

Email: cenpcece@gmail.com



भारत सरकार/Government of India  
विद्युत मंत्रालय/Ministry of Power  
केंद्रीय विद्युत प्राधिकरण/Central Electricity Authority  
राष्ट्रीय विद्युत समिति/National Power Committee [ISO 9001:2008]  
कटवारिया सराय/Katwaria Sarai, नई दिल्ली / New Delhi – 110016  
वैबसाइट / Website: [www.cea.nic.in](http://www.cea.nic.in)



No. 3/NRCE/NPC/CEA/2017/ 294-305

Date: 21<sup>st</sup> April 2017

**Subject: Second Meeting of the reconstituted Sub-Group of NRCE for finalizing the methodology for computation of TTC/ATC/TRM- Reg.**

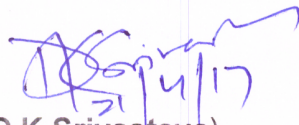
Sir,

Enclosed please find a copy of Agenda Notes for the second meeting of the reconstituted sub-group of NRCE to be held on **04<sup>th</sup> May 2017 (Thursday) at 1100 Hrs** in Conference Hall, 2<sup>nd</sup> Floor, NRPC Building, Katwaria Sarai, New Delhi-110016.

Kindly make it convenient to attend the meeting.

Yours faithfully,

Encl: as above.

  
(D.K.Srivastava)

Director (NPC) / Member Convener

To:

1. Shri Pardeep Jindal, Chief Engineer PSP&A- 2, (Chairperson Sub Group of NRCE) Central Electricity Authority Sewa Bhawan, R.K.Puram, <b>New Delhi-110066</b>	2. Dr. A. R. Abhyankar, Associate Professor, Electrical Engg. Department, IIT Delhi, <b>New Delhi-110016</b>
3. Shri Awdesh Kumar Yadav, Director PSP&A-I, Central Electricity Authority Sewa Bhawan, R.K.Puram, <b>New Delhi-110066</b>	4. Shri Sathyanarayan, Superintending Engineer, Western Regional Power Committee, Plot No. F-3, MIDC Area Marol, Andheri (East), <b>Mumbai-400093</b>
5. Shri B.Lyngkhoi, Superintending Engineer North Eastern Reg. Power Committee NERPC Complex, Dong Parmaw, Lapalang, <b>Shillong-793006</b>	6. Shri Naresh Kumar, Executive Engineer, Northern Regional Power Committee, 18-S.J.S. Marg, Katwaria Sarai, <b>New Delhi-110016.</b>

<p>7. Shri Ganesh Rao Jada, Executive Engineer, Eastern Regional Power Committee, 14, Golf Club Road, Tolly Gunge, <b>Kolkata- 700033.</b></p>	<p>8. Shri N.R.L.K.Prasad, Executive Engineer Southern Regional Power Committee No.29, Race Course Cross Road, Bengaluru-<b>560009</b></p>
<p>9. Shri Mukesh Khanna AGM (CTU- Plg.), Power Grid Corporation of India Ltd., Saudamini, Plot No.2, Sector-29, <b>Gurgaon-122001.</b></p>	<p>10. Shri D. Ravi Chandran, Superintending Engineer (Sys. Stud.) TANGEDCO, Eastern Wing, 4<sup>th</sup> Floor NPKRR Maaligai, 144, Anna Salai, <b>Chennai-600002.</b></p>
<p>11. Dr. Sanjay Kulkarni Chief Engineer (STU) MSETCL Prakashganga Plot NO. C-19, E-Block, Bandra-Kurla Complex, Bandra(E), <b>Mumbai-400051</b></p>	

Special Invitee:

Executive Director,  
NLDC, POSOCO,  
B-9, Qutub Institutional Area  
Katwaria Sarai,  
**New Delhi-110016.**



Email: cenpecea@gmail.com



भारत सरकार  
विद्युत मंत्रालय  
केंद्रीय विद्युत प्राधिकरण  
राष्ट्रीय विद्युत समिति  
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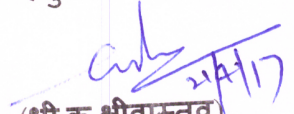
दिनांक: 21-04-2017

संख्या: 3/एनआरसीड/रविस/केविप्रा/2017/294-305

विषय: NRCE का पुनर्गठित उप-ग्रुप की दूसरी बैठक के कार्यसूचि के सम्बन्ध में।

उपरोक्त विषय से सम्बन्धित दस्तावेज आपकी जानकारी एवम आवश्यक कार्यवाही हेतु संलग्न है।

संलग्नक : यथोपरि

  
(धी.कु.श्रीवास्तव)  
निदेशक

सेवा में :

1. श्री प्रदीप जिंदल, मुख्य अभियंता PSP&A- 2, (अध्यक्ष NRCE के उप समूह) केंद्रीय विद्युत प्राधिकरण, नई दिल्ली -110 066	2. डॉ ए आर अभ्यंकर, सह - प्रोफेसर, इलेक्ट्रिकल इंजीनियरिंग। विभाग, आईआईटी दिल्ली, नई दिल्ली -110016
3. श्री अवदेश कुमार यादव, निदेशक PSP&A-I, केंद्रीय विद्युत प्राधिकरण नई दिल्ली -110 066	4. श्री सथ्यनारायण, अधीक्षन अभियंता, पश्चिम क्षेत्रीय विद्युत समिति, मुम्बई-400093
5. श्री बी लिंगखोई, अधीक्षन अभियंता उत्तर पूर्वी क्षेत्रीय विद्युत समिति शिल्लोंग - 793 006	6. श्री नरेश कुमार, कार्यपालक अभियंता, उत्तर क्षेत्रीय विद्युत समिति, नई दिल्ली -110016.
7. श्री गणेश राव जड़ा, कार्यपालक अभियंता, पूर्वी क्षेत्रीय विद्युत समिति , कोलकता - 700 033	8. श्री एन.आर.एल.के. प्रसाद, कार्यपालक अभियंता, दक्षिण क्षेत्रीय विद्युत समिति, बेंगलुरु-560 009
9. श्री मुकेश खन्ना, एजीएम (CTU- Plg.), पावर ग्रिड, गुरुगाव -122001.	10. श्री डी रवि चंद्रन, अधीक्षन अभियंता (प्रणाली के अध्ययन) TANGEDCO, चेन्नई-600002.

11. डॉ. संजय कुलकर्णी, मुख्य अभियंता (STU) एम.एस.इ.टी.सी.एल, मुम्बई-400051	
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विशेष आमंत्रित :

ई.डी. एन.एल.डी.सी

पोसोको,

बी-9, कुतुब संस्थागत क्षेत्र,

कटवारिया सराय

नई दिल्ली-110016



## AGENDA NOTES

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### Agenda Notes for the Second Meeting of the Sub Group of NRCE for finalizing the methodology for computation of TTC/ATC/TRM

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**Time & Date for the meeting:** 11:00 Hrs. on 04.05.2017  
**Venue for the meeting:** 2<sup>nd</sup> Floor, Conference Hall, NRPC, Katwaria Sarai, New Delhi.

#### ***CONFIRMATION OF MINUTES OF THE FIRST MEETING***

The minutes of the first meeting of the reconstituted sub-group of NRCE held on 19<sup>th</sup> September 2016 were circulated vide letter dated 14<sup>th</sup> October 2016. No comments have been received from any of the members.

**Minutes of the meeting may kindly be confirmed.**

#### ***AGENDA ITEMS FOR DELIBERATIONS***

#### **AGENDA No.1. VALIDATION OF THERMAL LIMITS OF TRANSMISSION ELEMENTS**

In the first meeting of the Sub Group held on 14<sup>th</sup> October 2016, CTU had agreed to provide the details to POSOCO (with a copy to PSPA-II Div, CEA). CTU to conduct survey of ISTS Lines and Equipment ratings for 400kV lines. Based on which POSOCO would prepare a list of thermal loading limits (after duly considering constraint due to terminal equipment ratings) and send the same to Member Convener, Sub-Group and CEA (PSPA-II Div.). POSOCO has informed the following:

- Line/Equipment ratings for lines of S1-S2 Corridors furnished by CTU.
- Line/Equipment ratings for 400kV Mohindergarh- Bhiwani Ckt-I & II furnished by Adani Power Ltd.
- Line rating for 400kV Loni 1 & 2, and Terminal Equipment rating of substation for lines: Mandola 1 & 2, Greater Noida, Muradnagar furnished by NTPC.

Member Secretary, NRCE & Chief Engineer (NPC) vide letter dated 21<sup>st</sup> February 2017 (**Annexure I**) had requested CTU to expedite the submission of terminal equipment ratings of 400kV and 765 kV transmission lines in order to carry out the ambient temperature adjusted TTC by POSOCO for all the transmission corridors of the country.

SRPC vide letter dated 25.01.2017 (**Annexure II**) has submitted that based on NRCE operational guidelines for determination of ATC/TTC for short term horizon (0-3 months),



NLDC vide letter dated 06.04.2015 had taken up the issue with entities to confirm the maximum continuous rating of the lines, the terminal equipment on both sides of the lines from the respective owners and the relay settings so as to adopt temperature dependent thermal ratings. Details for SR were furnished to NLDC and the ratings were adopted for Southern Region. NLDC had informed that the ratings were yet to be adopted in other regions. Number of lines in other regions and inter-regional links affect the ATC/TTC towards SR. It is kindly requested that the temperature dependent thermal ratings may be used for all the links which affect the ATC/TTC.

**CTU & POSOCO to provide the requisite inputs.**

**AGENDA No.2. ANALYSIS OF DETERMINATION OF TRM  
(in accordance with the procedure laid down by CERC)**

In the first meeting of the Sub Group, it was observed that the computation of TRM (2% of anticipated peak demand (MW), size of the largest generating unit, size of largest anticipated infeed) requires further study. The Sub Group were of the view that this could be deliberated in the next meeting.

**CTU and POSOCO may present the methodology being used for the computation of TRM. Members may deliberate.**

**AGENDA No.3. UTILIZATION OF LTA GRANTED FOR SOLAR PLANTS**

In the first meeting of Sub-group, it was opined that CTU is granting LTA for Solar Plants on RTC basis. Since power generated from solar plants are not on RTC, the LTA allocated to solar plants needed to be considered appropriately while computing ATC. CTU representative had agreed to look into this aspect and revert on this issue within next two weeks. It was decided that utilization of LTA granted for solar power plants to be explored in the next meeting. Can we have similar approach for Wind also?

**CTU to apprise. Members may present their views/observations**

**AGENDA No.4. NEED FOR ACCURATE DATA AT ALL GENERATION AND DEMAND NODES**

In the first Meeting of Sub-group, it was opined that the TTC/ATC computation procedure should be transparent and the computation details, assumptions etc. needed to be shared. It was observed sometimes addition of generating station and transmission elements were not considered in study and also nodal demand data does not match with actual data. The loop flow of power in the network is also an area that needed to be addressed



appropriately. It was noted that awareness should be brought to all the states in the OCC Meetings on the need for accurate data at all generation and demand nodes of the power system in the state.

**RPCs to apprise the follow up action.**

**AGENDA No.5. OUTAGE TREATMENT OF FSC FOR CONTINGENCIES**

In the 4<sup>th</sup> NRCE Meeting held on 15.10.2014, it was queried by UP whether outage of Fixed Series Compensation (FSC) on a line could be treated as a contingency, since they were building a double circuit 765 KV line with FSC. During design stage, when the manufacturer of FSC was queried, it was stated that in case FSC of one circuit became dis-functional, the second FSC should also be taken out of service to prevent uneven loading of the parallel circuits. It was decided that this would be studied by the sub-Group of the NRCE and recommendation to be given to the concerned Division for modification of CEA Planning Criteria, if required.

In the first meeting of the Sub Group, it was decided that outage treatment of FSC for contingencies to be taken up in next meeting.

**Members may deliberate.**

**AGENDA No.6. TTC/ATC CURTAILMENT ON ACCOUNT OF BUS SHUT DOWNS**

SRPC vide letter dated 25.01.2017 has submitted that SR import TTC/ATC is getting curtailed on account of shut down of bus at Raichur and Sholapur. This issue had been taken up with NLDC earlier that shutdown of bus is not covered as one of the contingency in the reliability criteria of CEA's Manual on Transmission Planning Criteria. NLDC had cited reliability and system security constraints for considering TTC/ATC curtailment for bus shutdowns. Recently, this issue was also discussed in 127<sup>th</sup> OCCM (09.01.2017) wherein, constituents had expressed concern over curtailment especially since a number of SPS are already in place. It needs to be kindly assessed whether TTC/ATC curtailment for bus shutdowns meet the conditions of congestion procedure/Transmission Planning criteria while keeping in view that SPS are already in place.

**Members may deliberate.**

**AGENDA No.7. NEED FOR PROPER COORDINATION IN ATC/TTC COMPUTATIONS OF CTU AND NLDC**

SRPC vide letter dated 25.01.2017 has submitted that recently, it was noted that the WR-SR TTC was enhanced to 4,400 MW (3,250 MW ATC) from 00-05 and 22-24 hrs (revision No.7) for 7 hrs while LTA/MTOA granted was increased to 3,384 MW for full day. The figure of 3,384 MW was presumably from CTU. There needs to be proper



coordination between CTU and NLDC to ensure that ATC/TTC figures are matching to avoid any disagreement at a later stage.

**SRPC may present the agenda. CTU/POSOCO may apprise.**

#### **AGENDA No.8. REAL TIME ATC/TTC DECLARATION**

SRPC vide letter dated 25.01.2017 has submitted that congestion is applied on the ATC/TTC computations based on the studies and on the notified figures of NLDC. In the Order, in respect of Petition No.009/SM/2015 (05.08.2015), Hon'ble CERC had recommended '*POSOCO to take steps to develop Interpreter as a suitable interface between SCADA and PSSE to enable revision of TTC in real-time and declaration of TTC/ATC on hourly/weekly/monthly basis as done by PJM.*' This would enable congestion monitoring on real time ATC/TTC and could help in availing more power based on the ATC/TTC computations. Though in some cases, there could be curtailments based on real time ATC/TTC computations. Status update on this could be useful. It is requested that the issues may be kindly taken up in NRCE for having a uniform guideline /procedure in place.

**POSOCO may apprise and present the methods being followed. Members may deliberate.**

#### **AGENDA No.9. CRITERIA FOR DECLARING REGION AS UPSTREAM OR DOWNSTREAM**

SRPC vide letter dated 25.01.2017 has submitted that the criteria for declaring region as upstream or downstream had been taken up by SRPC with NLDC on few occasions. NLDC in its reply had cited sensitivity and operators experience in declaring region as upstream or downstream. The bench mark for sensitivity has not been specified by NLDC and the same may mostly be left to the operators to declare the region as upstream or downstream. SRPC has been advocating for clear guidelines for declaring any region as upstream or downstream to avoid any subjectivity in operator's decisions. Uniform approach needs to be adopted. Only thus regional entities can be made fully aware of their role towards relieving congestion. Participation of larger number of entities would only help in relieving congestion at a faster pace.

**SRPC may present the agenda. Members may deliberate.**

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[ISO 9001:2008]

No. 3/NRCE/NPC/CEA/2017/ 169-172

Date: 21<sup>st</sup> February 2017

To,  
**Chief Operating Officer (CTU),**  
Power Grid Corporation of India Ltd.,  
Saudamini, Plot No. 2, Sector-29,  
Gurugram-122001

**Subject: Submission of Terminal Equipment Rating of Lines of 400kV & 765kV - Reg.**

- Ref:** 1. MoM of the 3<sup>rd</sup>, 5<sup>th</sup> & 7<sup>th</sup> meeting of NRCE held on 01.08.2014, 09.02.2015 & 07.12.2016  
2. MoM of the 1<sup>st</sup> meeting of the reconstituted Sub-group of NRCE for finalizing the methodology for computation of TTC/ATC/TRM held on 19<sup>th</sup> September 2016.  
3. NPC letter No. 3/NRCE/NPC/CEA/2016/728-729 dated 21<sup>st</sup> October 2016.

Madam/Sir,

As you are aware that in the 3<sup>rd</sup> Meeting of NRCE held on 01.08.2014, it was decided that ambient adjusted thermal rating would be used by POSOCO to calculate the TTC, ATC & TRM and certification may be taken by POSOCO from the owners of such lines where the current is enhanced beyond the normal ampacity rating of the line due to ambient adjusted loading, so that the terminal equipment as well as the relay settings in the sub-stations can safely carry the enhanced current and thereafter, if necessary, changes in the operational guidelines would be carried out accordingly.

In the 5<sup>th</sup> NRCE meeting held on 09.02.2015, NRCE had finalized the Operational Guidelines for determination of TTC, ATC & TRM and issued to POSOCO for usage of operating margins on account of ambient temperature adjusted loadability of transmission lines as provided in the CEA Transmission Planning Criteria. Subsequently, CEA vide letter dated 20.02.2015 had submitted the Operation Guidelines for determination of TTC/ATC/TRM for the short term horizon (0-3 months) to CERC. The following are the extracts of the Guidelines pertaining to terminal equipment ratings for reference please:

*"vii. Before the increased thermal limit on account of fall in ambient temperature is used, the System Operator may confirm from the owner of the terminal equipment on both sides of the line if the terminal equipment is capable of carrying the increased current*

and if the relay settings are in accordance with the same. The terminal equipment owners will confirm the same. The confirmation may be done once before the start of the season, i.e. monsoon, winter, etc. The terminal equipment owners will, on their own, intimate the System Operator when there is an addition to the terminal equipment and its rating for change of TTC/ATC if required."

POSOCO vide letter dated 06<sup>th</sup> April 2015 had requested all the regional transmission utilities and POWERGRID for certification of line rating/ equipment rating for the purpose of adopting seasonal ratings as specified by NRCE. Accordingly, the terminal equipment ratings of SR were provided by Utilities in SR and POSOCO had considered ambient temperature adjusted TTC for S1-S2 from the month of September 2015.

POSOCO vide letter dated 20.08.2015 again requested all the transmission utility of NR, WR, ER, NER and POWERGRID for certification of line rating/ equipment rating for the purpose of adopting seasonal ratings as specified by NRCE.

In the first meeting of the reconstituted sub group of NRCE for finalizing the methodology for computation of TTC/ATC/TRM held on 19<sup>th</sup> September 2016, CTU had agreed to provide the ratings of terminal equipment of transmission lines of 400 kV and 765 kV to POSOCO with a copy to CEA.

NPC vide letter dated 21<sup>st</sup> October, 2016 had sent a reminder to CTU and requested the details of ratings of terminal equipment of transmission lines of 400kV and 765kV.

In the 7<sup>th</sup> meeting of NRCE held on 7<sup>th</sup> December 2016, POSOCO had informed that due to non-availability of terminal equipment ratings of regions/corridors (other than SR), POSOCO was not able to implement the ambient temperature adjusted TTC in all the regions. The Members had expressed concern on non-submission of the terminal equipment by CTU /STUs to POSOCO/CEA. Representative of CTU again agreed to submit the terminal equipment ratings to POSOCO/CEA.

The required details of terminal equipment ratings of 400kV and 765kV transmission lines from CTU are still awaited.

It is therefore requested to expedite the submission of the above details to this office, with a copy to POSOCO at the earliest in order to carry out ambient temperature adjusted TTC by POSOCO for all the transmission corridors in the country.

भवदीय / Yours faithfully,

  
(बी.सी.मल्लिक / B.C.Mallick) 21/2/2017

Chief Engineer & Member Secretary, NRCE


**Copy to:**

1. Shri Mukesh Khanna, AGM (CTU-Plg.), PGCIL, Saudamini, Plot No.2 Sector 29, Gurugram -122001
2. Chief Engineer, PSP&A-II, CEA, Sewa Bhawan, New Delhi -110 066

**Copy for kind information to:**

1. Member (GO&D), CEA



भारत सरकार केंद्रीय विद्युत प्राधिकरण दक्षिण क्षेत्रीय विद्युत समिति बेंगलूरु - 560 009		 Government of India Central Electricity Authority Southern Regional Power Committee Bengaluru - 560 009	
Web site: www.srpc.kar.nic.in		e-mail: mssrpc-ka@nic.in	
सं/No. SRPC/SE-II/2017/		Ph: 080-22287205	Fax: 080-22259343
		दिनांक / Date	25.01.2017

Chief Engineer &  
 Member Secretary, NRCE  
 CEA  
 NEW DELHI – 110 016

**Sub: Issues in respect of ATC/TTC Computation and Congestion -reg**

Sir

As you are kindly aware, Southern Region is predominantly an importing region and thus any impact on ATC/TTC affects power purchase cost of SR constituents. The following issues merit kind attention in respect of ATC/TTC and Congestion:

**1. Criteria for declaring region as upstream or downstream**

The criteria for declaring region as upstream or downstream had been taken up by SRPC with NLDC on few occasions. NLDC in its reply had cited sensitivity and operators experience in declaring region as upstream or downstream. The bench mark for sensitivity has not been specified by NLDC and the same may mostly be left to the operators to declare the region as upstream or downstream. SRPC has been advocating for clear **guidelines for declaring any region as upstream or downstream** to avoid any subjectivity in operator's decisions. **Uniform approach** needs to be adopted. Only thus regional entities can be made fully aware of their role towards relieving congestion. Participation of larger number of entities would only help in relieving congestion at a faster pace.

**2. TTC/ATC curtailment on account of bus shut downs**

SR import TTC/ATC is getting curtailed on account of shut down of bus at Raichur and Sholapur. This issue had been taken up with NLDC earlier that shutdown of bus is not covered as one of the contingency in the reliability criteria of CEA's Manual on Transmission Planning Criteria. NLDC had cited reliability and system security

constraints for considering TTC/ATC curtailment for bus shutdowns. Recently, this issue was also discussed in 127<sup>th</sup> OCCM (09.01.2017) wherein, constituents had expressed concern over curtailment especially since a number of SPS are already in place. It needs to be kindly assessed whether TTC/ATC curtailment for bus shutdowns meet the conditions of congestion procedure/Transmission Planning criteria while keeping in view that **SPS are already in place.**

**3. Adopting seasonal rating as specified by NRCE**

Based on NRCE operational guidelines for determination of ATC/TTC for short term horizon (0-3 months), NLDC vide letter dated 06.04.2015 had taken up the issue with entities to confirm the maximum continuous rating of the lines, the terminal equipment on both sides of the lines from the respective owners and the relay settings so as to adopt temperature dependant thermal ratings. Details for SR were furnished to NLDC and the ratings were adopted for Southern Region. NLDC had informed that the ratings were yet to be adopted in other regions. Number of lines in other regions and inter-regional links affect the ATC/TTC towards SR. It is kindly requested that the temperature dependant thermal ratings may be used for all the links which affect the ATC/TTC towards SR.

**4. Need for proper coordination in ATC/TTC computations of CTU and NLDC**

Recently, it was noted that the WR-SR TTC was enhanced to 4,400 MW (3,250 MW ATC) from 00-05 and 22-24 hrs (revision No.7) for 7 hrs while LTA/MTOA granted was increased to 3,384 MW for full day. The figure of 3,384 MW was presumably from CTU. There needs to be proper coordination between CTU and NLDC to ensure that ATC/TTC figures are matching to avoid any disagreement at a later stage.

**5. Real time ATC/TTC declaration**

Congestion is applied on the ATC/TTC computations based on the studies and on the notified figures of NLDC. In order in respect of Petition No.009/SM/2015 (05.08.2015) Hon'ble CERC had recommended '*POSOCO to take steps to develop Interpreter as a suitable interface between SCADA and PSSE to enable revision of TTC in real-time and declaration of TTC/ATC on hourly/weekly/monthly basis as done by PJM.*'

This would enable congestion monitoring on real time ATC/TTC and could help in availing more power based on the ATC/TTC computations. Though in some cases, there could be curtailments based on real time ATC/TTC computations. Status update on this could be useful.



It is requested that the issues may be kindly taken up in NRCE for having an uniform guidelines/procedure in place.

धन्यवाद /Thanking you,

भवदीय / Yours faithfully



(एस.आर. भट्ट/S.R. BHAT)  
सदस्य सचिव / Member Secretary

Copy for kind information to: Executive Director, NLDC, New Delhi