timeframe, as the left out period now is only about 24 months.

4.7. Qualification Requirement (QR) of Synchronous Condensers (SynCon) units

4.7.1. MoP vide letter dated 23.12.2025 requested to delink the following two schemes as there was delay in finalization of QR for SynCon units:

i. Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-5 :6 GW) [Barmer Complex] (HVDC: Barmer-II to South Kalamb) along with SynCon units - **BPC(RECPDCL)**

ii. Installation of 2 Nos. of SynCon units at 765/400/220kV Fatehgarh-II PS - **BPC(PFCCL)**

4.7.2. JS (Trans), MoP stated that the information on QR has been received from CEA and is under consideration.

4.7.3. Accordingly, the agenda item was dropped

4.8. Approval of ISTS Schemes Costing up to Rs. 100 Crore by CTUIL for Intimation to NCT

4.8.1. MoP Office Order dated 28.10.2021 regarding reconstitution of the National Committee on Transmission (NCT) provides that ISTS projects costing less than or equal to Rs. 100 crores will be approved by the CTUIL along with their mode of implementation under intimation to the NCT.

4.8.2. Year wise summary is given below:

SI No.	Financial Year	No of Schemes	Cost (Cr)

1	2021-22	17	443.62
2	2022-23	36	1231.76
3	2023-24	41	1571.99
4	2024-25	41	1901.14
5	2025-26	30	1127.94
	TOTAL	**165**	**6276.45**

4.8.3. Details of the schemes are enclosed at **Annexure-II**.

4.8.4. Members noted the same and CTUIL was directed to intimate the approved schemes below Rs. 100 Crs to NCT on regular basis.

4.9. Pusauli HVDC Upgradation.

4.9.1. MoP vide letter dated 25-09-2025 has granted in-principle approval for establishing a SiC VSC-based HVDC Back-to-Back station in existing Pusauli (Sasaram) under RTM mode to POWERGRID at the cost of Rs. 3440 crore.

4.9.2. The scheme was deliberated in 34th NCT meeting held on 10.11.2025, wherein CTUIL was directed to carry out a detailed study of the scheme taking into account the suggestions and feedback. Further, the study may suggest new alternative locations for establishment of SiC VSC-based HVDC system for better utilization.

4.9.3. CTUIL presented the following:

a) In view of the requirements of large number of HVDC systems, as compared to limited number of HVDC suppliers it would be prudent to undertake indigenous development on future ready technology like SiC MOSFET-based power modules. Further, the Submodules design is specific to high power requirement of HVDC application and as such the SiC based MOSFETs being used in BESS Inverter application are not suitable for HVDC applications.

b) Since SiC MOSFET-based power modules for HVDC technology are still in the Research and Development (R&D) phase and considering the criticality of Gazuwaka BTB HVDC system as already confirmed by Grid India, it is not recommended to experiment indigenous SiC MOSFET based power modules at Gazuwaka upgradation.

c) The developmental HVDC works are still in the research and development phase hence its placements should be avoided at locations that may have technical & commercial implications, timely evacuation of power from RE generators or critical corridors that may have adverse impact on grid security and stability. Further, the developmental works should preferably be undertaken at an existing HVDC back-to-back station where land, civil works another logistics are readily available

d) The OEM supplier of Pusauli HVDC has already consented for indigenous development of SiC MOSFET-based power modules jointly with Indian companies.

e) Considering present and future bidirectional power transfer requirements between ER & NR, upgradation of existing 500 MW HVDC BTB at Pusauli to 1000 MW, utilizing indigenously developed SiC MOSFET-based power modules appears to

be the most preferred option.

f) SiC MOSFET-based HVDC at Pusauli would pave the way for development of VSC based HVDC in India under "Aatmanirbhar Bharat" initiative of Government of India.

4.9.4. CTUIL stated that there are four HVDC back to back stations in the country. Out of them (i) Vindyachal HVDC after completing its useful life has been refurbished in the year 2021. Therefore, this HVDC back-to-back cannot be a preferred candidate for developmental works (ii) Bhadrawati (Chandrapur) HVDC has completed its useful life in year 2023 and the NOA for its refurbishment has already been issued. (iii) Gazuwaka HVDC proposal for refurbishment of 2x500 MW block has been approved in RPC and the hearing in CERC has been completed. Further, Grid-India in its feedback has categorically confirmed that HVDC Gazuwaka is an important link between ER and SR and significantly helps in congestion management during both high SR import and export periods. Being Critical, therefore could not be used for experiments as of now. Accordingly, (iv) Pusuali HVDC station is preferable location for undertaking the development of SiC based 1000 MW HVDC BTB Station Pusauli HVDC back-to-back System.

4.9.5. Joint Secretary (Trans), MoP stated that the scheme is already approved by MoP and to support Make in India plan this indigenous system is required.

4.9.6. S. R. Narasimhan Expert member, stated that limited number of manufacturers have shown interest in this system planning which may result in indigenous monopoly.

4.9.7. Chairperson, NCT informed that IPR will be in the name of Indian Companies and that can be shared with whosever want to do development in the country.

4.9.8. After deliberations, NCT recommended the Pusauli HVDC Upgradation with following scope of works:

S.No.	Scope of work	Capacity (MVA) / Line length (km)/ Nos.	Cost and Implementation timeframe
1	Upgradation of existing 500MW LCC based HVDC Back-to-Back (BTB) at Pusauli (Sasaram) to 1000MW VSC based HVDC Back-to-Back	1000MW VSC based HVDC	Estimated cost of the scheme is 3440 Crs. With implementation timeframe of 60 months from date of allocation.

Note:

i. Silicon Carbide (SiC) MOSFETs based Power Modules are to be used for 1000MW HVDC VSC Back to Back.

ii. All the terms & conditions of MoP vide letter no 25-10/66/2024-PG dated 25-09-2025 may be fulfilled by the TSP.

4.9.9. NCT further recommended that the Pusauli HVDC site may be developed as full-fledged facility for R&D, development and testing of HVDC equipment.

4.10. Presentation by CTUIL on difficulties in transmission planning

4.10.1. CTUIL presentation cover the current installed generation capacity, projected capacity by 2030 based on connectivity applications and planning assumptions, the prevailing planning framework, the expected power supply position by 2030, the load–generation balance, and the key challenges along with the way forward. The overall objective was to present an integrated view of generation, transmission, and demand planning within the 2030 timeframe.

4.10.2. The trajectory of peak demand shows a consistent upward trend, with recent peak demand reaching around 250 GW. Projections indicate that peak demand by 2030–31 may range between 310 GW and 351 GW, depending on the scenario considered under EPS and draft NEP assumptions. Variations observed between projected and actual peak demand in certain years were highlighted as exceptional and not indicative of a structural deviation from long-term demand growth trends.

4.10.3. At present, the total installed generation capacity is about 500 GW, with a substantial share coming from variable renewable energy sources. When hydro and nuclear capacities are included, the non-fossil capacity increases further. Based on ongoing capacity addition plans and connectivity applications, the installed capacity by 2030–31 is expected to exceed 900 GW. However, it was emphasised that connectivity applications represent resource potential and developer interest, and should not be directly equated with firm demand.

4.10.4. In addition to the demand projected under EPS, further demand is expected to arise from emerging sectors such as green hydrogen and green ammonia projects, as well as direct ISTS drawal by bulk and industrial consumers. This additional demand is estimated to be in the range of 130–140 GW. To cater to this incremental requirement, an additional generation capacity of over 400 GW, including energy storage systems, is being envisaged.

4.10.5. The renewable energy potential declared by MNRE is about 450 GW, out of which transmission planning decisions have already been taken for nearly 240 GW. A significant quantum of RE connectivity has already been granted, while some projects are under construction or at advanced stages of bidding. However, a significant portion of connectivity applications remains pending due to the non-finalisation of associated transmission systems majorly in Rajasthan (more than 60GW) and Gujarat.It was also observed that developers are increasingly shifting towards intra-state RE development, which has implications for ISTS planning and phasing.

4.10.6. A key challenge highlighted was the mismatch between generation capacity addition and transmission system readiness. Transmission projects typically have longer gestation periods, and if connectivity timelines are not aligned with transmission completion, large-scale RE integration may lead to congestion and curtailment. This

underscores the need for synchronised planning of generation and transmission infrastructure.

4.10.7. As per the load generation balance (LGB) for FY 2030-31 carried out as per midterm rolling plan of CTUIL, there is absolute surplus power of about 25-55 GW in all India basis across seasons and dispatch scenarios. The surplus is observed even after considering demand growth as per 20th EPS report and substantial green Hydrogen loads (about 19 GW) and drawl of power in Solar Hours by ESS/PSPs (about 61 GW). The extant of surplus shall further increase to 85-110 GW in case of delay in materialization of envisaged Gren Hydrogen demand, PSP & BESS projects as well as consideration of thermal dispatch (minimum technical level) to 55% level instead of 40%.

4.10.8. Due to above issues, transmission system for evacuation for 62 GW RE in Rajasthan has not been finalized as no landing point is available for absorption of such huge RE power. Further, considering the minimum gestation period of HVDC transmission system (54 months from award), the transmission system for new applications for connectivity in Rajasthan may be available only beyond 2032 timeframe subject to materialization of 62 GW transmission schemes which are pending finalization due to non-availability of landing points with all India surplus scenario. Similar issues are being encountered in Gujarat.

4.10.9. Studies indicate the possibility of significant surplus generation during solar hours, while challenges may persist in meeting evening peak demand. This imbalance points to the need for adequate energy storage, improved ramping capability, and flexible operation of thermal units. It was emphasized that the issue is not only capacity adequacy but also the ability to operate the grid securely under high renewable penetration.

4.10.10. Energy storage was identified as a critical enabler for managing variability and ensuring grid stability. Co-location of storage with renewable energy projects was strongly advocated to optimize transmission utilization and reduce system stress. An initial benchmark of around 10% storage capacity relative to renewable capacity was discussed as a practical starting point, with scope for refinement based on further studies.

4.10.11. From a regulatory and planning perspective, it was noted that while connectivity grants are governed by regulatory timelines, system preparedness and resource adequacy must form the basis of long-term planning decisions. Unchecked capacity addition without reference to demand and system capability may result in overcapacity, inefficient operation, and financial stress on the power system.

4.10.12. Going forward, it was emphasized that transmission planning should be commensurate with demand growth rather than being driven solely by generation potential. Resource adequacy planning should guide the phasing of renewable capacity addition, connectivity grants, and storage deployment. A coordinated and continuous planning mechanism among concerned agencies was suggested to monitor implementation,

account for delays or deviations, and enable timely course correction.

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Annexure-I

List of participants of the 36th meeting of NCT

CEA:

1. Sh. Ghanshyam Prasad, Chairperson
2. Sh. V.K. Singh, Member (PS)
3. Sh. B S Bairwa, Chief Engineer (PSPA-II)
4. Smt. Ammi R Toppo, Chief Engineer (PSPA-I)
5. Sh. Faroquee Iqbal, Director (PSPA-II)
6. Smt. Kavita Jha, Director (PSPA-I)
7. Sh. Ganeshwar Rao Jada, Director (PSPA-I)
8. Sh. Kanhaiya S Kushwaha, DD (PSPA-I)
9. Smt. Naghma Furqan, Director (PSCD)
10. Sh. Prateek Jadaun, AD (PSPA-II)
11. Sh. Praveen Kumar, AD (PSCD)

MoP:

1. Sh. Sai Baba, Joint Secretary (Trans.)

MNRE:

1. Sh. Tarun Singh, Scientist E
2. Sh. Abhay Bakre, MD/NGHM
3. Sh. Shafiqur Rehman, DGM (Transmission)

CTUIL:

1. Sh. K. K. Sarkar, Sr. GM
2. Sh. Rajesh Kumar, Sr. GM
3. Sh. Vikas Bagadia, CGM
4. Sh. RVMM Rao, CGM
5. Sh. Anupam Kumar, Ch. Manager
6. Sh. Sandeep Kumawat, DGM
7. Sh. Bhaskar Wagh, DGM
8. Sh. Venkatesh Gorli, Ch. Manager
9. Sh. Anil Kr. Meena, GM
10. Sh. Ajay Dahiya, DGM
11. Sh. Malla Mahendranath, Ch. Manager
12. Sh. Pratyush Singh, Ch. Manager

GRID India:

1. Sh. S.C. Saxena, CMD
2. Sh. Rajiv Porwal, Dir. (SO)
3. Sh. Vivek Pandey, CGM (NLDC)
4. Sh. Priyam Jain, Chief Manager (NLDC)
5. Sh. Gaurab Dash, Deputy Manager (NLDC)

OPTCL

1. Sh. Bhaskar Jyoti Sarma, CMD

PFCCL

1. Sh. Deepak Kumar, Dy. Manager
2. Sh. Sanjiv Kumar, DGM
3. Sh. Naveen Phougat, GM

Expert Members

1. Sh. S. R. Narasimhan
2. Sh. Abhay Choudhary

SECI

1. Sh. R.K. Agarwal, Consultant
2. Sh. Shreedhar Singh, GM (Solar)

RECPDCL

1. Sh. Anil Kumar Perala, Chief Manager
2. Vijay Kulkarni, Sr. GM (TBCB)

Power Grid

1. Narendra Babu, Sr. DGM
2. Puneet Tyagi, CGM

RPCs

1. Sh. N.S. Mondal, MS(ERPC)
2. Sh. P.D.Lone, WRPC
3. Sh. Asit Singh, MS(SRPC)
4. Director (T&SO), KSEBL