भारत सरकार
विद्युत मंत्रालय
केंद्रीय विद्युत प्राधिकरण
राष्ट्रीय विद्युत समिति

संख्या: 4/एमडीजीएस/रविस/केविप्र/2017/758-777 दिनांक: 10 नवम्बर 2017

विषय: **एन. पी. सी. की सातवी बैठक के कार्यवृत के सम्बन्ध मे**|

महोदय,

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

संलग्नक : यथोपरि|

भवदीय,
10/11/2017
(**प्रदीप जिंदल**)
मुख्य अभियंता एवं सदस्य सचिव, रा. वि. स.

सेवा मे :

1. अध्यक्ष, उत्तर पुर्वी क्षेत्रीय विद्युत समिति
2. अध्यक्ष, उत्तर क्षेत्रीय विद्युत समिति
3. अध्यक्ष, पश्चिम क्षेत्रीय विद्युत समिति
4. अध्यक्ष, दक्षिण क्षेत्रीय विद्युत समिति
5. अध्यक्ष (टी सी सी), पुर्वी क्षेत्रीय विद्युत समिति
6. अध्यक्ष(टी सी सी), उत्तर पुर्वी क्षेत्रीय विद्युत समिति
7. अध्यक्ष(टी सी सी), उत्तर क्षेत्रीय विद्युत समिति
8. अध्यक्ष(टी सी सी), पश्चिम क्षेत्रीय विद्युत समिति
9. अध्यक्ष(टी सी सी), दक्षिण क्षेत्रीय विद्युत समिति
10. अध्यक्ष(टी सी सी), पुर्वी क्षेत्रीय विद्युत समिति
11. सदस्य सचिव, उ क्षे वि स, नई दिल्ली -110 016
12. सदस्य सचिव , प क्षे वि स, मुम्बैई -400 093
13. सदस्य सचिव, द क्षे वि स, बेंगलुरु-560 009
14. सदस्य सचिव, पु क्षे वि स, कोलकता - 700 033
15. सदस्य सचिव, उ पु क्षे वि स, शिल्लोंग – 793 006
16. मुख्य कार्यपालक अधिकारी , उ म प्र, रा भा प्रे के, नई दिल्ली -110 016.
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सत्यमेव जयते

भारत सरकार/Government of India

विधुत मंत्रालय/Ministry of Power

केंद्रिय विधुत प्राधिकरण/Central Electricity Authority

राष्ट्रीय विद्युत समिति/National Power Committee

No. 4/MTGS/NPC/CEA/2017/ 758-777 Date: 10th November 2017

To

As per the distribution list

Subject: **Minutes of the Seventh meeting of NPC - Reg.**

Sir,

The Minutes of the 7th Meeting of NPC held on 08th September 2017 at Indore is enclosed for kind information and necessary action please. The same is also available on CEA website.

Yours faithfully

Encl.: as above

P Jindal 10/11/2017

(Pardeep Jindal)

Chief Engineer & Member Secretary, NPC

Distribution List (7th Meeting of NPC)

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17. Director (Operation), PGCIL, Saudamini, Plot No.2, Sector-29, Guragon-122001
18. Chief Engineer, GM, CEA, New Delhi-110066

Copy for Kind information to:

1. Chairperson, CEA, New Delhi
2. Member (G&OD), CEA, New Delhi

Central Electricity Authority
National Power Committee

Summary Record of Discussion of the Seventh (7th) Meeting of National Power Committee (NPC) held on 08th September 2017 at Indore

1. Introduction

1.1 The 7th Meeting of the National Power Committee was held on 08th September 2017 at Indore. The list of the participants is at **Annexure-I.**

1.2 Shri A.Balan, Member Secretary, WRPC welcomed all the Members and delegates to the meeting. He thanked Chairman, WRPC for his kind concurrence for hosting the 7th meeting of NPC by WRPC at Indore. Further, he thanked Chairperson, CEA & NPC for the chance given to WRPC for hosting the meeting.

1.3 Shri D. Prabhakar Rao, Chairperson, SRPC thanked Chairperson, NPC for conducting the 7th meeting of NPC at Indore, the commercial capital of Madhya Pradesh. He thanked MS, WRPC and his team for the nice arrangement made for the stay and conduct of the meeting. He briefed about the grid disciplines being maintained by Southern Region. He appreciated NPC forum for the proactive decisions taken on various issues, especially in respect of large-scale integration of renewable with the grid and also for the mutual cooperation among all the RPCs.

1.4 Shri Ravindra Kumar Verma, Chairperson, CEA & NPC, welcomed the Members and participants to the meeting. He thanked MS, WRPC for the excellent arrangement made for the conduct of the meeting. He stated that we are very fortunate to witness the significant changes undergoing in the Indian power sector. The fuel mix of power sector in India is changing with about 175 GW of Renewable Energy (RE) Integration by 2022. With such a huge quantum of RE Integration, the various issues associated with RE viz. intermittency, quality, different operating philosophy etc. needs to be addressed. He stated that according to 19th EPS report of CEA, Cumulative Annual Growth Rate (CAGR) is estimated to be of 6.18 % for the next five years with total installed capacity of 500GW by the year 2022. He observed that NPC forum was constituted with a view to resolve issues among the RPCs for integrated operation of the power system of the country. He said that larger attendance at senior level is crucial in the meetings of NPC and requested Member Secretaries of RPCs to ensure participation of Members of NPC in the meetings. He requested Member Secretary, NPC to take up the agenda items.

1.5 Shri Pardeep Jindal, Chief Engineer, CEA & Member Secretary, NPC welcomed Chairperson, CEA&NPC, Chairperson, SRPC, TCC chairperson of SRPC, Member Secretaries of RPCs and the representatives from J&K, Gujarat, NLDC and CTU to the 7th meeting of NPC. He expressed gratitude to WRPC for hosting the 7th Meeting of

NPC and providing the necessary arrangements for the same. He briefed about the formation of NPC and its function, and informed that NPC in its 4th meeting held on 10th December 2015 had agreed the proposal to include NLDC as a member in NPC. Accordingly, MoP had been requested for amendment in the composition of NPC and also in the Conduct of Business Rule (CBR).

1.6 Representative from CTU requested to include **CTU as a permanent member of NPC**. Chairperson, NPC said that this issue could be introduced as a formal agenda in the next meeting of NPC. CTU was advised to submit a detailed proposal with justification in this regard to NPC Secretariat. Accordingly, NPC Secretariat would take up the proposal for deliberation in the next NPC meeting. The same was agreed.

1.7 MS, SRPC expressed concern on the proposal of amemnednet in CBR in respect of inclusion of Preparation and issuance of **National Energy Account (NEA)** for inter-regional and inter-national energy transactions by NPC Secretariat, as the same was not deliberated in RPC forums. Member Secretary, NPC clarified that while processing the proposal of membership of NLDC in NPC, MoP had raised some quires/observations and sought comments of CEA. One of the observation was that *considering the changing scenarios, the functions of NPC may also be broadened including the functions of maintain the National Energy Account involving the inter-national and inter-regional transmission transactions.* Accordingly, comments of CEA had been furnished to MoP. Copy of the communications in this regard is at **Annexure-II**.

18 Upon query by MS, SRPC, Representative of NLDC informed that the issue of creation National Pool account was under deliberation in various forums in view of the formation of all India grid. Inter-regional transactions needed to be accounted at national level and with the formation of National Power Committee it is possible also.

1.9 Chairperson, NPC suggested that an agenda in this regard with detailed procedure / institutional arrangement etc. could be presented by NLDC in the next meeting of NPC, and the same was agreed.

2. CONFIRMATION OF MINUTES OF 6TH MEETING

2.1 The Minutes of 6th meeting of NPC held on 19th December 2016 held at Bengaluru was circulated vide letter No. 4/MTGS/NPC/CEA/2017/76-95 dated 12th January 2017.

2.2 SRPC vide letter dated 08.02.2017 (copy at **Annexure-III**) had sought amendment in the following para of Item 8(b) of the Minutes:

- ……. MS, SRPC informed that SRLDC and SRPC Secretariat jointly had furnished reports to CERC in compliance of CERC Petition No.60/MP/2014. SRLDC were getting 11kV level data from SLDCs and data up to 11 kV were included in the report.

- TANTRANSCO informed that they had identified the feeders upto 11 kV and data are made available to SRLDC.

The proposed amendment is as follows:

- *…… MS, SRPC informed that SRLDC and SRPC Secretariat jointly had furnished reports to CERC in compliance of CERC Petition No.60/MP/2014.* ***SRLDC was getting data up to 11kV level from some of the SLDCs*** *and data up to 11 kV were included in the report.*
- *TANTRANSCO informed that they had identified the feeders upto* ***110 kV*** *and data are made available to SRLDC.*

2.3 The Committee confirmed the minutes of the 6th meeting of NPC with the above amendments.

3. Monitoring of Schemes Funded from PSDF

3.1 MoP has sanctioned grant of around Rs.9305 Crores (86 Schemes as on 10.08.2017) to States/ Central Power utilities/RPCs from PSDF. The details of the schemes are at **Annexure-IV**. Region wise summary is given below:

Sr. No.	Region	No. of Schemes	Grant Sanctioned in Rs. Crores	Grant Disbursed in Rs. Crores
1	Northern	17	1677.15	150.91
2	Western	21	483.50	28.88
3	Southern	20	1751.28	106.89
4	Eastern	14	1385.09	139.22
5	North Eastern	11	624.04	92.54
6	All India Schemes (PGCIL,REC)	3	3384.27	173.99
Total		**86**	**9305.33**	**692.44**

From above, it may be seen that despite sanctioning Rs.9305 Crores, the actual disbursement is quiet less due to slow implementation of projects by entities. The slow progress in implementation of the schemes is a matter of concern.

3.2 As per the guidelines of PSDF, the disbursement of the funds shall be carried out in a phased manner, in four instalments as per the details given below:

i. **First Stage**: 10% of the total grant sanctioned (out of 30%) shall be released after sanction of grant and signing of Tripartite/Bipartite Agreement.

ii. **Second Stage: 20%** of the total grant sanctioned (out of 30%) shall be released in accordance with the award of contracts in max. no. of five tranches.

iii. **Third Stage/ Intermediate Stage: 60%** of the grant after utilization of the grant disbursed in first installment and consumption of self-contribution of the entity, in maximum five tranches.

iv. **Fourth Stage:** Balance 10% of the grant shall be released on completion of the scheme.

3.3 As per the decision in the 6th meeting of NPC, NPC secretariat has been furnishing summary of sanctioned schemes funded from PSDF to RPCs for information and deliberation in their OCC meetings. RPCs were further requested to examine the implementation of schemes in OCC & TCC meetings and intimate NPC about any bottlenecks.

3.4 **Deliberation / Decision in the meeting:**

i) MS, NPC requested RPCs to take up the matter with State utilities for expediting implementation of the schemes so that fruitfulness of PSDF scheme is availed in better performance of the grids.

ii) MS, NRPC informed that utilities are not able to place LoA in time. Further the scheme keep on changing with progress in time. He observed that the sincerity of the utilities towards utilization could be checked and proper action could be taken for non-serious utilities.

iii) MS, NPC observed that some amount from the sanctioned amount of Rs.9305Crores may be unlocked if the schemes of non-serious utilities are eliminated from PSDF funding.

iv) Chairperson, CEA & NPC emphasized that PSDF is being monitored at Secretary, Power level, hence Utilities should put in efforts to complete the schemes under the timeline. He also pointed out that quantum of fund left in the PSDF is less and hence utilities should be sensitized regarding the utilization of PSDF.

v) MS, SRPC informed that the matter is being discussed in the OCC/TCC meetings of SRPC. He pointed out that out of 20 schemes in SR, 11 schemes were sanctioned only in 2017. He expressed concern on the delay in inspection of the project on Renovation & up gradation of Protection System of KSEBL, which restricted Kerala to get the grant disbursed from 60% of the grant.

vi) MS, NERPC informed that the introduction of GST is also one of the reasons behind delay in the utilization of fund by the utilities of North Eastern region. Since the schemes of utilities of NER are 100% funded from PSDF, due to introduction of GST, there may be variation in cost.

vii) Representative from NLDC, informed that NLDC as Nodal Agency for operationalization of PSDF is awaiting sanction orders from MoP for

expenditures towards monitoring the implementation of Schemes under PSDF. It was informed that charges up to 0.2% of the grant released by MoP shall be retained by NLDC with an upper cap of Rs 1.0 crore per annum and expenditure as per actual for carrying out the works related to monitoring of schemes funded from PSDF. He added that POSOCO had requested release of Rs. 4300 Crore from MoP in April 2017 while they received only Rs. 500 Crore by June 2017 which is one of the major bottleneck and causing delay in disbursement of funds to utilities.

4. Automatic Generation Control (AGC)

4.1 MS, NPC said that, presently states are facing issues related to deviation from schedules (under DSM), which may increase further as more and more of Renewable Energy Sources (RES) is added to the system. Further to operate the system at the desired frequency of 50 Hz, it is important that control reserves in the form of governor response i.e. primary response and Automatic Generation Control (AGC) i.e. secondary response should be available. In this direction, CERC in its order dated 13.10.2015 in Petition No. 11/SM/2015 reiterated the need for mandating Primary Reserves as well as Automatic Generation Control (AGC) for enabling Secondary Reserves:

"(a) All generating stations that are regional entities must plan to operationalise AGC along with reliable telemetry and communication by 1st April, 2017. This would entail a one-time expense for the generators to install requisite software and firmware, which could be compensated for. Communication infrastructure must be planned by the CTU and developed in parallel, in a cost-effective manner.

(b) On the other hand, National/Regional/State Load Dispatch Centres (NLDC/RLDCs/SLDCs) would need technical upgrades as well as operational procedures to be able to send automated signals to these generators. NLDC /RLDCs and SLDCs should plan to be ready with requisite software and procedures by the same date.

(c) The Central Commission advises the State Commissions to issue orders for intra-state generators in line with this timeline as AGC is essential for reliable operation of India's large inter-connected grid."

In order to achieve the goal of sufficient primary response and secondary response in each region, efforts are required at RPC & NPC level in a coordinated manner. He requested POSOCO to give a presentation on AGC and their experience at Dadri

4.2 **Deliberation / Decision in the meeting:**

i) Representative from POSOCO informed that around 4000MW as primary, 3623 MW as secondary/AGC and 5218 MW as tertiary reserve in envisioned for the Indian Grid. He informed that AGC which is a secondary reserve would come into effect after frequency control action through primary response. He further informed that AGC is much slower (takes 5 - 6 minutes) and is a PI Controlled

logic. AGC would bring back the frequency to desired frequency and hence stabilize the grid. He emphasized the need to operationalize AGC in all the ISGS so that desired defense mechanism could be put into place to meet the contingency situation in Indian grid (A copy of the presentation made by POSOCO is at **Annexure-V**)

ii) Chairperson, CEA & NPC, informed that a report on flexing of thermal generation up to 20-30 % level is under examination by CEA. He informed that old thermal generating station might not even ramp down its generation below 70% and phasing out of the old/inefficient power plants were being taken up.

iii) Representative from SRPC (TSTRANSCO) said that weather forecast tools are the most important to assess the demand and load of a state & hence is the major tool for reducing balancing requirement. States are able to predict their demand well when the weather condition is normal or the deviation is within 5% of the normal weather condition. States like Telangana which are more dependent on agricultural demand which is more sensitive to weather, had seen variation of around 2000MW within half an hour during monsoon season. Variation of 1 to 2 degrees in cities where concentrated demand is there could bring down the AC loads to the tune of 500MW in half an hour to 45 minutes. Hence there is a greater requirement of having precise weather forecasting to system operators to minimize the unbalancing power.

iv) Representative from POSOCO said that forecast data is more of qualitative in nature as observed from IMD website which may help only in outage maintenance planning. However, there is need of data being quantitative in nature reflecting temperature, rainfall, humidity parameters and those forecast data could be factored into load flow model.

v) Representative from WRPC (CE, GETCO) said that IMD's main concern is predicting likelihood of heavy rainfall, occurrence of flood, cyclones etc. Hence with our request, there could be a sub-group on data which is sensitive to temperature & weather parameter forecast. Moreover, the sensitivity of forecast data which as a system operator desires had to be improved upon. He further informed that they had floated a tender for load forecast software, with funding from PSDF. In addition, an internal team which is working round the clock so that the challenges related to load forecasting could be mitigated.

vi) MS, NERPC said that weather forecast in North Eastern Region is very difficult as the data reflected in IMD's website is general in nature and did not cater real time data. Moreover, RTU's were not installed at all the locations.

vii) MS, NRPC stated that even after spending huge money in the implementation of RGMO, the primary response is not coming accordingly. Many of the units had not commissioned RGMO which is a matter of concern. He further informed that

AGC comes into picture when RGMO fails and hence there is need to prioritize first the proper operationalization of primary response.

viii) MS, WRPC endorsed the views of MS, NRPC. He further stated that first the issues related to implementation of primary response be resolved. He enquired POSOCO whether they were planning to implement AGC as a back up to primary response or as an independent response. He raised concern about investing in AGC without studying its advantages/disadvantages.

ix) MS, SRPC informed that the matter regarding sufficient primary response is already being deliberated in the OCC/TCC/SRPC meetings. All SLDCs are conducting specific meetings with their respective embedded generators All efforts are being made to ensure better primary response in SR. AGC is also being discussed in the TCC and SRPC meetings. Pilot projects at NTPC stations of Simhadri TPS Stage-II and NP Kunta have been identified for implementation of AGC.

x) Representative from NLDC explained that primary response would come immediately, say within 3 - 4 seconds, after a contingency occurs, according to the governor droop & it is a proportional control, whereas AGC is much slower as it is PI Control & usually would come in 5 to 6 minutes & would try to improve frequency according to ACE (Area Control Error) value.

xi) MS, WRPC raised concern that Indian Power sector has around 300 GW installed capacity with a demand of 150 GW & a 600MW unit trips, the inertia of the system is unable to give secondary response. He stated that efforts should be channelized in the implementation of primary response.

xii) MS, NRPC stated that currently, the health of DISCOM is in very bad shape and hence AGC could not be forced upon them. He suggested that filing of petitions by POSOCO & CTU should be after deliberations in RPCs.

xiii) MS, SRPC stated that all the three i.e. primary, secondary & tertiary response are required for smooth operation of the Indian Grid. He pointed out that for implementation of ancillary services generators are paid incentives for ramping up/down its generation. Hence, POSOCO's efforts should be appreciated for arriving at the markup cost of 50 paise/kwh to be paid for mileage in respect of AGC.

xiv) MS, NPC stated that primary and secondary response are equally essential as AGC alone could not handle the frequency variation. He proposed that a formal structure at RPC & NPC levels could be formed for deliberating issues on frequency control including the issues related to primary, secondary(AGC) and tertiary (RRAS) controls and DSM, because these issues require detailed intense discussion and should be addressed properly. On the apprehension of investing in

AGC, he said that primary response comes according to the steam/ water availability while tertiary (ancillary) comes after 45 minutes to an hour (manual in nature as it is to be scheduled), hence there should be some automatic regulator within this time frame and AGC plays the crucial role.

xv) Regarding the amount to be charged for AGC, he said that there could be two philosophies i.e. first one is either to give markup, and the second is to go for a market approach. He further stated that this aspect was also discussed in case of Ancillary/tertiary in CERC, where they opted for markup instead of a market approach. MS, NPC informed that in European countries there is a market for AGC and as well as for tertiary, hence market based approach could be better option. He insisted that all these aspects may be discussed at RPC/NPC level with all the stakeholders and accordingly suggestions may be forwarded to POSOCO/ CERC / MoP,

xvi) Chairperson, CEA & NPC observed that the agenda could be summed up in two parts i.e. first is that AGC is the requirement of system operation where in generators have to participate in frequency regulation; the second is the ramifications of this kind of implementation on tariff. Since this agenda pertains to generators and DISCOMs, it could be discussed in detail at RPC level. He stated that since DISCOMs are the buyer of power from generators there should be some provision of participation in frequency regulation which could be introduced in PPAs which could make generators liable to follow. He further stated that there should be a holistic view considering all the aspect viz. technical, commercial, legal/regulatory in terms of PPAs and model document for PPAs which could be thoroughly analyzed/examined at POSOCO & NPC level.

4.3 **After deliberation, NPC decided that AGC would be discussed in detail at RPC level in a special meeting. The discussions would include aspects of implementation of primary and tertiary controls also. For this, the agenda would be sent by POSOCO and routed through NPC Secretariat to have a commonality and national perspective.**

Action: POSOCO/NPC Secretariat/RPCs

5. Common Transmission System Data Base

5.1 MS, NPC emphasized the need of having an accurate all India power system data for carrying out accurate power system studies for operational and planning horizons. He informed that power system in India is growing at the rate of about 6-7% per annum and hence, accuracy of base data for studies is very important to minimize errors in operational studies and system optimization at planning stage. Effectiveness of transmission planning and system operation including determination of Total Transfer

Capacity (TTC) and dynamic system behavior depends largely on accuracy of network model i.e. the model used for steady state, short circuit and stability analysis. Recently, under direction of Government of India, a consultant has been appointed, who has also given recommendation in regard to accurate model for planning and operation of transmission system.

5.2 He added that it would be a huge task as the models that are being used by the states and also for ISTS need a lot of improvement and there would also be a need to validate them on a regular basis say after 2 to 3 years. He proposed that work can be taken up by NPC/CEA in association with CTU, all RLDCs/SLDCs/STUs and under active coordination of RPCs. Details in respect of above are given in his presentation, attached at **Annexure-VI**). He suggested an institutional and procedural setup to carry out the following task:

i. Validation of model for steady state analysis

ii. Validation of model for each machine, HVDC, FACTS devices

iii. Regular updating of above models

iv. Common approach to integrate models of each STU into an All India Model.

5.3 **Deliberation / Decision in the meeting:**

i) NRPC, SRPC & NERPC appreciated the proposal mooted by NPC Secretariat.

ii) MS, ERPC informed that the data are already available with ERPC in the PRDC format, which can be used for national base case without any difficulty.

iii) MS, WRPC observed that modeling of data is required to accommodate application for RE integration. He opined that unique ID for line elements in the country may be adopted.

iv) Representative from POSOCO informed that data format used by CTU could be circulated to all the RPCs so that a common data format could be used.

v) Chairperson, CEA & NPC stated that we may have to do data mining for creation of suitable data base for this purpose. He advised that, first of all we should list out that what data is required, and to start with we can take whatever data is available as low-hanging fruit and then request the utilities through RPCs to furnish data. He said that, initially we may get only 30 - 50% data, so we would need to follow up with the utilities and dig out data. For this, he suggested that POSOCO may prepare required formats and circulate to all RPCs, and in turn RPCs may obtain data from their constituents. He requested POSOCO to circulate the format in this regard to be used by all the RPCs. **The same was accepted.**

Action: NPC Secretariat/RPCs/POSOCO

6. SPECIAL INVITEE / MEMBERSHIP STATUS TO M/s PTC IN RPCs

6.1 MS, NPC informed that the issue of request from M/s PTC for Special Invitee / Membership status in all RPCs was discussed in the 5th meeting of NPC wherein, it was decided that the issue would be deliberated in respective RPCs and outcome thereof would be communicated to CEA for taking up the matter with MoP.

6.2 In the 6th meeting, the following had been noted:

- *"SRPC had informed that special invitee/Membership status to M/S PTC in SRPC was not agreed by SRPC. SRPC and WRPC had recommended membership of only one trader as envisaged in MoP Resolution.*
- *ERPC had informed that due to international transactions, PTC, NVVNL and TPTCL were given membership status in ERPC.*
- *Chief Engineer (GM) had informed that as per the proposed amendment taken up with MoP by CEA, a representative of each of nodal agency appointed by Government of India for cross border power transaction with the countries having electrical interconnection with the region also included as members of respective RPCs irrespective of the trading volume. In such case PTC could be retained as a member of ERPC. All other RPCs trader membership would be as per the present practice being followed.*
- *Chairperson, NPC observed that presently ER & NER were the regions involved in cross border transaction of power. MoP may take a call on the proposed amendment in the Resolutions of RPC for including traders who are involved in cross border trading as members of respective RPCs.*
- *NPC had decided to await the outcome of proposed amendment of resolution by MoP."*

6.3 In the meeting, MS, NPC informed that, as per communication received from the GM Division, CEA, the response from MoP was still awaited and the matter is being followed up with MoP. **The committee noted the same.**

7. Membership of IPPs in RPCs

7.1 WRPC had stated that as per MoP Resolution, representative of every generating companies (other than CGS and state government owned generating companies) having more 1000 MW installed capacity in the region would be Member of RPC. The number of IPPs has been increasing continuously as IPPs whose installed capacity crosses 1000MW were getting entitled for membership of RPC and it was difficult to organize and manage RPC meetings.

7.2 In the 5th meeting of NPC, it was decided that the issue to be deliberated first in respective RPCs and after evolving a common view the same would be referred to MoP for amendment in Resolution. RPCs had agreed to put up the issue in the next RPC

meeting for deliberation. Subsequently, SRPC had informed that the present practice on membership of IPP as per MoP Resolution would be continued.

7.3 Accordingly, in the meeting, 6th meeting of NPC the following had been noted:

- *WRPC had informed that in the 32nd meeting of WRPC, it was decided that IPPs qualification may be increased to 2000 MW and IPPs below 2000 MW may be represented by one IPP on rotational basis.*
- *NRPC & SRPC had suggested that the amendment in Resolution should be proposed only for WRPC because other RPCs have no issue.*
- *Member (GO&D) had pointed out that MoP has issued individual Resolutions for each RPC. Resolution in respect of WRPC could be proposed for amendment regarding membership of IPPs.*
- *NPC had decided that GM Division, CEA would take up with MoP for amendment in Resolution of WRPC in respect of eligibility condition of IPPs membership in WRPC.*

7.4 In the meeting, MS, NPC informed that, as per communication received from the GM Division, CEA, the response from MoP was still awaited and the matter is being followed up with MoP. **The committee noted the same.**

8. Automatic Under Frequency Load Shedding (AUFLS) Scheme and Mapping of Feeders

(A) Automatic Under Frequency Load Shedding (AUFLS)

8.1 MS, NPC informed that in the 4th meeting of NPC held on 10th December 2015, following was discussed on the subject:

- "*NRPC had intimated that all the states except Chandigarh and J&K had implemented the above load-relief scheme. Chandigarh had implemented AUFLS scheme at 49.2 and 49.0 Hz only and J&K was yet to implement the same.*
- *SRPC & WRPC intimated that the scheme had been implemented in their region and it was designed to provide even higher load-relief than that required under the scheme. SRPC mentioned that the scheme in SR states had been implemented by selecting the feeders in such a fashion that average load-relief – not the peak load-relief – provided by those feeders through the UFRs was equivalent to the load-relief required to be provided under the AUFLS scheme. WRPC stated that in WR, except Goa (for about 30 MW load-relief), all states had implemented the scheme.*
- *NPC had expressed satisfaction that barring a few states, the revised AUFLS scheme had been implemented by the states in the country. It was decided that the RPCs would take up the matter of implementation of the scheme with the states which had not so far implemented the same and inform the progress at the next meeting.*"

8.2 Further, in the 5th meeting, WRPC informed that Goa had implemented the scheme and NRPC informed that they have taken up with Chandigarh and J&K. In the 6th meeting,

the status remained unchanged. He said that considering successful implementation of the AUFLS in various states/regions, it is important to deliberate on the following two aspects:

i. Whether desired load relief has been obtained during fall in frequency,

ii. The need to review the quantum of load shedding and stages of frequency

8.3 Deliberation / Decision in the meeting:

i) Representative from J&K informed that there are some issues at tendering stage and once resolved they could implement AUFLS in their state.

ii) MS, NPC sought the views of Members on the review of quantum of load shedding and stages of frequency.

iii) It was agreed that there is need for review of the quantum of load shedding without introduction of additional slabs/stages of frequency. And therefore, **RPCs may deliberate on additional slabs of frequency as well as raising the set frequency for UFR operation. The views of RPCs would be put up in next meeting of NPC.**

Action: NPC Secretariat/RPCs

(B) Mapping of Feeders:

8.4 MS, NPC informed that in the 4th Meeting, NPC had decided to maintain status quo in respect of AUFLS. It was also agreed by the RPCs to initiate the process of mapping of feeders covered under AUFLS scheme like SRPC with a view to ensuring proper implementation of the scheme and also have a real time assessment of load-relief likely to be available under the scheme if it operated.

8.5 In the 6th meeting, the following has been noted:

- *SRPC had informed that 84% mapping of feeders on SCADA had been completed in SR. Subsequently, SRPC has furnished the details of feeder mapping.*
- *NRPC had informed that Delhi and HP had completed feeder mapping.*
- *WRPC expressed concern on mapping of 11 kV feeders since communication/telemetry infrastructure is generally not available at these voltage levels.*
- *It was agreed that each RPC would submit the details / progress of feeder mapping to NPC secretariat.*

8.6 Deliberation / Decision in the meeting:

i) MS, SRPC informed that the mapping percentage is around 86%. The updated information furnished by SRPC is at **Annexure-VII**.

ii) **After deliberation, it was agreed that each RPC would submit the details / progress of feeder mapping to NPC secretariat.**

Action: NRPC/WRPC/ERPC/NERPC

9. Ensuring Proper Functioning of Under Frequency Relays (UFR) & Df/Dt Relays

9.1 In the 5th meeting of NPC, it was agreed that each RPC would ensure proper functioning of UFR and df/dt relays as per the agreed procedure of the region. Actual tripping of feeder may not be required to test the healthiness of the UFRs. It was also agreed that RPCs would send their comments/suggestion on preparation of procedure for certification of healthiness of UFR and df/dt relays.

9.2 In the 6th meeting of NPC, it was decided that all RPCs Secretariats would furnish to NPC Secretariat the procedure being followed by them to ensure healthiness of UFR & df/dt relays. RPC Secretariats shall carry out periodic inspection, in line with the provisions of IEGC.

9.3 Subsequently, SRPC has furnished the information received from SR States/UT in respect of the procedure being followed by them to ensure healthiness of UFR & df/dt relays (**Annexure-VIII**). SRPC is carrying out periodic inspection regarding proper functioning of AUFR & df/dt relays in line with provisions of IEGC.

9.4 **Deliberation /** Decision **in the meeting:**

i) MS, NPC informed that there is a need for periodic tests of UFR & df/dt relays to ensure their healthiness. He informed that WRPC had done two inspections in the last two days and that is a good sign. SRPC has sent detailed report wherein they have collected information from all the states.

ii) He proposed that NPC may discuss on two items i.e. i) the frequency of inspection, and ii) whether RPCs should go for mock test or carry out actual tripping to test the healthiness. He informed that most of the states in Sothern Region were carrying out yearly inspection except Karnataka, which inspects once in 6 months. He informed that Kerala and Pondicherry were carrying out actual tripping whereas other states in SR were going for mock tests to test the healthiness of the relays. He asked the members whether any mandate regarding the frequency and method of testing of the relays is required to be given from NPC.

iii) MS, ERPC informed that they were conducting site inspection of 1/3rd of the UFRs installed on quarterly basis and carry out actual tripping to test the healthiness of relays.

iv) MS, WRPC expressed concern regarding reduction in the life of the Circuit Breakers if actual tripping was carried out frequently for such testing. He

informed that mock test for the identified feeders is good enough and hence WRPC is carrying out mock test only.

v) MS, SRPC informed that they were also carrying out inspection regularly. They had covered 10 substations in the last two months. He further informed that they were carrying out mock test to test the healthiness of the relays.

vi) MS, NRPC informed that they are inspecting two substations every month and mock test were being carried out to test the healthiness of feeders as sometimes these feeders were irrigational feeders.

vii) MS, NERPC informed that they are carrying out mock test to check the healthiness of the feeders.

9.5 **After deliberation, NPC decided that mock test is good enough to test the healthiness of the UFR & df/dt relays. The frequency of site inspection was proposed to be upto six months. RPC Secretariat shall carry out periodic inspection, in line with the provisions of IEGC. RPC secretariat to furnish the inspection reports to NPC Secretariat.**

Action: RPCs

10. Scheme of Protection System Data Base in RPCs

10.1 MS, NPC informed that the Ramakrisha Task Force Report on Power System Analysis Under Contingencies had been accepted by MoP. Ramakrisha Task Force had recommended for creation of data base for relay settings.

"There is also a need for creating and maintaining data base of relay settings. Data regarding settings of relays in their network should be compiled by the CTU and STUs and furnished to the RLDC and SLDC respectively and a copy should also be submitted to RPC for maintaining the data base."

10.2 The scheme of ERPC and SRPC for above purpose for funding from PSDF have been approved by MoP and the schemes are under implementation. In the 6th meeting, it was agreed that NRPC, WRPC & NERPC would also create data base of relay setting in their regions as per the scheme finalized by ERPC / SRPC. These RPCs were also requested to initiate the preparation of above scheme to implement the recommendations of the Ramakrishna Task Force. Consultant-A, also observed the creation and maintaining of data base.

10.3 **Deliberation / Decision in the meeting:**

i) MS, NPC informed that ERPC had procured the software with a sanctioned grant of Rs. 20 Crores and similarly, SRPC also in the process of procurement with a sanctioned grant of Rs. 25 Crores from PSDF. MS, ERPC informed that the

scheme would be completed by 30th September, 2017. Five training programmes have already been completed and another three trainings were under process.

ii) MS, SRPC informed that SRPC had placed the letter of award on M/s PRDC. The nominations of nodal officers from concerned utilities have already been sought. The scheme is scheduled to go live in a time span of 18 months.

iii) MS, NERPC informed that they had formed a sub-group for preparation of technical specifications for the transmission system database. The sub-group would meet on in September, 2017 to finalized the scheme for NERPC.

iv) MS, NRPC informed that Chairman, NRPC had approved the scheme for Northern Region and they would soon submit the DPR to NLDC.

v) MS, WRPC informed that they would like to go for in house development of the data base which could be in excel or SQL format and if any needs arises they would opt for development through third party.

Action: NRPC/WRPC/NERPC

11. Methodology / Procedure for computing Actual Drawal / Injection of Entities in case of Non-availability of Main/Check/Standby Meter Data

11.1 MS, NPC informed that WRPC had proposed to have redundancy in commercial metering system which has far more commercial implications as compared to the meter cost. WRPC has also suggested that the amendment in the Central Electricity Authority (Installation and operation of meters) Regulations, 2006, could be brought in, by making provision of installation of check meters on all the interface metering points of regional entities of the ISTS, and that NPC may take up with Distribution Planning and Development Division of CEA for making the above provision in the CEA's metering regulations.

11.2 The issue was deliberated in the 6th meeting of NPC, wherein it was observed that the computation methodology being followed by each RLDC is different. It was agreed that POSOCO would revert back on the procedure being followed by the RLDCs. Subsequently, POSOCO had furnished the details of methodology being followed by RLDCs. **The methodology / procedure for computing actual drawal / injection of entities in case of non-availability of main/Check/Standby Meter data** along with uniform methodology proposed by NPC (**Annexure-IX**) was sent to RPCs for views / comments after deliberation in the respective Commercial Sub- Committees.

11.4 SRPC has furnished views of Commercial Sub-Committee and ERPC has furnished views of ERPC Secretariat & ERLDC. Views received from SRPC & ERPC are at **Annexure-X.** SRPC had stated that applying uniform loss rate would be erroneous. The error by considering the losses in this fashion would be much more than in the

error in the event of not accounting losses. Moreover, applying proposed flat rate of losses may, at times give energy generation figures more than actual injection.

11.5 ERPC was also of the view that straight jacketing transmission loss as fixed number should be avoided.

11.6 In view of the above, MS, NPC proposed that the actual loss on the line or ICT computed based on the previous week data may be used for loss application.

11.7 **Deliberation / Decision in the meeting:**

i) RPCs agreed with the proposal of NPC. The usage of this data would be scientific as all the parameters of line/equipment are well taken for arriving loss percentage.

ii) Representative from POSOCO expressed concern regarding metering inaccuracies which are generally not accounted. He stated that replacement of faulty meters could be expedited to account for metering inaccuracies.

iii) Chairperson, CEA & NPC enquired the members about the periodicity of replacement of faulty meters. Chairman, TCC (SRPC) informed that it is around 3 months in the state of Telengana. Representative from CTU informed that they usually take 2-3 days for replacement of faulty meters.

iv) Chairperson, CEA & NPC observed that a framework for replacement of meters could be developed and best practices followed could be circulated to all the RPCs. He requested NPC to take a lead in this.

11.8 **After deliberation, NPC agreed that the actual loss on the line or ICT computed based on the previous week data may be used for loss application (in case of non-availability of previous week data nearest week available data may be used). The same should be implemented from first week of December 2017). It was decided that NPC Secretariat may develop a framework for replacement of meters after taking inputs from RPCs on the practice being followed by the Utilities.**

Action: NPC secretariat/ RPCs

12. Implementation of 5-Minute Scheduling, Metering, Accounting and Settlement

12.1 MS, NPC stated that the issue of moving from 15-minutes to 5-minutes' time block scheduling is under discussion based on the report of SAMAST and CERC order in Petition No. SM/127/2011. He informed that two meetings of the sub-group with the members from POSOCO, RPCs, NPC, CEA, CTU & representative from one RE rich state in NR, WR had been convened after the directions from 11th meeting of "*FOR Technical Committee for Implementation of Framework on Renewables at the State Level*". As the issue is of importance to the generators and DISCOMs in each region, it should be discussed at RPC level, and that is the reason to bring the issue for consideration of NPC.

He further informed that, for implementation of 5-minute scheduling, changes would be required at meters, CERC Regulations, Metering Standards of CEA and accounting practices of all the RPCs. He added that most of the European countries, even with substantial RE presence in the grid and electricity market, do not have 5-minutes time-block & they generally follow 15 minutes to 1-hour time blocks. He opined that in the absence of effective Primary and Secondary Controls, the intended benefits of changing to 5-minute schedule block may not be there. And therefore, there is need to simulate at least past one year data to ascertain real benefit, if any, of the proposed change.

12.3 Chairperson, SRPC observed that the issue was not in the circulated Agenda. MS, NPC said that, as the issue is of importance to the generators and DISCOMs in each region, it should be discussed at RPC level, and that is the reason to bring the issue for consideration of NPC.

12.4 On a query by Chairperson, CEA & NPC about the formation of the sub-group, MS, NPC informed that FOR (Forum of Regulators) had constituted this sub-group with adequate representation from all the stakeholders. ToR of the sub-group includes *5-Minute Scheduling, Metering, Accounting and Settlement.* Chairperson, CEA & NPC observed that the regulation in this regard is to be made by CERC, and hence NPC may at the best note the issue; the RPCs may however, were free to discuss the matter at their level.

12.5 After deliberation, NPC noted the issue as discussed above and observed that RPCs, if desire, may discuss this issue at their level.

13. Standing Committee Recommendations to PGCIL for strengthening the Design of Towers (NRPC issue)

13.1 MS, NRPC vide letter dated 06.09.2017 (**Annexure-XI**) had submitted the agenda about the Standing Committee recommendations to PGCIL for strengthening the design of towers. The Standing Committee had recommended that the towers with delta configuration shall be avoided to the extent possible in 765KV single circuit(S/C) lines in future and as such most of the 765KV lines shall be Double circuit (D/C) lines with vertical configuration. **The Committee noted the same.**

14. Accounting Methodology for 'Bilateral Short Term' and 'Collective Transaction' in case of Grid Disturbances

14.1 MS, NPC informed that in pursuance to Para 6.5.17 of CERC (Indian Electricity Grid Code) (Second Amendment) Regulations, 2014, the NPC in its 4th Meeting, constituted a Working Group comprising representatives from CEA, Secretariat of RPCs/NPC and NLDC to finalize Methodology of settlement of accounts for bilateral short term and collective transactions for the period of Grid Disturbance. The accounting methodology

finalized by the working group was deliberated and approved in the 6th Meeting of NPC held on 19th December 2016 and advised NPC Secretariat to submit the methodology to CERC.

14.2 Accordingly, NPC Secretariat vide letter dated 27th January 2017 has submitted to CERC the methodology of settlement of accounts for bilateral short term and collective transactions, for the period of Grid Disturbance. **The Committee noted the same.**

15. Line Differential Protection

15.1 Implementation of Line Differential Protection (LDP) as per the recommendation of the Sub-Committee on Relay/Protection under task Force for Power System Analysis under contingencies (Para14 in Section-6 of the report under Relay setting guide lines for Transmission lines):

> ***"*** *LINE DIFFERENTIAL PROTECTION*
> *Many transmission lines are now having OPGW or separate optic fibre laid for the communication. Where ever such facilities are available, it is recommended to have the line differential protection as Main-I protection with distance protection as backup (built-in Main relay or standalone). Main-II protection shall continue to be distance protection. For cables and composite lines, line differential protection with built in distance back up shall be applied as Main-I protection and distance relay as Main-II protection. Auto-recloser shall be blocked for faults in the cables."*

15.2 Further, in the 6th meeting the following has been noted:

- *"Chief Engineer, NPC had informed that the issue was discussed in the Protection Sub-Committee meeting of ERPC wherein the members in principle agreed the scheme. Differential protection is already implemented in short lines in ER.*
- *MS, SRPC was of the view that all 220kV & above short length and / or high line loadings transmission lines, where conventional distance protection relay may mal-operate (on over-reach) due to difficulties in setting Zone-1. Line Differential Protection is to be provided as both Main-I & Main-II protection with distance protection as backup in short length and /or high line loading transmission lines.*
- *WRPC and NRPC had informed that the issue is under deliberation in their OCC meeting.*
- *It was agreed that group formed for the PSS tuning would also study the issue involved with implementation of Line Differential Protection and submit its report / recommendation at the earliest."*

15.3 Subsequently, nominations were sought from RPCs, POSOCO, CTU and the same was received from all except from ERPC. In this regard, it may please be noted that a Subgroup under National Reliability Council for Electricity (NRCE) constituted for "Preparation of reliability Standards for Protection System and Communication System" has proposed the following in respect of LDP:

"For transmission line having voltages at 220kV and above: High speed Duplicated Main Protection (Main-I and Main-II) shall be provided and at least one of them being carrier aided non-switched four zone distance protection. The other protection may be a phase segregated current differential (this may require digital communication) or a carrier aided non-switched distance protection. Wherever OPGW or separate optic fibre laid for the Communication is available, Main-I and Main-II protection shall be the line differential protection with distance protection as backup (built-in Main relay or standalone). For very short line (less than 10 km), line differential protection with distance protection as backup (built-in Main relay or standalone) shall be provided mandatorily as Main-I and Main-II.)."

15.4 In view of the above, separate group to study the issue involved with implementation of Line Differential Protection may not be required. The report finalized by the subgroup under NRCE will be submitted to NPC. **The Committee agreed for the above.**

16. Grid Disturbance Report (GDR)

16.1 MS, NPC informed that the NPC Secretariat is carrying out monitoring/analysis of grid disturbance on Regional / National basis. In order to have uniformity in submission of Grid Disturbance Report by RPCs, a format has been prepared and circulated to all RPCs for submission of report on monthly basis. He said that WRPC and SRPC have been furnishing the report in the prescribed format and requested all the other RPCs to submit grid disturbance report on monthly basis (latest by 3rd day of every month) as per the format to NPC division regularly and the soft copy e-mailed to cenpc-cea@gov.in .

16.2 All the RPCs agreed to adhere with the time schedule for submission of information.

17. Preparation of Guidelines on Availability of Communication System

17.1 MS, NPC informed that CERC has entrusted NPC to prepare Guidelines on "Availability of Communication System" in terms of Regulation 7.3 (i) of CERC (Communication System for Inter-State transmission of electricity) Regulations, 2017. In this regard, it was decided to constitute a Working Group with members from RPCs, POSOCO, CTU, CEA, PGCIL and NTPC (Director & above from CEA, SE & above from RPCs and AGM & above from other organizations).

17.2 He informed that the nominations have been received only from all except ERPC and CTU. CTU representative informed that PGCIL had already nominated officers and there would not be separate nominee from CTU. On a query from MS, ERPC it was clarified that the expert from state utilities may be nominated in case of suitable officers in Secretariat of RPCs are not available. Chairperson, CEA& NPC requested ERPC to expedite the nomination.

18. Capacitor Bank Installation in NER for funding from PSDF

18.1 MS, NERPC informed that the DPRs for Capacitor Bank Installation in Mizoram & Nagaland have already been sent to NPC, CEA & NLDC. However, it was informed that the above project has been kept as low priority and may be taken up as when the fund is available. He said that since these Sates are facing low voltages and installation of capacitor bank will help their system. Moreover, the cost of DPR is very less (around 35 Cr for both Sates). He requested Chairman, CEA to kindly review and considered the DPRs for Capacitor Bank installation for Nagaland & Mizoram.

18.2 Chairman, CEA stated that he will look into the matter to find out a solution for approving the above DPRs of installation of capacitors in NER.

19. Date and Venue of Next Meeting

As per the roster for hosting the NPC meeting the next meeting is to be hosted by NERPC. Representatives from NERPC agreed to host the 8th meeting of NPC. The date and venue of 8th meeting would be intimated in due course.

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ANNEXURES

No.	DESCRIPTION
I	List of Participants
II	Copy of the communications with MoP- Amendments in CBR
III	SRPC letter dated 08.02.2017 - Amendment in Item 8(b) of the Minutes of 6th meeting of NPC
IV	Details of the scheme funded from PSDF
V	POSOCO Presentation on AGC
VI	NPC Presentation on Common Transmission System Database
VII	SRPC furnished information received from SR States/UT in respect of the procedure being followed by them to ensure healthiness of UFR & df/dt relays
VIII	SRPC – AUFR/(df/dt) updated information
IX	The methodology / procedure for computing actual drawal / injection of entities in case of non-availability of main/Check/Standby Meter data along with uniform methodology proposed by NPC
X	Views received from SRPC & ERPC on the methodology proposed by NPC
XI	NRPC letter dated 06.09.2017-Standing Committee recommendations to PGCIL for strengthening the design of towers

ANNEXURE – I

List of Participants in the 7th Meeting of NPC held on 08th September 2017at Indore.

Central Electricity Authority (CEA)

1.Shri Ravindra Kumar.Verma, Chairperson CEA & NPC
2.Shri Pardeep Jindal, Chief Engineer & Member Secretary NPC
3.Shri D.K. Srivastava, Director, NPC
4.Shri K.P. Madhu, Deputy Director, NPC
5.Shri Deepanshu Rastogi, Assistant Director-I, NPC

Western Region Power Committee (WRPC)

1.Shri A.Balan, Member Secretary,WRPC
2.Shri B.B.Mehta, Chief Engineer, SLDC, Gujarat
3.Shri J.K.Rathod, Superintending Engineer, WRPC
4.Shri LKS Rathore, Assistant Secretary, WRPC
5.Shri P.D.Lone, Executive Engineer, WRPC
6.Shri Dipak H Patel, Divisional Engineer (STU),GETCO

Northern Region Power Committee (NRPC)

1.Shri M A K P Singh, Member Secretary, NPC
2.Shri S.K.Kaul, Chief Engineer (C&S),JKPDD
3.Shri Upendra Kumar, Superintending Engineer, NRPC

Eastern Region Power Committee (ERPC)

1.Shri A.K.Bandyopadhyaya, Member Secretary, ERPC
2.Shri P.K.De, Executive Engineer, ERPC

Southern Region Power Committee (SRPC)

1.Shri D.Prabakar Rao, Chairperson, SRPC & CMD, TSTRANSCO
2.Shri G.Narsing Rao, Chairperson, TCC (SRPC) & Director (Proj. & GO), TSTRANSCO
3.Shri S. R.Bhat, Member Secretary,SRPC
4.Shri P.Suresh Babu, Superintending Engineer, SLDC,TSTRANSCO
5.Shri Anil, Executive Engineer, SRPC

North Eastern Region Power Committee (NERPC)

1.Shri P.K.Mishra, Member Secretary, NERPC
2.Shri B.Lyngkhoi, Superintending Engineer, NERPC

Power System Operation Corporation Ltd. (POSOCO)

1.Shri S.R.Narasimhan, General Manager, NLDC
2.Shri Vivek Pandey, Chief Manager, WRLDC.

Power Grid Corporation of India Ltd. (PGCIL)

1.Shri Mukesh Khanna, General Manager, CTU-Plg,

***

ANNEXURE-II

भारत सरकार
विद्युत मंत्रालय
केंद्रीय विद्युत प्राधिकरण
राष्ट्रीय विद्युत समिति
कटवारिया सराय, नई दिल्ली - 110016
वैबसाइट / Website: www.cea.nic.in

[ISO 9001:2008]

No. 4/MTGS/NPC/CEA/2016 /91 Dated 19.01.2016

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

विषय : Establishment of NPC - amendment in Composition of NPC- Reg.
Ref : MoP order No.A-60016/24/2012-Adm-I dated 25.03.2013

Sir/Madam,

Ministry of Power vide order dated 25th March 2013 has constituted National Power Committee (NPC) (copy enclosed for reference pl.) under the chairmanship of Chairperson, CEA to resolve issue among RPCs and to discuss & resolve issues referred to NPC requiring consultation among one or more RPCs, concerning inter-alia inter-regional implication or any other issue affecting more than one region or all regions.

NPC in its previous meetings had taken some decisions to strengthen the grid security like uniform setting of Under Frequency Relay (UFR) across the country and the committee is also in the process of finalisation of procedure for regular inspection / checking of healthiness of UFR. NPC in its fourth meeting held on 10th December 2015, agreed on the proposal to include NLDC as the Member of NPC (copy of the extract of Minutes are attached for ref. please.).

Further, after the reorganisation of CEA, a separate division has been created for National Power Committee (NPC) to handle the works of secretariat of NPC. Accordingly, it is proposed that Chief Engineer (NPC Div, CEA) be designated the Member Secretary,

The amended composition of NPC would therefore be as under:

1. **Chairperson, CEA**	**Chairperson of NPC**
2. Member (GO&D), CEA	Member
3. Chairperson of each of NRPC, WRPC SRPC and ERPC	Member
4. Representative of Chairperson, NERPC	Member
5. TCC Chairperson of each RPC	Member
6. Member Secretary of each of NRPC, WRPC SRPC, ERPC & NERPC	Member
7. CEO, NLDC, POSOCO	Member
8. Chief Engineer (NPC Div, CEA)	Member Secretary

It is therefore requested that necessary orders amending the composition of National Power Committee to include NLDC as member of NPC and Chief Engineer (NPC Div, CEA) to be the Member Secretary, NPC may be issued by MoP. The Conduct of Business Rule (CBR) for NPC would also stand amended as per above order.

Encl: As above.

Yours faithfully,

Bmallick 19/01/2016

(B.C.Mallick)
Chief Engineer, NPC

No.A-60016/24/2012-Adm-I
Government of India
Ministry of Power

New Delhi, Dated 25.03.2013

ORDER

Subject: Establishment of National Power Committee (NPC).

Keeping in view the ever growing complexity of Power System, synchronous mode of operation of the entire grid of the country and to evolve a common approach to issues related to reliability and security of the grid, it has been decided with the approval of the Competent Authority to establish the National Power Committee (NPC). The composition of the Committee shall be as under:

1. Chairperson, CEA	Chairperson of NPC
2. Member (GO&D), CEA	Member
3. Chairperson of each of NRPC, WRPC, SRPC and ERPC	Member
4. Representative of Chairperson, NERPC	Member
5. TCC Chairperson of each RPC (NRPC, WRPC, SRPC, ERPC, NERPC)	Member
6. Member Secretary of each of NRPC, WRPC, SRPC, ERPC & NERPC	Member
7. Chief Engineer (Grid Management Div., CEA) -	- Member Secretary

2. NPC shall carry out following functions for integrated operation of the power system of the country:

(i) To resolve issue among RPCs; and

(ii) Discuss and resolve issues referred to NPC requiring consultation among one or more RPCs, concerning inter-alia inter-regional implication or any other issue affecting more than one region or all regions.

3. Decisions taken in the NPC shall be considered concurred by respective RPCs for implementation.

P.T.O.

Annex to Order No.A-60016/24/2012-Adm-I dated 25.03.2013

National Power Committee
Conduct of Business Rules

CHAPTER I

GENERAL

1. Short title and commencement:

These rules shall come into force from the date of its formation i.e. 26-09-2011 and shall remain in force unless otherwise modified.

2. Definitions:

2.1 In these Rules unless the context otherwise requires:-

(a) 'Agenda' means the list of business proposed to be transacted at a meeting of the Committee.

(b) 'Committee' means the National Power Committee

(c) 'Meeting' means a meeting of the Committee convened by Member Secretary after consultation with Chairperson, NPC.

(d) 'Member' means the member of the NPC

(e) 'Rule' means National Power Committee (Conduct of Business) Rules, 2011.

3. Composition of NPC:

1. Chairperson, CEA – Chairperson, NPC
2. Chairperson, NRPC
3. Chairperson, WRPC
4. Chairperson, SRPC
5. Chairperson, ERPC
6. Representative of Chairperson, NERPC
7. Chairperson, TCC of NRPC
8. Chairperson, TCC of WRPC
9. Chairperson, TCC of SRPC
10. Chairperson, TCC of ERPC
11. Chairperson, TCC of NERPC
12. Member (GO&D), CEA
13. Member Secretary, NRPC
14. Member Secretary, WRPC
15. Member Secretary, SRPC
16. Member Secretary, ERPC
17. Member Secretary, NERPC
18. Chief Engineer, GM Div., CEA – Member Secretary, NPC

4. Functions of NPC

NPC shall carry out following functions for integrated operation of the power system of the country:

(i) To resolve issue among RPCs; and

(ii) Discuss and resolve issues referred to NPC requiring consultation among one or more RPCs, concerning inter-alia inter-regional implication or any other issue affecting more than one region or all regions

Decisions taken in the NPC shall be considered concurred by the respective RPCs for implementation.

5. Secretariat of NPC

Secretariat of NPC will be provided by CEA and Chief Engineer (Grid Management Division), CEA will be Member Secretary. Secretariat shall perform the following duties namely:

a) Keep custody of records of proceedings of the Committee meetings.

b) Prepare agenda for the Committee meetings.

c) Prepare minutes of Committee meetings.

d) Take follow-up action on the decision taken in the Committee meetings.

e) Collect from constituent members or other offices or any other party as may be directed by Committee, such information as may be considered useful for the efficient discharge of functions of the Committee and place the information before the Committee.

CHAPTER II
PROCEDURE FOR CONDUCTING NPC MEETINGS

6. Place and date of NPC Meeting

The place and date of the meeting shall be decided by Chairperson, NPC

7. Notice for the Committee Meetings and Agenda

7.1 Notice for the Committee meetings shall be issued by Member Secretary, NPC at least 25 days in advance in consultation with Chairperson, NPC. In case of emergency

meetings required to be conducted to carry out urgent business, notice of one week is to be given.

7.2 The Agenda points for the meeting shall be sent to the Member Secretary by the members at least 20 days in advance of the meeting. The Member Secretary, NPC shall finalize the agenda and circulate the same to all its members at least 10 days in advance before the meeting.

7.3 Agenda for Committee meeting shall generally be put up after discussions in RPC.

7.4 Member Secretary, NPC may also put any agenda involving urgent matters/policy issue directly in consultation with Chairperson, NPC.

7.5 Member Secretary, NPC may convene a meeting at short notice on any urgent matter in consultation with Chairperson of the NPC.

9. Effect of Non-receipt of Notice of Meeting by a Member

The non-receipt of notice by any member of NPC shall not invalidate the proceeding of the meeting or any decision taken in the meeting.

10. Cancellation / Re-scheduling of Meeting

If a meeting is required to be cancelled or rescheduled the same shall be intimated to the members at the earliest by telephone / fax.

11. Periodicity of Meetings

The Committee members shall meet at least once in six months. However, the Committee may meet any time to discuss any issue as and when required in consultation with Chairperson, NPC.

12. Quorum of NPC Meeting

12.1 The quorum of the meeting shall be 50% of its members.

12.2 NPC would take decisions based on majority/general consensus of the strength present.

12.3 Members of NPC and NPC Secretariat shall participate in Committee Meetings. The Special invitees by the Committee may also attend the meeting.

13. Presiding Authority

13.1 The Chairperson, NPC shall preside over the meeting of NPC and conduct the meeting. The Member Secretary, NPC shall assist the Chairperson of NPC in conducting the meeting. If the Chairperson is unable to be present at the meeting for any reason, Member (GO&D) would preside over the meeting.

13.2 In the absence of Member Secretary, NPC, Director (Grid Management Div.), CEA shall function as Member Secretary to assist Chairperson, NPC.

14. Recording of the Minutes

14.1 The minutes of the meeting shall be finalized and circulated to all its members by the Member Secretary, NPC normally within 15 working days from the date of the Committee Meeting.

15. Confirmation of the Minutes

Minutes of the NPC meeting shall be placed in the next meeting for confirmation. However, in case of urgency the minutes may be confirmed by circulation.

16. Funding

Requirement of funds for hosting the meetings of NPC would be met through CEA's budgetary provisions. However, NPC may decide to create a fund for NPC in future for establishment expenses of its Secretariat.

CHAPTER III
MISCELLANEOUS

17. Savings of inherent Power of the NPC

17.1 Nothing in these Rules shall bar the NPC from adopting a procedure that is at variance with provisions of these Rules, if the NPC in view of the special circumstances of a matter or class of matters deem it necessary or expedient to deal with such a matter or class of matters.

17.2 Nothing in these Rules shall expressly or by implication, bar the NPC to deal with any matter or exercise any power for which no Rules have been framed and NPC may deal with such matters, and functions in a manner it thinks fit.

(N. Sriraman)
Deputy Secretary
25.03.2013

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वैबसाइट / Website: www.cea.nic.in

[ISO 9001:2008]

No. 4/MTGS/NPC/CEA/2016/ 63

Dated 19.02.2016

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

Subject: **Establishment of NPC - amendment in Composition of NPC- Reg.**
Ref : MoP order No.A-60016/24/2012-Adm-I dated 25.03.2013

Madam / Sir,

Please refer to this office letter No.4/MTGS/NPC/CEA/2016/191 dated 19.01.2016 (copy enclosed for ready reference) wherein it was proposed to include NLDC as the Member of NPC and Chief Engineer (NPC Div.), CEA be designated the Member Secretary, NPC in place of Chief Engineer (Grid Management Div.),CEA.

The amended composition of NPC would therefore be as under:

1. **Chairperson, CEA**	**Chairperson of NPC**
2. Member (GO&D), CEA	Member
3. Chairperson of each of NRPC, WRPC SRPC and ERPC	Member
4. Representative of Chairperson, NERPC	Member
5. TCC Chairperson of each RPC	Member
6. Member Secretary of each of NRPC,WRPC SRPC,ERPC & NERPC	Member
7. CEO, NLDC, POSOCO	Member
8. Chief Engineer (NPC Div.), CEA	Member Secretary

It is therefore requested that necessary orders amending the composition of National Power Committee to include NLDC as member of NPC and Chief Engineer (NPC Div, CEA) to be the Member Secretary, NPC may be issued by MoP. The Conduct of Business Rule (CBR) for NPC would also stand amended as per above order.

This issues with the approval of Chairperson, CEA

Encl: As above.

Yours faithfully,

No.A-60016/24/2012-Adm.I
Government of India
Ministry of Power
******

New Delhi, dated 29th March, 2016.

To
The Chairperson,
Central Electricity Authority,
Sewa Bhawan, R.K. Puram,
New Delhi.

(Kind attn.: Shri B.C. Mallick, Chief Engineer (NPC Division))

Sub:- Establishment of National Power Committee (NPC) – amendment in Composition of NPC – reg

Sir,

I am directed to refer to CEA's letter No.4/MTGS/NPC/CEA/2016-191 dated 19/01/2016 on the subject mentioned above and to say that the Competent Authority in the Ministry has directed to seek a brief note on the role of Regional Committees and Central Committees in the National Power Committee (NPC).

2. It is, therefore, requested that the above note may be made available for further necessary action.

Yours faithfully,

(Sanjay Kumar)
Section Officer
Tele: 23766502.

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No. 4/MTGS/NPC/CEA/2016/ 517

Dated 01st June 2016

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

Subject: **Establishment of NPC - amendment in Composition of NPC- Reg.**
Ref : 1.MoP order No.A-60016/24/2012-Adm-I dated 25.03.2013
2.CEA letter No.4/MTGS/NPC/CEA/2016-191 dated 19.01.2016
3.CEA letterNo.4/MTGS/NPC/CEA/2016-63 dated 19.02.2016(copy enclosed)

Madam / Sir,

With reference MoP letter No.A-60016/24/2012-Adm.I dated 29th March 2016 (copy enclosed) on the subject, the note on the role of Regional Power Committees and Central Electricity Authority in the National Power Committee (NPC) is enclosed for kind needful please.

This issues with the approval of Chairperson, CEA

Encl: As above.

Yours faithfully,

(B.C.Mallick) 01/06/2016
Chief Engineer, NPC

CENTRAL ELECTRICITY AUTHORITY
NATIONAL POWER COMMITTEE (NPC)

Subject: Note on the Role of Regional Power Committees (RPCs) and Central Electricity Authority (CEA) in the NPC

Keeping in view the ever growing complexity of Power System, synchronous mode of operation of the entire grid of the country and to evolve a common approach in respect of issues related to reliability and security of the grid, Ministry of Power vide order dated 25th March 2013 has constituted National Power Committee (NPC) under the chairmanship of chairperson, CEA and Chief Engineer (Grid Management Div.,CEA) as Member Secretary. The composition of NPC was as under:

1. **Chairperson, CEA**	**Chairperson of NPC**
2. Member (GO&D),CEA	Member
3. Chairperson of each of NRPC,WRPC SRPC and ERPC	Member
4. Representative of Chairperson, NERPC	Member
5. TCC Chairperson of each RPC	Member
6. Member Secretary of each of NRPC,WRPC SRPC,ERPC & NERPC	Member
7. Chief Engineer (GM Div, CEA)	Member Secretary

The TOR comprised the following functions for integrated operation of the power system of the country:

(i) To resolve issue among RPCs

(ii) Discuss and endeavor to arrive at consensus amongst the RPCs on issues referred by any RPC requiring consultation among one or more RPCs.

(iii) Discuss and endeavor to arrive at consensus amongst the RPCs on issues having inter-regional implication referred by CEA/MoP

(iv) Discuss and endeavor to arrive at consensus amongst the RPCs on any issue affecting more than one region or all regions.

Role of CEA in the NPC:

Chairperson, CEA is Chairperson of the NPC and Member (GO&D), CEA is a member of NPC.

Secretariat of NPC is provided by CEA and Chief Engineer (NPC), CEA is the Member Secretary. The Secretariat shall perform the following duties:

a) Prepare agenda for the Committee meetings.

b) Prepare minutes of Committee meetings.

c) Take follow-up action on the decision taken in the Committee meetings.

d) Keep custody of records of proceedings of the Committee meetings.

e) Collect from constituent members or other offices or any other party as may be directed by Committee, such information as may be considered useful for the efficient discharge of functions of the Committee and place the information before the Committee

The Chairperson, NPC shall preside over the meeting of NPC and conduct the meeting. The Member Secretary, NPC shall assist the Chairperson of NPC in conducting the meeting. If the Chairperson is unable to be present at the meeting for any reason, Member (GO&D), CEA would preside over the meeting. In the absence of Member Secretary, Director (NPC), CEA shall function as Member Secretary.

Role of RPCs in the NPC:

Chairperson of RPC, Chairperson of TCC and Member Secretary of all the Regional Power Committees are the members of NPC. Agenda for NPC meeting is generally put up after discussions in respective RPC. NPC is the forum to arrive at consensus amongst the RPCs on the following:

- On issues referred by any RPC requiring consultation among one or more RPCs.
- On issues having inter-regional implication referred by CEA/MoP
- On any issue affecting more than one region or all regions.

Decisions taken in the NPC shall be considered concurred by the respective RPCs for implementation.

****

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वैबसाइट / Website: www.cea.nic.in

[ISO 9001:2008]

No. 4/MTGS/NPC/CEA/2016/ 154 Dated: 20.09.2016

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

Subject: **Establishment of NPC - amendment in Composition of NPC- Reg.**

Ref: 1. MoP order No. A-60016/24/2012-Adm-I dated 25.03.2013 (copy enclosed)
2. CEA letter No.4/MTGS/NPC/CEA/2016-191 dated 19.01.2016 (copy enclosed)
3. MoP order No. A-60016/24/2012-Adm-I dated 29.03.2016 (copy enclosed)
4. CEA letterNo.4/MTGS/NPC/CEA/2016-63 dated 19.02.2016 (copy enclosed)
5. CEA letterNo.4/MTGS/NPC/CEA/2016-517 dated 01.06.2016 (copy enclosed)

Madam / Sir,

With reference to this office letter No. 4/MTGS/NPC/CEA/2016/63 dated 19.02.2016 (copy enclosed for reference) wherein it was proposed to include NLDC as the member of NPC and Chief Engineer (NPC Div.), CEA be designated the Member Secretary, NPC in place of Chief Engineer (Grid Management Div.), CEA, response from MoP is still awaited.

In this regard a note vide this office letter No. 4/MTGS/NPC/CEA/2016-517 dated 01.06.2016 on the role of Regional Power committee (RPC) and Central Electricity Authority in National Power Committee(NPC) as desired by MoP vide letter No. A-60016/24/2012-Adm.I dated 29.03.2016 has also been sent and the same is again enclosed for reference.

It is, therefore, requested that necessary orders for amendment in the composition of NPC may please be issued.

Encl: As above.

Yours faithfully,

(B.C. Mallick)
Chief Engineer, NPC

No.A-60016/24/2012-Adm.I
Government of India
Ministry of Power
******

New Delhi, dated 30th November, 2016.

To
The Chairperson,
Central Electricity Authority,
Sewa Bhawan, R.K. Puram,
New Delhi.

(Kind attn.: Shri B.C. Mallick, Chief Engineer (NPC Division))

Sub:- Establishment of National Power Committee (NPC) – amendment in Composition of NPC – reg

Sir,

I am directed to refer to CEA's letter No.4/MTGS/NPC/CEA/2016/517 dated 01/06/2016 on the subject mentioned above and to say that the matter regarding inclusion of CEO, POSOCO as Member, NPC and replacement of CE(GMD) by CE(NPC) as Member Secretary, NPC has been considered in the Ministry and it has been observed that for this purpose *the NPC (Conduct of Business) Rules, 2011 will require to be changed. Therefore, considering the changing scenarios, the functions of NPC may also be broadened including the functions of maintaining the National Energy Account involving the inter-national and inter-regional transmission transactions."*

2. It is, therefore, requested that the comments of CEA in this regard may be furnished and a draft proposal may be submitted to this Ministry by 05/12/2016.

Yours faithfully,

(Satinder Kaur)
Under Secretary to the Government of India
Tele: 23715327.

Dir (NPC)
Please prepare a draft proposal as discussed
Mallick 1/12/2016

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केंद्रीय विद्युत प्राधिकरण
राष्ट्रीय विद्युत समिति
कटवारिया सराय, नई दिल्ली - 110016
वैबसाइट / Website: www.cea.nic.in

[ISO 9001:2008]

No. 4/MTGS/NPC/CEA/2016/ 216 Dated 05th December 2016

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

Subject: **Establishment of NPC - amendment in Composition of NPC- Reg.**

Ref : 1.MoP order No.A-60016/24/2012-Adm-I dated 25.03.2013
2.CEA letter No.4/MTGS/NPC/CEA/2016/191 dated 19.01.2016
3.CEA letter No.4/MTGS/NPC/CEA/2016/63 dated 19.02.2016
4.MoP letter No. A-60016/24/2012-Adm-I dated 29.03.2016
4.CEA letter No. 4/MTGS/NPC/CEA/2016/ 517 dated 01.06.2016
5.CEA letter No. 4/MTGS/NPC/CEA/2016/ 154 dated 20.09.2016

Madam / Sir,

With reference to the MoP letter No.A-60016/24/2012-Adm.I dated 30th November 2016 (copy enclosed) on the subject addressed to Chairperson, CEA, the following are submitted for kind consideration:

Preparation and issuance of National Energy Account (NEA) for inter-regional and inter-national energy transactions by NPC Secretariat may be included as one of the functions of NPC Secretariat. Further, preparation of weekly National Deviations Settlement Mechanism Account (NDSM) and Reactive Energy Account (if required) as a part of NEA, may also be considered as one of the functions of NPC Secretariat. However, Regulations by CERC, based on which energy accounting is being done, at present do not mention about NEA and NDSM. Therefore, necessary policy guidelines by MoP would also be required to be given to CERC for incorporating necessary changes in the relevant Regulations for National Deviations Settlement Mechanism Account (NDSM) and National Energy Account (NEA).

A draft revised NPC (Conduct of Business) Rules has been prepared incorporating the additional function of NPC. The same is enclosed for needful please.

This issues with the approval of Chairperson, CEA

Encl: As above.

Yours faithfully,

(B.C.Mallick)
Chief Engineer, NPC

Annex to Order No. No. A-60016/24/2012-Adm-I dated ----------

National Power Committee
Conduct of Business Rules

CHAPTER I

GENERAL

1. Short title and commencement:

These rules shall come into force from the date of its formation i.e. 26-09-2011 and shall remain in force unless otherwise modified.

2. Definitions:

2.1 In these Rules unless the context otherwise requires: -

(a) 'Agenda' means the list of business proposed to be transacted at a meeting of the Committee.
(b) 'Committee' means the National Power Committee
(c) 'Meeting' means a meeting of the Committee convened by Member Secretary after consultation with Chairperson, NPC.
(d) 'Member' means the member of the NPC
(e) 'Rule' means National Power Committee (Conduct of Business) Rules, 2011.

3. Composition of NPC:

1. Chairperson, CEA – Chairperson, NPC
2. Chairperson, NRPC
3. Chairperson, WRPC
4. Chairperson, SRPC
5. Chairperson, ERPC
6. Representative of Chairperson, NERPC
7. Chairperson, TCC of NRPC
8. Chairperson, TCC of WRPC
9. Chairperson, TCC of SRPC
10. Chairperson, TCC of ERPC
11. Chairperson, TCC of NERPC
12. Member (GO&D), CEA
13. Member Secretary, NRPC
14. Member Secretary, WRPC
15. Member Secretary, SRPC
16. Member Secretary, ERPC
17. Member Secretary, NERPC
18. **CEO, NLDC, POSOCO**
19. **Chief Engineer, NPC Div., CEA – Member Secretary, NPC**

4. **Functions of NPC**

NPC shall carry out following functions for integrated operation of the power system of the country:

(i) To resolve issue among RPCs

(ii) Discuss and resolve issues referred to NPC requiring consultation among one or more RPCs, concerning inter-alia inter-regional implication or any other issue affecting more than one region or all regions

(iii) Preparation and issuance of National Energy Account (NEA) for inter-regional and inter-national energy transactions by NPC Secretariat.

Decisions taken in the NPC shall be considered concurred by the respective RPCs for implementation.

5. **Secretariat of NPC**

Secretariat of NPC will be provided by CEA and Chief Engineer (NPC Division), CEA will be Member Secretary. Secretariat shall perform the following duties namely:

a) Keep custody of records of proceedings of the Committee meetings.

b) Prepare agenda for the Committee meetings.

c) Prepare minutes of Committee meetings.

d) Take follow-up action on the decision taken in the Committee meetings.

e) Collect from constituent members or other offices or any other party as may be directed by Committee, such information as may be considered useful for the efficient discharge of functions of the Committee and place the information before the Committee.

f) Collection of data from NLDC on weekly basis (Interregional and International scheduled energy and actual energy data)

g) Preparation of Weekly NDSM and Reactive Energy Account (if required)

f) Preparation of monthly NEA

6. **Sub-Committees of NPC**

To deal with matters pertaining to the energy accounting and related issues there shall be a commercial sub-committee with the members drawn from representatives of each RPC Secretariat, RLDCs and NLDC. The commercial sub-committee shall be headed by the Chief Engineer (NPC Div,), CEA. NPC can create other Sub-Committees to deal with matters pertaining to operation and protection issues on national basis.

CHAPTER II
PROCEDURE FOR CONDUCTING NPC MEETINGS

7. Place and date of NPC Meeting

The place and date of the meeting shall be decided by Chairperson, NPC

8. Notice for the Committee Meetings and Agenda

8.1 Notice for the Committee meetings shall be issued by Member Secretary, NPC at least 25 days in advance in consultation with Chairperson, NPC. In case of emergency meetings required to be conducted to carry out urgent business, notice of one week is to be given.

8.2 The Agenda points for the meeting shall be sent to the Member Secretary by the members at least 20 days in advance of the meeting. The Member Secretary, NPC shall finalize the agenda and circulate the same to all its members at least 10 days in advance before the meeting.

8.3 Agenda for Committee meeting shall generally be put up after discussions in RPC.

8.4 Member Secretary, NPC may also put any agenda involving urgent matters/policy issue directly in consultation with Chairperson, NPC.

8.5 Member Secretary, NPC may convene a meeting at short notice on any urgent matter in consultation with Chairperson of the NPC.

9. Effect of Non-receipt of Notice of Meeting by a Member

The non-receipt of notice by any member of NPC shall not invalidate the proceeding of the meeting or any decision taken in the meeting.

10. Cancellation / Re-scheduling of Meeting

If a meeting is required to be cancelled or rescheduled the same shall be intimated to the members at the earliest by telephone / fax/ email.

11. Periodicity of Meetings

The Committee members shall meet at least once in six months. However, the Committee may meet any time to discuss any issue as and when required in consultation with Chairperson, NPC.

12. Quorum of NPC Meeting

11.1 The quorum of the meeting shall be 50% of its members.

11.2 NPC would take decisions based on majority/ general consensus of the strength present.

11.3 Members of NPC and NPC Secretariat shall participate in Committee Meetings. The Special invitees by the Committee may also attend the meeting.

13. Presiding Authority

13.1 The Chairperson, NPC shall preside over the meeting of NPC and conduct the meeting. The Member Secretary, NPC shall assist the Chairperson of NPC in conducting the meeting. If the Chairperson is unable to be present at the meeting for any reason, Member (GO&D) would preside over the meeting.

13.2 In the absence of Member Secretary, NPC, Director (NPC Div.), CEA shall function as Member Secretary to assist Chairperson, NPC.

14. Recording of the Minutes

The minutes of the meeting shall be finalized and circulated to all its members by the Member Secretary, NPC normally within 15 working days from the date of the Committee Meeting.

15. Confirmation of the Minutes

Minutes of the NPC meeting shall be placed in the next meeting for confirmation. However, in case of urgency the minutes may be confirmed by circulation.

16. Funding

Requirement of funds for hosting the meetings of NPC would be met through CEA's budgetary provisions. However, NPC may decide to create a fund for NPC in future for establishment expenses of its Secretariat.

CHAPTER III
MISCELLANEOUS

17. Savings of inherent Power of the NPC

17.1 Nothing in these Rules shall bar the NPC from adopting a procedure that is at variance with provisions of these Rules, if the NPC in view of the special circumstances of a matter or class of matters deem it necessary or expedient to deal with such a matter or class of matters.

17.2 Nothing in these Rules shall expressly or by implication, bar the NPC to deal with any matter or exercise any power for which no Rules have been framed and NPC may deal with such matters, and functions in a manner it thinks fit.

( )
Deputy Secretary

ANNEXURE-III

फ़ैक्स/स्पीड पोस्ट /FAX/SPEEDPOST

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	Ph: 080-22287205	Fax: 080-22259343
सं/No. SRPC/SE-II/2017/ 727		दिनांक / Date	08.02.2017

Chief Engineer
&Member Secretary, NPC
CEA,
Katwaria Sarai
NEW DELHI – 110 016

Sub: Amendment to Minutes of the 6th Meeting of NPC– reg.

Sir,

In respect of the Minutes of the 6th Meeting of NPC conducted on 19th December 2016 (MoM dated 12.01.2017 in para 8 (b), the following has been stated:

- .....MS, SRPC informed that SRLDC and SRPC Secretariat jointly had furnished reports to CERC in compliance of CERC Petition No.60/MP/2014. SRLDC were getting 11 kV level data from SLDCs and data up to 11 kV were included in the report.
- TANTRANSCO informed that they had identified the feeders up to 11 kV and data are made available to SRLDC.

In this regard, it may kindly be noted that UF& df/dt relays are commissioned at different voltage levels in different states and thus mapping has been done accordingly. In SR, certain feeders/PTRs (LV side) at 11 kV have been mapped to SRLDC in Kerala and Puducherry. In Tamil Nadu, the feeders have been mapped at 110 kV level.

In view of the above, following amendment may kindly be considered:

- *.....MS, SRPC informed that SRLDC and SRPC Secretariat jointly had furnished reports to CERC in compliance of CERC Petition No.60/MP/2014.* ***SRLDC was getting data up to 11 kV level from some of the SLDCs*** *and data up to 11 kV were included in the report.*
- *TANTRANSCO informed that they had identified the feeders up to* ***110*** *kV and data are made available to SRLDC.*

धन्यवाद /Thanking you,

भवदीय / Yours faithfully

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

Dir(Ops)
Director(Ops) 14/2/17

ANNEXURE-IV

Year Wise/State Wise Details of Schemes funded from PSDF

(As on 31.08.2017)

Government of India has approved the scheme for operationalization of **Power System Development Fund** (PSDF) on 10th January, 2014.

Year 2014-15 : **(Amount in Rupees**

Sl. No.	State / Utility	No. of Schemes	Scope of Work (Scheme)	Approved Cost	Grant Sanctioned	Date of Sanction	Funds Released	% of fund Disbursed against grant Sanctioned
1	POWERGRID	1	Unified Real Time Dynamic State Measurement (URTDSM) Scheme (Installation of PMUs)	374.63	**262.24**	31/12/2014	173.99	66.35 %
2	Kerala	1	Upgradation and Renovation of protection system of 400 and 220kV substations in Kerala to rectify protection related deficiencies	91.46	**82.31**	31/12/2014	22.8197	27.72 %
3	Rajasthan	2	Renovation and Upgradation of protection system of 220kV and 400kV substations in the state of Rajasthan in order to rectify Protection related deficiencies	159.53	**143.58**	31/12/2014	10.7951	7.52 %
			Installation of one no each new 400kV, 125MVAR Bus Type Shunt Reactor at 400kV Hindaun and 400kV GSS Merta City, along with shifting of 400kV, 50MVAR Bus Type shunt reactor from 400kV Merta City to 400kV Bhilwara and associated bays at these stations.	23.87	**21.48**	31/12/2014	6.45	30.03 %
4	West Bengal	1	Renovation and Upgradation of protection system of 400 and 220kV substations to rectify Protection related deficiencies in West Bengal	120.67	**108.6**	31/12/2014	12.58	11.58 %
Total		**5**			**618.21**		**226.6349**	36.66 %

Year 2015-16 : **(Amount in Rupees Crores)**

Sl. No.	State / Utility	Nos. of Schemes	Scope of Work (Scheme)	Approved Cost	Grant Sanctioned	Date of Sanction	Funds released	% of fund Disbursed against grant Sanctioned
1	Assam	2	Renovation and Upgradation of protection & control systems of Sub Stations in the state of Assam in order to rectify protection related deficiencies	299.37	**299.37**	11/05/2015	38.54	12.87 %
			Installation of Bay control Unit (BCU) in the state of Assam	53.52	**53.52**	28/10/2015	11.726	21.91 %
2	Bihar	1	Renovation and Upgradation of protection and control systems of 220/132kV grid substations in the state of Bihar in order to rectify protection related deficiencies	71.35	**64.22**	11/05/2015	18.68	29.09 %
3	Nagaland	1	Renovation and Upgradation of protection and control systems of 132kV substations in the state of Nagaland in order to rectify protection related deficiencies.	39.96	**39.96**	11/05/2015	10.96	27.43 %

4	Gujarat	3	Installation of Automatic Demand Management System in the state of Gujarat in order to improve grid discipline	1.67	**1.5**	11/5/2015	1.35	90.00 %
			Load Forecasting Scheme in the state of Gujarat	3.70	**3.7**	04/08/2015	0	0.00 %
			Wind generation forecasting in the State of Gujarat.	1.62	**1.62**	17/03/2015	0.32	20.03 %
5	Karnataka	2	Renovation and Upgradation of protection and control systems of 400/220/132kV Switchyards of KPCL Generating substations in the state of Karnataka to rectify protection related deficiencies	19.84	**17.85**	11/05/2015	8.7184	48.84 %
			Renovation and Upgradation of protection system of substations of KPTCL in the state of Karnataka.	67.13	**60.42**	17/03/2016	18.126	30.00 %
6	Odisha	1	Renovation and Upgradation of protection and control systems of substations in the state of Odisha in order to rectify protection related deficiencies	180.56	**162.50**	11/05/2015	25.1597	15.48 %
7	Uttar Pradesh	3	Installation of Capacitors banks in the state of Uttar Pradesh in order to improve Voltages	39.29	**35.36**	11/05/2015	10.0657	28.47 %
			Renovation and Upgradation of Protection and control Systems, UFR Mapping and Islanding scheme in the state of Uttar Pradesh to rectify Protection related deficiencies	202.94	**182.65**	11/05/2015	40.7057	22.29 %
			Reconductoring of 11 Nos of 132kV Lines of the state network of UPPTCL for Relieving Congestion	80.00	**60.00**	17/03/2016	0	0.00 %
8	Puducherry	1	Renovation and Upgradation of protection and control systems in the state of Puducherry to rectify protection related deficiencies	10.56	**9.5**	04/08/2015	0.95	10.00 %
9	Meghalaya	2	Renovation and Upgradation of Protection and Control Systems in the state of Meghalaya to rectify Protection related deficiencies.	69.19	**69.19**	04/08/2015	13.0905	18.92 %
			Renovation and Upgradation of Protection System of substations in Meghalaya GENCO (MePGCL)	32.53	**32.53**	05/01/2016	5.5491	17.06 %
10	Tamil Nadu	1	Renovation and Upgradation of protection and control systems in the state of Tamil Nadu to rectify protection related deficiencies	138.28	**124.45**	04/08/2015	12.445	10.00 %
11	Mizoram	1	Renovation and Upgradation of protection and control systems of 132kV substations in the state of Mizoram in order to rectify protection related deficiencies.	26.84	**26.84**	28/10/2015	2.68	9.99 %
12	Northern Regional Power Committee	1	Study program on the integration of renewable energy resources of NRPC	6.45	**6.45**	28/10/2015	4.486	69.55 %

13	Jammu & Kashmir	2	Renovation and Upgradation of protection system in the substations of Jammu.	140.04	**140.04**	28/10/2015	26.411	18.86 %
			Renovation and Upgradation of protection system of substations in Kashmir area.	146.12	**146.12**	17/03/2016	0	0.00 %
14	Telangana	1	Renovation and Upgradation of protection system in the substations of Telangana	59.97	**53.97**	28/10/2015	10.11	18.74 %
15	Himachal Pradesh	1	Renovation and Upgradation of Protection System of substations of HPSEBL.	55.44	**55.44**	05/01/2016	5.544	10.00 %
16	Tripura	1	Renovation and Upgradation of Protection System in the substations in the state of Tripura.	31.05	**31.05**	05/01/2016	8.85	28.50 %
17	POWERGRID	1	Installation of STATCOMs in Eastern Region (at Ranchi-New,Rourkela, Kishanganj and Jeypore substation of POWERGRID).	700.31	**630.28**	05/01/2016	63.03	10.00 %
18	Delhi	1	Rectification and Upgradation of protection system and replacement of outlived equipments in DTL substations	125.98	**113.38**	17/03/2016	11.338	10.00 %
19	Eastern Regional Power Committee (ERPC)	1	Creation and Maintanance of Web based Protection Database Management	20.00	**20.00**	17/03/2016	14.8342	74.17 %
20	Madhya Pradesh	2	Renovation Upgradation of protection system of substations in MPPTCL	103.00	**92.70**	17/03/2016	21.03	22.69 %
			Implimentation of integrated system for ABT, Open Acess and MIS for MP-SLDC	4.00	**3.60**	17/03/2016	0.90	25.08 %
21	Punjab	1	Installation of Bus bar protection scheme in the state of Punjab	18.21	**16.39**	17/03/2016	0	0.00 %
22	Uttrakhand	1	Renovation and Upgradation of Protection System of substations in PTCUL.	125.05	**125.05**	17/03/2016	35.11	28.08 %
Total		**31**			**2679.65**		**420.7211**	15.70 %

Year 2016-17 : **(Amount in Rupees**

Sl. No.	State / Utility	Nos. of Schemes	Scope of Work (Scheme)	Approved Cost	Grant Sanctioned	Date of Sanction	Funds released	% of fund Disbursed against grant Sanctioned
1	Madhya Pradesh	2	Renovation Upgradation of protection system of substations in MPPGCL	52.34	**47.11**	05/09/2016	4.71	10.00 %
			Installation of 125MVAR Bus Bar Reactors at 400kV substation of MPPGCL.(SSTPP Khandwa substation)	6.21	**5.59**	05/09/2016	0.56	10.00 %
2	Andhra Pradesh	2	Renovation and Upgradation of protection and control system of EHT substations in APTRANSCO	125.27	**112.74**	05/09/2016	11.27	10.00 %
			Upgradation of control and protection system replacement different substations of APGENCO	44.42	**39.98**	05/09/2016	4.00	10.00 %

3	Chattisgarh	1	Scheme for Replacement/ renovation/Upgradation of protection system and Switchyard Equipment of EHV substations in CSPTCL.	68.52	**61.67**	05/09/2016	0.00	0.00 %
4	Arunachal Pradesh	1	Rectification of deficiencies and renovation of the grid substations of Arunachal Pradesh	18.21	**18.21**	05/09/2016	0.00	0.00 %
5	Telangana	1	Project on Commissioning of 400kV, 125MVAR Bus Reactors in 400kV Grid Substations in TSTRANSCO (Mahaboobnagar, Mamidipally, Malkaram, Gajwel and Shankarpalli).	53.63	**48.27**	05/09/2016	14.20	29.42 %
6	Manipur	1	Renovation and Upgradation of the Grid Substations in MSPCL	33.50	**33.50**	05/09/2016	0.00	0.00 %
7	West Bengal	1	The Renovation and Modernization of STPS switch yard and implementation of Substaion Automation System.	26.09	**23.48**	05/09/2016	2.35	10.00 %
8	Haryana	1	Renovation and Modernization of distribution system of DHBVN, Haryana	364.27	**273.20**	05/09/2016	0.00	0.00 %
9	Bihar	2	Installation of capacitor bank for Improvement of Voltage profile in BSPTCL, Bihar.	20.98	**18.88**	05/09/2016	0.00	0.00 %
			Renovation and Upgradation of the protection and control system of 12 nos 132/33 kV Grid Sub Station	54.69	**49.22**	02/01/2017	0.00	0.00 %
10	Punjab	1	Provision of second DC Source at 220 kV & 132 kV Grid Sub Stations of PSTCL	15.30	**13.78**	02/01/2017	0.00	0.00 %
11	Southern Regional Power Committee (SRPC)	2	Study Programme on the Integration of Renewables Energy Resources into the Grid in Southern Region	5.50	**5.50**	02/01/2017	3.77	68.55 %
			Procurement Web Based Management Software and Protection setting calculation tool for Southern Region	25.09	**25.09**	02/01/2017	0.00	0.00 %
12	Kerala	1	Implementation of Automatic Demand Management scheme (ADMS) at 322 substation of KSEBL upto 33 kV	5.30	**4.77**	02/01/2017	0.48	10.00 %
13	DVC	1	Renovation and Upgradation of control and protection system and replacement of substation Equipment of 220 kV/132 kV/33 kV Ramgarh substation of Damodar Valley Corporation	28.85	**25.96**	02/01/2017	2.60	10.00 %
14	Tamil Nadu	1	Establishment of Technical and IT Infrastructure for implementation of intra state ABT in Tamilnadu	13.31	**11.98**	02/01/2017	0.00	0.00 %
15	Gujarat	1	Installation of Super Conducting Fault Current Limiter (SCFCL) at 220 kV Haldarva substation of GETCO	32.37	**29.13**	02/01/2017	0.00	0.00 %

16	PGCIL	1	Transmission system Associated with "North East - Northern/Western Interconnector-I Project" and "Transmission system for development of pooling station in Northern Part of West Bengal and transfer of power from Bhutan to NR/WR (Funding BNC-Agra HVDC)	5778.00	**2889.00**	10/03/2017	0.00	0.00 %
17	PGCIL/ RECTPCL	1	11 kV Rural feeder Monitoring Scheme	233.03	**233.03**	10/03/2017	0.00	0.00 %
Total		**21**			**3970.09**		**43.93**	1.11 %

Year 2017-18 : **(Amount in Rupees Crores)**

Sl. No.	State / Utility	Nos. of Schemes	Scope of Work (Scheme)	Approved Cost	Grant Sanctioned	Date of Sanction	Funds released	% of fund Disbursed against grant Sanctioned
1	Kerala	2	Construction of Multi-Circuit Multi-voltage transmission Lines (Madakathara - Areekode 400/220 kV & Nallalam to Kizhisseri 220/110 kV MCMV lines).	371.03	**333.93**	16/05/2017	0.00	0.00 %
			Up-rating Kakkayam - Nallalam 110kV line & Upgrading Nallalam- Chevayur-Westhill-Koyilandy110kV Single Circuit line in to Double Circuit line	89.13	**66.85**	16/05/2017	0.00	0.00 %
2	DVC	1	Renovation and Modernization of control and protection system and replecement of equipment at Parulia, Durgapur, Kalyanewari, Giridhi Jamsedpur, Barjora, Burnpur, Dhanbad and Bundwan substation	156.11	**144.71**	16/05/2017	0.00	0.00 %
3	West Bengal	3	Implementation of Islanding scheme at Bandel Thermal Power Station (BTPS) of WBPDCL	1.54	**1.39**	16/05/2017	0.00	0.00 %
			Installation of switchable reactor & Shunt capacitors by WBSETCL	48.19	**43.37**	22/05/2017	0.00	0.00 %
			Renovation & Modernization of Transmission System for relieving congestion in intra-state transmission system of WBSETCL	93.51	**70.13**	22/05/2017	0.00	0.00 %
4	Tamil Nadu	1	Renovation and Modernization of Protection System of 400kV, 230kV & 110kV Stations of TANTRANSCO	186.09	**167.48**	16/05/2017	0.00	0.00 %
5	Telangana	2	Renovation and Upgradation of protection system of Thermal generating substations of TSGENCO	7.27	**6.54**	16/05/2017	0.00	0.00 %
			Relieving of Transmission Congestion of existing Overloaded 220kV Lines in Hyderabad	78.84	**59.13**	19/05/2017	0.00	0.00 %

6	NERPC	1	Study programme on the Integration of Renewables Energy Resources (RES) into the Grid in North Eastern Region	6.50	**6.50**	16/05/2017	1.15	17.65 %
7	Maharashtra	6	Replacement of existing 0.15 ACSR wolf conductor of 132kV Balapur-Patur-Malegoan corridor and 0.2 ACSR wolf conductor of 132kV Khapri-Besa (Nagpur Ring Main Line) by High Ampacity (HTLS) Conductor (**2 schemes**)	46.15	**34.61**	16/05/2017	0.00	0.00 %
			Installation of Data Concentrators in MSETCL	10.41	**9.37**	16/05/2017	0.00	0.00 %
			Installation of RTUs for 132 kV Substations of MSETCL	25.65	**7.70**	16/05/2017	0.00	0.00 %
			Installation of Capacitor Banks at HV & EHV level at various EHV subatations under Nashik & Pune zones in MSETCL	15.72	**14.15**	22/05/2017	0.00	0.00 %
			Implementation of Automatic Demand Management Scheme (ADMS) on 33/11kV HV feeders-in Maharashtra	32.58	**29.32**	22/05/2017	0.00	0.00 %
8	Chattisgarh	1	Implementation of Automatic Demand Management Scheme (ADMS) by CSPTCL	5.03	**4.53**	16/05/2017	0.00	0.00 %
9	Uttar Pradesh	1	Replacement of the existing ACSR Conductor of identified lines by HTLS Conductor for	63.31	**47.48**	16/05/2017	0.00	0.00 %
10	Rajasthan	2	Smart Operation Mamgement System (STOMS) in Rajasthan Power System -RVPNL	13.18	**11.86**	19/05/2017	0.00	0.00 %
			Communication Backbone "Smart Transmission Network & Asset Management System " - RVPNL	569.77	**284.89**	22/05/2017	0.00	0.00 %
11	Gujarat	4	Installation of automatic switched capacitors on 11kV Feeders of MGVCL	28.39	**25.55**	22/05/2017	0.00	0.00 %
			Installation of automatic switched capacitors on 11kV Feeders of UGVCL	37.51	**33.76**	22/05/2017	0.00	0.00 %
			Installation of automatic switched capacitors on 11kV Feeders of DGVCL	15.77	**14.19**	22/05/2017	0.00	0.00 %
			Installation of automatic switched capacitors on 11kV Feeders of PGVCL	63.32	**56.99**	22/05/2017	0.00	0.00 %
12	Manipur	1	33kV system Integration with SLDC system in Manipur.	13.37	**13.37**	22/05/2017	0.00	0.00 %
13	Odisha	1	Renovation and Upgradation of protection and control system by OHPCL	24.83	**22.35**	19/05/2017	0.00	0.00 %
14	Madhya Pradesh	1	Installation of 50 MVAR Line Reactor at 400kV substation at STPS -MPPGCL	7.45	**6.71**	22/05/2017	0.00	0.00 %
15	Andhra Pradesh	1	Reliable communication and Data acquisition system upto 132kV of APTRANSCO	284.96	**142.48**	23/05/2017	0.00	0.00 %

16	PGCIL	1	Installation of STATCOM in SR at Hyderabad, Udumalpet & Trichy substations of POWRGRID	472.55	**378.04**	22/05/2017	0.00	0.00 %
Total		**29**			**2037.38**		**1.15**	0.06 %
Grand Total		**86**			**9305.33**		**692.44**	7.44 %

NOTE: One scheme of Uttar Pradesh for relieving congestion (Rs. 60 crores sanctioned grant during 2015-16) is not eligible as the LoA has already been placed before the approval of the scheme.

ANNEXURE-V

Operationalization of Spinning Reserves

8th September 2017

Outline

- Roadmap for spinning reserves by CERC
- Primary Control
- Secondary Control through Automatic Generation Control (AGC)
  - Pilot project implementation
  - Rollout of full fledged AGC in the country
- Further steps

CERC orders

- **Central Electricity Regulatory Commission (Ancillary Services Operations) Regulations, 2015**
  - 13th August 2015
  - http://cercind.gov.in/2015/regulation/Noti13.pdf
  - Implemented from: 12th April 2016
- **Report of the Committee on Spinning Reserves**
  - 17th September 2015
  - http://www.cercind.gov.in/2015/orders/Annexure-%20SpinningReseves.pdf
- **Roadmap to operationalise Reserves in the country**
  - 13th October 2015
  - http://cercind.gov.in/2015/orders/SO_11.pdf

Roadmap for Reserves

Primary

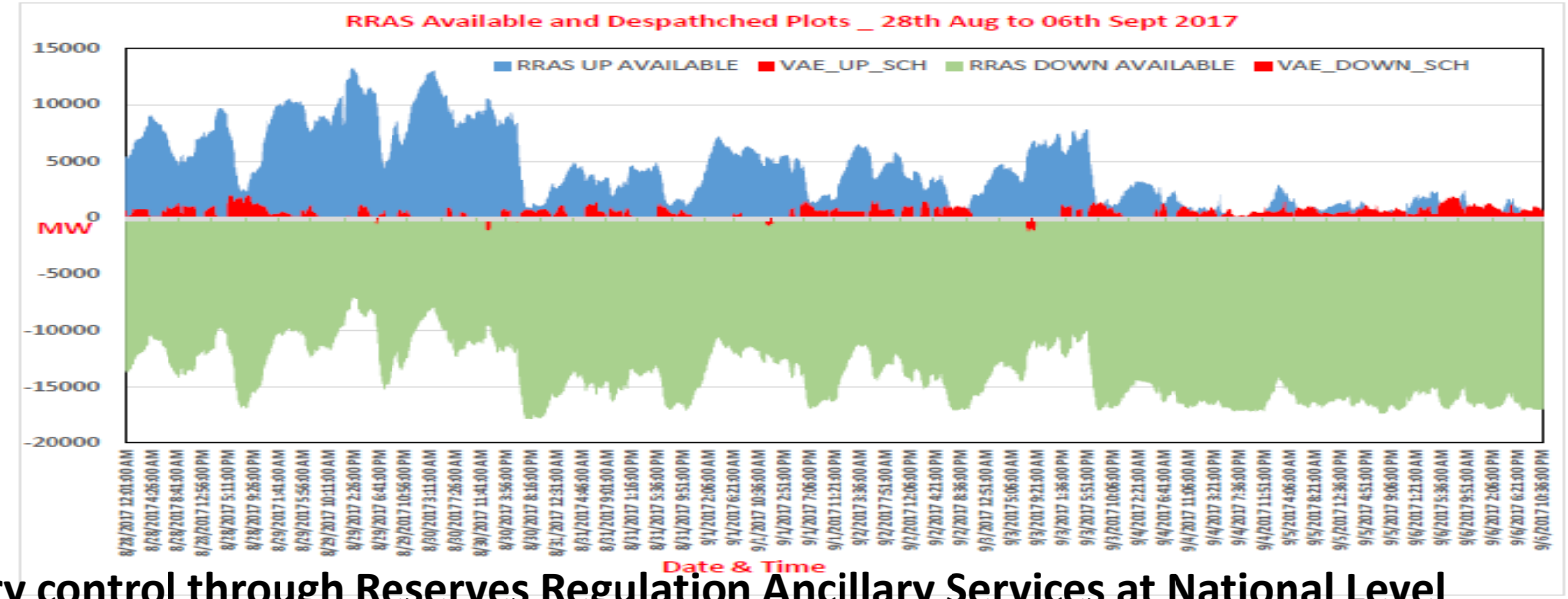
- **All India - 4000 MW**
  - Outage of Ultra Mega Power Plant (UMPP) or any similar event
- Automatic, Decentralized, mandated as per Grid Code

Secondary

- **All India - 3623 MW**
  - NR – 800 MW
  - WR – 800 MW
  - SR – 1000 MW
  - ER – 660 MW
  - NER – 363 MW
- Automatic, regional level with suitable compensation

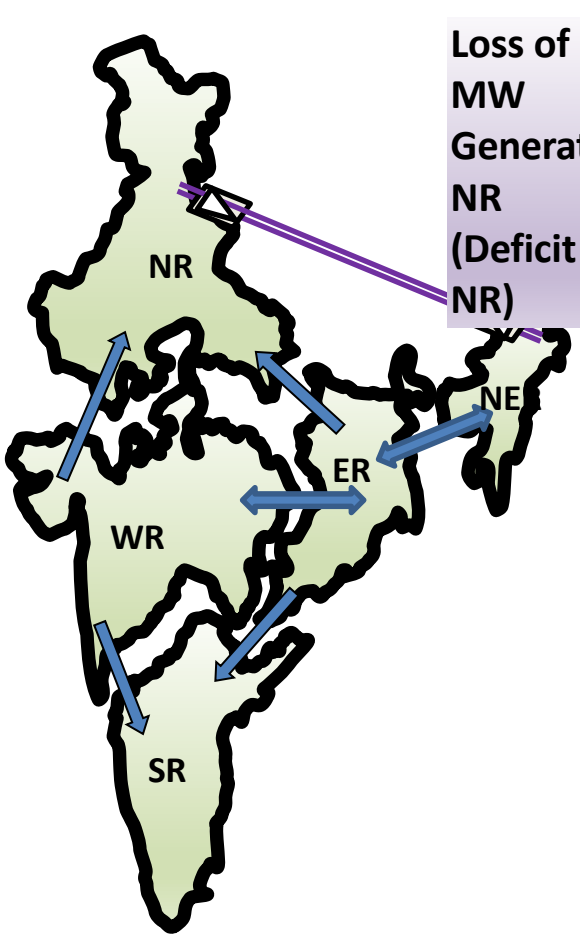
Tertiary

- **All India - 5218 MW**
  - NR – 1658 MW
  - WR – 1353 MW
  - SR – 1343 MW
  - ER – 857 MW
  - NER – 65 MW
- Manual, state level
- UnRequisitioned Surplus

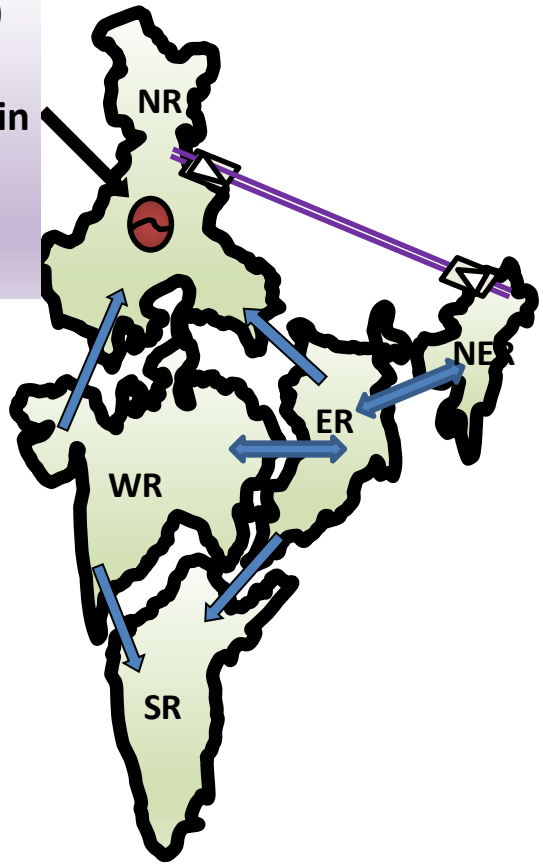


Tertiary control through Reserves Regulation Ancillary Services at National Level

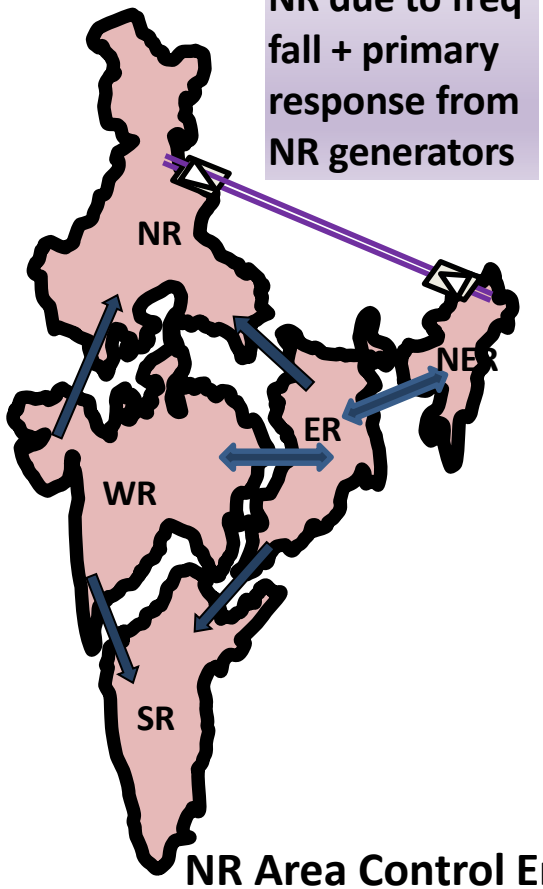
Impact of loss of 660 MW generator in NR



Loss of 660 MW Generator in NR (Deficit in NR)



165 MW load reduction in NR due to freq fall + primary response from NR generators



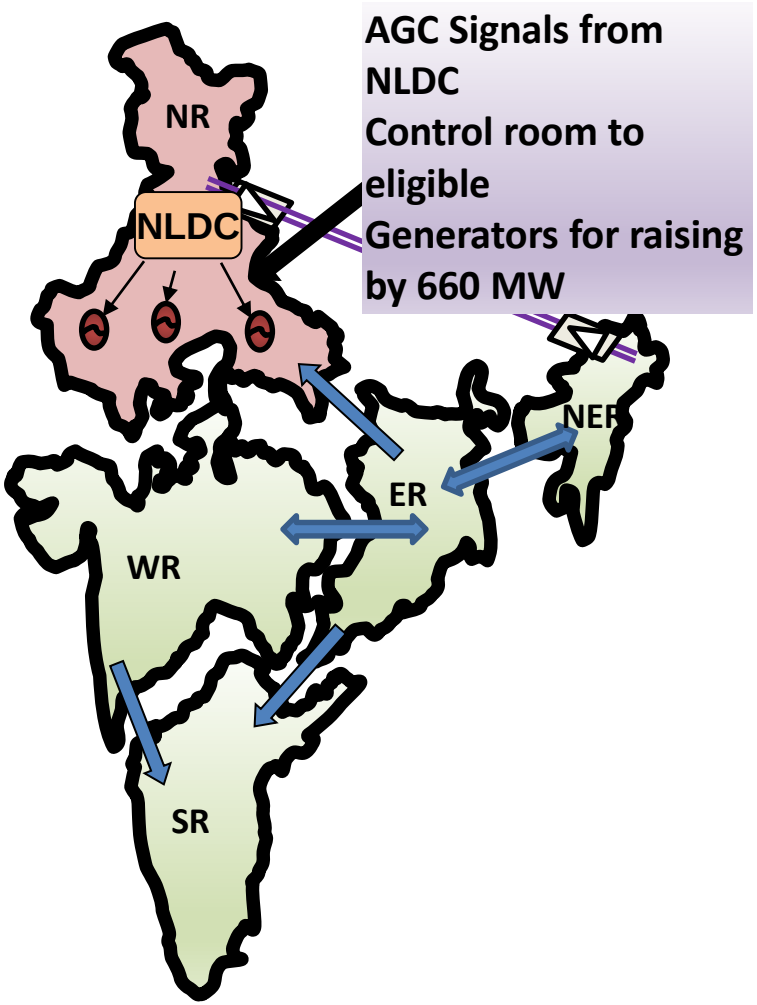
NR Area Control Error = 495 + 165=660 MW

Normal Operation of Indian Grid (Frequency = 50.00 Hz)

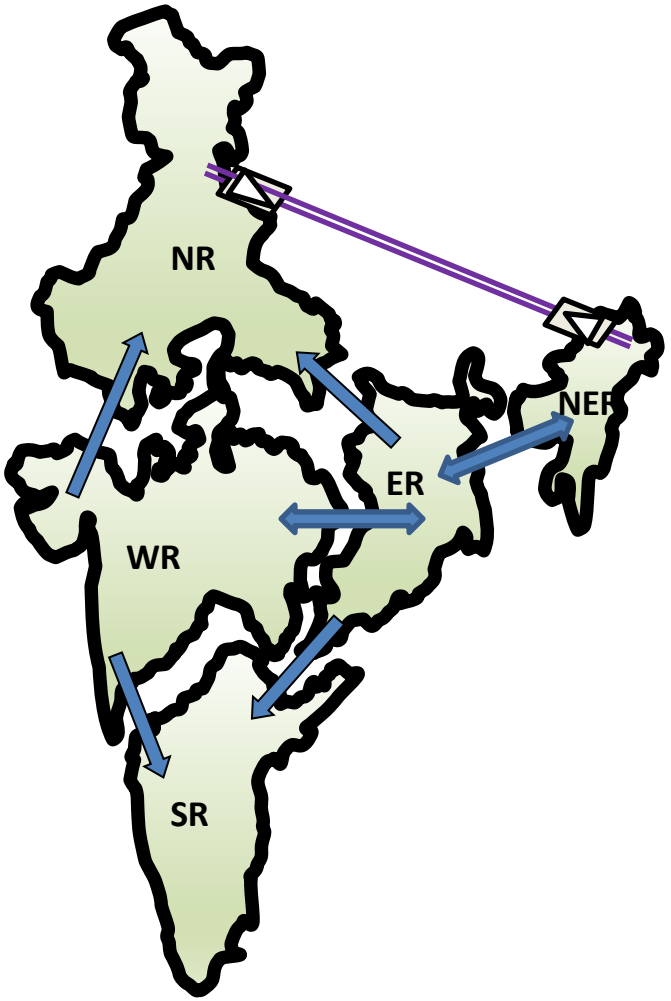
Contingency operation (Frequency drop to 49.90 Hz FRC ~ 6600 MW /Hz)

Primary Response from NR, WR, SR, ER, NER (NR Import rise by 495 MW)

Secondary Control through Automatic Generation Control or AGC

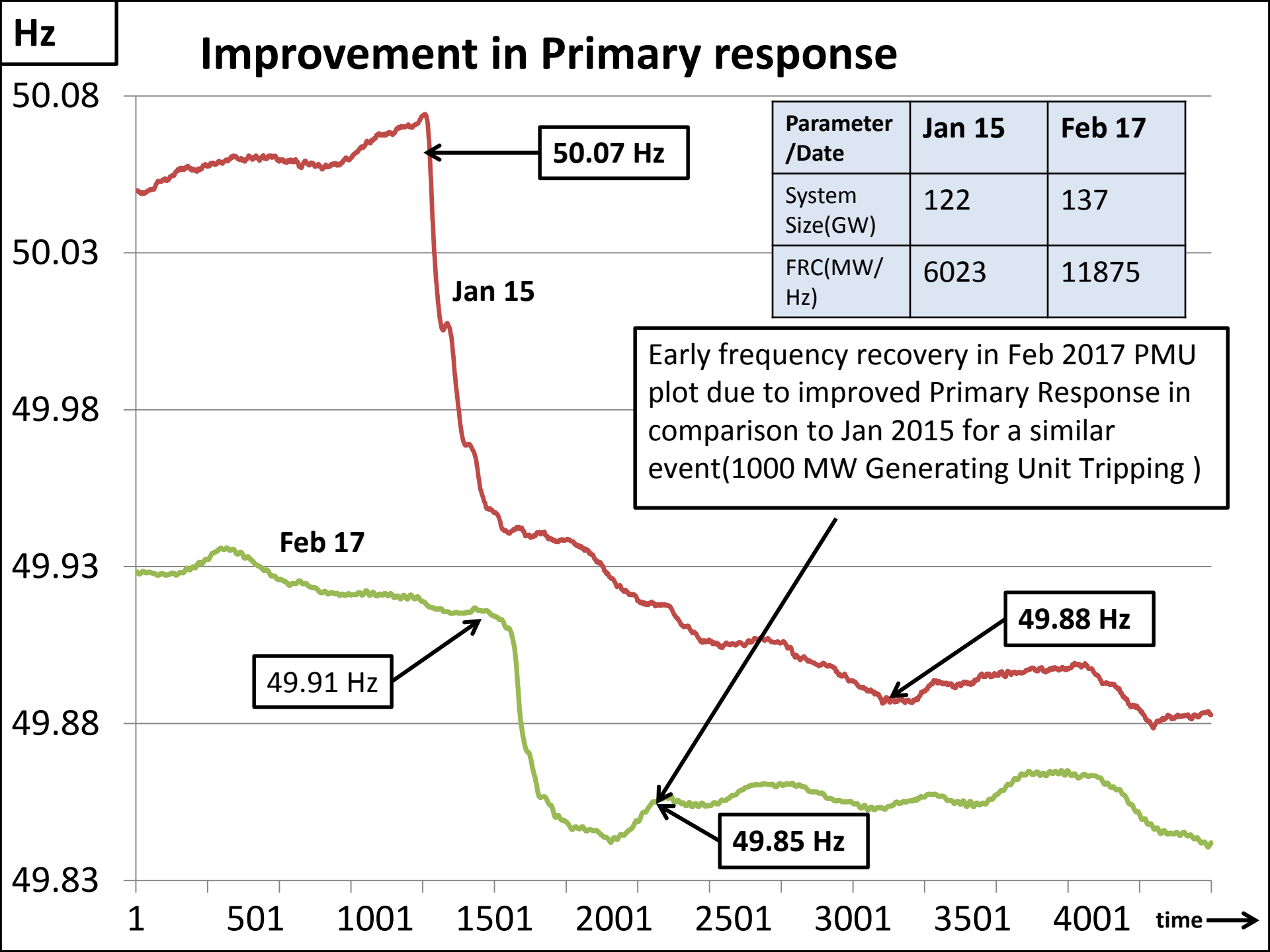


AGC in action in NR to meet 660 MW deficit and restore primary reserves

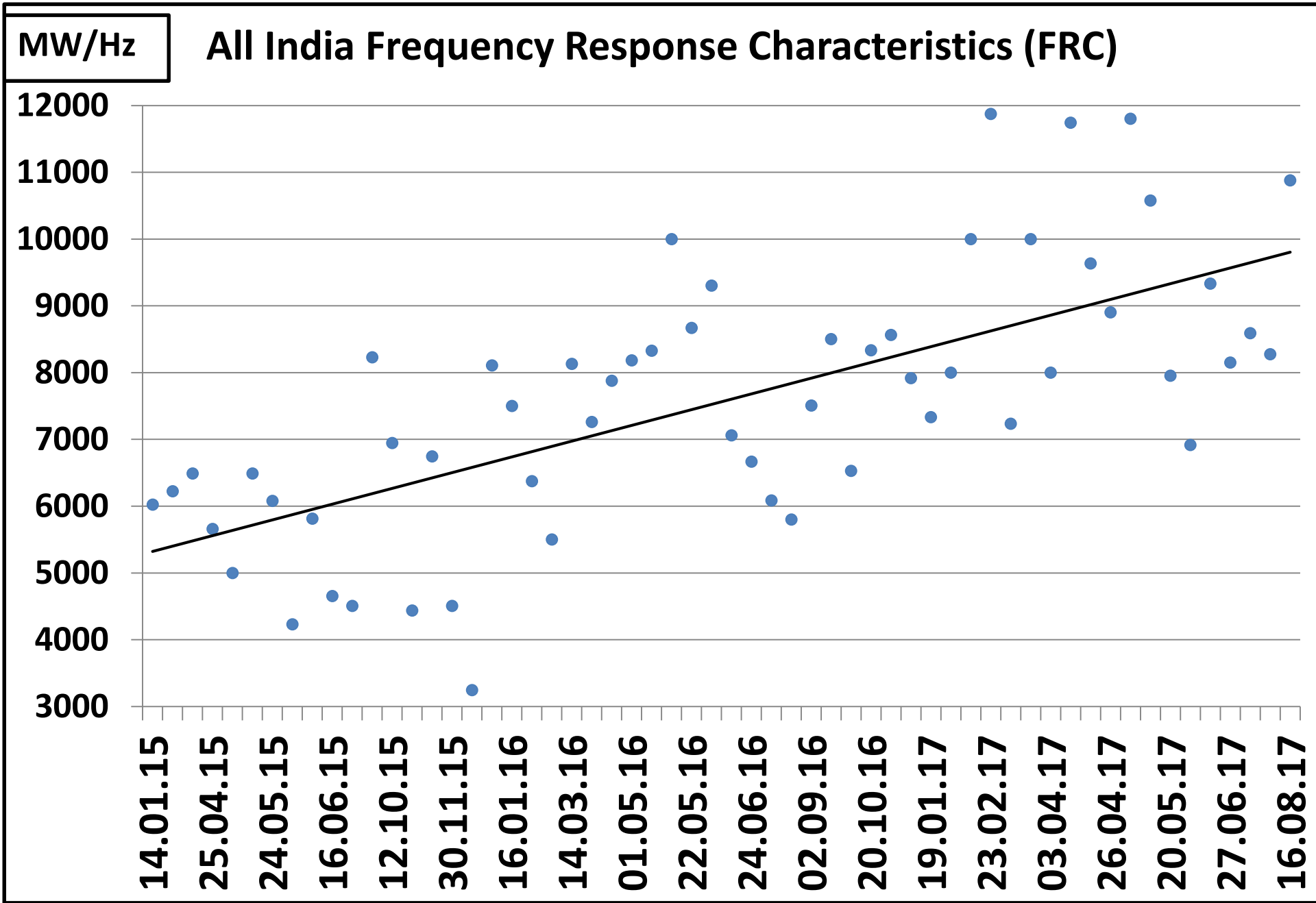


Frequency Stabilised at 50.00 Hz after a few minutes

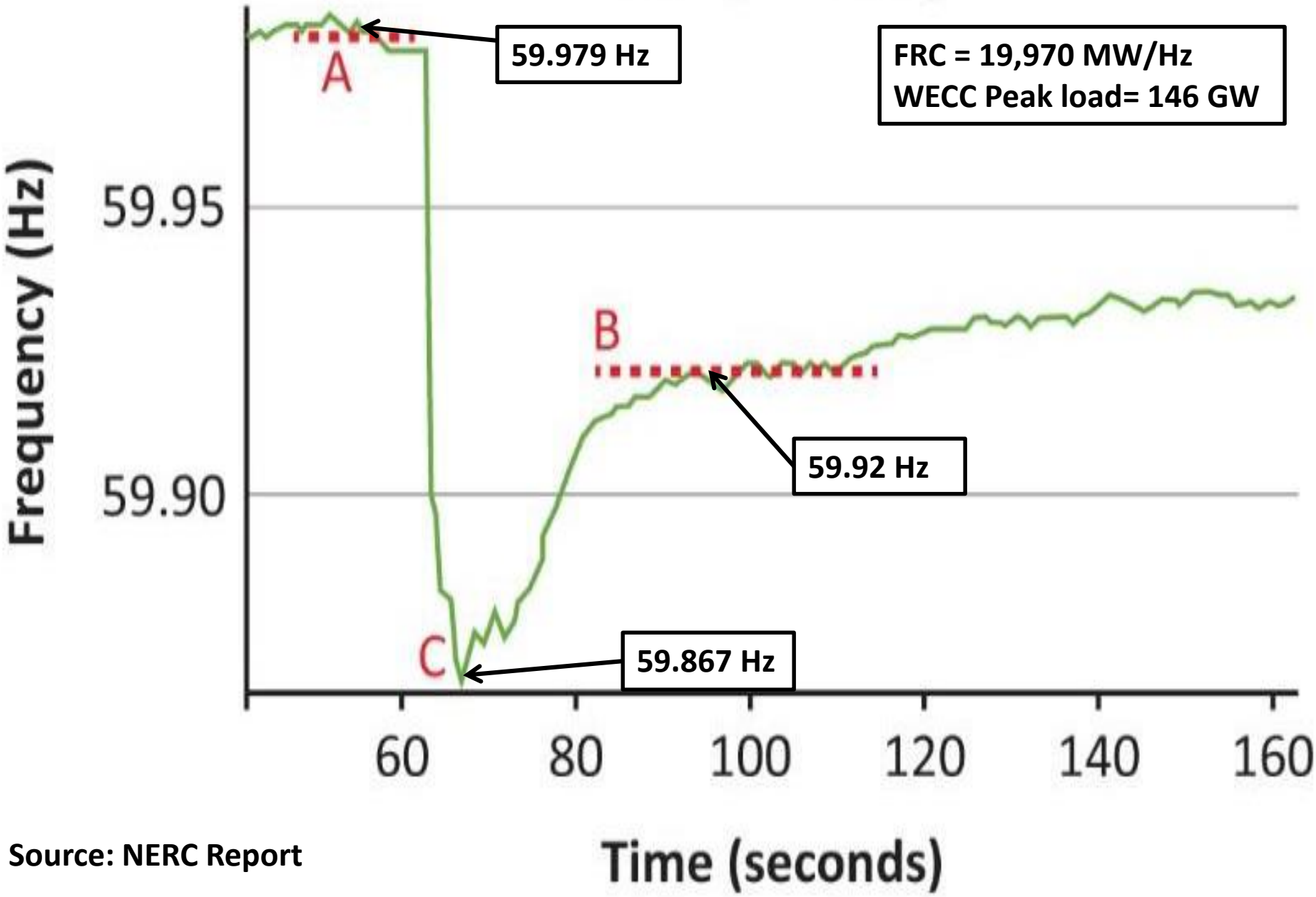
Tertiary to replace secondary Reserves in 15 minutes


Hz
Improvement in Primary response
50.08
50.03
49.98
49.93
49.88
49.83
1
501
1001
1501
2001
2501
3001
3501
4001
time
50.07 Hz
Jan 15
Feb 17
49.91 Hz
49.88 Hz
49.85 Hz
Parameter /Date | Jan 15 | Feb 17
System Size(GW) | 122 | 137
FRC(MW/ Hz) | 6023 | 11875
Early frequency recovery in Feb 2017 PMU plot due to improved Primary Response in comparison to Jan 2015 for a similar event(1000 MW Generating Unit Tripping)

All India FRC for 58 events from Jan 2015 to August 2017



Western interconnection (US) frequency during fault induced solar PV interruption ~1178 MW on 16th August 2016



Source: NERC Report

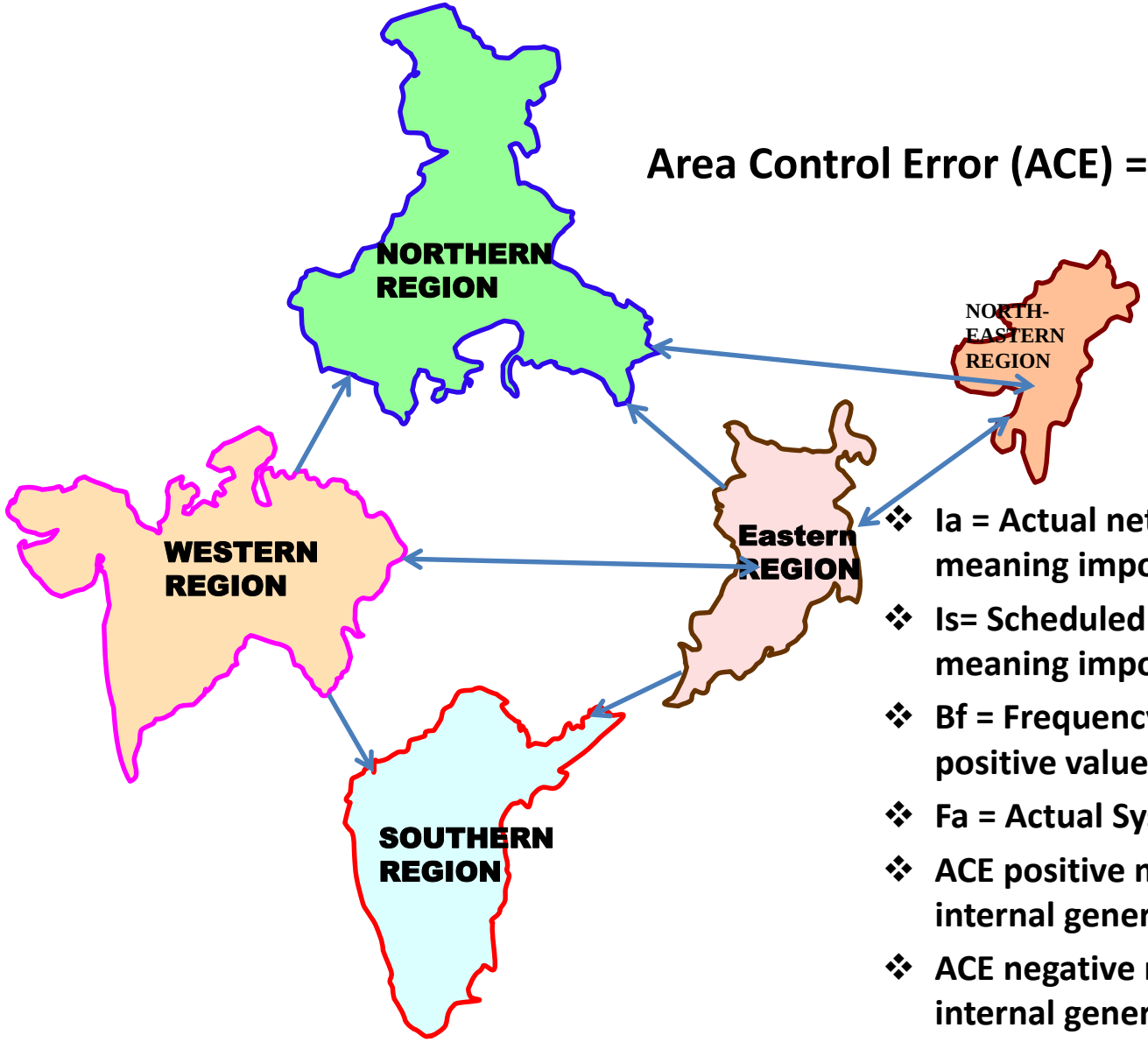
Primary Frequency Control

- Assessment of Frequency Response Characteristics (FRC) by NLDC/RLDC
  - Reported quarterly to CERC
- Improvement in FRC over last 3 years
  - 6000 MW/Hz to 10,000 MW/Hz approx
  - Need for target FRC (at least 15,000 MW/Hz)
  - Dead band (+/-0.03 Hz) to be reduced gradually
- Order dated 31st Jul 2017 by CERC in pet. 84/MP/2015
  - 1st Sep 2017; close monitoring of primary response
- Indian Electricity Grid Code (IEGC) 5th amendment
  - Independent third party testing once in 2 years
  - Agencies to be identified by RLDCs/SLDCs
  - RGMO to be phased out gradually

Automatic Generation Control (AGC) Pilot Project

Implementation Philosophy

Define the 5 geographical regions as Control Area for secondary control

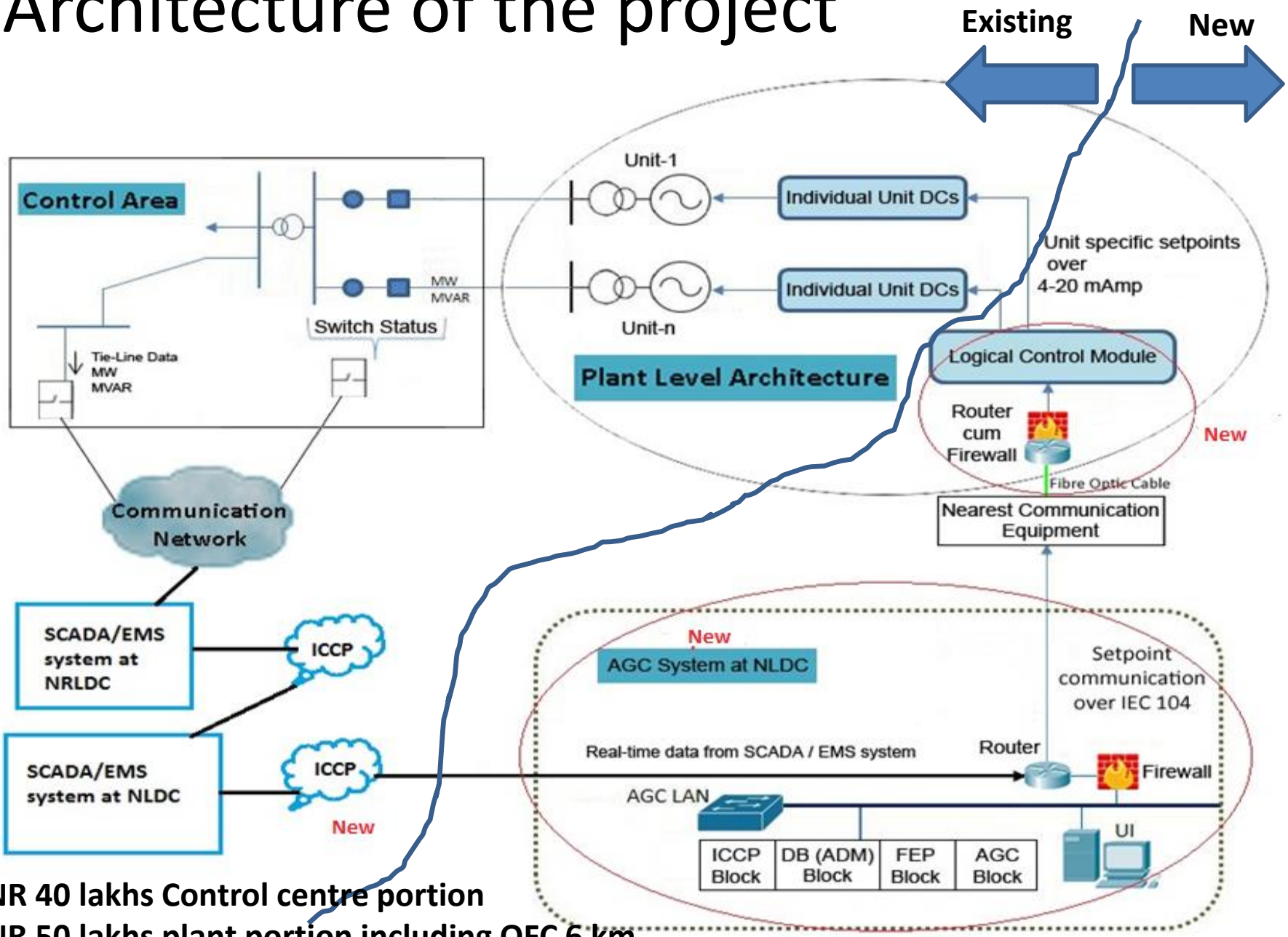


Area Control Error (ACE) = (Ia - Is) + 10 * Bf * (Fa - 50)

- Ia = Actual net interchange, negative for NR meaning import by NR
- Is= Scheduled net interchange, negative for NR meaning import by NR
- Bf = Frequency Bias Coefficient in MW/0.1 Hz, positive value
- Fa = Actual System Frequency
- ACE positive means NR is surplus and NR internal generation has to back down
- ACE negative means NR is deficit and NR internal generation has to increase

- Tie line bias mode and Frequency bias only mode both possible

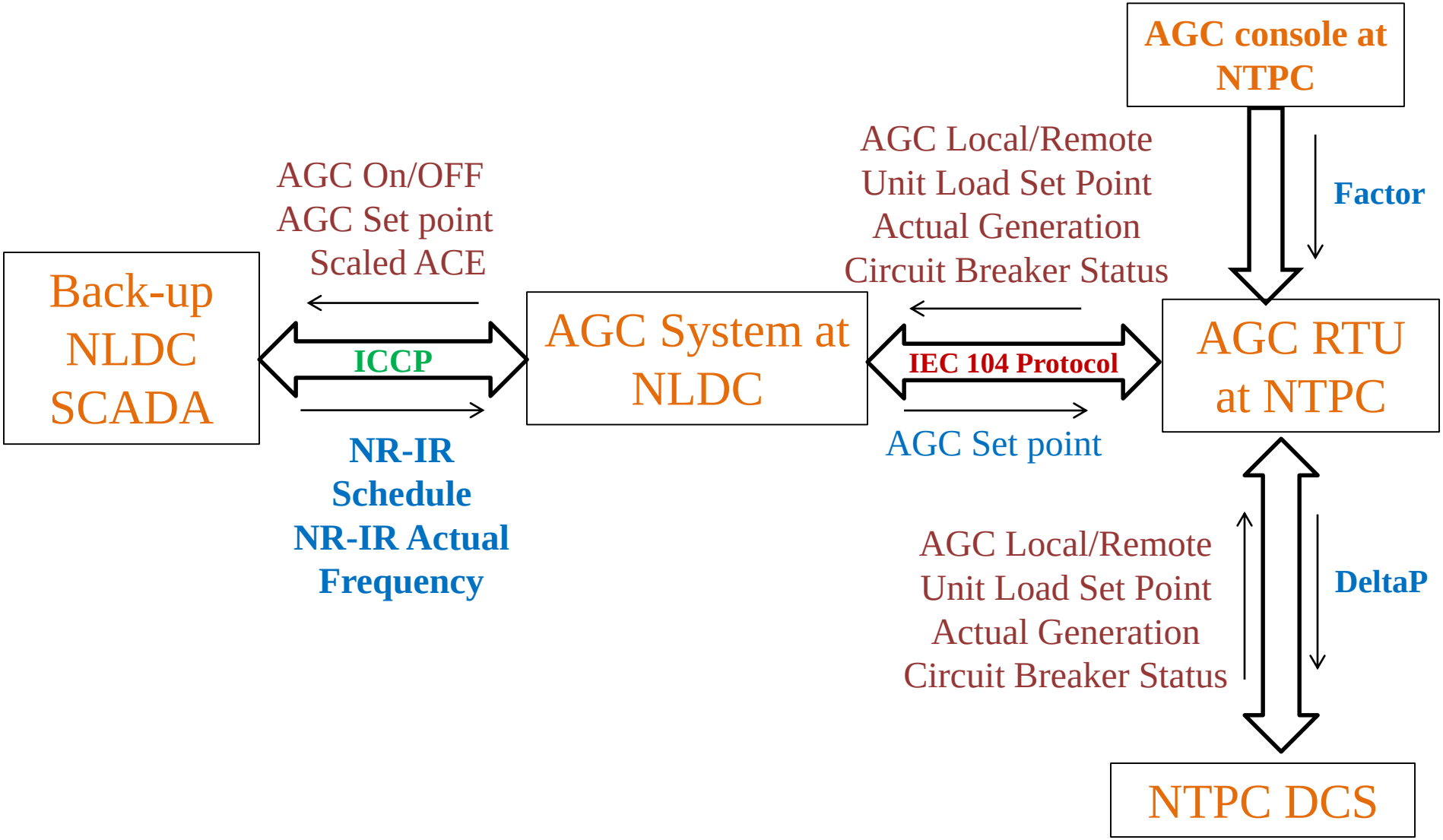
Architecture of the project



~INR 40 lakhs Control centre portion

~INR 50 lakhs plant portion including OFC 6 km

Data Flow in AGC Project



Scaling the ACE value

- NTPC Dadri stg-II alone cannot compensate the whole Northern Region ACE
- Interchange scaled using a factor of 15, changeable
  - Nearly 15 stations available for AGC in NR
- 50 MW will be the maximum Spinning Reserve utilization
- Beyond 50 MW NR Scaled ACE
  - Entire 50 MW spinning Reserve will be utilized from NTPC Dadri stg-II
- Utilization restricted to 50 MW
  - Regulation limits in the Spectrum 7 software

Rules fed in NTPC RTU

- AGC correction (Delta P) calculated in RTU as
  Delta P = Set point sent by NLDC – Total Unit Load Set Point (ULSP) of plant

- Check Delta P limits
  - If Delta P > 50 MW, Delta P = 50 MW
  - If Delta P < -50 MW, Delta P = -50 MW

- If one link goes down, switch to another

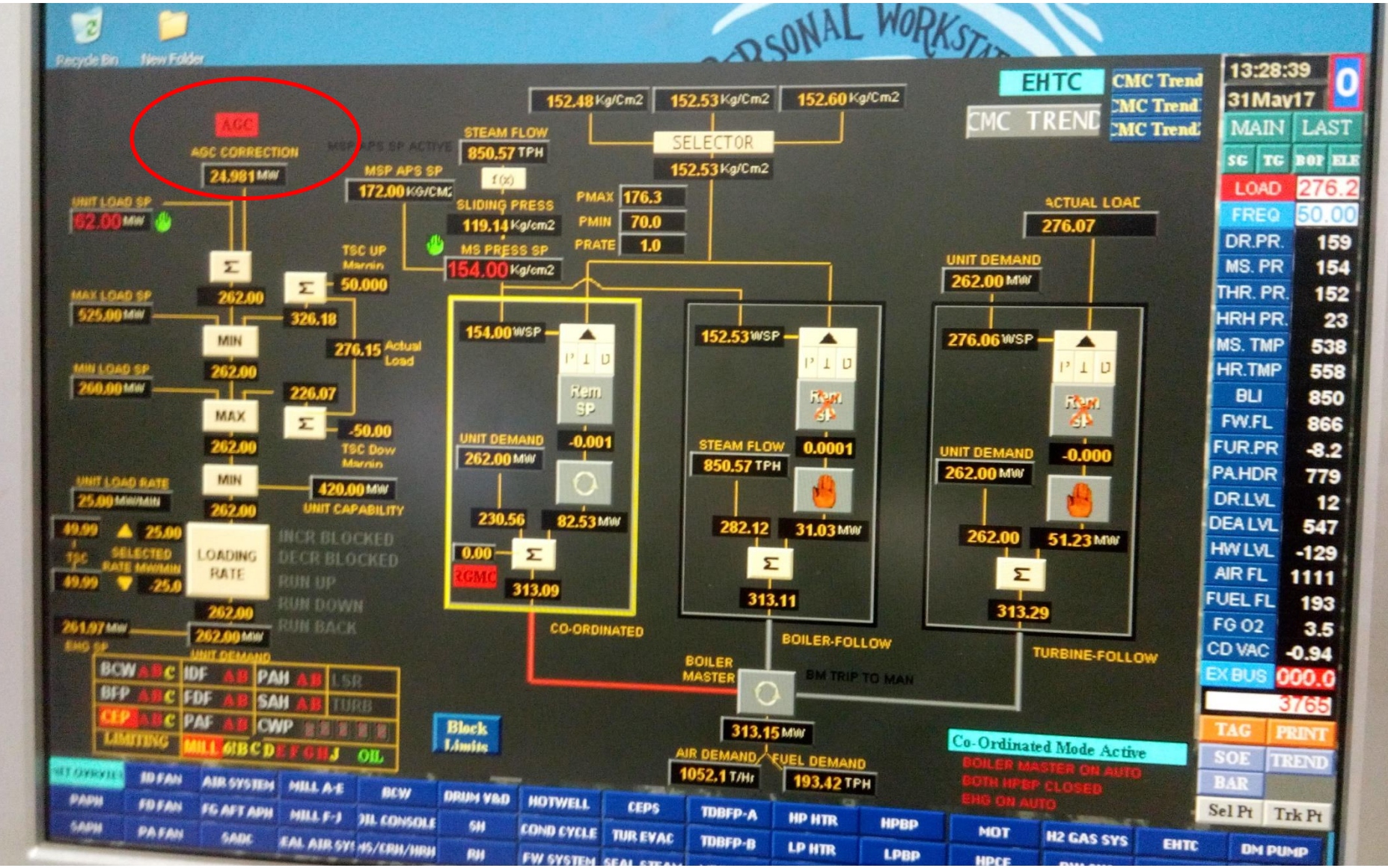
- Multiply the Delta P by the factor entered by NTPC operator
  - Divide the Delta P amongst the two units

- Send the AGC correction (Delta P)
  - To individual NTPC unit DCS
  - Hardwired

Output limit checks

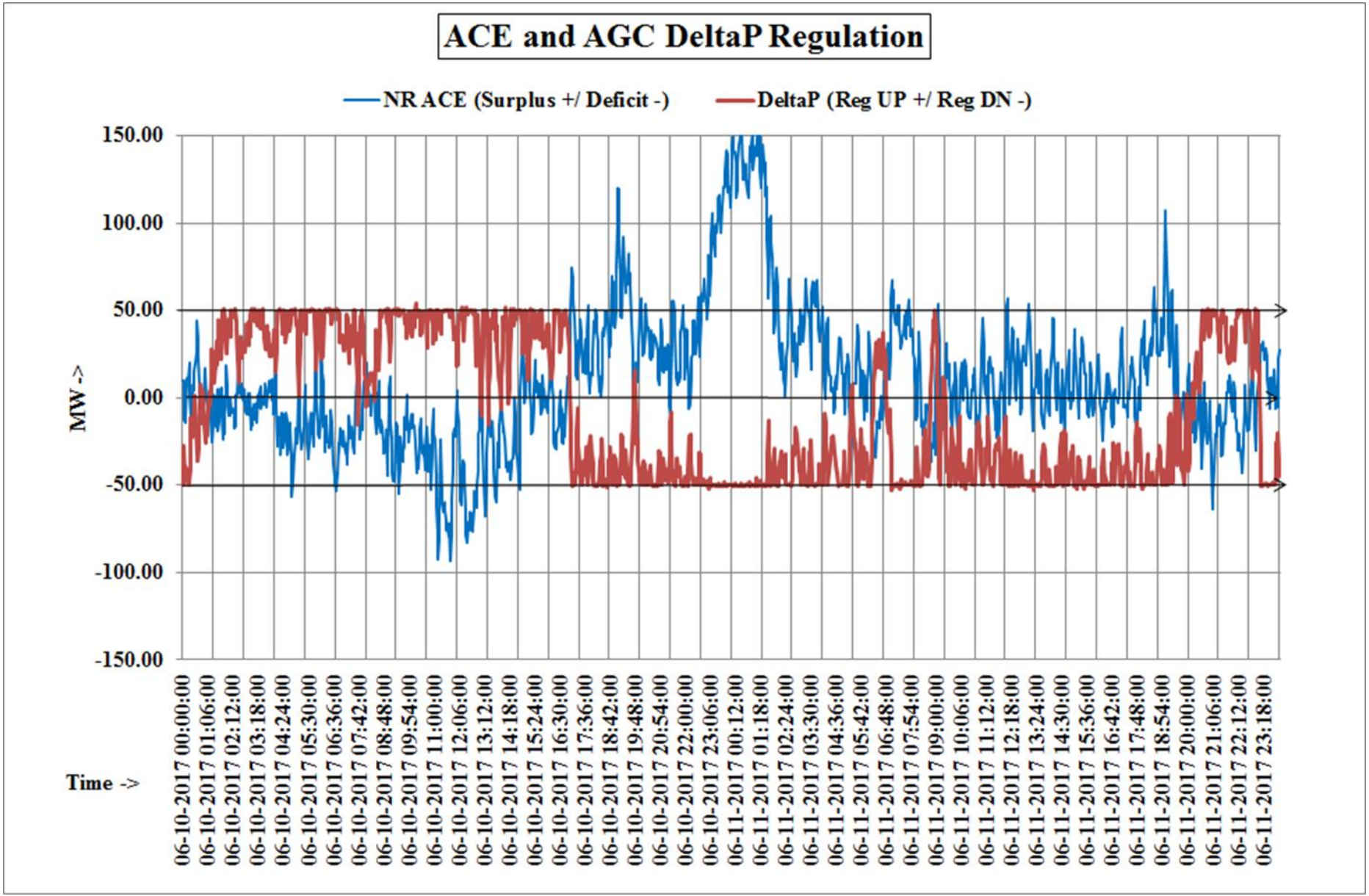
- 50 MW utilization of Spinning Reserve
- Plant Ramp rate (~ 10 MW/min) honoured while giving DeltaP signals
- Difference between two successive values of Delta P
  - Max(Delta (Delta P)) = 1MW
  - After tuning of controllers
  - Taken care of by the Ramp application at NLDC
- Unit Capabilities checked at Plant end
  - Maximum MW limit
  - Mill availability and Spinning Reserve in real time as declared on paper
    - If (Unit Capability – 50 – ULSP) < 0, then start an extra mill, indication at NTPC.

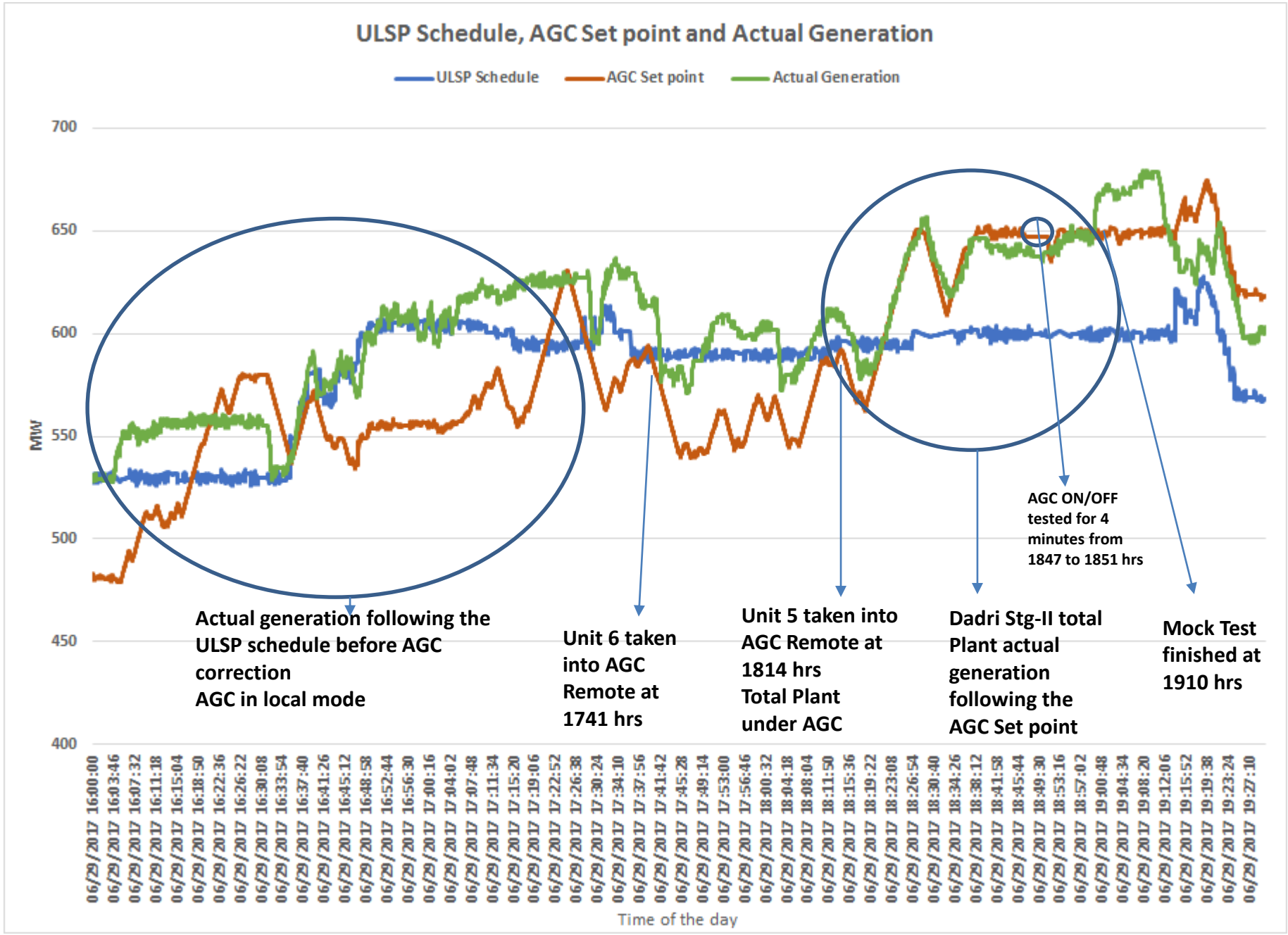
NTPC DCS snapshot

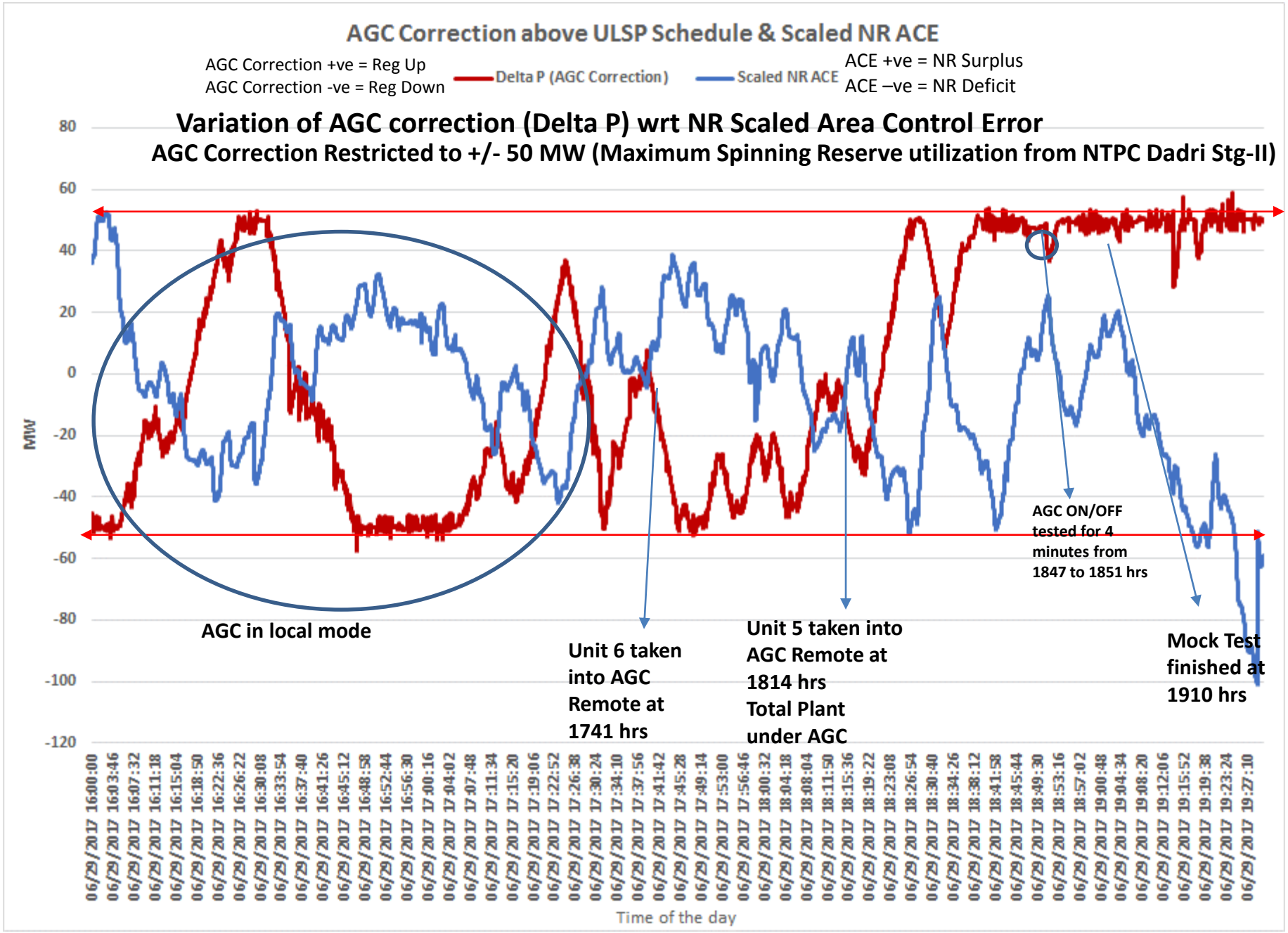


Sample performance plots

0000hrs of 10th June 2017 to 0000hrs of 12th June 2017




ULSP Schedule, AGC Set point and Actual Generation
ULSP Schedule
AGC Set point
Actual Generation
MW
700
650
600
550
500
450
400
Time of the day
Actual generation following the ULSP schedule before AGC correction
AGC in local mode
Unit 6 taken into AGC Remote at 1741 hrs
Unit 5 taken into AGC Remote at 1814 hrs
Total Plant under AGC
Dadri Stg-II total Plant actual generation following the AGC Set point
AGC ON/OFF tested for 4 minutes from 1847 to 1851 hrs
Mock Test finished at 1910 hrs


AGC Correction above ULSP Schedule & Scaled NR ACE
AGC Correction +ve = Reg Up
AGC Correction -ve = Reg Down
Delta P (AGC Correction)
Scaled NR ACE
ACE +ve = NR Surplus
ACE –ve = NR Deficit
Variation of AGC correction (Delta P) wrt NR Scaled Area Control Error
AGC Correction Restricted to +/- 50 MW (Maximum Spinning Reserve utilization from NTPC Dadri Stg-II)
MW
Time of the day
AGC in local mode
Unit 6 taken into AGC Remote at 1741 hrs
Unit 5 taken into AGC Remote at 1814 hrs
Total Plant under AGC
AGC ON/OFF tested for 4 minutes from 1847 to 1851 hrs
Mock Test finished at 1910 hrs

Payment for Energy & Incentive

- Variable cost of Dadri Stg-II available
- Block wise data
  - For both Up and Down regulation
- Payment for energy
  - For AGC MWh generated during a block
    - Payment @ variable charges to Dadri from the NR DSM pool
  - For AGC MWh reduced during a time block
    - Dadri pays @ variable charges to the NR DSM pool
- Payment for mileage
  - Absolute value of 5-minute MWh could be taken
  - 50 paise/kWh markup paid for this mileage

Deviation Settlement Mechanism (DSM)

- Deviation in MWh for every time block
- **MWh deviation = (Actual MWh) - (Scheduled MWh) - (AGC MWh)**
- AGC MWh can be positive or negative
  - Block wise data available
- Actual MWh and Scheduled MWh will be always positive
- Would be settled as per the existing DSM Regulations

Proposed rollout of AGC: Phase-I

- All the ISGS generators whose tariff is regulated / adopted by CERC
  - Proposed to be made capable of participating in secondary control
- The tariff rate for these generators is already available
- There are fewer communication issues
- Ancillary Services Framework is available for settlement
  - without the refund of fixed charges as mentioned in the Half Yearly Feedback on Ancillary Services
- Expected to be dispute free
- Availability of the full quantum of reserves as mandated by CERC may be an issue
  - SR, ER and NER
- INR 50-100 lakhs per plant depending on the optical fibre length

Proposed rollout of AGC: Phase-II

- All Regional Entity generating stations ~150 nos.
  - To improve the availability of Reserves scheduled by RLDCs
  - Over and above the Phase-I power stations
- Some Independent Power Producers (IPPs) have part PPA (Power Purchase Agreement)and part merchant contracts
  - DC and Schedule have to be obtained from these generators
    - Similar to Central Sector generating stations for reserve estimation
  - Tariff for these generators has to be decided and agreed upon apriori
- Many of these regional entity generating stations operate in the day ahead energy market
  - Day ahead prices play a significant role in availability to the grid
  - Low prices in the Day Ahead Market (DAM) on a sustained basis
  - May lead to many units remaining off the grid
- Optical Fibre connectivity over dedicated lines?

Estimated cost of secondary regulation services

- Mark up payments
  - Could range from INR 40 lakhs to INR 2 crores per day
- The net energy over a period of time will be negligible
- If in case a lot of Reserve energy gets consumed
  - Continuous Regulation Up signal by AGC
  - Direct signal that Base Case scheduling has to be revised
  - Units under Reserve Shut Down (RSD) must be brought online
- Conversely, if in case the AGC signal is always Regulation Down
  - Base Case scheduling has to be revised in that particular region
  - If needed units can be taken under RSD
- Close watch would have to be kept on forecast errors
  - For load and RE

AGC/Reserves related CERC proceedings

- Petition filed by POSOCO with CERC on 3rd April 2017 on AGC Pilot
- POSOCO has filed detailed modus operandi for Operationalization of Spinning Reserves on 14th July 2017
  - for CERC's consideration regarding full AGC project
  - https://posoco.in/download/detailed-modus-operandi-on-operationalization-of-spinning-reserves/?wpdmdl=13461
- Pilot project petition heard by CERC on 18th July 2017
- Record of Proceedings (ROP) issued by Hon'ble CERC
  - http://cercind.gov.in/2017/ROP/79_RC.pdf
- Comments from the stakeholders invited
  - https://posoco.in/download/suggestions-invited-on-agc-project-and-detailed-modus-operandi/?wpdmdl=13551
- Petition listed for hearing on 21st September 2017

Further steps

- Implementation of SAMAST (or similar) reforms at intra state level
  - Tertiary reserves and control at intra state level
- Real time data availability of inter-regional tie lines and generators
- Payment for the generator as per the performance
  - FERC 755 Order
  - https://www.ferc.gov/whats-new/comm-meet/2011/102011/E-28.pdf
- International interconnections; AGC for AC ties with neighbours
- Imbalance pricing or DSM philosophy
- Frequency Response Characteristics (FRC) targets and monitoring
- 55% technical minimum for thermal at intra state level
- Ramp up/ramp down rates as well as minimum uptime and downtime
- CEA's opinion sought if certain coal fired units could go down to 40%.
- Forecasting and Scheduling of RE and load with improved accuracy.
- Move to 5-minute dispatch and settlement.

Thank you

ANNEXURE-VI

Power System Database and Modelling

A Central Repository of detail models of all Power System Equipment

1. Load Flow

2. Short Circuit

3. Stability Studies:
   - Machines
   - FACTS
   - HVDC

A. Regional Committee for Modelling (Load Flow & Short Circuit)

Constitution of Committee:

1) **SE(Operation), RPC Chairperson**
2) Representative from RLDC
3) Representatives from STUs & SLDCs
4) Representatives from NPC & CTU

Scope of Work:

1) Creation of Database for Modelling:

i) Topology
ii) Substations Layout
iii) Transmission Line Data
iv) Terminal Equipment Details

v) Transformer Data
vi) Load Data
vii) Generator Data

2) To create regional model for load flow & short circuit

Eight Models i.e. Peak and off-peak for 4 quarters

- **Common Data Format to be followed**
- **Restricted Access to the Data**

B. National Level Committee

Constitution of Committee:

1) Chief Engineer, NPC **Chairperson**
2) Representative from RPCs & RLDCs
3) Representatives from CTU & NLDC

Scope of Work:

1) To create Common Data format for modelling.
2) To prepare LGB guidelines for models.
3) Validation of regional models & their facilitation.
4) To create National load flow data:

Eight Models i.e. Peak and off-peak for 4 quarters

C. Committee for Machine Data/Stability Data

Constitution of Committee:

1) Member (GO&D), CEA **Chairperson**
2) Member Secretaries of RPCs
3) ED, NLDC
4) COO, CTU
5) Chief Engineer, NPC-**Member Secretary**

Aim:

1. To accurately model machine parameters for stability studies (also HVDC & FACTS)
2. To validate model on regular basis

Strategy:

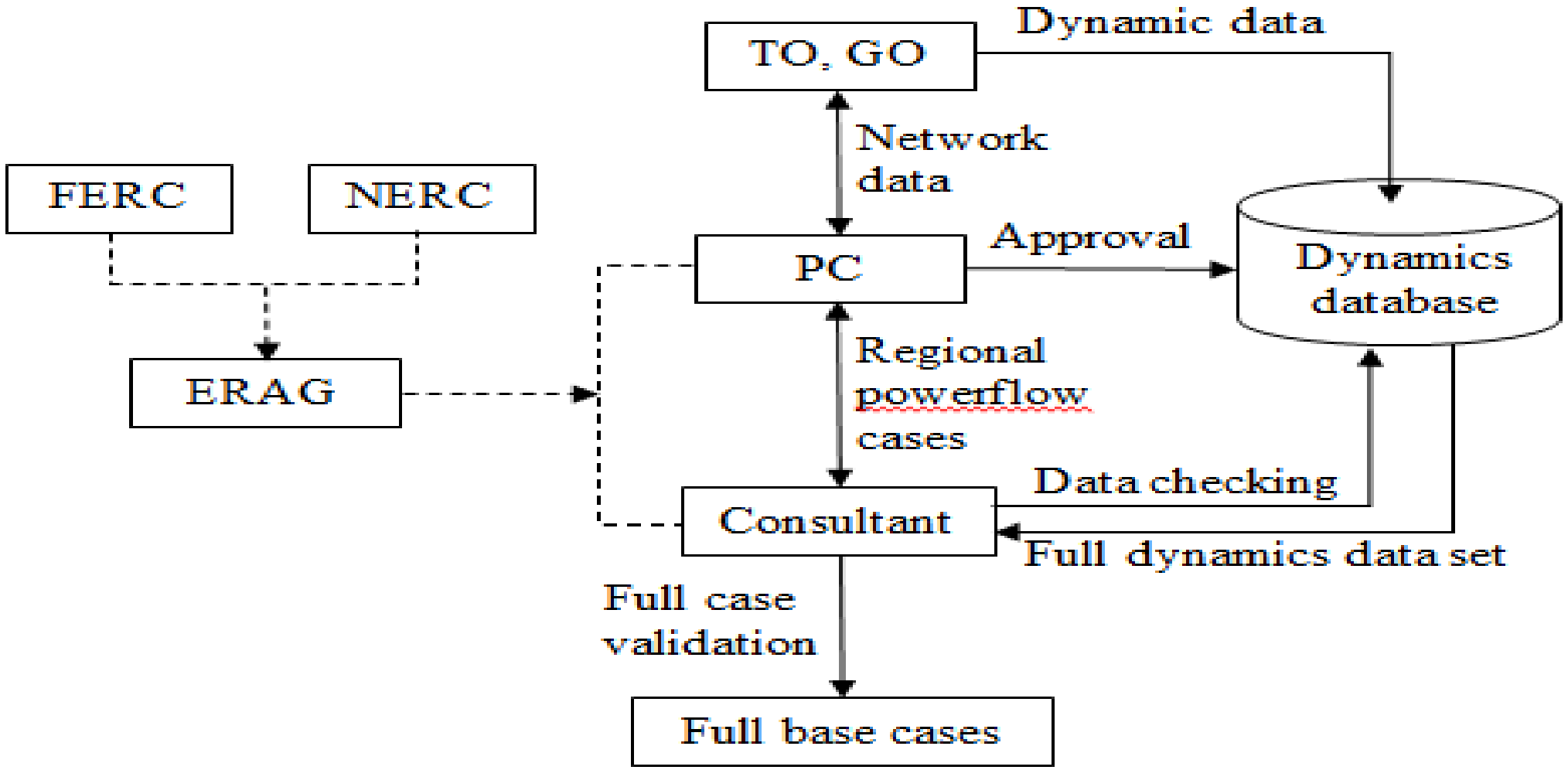
1. Kickstart
   - Through Consultant (IIT Delhi/Mumbai/Kanpur/IISC Bengaluru)
   - Internal Capability (CEA, CTU, POSOCO, States, RPCs)
2. To cover all plants
3. ToR for IITs/IISC
4. ToR for Validation Consultant

Funding for Consultant??

An e.g. for Basecase development process: EI, North America

ERAG (Eastern Interconnection Reliability Assessment Group) in North America, deals with three types of parties in base case development effort:

- FERC and NERC: providing guidance on the model development effort and approving mechanism to resolve technical/business issues
- Planning Coordinator (PC): There are eight PCs in Eastern Interconnection **(EI)** of North America, coordinating the submission of models and data required for a region in EI and also updating the regional base cases, viz. Hydro Quebec, NPCC, PJM, MISO, Manitoba Hydro, SPP, SERC & FRCC
- Consultant: actually develops base cases and validates models from the data provided by PCs



FERC – Federal Energy Regulatory Commission

NERC – North America Electric Reliability Cooperation

ERAG – Eastern Interconnection Reliability Assessment Group

TO – Transmission Owner

GO – Generator Owner

PC – Planning Coordinator

ANNEXURE-VII

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	mssrpc-ka@nic.in	Ph: 080-22287205	Fax: 080-22259343
सं/No. SRPC/SE-II/2017/		दिनांक / Date	30.03.2017

Chief Engineer
National Power Committee
CEA
NEW DELHI – 110 016

Sub: Status of decisions in the Meetings of NPC and schemes funded from PSDF– reg.

Ref: CEA letter No.4/MTGS/NPC/CEA/2017/238-243 dated 23.03.2017

Sir,

Kind reference is invited to letter cited above. As desired, the following update is submitted with respect to Southern Region.

1. **Representation of NPC in Sub-Committees of RPCs:**
   In the 4th meeting of NPC held on 10.12.2015, it was agreed to include Chief Engineer (NPC) as a member of TCC, and Director (NPC) as a Member of Operation Coordination Sub-Committee (OCC), Protection Sub-Committee and Commercial Sub-Committee in all the RPCs. RPCs are yet to confirm the representation of NPC in RPCs.

   ✓ ***NPC is already being invited for the TCC/SRPC and Monthly OCC Meetings of SRPC. NPC Officer participated in the TCC & SRPC Meetings held in February 2017.***

2. **Ensuring Proper Functioning of Under Frequency Relays (UFRs) & df/dt Relays:**
   In the 6th meeting of NPC held on 19.12.2016, it was decided that all RPCs Secretariat would furnish to NPC Secretariat the procedure being followed by them to ensure healthiness of UFR & df/dt relays. RPC Secretariat shall carry out periodic inspection, in line with the provisions of IEGC.

- ✓ ***Information in this regard received from States is furnished at Annexure-I. All States have furnished the required information.***
- ✓ ***SRPC is carrying out periodic inspection regarding proper functioning of AUFR and df/dt relays in line with provisions of IEGC. Issues, if any, are being taken up with the concerned utilities.***

3. **Mapping of Feeders:**

In the 6th meeting of NPC held on 19.12.2016, it was agreed that each RPC would submit the details / progress of feeder mapping to NPC Secretariat.

- ✓ ***The Status is as follows:***

State			AP	TS	KAR	KER	TN	PUD	SR
Recommended	MW	A	2782	2965	3539	1173	4176	103	14738
Implemented	MW	B	2782	2978	3559	1207	4544	116	15186
	%	B/A	**100**	**100**	**101**	**103**	**109**	**113**	**103**
SCADA monitorable	MW	C	1169	2353	3557	1184	3849	116	12112
	%	C/B	**42**	**79**	**101**	**101**	**92**	**113**	**82**

✓

4. **Scheme for Storage and Management of Protection System Data Base:**
In the 6th meeting of NPC held on 19.12.2016, it was agreed that NRPC, WRPC & NERPC would also create data base of relays setting & protection coordinate in their region similar to the scheme finalized by ERPC/SRPC.

- ✓ ***NIT No.02/2017 for "Procurement of Web-based Management Software and Protection Setting Calculation Tool for Southern Region has been floated on 23.03.2017.The time line in this regard is as follows:***

  - ***Last Date of Receipt of Bids: 10th May, 2017 up to 11:00 hrs***
  - ***Date of Opening of Technical Bid: 10th May, 2017 at 11:30 hrs***

APTRANSCO

ANNEXURE – I

(1/6)

TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED

From
The Chief Engineer/
IPC & Power Systems,
APTRANSCO,
Vidyut Soudha, Hyderabad.

To
The Member Secretary,
SRPC,
29, Race Course Road
Banagalore-560009.

Lr.No.CPS/SP/13/F.UF/Vol. /D.No.44/2017, Dt:03.02.2017.

Sub: APTRANSCO - System Protection – Ensuring proper functioning of Under Frequency Relays(UFRs) & df/dt Relays - Reg.

Ref: SRPC/SE-II/2017/346-351, Dt: 16-01-2017.

>>*<<

With reference to the above, the following procedure is being followed in APTRANSCO for ensuring the healthiness of AUFR and df/dt relays.

1. Mock testing is being carried out for checking the healthiness of AUFR and df/dt relays on quarterly basis during the months of March, June, September and December as per NRPC recommendations.

2. Healthiness of protection circuit is being ensured regularly by the shift in charges in the Substation and also during the annual maintenance of the feeders and transformers protection relays, the healthiness of breakers are also being ensured.

3. While mock testing of the AUFR and df/dt relays on quarterly basis, the healthiness of relays are being ensured without actual tripping of the breaker.

The above is submitted for favor of information please.

Sd/-
CHIEF ENGINEER/
IPC & POWER SYSTEMS

TSTRANSCO

TRANSMISSION CORPORATION OF TELANGANA LIMITED

2/5

From
The Chief Engineer/
SLDC,
TSTRANSCO,
Vidyut Soudha, Hyderabad.

To
The Member Secretary,
SRPC,
29, Race Course Road
Bangalore-560009.

E-Mail:sepststransco@gmail.com

Lr.No.CE/SLDC/SEP S/SP/131/SRPC/Vol.2/D.No.40/17,Dt:24.01.2017

Sir,

Sub: Ensuring proper functioning of Under Frequency Relays (UFRs) & df/dt relays - Information submitted - Reg.

Ref: SRPC/SE-II/2017/346-351, Dt:16-01-17.

>>*<<

With reference to the above, the following procedure is being followed in TSTRANSCO for ensuring healthiness of UFR and df/dt relays.

1. Periodical testing for checking the healthiness of only UFR and df/dt relays are being carried out every six months as per SRPC guidelines.
2. However during the Annual Maintenance, while checking the feeder and transformer protection, the tripping of breaker is also verified by initiation of UFR & df/dt trip signals.
3. While testing UFR and df/dt relays at every six months, the relay healthiness is being ensured without actual tripping of the Breaker.

The above is submitted for favour of information please.

Sd/-
CHIEF ENGINEER

SLDC/TSTRANSCO

Forwarded message ———
From: **CEERT KPTCL** <ceertkptcl@gmail.com>
Date: Wed, Mar 8, 2017 at 4:59 PM
Subject: PROCEDURE BEING FOLLOWED IN KPTCL TO ENSURE HEALTHINESS OF UNDER FREQUENCY RELAYS-reg
To: sldckptcl@gmail.com

Sir,

1. The under frequency relays commissioned at various 220kV Sub Stations of KPTCL for shedding loads connected to Under Frequency and df/dt schemes are tested once in a year.

2. Healthiness of the protection circuit of the Under Frequency Relay up to Contact Multiplication Relay (CMR) will be checked during periodic testing of UFR without actually tripping of the CBs of feeders connected. Circuit healthiness after CMR up to master trip relay of individual feeder connected will be checked during the outage of each feeder whenever availed for maintenance works.

With Regards,
—
CEE RT & R&D
KPTCL, Kaveri Bhavan,
Bangalore-560009.

(3/5)

KERALA STATE ELECTRICITY BOARD Ltd.

Office of the Chief Engineer(Transmission System Operation)
LD Centre, H.M.T.Colony P.O., Kalamassery – 683 503.
Phone: 0484 2555965, 2555950,94960119100 Fax: 0484 2543850
Email : cesoklsy@gmail.com, ceso@kseb.in

4/6

No. CESO/EELD1/AEEGS/UF/2016-17/2856 Dt:20-02-17

To,

The Member Secretary
SRPC
Bengaluru-560 009

Sir,

Sub:- Ensuring proper functioning of Under Frequency Relays & df/dt relays
Ref:- 1. Ltr No.SRPC/SE/2017/346-351 dtd 16-01-17 of SE
2.Minutes of 6th NPC meeting held on 19-12-2016.

As per reference above the procedure followed in KSEBL for ensuring proper functioning of Under frequency relays and df/dt relays is detailed below.

1. The UFR and df/dt relays are tested while conducting the routine testing of protective relays of substation (routine test) once in a year as per the testing schedule of the substations. All functional properties and healthiness of relays will be checked during this time. Additional testing will be done in case any abnormality is observed.
2. During routine testing, healthiness of relays, protection scheme, measuring instruments and circuit breakers are carried out annually.
3. Actual breaker tripping is performed during the testing of any of the protection schemes.

Yours faithfully,

Chief Engineer (T-SO). 20/2/17

Copy to: The ED,SRLDC,Bangaluru

TAMILNADU TRANSMISSION CORPORATION LIMITED

(5/6)

From	To
Er. K. Natarajan, B.E., Chief Engineer, Protection and Communication, 5B Block, First Floor, TNEB complex, 144, Anna Salai, Chennai – 600 002.	The Member Secretary, SRPC, 29, Race Course Cross Road, Bangalore – 560 002.

Lr. No. CE/P&C/SE/D/EPC4/AEE3/F.SRPC/D.76 /17, dated 10.02.2017.

Sir,

Sub.: TANTRANSCO – Ensuring Proper functioning of Under Frequency Relays (UFRs) & df/dt Relays – Furnishing of Procedures followed by TANTRANSCO - Reg.

Ref.: No: SRPC/SE-II/2017/346-351, Dated 16.01.2017.

*** * ***

The details requested vide reference for ensuring the proper functioning of Under Frequency Relays (UFRs) & df/dt Relays in TANTRANSCO are furnished below:

1. *Procedure being followed in TANTRANSCO to ensure healthiness of UFR and df/dt relays:*

   The healthiness of the UF and df/dt relays are ensured continuously by providing audible annuhciation through the watch dog contact.

2. *For the Healthiness of protection circuit in addition to healthiness of Relays / Breakers, the frequency of maintenance schedule of Relays, Breakers, etc. followed by TANTRANSCO:*

   During Annual Relay testing, the healthiness of the protection circuits are ensured upto the breaker. Breaker Opening & Closing times, Breaker Contact Resistance and Tripping interlocks are checked annually.

3. *Whether the actual Breaker tripping is being carried out during testing the healthiness of the UFR and df/dt relays?*

   During testing of UF and df/dt relays, the operation of trip relays and availability of trip positive in the trip link are ensured with trip links in removed condition. Actual Breaker tripping is not carried out.

A. Sivakumar
10.2.'17
For Chief Engineer/P&C
TANTRANSCO

Copy to the Superintending Engineer / LD&GIO / TANTRANSCO.

(6/6)

GOVERNMENT OF PUDUCHERRY
ELECTRICITY DEPARTMENT
137, Nethaji Subhash Chandra Bose Salai, Puducherry - 605 001.
Phone: 0413 – 2331556; Fax: 0413 – 2334277; e-mail: se1ped.pon@nic.in

No. 8837/ED/SE-I/DIV VII/F TECH/2016-2017 Date: 28.03.2017

To
The Member Secretary,
Southern Regional Power Committee,
Government of India,
Central Electricity Authority,
No.29, Race Course Cross Road,
Bengaluru – 560 009.

Sir,

Sub: Electricity Department – Puducherry – Report on the procedure being followed by Electricity Department – for ensuring the proper functioning of UFRs and df/dt relays – furnished - Reg.,

With reference to the above, the following particulars / informations are furnished in order to apprise the same to NPC.

The following procedures are being adopted by Electricity Department, Puducherry for the checking of UFRs & df/dt relays for the proper functioning of them.

1. Healthiness of UFRs & df/dt relays are being checked during Annual testing of Substations.

2. The actual breaker tripping of UFR and df/dt relays are also being carried out during the Annual testing of Substations.

This is your kind information please.

Yours faithfully,

(D. RAVI)
SUPERINTENDING ENGINEER - I

ANNEXURE-VIII

AUFR/(df/dt) : Recommended Quantum/Implemented Quantum SCADA Monitorable Quantum

SCADA Monitoring MW							
STATE	49.2	49	48.8	48.6	df/dt @49.5	df/dt @49.3	Total
AP	258	227	286	182	205	492	1650
TS	259	405	307	421	231	710	2333
KAR	706.8	878.9	714.2	651	624.6	840.6	4416
KER	228	234	266	221	275	175	1399
TN	586	671	796	732	617	513	3915
PONDY	21	24	19	18	12	6	100
SR	2059	2440	2388	2225	1965	2737	13813

SCADA Monitoring %(with respect to implimented quantum)							
STATE	49.2	49	48.8	48.6	df/dt @49.5	df/dt @49.3	Total
AP	66	58	72	46	59	58	59
TS	62	96	72	98	63	78	78
KAR	100	100	100	100	99	100	100
KER	95	100	100	100	95	100	98
TN	73	83	96	88	100	96	88
PONDY	78	100	86	100	100	100	92
SR	79	88	90	87	87	82	86

Implemented Quantum							
STATE	49.2	49	48.8	48.6	df/dt @49.5	df/dt @49.3	Total
AP	392	393	398	399	345	855	2782
TS	419	420	426	431	368	914	2978
KAR	706.8	878.9	714.2	651	632.8	840.6	4424
KER	241	234	266	221	290	175	1427
TN	804	808	830	831	617	534	4424
PONDY	27	24	22	18	12	6	109
SR	2590	2758	2656	2551	2265	3325	16144

Implemented Quantum %(with respect to recommended quantum)							
STATE	49.2	49	48.8	48.6	df/dt @49.5	df/dt @49.3	Total
AP	100	100	100	100	100	100	100
TS	100	100	100	101	100	100	100
KAR	123	152	122	111	134	114	125
KER	118	114	128	106	163	100	121
TN	109	109	110	110	99	96	106
PONDY	100	100	100	100	100	100	100
SR	110	117	111	106	113	102	109

Recommeded Quantum MW							
STATE	49.2	49	48.8	48.6	df/dt @49.5	df/dt @49.3	Total
AP	392	393	398	399	345	855	2782
TS	417	419	424	426	367	912	2965
KAR	576	578	586	588	474	737	3539
KER	204	205	208	209	178	175	1179
TN	740	744	753	756	624	559	4176
PONDY	27	24	22	18	12	6	109
SR	2356	2363	2391	2396	2000	3244	14750

SCADA Monitoring %(with respect to recommended quantum)							
STATE	49.2	49	48.8	48.6	df/dt @49.5	df/dt @49.3	Total
AP	66	58	72	46	59	58	59
TS	62	97	72	99	63	78	79
KAR	123	152	122	111	132	114	125
KER	112	114	128	106	154	100	119
TN	79	90	106	97	99	92	94
PONDY	78	100	86	100	100	100	92
SR	87	103	100	93	98	84	94

ANNEXURE-IX

Email: cenpccea@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
वेबसाइट / Website: www.cea.nic.in

No. 4/MTGS/NPC/CEA/2017/ 201-207 Date: 07th March 2017

Subject: Methodology / Procedure for computing actual drawal / injection of entities in case of non-availability of Main/Check/ Standby Meter data -Reg.

Ref : Decision of 6th Meeting of NPC held on 19th December 2016.

NLDC vide letter dated 21st February 2017 (copy enclosed for reference) has furnished the methodology being adopted by the RLDCs for computing actual drawal / injection of entities. Based on the inputs of NLDC, methodology adopted in various regions for computing actual drawal / injection of entities in case of non-availability of Main/Check/Standby Meter data has been compiled and a uniform methodology/procedure is proposed. Methodology adopted in NR/ER/WR/SR/NER and uniform methodology proposed by NPC is given in **Annexure-A**.

The proposed methodology may be deliberated by Commercial Sub- Committee and views /comments may please be furnished by **31st March 2017**.

Yours faithfully,

Encl: as above.

7/3/2017
(B.C.Mallick)
Chief Engineer

To:

1. Member Secretary, NRPC, New Delhi-110016.
2. Member Secretary, WRPC, Mumbai-400 093.
3. Member Secretary, SRPC, Bengaluru-560009
4. Member Secretary, ERPC, Kolkota-700033
5. Member Secretary, NERPC, Shillong-793003.
6. Chief Executive Officer, NLDC, New Delhi-110016.

Copy for Kind information to:
Member (G&OD), CEA, New Delhi

Annexure-A

METHODLOGY ADOPTED BY RLDCs FOR ACTUAL INJECTION / DRAWALCOMPUTAION – NPC Proposed Methodology
(In case of non-availability of Main/Check/Standby Meter data)

Description	NRLDC	WRLDC	SRLDC	ERLDC	NERLDC	NPC Proposal
A. Generating Stations:(Main & Check Meter on all outgoing feeders and Standby meter at HV side of GTs & SATs)						
Non-availability of **Main Meter data**	Check meter data	Check meter data	Check meter data	Check meter data	Other end meter data on outgoing feeders applying transmission loss. *	**Check Meter data #**
Non-availability of **Main & Check Meter data**	Standby Meter data installed on HV side of GT	Other end meter data on the line applying transmission loss	Other end Meter data on the line	Other end Meter data on the line	Standby Meter data	**Standby Meter at HV side of GTs & SATs #**
Non-availability of **Main, Check & Standby Meter data**	Other end meter data on the line by applying line loss		HV side of GTs & STs	HV side of GTs & STs		**Other end Meter data on the outgoing feeders considering transmission loss**
B. Transmission Lines: (Main Meter at one of end of the line between S/S of same licensee and at both ends of two different licensees. Meter installed at other end of the line shall work as Standby meter						
Non-availability of **Main Meter data**	Standby Meter data applying transmission loss	Standby Meter data applying transmission loss	Standby meter data	Standby Meter data	Standby Meter data applying transmission loss	**Standby Meter data applying transmission loss**
Non-availability of **Main & Standby Meter data**	Bus mismatch reading / Loss Meters		Computed using net sum of power flow at the station.	Data from meter installed by respective State		**Computation using net Bus flow at the S/S.**
C. ICT : (Main Meter at HV side and Standby Meter at LV side of Inter Connecting Transformers)						
Non-availability of **Main Meter data**		Standby meter data without applying ICT loss	Standby meter data		Standby meter data	**Standby Meter data # applying ICT loss**
Non-availability of **Main & Standby Meter data**						**Computation using net Bus flow at the S/S.**
D. **Main & Check Meter**	Installed on same CT/PT					**Shall be installed at different core of CT/PT**
E. Standard Transmission Loss						
765kV		1.5 %	***No transmission loss is applied in any of the cases***			**1.5%**
400 kV	1.5%	2.0 %			1.5%	**1.5%**
220kV	3.0%	4.0%			3.0%	**2.0%**
132 kV & below	4.0%				4.0%	**4.0%**

* No check meters installed in NER

Location of Meter as per CEA Regulation.

पावर सिस्टम ऑपरेशन कारपोरेशन लिमिटेड

(भारत सरकार का उद्यम)

POWER SYSTEM OPERATION CORPORATION LIMITED

(A Govt. of India Enterprise)

पंजीकृत एवं केन्द्रीय कार्यालय : प्रथम तल, बी-9, कुतुब इंस्टीट्यूशनल एरिया, कटवारिया सराय, नई दिल्ली-110016
Registered & Corporate Office : Ist Floor, B-9, Qutab Institutional Area, Katwaria Sarai, New Delhi -110016
CIN : U40105DL2009GOI188682, Website : www.posoco.in, E-mail : posococc@posoco.in,Tel.: 011- 41035696, Fax : 011- 26536901

Ref: NLDC/System Operation/

Date: 21st February 2017

To

Chief Engineer,
National Power Committee (NPC),
NRPC Building, 18-A, Qutab Institutional Area,
Shaheed Jeet Singh Marg, Katwaria Sarai,
New Delhi – 110016

Sub: Furnishing of information by POSOCO to NPC Secretariat – Reg.

Sir,

With reference to your letter No. 4/MTGS/NPC/CEA/2017/152-153 dated 9th February 2017, the point wise reply to the details requested by NPC in the above mentioned letter are as follows:

1. **Copy of the reports on the status of mapping of feeders being furnished by RLDCs to CERC:** RLDCs are regularly furnishing the data regarding status of mapping of feeders to RPCs and the same is being discussed in RPCs OCC meetings.

2. **Details of Power System Oscillations observed in the system:** Detailed reports prepared by NLDC in consultation with RLDCs regarding power system oscillations observed in the system are uploaded on POSOCO website. The detailed reports can be accessed through the following links:

   a) https://posoco.in/download/report-on-low-frequency-oscillation-in-indian-power-system-march-2016/?wpdmdl=523
   b) https://posoco.in/download/report-power-system-oscillations-india-posoco-final/?wpdmdl=535
   c) https://posoco.in/download/synchrophasors-initiatives-in-india-decmber-2013-web/?wpdmdl=713
   d) https://posoco.in/download/synchrophasors-initiative-in-india_june-2012/?wpdmdl=712

   In addition to above, Low Frequency Oscillations (LFOs) observed in the system are regularly reported in the Quarterly Operational feedback sent by NLDC to CEA, CTU and CERC.

(PTO)

3. The Methodology/Procedure followed by the RLDCs for computing actual drawal/injection of entities in case of non-availability of Main/Check/Standby meter data is enclosed at Annexure-1.

Thanking you,

Yours faithfully,

Encl: as above

21/2/17

(N Nallarasan)
Deputy General Manager,
System Operation, NLDC

Annexure-1

1. **Methodology adopted for non-availability of Main/Check/Standby SEM in Northern Region**

a) **Non-availability of Main-meters-**

- In case of Gen stations, where we calculate Injection from the line meters, Main and Check meters are installed on same CT/PT and the other end meter is a standby meter. In case of non-availability of main meters, we take the readings of **Check** meters.
- In case of drawl calculation of a state, the meters are installed on both ends of a tx line-Main and Standby meters. In case of non-availability of main meters, we take the readings of **Standby** meters, taking into account the line-loss as a multiplication factor.
- The line loss is of the order of 1.5 % for 400 kV, 3% for 220 kV lines & 4% for 132 & below lines. The same has been agreed by Commercial Committee of NREB in its 105th meeting held on 08.03.2001.

b) **Non-availability of both Main and Check Meters-**

- In case of Gen stations and in case of non-availability of main and check meters both, we take the readings of **Standby** meters. The **Standby Meter set**, in this case, comprises of all meters installed on HV side of generator transformers. The **Main** and **Check** meter-set comprises of meters installed on all Outgoing feeders.

c) **Non-availability of Main,Check, and Standby Meters-**

- In case of Gen stations, where we calculate Injection from the line meters, Main and Check meters are installed on same CT/PT and the meter installed on Generator Transformer is a standby meter set. In case of non-availability of main/check/standby meters, we take the readings of **other end meters** installed on the line, taking into account the line-loss as a multiplication factor.

- In case of drawl calculation of a state and non-availability of all the meters, we substitute the **bus mismatch reading**. Usually, we have another type of meter called **Loss meters** for the purpose of determining bus-mismatch readings and not for the purpose of Injection/Drawl Calculation.

2. **Methodology adopted for non-availability of Main/Check/Standby SEM in North -Eastern Region**

a) **In case of Generating Stations:**

- In case of non-availability of Main Meter, Data of other end of outgoing feeder is used for computation of Injection with application of transmission loss (no check meters installed in NER).
- In the absence of both Main/ other end meter data, standby meter data is used for Injection Computation.

b) **In case of Transmission line:**

- In case of non-availability of Main Meter: Standby meter (installed on other end of line) data is used for drawal computation with **application of transmission loss.**

c) **In case of ICT:**

- Standby meter (installed on LV side of ICT) is used for Injection/Drawal computation.

d) **Standard Transmission Loss % considered -**

- For 400KV line - 1.50%
- For 220 kV line - 3%
- For 132 kV and below lines - 4%

3. **Methodology adopted for non-availability of Main/Check/Standby SEM in Western Region**

a) **In case of Generating Stations:**

- Check meter data is used for computation of Injection with **no application of loss.**
- In the absence of both Main/Check meters data, standby meter (installed on other end of line) data is used for Injection Computation with **application of transmission loss.**

b) **In case of Transmission line:**

- Standby meter (installed on other end of line) data is used for drawal computation with **application of transmission loss.**

c) **In case of ICT:**

- Standby meter (installed on LV side of ICT) is used for Injection/Drawal computation with **no application of ICT loss.**

d) **Standard Transmission Loss % considered at WRLDC end:**

- For 765KV line - 1.5%
- For 400KV line - 2.0%
- For 220 & below - 4%

4. Methodology adopted for non-availability of Main/Check/Standby SEM in Southern Region

Following procedure is being followed in Southern Region for energy computation, in the absence of Main/Check/Stand-by SEM data

a) Generating Station:

- In the absence of Main SEM data for any feeder, Check SEM data will be used for accounting.
- In the absence of both Main & Check SEM data (due to CT/PT failure) for any feeder, Stand-by SEM data on other end of the feeder is used for accounting.
- In the absence of all the three Main, Stand-by, Check SEMs for any feeder, Stand-by SEMs of the generating stations i.e. HV side of GTs and STs are used for accounting the injection of Generating station.

b) Transmission Line:

- In the absence of the Main SEM, stand-by SEM data on the other end of the line is used for accounting.
- In the absence of both Main and Stand-by SEM data, drawl/injection from the particular line is computed using the net sum of power flow through all the other lines at the Station. (Bus section using Kirchhoff's Current law)

c) ICT

- In the absence of Main SEM data (On HV Side of ICT), stand-by SEM on LV side is used for accounting.

Note: No Transmission loss is applied in any of the above cases.

5. Methodology adopted for non-availability of Main/Check/Standby SEM in Eastern Region

As per Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006, Main, Check and Standby Special Energy Meters (SEM) are installed at all the interface points of Eastern Region. Sub-clause (1) of Clause (7) as per Central Electricity Authority (Installation and Operation of Meters) Amendment Regulations, 2010 is as below:

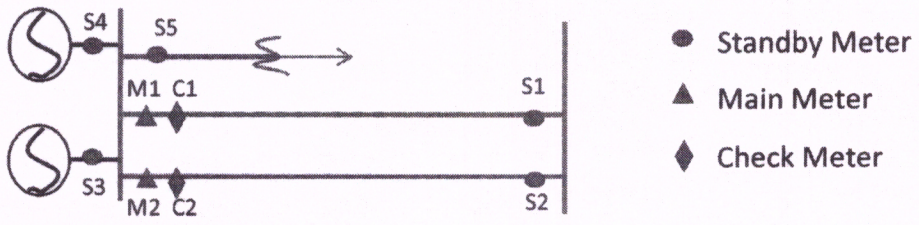
Quote:

Sl. No.(1)	Stages (2)	Main Meter (3)	Check Meter(4)	Standby Meter (5)
1.	Generating Station	On all Outgoing Feeders	On all Outgoing Feeders	(i) High Voltage (HV) side of Generator Transformers (ii) High Voltage (HV) side of all Station Auxiliary Transformers
2.	Transmission and Distribution System	At one end of the line Between the substations of the same licensee, and at both ends of the line between substations of two different licensees. Meters at both ends shall be considered as main meters for respective licensees.	-	There shall be no separate standby meter. Meter installed at other end of the line in case of two different licensees shall work as standby meter.
3.	Inter-Connecting Transformer	High Voltage side of Inter-Connecting Transformer	-	Low Voltage side of Inter-Connecting Transformer

4.	Consumer directly connected to the Inter-State Transmission System or Intra-State Transmission System who have to be covered under Availability Based Tariff and have been permitted open access by the Appropriate Commission or For consumers connected to distribution system and permitted open access by the Appropriate Commission. or Any other system not covered above	As decided by Appropriate Commissions.

Unquote:

Case-1 (Generating Station):



SEMs are installed at a generating station is as above. Main and Check meters are at all outgoing feeders whereas standby meters are placed at GT and ST of plant and other end of feeders.

Generator injection = M1 + M2 (Uninterrupted case)

In case of failure/non-availability of Main, check and standby meters following equations are used respectively.

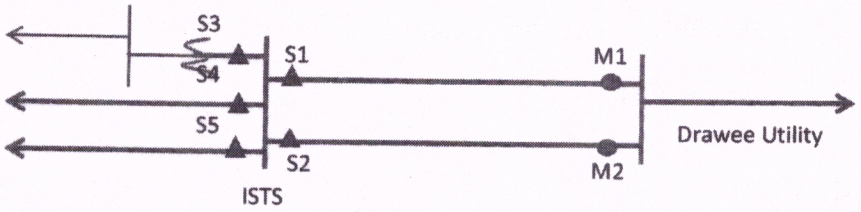
Generator injection = C1 + C2 (Main meter failure case)

Generator injection = S1 + S2 (Main & Check meter failure case)

Generator injection = S3 + S4 - S5 (Main, Check & standby meter (remote end) failure case)

In Worst case, if all meters are failed or unavailable, data of meters installed by generating plant on those feeders are used.

Case-2 (State connectivity with ISTS):



A. *If State is connected with ISTS station, then State drawl will be generally computed as below:*

State drawl = M1 + M2 (if Line is owned by Transmission Licensee)
Uninterrupted case

State drawl = S1 +S2 (if Line is owned by State)

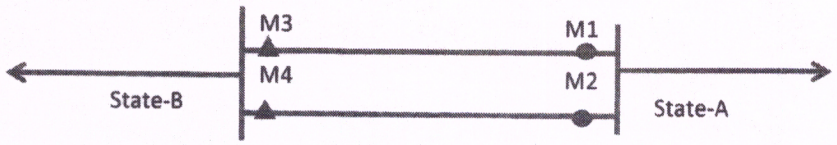
In above case if one end meter fails, other end meter is used.

B. *In case of failure/non-availability of main meter and standby meter, net bus is used as below:*

State Drawal = S3 + S4 + S5 **(Main & Standby meter failure case)**

In Worst case, if all meters are failed or unavailable, data of meters owned/installed by respective states on those feeders are used.

Case-3 (State with State connectivity):



For state-A drawal = M1 + M2

For state-B drawal = M3 + M4

In case of failure/non-availability of any SEM other end SEM for respective feeder is used for drawal calculation.

In Worst case, if all meters are failed or unavailable, data of meters owned/installed by respective states on those feeders are used.

ANNEXURE-X

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	Ph: 080-22287205	Fax: 080-22259343
सं/No. SRPC/SE I/2017/1557		दिनांक / Date	27.03.2017

Chief Engineer
National Power Committee
CEA
NEW DELHI – 110 016

Subject: Methodology/ Procedure for computing actual drawal/injection of entities in case of non - availability of Main/Check/ Standby Meter data – reg.

- - -

Sir,

Kind reference is invited to letter No 4/MTGS/NPC/CEA/2017/201-207 dated 07th March 2017 on the subject. In this regard, please find enclosed views of SRPC Commercial Sub Committee for kind perusal.

Thanking you,

Yours faithfully,

(S.R.Bhat)
Member Secretary

Encl: as above

Dir (NPC) 3/4/2017

Methodology adopted for actual injection /Drawal computation (in case of non-availability of Main/check/Standby meter data)

Sr.No	Gen Stn/Tr Line/ICT/Loss	Existing SRLDC practice	NPC Proposal	SRPC (CCM) views	Remarks
A	**Generating Station**				
1	Non availability of Main Meter data	Check meter data	Check Meter data	**Check meter data**	**NPC proposal same as SRPC adopted Methodology.**
2	Non availability of Main & check meter data	Other end meter data on the line	Stand by Meter at HV side of GTs & SATs	**Other end meter data on the line**	**Other end meter is also Stand by Meter and may require less number of meters in computation. Hence may have less error**
3	Non Availability of Main, Check and Meter data	HV side of GTs and STs	Other end Meter data on the outgoing feeders considering transmission loss	**NPC proposal, without considering transmission loss.**	**Considerable error may creep in when loss is considered only based on Voltage class without considering power flow and line length.**
B	**Transmission Line**				
1	Non availability of Main Meter data	Stand by meter data	Stand by meter data applying transmission loss	**Stand by meter data without applying transmission loss**	**Considerable error may creep in when notional loss is considered only based on Voltage class without considering power flow and line length.**
2	Non availability of Main & check meter data	Computed using net sum of power flow at the station	Computation using net Bus flow at the S/S	Computed using net sum of power flow at the station.	**NPC proposal same as SRPC adopted Methodology.**
C	**ICT**				
1	Non availability of	Stand by meter data	Standby Meter data	**NPC proposal without loss.**	**Considerable error creeps in when notional**

	Main Meter data		applying ICT loss		**loss is considered only based on Voltage class without considering the power flow.**
2	Non availability of Main & stand by meter data	-	Computation using net Bus flow at the S/S	**Computed using net sum of power flow at the station applying Kirchhoff's law.**	**NPC proposal same as SRPC adopted Methodology.**
D	**Main & Check Meter (Installed on same CT/PT)**				
1	Main & check Meter -	Installed on same CT/PT	Shall be installed at different core of CT/PT.	**NPC proposal may be followed in New Substations and wherever possible.**	**It may require 6 Core CT/PT. Already stand by meter on GT/SAT and other side of transmission line is available for redundancy in case of CT/PT failure.**
E	**Standard Transmission Line Loss**				
1	765 KV	No Transmission Loss applied in any case	1.5%	**SRPC (CCM) members of the opinion that no Transmission loss to be applied.***	It is to be kindly noted that loss based only on voltage class may give undue advantage to entities. Justification given below.
2	400 KV		3%		
3	220 KV		4%		
4	132 KV and below				

*** Justification for not applying Transmission loss in SR**

(i) Loss application based only on voltage class may not be a scientific method since the Loss in a Line depends on

a. Length of the Line
b. Conductor configuration like twin/quad/hex or moose/bersimis/zebra etc.
c. Ambient and conductor Temperature (resistance varies with temp)
d. Prevalent Voltages
e. Extent of loading of element (Power Flow)

(ii) Loss in the system element cannot be precisely calculated based only voltage case

Average line losses for a week (6th to 12th March 2017) for some of the 400 kV lines in Southern Region are illustrated below:

a. Khammam - Kalpakka Line : 2.3% (Line Length 364 Km ; Twin Moose ACSR)

b. Sriperumbudur - Sunguvarachatram Line : 0.1% (LL -18 Km ; Twin Moose ACSR)

c. Nellore (PGCIL) - Nellore (Andhra Pradesh): 0.2% (LL- Bus Extension)

This suggests that applying uniform loss rate would be erroneous. The error by considering the losses in this fashion would be much more than the error in the event of not accounting losses. Moreover, applying proposed flat rate of losses may, at times, give energy generation figures more than actual generation.

(iii) Loss application unduly supporting the utility not sending the data and not attending the faulty SEM promptly.

Fax Msg No - 219

भारत सरकार
विद्युत मंत्रालय
पूर्वी क्षेत्रीय विद्युत समिति
GOVERNMENT OF INDIA
MINISTRY OF POWER
EASTERN REGIONAL POWER COMMITTEE

No .ERPC/COM-I/Gen/2017/ 267

Date: 13.04.2017

To
The Chief Engineer
National Power Committee
Katwaria Sarai,
New Delhi-110016

Subject: Methodology / Procedure for computing actual drawal / injection of entities in case of non-availability of Main/Check/ Standby Meter data-Reg.

Ref: NPC letter vide no.4/MTGS/NPC/CEA/2017/201-207 dated 07.03.2017

Sir,

With reference to the above, it is to be informed that Commercial sub-Committee meeting of Eastern Region is yet to be scheduled. However, the comments of ERPC Secretariat and ERLDC are enclosed at Annexure-I &II respectively for needful action at your end.

Encl: as above

Yours faithfully,

(A.K.Bandyopadhayaya)
Member Secretary

दिनांक 4-5-17

Dir(NPC)/DD

4/5/2017

Annexure-I

Views of ERPC Secretariat

	Description	ERPC Secretariat View
A. Generating Station	Non Availability of Main meter data	Check meter to be used
	Non Availability of Main & Check meter	Stand by meter on other end of the transmission line
	Non Availability of Main, Check & Stand by meter	Stand By meters on HV side of GT & SAT
B.Transmission Line	Non Availability of Main meter data	Stand By meter *without* applying transmission loss
	Non Availability of Main & stand by meter data	Computation using net bus flow at the sub station
C. ICT	Non Availability of Main meter data	Stand By meter by *without* applying loss
	Non Availability of Main & stand by meter data	Computation using net bus flow at the sub station
D.	Main and check meter	Shall be Installed on different core of CT/PT. Feasibility to be checked.
E.	Standard Transmission Loss	Not Applicable

Note:

1. Sending of Meter data to RLDC for accounting purpose is primarily the responsibility of the constituent under whose sub-station the meter is placed. Use of standby meters on HV side of GT & SAT for generating station, use of standby meter applying transmission loss for Transmission lines and use of standby meter applying ICT loss for ICT will discourage the efforts of the constituents for sending meter data on time. On many occasions in Commercial meetings also pressure could be created to send meter data / rectify CT/PT, etc as otherwise use of other end data put the loss on the defaulting constituent accounts.

2. Transmission loss percentage depends on many factors such as line loading, conductor type. Reactive power etc. Hence, straight jacketing Transmission loss as a fixed 'number' should be avoided.

Annexure -II

पावर सिस्टम ऑपरेशन कारपोरेशन लिमिटेड
(भारत सरकार का उद्यम)
POWER SYSTEM OPERATION CORPORATION LIMITED
(A Government of India Enterprise)

पूर्वी क्षेत्रीय भार प्रेषण केंद्र *Eastern Regional Load Despatch Centre*
(CORPORATE IN: U40105DL2009GOI188682)
14 गोल्फ क्लब रोड, टॉलीगंज, कोलकाता – 700033, ई-मेल: erldcomml@posoco.in
14 Golf Club Road, Tollyganj, Kolkata – 700033, E-mail: erldcomml@posoco.in
Tel : (033) 24235265, 24235428, Fax : (033) 24235809

संदर्भ : पूक्षेभारप्रेके./एम.ओ/M-01 /

दिनांक: 21/03/2017

To,

The Member Secretary,
Eastern Regional Power Committee,
Kolkata

Sub: ERLDC Views on Methodology for computation of Actual drawal/Injection of entities in case of non-availability of Main/Check/Standby Meter Data

Sir,

With reference to ERPC Letter No. ERPC/COM-I/GEN/2017/2224 dated 15.03.2017 on the above subject, ERLDC views are enclosed in Annexure-I.

जी मित्रा /G. Mitra
उप. महा.प्र. (एम.ओ)/ Dy. General Manager (MO)

Annexure-I

	Description	NPC Proposal	ERLDC View	Remarks
A. Generating Station	Non Availability of Main meter data	Check meter to be used	Check meter to be used	
	Non Availability of Main & Check meter	Stand By meters on HV side of GT & SAT	Stand by meter on other end of the transmission line	
	Non Availability of Main, Check & Stand by meter	Stand by meter on other end of the transmission line	Stand By meters on HV side of GT & SAT	
B. Transmission Line	Non Availability of Main meter data	Stand By meter by applying transmission loss	Stand By meter without applying transmission loss	
	Non Availability of Main & stand by meter data	Computation using net bus flow at the sub station	Computation using net bus flow at the sub station	Net Bus computation not possible in case substation owned by different state utility & RLDCs don't have 15 min data for intrastate Lines. ABT meter data from state owned meter
C. ICT	Non Availability of Main meter data	Stand By meter by applying ICT loss	Stand By meter by without applying loss	
	Non Availability of Main & stand by meter data	Computation using net bus flow at the sub station	Computation using net bus flow at the sub station	
D.	Main and check meter	Shall be installed on different core of CT/PT	same. But this may require CT replacement as 2 nos of metering core is required in CT	
E.	Standard Transmission Loss	765kV -1.5%	No Comment	
		400kV- 1.5%		
		220kV -2%		
		132kV and below -4 %		

ANNEXURE-XI

भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
उत्तर क्षेत्रीय विद्युत समिति
Northern Regional Power Committee

No.: NRPC/OPR/105/2017/10020 Date: 06.09.2017

To

The Chief Engineer,

National Power Committee,

Central Electricity Authority.

Subject: NRPC agenda for NPC meeting scheduled to be held on 7.09.2017.

Sir,

Agenda attached as **Annexure** is proposed to be included for NPC meeting scheduled to be held on 7th September, 2017.

(M.A.K.P. Singh)
Member Secretary

Additional Agenda for NPC meeting

Agenda 1 . Standing Committee recommendations to PGCIL for strengthening the design of towers.

The design of towers should be reviewed for further strengthening, in case of more failure occurs in future in such lines.

The standing committee of experts on tower failure appointed by CEA in its report has recommended that "The design of towers need to be reviewed for further strengthening. Even though the towers were designed according to IS : 802 (1995), in case of more failure occurs in such lines.

As per the decision of the standing committee, BIS was requested to take action for (i) revision of IS 875 for review of wind map, based on studies made by SERC in 2009 in view of frequent failure of towers in the eastern, northern and western region of the country, and (ii) adoption of design criteria of 100% transverse wind load for normal condition and 75% transverse wind load for broken wire condition for suspension towers. The committee has also recommended for installation of Anemometer in all sub-stations of PGCIL duly computerized for obtaining wind speed data on hourly basis.

After the detail discussions /deliberations in the meeting held in CEA , Standing Committee recommended that :
The towers with delta configuration shall be avoided to the extent possible in 765KV single circuit(S/C) lines in future and as such most of the 765KV lines shall be Double circuit (D/C) lines with vertical configuration.

Further Ministry of Power has decided to carry out Audit of Transmission towers with respect to their design and life. Accordingly, a Committee for the said purpose had been constituted as mentioned below:-

Sl. No.	**Constituent of the Committee**	**Capacity**
1.	Member(Power system),CEA	Chairperson
2.	Chief Electrical Inspector, CEA	Member Secretary
3.	COO,CTU,PGCIL	Member
4.	Representative(Director level)from CPRI	Member
5.	Representative(Appropriate level) from SERC (Structural Engineering Research Center)under CSIR	Member

In addition to the above, representatives from the State Utilities may also be included in the Committee, if required.

Committee shall undertake the Audit of Transmission towers with respect to design and life of towers (on a 5% sampling basis), as per the following mechanism:

(i) The Committee shall submit a plan and design for undertaking the audit in the for instance.

(ii) The Committee shall submit its report on quarterly basis with its recommendation to the Ministry of Power for consideration and appropriate necessary action.

This is for information of the Members.