सत्यमेव जयते
भारत सरकार
Government of India
विद्युत् मंत्रालय
Ministry of Power
पूर्वी क्षेत्रीय विद्युत् समिति
Eastern Regional Power Committee

Tel. No.:033-24239651.24239658 FAX No.:033-24239652. 24239653 Web:www.erpc.gov.in

सं /NO. ERPC/EE/OPERATION/2025/889 दिनांक / DATE: 30.07.2025

सेवा में /To,
संलग्न सूची के अनुसार /As per list enclosed.

विषय : 25 जुलाई, 2025 (शुक्रवार) को मैरियट रांची में आयोजित 229वीं ओसीसी बैठक का कार्यवृत्त-संबंध में।
Subject: Minutes of 229th OCC Meeting held on 25.07.2025 (Friday) at Marriott, Ranchi -regd.

महोदय महोदया,
Sir(s)/Madam,

कृपया अपनी जानकारी और आवश्यक कार्रवाई के लिए 25 जुलाई, 2025 (शुक्रवार) को मैरियट रांची में 10:30 बजे आयोजित 229वीं ओसीसी बैठक का कार्यवृत्त आयोजित बैठक के संलग्न कार्यवृत्त देखें। यह ईआरपीसी वेबसाइट (www.erpc.gov.in) पर भी उपलब्ध है।

Please find enclosed Minutes of 229th OCC Meeting held on 25.07.2025 (Friday) Office at Marriot, Ranchi at 10:30 hrs for your kind information and necessary action. The same is also available at ERPC website (www.erpc.gov.in).

टिप्पणियाँ, यदि कोई हों, कृपया यथाशीघ्र इस कार्यालय को अग्रेषित करें।
Observations, if any, may please be forwarded to this office at the earliest.

इसे सदस्य सचिव के अनुमोदन से जारी किया जाता है।
This issues with the approval of Member Secretary.

भवदीय /Yours faithfully
30/07/25
for (S. Kejriwal)
SE(ERPC)
एस.ई (ईआरपीसी)

LIST OF ADDRESSES:

1. CHIEF ENGINEER (TRANS., O&M), BSPTCL, PATNA, (FAX NO. 0612-2504557/2504937)

2. CHIEF ENGINEER (System Operation), BSPTCL, PATNA, (FAX NO. 0612-2504557/2504937)

3. CHIEF ENGINEER, TRANSMISSION (O&M), JUSNL, RANCHI (FAX NO.-0651-2490486/2490863)

4. CHIEF ENGINEER, TVNL, DORANDA, RANCHI - 834102 (FAX NO. 06544-225414)

5. CHIEF LOAD DISPATCHER, SLDC, OPTCL, BHUBANESWAR (FAX NO.0674-2748509)

6. CHIEF GENERAL MANAGER (O&M), OPTCL, BHUBANESWAR7. SR. GENERAL MANAGER (PP), GRIDCO, JANPATH, BHUBANESWAR (0674-2547180)

8. DIRECTOR (OPERATION), IB TPS, AT/PO BANHARPALI, JHARSUGUDA, (FAX NO. 06645-222225/222230)

9. GENERAL MANAGER, TTPS, TALCHER, (FAX NO. 06760-243212)

10. SR. GENERAL MANAGER (ELECTRICAL), OHPC LTD., BHUBANESWAR, (FAX NO.0674-2542102)

11. CHIEF ENGINEER, CLD, WBSETCL, HOWRAH, (FAX NO. 033-26886232)

12. CHIEF ENGINEER, CENTRAL PLANNING WING, WBSETCL, SALT LAKE (FAX NO.:033-23591955)

13. CHIEF ENGINEER (PTR), WBSEDCL, SALT LAKE, KOLKATA (FAX:033-23345862)14. CHIEF GENERAL MANAGER (OS), WBPDCL, KOLKATA-98 (FAX NO. 033-23393286/2335-0516)

15. GM, KOLAGHAT TPS, WBPDCL, KOLAGHAT (FAX NO.03228231280)

16. DGM (OPERATION), DPL, DURGAPUR, (FAX NO. 0343-2555052)

17. GM (SYS OPERATION), CESC, CHOWRINGHEE SQUARE, KOLKATA (FAX NO.033-22253756/22129871)

18. CHIEF ENGINEER, SLDC, DVC, HOWRAH (FAX NO. 033-2688-5094)

19. ADDL.CHIEF ENGINEER, SLDC, POWER DEPT., GOVT. OF SIKKIM, GANGTOK, (FAX NO. 03592-228186/201148/202284)

20. EXECUTIVE DIRECTOR, ERLDC, POSOCO, KOLKATA, (FAX NO. 033-2423-5809)

21. GENERAL MANAGER, FSTPP, NTPC, FARAKKA, (FAX NO. 03512- 224214/226085/226124)

22. GENERAL MANAGER , KhSTPP, NTPC, KAHALGAON (FAX NO.06429-226082)

23. GENERAL MANAGER, TSTPP, NTPC, TALCHER, (FAX NO. 06760-249053)

24. GENERAL MANAGER (OS), POWERGRID, ER-II, KOLKATA (Fax no: 033-23572827)

25. GENERAL MANAGER, POWERGRID, ER-I, PATNA, (FAX NO.0612-2531192)

26. GENERAL MANAGER (O&M), POWERGRID, ODISHA PROJECTS, SAHID NAGAR, BHUBANESWAR – 751 007

27. EXECUTIVE DIRECTOR (O&M), NHPC, FARIDABAD (FAX No.:0129-2272413)

28. GENERAL MANAGER, TEESTA –V POWER STATION, NHPC, SINGTAM, EAST SIKKIM (FAX 03592 - 247377)

29. CHIEF ENGINEER, RANGIT POWER STATION, NHPC, P.O. RANGIT NAGAR, SOUTH SIKKIM (FAX NO.03595-259268)

30. SENIOR VICE PRESIDENT, PTC LTD., NBCC TOWERS, 15-BHIKAJI KAMA PLACE, NEW DELHI- 110066 (FAX NO. 011-41659504)

31. PLANT HEAD, ADHUNIK POWER & NATUARAL RESOURCES, JHARKHAND(FAX NO.: 0657-6628440)

32. AGM (OPERATION), MAITHON POWER LTD, DHANBAD (FAX: 08860004758)

33. VICE PRESIDENT(POWER), VEDANTA LIMITED, BHUBANESWAR- 751023 (FAX NO 0674-2302920)

34. CHIEF ELECTRICAL ENGINEER, EASTERN RAILWAY, KOLKATA-700 001 (FAX NO.: 033-22300446)

35. CHIEF ELECTRICAL ENGINEER, SOUTH EASTERN RAILWAY, KOLKATA-43 (FAX: 033-24391566)

36. DEPUTY DIRECTOR, EASTERN RPSO, 14, GOLF CLUB ROAD,TOLLYGUNJ, KOLKATA-700033

37. GENERAL MANAGER (O&M), NHPC LTD, FARIDABAD, FAX: 0129-2272413

38. ASSOCIATE VICE PRESIDENT, GMR KEL, BHUBANESWAR-751007. (FAX NO: 0674- 2572794)

39. GM (SO & COMML), NTPC VVNL, NEW DELHI-110033. Fax:011-2436702140. SHRI D. P. BHAGAVA, CHIEF CONSULTANT (O&M), TEESTA URJA LIMITED, NEW DELHI-110 001 (FAX:011-46529744)

41. SHRI BRAJESH KUMAR PANDE, PLANT HEAD, JITPL. (FAX:011-26139256-65)

42. DIRECTOR (NPC), CEA, NRPC BUILDING, KATWARIA SARAI, NEW DELHI- 11001643. VP (OS), HALDIA ENERGY LIMITED, BARIK BHAWAN, KOKATA-700072, FAX: 033-22360955

44. GENERAL MANAGER(O&M), BRBCL, NABINAGAR, BIHAR-824003, FAX-06332- 233026

CC:

Chief Engineer, OPM, CEA	Chief Engineer, NPC, CEA	ASSISTANTSECRETARY, ERPC

पतों की सूची:

1. मुख्य अभियंता (ट्रांस., ओ एंड एम), बीएसपीटीसीएल, पटना, (फैक्स संख्या 0612-2504557/2504937)

2. मुख्य अभियंता (सिस्टम ऑपरेशन), बीएसपीटीसीएल, पटना, (फैक्स संख्या 0612-2504557/2504937)

3. मुख्य अभियंता, ट्रांसमिशन (ओ एंड एम), जेयूएसएनएल, रांची (फैक्स संख्या-0651-2490486/2490863)

4. मुख्य अभियंता, टीवीएनएल, डोरंडा, रांची - 834102 (फैक्स संख्या 06544-225414)

5. मुख्य लोड डिस्पैचर, एसएलडीसी, ओपीटीसीएल, भुवनेश्वर (फैक्स नं.0674-2748509)

6. मुख्य महाप्रबंधक (ओ एंड एम), ओपीटीसीएल, भुवनेश्वर7. एसआर. महाप्रबंधक (पीपी), ग्रिडको, जनपथ, भुवनेश्वर (0674-2547180)

8. निदेशक (ऑपरेशन), आईबी टीपीएस, एटी/पीओ बनहरपाली, झारसुगुड़ा, (फैक्स नंबर 06645-222225/222230)

9. महाप्रबंधक, टीटीपीएस, तालचेर, (फैक्स संख्या 06760-243212)

10. वरिष्ठ महाप्रबंधक (विद्युत), ओएचपीसी लिमिटेड, भुवनेश्वर, (फैक्स संख्या 0674-2542102)

11. मुख्य अभियंता, सीएलडी, डब्ल्यूबीएसईटीसीएल, हावड़ा, (फैक्स संख्या 033-26886232)

12. मुख्य अभियंता, केंद्रीय योजना विंग, डब्ल्यूबीएसईटीसीएल, साल्ट लेक (फैक्स संख्या: 033-23591955)

13. मुख्य अभियंता (पीटीआर), डब्ल्यूबीएसईडीसीएल, साल्ट लेक, कोलकाता (फैक्स: 033-23345862)14. मुख्य महाप्रबंधक (ओएस), डब्ल्यूबीपीडीसीएल, कोलकाता-98 (फैक्स नंबर 033-23393286/2335-0516)

15. जीएम, कोलाघाट टीपीएस, डब्ल्यूबीपीडीसीएल, कोलाघाट (फैक्स नंबर 03228231280)

16. डीजीएम (ऑपरेशन), डीपीएल, दुर्गापुर, (फैक्स नंबर 0343-2555052)

17. जीएम (एसवाईएस ऑपरेशन), सीईएससी, चौरंगी स्क्वायर, कोलकाता (फैक्स नंबर 033-22253756/22129871)

18. मुख्य अभियंता, एसएलडीसी, डीवीसी, हावड़ा (फैक्स नंबर 033-2688-5094)

19. अतिरिक्त मुख्य अभियंता, एसएलडीसी, विद्युत विभाग, सिक्किम सरकार, गंगटोक, (फैक्स संख्या 03592-228186/201148/202284)

20. कार्यकारी निदेशक, ईआरएलडीसी, पोसोको, कोलकाता, (फैक्स संख्या 033-2423-5809)

21. महाप्रबंधक, एफएसटीपीपी, एनटीपीसी, फरक्का, (फैक्स नंबर 03512- 224214/226085/226124)

22. महाप्रबंधक, खएसटीपीपी, एनटीपीसी, कहलगांव (फैक्स नंबर 06429-226082)

23. महाप्रबंधक, टीएसटीपीपी, एनटीपीसी, तालचेर, (फैक्स नंबर 06760-249053)

24. महाप्रबंधक (ओएस), पावरग्रिड, ईआर-II, कोलकाता (फैक्स नंबर: 033-23572827)

25. महाप्रबंधक, पावरग्रिड, ईआर-I, पटना, (फैक्स) नं.0612-2531192)

26. महाप्रबंधक (ओ एंड एम), पावरग्रिड, ओडिशा परियोजनाएं, शहीद नगर, भुवनेश्वर - 751 007

27. कार्यकारी निदेशक (ओ एंड एम), एनएचपीसी, फरीदाबाद (फैक्स नं.: 0129-2272413)

28. महाप्रबंधक, तीस्ता-V पावर स्टेशन, एनएचपीसी, सिंगताम, पूर्वी सिक्किम (फैक्स 03592 - 247377)

29. मुख्य अभियंता, रंगित पावर स्टेशन, एनएचपीसी, पी.ओ. रंगीत नगर, दक्षिण सिक्किम (फैक्स नं. 03595-259268)

30. वरिष्ठ उपाध्यक्ष, पीटीसी लिमिटेड, एनबीसीसी टावर्स, 15-भीकाजी कामा प्लेस, नई दिल्ली- 110066 (फैक्स नं. 011-41659504)

31. प्लांट हेड, आधुनिक पावर एंड नेचुरल रिसोर्सेज, झारखंड (फैक्स नं.: 0657-6628440)

32. एजीएम (ऑपरेशन), मैथन पावर लिमिटेड, धनबाद (फैक्स: 08860004758)

33. उपाध्यक्ष (पावर), वेदांता लिमिटेड, भुवनेश्वर- 751023 (फैक्स नं. 0674-2302920)

34. मुख्य विद्युत अभियंता, पूर्वी रेलवे, कोलकाता-700 001 (फैक्स नं.: 033-22300446)

35. मुख्य विद्युत अभियंता, दक्षिण पूर्वी रेलवे, कोलकाता-43 (फैक्स: 033-24391566)

36. उप निदेशक, पूर्वी आरपीएसओ, 14, गोल्फ क्लब रोड, टॉलीगंज, कोलकाता-700033

37. महाप्रबंधक (ओ एंड एम), एनएचपीसी लिमिटेड, फरीदाबाद, फैक्स: 0129-2272413

38. एसोसिएट वाइस प्रेसिडेंट, जीएमआर केईएल, भुवनेश्वर-751007। (फैक्स नं: 0674-2572794)

39. जीएम (एसओ एवं सीओएमएल), एनटीपीसी वीवीएनएल, नई दिल्ली-110033। फैक्स:011-2436702140। श्री डी. पी. भागवा, मुख्य सलाहकार (ओ एंड एम), तीस्ता ऊर्जा लिमिटेड, नई दिल्ली-110 001 (फैक्स:011-46529744)

41. श्री ब्रजेश कुमार पांडे, प्लांट हेड, जीतपीएल। (फैक्स:011-26139256-65)

42. निदेशक (एनपीसी), सीईए, एनआरपीसी बिल्डिंग, कटवारिया सराय, नई दिल्ली-11001643. वीपी (ओएस), हल्दिया एनर्जी लिमिटेड, बारीक भवन, कोकाता-700072, फैक्स: 033-22360955

44. महाप्रबंधक (ओ एंड एम), बीआरबीसीएल, नबीनगर, बिहार-824003, फैक्स-06332-233026

सीसी:

मुख्य अभियंता, ओपीएम,	सीईए मुख्य अभियंता, एनपीसी	सीईए सहायक सचिव, ईआरपीसी

Eastern Regional Power Committee

229th OCC MEETING

Venue: Marriott, Ranchi

Date: 25.07.2025

Contents

Minutes of the 229th OCC Meeting chaired by Member Secretary (ERPC) held on 25.07.2025

GM (PUVNL), *welcomed all esteemed members of OCC and other members to the 229th OCC meeting. He expressed his gratitude to ERPC for giving them the opportunity to host the 229th OCC Meeting which is held first time by PVUNL in a regional space of ER. He wished all the delegates a fruitful deliberation in the meeting.*

ED(Operation) JUSNL welcomed in his keynote address welcomed all the delegates *to the 229th OCCh Meeting. He further extended his sincere gratitude to all the participants for their valuable contributions towards the development of power sector in the Eastern region. He highlighted the importance of ERPC forum in resolving various techno-commercial issues among the members of forum amicably.*
He mentioned that Jharkhand supplies coal as a fuel to all the thermal power plants in the nation. However, states itself has scarcity of the thermal generation capacity. After commissioning of the all units of PUVNL dependency on all other entities will be reduced.
Further he informed the forum 400 KV Katia-PUVNL DC line shall be commissioned by end of the July 2025. Remaining other T/Ls associated with the evacuation of power from PUVNL units will be completed by 2026 subject to forest clearance from Forest dept.

Member Secretary, ERPC *warmly welcomed all OCC members, other participants and appreciated the efforts of PUVNL for hosting the meeting in Ranchi in grandeur manner. The objective of hosting this meeting at Ranchi was to resolve various issues pertaining to scheduling of power from upcoming PVUNL project since all highe level officers of various offices of power department of Jharkhand would be present and fruitful decisions could be taken. He also highlighted the need of the conduction of such meeting outside the premises of ERPC in future as well, as this forum is directly available for the technical discussion with large numbers of participants from the concerned state and finding solutions for any operational challenges of regional entities of power sector.*

Further, he outlined the performance of ER grid during June, 2025 and highlighted the following points:

- *In **June-2025**, energy consumption of ER was **19.13 BU which is 2.69 % less than June-2024.***
- *In **June-2025**, Peak demand met of ER was **33.020 GW** which is **5%** more than June -2024.*
- *During **June-2025**, **72.64%** of time, the grid frequency was in IEGC Band (49.90Hz-50.05Hz).*
- *Thermal **PLF** of ER during **June-2025*** was **68.32 %** *against All India PLF of **64%.***
- *Some thermal generating units were lauded for maintaining PLF more than **90%** during **June-2025** that are listed below:*

Utility	Generating station	PLF (%)
WBPDCL	SANTALDIH TPS	95

OPGC	IB VALLEY TPS	92
IPP	HALDIA TPP	100

❖ **Coal stock position (As on 11.06.2025) is as follows:**

SL.	Name of States/Power Stns.	% of Actual Stock vis-à-vis Normative Stock
1.	Jharkhand (TVNL)	206%
2.	Odisha/IBTPS	77%
3.	WBPDCL	52% (Min. SANTALDIH TPS-36% , Max.Bandel TPS –73%)
4.	D.P.L. TPS	44%
5.	DVC	89% Min. Mejia TPS-64% Max DURGAPUR STEEL TPS 127%
6.	NTPC	102% (Max. BARAUNI TPS -161% & Min. NORTH KARANPURA TPP - 58%)

❖ ***Commissioning of the lines by the month of June -2025***

Sl. No.	Voltage Level (kV)	Name of Transmission Lines	Circuit Type	Executing Agency	Line Length (cKM)
1.	220 kV	Keonjhar (PGCIL SS) to Turumunga GSS	D/C	OPTCL	34
2.	220 kV	Kathalguri (NEEPCO)-Namsai (POWERGRID) under Project System Strengthening Scheme for Eastern and North Eastern Regions	D/C	PGCIL	142
3.	400 kV	400 kV D/C Jeypore (POWERGRID)-Jagdalpur (CSPTCL) line under Project Inter-regional ER-WR Interconnection (SPV Name ERWR Power	D/C	PGCIL	136

		Transmission Ltd.)			

He further highlighted the following:

- *The commercial operation date (COD) for NTPC Barh Unit 3 (660 MW) of Stage-I was officially declared as July 1, 2025.*

➢ *3 Days PSSE training is being conducted by M/S SIEMENS for all ER constituents at ERPC secretariat.*

➢ *A Cyber Security Awareness Workshop for Eastern & North-Eastern Region Power Utilities organized by CSIRT-Power, Ministry of Power, in association with DVC on 14th July 2025 at Cafe Ekante, New Town, Kolkata & OPTCL on 17th July, 2025 at OPTCL Power Training Centre, Bhubaneswar.*

➢ *Reconductoring work in all 4 major circuits of Rourkela-Jharsuguda power corridor has been completed by PG Odisha.*

➢ *Frequent trippings of PMJTL lines namely 765KV Double ckt Ranchi-Medinipur TL, 765KV Double ckt Medinipur-Jeerat TL, 400KV Jeerat-New Jeerat CKT-I & II, New Jeerat-Subhasgram CKT-I & II because of failure of CLR insulators jeopardising the critical power corridors of Kolkata.*

➢ *New emission norms for coal based thermal power plants have been issued by MOEF&CC in which all TPPs units under category A (plants located within in 10 KM radius of NCR and million plus cities) are required to install FGDs. Plants under category B might require FGD installations on case to case basis. Plant under Category C have been exempted from Implementation of FGDs.*

❖ *List of participants is attached at **Annexure-A.***

EASTERN REGIONAL POWER COMMITTEE

AGENDA FOR 229th OCC MEETING TO BE HELD ON 25.07.2025 (FRIDAY) AT 10:30 HRS

1. PART-A: CONFIRMATION OF MINUTES

1.1. Confirmation of Minutes of 228th OCC Meeting held on 17th June 2025 through VC

The minutes of 228th Operation Coordination Sub-Committee meeting held on 17.06.2025 was circulated vide letter dated 19.06.2025.

Members may confirm the minutes of 228th OCC meeting.

Deliberation in the meeting:

All members confirmed the minutes of 228th OCC meeting.

2. PART-B: ITEMS FOR DISCUSSION

2.1 Schedule Generation Below Technical Minimum- Non-Compliance wrt IEGC-2023: NTPC

SCUC & SCED technical minimum support was not extended to some generating stations, the affected generating stations incurred significant financial loss and grid experiences disturbance due to excessive non-scheduled energy on account of this anomaly in the scheduling structure.

Further, the attention is drawn to the specific recent incidents (mentioned in Table no.01), generating stations which were required to cater to the evening peak of Eastern region, incurred heavy DSM loss to maintain Technical Minimum in absence of suitable schedule from beneficiaries and SCUC/SCED support.

It is also likely to mention that some beneficiaries of above-mentioned stations are procuring power from the market during non-solar hours instead of availing their entitled share from these generating stations.

Table- 01: Stations receiving SG less than TM

Date	Station	Tech. Min. (MW)	SG<TM during solar hours (MW)	SG<TM during solar hours (MW)	Support
31.05.2025	Kahalgaon_II	777	Block No. (34-60)	Min- 634 Max- 716	SCUC- No SCED- Yes
01.06.2025	Farakka_I&II	823	Block No. (29-70)	Min- 152 Max- 782	SCUC- No SCED- Yes
01.06.2025	Farakka_III	259	Block No. (26-71)	Min- 11 Max- 238	SCUC- No SCED- Yes
01.06.2025	Kanti_II	195	Block No.	Min 170 Max- 170	SCUC- No SCED- Yes

			(22-40)		
15.06.2025	Kanti_II	195	Block No. (43-56)	Min 91 Max- 178	SCUC- No SCED- Yes
16.06.2025	Farakka_I&II	823	Block No. (50-54)	Min- 359 Max- 777	SCUC- No SCED- Yes

Applicable Clauses/Regulations:

1. Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2023, clause No. 4(b) Section 46
2. Central Electricity Regulatory Commission (Indian Electricity Grid Code) (First Amendment) Regulations, 2024: Clause No. 6(5)10
3. Detailed procedure for moderating schedule up to minimum turndown level for Section 62 generators through SCED, dated- 12.03.2025

In **54th TCC meeting,** it was updated that a committee is formed under NPC to finalize a mechanism for ensuring Thermal Generation at Technical Minimum level for Grid Stability and RE Integration. (Committee report is enclosed as **Annexure B. 2.1**)

Members may discuss.

Deliberation in the meeting:

OCC advised all the members to go through all the recommendations of the committee as attached in Annexure B.2.1 and give their comments/suggestions regarding the subject cited issue, if any to ERPC Secretariat by 1st week of August.

2.2 Update on under-implementation Islanding schemes: ERPC

2.2.1 Update on Patna Islanding scheme: ERPC

- The Patna islanding scheme would be formed with Units of NPGCL along with loads of Patna city.
- NTPC was entrusted for carrying out study of NPGC units and M/S Solvinia had submitted report on study of islanding scheme dated 08th May 2024. Thereafter based on comments received from ERLDC, replies were submitted by M/S Solvinia. NTPC had communicated the report to all concerned including SLDC Bihar.
- Some further tests needed could not be carried out due to non-receipt of relevant data from Bihar.
- The proposed Patna islanding scheme aims to isolate one running unit of NPGC (660 MW) with pre-identified load of Patna city and nearby areas. After isolation of selected loads and NPGC through the identified network, run the island in islanded mode to cater the city load and to extend start-up supply to generating stations in adjoining area to facilitate early restoration.

- Patna city and nearby loads will be islanded with one of the running units of NPGC (660 MW).

In 228th OCC Meeting, Bihar SLDC has informed that complete proposal with cost estimate has been prepared and waiting for the administrative approval. (OCC referred matter to TCC).

As per 54th TCC/ERPC meeting:
Director (Op) BSPTCL mentioned that the cost considered in DPR was composite cost amounting to Rs. 5.5. Cr. However for tendering, the component wise cost was sought from the vendor. The revised cost received from the vendor is Rs 9.78 Cr. He informed that the scheme will be implemented by utilizing their own fund.
TCC advised BSPTCL to ensure speedy implementation of Patna Islanding Scheme.

BSPTCL may update.

Deliberation in the meeting:

BSPTCL updated that the DPR for the Patna islanding scheme has been sent for approval of PSDF grant on 18.07.2025.

OCC Decision:

OCC advised BSPTCL to conduct regular follow-ups with the PSDF committee regarding the status of approval of PSDF grant and also was requested to implement the same at the earliest.

2.2.2 Update on IB Valley TPS Islanding Scheme.

IB valley TPS Islanding scheme has also been put on hold for long time. The status regarding the same has been sought on urgent basis by Ministry of Power (Govt of India).
In **228th OCC Meeting**, OPTCL informed that

a) There was some disagreement with OPGC on earlier proposed islanding scheme.
b) New scheme is being designed for islanding of IB TPS and the same shall be ready in a month's time.

OCC expressed concern over the delay in finalization of IB TPS islanding scheme in view of strict follow up by MoP/CEA on the progress of such a highly important proposed scheme.
OCC advised OPGC/SLDC Odisha to mutually design the islanding scheme of IB TPS and present the scheme in next OCC.

During **54th TCC meeting,** Director (Op), OPTCL informed that both units of IBTPS are old and have limited ramp up or ramp down capability. Further he informed that maintaining load of 160 MW exclusively for the islanding scheme is difficult in the current OPTCL network around Budhipadar. He intimated that the load arrangement is being reviewed and it will be finalized soon.

TCC advised OPGC/OPTCL to finalize the scheme at the earliest and present the same in the next OCC meeting.

OPGC/ SLDC Odisha may update.

Deliberation in the meeting:

- *SLDC Odisha informed that the dynamic study of the OPGC network is yet to be studied for implementing the Ib valley islanding scheme.*
- *SLDC Odisha also updated that the DPR for this scheme will be finalized by OPTCL.*
- *ERLDC gave a presentation based on the static system studies of the OPGC network and highlighted that during islanding condition load variation will be between 115MW to 435 MW and the corresponding generation will be in the range of 320MW to 380MW as per attached **Annexure B.2.2.2**.*
- *OPGC requested the forum that they may also be involved in the dynamic study to be carried out for implementation of this scheme.*

OCC Decision:

- *OCC advised ERLDC to conduct the dynamic studies of the OPGC network at the earliest in association with SLDC Odisha and OPGC.*
- *OCC advised OPTCL to prepare the DPR after the completion of dynamic studies.*

2.2.3 Replacement of CLR insulators of PMJTL lines: ERPC

Kolkata and surrounding suburban area are being fed from three main Substation Subhasgram(PG), Rajarhat(PG) and Jeerat(WBSETCL) substation. These substations receive power mainly from 765 kV New Jeerat(PG), Farakka (NTPC) and Sagardighi (WBPDCL) other than internal generation of HEL and Budge Budge. During the peak demand period of 2023 there was significant transformation capacity shortage in Subhasgram S/S. Persistent effort of all stakeholders from ERPC forum ensured 500 MVA capacity addition at Subhasgram, 2X315 MVA capacity addition at Jeerat till date. Also commissioning of another 500 MVA ICT at Rajarhat and a spare of 500 MVA ICT at Subhasgram (PG) are under implementation stage and being actively monitored. This has ensured sufficient transformation capacity in steady state around Kolkata region. However, in recent past frequent and multiple transmission outages has been observed at 400KV and 765 kV corridors around Kolkata resulting in vulnerability of power supply in Kolkata.

Considering the rising demand and the critical nature of loads in key areas such as hospitals, metro railway, airports and the capital city of Kolkata, it is prudent to initiate a discussion on short-term mitigation strategies as well as long-term planning proposals.

In the latest TCC/ERPC meeting, PowerGrid was asked to examine and replace all faulty CLR insulator across entire locations and stressed to finish it by **Jan 2026** while financial aspect will be taken care by PMJTL.

Following a meeting through VC held on 16.07.2025 with ERPC, ERLDC, WBSLDC & PowerGrid ER-I & ER-II, following details have been sought from PowerGrid (Minutes enclosed for detailed information, **Annexure B.2.2.3**):

After detailed deliberations, POWERGRID needs to submit a short term and long-term plan for replacement of insulators.

- In Short Term measure, POWERGRID to submit shutdown proposals for replacement of the remaining faulty 157 insulators across 77 locations by 21st July 2025 to facilitate discussion in the upcoming 229th Outage OCC Meeting to be held on 22nd July 2025.
- While as a Long-term Solution, POWERGRID has to conduct a thorough check of all four lines and submit a detailed report and a bar chart including timelines for procurement, material arrival at site, gang deployment, shutdown schedule, etc. targeting completion by January 2026.

PMJTL/POWERGRID may update, and members may discuss.

PGCIL may update. OCC May discuss.

Deliberation in the meeting:

Powergrid submitted:

- *Insulator failure in the 400 kV line is mainly due to insulator flashover and in the 765 kV line due to breakdown of insulator FRP rod.*
- *Following is the breakup of insulators installed in the PMJTL line:*

kV	*Insulators*	*Decan insulators*	*Identified defective Decan insulators*	*Defective insulator replaced*
765	*58092*	*17795*	*1082*	*1044*
400	*16162*	*10273*	*3619*	*3500*
Total	*74254*	*28068*	*4701*	*4544*

- *Total identified defective insulator pending replacement is 157 and under short term planning the shutdown for replacement of these insulators has already been applied.*
- *Long term planning: Replacement of balance Decan insulators (excluding the already replaced and identified defective ones) will be completed by Feb'26 for 400 kV lines and by Oct'26 for 765 kV lines.*

ERLDC informed:
Incidents of insulator failure are more numerous during rainy season as per their observation of past incidents.

SLDC West Bengal appraised:
All the shutdowns requested by powergrid for CLR replacement for the month of August will be incorporated based on real time before Durga puja.

OCC Decision:

- *OCC took a serious note of the repeated failures of CLR insulators in the above mentioned lines jeopardizing the critical power corridor of Kolkata.*
- *OCC advised Powergrid that Deccan make insulators being installed as replacement may be tested by any certified testing agency like CPRI to ensure its reliability and the testing certificate maybe shared with ERPC.*
- *OCC also advised Powergrid to submit a comprehensive long term plan for replacement of CLR insulators.*
- *OCC also advised ERLDC to give continuous shutdown of any of the lines in coordination with SLDC West Bengal on real time so that Powergrid may replace all the defective insulators in one go so that the reliability of at least one line may be ensured before the onset of Durga puja.*

2.2.4 Provision for Reliable Power Evacuation from NKSTPP

Vide 227th OCC dated 26.05.25

- Presently, only the 400 KV D/C Chandwa line is available for power evacuation from NKSTPP, as the 400 KV NKSTPP–Gaya D/C line is still under construction.
- As per the system study conducted by ERLDC for power evacuation, in the scenario where all three units at NKSTPP are operational, stable operation is possible only up to 1700 MW in the event of a trip or shutdown of one circuit of the 400 kV D/C Chandwa line.
- The second evacuation corridor, i.e., the 400 kV NKSTPP–Gaya D/C line, is under construction and is being expedited by M/s NKTL.

As per **228th OCC meeting:**

i)ERLDC informed that SPS has been implemented successfully.
ii)NTPC updated that erection work of double ckt 400 KV NKSTPP Gaya lines going on in which 95 % & 75 % work has been completed in Bihar & Jharkhand respectively.
NTPC further updated that foundation work of 197 out of 207 towers and stringing work in 10 KM out of 71 KM is finished in Jharkhand.

OCC approved the SPS scheme as implemented for reliable power evacuation from NkSTPP & matter was referred to TCC for further deliberations.

Deliberation in the 54th TCC meeting:

- NTPC updated that 5 foundations and 20 tower erections are yet to be completed and the work is expected to be completed by Dec, 2025.
- TCC opined that in case of delaying in bring the line into operation, such project could attract Commercial implication on NKTL.
- Since there was no representative from NKTL, the forum advised ERPC Secretariat to issue a letter to NKTL for regular updation of the status of the transmission line and requested all the concern utilities viz. Jharkhand & Bihar to facilitate for addressing issues regarding RoW & forest clearance.

NKTL may update. Members may discuss.

Deliberation in the meeting:

NKTL was not present in the meeting.
NTPC updated that in Jharkhand portion foundation work of 205 out of 207 towers and stringing work in 15 KM out of 71 KM is finished and in the Bihar portion the work is almost complete.

OCC Decision:

OCC opined that a separate meeting involving personnel from NKTL, NTPC, JUSNL, ERLDC and ERPC may be conducted to check the progress of the commissioning of 400 kV NKSTPP–Gaya D/C line.

2.2.5 Bus split operationalization at NTPC Kahalgaon: ERPC

As decided in **219th OCC** Meeting, a committee comprising of members from ERPC and ERLDC visited NTPC Kahalgaon on 17-10-2024 to assess the status of Bus splitting at 400 kV level and way forward for operationalization of 400 KV Bus sectionalizer.
OCC asked NTPC to expedite their bus-splitting operation work as per the submitted deadline so that ongoing project at Goda substation may not get hampered.
As per **228th OCC meeting**:
NTPC updated that 132kV bay commissioning and testing activity shall be completed by June 2025. It was further updated that all testing activities of 400/132kV ICT 3 & 4 shall be completed by 1st week of July 2025.
NTPC informed that there was failure of 132 KV power cable at station transformer 3 on 22.05.2025 and proposed for extension of timeline for the completion of Bus -splitting to Dec,2025.

OCC raised serious concerns regarding repeated delay in completion of Bus-splitting work at Kahalgaon by NTPC in view of sustained operation in high fault level scenario and the matter was referred to TCC.

As per 54th TCC meeting:
As the issue is long pending, TCC advised NTPC to strictly adhere to the timeline for its completion i.e Aug-2025. NTPC informed that the delay was caused by the intermittent rain and failure of a 132 kV power cable. Further updated that to expedite the process, NTPC approached Bihar for providing the cable jointing kit. Bihar agreed to supply the required kit within a week and accordingly, the work is expected to be completed by August 2025.

NTPC may update. Members may discuss.

Deliberation in the meeting:

NTPC informed:

- *132 kV cable joining kit has been received from BSPTCL.*
- *As per the present work progress, KSTPP ICT 3 charging will be done by 15.08.2025.*
- *The expected bus splitting operationalization will be completed by Oct, 2025.*

OCC Decision:
The complete work break up in respect of pending bus splitting activities maybe shared along with weekly work progress with ERPC.

2.2.6 Requirement of one 315MVA ICT on Loan basis from regional pool of spares: DVC

One no. 400/220/33 KV,315MVA ICT got damaged at Koderma Thermal Power Station, DVC on 02.06.2025. Due to this outage, DVC is facing difficulties in managing power flow of that area.

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As per **228th OCC meeting**

DVC informed that the spare 315 MVA ICT, previously made available from 400 kV PowerGrid Durgapur Substation, has physical design mismatches. Hence, after discussion with PowerGrid, spare ICT from Muzaffarpur S/s with matching design and specification has been agreed.

OCC referred the issue to TCC/ERPC for post facto approval.

As per 54th TCC Meeting:

TCC agreed with the proposal and advised DVC to expedite transportation of the ICT from PowerGrid Muzaffarpur to Koderma after conducting the necessary tests & therein DVC submitted that financial modality shall be finalized shortly.

DVC may update the status & intimate the financial modality for availing this ICT.
Deliberation in the meeting:

- *DVC updated that transformer dismantling has already begun at PG Muzaffarpur and the same will be transported to Koderma shortly.*
- *The necessary road permits has been obtained and it is expected that ICT will reach Koderma by mid-October, 2025 due to rainy season.*

OCC Decision:
OCC advised DVC to expedite the transportation of the said ICT from Muzaffarpur to Koderma.
DVC was also requested to finalize the financial modality at the earliest.

2.2.7 Issues for follow up.

Issue	Reference	Last updated Status	Action Point
Update on Rajarhat GIS (POWERGRID) 400/220kV S/S: 2x500MVA	Vide 226th OCC dated 22.04.2024: The need to prioritize the installation of a 3rd 400/220KV,500MVA ICT at Rajarhat (PG) with the same urgency as Subhasgram (PG) to prevent a recurrence of similar critical situations in the future If the proposed 3rd ICT is not operational by the summer of 2026, severe congestion is likely to affect the ICTs at Rajarhat (PG).	**As per 228th OCC:** i) Powergrid informed that GIS package bid opening is on 20.06.2025. ii) Transformer will be arrived by end of July,2025. Powergrid informed the forum that Transformer has been transported from Hyderabad.	*Powergrid updated that the ICT has reached Kolaghat on 24.07.2025 and the same will arrive at Rajarhat S/s within one month.*
Upgradation of 220kV Network in Kolkata Region.	Vide 217th OCC dated 24.07.24 Due to persistent N-1 violation, Upgradation of these 220 KV feeders to be planned: ✓ 220kV Subhasgram (WB)-Lakshmikantpur D/C	**As per 228th OCC:** WBSETCL has updated that TESG committee approved the proposal in the meeting held in April 2025.	*WBSETCL updated that the approval for PSDF grant has not yet been received. They also apprised that only the following lines*

	✓ 220 kV Jeerat-Barasat D/C ✓ 220 kV Barasat-Kasba D/C	OCC advised to put up the proposal in the next PSDF meeting for approval of grant. WBSETCL has updated that proposal has been submitted to CEA appraisal committee regarding PSDF funding.	*have been listed for following 220 kV lines:* ✓ *Jeerat-Barasat D/C* ✓ *Barasat-Kasba D/C* ✓ *Subhasgram-Kasba* ✓ *Kolaghat-Foodpark* ✓ *Foodpark-Jangalpur* *OCC advised WBSETCL to expedite the upgradation work of above lines since it has already been delayed by more than 2 years and in case PSDF grant is not possible then other avenues of funding maybe explored since the loading of the above lines are going to be critical in the coming summer months.*
Restoration status of 220kV-Rajarhat (PG) - New Town IIC – II.	Vide 221st OCC dated 27.11.24 The faulty b phase cable already is isolated at both ends. As, the repair of the b phase cable involves kits and spares (particularly for the jointing portion of two different sized cables) from abroad, which is time consuming, so to keep the other two phase UG	**As per 228th OCC:** *WBSETCL has informed that cable joining Kit will arrive at the site by 19.06.2025.*	*WBSETCL updated that the said line was charged on 09.07.2025 after rectification of cable fault. However, on 10.07.2025 B phase of circuit 1 of Rajarhat-*

	cables healthy, it was extremely necessary to keep those in no load charging condition. • Repair of the faulty cable (B phase) is getting delayed due to non-availability of the imported cable joiniting kit. • Neither charging the cable at low voltage nor charging from WBSETCL end was feasible • The said no load charging may please be allowed within shortest possible time to reduce any possibility of damage of R, Y phase cables in respect of Rajarhat (PG)-New Town AAIIC circuit II.		*New Town IIC developed a cable fault.*
Update on Reconductoring of ISTS lines under Eastern Region Expansion Scheme-44	• Vide 226th OCC dated 22.04.2024 • Approved in 52nd TCC NCT (National Committee on Transmission) meeting dated 23.10.2024 • Reconductoring of ISTS portion of 220 kV corridor viz. Alipurduar (POWERGRID) – Falakata (WBSETCL) – Birpara (POWERGRID) – Binaguri (POWERGRID) – Siliguri (POWERGRID) – Kishanganj (POWERGRID) – Dalkhola	**As per 228th OCC**: • *PGCIL has updated that the bid shall open on 17.06.2025.*	*PowerGrid updated that LoA will be placed by Aug, 2025.* *OCC advised Powergrid to share the tentative timeline for the reconductoring of the Chuka transmission system.*

	(POWERGRID) – Gazole (WBSETCL) – Malda (POWERGRID), may be taken up under ISTS		
Update on Restoration of 132kV Rangit-Kurseong & 132kV Siliguri-Melli-Rangpo lines	• Vide 226th OCC dated 22.04.2024 • Due to incessant rain and several landslides, towers at loc. 125-128 of 132 kV Rangit-Kurseong and 132 kV Siliguri-Melli got badly affected • Consequently, Kurseong and Melli (Kalimpong source) are fed through single source of Siliguri and Rangpo respectively • After necessary reconfiguration, 132 KV Siliguri-Kurseong-II (interim) arrangement charged on 9th October and 132kV-Rangit-Melli (interim) has been charged tentatively on 22nd October. POWERGRID intimated that it would take 15-20 Days to restore the original configuration after rectifying damaged towers.	• **As per 228th OCC**: Powergrid updated that restoration work at location 127 is delayed due to torrential rain which is hampering transportation of materials over hilly areas. Further, Once the foundation work will be over tower erection work will be done within 15 days. Post the completion of work at location 127, work at location 126 will begin. OCC asked PGCIL to submit weekly progress report. No further **progress report received till date.**	*Powergrid updated that the said line will be charged by 15.08.2025.*
MTDL of Intra-state generators (55%).	Vide 218th & 220th OCC dated 13.08.24 & 25.10.25: • WBPDCL updated that all the thermal generating units including that of Kolaghat, are technically capable to operate at 55% MTDL But in absence of appropriate regulations of WBERC, generating units not operating at	As per **228th OCC** i*) ERLDC informed that they have conducted Separate training sessions for TRAS down Market for IPPs on 29.05.2025 and for state Gencos on 12.06.2025.* *ii) Further, ERLDC informed that MPL has participated in the market since 01.06.2025.*	*OCC advised all the intra-state generators to follow the flexible operation guideline issued by CEA to support the grid mainly during solar hours and may pursue with*

	55% MTL or below on sustained basis. • ED, ERLDC apprised that they have already highlighted the matter to WBERC & WBERC has assured to come up with appropriate regulation to incentivize generators.	*iii) All IPPs of ER have registered in TRAS down market.* ***OCC Decision:*** *ERLDC was asked to conduct a meeting with SLDCs for addressing their concerns related to MTDL and TRAS down market.*	*their respective SERCs for their financial compensation.*
Implementation of AGC in Intra-state generating units.	• 218th OCC dated 13.08.24 With the increasing penetration of renewable energy, managing frequency is expected to become more challenging in the future. Therefore, it is crucial to enhance frequency control and stability through increased participation from intra-state AGC.	As per **228th OCC**: *SLDC Bihar informed that they have planned meeting with NTPC Barauni regarding signal testing.*	*ERLDC updated that NOC is pending from SLDC Bihar. However, hardware for implementing the AGC is already installed.* *OCC advised all intra state generators to implement AGC keeping in view its financial benefits as attached in Annexure B.2.2.7.*

All concerned may update. Members may discuss.

2.3 Status of upcoming Generation Projects: ERPC Secretariat

Generating unit	Update as per 54th ERPC meeting	Update
Patratu STPP	✓ The transmission line for evacuation of Patratu generation will be ready by **15th July 2025.** ✓ JUSNL was requested to	*JUSNL updated that the stringing along with OPGW laying is going on and the line will be charged by 30.07.2025.*

	update on the commissioning of transmission line for evacuation of Patratu generation.	
Buxar TPP(SJVN)	SJVN informed the forum that said unit is likely to be synchronised by July 15, 2025 and CoD may be done in Aug, 2025.	*SJVN updated that the trial operation will be carried out by 15.08.2025.*

2.4 Shutdown proposal of generating units for the month of August 2025: ERPC

Maintenance Schedule of Thermal Generating Units of ER during 2025-26									
System	***Station***	***Unit***	***Capacity (MW)***	***CEA Approved***		***No. of Days***	***Revised proposed***		***Reason***
				From	***To***		***From***	***To***	
DVC	*MEJIA TPS*	*4*	*210.00*	*31-Jul-25*	*27-Aug-25*	*28*			*AOH-Blr, LPT & Gen*
OPGC	*IB VALLEY TPS*	*3*	*660.00*	*1-Aug-25*	*30-Aug-25*	*30*			*Boiler Inspection*
WBPDCL	*KOLAGHAT TPS*	*6*	*210.00*	*10-Aug-25*	*20-Aug-25*	*11*			*Boiler Lic Renewal*
APNRL	*MAHADEV PRASAD STPP*	*2*	*270.00*	*16-Aug-25*	*14-Sep-25*	*30*			*Annual Over hauling*
WBPDCL	*Bakreshwar*	*1*	*210.00*	*28-Aug-25*	*17-Sep-25*	*20*			*BOH*
WBPDCL	*SAGARDIGHI TPS*	*1*	*300.00*	*5-Aug-25*	*8-Sep-25*	*35*			*BOH+ESP R&M*
NTPC	*MUZAFFARPUR TPS*	*3*	*195.00*	*21-Aug-25*	*14-Sep-25*	*25*	01.11.2025	*30.11.2025*	*Boiler + TG Brg Insp*
CESC	*SOUTHERN REPL. TPS*	*1*	*67.50*	*2-Aug-25*	*19-Aug-25*	*18*			*Annual Overhauling*

TVNL	*TENUGHAT TPS*	*1*	*210.00*	*25-Aug-25*	*10-Sep-25*	*17*			*Statutary Maintenance Work*
JSW Energy	*UTKAL TPP (INDBARATH)*	*1*	*350.00*	*16-Aug-25*	*30-Aug-25*	*15*			*AOH*
NTPC	*TALCHER STPS*	*4*	*500.00*	*20-Aug-25*	*28-Sep-25*	*40*			*Overhaul*

Members may discuss/update.

Deliberation in the meeting:

- *DVC informed that they want to avail shutdown of Mejia U#3 in place of Mejia U#4 from 01.08.2025 to 10.08.2025 for R&M work.*
- *DVC also requested to avail the shutdown of DSTPS U#1 from 15.08.2025 to 11.09.2025 (28 days) for AOH Work.*
- *OPGC requested to avail the shutdown of Ib TPS U#3 from 22.08.2025 to 21.09.2025 against the LGBR approved date of 01.08.2025 to 30.08.2025.*
- *WBPDCL submitted:*
    1. *Kolaghat U#6 shutdown shall not be availed.*
    2. *Sagardighi U#1 will be under shutdown from 05.08.2025 to 08.08.2025 for boiler license renewal/safety inspection.*
    3. *Shutdown of Bakreshwar from 28.08.2025 to 17.09.2025 for BOH work.*
    4. *Bandel U#2 is under shutdown since 25.07.2025 for a period of 20 days because of BTL against the LGBR approved dates of 01.08.2025 to 20.08.2025.*
- *CESC apprised:*
    1. *Southern U#1 is under shutdown since 24.07.2025 for a period of 28 days for AOH work.*
    2. *Southern U#2 will be under shutdown from 02.09.2025 to 11.09.2025.*
- *TVNL informed that shutdown of U#1 will be availed next year.*
- *NTPC requested Muzaffarpur U#4 shutdown from 21.08.2025 to 14.09.2025 and U#3 shutdown from 01.11.2025 to 30.11.2025.*

OCC Decision

OCC approved other shutdown proposals along with modifications as deliberated above.

2.5 Request for the revision of Annual Overhauling Scheduling of APNRL: APNRL

APNRL has requested approval for the revision of the annual overhauling schedule. Earlier, it was proposed to undertake the annual overhauling of Unit #2 from **16.08.2025 to 14.09.2025**. However, based on a technical assessment, it is recommended to **postpone the shutdown of Unit #2 to the next financial year**.

Meanwhile, **Unit #1 is experiencing high turbine shaft vibrations**, and hence, it is now proposed to undertake the **annual overhauling of Unit #1 from 10.11.2025 to 15.12.2025**. In order to inform the long/mid term procurer beneficiaries of the revised schedule.

Members may discuss.

OCC Decision:

OCC agreed with the proposal of APNRL.

2.6 Overhauling of NTPC Eastern Region stations: NTPC

2.6.1. Deferment of overhauling of Unit 1 of Nabinagar (660 MW)

Unit#1 OH of 60 days was deferred from 21st June'25 to 1st Nov'25, on request of major beneficiaries proposed in 222nd OCC Meeting and approved in 226th OCC Meeting. It is requested that Nabinagar U#1 be deferred by 3 to 4 weeks, suggestively from 1st Dec'25.

Members may discuss.

Deliberation in the meeting:

OCC Decision:

OCC agreed with the proposal of NTPC Nabinagar for deferment of AOH activity of U#1.

2.6.2 Overhauling of Unit 4 of BRBCL

Overhauling of Unit 4 of BRBCL scheduled from **25-Aug-25 to 23-Sep-25.** Mail has been sent to all concerned beneficiary and same has been agreed to by major beneficiary Indian Railways (90% allocation).

Members May discuss.

Deliberation in the meeting:
Bihar submitted that considering the power deficit scenario in the state, a special meeting maybe convened to discuss the shutdown of BRBCL U#4.

OCC Decision:

OCC advised Bihar may visit BRBCL to assess the criticality of operational issues because of which NTPC is requesting the above shutdown.

2.6.4 Deferment of Overhauling of Farakka Unit#4

As per approved LGBR of FY2025-26, AOH schedule was from 1st Nov 2025 to 5th Dec 2025 which was revised from 1st Aug-2025 to 6 Sep,2025 (Approved in 228th OCC). At present NTPC has requested for postponement of Overhauling of the said unit from 15th Aug,2025 to 19th Sep, 2025.

Members May discuss.

Deliberation in the meeting:

West Bengal and Bihar vehemently opposed the proposed shutdown of Farakka during the high demand period as several other NTPC units are already in shutdown.

It was also stated that the newly commissioned units viz. Barh U#3 and North Karanpura U#3 are still performing unreliably.

OCC Decision:

The requested shutdown of Farakka U#4 is deferred to winter period.

2.6.5 Shutdown Program of Generating Units at NKSTPP: NTPC

NKSTPP Unit 2(660 MW) Annual OH was not scheduled as per approved LGBR of FY 2025-26 by CEA however NTPC has requested for planned shutdown from 08.08.2025 for a duration of 35 days to address the following issues:

- IP Turbine inner casing thermocouple replacement:

In Unit #2, all three temperature elements of IPT inner casing temperature have failed, resulting in non-availability of actual temperature of IP Shaft. Consequently, IPS margin could not be monitored in the TSC. Presently Unit start up is being done on the assumptive calculations based on HP Turbine shaft temperatures (Provided by OEM) As TSC monitoring is not available, loading and unloading of Turbine is being done based on HPT Shaft temperatures. To safeguard any damage to capital equipment due to non-availability of desired parameters, this defect needs to be attended urgently. For this Outer casing of IP turbine is to be removed.

Material Status: Available

Duration: 25-30 days.

- LP Turbine inlet compensator replacement:

Due to failure of compensator, Unit has been running on poor vacuum which may lead to increased vibration in LPT Last stage blades and may result in damage of the LPT Last stage blade, if allowed to run for a longer time. Further, every startup consumes part of total allowable time provided by OEM for bringing back the unit under such adverse conditions.

Material Status: Available

Duration: 25-30 days.

Above defects are of critical in nature and requires immediate rectification for the safety of capital equipments like IP & LP Turbine.

NTPC may explain. Members may discuss.

Deliberation in the meeting:

NKSTPP submitted that it would be unwise to operate the unit under such condition for a longer period which may cause severe damage of the equipment.

OCC Decision

NKSTPP was advised to obtain views of the NTPC corporate expert group and the shutdown of the unit may be considered based on its severity after the revival of Barh U#5.

2.7 Seeking Project Appraisal from ERPC for PSDF Grant against Establishment of Security Operation Centre along with Network Operation Centre: DVC

To ensure compliance of the directives of Information Technology (Information Security Practices and Procedures for Protected Systems) Rules 2018 & to ensure proper monitoring, security and network performance of CII of DVC LDC, it is developing a cyber security operation Centre (SOC) along with Network Operating Centre (NOC) as directed vide OM dated 26/03/20, concurred by MoM dated 1st May, 2025 by CSIRT-Power and requesting for the financial assistance through PSDF grant.
As per the revised "Guidelines/Procedure for Disbursement of Funds from Power System Development Fund (PSDF)" dated 12.03.2024, ***Annexure-B.2.7.1****, point (e)*, establishment of Security Operation Centre (SOC) at SLDCs falls under clause 5.1(c) and qualifies for 90% PSDF grant assistance.
The location of SoC along with NoC to be developed is as below:
DVC LDC, 7th floor, DVC TOWERS, Kolkata, West Bengal 700054

In this regard, a DPR has been prepared exclusively for the Establishment of Security Operation Center with integrated Network Operation Centre at DVC LDC for grant of funding from PSDF under category 5.1(c), as mentioned in the attached documents (enclosed as **Annexure B.2.7.2**).

DVC May explain.

OCC Decision

OCC agreed with the proposal of DVC.

DVC may approach PSDF nodal agency for further appraisal and consideration of the scheme under PSDF.

2.8 Upgradation of ISTS URTDSM project phase II: PowerGrid

POWERGRID has been assigned responsibility for preparation of DPR for URTDSM Phase-II in the 13th NPC. The DPR with cost estimate was presented in the 14th NPC meeting. The scope covered the replacement of 32 control centres, 2 new control centres at NLDC/ RLDCs/ SLDCs and providing 4000 new PMUs as per the PMU placement philosophy of the Subcommittee Report. The cost of the project was Rs. 3922 crores. This was made based on 70:30 funding where 70 % is to be funded by PSDF and 30% from POWERGRID Equity, as it was done for URTDSM Phase-I project.
It is to mention that the URTDSM Phase-II proposal was deliberated in the 219th OCC Meeting of ERPC dated 24.09.2024 and technically agreed. However, the funding for the project was requested from PSDF.
Subsequently it was conveyed that the funding would not be available from PSDF hence it was decided to optimize the cost by exploring various options such as centralized control center at RLDC, reduction in PMUs, storage etc., Accordingly, In the 15th NPC meeting it was decided to implement the Phase-II project only for the ISTS portion (i.e., NLDCs & RLDCs and PMUs for only Central sector stations).
Accordingly, the cost estimate of Rs. 1122 Crores for ISTS portion comprising of control centres (7nos.) of NLDC and RLDCs and PMUs at central sector stations (1070 nos.) based on Uniform philosophy of PMU placement was presented in the 16th NPC meeting in July 2025. It was directed that the proposal be shared with all RPCs/Grid-India. Hence, a brief of the project, BOQ, and Cost Estimate for the project is enclosed as **Annexure-2.8** for deliberations by the RPCs.

Considering the existing Phase-I system is going to complete its 7 years AMC on January 2027 and the hardware/software are more than 9 years old, the decision to implement the URTDSM Phase-II system is to be taken up urgently.
In view of the above, it is requested that URTDSM Phase-II project for ISTS portion may be deliberated as an Agenda item in the upcoming ERPC Meeting.

PowerGrid may explain. Members may discuss.

OCC Decision

OCC agreed with the proposal of Powergrid regarding implementation of URTDSM Phase-II system.

2.9 Tower Strengthening works at towers of 400 kV Teesta-III – Kishanganj D/C transmission Line in Teesta-III – Rangpo section due to natural causes, settlement and movement of soil in Sikkim and Darjeeling hills route of the line as per recommendations of POWERGRID /GSI: SPTL

The 400 kV Quad Moose Double Circuit Transmission Line originates from Teesta

Stage-III Hydro Electric Project, Sikkim to Rangpo Substation and terminates in Kishanganj Pooling Station of POWERGRID. The transmission line of length 215 km (589 towers) passes through Mangan, Gangtok & Namchi Districts of Sikkim, Darjeeling District of West Bengal and Kishanganj District of Bihar. The transmission line section was commissioned progressively from 2016 to 2019.

The terrain of the line comprising of Inner Himalayan Range, the Greater Himalayan Range and Shivalik Range where the transmission line passes is prone to internal disturbances inside the earth due to Neo-Tectonic activity which also causes settlement of soil in that zone. The terrain is prone to occurrence of periodic tremors & earthquakes, movement in sub surface strata and continuous natural calamities are also being observed in this route of the line.

During the O&M of the line, minor damages and rectifications works in the towers members are carried out as identified. However, at some of the towers repeated instances of opening of members, bent in members are being observed. In the Tower no. 72 located in Gangtok District, Sikkim, damages in tower members and soil subsidence near the tower foundation area was observed in various time intervals in January 2021, May 2023 and February 2024 even after rectification works were carried out repeatedly by SPTL. Further, subsidence of soil in the vicinity of tower foundation area was also observed. Currently, similar issues are also being faced in Tower 17 and Tower 62 of the transmission line due to movement and settlement in foundation area. The above-mentioned towers fall under 400 kV D/C Teesta-III – Rangpo Section of the SPTL transmission line.

As repeated instances were being observed, SPTL had requested POWERGRID to evaluate structural safety and review & suggest any remedial measure to strengthen the tower no. 72 and also the other towers having similar issues as POWERGRID was the design & Engineering consultant of the line during construction of the Project.

Based on further discussion with POWERGRID, geological assessment of the tower locations through Geological Survey of India (GSI) was also carried out. GSI has submitted in the report that over time the overburden soil on which foundation is placed has become saturated due to underground seepage originating from drainage pathways upslope. GSI has suggested remedial measures such as construction of protection walls and improving the drainage near the foundation area.

POWERGRID also carried out site visits and has observed that there is subsidence in the foundation areas of the locations of Tower no. 72 and also Tower no. 17 and 62. Remedial measures such as additional strengthening of the tower body bottom, middle, top upto cross arm level, additional protection walls, ground improvement and drainage improvement measures near the towers to stabilize the slope have been suggested. Also measures such as installation of an additional insulator to reduce the tension on the tower body and ground soil improvement measures has also been suggested. The suggested measures relating to civil works, additional protection walls are being planned and will be executed as and when required.

It is mentioned that the above condition is a force majeure situation occurring due to natural calamity condition due to change in sub-surface foundation as indicated by GSI and POWERGRID and also the terrain of the line subject to underground movements due to active seismic zone, movements in the route of the line passing through Sikkim

and Darjeeling Hills.

Accordingly, as per the final report of the POWERGRID the required interim and final measures tower strengthening on the towers of the line will be taken up by SPTL. To do the Tower strengthening and other required works at Tower body, cross arms, top portion, adjustment of sag to reduce tension etc. of the above-mentioned towers/spans, suitable minimum outage of 400kV D/C Teesta-III – Rangpo Section of the transmission line will be required under force majeure condition.

Hence, SPTL request the OCC to accord the principal approval for outage under force majeure/natural calamity condition. The request for actual outage will be availed by SPTL as and when required basis as per the transmission line outage procedure and as per the working condition at site. (**Annexure B.2.9**)

SPTL may update. Members may discuss.

OCC Decision

OCC accorded the in principal approval for proposed outage of 400 kV Teesta-III – Kishanganj D/C transmission Line in Teesta-III – Rangpo section as and when required by SPTL. However, actual availability will be issued by ERPC as per the extant policy.

2.10 Allocation issue of Unallocated Power (15%) of Patratu TPS and Buxar TPP: ERPC

Present allocation (%) of Unallocated Pool Power of ER is produced below:

States	Allocation (%)
Bihar	68.147
Jharkhand	10.923
Odisha	12.223
West Bengal	8.456
Sikkim	0.249
Total	100.000

Regarding willingness/unwillingness to avail Unallocated Power (15%) of Patratu TPS and Buxar TPP, comments from the beneficiaries of Unallocated Pool Power of ER namely Bihar, Jharkhand, Odisha, Sikkim and West Bengal has been received and the gist of the same are produced below.

Bihar:

1) Decided not to avail power from the 15% unallocated quota of **Buxar TPP** at this juncture (No. H-PMC-BTPP-542/2020/236 dated 02.07.2025, addressed to MS, ERPC)

2) Decided not to avail power from the 15% unallocated quota of Patratu TPS at this juncture (No. H-PMC-Misc. (Thermal)-60/2025/238, dated 03.07.2025, addressed to CEO, PVUNL)

Jharkhand:
JBVNL requires no power from allocation of 15% unallocated power from **Buxar TPP and Patratu TPS (**Mail dated 18.07.2025 from CE (Comml.), JBVNL, marked to MS, ERPC)

Odisha:

1) Odisha will not avail the share from the 15% unallocated Power of **Patratu TPS** at this stage (No. GRIDCO/100/2025-CGM (Comml-PP)/979-A, dated 30.06.2025, addressed to MS, ERPC).

2) Odisha may not avail power from **Buxar TPP due to its high cost**. However, the proposal is subject to further scrutiny and decision by Committee of Directors No. GRIDCO/387/2024-CGM (Comml-PP)/1111, dated 14.07.2025, addressed to MS, ERPC)

Sikkim:

1) Sikkim does not have requirement of **Patratu TPS power** and regrets the surrender of the unallocated share (No. 73/TRD/Power/2020-21/163, dated 28.05.2025, addressed to MS, ERPC)

2) Sikkim expressed to surrender of share allocation to Sikkim **from unallocated quota of NTPC stations in ER and Bhutan HPS** (No. 167/73/TRD/Power/2020-21, dated 05.06.2025, addressed to MS, ERPC)

West Bengal:

WBSEDCL **conveyed consent for allocation** of 8.456% from unallocated power of **Buxar** (1320 MW) and **Patratu** TPS (4000 MW). They have **requested for the waiver of STU charges & losses of the states** for the said projects. (No. CE/PTP/ERPC/169, dated 03.07.2025, addressed to MS, ERPC)

DVC:

Though **DVC is not a beneficiary from the Unallocated Pool Power of ER**, they have expressed their willingness to enter into a long term PPA **for procurement of 360 MW power from the15% unallocated power of Patratu TPS Stage-I. (**No. ED/COML/ERPC/04/354, dated 02.06.2025, addressed to MS, ERPC)

Members may discuss.

<u>Deliberation in the meeting</u>:

WBSEDCL requested the forum that a letter maybe sent from Chairperson, ERPC to Jharkhand and Bihar for consideration of waiving off of STU charges/power wheeling charges and transmission losses for encouraging ER states to avail power from these thermal projects as is being followed in other regions of the country.

SJVN expressed to offer the balance unallocated power from Buxar TPP to DVC and requested to intimate their willingness to procure the same.

OCC Decision

OCC advised WBSEDCL to share their willingness for availing the remaining power from PVUNL and Buxar TPP apart from its present allocation of 8.456% from the unallocated pool power of ER by 15.08.2025 to ERPC secretariat.

2.11 Agenda of PVUNL for 229th OCC 1) NoC from STU (JUSNL) needed for scheduling by ERLDC

1. **NoC from STU(JUSNL) needed for scheduling by ERLDC**

To do scheduling for PVUNL, ERLDC needs deemed connectivity/GNA for PVUNL. As JBVNL is applying for connectivity of 85% (2040MW) PVUNL has requested STU to grant NoC for scheduling of 2040 MW by ERLDC. STU needs JBVNL to sign connectivity agreement first which is getting delayed due to which STU is not issuing the NoC. So, it is requested for JBVNL to sign the connectivity agreement at the earliest.

Deliberation in the meeting:

ERLDC submitted that for scheduling of PVUNL units NOC is required from STU regarding transmission losses and wheeling charges.

SLDC Jharkhand informed:

- *As per the present tariff regulation of JSERC, STU loss charge is 2.23% and the power wheeling charge is 38 p/unit and this charge cannot be waived off by Jharkhand at this stage.*

OCC Decision

OCC advised ERLDC to take appropriate measures for scheduling of PVUNL units in due course as per the direction of CERC.

2. **NoC for Utilization of State GNA:**

As per the EM issued by CERC dated 13.02.2023 No. L-1/261/2021/CERC on (Connectivity and General Network Access to the inter-State Transmission System) (First Amendment) Regulations, 2022, in point no-31 it is clarified as follows:

"We observe that a generating Station within a State control area may like to schedule its power outside the State. The same may happen within deemed GNA quantum of State."

In the 54th ERPC board meeting also it was clarified by CTU that PVUNL can utilize the injection GNA of Jharkhand. Also ERLDC had earlier clarified in the meeting on 05.06.2025 that PVUNL can utilize the injection GNA of Jharkhand and it will put no commercial burden upon the Jharkhand STU/SLDC as well as JBVNL. In this regard, PVUNL had given a request e-mail in this regard on 10.06.2025 to grant NoC for utilization of Jharkhand state's injection GNA but, the same has not been issued till now. In the meeting on 23.07.2025 also it was clarified by CTU that GNA of state belongs to STU and it is bidirectional thus the NoC can be issued by STU to PVUNL. As the grant of GNA by CTU takes time, this request may kindly be approved by STU.

Deliberation in the meeting:

ERLDC submitted:

- *PVUNL is connected to Jharkhand network and the scheduling of PVUNL should not affect the GNA of Jharkhand.*

- ***GNA of Jharkhand for scheduling:***

Increased by the quantum equal to the maximum schedule possible from PVUNL to Jharkhand in line with 1st Amendment of GNA Regulation

Additional GNA required for Jharkhand can be calculated using the following formula:
Additional GNA = (Unit-1 IC−Aux. Consumption) × Jharkhand's Share

Example Calculation: Additional GNA= (800−(800×5.75%)) × 85% = 640.9 MW

SLDC Jharkhand shall give declaration that this additional quantum shall be used only for PVUNL schedule and not for any other schedule

Transmission charges: as per original GNA of Jharkhand.

RTDA: calculation of Jharkhand will be carried out considering original GNA in line with 1st Amendment of GNA Regulation.
For RTDA purposes, direct drawal from Patratu STPS to Jharkhand will be deducted from the actual drawal data of Jharkhand.

OCC Decision

OCC conceded to SLDC Jharkhand's consent regarding ERLDC proposal on GNA & RTDA calculation.

- ***GNA requirement of PVUNL:***

ERLDC submitted:

GNA for Patratu STPS scheduling will be considered to be quantum of connectivity with host State (Jharkhand). Quantum shall be provided by Jharkhand STU through SLDC via NoC issued to PVUNL.

RTDA charges will apply on Patratu STPS if its actual generation exceeds total considered GNA.

PVUNL has to submit NOC from Jharkhand STU for wheeling of power to ISTS.

PVUNL informed:

85% connectivity from PVUNL will be taken by JBVNL.

For trial run operation of Unit #1 & #2 ERLDC needs NOC from STU. However, STU depends on JBVNL for issuing the same.

OCC Decision

OCC advised JBVNL and JUSNL to resolve the matter bilaterally within a week and the same may be communicated to ERLDC at the earliest.

3. **Participation in SCED, SCUC, and Ancillary Services (SRAS/AGC and TRAS)**

Deliberation in the meeting:

ERLDC submitted:

• SCED, SCUC, and Ancillary Services (SRAS/AGC and TRAS) schedule will be at the Ex-Bus of PVUNL and shall not be included in the schedule of Jharkhand.

• ISTS and STU losses shall not be applied to this quantum while scheduling PVUNL.

• PVUNL shall obtain a NoC to enable participation in SCED, SCUC, and Ancillary Services (SRAS/AGC and TRAS).

• No STU losses and STU transmission charges on the schedule quantum of SCED, SCUC, and Ancillary Services (SRAS/AGC and TRAS)) till PVUNL is scheduled by

RLDC.

OCC Decision

OCC conceded to SLDC Jharkhand's consent with the proposal of ERLDC.

4. **Start Up and Infirm Power: settlement in line with DSM Reg. 2024**

Deliberation in the meeting:

ERLDC submitted

- *Presently startup power is drawn by PVUNL from Jharkhand DISCOM as HT consumer.*
- *NOC is required from Jharkhand for drawl of start-up power and injection of infirm power by PVUNL from/to Grid and to settle in line with DSM Reg. 2024.*
- *LC to be opened in the favour of CTU & Jharkhand STU by PVUNL for transmission charges. Transmission charges shall be paid to CTU as well as STU by PVUNL.*
- *Approval of start-up power shall be issued by SLDC Jharkhand.*
- *Start-up drawal and infirm injection will be accounted as per CERC DSM regulations and settled from Regional DSM and AS pool account.*

OCC Decision

- *OCC advised JUSNL to issue the NOC for start-up power at the earliest and JUSNL agreed with the same.*
- *OCC concluded that the project could be treated as a state embedded project and not as an ISGS for all types of deviation and other related issues.*

5. **Trial run operation certification and COD**

ERLDC submitted:

- *All tests to be performed as per IEGC 2023 and relevant regulations of JSERC.*
- *Upon completion of all tests, the same shall be submitted to SLDC.*
- *Jharkhand. SLDC Jharkhand in coordination with ERLDC shall verify the reports.*
- *Trial run certification shall be issued by SLDC Jharkhand.*

OCC Decision

OCC advised PVUNL to get TOC issued in coordination with JUSNL.

2.12 ERLDC Operating procedure for ER Grid for 2025-26: ERLDC

As mandated by IEGC 2023, Reg. 28(4) each RLDC has to update Operating Procedure of regional grid Annually in consultation with all stakeholders. Accordingly, ERLDC has updated the Operating Procedure for the Eastern Region for the financial year 2025–26. The draft operating procedure was circulated among the stakeholders vide mail dated 15th July,2025 for their comments.
Further to discuss the proposed changes in the operating procedure, an online meeting was held on 17th July 2025 at 15:00 hrs among the regional entities in which key changes in the document were discussed. In the Meeting, SLDC WB has requested more time to review the documents.
Accordingly, all the regional entities of ER are hereby requested to provide their comments **within one month** from the date of this 229th OCC Meeting.

The operating procedure for 2025-26 can be accessed via the following link: https://erldc.in/systemoperation/operating-procedure-of-er

Members may discuss.

OCC Decision

OCC noted.

2.13 Status of DTL for Ind Barath TPP: ERLDC

Following the 54th TCC/ERPC Meeting held on 23–24 June 2025 at Chennai, where TCC advised JSW for expediting the construction of the transmission line and has referred the matter to ERPC for information.
Subsequently, A meeting to discuss the issues related to dedicated transmission line of IBEUL was held under Chairperson CEA on 07th July 2025 involving ERPC, GRID India, SLDC Odisha and M/s JSW. After detailed deliberations, the following was decided:

- IBEUL to complete the work of DTL by 31st December 2025. Till then the interim arrangement for evacuation of power through LILO of OPGC-Sundergarh 400 kV line at IBEUL shall continue.
- ERLDC in consultation with SLDC may review the SPS logic in place and formulate necessary guidelines/SOPs for operation.
- IBEUL in consultation with MCL shall explore the possibility of re-routing their DTL alongside the railway track in MCL backfill area.
- IBEUL shall present the progress report to CEA, ERPC, ERLDC and OPTCL on weekly basis.

Under the above, An Online meeting has been conducted on 22-07-2025 and a mutually agreed SOP has been finalised take care operational issues and shared with JSW and SLDC Odisha. SOP is attached **(Annexure B.2.12).**

Members may note.

OCC Decision

OCC noted and advised IBEUL to explore the possibility of operationalizing the line by mobilising ERS and Odisha also agreed with the proposal and to render all types of assistance in this regard.

2.14 Planned Shutdown of Unit #7 Due to High Vibration at Generator Pedestal- NTPC

NTPC Kahalgaon Unit #7 (500 MW) has been experiencing intermittent exceedance of alarm thresholds for pedestal vibration (7Y) at Bearing No. 7 during partial load operations.
Analysis of diagnostic plots from the Vibration Monitoring System (VMS) indicates that the elevated vibration levels at the exciter and generator pedestals are symptomatic of misalignment and reduced stiffness at the exciter pedestal.

The NTPC Turbine Expert Group has reviewed the situation and cautioned that a further increase in vibration levels could impose significant mechanical stress on critical machine components. They have recommended immediate corrective action.

Accordingly, Unit #7 is scheduled for a planned shutdown from 00:00 hrs on 15th July 2025 to prevent potential damage and ensure equipment safety.

In view of this, the unit's planned overhauling—originally scheduled from 22nd August 2025—will be advanced and carried out during this shutdown period, which is expected to last 35 days.

Consequently, the overhauling of Unit #2 (210 MW), initially planned from 1st August 2025, will be deferred to accommodate the revised shutdown schedule of Unit #7.

Members may note.

OCC Decision

OCC noted.

2.15 Consideration of Force Majeure for the period of outage of 400kV Pandiabili-Duburi Line from 05:21 Hrs of 10.07.2025 to 16:07 Hrs of 11.07.2025 – PGCIL

400kV Pandiabili-Duburi Line tripped at 05:21 hrs of today (10.07.2025) on Y-Phase to Ground Fault. After Line patrolling by the TL Maintenance Group, it came to the

notice that, at Location No.- 665 Y-Phase (Tension Tower), one polymer insulator (Twin Moose) was found to be in de-capped condition. The river was in swollen condition and was having high current. We have approached local boats, but due to high current of water in the river, they have not agreed to shift manpower and T&P near the tower base inside the river. Subsequently, the matter was taken up with the District Administration requesting for deployment of ODRAF team to facilitate the replacement of the de-capped insulator. In this regard, the copy of the letter written to the District Administration is attached herewith for kind reference.
ODRAF has requested NDRF team for help. Subsequently, NDRF team visited the location and advised to take up the work on 11.07.2025 morning considering the criticality of the case which required proper preparation considering the all required safety measures and was also not allowed post sunset. The photograph of site visit of NDRF team is also attached herewith for reference.
Subsequently, Fitters from POWERGRID with active support from NDRF team were deployed from the early morning of 11.07.2025, the work was completed successfully and 400kV Pandiabili-Duburi Line was brought back into service at 16:07 Hrs of 11.07.2025.
Therefore, We would request to you to consider the case of outage of 400kV Pandiabili-Duburi Line from 05:21 Hrs of 10.07.2025 to 16:07 Hrs of 11.07.2025 as a Force Majeure one keeping in view the gravity of the incident and high degree of risk involved in carrying out the restoration work. Photographs of restoration activities have been attached for your kind reference.
PG ODISHA may explain. Members may discuss.

OCC Decision

OCC noted the difficulties highlighted by PG Odisha during restoration 400kV Pandiabili-Duburi Line and advised ERPC Secretariat to calculate the availability of the line as per extant regulations.

2.16 Upcoming Hydro power projects of SJVN

Project	Description	Remarks
Etalin HEP (3097 MW)	Location- Arunachal Pradesh Design Energy -12260 MU Anticipated Commissioning- 2033 Peaking Capability- Yes Levelized Tariff- Rs. 4.94/kWh	Actual tariff will be as determined by CERC under Section-62 of Electricity Act on CoD of the project
Lower Arun HEP (669 MW)	Location- Nepal Design Energy -2901 MU Anticipated Commissioning- 2031 Peaking Capability- Yes Levelized Tariff- Rs. 4.99/kWh	

Upper Karnali HEP (900 MW)	Location- Nepal Design Energy -3994 MU Anticipated Commissioning- 2031 Peaking Capability- Yes Levelized Tariff- Rs. 5.45/kWh	

OCC Decision

OCC advised all the members to go through the attached Annexure B.2.17 and share their willingness with ERPC secretariat for procurement of power from the above mentioned hydro projects of SJVN at the earliest.

3. PART-C: ITEMS FOR UPDATE/FOLLOW-UP/INFORMATION

3.1. ER Grid performance during June 2025

The average and maximum consumption of Eastern Region and Max/Min Demand (MW), Energy Export for the month June -2025 were as follows:

AVERAGE CONSUMPTION (MU)	MAXIMUM CONSUMPTION(MU)/ DATE	MAXIMUM DEMAND (MW)	MINIMUM DEMAND (MW)	SCHEDULE EXPORT	ACTUAL EXPORT
		DATE / TIME	DATE / TIME	(MU)	(MU)
636 MU	702 MU*, 14.06.2025 ****All-time highest***	33020 MW*, 13.06.2025 at 23:27 Hrs. ****All-time highest***	20789 MW, 20.06.2025 at 06:00 Hrs.	1329	1269

ERLDC/ERPC may highlight the performance of the ER grid.

OCC Decision:
OCC noted ER grid performance during June 2025.

3.2. Non-Submission of FRC data in stipulated time-frame: ERLDC

Adhering to IEGC clauses **30.8** and **30.10.(a)** to **30.10.(q),** generating stations within the Eastern region are required to submit essential data to ERLDC within two days of receiving a notification regarding a reportable frequency event. Additionally, according to clause 30.10.(n), all control areas within the eastern region must assess their frequency response characteristics and share the evaluation, along with high-resolution data, with the ERLDC. Therefore, timely submission of primary response data is crucial for compliance with the IEGC.

228th OCC Decision

- ✓ All generators were advised to regularly share high resolution data against each reportable frequency event with ERLDC on time to facilitate accurate assessment of FRP for respective control areas.
- ✓ All generating utilities were also urged to update the google sheet (link mentioned above) with email address where notifications of reportable events will be shared.

The latest data receipt status is given below (as on 18.07.2025):

STATIONS	04.01.2025 19:23 hrs	12-03-2025 14:51 HRS	12-03-2025 15:37 HRS	12-06-2025 13:34 HRS	16-06-2025 11:51 HRS
FSTPP #STG 1 & 2					
FSTPP # STG 3					
KhSTPP #STG 1					
KhSTPP #STG 2					
TSTPP #STG 1					
Barh stage-1					
Barh stage-2					
BRBCL					
Darlipalli					
North Karanpura					
NPGC					
TEESTA V					
Dikchu					
IBEUL (JSW UTKAL)/INDBHARAT					
GMR					
MPL					
ADHUNIK					
JITPL					
TEESTA III					
Bihar					
Jharkhand					
DVC					
OPTCL					
WB					

Updated as on	13.07.2025
	Received
	Not Received
	Plant Out
	Data freeze at plant

Hence all are again requested to follow the stipulated timeline and submit the data to ERLDC and also fill the google sheet below to include the email address where notifications of reportable events should be sent.

https://docs.google.com/spreadsheets/d/1sIvAOmQIEQVIMn0LnB78eKMa2sz2QYICZ-sPEpeV_jk/edit?usp=sharing

ERLDC may explain. Members may discuss.

OCC Decision

✓ *All generators were advised to regularly share high resolution data against each reportable frequency event with ERLDC on time to facilitate accurate assessment of FRP for respective control areas.*

✓ *All generating utilities were also urged to update the google sheet (link mentioned above) with email address where notifications of reportable events will be shared.*

3.3. Regarding Non-Submission of Forecasting Data from States: ERLDC

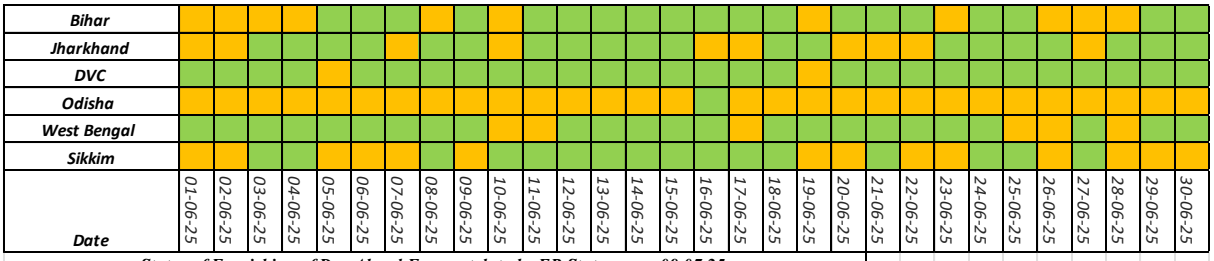
The **Clause 2** of **Regulation 31** of **IEGC 2023** has mandated all the SLDCs to timely submit the demand estimate data to the respective RLDC and RPC.

Current data submission status is given in the table below: Hence it is again requested to all the concerned for timely submission of demand estimation data to ERLDC. This collaboration is essential for effective planning and preparedness to meet the region's electricity demands efficiently and reliably.

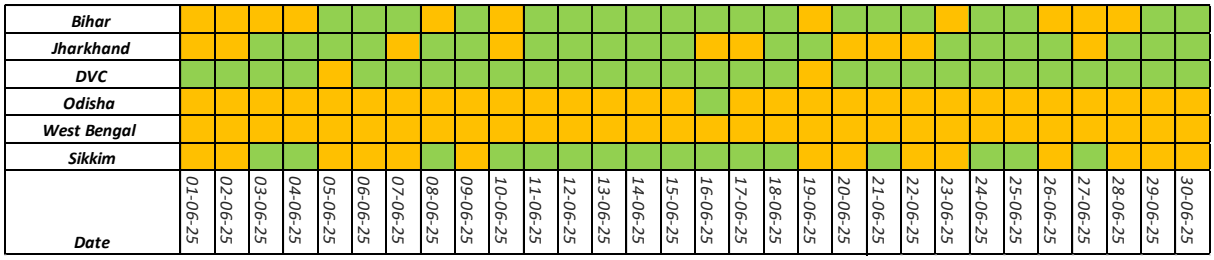
228th OCC Decision

- OCC advised all SLDCs for strictly adhering to the schedule of demand estimation as mandated in IEGC 2023, timely sharing with ERLDC in specified format as well as uploading of forecasting error on their respective websites.
- SLDCs who are submitting day ahead forecast, were advised to also share the forecasting data for their respective control areas on weekly as well as monthly basis with ERLDC.
- All SLDCs were urged to regularly furnish resource adequacy data besides demand forecast.

Latest Forecast and Resource Adequacy Data receipt status at ERLDC is shown below:



Status of Furnishing of Day Ahead Forecast data by ER States as on 09.07.25



	Status of Furnishing of Week Ahead Forecast data by ER States					Status of Furnishing of Week Ahead Resource Adequacy data by ER States				
Bihar										
Jharkhand										
DVC										
Odisha										
West Bengal										
Sikkim										
Date	26-05-25 to 01-06-25	02-06-25 to 08-06-25	09-06-25 to 15-06-25	16-06-25 to 22-06-25	23-06-25 to 29-06-25	26-05-25 to 01-06-25	02-06-25 to 08-06-25	09-06-25 to 15-06-25	16-06-25 to 22-06-25	23-06-25 to 29-06-25

Received | Not Received | Delayed Receipt

	Status of Furnishing of Month Ahead Forecast data by ER States	Status of Furnishing of Month Ahead Resource Adequacy data by ER States
Bihar		
Jharkhand		
DVC		
Odisha		
West Bengal		
Sikkim		
Date	01-06-2025 to 30-06-2025 (June 2025)	01-06-2025 to 30-06-2025 (June 2025)

Received | Not Received | Delayed Receipt

ERLDC may explain and all SLDCs may update. Members may discuss.

OCC Decision:

• OCC advised all SLDCs for strictly adhering to the schedule of demand estimation as mandated in IEGC 2023, timely sharing with ERLDC in specified format as well as uploading of forecasting error on their respective websites.

• SLDCs who are submitting day ahead forecast were advised to also share the forecasting

data for their respective control areas on weekly as well as monthly basis with ERLDC.

• All SLDCs were urged to regularly furnish resource adequacy data besides demand forecast.

3.4. Mock Black Start: ERLDC

- As per IEGC Reg. 34.3: A mock trial run of the procedure for different sub-systems including black-start of generating units along with grid forming capability of inverter-based generating station and VSC-based HVDC black-start support at least once a year under intimation to the concerned SLDC and RLDC.
- Eastern region has 16 hydro power plants, which has capability to play a crucial role during restoration after any grid disturbance. Mock black start testing along with grid forming capability is being carried out on yearly basis, as mandated by IEGC reg 34.3, to ensure the capability & readiness of those generators for any contingency.
- Also, diesel generator sets and other standalone auxiliary supply source to be used for black start shall be tested on a weekly basis and the test reports are to be shared to the concerned SLDC, RLDC and NLDC on a quarterly basis.
- As per IEGC Reg. 34.4: Simulation studies are to be carried out by each user in coordination with RLDC for preparing, reviewing and updating the restoration procedures considering the following:

a) Black start capability of the generator;
b) Ability of black start generator to build cranking path and sustain island;
c) Impact of block load switching in or out;
d) Line/transformer charging;
e) Reduced fault levels;
f) Protection settings under restoration condition

So far, Balimela, Burla, U. Indravati, TLDP-IV, and Subarnarekha have completed their mock black start tests, while Jorethang and Tashiding have confirmed tentative dates for FY25. The remaining generators are yet to schedule their tests and are requested to confirm their mock drill dates. Status of mock black start is as follows:

Sl. No.	Name of Hydro Station	2024-25 Actual Date of Test	Tentative date for blackstart exercise for FY 2025-26
1	U. Kolab		
2	Balimela	15th January 2025	
3	Rengali		
4	Burla	December-24	
5	U. Indravati	Sep-24	
6	Maithon	December-24	
7	TLDP-III		
8	TLDP-IV	December-24	
9	Subarnarekha	3rd December 2024	
10	Teesta-V	N/A	
11	Chuzachen		
12	Teesta-III	N/A	
13	Jorethang		
14	Tashiding		
15	Dikchu	N/A	
16	Rongnichu		

228th OCC decision:

- OCC advised all black start capable hydro generating units of ER to update their schedule of mock black start to ERLDC at the earliest. This is in compliance to IEGC 2023 (CERC).
- OCC further opined that in case of non-receipt of further update by respective hydro generating units the proposed tentative schedule of mock black start may be considered as final. Thereafter all black start capable hydro units shall have to conduct mock black start at least once in a year as mandated in IEGC 2023.

All the generators are requested to confirm dates for black start of each generating unit. Also, the users are requested to share the data required simulation studies before the scheduled date of mock drill.

Members may note.
OCC decision:
OCC advised all black start capable hydro generating units of ER to update their schedule of mock black start to ERLDC at the earliest. This is in compliance to IEGC 2023 (CERC).

4. PART-D: OPERATIONAL PLANNING

4.1. Anticipated power supply position for August-2025

The abstract of peak demand (MW) vis-à-vis availability and energy requirement vis-à-vis availability (MU) for the month of July-2025 is prepared by ERPC Secretariat (**Annexure D.1**) on the basis of LGBR for 2025-26 and feedback of constituents, keeping in view that the units are available for generation and expected load growth etc.

Members may update.
Deliberation in the meeting
All states were requested to provide their anticipated power supply position for Aug-2025 within a week. Updated anticipated power supply position will be shared accordingly.

4.2. Major Thermal Generating Units/Transmission Element outages/shutdown in ER Grid (as on 06-06-2025)

a) Thermal Generating Stations outage report:

SL No	STATION	STATE	AGENCY	UNIT NO	CAPACITY (MW)	REASON(S)	OUTAGE DATE
1	KHSTPP	BIHAR	NTPC	7	500	Annual overhauling	15-Jul-2025
2	GMR	ODISHA	GMR-KEL	2	350	Annual Overhauling	06-Jul-2025
3	BARH	BIHAR	NTPC	5	660	Annual Overhauling	02-Jul-2025

4	DARLIPALI	ODISHA	NTPC	2	800	Annual Overhauling	01-Jul-2025
5	KOLAGHAT	WEST BENGAL	WBPDCL	4	210	Annual Overhauling	27-Jun-2025
6	BAKRESHWAR	WEST BENGAL	WBPDCL	4	210	Overhauling of boiler and turbine	16-Jun-2025
7	CHANDRAPURA TPS	DVC	DVC	7	250	Initially unit was out due to Loss of fuels, later generator electrical fault found. Later it was taken under Capital Overhauling from 18.06.2025.	03-Jun-2025
8	TENUGHAT	JHARKHAND	TVNL	2	210	Annual Maintenance	20-Apr-2025
9	CHANDRAPURA TPS	DVC	DVC	7	250	Loss of fuels	03-Jun-2025
10	BARH	BIHAR	NTPC	3	660	Gen H2 leakage	19-Jul-2025
11	BARH	BIHAR	NTPC	4	660	Boiler Tube Leakage	17-Jul-2025
12	CHANDRAPURA TPS	DVC	DVC	8	250	Boiler Tube Leakage	18-Jul-2025
13	KOLAGHAT	WEST BENGAL	WBPDCL	5	210	Boiler Tube Leakage	18-Jul-2025
14	Sterlite	ODISHA	SEL	4	600	Due to APH problem	14-Jul-2025
15	Sterlite	ODISHA	SEL	2	600	Initially unit was out due to problem in APH A Gearbox later generator hydrogen Leakage issue also found	31-May-2025

All Generating stations are requested to update expected restoration time and reason outage to ERLDC/ERPC on weekly basis in case of any change at their end.

b) <u>Major Generating stations Out on Reserve Shutdown due to low system demand:</u>

SL No	STATION	STATE	AGENCY	UNIT NO	CAPACITY (MW)	REASON(S)	OUTAGE DATE

1	SOUTHERN	WEST BENGAL	CESC	2	67.5	Low system demand	15-Jun-2025
2	SOUTHERN	WEST BENGAL	CESC	1	67.5	Initially tripped on Furnace Problem Later it was taken under Reserve shutdown due to low system demand	15-Jun-2025

c) Hydro Unit Outage Report:

S. NO	STATION	STATE	AGENCY	UNIT NO	CAPACITY (MW)	REASON(S)	OUTAGE DATE
1	TEESTA STG III Hep	SIKKIM	TUL	1	200	Sudden cloudburst at glacier fed LOHNAK Lake followed by huge inrush of water in Teesta River and damage of Teesta III Dam & downstream Powerhouses	04-Oct-2023
2	TEESTA STG III Hep	SIKKIM	TUL	2	200		
3	TEESTA STG III Hep	SIKKIM	TUL	3	200		
4	TEESTA STG III Hep	SIKKIM	TUL	4	200		
5	TEESTA STG III Hep	SIKKIM	TUL	5	200		
6	TEESTA STG III Hep	SIKKIM	TUL	6	200		
7	TEESTA HPS	SIKKIM	NHPC	1	170	Sudden cloudburst at glacier fed LOHNAK Lake followed by huge inrush of water in Teesta River and damage of Teesta III Dam & downstream Powerhouses	04-Oct-2023
8	TEESTA HPS	SIKKIM	NHPC	2	170		
9	TEESTA HPS	SIKKIM	NHPC	3	170		
10	BALIMELA HPS	ODISHA	OHPC	5	60	Repair and maintenance work	16-Jan-2025
11	BALIMELA HPS	ODISHA	OHPC	6	60	Initially unit was out due to Severe water leakage from turbine, later unit was taken under Repair and maintenance work from 00:00 hrs of 16.01.25	06-Jan-2025

12	CHIPLIMA HPS / HIRAKUD II	ODISHA	OHPC	1	24	Capital Overhauling	15-Dec-2023

d) Long outage report of transmission Element (MORE THAN 01 WEEK) (As on 20.07.2025):

Transmission Element / ICT	Outage From	Reasons for Outage
220/132 KV 100 MVA ICT II AT LALMATIA	22-01-2019	220/132KV, 100MVA Transformer (NTPC side) is charged on 07.02.2024 from HV side on no load. Now, it is in idle charged condition
220KV-FSTPP-LALMATIA-I	21-04-2021	Two nos. of tower collapsed on 29.05.2024 near to Lalmatia GSS in the Loc. No. 246 & 247. Presently 220 kV Farakka-Lalmatia line is charged(from loc no 241 to loc 84) at 132 kV voltage level for anti-theft purpose by tapping at loc. No. 100-101.
220KV-WARIA-BIDHANNAGAR-1	08-06-2022	To control overloading of 220 kV Waria-DSTPS (Andal) D/C line
220KV-WARIA-BIDHANNAGAR-2	08-06-2022	To control overloading of 220 kV Waria-DSTPS (Andal) D/C line
132KV-BARHI-RAJGIR-1	25-03-2023	Dismantling of tower no. 227, 228, and 229 crossing the premises of Mahabodhi Cultural centre along with Destringing of conductor of both circuits and Earthwire between tension tower no. 218-237 in same line.
132KV-NALANDA-BARHI(DVC)-1	25-03-2023	Dismantling of tower no. 227, 228, and 229 crossing the premises of Mahabodhi Cultural centre along with Destringing of conductor of both circuits and Earthwire between tension tower no. 218-237 in same line.
400KV-RANGPO-TEESTA-V-1	04-10-2023	Tower near gantry of Teesta V powerhouse collapsed due to sudden cloudburst at glacier fed LOHNAK Lake followed by huge inrush of water in TEESTA river and damage of Teesta III Dam & downstream Powerhouses
400KV-RANGPO-TEESTA-V-2	04-10-2023	Tower near gantry of Teesta V powerhouse collapsed due to sudden cloudburst at glacier fed LOHNAK Lake

		followed by huge inrush of water in TEESTA river and damage of Teesta III Dam & downstream Powerhouses
132KV-RANGPO-SAMARDONG-1	22-05-2024	Rangpo:Y_N fault with fault distance 0.157 KM ,14.562kA Samardong: NA
132KV-CHANDIL-MANIQUI-1	05-06-2024	Power assistance withdrawn
400KV/220KV 315 MVA ICT 1 AT NORTH KARANPURA	12-09-2024	Tripped on Differential protection
132KV-MADHEPURA (BH)-SAHARSA(PMTL)-1	23-09-2024	To control loading on 132kV Madhepura-Sahrsa line
132KV-MELLI-SILIGURI-1	05-10-2024	S/d for inspection of tower of Loc.127 found twisted due to heavy landslide & heavy continuous rainfall in Soom Tea Garden under Darjeeling section. Line charged as 132 KV Siliguri-Melli II (Interim arrangement) at 19:20 hrs on 09-10-2024. This interim arrangement is obtained by horizontal jumpering at Loc-129 after disconnecting main jumper for both Rangit & Melli side.
132KV-RANGIT-KURSEONG-1	05-10-2024	S/d for inspection of tower of Loc.127 found twisted due to heavy landslide & heavy continuous rainfall in Soom Tea Garden under Darjeeling section. Line charged as 132 KV Siliguri-Melli II (Interim arrangement) at 19:20 hrs on 09-10-2024. This interim arrangement is obtained by horizontal jumpering at Loc-129 after disconnecting main jumper for both Rangit & Melli side..
400KV/220KV 315 MVA ICT 1 AT TSTPP	01-11-2024	Tripped on PRD protection
132KV-PATRATU-PATRATU-1	16-11-2024	Diversion/Heightening of line due to inadequate clearance from under construction railway Line by PVUNL
132KV-PATRATU-PATRATU-2	16-11-2024	Diversion/Heightening of line due to inadequate clearance from under construction railway Line by PVUNL
400KV-ALIPURDUAR (PG)-PUNASANGCHUN-JIGMELING-1	10-12-2024	Jumper connection and interconnection removal at Kamichu
400KV/220KV 315 MVA ICT 2 AT MEJIA-B	20-01-2025	Tripped during charging of ICT#1 bay with cable from 220 kv GIS side
400KV-JHARSUGUDA-ROURKELA-2	01-03-2025	Reconductoring work
400KV-MEDINIPUR-KHARAGPUR-1	17-03-2025	Tripped on DP. Tower Collapsed
400KV-MEDINIPUR-KHARAGPUR-2	17-03-2025	Tripped on DP. Tower Collapsed

400KV/220KV 315 MVA ICT 1 AT LATEHAR(JUSNL)	30-03-2025	REF protection operated
400KV/220KV 315 MVA ICT 1 AT LATEHAR	22-04-2025	R phase LA of 400/220/33 KV ICT - I got bursted
400KV/220KV 315 MVA ICT 2 AT LATEHAR	16-04-2025	Transformer REF protection operated
400KV/220KV 315 MVA ICT 2 AT KODERMA	02-06-2025	Transformer Differential Protection operated
132KV-RANGPO-SAMARDONG-1	03-06-2025	Samardong : overcurrent tripping
400KV-JHARSUGUDA-ROURKELA-2	15-06-2025	Reconductoring work
132KV-KATAIYA(LAHAN)-KUSHAHA-2 (LAHAN)-3	17-06-2025	Fault distance-11.8 KM , Ia-206.2A Ib-134.2A Ic-892.5A In-891.5A
220KV-DALKHOLA-PURNEA-1	23-06-2025	For system requirement(To control loading of 220kV Purnea-Purnea D/C)
220KV-DALKHOLA-PURNEA-2	23-06-2025	For system requirement(To control loading of 220kV Purnea-Purnea D/C)
220KV-PUSAULI(PG)-DURGAUTI-1	25-06-2025	Circuit 1 line potential transformer has blasted
132KV-RAXAUL(NEW)-PARWANIPUR-2	03-07-2025	To carry out Gantry erection works at near by Parsauni 132/66/33 kV Substation of Nepal
132KV-RAXAUL(NEW)-PARWANIPUR-1	03-07-2025	To carry out Gantry erection works at near by Parsauni 132/66/33 kV Substation of Nepal
220KV-RAJARHAT-NEW TOWN(AA-II)-1	10-07-2025	Emergency shutdown for BCU replacement work at Rajarhat. Charging attempted but tripped on SOTF. B_ph cable faulty

Transmission licensees/ Utilities are requested to update expected restoration date & work progress regarding restoration regularly to ERPC/ERLDC on monthly basis by 5th of each month so that status of restoration can be reviewed in OCC. Utilities are also requested to update outage of any elements within their substation premises like isolator/breaker to ERPC/ERLDC regularly. (Reported as per Clause 5.2(e) of IEGC).

Deliberation in the meeting

Members noted.

4.3. Commissioning of new units and transmission elements in Eastern Grid in the month of June-2025.

The details of new units/transmission elements commissioned in the month of May-2025 based on the inputs received from beneficiaries:

NEW ELEMENTS COMMISSIONED DURING May, 2025							
उत्पादन इकाइयाँ / GENERATING UNITS							
.Sl.No.	स्थान Location / Pooling Station	मालिक/यूनिट का नाम OWNER/UNIT NAME	यूनिट संख्या/ स्रोत Unit No/ Source	संकलित क्षमता (मेगावाट) Capacity added (MW)	कुल/स्थापित क्षमता (मेगावाट) Total/Installed Capacity (MW)	दिनांक DATE	टिप्पणी Remarks क्र
1	SAGARDIGHI	WBPDCL/ Sagardighi Unit-5	5/ Coal	660	3300	21-06-2025 00:51	
आई.सी.टी/जी.टी/एस.टी / ICTs/ GTs / STs							
क्र.Sl.No.	एजेंसी/ मालिक Agency /Owner	उप-केन्द्र SUB-STATION	आईसीटी संख्या ICT NO	वोल्टेज (केवी) Voltage Level (kV)	क्षमता (एमवीए) CAPACITY (MVA)	दिनांक DATE	टिप्पणी Remarks
1	WBPDCL	SAGARDIGHI	400KV/ 21KV 810 MVA GT 5 AT SAGARDIGHI	400	810	21-06-2025 00:51	
2	Aditya Aluminium	ADITYA ALUMINIUM(AA)	400KV/ 220KV 315 MVA ICT 2 AT ADITYA ALUMINIUM(AA)	400	315	03-06-2025 14:15	First time charging code through Tie bay no 402. from HV side only.
3	Aditya Aluminium	ADITYA ALUMINIUM(AA)	400KV/ 220KV 315 MVA ICT 1 AT ADITYA ALUMIN	400	315	03-06-2025 13:47	First time charging code through Tie bay no 405. from HV side only.

			IUM(AA)				
प्रेषण लाइन / TRANSMISSION LINES							
क्र. Sl. No.	**एजेंसी/ मालिक Agency /Owner**	**लाइन का नाम LINE NAME**	**लंबाई (किमी) Length (KM)**	**कंडक्टर प्रकार Conductor Type**	**दिनांक DATE**	**टिप्पणी Remarks**	
1	POWER GRID ER WR Transmission Limited	400 kV Jeypore - Jagdalpur - 1	68.8	AL59			
2	POWER GRID ER WR Transmission Limited	400 kV Jeypore - Jagdalpur - 2	68.8	AL59			
3	OPTCL	220KV-TURUMUNGA(OPTCL)-KEONJHOR(PG)-1	17.25	ACSR ZEBRA			
4	OPTCL	220KV-TURUMUNGA(OPTCL)-KEONJHOR(PG)-2	17.25	ACSR ZEBRA			
लिलो / प्रेषण लाइन की पुनर्व्यवस्था / LILO/RE-ARRANGEMENT OF TRANSMISSION LINES							
क्र. Sl. No.	**एजेंसी/ मालिक Agency /Owner**	**लाइन का नाम / लिलो पर Line Name/LILO at**	**लंबाई (किमी) Length (KM)**	**कंडक्टर प्रकार Conductor Type**	**दिनांक DATE**	**टिप्पणी Remarks**	
NIL							
बस/लाइन रिएक्टर / BUS/LINE REACTOR							
क्र.	**एजेंसी/ मालिक**	**एलेमेंट का नाम Element Name**	**उप-केन्द्र SUB-STATION**	**वोल्टेज (केवी) Voltage**	**दिनांक DATE**	**टिप्पणी Remarks**	

Sl. No.	Agency /Owner			Level (kV)		
1	WBSETCL	125MVAR 400KV B/R-2 AT NEW PPSP	NEW PPSP	400 KV 125 MVAR	20-06-2025 18:31	

बस / BUS						
क्र. Sl. No.	एजेंसी/ मालिक Agency /Owner	एलेमेंट का नाम Element Name	उप-केन्द्र SUB-STATION	वोल्टेज (केवी) Voltage Level (kV)	दिनांक DATE	टिप्पणी Remarks
NIL						

एच.वी.डी.सी/ए.सी फिल्टर बैंक/फैक्ट्स डिवाइस संबद्ध प्रणाली / HVDC /AC Filter bank / FACTS DEVICE associated System						
क्र. Sl. No.	एजेंसी/ मालिक Agency /Owner	एलेमेंट का नाम Element Name	उप-केन्द्र SUB-STATION	वोल्टेज (केवी) Voltage Level (kV)	दिनांक DATE	टिप्पणी Remarks
NIL						

बे / BAYS						
क्र. Sl. No.	एजेंसी/ मालिक Agency /Owner	एलेमेंट का नाम Element Name	उप-केन्द्र SUB-STATION	वोल्टेज (केवी) Voltage Level (kV)	दिनांक DATE	टिप्पणी Remarks
1	WBPDCL	400KV MAIN BAY OF GT-5 AT SAGARDIGHI		SAGARDIGHI	400	
2	Aditya Aluminium	400KV MAIN BAY OF LAPANGA -2 AT ADITYA ALUMINIUM(AA)		Aditya Aluminium	400	
3	Aditya Aluminium	400KV MAIN BAY OF LAPANGA -1 AT ADITYA ALUMINIUM(AA)		Aditya Aluminium	400	
4	Aditya Aluminium	ADITYA ALUMINIUM - 400KV - Bus 2		Aditya Aluminium	400	

5	Aditya Aluminium	ADITYA ALUMINIUM - 400KV - Bus 1		Aditya Aluminium	400	
6	PGCIL ER-II	132KV MAIN BAY OF 50 MVA ICT 3 AT GANGTOK		GANGTOK	132	Idle charging from 132 kV side
7	PGCIL ER-II	66KV MAIN BAY OF 50 MVA ICT 3 AT GANGTOK		GANGTOK	66	First time loaded
8	PGCIL ER-II	132KV TRANSFER BUS COUPLER BAY AT GANGTOK		GANGTOK	132	Previous TBC bay was diverted for main bay of the ICT
9	OPTCL	220 kV Main Bay of Turumunga(OPTCL) Ckt-1 at Keonjhar(PGCIL)		Keonjhar(PGCIL)	220	
10	OPTCL	220 kV Main Bay of Turumunga(OPTCL) Ckt-2 at Keonjhar(PGCIL)		Keonjhar(PGCIL)	220	
11	POWER GRID ER WR Transmission Limited	400KV TIE BAY OF JAGDALPUR(CSPTCL)-2 AND FUTURE AT JEYPORE		Jeypore	400	
12	POWER GRID ER WR Transmission Limited	400KV MAIN BAY OF JAGDALPUR(CSPTCL)-2 AT JEYPORE		Jeypore	400	
13	POWER GRID ER WR Transmission Limited	400KV TIE BAY OF JAGDALPUR(CSPTCL)-1 AND FUTURE AT JEYPORE		Jeypore	400	
14	POWER GRID ER WR Transmission Limited	400KV MAIN BAY OF JAGDALPUR(CSPTCL)-1 AT JEYPORE		Jeypore	400	

15	POWER GRID ER WR Transmission Limited	400KV MAIN BAY OF FUTURE-2 AT JEYPORE		Jeypore	400	
16	POWER GRID ER WR Transmission Limited	400KV MAIN BAY OF FUTURE-1 AT JEYPORE		Jeypore	400	

Members may note.

Deliberation in the meeting

Members noted.

4.4. UFR operation during the month of June 2025

Frequency profile for the month as follows:

MONTH	MAX (DATE/TIME)	MIN (DATE/TIME)	% LESS IEGC BAND	% WITHIN IEGC BAND	% MORE IEGC BAND
June, 2025	50.38 Hz on 29-06-2025 at 13:48 Hrs	49.55 Hz on 27-06-2025 at 22:10 Hrs	7.55	71.85	20.59

Hence, no report of operation of UFR has been received from any of the constituents.

Members may note.

Deliberation in the meeting

Members noted.

****

Annexure A

Participants in 229th OCC Meeting of ERPC

Venue: JW Marriot, Ranchi | Time: 10:30 hrs | Date: 25.07.2025 (Friday)

Sl No	Name	Designation/ Organization	Contact Number	Email	Signature
1	**N.S Mondol**	**Member Secretary ERPC**		**mserpc-power@gov.in**	
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"Coming together is a beginning, staying together is progress, and working together is success." –Henry Ford

Participants in 229th OCC Meeting of ERPC

Venue: JW Marriot, Ranchi Time: 10:30 hrs Date: 25.07.2025 (Friday)

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Participants in 229th OCC Meeting of ERPC

Venue: JW Marriot, Ranchi Time: 10:30 hrs Date: 25.07.2025 (Friday)

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"Coming together is a beginning, staying together is progress, and working together is success." –Henry Ford

Annexure B.2.1

भारत सरकार/Government of India
विद्युत मंत्रालय/Ministry of Power
केंद्रिय विद्युत प्राधिकरण/Central Electricity Authority
राष्ट्रीय विद्युत समिति प्रभाग /National Power Committee Division
Ist Floor, Wing-5, West Block-II, RK Puram, New Delhi-66

No. CEA-GO-15-14/1/2025-NPC Division/122 **Date: 30.06.2025**

To,

(All Members of the Committee)

विषय: ग्रिड स्थिरता और नवीकरणीय ऊर्जा एकीकरण के लिए तकनीकी न्यूनतम स्तर पर तापीय उत्पादन सुनिश्चित करने के लिए तंत्र विकसित करने हेतु समिति की रिपोर्ट के संबंध में।

Subject: Report of the Committee to Evolve the Mechanism for ensuring Thermal Generation at Technical Minimum level for Grid Stability and RE Integration -reg.

ग्रिड स्थिरता और नवीकरणीय ऊर्जा एकीकरण के लिए तकनीकी न्यूनतम स्तर पर तापीय उत्पादन सुनिश्चित करने के लिए तंत्र विकसित करने हेतु समिति की रिपोर्ट आपके सूचनार्थ और आवश्यक कार्रवाई हेतु संलग्न है।

The report of the committee to Evolve the Mechanism for ensuring Thermal Generation at Technical Minimum level for Grid Stability and RE integration is enclosed herewith for your kind information and necessary action, please.

भवदीय/Yours faithfully

30/6/25

(ऋषिका शरण /Rishika Sharan)
मुख्य अभियंता एवं सदस्य सचिव (एनपीसी)
Chief Engineer & Member Secretary (NPC)

Copy for kind information:-

1. **SA to Chairperson, CEA**
2. **SA to Member (GO&D), CEA**
3. **SA to Member (Power System), CEA**

Report of the Committee to evolve mechanism for ensuring Thermal Generation at Technical Minimum level for Grid Stability and RE Integration.

Prepared by

Central Electricity Authority (CEA)

June 2025

1. BACKGROUND

The rapid increase in renewable energy penetration, combined with periods of low demand has created significant operational challenges for the grid as well as thermal generators in India. During weekends/holidays solar hours, the availability from Variable RE is high, consequently the requisitions from several inter-state thermal stations by beneficiary is nil or negligible resulting in injection schedules below the minimum technical levels (MTL). However, these generators are still required to provide firm supply during non-solar hours/evening peak hours.

During the meeting dated 26.05.2025, Chairperson, CEA, observed that several thermal generators, particularly Central Sector owned units, were being scheduled below their technical minimum limits during day time despite their requirement during non-solar/evening peak demand. NLDC also reported persistent high frequency operation and the need for limiting RE generation especially during weekends with lower demand, by deployment of TRAS emergency provisions after exhausting the downward regulation capability from conventional sources.

To resolve the above issues, a committee was constituted under the chairmanship of the Member Secretary (NRPC) with representatives from RPCs, GM Division, CEA, CERC, NLDC, RLDCs as Members and Member Secretary, NPC as the Member Convener. **(Constitution of Committee order enclosed at Annexure -I)**

The primary mandate of the Committee was to evolve a common mechanism to ensure adequate scheduling of thermal generation during daytime hours upto technical minimum for ensuring sufficient ramp-up capabilities to maximize the thermal availability during evening/non-solar peak hours. This will ensure secure and reliable grid operations, support the integration of RE sources, and help avoid operational and commercial challenges for generating units nationwide.

The terms of reference of the meeting are as follows:

(a) Review the current scheduling and dispatch practices of all thermal generators, particularly during Solar/high RE hours and propose mechanism for ensuring technical minimum schedule of thermal generators to support grid balancing and reliability during Non-Solar/evening hours.

(b) Assess operational constraints, technical minimum limit issues, and ramp-up/ramp-down capabilities of all thermal generators, to ensure the maximum availability during Non-Solar hours.

(c) Recommend a common mechanism for:
   i. Ensuring all thermal units are scheduled above their technical minimum limits during solar hours and moderating other generation sources including RE for ensuring reliable grid operation during Non-Solar hours.
   ii. Maintaining sufficient ramp-up capability of thermal generating units to meet the Non-Solar/evening demand.

(d) Address commercial and regulatory aspects linked to the common mechanism being finalized for operation of thermal generating units.

2. KEY CHALLENGES AND REGULATORY PROVISIONS

2.1. Central Electricity Authority (Flexible Operation of Coal based Thermal Power Generating Units) Regulations, 2023

Central Electricity Authority (Flexible Operation of Coal based Thermal Power Generating Units) Regulations, 2023 is applicable to all coal based thermal power generating units owned or under control of the Central Government, State Governments or owned by any private company, connected with the grid and to the load despatch centre.

The regulation states that "minimum power level" means *the minimum output power expressed in percentage of maximum continuous power rating that the coal based thermal power generating unit can sustain continuously without oil support*.

The regulations mandate that "*the coal based thermal power generating units shall have flexible operation capability with minimum power level of forty percent. Provided that the generating units which are not capable of achieving minimum power level of fifty-five percent, shall achieve the same within one year of the notification of these regulations. Provided further that the generating units which are not capable of achieving minimum power level of forty percent, shall achieve the same as per phasing plan mentioned in the sub-regulation (2) of regulation 5 of these regulations*."

2.2. Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations 2023: Provisions for Minimum Technical Level (MTL) Regulations and Requisition by beneficiaries

Minimum Technical Level (MTL) for thermal generating stations, as per Regulation 45(12) of Indian Electricity Grid Code, 2023, is specified as 55% or such other minimum power level as specified in the CEA (Flexible Operation of coal based Thermal Generating Units) Regulations, 2023, whichever is lower, The procedure for scheduling and dispatch has been provided under regulation 49 of IEGC, which does not place any obligation upon beneficiaries to provide schedule upto MTL.

In its order in petition 18/SM/2023 for removal of difficulties, CERC provided the following directions:

"...while the beneficiaries/buyers shall have full flexibility to decide on their requisition from a generating station up to 14:30 hrs on 'D-1' day, their right to revision of schedules in the said generating station for 'D' Day shall be subject to the condition that such revision of schedule for 'D' Day shall not be below their respective share of minimum turndown level in the respective generating station..."

IEGC 1st amendment introduced the following provisions in Regulation 49(4) (b) (ii) with respect to downwards revision of schedule by beneficiaries:

"Provided that downward revision of schedules by the buyers for 'D' day, after 14:30 hrs. on 'D-1' day in the generating station is permissible only for beneficiaries which have scheduled above their respective share of minimum turndown level in the generating station: "

Provided also that downward revision by such beneficiaries, which have scheduled above their respective share of minimum turndown level in the generating station, shall be permissible limited to a quantum such that overall schedule of the generating station is at least at Minimum turndown level. The downward revision of schedules by such beneficiaries for 'D' day, after 1430 hrs on 'D-1' day shall be permissible on a pro-rata basis of the power scheduled above the minimum turndown level of their share at 1430 hrs of 'D-1' day"

Even with the above amendment, beneficiaries have complete freedom in providing requisition up to 14:30 hrs. of 'D-1', with restrictions on further downwards revision. On D-1 basis, beneficiaries often provide very low, or even zero requisitions during solar hours, while providing full requisitions during evening peak.

2.3. Security Constrained Economic Despatch (SCED) and SCED-MTL Support

The 1st amendment to the IEGC has introduced a provision for providing scheduling Sec 62 thermal generating stations through Security Constrained Economic Despatch (SCED), even when they are scheduled below the minimum turndown level (MTL) during off-peak hours (declared by RLDCs) with introduction of a new sub-clause(v-a) under regulation 49(2)(a). Accordingly, a detailed procedure for moderating schedule up to MTL has been prepared by NLDC, which was approved by CERC on 12.03.2025. In line with the procedure, an assessment is carried out for identifying units to be provided schedule up to MTL through SCED.

IEGC-2023 clause 49(2) (a)

Quote

"*……. the schedule below the minimum turndown level shall be adjusted under SCED such that the schedule in all time blocks of the day is at least at the minimum turndown level……."*

Unquote

Power plants with schedule less than MTL during any time block in off-Peak hours and schedule greater than MTL for at least 8 time blocks in peak hours are eligible for MTL support through SCED. The list of plants identified for MTL support is published on NLDC website on D-1 basis.

Generating stations identified under SCED-MTL receive SCED-Up support upto their MTL in real time, provided sufficient down reserves are available to accommodate the corresponding SCED-Down for system balancing and sufficient margins are available on inter-regional corridors to accommodate the resulting flows.

Security Constrained Unit Commitment (SCUC) Mechanism

In accordance with the CERC (IEGC), Regulations 2023, MTL support is also extended to eligible generators through the Security Constrained Unit Commitment (SCUC) mechanism. The SCUC Cat#1 program is executed daily at 15:00 hrs with the primary objective of creating up reserves in the system. The program has been prepared in-line with the detailed procedure approved by CERC.

IEGC-2023 clause 46(4) (d):

Quote

"*…….NLDC in coordination with the RLDCs……anticipates shortfall of reserves in D day due to (i) extreme variation in weather conditions; (ii) high load forecast; (iii) the requirement of maintaining reserves on regional or all India basis for grid security; (iv) network congestion, ……NLDC may schedule incremental energy from the generating units in the list referred to in sub-clause (c) of this clause, so as to bring such units to their minimum turndown level in order to maximize availability of onbar units, by 15:00 Hrs. of D-1 day.* "

Unquote

IEGC-2023 clause 47:

Quote

"47. UNIT SHUT DOWN (USD)

(1) The generating stations or units thereof, identified by NLDC in co-ordination with RLDCs, as per sub-clause (c) of clause (4) of Regulation 46 of these regulations, but not brought on bar under SCUC, shall have the option to operate at a level below the minimum turn down level or to go under Unit Shut Down (USD).

(2) In case a generating station, or unit thereof, opts to go under unit shut down (USD), the generating company owning such generating station or unit thereof shall fulfil its obligation to supply electricity to its beneficiaries who had made requisition from the said generating station prior to it going under USD, by arranging supply either (a) by entering into a contract(s) covered under the Power Market Regulation; or (b) by arranging supply from any other generating station or unit thereof owned by such generating company subject to honouring of rights of the original beneficiaries of the said generating station or unit thereof from which supply is arranged; or (c) through SCED subject to the stipulation under sub-clause (a)(vi) of clause (2) of Regulation 49 of these regulations, the details of which shall be provided in the Detailed Procedure to be specified by NLDC in this regard.

(3) In case of emergency conditions, for reasons of grid security, a generating station or unit thereof, which is under USD may be directed by NLDC to come on bar, and in such event the generating station or unit thereof shall come on bar under hot, warm and cold conditions as per the time period to be specified in the detailed procedure under subclause (i) of clause (4) of Regulation 46 of these regulations.

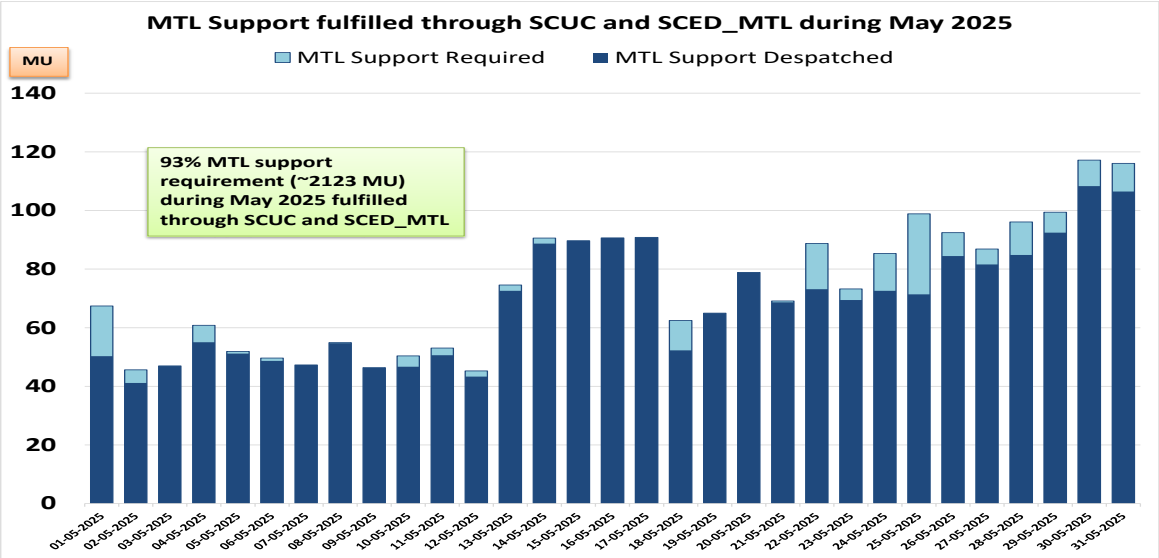
(4) Once a generating station is brought on bar as per clause (3) of this Regulation, it shall be treated as a unit under SCUC and scheduled and compensated as per Regulation 46 of these regulations."

Unquote

SCUC process considers reserve requirement, current plant schedules, and minimum turndown levels, and runs automatically to ensure sufficient reserves (typical requirement is in the evening peak hours). Generators with schedules below their MTL are identified as eligible. Among them, those capable of enhancing system reserves during periods of reserve deficit are selected for MTL support under SCUC. The reserve requirement is automatically calculated in line with the approved procedure by CERC, based on a statistical analysis of the area control error of the previous 7 days. The list of committed units under SCUC is published on NLDC website on D-1 basis. The identified plants receive SCUC-Up schedule up to MTL in real-time. Equivalent quantum of SCUC-Down is scheduled in other plants in SCED stack following merit order to balance the system.

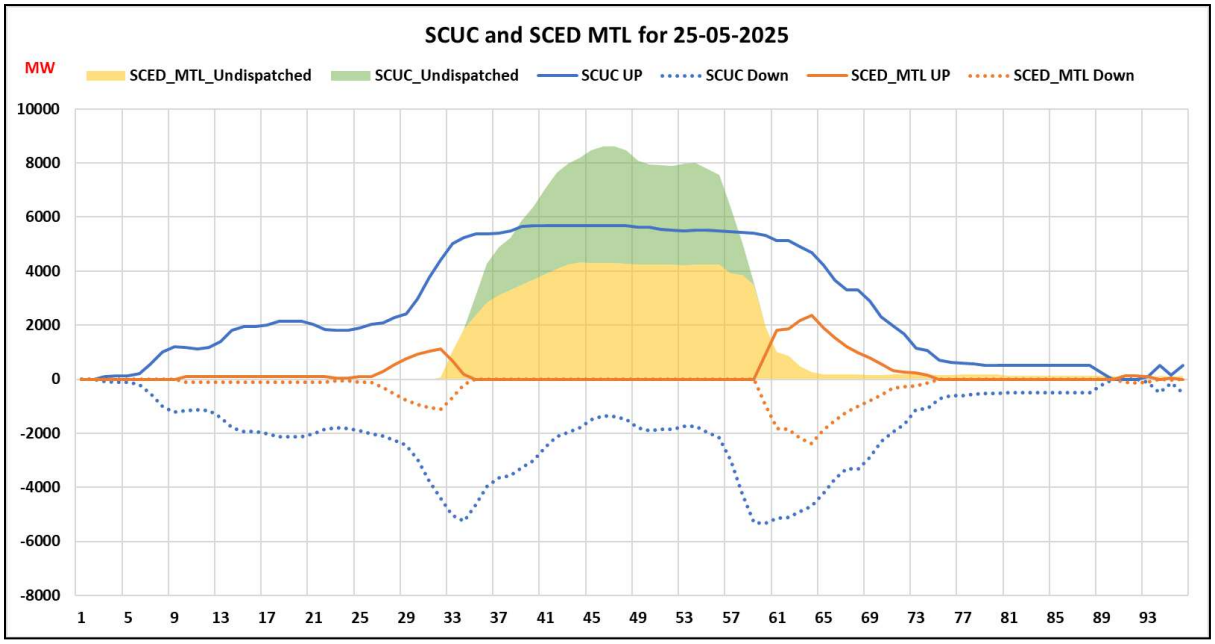
2.4. Challenges in SCUC and SCED-MTL Support Implementation

Due to very low requisitions from beneficiaries, the demand for support under SCUC and SCED-MTL remains significantly high during solar hours, often exceeding 8000 MW to 10000 MW. On several days, 25 to 45 generating stations required MTL support. The available down reserves from the remaining thermal ISGS are utilized to balance the support extended to these stations. The plots below illustrate the MTL support provided through SCUC and SCED during May 2025.

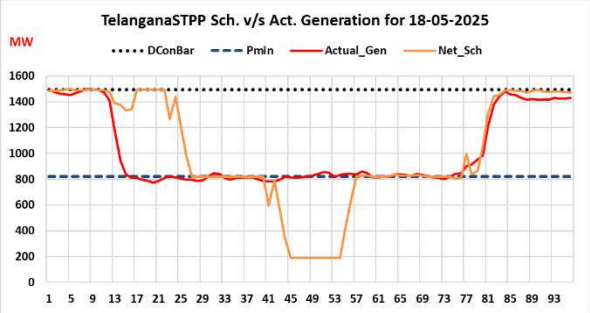


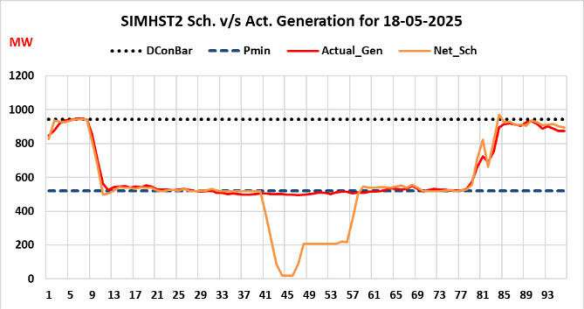
On an aggregate basis, 93% of the support requirement, ~2123 MU MTL support requirement was fulfilled out of 2285 MU, was fulfilled. Only 7% of the requirement of the plants couldn't be fulfilled because of insufficient down reserves in the system.

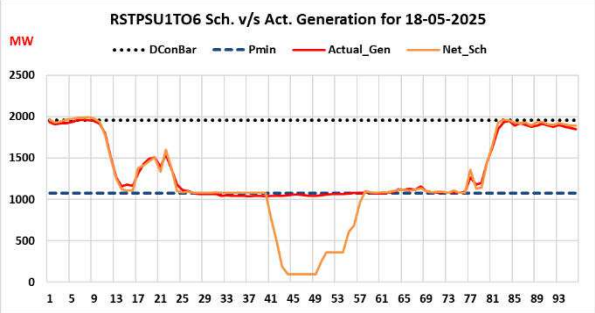
When the available down reserves are insufficient, it results in over-injection in the grid and high frequency, as matching decrease (SCED-Down or SCUC-Down) of generation cannot be provided to balance the increase (SCED-Up or SCUC-Up) in generation to achieve MTL. SCUC-Up is provided to support schedule till MTL but matching SCUC-Down cannot be scheduled as all other units in SCUC stack have reached MTL. Further, the generating stations which do not get MTL support through SCED in the real time due to shortfall in down reserves continue to operate at 55% of the Normative DC level, despite their schedules being lower. The plot below illustrates the over injection due to scheduling below MTL on 25th May 2025. The total quantum of support required due to scheduling below MTL was to the tune of 10000 MW (6000 MW under SCUC and 4000 MW under SCED). Against 6000 MW of SCUC-Up support provided, SCUC-Down could be booked for only 2000 MW resulting in net 4000 MW over injection. Support under SCED-MTL could not be provided to any plant, resulting in another 4000 MW over injection assuming the plants continued to operate at 55% level.



Schedule vs. actual plots for some sample stations unable to get support for meeting MTL are shown below:







2.5.Frequency Excursions Due to Shortfalls in Down Reserves

CERC (DSM & Related matters) Regulation 2024 clause 8(1)

Quote

" (1) Charges for Deviation, in respect of a general seller (other than an RoR generating station and a generating station based on municipal solid waste) shall be as under:

Deviation by way of over injection (Receivable by the Seller) @ zero when [50.05 Hz < f < 50.10 Hz] : Provided that such seller shall pay @ 10% of RR when [f ≥ 50.10 Hz]

Deviation by way of under injection (Payable by the Seller) @ 85 % of RR when [f > 50.05 Hz]"

Unquote

CERC (DSM & Related Matters) Regulation 2024 clause 8(7)

Quote

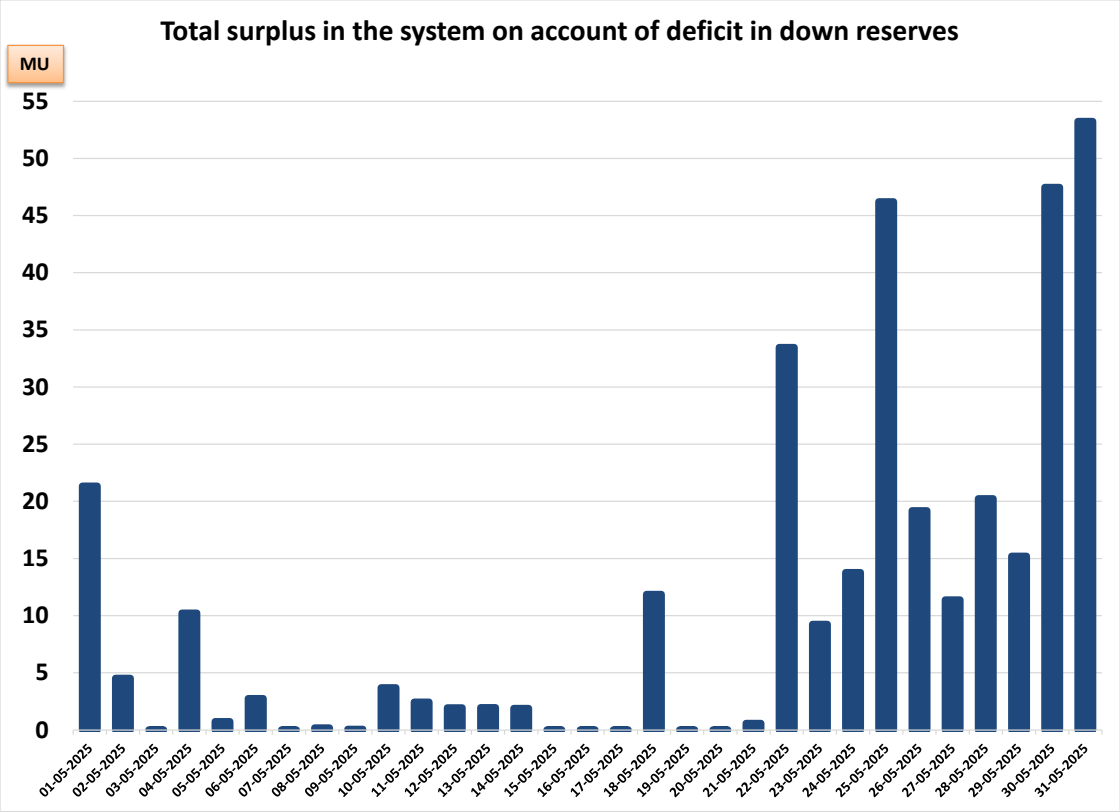
"(7) Charges for Deviation, in respect of a Buyer, shall be receivable or payable as under:

Deviation by way of under drawal (Receivable by the Buyer) @ zero when [50.05 Hz < f < 50.10 Hz] : Provided that such buyer shall pay @ 10% of NR when [f ≥ 50.10 Hz];

Deviation by way of over drawal (Payable by the Buyer)@ 50% of NR when [50.05 Hz < f < 50.10 Hz]: (iv) @ zero when [f ≥ 50.10 Hz];"

Unquote

The plot below depicts the over-injection during the May-2025 on account of deficit in down reserves.



These conditions arise during low demand periods, especially weekends and holidays coinciding with inclement weather in various parts of the country. The ability to control high frequency by decrementing generation under Secondary Reserves Ancillary Services (SRAS) and Tertiary Reserves Ancillary Services (TRAS) is hindered by unavailability of adequate down reserves, which are consumed in providing SCUC and SCED_MTL support to generators scheduled by beneficiaries below MTL.

As a result of the above, there were 18 days in May 2025, in which the frequency remained more than 50.05 Hz for more than 20% of time during the day, with sustained high frequency for several hours experienced on many days. To mitigate this, TRAS-DOWN despatch under the emergency provisions of the CERC Ancillary Services Regulations, 2022, is being invoked by Grid-India in real time. The plots below show the days with frequency remaining above 50.05 Hz more than 20% of time in May 2025 and the duration of longest sustained frequency excursions above the band.

Frequency > 50.05% (for more than 20% of time of the day) : May-25

Mon	Tue	Wed	Thu	Fri	Sat	Sun
			1 31%	2 37%	3	4 27%
5 29%	6 22%	7	8	9	10 27%	11
12	13	14	15	16	17	18 33%
19	20	21 27%	22 37%	23 24%	24 27%	25 30%
26 25%	27 22%	28 27%	29 36%	30 29%	31 32%	

Highlighted days when frequency remained above the band for 20% of the time of the day.
(The percentage of time frequency remained above the band is indicated against the date)

Frequency > 50.05% (persistently* during solar hours) : May-25

Mon	Tue	Wed	Thu	Fri	Sat	Sun
			1 03:24	2 02:44	3 00:50	4 03:24
5 00:33	6 02:04	7	8	9	10 00:37	11
12	13	14	15	16 00:35	17 00:44	18 04:48
19	20	21 01:19	22 04:33	23 01:18	24 01:11	25 03:40
26 01:30	27 01:14	28 03:04	29 03:22	30 01:49	31 02:02	

Highlighted days when frequency remained above the band persistently during solar hours (06:00–18:00 hrs).
Frequency remained above the band continuously for at least 30 minutes.
(The cumulative duration of such spans is indicated against each date.)

2.6. Regulatory Support Under Ancillary Services Regulations, 2022

CERC Ancillary Services (Regulations), 2022 clause 20(1)

Quote

"*In case of shortfall*

(1) All generating stations, whose tariff is determined by the Commission under Section 62 of the Act including those having URS power after declaration of the RTM results, shall be deemed to be available for use by the Nodal Agency for SRAS or TRAS or both, subject to technical constraints of such generating stations."

Unquote

CERC Ancillary Services (Regulations), 2022 clause 20(6)

Quote

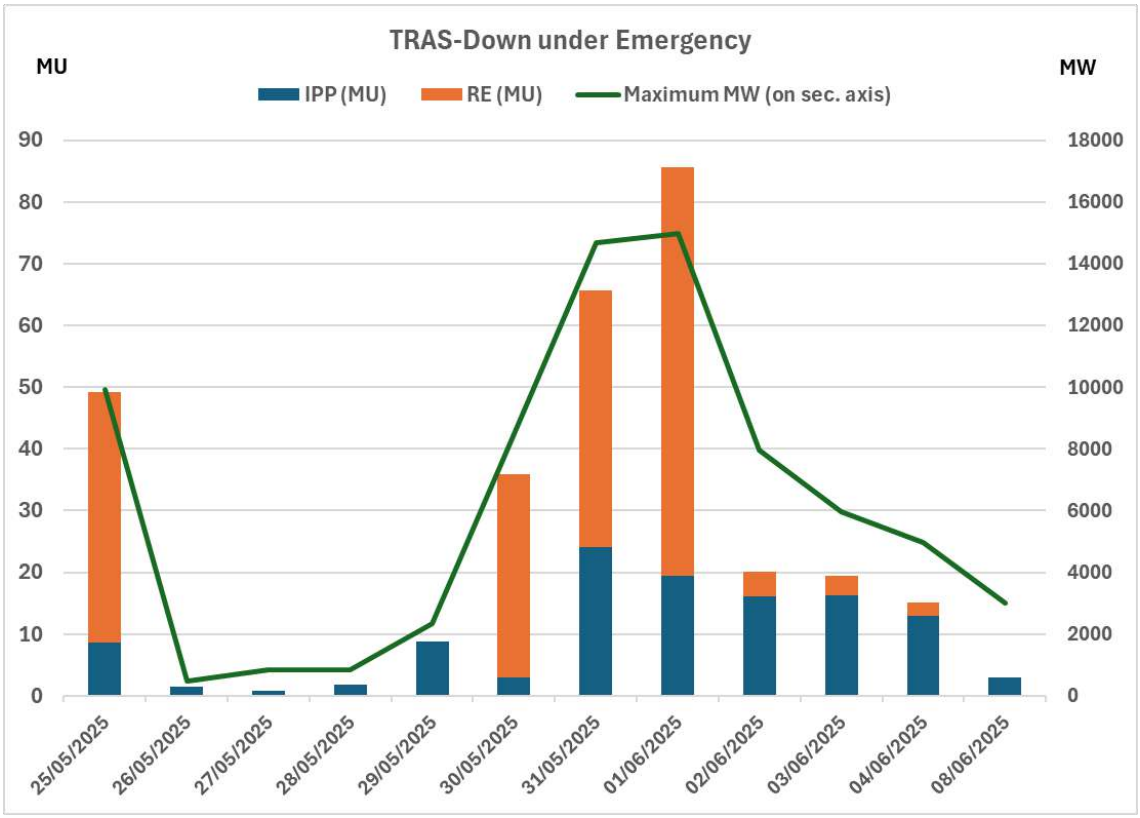
"In case of emergency conditions

(6) In case the Nodal Agency requires any generating station to provide Ancillary Services to meet the emergency conditions for reasons of grid security as per the provisions of the Grid Code, such generating station shall be compensated at the rate of the energy charge as determined under Section 62 of the Act or adopted under Section 63 of the Act, or at the rate of the compensation charge declared by the AS provider, as the case may be."

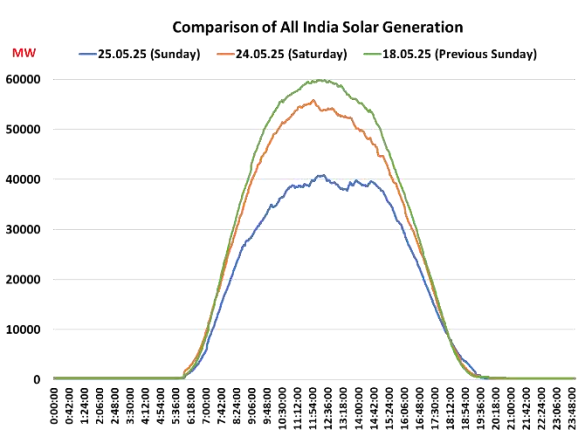
Unquote

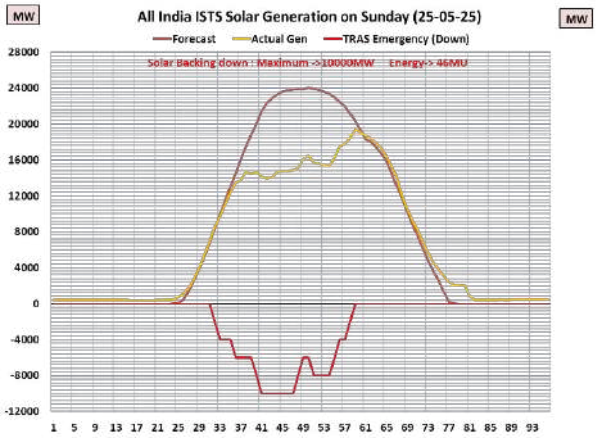
This involves instructing regional IPP generators to reduce generation to 55% of MCR during solar hours in lean demand periods, including weekends and holidays. If the required TRAS-Down

quantum cannot be met by IPPs, regional entity renewable generation is also moderated under TRAS emergency measures to contain high frequency. To start with, solar generating stations with installed capacity of 250 MW and above have been included. However, the scope may change as requirement further evolves. Maximum backing down under TRAS-Emergency to the tune of 15000 MW has been carried out so far. The plot below shows the quantum of TRAS-Down dispatched under Emergency conditions to regional IPPs and regional RE plants.



The plot below shows the trend of All India and ISTS solar generation on 25th May 2025, when TRAS-Down instruction of 40 MU was given to solar generation.





2.7. Intra-State Level MTL Provisions

At the same time, regulatory provisions for 55% MTL and compensation mechanism at the intra-state level are present only in some states. The table below summarizes the MTL provisions at the same level.

State	MTL guideline	Source	Remarks
Uttar Pradesh	55%	UPERC MOD Regulations, 2021	
Haryana	55%	HERC TCT Regulations, 2019	Includes compensation mechanism for part load operation and additional start/stop
Maharashtra	55%	MERC Grid Code, 2020	Includes compensation mechanism for part load operation and additional start/stop
Madhya Pradesh	55%	MPERC Grid Code, 2024	Includes compensation mechanism for part load operation and additional start/stop
Karnataka	55% (40% for two units)	KERC MOD Regulations, 2024	Includes compensation mechanism for part load operation
Telangana	In line with IEGC	TSERC Grid Code, 2018	
Andhra Pradesh	In line with IEGC	APERC RSD Procedure 2023	

Tamil Nadu	60-80%	Minutes of 210th OCC meeting of SR	55% as per draft state grid code.
West Bengal	70%	Minutes of 214th OCC meeting of ER	
Odisha	55-60%		

The table below shows the operating level of intra-state thermal units observed on 25th May 2025:

Less than 55%		More than 55%			
Plant Name	**% of DC**	**Plant Name**	**% of DC**	**Plant Name**	**% of DC**
UKAI	47%	BLTPS	100%	IEPL	64%
SLPP	55%	BHUSAWAL	92%	MARWA TPS	64%
PARLI	46%	KORBA(W) CSETCL	92%	SANJAY GANDHI TPS	63%
NASIK	48%	AMARKANTAK	91%	Tuticorin	63%
TATA TROMBAY Th	51%	Kolaghat TPS	91%	KHAPARKHEDA	63%
JPL DHULE (SHIRPUR)	48%	JP BINA	89%	SWPGL	63%
APML TIRODA	55%	HALDIA TPS	86%	CHANDRAPUR	62%
		KLTPS	84%	SINGAJI	62%
		METTUR-Stg1&2	84%	Kota	62%
		VSLPP	83%	RGTPS (Khedar)	62%
		PARAS	83%	VIJAYAWADA TPS	62%
		DPL TPS	80%	VADINAR	61%
		Bandel TPS	80%	Raichur TPS	61%
		KORBA EAST EXT(DSPM)	77%	WANAKBORI	61%
		HIRANMAYEE TPS	75%	KHURJA STPP	61%
		IB TPS Stg-1	73%	KORADI	59%
		Panipat	72%	Kawai	58%
		GANDHINAGAR(GTPS)	72%	APL MUNDRA	58%
		STCMS	71%	Anpara-D	57%
		Lehra MBBTTPS	71%	Chhabra	57%

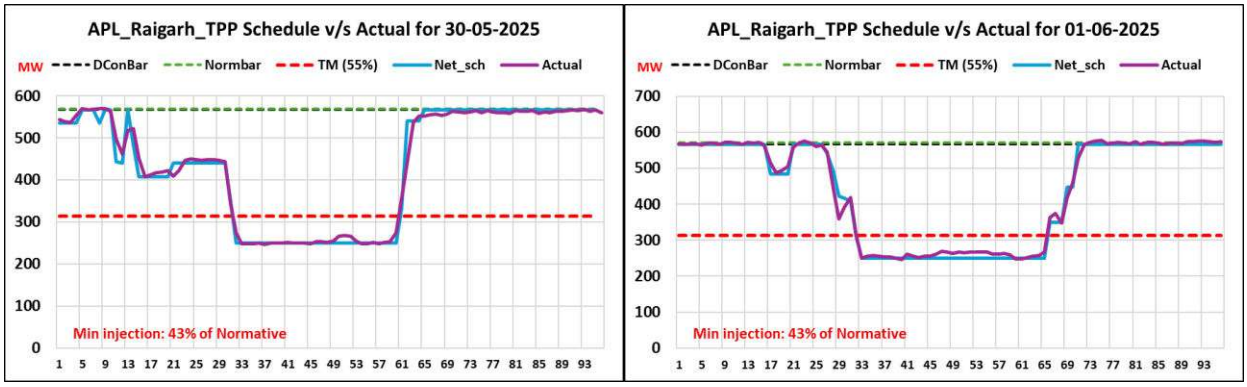
		Barsingsar	71%	DCRTPP	57%
		Bakreswar TPS	71%	Anpara A&B	57%
		GGSTPS Ropar	70%	Kalisindh	57%
		Suratgarh	70%	Surat-SCTPS	57%
		Tenughat TPS	70%	SATPURA II	56%
		Santaldih TPS	67%	Meja	56%
		JAIGAD	67%	IB AMARAVATI	56%
		Raj West	66%	GHATAMPUR TPS	56%
		SAGARDIGHI TPS	64%	DAHANU	56%

2.8.Performance of IPP thermal plants

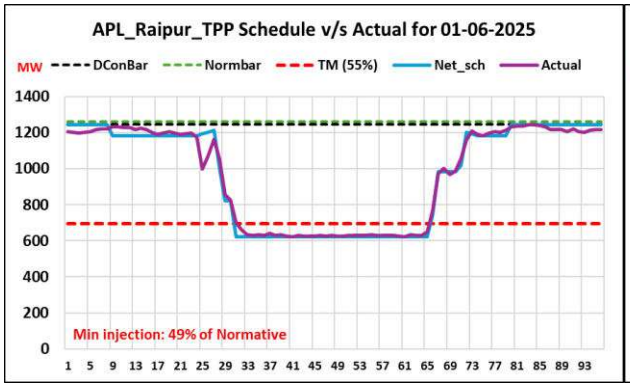
IPPs are generally dependent on a mix of long-term/short-term contracts including sale through DAM and RTM for securing injection schedules. Long term PPAs generally have provisions for minimum schedule up to MTL by beneficiaries. Thermal IPPs with merchant capacity obtain schedules through their participation in bilateral and collective short term markets. Many IPPs use products like block bids to ensure that they get minimum schedule during all periods while ensuring the average market price meets their requirement. It is observed that during lean periods, some IPPs are able to get schedules higher than 55% while there are also some IPPs which get minimum schedules in the range of 30-50%. IPPs having schedules above 55% have been backed down to 55% through TRAS-Down instructions under emergency conditions. Their actual generation is observed to generally match the schedule provided.

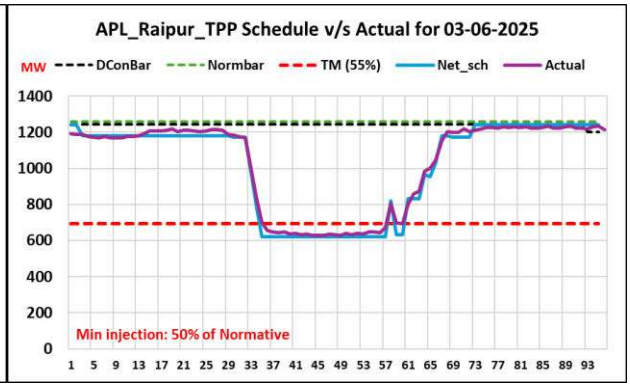
A number of thermal IPPs regularly get schedules lower than 55% (25-30% in case of one plant) and their actual injection is generally in line with their schedules. Sample plots of scheduled and actual injection of such plants are shown below:

- **APL_Raigarh_TPP**

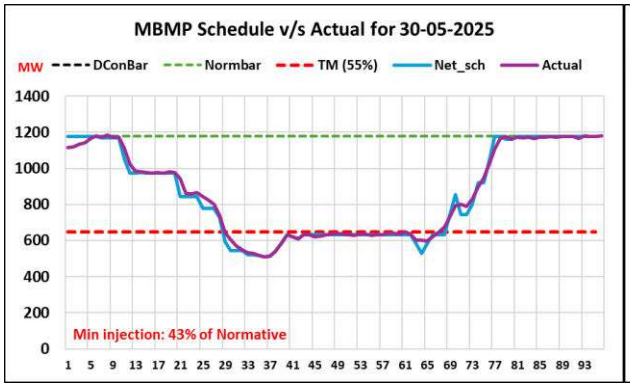


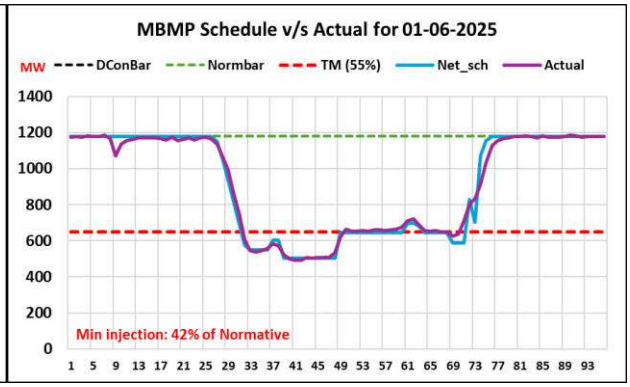
- **APL_Raipur_TPP**



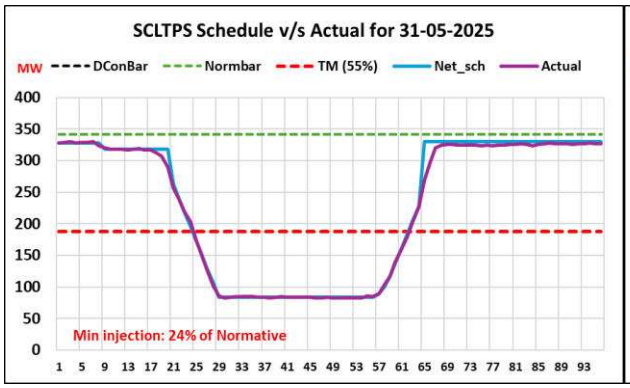


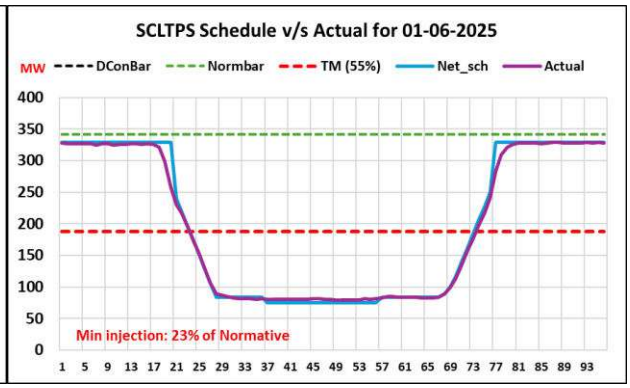
- **MBMP**



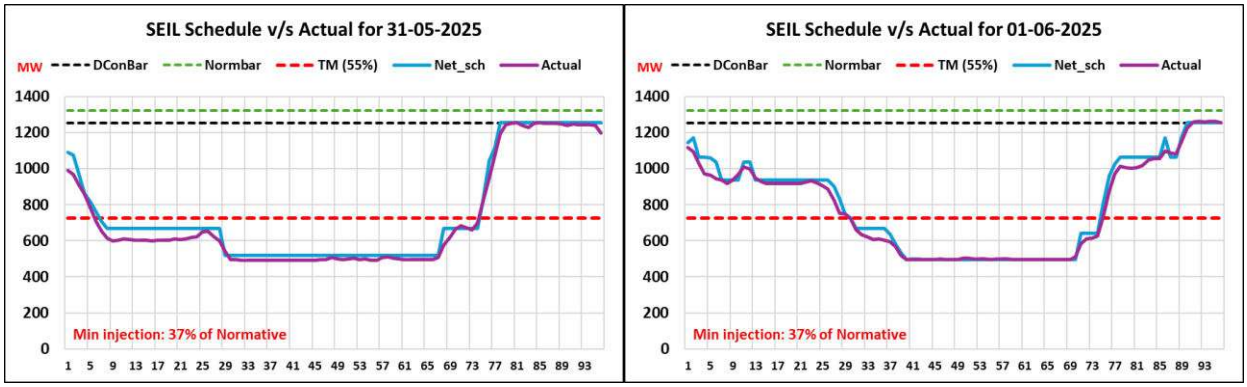


- **SCLTPS**

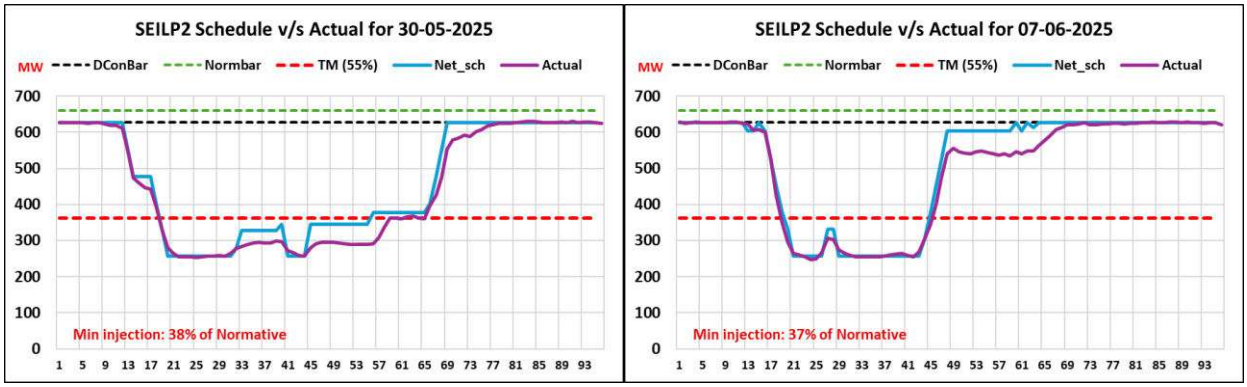




- **SEIL**



- **SEILP2**



The table below shows the minimum generation level of thermal IPPs observed on 31st May 2025.

Plant Name	Min. Injection (MW)	DC On-Bar (MW)	Normative On-bar (MW)	Min Injection (% of Normative)
SCLTPS	82	342	342	24%
SEIL	490	1254	1320	37%
MEENAKSHI	107	240	270	39%
COASTGEN	267	708	1200	44%
MBMP	570	1178	1178	48%
APL_Raigarh_TPP	279	567	570	49%
SEILP2	325	627	660	49%
JSPL_DCPP	124	240	243	51%
RKM_POWER	338	655	661	51%
LAMKPL	283	546	546	52%

MAHAN_ENERGEN_U2	297	560	564	53%
BALCO	599	1039	1110	54%
JPL	494	771	915	54%
APL_Raipur_TPP	682	1244	1260	54%
SIMHAPURI	293	540	540	54%
GMRKEL	358	660	660	54%
JHABUA_IPP	307	566	566	54%
KSK_MAHANADI	917	1683	1683	55%
TPCL_Mundra	2075	3800	3800	55%
SASAN	2033	3700	3722	55%
JPL2	1262	2310	2310	55%
JPNIGRIE_JNSTPP	678	1241	1241	55%
ILFS	312	557	570	55%
APNRL	270	491	491	55%
GMR_WARORA*	319	560	560	57%
DBPL	661	1137	1137	58%
TRN_ENERGY*	347	490	549	63%
SKS_Raigarh*	350	547	547	64%
JIPL*	753	1133	1138	66%

**Didn't follow TRAS Emergency Down Instructions.*

2.9.CERC order on pilot project for two shift operation

Considering the constraints in flexibility, CERC order dated 23.03.2025 in Suo-Motu Petition No. 2/SM/2025 in the matter 'Measures to mitigate the risks on the power system under Clauses (2) and (3) of the Regulation 30 of the Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2023' directed to take up a pilot project on two shift operation of thermal generating stations. Relevant extracts are quoted below:

"*As a pilot, regional entity thermal generating stations whose tariff is determined by this Commission under Section 62 of the Act, to be operated in two-shift operation, shall be identified by NLDC in consultation with the owner(s) of such thermal units and CEA. While identifying the*

units for such pilot, the experience of Tuticorin and Mettur as stated in Paragraph 15 of this Order shall be taken into account. To start with, rail-fed 500 MW Units may preferably be selected under the pilot. NLDC is directed to identify such pilot thermal units and issue a detailed procedure for operating such units under a two-shift cycle, within two months of the issue of this Order. The Detailed Procedure shall contain the guidelines regarding operational aspects, including scheduling, dispatch, accounting, settlement, compensation on account of expenses due to two-shift operation (including start-up cost, heat rate, etc.), and any residual matter. The same shall be shared with stakeholders and submitted to the Commission for approval."

In compliance with the above NLDC has identified a list of candidate thermal units that could be considered for the pilot on two shift operation. Vide its letter dated 22nd May 2025 NLDC had requested NTPC Ltd. to confirm its readiness for pilot. List of plants that were proposed by NLDC for the pilot are as below:

S. No.	Plant Name	Installed Capacity	Region	ECR (paise / kWh)	Warm Start Up Time (Minutes)
1	Dadri Stg2	2*490	NR	439	240
2	Jhajjar	3*500	NR	423	480
3	Vallur	3*500	SR	404.4	240
4	Simhadri Stg1	4*500	SR	375.4	240
5	Simhadri Stg2	2*500	SR	374	240
6	Ramagundam	3*500+1*500	SR	368.1	240
7	UNCHAHAR4	1*500	NR	339.2	240
8	Mauda Stg1	2*500	WR	315.5	240
9	Dadri Stg1	4*210	NR	526.3	240
10	BGTPP	3*250	NER	390.4	360
11	Ramagundam	3*200	SR	368.1	240
12	UNCHAHAR2	2*210	NR	357.5	240
13	UNCHAHAR3	1*210	NR	355	240
14	UNCHAHAR1	2*210	NR	354.1	240
15	KBUNL Stg2	2*195	ER	299.4	240

NTPC vide its letter dated 13.06.2025 **(Annexure-II)** shared their observations and requested to be exempted from participating in the proposed pilot study on two-shift operation.

2.10. Compensation for Part load operation of thermal Generators:

CERC (IEGC) Regulation 2010 (Fourth Amendment) clause 6.3 B.7:

Quote

"7. The RPCs shall work out a mechanism for compensation for station heat rate and auxiliary energy consumption for low unit loading on monthly basis in terms of energy charges and compensation for secondary fuel oil consumption over and above the norm of 0.5 ml/kWh for additional start-ups in excess of 7 start-ups, in consultation with generators and beneficiaries at RPC forum and its sharing by the beneficiaries."

Unquote

CERC vide order dated 05.05.2017 approved the Mechanism for Compensation for Degradation of Heat Rate, Aux Compensation and Secondary Fuel Consumption, due to Part Load Operation and Multiple Start/Stop of Units. At present, the same is for generating station whose tariff is determined under section 63 of the Electricity Act'2003. However, for Generating station whose tariff determined by commission under section 62 of Electricity Act' 2003, the compensation mechanism for part load operation will be as per

CERC (Tariff) Regulation 2024 (1st Amendment) clause 70(G):

Quote

"(G) Compensation for the operation of generating station below normative plant availability factor

(1) The generating stations whose tariff is determined by the Commission under Section 62 of the Act shall be compensated for degradation of station heat rate and auxiliary energy consumption, consumption of additional secondary fuel oil due to loading below the normative plant availability factor specified under Regulation 70(A) of these regulations……."

Unquote

3. COMMITTEE OBSERVATIONS AND DECISIONS IN COMMITTEE MEETINGS

3.1. OBSERVATIONS

1. On D-1 basis, beneficiaries often provide very low or even zero requisitions for thermal units during solar hours, while providing full requisitions during evening peak.
2. Despite the provision of the first amendment of IEGC, beneficiaries have complete discretion to submit requisitions up to 14:30 hrs of 'D-1', with restrictions on further downwards revision thereafter.
3. In case generating stations decide to take Unit Shut Down (USD) due to low schedules, supply obligation to the beneficiaries remains to the extent of full DC (including unit under USD), and beneficiaries have the freedom to revise their schedules upward.
4. A detailed procedure for moderating schedule up to MTL has been prepared by NLDC, which was approved by CERC on 12.03.2025. In accordance with this procedure, an assessment is carried out for identifying units to be provided schedule up to MTL through SCED.
5. The SCUC Cat#1 program is executed daily at 15:00 hrs, with the primary objective of creating up reserves in the system.
6. Due to very low requisitions from beneficiaries during solar hours, the demand for support under SCUC and SCED-MTL remains significantly high which has already reached in the range of 8000 MW to 10000 MW.
7. On several days, 25 to 45 generating stations required MTL support. The available down reserves from the remaining thermal ISGS are utilized to balance the support extended to these stations.
8. When the available down reserves are insufficient, it results in over-injection in the grid and high frequency, as matching decrease (SCED-Down or SCUC-Down) of generation cannot be provided to balance the increase (SCED-Up or SCUC-Up) in generation to achieve MTL. SCUC-Up is provided to support schedule till MTL but matching SCUC-Down cannot be scheduled as all other units in SCUC stack have reached MTL.
9. The ability to control high frequency by reducing generation under Secondary Reserves Ancillary Services (SRAS) and Tertiary Reserves Ancillary Services (TRAS) is hindered by unavailability of adequate down reserves, which are consumed in providing SCUC and SCED-MTL support to generators scheduled by beneficiaries below MTL.
10. When the required TRAS-Down quantum cannot be met by IPPs, regional entity renewable generation is also moderated under TRAS emergency measures to contain high frequency.
11. Inflexibility in market participation and bidding strategy based on recovering ECR in every single time block, as opposed to recovering ECR on average basis hinders ability to obtain MTL schedule from the market. IPPs with a more flexible market strategy are able to commit their units and obtain MTL schedules from the market itself.
12. Design side aspects such as price cap in spot markets and bid cap (120% of ECR) under LPS rules may be revisited to encourage flexible operation.

3.2. DECISIONS OF 1ST AND 2ND MEETINGS OF THE COMMITTEE:

3.2.1. 1ST MEETINGS OF THE COMMITTEE

The 1st Meeting of the committee held on 03.06.2025 and after detail deliberations, the followings short term and long term solutions were proposed in the first meeting of the committee for ensuring Thermal Generation at Technical Minimum level for Grid Stability and RE Integration: **(The copy of 1st MoM is enclosed at Annexure-III)**

1. Short Term solutions (within 1 year):

a) Implementation of minimum technical load (MTL) level of 55% immediately on pan-India basis and 40% as per phasing plan and establishment of monitoring mechanism to ensure compliance with the CEA (Flexible Operation of Coal based Thermal Power Generating Units) Regulations, 2023.

b) State Grid Codes shall be aligned with the Central Electricity Authority (CEA) "Flexible Operation of Coal based Thermal Power Generating Units" regulation 2022, notified in January 2023. Suitable directions needs to be issued to SERCs by Ministry of Power/CEA to notify commercial compensation mechanism as per CEA guidelines to ensure the MTL of 55%, which in force from 01.02.2024 as per CEA (Flexible Operation of Coal based Thermal Power Generating Units) Regulation 2023 on sustained basis.

c) Generators maintaining MTL of 40-45% may be given more preference (bypassing Merit Order when required for maintaining down reserves) and units may be kept on bar.

d) Directions from RPCs may be issued to existing PSPs to make all pumps operational and also use as a load during solar hours as envisaged in Optimal Generation Mix Report of CEA.

e) Time lines for scheduling for all Intra State generators also need to be streamlined with CERC IEGC Regulation 2023 (7-8 Time Block) which will ensure equitable comparison and similar provisions of scheduling of power.

f) Till two shift operation of thermal generators is being implemented, there is a need to create equitable balance between the supply obligation of generators under IEGC Regulation 2023 as well as offtake obligation of drawing entities/ beneficiaries of the generators. Beneficiaries requisitioning power during non-solar hours from an ISGS shall have Offtake obligations from those stations during solar hours. Beneficiaries may be mandated to maintain a minimum requisition as percentage of maximum requisition in a day, during the lean hours to ensure operationally reasonably schedule during lean hours and availability in non-solar hours.

g) Optimal number of thermal units may be kept on bar during solar hours by NLDC/RLDC/SLDCs to meet non-solar hours demand. Excess generation is leading to frequency excursions. Empowering NLDC/RLDC/SLDC to take out units under exigencies.

2. Long Term solutions (Beyond 1 year):

a) Ensuring 40% MTL for all coal based thermal generators both at ISTS & InSTS on sustained basis. Other technological intervention may be considered by generators (storage etc). Monitoring of the same has to be done rigorously.
b) Two shift operation/taking out units on weekends/holidays/high wind season needs to be implemented.
c) Peaking capacity may be considered with technical and commercial aspects with well-defined rules. This will further optimise number of units on bar, ensuring MTL at solar hours and also enable the states to meet the evening peak demand.
d) Energy storage (BESS, PSP etc.) need to be promoted rigorously to integrate the RE targets. BESS installation in existing thermal stations may be one of the options for storing excess energy during solar hours.
e) Each control area needs to maintain the reserves as calculated by NLDC on year ahead basis to control and manage the deviations and other grid parameters.
f) Demand response needs to be promoted. Initially large industries with captive generation may be focused.
g) TOD tariff with lower tariff during solar hours and higher tariff during evening needs to be implemented by all SERCs.

3.2.2. 2ND MEETINGS OF THE COMMITTEE:

The 2nd Meeting of the committee held on 12.06.2025 and after detailed deliberations, the followings were proposed in the second meeting of the committee for ensuring Thermal Generation at Technical Minimum level for Grid Stability and RE Integration: **(The copy of 2nd MoM is enclosed at Annexure-IV).**

a) There is a need to create **equitable balance** between the supply obligation of generators under IEGC Regulation 2023 as well as offtake obligation of drawing entities/ beneficiaries of the generators. Beneficiaries requisitioning power during non-solar hours from an ISGS shall have Offtake obligations from those stations during solar hours. Beneficiaries may be mandated to ensure that their minimum requisition in the day as percentage of maximum requisition in that day, is equal to or higher than a predefined value to ensure operationally reasonably schedule during lean hours and availability in non-solar hours. The ratio of minimum and maximum requisition by the beneficiary in a generating stations during a day could be 40%.

b) Regulatory provision for de-commitment of the Thermal units through SCUC to be introduced. The unit which is not committed under SCUC by NLDC 1500 hrs on day ahead and its schedule remains below MTL level by 2200 hrs on day ahead basis may be allowed to de-commit. The time between 1500 hrs and 2200 hrs would be the time available to the beneficiaries to revise their schedules to either support the unit by giving schedule above MTL or reduce their schedule from those units. The de-committed unit will have no supply obligation.

c) Suitable provisions may be provided for **higher DSM charges on entities for over-injection or under-drawl by the entities when the grid frequency exceeds 50.05 Hz during solar hours/off-peak hours**, irrespective of the nature (both RE and non-RE) of the entities. However, **under-injection/over-drawl by the entities when the grid frequency exceeds 50.05 Hz during solar hours/off-peak hours, irrespective of the entity type (RE or non-RE), should attract a lesser penalty and incentivization may be considered**. Further, during the schedule revision under TRAS Emergency provision, over injection may not be allowed and the volume limit may be made as Zero during such time period.

d) Two shift operation of thermal Generating units must be performed on pilot basis in each region and potential damage including wear & tear, O&M, and plant life spans should be thoroughly examined before final implementation. Wear & tear, O&M, plant life spans and cost implications may be properly recorded during pilot two shift operation.

e) Necessary Regulatory provisions for participation of all ISTS & InSTS generators for giving Ancillary Service support to the Grid are required. Ancillary service regulations should be brought out by SERC for intra state level in line with CERC Ancillary Service Regulation.

f) NTPC Ltd. shall develop and share Standards Operating Procedure for implementation of 55% minimum turn down level in intrastate thermal power stations. Training program to be conducted in NPTI with support from NTPC Ltd. for employees of state thermal generators for running intra state plants upto 55% MTL.

g) Energy storage capacity to be created/ augmented in interstate as well as intrastates may accelerate the commissioning of the required storage capacities.

h) To ensure non-discriminatory backing down across all grid connected generators during low loads, irrespective of ownership, the State Electricity Grid codes need to be aligned with CEA (Flexible operation of thermal power plants) Regulations, 2023 and IEGC. Regulatory provision to compensate intrastate generating plants for part load operations to be notified by State Electricity Regulatory Commissions.

i) Decisions taken in the 1st Meeting held on 03.06.2025 and 2nd Meeting would be considered while finalizing the final recommendations of the Committee.

4. RECOMMENDATIONS:

Based on extensive deliberations and inputs/comments received from members, the committee has recommended the following short term and long term solutions to ensure Thermal Generation at Technical Minimum level for Grid Stability and RE Integration:

1. **Short Term solutions (within 1 year):**

a) Implementation of minimum technical load (MTL) level of 55% immediately on pan-India basis and 40% as per phasing plan for all units, irrespective of their ownership at Intrastate/Interstate level and establishment of monitoring mechanism to ensure compliance with the CEA (Flexible Operation of Coal based Thermal Power Generating Units) Regulations, 2023. **Exemption, if any, may be granted by SERC/CERC on technical ground.**

b) **State Grid Codes shall be aligned** with the Central Electricity Authority (CEA) "Flexible Operation of Coal based Thermal Power Generating Units" regulation 2022, notified in January 2023 and IEGC 2023. Suitable directions needs to be issued to SERCs by Ministry of Power/CEA to notify commercial compensation mechanism as per CEA guidelines to ensure the MTL of 55%, which in force from 01.02.2024 as per CEA (Flexible Operation of Coal based Thermal Power Generating Units) Regulation 2023 on sustained basis.

c) Generators maintaining MTL of 40-45% may be given more preference (bypassing Merit Order when required for maintaining down reserves) and units may be kept on bar.

d) Directions from RPCs may be issued to existing PSPs to make all pumps operational and also use as a load during solar hours as envisaged in Optimal Generation Mix Report of CEA.

e) Time lines for scheduling for all Intra State generators also need to be streamlined/harmonized with CERC IEGC Regulation 2023 which will ensure equitable comparison and similar provisions of scheduling of power.

f) There is a need to create **equitable balance** between the supply obligation of generators under IEGC Regulation 2023 as well as offtake obligation of drawing entities/ beneficiaries of the generators. Beneficiaries requisitioning power during non-solar hours from an ISGS shall have Offtake obligations from those stations during solar hours.

Beneficiaries may be mandated to maintain a minimum requisition as percentage of maximum requisition in a day, during the lean hours to ensure operationally reasonably schedule during lean hours and availability in non-solar hours. If the ratio cannot be maintained, one or more units from that station could be allowed to be taken under reserve shutdown to replenish down reserves. Once the unit is taken under reserve shut down, the aggregate requisition by beneficiaries in that station should be restricted to the declared capacity corresponding to the units on bar in that station. The **proposed ratio of minimum and maximum requisition by the beneficiary in a generating stations during a day may be 40%.**

g) De-commitment of the Thermal units through SCUC is required to be included in regulatory provisions (CERC/SERC). The unit which is not committed under SCUC by NLDC 1500 hrs on day ahead and its schedule remains below MTL level by 2200 hrs on day ahead basis may be allowed to de-commit. The time between 1500 hrs and 2200 hrs would be the time available to the beneficiaries to revise their schedules to either support the unit by giving schedule above MTL or reduce their schedule from those units. **The de-committed unit will have no supply obligation while it will be able to maintain its DC.**

h) Optimal number of thermal units may be kept on bar during solar hours by NLDC/RLDC/SLDCs to meet non-solar hours demand. Excess generation is leading to frequency excursions. **Empowering NLDC/RLDC/SLDC to take out units under exigencies.**

i) Suitable provisions may be provided for **higher DSM charges on entities for over-injection or under-drawl by the entities when the grid frequency exceeds 50.05 Hz during solar hours/off-peak hours**, irrespective of the nature (both RE and non-RE) of the entities. However, **under-injection/over-drawl by the entities when the grid frequency exceeds 50.05 Hz during solar hours/off-peak hours, irrespective of the entity type (RE or non-RE), should attract a lesser penalty and incentivization may be considered**. Further, during the schedule revision under TRAS Emergency provision, over injection may not be allowed and the volume limit may be made as Zero during such time period.

j) Necessary Regulatory provisions for participation of all ISTS & InSTS generators for giving Ancillary Service support to the Grid are required. Ancillary service regulations should be brought out by SERC for intra state level in line with CERC Ancillary Service Regulation. TRAS Shortfall & TRAS Emergency needs to be brought out by all SERC which may include backing down of RE as last resort. Suitable directions needs to be issued to SERCs by Ministry of Power/CEA in this regard.

k) NTPC Ltd. shall develop and share Standards Operating Procedure for implementation of 55% minimum turn down level in intrastate thermal power stations. Training program to be conducted in NPTI with support from NTPC Ltd. for employees of state thermal generators/IPPs for running intra state plants upto 55% MTL.

l) Energy storage capacity to be created/ augmented in interstate as well as intra-state system. States may accelerate the commissioning of the required storage capacities.

2. Long Term solutions (Beyond 1 year):

a) Ensuring 40% MTL for all coal based thermal generators both at ISTS & InSTS on sustained basis. Other technological intervention may be considered by generators (storage etc.). Monitoring of the same has to be done rigorously.
b) Two shift operation/taking out units on weekends/holidays/high wind season needs to be implemented. Before implementation two shift operation of thermal Generating units must be performed on pilot basis in each region and potential damage including wear & tear, O&M, and plant life spans should be thoroughly examined before final implementation. Wear & tear, O&M, plant life spans and cost implications may be properly recorded during pilot two shift operation.

c) Peaking capacity may be considered with technical and commercial aspects with well-defined rules. This will further optimise number of units on bar, ensuring MTL at solar hours and also enable the states to meet the evening peak demand.

d) Energy storage (BESS, PSP etc.) need to be promoted rigorously to integrate the RE targets. BESS installation in existing thermal stations (Both Inter and Intra State thermal stations) may be one of the options for storing excess energy during solar hours.

e) Each control area needs to maintain the reserves (Up & Down) as calculated by NLDC in different timeframes to control and manage the deviations and other grid parameters.

f) Demand response needs to be promoted. Initially large industries with captive generation may be focused.

g) TOD tariff with lower tariff during solar hours and higher tariff during evening needs to be implemented by all SERCs.

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Annexure-I

सत्यमेव जयते

भारत सरकार/Government of India

विद्युत मंत्रालय/Ministry of Power

केंद्रिय विद्युत प्राधिकरण/Central Electricity Authority

राष्ट्रीय विद्युत समिति प्रभाग /National Power Committee Division

1st Floor, Wing-5, West Block-II, R.K. Puram, New Delhi-66

No. CEA-GO-15-14/1/2025-NPC Division/106 **Date: 30.05.2025**

To,

(As per distribution list)

विषय:- ग्रिड स्थिरता और नवीकरणीय ऊर्जा एकीकरण के लिए तापीय उत्पादन तकनीकी न्यूनतम स्तर पर सुनिश्चित करने के लिए तंत्र विकसित करने हेतु समिति का गठन

Subject: Constitution of Committee to Evolve the Mechanism for ensuring Thermal Generation at Technical Minimum level for Grid Stability and RE Integration -reg.

Sir/Madam,

A meeting was chaired by Chairperson, CEA, on 26.05.2025 to review the Power Supply Position, demand trends, generation availability, grid constraints, and readiness for managing the renewable energy (RE) variability.

2. During the said meeting, Chairperson, CEA, observed that several thermal generators, particularly Central Sector owned units, were being scheduled below their technical minimum limits during day time despite their requirement during non-solar/evening peak demand. The NLDC also reported the need for limiting RE generation under emergency conditions after exhausting all other avenues and due to inadequate downward regulation capability from conventional sources, especially during weekends with lower demand.

3. It was decided that a Committee may be constituted under the chairmanship of the Member Secretary, NRPC, with representatives from RPCs, GM Division, CEA, CERC, NLDC, RLDCs as Members and Member Secretary, NPC as the Member Convener. The primary mandate of the Committee is to develop a common mechanism to ensure adequate scheduling of thermal generation during daytime hours upto technical minimum for ensuring sufficient ramp-up capabilities to maximize the thermal availability during evening/non-solar peak hours. This will ensure secure and reliable grid operations, support the integration of RE sources, and help avoid operational and commercial challenges for generating units nationwide.

4. Accordingly, the Committee is constituted as follows:

S. No.	Name	Designation	Organization	
1.	Shri. V.K.Singh	Member Secretary	NRPC	**Chairman**

2.	Shri. N.S. Mondal	Member Secretary	ERPC	Member
3.	Shri. Asit Singh	Member Secretary	SRPC	Member
4.	Shri. K.B. Jagtap	Member Secretary	NERPC	Member
5.	Shri. Deepak Kumar	Member Secretary	WRPC	Member
6.	Shri. Brieflee Lyngkhoi	Chief Engineer	GM, CEA	Member
7.	Shri. Awdhesh Kumar Yadav	Chief (Engg.)	CERC	Member
8.	Smt. S. Usha	Executive Director	NLDC	Member
9.	Shri. V. Balaji	Executive Director	SRLDC	Member
10.	Shri. Rajib Sutradhar	Executive Director	ERLDC	Member
11.	Shri. Amaresh Mallick	Executive Director	NERLDC	Member
12.	Shri. Manoj Kumar Agarwal	Executive Director	NRLDC	Member
13.	Shri. Mahesh M. Mehendale	Executive Director	WRLDC	Member
14.	Smt. Rishika Sharan	Member Secretary	NPC, CEA	**Member Convener**

5. The Terms of Reference of the Committee are as follows: -

   a) Review the current scheduling and dispatch practices of all thermal generators, particularly during Solar/high RE hours and propose mechanism for ensuring technical minimum schedule of thermal generators to support grid balancing and reliability during Non-Solar/evening hours.
   b) Assess operational constraints, technical minimum limit issues, and ramp-up/ramp-down capabilities of all thermal generators, to ensure the maximum availability during Non-Solar hours.
   c) Recommend a common mechanism for:
      i. Ensuring all thermal units are scheduled above their technical minimum limits during Solar hours and moderating other generation sources including RE for ensuring reliable grid operation during Non-Solar hours.
      ii. Maintaining sufficient ramp-up capability of thermal generating units to meet the Non-Solar/evening demand.
   d) Address commercial and regulatory aspects linked to the common mechanism being finalized for operation of thermal generating units.

6. The Committee shall submit the report by 20th June, 2025.

This issues with the approval of the competent authority.

भवदीय,/Yours faithfully,

30/05/25

(सत्येंद्र कु. दोतान / Satyendra Kr. Dotan)
निदेशक (रा.वि.स.) / Director (NPC)

Distribution list:

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14. Smt. Rishika Sharan, Chief Engineer, NPC, CEA,1st Floor, Wing-5, West Block-II, R.K. Puram, New Delhi-110066.[Email: cenpc-cea@gov.in/ rishika@nic.in]

Copy for kind information to:

1. SA to Chairperson, CEA,
2. SA to Member (GO&D), CEA

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Annexure-II

Ref No: Scope/CORP. PLNG./2025-26/ Min. Ref./163645
Date: 13.06.2025

To,

Shri Vivek Pandey
Chief General Manager
National Load Despatch Center (NLDC)
New Delhi – 110019

Subject: CERC Suo Motu order in petition 2/SM/2025: Two-shift operation of thermal units

Sir,

This has reference to NLDC letter dated 22.05.2025 regarding two-shift operation of thermal units.

In this regard, NTPC inputs regarding two-shift operation are enclosed as **Annexure** for consideration.

Thanking you.

Yours faithfully

Sd/-
(B N Dhupal)
Addl. General Manager
Corporate Planning
NTPC Limited

Annexure

NTPC comments on two-shift operation of thermal units

- NTPC appreciates the concern to maintain the grid frequency by adopting various means to control the generation however it may be put on record that, frequent two-shift operations involving daily start-stop cycles have a significant adverse impact on the long-term health and reliability of thermal power plants due to design limitations and other issues.

- The repeated high cyclic load results in heavy stress particularly on thick wall component of boiler and turbine which deals with high temperature and pressure. This accelerates wear and tear on pressure parts, rotating machinery, and critical components such as boiler pressure parts, turbine casings, low-pressure (LP) turbines, stop valves, boiler tubes, and generator windings. Also, there will be lots of startup and shutdown hiccups during two shift operation and turbine passing through critical speed so frequently can be catastrophic.

- Additionally, frequent switching operations and flexing place increased stress on Generator, Electrical parts, High-tension circuit breakers and auxiliary systems leading to more failure. These operational stresses not only lead to higher operation and maintenance costs and reduced equipment life expectancy but also increases the consequential damage to capital equipment. Two shift operations will result in high deviation in emission parameters such as SoX, NoX and SPM. As large number of equipment's are involved hence efficiency will be poor.

- Many of these components are unique and custom-engineered, making spare planning and procurement a time-consuming process with long lead times. In the event of major outages, this can result in extended downtimes, thereby elevating the risk of forced outages and ultimately compromising grid reliability over the long term. Also, it is worth mentioning that damage control mechanism may not be effective to reduce detrimental effect of two shift operation.

- Further, impact of two shift operation on life and force outage may not visible immediately or during test duration rather they get first accumulated and get manifested in around 2-3 years' time, so considering this, purpose of getting data/impact through two shift operation trials may not be trustworthy.

- NTPC is demonstrating its commitment to grid flexibility by operating its thermal units down to their Minimum technical level of 55% as per the grid requirement and participating in ancillary services (SRAS, TRAS). In contrast, many of the other regional and state-controlled generating stations generally operate well above 55% of their rated capacity. Since these stations are not participating in the Ancillary Services, down reserves available in these stations above the level of 55% remain un-utilised. This disparity places a disproportionate burden on NTPC units and would lead to long-term asset degradation compromising health of national assets.

- The need for two-shift operation can be substantially mitigated through effective demand side management (DSM), including incentivizing peak load shifting for large industrial and commercial consumers, promoting time-of-day tariffs to

adjust the demand curve, and encouraging demand response programs to increase load during solar hours. Such measures can help align demand with generation availability, reducing the need for frequent cycling of thermal units.

- A uniform technical minimum loading level across all thermal generating stations can enhance flexibility in grid operations, improve down reserve margins during lean demand periods, and allow better utilization of available generation without resorting to unit shutdowns. We recommend a coordinated review of technical minimum norms across States to ensure equitable and efficient dispatch.

- It is also pertinent to highlight the growing role of storage systems, especially Battery Energy Storage Systems (BESS), in grid balancing. Several BESS projects are currently in the pipeline across the country. The recent advisory issued by CEA dated 18.02.2025 to incorporate minimum two-hour co-located BESS equivalent to 10% of installed solar capacity in future solar tenders will significantly enhance grid flexibility. These systems can absorb excess solar generation during the day and discharge during evening peaks, thereby reducing the need for thermal unit cycling.

- With a coordinated approach involving demand side management, implementation of uniform technical minimum norms, and installation of battery energy storage systems, the need for two-shift operation of thermal units can be effectively avoided.

- However, to prioritize units for load reduction, preference should be given to those with the lowest net generation efficiency, considering net heat rate, including energy consumed in coal transportation and those that contribute most significantly to environmental impact based on pollutant emissions.

- It may be noted that in the recently held meeting under the Chairmanship of the Secretary (P) on 27.05.2025 regarding "Grid Management and updated Projection of Summer Power Demand", NTPC expressed serious concerns over two-shift operations and 40% load flexing, citing their adverse impact on unit health. Operating units below 55% load is not technically feasible, particularly due to issues such as poor coal quality. NTPC is already experiencing high boiler tube leakages, frequent flame failures, and a significant increase in generator and turbine failures over the past three years. Repeated ramp-ups and ramp-downs are accelerating wear and reducing the lifespan of thermal units. Further, NTPC submitted that it is not in position to support two-shift operations.

Considering the above mentioned technical and operational constraints, reliability concerns, and the higher efficiency and environmental performance of NTPC units, it is requested that NTPC be exempted from participating in the proposed pilot study on two-shift operation. NTPC remains committed to supporting Grid-India in ensuring secure and reliable grid operations.

Annexure-III

भारत सरकार/Government of India
विद्युत मंत्रालय/Ministry of Power
केंद्रिय विद्युत प्राधिकरण/Central Electricity Authority
राष्ट्रीय विद्युत समिति प्रभाग /National Power Committee Division
Ist Floor, Wing-5, West Block-II, RK Puram, New Delhi-66

No. CEA-GO-15-14/1/2025-NPC Division/ 111 Date: 11.06.2025

To,

(All Members of the Committee)

विषय: 03.06.2025 को आयोजित ग्रिड स्थिरता और आरई एकीकरण के लिए तकनीकी न्यूनतम स्तर पर थर्मल उत्पादन सुनिश्चित करने के लिए तंत्र विकसित करने के लिए समिति की पहली बैठक के कार्यवृत्त के संबंध मे ।

Subject: **Minutes of the 1st Meeting of Committee to Evolve the Mechanism for ensuring Thermal Generation at Technical Minimum level for Grid Stability and RE Integration held on 03.06.2025 -reg.**

कृपया दिनांक 26.03.2025 को वीडियो कॉन्फ्रेंसिंग के माध्यम से आयोजित राष्ट्रीय संरक्षण स्थायी समिति (एनपीएससी) की पहली बैठक का कार्यवृत्त आपकी सूचना एवं आवश्यक कार्रवाई हेतु संलग्न है।

The Minutes of the 1st meeting of the committee held on 03.06.2025 through VC, is enclosed herewith for your kind information and necessary action, please. The 2nd meeting of the committee is scheduled to be held on 12.06.2025 at 4 PM. **The agenda for the 2nd meeting is also enclosed herewith at Annexure -II**

भवदीय/Yours faithfully

11/06/2025

(ऋषिका शरण /Rishika Sharan)
मुख्य अभियंता एवं सदस्य सचिव (एनपीसी)
Chief Engineer & Member Secretary (NPC)

Copy for kind information:-

1. SA to Chairperson, CEA
2. SA to Member (GO&D), CEA
3. SA to Member (PS), CEA

Minutes of 1st Meeting of Committee chaired by Member Secretary, NRPC held on 03.06.2025

List of Participants are attached at Annexure -I

1. The 1st meeting of the Committee to Evolve the Mechanism for ensuring Thermal Generation at Technical Minimum level for Grid Stability and RE Integration was held on 03.06.2025 through online mode. The list of participants is enclosed at **Annexure-I.**

2. **Member Secretary, NPC & Member Convener of the Committee** extended a warm and heartfelt welcome to the Chairperson of the meeting, and all other committee members. She stated that the committee was constituted to evolve the Mechanism for ensuring Thermal Generation at Technical Minimum level for Grid Stability and RE Integration.

3. **Member Secretary, NRPC & Chairperson of the Committee** also welcomed all the participants of the meeting and asked member convener to start the discussion.

Deliberations:

4. **Representative of NPC Secretariat** gave a brief presentation on the issue and also informed about the primary mandate of the Committee is to develop a common mechanism to ensure adequate scheduling of thermal generation during daytime hours upto technical minimum for ensuring sufficient ramp-up capabilities to maximize the thermal availability during evening/non-solar peak hours. Further, she informed that the terms of reference of the meeting are as follows:
    (a) Review the current scheduling and dispatch practices of all thermal generators, particularly during Solar/high RE hours and propose mechanism for ensuring technical minimum schedule of thermal generators to support grid balancing and reliability during Non-Solar/evening hours.
    (b) Assess operational constraints, technical minimum limit issues, and ramp-up/ramp-down capabilities of all thermal generators, to ensure the maximum availability during Non-Solar hours.
    (c) Recommend a common mechanism for:
        i. Ensuring all thermal units are scheduled above their technical minimum limits during Solar hours and moderating other generation sources including RE for ensuring reliable grid operation during Non-Solar hours.
        ii. Maintaining sufficient ramp-up capability of thermal generating units to meet the Non-Solar/evening demand.
    (d) Address commercial and regulatory aspects linked to the common mechanism being finalized for operation of thermal generating units.

5. **MS, NPC** briefed about the Compensation methodology for operating a Thermal Generating unit below 55% Minimum Technical Load (MTL) report published by CEA. She further explained that in the report it is clearly mentioned that how the power plant can be compensated for fixed cost due to infusion of capital investment and increased O&M cost, variable charges due to efficiency loss during part load operation and additional oil consumption due to increased Equivalent Forced Outage Rate (EFOR).

6. **MS, NRPC** opined that during the solar hours of low demand days, the thermal units could be operated at 55% of MCR in order to keep the optimum number of the units (InSGS & ISGS) on bar to meet demand during non-solar hours. However, Intra state Generators (InSGS) are not operating near 55% of their MCR leading to excess generation during Solar hours. Further, he stated grid instability due to the excess generation during solar hours of low demand days can not be addressed only by scheduling regional thermal generators at technical minimum, InSGS should also play their part to resolve the issue.

7. **MS, ERPC** stated that at regional level, it has been demonstrated that all thermal generating units above 200 MW are equipped to achieve 55% MTL and some of the power plants are also able to achieve 40% MTL.

8. He further stated that whatever technical modification is required to achieve the 40% Minimum Technical Load (MTL) will be addressed during the next annual scheduled overhauling of the units.

9. **MS, NRPC** stated that till date, most of the thermal power plants, except few state sector thermal power plants of smaller unit of 100 MW are capable to operate it at 55% of MTL. He further stated that we can work out how much RE baking down can be avoided once all thermal power plants can be operated at 55% of MTL during the solar hours.

10. **Chief Engineer, GM Division, CEA** stated that 40% MTL to be achieved by 2030 is in phase wise manner. The Phasing plan of CEA for 40% MTL is as follows:

    - **Phase-1** (Jul, 24 – June, 26): Around 91 units (51080 MW) capacity to be complied for 40% MTL
    - **Phase-2** (Jul, 26 – June, 28): Around 100 units (46825 MW) capacity to be complied for 40% MTL
    - **Phase-3** (Jul, 28 – Dec, 29): Around 101 units (37215 MW) capacity to be complied for 40% MTL
    - **Phase-4** (Jan, 30 – Dec, 30): Around 191 units (55767 MW) capacity to be complied for 40% MTL

11. He further stated that the pilot project till March, 2024 of achieving 40% MTL of 10 Units (5850MW) been implemented, the issue of excess generation in the grid as it is now, could have been resolved to an extent. Hence, strong monitoring has to ensure that generators comply with the timeline. Moreover, generators should perform of attaining 40% MTL during solar hours duration not just few time blocks to show that they are complied. Compensation mechanism may be put in place by CERC to encourage more generators to participate.

12. **ED, NLDC** stated that, as per SERC regulations, there is no mandate for operation at 55% of MTL for Intra State thermal generators, except for few states such as Uttar Pradesh, Haryana, Telangana, Andhra Pradesh, Karnataka, Madhya Pradesh, and Maharashtra. Other states continue to operate their intra state plants above 55% even when frequency is high. She added that the commercial mechanism for compensating the intrastate thermal stations is yet to be notified by the SERCs.

13. She further stated that the grid code of each SERC should be revised in accordance to **Central Electricity Authority (Flexible Operation of Coal based Thermal Generating Units) Regulations, 2023 and CERC (IEGC) Regulation'2023**. She also informed that all the Inter-state generating stations and IPPs are operating at 55% of MTL during the solar hours from almost 9:00 to 13.30 hours.

14. **Representative of NLDC** stated that the power plants which are connected at Inter state level fall under RLDC jurisdiction. The generating stations covered under section 62 of Electricity Act'2003 are already in the ancillary service mechanism. NLDC is invoking ancillary emergency provision of CERC regulations for the generating stations covered under Section 63 of Electricity Act'2003 and IPPs, which are not included in the ancillary shortfall mechanism. Under that clause, instruction are given to operate at up to 55% of MTL. Similar instructions are also being issued to merchant power stations, even when their schedules are part of the power exchange or outside bilateral arrangements. It was also explained that the decision of decommitting ISGS thermal units during surplus conditions in solar hours is constrained by inadequacy of generation resources during non-solar hours and reluctance of thermal stations for two-shift operation of units. He added that the beneficiaries requisition their full share during non-solar hours and thus closure of thermal units would result in load shedding.

15. He further informed that during shortfall in down reserves, they are compelled to invoke emergency ancillary regulation to interstate connected IPPs as well as VRE power plants. As of now, solar plants with installed capacity of above 250 MW are despatched under TRAS_emergency. These plants are asked to reduce their injection, without changes in the drawal schedules of their beneficiaries/procurers. They're not impacted commercially, because on the injections side, their schedules are being reduced by the ancillary down dispatch instruction from NLDC. This situation can be avoided if the margins available in the intra-state generating stations.

16. He also added that there is still a margin of around 8000 to 10,000 MW in the intra-state generating stations, which are presently operating at 70% or 80% of their full load capacity. If the Intra State Generator will operate further till 55%, then it can create an additional cushion of 8000 to 10,000 MW for down reserve and which in turn can avoid invoking emergency ancillary on the solar plants.

17. He also stated that right now, messages are being regularly sent by NLDC/RLDC to the respective SLDCs to reduce the generation in the intra-state plants. However, the intra State Generators are reluctant to reduce their generation in the absence of commercial compensation to cover the losses as per the formula worked out by CEA and CERC.

18. **ED, NLDC** stated that SCUC and SCED are mandatory for all generators covered under Section 62 of Electricity Act'2003 and other generators may opt SCUC and SCED. She further informed that as per LPSC procedure, which will come into effect from 1st July, no generators will be allowed to bid above 120% of their Energy Charge Rate (ECR). If a generator bids above 120% of ECR, then their corresponding MW fixed cost will be reduced.

19. **Chief (Engg.), CERC** stated that apart from achieving 55% MTL for intra state-generating stations long term technical solutions need to be explored on these issues, such as achieving thermal flexibility upto 40% as MTL for TPS, enabling two-shift operations and allowing thermal generating stations to install battery energy storage systems (BESS) at the switchyard. The Phasing Plan of CEA for achieving 40% MTL upto 2030, requires focussed steps towards enabling two-shift operations and BESS/PSP installation. BESS/PSP would enable them to store excess power during low-demand periods/ solar hours and supply it during peak hours. He also informed CERC through its Suo-Motu order 2/SM/2025 dated 29.03.2025 has already mandated regional entity thermal generating stations whose tariff is determined by this Commission under Section 62 of the Act, to be operated in two-shift operation, as pilot project . The unit for pilot project shall be identified by NLDC in consultation with the owner(s) of such thermal units and CEA.

20. **MS, SRPC** stated that the Compensation mechanism for part load and frequent start-ups from hot, warm & cold need to be brought by SERCs. Till it is notified by SERCs, the CERC mechanism may be adopted by states. He further stated that time lines for scheduling for all Intra State generators also need to be streamlined with CERC IEGC Regulation 2023 (7-8 Time Block) which will ensure equitable comparison and similar provisions of scheduling of power.

21. He further suggested some changes in IEGC/CERC Regulations:
    a) Obligation to supply power (Regulation 47(2) of IEGC Regulation 2023) may be dropped to facilitate USD/RSD on D-1 and on Intraday.
    b) RSD/USD procedure needs to be relooked to ensure that power is available to needy states and not booked to the states not requiring power (Regulation 47of IEGC).
    c) Since Intra State generators are not going upto 55% on sustained basis and the MTL/reserves are being managed through SCUC/MTL-SCED for ISTS generators, the power under the above may be booked to beneficiaries which will ensure scheduling of Intra State generators to lower levels.
    d) Empowering NLDC/RLDC/SLDC to take out units under exigencies. Commercial implications may covered in RSD/USD procedures of CERC/SERC.
    e) SRAS/TRAS down reserves as per Regulation 30(11) & 30(12) of IEGC may be ascertained and ensured by NLDC/RLDC as per notified Procedures. This will improve the ensuring MTL of units on bar during solar hours.
    f) SCUC for Intra State generators should be carried out by SLDC to identify optimum number of units to be kept on bar and same needs to be communicated to NLDC/RLDC for further optimising the SCUC at National/Regional level (Regulation 46). This will improve the ensuring MTL of units on bar during solar hours.
    g) Two shift operation for thermal units is need of hour (CERC Order 2/SM/2025 dated 29.03.2025 & CEA Construction Regulations – mandates 150 cold starts and 1000 warm starts). Converting cold start to warm start through preservation may be looked into.

h) AGC for RE for providing down reserve on proactive manner may be implemented (both ISTS & InSTS). Procedure for measuring of performance needs to be identified by NLDC which could be adopted at InSTS level.

i) TRAS emergency down to be made mandatory for all generators (ISTS & InSTS connected). The commercial aspects need to be finalised by CERC/SERC.

j) TRAS emergency down for RE may be considered with incentive of 1p to 5p based on performance. This may be implemented at frequency above 50.15 Hz. The same may be implemented at InSTS level also.

k) Regulation/Procedure for RE support (reserve down) under Emergency TRAS/SRAS may be formally brought out by CERC. The same may be adopted by SERCs.

l) Booking of some energy and corresponding cost of Ancillary deployment to causer may help in optimum utilisation of resources and more balanced sharing of the cost of Ancillary services. Presently the complete cost is getting socialised through Ancillary and Deviation Pool Account. This may help in curtailing UD & OD of the Regional Entities (States) since some cost implications will be there.

22. **CE (Engg.), CERC** informed that Tariff Regulations'2024 allows the expenditure required to enable flexible operation of the generating station at lower loads as part of the capital cost of the project which gets recovered in form of tariff. Flexible operation of thermal projects would result in operation of generating station below normative plant availability factor. To take care of part load operation compensation in the form Station Hear Rate (SHR) degradation, increase in Auxilary Power consumption (APC) has been brought out vide 1st Amendment to CERC tariff Regulations' 2024. He also informed that the detailed procedure has also been devised by NLDC and has been submitted to the Commission for approval.

23. He further stated that compensation mechanism developed under CERC (IEGC) Regulation-2010 was applicable for generators under sections 62 & 63 of electricity Act'2003. These have now been segregated, wherein the provisions of compensation for Section 63 generators will continue to be governed by the procedures under the IEGC-2010, while the provisions for compensation for Section 62 generators will be governed as per the 1st Amendment to the CERC Tariff Regulations, 2024.

24. **Decisions of the Committee:-**

After detailed deliberations, the followings short term and long term solutions were proposed for ensuring Thermal Generation at Technical Minimum level for Grid Stability and RE Integration:

1. Short Term solutions (within 1 year):

a) Implementation of minimum technical load (MTL) level of 55% immediately on pan-India basis and 40% as per phasing plan and establishment of monitoring mechanism to ensure compliance with the CEA (Flexible. Operation of Coal based Thermal Power Generating Units) Regulations, 2023.

b) State Grid Codes shall be aligned with the Central Electricity Authority (CEA) "Flexible Operation of Coal based Thermal Power Generating Units" regulation 2022, notified in January 2023. Suitable directions needs to be issued to SERCs by Ministry of Power/CEA to notify commercial compensation mechanism as per CEA guidelines to ensure the MTL of 55%, which in force from 01.02.2024 as per CEA (Flexible Operation of Coal based Thermal Power Generating Units) Regulation 2023 on sustained basis.
c) Generators maintaining MTL of 40-45% may be given more preference (bypassing Merit Order when required for maintaining down reserves) and units may be kept on bar.
d) Directions from RPCs may be issued to existing PSPs to make all pumps operational and also use as a load during solar hours as envisaged in Optimal Generation Mix Report of CEA.
e) Time lines for scheduling for all Intra State generators also need to be streamlined with CERC IEGC Regulation 2023 (7-8 Time Block) which will ensure equitable comparison and similar provisions of scheduling of power.
f) Till two shift operation of thermal generators is being implemented, there is a need to create equitable balance between the supply obligation of generators under IEGC Regulation 2023 as well as offtake obligation of drawing entities/ beneficiaries of the generators. Beneficiaries requisitioning power during non-solar hours from an ISGS shall have Offtake obligations from those stations during solar hours.. Beneficiaries may be mandated to maintain a minimum requisition as percentage of maximum requisition in a day, during the lean hours to ensure operationally reasonably schedule during lean hours and availability in non-solar hours.
g) Optimal number of thermal units may be kept on bar during solar hours by NLDC/RLDC/SLDCs to meet non-solar hours demand. Excess generation is leading to frequency excursions. Empowering NLDC/RLDC/SLDC to take out units under exigencies.

2. Long Term solutions(Beyond 1 year):

a) Ensuring 40% MTL for all coal based thermal generators both at ISTS & InSTS on sustained basis. Other technological intervention may be considered by generators (storage etc.). Monitoring of the same has to be done rigorously.
b) Two shift operation/taking out units on weekends/holidays/high wind season needs to be implemented.
c) Peaking capacity may be considered with technical and commercial aspects with well-defined rules. This will further optimise number of units on bar, ensuring MTL at solar hours and also enable the states to meet the evening peak demand.
d) Energy storage (BESS, PSP etc.) need to be promoted rigorously to integrate the RE targets. BESS installation in existing thermal stations may be one of the options for storing excess energy during solar hours.
e) Each control area needs to maintain the reserves as calculated by NLDC on year ahead basis to control and manage the deviations and other grid parameters.

f) Demand response needs to be promoted. Initially large industries with captive generation may be focused.
g) TOD tariff with lower tariff during solar hours and higher tariff during evening needs to be implemented by all SERCs.

The meeting ended with a vote of thanks to chair and all the participants.

****

Annexure-I

List of Participants of the 1st Meeting of the Committee held on 03.06.2025 through video conference.

NRPC:-

1. Shri. V.K.Singh, Member Secretary **-Chairperson**
2. Shri Praveen Jangra , EE

CEA:-

1. Smt. Rishika Sharan, CE (NPC)
2. Shri Brieflee Lyngkhoi, CE (GM Div.)
3. Shri. Satyendra Kumar Dotan, Director (NPC)
4. Shri. Ravi Shankar, DD (NPC)
5. Shri. Nikul Rohin, AD (NPC)
6. Ms. Bhawna Aggarwal, AD (NPC)
7. Shri. Rakesh Bairwa, AD (NPC)

CERC:-

1. Shri Awdhesh Kumar Yadav, CE (Engg.)

SRPC:-

1. Shri. Asit Singh, Member Secretary
2. Shri. J. B. Len, Superintending Engineer
3. Ms. Malini, Superintending Engineer

ERPC:-

1. Shri. N.S. Mondal, Member Secretary

WRPC:-

1. Shri. Deepak Kumar., Member Secretary

NLDC:-

1. Smt. S. Usha, Executive Director

NRLDC:-

1. Shri. Manoj Kumar Agarwal, Executive Director

SRLDC:-

1. Shri V. Balaji, Executive Director

ERLDC:-

1. Shri. Rajib Sutradhar, Executive Director

NERLDC:-

1. Shri. Amaresh Mallick, Executive Director

WRLDC:-

1. Shri. Mahesh M. Mehendale, Executive Director

Annexure-II

Agenda points for discussion on 2nd meeting of the committee to be held on 12.06.2025

a) Till two shift operation of thermal generators is being implemented, there is a need to create **equitable balance** between the supply obligation of generators under IEGC Regulation 2023 as well as offtake obligation of drawing entities/ beneficiaries of the generators. Beneficiaries requisitioning power during non-solar hours from an ISGS shall have Offtake obligations from those stations during solar hours.. Beneficiaries may be mandated to maintain a minimum requisition as percentage of maximum requisition in a day, during the lean hours to ensure operationally reasonably schedule during lean hours and availability in non-solar hours **OR** complete abeyance of supply obligation of generators.

b) Unit Shutdown by generators without any supply obligation needs to be obligated to bring back the unit on bar **within well defined timelines** as per the requirement of the beneficiaries.

c) In case of receipt of less schedule, if the thermal generator has to resort reserve shut down, the beneficiaries may agree to allow shut down **against payment of fixed charges**. However, the requisition of beneficiaries may be restricted to the On bar Declared capacity of the thermal generating stations. This will avoid fictitious schedule and ensure reliable load generation balance. Supply obligation under IEGC Regulation 2023 may be limited to the declared capacity of units on bar.

d) Optimal number of thermal units may be kept on bar during solar hours by NLDC/RLDC/SLDCs to meet non-solar hours demand. Excess generation is leading to frequency excursions. **Empowering NLDC/RLDC/SLDC to take out units under exigencies. Regulatory provisions to facilitate unit shutdown in case beneficiaries surrender power and unit cannot be supported through SCUC.**

e) Suitable provisions may be provided for **higher DSM charges for over injection or under drawl by the entities when the grid frequency exceeds 50.10 Hz**, irrespective of the nature (both RE and non RE) of the entities. Further, during the schedule revision under TRAS Emergency provision, over injection may not be allowed and the volume limit may be made as Zero during such time period.

f) The **decision**s taken in the 1st Meeting of the committee in respect of short term solutions and long term solutions.

g) **Any other agenda** points, if any.

Annexure-IV

सत्यमेव जयते

भारत सरकार/Government of India
विद्युत मंत्रालय/Ministry of Power
केंद्रिय विद्युत प्राधिकरण/Central Electricity Authority
राष्ट्रीय विद्युत समिति प्रभाग /National Power Committee Division
Ist Floor, Wing-5, West Block-II, RK Puram, New Delhi-66

No. CEA-GO-15-14/1/2025-NPC Division/ 118 **Date: 24.06.2025**

To,

(All Members of the Committee)

विषय: 12.06.2025 को आयोजित ग्रिड स्थिरता और आरई एकीकरण के लिए तकनीकी न्यूनतम स्तर पर थर्मल उत्पादन सुनिश्चित करने के लिए तंत्र विकसित करने के लिए समिति की द्वितीय बैठक के कार्यवृत्त के संबंध मे ।

Subject: Minutes of the 2nd Meeting of Committee to Evolve the Mechanism for ensuring Thermal Generation at Technical Minimum level for Grid Stability and RE Integration held on 12.06.2025 -reg.

कृपया दिनांक 12.06.2025 को वीडियो कॉन्फ्रेंसिंग के माध्यम से आयोजित राष्ट्रीय संरक्षण स्थायी समिति (एनपीएससी) की द्वितीय बैठक का कार्यवृत्त आपकी सूचना एवं आवश्यक कार्रवाई हेतु संलग्न है।

The Minutes of the 2nd meeting of the committee held on 12.06.2025 through VC, is enclosed herewith for your kind information and necessary action, please.

भवदीय/Yours faithfully

24/06/2025

(ऋषिका शरण /Rishika Sharan)
मुख्य अभियंता एवं सदस्य सचिव (एनपीसी)
Chief Engineer & Member Secretary (NPC)

Copy for kind information:-

1. **SA to Chairperson, CEA**
2. **SA to Member (GO&D), CEA**
3. **SA to Member (PS), CEA**

Minutes of 2nd Meeting of Committee chaired by Member (Power System), CEA held on 12.06.2025

List of Participants are attached at Annexure -I

1. The 2nd meeting of the Committee to Evolve the Mechanism for ensuring Thermal Generation at Technical Minimum level for Grid Stability and RE Integration was held on 12.06.2025 through online mode. The list of participants is enclosed at **Annexure-I.**

2. **Member Secretary, NPC & Member Convener of the Committee** extended a warm and heartfelt welcome to the Chairperson of the meeting, and all other committee members.

3. **Member (PS), CEA & Chairperson of the Committee** also welcomed all the participants of the meeting and asked member convener to start the discussion on the agenda for the second meeting which was already circulated among the members.

Deliberations:

4. **MS, NPC** started the discussion with the first agenda of the meeting. She sought the opinion of all the members of the committee on whether to choose an equitable balance between the supply obligation of generators as well as offtake obligation of drawing entities of the generators **OR** complete abeyance of supply obligation of generators.

5. **Representative of NLDC** opined that there must be equal responsibility on generators as well as beneficiaries. Beneficiaries often provide nil requisition during solar hours and full requisition during non-solar hours against their entitlement resulting in injection schedule below minimum technical limit during solar hours and upto their Declared Capability during non-solar hours. The ISGS refrain from withdrawing their units and continue to over-inject during solar hours and keep their units on bar to honour the injection schedule during non-solar hours (supply obligation as per IEGC). Beneficiaries requisitioning power during non-solar hours from an ISGS should have off-take obligations from those stations during solar hours. The beneficiaries need to be mandated to ensure that their minimum requisition as percentage of maximum requisition in that day in a given thermal station, is not below a predefined value to ensure operationally reasonably schedule during lean hours and availability in non-solar hours.. If the ratio cannot be maintained, one or more units from that station could be allowed to be taken under reserve shutdown to replenish down reserves. Once the unit is taken under reserve shut down, the aggregate requisition by beneficiaries in that station should be restricted to the declared capacity corresponding to the units on bar in that station. .

6. **MS, NPC** stated that in the current practice there are more number of units kept on bar through SCUC support than optimal number of units actually required to be on bar.

7. **On query of CE(Engg.), CERC** regarding quantum of up reserves created by unit commitment during non-solar hours , NLDC clarified that there is no minimum cut-off quantum of up reserves creation criteria for unit commitment under SCUC. He suggested that the units which are not committed by NLDC may be allowed to go off-bar without any supply obligation after giving some time to its beneficiaries for schedule revision. Say, by

1500 hrs on day ahead basis the units which are not committed by NLDC are already known. The gate closure for revision of schedules by beneficiaries on these units may be introduced , say by 2200 hrs on day ahead basis, beyond which if the unit still is having schedule below MTL ,it can be allowed to go off-bar on D day without any supply obligation. .

8. **Representative of NLDC** further stated that regulatory provisions on SCUC may be reviewed to introduce provision for de-committing thermal units during surplus scenarios.. The aggregate requisition by beneficiaries in the station (whose one or more units is decommitted through SCUC) should be restricted to the declared capacity corresponding to the units on bar in that station to avoid unreasonable injection schedule. These provisions would encourage flexible operation of intrastate thermal units.

9. **Representative of NPC Secretariat** suggested that there should be stricter control over beneficiaries who under-draw during solar hours or off-peak hours under high grid frequency conditions. He proposed imposing higher DSM penalties on entities that under-draw or over-inject during solar hours or off-peak hours when the grid frequency exceeds 50.05 Hz.

10. He further stated as per direction of Ministry of Power, 2-shift operation of thermal stations must be performed on pilot basis and potential damage including wear & tear, O&M, and plant lifespans should be thoroughly examined before final implementation.

11. **Decisions of the Committee:-**

After detailed deliberations, the followings were proposed for ensuring Thermal Generation at Technical Minimum level for Grid Stability and RE Integration:

a) There is a need to create **equitable balance** between the supply obligation of generators under IEGC Regulation 2023 as well as offtake obligation of drawing entities/ beneficiaries of the generators. Beneficiaries requisitioning power during non-solar hours from an ISGS shall have Offtake obligations from those stations during solar hours. Beneficiaries may be mandated to ensure that their minimum requisition in the day as percentage of maximum requisition in that day, is equal to or higher than a predefined value to ensure operationally reasonably schedule during lean hours and availability in non-solar hours. The ratio of minimum and maximum requisition by the beneficiary in a generating stations during a day could be 40%.

b) Regulatory provision for de-commitment of the Thermal units through SCUC to be introduced. The unit which is not committed under SCUC by NLDC 1500 hrs on day ahead and its schedule remains below MTL level by 2200 hrs on day ahead basis may be allowed to de-commit. The time between 1500 hrs and 2200 hrs would be the time available to the beneficiaries to revise their schedules to either support the unit by giving schedule above MTL or reduce their schedule from those units. The de-committed unit will have no supply obligation.

c) Suitable provisions may be provided for **higher DSM charges on entities for over-injection or under-drawl by the entities when the grid frequency exceeds 50.05 Hz**

during solar hours/off-peak hours, irrespective of the nature (both RE and non-RE) of the entities. However, **under-injection/over-drawl by the entities when the grid frequency exceeds 50.05 Hz during solar hours/off-peak hours, irrespective of the entity type (RE or non-RE), should attract a lesser penalty and incentivization may be considered**. Further, during the schedule revision under TRAS Emergency provision, over injection may not be allowed and the volume limit may be made as Zero during such time period.

d) Two shift operation of thermal Generating units must be performed on pilot basis in each region and potential damage including wear & tear, O&M, and plant life spans should be thoroughly examined before final implementation. Wear & tear, O&M, plant life spans and cost implications may be properly recorded during pilot two shift operation.

e) Necessary Regulatory provisions for participation of all ISTS & InSTS generators for giving Ancillary Service support to the Grid are required. Ancillary service regulations should be brought out by SERC for intra state level in line with CERC Ancillary Service Regulation.

f) NTPC Ltd. shall develop and share Standards Operating Procedure for implementation of 55% minimum turn down level in intrastate thermal power stations. Training program to be conducted in NPTI with support from NTPC Ltd. for employees of state thermal generators for running intra state plants upto 55% MTL.

g) Energy storage capacity to be created/ augmented in interstate as well as intra States may accelerate the commissioning of the required storage capacities.

h) To ensure non-discriminatory backing down across all grid connected generators during low loads, irrespective of ownership, the State Electricity Grid codes need to be aligned with CEA (Flexible operation of thermal power plants) Regulations, 2023 and IEGC. Regulatory provision to compensate intrastate generating plants for part load operations to be notified by State Electricity Regulatory Commissions.

i) Decisions taken in the 1st Meeting held on 03.06.2025 and 2nd Meeting would be considered while finalizing the final recommendations of the Committee.

The meeting ended with a vote of thanks to chair and all the participants.

****

Annexure-I

List of Participants of the 1st Meeting of the Committee held on 12.06.2025 through video conference.

CEA:-

1. Shri. V. K. Singh, Member (Power System) **-Chairperson**
2. Smt. Rishika Sharan, CE (NPC)
3. Shri. Satyendra Kumar Dotan, Director (NPC)
4. Shri. Shishir Kumar Pradhan, DD (NPC)
5. Shri. Ravi Shankar, DD (NPC)
6. Shri. Nikul Rohin, AD (NPC)
7. Ms. Bhawna Aggarwal, AD (NPC)
8. Shri. Rakesh Bairwa, AD (NPC)

CERC:-

1. Shri Awdhesh Kumar Yadav, CE (Engg.)

NRPC:-

1. Shri Anjum Parvez, Superintending Engineer

SRPC:-

1. Ms. Malini, Superintending Engineer

ERPC:-

1. Shri. N.S. Mondal, Member Secretary

WRPC:-

1. Shri. Deepak Kumar., Member Secretary

NLDC:-

1. Smt. S. Usha, Executive Director

NRLDC:-

1. Shri. Manoj Kumar Agarwal, Executive Director

SRLDC:-

1. Shri V. Balaji, Executive Director

ERLDC:-

1. Shri. Rajib Sutradhar, Executive Director

NERLDC:-

1. Shri. Amaresh Mallick, Executive Director

WRLDC:-

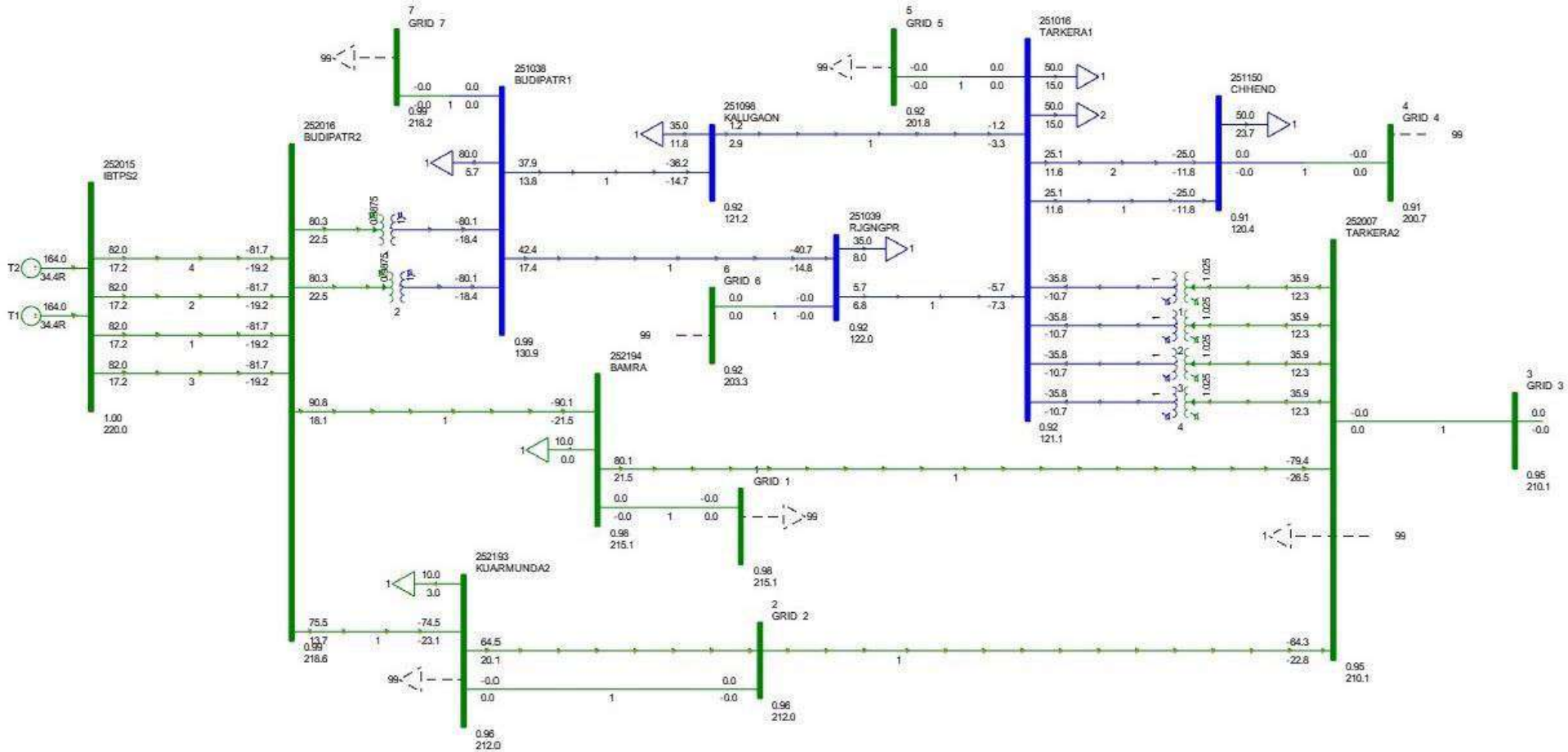
1. Shri. Mahesh M. Mehendale, Executive Director

Annexure B.2.2.2

IB Islanding Scheme

Steady state simulation flows are found ok, however Dynamic feasibility study to be done , Under different extreme load generation scenarios and accordingly logic and scheme to be finalised.

Sl No	GSS	Max. Load in MW	Min. Load in MW
1	Budhipadar	125	45
2	Bamra	35	10
3	Kuanrmunda	20	10
4	Tarkera	255	50
		435	**115**
		Max Generation	**Min Generation**
		380	**320**



Record Notes of discussion of the Meeting held on 16.07.25 between ERPC, ERLDC, POWERGRID & WBSETCL regarding replacement of defective insulators in (i)765kV New Ranchi-Medinipur D/C, (ii)765kV Medinipur-New Jeerat D/C, (iii)400kV New Jeerat-Subhasgram D/C & (iv)400kV New Jeerat-Jeerat D/c

Following the 54th TCC/ERPC Meeting held on 23–24 June 2025 at Chennai, where POWERGRID was advised to thoroughly inspect and replace faulty insulator strings across all 400kV lines from New Jeerat (including switchyard) and the entire stretch of the 765kV New Ranchi–Medinipur–New Jeerat D/C corridor by January 2026, a meeting was convened by ERLDC to understand the ongoing action plan.

The list of Participants is attached as **Annexure-I.**

At the outset, GM (System Operation), ERLDC, welcomed all participants and highlighted the critical importance of ensuring uninterrupted power supply to the Kolkata region. He expressed concern over repeated insulator failures and the consequent shutdown requests from POWERGRID. It was followed by a brief discussion among participants. The summary of the meeting are as follows:

1. ERLDC made a brief presentation showing statistics of planned/ emergency outages availed since 2023 vis-a-vis outage hours. The details of tripping in these lines were also highlighted. Frequent outage of these lines are hampering system reliability in Kolkata and adjacent area of WB.

2. CE, WB SLDC submitted that the said lines are not only important but also corridors for supply of power to 400kV sub-stations such as Subhasgram, Rajarhat & Jeerat which caters to the load of Greater Kolkata. She emphasized on proper planning of insulator replacement work to complete the same before January 2026 considering various examinations & state assembly elections to be held during 2026.

3. A presentation was made by POWERGRID wherein they indicated that 512 nos., 532 nos.,3233nos. & 267 nos. insulators already replaced in the lines (i), (ii), (iii) & (iv) respectively. POWERGRID further intimated that 18, 20, 31 & 88 nos. insulator strings required to be replaced to complete the present work.

4. ERLDC enquired whether the insulators replaced/ being replaced are from the same supplier and lot as that of defective insulators. In reply, POWERGRID intimated that insulators are from same supplier (M/s Deccan) but different lot and confirmed about the quality of the insulators. However, in addition POWERGRID intimated that an insulator package will be awarded shortly for supply of insulator against further replacement of 28068 nos. insulators (supplied by M/s Deccan) in the mentioned lines. POWERGRID assured that this replacement work will be taken up in a planned manner to complete the same by January 2026.

5. After detailed deliberations, it was appearing that POWERGRID should make a short term and long-term plan for replacement of insulators of balance 157 nos. & 28068 nos. of insulator in the 4 lines by 21.07.25 so that it can be discussed in outage meeting of 229th OCC and short term replacement work can be completed before Durga Puja.

6. While as a Long-term Solution, POWERGRID has to conduct a thorough check of all four lines and submit a detailed report and a bar chart including timelines for procurement, material arrival at site, gang deployment, shutdown schedule, etc. targeting completion by January 2026

7. ERLDC further requested POWERGRID to submit following details:
    - List of tower locations for replacement of defective insulator.
    - List of tower locations where replacement of defective insulator already completed.
    - List of tower locations for replacement of defective insulators under short term planning (157nos.) and associated outage plan of the lines,
    - List of tower locations for replacement of defective insulators under long term planning (28068nos.) and associated outage plan of the lines,

8. ERPC also requested POWERGRID to submit the full action plan at the earliest for discussion in the upcoming 229th OCC Meeting.

****

The meeting concluded with a vote of thanks.

Annexure-I

List of Participants

ERPC

1. Manjunath M, Dy. Director
2. Dillip Kumar Khuntia, Asst. Director
3. Kumari Swati, Asst. Director

WB SLDC

1. Rita Chakraborty, CE

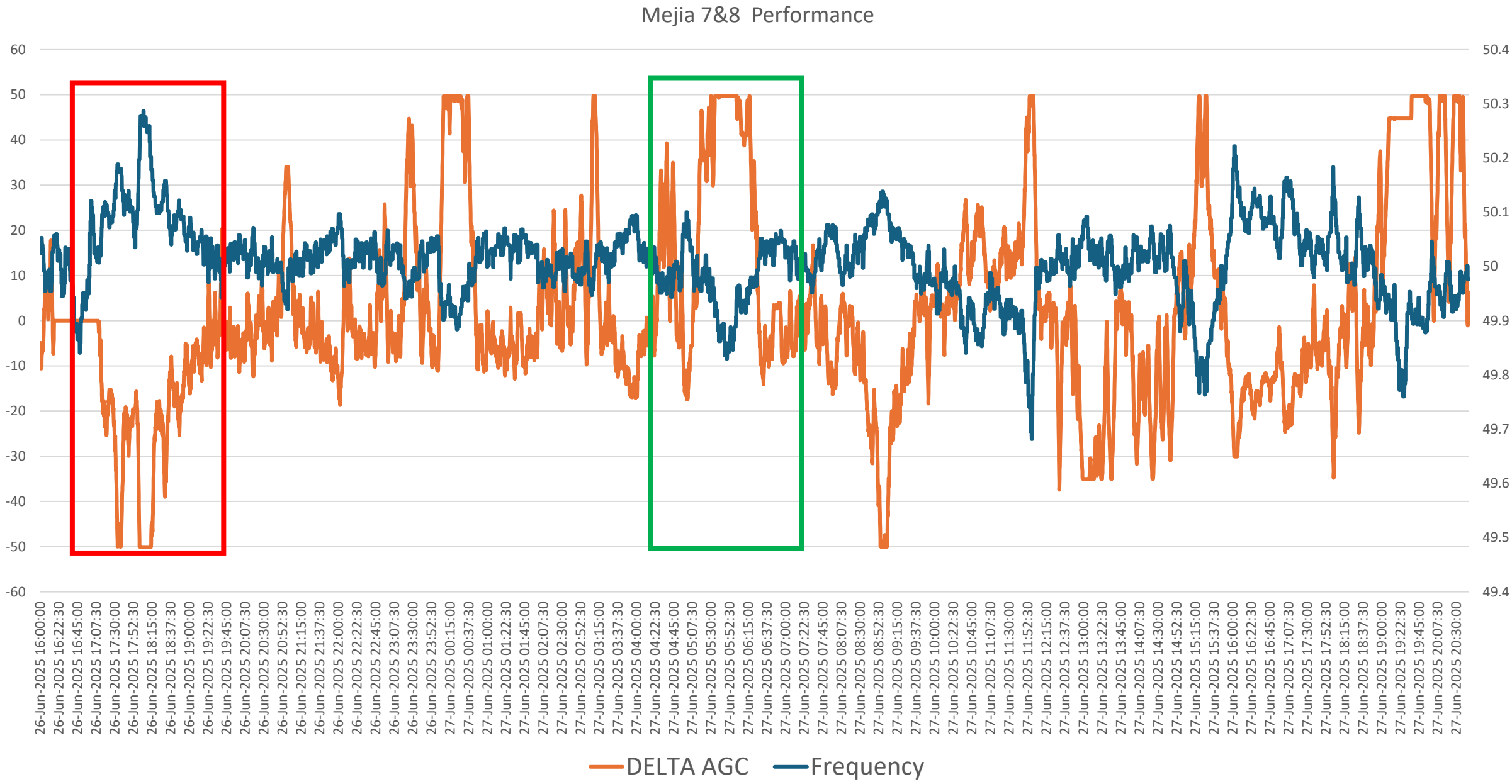
ERLDC, GRID-INDIA

1. Debabrata Biswas, GM
2. Bilash Achari, DGM
3. Manas Das, DGM
4. Pinki Debnath, Ch. Mgr.
5. Rakesh Kumar Pradhan, Ch. Mgr.
6. Chandan Mallick, Ch. Mgr.
7. Alok Pratap Singh, Ch. Mgr.
8. Pritam Mukherjee, Mgr.
9. Ramashankar Kumar, Asst. Mgr

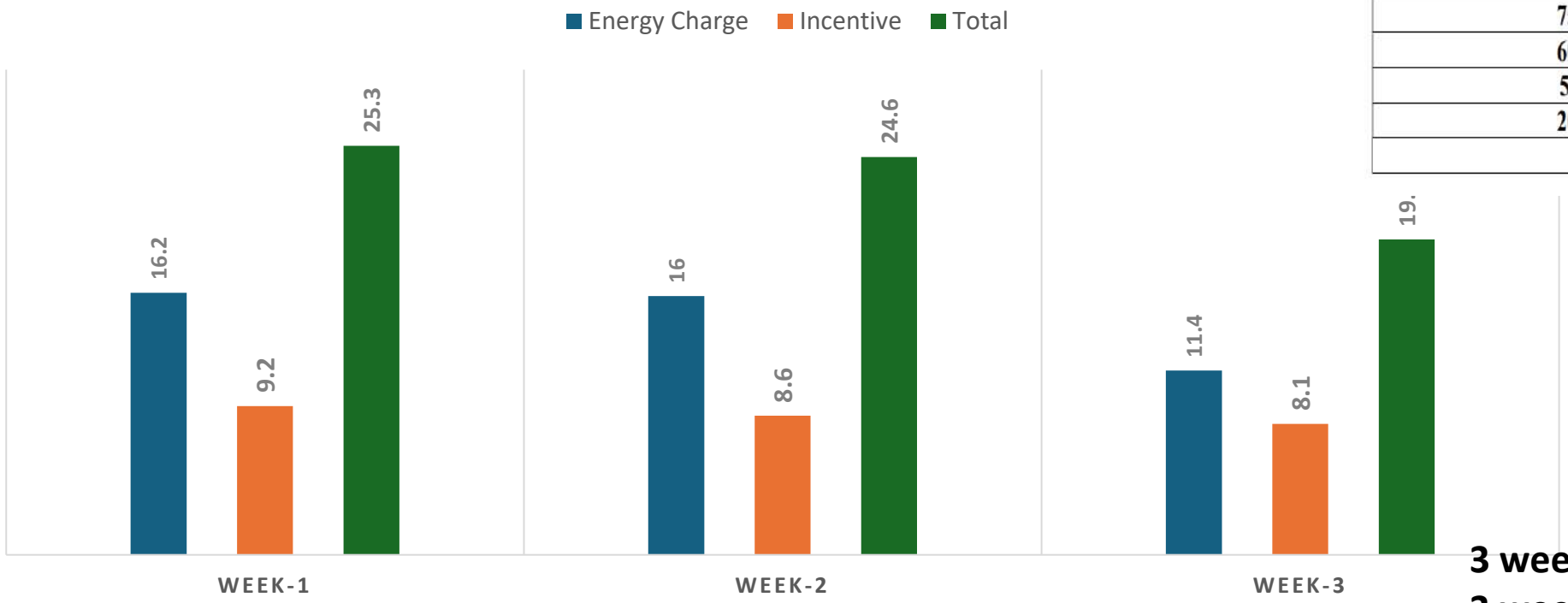
POWERGRID

1. Pranav Kumar, CGM
2. Malay Kr. Kirtania, Sr DGM
3. Vijay Prakash Puri, DGM
4. Prasun Kumar Mallick, DGM
5. Ravindra Kumar, Ch. Mgr.

Annexure B.2.2.7



MEJIA 7&8 AGC



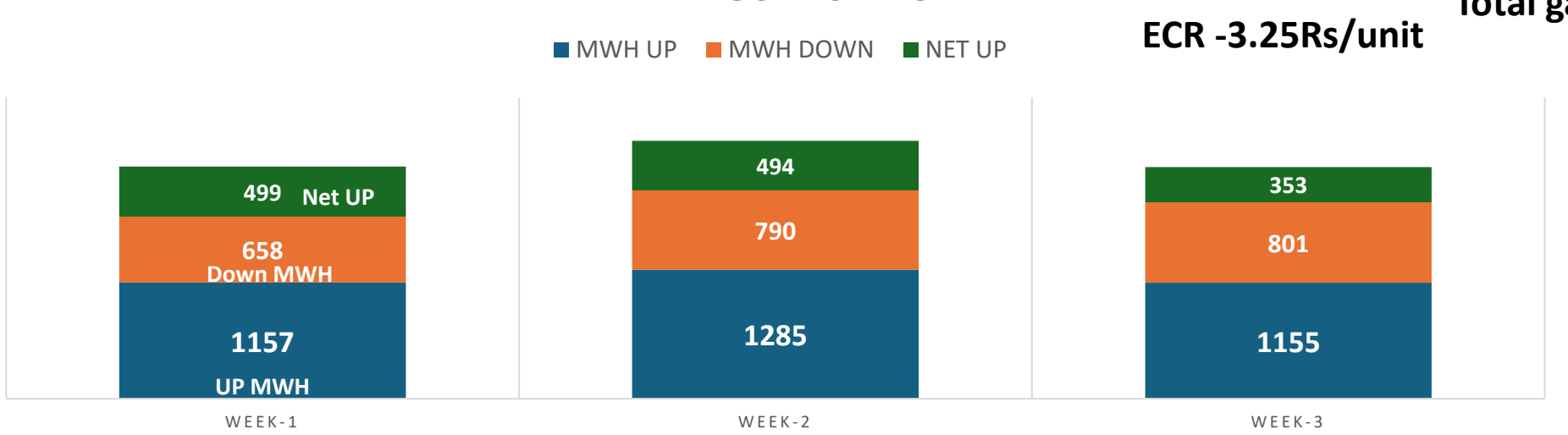
Actual performance vis-à-vis secondary control signal for an SRAS Provider	Incentive Rate (paise/kWh)
95 % and above	(+) 50
75 % to below 95%	(+) 40
60 % to below 75%	(+) 30
50% to below 60%	(+) 20
20 % to below 50%	(+) 10
Below 20%	0

Average Performance – 97%
Max Slab – 50 paisa/KWh

3 weeks Total Incentive -26 Lacs
3 weeks Total Energy Charge -43 lacs
Total gain in 3 Weeks – Approx 70 Lacs

ECR -3.25Rs/unit

MWH AGC DESPATCH



सं.22/22/2023-ओ एम [268631]
भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power

F-Wing, 2nd Floor, Nirman Bhawan
New Delhi, the 12th March, 2024

To,

1. Chairperson, Central Electricity Authority, New Delhi
2. Principal Secretary/Secretary (Energy) of State Governments/UTs.
3. Secretary, Ministry of New and Renewable Energy, CGO Complex, New Delhi
4. Secretary, CERC, New Delhi
5. Secretary, State Electricity Regulatory Commissions.
6. Chairman, State Power Utilities/SEBs.
7. Chairman, CPSUs under Ministry of Power
8. Chairman, CPSUs under Ministry of New and Renewable Energy
9. Member Secretary, Regional Power Committees
10. CMD, Grid-India, New Delhi
11. ED, NLDC, New Delhi

Subject: Revised Guidelines/Procedure for Disbursement of Funds from Power System Development Fund (PSDF) -reg.

Reference: MoP OM No. 22/22/2023-OM dated 04.07.2023 (Copy enclosed).

Sir,

Revised Guidelines/Procedure for Disbursement of funds from Power System Development Fund (PSDF), approved by the Competent Authority, is enclosed for information and necessary action.

Encl: As Above

Yours faithfully

12/03/24

(Parveen Dudeja)
Director (OM)
Tel: 23062439
Email:parveen.dudeja@nic.in

Annexure-III

The illustrative list of new projects to be funded from PSDF is under:

a) Battery Energy storage system at least till the cost of storage is high **[under clause 5.1(e)].**
b) Supporting Renewable Energy project development through market mechanisms by national agencies like SECI **[under clause 5.1(e)].**
c) Offshore wind project- underwater sea cable transmission portion **[under clause 5.1(e)].**
d) SLDC cum REMC at Ladakh, REMCs at 3 more locations & Disaster Recovery Center at RLDC-3 nos & NLDC-1 nos to be funded through PSDF **[under clause 5.1(c)].**
e) Security Operation Centre at SLDCs for real-time cyber security monitoring **[under clause 5.1(c)].**
f) Pilot project for dynamic line rating in each region **[under clause 5.1(c)].**
g) Communication scheme for AMR and real-time telemetry for 100% grid visibility **[under clause 5.1(c)].**
h) Supporting new technology development need for power sector **[under clause 5.1(f)].**
i) Supporting Grid/feeder monitoring **[under clause 5.1(c)].**

Brief Details of the Project Appraisal by CTU / STU / RPC

The applicant utility shall submit project appraisal by CTU / STU / RPC in the given format and a copy of the Appraisal Report should be attached at Annexure

Item	Details to be filled by Applicant Utility	
Appraisal By:	**CTU** ☐ **STU** ☐ **RPC** ☐	
Date of Submission to CTU / STU / RPC for approval		
Name of the Scheme		
Details of the Appraisal Report by CTU / STU / RPC (Attached at Annexure)	**Reference. No :** _____ **Date:** _____	
Summary of observations from CTU/ STU/RPC Appraisal Report	Summary of Proposal Appraised	
	Technical Observations	
	Financial Observations	
	Compliance of Grid Standards / Codes by the Applicant	
	Limitations / Shortcomings pointed out by CTU/STU/RPC if any	
	Recommendations of CTU/STU/RPC	

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

DAMODAR VALLEY CORPORATION

(ESTABLISHED BY ACT XIV OF 1948)

Detailed Project Report

For

Establishment of
Next Generation Security Operation Centre (SOC)
with integrated
Network Operation Centre (NOC)
At
"DVC LOAD DESPATCH CENTRE"

DVC TOWERS, KOLKATA, WESTBENGAL-54

To be posed to:
National Load Dispatch Centre (NLDC)
Nodal Agency for schemes under PSDF

Estimated Project Cost Rs. 27.93 Crores
(PSDF Component 90%)

(JULY – 2025)

Contents

Definitions and Acronyms

S/N	Acronym	Definition
1	DB	Database
2	DC	Data Centre
3	DR	Disaster Recovery Site
4	DAM	Database Access Management
5	INR	Indian Rupees
6	IP	Internet Protocol
7	IT	Information Technology
8	ISO	International Organization for Standardization
9	LAN	Local Area Network
10	LDAP	Lightweight Directory Access Protocol
11	LLD	Low Level Design
12	MIS	Management Information System
13	Mbps	Million Bits per Second
14	MPLS	Multi-Protocol Label Switching
15	MSE	Micro & Small Enterprise
16	MTBF	Mean Time Between Files
17	MDM	Mobile Device Management
18	NDA	Non-Disclosure Agreement
19	NAC	Network Access Control
20	OEM	Original Equipment Manufacturer
21	OS	Operating System
22	PIM	Privilege Identity Management
23	PO	Purchase Order
24	PSDF	Power System Development Fund
25	RLDC	Regional Load Dispatch Centre
26	REMC	Renewable Energy Management Centre
27	RFP	Request for Proposal
28	RCA	Root cause analysis
29	RDBMS	Relational Database Management System
30	RPO	Recovery Point Objective
31	RTO	Recovery Time Objective
32	SIEM	Security Information and Event Management
33	SLA	Service Level Agreement
34	WAN	Wide Area Network
35	ITSM	IT Service Management
36	NMS	Network Management System
37	NOC	Network Operation Centre.

1. Executive Summary

Name of the Project : Establishment of Next Generation Security Operation Centre (SOC) with integrated Network Operation Centre(NOC) at DVC Load Despatch Center.

Period of Completion : 18 Months (From the date of Approval).

Total Estimated cost : **Rs. 27.93 Crores**

Implementation Agency : To be finalised after Open Tender.

Mode of Execution : Through external agencies on contract basis as per Govt procedures under the supervision of DVC LOAD DESPATCH CENTRE.

No. of sites to be integrated to SOC : **(02) DVC LDC MAIN and DVC LDC BACKUP**

Major Equipment : SIEM, SOAR, UEBA, NBAD, DAM, Log Collectors, NMS, ITSM, DATA Diode, Storage infrastructure, required Hardware, Display & peripheral software

Source of Fund :From PSDF as per approved limit. Rest from internal sources.

2. Introduction

The Damodar Valley Corporation (DVC) is a pioneering multipurpose river valley project in India, established in 1948 under sub-section (1) of Section 3 of the Damodar Valley Corporation Act, 1948; with the aim of harnessing the vast potential of the Damodar River and its tributaries. DVC operates in the states of West Bengal and Jharkhand, overseeing a comprehensive range of activities including power generation, flood control, irrigation, and water supply management. As an integrated entity, DVC has played a crucial role in the industrial and agricultural development of the region. With its diverse portfolio of thermal, hydroelectric power stations and Solar, DVC contributes significantly to the energy security and socio-economic growth of eastern India.

As per CERC notification No. L-1/265/2022/CERC dated 29/05/2023, for the purpose of IEGC regulations, Damodar Valley Corporation (DVC) shall be treated as a regional entity and a separate control area. The **DVC Load Despatch Centre** shall perform functions of an SLDC for the control area of DVC.

DVC LDC has its office at 7th floor, DVC TOWERS, Damodar Valley Corporation, CIT Rd, Ultadanga, Kolkata, West Bengal 700054.

Operation Technology and Information Technology is vital to DVC LDC operations, and it aims at utilizing Information Technology (IT) for 'Automating' its operations for more productive, knowledge-based work environment and improved decision-making.

In this critical role, DVC LDC functions as the nerve centre of real-time grid monitoring and control, managing generation, load forecasting, scheduling, telemetry, and SCADA operations. These functions heavily rely on robust and uninterrupted Operation Technology (OT) and Information Technology (IT) infrastructures, which must be secure, resilient, and intelligent to meet the growing demands of reliability, efficiency, and regulatory compliance.

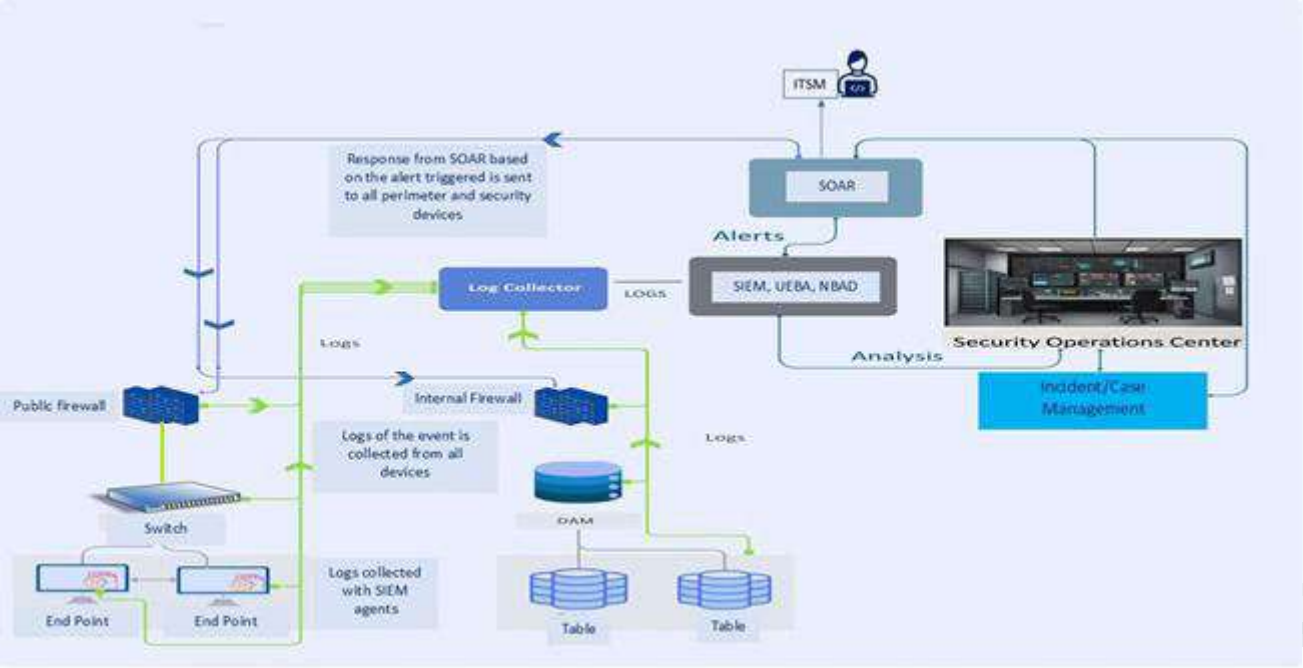
Moreover, Cyber security has become a major concern over the past few years as hackers have penetrated the OT/IT infrastructure of the various enterprises with increasing frequency and sophistication. The protection of information infrastructure and preservation of the confidentiality, integrity, and availability of information in cyberspace is the essence of a secure cyber space.
Keeping in view the foreign geographies, increasing innovative & advanced cyberattacks and malwares, threats emanating from emerging technologies bots, dark web, social engineering, cloud etc., it is important that facility for constant monitoring of the existing controls and establishing suitable platform to correlate the organizational network traffic and user behaviour with the security threat intelligence to gain necessary insight of the possible threats and vulnerabilities, be established and operated on 24 x 7 basis.

To effectively mitigate these evolving threats, DVC LDC intended to set-up a state-of-the-art on-premises Next Generation Security Operations Centre (SOC) integrated with a Network Operations Centre (NOC). This facility will provide real-time, 24x7 surveillance and incident response capabilities across the entire OT and IT network landscape.

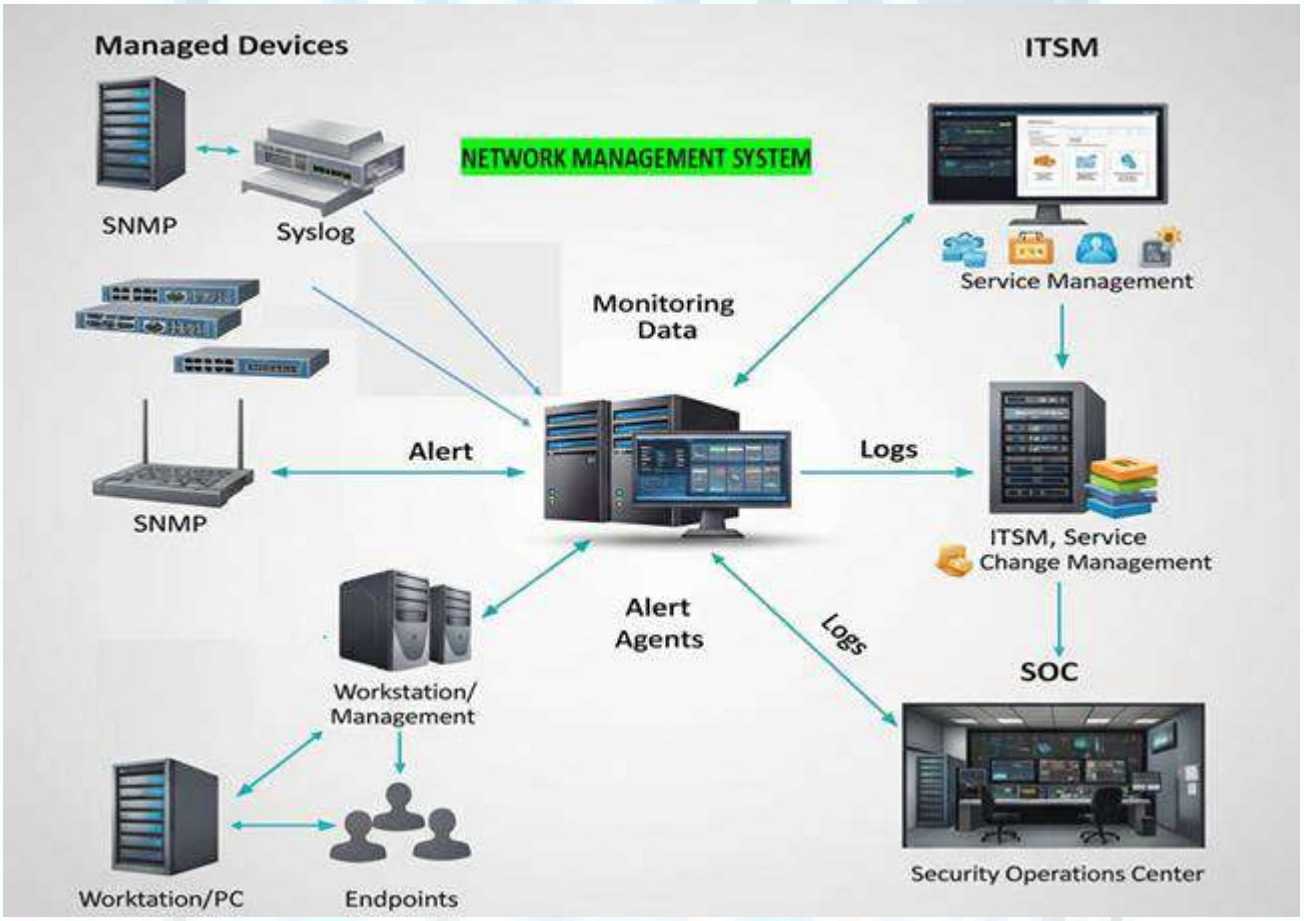
The proposed SOC-NOC facility is not merely a compliance measure, but a strategic security enhancement aligned with DVC's vision of secure, automated, and intelligent grid operations. It will future-proof DVC's digital infrastructure, ensure operational continuity, and strengthen DVC's cyber defence posture and ensure safe, reliable, and resilient operations in alignment with national objectives for securing critical infrastructure.

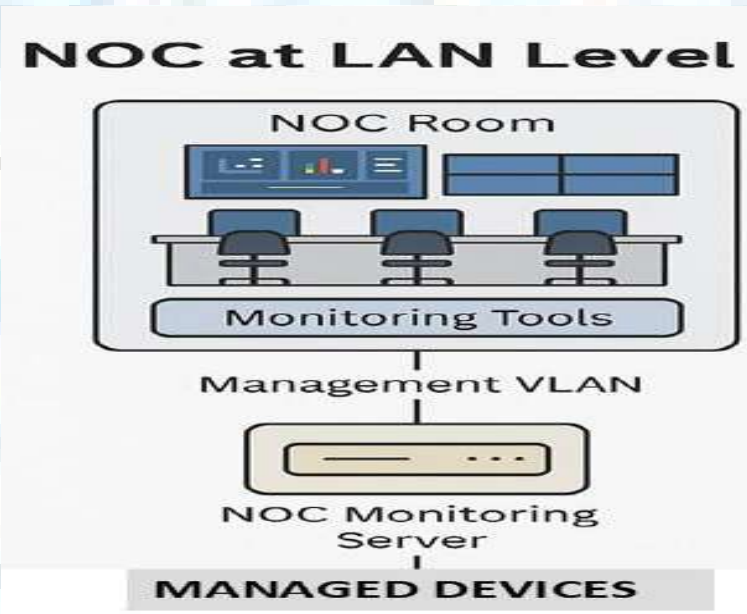
3. Proposed Scheme

The proposed SOC will function as a centralized monitoring and incident response platform using a Next-Generation Security Information and Event Management (NGSIEM) solution. This system will continuously collect, correlate, and analyze logs from various network and SCADA sources. The security analysts will act on generated alerts using real-time dashboards and threat intelligence feeds from authentic and statutory platforms such as CERT-In, NCIIPC, and others.

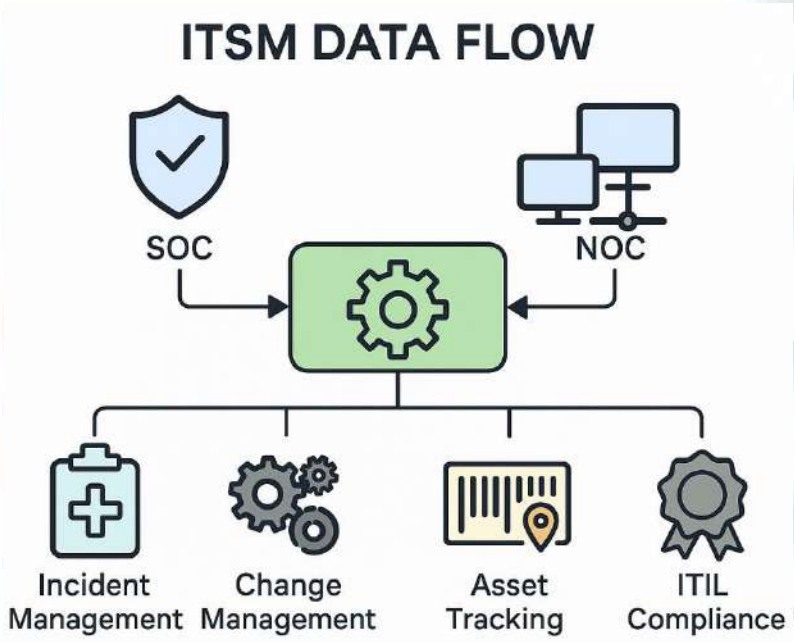


NOC function as Incident Detection and response including configuration management, Asset Tracking, health Check and user access tracking. Also, A Network Management System (NMS) will monitor and should be capable to manage DVC-LDC infrastructure in real-time, ensuring high availability and performance of the SCADA network and other OT network in DVC_LDC. The NMS will serve as the core tool for the Network Operations Center (NOC), providing comprehensive visibility and alerting, while integrating with the Security Operations Center (SOC) and IT Service Management (ITSM) processes.



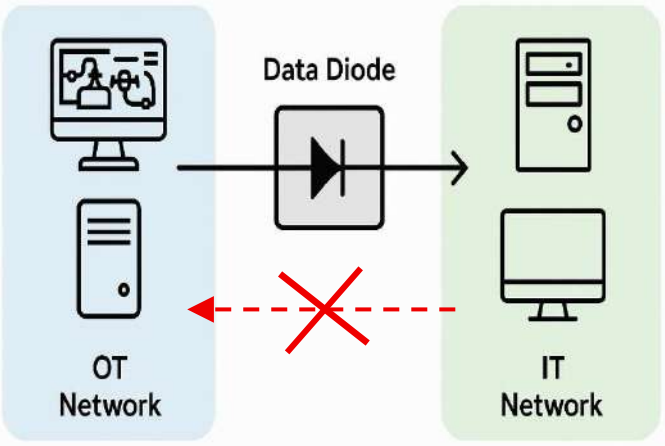


ITSM For managing IT services, incidents, requests, and issues efficiently to ensure continuous IT service availability. It is to be integrated with SOC and NOC.



Data Diode shall enforce one-way communication, ensuring secure data flow from OT to IT.
DATA Diode Consideration/Features but not limited to;

1. **Enforced Unidirectional Flow:** Utilizes a physically isolated, non-network serial link between paired Netwall servers to guarantee true one-way data transmission with no return path.
2. **Assured Data Delivery:** Built-in delivery assurance mechanisms ensure complete and reliable data transfer without packet loss, optimizing the use of available bandwidth.
3. **Comprehensive Industrial Compatibility:** Supports seamless integration with industrial systems and protocols, ensuring broad applicability across critical infrastructure.
4. **Overflow Protection:** Equipped with anti-overrun technology to prevent buffer overflows, eliminate retransmission cycles, and avoid synchronization errors.
5. **High-Speed Throughput:** Offers scalable bandwidth capabilities, supporting transmission speeds up to 1 Gbps for high-volume data environments.



The guiding principles of this SOC-NOC implementation are:

1. Identification & Prevention of Security Vulnerabilities:

The SOC-NOC should actively identify vulnerabilities in the DVC LDC IT/OT environment using anomaly detection, endpoint sensors, and correlation engines. Preventive measures will be embedded through automation and playbooks developed using SOAR platforms. Known threats can be neutralized quickly without manual intervention through dynamic correlation and response actions.

2. Incident Management:

Incident Management is the core functional pillar of the SOC-NOC for timely incident reporting and escalation. Using integrated IT Service Management (ITSM) and SOAR systems, incidents will be recorded, analyzed, and resolved. Escalation matrices will be defined for critical alerts, ensuring that designated teams at DVC LDC or relevant national cybersecurity authorities are informed and involved. Every incident will be tracked and recorded with proper ticketing till closure of the incident. It shall also have auto escalation features based on the severity.

3. Continuous Improvement:

The SOC-NOC platform will support continual optimization. Data from past incidents, behavioral baselines, and analyst feedback will be used to tune correlation rules and improve orchestration workflows. This adaptive learning model will allow the SOC to evolve in line with emerging threats and operational priorities of DVC LDC.

4. Threat Intelligence Integration & Dissemination:

The proposed SOC should be integrated with Threat Intelligence Platforms (TIPs) like MISP and platforms provided by CERT-In, NCIIPC, and others related bodies. This capability will allow ingestion of verified threat feeds and indicators of compromise (IOCs). Additionally, it will support secure sharing of threat findings to external stakeholders using open interoperable standards.

DVC LDC has envisaged the following security solutions (Core Technologies and Tools) required to enhance the robust monitoring that are compliant with ISO 27001, CERT-In, NCIIPC, CEA Cyber Security Guidelines 2021, Any cyber-Security regulations issued by CEA/CERC in due course etc.

I. **The SOC-NOC architecture shall incorporate the following tools and modules, forming the backbone of the system:**

- NGSIEM (Next-Generation SIEM): Central log aggregation and correlation engine with AI/ML capabilities for advanced threat detection.
- SOAR (Security Orchestration, Automation and Response): Automates the incident response workflow, including ticketing, containment actions, and alert enrichment.
- NBAD (Network Behaviour Anomaly Detection): Provides deep visibility into traffic patterns and detects deviations indicative of threats like DDoS or lateral movement.
- UEBA (User and Entity Behaviour Analytics): Monitors accounts and user behaviours to identify insider threats or compromised credentials through pattern deviation.
- DAM (Database Activity Monitoring): Monitors access and activities on critical SCADA databases to detect unauthorized access or misuse.
- Data Diode: Ensures strict OT to IT isolation while securely transmitting telemetry and logs to SOC

platforms without enabling bidirectional communication.

• ITSM: Integrated ITSM tools will manage incident lifecycle, service requests, change control, and compliance reporting including Asset management and auto escalation features based on the severity.

• NOC Tools: Network health, device status, and bandwidth utilization will be monitored via NMS and network telemetry. Alerts will feed into SIEM for correlation with security events.

Compliance & Governance

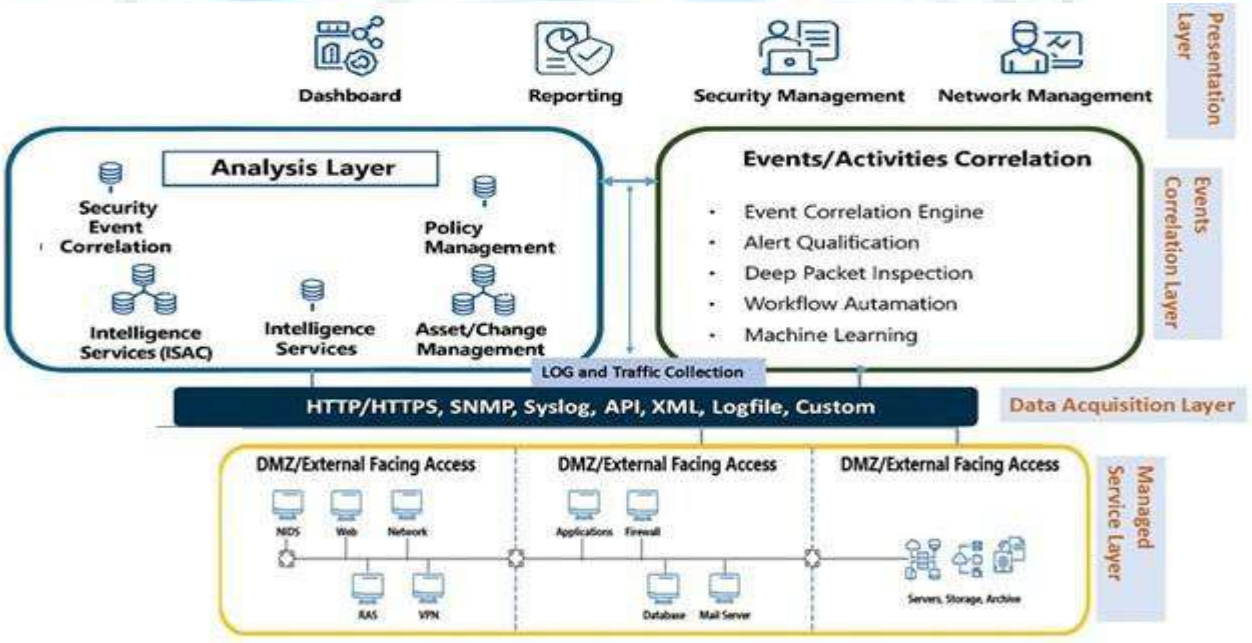
The entire SOC-NOC platform will comply with ISO/IEC 27001, CERT-In directives, NCIIPC Critical Sector Guidelines, and CEA's Cyber Security Guidelines 2021. Additionally, any future advisories issued by CEA or CERC and others statutory bodies will be incorporated into the operational framework through adaptable policy modules.

The SOC and NOC will ensure the log retention for minimum 180 days, supporting hot and cold storage configurations using scalable HCI/Server storage systems. Access controls, audit trails, and forensic readiness will be built-in from inception.

Integration Strategy

The architecture is divided into logically distinct LANs such as SCADA LAN, ICCP LAN, Infra Management LAN, Data LAN, and Corporate WAN. Firewalls segment these LANs with definite policies. The proposed SOC and NOC tools to be deployed in such a way that it covers all segmented LAN. Log collection for SOC starts at each segmented LAN, is transferred syslog to the Data Diode, and further relayed to SIEM. Also the device status i.e health and performance including network status (Bandwidth utilization) sent to NOC through NMS (via SNMP) and Network Sensors. The remaining tools function on the ingested data without any loopback to the OT environment.

The proposed SOC-NOC implementation at DVC LDC should offers a resilient, scalable, and secure approach to managing cybersecurity across critical SCADA and IT networks. Through centralized monitoring, rapid incident response, integrated threat intelligence, and standards-compliant practices, the system will substantially enhance DVC's cyber defence capabilities and operational assurance.



4. Scope of the project

The objective is to establish DVC LDC's own on-premises Next Generation Security Operation Centre (NG-SOC) with integrated Network Operation Centre (NOC). The following are the brief activities to be performed for successful Supply, Installation, Implementation, Integration, Maintenance and Support of state of-the- art Next Generation Security Operation Centre (SOC) with integrated Network Operation Centre (NOC):-

- The scope includes advanced threat analytics, scalability, end-to-end support, and operational readiness aligned with cybersecurity compliance guidelines including ISO 27001, CERT-In, NCIIPC, and CEA Cybersecurity Guidelines 2021.
- Integration and Expandability
  - Initial integration covers SLDC SCADA and URTDSM.
  - The system shall be capable of integrating additional systems and platforms (including cloud-hosted PaaS/IaaS) as and when implemented in DVC SLDC.
  - Integration with IT/OT, NMS, existing SI, ISP, and application platforms shall be ensured without affecting current operations.
  - The proposed solution architecture shall offer modularity, scalability, redundancy, and fault tolerance.

- Functional Scope – SOC
  - Security Event Monitoring using Advanced Big Data Analytics.
  - Advanced Threat Detection and Predictive Analytics using ML and AI-driven models.
  - Deployment of NGSIEM, SOAR, UEBA, NBAD, DAM, Data Diode, and ITSM integration.
  - Minimum 180-day log retention with scalable Server & Storage infrastructure / Hyper Converged Infrastructure.
  - Threat Hunting, Behavioural Analysis, Root Cause Analysis (Major & Minor Incidents), and identification of Patient Zero & Blast Radius.
  - Incident/threat Response Lifecycle: Prepare, Identify, Contain, Eradicate, Recover, Learn.
  - Policy Identification, Asset Classification, and Business Process Mapping.
  - Compliance alignment and coordination with national cybersecurity platforms (CERT-In, NCIIPC) for the entire service period.
  - Coordination with DVC LDC System Integrators for seamless deployment.

- Functional Scope – NOC & NMS
  - NOC shall manage network operations across routers, switches, bandwidth links, etc.
  - NMS to provide centralized performance monitoring and fault management.
  - SNMP-based polling, fault alerts, network availability, and traffic optimization.
  - Visualization dashboards for performance with real-time fault resolution.
  - Study of existing bandwidth and recommendation for upgrade (if required).
- NMS having functionalities of Network monitoring , performance monitoring, configuration management, and change management.

- ITSM Integration
  - All security events shall be logged and tracked using appropriate ticketing tools.
  - Escalation matrices and SLA monitoring dashboards included.
  - Integration of ITSM with SOAR, NMS, and SIEM to ensure incident lifecycle traceability.

- Deployment, Operation & Maintenance

  - Complete supply, installation and commissioning by implementing customised configuration and parameterization of all SOC-NOC components at central site i.e DC(Main LDC)
- Integration of any new hardware and software associated with the system.
- Facility management, AMC, and OEM support for 5 years (back-to-back).
- All software/hardware supplied must have 5+ years of End of Support Life (EoSL) from Go-Live.
- Ensure no disruption to existing SLDC infrastructure during commissioning or operation.

- Manpower and Support
  - 24x7 onsite SOC operations support at Main LDC site.
    – 1 Level-1 Analyst for alert monitoring and coordination.
    – 1 Level-2 Analyst for incident analysis and coordination
  - Resources must be trained on deployed tools (SIEM, SOAR, UEBA, etc.). to utilize the full capacity and potential of the SOC installation harnessing the implementation for right output.
  - 24X7 onsite NOC operation support at Main LDC site:
    –1 Level-1 Analyst to monitor NOC operation

- Redundancy and Fault Tolerance
  - All components must be deployed with failover and high availability.
  - Log storage, monitoring servers, firewalls, and data transmission must be HA-ready.
  - Secure and isolated zones with Data Diode-based IT/OT segregation.
- Deliverables
  - Deployed SOC-NOC system with validated integrations to SLDC SCADA, URTDSM, and external interfaces.
  - Comprehensive SOPs, escalation matrix, incident response framework.
  - Training for staffs, performance reports, monthly incident logs.
  - SLA compliance dashboards, audit readiness, and O&M manuals.

- The vendor shall perform the complete hardware deployment including:
  - Rack mounting, cabling, power provisioning, grounding, and labelling.
  - Configuration, hardening, and secure onboarding of all components.
  - Integration with existing SCADA/URTDSM, LAN, and security zones.
  - Testing and validation for performance, redundancy, and security posture.

This scope ensures that DVC-LDC benefits from a robust, future-ready SOC-NOC platform that supports continuous cyber defence and proactive infrastructure management. Its standards-compliant framework, big-data analytics, automation, and scalable architecture make it suitable for critical power sector operations while being flexible enough for future integrations and upgrades.

Hardware requirement:

The scope essentially includes design, engineering, supply and commissioning of necessary hardware for installation and operation of the SOC components and NOC components including ITSM and DATA Diode and integration of the same with the existing OT and IT Network of the DVC-LDC.

The supplied Hardware should conform to the minimum Technical Specification and BOQ as indicated in Header-5 of this document.

1. Technical Compliance and Sizing
   All hardware must comply with the minimum technical specifications and Bill of Quantities (BoQ) defined in Header-5 of the project documentation. It must also be capable of delivering uninterrupted services over a lifecycle of at least five years.
   The hardware must be:
   • Redundant in nature, ensuring high availability and fault tolerance.
   • Sized with a minimum 30% additional headroom over peak-load operation requirements.
   • Modular and scalable to accommodate future upgrades and system integrations.
   • Compatible with the proposed software components of SOC, NOC, ITSM, and data diode.
2. Servers
   • High-performance enterprise-grade servers for hosting SIEM, SOAR, UEBA, NBAD, DAM, NMS and ITSM tools.
   • Dual power supply, redundant fans.
   • 30% additional CPU, memory, and disk IOPS capacity over projected peak utilization.
   • Support for virtualization and container orchestration platforms.
3. Network Equipment
   • Core and access layer switches with necessary ports, QoS support, and high throughput.
   • Next-generation firewalls (as per security design) to segregate network zones (IT/OT/DMZ).
   • Routers for WAN connectivity, redundant paths, and policy-based routing
4. Storage Solutions
   • Centralized scalable NAS/SAN or HCI (Hyper-Converged Infrastructure) for log and database storage.
   • Storage must support tiered architecture for hot, warm, and cold data retention (as per 180-day policy).
   • Storage solution must allow data redundancy and auto failover
5. The vendor shall ensure that all supplied hardware meets the operational, redundancy, and performance benchmarks required for continuous functioning over five years. In case the specifications defined in the BoQ are insufficient for real-time operations or future expansions, it is the vendor's responsibility to redesign and provide appropriately enhanced hardware at the proposal stage for compliance to the requirement at no extra cost.

6. The vendor must provide:
   • Minimum 5 years of OEM warranty/support and comprehensive AMC for all supplied hardware.
   • Additional hardware at no extra cost if during the contract period, the deployed hardware fails to support the required SOC/NOC operation and security advisories issued by any statutory body.

4.1. Geographical Location

For solution implementation, the location of different sites is as follows:

DVC LDC Main (DC) : 7th floor, DVC Tower, Damodar Valley Corporation, CIT Rd, Ultadanga, Kolkata, West Bengal 700054.

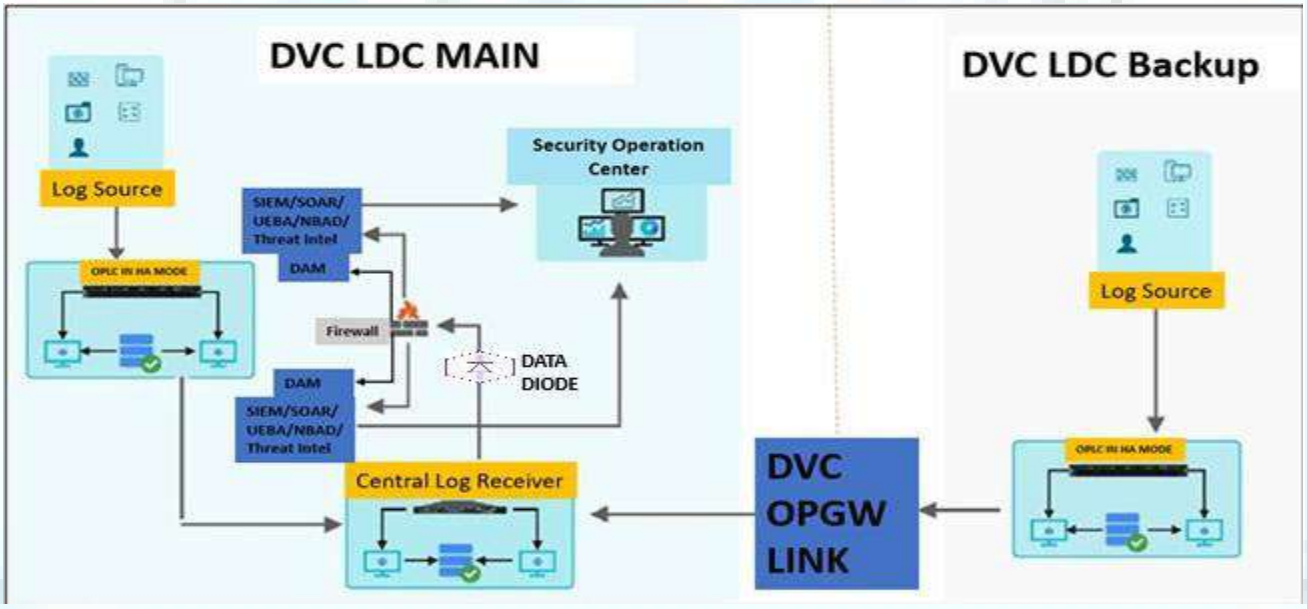
DVC LDC Backup (DR): DVC LDC (GOMD-I Premises), DVC, 31/1 ANDUL ROAD, Danesh sheikh Ln, Shibpur, Howrah, West Bengal 711109.

The SOC and NOC will operate in an integrated mode at DVC SLDC Main Control Centre (Kolkata). Both systems must have seamless interoperability to allow timely sharing of network performance and security events for incident management.

Provisioning of Logs collectors and network sensors to collect logs of devices and details of flow and traffic behavior from different sites (main, backup control centre of IT & OT) has to be considered to collect and send logs/network details to SIEM and NMS which shall be installed in DVC LDC-Main (Kolkata). Main and Backup Control Centres will be connected over existing DVC OPGW Network. Necessary provision for triggered fail-over of the SOC operation to backup / DR site from main site should be considered in the design in case necessitates.

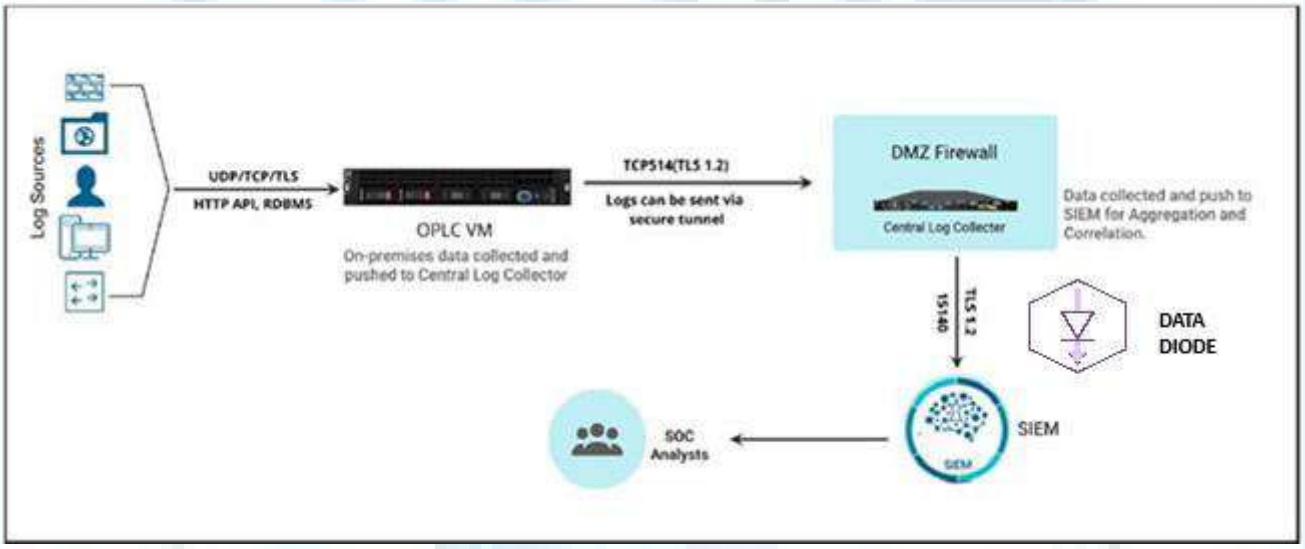
4.2. Design Considerations

The solution to be designed & deployed at DC centres as per present industry best practices in their design document. High-level Architecture representing the connection between DVC LDC Main and Backup is shown below:



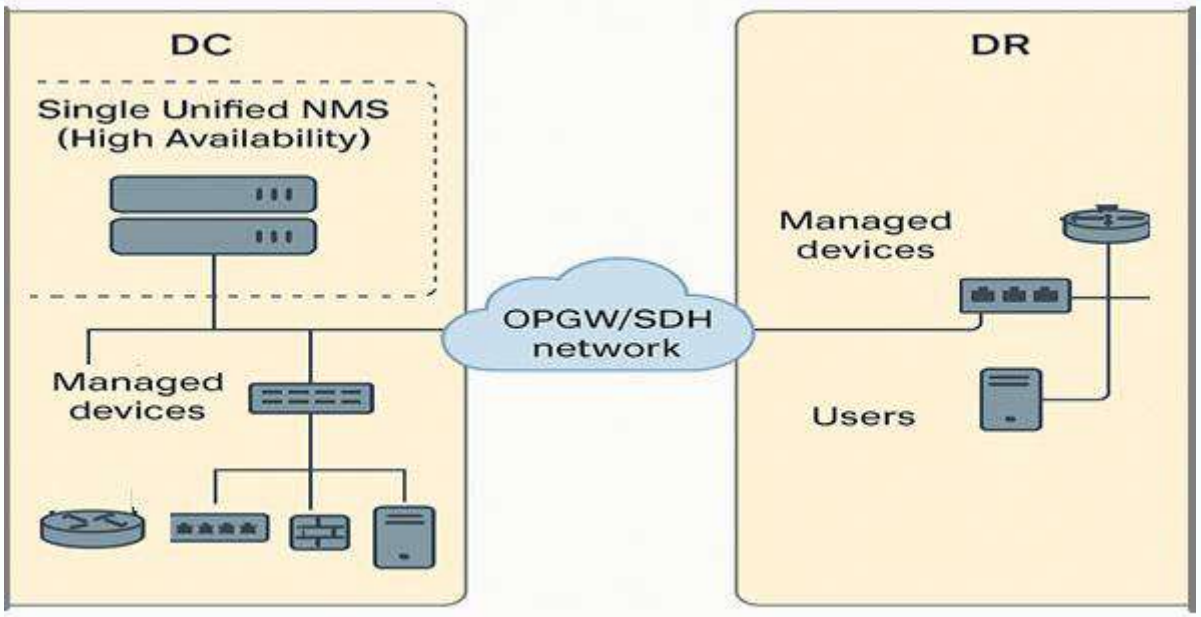
- ✓ SIEM Server, Central Log and On-premises Log collectors are built on VM with High-availability (HA)
- ✓ DVC LDC Main location and Backup Location are connected via DVC OPGW Network.
- ✓ All the device logs are collected in OPLC (on-premises Log collector) and pushed to the Central Log Receiver in DVC LDC Main.

The architecture for log collection at OPLC is represented below:



Provisioning of Log Collectors in HA to collect logs from envisaged sites and exchange of the same with DC.

II. If connectivity between log collector and logger is down then the Log collector should store the logs of at least five days and send them once connectivity is established.
III. Collection of logs from multiple IT and OT systems.
IV. Dedicated dashboard for each site (there shall not be any restriction in user and site) shall be envisaged/developed, so that each site should have the visibility of their security alerts/incidents which shall also include report generation. Design, create and customize the dashboards as per time-to-time requirements during entire period of contract.
V. NBAD and DAM shall be deployed for each site.
VI. The SIEM solution should maintain minimum latest 3 (Three) Months of Online logs (Frequent Searches, Reporting & Threat Hunting) and rest of 9 (Nine) Months offline logs (Non-Frequent Searches, Threat Hunting & Forensic Investigation). Minimum 12 Months log must be available at any point of time.
VII. The compression ratio between online logs and the archived / offline logs should be as per industry standard and should not be less than 70% of the raw log volume.
VIII. However, storage period 'online' or 'off-line' can be user adjustable for any defined period without requirement of any additional requirement
IX. Deployment of ticketing tool along-with the solution so that DVC LDC representative can report any security incident and track the status of incident. It shall also have auto escalation features based on the severity.
X. For NOC and ITSM Both the site needs to be considered.



High-Level Architecture of NMS Deployment : The diagram illustrates the NMS residing at the DC site in an HA configuration. The NMS at DC is connected to the DC's local network infrastructure and also to the DR site's network through the OPGW-based SDH communication link. In the figure, the DC and DR network segments are linked through SDH/OPGW network, allowing the single NMS at DC to monitor devices in both locations. Notably, no NMS is present at the DR site; the DR equipment is depicted as being supervised remotely by the centralized NMS over the high-speed fiber link. This design portrays a unified NMS deployment at DC with real-time visibility into both the DC and DR site systems.

4.3. Scope of Work for Each Security Solutions

4.3.1. Software

4.3.1.1. Security Information & Event Management (SIEM)

The SIEM solution is expected to collect logs from security and network devices, servers, application security logs etc installed at various locations of DVC LDC. In addition, the logs being generated by the solutions deployed as part of the SOC implementation, if any, need to be collected by the SIEM. It is expected to perform the following as part of the SIEM:

- Implement SIEM solution at DC/Main LDC along with capacity to percolate logs from the log collectors at DVC LDC(Backup/DR) locations.
- Implement Packet solution at DC/Main LDC.
- Integrate the identified devices/application/operating systems/database with SIEM.
- Integrate existing security solutions mentioned along with the new solution procured though this RFP with SIEM.
- Integrate Application Logs with SIEM.
- Developing custom parsers for non-standard logs.
- Implement correlation rules out of the box and standard use cases.
- Implement and configure user and entity behaviour analysis rules.

Storage:

The SIEM should be able to maintain minimum latest 3 (Three) Months of Online logs (Frequent Searches, Reporting & Threat Hunting) and rest of 9 (Nine) Months offline logs (Non-Frequent Searches, Threat Hunting & Forensic Investigation) as per compression ratio indicated above. Minimum 12 Months log must be available at any point of time. In addition, after 12 months duration, logs shall be maintained on the other Drives to be provided by the DVC LDC. The solution should be capable of automatically moving the logs from online to archival drives based on the ageing of the logs. There should be a facility to load the old data from archival to replay the typical incident scenario.

The vendor should consider supply of adequate storage capacity to store the entire log for a period of 5 years from inception of the project with minimum 30% additional capacity as threshold.

4.3.1.2. Security Orchestration, Automation and Response (SOAR)

SOAR solution will be deployed to automate specific use cases to reduce time gap between incident detection, analysis and closure by continuous optimization of workflows, playbooks to lessen dependency on L1/L2 resources. SOAR should help DVC LDC to reduce mean time to detect (MTTD) and mean time to respond (MTTR). It is expected to perform the following as part of the SOAR solution:

- Implement the solution across Main LDC.
- Integrate SOAR with other supplied and existing solution.
- Implement out of the box supported playbooks and custom playbooks
- Validate and verify configuration and playbooks functionality

4.3.1.3. Network Behaviour and Anomaly Detection (NBAD)

NBAD solution will be deployed to monitor network for unusual events or trends by collecting flows from the network devices. This will help to detect anomalous traffic flows such as malware, identify user access policy violations, obtain deep and broad visibility into all network traffic

- Implement the solution at Main LDC.
- Integration of network devices and flow records collection.
- Configuration of policies for different segments and analysis of flows.
- Integrate with SIEM to enrich the security alerts and for early detection and response to the threat and to provide single view of solution.
- The NBAD solution should utilize standard methodologies/ models to reduce false positives and reduce error rates.
- Fine tune the baseline profile for network access.
- Identify the network baseline and configure the NBA policies.

4.3.1.4. User and Entity Behaviour Analytics (UEBA)

UEBA will be deployed to profile and analyse the activities of users performing unexpected activities thereby showing signs of behaviour different than their peers in same team, group, business/ IT unit or function, region, zone, delegated powers/authority etc.

- Implement the solution across Data Center
- Integrate UEBA with other supplied and existing solution

- Implement out of the box supported multiple use-cases
- Validate and verify configuration and functionality
- UEBA will be used to analyse the behaviours of servers and user end device.

4.3.1.5. Database Activity Management (DAM)

The proposed Database Activity Management solution should be expected should be able to address the following key areas but not restricted:

- Creation of an inventory through auto discovery of all databases and database users, deployed across the enterprise. Discovery of sensitive data.
- Discovery of vulnerabilities, missing patches.
- Creation of policies/rules for enforcing access control and proper rights management on databases.
- Monitoring access to databases, database activities, blocking unauthorized access / activities and segregation of duties.
- Reporting of deviations to the policies and access control.
- Masking of sensitive data in output.
- Virtual patching of database for known missing patches.
- Complying with relevant regulatory demands.
- Help enhance forensic capability along with supporting solutions
- Monitor events from DAM and suggest/ take appropriate action to DVC LDC on an on-going basis.
- Improve the policies configured on an on-going basis to reduce the occurrence of false positives.

4.3.1.6 ITSM:

- The ITSM solution must be **fully ITIL-compliant** and integrate seamlessly with both the Security Operations Center (SOC) and Network Operations Center (NOC). In this context, ITSM processes (such as incident and change management) must extend into the operational technology (OT) environment to support continuous power system availability. This report provides an overview of ITSM requirements for an SLDC, including core and advanced features, integration considerations (e.g. SIEM, SOAR, NBAD, UEBA, DAM, and network devices), architectural recommendations for IT/OT integration, and key parameters the organization should define for successful implementation
- **Incident Management:** The ITSM must provide a robust incident management module to log, track, and resolve incidents (unplanned interruptions or reductions in service). This includes categorizing incidents, prioritizing them by impact/urgency (with power system safety and uptime as top priorities), and assigning them for resolution. **Fast and efficient incident handling is vital to maintain continuous system availability**, so the tool should support automated notifications, escalation workflows, and integration with monitoring/SIEM tools to create tickets from alerts. For example, a critical SCADA communication failure or a security breach alert should automatically generate a high-priority incident and alert on-call engineers. The incident module should also facilitate collaboration between IT, OT, NOC, and SOC teams during major incidents (e.g. a cyber attack on SCADA) and maintain an audit trail of all actions taken. Well-implemented incident

management not only restores services quickly but also collects data (timeline, evidence, resolutions) that is useful for compliance reporting and post-incident reviews.

- **Integration with SOC Tools (SIEM, SOAR, NBAD, UEBA, DAM):** The Security Operations Center monitoring the DVC-LDC will deploy tools like Security Information and Event Management (SIEM) systems, Security Orchestration Automation and Response (SOAR) platforms, Network Behavior Anomaly Detection (NBAD), User and Entity Behavior Analytics (UEBA), and Database Activity Monitoring (DAM). The ITSM should integrate with these tools to enable **SecOps-driven incident management**. At a minimum, the ITSM must accept input from the SIEM: for example, when the SIEM detects a high-priority security alert (such as an anomalous SCADA protocol command or an unauthorized firewall access), it should automatically generate an incident ticket in the ITSM. This ensures security alerts are immediately tracked and addressed by the incident response process. Modern SIEM solutions with built-in UEBA can flag suspicious patterns (e.g. a user account behaving abnormally); the ITSM integration should enable these alerts to **open tickets automatically and notify the security team**.

  Integration with a SOAR platform further enhances efficiency: a SOAR can ingest an ITSM ticket and launch automated response playbooks (for instance, isolating a compromised server or blocking an IP on the firewall), then update or resolve the ITSM incident once actions are done. Conversely, analysts in the ITSM can trigger SOAR workflows via the ticket interface. This bi-directional integration between ITSM and SOAR helps **coordinate human and automated response**, maintaining a single record of the incident. Similarly, alerts from **NBAD/UEBA** systems (for network or user anomalies) and **DAM** (for database breaches or policy violations) should feed into the ITSM – either via the SIEM or direct connectors – to create incidents or at least log security events for analysis.
- **Scalability and Performance:** The tool should scale to handle the volume of configuration items and tickets the DVC-LDC will generate. This includes all the tracked assets (if including every infrastructure in DVC-LDC etc.) and the potential for a surge of incidents during major events. Performance is critical – during an incident, the last thing needed is a slow Service Desk system.
- It shall also have auto escalation features based on the severity.

4.3.1.7.Network Management System(NMS):

- **Unified Network Monitoring & Visualization**: The NMS should automatically discover all network assets and maintain an up-to-date inventory of routers, switches, firewalls, servers, and critical endpoints. This includes dynamic topology maps of the SCADA LAN (covering both DC and DR sites) to visualize device interconnections and network architecture. A unified dashboard will give operators a bird's-eye view of network status (with color-coded device status, link utilization, etc.) across the SCADA environment.
- **Fault Management and Alerts:** The NMS will perform continuous **fault monitoring** to detect issues like device outages (ping/SNMP reachability), interface/link failures, route flaps, or hardware errors. It should support **real-time alerting** via multiple channels (on-screen console) whenever a fault or threshold violation occurs. Advanced event management capabilities are needed to intelligently handle alarms – for example, **correlating multiple related alerts into higher-level incidents** and suppressing redundant alarms. The NMS

should provide **configurable thresholds** for key parameters (CPU, memory, interface utilization, etc.) and generate alerts when thresholds are crossed (e.g. high CPU on a SCADA server or a firewall interface nearing capacity). All alarms and events should be logged with timestamps for audit and analysis

- **Performance Monitoring and Trending:** The NMS will poll devices for metrics like **bandwidth utilization**, packet loss, latency, CPU and memory usage on routers/switches/servers, disk utilization on servers, etc. This data will feed into historical graphs and reports. The NMS should support **long-term data retention (minimum 180 days)** to analyze performance over time and detect patterns (e.g. steadily increasing traffic on a link or periodic latency spikes.
- **Network Traffic Analysis (Flow Monitoring):** For deeper insight into network behavior, the NMS (or an integrated module) should support collecting flow data (e.g. NetFlow, sFlow, or IPFIX) from routers and core switches. This should allow analysis of **network traffic patterns, conversations, and bandwidth usage by protocol**. The NMS solution might incorporate deep packet inspection or integration with anti-APT sensors, but at minimum it should gather flow statistics to enable drilling down into the cause of high utilization or unusual network behavior.
- **Configuration and Change Management:** Given the number of network devices (and critical nature of their configs in a power grid environment), the NMS should include or integrate with a **Network Configuration Management** feature. This entails **backup of device configurations** (routers, switches, firewalls) on a scheduled basis and whenever changes are detected. The system should track config versions and highlight differences if a change is made. Real-time config change alerts (for example, if someone modifies a router's running config) would be invaluable – this can detect unauthorized or erroneous changes quickly. Configuration management also aids in disaster recovery: if a device fails, the saved config can be used to restore service quickly. Additionally, the NMS can enforce **standard configuration policies** – e.g. checking that SNMP, NTP, and security settings on devices for compliance. If available, a **compliance audit** module can run scripts to ensure configurations meet **CEA/CERT-In guidelines** (for instance, that only secure protocols are enabled, or that an "air-gap" firewall has no unauthorized rules).
- **Security Monitoring (Integration with SOC):** Although the NMS is primarily an availability/performance tool, it can contribute to security monitoring of the OT network. It should ingest **syslogs and SNMP traps** from devices – for example, firewall or IDS/IPS appliances may send critical syslogs (like detection of a port scan or a failed login on a router) to the NMS console. The NMS event console can be configured to flag security-related events and forward them to the SOC. At minimum, **user activity logs and device access logs** should be captured.
- **High Availability:** Because SLDC operations are critical, the NMS itself must be resilient. The proposed NMS will **cover both the DC and DR sites** – it should be able to monitor devices in both locations and should be implemented in high availability mode
- **Common NOC Operations Features:** The NMS should provide all standard NOC tool functionalities out-of-the-box. This includes customizable **dashboards** (for different teams or shifts), **reports** that can be scheduled (daily health reports, weekly bandwidth reports, monthly uptime metrics for SLA reporting, etc.), and **notification management** (ability to define escalation chains, so if an alert is not acknowledged in pre-defined minutes it pages

the next on-call engineer). A **Network Operations Center view** is often a large-screen display of key NMS dashboards – the system should allow creating such wallboard displays (like world-map of sites with statuses, or a summary of all critical alarms). The NMS should also support multi-user access with role separation (so that, for example, operators can view and acknowledge alerts, but only network engineers can run config changes through the NMS tool). Integration with a time-synchronized clock (NTP) ensures all events are timestamped consistently, which is particularly important when correlating with SOC incident timelines (per CERT-In directives on clock synchronization).

- **Integration with SOC and ITSM Systems:**
  One of the key requirements is that the NMS integrates with the Security Operations Center (SOC) and the IT Service Management (ITSM) systems. Effective integration means the NMS will not operate in a silo but will share information with, and trigger actions in, these platforms to streamline operations and incident response. To integrate NOC and SOC workflows, NOC should be capable of feed its event to SIEM. configure the NMS to send critical events (especially those that may indicate security issues) to the SIEM in real-time. Integration with ITSM ensures that whenever the NMS flags an issue, it can create or update incident tickets for the IT support teams. The proposed design is to have **automated ticket creation** for certain severity conditions.

4.3.2. Hardware

I. Required adequate computation and storage for successful implementation of the proposed solution along with workstations, Video Projection Display and Operator Consoles.

II. All the servers for SOC, NOC and for other applications if required (physical as well as VM), Collectors etc., shall be redundant and be able to operate in HA. The infrastructure should be designed using minimum 2 nodes HCI (Hyper converged infrastructure) cluster with redundant SAN storage / V-SAN.

III. Hardware shall be compliant with ISO 27001, CERT-In, NCIIPC, CEA Cyber Security Guidelines 2021, Inclusively any Cyber security regulations issued by statutory authorities like CEA, CERC, MoP throughout the entire AMC Period.

IV. Operator Console hardware configuration shall support seamless operation with various software Tools supplied for maintenance of SOC & NOC and should be industrial class workstation capable of performing 24 x 7.

V. Data Diode to restrict traffic from IT to OT system : Shall use Hardware based data diode to transfer data securely in one direction. Device shall support wide range of industrial OT and corporate IT protocols and applications. The offered solution must include all necessary components, Hardware, Software, and Licenses thereof to install the entire solution as a no-single-point of-failure high-availability system without custom engineering.

VI. Necessary hardware assembly for time-synchronized clock (NTP).

4.4. Infrastructure

4.4.1. Wall Unit & Workstations

- Wall unit gives operators a top-line view of mission-critical information. Control room operators need this high-level view to simultaneously access data streams of all types in real time. With a comprehensive array of information, operators get a broader understanding of what's happening during an incident, allowing for better informed decision- making in moments of crisis.
- Charts, graphs and indices on digital dashboards used in control room environments reflect real-time snapshots of statuses, trends, alerts, key performance indicators (KPIs) and activities. Smaller screens on walls and at workstations provide complementary information, allowing users to focus on specific tasks and information streams
- Hence, wall unit & workstations shall be designed and positioned appropriately and shall have long life.
- Dashboard should be customized and designed to provide necessary insight and alerts on real-time basis.

4.4.2. Miscellaneous:

- Aesthetically designed cable trenches if needed with false flooring.
- Provision for Separate and suitably identified cabling and tagging for LAN & Power cable should be considered within the scope of the contract.

4.5. Warranty / Maintenance and Support

The contract is to be operated on single responsibility basis. The availability of all the solutions supplied under the contract is the essence of the contract. The maintenance of all the supplied system is comprised of all activities required to keep the above systems up and running all the time at an optimum level by proactive monitoring, diagnosis and rectification of any failure of all the hardware(s)/ software(s).

Management, Maintenance and Configuration of the newly delivered systems for the entire contract period (Management and Configuration scope is also included for existing Information Security Infrastructure). The support to be provided to DVC LDC should be on a 24x7 Onsite basis.

Support shall be provided to ensure an uptime of 99.9% for the supplied solution.

This part of this section covers the various type of supports to be provided during the 24x7 Operations and Maintenance of SOC along-with other scope of work specified under the contract.

4.5.1. Scope of work during Warranty & Support Period

The detailed scope of services to be provided after Go-Live, shall include but not limited to the following:

I. Maintenance of all the components under the SOC and NOC Solutions.
II. All proposed solution should have five year onsite & comprehensive warranty.

III. 24*7 support for all the security application related malfunctions and ability to record event log requests online.

IV. System administration tasks including regular backup of system, restoration, installation, health check etc.

4.5.2. Manpower During Maintenance Contract

A team of qualified, trained, and certified professionals shall be deputed at DVC LDC premises as per the resource positioning table given below:

Team	24x7 (3 Shifts per day) Resources (no.)	24x7 (3 Shifts per day) Resources (no.)
SOC-Operation	One L2 in each shift	One L1 in each shift
NOC-Operation	NA	One L1 in each shift

a. Qualification and skill requirements of the onsite resources are as under:

Sl. No	Job Profile	Qualification and Skills
1	L1-SOC	• B.E. / B.Tech. / MCA. • More than 3 years of IT experience, out of which at least 1 years will be on Security domain and in dealing with SOC systems on proposed OEM
2	L2-SOC	• B.E. / B.Tech. / MCA. • More than 5 years of IT experience, out of which at least 3 years in dealing with SOC systems and operations (SIEM, log monitoring, event correlation, analysis etc). • Professional certification (1 or more of the following) such as CEH/OSCP/CCSP + OR OEM certifications for the product being proposed as part of the solution • Should have experience in simulated SOC environment like cyber range (certification to be attached along with).
3	L1-NOC	• B.E./B.Tech/MCA • More than 3 years of IT/Networking experience , out of which at least 1 years in dealing with NOC system and operation (Network monitoring, ITSM queues and basic SOC alerts) and in dealing with NOC systems on proposed OEM

b. Brief activities to be performed by various level of resources deployed at SOC are:

I. **Level-1 (L1) Resources:** The operations monitoring/L1 team shall oversee the tools monitoring and daily operations of the NG-SOC and manning the helpdesk and work as per industry best practices. The team shall comprise of 24x7 resources, supported by an L2 analyst.

II. **Level-2 (L2) Resources:** This team shall handle the responsibility of NG- SOC Analyst. Shall be responsible for tools Managing & Threat Hunting and Analytics behaviour and Handling critical issues. Risk and incident management for security events and the execution of proper responses to those events. They are expected to closely work with the other teams, proactively advice DVC LDC on security incidents and threats. L2 resources should showcase

multi domain expertise in fields like SIEM, SOAR, NBAD, UEBA, DAM and should be capable to resolve the complex incidents with Root Cause Analysis and event correlations.
L2 resources shall be deployed on 8x6 basis in two shifts per day with one weekly off. Sufficient backup resource should be available to continue the shift operation without any break in case any of the regular L2 shift team members is/ are on leave or unavailable.

III. **Level-1 (L1) Resources (NOC):** The operations monitoring/L1 team shall oversee the tools monitoring and daily operations of the NOC and manning the helpdesk and work as per industry best practices. The team shall comprise of 24x7 resources. Should Continuously monitor network, ITSM queues, and basic SOC alerts. Immediate alert acknowledgment and correct routing to L2 or appropriate teams. Support routine health checks and device status validations.

5. Bill of Quantity for the Proposed SOC and NOC Establishment

S.N.	Description	Unit	Qty.	Remarks
A	**Indigenous SOC: Software & Hardware including 5 years Back-to-Back OEM Warranty/ Support & Product Update and 5 years AMC**			
A.1	**Software and Hardware for Indigenous SOC**			
1	Next Generation Security Information and Event Management (NG SIEM)	Lot	1	Considered Licensing for maximum 6000 events per second or equivalent including setup for IT & SAMAST project; SCADA; URTDSM along with OT Backup logs
2	Security Orchestration, Automation and Response (SOAR)	Lot	1	As per SIEM Licensing
3	Network Behaviour Anomaly Detection (NBAD)	Lot	1	Licensing of max 100mbps Network traffic may be considered initially per SLDC
4	User and Entity Behaviour Analytics (UEBA)	Lot	1	Profile creation and monitoring capability of 500 Users or equivalent
5	Database Activity Monitoring (DAM)	Lot	1	Licensed for 15 Databases or equivalent including all installation
6	2x2 55-inch Video Wall with CPU	No	1	For SOC Control room setup
7	24x7 Workstation	Nos.	4	For SOC shift operator and other security analysts.
8	Log Collectors in HA (in active-passive mode of operation)	pair	6	The quantity considered includes log Collector at OT n/w at Backup LDC. OPLC should be in HA.
9	Necessary Server & Storage infrastructure/Hyper Converged Infrastructure for complete SOC solution (working in HA mode at DC with minimum N-1 redundancy) along with necessary Licensing for	Lot	1	**Storage sizing should include capability of storing 3 months log on the fly and at least balance 6 months log in archived / compressed mode**. Hardware sizing to be considered should be capable of running full functionality of the SOC modules on High-availability in N-

	Hypervisor Kernel and Server OS platforms			1 scenario (i.e. in One Node failure condition)
10	Firewall on HA (in active-passive mode of operation) with 5-year support & subscription	Pair	1	
11	Server Rack	Nos.	2	2 Nos. rack considered to have rack level redundancy
12	Switches & Router	Lot	1	As per integration requirement and network architecture
13	Cable & accessories	Lot	1	
14	Installation, Configuration and training	LS	1	
A.2	**Comprehensive AMC along with L1 & L2 Resources for Indigenous SOC**			
15	Comprehensive Operation and Maintenance cost for SOC	Months	60	This has been considered in view of the technical complexity of the project and lack of technically skilled manpower to utilize the full potential of the SOC installation harnessing the implementation for right output. The outsourced technically skilled resources may be gradually replaced by dedicated in-house resources through proper training and familiarization.
16	Deputation of outsourced technical experts for operating the SOC 24 x 7 (1 nos of Level 1 and 1 nos of Level 2 resources round the clock)	Months	60	
B	**Indigenous NOC: Software & Hardware including 5 years Back-to-Back OEM Warranty / Support, Product Update and 5 years AMC**			
B.1	**software and Hardware for Indigenous NOC**			
17	Network Management System (NMS)	Lot(S/W)	1	NMS having functionalities of network monitoring, performance monitoring, configuration management and change management
18	ITSM Tool	Lot(S/W)	1	For managing IT services, incidents, requests, and issues efficiently to ensure continuous IT service availability
19	Data Diode to restrict traffic from IT to OT system	Nos. (H/W)	1	Shall use Hardware based data diode to transfer data securely in one direction. Device shall support wide range of industrial OT and corporate IT protocols and applications. The offered solution

				must include all necessary components, Hardware, Software, and Licenses thereof to install the entire solution as a no-single-point of-failure high-availability system without custom engineering.
20	A.) Necessary Server & Storage infrastructure / Hyper Converged Infrastructure for complete NOC solution (working in HA mode at DC with minimum N-1 redundancy)	Lot (H/W)	1	Storage sizing should include capability of storing 3 months log on the fly and at least balance 6 months log in archived / compressed mode. Hardware sizing to be considered should be capable of running full functionality of the NOC modules on Highavailability in N-1 scenario (i.e. in One Node failure condition)
	B.) Licensing for Hypervisor Kernel and Server OS platforms with virtualization software	Lot (S/W)		
21	24X7 Workstation	Nos.(H/W)	2	for NOC Shift operator and other security analysts
22	Server rack	Nos.(H/W)	2	2 nos. rack considered to have rack level redundancy
23	Cable and accessories	Lot	1	
24	Installation, configuration and training	LS	LS	
B.2	**Indigenous NOC Operational Cost**			
25	Comprehensive Operation and Maintenance cost for NOC	Months	60	This may be considered in view of the technical complexity of the project and lack of technically skilled manpower to utilize the full potential of the NOC installation harnessing the implementation for right output. The outsourced technically skilled resource(s) may be gradually replaced by dedicated in-house resources through proper training and familiarization.
26	01(one) No. of L1 Manpower support for NOC operations	Months	60	
The SOC and NOC solution should be indigenous.				

6. Work Schedule

Phase	Duration in Months														
	1	2	3	4	5	6	7	8	9	10	11	12	5-year AMC		
Phase I															
Phase II															
Phase III															
Phase IV															
Phase V															
Phase VI															
Phase VII															

Phase	
Phase I	Infrastructure Setup
Phase II	Supply of all Solutions, Hardware
Phase III	Installation, Configuration, Integration, Implementation, Documentation, Testing.
Phase IV	Documentation, Testing (Final Acceptance Test (FAT)) and Training
Phase V	Go-Live
Phase VI	Tuning of SOC and NOC:
	a. SIEM - Event Log Collection & Management
	b. SOAR – Automation of actions
	c. UEBA – Analysis of high risk entities / users
	d. NBAD – Network security threat detection
	e. DAM- Database Activity Monitoring
	f. NMS-Network Management System
	g. ITSM- IT Service Management
	h. DATA Diode
Phase VII	AMC for 5 Years

7. Estimate for Establishment of Security Operation Centre at DVC-LDC

S.N.	Description	Unit	Qty.	Total Price (in Rs.)	GST amount (in %)	Total Price(Rs.) (Including GST)
A	**Indigenous SOC: Software & Hardware including 5 years Back-to-Back OEM Warranty/ Support & Product Update and 5 years AMC**					
A.1	**Software and Hardware for Indigenous SOC**					
1	Next Generation Security Information and Event Management (NG SIEM)	Lot	1	15771864	18%	18610800
2	Security Orchestration, Automation and Response (SOAR)	Lot	1	12454475	18%	14696280

3	Network Behaviour Anomaly Detection (NBAD)	Lot	1	9198300	18%	10853994
4	User and Entity Behaviour Analytics (UEBA)	Lot	1	7688373	18%	9072280
5	Database Activity Monitoring (DAM)	Lot	1	16311186	18%	19247200
6	2x2 55-inch Video Wall with CPU	No	1	5486381	18%	6473930
7	24x7 Workstation	Nos.	4	630755	18%	744291
8	Log Collectors in HA (in active-passive mode of operation)	pair	6	3480254	18%	4106700
9	Necessary Server & Storage infrastructure/Hyper Converged Infrastructure for complete SOC solution (working in HA mode at DC with minimum N-1 redundancy) along with necessary Licensing for Hypervisor Kernel and Server OS platforms	Lot	1	17621726	18%	20793636
10	Firewall on HA (in active-passive mode of operation) with 5-year support & subscription	Pair	1	7367542	18%	8693700
11	Server Rack	Nos.	2	1756528	18%	2072703
12	Switches & Router	Lot	1	4000747	18%	4720881
13	Cable & accessories	Lot	1	424407	18%	500800
14	Installation, Configuration and training	LS	1	3537227	18%	4173928
A.2	**Comprehensive AMC along with L1 & L2 Resources for Indigenous SOC**					
15	Comprehensive Operation and Maintenance cost for SOC	Months	60	13216271	18%	15595200
16	Deputation of outsourced technical experts for operating the SOC 24 x 7 (1 nos of Level 1 and 1 nos of Level 2 resources round the clock)	Months	60	34792745	18%	41055439
B	**Indigenous NOC: Software & Hardware including 5 years Back-to-Back OEM Warranty / Support, Product Update and 5 years AMC**					
B.1	**software and Hardware for Indigenous NOC**					

17	Network Management System (NMS)	Lot(S/W)	1	9258927.5	18%	10925534
18	ITSM Tool	Lot(S/W)	1	2197627.1	18%	2593200
19	Data Diode to restrict traffic from IT to OT system	Nos. (H/W)	1	9044746	18%	10672800
20	A.) Necessary Server & Storage infrastructure / Hyper Converged Infrastructure for complete NOC solution (working in HA mode at DC with minimum N-1 redundancy)	Lot (H/W)	1	18096578	18%	21353962
	B.) Licensing for Hypervisor Kernel and Server OS platforms with virtualization software	Lot (S/W)				
21	24X7 Workstation	Nos.(H/W)	2	4500454.2	18%	5310536
22	Server rack	Nos.(H/W)	2	1755128.1	18%	2071051
23	Cable and accessories	Lot	1	424406.78	18%	500800
24	Installation, configuration and training	LS	LS	2405627.1	18%	2838640
B.2	**Indigenous NOC Operational Cost**					
25	Comprehensive Operation and Maintenance cost for NOC	Months	60	18046441	18%	21294800
26	01(one) No. of L1 Manpower support for NOC operations	Months	60	17267797	18%	20376000
Total Departmental Estimate for Establishment of Next Generation Security Operation Centre with Integrated Network Operation Centre(NOC) including 5 years OEM Warranty/Support and Product Update and 5 Years AMC (Inclusive of GST) in Rs.						**₹ 27,93,49086**
					Rounded off	**₹ 27,93,00,000**
DE(in words): Rs. Twenty Seven crore ninety three lakhs only. (inclusive of GST)						

Timelines of Activities

			AUG-DEC 2025					JAN- DEC 2026												JAN-2027
S.N	Description	Month	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18
1.	Project Approval																			
2.	Bid Preparation																			
3.	Bidding Period																			
4.	Evaluation, Contract Award and Mobilization																			
5.	1st Disbursement	10% of total sanctioned grant																		
6.	Supply of all solutions																			
7.	2nd Disbursement	20% of contract value																		
8.	Installation, Configuration, Integration, Implementation & Testing of all the solutions																			
9.	3rd Disbursement	30% of contract value																		
10.	Documentation, Testing (FAT) & Training																			
11	4th Disbursement	30% of contract value																		
12.	Go-Live																			
13	Final Disbursement																			
14	Tuning of SOC																			

Annexure-I

List of Existing Equipment in DVC LDC

Name of the Organization	Description	Quantity
DVC LDC	Router	25
	Switch	58
	Firewall	15
	Server	44
	Users	19
	Anti-APT	2

Brief on
Unified Real Time Dynamic State Measurement (URTDSM)
Project Phase-II (for ISTS Portion)

Contents

Brief on
Unified Real Time Dynamic State Measurement
URTDSM Project Phase-II
for discussion in RPCs

1.0 Background of URTDSM Phase-II Proposal:

POWERGRID has been entrusted to prepare the DPR for URTDSM Phase-II project in the 13th NPC meeting held on 05.07.2023. The DPR is to be made on basis of 'Report of the Sub-Committee on PMU Placement and Analytics under URTDSM Phase II' constituted by National Power Committee.

Presently 1400 PMUs and 32 Control centres have been established under the URTDSM Phase-I project. This project was implemented with 70% of the project cost as PSDF grant and 30% was through POWERGRID Equity (RTM for 30% portion and no tariff for 70% grant portion).

Similarly, DPR for URTDSM Phase-II Project, which included 4000PMUs(new) and 34 control centres was prepared with funding pattern of 70% PSDF grant and 30% POWERGRID equity in line with Phase-I. The DPR, with an estimate of Rs.3922 Crores, was submitted to NPC/CEA on 11.03.2024. The scope included replacement of 34 control centres and supply of 4000 new PMUs including integration of 1400 existing PMUs.

In the 14th NPC meeting held in Bengaluru on 03.02.2024, DPR status was updated to members. It was suggested to optimize the cost. Further, NPC vide email dated 18.04.2024 has informed that PSDF funding shall not be available for the project and alternate sources of funding shall be explored by POWERGRID. Hence, POWERGRID approached all the Constituents in the RPCs for concurrence for execution of the URTDSM Phase-II Project on RTM basis.

In the 15th NPC Meeting held on 14.11.2024, the committee recommended that "PowerGrid is to submit the revised proposal in consultation with Grid India, only for the existing network after segregating the PMUs and control centers under ISTS and STUs system. The proposal may also be revised to optimize the number of control centers and PMUs at ISTS & STUs system separately. The revised proposal for ISTS portion may be put up to the NCT for further consideration."

During previous NPC & RPC meetings for URTDSM phase-II project, it was discussed that the number of PMUs for URTDSM Phase-II need to be optimized for reducing the overall project cost. The initial DPR prepared by POWERGRID was based on the sub-committee recommended philosophy of PMU placement. However, CEA has published new guidelines for unified philosophy of PMU placement in Indian Grid in March 2025, which will supersede all existing guidelines and sub-committee report etc.,

According to 15th NPC, POWERGRID was entrusted to put up proposal for ISTS portion to NCT and revised proposal for ISTS and STU portion separately for discussion. ISTS portion comprises of Control Centers of Grid-India (NLDCs and RLDCs) and PMUs for Central Sector locations as per latest CEA Guidelines referred above.

POWERGRID prepared DPR for URTDSM Phase-II ISTS portion (upgradation of control centers at NLDCs, RLDCs and installation of new PMUs for Central Sector stations as per latest CEA guidelines). Tentative cost and BOQ for STUs portion (Control centers of SLDCs across India and new PMUs for State sector substations) is also put up for discussion in the 16th NPC.

Upon the concurrence of 16th NPC for proposed DPR for ISTS portion, the same will be put up to NCT for approval in RTM route. For the State Sector, funding methodology is to be finalized in reference to the tentative cost and BOQ.

2.0 Brief Details of URTDSM Phase-I Project:

POWERGRID took up the implementation of URTDSM phase-1 in Jan 2014 and the project was commissioned progressively from 2018 to 2021 with installation of 1409 PMUs and PDCs at 32 control centers, the project was funded 70% from PSDF grant and 30% from POWERGRID equity.

The existing system of URTDSM Phase-I is under maintenance support through Annual Maintenance contract with the contractor, which will end in Jan 2027. The PMUs installed at substations can be in service for fifteen years from their date of commissioning.

3.0 Need for URTDSM Phase-II Project

3.1 Need for new PMUs

After commissioning of URTDSM Phase-I Scheme, expansion of power system has taken place at considerable pace with addition of large-scale renewable generation and incorporation of new transmission system technologies (SVC, STATCOM, FSC, etc.,). Over the years, there have been significant organizational, regulatory, Market operations, and technological changes. The placement of PMUs at new renewable generation plants and other new technology devices (FACTS) is required to know their dynamic response during disturbances and to verify that they are operating under the limits stipulated as per the regulatory norms.

The Committee report on PMU has defined a new philosophy for placement of PMUs and suggested to cover additional equipment such as ICTs, SVCs, Bus Reactors, FSC, TCSC etc. have been considered for measurement through PMU, which were not in Phase-I implementation.

3.2 Upgradation of Control centers

AMC support for the existing control centers will lapse by Jan 2027. Due to this, the maintenance of the existing hardware and software beyond its design life cycle of 7 years will be very challenging owing to lack of spares and services, poor performance and increasing cyber vulnerabilities due to obsolete technologies.

Moreover, the existing hardware and software cannot support the new analytics being envisaged under Phase-II project for better monitoring of the power system.

The URTDSM phase-1 Control centres are having issues of End of Life/End of support due to technical obsolescence of software, hardware, and cyber security appliances and will become technically obsolete. Hence to keep the WAMS URTDSM Control centres functional, the URTDSM phase 2 project which includes the upgrade of existing control centres, is to be implemented on priority.

Increased penetration of Renewable energy has required increase in more monitoring of the regional grids which requires more deployment of PMUs. The URTDSM phase 2 includes installation of PMUs as per latest CEA Guidelines on PMU placement.

3.3 Additional technical factors to establish the need for URTDSM Phase-II System

In addition to the reasons mentioned above, the following are some of the power system aspects which are being handled only with URTDSM system, which is based upon Wide Area Measurement System (WAMS) technology:

(i) PMU measurements provide synchronized voltage, current and phase angle measurements, which is not possible in RTU measurements. The phase angle measurement is valuable information about the state of the grid and the grid operators can take decisions based upon precise measured information instead of thumb rule based upon their experience.

(ii) Based upon the phase angle measurements from both the ends of the line enhanced utilization of Transmission lines closer to thermal loading of line can be achieved.

(iii) In case of system separations, the Synchrophasor measurements display the load angle separation and can be used to determine the change required in generation to synchronize the two isolated systems, this being more accurate data facilitates faster restoration and avoid any jerks or oscillations in the power system.

(iv) One of the most important applications of PMU measurement is post facto analysis so that an incident can be analyzed with high resolution data so the behavior of each element-generator, RE generator, FACTS devices, Power system islands etc.

(v) With increasing grid size and installed capacity from multiple generation sources, the approved placement shall provide a wider footprint of PMU data, increasing observability by the Operator for Grid management.

4.0 DPR for URTDSM Phase-II

As per 15th NPC recommendation, DPR of URTDSM project phase-II (for ISTS portion) in accordance with the latest CEA Guidelines on unified philosophy for PMU placement in Indian Grid is prepared by POWERGRID.

Accordingly, DPR Cost Estimate for URTDSM Phase-II (for ISTS portion) is Rs 1124.35 Cr (including the AMC charges)

POWERGRID proposes to take up URTDSM Phase-II Project (for ISTS portion) on RTM basis (upgradation of all Control Centres for NLDCs and RLDCs of Grid-India, and installation of new PMUs at Central Sector locations as per latest CEA PMU Placement Philosophy), on cost sharing PoC mechanism pan India (**100% RTM route with 70:30 Debt equity ratio**).

5.0 Approach for Implementation for URTDSM Phase II Project

The approach for Implementation for URTDSM phase-II project is as follows:

(i) The URTDSM Phase-II project shall be implemented initially for ISTS portion covering NLDCs (2), RLDCs (5), new PMUs at Central Sector locations and remote consoles for all SLDCs.

(ii) Phase-II for STU portion (SLDCs and State sector/IPP stations) shall be implemented separately, subject to finalization of funding method for state portion.

6.0 Scope of Work for URTDSM Phase II Project:

The scope of work under URTDSM Phase-II project is proposed as follows.

1. Installation of approximately 1070 nos. of PMUs at the Central Sector Substations and Power plants across the country as per the lates CEA Guidelines for unified PMU placement philosophy in Indian Grid.
2. Replacement/Establishment of PDCs and associated control center equipment comprising of software and hardware at 7 Control centers.
    a. Main and Backup NLDCs (2 nos.)
    b. All RLDCs (5 nos.)
    c. Remote Consoles for CEA/RPCs/SLDCs - 31 nos
3. The hardware and software to be installed at Control Centers shall be sized to accommodate all the PMUs currently installed under Phase-I, and the proposed PMUs under Phase-II with provision for future expansion of about 100% over and above.
4. The FO based communication system existing and being established by POWERGRID and Constituents shall meet the requirement of Phase-II. *The addition/augmentation of communication link is NOT envisaged under the scope of URTDSM Phase-II project DPR*.

5. **New Analytical applications**: Analytical applications have been suggested by the subcommittee for deployment under Phase-II scheme. Few of them, like Linear State Estimator and Oscillation Monitoring Application, are already deployed in Phase-I. However, due to obsolescence of the hardware/software issues in the existing control centers, they need to be replaced with new software and hardware. The following are the new analytical applications being proposed under Phase-II at all 7 control centers:

    a. Linear State Estimator
    b. Oscillation Monitoring Application.
    c. Real time automated event detection along with early warning system and ROCOF calculation over variable window.
    d. Voltage Stability analytics (VSA)
    e. WAMS based contingency analysis, security assessment & Islanding Detection.
    f. Real time Inertia Estimation and monitoring.
    g. Post-mortem analytics.
    h. Generator Model Validation
    i. Wide Area Control Systems (at selected nodes only)
        (i) WAMS based automatic load shedding (AUFLS and df/dt):
        (ii) Control of HVDC, PSS and STATCOM for damping system oscillations
    j. Response of Wind Farm and Solar PV for LVRT, Reactive Power etc.

    The above analytical applications are the requirements suggested based on the feedback of the system operator. It will be explored to procure them either from the prospective Bidders/Software OEMs or to develop them in association with premier academic institutes.

6. Integration of the existing PMUs.

7. Integration of the Phase-II PDCs with the existing SCADA/EMS systems at each location.

8. Integration with existing Video Projection System (VPS) (supplied under separate project) at each location.

9. Consultancy Services from premier academic institutions for development of new analytics under phase-II implementation, if required.

10. Engagement of Consultant for design of large scale WAMS system comprising of IT infrastructure for handling the vast amount of PMU data in real-time and historical data.

11. Capacity building through training of engineers from Grid-India (for Control center portion) & Central Sector Utilities (for PMU portion) are proposed as part of this URTDSM Phase-II project.

In addition to the Supply and Services under Phase-II, it is also proposed to include the Annual Maintenance Contract (AMC) charges through 100% RTM basis (70% debt and 30% Equity from POWERGRID), similar to the AMC contract being operated by POWERGRID for existing Phase-I system.

6.1 Location of SLDCs for PDC replacement and no of PMUs in each Region under URTDSM Phase II Project (ISTS portion):

Region→	NR	ER	NER	WR	SR
No of Control Centers	2	2	1	1	1
Location of 7 control centers	1. Main NLDC 2. NRLDC	1. Backup NLDC 2. ERLDC	1. NERLDC	1. WRLDC	1. SRLDC
PMUs (1070 No's) in Central Sector locations of each Region (as per latest CEA Guidelines)	218	303	151	309	89

7.0 URTDSM Phase II Project DPR Cost for ISTS portion across India:

BoQ Category	Software	Hardware	Auxiliary Power System	Services	Training	AMC	Total (including T&D)	T&D
PDCs at NLDC	144.03	21.26	2.06	2.76	0.00	3.34	173.46	25.62
PDCs at RLDC	348.57	53.9423	4.00	6.90	7.43	8.35	429.19	63.44
PMUs	17.568	321.1894	0.00	0.00	2.11	20.11	360.98	53.37
Mandatory Spares	0.00	17.1105	0.68	0.00	0.00	0.00	17.79	2.63
Total	**510.17**	**413.50**	**6.74**	**9.66**	**9.54**	**31.80**	**981.42**	**145.05**

DPR is based on a 100% RTM basis with 70% debt and 30% equity from POWERGRID.

Sl. No.	Description	Total Cost (Rs. in crores)
1	Unified Real Time Dynamic State Measurement Phase-II *(Supply, services, taxes & duties, testing & commissioning)*	949.62
2	Overheads *(IEDC, Contingencies)*	75.97
3	Consultancy charges for Panel of Experts	10.00
	Sub-Total	1035.59
4	Interest during Construction (IDC)	56.96
	TOTAL (Supply, Services)	1092.55
5	AMC charges and other services during AMC	**31.80**
	GRAND TOTAL including AMC	**1124.35**

The abstract cost estimate is given at ***Annexure***
The above project cost including AMC is based on the Budgetary quote from M/s L&T, the actual project and AMC charges will be known after the process of tendering and award, subject to approval of this proposal by Regulatory Authority.

7.1 Target Beneficiaries

The beneficiaries of the project would be all the designated ISTS customers (DICs) *as per POC mechanism for the URTDSM Phase-II (ISTS portion) as per CERC regulations.* ***(as per Clause no. 78 of CERC Tariff Regulations 2024-29).***

7.2 Project Strategy

The Unified Real Time Dynamic State Measurement System (URTDSM) Phase-II Project shall be implemented by POWERGRID. The PMU installation shall be taken up at those locations where Fiber Optic based communication system is either existing or is being installed under various projects, which shall be available by Dec' 2027. The tariff on the investments for the same shall be recovered from the beneficiaries (SLDCs) as per CERC regulations.

Upon the concurrence of POWERGRID's RTM proposal for ISTS portion by NPC/NCT, POWERGRID shall proceed for further tendering process.

The project shall be planned for a lifetime of 7 years for the IT infrastructure at Control Centers. The AMC shall be taken for 1-year (Defect liability period) and 6 years (AMC period) after operational acceptance (with an additional provision to extend the AMC by another 2 years on the same terms and conditions.

8.0 O&M facilities

The URTDSM system shall be used by respective NLDC/ RLDC/ Central Sector substations and the maintenance responsibility for the subject project shall be under the scope of Grid-India (for all 7 Control centers) and by respective Central Sector Utility for the PMU locations.

After the defect liability period (DLP) of 1 year, 6-year maintenance support by OEM shall be kept in the Project.

POWERGRID hereby proposes for funding the AMC charges also along with Supply and Services charges for SLDCs portion through 100% RTM route under this URTDSM Phase-II scheme. However, The charges for O&M of the system shall be finalized as per CERC/ RPC approval.

9.0 Time Frame

The subject project is scheduled to be commissioned within **36 months** from the date of Investment Approval.

10.0 Conclusion:

The URTDSM phase-1 Control centres are nearing their Operational life and will become technically obsolete. Hence to keep the WAMS URTDSM Control centres functional, the URTDSM Phase-II project which includes an upgrade of existing control centres, is to be implemented on priority.

Increased penetration of Renewable energy has required increase in more monitoring of the regional grids which requires more deployment of PMUs. The proposal for URTDSM Phase-II (ISTS portion) includes installation of PMUs at Central Sector locations as per the latest CEA guidelines.

1. *"**POWERGRID proposes to take up URTDSM Phase-II Project (for ISTS portion) on pan India basis, on cost sharing mechanism (100% RTM route with 70:30 Debt Equity ratio)**".*

2. ***Deliberation on URTDSM Phase-II for STU portion, subject to finalization of funding methodology for States.***

   Put up for deliberation in NPC/RPCs.

URTDSM Phase-II WAMS System - BoQ for Main & Backup NLDC				
Sr.No	Name of the item	Unit	Main NLDC Qty	Backup NLDC Qty
A	SOFTWARE			
1	PDC Software	Lot	1	1
2	WAMS Visualisation (UI) Software	Lot	1	1
3	Analytical Applications			
(a)	Linear State Estimator	Lot	1	1
(b)	Oscillation Monitoring Application	Lot	1	1
(c)	Real time automated event detection along with early warning system and ROCOF calculation over variable window	Lot	1	1
(d)	WAMS based Voltage Stability analytics (VSA)	Lot	1	1
(e)	WAMS based contingency analysis, security assessment & Islanding Detection	Lot	1	1
(f)	Generator Model Validation, Real time Inertia Estimation and monitoring	Lot	1	1
(g)	Post-mortem analytics	Lot	1	1
(h)	Wide Area Control Systems			
i.	WAMS based automatic load shedding (AUFLS and df/dt)	Lot	1	1
ii.	Control of HVDC, PSS and STATCOM for damping system oscillations	Lot	1	1
(i)	Response of Wind Farm and Solar PV for LVRT, Reactive Power.	Lot	1	1
4	Programming Development System (PDS) Software	Lot	1	1
5	Commercial Off-The-Shelf (COTS) Softwares			
(a)	Data Historian Software	Lot	1	1
(b)	Identity Management Software	Lot	1	1
(c)	Network Access Control (NAC)	Lot	1	1
(d)	Patch Management Software	Lot	1	1
(e)	Virtualisation Software for all the virtual servers envisaged and required under the project along-with centralised management software	Lot	1	1
(f)	Operating System for all the servers	Lot	1	1
(g)	Host based intrusion prevention system (HIPS) with centralised management	Lot	1	1
(h)	End Point Security Solution	Lot	1	1
(i)	Centralised Management and Log Analyser of all FWs	Lot	1	1
(j)	Network Management System (NMS)	Lot	1	1
(k)	SIEM (Security Information and Event management)	Lot	1	1
(l)	VAPT Tool	Lot	1	1
6	Report Development & Generation Software	Lot	1	1
7	Storage system			
(a)	SAN Software	Lot	1	1

(b)	NAS Software	Lot	1	1
8	SMS & Email Interface	Lot	1	1
9	Backup Solution Software	Lot	1	1
10	Data exchange Software with external applications	Lot	1	1
B	**HARDWARE**			
1	PDC Server sized for data of 10000 PMUs	No.	2	2
2	Analytical Applications Servers	No.	2	2
3	Historian Servers	No.	2	2
(a)	Data Historian Server			
(b)	Report Development & Generation Server			
4	WAMS Visualisation (UI) Server	No	2	2
5	Programming Development System (PDS) Server	No	1	0
6	Management Applications Servers			
(a)	Identity Management Server	No.	2	2
(b)	NMS Server			
(c)	Network Access Control (NAC) Server	No.	2	2
(d)	End Point Security Solution			
(e)	Centralised Management & Log analyser of Firewall (Internal)			
7	Internal DMZ Servers			
(a)	SIEM Server	No	2	2
(b)	Centralised Management & Log analyser of Firewall (External)			
8	External DMZ Servers			
(a)	End Point Security Solution	No	2	2
(b)	Patch Management Server			
9	Anti APT	No	1	1
10	Storage System			
(a)	Storage Solution of Minimum 1200TB, RAID10, SAN or equivalent along with SAN Management Server	No.	1	1
(b)	NAS Storage of 100TB	No.	1	1
11	Workstation consoles with 23.8" dual monitor			
(a)	PDC application	No.	2	2
(b)	PDS Application	No.	1	1
(c)	Analytical Applications	No.	1	1
(d)	External DMZ	No.	1	1
(e)	Inernal DMZ	No.	1	1
(f)	Management Applications	No.	1	1
(g)	Historian Applications	No.	1	1
(h)	Server Management Console	No	1	1
(i)	Remote Diagnostic Console	No	1	1
12	Color Laser Printer	No.	1	1
13	Time System (NavIC & GPS based)	Lot	2	2
14	Firewalls (with Minimum 10Gbps NGTP)			
(a)	External Firewall with NIPS for Internet and Remote consoles	No.	2	2
(b)	External Firewall with NIPS for PDC/PMU/SCADA data	No.	2	2
(c)	Internal Firewall with NIPS	No.	2	2
15	WAN Router cum Firewall			

(a)	For Communicating with PDCs at RLDCs (8 x Fiber Optic Ports, 8 Ethernet ports (1Gbps))	No.	2	2
(b)	For communicatiing with Remote Consoles (8 x Fiber Optic ports, 8 Ethernet ports (1Gbps))	No.	2	2
(c)	For Internet/Corporate Intranet connectivity (8 x Fiber Optic ports, 8 Ethernet ports (1Gbps))	No.	2	2
(d)	WAN router at Remote Console end (4 Ethernet ports (1Gbps))	No.	3	
16	L3 LAN Switches (10G FO ports) for the following LANs			
(a)	48-port L3 LAN Switch for PDC LAN	No.	2	2
(b)	24 port L3 LAN Switch for Historian LAN	No.	2	2
(c)	24 port L3 LAN Switch for External DMZ LAN	No.	2	2
(d)	24 port L3 LAN Switch for Internal DMZ LAN	No.	2	2
(e)	24 port L3 LAN Switch for Management LAN	No.	2	2
(f)	24 port L3 LAN Switch for Analytics LAN	No.	2	2
(g)	32 port FC Switch for SAN system	No.	2	2
17	Remote Consoles, equivalent to Work station console mentioned at Item No.4 above (for NTAMC and other Strategic locations)	No.	7	
18	Server for Backup Solution	No.	1	1
19	Backup Appliance	No.	1	1
20	Laptop for VAPT	No	1	1
21	Server for Data Exchange with external applications	No	1	1
22	Any other additional hardware at Control center end for implementing Wide Area Measurement Protection and Control (WAMPAC) system	No	1	1
C	**Auxiliary Power System**			
(a)	120 kVA (96kW at 0.8 pf) UPS running in parallel	No.	2	2
(b)	VRLA type Battery banks for above UPS (each bank of 230.4 kVAH)	No.	2	2
(c)	Input ACDB (600kVA rating)	No.	1	1
(d)	Output ACDB (400kVA rating)	No.	1	1
(e)	Accessories for maintenance of VRLA type batteries	Lot	1	1
(f)	Power Distribution and cabling work required to establish UPS	Lot	1	1
(g)	UPS Monitoring System and it's integration with URTDSM System	Lot	1	1
D	**SERVICES**			
1	Integration of WAMS system with following units/applications:			
(a)	Integration with the SCADA/EMS Sytem at NLDC and backup NLDC respectively	No.	1	1
(b)	Integration with 3rd party applications	Lot	1	1
(c)	Integration (at Control center end) of existing PMUs	No	3,000	3,000
(d)	Integration (at control center end) of new PMUs supplied under this project	No	1,100	1,100
(e)	Integration of WAMS System with existing Video Projection System (VPS) of SCADA/EMS System in respective control center	Lot	1	1
(f)	Cyber Security Audit by Cert-IN certified Auditors during FAT.	Lot	1	1
(g)	Cyber Security Audit by Cert-IN certified Auditors during SAT.	Lot	1	1
(h)	Dismantling and Buyback of existing WAMS system of URTDSM Phase-I (after successful parallel operation)	Lot	1	1
(i)	SMS integration with service provider Email integration with owner email system	Lot	1	1

E	**Training**			
1	Training - Man days @15 Days x 18 persons	Man-days	270	
F	**Annual Maintenance Contract**			
(a)	Annual maintenance contract of WAMS System and all the equipment supplied in the project for a period of 7 years (1 year DLP and 6 years AMC)	Lot	1	1
(b)	Annual Training under AMC period	Lot	1	1
(c)	Six Monthly Cyber Security Audit by Cert-IN certified Auditors during 7 years AMC period	Lot	1	1
(d)	Patch Management including Signature updates for all Cyber security equipments for 7 years	Lot	1	1
(e)	Integration of new PMUs data from PDCs at respective RLDCs with PDC at NLDC during entire AMC period	No	5,000	5,000

>> The sizing for Historian Storage at NLDCs is considered @25 samples/second reporting rate of the existing and new PMUs including 100% expansion

URTDSM Phase-II WAMS System - BoQ for 5 RLDCs								
Sr.No	Name of the item	Unit	Name of RLDC					Total Qty
			NRLDC	ERLDC	NERLDC	SRLDC	WRLDC	
A	**SOFTWARE**							
1	PDC Software	Lot	1	1	1	1	1	5
2	WAMS Visualisation (UI) Software	Lot	1	1	1	1	1	5
3	Analytical Applications							
(a)	Linear State Estimator	Lot	1	1	1	1	1	5
(b)	Oscillation Monitoring Application	Lot	1	1	1	1	1	5
(c)	Real time automated event detection along with early warning system and ROCOF calculation over variable window	Lot	1	1	1	1	1	5
(d)	WAMS based Voltage Stability analytics (VSA)	Lot	1	1	1	1	1	5
(e)	WAMS based contingency analysis, security assessment & Islanding Detection	Lot	1	1	1	1	1	5
(f)	Generator Model Validation, Real time Inertia Estimation and monitoring	Lot	1	1	1	1	1	5
(g)	Post-mortem analytics	Lot	1	1	1	1	1	5
(h)	Wide Area Control Systems							
i.	WAMS based automatic load shedding (AUFLS and df/dt)	Lot	1	1	1	1	1	5
ii.	Control of HVDC, PSS and STATCOM for damping system oscillations	Lot	1	1	1	1	1	5
(i)	Response of Wind Farm and Solar PV for LVRT, Reactive Power.	Lot	1	1	1	1	1	5
4	Programming Development System (PDS) Software	Lot	1	1	1	1	1	5
5	Commercial Off-The-Shelf (COTS) Softwares							
(a)	Data Historian Software	Lot	1	1	1	1	1	5
(b)	Identity Management Software	Lot	1	1	1	1	1	5
(c)	Network Access Control (NAC)	Lot	1	1	1	1	1	5
(d)	Patch Management Software	Lot	1	1	1	1	1	5
(e)	Virtualisation Software for all the virtual servers envisaged and required under the project along-with centralised management software	Lot	1	1	1	1	1	5
(f)	Operating System for all the servers	Lot	1	1	1	1	1	5
(g)	Host based intrusion prevention system (HIPS) with centralised management	Lot	1	1	1	1	1	5
(h)	End Point Security Solution with centralised management	Lot	1	1	1	1	1	5
(i)	Centralised Management and Log Analyser of all FWs	Lot	1	1	1	1	1	5
(j)	Network Management System	Lot	1	1	1	1	1	5
(k)	SIEM (Security Information and Event management)	Lot	1	1	1	1	1	5
(l)	VAPT Tool	Lot	1	1	1	1	1	5
6	Report Development & Generation Software	Lot	1	1	1	1	1	5
7	Storage system							
(a)	SAN Software	Lot	1	1	1	1	1	5
(b)	NAS Software	Lot	1	1	1	1	1	5
8	SMS & Email Interface	Lot	1	1	1	1	1	5
9	Backup Solution Software	Lot	1	1	1	1	1	5
10	Data exchange Software with external applications	Lot	1	1	1	1	1	5
B	**HARDWARE**							
1	PDC Server sized for data of 2500 PMUs	No.	2	2	0	2	2	8
2	PDC Server sized for data of 1000 PMUs	No.	0	0	2	0	0	2
3	Analytical Applications Servers	No.	2	2	2	2	2	10
4	Historian Servers	No.	2	2	2	2	2	10

(a)	Data Historian Server							
(b)	Report Development & Generation Server							
5	WAMS Visualisation (UI) Server	No	2	2	2	2	2	10
6	Programming Development System (PDS) Server	No	1	1	1	1	1	5
7	Management Applications Servers							
(a)	Identity Management Server	No.	2	2	2	2	2	10
(b)	NMS Server							
(c)	Centralised Management & Log analyser of Firewall (Internal)	No.	2	2	2	2	2	10
(d)	Network Access Control (NAC) Server							
(e)	End Point Security Solution							
8	Internal DMZ Servers	No	2	2	2	2	2	10
(a)	SIEM Server							
(b)	Centralised Management & Log analyser of Firewall (External)							
9	External DMZ Servers	No	2	2	2	2	2	10
(a)	End Point Security Solution							
(b)	Patch Management Server							
10	Anti APT	No	1	1	1	1	1	5
11	Storage System							
(a)	Storage Solution of Minimum 600TB, RAID10, SAN or equivalent along with SAN Management Server	No.	1	1	0	1	1	4
(b)	Storage Solution of Minimum 250TB, RAID10, SAN or equivalent along with SAN Management Server	No.	0	0	1	0	0	1
(c)	NAS Storage of 50TB	No.	1	1	0	1	1	4
(d)	NAS Storage of 20TB	No.	0	0	1	0	0	1
12	Workstation consoles with dual monitor							
(a)	PDC application	No.	2	2	2	2	2	10
(b)	PDS Application	No.	1	1	1	1	1	5
(c)	Analytical Applications	No.	1	1	1	1	1	5
(d)	External DMZ	No.	1	1	1	1	1	5
(e)	Inernal DMZ	No.	1	1	1	1	1	5
(f)	Management Applications	No.	1	1	1	1	1	5
(g)	Historian Applications	No.	1	1	1	1	1	5
(h)	Server Management Console	No	1	1	1	1	1	5
(i)	Remote Diagnostic Console	No	1	1	1	1	1	5
13	Color Laser Printer	No.	1	1	1	1	1	5
14	Time System (NavIC & GPS based)	Lot	2	2	2	2	2	10
15	Firewalls (With Minimum 8Gbps NGTP)							
(a)	External Firewall with NIPS for Internet and Remote consoles	No.	2	2	2	2	2	10
(b)	External Firewall with NIPS for PDC/PMU/SCADA data	No.	2	2	2	2	2	10
(c)	Internal Firewall with NIPS	No.	2	2	2	2	2	10
16	WAN Router cum Firewall							
(a)	For Communicating with PDCs at NLDCs (8 x Fiber Optic Ports, 8 Ethernet ports (1Gbps))	No.	2	2	2	2	2	10
(b)	For Communicating with PDCs at SLDCs (8 x Fiber Optic Ports, 8 Ethernet ports (1Gbps))	No.	2	2	2	2	2	10
(c)	For communicatiing with Remote Consoles (8 x Fiber Optic ports, 8 Ethernet ports (1Gbps))	No.	2	2	2	2	2	10
(d)	For Internet/Corporate Intranet connectivity (8 x Fiber Optic ports, 8 Ethernet ports (1Gbps))	No.	2	2	2	2	2	10
(e)	WAN router at Remote Console end (4 Ethernet ports (1Gbps))	No.	2	2	2	2	2	10

17	L3 LAN Switches (10G FO ports) for the following LANs							
(a)	48-port L3 LAN Switch for PDC LAN	No.	2	2	2	2	2	10
(b)	24 port L3 LAN Switch for Historian LAN	No.	2	2	2	2	2	10
(c)	24 port L3 LAN Switch for External DMZ LAN	No.	2	2	2	2	2	10
(d)	24 port L3 LAN Switch for Internal DMZ LAN	No.	2	2	2	2	2	10
(e)	24 port L3 LAN Switch for Management LAN	No.	2	2	2	2	2	10
(f)	24 port L3 LAN Switch for Analytics LAN	No.	2	2	2	2	2	10
(g)	32 port FC Switch for SAN system	No.	2	2	2	2	2	10
18	Remote Consoles, equivalent to Work station console mentioned at Item No.4 above	No.			10			10
19	Server for Backup Solution	No.	1	1	1	1	1	5
20	Backup Appliance	No.	1	1	1	1	1	5
21	Laptop for VAPT	No	1	1	1	1	1	5
22	Server for Data Exchange with external applications	No	1	1	1	1	1	5
23	Any other additional hardware at Control center end for implementing Wide Area Measurement Protection and Control (WAMPAC) system	No	1	1	1	1	1	5
C	**Auxiliary Power System**							
(a)	60 kVA (48kW at 0.8 pf) UPS running in parallel	No.	2	2	2	2	2	10
(b)	VRLA type Battery banks for above UPS (each bank of 115.2 kVAH)	No.	2	2	2	2	2	10
(c)	Input ACDB (450kVA rating)	No.	1	1	1	1	1	5
(d)	Output ACDB (300kVA rating)	No.	1	1	1	1	1	5
(e)	Accessories for maintenance of VRLA type batteries	Lot	1	1	1	1	1	5
(f)	Power Distribution and cabling work required to establish UPS	Lot	1	1	1	1	1	5
(g)	UPS Monitoring System and it's integration with URTDSM System	Lot	1	1	1	1	1	5
D	**SERVICES**							
1	Integration of WAMS system with following units/applications:							
(a)	Integration with the SCADA/EMS Sytem at respective RLDC	No.	1	1	1	1	1	5
(b)	Integration with 3rd party applications	Lot	1	1	1	1	1	5
(c)	Integration (at Control center end) of existing PMUs	No.			3,000			3000
(d)	Integration (at Control center end) of new PMUs supplied under this project	No.	218	303	151	89	309	1070
(e)	Integration of WAMS System with existing Video Projection System (VPS) of SCADA/EMS System in respective region	Lot	1	1	1	1	1	5
(f)	Cyber Security Audit by Cert-IN certified Auditors during FAT.	Lot	1	1	1	1	1	5
(g)	Cyber Security Audit by Cert-IN certified Auditors during SAT.	Lot	1	1	1	1	1	5
(h)	Dismantling and Buyback of existing WAMS system of URTDSM Phase-I (after successful parallel operation)	Lot	1	1	1	1	1	5
(i)	SMS integration with service provider Email integration with owner email system	Lot	1	1	1	1	1	5
E	**Training**							
1	Training - Man days @15 Days x 24 persons in each Region	Man-days	360	360	360	360	360	1,800
F	**Annual Maintenance Contract**							
(a)	Annual maintenance contract of WAMS System and all the equipment supplied in the project for a period of 7 years (1 year DLP and 6 years AMC)	Lot	1	1	1	1	1	5

(b)	Annual Training under AMC period	Lot	1	1	1	1	1	5
(c)	Six Monthly Cyber Security Audit by Cert-IN certified Auditors during 7 years AMC period	Lot	1	1	1	1	1	5
(d)	Patch Management including Signature updates for all Cyber security equipments for 7 years	Lot	1	1	1	1	1	5
(e)	Integration of new PMUs (from existing substations or from new substations) with PDCs at RLDCs during entire AMC period	No	1,200	800	700	1,100	1,200	5000
(f)	Integration of PDCs at SLDCs with PDCs at respective RLDCs during AMC period	No	9	5	3	5	4	26

>> The sizing for Historian Storage at RLDCs is considered @50 samples/second reporting rate of the existing and new PMUs including 100% expansion

BOQ for Central Sector PMUs to be procured under URTDSM Phase-II								
S.No	Name of the item	Unit	Regionwise Qty					Total Qty
			NR	ER	NER	SR	WR	
A	**SOFTWARE**							
1	PMU configuration software	Lot	12	6	4	6	4	32
B	**HARDWARE**							
1	PMUs		218	303	151	89	309	1070
2	Panel for mounting PMUs (complete with all necessary accessories, cables etc. as per specification) along with identified analog channels / modules	Lot	1	1	1	1	1	5
3	Time System (GPS receiver)	Lot	218	303	151	89	309	1070
4	Substation Grade Layer-3 LAN Switches with 10 ports minimum i.1 Gbps Fibre port- 4 nos. ii.1 Gbps Cu ports- 2 nos. iii.100 Mbps Cu ports- 4 nos	No.	135	170	55	75	210	645
5	Substation Grade Layer-2 LAN Switches with 10 ports minimum i.1 Gbps Fibre port- 4 nos. ii.100Mbps Fibre ports- 4 nos. iii.100Mbps Cu ports – 2 nos.	No.	109	152	76	45	155	535
6	Armored Fibre Optic Cable and associated termination	Lot	135	170	55	75	210	645
7	LIU - FO PATCH PANEL-12 PORT	No.	244	322	131	120	365	1180
8	PMU configuration tool (Laptop)	No.	12	6	4	6	4	32
9	Integration (at substation end) of new PMUs supplied under this project with PDCs of respective Control center	No.	218	303	151	89	309	1070
B	**TRAINING**							
1	Training (For All Central Sector locations in each Region, 3 days for 5 persons)	Man days	150	90	90	90	90	510
C	**Annual Maintenance Contract**							
(a)	Annual maintenance contract of PMUs and all the associated equipment supplied in the project for a period of 7 years (1 year DLP and 6 years AMC)	Lot	1	1	1	1	1	5

>> The PMU quantity mentioned above is indicative requirement under Phase-II for only Central Sector portion.
>> Each PMU shall be supporting measurement of 2sets of Voltage and Current phasors (i.e, of 2 elements) as a minimum and shall comply with latest version of IEEE C37.118.2 and IS/IEC 60255-118.1standards with latest amendments.

URTDSM Phase-II - BOQ for Mandatory Spares			
Sl.no	**Item description**	**Unit**	**Total Qty**
A	**Spares for URTDSM system**		
1	Servers one of each type at every RLDC & NLDC	Lot	1
2	**Storage System**		
(i)	10% of the critical items at every control center like Dual redundant power supplies, controllers and storage disks/ specialized storage etc.	Lot	1
3	Workstation console with dualcolour monitor (@10% of Total Supply in each Region/State)	Lot	1
4	LAN switch one of each type at every RLDC/NLDC	Lot	1
5	Internal Firewall at every RLDC and NLDC	Lot	1
6	External Firewall at every RLDC and NLDC	Lot	1
7	WAN Routers one of each type at every RLDC and NLDC	Lot	1
8	Time System (GPS receiver) (@10% of Supply)	Lot	1
9	PMU (complete with all necessary accessories, cables etc. as per specification) along with additional analog channels / modules	No.	110
B	**Spares for Auxiliary Power Supply system**		
1	MCCB/MCB/Isolator/ Switch/Contactor of each type & rating (as applicable & used inside UPS panel)	Lot	7
2	Fuse of each type & rating (if applicable)	Lot	35
3	DC Filter assembly	Lot	7
4	Input AC Filter assembly	Lot	7
5	Output AC Filter assembly	Lot	7
6	Electronic Printed Circuit Board / Card of each type (including all cards/modules for rectifier/charger, inverter, system card, display module, interface cards etc.)	Lot	7
7	Power Semiconductor devices of each type & rating such as SCRs, IGBTs etc. for rectifier/charger module, Inverter module, Static Switch module for all the three phases (exclude those items which are covered under item-6 above)	Lot	7

ANNEXURE - 4.0

ABSTRACT COST ESTIMATE

(BASE COST)

Unified Real Time Dynamic State Measurement (URTDSM)
Project Phase-II

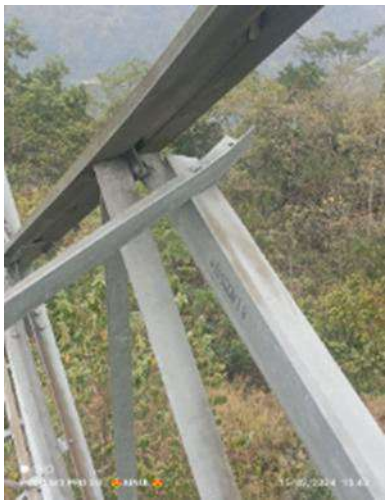
DPR Cost Estimate (Based on budgetary offers)

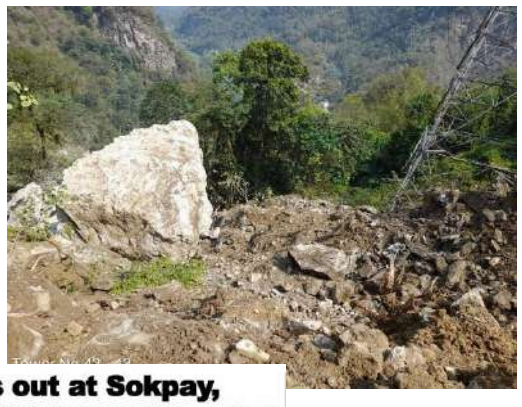
Sl. No.	DESCRIPTION		AMOUNT (Rupees in Crs.)
	Equipment Cost		
A	**Supply**		
	Sub- Total A		949.62
B	**Services**		
i	Installation, Testing and Commissioning		
ii	Training charges		
	Sub- Total B (i to ii)		**Included above in A**
C	**Taxes and Duties**		
i	GST @ 18%, 28% (as applicable on Supply cost & Services) on **(A+B)**		**Included above in A**
D	Inland Freight and Insurance (as applicable on **A**)		**Included above in A**
E	**Sub Total A TO D**		**949.62**
F	Incidental Expediture During construction (IEDC)	**@ 5% of [F]**	47.48
G	Contingencies	**@ 3% of [F]**	28.49
H	Consultancy charges for URTDSM Phase-II for Panel of Experts		10.00
I	**Sub Total (A TO H)**		**1,035.59**
J	Interest During Construction (IDC)		56.96
K	**GRAND TOTAL**		**1,092.55**
L	Maintenance charges for 1 year during warranty period and 6 years after warranty period excl. GST* (AMC) incl. Cyber Security Audit		**26.95**
	GST @ 18% on AMC		**4.85**

Note:
1. Debt:Equity ratio has been considered as 70:30.
2. Interest rate on Loan has been considered @ 11.00% for Domestic Loan subject to actuals.
3. The project is scheduled to be commissioned by 01.09.2028. However, for the purpose of phasing of funds, Investment approval has been assumed on 01.09.2025.
4. IDC has not been calculated on AMC. Annual Maintenance Charges is not part of the Project cost. However, the same shall be part of bidding documents and to be borne out of O&M expenditure

Annexure-B.2.9

Some Site Photographs and Natural calamity incidents in SPTL line





Major landslide breaks out at Sokpay, 18 families evacuated, NS highway disrupted

DICHEN ONGMU

GANGTOK, March 26: A massive landslide broke out at Sokpay village under Dikchu-Jang GPU on the wee hours of Sunday. Fortunately no human casualties were reported but about four houses were damaged while 18 families were evacuated to safer locations by the concerned authorities.

Agricultural lands, standing crops, properties and livestock have also been extensively damaged when the almost two kilometre slide ran through the village. Drinking water supply and power lines along with the area's tourism spot 'Selfie Dara' were also washed away by the slide.

The national highway connecting North Sikkim has also been cut-off following the slide.

Gangtok DC Tushar Nikhare reached the spot and surveyed the slide along with other concerned district administration officials.

Gangtok zilla adhyaksha Balaram Adhikari and his team also took stock of the damage caused by the slide. He informed that immediate relief packages of Rs. 1.30 lakh were provided to the two families who have lost their homes in the slide. Relief amount of Rs. 46,500 was handed over to a cow owner while Rs. 25,400 was provided as relief to a tenant.

"There would have been major human casualties had the landslide occurred during the day since there is a good flow of vehicles along highway plus tourists also often stop at Selfie Dara to take the pictures", said Adhikari.

Asked about the possible reasons of the landslide, Adhikari mentioned that local residents are blaming the NHPC dam at the base of the hill and the powerline tower situated at the hill top.

"We cannot simply blame the projects situated here as the core reason behind the slide is still unknown. However, the directions are given to the Mines & Geology department who will conduct the study and research about the root cause of the devastation," said the Gangtok zilla adhyaksha.

Assuring complete assistance from the government, Adhikari informed that the affected families were evacuated to the nearby guest houses and villages for their safety.

Local villager Manju Sharma shared that such slides have occurred earlier as well in the area followed by several surveys by the officials with suggestions of evacuating everyone, which never really developed into the execution stage. "Every monsoon we have to evacuate and stay somewhere else. The authorities tell us that we will be shifted but it never happens. We feel that the government can give us an area, set up a colony and shift us there", she shared.

Sunita Subba lost her shop and house at Selfie Dara during the landslide.

"I do not own this property but I have invested all my savings in this shop to run my family. As per the authorities, only the land owners will be compensated and not the tenants like us and this is worrisome for us. All I had was this shop and three pigs which I lost to the slide. I have no means of earnings now", lamented Subba seeking help from the government.

Annexure B.2.12

Standard Operating Procedure (SOP) for Controlling the Loading on 400 kV Lapanga–OPGC D/C

➢ Ensuring healthiness during N-1 Condition: SPS Implemented

After integration of 2nd unit of JSWEUL with Both units running under this scenario to ensure the safe and secure operation of the 400 kV Lapanga–OPGC double circuit (D/c) transmission line, One Special Protection Scheme (SPS) discussed and agreed at CEA level has already been implemented for generation reduction or unit tripping at JSWEUL, based on the loading conditions of either circuit of the 400 kV Lapanga–OPGC D/c.

SPS Logic

S.no		Triggering Criteria (Current Based) *	Signal to JSWEUL
1	Flow in 400 kV Lapanga-OPGC S/c (either line)	1440 A (950 MW) < Flow < 1520 A (1000 MW)	**Alarm to Ind Bharat (JSWEUL) to reduce load manually**
2		1520 A (1000 MW) < Flow < 1550 A (1020 MW)	**Trip Signal to JSWEUL. One Unit will trip after 05 minutes if still Flow not less than 1000 MW will trip another unit in next 05 Minutes**
3		>1550 A (1020 MW)	**Trip Signal to JSWEUL. One Unit will trip after 05 seconds if still Flow not less than 1020 MW will trip another unit in next 05 seconds**

1. Generation reduction/Tripping of Unit at JSWEUL shall take place as per SPS logic.
2. In case of failure of the SPS to operate as intended, **JSWEUL shall manually reduce generation or trip running units** in accordance with the SPS logic to maintain system stability and prevent overloading of the transmission lines.

➢ Ensuring healthiness during N Condition:

In case both circuits of the 400kV OPGC–Lapanga double circuit (D/C) line are in service and the loading in each circuit exceeds 750 MW with an increasing trend, the following manual control measures shall be taken based on instructions from RLDC/SLDC to bring the loading within permissible limits:

1. Power Order of HVDC Talcher–Kolar and Gazuwaka to be optimized to the extent possible, while respecting the N-1 security limit of the 400KV Talcher–Meramundali D/C line. This action shall be coordinated with NLDC and subject to prevailing Southern Region (SR) constraints in real time.
2. Drawl of Sterlite to be restricted within 850-900 MW. If Sterlite's drawl exceeds 900 MW, one circuit of the 400kV Lapanga–Sterlite line shall be opened as per instructions from SLDC/RLDC.
3. If required, both circuits of the 400kV Lapanga–Sterlite line may be opened on request of SLDC Odisha. Under this condition, Sterlite shall draw power radially from the Jharsuguda D/C line, which will help in reducing the loading on the OPGC–Lapanga line. However, if Sterlite draws more than 850 MW under this radial configuration, the N-1 reliability criterion will be violated.
4. After exercising all the above points, if loading on the 400kV OPGC–Lapanga D/C line still exceeds 750 MW per circuit with both JSWEUL units are operational, RLDC will instruct a progressive reduction of generation from JSWEUL units to bring the loading below 750 MW per circuit.
5. Backing down of JSWEUL generation shall respect the technical minimum generation limit of 200 MW per unit (as communicated by M/s JSWEUL). Therefore, the combined generation from JSWEUL Unit-1 and Unit-2 shall be restricted to 400 MW.

ANNEXURE B.2.17

Agenda item of SJVN for inclusion in 229th OCC meeting of ERPC

A. Consent for purchase of power from Etalin HEP (3097 MW) in Arunachal Pradesh

SJVN, is executing the works of Etalin Hydro Electric Project as a run-of-the-river Project on the Dri and Tangon rivers, tributaries of Dibang river in Arunachal Pradesh.

The project features two concrete dams, two dam toe power houses, two large diameter headrace tunnels and an underground powerhouse complex comprising of surge shaft, pressure shaft and caverns for the two machine halls with 10 units of 307 MW each to generate 3070 MW. Further, Dri Dam Toe power house and Tangon Dam Toe power house to generate 19.60 MW and 7.40 MW respectively totalling to 27 MW.

The Project is scheduled to be completed in 84 months from the zero date of start as 01.01.2027. The annual generation from the project is estimated as 12260.08 MU annually in a 90% dependable year with 95% of plant availability.

Project cost has been estimated at February, 2025 PL with escalation at completion level. The completion cost of the project is estimated at ₹ 30037.36 Crore including Interest During Construction (IDC) of ₹ 6148.01 Crore and Financial Charges (FC) of ₹ 96.83 Crore. The 1st year & levelized Tariff stand at ₹ 5.11/ unit and ₹ 4.94/ unit.

B. Consent for purchase of power from Lower Arun HEP, 669 MW in Nepal.

SJVN, is executing the works of Lower Arun HEP, 669 MW on River Arun in the neighbouring country of Nepal. Lower Arun HEP will operate in Tandem with Arun-3 HEP which is already under construction by SJVN's fully owned subsidiary SAPDC. The project consists of 4 units of 167.25 MW each to generate 669 MW.

The Project is tentatively scheduled to be completed in 2031. The annual generation from the project is estimated as 2901.02 MU annually in a 90% dependable year with 95% of plant availability. As per the condition of Power Development Agreement with Govt. of Nepal, 21% of the net energy shall be given to Government of Nepal (GoN) free of cost.

Project cost has been estimated at September, 2021 PL with escalation at completion level. The completion cost of the project is estimated at ₹ 5792.36 Crore including Interest During Construction (IDC) of ₹ 899.64 Crore and Financial Charges (FC) of ₹ 20.27 Crore. The 1st year & levelized Tariff stand at ₹ 5.37/ unit and ₹ 4.99/ unit.

C. Consent for purchase of power from Upper Karnali HEP, 900 MW (2X30 MW) in Nepal.

Upper Karnali HEP (900 MW) is being developed by Joint venture of SJVN, GMR, IREDA and Nepal Electricity Authority in the neighbouring country of Nepal. The project consists of 8 units of 112.5 MW each to generate 900 MW.

The Project is scheduled to be commissioned by 2031. The annual generation from the project is estimated as 3994 MU annually in a 90% dependable year with 95% of plant availability.

Project cost has been estimated at April, 2024 PL with escalation at completion level. The completion cost of the project is estimated at ₹ 9145.29 Crore including Interest During Construction (IDC) and Financial Charges (FC) of ₹ 1535.07 Crore. The levelized Tariff stand at ₹ 5.45/ unit.

- SJVN is in a position to offer power from above mentioned projects after their commissioning at a tariff as determined by CERC under Section 62 of Electricity Act. It is requested to please convey the consent of constituent members for purchase of power indicating the quantum of power required from these Hydro projects to HoD (C&SO), SJVN at **sjvn.cso@sjvn.nic.in** and **gmcsosjvn@gmail.com** so that Power Purchase Agreement (PPA) can be signed subsequently. Further, a detailed presentation can be arranged in case any constituent member wish to obtain more information regarding these hydro projects.

Project	Description	Remarks
Etalin HEP (3097 MW)	Location- Arunachal Pradesh Design Energy -12260 MU Anticipated Commissioning- 2033 Peaking Capability- Yes Levelized Tariff- Rs. 4.94/kWh	Actual tariff will be as determined by CERC under Section-62 of Electricity Act on CoD of the project
Lower Arun HEP (669 MW)	Location- Nepal Design Energy -2901 MU Anticipated Commissioning- 2031 Peaking Capability- Yes Levelized Tariff- Rs. 4.99/kWh	
Upper Karnali HEP (900 MW)	Location- Nepal Design Energy -3994 MU Anticipated Commissioning- 2031 Peaking Capability- Yes Levelized Tariff- Rs. 5.45/kWh	