SPEED POST

भारत सरकार
Government of India
केन्द्रीय विद्युत प्राधिकरण
Central Electricity Authority
पश्चिम क्षेत्रीय विद्युत समिति
Western Regional Power Committee
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आई एस ओ : 9001-2008
ISO : 9001-2008

सं :पक्षेविस /36वी पक्षेविस बैठक/ सहा सचिव/ **2018-**
No. WRPC/36th /WRPC Mtg./AS/2018/ 7867 Date : 04 SEP 2018

सेवा में, /To,

(संलग्न सूची के अनुसार)
(As per enclosed list)

विषय : पश्चिम क्षेत्रीय विद्युत समिति की **36** वीं बैठक की कार्यवृत
Sub.: Minutes of the 36th meeting of Western Regional Power Committee

महोदय/Sir,

इस पत्र के साथ **23** जून **2018, 10:00** बजे को अहमदाबाद में आयोजित पश्चिम क्षेत्रीय विद्युत समिति की **36** वीं बैठक एवं इससे पहले **22** जून **2018, 10:00** बजे को आयोजित तकनिकी समन्वयन समिति की बैठक की कार्यवृत संलग्न है।

Please find enclosed herewith the Minutes of the 36th meeting of Western Regional Power Committee held on 23rd June 2018 preceded by TCC meeting on 22nd June 2018 at Ahmedabad for information and further needful.

भवदीय/Yours faithfully,

संलग्न :उपरोक्तानुसार

Encl: As Above

ए.बालन 4/9/2018
(ए. बालन/ A. Balan)
सदस्य सचिव /Member Secretary

		2018-19
List of members of WRPC		FAX NUMBERS
1	Chairman, WRPC/ Principal Secretary,Dept. of Energy Govt.of	0755-2575666
	MP and Chairman, MPPTCL, Bhopal.	
2	Member (GO&D), CEA, New Delhi	011-26108834
3	Managing Director, CSPTCL,Raipur	0771-2262141
5	Managing Director, CSPGCL, Raipur.	0771-2262741
4	Managing Director, CSPDCL, Raipur.	0771-4066566
6	Executive Director(LD), SLDC, Raipur.	0771-2574174
7	Chairman,GUVNL,Vadodara.	0265-2340220
8	Managin Director, GSECL, Vadodara	0265-2344734
9	Managing Director, GETCO,Vadodara.	0265-2338152 Gen.2337918
10	Managing Director, Madhya Guj.Vij.Com.Ltd, Vadodara	0265-2338280 / 2338164
11	Chief Engineer (LD), SLDC, GETCO, Vadodara.	0265-2352019 / 2356469
12	Managing Director, MPPTCL, Jabalpur	0761-2664141
13	Managing Director, MPPGCL, Jabalpur.	0761-2665661
14	Director (Commercial) MP Paschim VV Nigam.Lindore,	0731-2424300
15	CE(LD), SLDC, MPPTCL, Jabalpur.	0761-2670119, 2664343
16	Chairman & Managing Director, MSETCL, Mumbai.	26598595
17	Chairman & Managing Director, MSPGCL, Mumbai.	26471060, 26581400
18	Chairman & Managing Director, MSEDCL, Mumbai.	26478672
19	Chief Engineer (LD), SLDC, MSETCL, Kalwa.	27601769
20	Chief Electrical Engineer, Electricity Dept., Goa	0832-2426986
21	Secretary(P), UT of Daman & Diu, Moti Daman.	0260-2230771/ 2230088
22	Secretary(P), UT of DNH, Silvassa.	0260-2630220
23	Director (HR.), NTPC Ltd., New Delhi.	011-24360912
24	Director (Finance), NPCIL, Mumbai.	022-25993332
25	Director (Operation), PGCIL, Gurgaon.	0124-2571922 / 2571802
26	Chief Executive Officer, NLDC, New Delhi.	011-26536901
27	Executive Director, POSOCO, WRLDC, Mumbai.	28202630
28	COO & Executive Director (O), Tata Power Com.L. Mumbai	66657966
29	Managing Director, RGPPL, Noida	0120-4148911, 13, 14
30	Chief Executive Director&MD, NHDC Ltd, Bhopal.	0755-4030003
31	Executive Director, Torrent Power Generation, Surat	02621-661151
32	COO(O&M), Adani Power Ltd, Ahmedabad	079-25557155, 25557176
33	COO,GMR Warora Energy Ltd,Chandrapur, Maharashtra.	
34	PTC India Ltd	
35	VP(Distribution), Torrent Power, Surat.	
36	Director & CEO, JSW Energy Ltd.,New Delhi.	011-48178740
37	EVP & Station Head,Jindal Power Ltd,Raigarh,Chhattisgarh.	07767-281995
38	CEO,Coastal Gujarat Power Ltd,Kutch.	02838-661181
39	Sr.Vice President (O),RattanIndia Power Ltd,Gurgaon	0124-6695868
40	President & Plant Head, Jaypee Nigrie STPP,Sigrauli,MP	
41	Project Head, D.B.Power Ltd, Raigarrh, Chhattisgarh.	
42	COO(O&M), Adani Power Maharashtra Ltd, Ahmedabad	079-25557155
43	Project Head, KSK Mahanadi Power Co.Ltd.,Bilaspur, C.G.	
44	President-Thermal,MB Power(M.P.) Ltd,New Delhi.	011-47624229
45	Project Head,Sasan UMPP,Sasan Power Ltd,Waidhan,M.P	

	List of members of TCC	2018-19
1	MD,MPPMCL/ Chairman,TCC of WRPC/MPPKVVCL,Jabalpur	0761-2664749
2	Chief Engineer (GM), CEA, New Delhi.	011-26109750
3	Executive Director (Comml.), CSPDCL, Raipur	0771-2574442
4	Executive Director(O&M:Gen), CSPGCL, Raipur	0771-2574425
5	Executive Director(Gen.), GSECL, Vadodara	0265- 2344537 / 252338848
6	Superintending Engineer (R & C), GETCO, Vadodara.	0265-2353086 / 2337918
7	Chief Engineer(Projects),Madhya Guj. Vij.Com.Ltd, Vadodara	0265-2337918
8	Executive Director (O&M-Gen), MPPGCL, Jabalpur.	0761-2664572
9	Director,(Technical),MP Paschim VV Nkigam Ltd,Indore.	0731-2426218
10	Director (Operation), MSETCL,Mumbai	022-26590383, 26591254
11	Director (Operation), MSPGCL, Mumbai.	26478852 / 26474190
12	Director (Operation), MSEDCL, Mumbai.	26581465 / 26472976
13	Executive Engineer, DD, Nani Daman	0260-2250889
14	Executive Engineer, DNH, Silvassa	0260-2642338
15	Regional ED, NTPC Ltd., WRHQ-I, Mumbai.	28259364
16	Regional ED, NTPC Ltd., WRHQ-II, Raipur	0771- 2544550 / 2544513
17	Associated Director (Trans), NPCIL, Mumbai.	25993664
18	Executive Director, WRTS-I, PGCIL, Nagpur.	0712-2641471
19	Executive Director, WRTS-II, PGCIL, Vadodara.	0265-2488564
20	Head, Tata Power Company Ltd, Chembur, Mumbai	67175385
21	General Manager (Power), RGPPL, Ratnagiri	02359-241071
22	Chief Engineer(Elect.), NHDC, Bhopal, M.P.	0755-4030130
23	Executive Director (O&M), Torrent Power, Surat	02621-661151
24	Asso. V. President(P&M),Adani Power Ltd,Ahmedabad	079-25557176
25	Head -O&M,GMR Warora Energy Ltd,Chandrapur Maharashtra.	
26	PTC India----------	
27	G.M.(EHV), Torrent Power, Surat.	
28	Director (Technical), JSW Energy Ltd., Bandra(E),Mumbai	022-42863000
29	General Manager-Power Control Jindal Power Ltd Chhattisgarh.	
30	Chief (O&M),Coastal Gujarat Power Ltd,Kutch. &	02838-661181
31	Sr.Vice President (O),RattanIndia Power Ltd,Gurgaon	0124-6695868
32	General Manager, Jaypee Nigrie STPP,Sigrauli,MP	
33	Project Head, D.B.Power Ltd, Raigarrh, Chhattisgarh.	
34	A. V. P(P&M),Adani Power Maharashtra Ltd,Ahmedabad	079-25557155
35	Project Head, KSK Mahanadi Power Co.Ltd.,Bilaspur, C.G.	
36	GM-Business Development, MB Power (M.P.)Ltd,New Delhi.	
37	Project Head,Sasan UMPP,Sasan Power Ltd,Waidhan,M.P	
38	Chief Engineer, NPC, New Delhi	011-26865206,26526361
	SPECIAL INVITEE	
1	CMD, MPPMCL Jabalpur.	0761-2664749, 2661245
2	Member (Power), NCA, Indore.	0731-2559888
	Copy to	
1	Member Secretary, ERPC, Kolkata	033-24239652, 24239653
2	Member Secretary, SRPC, Bengaluru	080-22259343
3	Member Secretary, NERPC, Shillong	0364-2534040
4	Member Secretary, NRPC, New Delhi	011-26868528, 26865206

भारत सरकार
केन्द्रीय विद्युत प्राधिकरण

पश्चिम क्षेत्रीय विद्युत समिति
मुंबई

Government of India
Central Electricity Authority

Western Regional Power Committee
Mumbai

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दिनांक **22** एवं **23** जून **2018** को **गुजरात द्वारा** अहमदाबाद में आयोजित **36 वी बैठक का** कार्यवृत्त

Minutes of 36th Meeting of TCC/WRPC held on 22nd June 2018 & 23rd June 2018 at Ahmedabad hosted by Gujarat

C o n t e n t s

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Annexures

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Annexure –B.1	MoM of meeting was held on 23.01.2018 under the Chairmanship of Member (Thermal), CEA, New Delhi
Annexure –C.1	Presentation by NPCIL
Annexure –C.2	KAPS Site visit MoM
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Annexure –D.7	Status regarding Generating units, commissioned /expected to be commissioned during the current year 2018-19
Annexure –D.8	MoM of a meeting of the Group was held on 22.02.2018(Five minutes' scheduling and energy accounting)
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Annexure –D.10	List of transmission elements into commercial operation for the period from 01.05.2017 to 22.03.2018
Annexure –D.11	Revised details of LC to be opened by WR entities for the FY 2018-19
Annexure –D.12	The status of DSM charges Payable/Receivable by WR entities to WR Deviation pool account fund maintained by WRLDC as on 23rd May 18
Annexure –D.13	The Payable/Receivable by WR entities to Reactive pool account fund maintained by WRLDC as on 21.05.2018
Annexure –D.15-1 to D.15-4	Interest statements against all the Regulatory Pool accounts maintained by WRLDC
Annexure –D.17	Updated status of the protection audit observations/ recommendations as on December 2017
Annexure –D.18-1	SPS for JP-Nigirie and MB Power were formulated in a special meeting held at WRPC on 23.08.2017
Annexure – D.18-2	The current SPS operating condition at CGPL
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Annexure –D.19	MoM of Mumbai islanding a meeting was held on 13.03.18 at WRPC Mumbai
Annexure –D.20-1	The existing slabs and quantum of load shedding under UFR
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Annexure –D.24	The action taken report in pursuance of MoM of 35th TCC/WRPC meeting held on 19th & 20th December 2017
Annexure –D.25	CEA presentation on Cyber security

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36th Western Regional Power Committee (WRPC) meeting was held on 23rd June, 2018 at Ahmedabad. It was preceded by Technical Coordination Committee (TCC) meeting held on 22nd June, 2018. The lists of participants are attached at **Annexure – I & II**. The WRPC meeting was hosted by Gujarat Transmission Company Ltd.(GETCO). The TCC meeting was chaired by Shri Sanjay Shukla, IAS, Chairman TCC & MD, MPPMCL. The WRPC meeting was chaired by Shri I C P Keshari, IAS, Chairman, WRPC & Principal Secretary(Energy), Government of Madhya Pradesh.

Opening remarks during TCC meeting:

Shri B B Chauhan, MD, GETCO welcomed all the participants of 36th TCC at first heritage city of India - Ahmedabad. He briefly gave information about the history of Ahmedabad City. He also informed that during his tenure as TCC Chairman last year, the TCC /WRPC forum came across lot of issues and most of them resolved amicably with the active participation of all the members. He hoped that the same spirit will continue during this TCC also.

Shri Sanjay Shukla, IAS Chairman TCC and MD MPPMCL welcomed all the participants of 36th TCC meeting. He said "*before we discuss TCC/WRPC, I would like to mention that Gujarat is a place which inspired most of the Indians. And there are many reasons, the kind of vision the people of this land have, the kind of approach to work, approach to life, to business, to progress and development is the source of inspiration for majority of people. We believe that the Gujarat is a leader in power sector and therefore Madhya Pradesh try to achieve the level achieved by Gujarat. Coming to our business of TCC, I am taking pride to be Chairman of TCC and to participate in discussion where large number of learned and experienced power sector engineers are participating and some great mind are at work today. Therefore today we all will learn, will know the different views and try to achieve higher level position from the existing position. We are among the best Regional Committees as far as management, overdrawl, grid security, grid discipline and many more aspects are concerned. Being a best Regional Committee, we have also contributed by giving new ideas, new initiatives, which have been later on adopted by entire country. So it is a really a pleasure to work in a region or areas where people are taking interest /initiatives. I hope that all the participants will take away many things from this meeting. I wish TCC a grand success. I also urge all the members to openly speak their mind during the discussion. WR is always ahead in implementations of regulations and also giving lot of new ideas and taking initiatives which are the bench mark and standard for the country. I thank Shri B B Chauhan MD, GETCO, Shri B B Mehta CE SLDC and his team for making excellent and comfortable staying arrangements for all the TCC participants*".

Opening remarks during WRPC meeting:

Shri Pankaj Joshi IAS, Managing Director, GUVNL welcomed Shri Saurabh Bhai Patel, Hon'ble Energy Minister, Govt of Gujarat, Shri I C P Keshari IAS, Chairman, WRPC and Principal Secretary (Energy), Govt of Madhya Pradesh, Shri Sanjay Shukla, IAS Chairman TCC and MD MPPMCL and all esteemed delegates and participants from various Power Utilities of WR at India's first world heritage city, Ahmedabad. He said *"Jyotigram Yojana in state of Gujarat has been successfully implemented which resulted into 100% segregation of agriculture feeders from rural feeders and Gujarat became the first State in the country to make available reliable and uninterrupted power for 24 X 7 to all its 18,000 villages. The Jyotigram Yojana has also radically improved the quality of villager life. WRPC is always ahead to facilitate in matter related to smooth and stable operation of the integrated grid. WRPC is central regional coordinating agency in related to power issues of Western Region. During my Chairmanship last year, members of WRPC were extremely positive and forward looking. In the past WRPC was credited with several initiatives which were later replicated by other regions in the country. I hope WRPC will continue to work in the same spirit and strength in future also".*

Shri I C P Keshari IAS, Chairman, WRPC and Principal Secretary (Energy), Govt of Madhya Pradesh, welcomed Hon'ble Energy Minister, State of Gujarat, Shri Pankaj Joshi, IAS Managing Director, GUVNL, Shri Sanjay Shukla, IAS Chairman TCC and MD MPPMCL, Shri B B Chauhan MD, GETCO, Shri A. Balan, Member Secretary, WRPC and all other delegates & participants of 36th WRPC meeting. On behalf of WRPC, he expressed his gratitude to GUVNL, GETCO and their team of engineers for making excellent and comfortable stay and transport arrangements. He said *"WRPC is unique in several aspects i.e. maintaining the grid discipline, having - highest generation installed capacity, the only working UMPPs in WR (Sasan & CGPL), highest single location generating plant (Vindhyachal 4920 MW), etc. In the TCC meeting, threadbare discussion took place and almost all technical issues were resolved amicably. MP & UP started using inter-regional URS power which leads to optimization of generation in both the states. Over drawing by Railways and PSA signing issues in all most all the states are there which could be jointly resolved. Though most of the WR states are power surplus, still they are having other related issues to manage the same. WRPC is excellent forum to address these types of issues and I request member utilities to come forward with amicable solution".*

Shri Saurabhbhai Patel, Hon'ble Minister of Energy, Gujarat state welcomed all the delegates. He said *"planning was done before a decade based on the scenario and the circumstances at that point of time and now the new challenges have come. Gujarat has massively planned in respect of generation addition for the state which is sufficient to cater the energy for next 5 to 7 years at the growth rate of 7 to 10 %. Still Gujarat is striving for availability of cheaper power. There are issues related to availability of domestic coal & increase in rate of imported coal. As per my opinion, 10 years down the line only pit head coal based thermal plant can survive. Availability of gas is also one of the challenging*

issues. The rate of bidding of new RE developers are increasing day by day. RE is the only viable solution in the present scenario. Gujarat is going to plan for implementing hybrid policies of RE generation. Gujarat is going for pilot project costing around Rs. 1000 cores. I hope that if this technology succeeds then it will be a game changer in power sector. I suggest installation of roof top solar in domestic as well as agriculture sectors. Industries shall also have their own captive generation so that dependency will be reduced from the grid. Gujarat and Rajasthan have huge solar & wind potential which shall be explored. There has to be adequate transmission corridors for evacuation of that power. Policy decisions are required to be taken which shall result in optimal cost. There is also a need to examine subsidies across various sectors".

Thereafter Member secretary, WRPC took up the regular agenda items.

	A. Confirmation
A.1	**Confirmation of the Minutes of 35th Meeting of WRP Committee**
	The minutes of 35th meeting of WRP Committee held on 20th December 2017 at Jabalpur were forwarded to the members vide letter No. WRPC/35th WRPC Mtg. /AS/2018/2076 dated 01.03.2018. No comments have been received. Also participants were agreed on MoM of 35th meeting of WRP Committee during the meeting.
	TCC/WRPC confirmed the 35th WRPC minutes.
	B. New issues
B.1	**Incentive schemes for early installation of FGD**
	A meeting was held on 23.01.2018 under the Chairmanship of Member (Thermal), CEA, New Delhi on the subject "Incentive to Thermal Power Plants for early installation of Pollution Control Equipment". MoM of the said meeting attached as **Annexure B.1**. In the meeting Member (Thermal), CEA desired that RPC s should submit the views by discussing with DISCOM/Generators. The matter was discussed during 507th OCC meeting held on 15th May 2018 at WRPC. The following points on which comments/ views of DISCOM/Generators

need to be deliberate:

1. Priority in Scheduling of environmentally compliant TPPs. The following **three options** were discussed:

Option (a). For the purpose of MOD (Merit Order Despatch), two categories in TPPs may be created. one which are environmental norms compliant and the other TPPs which are non compliant to environmental norms. Priority in scheduling may be given to the TPPs which are environmentally compliant irrespective of their variable cost.

Option (b). The increased variable cost due to installation of FGD and other pollution control equipment may be subtracted from the tariff for MOD in respect of the plants installing pollution control equipment. The existing framework of scheduling priority, which is based on merit order, should continue. This is in order to ensure incentive to plants compliance with new environmental norms.

Option (c). EPO (Environment Power Obligation) may be introduced in line with RPO (Renewable Power Obligation) and should be made mandatory for DISCOM to purchase at least say 10% power from plants which are norms compliant.

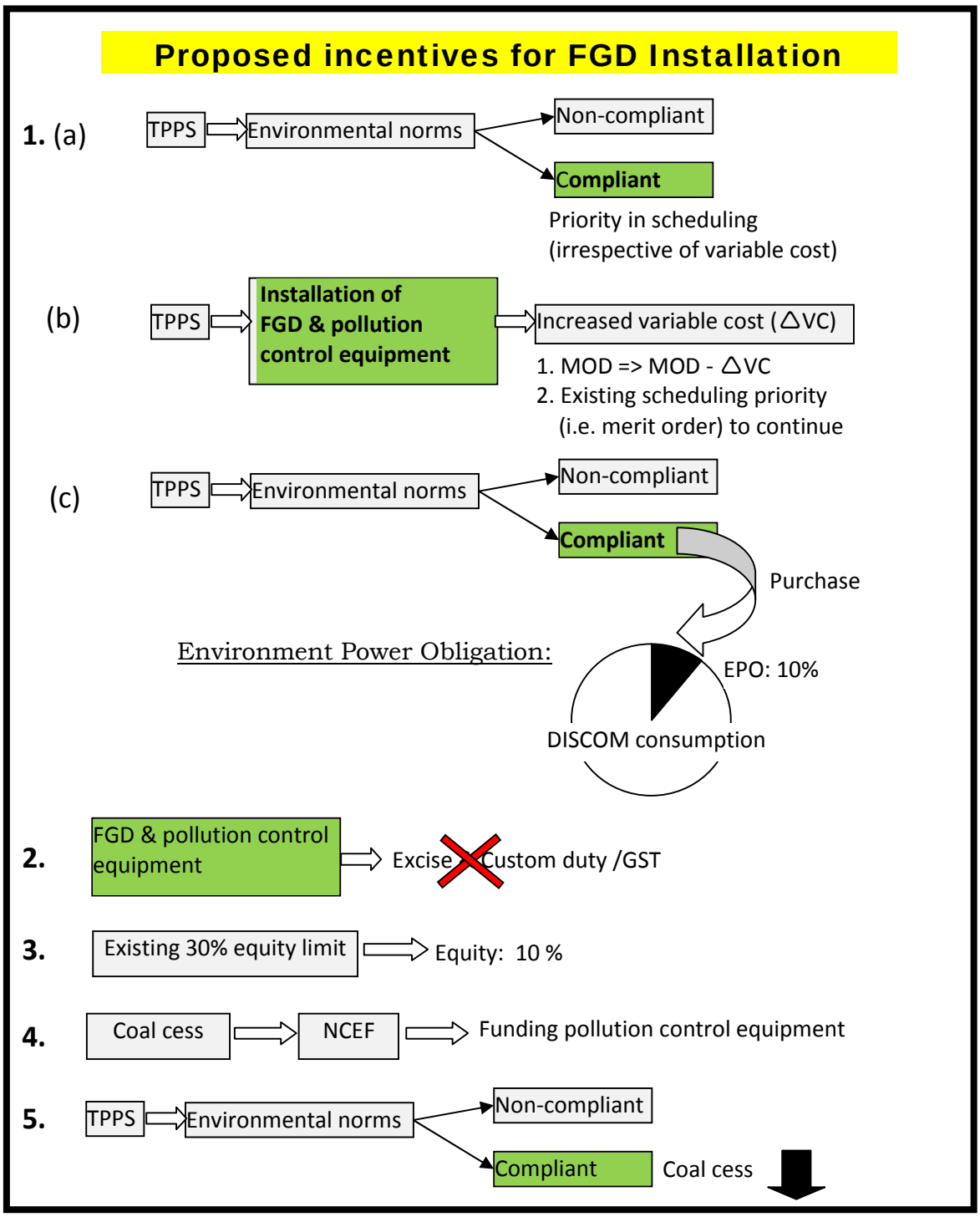
The finalized dispensation from above may be continued till December,2022 only.

2. Excise & Custom duty/ GST may be exempted for pollution control equipment like FGD etc.

3. Present limit of 30% equity to be met by plants to be relaxed to 10%, this will enable plants to raise the fund comfortably and encourage for early installation of pollution control equipment.

4. NCEF collected through coal cess may be utilized for funding the utilities for installation of pollution control equipment.

5. The amount of coal cess may be reduced for TPPs complying with new environmental norms.



Issue:

- Discom/Generators may point-wise comment on the same.
- Any other incentive scheme for suggestion.

TCC discussions:

a) Member Secretary (MS), WRPC stated that target dates have already been fixed in a special TCC meeting at WRPC, Mumbai to commission the FGD in each identified plant and subsequently there was a meeting at CEA New Delhi, Chaired by Member (Thermal) to discover the modalities of reward/incentives for early commissioning of FGDs i.e. earlier than target dates. In that meeting, RPCs were advised to take up this in RPC forum for further discussion for obtaining the views of DISCOMs. Further agreement on the point-wise options suggested in CEA meeting may be conveyed, and if there is disagreement then reason for disagreement or any other option for incentive may also be proposed by the members apart from 5 incentives options given by CEA.

b) MP representative stated that this is a commercial agenda which is going to affect DISCOMs by incentivising the generators for early installing the FGDs. He further stated any agenda which is brought to the TCC or WRPC should be discussed in lower/earlier forums first and therefore this agenda should have been discussed in CCM. He added that instead of CCM, the agenda has been discussed in OCC where there was no representation from DISCOM. MS clarified that this issue was introduced in OCC as there was a short of time since CCM is being held quarterly.

c) GUVNL representative stated that this is a mandatory obligation on the part of generator. They are supposed to install it as a part of environmental norms. Therefore for giving incentives to the generators, DISCOMs should not be burdened. If generators are installing FGD well before the target date, they are not doing any favour. It is mandatory for them and therefore they should not be given any incentives. He further stated DISCOMS should not be burdened with payment for violating merit order. Therefore, Gujarat opposes all the options of 1(a), (b), (c). He further added that MoP has given a direction on 30th May, 2018 wherein it is mentioned that the entire cost has to be passed off and will be part of tariff. It is not fair to further burden by way of incentivising and our request is not to burden DISCOMs, any further. Anyway DISCOMs are going to pay the tariff, since MoP has made it clear. There are number of petitions pending in CERC in this regards and CERC is already deciding on the tariff. Therefore any special priority in merit order or incentives is not acceptable to us.

d) Maharashtra representative expressed similar views and stated that there should not be any scheduling priority because there is only single MOD operated in the State and there should not be separate MOD for the stations who follow FGD installation. Advisor (system), MSETCL stated that as far as SLDC is concerned, they are supposed to operate two different lists for merit order in the proposed mechanism. The existing methodology, which is very transparent for scheduling purpose, will create complexity in scheduling and how it will be implemented, is a big issue

	therefore this needs to be addressed very carefully. e) MP representative requested for a special CCM for this issue only. f) Chairman TCC stated that there is a letter dated 30th of May, 2018 from MoP to Chairperson, CERC. This is about mechanism for implementation of new environmental norms for thermal power plants supplying power to distribution licensees under concluded LTA, MTOA, PPAs and they have directed CERC as per power given under the Act. g) CE SLDC Gujarat stated with due respect to the concern of the DISCOM and the point raised by other dignitary, we have to take holistic view, the way we put RE as must run irrespective of variable cost which has gone up to Rs.4.19 and today it is coming down and we are using it. Environmental concerns are required to be addressed. We have to find out interim way out which will balance the financial portfolio of the DISCOM and follow the wish-list of having the clean environment in the days to come. The necessary subsidy or support can be given from the clean environment fund to the DISCOM who avail this facility for incremental data or for the capacity is being utilised by the generator for this purpose. Therefore if we agree to save the environment, we can think out-of-box solution since ultimately the amendment is for saving the environment. h) MS clarified that first plant has to come up by Dec 2019. This is incentive scheme only and suppose incentive is not there that does not mean that FGD is not required to be implemented, incentive is extra. The incentive schemes are proposed only and not yet finalised. Here we are seeking constituent's views only. i) MP representative stated that everybody is agreeing to protect the environment but not at the cost of DISCOM. j) CE (IT), CEA informed that as per the directives of Government, by Dec-2018 all non-complaint plants were required to be closed down. However CEA met Coal ministry for extending this process for 4 to 5 years and timeline is given to all the plants for FGD implementation. It is to make conducive environment and positive suggestion can be given as to how to implement, incentivise or give priority in merit order. k) Chairman TCC stated that all the DISCOMs are regulated entity and they have to follow tariff order. Tariff policy and MOD is integral part of tariff orders. If they violate MOD, how do they recover the cost? This is their main concern. The other operational issues which will go to which committee is a procedural issue. WRPC anyway can't take the role of CERC, MPERC, or MERC or GERC and we are mainly academic body. If concerns are coming from any corner, it has to be discussed. Therefore all the States have opined that DISCOMs are not in a good shape which is a known fact; therefore, any additional expenditure is going to worsen their

	financial condition. The law is for the generator and if they are taking time it may be for taking financial closure or for some other reasons. CEA has given some options; they may not be the best options. Broadly States have not agreed for the options, the main reason being violation of MOD. l) NTPC representative stated that the concern of the States regarding high cost and MOD is well taken. NTPC also appreciates the particular point that cost should not go high to the end consumer. On the other hand what CEA is telling is about the protection of the environmental norms. One of the important points is that suppose a generator puts this FGD plant, say next year and because he has commissioned FGD, he should not come into a disadvantage position in MOD. The capacity charge goes up when we put FGD and also the variable cost increases and thus the MOD gets affected. m) Chairman TCC clarified that capacity charge does not come in MOD and the increase in cost burden on generator needs to be justified. n) NTPC representative replied that MOD gets affected by variable cost as there is 10 to 11 paise increase in variable cost per unit, in case of unit where FGD is installed. He further supplemented that NTPC has installed FGD at Vindhyachal-Stage V, and these figures are available in public domain also and it is between 6 to 12 paise. NTPC agrees for not putting extra burden on the beneficiary, on account of putting FGD and their concern is fully appreciated but there are other 7 points. NTPC is also of the view that the station which is not there in merit order and he puts FGD plant, he should not get benefitted by putting FGD plant and therefore we do not support point number 1. NTPC suggests that incremental variable cost due to FGD installation is not put in merit order. This will not harm the generator at least. o) Chairman TCC stated that the second argument of NTPC is not correct since generator has to install FGD. Like DISCOM, NTPC is also a regulated entity. The hypothesis in the argument is that others are not going to put may not be correct because everyone has to put, so if variable cost of all generators goes up by 6 paise, it does not make any difference. p) MP representative informed that even the generators with scheduling 55% to 100% are compensated and also incentives of 50 paise is given when the PLF is more than 85%. Here the fear is that if FGD installed then plant will not get schedule. Fixed cost is paid by DISCOM as per PPA. So the fear that FGD installed plant will not be scheduled is mistake and who is going to verify incremental variable cost due to FGD installation. Further, the variable cost would change every month and very difficult to verify resulting in gaming by generator. NTPC representative replied that variable cost increase would be addressed through regulation in which a methodology would be devised.

q) NTPC representative suggested that this forum can give recommendation for exception of excise duty, customs duty and GST on installation. This is a win-win situation for everybody and generators are not affected so also DISCOMS. Also consideration should be given to point no. 7 regarding coal cess reduction; ECR will reduce not only for FGD plants but also for everybody. Therefore point 4 & 7 helps everybody and let us not discard these points.

r) DB power representative informed that we are having the problem of SoX and NoX, but we are complied with particulate matter and water consumption. So at the rate of Rs.0.8 crores per MW we are supposed to invest 973 crores rupees. Bankers are suggesting that your previous 'change in law' entitlement is not obeyed by your customers then how should we have confidence that your new change in law will be complied by your customers. Government should also provide additional water for FGD.

s) CGPL representative stated that as per environment norms specific water consumption limit is given (3 meter cube per MW). For open cycle plants the limit is not defined, therefore it is very difficult to get the specifications of FGD for installing at Mundra, because we have sea-cooled water – open cycle. We have written to CEA and the reply is awaited.

t) Chairman TCC enquired whether DISCOMs agree with coal cess funding and excise duty waiver at proposal nos 2 & 5. Further he clarified that the change in law has to be with mutual consent or through CERC or State commission.

u) NLDC representative informed that fear of power plant with FGD will not be scheduled due to higher variable cost is not true. We have to recognise that every year 5 to 10 GW capacity would be out for FGD installation, so others who came up after FGD installation, would certainly be scheduled because demand has to be met any case. In the last (May-2018) month when we touched 171 GW, around 131 GW was thermal.

v) Chairman TCC summed up the discussion that broadly point no. 2, 4, 5 are in general agreeable, any opposition on these may be given. He further stated that we have to assume that all players have to play their role seriously and we will presume that all commissions also will play their role seriously. In CCM (not special CCM) it would be discussed further.

w) MS informed that the issues such as getting lime stone, gypsum disposal, sea water, auxiliary consumption going up and expenditure of Rs. 0.5 to 0.8 crore per MW are known to everybody. CEA has lot of presentations available on net.

x) Chairman TCC stated that MoEF notifications came 3 years back, still it is not known about technology, its availability, which company making. It

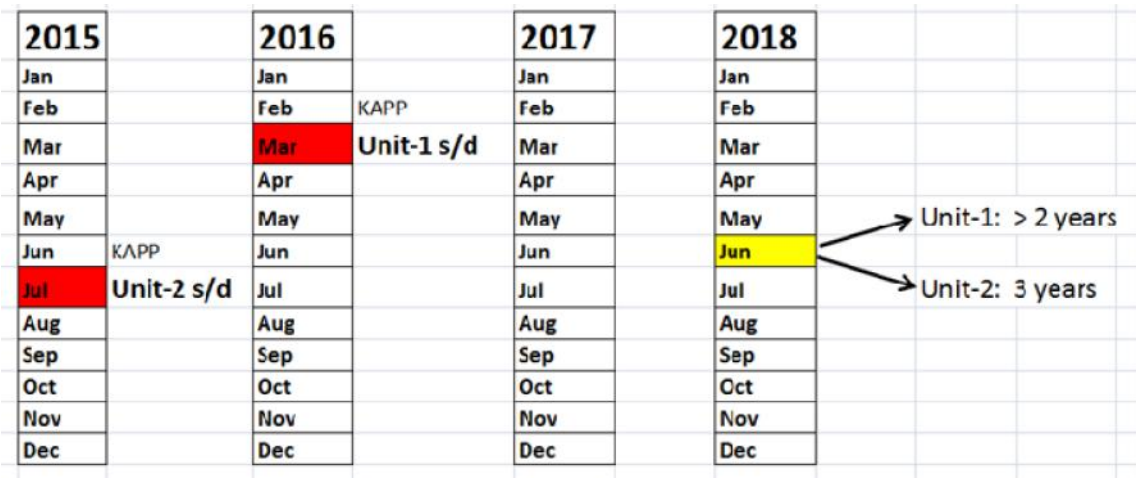
	reflects our preparedness. Higher level officers should participate in CCM and MDs of DISCOMs should be sensitized about this. The summary of the views are: (i) Madhya Pradesh did not agree on proposal under sr. No. 1 as incentivisation to generators for early commissioning of FGD would affect the DISCOMs commercially. However Madhya Pradesh agreed in principle on incentive scheme 2, 4 and 5. Madhya Pradesh further stated that this is a commercial agenda and therefore it was suppose to be discussed in CCM first. (ii) Maharashtra, Gujarat & Chhattisgarh were agreed on option 2, 3, 4 and 5. They suggested detailed discussion with regard to option 1 in CCM forum. (iii) NTPC and MPPGCL agreed on option 1 (b), 2, 3, 4 and 5. However they more requested for further discussion in CCM in respect of option 1(a) and 1(c). After detailed discussion, TCC agreed to discuss the issue of proposed incentives in CCM.
	WRPC Discussion/decision: a) Member Secretary, WRPC briefed the forum about the discussion in TCC. He also informed the forum about the views expressed by the members on proposed incentive schemes during TCC. *b) Chairman, WRPC stated that for every new innovation, ideas, regulatory decision, or decision of the act or notification, the ultimate bearing was on DISCOM. He further said that unfortunately everyone is taking decision on behalf of DISCOMs without getting DISCOMs on board. He advised that DISCOMs must be invited in full strength for discussion on the issues.* *After discussion, it was decided that the matter shall be thoroughly discussed in ensuing CCM. The recommendation of CCM shall be put up in the next board meeting.*
	WRPC noted the same. (**Action:** WRPC Secretariat)
	C. Follow up/status items
C.1	**Early revival of KAPP Unit No. 1 & 2 (220 MW each) and expediting of commissioning of KAPP Unit No. 3 & 4 (700 MW each)**
	CE, SLDC Gujarat informed that the installed capacity of Kakrapar Atomic Power Station is 440 MW (2 x 220 MW). It is connected with 220 KV power system of South Gujarat.

The both units of KAPP are under forced shutdown since long. KAPP Unit No. 1 (220 MW) is under forced shutdown from 11.03.16 and KAPP Unit No. 2 (220 MW) is under forced from 01.07.15 (almost more than two years).

Non-availability of KAPP units leads to severe constraint in 220 KV system of South Gujarat, which is having mostly urban and industrial loads.

The issue of early revival of KAPP units discussed in many OCC meeting of WRPC. Till date, there is no clarity regarding revival of units.

Also, it is learnt that the construction work of KAPP Unit No. 3 & 4 (700 MW each) is under verge of completion. The evacuation schemes of KAPP Unit No. 3 & 4 is already commissioned and it is in operation.



Issue:

- NPCIL may give details about revival of units 1 & 2.
- NPCIL may give target dates for commissioning unit 3 & 4.

TCC discussions:

a) Member Secretary briefed the matter and requested NPCIL to update the exact status of revival of KAPS unit 1 & 2. He also requested to give update on expected commissioning date of KAPS unit no 3 & 4 against original target dates.

b) Representative from NPCIL made a brief presentation on revival activities of KAPS 1 & 2 and commission activities of KAPS unit No 3 & 4(2x700 MW). The presentation is enclosed at **Annexure-C-1**. He informed that revival activities of KAPS unit no 1 & 2 is in full swing and unit 2 and unit 1 are expected to be revived by the end of October 2018 and June 2019 respectively. Regarding the commissioning of KAPS Unit no. 3 & 4, he informed that they are expected to be commissioned by June 2019 & June 2020 respectively against the

original target of June 2015 and December 2015. To a query on reasons for delay, he replied there were many reasons for the delay such as financial problems of vendors, advance payment to vendors, advance safety system to be qualified through mock tests etc. After qualification and sorting out these issues, the construction work could be taken up.

c) Representative from MPPMCL stated that as the Units are under prolonged outages since last 2 year, therefore the transmission charges (PoC) should be borne by NPCIL only. Representative from Gujarat endorsed the same. AGM, PGCIL informed that as per existing Sharing of Transmission charges and losses (PoC) regulation, the beneficiaries have to pay the transmission charges for associated ISTS since allocation of KAPS 1&2 is done by Ministry of Power. Beneficiaries may approach MoP for surrender of power from KAPS to some other beneficiary, so that MoP may reallocate the power to some other beneficiary and the transmission charges would be shared as per reallocation of power by MoP. If beneficiaries want exemption of PoC charges in existing allocation, they have to approach Hon'ble CERC.

d) Beneficiaries also raised the issue of sharing of transmission charges with regard to KAPS-3 & 4. They were of the opinion that the transmission charges for KAPS-3 & 4 should be borne by NPCIL till the commissioning of these units.

e) Representative from MPPMCL stated that Transmission Charges (PoC) for associated line of KAPS unit 3 & 4 should be borne by NPCIL as per 3rd amendment to PoC regulations. Other beneficiaries endorsed the same. Maharashtra representative stated that the evacuation system is already commissioned and as per regulations, whenever evacuation system is ready and there is delay on generator part in commissioning, the transmission charges of the system are required to be paid by generator and not through PoC.

f) AGM, PGCIL replied that till now there was no delay in ATS of KAPS 3&4. She further stated that PGCIL has not raised any bill. Recently, CERC order has come in this regard which says that when COD of the bays at Kakrapar shall be there, the transmission charges would be included in PoC. She said that NPCIL has given May-2017 and June-2017 as the date of commissioning of bays and our line was also commissioned in June,2017. Till now, there is no billing but we are going to raise the bill as per CERC order.

g) AGM, PGCIL further added that as per sharing of transmission charges Regulation 8.5 which says that if the generation is not commissioned or partly commissioned then the charges for that dedicated line would be borne by the concerned generator. She further added that it was agreed in 41st SCM that the line connecting to Kakrapar Switching Station (Vapi-Kakrapar-Navsari) is a contingency arrangement to meet the load

of Gujarat and to increase the reliability of power and therefore considering the line as a system strengthening line, CERC put it under PoC. So the tariff for this line has been decided by CERC. There is a power flow of around 200MW on this line. If there would have been no power flow and no bays at KAPS and PGCIL has commissioned the line, then KAPS would have paid the transmission charges. In similar type of case CERC has passed the order for Sujalpur-RAPS line for payment of transmission charges by RAPS and RAPS is paying the transmission charges of the line. If there is any issue with sharing of PoC, review petition should be filed in CERC.

h) CE SLDC GETCO informed that Navsari-Kakrapar line & Kakrapar-Vapi lines are separate lines and electrically it is not Navasari-Vapi line. Therefore the CERC order cited above by AGM PGCIL should be strictly followed (i.e. KAPS to bear transmission charges). Otherwise, if the forum is not convinced, we should collectively approach CERC, since WR beneficiaries cannot be loaded with PoC charges of the line and even we are not interested in this line.

i) Chairperson TCC stated that the CERC order has to be studied first and then the affected party must take appropriate action.

j) GUVNL representative informed that PGCIL has approached Gujarat 3 to 4 years back for TSA for including this element. The same was not signed by Gujarat stating that without PSA we cannot sign the TSA, so when there is no TSA how can PGCIL raise the bill.

k) CTU representative replied TSA came in vogue since 2011 after the PoC regulations. If anybody does not sign TSA, it is deemed signed document as per regulation, if you are a DIC. Every DIC has to sign TSA only one time. CTU representative replied that KAPS power is allocated by MoP. In such case NTPC, NPC apply for LTA to CTU and CTU grants it. However, the LTAs are signed by beneficiaries. Further there is one CERC order which has provided that if MoP has allocated power to some States or Beneficiaries and even if they do not sign LTA, it is deemed signed until unless it is reallocated by Mop to some other beneficiary. If you do not want power, the same should be informed MoP, so that it can be reallocated to some other beneficiary by MoP.

l) With regard to long outage of KAPS 1 & 2, CE, SLDC, Gujarat stated that any plant which is out of bar for more than the designated period, then they cannot avail the fruit of DSM and continue drawing their auxiliary supply. In case of KAPS 1 & 2, there are two impacts on Gujarat, firstly Gujarat is not getting any power from the plant since last three years and secondly Gujarat is paying the huge PoC as the plant is unfortunately located in Gujarat. ED WRLDC stated that he also feels that KAPS unit 1 & 2 is out since 3 to 4 years and the transmission charges should be paid by KAPS. MPPMCL representative

also agreed for the same. MPPMCL representative further stated that auxiliary consumption has to be adjusted on month to month basis and not years together, in such situation they have to get allocation from NTPC.

m) CE, SLDC, Gujarat also stated that all beneficiaries of KAPS 3 & 4 have to file petition in CERC to pass on PoC charges to NPCIL and a separate petition for KAPS 1 & 2 with regard to prolonged outage due to which PoC has became unbearable for all beneficiaries.

n) Representative from PGCL informed that in a recent tariff order, CERC has directed to pool the tariff of associated transmission lines of KAPS unit 3 & 4 through PoC. If beneficiaries want relief, then they have to approach CERC for review petition.

o) NPCIL representative clarified that KAPS 1 & 2 units are drawing power from beneficiaries as per PPA at 220kV level. Gujarat is also billing us for this. We are paying energy charges as agreed in WRPC meeting. Also we are paying PoC charges towards drawl of power for unit 1 & 2. Loss of KAPS 1 & 2 generation is unfortunate we are trying it to do it fast as it is a big work. This is the first time we are facing outage of both the units, normally one unit is taken out at a time. Also there is no provision in regulation that when there is plant shut down after commissioning, generator has to pay PoC charges, therefore how can we pay the transmission charges. Any beneficiary who does not require power should surrender it so that MoP would allocate the power to some other beneficiary.

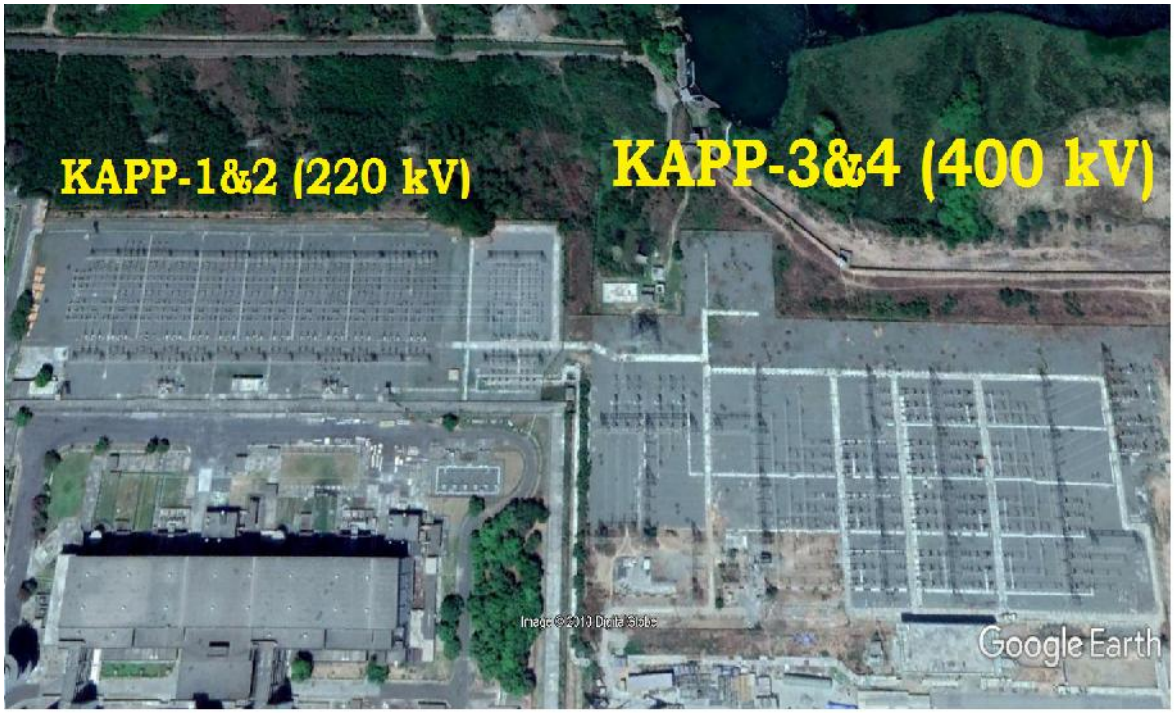
p) Maharashtra representative citing provision added in the Connectivity regulation,16(b), informed that in this case also, KAPS unit is under forced outage, LTA capacity is not being utilised, that capacity can be released under MTOA and that much portion of PoC charges of the LTA beneficiary can be reduced.
   - WRLDC representative replied that the regulation quoted is implemented by WRLDC, wherever interregional corridors are there which is underutilised by any generator and is released for short term. So far as MTOA is concerned we have not released because generators are not releasing for more than one month. As far as KAPS LTA is concerned whom it should be given is the question and who will be using the LTA and MTOA. Therefore these regulations cannot be implemented for KAPS.
   - CTU representative stated that for dedicated line it (i.e. unutilised LTA) is not possible since only generators would be using it. Further this capacity can be used for Medium term, where congestion is there, so that we don't block the system for LTA which is not being utilised. In this case, there is no congestion and the line is not being utilised.

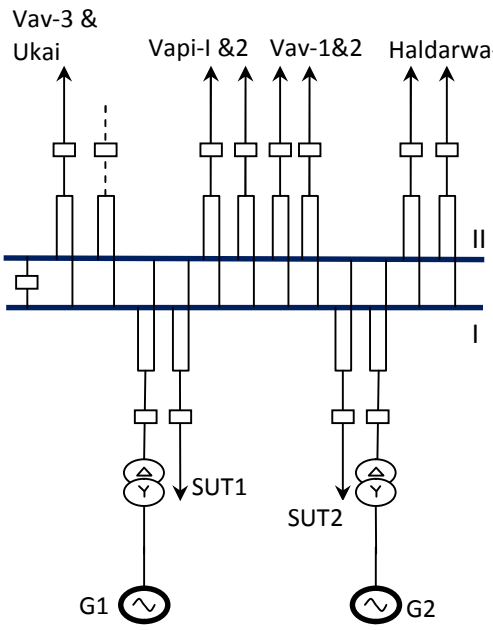
	q) WRLDC representative clarified that, as far as drawl of power by KAPS 3 & 4 for commissioning activity, PGCIL has granted start up power and KAPS 3 & 4 is paying transmission charges under RTDA. The money collected is going back to the beneficiary, so for 3&4 whatever being drawn from beneficiaries they are not bearing the cost. r) NPCIL representative stated that everybody is asking generator to pay the charges. From where generator can bring this money and how a generator can recover these charges. Ultimately the generator has to increase the tariff, which will be passed on to DISCOMs only. s) MD GETCO enquired regarding the commitment given by NPCIL in the last meeting, since NPCIL is changing the time lines all the times. Summary of the discussion/decisions are: (i) *Beneficiaries of KAPS 3 & 4 may file petition in CERC to pass on PoC to NPCIL, if they want relief from PoC charges.* (ii) *Beneficiaries of KAPS 1 & 2 may take up the issue of prolonged outage of plants with CERC to get relief from PoC burden, if they want relief from PoC charges.* (iii) *To get relief from payment of PoC (for KAPS 1& 2 and KAPS 3&4), beneficiaries may take up the matter with MoP to surrender their share, if they want.*
	WRPC discussion: MS informed about the update given by NPCIL in TCC for revival and commissioning of KAPS units - that unit-1 would come up in Oct-2018, unit-2 in Jan 2019, unit-3 in Mar-2020 and unit-4 in Jun-2020. He also informed about TCC decision that any aggrieved party could approach CERC for relief of transmission/PoC charges. Chairman, WRPC stated that the forum would go by the decisions taken in the TCC meeting.
	WRP Committee noted the same. (Action**: NPCIL & Beneficiaries**)
C.2	**Installation of ICT at KAPP**
	CE, SLDC Gujarat informed that in earlier board meetings, SLDC – Gujarat informed that there is need for providing interconnection between 220 KV and 400 KV switchyard at KAPP by commissioning 400/220 KV, 500 MVA ICT. In **35th WRPC** meeting, it was decided that PGCIL & GETCO would carry out site inspection to check feasibility for providing interconnection between 400 KV & 220 KV Switchyard at KAPS - Regarding checking feasibility of providing 400/220 KV 500 MVA ICT.

The representative of GETCO and PGCIL had visited KAPP site on 03.01.18 for checking feasibility of providing 400/220 KV, 500 MVA ICT at KAPP for interconnection of 400 KV & 220 KV Switchyard at KAPS. The detailed report is attached herewith **(Annexure C.2)**.

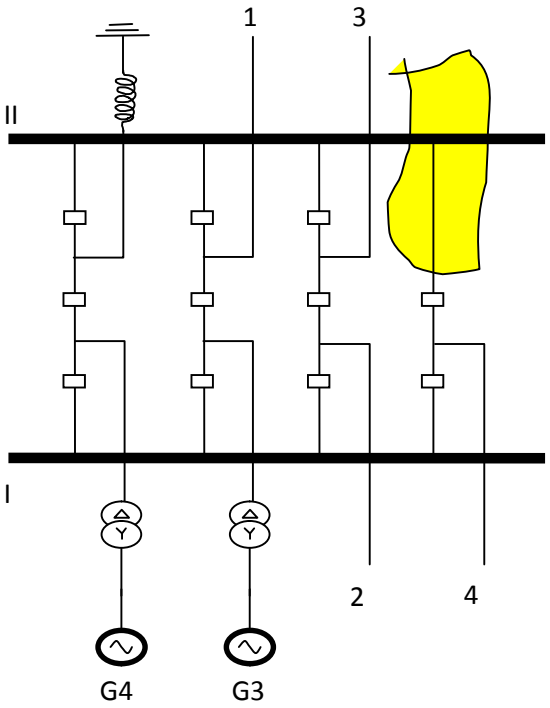
As per the report, a spare bay is available in 400 KV Switchyard at KAPP for providing ICT. The 220 KV power cable will require to be laid down from 400 KV Switchyard to 220 KV Switchyard.

The commissioning of ICT would also help for extending power supply to New KAPP project during large-scale blackout as Kawas, Jhanor, GPEC and Ukai Hydro plants are having black start facility. In addition, the commissioning of ICT would lead less loading on 220 KV D/C Haldarva – Jhanor line, 220 KV D/C Kawas – Ichhapore line and 220 KV D/C Ukai – Mota line etc.





KAPP 1 & 2 (220 kV)



KAPP 3 & 4 (400 kV)

Issues:

1. Discussion on requirement of providing interconnection between 400 KV and 220 KV switchyard at KAPP by ICT.
2. NPCIL may give their views.
3. Discussion on the following aspects:
   (i) SCM approval
   (ii) Funding mechanism
   (iii) List of equipment required at 220KV, 400KV buses and in between.
   (iv) Target date
   (v) Ownership
   (vi) O&M of equipment - charges

TCC discussions:

a) Member Secretary, WRPC stated that in line with the decision taken in 35th WRPC meeting, a team comprising representative from GETCO & PGCIL had visited KAPP site on 03.01.2018 for checking feasibility of providing 400/220 KV, 500 MVA ICT at KAPP for interconnection of 400 KV & 220 KV Switchyard at KAPS and they found some space.

b) Chairman TCC enquired about the requirement of the ICT proposed by Gujarat. CE, SLDC, GETCO replied that technically the plants were not running and the transmission asset are remaining unutilised and are

required to be used. All other atomic plants wherever expansion has taken place in other parts of the India, there is an interconnection between 400kV and 200 kV. Only at Kakrapar it is not there; it is already there in Kaiga and other project also. Hence GETCO proposed the ICT. Based on the last WRPC meeting decision, there was a technical visit by a team of CTU and GETCO.

c) On a query from Chairman TCC that who would do the work. CE, GETCO replied that it would be done by Powergrid. He further added that asset in WR are required to be utilized. If it is feasible, it should be collectively decided and amicably done.

d) ED, WRLDC enquired about availability of space and informed that though GETCO and Powergrid had signed the field visit report, NPCIL had not signed. NPCIL replied that though the combined visit was decided in the last meeting, they were not informed and only some people, who were not responsible for taking decision, from control room gone to site visit.

e) On query from ED, WRLDC whether NPCIL would sign the report at present, NPCIL replied that they would not, as feasibility study has to be done in totality and they had already indicated the non-availability of space in SCM. NPCIL clarified that though in the field report it was indicated that there was one bay in 400 kV and some space for 220 kV bay, but the specific location for transformer installation was not mentioned. NPCIL further stated that there would be requirement of two transformers and not one, as given in the report and queried whether the proposed capacity of 500 MVA was based on any study in SCM.

f) NPCIL stated that in 42nd SCM no technical requirement for ICT was indicated, but it was not recorded in minutes; NPCIL also felt that there was no advantage of ICT. NPCIL explained that Kaiga was a different case where on 220 kV there are two short out going lines forming a very weak system, but at Kakrapar 6 nos of 220kV lines and 4 nos of 400kV lines, forming very strong system.

g) NPCIL informed that problem is being faced due to outage of units, also who would spend crores of rupees for ICT. Though land is there but due to highly uneven terrain, levelling would be a difficult task.

h) CE, SLDC, Gujarat informed that, a spare bay is available in 400 KV Switchyard at KAPP for providing ICT. 220 KV power cable will be required to be laid down from 400 KV Switchyard to 220 KV Switchyard.

i) Representative from NPCIL informed that the available bay is for future 400kV S/C line. He further informed that if ICT is planned, it must be

as per N-1 (i.e two ICTs) planning criteria and approved through Standing Committee of CEA.

j) CE SLDC Gujarat informed that every other day we have to open the line from Haldarwa to Kakrapar. There is a heavy power flow from Kakrapar to Vapi network. This proposed ICT will definitely release GETCO network and GETCO system reliability will improve. If required we will carry out system study with the help of RLDC. NPCIL is not bringing units 1 & 2 for last four years. There is no commitment as to when the units will come. Units 3&4 should have been synchronise in 2015, but delayed by 3 or 4 years, the transmission asset created by PGCIL should be utilised.

k) WRLDC representative informed that studies have to be done, initially we have done the studies with Kakrapar ICT. But we have seen 220 kV system getting overloaded with the proposed ICT at Kakrapar, so we are doubtful of relieving of 220 kV system. Kakrapar 3&4 are 700 MW units and already Navasari is getting overloaded. Therefore we feel CEA may carry out study.

l) Chairman TCC stated that after commissioning of units 3 & 4, this investment will be redundant; and may go waste.

m) NLDC representative stated that when the ICT is in service, the 400 kV and 220 kV system gets connected. It is not feasible if both the units come. Then ICT can be planned for resilience. As in case of APL Mundra, the ICT was planned for start up power and other things. This is also equally important. Lines are not for reliability alone, when there is a blackout it would help NPCIL also. If ICT is there, let there is no power flow in normal circumstances. But when there is a crisis, supply can be extended from 220 kV to 400 kV. There is 220/132 kV ICT in Rajasthan AP which is normally not loaded. When there is a black start, they extend supply from Gandhisagar. The transformer is back charged and supply is given. So resilience is also equally important.

n) NPCIL representative stated that start up power can be extended from 220 kV side only for 1, 2, 3, 4 units and not from 400 kV. All configurations are not identical. They are requirements of grids integration. Backup power and all other such things have to be studied thoroughly. Kakrapar is not getting any advantage from black start or total loss of power or restoration of power, because 220 kV system is supplying to all the 4 units and not 400 kV.

o) MS informed that at Kaiga they have two ICTs. NPCIL replied that at Kaiga it is a weak 220 KV system, evacuation was a big problem. Then another two units came and therefore ICTs were very much required there. Kaiga 1 & 2 has been operated for more than 700 days of continuous operation and it is a record. System is very strong there.

p) CE, SLDC Gujarat stated that once again it could be studied because they had to keep their 220 kV lines out on every alternative day. This transformer will be a remedy to that.

q) Chairman TCC informed that in 42nd SCM, members agreed to drop the proposal on the ICT issue.

r) ED WRLDC suggested that the issue could be taken to SCM, since because of two different views. He opined that CEA would finally give view on that and if recommended, then they would take up with top NPCIL management for space.

s) When CE SLDC Gujarat enquired who would take up with SCM – Gujarat or others, ED WRLDC suggested WRPC to take up with SCM.

t) Chairman TCC stated that anyone can take up the matter to SCM, since it is a democratic set up.

u) CE, NPC stated the issue can be brought to the CEA and SCM. He added that in case of 2 transformers, considering n-1 between 400 & 220 KV, then the issue of transmission line charges whether to be paid by generator or the DISCOMs would not arise; these transmission lines by default come under system strengthening. He said that if ICTs had been there for these years when unit 1 & 2 are absent, then DISCOMS would have used these lines and the issue of transmission charges by generator would not have come. He suggested to carryout studies for two scenarios i.e. one study of ICT with all the units in present and other study with 1&2 units out of service and check the utilization of transformers for these two cases.

v) Chairman TCC stated that there are many aspects - the first being its requirement based on studies and second the availability of land. The right forum would be SCM and Gujarat can take up this issue to SCM and the next course of action would be decided accordingly.

WRPC Discussions/decisions:

a) MS, WRPC briefed the forum about TCC discussion on the issue and stated that Gujarat would approach SCM for consideration of ICT.

b) CE, SLDC, Gujarat said "*KAPS unit 1 and 2 are not available for more than 3-4 years and KAPS unit 3 & 4 which were expected to come last year are still out and may take 2-3 years more. The transmission network is available for which Gujarat is paying huge PoC charges. So, GETCO feel that at least to use available network we need to have interconnection between 400 KV and 220 KV. This is the only plant in India where there is no interconnection. Anywhere else, where ever there is generation at 400 KV and 220 KV there is interconnection. So if*

	required, we once again study but the need of ICT is absolute then it can be endorsed by the study. So here technical requirement is there, space is available so we should go ahead with the installation". c) Representative from NPCIL stated the following: • The report submitted by the group after visiting the only indicates availability of one bay at KAPS, but considering N-1 criteria, two ICTs are required to be installed however there is no mention about this in the report. • There is no thorough study about ICT requirement at KAPS, and whatever GETCO is saying is a temporary phenomenon wherein all the units at KAPS are under shutdown. Unit 2 will be revived in Oct-2018 and after six months of time unit-2 will also be available. So whatever problem GETCO is facing will not be there after revival of units and therefore there is no use of ICT. • ICT cannot be installed overnight, it takes around 2-3 years and by that time all the 4 units of KAPS would be revived. So there may not be requirement of ICTs after 4 years i.e. after revival & commissioning of KAPS units. • NPCIL is of the opinion that the feasibility study should be done by SCM and after this study if ICT is genuinely required then further course of action can be taken. The study should clearly bring out – whether it is for system requirement or NPCIL requirement; so accordingly investment would be decided. d) ED, WRLDC said that since SCM had turned down ICT proposal, once again Gujarat and WRLDC would do fresh study and if it is found merit, then they would take up as an agenda item and initiative would be taken jointly. After detailed discussion, Chairman, WRPC suggested that a fresh study with regard to feasibility of ICT at KAPS should be done by a group/committee comprising officers from CEA, GETCO and WRLDC. He added that CEA, Chairperson could be requested for nominating a person for the group/committee. WRPC decision: Group/committee comprising officers from CEA, GETCO and WRLDC would visit the site and study feasibility of ICT at KAPS & availability of space at KAPS for installation of ICT. Based on the report of the group/committee, a decision could be taken in the next meeting.
	WRPC noted the same. **(Action**: WRPC Secretariat, CEA, WRLDC, & GETCO**)**

C.3	**Installation of FGD in generating units-Progress Status:**

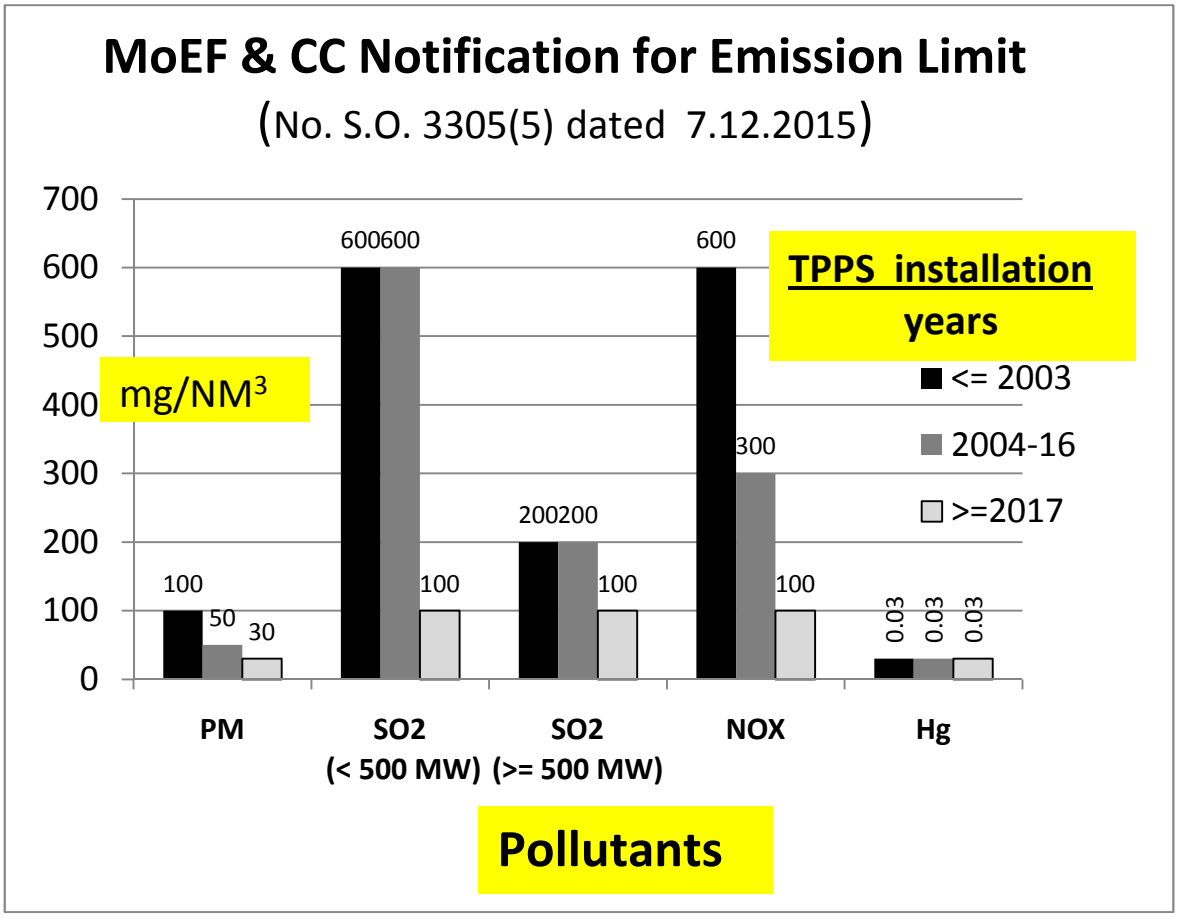
Background :

A special meeting was held on 01/09/2017 at New Delhi to review implementation of new environment norms for Thermal Power Plants under the Chairmanship of Secretary, Ministry of Environment, Forest and Climate Change.

Subsequently, CEA directed WRPC to organise a Special TCC meeting to discuss above issue.

In this regard a discussion was held by PCE, CEA with some of the generators on 21.09.2017 at WRPC, Mumbai.

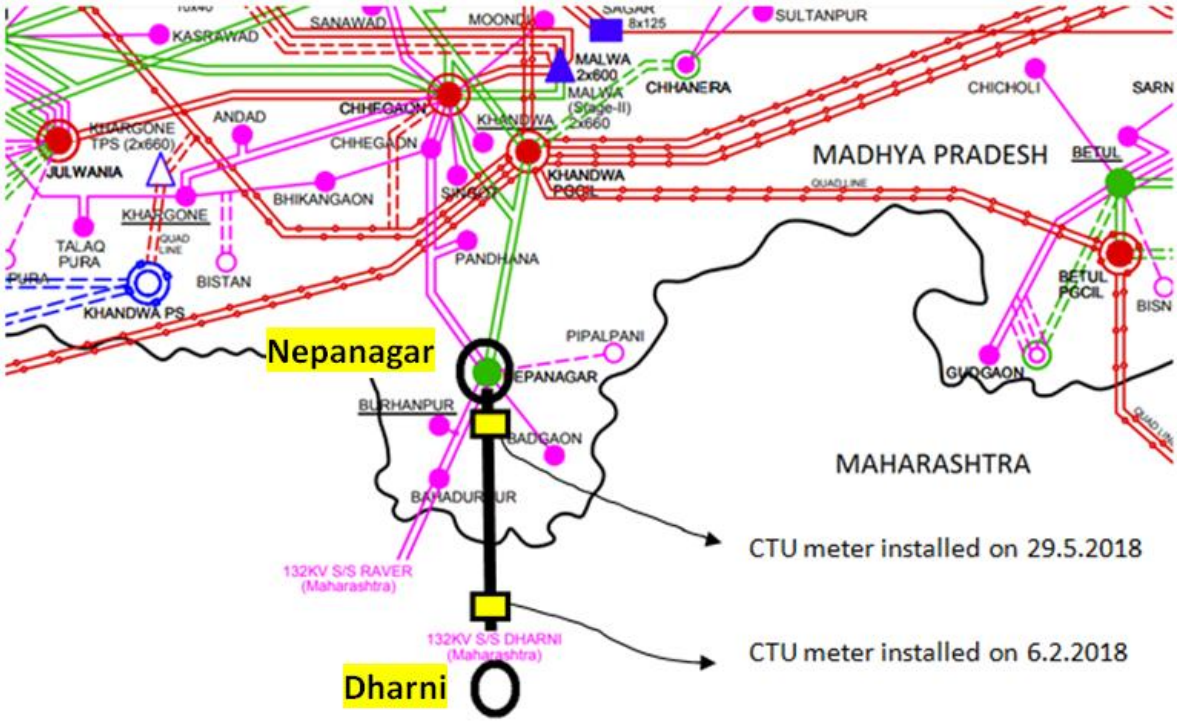
After this, a Special TCC meeting of WRPC was held on 28.09.2017 at WRPC, Mumbai to discuss a single point agenda for revised plan for Installation of FGD in generating units to comply with new MOEF norms of SOX emissions.



	The issue has been taken in different OCC (504th, 505th 506th) meetings of WR. The latest status of progress discussed in 507th OCC meeting of FGD is attached at **Annexure C.3.** **Issue**: The concerned Generators may update the progress of installation of FGD on the following aspects: (i) Completion of Feasibility Study, (ii) NIT issued (iii) Bid Opening (iv) Award of contract (v) Commissioning activity (vi) Completion date.
	TCC Discussions: Member Secretary, WRPC requested generators to update the status of progress of commissioning of FGD and up-gradation of ESP. Generators updated the status as follow: 1. Feasibility studies have been done by all generators. 2. Tendering process is under progress. Generators were advised for adhering to target fixed by CEA.
	WRPC Discussions/decision: Member Secretary, WRPC briefed the issues and TCC discussions. Chairman WRPC advised all GENCOs to move faster and stated that there was no escape. He further added that as the notification was issued by MoEF, there was no exemption or special treatment to anyone. He also cautioned about danger of closing the units at the end date.
	WRPC noted the same. **(Action**: all concerned thermal generating companies in WR**)**
C.4	**Progress of downstream network of constituents whose terminating bays are under construction by POWERGRID**
	The important assets were planned under various transmission schemes & under implementation. However, downstream 220kV system needs to be commissioned for utilization of the system. The Status of unutilized 220kV line bays at Existing Substations in WR and under Construction 220 kV line bays at New Substations / Substation Extensions in WR is attached at **Annexure C.4.**

	Issue: Constituents may update on the following aspects: (i) NIT issued (ii) Bid Opening (iii) Award of contract (iv) Start date of Commissioning activity (v) Percentage of work completed (vi) Completion date (vii) Any other constraints, if any.
	TCC Discussions: Member Secretary, WRPC requested all concerned STUs to expedite the downstream network and advised to complete in time line matching with ISTS else respective STU shall be ready to bear the transmission charges.
	WRPC noted the same. **(Action**: All concerned STU's in WR**)**
C.5	**Ongoing transmission schemes (765/400 kV & above): status of completion**
	The ongoing transmission projects (which are being executed/ implemented by transmission agencies) are regularly being monitored in Transmission scheme progress Review Meeting (TRM) meeting. In line with decision taken in 34th WRPC meeting (28th July, 2017), TRM meetings are conducted quarterly. Recently TRM was held on 17th April, 2018 at WRPC wherein reviewing of the status of ongoing projects and other associated issues like readiness of down-stream networks, Railway crossing works, ROW related issues, other constraints etc. were discussed. The updated status on various ongoing transmission schemes for the year 2018-19 as per the latest TRM is available at WRPC website at http://www.wrpc.gov.in/occ/APRIL18TRM_MINUTE_FINAL.pdf . **Issue:** Constituents may update on the following aspects: (i) Percentage of work completed (ii) Completion date (iii) Any other constraints, if any.
	TCC Discussions: Member Secretary, WRPC informed that progress of ongoing transmission projects are monitoring in TRM meeting and all associated issues are discussed in TRM forum and always try to remove /minimise the

	constraints present in on-going work of construction of downstream transmission lines. He further requested all transmission agencies to update the status of progress of transmission projects.
	WRPC noted the same. **(Action**: All concerned transmission agencies in WR**)**
C.6	**Declaration of 132 KV Nepanagar (Madhya Pradesh) - Dharni (Maharashtra) line as Inter-state Transmission line (ISTS)**
	Background: • MSEDCL vide letter No.MSEDCL/CE/PP/77th CCM/8085 dated 12.04.18 (copy enclosed at **Annexure C.6-1** has informed that the 132 kV Nepanagar (MP) - Dharni (MS) line has been charged in radial mode and on this line power flow has started from 16.02.2017 to MSEDCL. Further MSEDCL stated that as per CERC regulation for Sharing of Inter State Transmission Charges and Losses, the line has to be certified by WRPC as interstate line so that scheduling of central sector (ISGS) power to MSEDCL is possible through this line. • Discussions during the 77th CCM:- SE(C), WRPC stated that as per section 2(36) (i) of Electricity Act 2003, 132 KV Nepanagar-Dharni line qualifies as natural ISTS line and hence there is no need to give a separate ISTS certification from WRPC. The relevant section of the act is: Quote *"2(36) inter-State transmission system includes-* *i. any system for the conveyance of electricity by means of main transmission from the territory of one State to another State.* *ii. the conveyance of electricity across the territory of any intervening State as well as conveyance within the State which is incidental to such inter-State transmission of electricity.* *iii. the transmission of electricity within the tertiary of a State on a system built, owned operated, maintained, or controlled by a Central Transmission utility;"* Unquote • Subsequently, after 77th CCM: o **MSEDCL** vide its letter dated 01.06.2018 (copy enclosed at **Annexure C.6-2** informed that the CTU meter at Nepanagar end was installed on 29.05.2018 and requested WRPC to include 220 KV Nepanagar Substation as ISTS drawal point of Maharashtra for energy accounting and scheduling purpose. o **MPPTCL** vide its letter dated 29.05.2018 (copy enclosed at **Annexure C.6-3**) informed that 132 KV Nepanagar- Dharni line has not been designated as an ISTS line by the competent authority or agency so far. Thus the flow on this line should be

	treated as radial power from MP to Maharashtra and accordingly DSM charges under Intra State ABT against power drawal by Maharashtra through this line shall be computed by MP SLDC. 
	Issue: 1. No Certificate from WRPC for natural ISTS line. 2. Target date for approaching CERC for tariff fixation by MSETCL. 3. Agreement between MPPTCL & MSEDCL on drawl point. 4. Changes in the accounting by WRPC/WRLDC.
	TCC Discussions: a) MS WRPC, informed that ABT meters have been installed at Nepanagar and Dharni, after which a meeting of officials from Madhaya Pradesh, Maharashtra, WRLDC and WRPC was held at WRPC to discuss the drawl point, metering and scheduling philosophy for 132 KV Nepanagar –Dharani line (a copy of MoM is enclosed at **Annexure C.6-2**). Further he stated that 132 KV Nepanagar –Dharani is in between two states (i.e. natural ISTS) and no separate certificate is required to be issued from WRPC. b) WRLDC representative summarised the discussion of the meeting held at WRPC on 14.06.2018: • 132 KV Nepanagar –Dharani line is a natural ISTS line and hence the losses shall be pooled and borne by all beneficiaries. Nepanagar would be treated as a drawl point of MP and Dharni for Maharashtra. • Khandwa-Nepanagar and Khandwa-Chegaon–Nepanagar lines are owned by STU and transmission charges and losses for usage of this

	intervening system needs to compensated to MPPMCL by Maharashtra. As per intervening regulations of Hon'ble CERC, the transmission charges may be calculated for the intervening system by WRPC and the losses would be compensated in the accounts. c) MD, MPPTCL stated that the line connects two states and therefore as per act the line is qualified for ISTS status; but here issue is that Maharashtra portion is radial to MP network; so whatever power flow through this line also flow through MP network; therefore MP should get transmission charges and transmission losses for the intervening network; if this is agreeable to Maharashtra, then MP will not have any problem. d) CGM, MPPMCL stated that section 2(36) (i) of Electricity Act 2003 for natural ISTS is applicable for 'main' transmission line and not for a radial line; here 132 KV Nepanagar-Dharni is a radial line having unidirectional flow but not a main transmission line, therefore this can't be considered as a natural ISTS line. Further he stated that Hon'ble CERC would decide whether 132 KV Nepanagar-Dharni line is ISTS or not while determining the tariff of the line. *After discussion, Chairman, TCC recommended that entities of Madhya Pradesh viz. MPSLDC, MPPTCL and MPPMCL discuss the issue among themselves and confirm their joint decision to the WRP committee meeting tomorrow.*
	WRPC Discussions/decision: a) MS, WRPC informed that during TCC discussion MP stated that the line is not a main transmission line and the power flow is unidirectional and hence cannot be treated as ISTS line. He informed that in TCC meeting, MPTPCL was requested to clarify in WRPC meeting regarding the status of line. b) ED, WRLDC informed that for the last one and half years the issue had been discussed to decide whether ISTS or not. He said that majority of members are of the view that it is an ISTS line, but within MP also there are different views; MD, MPPTCL would decide on that; if it is not ISTS, then WRLDC would approach CERC. c) MD, MPPTCL stated that section 2(36) (i) of Electricity Act 2003 is applicable to main transmission line and 132 KV Nepanagar-Dharni line is not a main transmission line as the flow is unidirectional hence it cannot be treated as an ISTS. Further he suggested that Maharashtra approach the Hon'ble CERC for declaration of 132 KV Nepanagar-Dharni as ISTS and informed that that was also the decision of the last WRPC meeting. d) ED, WRLDC said that he disagreed but respected the view of MP and he would go to CERC.

	After discussion, WRPC agreed that there is no consensus between MP and Maharashtra on the issue of declaration of 132 KV Nepanagar-Dharni as ISTS line. Maharashtra may take up the issue with Ho'nble CERC, if required.
	WRPC noted the same. **(Action**: Maharashtra**)**
C.7	**New Interface Energy Meters, AMR system and meter data processing system: installation**
	• **Background**: WRLDC vide letter No. WRLDC/MO/1551/2018 dated 12.04.18 has informed that in the 73rd meeting of the WR Commercial Committee (Item no. 12.3) held on 10.08.16. It was decided that all the SEMs which have completed more than 10 years in service, shall be replaced with new AMR meters. The issue was further deliberated in detail during the 33rd WRPC meeting held on 01.02.2017 wherein it was decided to replace all SEMs with AMR compliant Interface meters having capability to integrate energy at 5 min time interval (user configurable) and having time synchronization facility. It was also agreed to include communication as a part of the package. • **34th WRPC (28-7-2017):** Before the meeting, WRLDC have forwarded technical specifications for "Interface Energy Meters (5-min compatibility), Automated Meter Reading and Meter Data Processing" for Western Region. The draft technical specifications were circulated by WRLDC on email on 01st May 2017. <u>TCC / WRPC Discussion:</u> During the discussion CE, SLDC, Gujarat made a presentation containing concerns on specifications circulated by WRLDC. After presentation, WRLDC confirmed that GETCO's concerns have been incorporated in the specifications. TCC/WRPC approved the specifications and PGCIL to take up the execution/ implementation of installation of New Interface Energy Meters, AMR system and meter data processing system. • **35th WRPC (20-12-2017):** During discussion, the status of installation of new interface meter, AMR system and meter data processing system was sought from PGCIL and in response ED PGCIL that it is CERCs jurisdiction to decide 5 min metering and the issue was discussed with Director (Opn.) and their management's view is that after getting approval from CERC procure and replace the existing15 min meters with new meters at the estimated cost of Rs.30 crores.

35th WRPC decision:
WRPC agreed to TCC recommendations and decided that PGCIL/CTU should go ahead with the replacement of existing meters with installation of New Interface Energy Meters, AMR system and meter data processing system having specifications as approved in 34th WRPC meeting. WRPC also noted that it is the responsibility of CTU to install the meters with AMR at all location of inter connection of ISTS, irrespective of the substation owned by CTU or STU.

- **77th CCM (20-04-2018):**
  - POWERGRID apprised the CCM regarding the following -
    - The status of procurement and plan for testing/replacement of energy meters -

    For the status of procurement and plan of testing of energy meter, PGCIL representative informed that -
    a. In case the 15 minutes IEMs are required to be replaced with 5 minute IEMs, necessary amendment in the CEA Metering regulation 2006 is required to be carried out by CEA
    b. There is difficulty in implementing for want of tariff regulation for SEM meters. The cost of meters to be replaced shall be recovered by one time reimbursement till finalization of terms and conditions of tariff for SEMs by CERC.

    - Procedure being adopted for testing of meters –
      IEC standard procedure is adopted for testing of meters

  - During discussion, it was learned that the work of installation of New Interface Energy Meters, AMR system and meter data processing system has not yet started despite the direction of the WRPC forum in 35th WRPC meeting.

Issue:
PGCIL may update the progress of installation of New Interface Energy Meters, AMR system and meter data processing system as decided by the 35th WRPC.

TCC discussions:

a) MS, WRPC briefly informed the background of agenda point and requested CTU (PGCIL) to update the progress of installation of New Interface Energy Meters, AMR system and meter data processing system as decided by the 35th WRPC.

b) PGCIL representative informed that they have started the work and done cost estimation of Rs. 30 crores for 1800 meters having feature of AMR, communication facility, hardware and software. Further he stated

that they have contacted meter manufacturers for knowing whether this can be implemented or not. According to manufacturers, there are some issues like life of the meters is 10 years and secondly for AMR facility we need to have reliable communication system and communication standard is yet to be issued by CEA inline with CERC (Communication system for interstate transmission of electricity) Regulation 2017. He further stated that due to above reasons, PGCIL has requested guidance from Hon'ble Commission in their communication in January-2018 and June-2018. Concluding his statement, he added that PGCIL request the Chair to help and guide them in this regard.

c) ED, WRLDC inquired, whether PGCIL sought direction from CERC with regard to meter.

d) In reply, PGCIL representative stated that yes they sought direction from CERC on meters. He further stated that there are some issues with meters also because the life of meter is 10 years and as per direction of WRPC they are going to recover the money through ARR and it would take 35 years.

e) ED, WRLDC clarified that meters have to be purchased by PGCIL having a 5 minute optional feature. In Western Region more than 1700 meters are currently installed from Secure, Elster and Honeywell manufacturers. The Honeywell meters currently installed have the optional feature of 5 min recording and meters with this feature were approved by the 33 WRPC to be procured by PGCIL. He further added that the this issue of replacement of meters are being discussed since last one and half years and in last WRPC meeting it was agreed that CTU would purchase the meter of 15 minutes having feature of 5 minutes. WRPC forum never asked to replace the existing meters by the meters having 5 minutes feature only. Therefore there was no point for PGCIL to approach CERC.

f) MD, GETCO, stated that the decision related to purchase of meter having 5 minutes feature has already been taken by 35th WRPC so now there is no need for further discussion. He added that PGCIL need to immediately purchase the meters as per specifications approved by 35th WRPC.

g) Representative of PGCIL stated that they are ready to implement decision of 35th WRPC. He further stated that if they spent money for meters and if they don't get the money back there would be a problem for them because the tariff is approved by CERC. He also stated that they put up for approval from management but management said that the issue is under consideration of CERC and first let CERC direct. However Director (Operation), PGCIL, would be present tomorrow in WRPC meeting and she would take stand in this regard.

h) ED, WRLDC stated that PGCIL should furnish a copy of letter that had been addressed to CERC so that he can get approval of CERC for PGCIL within 7 days of time as all people in CERC are like us only. During the discussion, PGCIL also agreed that some of the meters recently installed are having features of 5 minute.

i) WRLDC representative highlighted the following information:
   (i) The present settlement system is 15 minutes and till CERC gives direction, it cannot be changed and till that time 15-minutes AMR only required and there is no question of 5-min AMR or 15-min AMR.
   (ii) There are 783 meters of above 10 years of age, and 350 meters are of above 15 years of age. Entire accounting system/commercial settlement system is at serious risk and facing many meter errors. Further, there are meters with time drift of above 10 minutes and some are with more than one day also. Entire settlement is getting delayed because some meters have to be replaced. It is required to choose smooth settlement system instead of having a system with delayed settlement, disputes and commercial issues.

j) CE, NPC said that the efforts on the part of NRPC and WRPC are very good in that aspect. He informed that the issue was discussed in 7th NPC also, because the issue is the subject matter of all the regions, and NPC would make a framework for replacement of existing meters. He added that NPC had prepared draft framework and sent it to all the RPCs and waiting for views and the consolidated views would help forming a national framework.

k) NLDC said that according to the last SRPC minutes (meeting held in Feb-2018), Karnataka would have meters which are configurable from 0 to 60 minutes.

After long discussion, Chairman TCC stated that the PGCIL shall immediately implement the decision taken in 35th WRPC without any further delay.

WRPC Discussions/decision:

a) MS, WRPC informed the forum about the background of agenda item and TCC discussion. He stated that as per decision taken in 33rd WRPC, PGCIL was directed to install new IEM, AMR and meter data processing with 5 min and 15 min recording feature. He requested PGCIL to inform the forum about delay in implementation of 33rd and 35th WRPC decisions.

b) Chairman, WRPC stated that PGCIL should not make it as a prestige issue and in the last WRPC meeting PGCIL vociferously fought that it should not be done or decided. He added that many times in the state

cabinet or board, different views were put forward strongly but once the decision was taken, the decision belonged to everyone and in that spirit one should respond.

c) Director (Operation), PGCIL informed that she did not fully agree with the statement that they had not started the work. They had finalised technical specification and cost of meters had also been estimated. She stated that PGCIL is having 1700 meters and some of them have been replaced on bilateral basis like one time reimbursement. Regarding technical issue, there is nothing but only she wanted to highlight how the commercial issue would be settled when they make their project. She said *"there are two ways: either one time reimbursement like it was done last time or it can be through ARR. In that ARR, we can have bilateral billing. ARR would be through CERC route and it is for 25 years and it is all India basis. We have done this in other regions. Natural life of meters can be taken as 10 years. Accordingly, depreciation can be worked out based on CERC formula and we can do the bilateral billing if it is acceptable. Either of the option we can finalise and we can go ahead*". She stated that they also discussed the specifications approved by WRPC with the vendors and response from them was still awaited. Before concluding her statement, she added that they were working on it but might not be at a speed desired by WRPC forum but would complete faster.

d) Chairman, WRPC said that constituents can respond to PGCIL's two options.

e) MS, NRPC informed that the decision was taken during his tenure as MS, WRPC and PGCIL vociferously fought for ARR route. He added that it was agreed for ARR route for replacing all the meters at the cost of Rs. 25 crores and felt that till today it had not been honoured. He noted that as the participant of the meeting represented their highest head of the organisation, any refuting would amount to refuting his own version. Desiring commitment towards any agreement in the meeting, he suggested that any refusal or against view should be submitted in writing from his organisation.

f) In regard to meters which are to be added at ISTS and state interface points by CTU, Director (Opn.), PGCIL informed that some meters are in state sector or private sectors. She stated that PGCIL would be carrying out the maintenance/AMC of meters at ISTS points and submitted that other meters at state or private sectors should be maintained by the respective constituents because of communication system involvement. She said that details could be worked out and assured that it would not come in the way of installing meters.

g) When Chairman, WRPC seeking the members' response whether they

would opt for ARR model as decided in the last meeting, Director (Opn.), PGCIL stated that in case of PoC, it would be required to go to CERC. On a query seeking status of other regions, Director (Opn.), PGCIL informed that there was no move towards 5-minutes, but meters installed, and two types of payment method adopted – one is one-time reimbursement and the other is bilateral billing taking meter life as 10 years.

h) Director (Finance), GUVNL stated that if bilateral billing adopted, they would prefer one-time payment and not through ARR.

i) Chairman TCC stated that MP would go for one-time payment. He opined that members would opt for whatever billing method preferred by PGCIL. However, he stated that members could opt for the first choice (i.e. one-time payment) suggested by PGCIL.

j) Director (Opn.), PGCIL stated that any payment method would be acceptable to them i.e. whether one-time payment or 10-years bilateral. She agreed that there would be less burden in case of one-time payment method for constituents.

k) During the discussion, representative of NLDC stated that at present the responsibility of maintaining interface meter is of CTU and this should be there even for bilateral mode of reimbursement otherwise nobody would be there to take care of meters. He further added that if they had any other issue with payment, whether CERC tariff would be adequate or not, that can be taken up with the commission separately, but the responsibility of maintaining interface meters would be of CTU as per metering regulations.

l) ED, WRLDC said that the entire package could be divided into two parts - meter and AMR. He added that meter issue had been resolved with one-time payment basis. He informed that AMR is a technology which has to be implemented for State/Central meters and earlier PGCIL were only maintaining interconnecting meters. Stating that AMR communication has to be with one agency and the technology is going to be same for communication, he requested PGCIL to include the meters which they were not doing earlier.

m) Director(Opn.), PGCIL replied to ED, WRLDC that in case of inter-state lines, the communication would be theirs including OPGW; but in case of state sector the data not reaching and the communication infrastructure would not be theirs hence they could not do anything. She proposed that in the contract that would be finalised for meters, AMC for central sector also would be included. She added that for the state or private sector the contract would have facility to award the contract to them and there would be one-to-one between state utilities, otherwise it would not be possible.

n) DB Power stated that in case of IPPs there were different challenges. He informed that in case of DB Power two meters are located in Kotra pooling station and 8 meters were located in their premises. He wanted to know whether 8 meters were also owned by Powergrid. He stated that according to CEA metering regulation interface meters are to be owned by Transmission Licensee and in future after installing meters it should not be transferred to GENCOs. Director (Opn.), PGCIL clarified that meters on dedicated lines would be owned by the respective owner.

o) Chairman, WRPC clarified that the forum was not meant for re-writing regulations and whatever permitted under regulations would be tried.

p) Stating that he had some views in association with NLDC, CE, SLDC, GETCO informed that currently all the interface meters including located at state substation premises were being maintained by Powergrid. He requested that the associated AMR and modem facilities also be maintained by Powergrid. He said that states would help in follow up activities. He informed that currently in case of failure, PGCIL person would come to site, get it calibrated/repaired/replaced and that work cannot be taken up by the states. He said that in case of Degham s/s, CTU would do it as the owner, but for the remote end of that substation belonging to states, they would not do it as per the ongoing discussion. He further said that problem with meter and AMR could not be distinguished and requested Powergrid to continue meter maintenance along with AMR.

q) ED, WRLDC explained that whatever meters maintained today by CTU would continue to be maintained by CTU and they would not stop because of replacing meters. He said that meter and AMR were separate issues. He clarified that Director (Opn.), PGCIL was correctly saying that communication issues like 2 Mbps or 85 kbps should be taken care by states. He suggested that as a policy matter small issues and any surprise issues could be discussed and resolved in OCC and CCM meetings.

r) Chairman, WRPC stated that he had tremendous faith in the colleagues sitting in the meeting and the current issue would not come in the next WRPC meeting and he would expect one-liner that the decision had been implemented in total.

s) Noting the decision of one-time payment for meter replacement, Maharashtra representative wanted to know how that cost would be distributed amongst constituents. He further wanted to know how the cost would be recovered in future in case of meter failure.

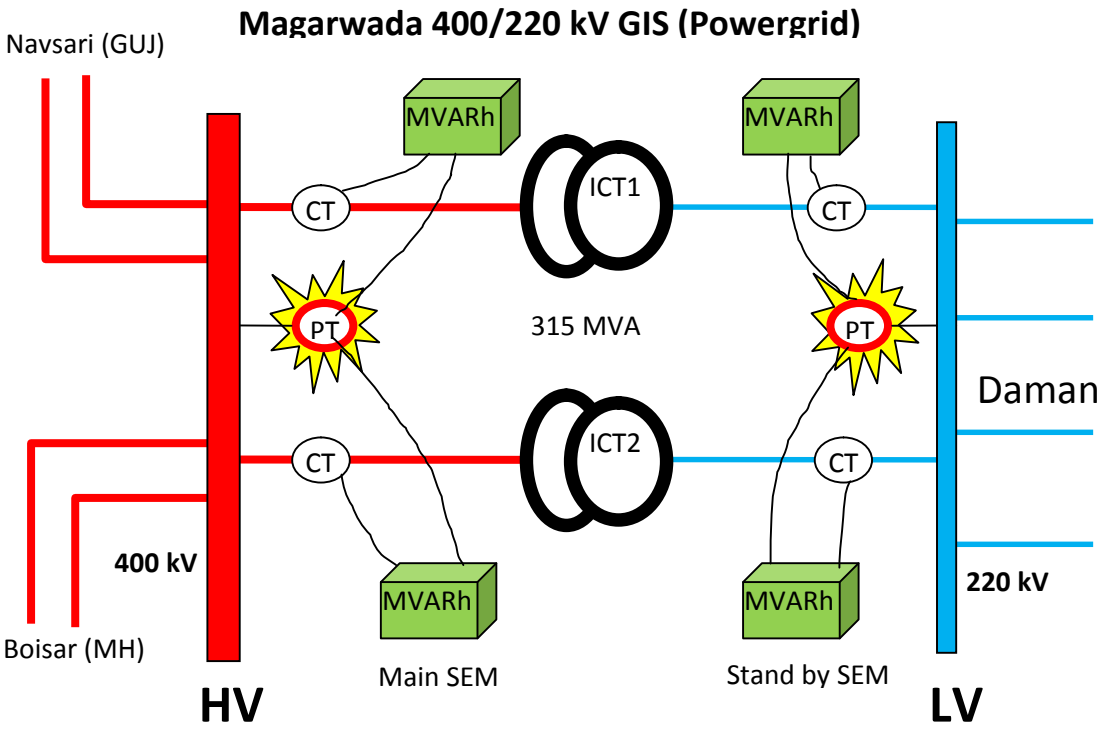
t) Director(Opn.), PGCIL replied that cost would be based on the meter count. Chairman, WRPC clarified that cost would be based on the

	meters located in the physical boundary of the constituent. Highlighting that procurement of new meters would take time and proposing 10% more meters by all states with their agreement, Director(Opn.), PGCIL stated that 10% more meters would be stationed at one place in order to have very little turnaround time. Maharashtra representative wanted to know whether that 10% extra (inventory) meters of one state which would be used for other state. ED, WRLDC stated those small issues could be discussed in CCM. u) MS, WRPC requested the members to get it clarified any other queries/doubts on the issue in the current meeting itself and informed that the next board meeting would take some time and the issue would not be reopened in any other meetings. Chairman, TCC stated that the issue should not be reopened in other meetings. *After discussion, WRP Committee decided the following:-* *(i) PGCIL/CTU shall replace existing meters by New Interface Energy Meters, AMR system and meter data processing system having specifications as approved in 34th WRPC meeting. WRPC also noted that it is the responsibility of CTU to install the meters with AMR at all location of inter connection of ISTS, irrespective of the substation owned by CTU or STU.* *(ii) The cost of the meters shall be borne by entities on one time reimbursement basis. The sharing of cost shall be done as per meters physically installed within respective boundaries of states.* *(iii) PGCIL/CTU shall procure 10% additional number of meters as it would reduce the turn around time for replacing the faulty meters in future.*
	WRPC noted the same. **(Action**: *PGCIL/CTU* **)**
C.8	**Error in computation of MVARh by SEM at 400/220kV Magarwada (PG) substation**
	Background – Methodology for settlement of excess amount paid by DD for reactive energy charges on account of erroneous reading was discussed in 34th WRPC meeting. The relevant portion of MoM of 34th WRPC/TCC decision is as follows - Quote *Representative from PGCIL informed that meter reference voltage was corrected on 21 April 2017 and meter started recording MVARh correctly. Both DD & PGCIL agreed to consider the reading of meter which was under observation for billing.* *WRPC informed that the adjustments towards excess payment*

already made by DD from the commissioning of the station till 21 April 2017 would be made from excess leftover amount in the DSM pool fund after completing obligations towards ancillary services operations. After the adjustment is made towards DD the remaining amount shall be passed on to PSDF.

Unquote

Subsequently, WRPC Secretariat worked out revised REC in respect of DD for the period from 16.03.2015 to 21.04.2017 based on methodology given below. This methodology is required to be approved by 36th WRPC so that excess amount paid by DD can be settled In line with the decision taken in 34th WRPC.



HV side error
Requirement:
400 kV (388 to 412 kV)
/ 110 V

Actual:
420 kV (407.4 to 432.6 kV)
/ 110 V

Correction in MVARh meter:
Reference voltage on 400kV side of ICT = 60.5 volts

LV side error
Requirement:
225 kV (213.4 to 226.6 kV)
/ 110 V

Actual:
245 kV (237.65 to 252.35 kV)
/ 110 V

Correction in MVARh meter:
Reference voltage on 220kV side of ICT = 57.0 volts

Error period:

- *Erroneous setting from:* 16th March 2015
- *Error corrected in meter: 21st April, 2017 (12:45 hrs)*

Claim by Daman & Diu:

Revised reactive energy (REC) charges from 16th March, 2015 to 21st April, 2017

Proposed settlement:

From weekly DSM pool accounts:

- Adjustment towards ancillary services.
- Adjust for D&D towards MVARh corrections.
- Remaining sent for PSDF.

Follow up activities:

- Letter to DD (Daman & Diu) seeking details of excess payment made.
- Based on the data received WRLDC, calculations for revised REC in respect of DD for the period 16.03.2015 to 21.04.2017.
- Methodology adopted for computing excess REC payment is given below:

---------- start of method ----------

Methodology for Calculating Excess Payment of REC made by DD on Account of Erroneous Reading of SEM

1. Preparation of **regular** REC statements issued by WRPC on weekly basis:

   REC statement is issued by WRPC on weekly basis. The charges at High Voltage and Low voltage are calculated as follows in respect of DD:

   Input data: DD3 text file provided by WRLDC

   Charges at High Voltage= rate *∑(MvarH_h)

   where ∑(MvarH_h) = Day wise MVARH_h value at (
   220KV Magarvada line1 + 220KV Magarvada line2 +
   400KV Magarvada ICT1 + 400KV Magarvada ICT2)

   Charges at low Voltage = rate *∑(MvarH_l)

   where ∑(MvarH_l) = Day wise MVARH_l value at (
   220KV Magarvada line1 + 220KV Magarvada line2 +
   400KV Magarvada ICT1 + 400KV Magarvada ICT2)

2. The input data for day wise MVARH value for the period 16.03.2015 to 21.04.2017 in respect of 400KV Magarvada ICT-1 and ICT-2 was erroneous and this was included along with the correct data i.e data of 220KV Magarvada line-1 and line-2 in REC issued by WRPC. Due to this reason the figures appeared in REC accounts issued for the above period is incorrect.

   Methodology:
   To know the revised week-wise correct amount of REC in respect of DD, erroneous amount of 400KV Magarvada ICT-1 and 400KV Magarvada ICT-2 need to be calculated

from input data file for the entire period by using the following equations.:

Charges at High Voltage = rate *∑(MvarH_h)
where ∑(MvarH_h) = Daywise MVARH_h value at (
400KV Magarvada ICT1 + 400KV Magarvada ICT2)

Charges at low Voltage= rate *∑(MvarH_l)
where ∑(MvarH_l) = Daywise MVARH_l value at (
400KV Magarvada ICT1 + 400KV Magarvada ICT2)

3. The amount indicated as per the above methodology will have to be restricted upto the actual payments made by DD towards REC during the period 16.03.2015 to 21.04.2017.

---------- end of method ----------

Issues:

- Excess payment data made by DD is not readily available and it requires computation and methodology.
- Approval of methodology used by WRPC, for computing excess payment of REC made by DD.
- If methodology is approved, WRPC will issue provisional statement of revised REC charges on account of erroneous data. Based on this statement, WRLDC will make the necessary adjustments for DD and disburse the due amount.

TCC discussions:

a) MS, WRPC stated that in the 34th WRPC the decision was taken to pay excess amount paid by DD from DSM pool fund prior to passing to PSDF. He informed that WRPC sect. attempted to compute the excess payment made by Daman and Diu by assuming that voltage was continuously high during the error period. He further added that WRPC Secretariat also wrote a letter to DD requesting to furnish the figure of excess payment made by them. He also informed that WRPC Secretariat has never handled this type of two years old metering dispute. Also voltage reading available is not reliable and therefore D&D was advised to take up this matter to CERC.

b) ED, WRLDC stated that they have done calculation and the same could be shared with the stake holders and if they have any objection in calculation they can go to CERC.

c) S.E.(Comml),WRPC requested ED, WRLDC to clarify whether the forum can open any case where decision of adjustment of crores of rupee is involved? If this forum is going to set this precedence, first we need to ask whether we can handle such issue wherein crores of rupees are involved and decision of adjustment is based on assumption. He further raised the question on calculation referred by ED, WRLDC. He further

	informed that the forum have not discussed any methodology in 34th WRPC. What the forum discussed in WRPC was how to adjust the excess amount to D&D. And method to arrive at excess amount is based on certain assumption and the assumption is that the voltage at Magarwada during the entire period is more than 388 KV. WRPC sect. were fine with this methodology and therefore WRPC sect wanted the same should be approved by 36th WRPC (as can be seen in agenda point). But, subsequently, a team of WRPC Secretariat visited Magarwada on 18/06/2018 to discuss the issue in totality with PGCIL officials at Magarwada. During this visit, log book readings for the entire period had also been obtained from PGCIL. While checking the voltage profile, it was observed that there were even low voltage (below 388 KV) during some of the hours and therefore the assumption of continuous high voltage is not correct. Due to this reason it is not appropriate to take financial decision of excess payment by considering a methodology which is based on incorrect assumption. d) Chairman, TCC asked representative that whether D&D has calculated excess amount. In reply, D&D representative stated that approx Rs 6.5 crores have been paid by D&D on account of erroneous meter data and the same had to be refunded as per the decision in the 34th WRPC and further he stated that interest should also be paid to D&D. He also added that voltage at Magarwada was above the normal value for 95 % of time. e) WRLDC representative stated that Rs 6.6 Crores have been paid by D&D. The reactive account payment is settled on a weekly basis and amount is not carried over hence the excess payment paid by D&D has been passed on to beneficiaries. Further the accounts cannot be revised as data is not available to calculate the revised REC statements. f) MS, WRPC stated that as per IEGC, issue related to error in meter should be brought to notice of appropriate authority within 2 weeks of time (15 days). He informed that the issue was not taken up within that time limit and after two years of time WRPC was informed. g) TCC, Chairman inquired about the entity that should approach Hon'ble CERC and MS, WRPC suggested that the aggrieved party in this case D&D should approach Hon'ble CERC and the directions by Hon'ble commission shall be followed. *After discussion Chairman, TCC stated the issue needs deliberation in full WRPC therefore it should be referred to the WRP committee for further guidance.*
	WRPC Discussions/decision: a) MS, WRPC stated that in 34th WRPC, it was decided to refund excess amount paid by D&D on account of erroneous meter readings. He

stated that WRPC Secretariat spent lot of time to arrive at excess payment made by D&D. Due to non availability of correct data, WRPC sect. was unable to arrive at the excess payment made by D&D. Therefore a methodology was prepared for calculation of excess amount paid by D&D based on assumption that the voltage at Magarwada was continuously high. WRPC Secretariat wanted to get approval of prepared methodology and therefore it was incorporated in this agenda item. But subsequently, a team from WRPC went to Magarwada to double check whether the assumption of continuous high voltage at Magarwada was right or not. During this visit, the team found from log book record that the voltage was on both sides (high & low) therefore the team could not convincingly establish that the voltage was continuously high. This agenda was discussed in detail in yesterday's TCC. He further added that considering the inability of arriving at exact amount of excess payment made by D&D, IEGC provision of 15 days time limit for reporting meter related data error and two years old case, request was made in TCC to Chairman, TCC that D&D can approach Hon'ble CERC.

b) D&D representative stated that the voltage remained on lower side only for 0.1% of time and 99.9% of time the voltage was normal or higher side and so whatever they were paying was excess payment only. Chairman, WRPC asked what the quantum of excess payment was and whether any calculation was made. D&D representative replied that the amount was Rs. 6.5 crores for two years of payment and available in RLDC reconciliation statement also. He further stated that after the reference voltage was corrected in the meter by PGCIL, there had been no payable amount by D&D till date and they were only receivable.

c) ED, WRLDC said that two years back there was a problem in the substation and Powergrid admitted the technical mistake and with last TCC Chairman, it was decided as a principle that it should be reimbursed from DSM pool. WRLDC and WRPC secretariat by taking some assumptions could arrive at Rs. 6.5. crores. In the TCC, WRPC team said that as they had some doubts, D&D could take it to CERC. He said "I, as WRLDC ED, am ready to sign on the document which has been done on some assumptions. I propose payment should be made to D&D and the entire calculations transparently should be sent to all stakeholders. If anybody had doubt let them go to CERC, instead of sending everything to CERC. D&D is a government Organisation and we are not giving to any private organisation. We are engineers and in any calculations some assumptions are being taken. In reactive pool account whatever error has come, we are giving from the DSM pool account. But we cannot start sending everything to CERC. What will happen? CERC will start calling WRLDC, Powergrid, and everybody and they will learn the entire process through me only and put the stamp. D&D is a govt organisation and let us try to solve. There are some people earlier who worked in CERC. CERC wants all decision to be taken at WRPC and we are sending small things to CERC. This is my

	proposal and I own all responsibility. I will sign that assumption calculation". d) SE, WRPC stated that WRPC Secretariat, being a pure central government office, is audited by CAG periodically. So CAG may raise the question on method of calculation of excess payment during their performance audit in future. Then in that case what would be the answer available with WRPC Secretariat? Therefore WRPC Secretariat just wanted it to be addressed to the Commission so that the stamp of the Commission on method of calculation can be obtained. WRPC Secretariat is not concerned about how much money D&D is going to get as a refund. e) Director (Finance), GUVNL stated that when all members agreed there should not be any problem for WRPC Secretariat. He added that though methodology was not decided in the last WRPC meeting, methodology suggested by WRLDC is agreeable to all members and thre should not be any problem to WRPC Secretariat. f) MS, WRPC explained that CVT might be with 3 or 5 cores; reference voltage was set to wrongly in the MVARh meter at 420 kV instead of 400 kV. Noting that error was corrected after one and half years, he said that as it was not clear whether CVT cores for other purpose also set wrongly and opined that even the log book reading might not be correct. He added that in order to have a small check a team was sent to D & D because if anything went wrong, WRPC secretariat might be blamed for issuing account without checking. He said that due to the stated reasons WRPC secretariat wanted higher forum to decide the amount or the forum could give the direction on how to arrive at excess payment because D & D was asserting that whatever payment was made by them to pool account was excess payment only. He suggested that if it was permitted by Chairman, WRPC, the issue could be discussed in CCM for finding out a fool-proof methodology to compute the excess payment. g) MS, WRPC requested directions for similar claims by any company in future saying that the meter was set wrongly for so many years. Chairman, WRPC advised that it could be deliberated in a committee and come up with a suggestion for what to be decided. *After the discussion, Chairman, WRPC decided and recommended the following:-* *(i) The amount of Rs 6.5 crores paid by D&D shall be reimbursed from the DSM pool fund as per the decision in the 34th WRPC.* *(ii) D&D shall give an account of Rs 6.5 Crores with an undertaking that in case of future audit objection D&D stand to be corrected.* *(iii) WRLDC shall certify the amount.* *WRPC agreed to the above recommendations.*
	WRPC noted the same. **(Action**: Daman & Diu,WRLDC

D. Information/noting items

D-1 Certification of Natural ISTS lines of MP

77th CCM:

MPPTCL vide letter No. 04-02/PSP-20/282 dated 06.02.18 (copy enclosed at **Annexure D.1-1**) has requested to consider the following EHV line of Madhya Pradesh state as natural inter-state line and approval in this respect may please be accorded so that MPPTCL may file the petition before CERC for determination of point of connection charges –

S. No	Name of ISTS line**	Voltage (kV)	Connecting States
1	Sheopur – Khander 132kV line	132	MP-Rajasthan
2	Gandhi Sagar – Rana Pratap Sagar 132kV line-1	132	MP-Rajasthan
3	Gandhi Sagar – Rana Pratap Sagar 132kV line-2	132	MP-Rajasthan
4	Seoni – Pench HEP 132 line-1	132	MP-Maharashtra
5	Seoni – Pench HEP 132 line-2	132	MP-Maharashtra
6	Balaghat – Dongargarh 132kV line-1	132	MP-CG
7	Balaghat Bhanegaon – Dhamdha 132kV line-2	132	MP-CG
8	Morwa – Beena (Rihand) 132kV line	132	MP-UP
9	Morwa – Anpara 132kV line	132	MP-UP

(** Corrected list of Lines as received from MPPTCL during TCC)

SE(C), WRPC stated that as per section 2(36) (i) of Electricity Act 2003, the lines given in the above TABLE provided by MPPTCL, qualify as natural ISTS line and hence there is no need to give a separate ISTS certification from WRPC.

CERC order on natural ISTS lines:

Relevant Excerpt from Hon'ble commission order dated 14.03.2012 under petition No:15/Suo-Motu/2012 (Clause 6):

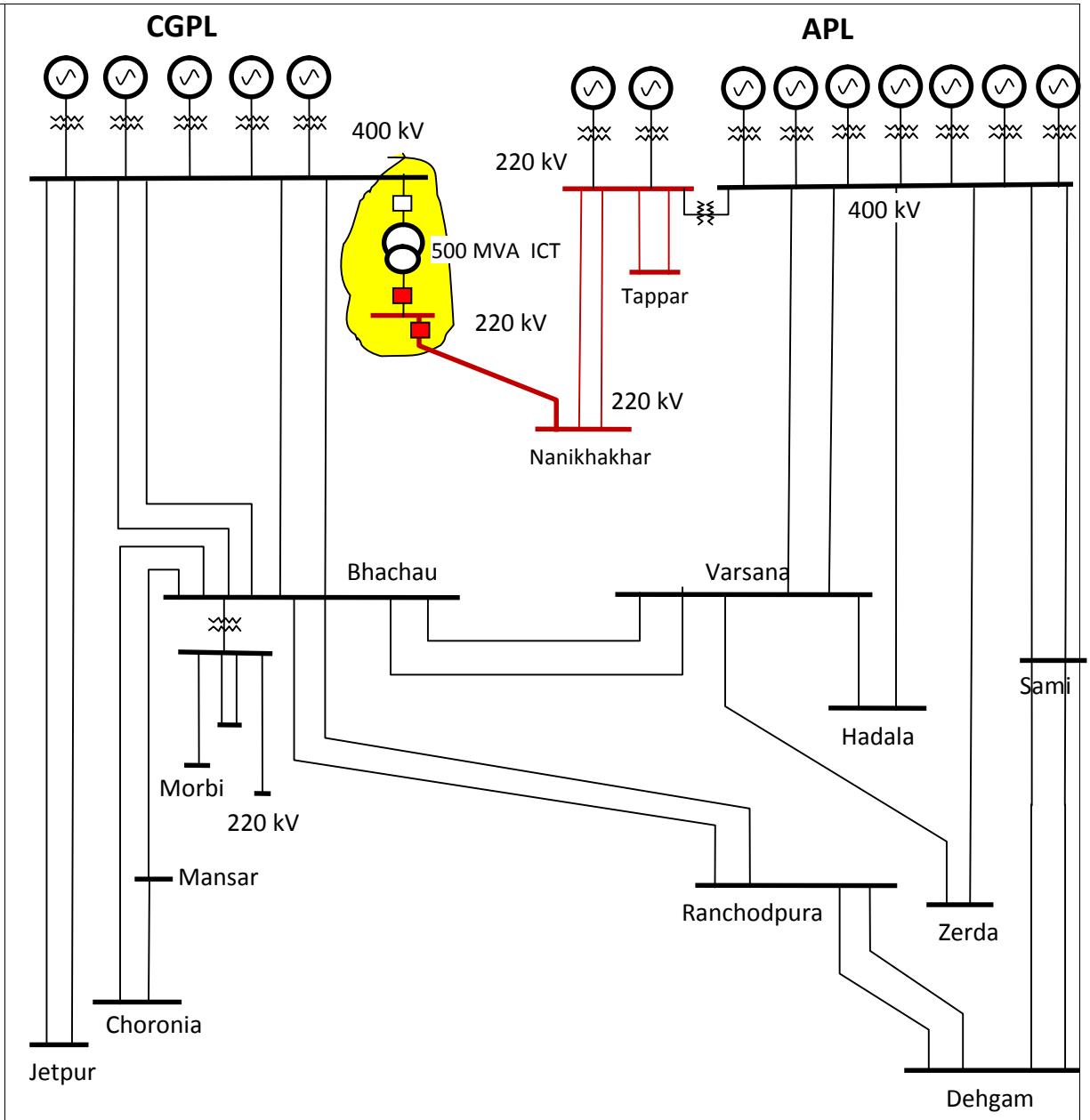
Quote

As a first step towards inclusion of non-ISTS lines in the PoC transmission charges, the commission proposes to include the transmission lines connecting two states, for computation of PoC transmission charges and losses. However, for the disbursement of transmission charges, tariff for such assets needs to be approved by the commission in accordance with the provisions of Sharing

	Regulations. Accordingly, we direct the owners of these inter-state lines to file appropriate application before the commission for determination of tariff for facilitating disbursement. Unquote **Follow up after 77th CCM:** Subsequently MPPTCL vide their letter dated 03.05.2018 (copy enclosed at **Annexure D.1-2**) requested that in order to file the petition before CERC, certification of WRPC for all the inter-state lines as natural ISTS shall be necessary. Once these lines are certified as natural ISTS lines by WRPC. MPPTCL shall approach CERC for approval of tariff for these lines. **Issue:** In view of the above and other relevant orders of the Hon'ble commission, MPPTCL may approach the commission for determination of tariff of the line mentioned under Table.
	TCC Discussions: a) MS, WRPC informed the forum about the corrected list of lines submitted by MPPTCL for declaration of ISTS. b) Regarding Balaghat Bhanegaon–Dhamdha 132kV line-2, MD MPPTCL raised concern about delay in completion at Chhattisgargh end. He informed that this was discussed in meeting in 2009 and then Member Secretary WRPC felt that Balaghat Bhanegaon – Dhamdha 132kV line-2 should be put in service and commercial issues shall be settled later on. Then in 401st OCC meeting on 10th July 2009, in which CSPTCL stated that they would appraise the matter with their management and would communicate the status. Later on Chhattisgarh had informed that 220 kV Rajnandgaon S/S was likely to be commissioned within a fortnight. MD MPPTCL further informed that the line is not yet ready till date. c) In reply, ED CSPTCL informed that line from Thelkadih (Rajnandgaon) has been brought up to Dongargarh and is kept idle. For Dongargarh to Balagaht one bay has to be constructed but there is no space at S/S. MD MPPTCL stated that bay should be constructed by CSPTCL, if bay not available, it is CSPTCL's responsibility. ISTS line cannot be discarded suo motu and therefore CSPTCL give the time line for oprationalisation of the line. CSPTCL representative agreed for the same. **TCC noted.**
	WRPC discussion: MS, WRPC informed the agenda position and requested members for any issues or comments. No comments were given.
	WRPC noted as above.

D-2	**Increase in GETCO Transmission loss due to high power flow on + 500 KV Mundra-Mohindergarh Bi-Pole HVDC line**
	Background: • 34th TCC/WRPC: the issue was first discussed. • 35th WRPC meeting: it was decided that WRLDC and GETCO would sit together for joint study and come up with the final finding by 15th January, 2018 and if the result of the joint study remains inconclusive then in that case the reply given by WRLDC shall be considered to be in order. **Issue:** WRLDC/GETCO may appraise the findings of the joint study carried out.
	TCC Discussions: a) Member Secretary, WRPC requested WRLDC to brief about finding of joint study. b) WRLDC & GETCO representatives informed that the joint study was carried out at WRLDC and they are satisfied with the results of the joint studies. GETCO and WRLDC representative confirmed that the issue has been resolved.
	WRPC noted as above.
D-3	**Interconnection between CGPL UMPP and Adani Mundra STPS in Gujarat – provision of 400/220 KV ICT at CGPL Mundra and compensation mechanism for 220 KV S/C CGPL Mundra – Nanikhakhar line & bays**
	Background: 35th WRPC (20th Dec, 2017): • The matter of provision of 400/220 kV, 315 MVA or 500 MVA ICT along with one no. of 400 kV ICT bay and one no. of 220 kV ICT bay at M/s CGPL Switchyard was discussed in the meeting. • Members agreed that the work of installation of ICT and associated bays at CGPL Complex shall be carried out by PGCIL and the cost of the same shall be recovered through POC mechanism. • WRPC also agreed to take the similar stand in similar cases in future. **Follow up after 35th WRPC:** • Work of installation has not been started by PGCIL as capacity of ICT was not decided during last WRPC Meeting.

	• Subsequently the matter was discussed during the 43rd SCM held on 11th May 2018 at Vadodara. Members deliberated on the rating of the ICT to be installed (315MVA or 500MVA) and it was decided that 1x500MVA, 400/220kV ICT shall be implemented as the difference of costs is not significant. • PGCIL agreed/noted for the same **Issues:** PGCIL may **update** the progress of work and give details on the following aspects: ⇨ NIT issued. ⇨ Informing SCM for size of the transformer and consent. ⇨ Target date for commissioning. ⇨ Any other related issue.



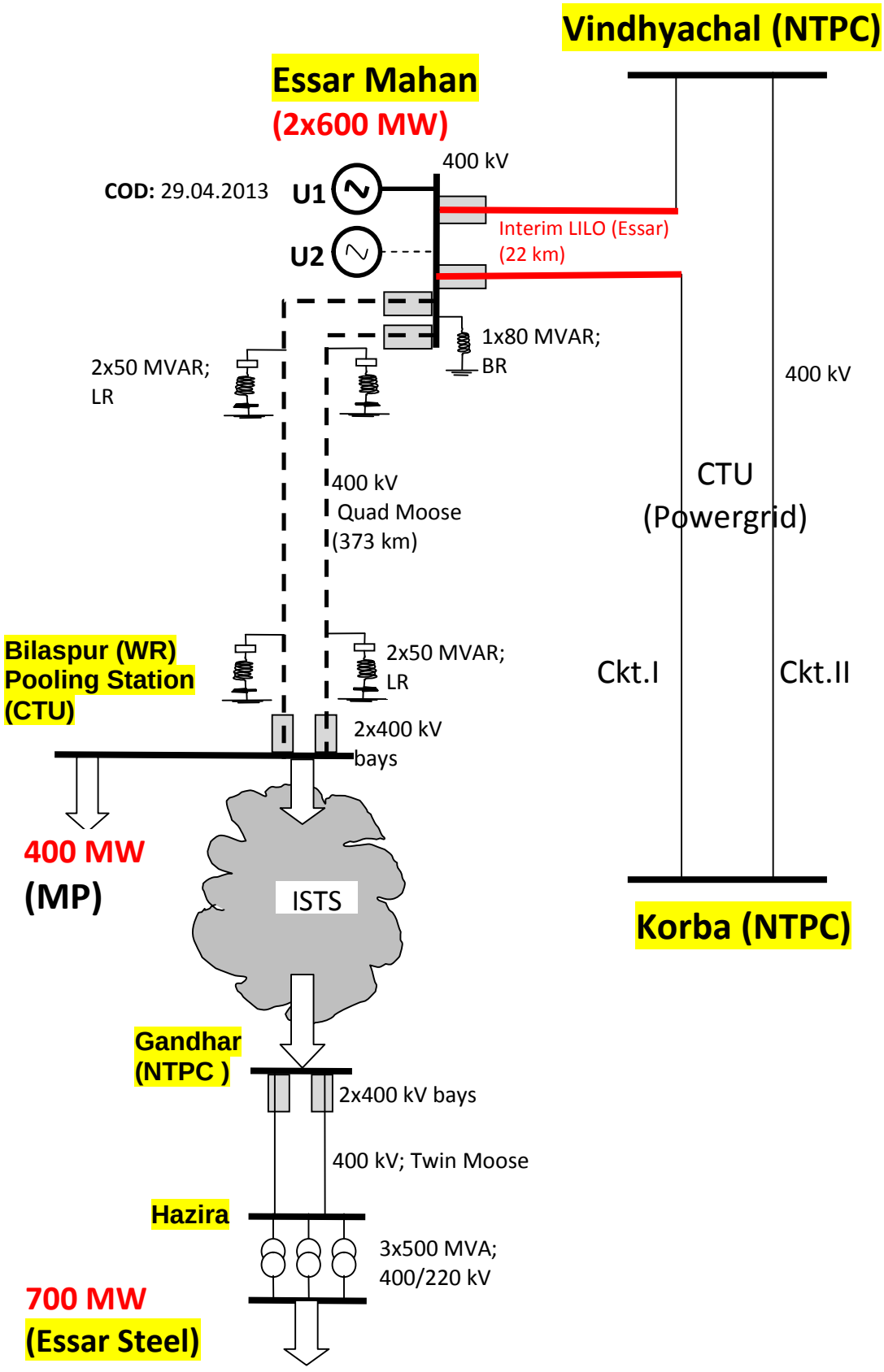
TCC Discussions:

a) Member Secretary, WRPC briefly informed the forum about the agenda point. He further informed that in 43rd SCM (held on 11th Jun 2018 at Vadodara), the size of ICT finalised as 500 MVA. He requested CTU representative to give status update.

b) CTU representative informed that capacity of ICT was cleared in last SCM (43rd SCM) held on 11th May, 2018 so now CEA will take up the proposal with the Empowered Committee. She further informed that PGCIL cannot start implementation on its own. She said that with the revised tariff policy, even for the extension work, CTU has to get notification from the Ministry that PGCIL has to do a particular work. So once CTU get the notification, CTU would implement the same. CEA

	has to recommend the proposal to Empowered Committee. Now the structure of Empowered Committee has changed and Secretary Power is the Chairman of that committee. So CEA need to put the agenda to Empowered Committee. c) Chairman, TCC inquired about next initiatives in implementation of installation of ICT. CTU representative replied that the agenda has to be put up by CEA to Empowered Committee and they will recommend that it will be done by PGCIL. So once CTU get the notification from Ministry, CTU will start the work. *TCC suggested WRPC Secretariat to write a letter to CEA for taking up the proposal to Empowered Committee on Transmission for further needful.*
	WRPC Noted the same.
D-4	**Extension of LILO arrangement for evacuation of power by ESSAR Power M.P. Ltd., 2x600 MW ("EPMPL")**
	34th WRPC : Following decision was taken: (1) Essar shall continue with existing interim LILO arrangement till 30th September, 2017. After September, 2017 decision shall be reviewed by WRPC based on visible progress made in construction work of dedicated line. (2) Essar shall furnish Weekly Progress Report showing details like no. of foundation completed, stringing completed, no. of tower erected etc. to WRPC Secretariat. (3) Essar shall be permitted to synchronise Unit No. 2, however Essar shall also have to ensure total generation of Essar Complex within the limit of 600 MW. WRLDC shall restrict injection of Essar upto 600 MW in real time operation. **35th WRPC :** WRPC decided the following; (i) M/s Essar Mahan may approach CERC if they want extension to the interim LILO arrangement beyond 20.01.2018. (ii) In absence of extension order from CERC by the deadline of 20.01.2018, the interim LILO shall be disconnected by WRLDC without coming to WRPC. (iii) If CERC gives an interim order before 20.01.2018 on the petition to be filed by M/s Essar Mahan seeking extension for the interim LILO arrangement, the WRP Committee authorized the Chairman WRPC to take decision as per the directives in the interim order and inform

	WRPC in next meeting (36th WRPC). **Follow-up after 35th TCC/WRPC meeting:** • M/s Essar Mahan approached Hon'ble CERC in month of January 2018. • Hon'ble CERC vide its Petition No. 10/MP/2018, Order dated 19th January, 2018(copy attached at **Annexure D.4-1**) allowed M/s Essar Mahan the use of the LILO till 31.03.2018. • Hon'ble CERC further directed the M/s Essar Mahan to ensure completion of the Mahan-Sipat line by 31.03.2018. Till that time, status quo shall be maintained. • If the transmission line is not commissioned by the M/s Essar Mahan on or before 31.3.2018, CTU shall take immediate necessary action for disconnection of the LILO arrangement with effect from 01.04.2018. • In case, CTU wants to continue with the LILO beyond 31.3.2018, CTU shall approach the Commission well before 31.3.2018 with proper justification. • Subsequently M/s Essar Mahan approached Hon'ble APTEL in the month of March 2018 for further extension of LILO of 400 kV Vindhyachal-Korba Ckt-I. • The Appellate Tribunal For Electricity vide Order DFR No. 1052 of 2018 dated 27th March, 2018(copy attached at **Annexure D.4-2**) allowed M/s Essar Mahan the use of the LILO till 30.06.2018.


Vindhyachal (NTPC)
Essar Mahan
(2x600 MW)
400 kV
COD: 29.04.2013
U1
U2
Interim LILO (Essar)
(22 km)
1x80 MVAR;
BR
2x50 MVAR;
LR
400 kV
CTU
(Powergrid)
400 kV
Quad Moose
(373 km)
Bilaspur (WR)
Pooling Station
(CTU)
2x50 MVAR;
LR
Ckt.I
Ckt.II
2x400 kV
bays
400 MW
(MP)
ISTS
Korba (NTPC)
Gandhar
(NTPC)
2x400 kV bays
400 kV; Twin Moose
Hazira
3x500 MVA;
400/220 kV
700 MW
(Essar Steel)

TCC Discussion:

a) Noting that no representative from Essar Mahan in the meeting, MS, WRPC informed that according to the latest information APTEL (Appellate Tribunal For Electricity) had given extension up to 30.6.2018.

b) CTU representative stated that letter had been given to open the line after 30.6.2018 if it is not completed in compliance with APTEL order. ED, WRLDC stated that based on the CTU letter he had informed WRTS-II to open the line at night 12:00 hrs on 30.06.2018. CTU representative informed that except this LILO all others had been opened and this is the generation project on LILO.

WRPC Discussion:

a) MS, WRPC informed that the issue from board had gone to CERC and from there to APTEL who had given dead line up to June, 2018.

b) Chairman, TCC informed that the issue was discussed in TCC and WRLDC informed the participants about the legalities. He added that on night of 30th June, 2018, if required, the LILO line would be disconnected.

TCC/WRPC noted.

D-5 **Performance of WR grid: during December 2017 to April 2018**

(i) System performance

a) Frequency:

Period: December 2017 to April 2018	
IEGC frequency range of 49.90 Hz to 50.05 Hz	from 73.86 % to 80.25 % of time
Frequencies below 49.9 Hz	from 9.69 % to 12.99 % of time
Frequency remained above 50.05 Hz	from 7.63 % to 13.28 % of time
Monthly average frequency during December 2017 to April 2018	49.98 Hz.

The detail of frequency profile for the months of during December 2017 to April 2018 is placed at **Annexure D.5-1**.

b) Demand:

The maximum unrestricted demand of Western Region was in the range of 48797 MW to 50,654 MW(Ex Bus) in during December 2017 to April 2018.

	The details of unrestricted peak demand, demand met and energy requirement and availability are as furnished at **Annexure D.5-2**. **(ii) Voltage Profile** Overall voltage profile had been satisfactory during the period under review. However, instances of high voltages beyond the IEGC specified operating range were observed at some of the EHV sub-stations in the region. Higher voltages in the range of 421 kV to 440 kV were noted at Bhopal, Khandwa, Damoh, Nagda, Indore, Raipur, Raigarh, Bhilai, Wardha, Dhule, Parli, Boisar, Kalwa, Karad, Dehgam, Vapi, Mapusa, Magadwada and Hazira substations. Also higher voltages of around 800 kV were observed at 765 kV Wardha, Durg, Kotra & Tamnar. To contain high voltages WRLDC resorted to opening of lightly loaded EHV lines on certain days. The detail of voltages at important 400 kV and 765 kV sub-stations during the period of during December 2017 to April 2018 is placed at **Annexure D.5-3**. The schedule of installation of reactors in attached at **Annexure D.5-4.**
	TCC/WRPC noted.
D-6	**Anticipated power supply position in WR: July to September 2018**
	The anticipated power supply position in the region for the period from July to September 2018 is at **Annexure D.6**. The anticipated regional demand is likely to vary between 49,800 MW to 52,600 MW and the capacity surplus will be around 3.0 - 6.0 %. In terms of energy, the unrestricted requirement is expected to range from 32,200 MUs to 33,500 MUs with regional energy surplus of around 1.5 % to 2.6 %.
	TCC/WRPC noted.
D-7	**New generating units in WR: during the current year 2018-19**
	The status regarding Generating units, commissioned /expected to be commissioned during the current year 2018-19 as updated in 507th OCC meeting held on 15.05.2018 at WRPC, Mumbai is attached at **Annexure D.7**.
	TCC/WRPC noted.

D-8	**Impact of forthcoming 'Five minutes' scheduling and energy accounting**
	Background Based on decision taken in 76th CCM held on 23rd October 2017 at WRPC, Mumbai a group was formed comprising representatives from WRLDC, SLDC, NTPC, State Gencos, PGCIL, Discoms, IPP and WRPC to analyse/discuss the impact of 5 minutes scheduling and energy accounting. The 1st meeting of the group on 5 minutes scheduling was held on 22.02.2018 at WRPC, Mumbai. **Outcome of the Group meeting -** In line with the above decision a meeting of the Group was held on 22.02.2018 (MoM is enclosed at **Annexure D.8**). The outcome of the meeting is as follow; a) Members in general opined that Primary and Secondary controls of generation should be strictly implemented before making any changes in the existing scheduling mechanism. To start with, AGC should be implemented for CGS, state Gencos, and IPPs. If AGC serves the purpose, then there may not be any necessity for changing the existing scheduling mechanism. b) Generators and DISCOMs expressed difficulties (such as boiler response, flame failure, fatigue failure, boiler tripping, etc.) in many aspects to maintain their actual injection/drawl close to their schedules in the 5-minute time frame. c) As the proposed 5-minute scheduling mechanism requires fast response, the existing manual control of generation may not be suitable for fast response. d) In RE-rich state it would be difficult for DISCOMs and SLDCs to absorb the deviation due to intermittent RE integration, since RE generators are not penalized for deviations. e) For forecasting, detailed guidelines covering various aspects are required. f) Some members expressed that it is feasible to switch over to 5-minute scheduling provided hardware/software is upgraded and additional manpower is deployed. Capacity building at various levels is required. g) Precise load forecasting, RE generation forecasting, and weather forecasting are essential for switching over to 5-minute scheduling. h) Some members expressed that: o As for as possible, existing meters are modified to support 5-minute recording. o Replacement of existing meters, if required, should be done in phased manner by CTU. o Meter replacement activity may take around 1½ – 2 years time.

TCC Discussions:

a) Member Secretary, WRPC briefly informed the forum about the agenda point. He further stated that the FOR (Forum of Regulators) is rigorously pursuing 5 min scheduling issue and WRPC officials also attended two meetings at FOR in which participants were asked to submit point-wise comments on the 5-min system proposals. Accordingly a group was formed in WR and its first meeting with NTPC and all generators, STU, DISCOMs was held and their views were obtained which are there in the MoM. The conclusion of the group meeting is that generally GENCO and DISCOM are not willing to go for 5 minutes scheduling because of lot of difficulties. Some STUs opined positively for 5-minutes scheduling. During their presentation, NTPC stated that first primary control should be implemented and then go for this type of secondary control if it is required.

b) ED, WRLDC stated that the issue is being discussed at FOR meetings and Planning Commission also and let the country decide it. In India, transition to renewable is through thermal only because of short of natural gas and hydel power. To improve the frequency due to DSM/over drawl, if it is 15 minutes scheduling then ancillary services can be brought in one hour only. But in case of 5 minutes scheduling it could be done in 20 minutes (i.e. 4 time blocks). So it is beneficial to DISCOMs to reduce the charges of overdrawl/DSM.

c) NLDC representative said that at FOR there is a sub-committee of technical and its report with advantages of 5-minutes is publicly available. At other countries, 5-minutes scheduling has been implemented and now they are moving to 5-minutes settlement. Though in WR, 5-minutes metering is insisted but they are not ready for 5-minutes scheduling which is a contradictory.

d) MS, WRPC informed that the first reference given in the background paper of FOR was that of Australian system where 5-mintues issue (i.e. 'change in rule') was proposed by a steel company. There were lot of oppositions from Generators and all the views/comments on the proposal were published on the website. After two years of discussions, the proposal was enforced recently.

e) ED, WRLDC informed that recently he attended a meeting of Go15 where top 15 countries of the world including Australia participated. This issue was discussed there and Australia also opined for 5-minutes scheduling in India. He said that Niti Aayog and FOR will decide the issue.

f) CE, NPC stated that a committee, in which he was also a member, was formed to submit a report to FOR. He raised his reservation and view on switching from 15 min to 5 min. He said that there are two facts: one is that there are only two countries - US and Australia where 5 min

scheduling is there; the other is that all the said 15 top countries have AGC since decades and whereas it is not here. The fact is that the renewable rich countries like Denmark, Germany, and Spain are not having 5- minutes system and still they are doing it. He professed that there should be two pre-conditions. Firstly, there should be full FGMO and fully functional AGC to reap the benefits of the 5-minutes system. Secondly, there must be a parameter specifying the limit of error for load and RE generation forecasting for getting the benefits of 5-minutes system. If there is a large error, then benefit could not be achieved. He informed that there is a paper by MIT, USA (which was enclosed with FOR report) wherein it is given that the 5-minutes system would not benefit DAM (Day Ahead Market). The proposed 5-minutes system will benefit only intra-day market where 2 or 3 hours before prediction would be certainty. But, prediction of wind, solar and load in days advance is difficult. When 15-minutes prediction itself for next day is a challenging task, going for 5-minutes prediction would be stupidity.

g) MSETCL representative stated that it requires some qualifying criteria to adopt 5-minutes scheduling. If perfection is there for 15-minutes operation now, then only 5-minutes would also be benefit. Only 7 out of 30 states have intra-state ABT and only in two states (Maharashtra and Andhra Pradesh), 15-minutes culture is there and other states that mechanism is also not there. There is no working culture to support moving to 5-minutes now. So first, in all states, intra-state ABT has to be implemented.

h) CE, SLDC, Gujarat stated that in parallel, other development such as AGC has to be implemented. Today there is no adequate primary control and it is being reviewed every month in OCC meeting. Many plants do not respond to primary control or responding in negative direction and unless that is stabilised it would be difficult. In Gujarat, also it is challenging task for primary control. So, primary control and improvement in load and wind forecasting have to be there for 5-minutes scheduling and they have to be developed in parallel.

i) Maharashtra representative stated that presently there are different criteria are applied for deviation i.e. 15% for RE generator and 12% for DISCOM which is limited to 250 MW. This disparity gives chance for Generator for more deviation. The RGMO provision is not being followed since 2010 and no penalty has been imposed on any generator for the same. SCADA reliability is not yet achieved and there is no penalty for non-visibility of SCADA. Because of SCADA invisibility, correct demand is not known which lead to incorrect forecast. As there is no 5-minutes weather forecast, 5-minutes demand prediction would be difficult. In Maharashtra 4500 MW is agriculture load which is 30% of demand and weather would have huge impact. Revision of schedules in 5-minutes system would be difficult and hence 5-minute scheduling should be reconsidered. The stated benefits of 5-minutes scheduling in the FOR

	report are required to be justified using a pilot project in any of the states having a small area and the benefits should be shown to all.
	WRPC Discussion: a) MS, WRPC informed that a sub-group was formed in WR to discuss the issue. A meeting of the group was held and views of various stakeholders were obtained and the same had been enclosed with agenda. In summary, GENCOs & DISCOMs were not in favour of 5-minutes scheduling at present. Some of the STUs are in favour of that. NTPC and other GENCOs stated that they would have lot of problems with boiler and primary and secondary controls (RGMO/FGMO and AGC) had not been fully implemented. Once they are fully implemented, if required, then new scheduling method shall be implemented. This is put up for forum's information. b) Chairman, WRPC said "Infrastructure-wise we must be ready. We should move towards that. Whether to do it or not and from what date that has to be decided".
	TCC/WRPC noted.
D-9	**Partial Loading Compensation for Kawas and Gandhar Gas Power Plant**
	<u>Background:</u> Hon'ble CERC vide notification No. L-1/18/2010-CERC dated 06.04.2016 issued 4th amendment in IEGC. The relevant clause of the amendment is as follows - **Quote** *"In case of gas based Central Generating Station or inter-State Generating Station, compensation shall be decided based on the characteristic curve provided by the manufacturer and after prudence check of the actual operating parameters of Station Heat Rate, Auxiliary Energy Consumption, etc."* **Unquote** A meeting between NTPC and WRPC was held on 15.12.2017 to discuss regarding preparation of compensation statement for the gas based stations of NTPC and the minutes of the meeting are enclosed at **Annexure D.9-1**. Further NTPC has provided data vide their letter no. WR-I/HQ/Comml/2017-18/ dated 02.01.2018 for calculation of compensation for gas based stations. As per the recommendation of the meeting and a way forward for preparation of compensation statement WRPC officials along with official from NTPC, MSEDCL, GUVNL and MPPMCL visited Kawas gas power plant

on 08th and 09th March 2018 and Gandhar gas power plant on 15th and 16th March 2018 to observe the values of degraded SHR and APC.

In this visit to Kawas and Gandhar gas power plant, the values were observed for half module and full module for varying load condition from 55% load to 85% load. The report of observed values witnessed at Kawas and Gandhar gas power plant are provided at **Annexure D.9-2**.

Further NTPC vide letter no WR-I/HQ/Comml/2017-18/2511 dated 29.03.2018 has requested to release of accounts for partial loading compensation for gas stations in WR.

Discussions during 77th CCM:

- MSEDCL representative informed that only 100% and 80% loading data is provided by OEM based on HBD and the other data is interpolated by NTPC. As per The DoP dated 05.05.2018 in Appendex-II 4.1(V) the following is given:

Quote

For Gas based generating stations, degraded SHR and AEC shall be decided based on the characteristic curve provided by manufacturer. If the characteristic curve is not provided for the entire range of the operating range i.e. up to 55% of module rating, then the extrapolation of the curve provided by the manufacturer shall be done to extend the curve up to 55% of module loading.

Unquote

- MSEDCL opined that in the absence of the OEM curve, NTPC may approach Hon'ble CERC for further instructions for the compensation mechanism for gas based power plant.
- MPPMCL and GUVNL representatives agreed to the view of MSEDCL and suggested NTPC to approach the Hon'ble CERC.
- NTPC representative stated that OEMs have provided HBD for 100% and 80% loading and it has provided the degraded curves for SHR and APC based on 'Actuals' as recorded in real time operation over the years. Further he requested that the Accounts for Partial Loading Compensation for Gas station of WR may be issued in line with the Hon'ble CERC order 05.05.2017.
- NTPC representative highlighted point no 5 of Hon'ble CERC order dated 05.05.2017.

  Quote

  The RPCs are directed to provide feedback, after consultation with the stakeholders, on the operation of the Compensation Mechanism within six months from the date of issue of this order for assessment of the efficacy of the Compensation Mechanism. It is clarified that review of the Compensation Mechanism will be undertaken only if it is considered necessary based on operational experience.

	Unquote • He further informed that as per the above the RPCs have a provision to give feedback to Hon'ble commission and hence he suggested that RPC secretariat may issue the provisional/Interim compensation statement for gas stations as per the data provided by NTPC or the observed values obtained during the visits at Kawas and Gandhar and later may submit the commission feedback. • 77th CCM recommendations – The committee recommended that NTPC and beneficiaries provide their views after consulting their management within a week regarding interim compensation statement based on the observed values during the visit to Kawas and Gandhar gas stations. **Subsequent developments:** The comments from MSEDCL vide letter dated 27.04.2018, GUVNL vide letter dated 23.04.2018 and NTPC vide letter dated 27.04.2018 have been received by WRPC and are enclosed at **Annexure D.9-3**. As per the above communications MSEDCL and GUVNL have not agreed for issuing interim compensation statement based on the observed values during the visit to Kawas and Gandhar gas stations. As per the decision taken in 77th CCM, WRPC Secretariat has to send feedback on the compensation mechanism in due course of time.
	TCC Discussions: MS, WRPC briefed the committee about the issue. GM, NTPC requested that as per regulation and the decision in the 77th CCM the feedback on the compensation mechanism to Hon'ble commission may be provided at the earliest. SE (Comml), WRPC informed that the feedback on compensation mechanism will be sent to Hon'ble commission at the earliest**.**
	TCC/WRPC noted.
D-10	**Declaration of Transmission elements into commercial operation by ISTS licensees**
	PGCIL vide email dated 11.04.18 has intimated the list of transmission elements into commercial operation for the period from 01.05.2017 to 22.03.2018. The list of the transmission elements is attached at **Annexure D.10.**
	TCC/WRPC noted.

D-11	**Status of Letter of credit (LC) opening against Deviation charges liability for 2018-19.**
	WRLDC vide letter No. WRLDC/MO/1551/2018 dated 24.05.18 has informed the details of LC to be opened by WR entities for the FY 2018-19. WRLDC vide email dated 07.05.2018 provided the revised details of LC to be opened by WR entities for the FY 2018-19 and the status is attached at **Annexure D.11.**
	TCC/WRPC noted .
D-12	**Status of Deviation charges**
	WRLDC vide letter No.: WRLDC/MO/1551/2018 dated 24.05.18 has informed the status of DSM charges Payable/Receivable by WR entities to WR Deviation pool account fund maintained by WRLDC as on 23rd May 18 (copy enclosed at **Annexure D.12**). WRLDC is also uploading weekly status of DSM in the following link. http://www.wrldc.org/Commercial/WR%20UI%20Pool%20Account%20Status.htm Major outstanding entities towards Deviation charges are listed below - 1. Essar Steel- Rs76.58Lakh up to 05th week(23-29.04.18) 2. Vandana Vidyut Ltd- Rs10.00Crs 3. Jindal power ltd. -Rs 81.55Lakh up to 05th week(23-29.04.18) 4. KSK Mahanadi-Rs. 37.87 Lakh up to 05th week(23-29.04.18) All DSM Pool members are requested to have the latest status from the above link and make timely payment to DSM Pool account
	TCC/WRPC noted .
D-13	**Status of Reactive Energy charges**
	WRLDC vide letter No.: WRLDC/MO/1551/2018 dated 24.05.18 has informed the Payable/Receivable by WR entities to Reactive pool account fund maintained by WRLDC as on 21.05.2018 (copy enclosed at **Annexure D.13**). Outstanding Entities towards Reactive Energy charges – DD
	TCC/WRPC noted .

D-14	**Status of Reconciliation of Deviation, RRAS and REC pool account for the period Oct'17 to Dec'17.**

WRLDC vide letter dated 19.04.2018, had sent the signed reconciliation statement for the period Jan'18 to Mar'18to all Deviation/REC pool members. All the details of payments/receipts of Deviation charges and REC during Jan'18 to Mar'18are also uploaded on WRLDC website (http://wrldc.org/Commercial/POOL_RECONCILIATION/2017-18/). The following members are yet to send back the signed reconciled statement to WRLDC for the period mentioned above. It may also pl. note that in case of non receipt of reconciled statement for FY 2017-18 for Q1 to Q4 is not received by WRLDC by 30th June'2018, the same shall be considered as deemed reconciled by the Regional entities.

DSM Pool Members

1	CSPDCL	14	GMR Warora Energy ltd
2	MP Power Management Co. Ltd.	15	KORBA WEST POWER Corp. LTD
3	MSLDC UI Settlement account	16	JAYPEE NIGRI TPP
4	Goa	17	Essar Steel Ltd
5	D&D	18	DGEN (Torrent Energy Limited)
6	HVDC Bha.	19	GMR Chhattisgarh Energy ltd
7	LancoAmarkantak Power Ltd	20	MB POWER
8	RGPPL	21	JHABUA POWER
9	BALCO	22	SKS POWER
10	CGPL UMPP MUNDRA	23	TRN Energy ltd
11	DCPP JSPL	24	HVDC CHAMPA
12	KSK Mahanadi	25	KAPS 3&4(INFIRM
13	Vandana Vidyut Ltd		

REC Pool members

1	CSPDCL
2	MP Power Management Co. Ltd.
3	MSEDCL
4	D&D

RRAS

1	RGPPL
2	CGPL
3	SASAN

All the above entities are requested to reconcile at their end and send the signed statement to WRLDC at the earliest. Non receipt of signed reconciliation statement by 30th June'2018 shall be considered as deemed reconciled by WRLDC.

TCC/WRPC noted .

D-15	**Interest on delayed payments w.r.t. the Regulatory pool accounts maintained by WRLDC**
	WRLDC vide letter dated 11th May 2018 has issued interest statements against all the Regulatory Pool accounts maintained by WRLDC as per the details given below. The detailed payment sheet is given at **Annexure D.15-1** to **Annexure D.15-4**. Detailed calculation sheet along with letters are also available in the following links.

Regulatory Pool Account	Letter Issued date	Interest for the period	Detailed calculation and statement available at the following links
DSM	11-05-18	1/7/17 to 31/3/18	http://www.wrldc.org/Commercial/DSM%20INTEREST/1718/
RRAS	11-05-18	11/4/16 to 31/3/18	http://www.wrldc.org/Commercial/RRAS%20INTEREST/1718/
REC	11-05-18	1/10/16 to 31/3/18	http://www.wrldc.org/Commercial/REC%20INTEREST/1718/
Congestion	11-05-18	1/7/16 to 31/3/18	http://www.wrldc.org/Commercial/CONGESTION%20INTEREST/1718/

	All are requested to make the payment.
	TCC/WRPC noted .
D-16	**Opening of Letter of Credit**
	General Manager(AM), PGCIL, Corporate Office Gurgaon vide letter dated 23.05.2018 informed that Essar Power (MP) Ltd, Western Railway (RGPPL), West Central Railway (RGPPL) and SKS Power untied have not opened their LC. DNH has not renewed their LC for the requisite amount. The beneficiaries may renew LC for the requisite amount in favour of POWERGRID.
	WRPC discussion: Director (Opn.), PGCIL stated that opening a letter of credit is a serious matter and according to CERC order in a recent petition, TSA might get terminated if LC not opened. She added that states also have to open LC even though of less amount and informed that the regulatory mechanism is different for LC.

	Director (Finance), GUVNL opined that as there was no possibility of states doing default for making payment of small amounts, insisting too much on the LC for state would unnecessarily increase the cost. Pointing out huge default of private parties from status shown, he informed that such parties may go into liquidation. He desired that WRLDC and WRPC should not allow those private parties who were drawing power without LC. Noting that many closed power stations drawing power for their entire complex under UI mechanism and without contract load/demand, he said that they could not afford supplying power from the state utilities to such complex.
	TCC/WRPC noted.
D-17	**Compliance Status observations made in Protection Audit (Petition No. 220/MP/2012):**
	1. First Phase Protection Audit Observation Compliances : CERC vide its order dated 21.02.2014 in respect to petition No. 220/MP/2012 filed by POWERGRID have directed that CTU and SLDCs shall submit quarterly Protection Audit Report to the respective RPC latest by 15thday of the first month of next quarter and RPCs shall submit the report to the Commission latest by 15th day of the second month of next quarter. The Member Secretary of Regional Power Committees shall monitor the protection related issues and bring to the notice of the Commission any instance of non-compliance of the Regulation 1.5 of the Grid Code in respect of the protection related issues considered in the instant petition. The observations/recommendations of third party Protection Audit carried out by Utilities in WR is being regularly monitored in the Protection sub-Committee (PCM) of WR and it has been observed that the progress of compliances of these observations/recommendation is very slow. The PCM have time and again requested all the utilities to comply all the observations/recommendation, since the time lines given for compliances by Hon'ble CERC is over. However the utilities are not complying the observations/recommendations of the third party protection audit. The updated status of the protection audit observations/recommendations as on December 2017, is as attached at **Annexure D.17.** **2. Second phase of Protection Audit of old S/Ss and Protection Audit of Newly commissioned S/Ss:** Protection Audit of all the S/Ss is required to be carried out once in five years and The protection audit of newly commissioned S/Ss be

	carried out within one year of its commissioning as per the Enquiry Committee on the Grid disturbance of 30th June 2012, recommendation. Utilities may give their action plan in this matter.
	TCC/WRPC discussions : Member Secretary WRPC informed the above agenda position to the Committee and requested that the partially complied (PC) and non-complied (NC) protection audit observations be compiled at the earliest.
	TCC/WRPC noted.
D-18	**Formulation & revision of SPS**
	A) SPS formulated for <u>JP-Nigirie and MB Power:</u>
	The SPS for JP-Nigirie and MB Power were formulated in a special meeting held at WRPC on 23.08.2017. The SPS formulated is enclosed at **Annexure D.18-1.** In the 131st PCM held on 27 & 28.02.2018, it was informed that MB power & J.P.Nigrie have implemented the SPS. As regards to exploration of the possibility of power swing blocking for Zone-1, when one line is already out and a temporary single phase fault on the other line in service, the sub-Committee discussed the issue and observed that in case of many generating stations such as NTPC & Adani Power they are keeping the power swing trip in Zone-1 in blocked mode for the DPS. The sub-Committee observed that J.P.Nigree and M.B.Power are connected through D/C line and are connected to the grid radially. Therefore to avoid tripping of the entire generating station the power swing trip in Z-1 may be blocked.
	TCC/WRPC discussions : Member Secretary WRPC informed that the SPS for JP-Nigrie and MB Power was formulated in the special meeting held on 23.08.2017 and was agreed in the 131st PCM held on 27 & 28.02.2018.
	TCC/WRPC noted.
	B). CGPL SPS revision
	The revision in SPS at CGPL was discussed and agreed in the 132nd PCM held on 18.04.2018 **B.1) Proposed SPS revision at CGPL:** CGPL generating station is an important UMPP in Western Region having the generating capacity of 830*5 MW and SPS is in place for safer evacuation of generation during contingencies. As the network configuration of the evacuating lines from CGPL generating station was

	changed due to LILO of 400 kV CGPL-Mansar and 400 kV CGPL-Chorania at 400 kV Bachau substation, there was a need for SPS revision in CGPL. The current SPS operating condition at CGPL is attached at **Annexure D.18-2.** As per the studies done by WRLDC, the details of modifications proposed by WRLDC is attached as **Annexure D.18-3**. **B.2) The revision of SPS was discussed and agreed in the 132nd PCM held on 18.04.2018 and is as given below** In the existing implemented SPS all the other conditions of the existing implemented SPS at CGPL are required to be removed, except the following conditions; (a) In case of D/C tripping of CGPL-Bachhau - Export is between 3300 to 3500MW then trip unit 40. - Two lines trip and export is more than 3500MW, then trip Unit 40 and runback in other selected unit. (b) The condition of extending trip command within 120msec to unit 40 as decided in the 3rd meeting of Expert Group held on 12.01.2018, when 5 units at CGPL are on bar and fault on any of the lines emanating from CGPL is not cleared within 100 msecs, would also continue to be in service. If one or more units at CGPL complex is already out then this scheme would be disabled. In the 132nd PCM the sub-Committee agreed for the revision of CGPL SPS with conditions (a) & (b) as above.
	TCC/WRPC discussions : Member Secretary WRPC informed that the existing SPS at CGPL was revised in the 132nd PCM held on 18.04.2018. CGPL representative stated that the Expert Group to study the power swing was constituted and the studies carried out by WRLDC were not discussed in the Expert Group meeting and PCM. He further stated that 1unit, 2unit and 3 unit tripping has been proposed in the WRLDC studies and they have reservations regarding B-1 above, but they agree with B-2. WRLDC representative stated that in the 132nd PCM minutes the conditions for revised SPS have clearly been mentioned and agreed in the PCM. Member Secretary WRPC clarified that the revised SPS was already discussed in the PCM and the item has been put up for noting only.
	TCC/WRPC noted.

D-19	**Review of Mumbai Islanding Scheme**
	3.a) Background: Tata Power Mumbai vide letter dated 23.10.2017 requested to review the existing Islanding Scheme. **3.b) Discussions in 131st PCM held on 27 & 28.02.2018:** The sub-Committee discussed the revision of the Mumbai Islanding Scheme and it was decided to hold a separate meeting on 13.03.2018 by involving TATA, BEST, Reliance-DISCOM, Reliance TRANSCO, MSETCL, WRLDC& WRPC. Accordingly a meeting was held on 13.03.18 at WRPC Mumbai and the decision taken in the meeting (MoM enclosed at **Annexure D.19**) is as follows; It was decided that if additional 300 MW load is shed then the island can be saved in case of Grid Disturbance. This additional 300 MW load to be shed, be shared proportionately among TPC and BEST on pro-rata basis peak demands (TPC would share 107 MW and BEST would share 193 MW). It was further requested that these load shedding be implemented as soon as possible. Representatives from TPC and BEST told that wherever Procurement is not required, it will be implemented within a month and wherever procurement will be required, it will take 3-4 months of time. **Follow up in the 132nd PCM held on 18.04.2018:** TPC representative informed that for existing substations where relays are available, it will be implemented by April 2018 end and where procurement is required, additional 6-8 months of time will be required. TPC & BEST representatives were requested to take up the issue of procurement of UFRs with their management and implement (wire up) the above additional load for shedding as early as possible.
	TCC/WRPC discussions : Member Secretary WRPC informed the above agenda position to the Committee and requested that TATA Power & BEST may give update on the progress regarding implementation of additional 300MW load shedding. TATA Power representative informed that as per the decision taken in the Special meeting held on 13.03.2018 the work is in progress and TATA Power & BEST is the implementing the same.
	TCC/WRPC noted

D-20	**Automatic Under Frequency Load Shedding (AUFLS) Scheme**

4.a) Background:

In the 7th NPC meeting held on 08.09.2017, MS, NPC sought the views of Members on the review of quantum of load shedding and stages of frequency. It was agreed that there is need for review of the quantum of load shedding without introduction of additional slabs/stages of frequency. 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.

The existing slabs and quantum of load shedding under UFR is enclosed at **Annexure D.20-1.**

4.b) 131st PCM (held on 27 & 28.02.2018) discussion:

WRPC informed that the flat frequency AUFLS is not aimed at smoothening out the frequency and it is a defence mechanism to arrest the fall of system frequency and try to bring back it to near the operating. There are other mechanisms already available in the system such as primary response, secondary response and tertiary response to address the variations in the system frequency around nominal frequency. Therefore any revision in the slabs and quantum of the flat frequency AUFLS may be decided by considering the fact that it is a defence mechanism. Further raising the slabs has to be judiciously decided based on the system inertia and the resources available (such as primary, secondary and tertiary responses) with the system operator.

MP Representative stated that the slab spectrum should be large and studies should be carried out for review of the slabs and quantum under Flat frequency AUFLS.

The sub-Committee decided that a separate meeting be held to discuss the issue of raising the AULFS slab and slab wise quantum of load shedding in detail.

4.c) Discussions in Special Meeting held on 13.03.2018:

In line with the decision taken in 131st PCM, a meeting was held on 13.03.18 at WRPC Mumbai (MoM enclosed at **Annexure D.20-2**) to discuss the issue of raising the AULFS slab and slab wise quantum of load shedding. During meeting, WRLDC informed the minimum frequency, maximum frequency and other frequency profile related details. From these details, it was clear that during last more than two years, frequency of grid did not touch below 49.5 Hz and therefore representatives from Gujarat, Maharashtra, MP and Goa were of the view to increase the first stage to 49.4 Hz from existing 49.2 Hz. The representative from WRLDC stated that it would be more convenient for a system operator to bring the system frequency to normative value from 49.4Hz instead of 49.2 Hz and therefore the stage should be raised to 49.4 Hz. WRPC stated that if first stage is fixed at 49.4 Hz, it would be more comfortable to system operator

	and also there would not be any frequent unnecessary operation of AULFS. After detailed discussion it was in general felt that the first frequency stage be raised to 49.4Hz from 49.2Hz. In the 132nd PCM it was decided that the outcome of the meeting held on 13.03.2018 regarding raising the AULFS slab and slab wise quantum of load shedding as mentioned above will be conveyed in forthcoming NPC meeting**.**
	TCC discussions: a) Member Secretary WRPC informed the above agenda position to the Committee. b) Chief Engineer (NPC), CEA informed that this issue of whether to revise the frequency band or the quantum of load shedding was discussed in the last NPC meeting and RPCs were requested to give their comments on the same. He further informed that they have recently vide their letter dated 30th May 2018 have given the load shedding quantum's for two frequency bands starting from 49.2 Hz & 49.4 Hz for all the four stages, based on the Zalte Committee Report of Western region. WRPC has agreed for revision of starting existing frequency band of 49.2Hz to 49.4Hz with the quantum of load shedding to be kept same as the existing Load shedding quantum. The proposed revised Load shedding quantum is indicated in the letter enclosed at Annexure-D-20.3, for different frequency bands. c) CE, NPC further stated that in the existing system the total load relief required is around 30,000 MW and share of WR is 8310 MW for all 4 stages. These calculations were done in the year 2015 and that time the grid was small compared to now. As the system has grown, more load has to be shed to up the frequency. Now in the year 2018, a total load relief of 48,000 MW is required with WR share of 13,000MW at 49.2 Hz and 13,480 MW at 49.4 Hz. He said that NPC wanted views of all RPCs and then it would be discussed in next NPC meeting. d) Chief Engineer (SLDC), GETCO stated that the issue is serious, since there are no reserves at either regional level or State level. Load shedding, ADMS etc are all manual phenomenon. He further stressed that the Grid has to be saved, some automatic load shedding tool should be available with RLDCs & SLDCs for the security of the grid. He informed that they had tough time in the month of May to control the grid. He even proposed that the first stage of load shedding be raised to 49.6Hz instead of 49.4 Hz from the existing 49.2 Hz. He stated that load shedding should be supplemented as suggested by CE, NPC. e) ED, WRLDC stated that they agreed for 49.4 Hz along with Gujarat. He also informed that last one year frequency had not touched 49.4 Hz. and the low frequency would be a rare case.

	f) Chief Engineer (NPC), CEA clarified that NPC wants views from all the RPCs on the quantum's mentioned in their letter dated 30th May 2018, so that it would be discussed in the next NPC meeting. As regards to load shedding quantum's at national level and regional level he clarified that NPC would carry out calculations at the national level and for WR States calculations are required to be done at regional level. **TCC noted.**
	WRPC discussions : MS, WRPC informed that in previous day's TCC it was stated by CE(NPC) that the status quo in respect of quantum cannot be maintained due to increased size of the grid and informed that the issue would be discussed in the forthcoming NPC meeting.
	WRPC noted.
D-21	**Outage of 400kV Bus at Bachau & Varsana S/Ss**
	Discussions in 131st PCM held on 27 & 28.02.2018: GETCO representative stated that they are not getting outage at Bacchau and Varsana bus due to the LILO of earlier 400 KV CGPL – Chorania and 400 KV CGPL –Manasar lines at 400kV Bacchau S/S, in a situation when there is full generation at CGPL. Now a days all the units at CGPL are on bar with full generation. As recommended by PCM a complete PPI at Varsana S/S and Bacchau S/Ss is undertaken by GETCO. Also due to pollution routine maintenance is required to be done at these S/S. However outage is not being granted for maintenance at 400kV Varsana S/S and Bacchau S/Ss by WRLDC citing outage will result in unsecure operation. In view of this GETCO is proposing to remove the LILO of 400 KV CGPL – Chorania and 400 KV CGPL –Manasar lines at 400kV Bacchau S/Ss. WRLDC representative stated that the CGPL-Bacchau loading limit communicated by PGCIL is 900MW. Also APL Mundra is very low now a days. Due to these line loading constraints, WRLDC is not in a position to give outage. To a query PGCIL representative replied that 400kV CGPL-Bachhau ckts the thermal loading limits is 1600MW and the normal loading limit is 1200MW. The sub-committee requested PGCIL to communicate the 1200MW load ability of 400kV CGPL-Bachhau ckts to WRLDC immediately. Also it was observed that before the LILO of 400 KV CGPL – Chorania and 400 KV CGPL –Manasar lines at 400kV Bacchau S/S, there were no constrains during such type of outages and also this system configuaration continued for more than 5years. Therefore the operation of the system configuration as suggested by GETCO(i.e. temporary removal of LILO of 400 KV CGPL – Chorania and 400 KV CGPL –Manasar lines at 400kV Bacchau S/S) may be accepted by WRLDC during the outages of 400kV Bacchau and Varsana.

	CGPL representative stated that they have proposed one unit outage in the month of April 2018. The sub-Committee also suggested that GETCO may co-ordinate their outage during the unit outage at CGPL.
	TCC/WRPC discussions : Member Secretary WRPC informed the above agenda position to the Committee. He also informed that the issue has been resolved. GETCO and WRLDC representative confirmed that the issue has been resolve.
	TCC/WRPC noted
D-22	**Operationalization of WRPC Fund Management Committee**
	Background: WRPC Secretariat framed a new methodology for managing the contingency fund of WRPC and put up under item No.24 "Funding arrangement of Establishment and Contingencies fund of WRPC Secretariat" before 32nd WRPC meeting for discussion and it was agreed. However, while trying to implement the methodology many practical difficulties were faced. Hence a simplified methodology was proposed for the approval of competent authority. But it was not approved and WRPC Secretariat was directed to put up in the WRPC meeting. Hence the existing practice is being continued.
	TCC Discussions: a) Member Secretary, WRPC informed that in 32nd WRPC meeting, it was decided to implement WRPC Fund Management Committee. b) He further informed that the WRPC Fund Management Committee is based on ERPC model and it is felt that implementation of this model might attract audit observation/RTI queries. Therefore, WRPC Secretariat slightly modified the model and put up before the then Chairman, WRPC for approval. However, WRPC Secretariat was directed to take up the issue in the next WRPC meeting. c) He said that WRPC Fund Management Committee decided and agreed by 32nd WRPC is difficult to implement. He informed that there is a provision to constitute a three member committee whose members are mostly from Mumbai, having cheque drawing power. In order to constitute a 3-member committee, WRPC Secretariat approached the member entities but many of them particularly located in Mumbai were not willing to take up the responsibility. In this background, he stated that keeping in view the practical difficulties in implementation of

creation of WRPC Fund Management Committee, WRPC secretariat is proposing to continue with existing mechanism of fund management till new suitable method is arrived at.

TCC noted the same as above.

WRPC Discussions/decision:

Member Secretary, WRPC briefed the issue and also informed the difficulties - getting single cheque and distributing to two different accounts, forming a three-member committee with cheque drawing power to approve the expenditure, unwillingness of companies to take up the responsibility, being faced by WRPC secretariat during implementation of decision of 32nd WRPC meeting. He said that keeping in view the practical difficulties in implementation of creation of WRPC Fund Management Committee, WRPC secretariat is proposing to continue with existing mechanism till mew suitable method is arrived at.

WRP Committee noted and agreed to maintain status–quo till suitable (practical) method related to WRPC fund management is developed.

D-23 **Meetings**

Meetings of WRPC from December 2017 to May, 2018 (since last WRPC meeting):

SN	Name of Meeting	Date	Place
	December,2017		
1	502nd OCC Meeting	12.12.2017	WRPC, Mumbai
2	Chairperson CEA meeting	15.12.2017	WRPC, Mumbai
3	Gas power plant partial load compensation meeting	15.12.2017	WRPC, Mumbai
4	TCC &WRPC meeting	19.12.2017 20.12.2017	Jabalpur,MP
	January,2018		
1	3rd Meeting of expert group meeting for CGPL meeting	12.01.2018	WRPC, Mumbai
2	CERC review meeting	15.01.2018	WRPC, Mumbai
3	503rd OCC Meeting	17.01.2018	WRPC, Mumbai
4	PSDF Proposal review meeting	19.01.2018	WRPC, Mumbai
	February,2018		
1	Training of Task I&II of package-B by M/s Powertech labs Inc.	8-10th Feb,2018	WRPC, Mumbai
2	Chairperson, CEA meeting on PSDF proposals meeting	09.02.2018	Jabalpur, MP
3	504th OCC Meeting	21.02.2018	WRPC, Mumbai
4	5 minute scheduling meeting	22.02.2018	WRPC, Mumbai

5	131st PCM Meeting	27-28th Feb 2018	WRPC, Mumbai
	March,2018		
1	Mumbai islanding meeting.	13.03.2018	WRPC, Mumbai
2	AUFLS review meeting.	13.03.2018	WRPC, Mumbai
3	505th OCC Meeting.	21.03.2018	WRPC, Mumbai
	April, 2018		
1	3rd REIF Meeting	17.04.2018	WRPC, Mumbai
2	Transmission Review Meeting	17.04.2018	WRPC, Mumbai
3	132nd PCM Meeting	18.04.2018	WRPC, Mumbai
4	506th OCC Meeting	19.04.2018	WRPC, Mumbai
5	77th CCM Meeting	20.04.2018	WRPC, Mumbai
	May 2018		
1	A meeting on pre-discussion on 43rd Standing Committee agenda	08.05.2018	WRPC, Mumbai
2	A meeting to discuss the Kotra Incidence on 23.04.2018	09.05.2018	WRPC, Mumbai
3	A meeting to discuss the issues of Champa-Kurukshetra HVDC	09.05.2018	WRPC, Mumbai
4	43rd Standing Committee on Power System Planning of WR	11.05.2018	PGCIL Vadodara
5	507th OCC meeting	15.05.2018	WRPC Mumbai
6	A meeting on settlement of wheeling charges between OPTCL and WR beneficiaries	18.05.2018	WRPC Mumbai

TCC/WRPC noted.

D-24 **Action Taken Report for MoM of 35th WRPC meeting (19-20 December, 2017)**

The action taken report in pursuance of MoM of 35th TCC/WRPC meeting held on 19th & 20th December 2017 is attached at **Annexure D.24.**

TCC/WRPC noted.

D-25 **Cyber Security Preparedness Monitoring**

CE(IT),CEA vide email dated 05.06.2018 intimated that in view of increasing incidents of cyber-attacks and threat to the integrated grid operation, all utilities need to monitor action being taken in regard to following points and report the status to respective Computer Emergency Response Teams (CERTs):

- Appointment of organization-wise Chief Information Security Officers and its status

- Identification of organization-wise Critical Infrastructure and its status
- Preparation of organization-wise Crisis Management Plan and its status
- Status of Cyber Security Mock Drill activity in coordination with CERT-In
- Status of Training / Workshops on Cyber Security organized / participated by Power Sector entities
- Status of action taken on CERT-In / NCIIPC advisories
- Quarterly action taken report may be submitted by each utility to Chief Information Security Officer (CISO) of Ministry of Power, i.e. Chief Engineer (IT), CEA with a copy to RPC Secretariat in the following format:

Quarterly Cyber Preparedness Monitoring Report

(Status as on:)

Sl. No.	State	Sector (Generation/ Transmission/ Distribution)	Utilities	Status of CISO Nomination	Status of Critical Infrastructure identified	Status of Crisis Management Plan prepared	Status of Cyber Security Mock Drill	Status of Trainings / Workshops organized / participated by Utility	Action taken on CERT-In / NCIIPC Advisories
1									
2									

TCC discussion:

CE(IT), CEA made a presentation on the Cyber Security issues. Presentation is attached at **Annexure-D.25.**

Chairman TCC queried over the immediate requirements for cyber security compliance. CE(IT), CEA replied that there are 5 following requirements:

a) Appoint organisation and plant level CISO.
b) Identify organisation-wise critical infrastructure and vulnerable points.
c) Formulate a crisis management plan (CMP).
d) Cyber security mock drill training.
e) Sharing information.

Chairman TCC suggested that there can be an agenda item in WRPC meeting for obtaining CISO (Chief Information Security Officer) nomination.

WRPC discussion:

	MS, WRPC stated the following: • As increasingly equipment in SCADA system and in the power sectors are being web-enabled and interconnected their cyber security has to be ensured from hacking. • Any computer server in the power sector connected to internet could be hacked as there are countless free hacking tools available in the internet for using by hackers. • All the states have to view the threat to cyber security aspect very seriously and take appropriate corrective actions; they should appoint CISO and contact CEA for any details. **Chairman, WRPC:** Stressing that Cyber Security is very important, Chairman, WRPC advised all the members to move faster to implement cyber security measures and highlighted that because of interconnection, if data of one constituent was compromised then it would affect others also. He cautioned that as the adversaries are stronger, members have to doubly prepare. Noting the vitality of data security and interconnected grid & states, he advised the members to act rightly and monitor the measures at the highest level. He suggested that experience of those states & CPSUs who had moved forward be used by others.
	TCC/WRPC noted.
D-26	**Any Other Item with the permission of the Chair**
	(i) Automatic Generation Control
	TCC discussion: MS, WRPC informed that in the last NPC meeting AGC issue was discussed and requested CE, NPC to highlight the requirements. CE, NPC stated that it is now well known how important is AGC even for moving from 15-minutes to 5-minutes scheduling also, AGC is required. POSOCO is carrying out pilot projects on AGC at Dadri, Simhadri and a solar project. In the last NPC meeting it was decided that because States also have to implement AGC and the best way for this is the RPC forum, where it can be monitored. There is also an issue of how to implement it, i.e. practical part of it. All the RPCs must discuss the aspects of AGC. NPC has taken agenda from POSOCO and circulated to all RPCs to discuss. The issue has already been discussed in NR and SR, RPC forums. In SR, they had one day session for focussed discussion on the issue and the same would be happening in NR. NPC had sent this agenda to WRPC for

	deliberations and obtaining recommendations, views and comments. Then views of all the 5 regions would be compiled for making a national perspective on AGC implementation. MS, WRPC informed that the AGC issue has been noted and a meeting/workshop would be arranged including lectures by best faculty on AGC and means of its implementation in WR. **TCC noted.**
	WRPC discussion: CE, NPC stated that AGC was discussed in 7th NPC meeting and RPCs were asked to deliberate on the topic and give the feedback for implementation feasibilities. GM, NLDC informed that there is a pilot project on AGC at Dadri of NTPC, and has been operated from NLDC. He added that Mauda, NTPC has been selected in WR, and Simhadri, NTPC has been selected in SR for AGC projects. MS, WRPC informed that a workshop/meeting would be arranged by WRPC Secretariat for understanding and exploring the possibilities of implementation.
	WRPC noted.
	(ii) Data exchange among utilities
	WRPC discussion: MS, WRPC suggested that there has to be efficient method for data/information exchange between utilities. CE, SLDC, Gujarat stated that tools such as Google drive is being used for data exchange that allows for easy export to Excel spreadsheet. CE, IT stated that SAP like systems could be employed to share the data between the utilities. He also informed that CEA's web portal has the facility for obtaining data from the utilities in an easy way. Chairman, WRPC directed that a group consisting of members from Gujarat, Maharashtra, Madhya Pradesh and NTPC could be formed to explore & formulate methods of data exchange and put up before the next WRPC meeting.
	WRPC noted.

D-27	**Date and venue of next WRPC meeting**
	Chairman WRPC suggested that 37th TCC/WRPC meeting will be held in the month of December 2018 to be hosted by NTPC. Representative from NTPC agreed to hold the 37th TCC/WRPC. The exact date and venue will be intimated separately.
	TCC/WRPC noted.
	The meeting ended with vote of thanks to the Chair.

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46	Shri S.K. Srivastava	Addl. G.M.	9869451127	sksrivastava@npcil.co.in
47	Shri R.G. Pathak	SOE	9427111955	rgpathak@npcil.co.in
XII	**NLDC, POSOCO**			
48	Shri S.R. Narasimhan	G.M.	9971117022	srnarasimhan@posoco.in
XIII	**POSOCO**			
49	Shri P.K. Agarwal	Dir.	9910064320	pkagarwal@posoco.in
50	Smt. S. Usha	D.G.M.	9869404458	susha@posoco.in
51	Smt. Pushpa S.	Asst. G.M.	9869404482	pushpa@posoco.in
52	Shri Vivek Pandey	C.M.	9869404673	vivek.pandey@posoco.in
XIV	**POWERGRID**			
53	Dr. V.K. Khare	E.D.	9480687467	vkkhare@powergridindia.com
54	Shri B. Anantha Sarma	G.M.	9422081971	basarma@powergridindia.com
55	Shri R.K. Tyagi	G.M.	9873549040	tyagir@powergridindia.com
56	Shri Surendra Prasad	G.M.	9425294180	surendraprasad@powergridindia.com
57	Ms. Manju Gupta	A.G.M.	9910378111	manju@powergridindia.com
58	Shri P.S. Das	D.G.M.	9433041837	psdas@powergridindia.com
XV	**NTPC**			
59	Shri Harbans Singh	RED-WR-II	9650991645	harbanssingh@ntpc.co.in
60	Shri Anil Nautiyal	G.M.	9004497012	anilnautiyal@ntpc.co.in
61	Shri K.K. Sinha	G.M.	9650993558	kksinha02@ntpc.co.in
62	Shri H. C. Harchandani	A. G. M.	9424209158	hiranand1962@gmail.com
63	Shri Sandeep Gupta	A.G.M.	9650994688	sandeepgupta@ntpc.co.in
64	Shri Sachin Jain	D.G.M.	9650990348	sachinjain@ntpc.co.in
XVI	**RGPPL**			
65	Shri S.K. Sharma	G.M.	9650990535	sksharma@ntpc.co.in
XVII	**NHDC**			
66	Shri Subhash Pagare	C.E. (E)	9993631927	subhashpagare@rediffmail.com
XVIII	**TATA POWER**			
67	Shri Brajesh Singh	Chief (O & M)	9099995744	brajesh.singh@tatapower.com
68	Shri T.K. Bhaskaran	Head PSCC	9223550622	tkbhaskaran@tatapower.com
XIX	**TORRENT POWER Ltd.**			
69	Shri Jaydip Chudasama	A.G.M.	9227410136	jaydipchudasama@torrentpower.com
XX	**NCA**			
70	Shri Rajesh Sharma	A.E.E.	8818885970	ncarajesh@yahoo.co.in
XXI	**ADANI POWER Ltd.**			
71	Shri M.R. Krishna Rao	Sr. V.P.	9099005556	mr.krishnarao@adani.com
XXII	**DB POWER Ltd.**			

72	Shri Sanjay Jadhav	Sr. D.G.M.	9769190360	sanjay.jadhav@dbpower.in
73	Shri Naveen Uttarwar	D.G.M.	9109951030	naveen.uttarwar@dbpower.in
XXIII	**JINDAL POWER Ltd.**			
74	Shri Arup Pal	Head-O & M	9821452228	arup.pal@jindalsteel.com
75	Shri Ajit Kumar Rai	G.M.	7898905013	ajitrai@jindalpower.com
XXIV	**JSW Energy Ltd.**			
76	Shri Satish Jindal	CEO	9810227433	satish.jindal@jsw.in
XXV	**RELIANCEADA**			
77	Shri Jaysinh Jadeja	A.V.P.	9827856545	jaysinh.jadeja@relianceada.com
XXVI	**JAYPEE NIGRIE**			
78	Shri Navin Tinguria	Sr. G.M.	9349788717	navin.tinguria@jalindia.co.in

ANNEXURE B-1

भारतसरकार/Government of India
विद्युतमंत्रालय/Ministry of Power
केन्द्रीयविध्युतप्राधिकरण/Central Electricity Authority/
तापीयनिष्पादनमूल्यांकनएवंजलवायुपरिवर्तनप्रभाग
Thermal Performance Evaluation & Climate Change Division

Subject: Minutes of meeting held on 23.1.2018 regarding Incentive to Thermal Power Plants for early installation of pollution control Equipment.

Minutes of the meeting held on 23.1.2018 under the Chairmanship of Member (Thermal), CEA to discuss Incentive to Thermal Power Plants for early installation of pollution control Equipment are attached herewith for your information and necessary action please.

PD & HRM
13/2/18

Narender Singh
2/2/2018
(Narender Singh)
Chief Engineer

Member Secretary (ERPC/ WRPC/ SRPC/ NRPC)

No. CEA/Th/TPE&CC/ENV/50/2018/ 122 Date: 1.2.2018

Copy to:

Member (Thermal): For kind information please.

Chief Engineer (F&CA/ NPC/TPRM), CEA

सेवाभवन,आर.के. पुरम,नईदिल्ली-110066, टेलिफेक्स: 011-26105075 इमेल: directorcore@yahoo.comवैबसाईट: www.cea.nic.in
SewaBhawan, R.K.Puram, New Delhi-110066, Telefax: 011-26105075 E-mail: directorcore@yahoo.com Website: www.cea.nic.in

Minutes of the meeting held on 23.1.2018 under the Chairmanship of Member (Thermal), CEA to discuss Incentive to Thermal Power Plants (TPPs) for early installation of pollution control Equipment.

The list of participants is enclosed at Annexure.

Sh. P. D. Siwal, Member (Thermal), Central Electricity Authority welcomed all the participants. He informed that pollution control equipment needs to be installed in the existing TPPs as well as in the thermal plants, which are under construction. Various power generators have been raising their concern that the TPPs which install the pollution control equipment at earlier dates will be in a disadvantageous position as their ranking in Merit Order Despatch (MOD) will deteriorate due to increase in Variable Charges. They have been time and again requesting to incentivize the TPPs who install pollution control equipment early. As per the phasing plan submitted by CEA, ESP upgradation/ FGD installation has been planned from the year 2018 to 2022. It is felt that incentivizing early installation of pollution control equipment will motivate the power generators to complete the requisite installation in time or ahead of schedule. In order to avoid disadvantage to power plants in MOD due to installation there is a need to balance their interest/ incentivize them. This will also result in reduction in environmental pollution. This will be a temporary phenomenon till December 2022 by the time when all the TPPs would have installed pollution control equipment as per the phasing plan/ directives of CPCB.

Discussions regarding system to incentivize TPPs for early installation of pollution control equipment were held with representatives of Regional Power Committees, TPE&CC, TPRM, TPPD, F&CA Division of CEA, etc. The following points emerged after the discussion:

1. Priority in Scheduling of environmentally compliant TPPs. The following three options were discussed:

    a. For the purpose of MOD, two categories in TPPs may be created, one which are environmental norms compliant and the other TPPs which are non compliant to environmental norms. Priority in scheduling may be given to the TPPs which are environmentally compliant irrespective of their variable cost.

    b. The increased variable cost due to installation of FGD and other pollution control equipment may be subtracted from the tariff for MOD in respect of the plants installing pollution control equipment. The existing framework of scheduling priority, which is based on merit order, should continue. This is in order to ensure incentive to plants compliance with new environmental norms.

    c. EPO (Environment Power Obligation) may be introduced in line with RPO (Renewable Power Obligation) and it should be made mandatory for DISCOM to purchase at least say 10% power from plants which are norms compliant.

The finalized dispensation from above may be continued till December, 2022 only.

2. Excise & Custom duty/ GST may be exempted for pollution control equipment like FGD etc.

3. Present limit of 30% equity to be met by plants to be relaxed to 10%, this will enable plants to raise the fund comfortably and encourage for early installation of pollution control equipment.

4. NCEF collected through coal cess may be utilized for funding the utilities for installation of pollution control equipment.

5. The amount of coal cess may be reduced for TPPs complying with new environmental norms.

Member (Thermal) desired that RPCs should call meeting with DISCOM/ Generators in respect of their region to discuss the system to incentivize TPPs and submit the report by Feb'2018 end.

The meeting ended with vote of thanks.

List of Participants:

CEA:

1. Sh. Pradeep Jindal, Chief Engineer (NPC)
2. Sh. Narender Singh, Chief Engineer(TPE&CC)
3. Sh. Ajay Talegaonkar, Chief Enigneer(F&CA)
4. Sh. B.R. Alwani, Director (TPE&CC)
5. Sh. Rajeev Kumar, Director (TPRM)
6. Sh. Sanjay Jain, Director (TPE&CC)
7. Sh. B.S. Rajput, AGM (TPE&CC)
8. Sh. K.P. Madhu, Deputy Director
9. Sh. Rajesh Kumar, Deputy Director (TPE&CC)
10. Ms. Pooja Jain, Assistant Director-I (TPE&CC)
11. Ms. Rita Nagdeve, Assistant Director-II (TPE&CC)

Regional Power Committees:

1. Sh. M.A.K.P. Singh, Member Secretary (NRPC)
2. Sh. J. Bandyopadhyay, Member Secretary (ERPC)
3. Sh. Upendra Kumar, SE (NRPC)
4. Sh. H.K. Pandey, SE (NRPC)
5. Sh. Asit Singh, SE (SRPC)
6. Sh. J.K. Rathod, SE (WRPC)
7. Sh. L.K.S. Rathore, Deputy Director (WRPC)

Annexure- C.1

STATUS OF KAKRAPAR UNITS AS ON 31.05.18

K.P.SINGH
ASSOCIATE DIRECTOR, NPCIL

KAPS UNIT-1

- Unit-1 reactor was shut down on 11.03.2016 due to suspected leakage from coolant channel.
- The coolant channels replacement work is in progress.
- KAPS-1 synchronization planned in June-2019

KAPS-2

- Unit-2 reactor was shut down on 01.07.2015 due to suspected leakage from coolant channel.
- The coolant channels replacement work is completed and other related works are in progress.
- KAPS-2 synchronization planned in October 2018.

KAPS-3

A] Construction completed:

- Reactor Building
- Turbine Building
- Service Building & Main Control Room
- Natural Draft Cooling towers (NDCT) and
- Induced Draft Cooling Towers (IDCTs)
- Spent Fuel Storage Bays &
- Supplementary Control Room

KAPS-3

B] Erection completed for:
- Calendria and Calendria tubes.
- Coolant Channels (392 Nos.).
- Steam Generators(4 Nos.).

C] Status of Electrical Systems:
- SUT-3 Charged.
- 400 KV switchyard commissioned.
- 6.6 kV and 415V switchgears Charged.
- 125 MVAR bus reactor commissioned.
- Erection of GT, UT and bus ducts- Started.
- Erection of TG - Inprogress.
- Cable trays and cabling 80% completed.

KAPS-3

D] Other Activities:
- Erection of Simulator completed.
- Fueling Machines available.
- PHT system piping (80% completed).
- Erection of reactivity control mechanism (80% completed).

Scheduled date of synchronization 30.06.2019.

KAPS-4

A] Construction Work progress:
- Reactor Building (90%)
- Turbine Building(90%)
- Service Building(100%)
- Natural Draft Cooling towers (NDCT) -100%
- Induced Draft Cooling Towers (IDCTs)-50%
- SFSB-80%

B] Erection completed:
- Calendria and Calendria tubes
- Coolant Channels(392 Nos.)
- Steam Generators(4 Nos.)

KAPS-4

C] Status of Electrical Systems:
- SUT-4 erected.
- Main control room panels erected.
- Switchgear panels erection completed.
- Erection of GT-4, UT and bus ducts- To start.
- Erection of TG – To Start
- Cable trays installation completed.
- Cable laying- In progress.

KAPS-4

D] Other works:

- PHT system piping (80% completed)
- Other systems piping (50% completed)
- Erection and commissioning of reactivity control mechanism- work to start.
- Instrumentation & control systems (20% completed).

Scheduled date of synchronization 30.06.2020

Bird view of KB#3 and KB#4

IDCT # 4A Structure Construction Completed

THANK YOU All

ANNEXURE C.2

Ref. No.- CE(ENGG)/II/KAPS-SVR/ 199 DATE: 08 /02 /2018

SITE VISIT REPORT

Name of Site: 400kV & 220kV switchyard of Kakrapar Atomic Power Station, Kakrapar-Gujarat.

Date of Visit: 04/01/2018

Name of Visitor: 1) Mr. M. A. Prajapati (DE-Engineering), Corp. Office-GETCO, Vadodara
2) Mr. Sumit Khare (Dy. Manager), PGCIL-Vadodara.

Site In-charge present: 1) Mr. Samir Pathan (SOE), 400kV Switchyard, NPCIL-Kakrapar
2) Mr. B. M. Sharma (SOE), 400kV Switchyard, NPCIL-Kakrapar
3) Mr. R. G. Pathak (SOE), 220kV Switchyard, NPCIL-Kakrapar

Sub: Site visit report of 400kV & 220kV switchyard of Kakrapar Nuclear Power Station, Kakrapar-Gujarat.

Ref. Doc.: Email from CE(SLDC), Dt-02.01.2018

With reference to the above subject the site was jointly visited by M/s. GETCO-Vadodara & M/s. PGCIL-Vadodara to check site feasibility to accommodate new 01 No. of 400/220kV, 500MVA ICT to interconnect existing 220kV & 400kV switchyard on Dt-03.01.2018.

Following points were observed / discussed during the visit.

A. **220kV Switchyard:** (KAPP 1&2)

1. Existing Bus Bar Scheme: 1Main & Main cum Transfer Bus
2. Space available to accommodate 01 No. of 220kV bay (ICT-LV) in existing switchyard.
3. ICT-LV shall be terminated using 220kV power cable only.
4. It is not possible to accommodate proposed Control and relay panel in existing control room looking to space constraints. Hence, it is proposed to install panels in new yard kiosk and bay control shall be done by SCADA system. Therefore, SAS panel and HMI PC shall be installed in existing Control room.

B. **400kV Switchyard:** (KAPP 3&4)

1. Existing Bus Bar Scheme: One and Half Breaker Scheme
2. Only 1No. of spare bay is available to install new 400/220kV, 500MVA ICT, which is presently occupied by M/s. NPCIL for future 400kV S/C line bay.
3. Sufficient space is available in existing control room to accommodate proposed control and relay panel of ICT.
4. It is required to construct approach road for new ICT.

The above site was inspected primarily to accommodate new 1No. 400/220kV, 500MVA at 400kV & 220kV switchyards of KAPS. 400kV side ICT bay shall be accommodated only if M/s. NPCIL sacrifices occupied future 400kV S/C line bay.

However, upon confirmation from M/s. NPCIL, complete scope of work will be finalized after detail engineering of existing switchyard and protection system.

This is put up for information and further needful action in the matter please.

Sign of Visitor:

1) Mr. M. A. Prajapati (DE-Engineering), Corp. Office-GETCO, Vadodara. 8/2/18

2) Mr. Sumit Khare (Dy. Manager), PGCIL-Vadodara.

Through,

CE(Project)- GETCO, Vadodara

To,
CE(SLDC)-GETCO, Vadodara

Copy to:
GM (Project) – PGCIL, Vadodara.

ANNEXURE-C-3

WR

S. NO.	Developer	Name of Project	Sector	State	Region	Unit No	Total Capacity	DT-of COMMISSIONING (MM/DD/YYYY)	FGD Phasing Plan for Implementation (DD/MM/YYYY) (A)	Completion of Feasibility Study (B)	NIT issued (C)	Bid Opening (D)	Award (E)	Actual Commissiong EPC (F) ($B) Actual commissioning shall be target date	Remarks
1	NTPC	MOUDA TPS	Central Sector	Maharashtra	WR	4	660	3/18/2017	31/12/2020						
2	NTPC	SOLAPUR	Central Sector	Maharashtra	WR	1	660	4/7/2017	31/12/2020						
3	NTPC	SIPAT STPS	Central Sector	Chhatisgarh	WR	4	500	6/20/2008	31/12/2021						
4	NTPC	SIPAT STPS	Central Sector	Chhatisgarh	WR	5	500	1/1/2009	31/12/2021						
5	NTPC	SIPAT STPS	Central Sector	Chhatisgarh	WR	3	660	1/8/2012	31/12/2021						
6	NTPC	VINDHYACHAL STPS	Central Sector	Madhya Prades	WR	7	500	3/3/1999	30/06/2021						
7	NTPC	VINDHYACHAL STPS	Central Sector	Madhya Prades	WR	8	500	2/26/2000	30/06/2021						
8	NTPC	VINDHYACHAL STPS	Central Sector	Madhya Pradesh	WR	9	500	7/27/2006	30/09/2021						
9	NTPC	VINDHYACHAL STPS	Central Sector	Madhya Pradesh	WR	10	500	3/8/2007	30/09/2021						
10	NTPC	VINDHYACHAL STPS	Central Sector	Madhya Prades	WR	11	500	6/14/2012	31/12/2021						
11	NTPC	VINDHYACHAL STPS	Central Sector	Madhya Prades	WR	12	500	3/22/2013	31/12/2021						
12	NTPC	KORBA STPS	Central Sector	Chhatisgarh	WR	1	200	2/28/1983	31/12/2022						
13	NTPC	KORBA STPS	Central Sector	Chhatisgarh	WR	2	200	10/31/1983	31/12/2022						
14	NTPC	KORBA STPS	Central Sector	Chhatisgarh	WR	3	200	3/17/1984	31/12/2022						
15	NTPC	KORBA STPS	Central Sector	Chhatisgarh	WR	4	500	5/31/1987	31/12/2022						
16	NTPC	KORBA STPS	Central Sector	Chhatisgarh	WR	5	500	3/25/1988	31/12/2022						
17	NTPC	KORBA STPS	Central Sector	Chhatisgarh	WR	6	500	2/26/1989	31/12/2022						
18	NTPC	KORBA STPS	Central Sector	Chhatisgarh	WR	7	500	11/25/2010	31/12/2022						
19	NTPC	SIPAT STPS	Central Sector	Chhatisgarh	WR	1	660	10/1/2011	31/12/2022						
20	NTPC	SIPAT STPS	Central Sector	Chhatisgarh	WR	2	660	5/25/2012	31/12/2022						
21	NTPC	VINDHYACHAL STPS	Central Sector	Madhya Pradesh	WR	1	210	10/10/1987	31/12/2022						
22	NTPC	VINDHYACHAL STPS	Central Sector	Madhya Pradesh	WR	2	210	7/23/1988	31/12/2022						
23	NTPC	VINDHYACHAL STPS	Central Sector	Madhya Pradesh	WR	3	210	2/3/1989	31/12/2022						
24	NTPC	VINDHYACHAL STPS	Central Sector	Madhya Pradesh	WR	4	210	12/26/1989	31/12/2022						
25	NTPC	VINDHYACHAL STPS	Central Sector	Madhya Pradesh	WR	5	210	3/31/1990	31/12/2022						
26	NTPC	VINDHYACHAL STPS	Central Sector	Madhya Pradesh	WR	6	210	2/1/1991	31/12/2022						
27	NTPC	MOUDA TPS	Central Sector	Maharashtra	WR	1	500	4/19/2012	31/12/2022						
28	NTPC	MOUDA TPS	Central Sector	Maharashtra	WR	2	500	3/29/2013	31/12/2022						
29	NTPC	MOUDA TPS	Central Sector	Maharashtra	WR	3	660	3/28/2016	31/12/2022						
30	NTPC & Sail	BHILAI TPS	Central Sector	Chhatisgarh	WR	1	250	4/20/2008	31/12/2022						
31	NTPC & Sail	BHILAI TPS	Central Sector	Chhatisgarh	WR	2	250	7/12/2009	31/12/2022						
32	CSEB	MARWA TPS	State Sector	Chhatisgarh	WR	1	500	3/30/2014	30/06/2021						
33	CSEB	MARWA TPS	State Sector	Chhatisgarh	WR	2	500	7/15/2016	31/03/2021						

34	CSPGCL	DSPM TPS	State Sector	Chhatisgarh	WR	1	250	3/30/2007	30/06/2021						
35	CSPGCL	DSPM TPS	State Sector	Chhatisgarh	WR	2	250	12/11/2007	30/09/2021						
36	CSPGCL	KORBA-WEST Ext. TPS	State Sector	Chhatisgarh	WR	5	500	3/22/2013	30/09/2021						
37	GSECL	GANDHI NAGAR TPS	State Sector	Gujarat	WR	3	210	3/20/1990	31/12/2021	18-Sep	19-Mar	19-Aug	19-Dec		
38	GSECL	GANDHI NAGAR TPS	State Sector	Gujarat	WR	4	210	7/20/1991	31/12/2021	18-Sep	19-Mar	19-Aug	19-Dec		
39	GSECL	GANDHI NAGAR TPS	State Sector	Gujarat	WR	5	210	3/17/1998	31/12/2021	18-Sep	19-Mar	19-Aug	19-Dec		
40	GSECL	KUTCH LIG. TPS	State Sector	Gujarat	WR	1	70	3/29/1990	31/12/2021	18-Sep	19-Mar	19-Aug	19-Dec		
41	GSECL	KUTCH LIG. TPS	State Sector	Gujarat	WR	2	70	3/25/1991	31/12/2021	18-Sep	19-Mar	19-Aug	19-Dec		
42	GSECL	KUTCH LIG. TPS	State Sector	Gujarat	WR	3	75	3/31/1997	31/12/2021	18-Sep	19-Mar	19-Aug	19-Dec		Revised FGD phasong plan for implementation 31/12/2022
43	GSECL	UKAI TPS	State Sector	Gujarat	WR	3	200	1/21/1979	31/12/2021						Installation of FGD is not considered as it is to be phase out for installation of 800MW unit in place of Unit No. 1,2 & 3
44	GSECL	UKAI TPS	State Sector	Gujarat	WR	4	200	3/28/1979	31/12/2021	18-Sep	19-Mar	19-Aug	19-Dec		
45	GSECL	UKAI TPS	State Sector	Gujarat	WR	5	210	1/30/1985	31/12/2021	18-Sep	19-Mar	19-Aug	19-Dec		Revised FGD phasong plan for implementation 31/12/2022
46	GSECL	WANAKBORI TPS	State Sector	Gujarat	WR	1	210	3/23/1982	31/12/2021						
47	GSECL	WANAKBORI TPS	State Sector	Gujarat	WR	2	210	1/15/1983	31/12/2021						It is under consideration for installation of 800MW unit either at Sikka,Gandhinagar or Wanakbori for which feasability sudy report has been intiated. After getting feasibility & DPD unit shall be retired & decommissioned /installation of FGD shall be decided.
48	GSECL	WANAKBORI TPS	State Sector	Gujarat	WR	3	210	3/15/1984	31/12/2021	18-Sep	19-Mar	19-Aug	19-Dec		
49	GSECL	WANAKBORI TPS	State Sector	Gujarat	WR	4	210	3/9/1986	31/12/2021	18-Sep	19-Mar	19-Aug	19-Dec		
50	GSECL	WANAKBORI TPS	State Sector	Gujarat	WR	5	210	9/23/1986	31/12/2021	18-Sep	19-Mar	19-Aug	19-Dec		
51	GSECL	WANAKBORI TPS	State Sector	Gujarat	WR	6	210	11/18/1987	31/12/2021	18-Sep	19-Mar	19-Aug	19-Dec		
52	GSECL	WANAKBORI TPS	State Sector	Gujarat	WR	7	210	12/31/1998	31/12/2021		20.09.2017	22.05.2018	18-Dec		Revised FGD phasong plan for implementation 31/12/2022
53	GSECL	SIKKA REP. TPS	State Sector	Gujarat	WR	3	250	3/29/2015	31/01/2022		20.09.2017	22.05.2018	18-Dec		
54	GSECL	SIKKA REP. TPS	State Sector	Gujarat	WR	4	250	9/25/2015	31/01/2022		20.09.2017	22.05.2018	18-Dec		
55	GSECL	UKAI TPS	State Sector	Gujarat	WR	6	500	3/5/2013	31/03/2022		20.09.2017	22.05.2018	18-Dec		Revised FGD phasong plan for implementation 31/12/2022
56	MPPGCL	AMARKANTAK EXT TPS	State Sector	Madhya Pradesh	WR	5	210	6/15/2008	31/03/2021						
57	MPPGCL	SANJAY GANDHI TPS	State Sector	Madhya Pradesh	WR	1	210	3/26/1993	31/03/2021						
58	MPPGCL	SANJAY GANDHI TPS	State Sector	Madhya Pradesh	WR	2	210	3/27/1993	31/03/2021						
59	MPPGCL	SANJAY GANDHI TPS	State Sector	Madhya Pradesh	WR	3	210	2/28/1999	30/06/2021						

60	MPPGCL	SANJAY GANDHI TPS	State Sector	Madhya Pradesh	WR	4	210	11/23/1999	30/06/2021						
61	MPPGCL	SANJAY GANDHI TPS	State Sector	Madhya Pradesh	WR	5	500	6/18/2007	31/03/2021						
62	MPPGCL	SATPURA TPS	State Sector	Madhya Pradesh	WR	10	250	3/22/2013	31/03/2021						
63	MPPGCL	SATPURA TPS	State Sector	Madhya Pradesh	WR	11	250	12/25/2013	31/03/2021						
64	MPPGCL	SHRI SINGHAJI TPP	State Sector	Madhya Prades	WR	1	600	11/18/2013	31/03/2021						
65	MPPGCL	SHRI SINGHAJI TPP	State Sector	Madhya Prades	WR	2	600	10/15/2014	31/03/2021						
66	MAHAGENCO	CHANDRAPUR STPS	State Sector	Maharashtra	WR	9	500	3/21/2016	31/03/2020						
67	MAHAGENCO	KORADI TPS	State Sector	Maharashtra	WR	10	660	12/28/2016	31/12/2020						
68	MAHAGENCO	BHUSAWAL TPS	State Sector	Maharashtra	WR	3	210	9/18/1982	31/03/2021						
69	MAHAGENCO	BHUSAWAL TPS	State Sector	Maharashtra	WR	4	500	3/7/2012	31/03/2021						
70	MAHAGENCO	BHUSAWAL TPS	State Sector	Maharashtra	WR	5	500	3/30/2012	31/03/2021						
71	MAHAGENCO	CHANDRAPUR STPS	State Sector	Maharashtra	WR	3	210	5/3/1985	31/03/2021						
72	MAHAGENCO	CHANDRAPUR STPS	State Sector	Maharashtra	WR	4	210	3/8/1986	31/03/2021						
73	MAHAGENCO	CHANDRAPUR STPS	State Sector	Maharashtra	WR	5	500	3/22/1991	31/03/2021						
74	MAHAGENCO	CHANDRAPUR STPS	State Sector	Maharashtra	WR	6	500	3/11/1992	31/03/2021						
75	MAHAGENCO	CHANDRAPUR STPS	State Sector	Maharashtra	WR	7	500	10/1/1997	31/03/2021						
76	MAHAGENCO	CHANDRAPUR STPS	State Sector	Maharashtra	WR	8	500	3/29/2015	31/03/2021						
77	MAHAGENCO	KHAPARKHEDA TPS	State Sector	Maharashtra	WR	1	210	3/26/1989	31/03/2021						
78	MAHAGENCO	KHAPARKHEDA TPS	State Sector	Maharashtra	WR	2	210	1/8/1990	31/03/2021						
79	MAHAGENCO	KHAPARKHEDA TPS	State Sector	Maharashtra	WR	3	210	5/31/2000	31/03/2021						
80	MAHAGENCO	KHAPARKHEDA TPS	State Sector	Maharashtra	WR	4	210	1/7/2001	31/03/2021						
81	MAHAGENCO	KHAPARKHEDA TPS	State Sector	Maharashtra	WR	5	500	8/5/2011	31/03/2021						
82	MAHAGENCO	KORADI TPS	State Sector	Maharashtra	WR	6	210	3/30/1982	31/03/2021						
83	MAHAGENCO	KORADI TPS	State Sector	Maharashtra	WR	7	210	1/13/1983	31/03/2021						
84	MAHAGENCO	KORADI TPS	State Sector	Maharashtra	WR	8	660	3/30/2015	31/03/2021						
85	MAHAGENCO	KORADI TPS	State Sector	Maharashtra	WR	9	660	3/15/2016	31/03/2021						
86	MAHAGENCO	NASIK TPS	State Sector	Maharashtra	WR	3	210	4/26/1979	31/03/2021						
87	MAHAGENCO	NASIK TPS	State Sector	Maharashtra	WR	4	210	7/10/1980	31/03/2021						
88	MAHAGENCO	NASIK TPS	State Sector	Maharashtra	WR	5	210	1/30/1981	31/03/2021						
89	MAHAGENCO	PARLI TPS	State Sector	Maharashtra	WR	4	210	3/26/1985	31/03/2021						
90	MAHAGENCO	PARLI TPS	State Sector	Maharashtra	WR	5	210	12/31/1987	31/03/2021						
91	MAHAGENCO	PARLI TPS	State Sector	Maharashtra	WR	6	250	2/16/2007	31/03/2021						
92	MAHAGENCO	PARLI TPS	State Sector	Maharashtra	WR	7	250	2/10/2010	31/03/2021						
93	MAHAGENCO	PARLI TPS	State Sector	Maharashtra	WR	8	250	3/30/2016	31/03/2021						
94	DB Power	BARADARHA TPS	Private Sector	Chhatisgarh	WR	2	600	3/24/2015	30/09/2020						
95	GMR	RAIKHEDA TPP	Private Sector	Chhatisgarh	WR	1	685	2/24/2015	30/06/2020						
96	GMR	RAIKHEDA TPP	Private Sector	Chhatisgarh	WR	2	685	3/28/2016	30/09/2020						
97	Maruti Power Limited	BANDAKHAR TPP	Private Sector	Chhatisgarh	WR	1	300	7/31/2015	31/03/2020						
98	SKS Power C	Binjkote TPP	Private Sector	Chhatisgarh	WR	1	300	4/25/2017	30/09/2020						
99	TRN Energy Private Ltd.	NAWAPARA TPP	Private Sector	Chhatisgarh	WR	2	300	4/18/2017	30/09/2020						

100	Bharat Aluminium Co. Ltd.	BALCO TPS	Private Sector	Chhatisgarh	WR	1	300	6/4/2015	30/09/2021							
101	Bharat Aluminium Co. Ltd.	BALCO TPS	Private Sector	Chhatisgarh	WR	2	300	3/24/2016	30/06/2021							
102	DB Power	BARADARHA TPS	Private Sector	Chhatisgarh	WR	1	600	2/23/2014	30/06/2021							
103	M/s Lanko Amarkantak Ltd,	PATHADI TPP	Private Sector	Chhatisgarh	WR	1	300	6/4/2009	31/03/2021							
104	M/s Lanko Amarkantak Ltd,	PATHADI TPP	Private Sector	Chhatisgarh	WR	2	300	3/25/2010	31/03/2021							
105	M/s O.P.Jindal	TAMNAR TPP	Private Sector	Chhatisgarh	WR	1	600	3/10/2014	31/03/2021							
106	M/s O.P.Jindal	TAMNAR TPP	Private Sector	Chhatisgarh	WR	2	600	3/30/2014	31/12/2021							
107	RKM Powergen Private Ltd.	UCHPINDA TPP	Private Sector	Chhatisgarh	WR	3	360	1/28/2016	31/12/2021							
108	KORBA-WEST TPS Pvt Ltd	AVANTHA BHANDAR	Private Sector	Chhatisgarh	WR	1	600	3/31/2014	31/03/2022							
109	KSK Mahanadi Power Co Ltd	AKALTARA TPS	Private Sector	Chhatisgarh	WR	1	600	8/13/2013	30/06/2022							
110	KSK Mahanadi Power Co Ltd	AKALTARA TPS	Private Sector	Chhatisgarh	WR	2	600	8/22/2014	31/03/2022							
111	M/s O.P.Jindal	OP JINDAL TPS	Private Sector	Chhatisgarh	WR	1	250	9/2/2007	31/03/2022							
112	M/s O.P.Jindal	OP JINDAL TPS	Private Sector	Chhatisgarh	WR	2	250	2/10/2008	31/03/2022							
113	M/s O.P.Jindal	OP JINDAL TPS	Private Sector	Chhatisgarh	WR	3	250	3/6/2008	30/06/2022							
114	M/s O.P.Jindal	OP JINDAL TPS	Private Sector	Chhatisgarh	WR	4	250	6/17/2008	30/06/2022							
115	M/s O.P.Jindal	TAMNAR TPP	Private Sector	Chhatisgarh	WR	3	600	1/7/2015	31/03/2022							
116	M/s O.P.Jindal	TAMNAR TPP	Private Sector	Chhatisgarh	WR	4	600	3/28/2015	30/06/2022							
117	RKM Powergen Private Ltd.	UCHPINDA TPP	Private Sector	Chhatisgarh	WR	1	360	10/28/2015	31/03/2022							
118	Tata Power (CGPL)	MUNDRA UMTPP	Private Sector	Gujarat	WR	1	800	3/7/2012	30/06/2020							
119	Essar Gujarat	SALAYA TPP	Private Sector	Gujarat	WR	1	600	1/4/2012	30/06/2021							
120	Essar Gujarat	SALAYA TPP	Private Sector	Gujarat	WR	2	600	6/15/2012	31/03/2021							
121	Tata Power (CGPL)	MUNDRA UMTPP	Private Sector	Gujarat	WR	2	800	7/30/2012	31/03/2021							
122	Tata Power (CGPL)	MUNDRA UMTPP	Private Sector	Gujarat	WR	3	800	10/27/2012	30/06/2021							
123	Adani Power Ltd.	MUNDRA TPS	Private Sector	Gujarat	WR	1	330	8/4/2009	31/12/2022							
124	Adani Power Ltd.	MUNDRA TPS	Private Sector	Gujarat	WR	2	330	3/17/2010	31/12/2022							
125	Adani Power Ltd.	MUNDRA TPS	Private Sector	Gujarat	WR	3	330	8/2/2010	30/09/2022							
126	Adani Power Ltd.	MUNDRA TPS	Private Sector	Gujarat	WR	4	330	12/20/2010	30/09/2022							
127	Adani Power Ltd.	MUNDRA TPS	Private Sector	Gujarat	WR	5	660	12/26/2010	30/06/2022							
128	Adani Power Ltd.	MUNDRA TPS	Private Sector	Gujarat	WR	6	660	7/20/2011	31/03/2022							

129	Tata Power (CGPL)	MUNDRA UMTPP	Private Sector	Gujarat	WR	4	800	1/21/2013	31/03/2022						
130	Tata Power (CGPL)	MUNDRA UMTPP	Private Sector	Gujarat	WR	5	800	3/22/2013	31/03/2022						
a	Torrent Power Generation Ltd,.	SABARMATI	Private Sector	Gujarat	WR	1	120	10/12/1978	31/12/2022						
132	Torrent Power Generation Ltd,.	SABARMATI	Private Sector	Gujarat	WR	2	121	12/31/1984	31/12/2022						
133	Torrent Power Generation Ltd,.	SABARMATI	Private Sector	Gujarat	WR	3	121	9/28/1988	31/12/2022						
134	ESSAR power	MAHAN TPP	Private Sector	Madhya Prades	WR	1	600	2/24/2013	31/12/2020						
135	Jaipraksh Power Venture Ltd	NIGRI TPP	Private Sector	Madhya Prades	WR	1	660	8/29/2014	30/06/2020						
136	Jaipraksh Power Venture Ltd	NIGRI TPP	Private Sector	Madhya Prades	WR	2	660	2/27/2015	30/09/2020						
137	Jhabua Power Ltd.	SEIONI TPP	Private Sector	Madhya Prades	WR	1	600	3/22/2016	31/03/2020						
138	Reliance Power Ltd	SASAN UMTPP	Private Sector	Madhya Prades	WR	1	660	5/30/2013	30/09/2021						
139	Reliance Power Ltd	SASAN UMTPP	Private Sector	Madhya Prades	WR	2	660	12/18/2013	30/06/2021						
140	Reliance Power Ltd	SASAN UMTPP	Private Sector	Madhya Prades	WR	5	660	8/24/2014	31/12/2021						
141	Reliance Power Ltd	SASAN UMTPP	Private Sector	Madhya Prades	WR	6	660	3/19/2015	30/09/2021						
142	MB Power	ANUPPUR TPP	Private Sector	Madhya Prades	WR	1	600	4/20/2015	31/03/2022						
143	MB Power	ANUPPUR TPP	Private Sector	Madhya Prades	WR	2	600	3/30/2016	30/06/2022						
144	Reliance Power Ltd	SASAN UMTPP	Private Sector	Madhya Prades	WR	3	660	5/21/2014	31/03/2022						
145	Reliance Power Ltd	SASAN UMTPP	Private Sector	Madhya Prades	WR	4	660	3/25/2014	31/03/2022						
146	TATA Power Co.	TROMBAY TPS	Private Sector	Maharashtra	WR	5	500	1/25/1984	31/03/2018						
147	Power Maharashtra Ltd	TIRORA TPS	Private Sector	Maharashtra	WR	2	660	3/25/2013	31/12/2021						
148	Adani Power Maharashtra Ltd	TIRORA TPS	Private Sector	Maharashtra	WR	3	660	6/10/2013	31/09/2021						
149	Adani Power Maharashtra Ltd	TIRORA TPS	Private Sector	Maharashtra	WR	4	660	3/23/2014	31/06/2021						
150	Adani Power Maharashtra Ltd	TIRORA TPS	Private Sector	Maharashtra	WR	5	660	9/25/2014	31/03/2021						
151	Ratan Power	NASIK (P) TPS	Private Sector	Maharashtra	WR	1	270	2/25/2014	31/03/2021						
152	Ratan Power	NASIK (P) TPS	Private Sector	Maharashtra	WR	2	270	2/15/2017	31/03/2021						
153	Vidarbha Industries Ltd	BUTIBORI TPP	Private Sector	Maharashtra	WR	1	300	8/17/2012	30/06/2021						
154	Vidarbha Industries Ltd	BUTIBORI TPP	Private Sector	Maharashtra	WR	2	300	3/19/2013	31/03/2021						

155	Wardha P C P L	WARDHA WARORA TPP	Private Sector	Maharashtra	WR	1	135	6/5/2010	30/09/2021							
156	Wardha P C P L	WARDHA WARORA TPP	Private Sector	Maharashtra	WR	2	135	10/10/2010	30/09/2021							
157	Wardha P C P L	WARDHA WARORA TPP	Private Sector	Maharashtra	WR	3	135	1/21/2011	31/12/2021							
158	Wardha P C P L	WARDHA WARORA TPP	Private Sector	Maharashtra	WR	4	135	4/30/2011	31/12/2021							
159	Adani Power Maharashtra Ltd	TIRORA TPS	Private Sector	Maharashtra	WR	1	660	9/11/2012	31/03/2022							
160	Dhariwal Infrastructure	DHARIWAL TPP	Private Sector	Maharashtra	WR	1	300	11/3/2013	31/03/2022							
161	Dhariwal Infrastructure	DHARIWAL TPP	Private Sector	Maharashtra	WR	2	300	5/28/2014	31/03/2022							
162	GMR emco ENERGY ltd	EMCO WARORA TPS	Private Sector	Maharashtra	WR	1	300	2/7/2013	31/03/2022							
163	GMR emco ENERGY ltd	EMCO WARORA TPS	Private Sector	Maharashtra	WR	2	300	8/27/2013	31/03/2022							
164	Ratan Power	NASIK (P) TPS	Private Sector	Maharashtra	WR	3	270	4/14/2017	31/12/2022							
165	Ratan Power	NASIK (P) TPS	Private Sector	Maharashtra	WR	4	270	5/19/2017	31/12/2022							
166	Ratan Power	NASIK (P) TPS	Private Sector	Maharashtra	WR	5	270	5/30/2017	31/12/2022							

ANNEXURE C.6-2

MAHAVITARAN (TM)
Maharashtra State Electricity Distribution Co. Ltd.

RPAD

5th floor, Prakashgad, Plot No.G-9, Bandra (East), Mumbai – 400 051 ☎ (O) 26474211
Email : cepp@mahadiscom.in, ceppmsedcl@gmail.com Website : www.mahadiscom.in
CIN = U40109MH2005SGC153645

Ref. No. MSEDCL/CE/PP/Nepanagar/ No 13596 **Date:** 01 JUN 2018

To,

The Member Secretary,
Western Regional Power Committee,
F-3, MIDC, Andheri (E),
Mumbai 400 093.
Fax- 022 28370193

Sub: Declaration of 220KV Nepanagar as interstate drawl point of Maharashtra for scheduling and energy accounting purpose.

Ref: MOM dated 29.05.2018 between PGCIL, MPPPTCL,MSETCL & MSEDCL

Sir,

The issue of declaration of 132 KV Nepanagar (M.P.) – Dharni (M.S.) line as an inter State Transmission Line (ISTS) has been discussed in 34th WRPC meeting and 42nd SCM wherein it was informed that this line is natural ISTS line. This issue was also deliberated in 77th WRPC's CCM meeting. It was requested to expedite installation of CTU meter to 132 KV Nepanagar-Dharni Line at 220 KV Nepanagar Substation

Accordingly, the installation of CTU meter on 132 KV Nepanagar-Dharni Line was proceeded. The CTU meter at Dharni end was installed on 06.02.2018 and at Nepanagar end on 29.05.2018. We are thankfull to for your kind support to complete the meter installation process.

In view of above, it is requested to include 220 KV Nepanagar substation as inter state drawl point of Maharashtra for energy accounting and scheduling purpose, at earliest.

Thanks and regards,

KBharat

Chief Engineer (Power Purchase)
MSEDCL

Copy s.w.rs. to:
The Director (Comm), MSEDCL.

Copy f.w.cs. to:
Chief Engineer, STU, MSETCL
Chief Engineer, SLDC, MSETCL
General Manager, WRLDC, Mumbai.
Superintending Engineer, LM Cell, MSEDCL, Kalwa.

Annexure – C.4

1. **Progress of downstream network whose terminating bays are implemented by POWERGRID**

A. Status of 220kV downstream network where Bays are ready.

Sl No	ISTS Substation	Voltage ratio in use	Status of Bays	220kV Lines emanating from Substation	No of ckt	Status of 220kV lines As updated on WRPC TRM meeting 17.04.2018
1	Raipur (PG)	3x315MVA, 400/220 kV	2no Bays ready since 01.07.2011 (WRSS-6)	Raipur (PG) – Doma 220 kV D/c	2	Commissioned on 30.11.2017
2	Mapusa (PG)	3x315MVA, 400/220kV	2 nos Bays ready since : 01.11.2013	Mapusa – Cuncolin 220 kV D/c	2	Ant. DOCO Sep 2020. GED may expedite the commissioning and update the status
3	Pirana	2x315MVA, 400/220kV	2nos Bays ready since 19.03.15 (WRSS-6)	Pirana – Barjadi 220 kV D/c	2	LoI 23.03.2017. GETCO may expedite the commissioning and update the status.
4	Boisar	2x315 +500MVA, 400/220kV	1no Bays ready since 30.05.15	Boisar – Borivali 220 KV line S/c	1	Ant. DOCO June 2018. MSETCL may expedite and update the status.
5	Magarwada	2x315MVA, 400/220kV	2nos Bays ready since 03/11/14	Magarwada – Ringanwada 220 kV D/c	2	Commissioned in Nov 2017
6	Wardha	2x315MVA, 400/220kV	2 nos Bays ready since 01.02.2011	Wardha – Yavatmal 220kV D/C	2	MSETCL may expedite and update the status
7	Solapur	2x315 +1x500MVA, 400/220kV	2 nos Bays ready since 01.04.2011 & 2 nos Bays ready since 02.11.2015	Solapur – Bhale (MS) 220kV D/c Solapur – Narangwadi (MS) 220kV D/c	2 & 2	MSETCL may expedite and update the status
8	Damoh	1 x 500 MVA 400/220 kV	2 Nos of Bays ready since Nov '16	LILO of 2nd 220 kV Circuit of Damoh(MPPTCL) – Sagar 220 kV line at Damoh (PGCIL) 400 kV S/S (1km)	2	Charged 28.08.2017

Sl No	ISTS Substation	Voltage ratio in use	Status of Bays	220kV Lines emanating from Substation	No of ckt	Status of 220kV lines As updated on WRPC TRM meeting 17.04.2018
9	Vadodara GIS	2 x 500 MVA, 400/220 kV	4 Nos bays Ready since May 2017	220 kV Venkatpura-Vadodara D/C Line 220 KV Jambua – Vadodara D/C Line	4	220 kV Venkatpura-Vadodara D/C Line charged 14.04.2018. 220 KV Jambua – Vadodara D/C Line planned for Jan 2019. GETCO may expedite and update the status.
10	Betul GIS	2x315 MVA, 400/220 kV	2 No Bays Ready since July 2017	Betul (PG) - Betul D/C 220 kV line (3 Km)	4	Betul (PG) - Betul D/C 220 kV line (3 Km) one ckt target date march 2019.(Dec 18 original)
			2 No Bays Ready since July 2017	LILO of Sarni - Pandhurna 220kV line at Betul GIS(PGCIL) 400 kV S/s (41 Km)		Targeted by Dec 2018 MPPTCL may expedite and update the status of both lines
11	Itarsi (PG)	1x500 MVA, 400/220 kV	2 Bays Ready since July 2017	LILO of 2nd 220kV circuit of Itarsi (MPPTCL) - Hoshangabad 220 kV line at Itarsi (PGCIL) 400kV S/s (Existing)	2	Commissioned in August 2017

B. 400 KV line bays implemented by POWERGRID

Sl No	ISTS Substation	Proposed Bays	Commissioning Schedule	Lines emanating from Substation	Remarks
1	Indore(PG)	2	July 2018	Indore(PG)-Ujjain 400 KV D/c line	MPPTCL may commission the line matching with the bays
2	Vadodara(PG)	2	Ready since May 2018	DGEN-Vadodara 400kV D/C line	DGENTPL(TBCB) has confirmed that they are not taking up implementation of the scheme. Future course of action to be decided.

C. Status of Under Construction 220 kV line bays at New Substations / Substation Extensions in WR

S. No.	ISTS Substation	Proposed Bays	Commissioning Schedule	220kV Lines emanating from Substation	No of ckt	Status of 220kV lines As updated on WRPC TRM meeting 17.04.2018
1	Morena 2x 315 MVA, 400/220 kV S/S (under TBCB implemented by Adani)	4	SCOD : 22.05.2018 Status : Ready since Feb 2018	i) LILO of one circuit of Malanpur – Mehgaon 220kV line at Morena 400/220 kV S/s (8Km from Loc. No.12). ii) Morena (Adani) - Sabalgarh 220kV D/C line (92Km) with LILO of one circuit of Morena - Sabalgarh 220kV line at Morena 220kV S/s of MPPTCL (0.5Km)	4	i)16.01.2018 ii)Jun 2018 target MPPTCL may expedite the commissioning and update status
2	Navi Mumbai 2 x 315, 400/220 kV	4	Bays ready since Mar'14 (WRSS-V)	LILO of Apta-Taloja and Apta-Kalwa section of the Apta-Taloja/Kalwa 220 KV D/c line at Navi Mumbai(PG)	4	MSETCL may expedite the commissioning and update the status
3	Indore (PG) 2x500 MVA, 400/220 kV	6	Jul'18 (WRSS-14)	Indore (PG) – Indore (MP) 220 kV D/c	2	4 bays targeted by Dec 2018. 2 Bays yet to be decided. MPPTCL may expedite the commissioning and update the status
				Indore (PG) – Ujjain (MP) 220 kV D/c	2	
				Future	2	
4	Parli (PG) 2x500 MVA, 400/220 kV	4	Jun/Jul'18 (WRSS-16)	LILO of Parli - Harngul 220 kV S/c at Parli(PG)	2	December 2018 Target. MSETCL may expedite the commissioning and update the status
				LILO of Parli-Osmanabad (MS) - 220 kV S/c at Parli (PG)	2	
5	Mapusa (PG) 3X315 MVA, 400/220	2	Jun/Jul'18 (WRSS-16)	Mapusa - Tuem 220kV D/c	2	Goa: Comml Bid open 11.04.2018. Target 3 years. GED may expedite the commissioning and update the status
6	Satna (PG) 1x500MVA, 400/220kV	2	2 Bays Commissioned in October 2017	LILO of one circuit of Satna (MPPTCL) - Chhatarpur 220 kV line at Satna (PGCIL) 400 kV S/s (3Km)	2	Line Charged on 23.11.2017.
7	Navsari 400/220kV 2x315MVA + 1x500MVA,	2	Ready since May 2018	Navsari – Bhestan 220kV D/c line	2	DGENTPL (TBCB) has confirmed that they are not taking up implementation of the scheme. Future course of action to be

S. No.	ISTS Substation	Proposed Bays	Commissioning Schedule	220kV Lines emanating from Substation	No of ckt	Status of 220kV lines As updated on WRPC TRM meeting 17.04.2018
						decided.
9	Rewa PS 3x500MVA, 400/220kV	6	ICT-I & II Charged on Mar'18 ICT III to be commissioned in September 2018	Rewa UMSPP – Rewa PS 220kV 3x D/C line	6	In Jun 2018, 2 lines are expected. One line in Dec 2018. MPPCL may match the line with the POWERGRID system and update the status.
10	Khandwa S/S 500MVA, 400/220kV	2	Jun '18 (WRSS-17)	Khandwa-Chamera 220 KV D/c line	2	Target by June 2018. MPPTCL may match the commissioning with POWERGRID system and update the status

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ANNEXURE C.6-1

MAHAVITARAN (TM)
Maharashtra State Electricity Distribution Co. Ltd.

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Email : cepp@mahadiscom.in, ceppmsedcl@gmail.com Website : www.mahadiscom.in
CIN = U40109MH200SSGC153645

Ref. No. MSEDCL/CE/PP/77th CCM/ / **Date:** 12 APR 2018/

No 8085

To,

The Member Secretary,
Western Regional Power Committee,
F-3, MIDC, Andheri (E),
Mumbai 400 093.
Fax- 022 28370193

Sub: Agenda item for 75th Commercial Committee meeting of WRPC

Ref: 1. L.No. WRPC/Comml.-I/3/CCM-Inv./2018/3427 dtd 09.04.2018
2. MERC Order dtd 9.03.2018 in Case No 114 of 2016
3. MoM of special meeting held on 22nd February at WRPC

Sir,

It is requested to incorporate the following agenda items for 77th Commercial Committee meeting of WRPC.

1. Declaration of 132 KV Nepanagar (Madhya Pradesh) – Dharni (Maharashtra) line as Inter – state Transmission line (ISTS).

The 132 kV Nepanagar (MP) – Dharni (MS) line has been charged in radial mode and on this line power flow has been started from 16.02.2017 to MSEDCL. Vide letter no. WRLDC/SO-II/1719/2017/2794, dated 18.10.2017, WRLDC clarifies that the 132 kV Nepanagar (MP) – Dharni (MS) line is eligible for consideration as an ISTS line connecting two states.

Further as per CERC regulation for Sharing of Inter State Transmission Charges and Losses, the line has to be certified by WRPC as interstate line. Also For accounting and scheduling of central sector (ISGS) power to MSEDCL, it is necessary to install CTU's SEM meters at interface point at Nepanagar end and at Dharni end. Accordingly, PGCIL has installed CTU's SEM meters on 132 KV Nepanagar-Dharni line at Dharani end on 06.02.2018, and for installation at Nepanagar end of 132 KV Nepanagar-Dharni, MSEDCL vide letter under ref.1 has requested WRLDC to expedite the matter.

In view of this it is requested to certify the 132 KV Nepanagar-Dharni line as interstate line, so that scheduling of central sector (ISGS) power to MSEDCL is possible through this line.

2. Alternate/standby supply arrangement by Indian Railways when source of power (RGPPL) is Not available:

During 76th CCM meeting, as no visible progress in the direction of signing PSA between MSEDCL and Indian Railway, the committee opined to close this agenda item till any further updates are received from MSEDCL.

MERC in its Order dtd 9.03.2018, in Case no 114 of 2016 for the Petition of Maharashtra State Electricity Distribution Co. Ltd for a mechanism for recovery of charges on account of over-drawal by Indian Railways, Hon. Commission has noted and ruled as below:

15.8 The Temporary category and other tariffs are determined and approved by the Commission through Tariff Orders in respect of the Distribution Licensees after a due process of public consultation.

The levy of Demand Charges is intended to recover all or part of the fixed costs of the Licensees, and is applicable to all consumers. ***While these Demand Charges may vary from one consumer category or sub-category to another, there is prima facie no reason to discriminate in favour of the Indian Railways in the Demand Charge applicable to Temporary category supply, in terms of Section 62(3) of the EA, 2003.*** *However, Indian Railways is free to make its suggestions during the forthcoming Mid-Term Review proceedings in respect of MSEDCL.*

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.

.

15.10 In the absence of such a stand-by arrangement with MSEDCL or other entity, MSLDC shall take appropriate steps to curtail the drawal of Indian Railways and limit it to the availability of the Generator(s) contracted by it.

From the above, now MERC vide this Order has clarified that MSEDCL's temporary tariff is applicable for the Standby supply availed by Indian Railways, as agreed by them in special CCM meeting held on 22.02.2017 at WRPC to discuss alternate arrangement of power to Indian Railway.

Also in the absence of such a stand-by arrangement with MSEDCL or other entity, **MSLDC shall take appropriate steps to curtail the drawal of Indian Railways and limit it to the availability of the Generator(s) contracted by it.**

3. RTDA charges applicable to BARC facilities billed to MSEDCL by PGCIL in its bill for period from Apr-14 to Mar-17 :

PGCIL has billed RTDA charges amounting applicable to BARC facilities billed to MSEDCL if though BARC facility is no more consumer of MSEDCL and BARC Facilities got allocation from TAPS 3&4 from 23.08.2014. On enquiry to PGCIL, it is informed that they will take up this issue with WRPC.

4. Statement showing energy scheduled from contracted ISGS stations to beneficiaries at their State peripheries:

The beneficiaries of WR region pay the monthly energy bill payment based on energy as shown in monthly regional energy account prepared by WRPC. The state energy account considers the total energy injected / scheduled at state periphery as input to the State periphery for the respective utilities which includes ISGS stations also. Though this information can be gathered from WRPC site, but it will be beneficial to all constituents of WR region to have the Statement showing energy scheduled from contracted ISGS stations to beneficiaries at their respective state peripheries.

Yours Faithfully,

Chief Engineer (Power Purchase)
MSEDCL

Copy s.w.rs. to:

Director (Commercial), MSEDCL

Email

ANNEXURE- C.6-3

MADHYA PRADESH POWER TRANSMISSION COMPANY LIMITED
STATE LOAD DESPATCH CENTRE, NAYAGAON, RAMPUR, JABALPUR
Telephone: (0761) 2970089 Fax: (0761) 2664343/2970119 e-mail sldcmpjbp@gmail.com
Corporate office: Madhya Pradesh Power Transmission Co Ltd., Block No.2, Shakti Bhawan, Rampur, Jabalpur 482008, CIN-U40109MP2001SGC014880, Email-mdtransco.nic.co.in

No.07-05/RPC-14/ 150 | Jabalpur, dtd: 29.05.2018

To

The Executive Director
Western Regional Load Despatch Centre
F-3, MIDC Area, Marol, Andheri(East)
Mumbai-400093.

Email- wrsemdata@posoco.in
vivek.pandey@posoco.in

Sub: Installation of SEM on 132 KV Nepanagar-Dharani line at Nepanagar end by PGCIL.

Dear Sir,

Special Energy Meters, Main & Check are being installed on 132 KV Nepanagar-Dharani line at Nepanagar end by PGCIL on 29th May 2018 afternoon. It is to mention that this line has not been designated as a ISTS line by the competent authority or agency so far. Thus the flow on this line shall be treated as radial power from MP to Maharashtra and accordingly DSM charges under Intra State ABT against power drawal by Maharashtra through this line, shall be computed by the MP SLDC.

This is for further needful please.

Chief Engineer,
SLDC, MPPTCL, Jabalpur.

Copy to –
1. The Member Secretary, WRPC, F-3, MIDC Area, Andheri (E), Mumbai-400093.
2. The Chief Engineer (Plng. & Design), M.P. Power Transmission Co. Ltd., Jabalpur.

SE (Comml.)
SE (Opn) 31/5/2018

EE (Comml.) 07/06

प. क्ष. वि. स. मुंबई /WRPC
आवक संख्या /Inward No. 826
दिनांक /Date: 01/06/18

ANNEXURE D-1.1

MADHYA PRADESH POWER TRANSMISSION CO. LTD.

(A wholly owned Govt. of Madhya Pradesh Undertaking)
CIN: U40109MP2001SGC014880
Block No.2, Shakti Bhawan, Rampur, Jabalpur (MP) 482008, Tel.:(0761) 270-2132, 2242,
Fax No.: (0761) 2660908, e-mail: ceps321@yahoo.com/ce.pnd@mptransco.nic.in

No. 04-02/PSP-20/ 282 Jabalpur, Date: 6.2.18

To,

Shri A.Balan
Member Secretary,
Western Region Power Committee (WRPC),
F-3, MIDC Area, Andheri (East),
Mumbai – 400093

Fax No.: 022-28370193
Email : ms-wrpc@nic.in

Sub: Regarding approval of deemed Inter-state/ Natural Inter-state line of MP State.

CERC has issued order on 25.04.2013 against Petition no.-15/Suo-Motu/2012 in the matter of determination of tariff of the inter-state transmission lines connecting two states and following 9 nos. EHV lines of Madhya Pradesh state has been approved as inter-state transmission lines for computation of Point of Connection(PoC) charges & losses under CERC Regulation 2010:

Sl No	Name of ISTS line	Voltage (kV)	Connecting States	Connecting Regions
1	Malanpur – Auraiya 220kV line	220	MP-UP	WR-NR
2	Mehgaon – Auraiya 220kV line	220	MP-UP	WR-NR
3	Badod – Kota 220kV line	220	MP-Rajasthan	WR-NR
4	Badod – Modak 220kV line	220	MP-Rajasthan	WR-NR
5	Pandhurna – Kalmeshwar 220kV line	220	MP-Maharashtra	-
6	Amarkantak – Kotmikala 220kV line-1	220	MP-CG	-
7	Amarkantak – Kotmikala 220kV line-2	220	MP-CG	-
8	Rajgarh - Sardar Sarovar 400kV line-1	400	MP-Gujrat	-
9	Rajgarh - Sardar Sarovar 400kV line-2	400	MP-Gujrat	-

Based on the above, MPPTCL has filed a petition no. 217/TT/2013 before CERC for determination of yearly transmission charges for the above 9 Nos. lines of MPPTCL for the control period 2009-2014. CERC has approved the yearly transmission charges for the above lines vide their order 15.10.2015.

प. क्ष. वि. स. मुंबई /WRPC
आवक संख्या /Inward No. 342
दिनांक /Date: 20/02/18

SE (Comml.) 19/2/2018

EE (Comml.) 19/02
Pl. provide a copy to undersigned.

Subsequently, SE(Comml.), WRPC vide letter no. WRPC/Comml-I/Corr/2016/1041 dated 07.06.2016 has intimated that in the 31st WRPC meeting 400kV Seoni(MP) – Bhilai(CG) was recommended to be considered as deemed ISTS line for the purpose of computation of PoC charges and also mention that this line is Natural ISTS line and so approved under PoC without certification of WRPC.

MPPTCL has also filed a petition no. 87/TT/2017 before CERC for determination of yearly transmission charges for the 2 Nos. lines i.e. Seoni – Sarni 400kV S/C line and Seoni-Bhilai 400kV S/C line upto MP Border of MPPTCL for the control period 2009-2014. Similarly, a petition no. 88/TT/2017 is also filed before CERC for determination of yearly transmission charges for the aforemention 11 Nos. lines of MPPTCL for the control period 2014-2019. CERC has issued order on 19.12.2017 against Petition no.-88/2017 in the matter of determination of yearly transmission charges for the aforemention 11 Nos. lines of MPPTCL for the control period 2014-2019.

In context to above, it is to intimate that NRPC vide letter no. NRPC/OPR/116/03/2016/10451-54 dated 09.11.2016 have approved 132kV S/C Khandar –Sheopur line as natural Inter-State line and accordingly, Rajasthan Vidyut Prasaran Nigam Ltd. (RVPNL) has also filed petition no. 26/TT/2017 before CERC for determination of point of connection charges of their inter-state lines. A copy of the letter dated 09.11.2016 of Member Secretary, NRPC, New Delhi is enclosed herewith for your kind reference.

In view of above and in reference with the NRPC above approval letter, WRPC is requested to consider the following EHV line of Madhya Pradesh state as natural inter-state line and approval in this respect may please be accorded so that MPPTCL may file the petition before CERC for determination of point of connection charges:

Sl No	Name of ISTS line	Voltage (kV)	Connecting States
1	Sheopur - Khander 132kV line	132	MP-Rajasthan
2	Neemuch – Nimbahera 132kV line	132	MP-Rajasthan
3	Gandhi Sagar – Rana Pratap Sagar 132kV line-1	132	MP-Rajasthan
4	Gandhi Sagar – Rana Pratap Sagar 132kV line-2	132	MP-Rajasthan
5	Seoni - Pench HEP 132kV line-1	132	MP-Maharashtra
6	Seoni - Pench HEP 132kV line-2	132	MP-Maharashtra

7	Balaghat – Dongargarh 132kV line-1	132	MP-CG
8	Balaghat/Bhanegaon – Dhamdha 132kV line-2	132	MP-CG
9	Kotma – Manendragarh 132kV line-1	132	MP-CG
10	Kotma – Manendragarh 132kV line-2	132	MP-CG
11	Morwa – Beena (Rihand) 132kV line	132	MP-UP
12	Morwa – Anpara 132kV line	132	MP-UP
13	Bina – Rajghat HEP 132kV line	132	MP-UP
14	Pichhore – Rajghat HEP 132kV line	132	MP-UP
15	Pichhore – Matatila HEP 66kV line	66	MP-UP

It is requested that the approval of the WRPC for the aforementioned inter-state lines for consideration as deemed ISTS lines may kindly be forwarded at the earliest.

Chief Engineer (Plg. & Design)
MPPTCL-Jabalpur

Copy to:
1. The ED(CRA), MPPTCL, Jabalpur.
2. The Chief Engineer (SLDC), MPPTCL, Jabalpur.
3. Staff Officer, O/o Managing Director, MPPTCL, Jabalpur

ANNEXURE D.1-2

FAX copy

MADHYA PRDAESH POWER TRANSMISSION CO. LTD.

(A wholly owned Govt of Madhya Pradesh Undertaking)
CIN: U40109MP2001SGC014660
Block No.2, Shakti Bhawan,Rampur, Jabalpur (MP)-482008 Tel : (0761) 2702132,2242
Fax No.:(0761) 2660908 e-mail: cegs321@yahoo.com/ce.pnd@mptransco.nic.in

No. 04-02/PSS/ 970 Jabalpur, Date: 3.5.18

To,

The Member Secretary/
Superintendng Engineer(Comml.)
Western Regional Power Committee,
F-3., MIDC Area, Andheri (E),
MUMBAI-400093.

Fax No.022-28370193

Sub: Comments on issues discussed during 77th Coordination Committee meeting of WRPC held on 20th April-2018.

The 77th meeting of Commercial Committee of the WRPC was held on 20th April-2018 at WRPC H.Q., Mumbai. The meeting was attended by Shri Rajiv Kumar Datta, Sr. General Manager(Commercial), MPPMCL, Jabalpur. As informed by him following issues on Item No.4 and Item No.9 of Part "C" of the Agenda during the meeting :-

Item No.4: Declaration of 132kV Nepanagar (Madhya Pradesh) - Dharni (Maharashtra) line as Inter-state Transmission line (ISTS).

During discussions of Item No.4, it was pointed out by PGCIL and Maharashtra that in-charge of Nepanager Substation has not allowed for installation of energy meter at Nepanagar end. The forum desired to know the reasons and authority to do so. Officer of WRPC pointed out that earlier both MP and Maharashtra was agreed to keep the line away from ISTS status. Maharashtra opined that when meter will be installed at Nepanagar, then only interstate flow of power can be measured at ISTS status shall be decided.

Item No.9: Approval of deemed Inter-state/Natural Interstate line of MP and Gujrat states.

During discussions of Item No.9, it was conveyed that the lines proposed by MPPTCL are natural ISTS lines and no need to certify the same from WRPC arises. The forum was of the opinion that MPPTCL should approach the appropriate commission for grant of tariff.

2/ In context to above in reference to Item No.4 of the Agenda, it is to inform that there is no central sector power flow on Nepanagar-Dharni line from MP State to Maharashtra. Therefore, status of this line can not be considered as ISTS line for installation of meters by PGCIL at Nepanagar. An ABT compliant inter-phase meters and check meters bearing Sl.No.MPCS9866 & XDS12309 respectively along with separate 132kV metering CTs and PTs (Details enclosed) has already been installed

on Nepanagar-Dharni 132kV line at Nepanagar end and the reading of this meter is being submitted to SLDC/WRLDC on regular basis for Regional Energy Accounting.

3/ In regard to Item No.9 of the Agenda, it is to inform that in order to file the petition before CERC, certification of WRPC for all the Inter-state lines as natural ISTS lines shall be necessary. Once these lines are certified as natural ISTS lines by WRPC, MPPTCL shall approach CERC for approval of tariff for these lines.

4/ The comments of MPPTCL may kindly be incorporated in the minutes of the meeting.

Addl.Chief Engineer (Plg. & Design)
O/o Chief Engineer(P&D)
MPPTCL:Jabalpur

Copy to :

1. The Executive Director(CRA), MPPTCL, Jabalpur.
2. The Chief General Manager(Regulatory), MPPMCL, Jabalpur.
3. The Chief Engineer (SLDC), MPPTCL, Jabalpur.
4. The Addl. Chief Engineer(P&D) O/o C.E.(P&D), MPPTCL, Jabalpur.

CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI

Petition No. 10/MP/2018

Coram:
Shri A.K. Singhal, Member
Shri A.S. Bakshi, Member
Dr. M. K. Iyer, Member

Date of Order: 19th of January, 2018

In the matter of

Petition under Section 79 (1) (c) (f) of the Electricity Act, 2003.

And
In the matter of

Essar Power M.P. Limited
Essar House,
11th Floor, 11 KK Marg, Opp Racecourse,
Mahalaxmi, Mumbai-400 034 ..... **Petitioner**

Versus

1. Central Transmission Utility
   B-9, Qutab Institutional Area,
   Katwaria Saria,
   New Delhi-110 016

2. Western Regional Power Committee
   F-3, MIDC Area, Marol,
   Opp SEEPZ, Central Road,
   Andheri (East), Mumbai-400 093.

3. Essar Power Transmission Company Limited
   Lower Ground Floor, Hotel Treebo Conclave Riviera,
   A-20, Kailash Colony, New Delhi-110 048

4. Central Electricity Authority
   Sewa Bhawan, R.K.Puram,
   New Delhi-110 066

……Respondents

The following were present:

Shri Sanjay Sen, Senior Advocate for the Petitioner
Shri Alok Shanker, Advocate for the Petitioner
Ms. Shruti Verma, EPMPL
Ms. M. Gupta, EPMPL

Shri Swapnil Verma, PGCIL
Ms. Joyti Prasad, PGCIL
Shri P.S.Das, PGCIL

ORDER

The Petitioner, Essar Power MP Limited, has filed the present petition pursuant to the direction given in 35th WRPC meeting held on 20.12.2017 at Jabalpur to the Petitioner to approach the Commission for seeking direction on continuation of LILO of 400 kV D/C Vindhyachal-Korba Transmission Line at Mahan TPS. The Petitioner has made the following prayers:

> "(a) Admit the present petition;
>
> (b) In view of WRPC direction to approach the Hon`ble CERC immediately for getting further direction on the issue of continuation/discontinuation of interim LILO arrangement of 400 k V Vindhyachal-Korba circuit beyond 20.1.2018, it is prayed that the Hon`ble Commission may pass appropriate orders in the matter;
>
> (c) Direct the appropriate authority to declare that the LILO of the Vindhyachal-Korba D/C line (which is ISTS) at Mahan as a permanent element in light of the above mentioned technical requirements;
>
> (d) Pending decision of the WRPC direction CTU to not take any coercive steps for opening the LILO;
>
> (e) Pass such other and further orders/directions as the Hon`ble Commission may deem appropriate in the facts and circumstances of the case."

2. The Petitioner, a subsidiary of Essar Power Ltd., is setting up a 1200 MW (2X600 MW) thermal power plant at district Singrauli in the State of Madhya Pradesh. The Petitioner has a long term Power Purchase Agreement with MPPMCL for 150 MW and 5% net power under MoU route. The Petitioner has entered into Long Term Power Purchase Agreement with Essar Steel for supply of 450 MW of power for a period of 12 years. According to the Petitioner, power from the generating station is to be evacuated through the 400 kV D/C Mahan-Sipat Transmission Line terminating at WR Pooling Station at Bilaspur. This transmission

line is being executed by Essar Power Transmission Company Limited (EPTCL), a group company of the Petitioner after being granted an inter-State Transmission Licence by the Commission on 29.4.2008 to develop the following transmission lines and the sub-stations:

a) 400 kV D/c Mhan-Sipat along with associated bays;

b) LILO of 400 kV Vindhyachal Korba at Mahan;

c) 400 kV D/c Gandhar Hazira line along with associated bays and

d) 400/220 kV substation at Hazira

3. The Petitioner has submitted that out of the above four elements, three have been commissioned and are already in operation. Only 400 kV D/C Mahan-Sipat line with associated bays is yet to be completed. The Petitioner has submitted that it has been making diligent efforts to expedite the commissioning of the transmission line in all respects. As a result of delay in the commissioning of the second unit, interest burden of second unit is piling up.

4. The Petitioner has submitted that EPTCL has assured the Petitioner that the tower erection works would be completed by second week of January and stringing works would be completed by Mid March 2018 and inspection, testing and commissioning shall be completed by the end of March 2018 subject to assumption that there will be no hold up in completing the remaining tower and stringing works.

5. The Petitioner has submitted that issue with regards the LILO at Mahan was discussed in the 42nd meeting of the Standing Committee of the Power Systems Planning for Western Region held on 17.11.2017. The Petitioner has submitted that the status of works on the Mahan-Sipat transmission line was reviewed on

20.12.2017 and WPRC while allowing the use of the LILO till 20.1.2018 directed the Petitioner to approach the Commission for seeking permission to use the interim LILO arrangement after 20.1.2018. Accordingly, the Petitioner has sought a direction in this petition to WRPC to continue interim LILO arrangement of 400 kV Vindhyachal Korba circuit beyond 20.1.2018.

6. During the hearing of the petition, learned senior counsel for the Petitioner submitted that time be granted till 31.3.2018 by which time the Petitioner expects that the subject transmission line would be put under commercial operation.

Analysis and Decision:

7. We have considered the submissions of the learned senior counsel for the Petitioner. The Petitioner has filed the present petition for seeking direction to CTU and to WRPC for continuation of LILO of 400 kV D/C Vindhyachal-Korba transmission line at Mahan TPS pursuant to decision in 35th WRPC meeting held on 20.12.2017. Member-Secretary, WRPC vide its letter dated 22.12.2017 conveyed the decision of 35th meeting held on 20.12.2017 regarding interim LILO arrangement of 400 kV Vindhyachal-Korba transmission line. Relevant portion of the said letter is extracted as under:

> "This is to inform that in 35th WRPC meeting, which was held on 2012.2017 at Jabalpur (MP), matter regarding extension of interim LILO arrangement of 400 k V Vindhyachal-Korba circuit-I for evacuation of power by M/s Essasr Power M.P.Ltd., 2x600 MW ("EMMPL") was discussed in detail and the following decisions were taken:
>
> (1) One month time (i.e till 20.01.2018) is given to M/s Essar Power M.P. Ltd. and M/s Essar Power M.P. Ltd. is directed to approach Hon`ble CERC immediately for getting further direction on the issue of continuation/disconnection of interim LILO arrangement of 400 kV Vindhyapchal-Korba circuit-I beyond 20.01.2018.
>
> (2) The Status quo of the said interim LILO arrangement of 400 kV Vindhyachal-Korba circuit-I shall be maintained till 20.01.2018.

The above decisions are hereby conveyed to all stakeholders for information and for further necessary action at their end."

8. According to the Petitioner, execution of works is progressing at good pace and the line is expected to be completed by March 2018. The Petitioner has also stated that the LILO on Circuit 1 of the Vindhyachal- Korba D/C Line at Mahan is not an interim LILO but is a permanent LILO and is required for reliable operation of both the Vindhyachal-Korba D/C Line and Essar Mahan Generating Station. CEA and CTU in a meeting Chaired by Member (PS) CEA held on 28.6.2017 have concluded that LILO is required to be retained even after commissioning of the Mahan-Sipat Line.

9. CEA in the meeting held on 5.1.2018, reviewed the progress of transmission line and directed the Petitioner to commission the transmission line before the end of March, 2018. Relevant portion of the minutes of meeting held on 5.1.2018 is extracted as under:

"2. Representative of EPTC updated the present status of Mahan-Sipat Transmission Line as given below:

Tower foundation/Erection:

a. All the foundations have been completed
b. Out of total towers of 942, Balance to complete-9 no.
c. Out of 9,5 tower erection gangs are working at 3 different tower locations (68 F, 219 and 5B) and will start the work at other 2 location from tomorrow at 2D/0 and 10A/6
d. * * *

Stringing:

a. Total stringing involved is 337 km
b. At present balance stringing is about 67 about.
c. 6 km under progress.
d. Stringing section with TSE:

i. 5 TSE machines are already deployed and are in operation but the manpower deployment is to be augmented to expedite the progress.

ii. Manpower in 1st and 2 TSE is ok

e. Stringing section with Manual gangs:

i. 1st gang-currently doing repaid and restoration. Will continue work on the repaid works.
ii. 2ns gang-currently working at Korba
iii. 3rd gang-Currently working at EPMPL plant gantry.
iv. 4th gang-Gang reached at site and will be fully operation by 6th Jan.
v. 5th gang-arrived at Waidhan and they will start working from 6th Jan.

2. EPTCL informed that they are actively coordinating with the local administration to quickly resolve the ROW issues being encountered at every location repeatedly at the time of foundation, erection, insulator hoisting and stringing and releasing compensation very fast. The district collector Singrauli has agreed to provide full time police team of 15 members. Police assistance is being regularly obtained in Wadraf Nagar tehsil of Chhattisgarh.

* * * * *

11. With regard to PLCC, EPTCL informed that they had taken up the matter for clearance for PLCC frequency allocation for line protection and communication with Ministry of Communication and requested CEA also to expedite the matter. CEA agreed to look into the issue.

12. Chief Engineer (PSPM), CEA noted the speeding up of progress in the months of November and December, 2017. Taking note of RoW challenges in the area, CEA requested EPTCL to intensify efforts and synergy with a view to ensuring that the line is commissioned positively before the end of March 2018."

10. Keeping in view the decision in the minutes of the meeting in CEA held on 5.1.2018, we direct the Petitioner to ensure completion of the Mahan-Sipat line by 31.3.2018. Till that time, *status quo* shall be maintained. If the transmission line is not commissioned by the Petitioner on or before 31.3.2018, CTU shall take immediate necessary action for disconnection of the LILO arrangement with effect from 1.4.2018.

11. The Petitioner is directed to submit the fortnightly progress report of the execution of transmission line.

12. The Petitioner has also prayed to direct appropriate authority to declare that the LILO of the Vindhyachal-Korba D/C line at Mahan as a permanent element. In this order, we are concerned with the completion of 400 kV D/C Mahan-Sipat transmission line by 31.3.2018 failing which the LILO shall be opened by CTU on

1.4.2018. In case, CTU wants to continue with the LILO beyond 31.3.2018, CTU shall approach the Commission well before 31.3.2018 with proper justification.

13. The Petition is disposed of in terms of the above directions.

Sd/-	Sd/-	Sd/-
(Dr. M. K. Iyer)	**(A. S. Bakshi)**	**(A.K. Singhal)**
Member	**Member**	**Member**

COURT-II
IN THE APPELLATE TRIBUNAL FOR ELECTRICITY
(Appellate Jurisdiction)

ORDER DFR NO. 1052 OF 2018 ON THE FILE OF THE APPELLATE TRIBUNAL FOR ELECTRICITY, NEW DELHI

Dated: **27th March, 2018**

Present: **Hon'ble Mr. Justice N.K. Patil, Judicial Member**
Hon'ble Mr. S.D. Dubey, Technical Member

In the matter of:

Essar Power M.P. Limited
Essar House,
11th Floor, 11 KK Marg, Opp. Racecourse,
Mahalaxmi Mumbai-400 034
Maharashtra …… Appellant(s)

Versus

1. **Central Electricity Regulatory Commission**
   Through The Secretary
   3rd & 4th Floor, Chanderlok Building,
   36, Janpath,
   New Delhi-110 001

2. **Central Transmission Utility**
   Through The COO
   B-9, Qutab Institutional Area, Katwaria Sarai,
   New Delhi-110 016
   Also at: Saudamini, Plot No.2, Sector-29,
   Near IFFCO Chowk, Gurgaon
   Haryana - 122 001

3. **Western Regional Power Committee**
   Through The Member Secretary
   F-3, MIDC Area, Marol, Opp. SEEPZ, Central Road,
   Andheri (East)
   Mumbai-400 093

4. **Essar Power Transmission Company Limited**
   Through The Vice President
   Lower Ground Floor,
   Hotel Treebo Conclave Riviera
   A-20, Kailash Colony
   New Delhi-110 048

5. **Central Electricity Authority**
   Through The Member (Power Systems)
   Sewa Bhawan, R.K. Puram, Sector-1,

New Delhi-110 066 …… Respondents

Counsel for the Appellant(s)	:	Mr. Sudhir Nandrajog, Sr. Ad. Mr. Alok Shankar Ms. Nayantara Pande Mr. Sandeep P Sahay Ms. Shruti Verma for EPMPL (Rep.)
Counsel for the Respondent(s)	:	Ms. Sanjana Dua for Ms. Suparna Srivastava for R-2 Mr. Kumar Mihir for R-4

O R D E R

1. With the consent of the learned counsel appearing for the both the parties, the matter was taken up for final disposal.

2. The Appellant herein, questioning the legality and validity of the Impugned Order dated 19.01.2018 passed in Petition No. 10/MP/2018 on the file of the Central Electricity Regulatory Commission, New Delhi and filed this Appeal, being DFR No. 1052 of 2018 seeking following reliefs:

(a) Set aside the impugned order dated 19.01.2018 passed by the Respondent Commission to the extent it directs opening of the LILO on S/C at Mahan on Vindhyanchal Korba D/C Line.

(b) Declare that the LILO on S/C at Mahan on Vindhyachal Korba D/C Line is a permanent element and cannot be disturbed.

(c) Pass such other order as this Hon'ble Tribunal may deem necessary in the interest of justice and equity.

3. The Appellant has presented this Appeal for considering the following substantive questions of law:

(a) Whether CERC ignored its earlier order in 30/MP/2014 by failing to recognize the LILO at Mahan as a permanent element and directing its disconnection?

(b) Whether CERC could have directed opening of the LILO at Mahan despite being made aware of the system requirements?

(c) Whether it is desirable and/or necessary to shut-down an efficient and ready generating station in peak summer months when power demands across the country would be peaking?

(d) Whether an asset developed by a transmission licensee after incurring significant cost and effort can be disallowed from being put in use?

4. The learned senior counsel, Mr. Sudhir Nandrajog, appearing for the Appellant and learned counsel, Mr Kumar Mihir, appearing for the fourth Respondent, at the outset, submitted that, they have filed undertaking affidavits on behalf of the Appellant and the fourth Respondent dated 26.03.2018. The same may kindly be taken on record and the instant appeal, being DFR No. 1052 of 2018 on the file of the Appellate Tribunal for Electricity, New Delhi may be disposed of in terms of the statement made in the aforementioned undertaking affidavits in the interest of justice and equity.

5. They undertake to carry out the works as expeditiously as possible and to ensure that the Mahan-Sipat Line is commissioned at the earliest but not later than 30.06.2018.

6. So far it relates to continue the LILO on S/C at Mahan on Vindhyanchal Korba D/C Line, the same is kept open.

7. The learned counsel, Ms. Sanjana Dua representing the learned counsel Ms. Suparna Srivastava, appearing for the second Respondent, on instruction, submitted that, the statements made by the learned senior counsel appearing for the Appellant and the learned

counsel appearing for the fourth Respondent in their undertaking affidavits dated 26.03.2018, may be placed on record and the instant appeal, being DFR No. 1052 of 2018, may be disposed of in the reasons stated therein modifying the Order impugned dated 19.01.2018 passed in Petition No. 10/MP/2018 on the file of the Central Electricity Regulatory Commission, New Delhi extending the time for completion of the aforementioned works till 30.06.2018.

8. We have heard the learned senior counsel appearing for the Appellant and the learned counsel appearing for the Respondent Nos. 2 and 4. Other respondents served unrepresented.

9. The undertaking affidavit filed on behalf of Essar Power M.P. Limited, Appellant herein, read as follows:

> ***"UNDERTAKING ON BEHALF OF APPELLANT IN TERMS OF ORDER DATED 26.3.2018***
>
> *I Shruti Verma, W/o Hemant Kumar aged around 39 years working as Legal Advisor in the office of the Appellant Company, currently at A-430 Lower Ground Floor, Defence Colony- 110024, do hereby state as under:*
>
> *1. That I am the authorised representative of the Appellant and am well aware of the facts and circumstances of the present case and am therefore competent to affirm the present affidavit.*
>
> *2. That this Hon'ble Tribunal during the hearing on 26.03.2018 directed the Appellant to furnish an affidavit of undertaking that the Mahan-Sipat Line shall be completed by Essar Power Transmission Company (hereafter "EPTCL") at the earliest and not later than 30.06.2018.*
>
> *3. That the Appellant owns and operates a 2 × 600 MW generating stations at Mahan. EPMPL has with significant investment completed construction of the Unit-II of the Power Plant. The Second Unit has been stranded only because of the load restriction on the LILO (600 MW). EPMPL has genuine interest to get the Mahan-Sipat Line completed at the earliest so that the Second Unit of the Power*

Plant can be put to use. Accordingly, EPMPL is doing everything possible within its means to help EPTCL complete the construction of the Mahan-Sipat Line.

4. That the completion of the line is being delayed due to severe resistance from the land owners leading to idling of many gangs deployed on the site. The details of right of way issues on the site have been placed on record in the appeal and are not being repeated herein for the sake of brevity.

5. That EPMPL has been informed that despite severe resistance being faced at site, EPTCL and its contractors are making progress every day. This has been possible due to extraordinary deployment at the site. It is submitted that more than 450 people have been deployed at the site.

6. That, as per the direction of this Hon'ble Tribunal during the hearing on 26.03.2018, EPMPL undertakes to ensure that the works continue as fast as possible and the Mahan-Sipat Line is commissioned at the earliest but not later than 30.06.2018.

7. That the interim arrangement through the LILO should be continued as existing at present even beyond the deadline of 31.3.2018, as directed by the CERC and the appellant should be entitled to evacuate the power through the present LILO arrangement.

DEPONENT

VERIFICATION:

That the contents of the above affidavit from paragraph 1 to 7 are true and correct and nothing stated therein is false and nothing material has been concealed therefrom.

Verified on 26th day of March, 2018 at Delhi.

DEPONENT"

10. The undertaking affidavit filed on behalf of Essar Power Transmission Company Limited, fourth Respondent herein, read as follows:

"UNDERTAKING ON BEHALF OF RESPONDENT NO. 4 – ESSAR POWER TRANSMISSION COMPANY LIMITED

I Sandeep Sahay, S/o Santosh B Sahay aged 44 years, resident of Flat No 101, Building M1, Riddhi Garden Complex, Film City Road, Malad East, Mumbai- 400097, presently at New Delhi do hereby state as under:

1. That I am the authorised representative of the Respondent No. 4 and am well aware of the facts and circumstances of the present case and am therefore competent to affirm the present affidavit.

2. That this Hon'ble Tribunal during the hearing on 26.03.2018 directed the Respondent No. 4 to furnish an undertaking to the effect that it shall complete the Mahan-Sipat Line at the earliest but not later than 30.06.2018.

3. I state that the Respondent No. 4 has already completed majority of the work involved and presently only approximately stringing of 40 km (out of 337 kms) is left to be completed which is taking time due to various Right of Way issues. Further Respondent No. 4 has invested a substantial amount of money in completion of the Mahan-Sipat Line and is doing everything possible within its means to complete the construction of the same.

4. That, as submitted above the completion of the line is being impeded due to severe encumbrance being encountered from the land owners. The details of right of way issues on the site have already been placed on record by way of the Appeal [pages 20-28 of appeal paper book] and are not being repeated herein for the sake of brevity.

5. I state that despite severe resistance being faced at site by EPTCL and its contractors, regular progress is being made which is evident from the following:

	Foundation (Total - 942 Nos)	*Towers (Total - 942 Nos)*	*Stringing (Total -337 kms)*
Status as in July, 2017	*938 -completed 4- balance*	*909- completed 33 – balance*	*197 completed 140 balance*
Status as on date	*942 completed*	*942 completed*	*297 completed 40 km balance*

6. I state that, as on date, more than 450 people have been deployed on the site and the Respondent No. 4 is also negotiating with the land owners for settling the Right of Way issues.

7. That as per the direction of this Hon'ble Tribunal, Respondent No. 4 undertakes to carry out the works as expeditiously as possible and to ensure that the Mahan-Sipat Line is commissioned at the earliest but not later than 30.06.2018.

DEPONENT

VERIFICATION:

That the contents of the above affidavit from paragraph 1 to 7 are true and correct and nothing stated therein is false and nothing material has been concealed therefrom.

Verified on 26th day of March, 2018 at Delhi.

DEPONENT"

11. In the light of the submissions made by the learned counsel appearing the Appellant and the learned counsel appearing for the Respondent Nos. 1 & 4 and the statement made in the undertaking affidavits filed on behalf of the Appellant and the fourth Respondent, as stated above, and for the reasons stated therein, we hereby modify the Impugned Order dated 19.01.2018 passed in Petition No. 10/MP/2018 on the file of the Central Electricity Regulatory Commission, New Delhi extending the time for commissioning of Mahan-Sipat Line as expeditiously as possible at any rate within a period upto 30.06.2018 without fail. It is needless to clarify that no further extension will be entertained.

11. Regarding prayer (b) i.e. Declare that the LILO on S/C at Mahan on Vindhyachal Korba D/C Line is a permanent element and cannot be disturbed, the liberty has been reserved to the Appellant to redress their grievance before the appropriate Legal Forum.

12. With these observations, the instant appeal, being DFR No. 1052 of 2018, filed by the Appellant stands disposed of.

(S.D. Dubey)
Technical Member

(Justice N.K. Patil)
Judicial Member

js/vt

ANNEXURE D.5-1

FREQUENCY PARTICULARS OF WESTERN REGION FOR THE PERIOD

DECEMBER 2017 TO APRIL 2018

Sr.No.	PARTICULARS	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18
1	**MAXIMUM FREQUENCY (Hz)**					
1.1	Integrated over an hour	50.13	50.07	50.06	50.08	50.08
1.2	Instantaneous	50.27	50.29	50.21	50.25	50.21
2	**MINIMUM FREQUENCY (Hz)**					
2.1	Integrated over an hour	49.84	49.83	49.86	49.85	49.81
2.2	Instantaneous	49.70	49.62	49.70	49.68	49.62
3	**AVERAGE FREQUENCY (Hz)**	49.98	49.98	49.98	49.97	49.97
4	**NUMBER OF TIMES FREQUENCY TOUCHED**					
4.1	48.6 Hz	0	0	0	0	0
4.2	48.8 Hz	0	0	0	0	0
4.3	51.0 Hz	0	0	0	0	0
5	**PERCENTAGE TIME WHEN FREQUENCY WAS**					
5.1	Above 50.05 Hz	13.28	10.92	10.06	7.72	7.63
5.2	***Between 49.9 Hz & 50.05 Hz***	73.86	77.94	80.25	79.29	79.57
5.3	Below 49.9 Hz	12.86	11.15	9.69	12.99	12.80

ANNEXURE - D.5-2

POWER SUPPLY POSITION IN WR FOR PERIOD FROM DECEMBER 2017 TO APRIL 2018 (IN EX-BUS MW)

Details	Chhattisgarh					Gujarat					Madhya Pradesh					Maharashtra				
	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18
Availability (MW)	3202	3223	3387	3706	3645	14664	14021	14246	14782	15005	12301	12165	11444	9765	8589	19956	21065	21164	22422	23207
Unrestricted demand (MW)	3202	3440	3390	3706	3658	14723	14031	14252	14820	15016	12338	12199	11444	9786	8591	19971	21073	21172	22486	23306
Deficit(-)/Surplus(+) in MW	0	-217	-3	0	-13	-59	-10	-6	-38	-11	-37	-34	0	-21	-2	-15	-8	-8	-64	-99
Deficit(-)/Surplus(+) in %	0.00	-6.31	-0.09	0.00	-0.36	-0.40	-0.07	-0.04	-0.26	-0.07	-0.30	-0.28	0.00	-0.21	-0.02	-0.08	-0.04	-0.04	-0.28	-0.42

POWER SUPPLY POSITION IN WR FOR PERIOD FROM DECEMBER 2017 TO APRIL 2018 (IN EX-BUS MW)

Details	Goa					Daman & Diu					Dadra & Nagar Haveli					Western Region				
	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18
Availability (MW)	490	522	486	521	562	362	339	353	350	347	766	774	774	776	778	49635	50085	48691	48924	50434
Unrestricted demand (MW)	515	523	486	522	562	362	339	353	350	347	766	774	774	776	778	49806	50477	48797	49031	50654
Deficit(-)/Surplus(+) in MW	-25	-1	0	-1	0	0	0	0	0	0	0	0	0	0	0	-171	-392	-106	-107	-220
Deficit(-)/Surplus(+) in %	-4.85	-0.19	0.00	-0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.34	-0.78	-0.22	-0.22	-0.43

POWER SUPPLY POSITION IN WR FOR PERIOD FROM DECEMBER 2017 TO APRIL 2018 (IN MUs) EX-BUS

Details	Chhattisgarh					Gujarat					Madhya Pradesh					Maharashtra				
	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18
Availability (MUs)	1928	2060	1816	2319	2302	9198	9165	8473	9898	10021	7081	6820	5497	5736	5490	12264	12430	11561	13836	14289
Unrestricted Requirement (MUs)	1929	2063	1817	2319	2303	9210	9165	8473	9898	10021	7081	6820	5497	5736	5490	12266	12430	11561	13836	14289
Deficit(-)/Surplus(+) in MUs	-1	-3	-1	0	-1	-12	0	0	0	0	0	0	0	0	0	-2	0	0	0	0
Deficit(-)/Surplus(+) in %	-0.05	-0.15	-0.06	0.00	-0.04	-0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.02	0.00	0.00	0.00	0.00

POWER SUPPLY POSITION IN WR FOR PERIOD FROM DECEMBER 2017 TO APRIL 2018 (IN MUs) EX-BUS

Details	Goa					Daman & Diu					Dadra & Nagar Haveli					Western Region				
	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18
Availability (MUs)	339	340	318	376	388	214	215	199	222	217	533	535	492	534	527	31862	31861	28654	33264	33372
Unrestricted Requirement (MUs)	342	340	318	376	388	214	215	199	222	217	533	535	492	534	527	31878	31864	28655	33264	33374
Deficit(-)/Surplus(+) : in MUs	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-16	-3	-1	0	-2
Deficit(-)/Surplus(+) : in %	-0.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.05	-0.01	0.00	0.00	-0.01

VOLTAGE PROFILE FOR THE PERIOD OF DECEMBER 2017 TO APRIL 2018

ANNEXURE -D.5-3

	भोपाल		खंडवा		इटारसी		दमोह		नागदा		इंदौर		ग्वालियर		रायपुर		रायगढ़	
MONTH	Bhopal		Khandwa		Itarsi		Damoh		Nagda		Indorer		Gwalior		Raipur		Raigarh	
	400kV		400kV		400kV		400kV		400kV		400kV		400kV		400kV		400kV	
	अधिकतम	न्युनतम	अधिकतम	न्युनतम	अधिकतम	न्युनतम	अधिकतम	न्युनतम	अधिकतम	न्युनतम	अधिकतम	न्युनतम	अधिकतम	न्युनतम	अधिकतम	न्युनतम	अधिकतम	न्युनतम
	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Dec-17	424	399	428	402	419	392	427	403	426	396	423	396	419	392	427	413	429	416
Jan-18	424	400	426	401	416	394	427	398	425	399	420	398	416	393	426	410	427	408
Feb-18	425	400	426	394	418	393	428	401	423	402	422	391	418	389	426	409	425	412
Mar-18	421	398	423	406	414	395	425	405	422	400	419	398	417	391	424	408	426	410
Apr-18	417	396	427	407	417	396	424	402	422	401	421	401	419	390	424	407	425	411

	भिलाई		वर्धा		धुले		परली		बोईसर		कलवा		कराड		असोज		देहगाम	
MONTH	Bhilai		Wardha		Dhule		Parli		Boisar		Kalwa		Karad		Asoj		Dehgam	
	400kV		400kV		400kV		400kV		400kV		400kV		400kV		400kV		400kV	
	अधिकतम	न्युनतम	अधिकतम	न्युनतम	अधिकतम	न्युनतम	अधिकतम	न्युनतम	अधिकतम	न्युनतम	अधिकतम	न्युनतम	अधिकतम	न्युनतम	अधिकतम	न्युनतम	अधिकतम	न्युनतम
	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Dec-17	426	381	429	409	439	406	430	398	429	403	437	403	431	407	421	400	435	386
Jan-18	425	407	427	410	437	382	430	394	430	397	439	396	431	405	422	400	435	385
Feb-18	423	404	427	411	437	402	432	398	429	397	438	401	429	405	419	398	434	407
Mar-18	421	404	426	410	434	404	427	397	429	393	434	395	427	401	421	396	434	405
Apr-18	421	400	427	409	433	407	425	396	420	394	430	394	427	399	417	394	429	382

	कासोर		जेतपुर		अमरेली		वापी		मापुसा		कला		मगरवाड़ा		हज़ीरा		बीना		इंदौर	
MONTH	Kasor		Jetpur		Amreli		Vapi		Mapusa		Kala		Magarwada		Hazira		**Bina**		**Indore**	
	400kV		400kV		400kV		400kV		400kV		400kV		400kV		400kV		765Kv		765Kv	
	अधिकतम	न्युनतम	अधिकतम	न्युनतम	अधिकतम	न्युनतम	अधिकतम	न्युनतम	अधिकतम	न्युनतम	अधिकतम	न्युनतम	अधिकतम	न्युनतम	अधिकतम	न्युनतम	अधिकतम	न्युनतम	अधिकतम	न्युनतम
	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Dec-17	426	410	421	394	427	392	429	400	432	394	427	398	430	403	423	383	797	749	797	747
Jan-18	426	383	415	397	422	402	430	394	431	387	426	391	432	399	428	387	794	755	796	747
Feb-18	421	394	414	398	421	404	428	392	433	395	425	391	428	398	420	392	799	756	796	750
Mar-18	423	404	419	396	424	397	432	396	428	387	430	393	434	396	427	388	790	758	792	751
Apr-18	421	405	416	396	422	394	421	396	428	385	419	390	423	397	422	396	792	754	789	749

	सासन		सतना		तमनार		कोटरा		वडोदरा		दुर्ग		ग्वालियर		सिपत		सियोनि		वर्धा	
MONTH	Sasan		Satna		Tamnar		Kotra		Vadodara		Durg		Gwalior		**Sipat**		**Seoni**		**Wardha**	
	765Kv		765Kv		765Kv		765Kv		765Kv		765Kv		765Kv		765Kv		765Kv		765Kv	
	अधिकतम	न्युनतम	अधिकतम	न्युनतम	अधिकतम	न्युनतम	अधिकतम	न्युनतम	अधिकतम	न्युनतम	अधिकतम	न्युनतम	अधिकतम	न्युनतम	अधिकतम	न्युनतम	अधिकतम	न्युनतम	अधिकतम	न्युनतम
	Max	Min	Max	Min	Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Dec-17	778	741	790	748	805	739	807	781	802	758	809	763	804	758	776	754	796	757	805	751
Jan-18	777	753	787	751	802	777	803	778	802	759	805	757	801	744	772	751	792	757	804	759
Feb-18	780	754	791	750	804	735	804	769	800	758	812	751	805	757	772	754	796	757	804	761
Mar-18	776	757	782	752	804	780	805	782	796	752	809	760	796	760	772	752	793	760	802	761
Apr-18	777	754	785	748	805	766	806	765	794	754	813	777	797	751	773	752	793	760	806	761

Annexure-D.5-4

Status of Reactors

Sl. No.	400 kV Sub/Stn.	Size (MVAr)	Implementing agency	Expected date of commissioning
1	Nanded	125	MSETCL	September – 2018
2	Kolhapur	125	MSETCL	September – 2018
3	Akola	125	MSETCL	August – 2018
4	ISP	125	NHDC	Sept – 2018 expected (Tendering done)
5	Satpura-ISP Line Rx(at Satpura end)	50	MPPGCL	Dec-2018
6	Bus Reactor at New Parli(PG)	330	PGCIL	Commissioned on 24.04.2018
7	Bus Reactor at Dhariwal	80	DIL	Commissioned on 23.05.2018

Planning of additional shunt reactors in south Maharashtra – shunt reactors are planned under phase- II by MSETCL. Proposed 125 MVAR Bus reactors are at following 400 KV substations:-

1. Chandrapur-II
2. Koradi-II
3. Khaparkheda
4. Bhusawal-II
5. Lonikand-II
6. Chakan
7. Kudus

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ANNEXURE -D.6

ANTICIPATED POWER SCENARIO IN WR FOR PERIOD FROM JULY 2018 TO SEPTEMBER 2018 (IN MW)(EX-BUS)

Details	CHATTISHGARH			GUJARAT			MADHYA PRADESH			MAHARASHTRA		
	Jul-18	Aug-18	Sep-18	Jul-18	Aug-18	Sep-18	Jul-18	Aug-18	Sep-18	Jul-18	Aug-18	Sep-18
Unrestricted demand (MW)	4005	4200	4230	14440	14648	15485	9530	9800	10300	19600	19400	20200
Availability (MW)	4145	4300	4250	14445	14660	15500	10416	10540	11248	20573	20700	20858
Deficit(-)/Surplus(+)												
(i) MW	140	100	20	5	13	16	886	740	948	973	1300	658
(ii) %	3.38	2.33	0.47	0.03	0.09	0.10	8.50	7.02	8.43	4.73	6.28	3.15

Details	GOA			DD			DNH			WESTERN REGION		
	Jul-18	Aug-18	Sep-18	Jul-18	Aug-18	Sep-18	Jul-18	Aug-18	Sep-18	Jul-18	Aug-18	Sep-18
Unrestricted demand (MW)	505	520	540	320	335	340	810	810	810	49896	50403	52605
Availability (MW)	517	540	550	336	343	342	840	825	845	52504	53811	55787
Deficit(-)/Surplus(+)												
(i) MW	12	20	10	16	8	2	30	15	35	2607	3409	3183
(ii) %	2.38	3.70	1.82	4.80	2.39	0.51	3.58	1.82	4.19	4.97	6.33	5.71

ANTICIPATED POWER SCENARIO IN WR FOR PERIOD FROM JULY 2018 TO SEPTEMBER 2018 (IN MUs)(EX-BUS)

Details	CHATTISHGARH			GUJARAT			MADHYA PRADESH			MAHARASHTRA		
	Jul-18	Aug-18	Sep-18	Jul-18	Aug-18	Sep-18	Jul-18	Aug-18	Sep-18	Jul-18	Aug-18	Sep-18
Unrestricted Requirement (MUs)	2300	2380	2400	8241	8194	9181	5750	6100	6500	14000	14200	13800
Availability (MUs)	2350	2400	2410	8370	8272	9291	5875	6221	6609	14256	14689	14040
Deficit(-)/Surplus(+)												
(i) MUs	50	20	10	129	78	110	125	121	109	256	489	240
(ii) %	2.13	0.83	0.41	1.54	0.94	1.19	2.13	1.94	1.65	1.79	3.33	1.71

Details	GOA			DD			DNH			WESTERN REGION		
	Jul-18	Aug-18	Sep-18	Jul-18	Aug-18	Sep-18	Jul-18	Aug-18	Sep-18	Jul-18	Aug-18	Sep-18
Unrestricted Requirement (MUs)	310	310	325	205	207	210	527	550	531	32240	32777	33506
Availability (MUs)	316	315	331	210	215	212	547	570	550	32942	33672	34135
Deficit(-)/Surplus(+)												
(i) MUs	6	5	6	5	8	2	20	20	19	702	896	629
(ii) %	1.92	1.59	1.74	2.45	3.51	1.03	3.60	3.51	3.51	2.13	2.66	1.84

ANNEXURE-D.7

Status of Generating Units in WR

The status regarding Generating units, commissioned /expected to be commissioned during the current year 2018-19 is as below:

Name of the Power Projects	**Unit No.**	**Capacity (MW)**	**Date of Commissioning /Schedule Date**
Gujarat			
NIL			
Chhattisgarh			
NIL			
Maharashtra			
NIL			
Madhya Pradesh			
Essar Power MP Ltd(Mahan)	2	600	Synchronized on 03.08.2017
Central sector/IPP			
KSK	5	600	December – 2018
RKM	4	360	July 2018
NTPC Lara	1	800	Oct 2018
NTPC Solapur	2	660	Oct 2018
NTPC Gadarwada	1	800	July-18
NTPC Gadarwada	2	800	Mar-19

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ANNEXURE D.8

भारत सरकार
Government of India
केन्द्रीय विद्युत प्राधिकरण
Central Electricity Authority
पश्चिम क्षेत्रीय विद्युत समिति
Western Regional Power Committee
एफ -3, एमआयडीसी क्षेत्र, अंधेरी (पूर्व), मुंबई - 400 093
F-3, MIDC Area, Andheri (East), Mumbai - 400 093

सत्यमेव जयते

आई एस ओ ः 9001-2008
ISO : 9001-2008

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संख्या : पक्षेविस /वाणिज्यिक –I / कार्यवृत्त /2017/ दिनांक : 07.06.2018
No. : WRPC/Comml.-I/ Minutes/2018 /

सेवा में / To

As per List (सूची के अनुसार)

विषय : 76वीं वाणिज्यिक समिति की बैठक का कार्यवृत्त ।
Sub : Minutes of the 1st meeting of subgroup on Five Minutes Scheduling and Accounting.

महोदय / Sir,

इस पत्र के साथ दिनांक **22।02।2018** को 11:00 बजे, कान्फ्रेंस हाल, प. क्षे. वि. स, एमआइडीसी मरोल, अंधेरी पूर्व, मुंबई में हुई, पांच मिनट शेड्यूलिंग पर उपसमूह की पहली बैठक का कार्य वृत्त आपकी सूचना एवं आवश्यक कार्रवाई हेतु संलग्न है।

Please find enclosed herewith Minutes of the 1st meeting of subgroup on Five minutes scheduling held on 22.02.2018 at 11:00 Hrs at WRPC Secretariat, Mumbai. This is for your information and necessary action.

The Minutes of the meeting is available on website www.wrpc.nic.in, same may please be downloaded.

भवदीय / Yours' faithfully,

07/06/18

(जे.के. राठौड़./**J. K. Rathod**)
अधीक्षण अभियंता (वाणिज्यिक) / Superintending Engineer (Comml.)

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28. Director, Jaypee Bina Thermal Power Plant, village sirchopi, Agasod P.O. Bina-470113 Distt. Sagar(MP)
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32. Managing Director, Gujarat State Electricity Corp. Ltd. Sardar Patel Vidyut Bhawan, Race Course, Vadodara.-390 007. Fax: 0265-2338152 Gen.2337918, 0265-2344734
33. Chairman & Managing Director, M.P.Power Generatioin Company Ltd., Shakti Bhavan, Vidyut Nagar, Rampur, Jabalpur.-482 008. Fax 0761-266 5661.
34. Managing Director, Maharashtra State Power Gen. Co. Ltd., Prakashgad, Plot No G-9, Bandra (East), Mumbai.-400 051. Fax: 26471060, 26581400.

Minutes of the meeting of group on 5 minutes scheduling held on 22.02.2018 at WRPC, Mumbai.

A meeting of group on 5-minutes scheduling was held on 22.02.2018 at WRPC, Mumbai. The list of participants is enclosed at **Annexure-I**.

MS, WRPC welcomed all the participants of the group. He stated that Forum of Regulators (FOR) in its eleventh meeting of the "Technical Committee for Implementation of Frame work on Renewable at the State Level" held at Chennai, it was decided to form a Sub-Group to examine the various aspects of migrating from 15-minute to 5-minute scheduling, metering, accounting and settlement at the inter-state level to facilitate large scale integration of Renewables to the grid.

Further he stated that three meetings of the sub-group constituted by the FOR technical Committee were held at NLDC, New-Delhi. Based on those three meetings, NLDC has prepared a report of Sub-Group on Introduction of Five Minute Scheduling, Metering, Accounting and Settlement in Indian Electricity Market in January 2018. He requested all the members to submit their point-wise comments, so that the WRPC can be informed of consolidated views of WR constituents and related developments.

SE, WRPC requested representatives to present their views. The presentations from the representatives are at **Annexure-II**.

1. NTPC

i) NTPC representative stated that top most priority is to be given to AGC:

a) Implementation of AGC which is long overdue & we are lagging in comparison to most of the power systems in the world, therefore AGC should get priority and cover as many machines as possible. This should start on war-footing.
b) More and more machines of CGS, IPPs, and State Gencos are to be included under the ambit of AGC.
c) Load Despatch Centre (LDC) should be empowered with sufficient secondary control reserves for success of AGC.

d) After gaining experience in frequency control through AGC, the need for rule change in the form of narrowing down the dispatch & settlement period may be studied and taken up suitably.

ii) As regards to migrating from 15-minute to 5-minute scheduling system, he further stated that:

a) Huge capital investment as well as time is required.

b) As there is no automatic/online control of fuel quantity based on its quality, there is inherent delay of around 5 minutes in coal stations. Therefore manual intervention is also required.

c) More accurate demand/load forecasting is needed.

d) Frequent changes in Schedules: A frequent change (i.e. every 5-minute) in schedule will make generation control very difficult. Changes in schedule introduced in consecutive five-minute blocks will lead to deviations in more than one consecutive block.

e) Un-Requisitioned Surplus (URS) power trading will pose challenges in meeting the schedule when schedule from Power Exchange (PX) will be added to normal schedule. Ramping up /down in such short period may not be possible.

f) More discussion needed on "Gate Closure" & method of schedule revision.

g) More complications in handling 288 time blocks of 5-minute each.

h) DSM violation / Zero crossing rule violation will be more—very difficult to maintain Scheduled Generation (SG) with manual control if SG varies in every 5 min.

i) There will be an impact on life of the major equipment, because of increase in cyclic operations leads to increase in thermal stresses.

j) Adhering to schedule changes: This will be difficult considering the fact that there is an inherent latent time gap for boilers for effecting changes in steam flow vis-a-vis fuel input changes. The load gradient thereafter, though known to the operator, also depends on fuel quality which cannot be estimated on real time / online basis. In the present condition, adjustments in coal flow during the latter part of a block helps to fine tune the

generation to the schedule given. A five minute time block is too less to correct the generation to the desired level in case of over/under generation.

k) For super critical units as the temperature variations are frequent may lead to frequent tripping of units on the special protection.
l) Due to cyclic operation there will be more shaft vibration and also the life of capital equipment may get reduced significantly. It may also lead to problems in boiler feed pump and it may further lead to fatigue failures of components in generation station.
m) NTPC stations are stable in operation in the range of 80 to 100% of loading. Operation outside this range will lead to flame instability and boiler trip.

2. Gujarat

SLDC Gujarat representative stated that the Operational challenges in migrating to 5 Minutes scheduling are as follows:

a) The associated inputs required to be changed viz. RE forecasting, DISCOM load forecasting.
b) More numbers of Agriculture groups (AG) are required to be formed in order to align with the five minutes load forecasting as presently, AG have 15 minute schedule.
c) As there is no past 5 Minutes data with DISCOM, hence they may find difficulty in 5 minutes load forecasting. So that there will be more deviations in DSM too.
d) In case of any short/momentary eventualities, presently generator has about one time block of 15 minute to mitigate the schedule. Whereas, in case of 5 minute time blocks, there are more chances that generator falls under DSM limit violation.
e) Appropriate regulatory changes are also required to be done particularly those are based on time blocks viz. effect of revision, change of sign of sustained deviation, DSM computation etc.
f) Migrating to 5 minutes is feasible, but requires manpower and up gradation in both Hardware and Software.
g) Merchant plants are deviating around + or – 500 MW due to which there is a violation in state DSM.

3. Maharashtra

Maharashtra SLDC expressed the following views on 5 minutes scheduling and energy accounting:

a) Presently UI Bill settlement mechanism (FBSM - Final Balancing and Settlement Mechanism) of Maharashtra state is based on MERC's order on 15-minute scheduling and energy accounting. So changing to 5 minute scheduling and energy accounting needs regulation from MERC and consent of all stake holders of Maharashtra state such as MAHAGENCO, MSETCL, MSEDCL, RELIANCE, TATA, BEST, RAILWAY, SERENE and IPPs.
b) Presently for calculation of UI bill around 1157 intra state meter and 67 inter-state meter data is used on 15 minute basis. To make the changes for 5-minute, rebuilding of structure required scheduling and billing software, meter data integration.
c) Requirement & rebuilding of infrastructure, MERC order, consent from STU and all stakeholder and budget allocation.
d) Views of Generators and DISCOMS are prime in this regard as ramp up and down are recurrently required.
e) Generation is difficult to match with frequently changing load due to 5-minute scheduling.
f) Prior assessment of generator is required whether generators are capable of 5 minutes generation and whether DISCOMS are able to manage their loads at 5 minutes and are they able to forecast at 5 minutes.
g) As Maharashtra is RE rich state, accurate forecasting of demand and RE over a period of 5 minutes is required.
h) RRF - Renewable Regulatory Fund regulation is not applicable on RE. There should be certain commercial implication on RE. RE visibility should be there.
i) Open access regulation to be changed for embedded consumer.
j) DSM limits to be liberal in terms of pricing & capping.

4. Madhya Pradesh

Representative from MP SLDC stated that:

a) Migrating to 5 minutes is feasible, but requires manpower and up gradation in both Hardware and Software.
b) Due to overdrawl/underdrawl on account of 5-minute scheduling, ADMS will also operate frequently.
c) AMR metering to be implemented in states also.
d) Simultaneous replacement of meters both at state and central level would be difficult.

5. Chhattisgarh

Representative from Chhattisgarh SLDC stated that:

a) Prepare a system for 5 minutes but migrate to 10 minutes and consider the feedback from Generators and then migrate to 5 minutes later on.
b) Decisions of DISCOMs (users) are based on overdrawl/underdrawl and system operators are based on frequency.
c) Many CPPs are with unpredictable injection pattern (i.e. with deviation of 0 to 150 MW) and this would further lead to deviation by DISCOM. This also leads to deviation in LGB-Load Generation Balance.

6. DB Power

DB Power representative stated the following:

a) There is no visible gain as compared to 15 minutes Scheduling.
b) The 5 minute is too short period for Generator's response. The normal change is about 50 MW/15 minute (refer 6.5.14 of Grid Code). This would call for frequent changes in unit Load and leading to the following:
    - Increase in thermal stress due to frequent variation in load.
    - Frequent boiler tube leakage.
c) Typical Bilateral and IEX intra-day market trades are based on hourly requirement irrespective of present 15 minutes Scheduling intervals. If this is reduced to 5 Minutes,

the thermal unit will not be able to respond to this large change in 5 minutes; thus increasing the deviations in each time block.

d) DisCom has to forecast the demand in 288 Time blocks and the accuracy of forecasts is necessary otherwise the DSM violations are more.
e) Solar mission and thrust on renewables may add 1,50,000 MW capacity in the grid, which poorly respond to frequency and ramp up and ramp down. Entire responsibility of frequency control would fall on thermal and hydro stations. Under these conditions, it is not clear how grid would behave under 5 min ABT Scheduling.
f) Monitoring on 5 minutes basis for either generator or Purchaser is itself a tedious task.
g) All SEMs will have to be recalibrated for this change without any specific advantage.
h) The professionals should judge tangible benefits of 5 minutes ABT scheduling, before adopting this change.
i) Consider cost optimization and safety benefits, rather than mathematical optimization.
j) DisComs need further investment if the benefits of better grid operation are to be passed on to the retail and industrial consumers. What is investment required by DisComs nation-wide?
k) If we enact such regulations, all Generators and DisComs can be accused of violations.
l) Due to surplus unused capacity in the grid, we have found faster generation response to frequency and grid flow in last 5 years.

7. Summary of discussions

After taking feedback from all the participants, Member Secretary, WRPC concluded the session by making the following remarks:

a) Members in general opinioned that Primary and Secondary controls of generation should be strictly implemented before making any changes in the existing scheduling mechanism. To start with, AGC should be implemented for CGS, state Gencos, and IPPs. If AGC serves the purpose, then there may not be any necessity for changing the existing scheduling mechanism.
b) Generators and DISCOMs expressed difficulties (such as boiler response, flame failure, fatigue failure, boiler tripping, etc.) in many aspects to maintain their actual injection/drawl close to their schedules in the 5-minute time frame.

c) As the proposed 5-minute scheduling mechanism requires fast response, the existing manual control of generation may not be suitable for fast response.
d) In RE-rich state it would be difficult for DISCOMs and SLDCs to absorb the deviation due to intermittent RE integration, since RE generators are not penalized for deviations.
e) For forecasting, detailed guidelines covering various aspects are required.
f) Some members expressed that it is feasible to switch over to 5-minute scheduling provided hardware/software is upgraded and additional manpower is deployed. Capacity building at various levels is required.
g) Precise load forecasting, RE generation forecasting, and weather forecasting are essential for switching over to 5-minute scheduling.
h) Some members expressed that:
    - As for as possible, existing meters are modified to support 5-minute recording.
    - Replacement of existing meters, if required, should be done in phased manner by CTU.
    - Meter replacement activity may take around 1½ – 2 years time.

After concluding remarks of MS, WRPC, meeting ended with thanks to the Chair.

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Encl:
a) Annexure-I (List of participants)
b) Annexure-II (Presentations)

Annexure-1

List of Participants for 5-minutes scheduling group meeting held on 22.02.2018 at WRPC, Mumbai						
	Name	Designation	Organisation	e-mail	Mobile No.	signature
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S.No.	Name	Designation	Organisation	e-mail	Mobile No.	signature
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25	A. U. Bulbule	SE(LM)	MSEDCL	selmkalwa@gmail.com	9833383882	22/02/2018
26	S. S. Patil	EE(LM)	"	"	9833980221	
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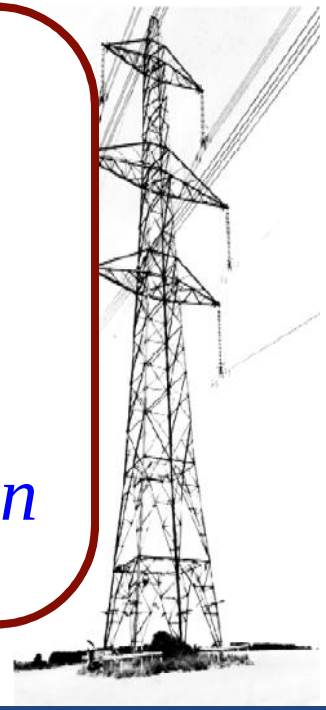
"Objective of the discussion "

Frequency at 50 Hz

~Flexible, Reliable, Sustainable, Efficient & Eco-friendly Power Generation providing Security & Stability to the Grid in view of large scale integration of Volatile RE sources~



5-min Scheduling & Settlement

By

NTPC Limited





Objective *~Flexible, Reliable, Sustainable, Efficient & Eco-friendly Power Generation providing Security & Stability to the Grid in view of large scale integration of Volatile RE sources~*

Frequency Control:

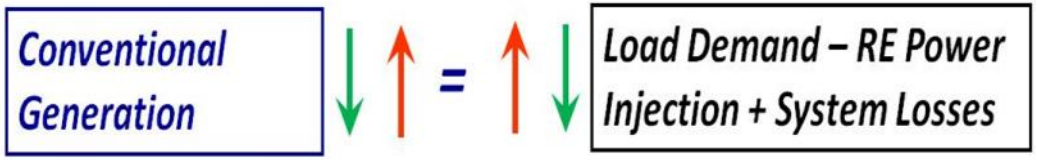
Maintaining grid frequency very close to reference frequency of 50 Hz by

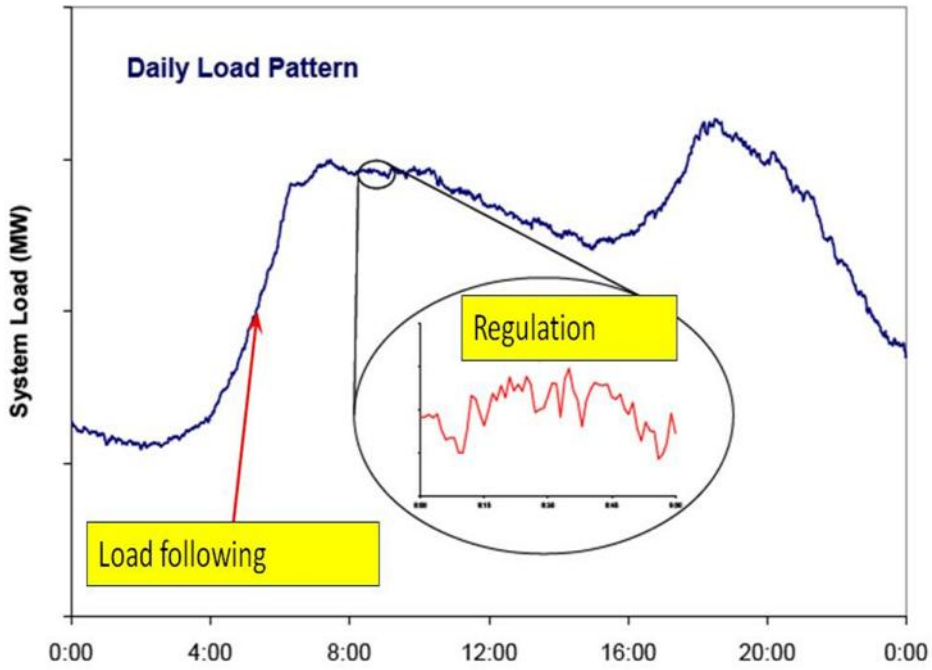
a) Load following & b) Regulation

Increasing Variability of "Net / Residual Load" with large scale RES integration

Action priority wise:

- Real time control of Generation by Automatic Generation Control-**AGC**.
- More accurate forecasting is needed.
- Manual: despatch instructions.





Control actions: First thing First

Top most priority is to be given to AGC.

- Implementation of AGC which is long over due & we are lagging in comparison to most of the power systems in the world, should get priority and cover as many machines as possible. This should start on war footing.
- More and more machines of CGS, IPPs, State Gencos are to be included under the ambit of AGC.
- LDCs should be empowered with Sufficient secondary control reserves for success of AGC.

After gaining experience in frequency control through AGC, the need for rule change in the form of narrowing down the dispatch & settlement period may be studied and taken up suitably.

15 min to 30 min scheduling & settlement is in practice in most of the countries including EU where the penetration of Wind (most uncertain & variable source of generation) is maximum >40%.

5 min scheduling & settlement:

- Why priority is given to 5 min scheduling in India where even after 175GW (mostly solar which is predictable in nature) addition of RE, share of RE gen will be ***17-18% from current level of 4-5%?***

- Why Not 1 min?

- Costs of five minute settlement ?–Cost benefit analysis may please be discussed.

Difficulties envisaged:

- DSM violation / Zero crossing rule violation will be more—very difficult to maintain SG with ***manual control*** if SG varies in every 5 min.

  Adhering to schedule changes: This will be difficult considering the fact that there is an inherent latent time gap for boilers for effecting changes in steam flow vis a vis fuel input changes. The load gradient thereafter, though known to the operator, also depends on fuel quality which cannot be estimated on real time / online basis. In the present condition, adjustments in coal flow during the latter part of a block helps to fine tune the generation to the schedule given. A five minute time block is too less to correct the generation to the desired level in case of over/under generation.

Difficulties envisaged:

- **Frequent changes in Schedules:** A frequent change in schedule will make generation control very difficult. Changes in schedule introduced in consecutive five minute blocks will lead to deviations in more than one consecutive blocks.

- URS power trading will pose challenges in meeting the schedule when schedule from PX will be added to normal schedule. Ramping up /down in such short period may not be possible.

- More discussion needed on "***Gate Closure***" & method of schedule revision.

- More complications in handling 288 time blocks.

THANK YOU

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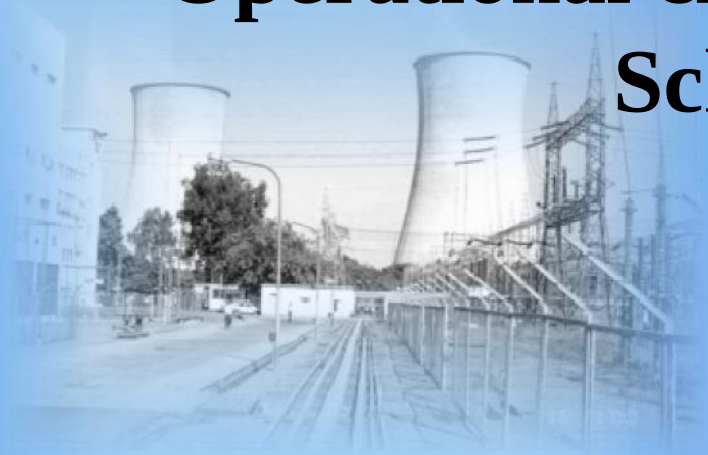
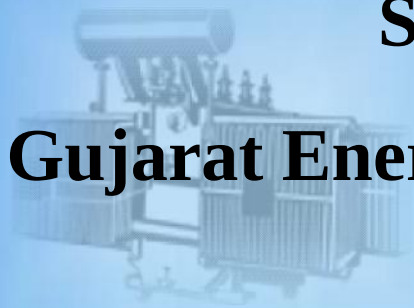
Operational challenges- 5 Minutes Scheduling





State Load Despatch Centre

Gujarat Energy Transmission Corporation Limited

[An ISO 9001 : 2008 Company]

Challenges

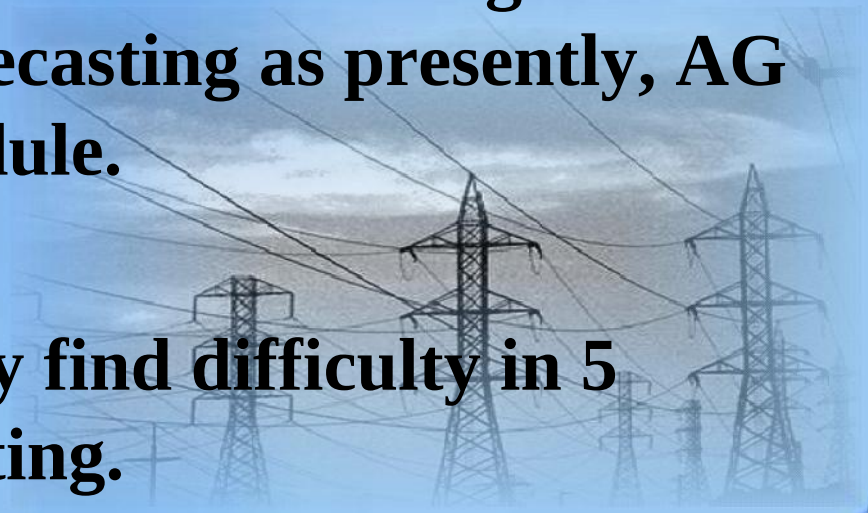
- OPERATIONAL
- DAILY SCHEDULING
- METERING

Operation/Daily scheduling challenges

- **All the associated inputs are required to be changed. Viz. RE forecasting, DISCOM load forecasting.**

- **More numbers of Agriculture groups (AG) are required to be formed in order to align with the five minutes load forecasting as presently, AG have 15 minute schedule.**

- **Hence, DISCOM may find difficulty in 5 minutes load forecasting.**



Operation/Daily scheduling challenges

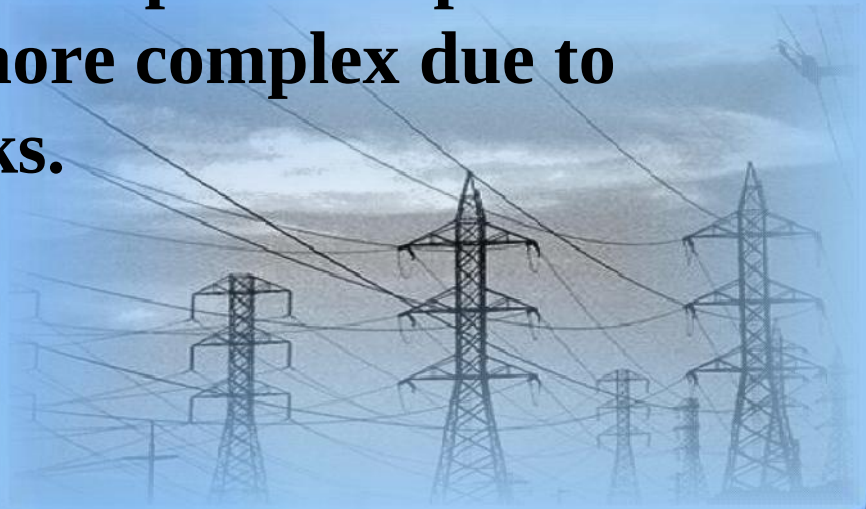
- **In case of any short/momentary eventualities, presently generator has about one time block of 15 minute to mitigate the schedule. Whereas, in case of 5 minute time blocks, there are more chances that generator falls under DSM limit violation.**

- **Appropriate regulatory changes are also required to be done particularly those are based on time blocks. Viz. effect of revision, change of sign of sustained deviation, DSM computation etc.**

Operation/Daily scheduling challenges

- **Number of pick up/back down of the generator during the day will be increased. That may affect the life of the generators.**

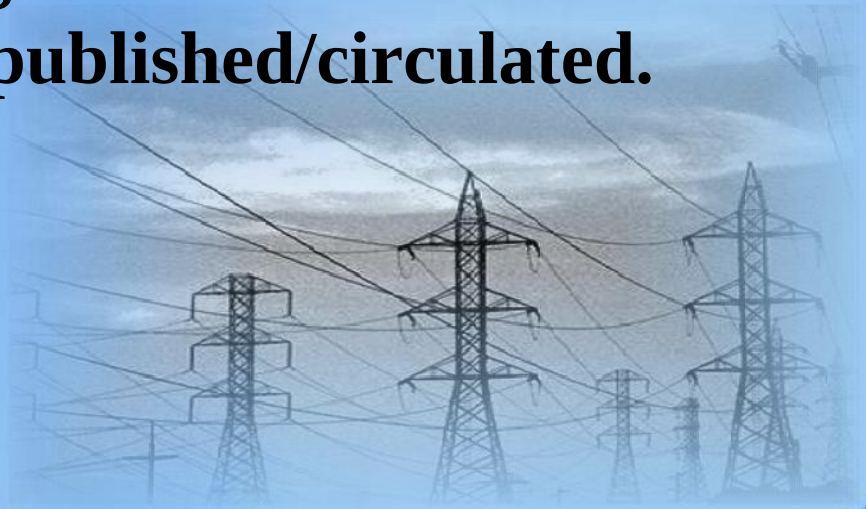
- **Number of scheduling revisions during the day will be increased and computation process also becomes somewhat more complex due to increase of time blocks.**



Metering

- **Technological-Regulatory challenges are already identified/discussed.**

- **Recently, FOR-Sub-Group report on Introduction of Five Minutes scheduling, metering, Accounting and Settlement in Indian electricity Market is published/circulated.**




Thank you !!!
SUN
WIND
EARTH
WATER

^

5 min ABT Scheduling in Indian Grid
- Generator's Perspective

Sanjay Jadhav – Sr. Dy. General Manager
D B Power Limited

At WRPC Meeting 22.02.2018

History of UI & DSM

Previous paradigm of ABT	Latest Paradigm of ABT
ABT was intended for frequency control and grid stability	• Intended for frequency control and grid stability • ABT enables Open Access in Inter-State Transmission
Gaming is Violation of Limits of +5% in a TB and +1% in day	Gaming is Mis-declaration of DC for commercial gain
Enables Merit Order Despatch	Public disclosure of schedule enables Merit Order Despatch
UI as a penalty for frequency control	DSM is a settlement mechanism. Additional DSM for higher penalty, for undesirable injection and drawal
Some generators & DisComs used the ABT for sale and buy of power without scheduling.	• Frequency should be 50 Hz. • Limited earning opportunity
Predominantly LT schedules	• LT, ST & PX Schedules
Intentional under-declaration was discouraged by +5% & +1 % limits for misuse of UI	• Over injection above +12% of schedule is priced at Cap rate NIL Rs./ kWh

^

Difficulties faced by GenCo and DisComs

- No visible gain as comapred to 15 Mts. Scheduling
- The 5 min is too short a period for Generator's response. The normal change is about 50 MW/15 minute (refer 6.5.14 of Grid Code). This would call for frequent changes in unit Load.
  - Increase in thermal stress due to frequent variation in load
  - May lead to frequent boiler tube leakage
- Typical Bilateral and IEX intra day market trades are based on hourly requirement irrespective of present 15 Mts. Scheduling interval. If this is reduced to 5 Minutes, the thermal unit will not be able to respond to this large change in 5 Min.; thus increasing the deviations in each time block.

^

Difficulties faced by GenCo and DisComs

- Can DisComs really forecast the demand in 384 TBs? What is accuracy of forecasts? Is it really required?
- Does 5 min scheduling really adds value in better grid discipline?
- Solar mission and thrust on renewables may add 150000 MW capacity in the grid, which poorly respond to frequency and ramp up and ramp down. Entire responsibility of frequency control would fall on thermal and hydro GenCos. Under these conditions, how grid would behave under 5 min ABT Scheduling?
- Monitoring on 5 Min. basis for either generator or Purchaser is in itself a tedious task
- All SEMs will have to be recalibrated for this change without any specific advantage.

Challenges of 5% ABT scheduling

- The professionals should judge tangible benefits of 5 min ABT scheduling, before this adopting this change
- Look for cost optimization and safety benefits, rather than mathematical optimization
- DisComs need further investment if the benefits of better grid operation are to be passed on to the retail and industrial consumers. What is investment required by DisComs nation-wide?
- If we enact such regulations, all Generators and DisComs can be accused of violations.
- Due to surplus unused capacity in the grid, we have found faster generation response to frequency and grid flow in last 5 years. But if “Make in India” curtails the surplus capacity gap, how grid will behave under 5 min ABT scheduling.

^

References

- CERC ABT order 04.01.2000
- CERC (UI Charges & RM) Regulations, 2009
- CERC (DSM & RM) Regulations, 2014
- WRPC CCM 76th meeting dated 23.10.2017
- WRPC letter dated 02.11.2017


Thank You

ANNEXURE D.9-1

भारत सरकार
Government of India
केन्द्रीय विद्युत प्राधिकरण
Central Electricity Authority
पश्चिम क्षेत्रीय विद्युत समिति
Western Regional Power Committee
एफ -3, एमआयडीसी क्षेत्र, अंधेरी (पूर्व), मुंबई - 400 093
F-3, MIDC Area, Andheri (East), Mumbai - 400 093
दूरभाष Phone: 022-28221681, 2820 0194, 95, 96 फैक्स Fax: 022-2837 0193
Website: www.wrpc.gov.in E-mail: comml-wrpc@nic.in

आई एस / आई एस ओ :
9001-2008
IS/ISO: 9001-2008

No. WRPC/Comml-I/corr / 2017 / 694 **Date: 22.1.2018**

To,

(सूची के अनुसार / As per list).

महोदय /Sir,

Sub: MoM of the Special meeting on preparation of compensation for partial loading in respect of gas based generating stations held on 15.12.2017 at WRPC - Reg.

Please find enclosed herewith a copy of MoM of **Special meeting on preparation of compensation statement for partial loading in respect of gas based generating stations held on 15.12.2017 at WRPC, Mumbai.**

The Minutes of the meeting is available on website www.wrpc.gov.in, the same may please be downloaded.

Thanking you.

भवदीय/ Yours faithfully,

(J.K.Rathod) 22/01/18

अधीक्षण अभियंता (वाणिज्य) / Superintending Engineer (Comml)

Mailing list:

1. Executive Director (Finance), Gujarat Urja Vikas Nigam Ltd., Vadodara-390 007. Fax: 0265-2344543.
2. Chief Engineer (LD), Gujarat Energy Transmission Corpn. Ltd., Vadodara- 390 021
3. Chief General Manager (Comml), MP Power Management Co.Ltd., Jabalpur-482 008. Fax: 0761-2664749.
4. Chief Engineer (LD), M P Power Transmission Company Ltd.,SLDC, Jabalpur 482 008. Fax: 0761-2661884
5. Chief Engineer (Comml), Chhattisgarh State Power Distribution Co. Ltd., Raipur – 492 013. Fax: 0771-5066942
6. Chief Engineer (LD), Chhattisgarh State Power Transmission Co. Ltd., Bhilai-490 024.
7. Chief Engineer (PP), Maharashtra State Electricity Distribution Co. Ltd., Mumbai-400 051. Fax: 022-26475012.
8. Chief Engineer (LD), State Load Despatch Centre, MSETCL, New Mumbai - 400 708. Fax: 022-27601769
9. Chief Electrical Engineer, Panjim, Goa-403 001. Fax: 0832-2222354
10. Executive Engineer, Electricity Department, Daman-396 210. Fax: 0260-2250889
11. Executive Engineer (Elect), Electricity Department, Silvassa-396 230. Fax:0260-2642338/236/787
12. General Manager (Comml), NTPC Ltd., New Delhi-110 003. Fax: 011-24364606
13. Regional Executive Director (West), NTPC Ltd., Mumbai-400 093. Fax- 28259345
14. Executive Director, POSOCO, WRLDC, Mumbai-400 093. Fax: 022-28202630
15. Addl. Chief Engineer (R & C), Gujarat Energy Trans. Corpn. Ltd., Vadodara-390 007
16. Chief Engineer (Trans. O&M), MSETCL, Mumbai-400 051
17. Member Secretary, Northern Regional Power Committee, New Delhi 110 016
18. Member Secretary, Southern Regional Power Committee, Bangalore 560 009
19. Member Secretary, Eastern Regional Power Committee, Kolkata-700 033
20. Member Secretary, North Eastern Regional Power Committee, Shillong 793 303
21. Chief Engineer (GM), Central Electricity Authority, New Delhi –110 066.

Minutes of Special meeting held on 15.12.17 at W.R.P.C, Mumbai.

Sh. J. K. Rathod, S.E. (C), WRPC welcomed the participants to the special meeting. The list of participants is attached at Annex-1.

SE(C), WRPC informed that a discussion was held between NTPC WRHQ Commercial group and Member Secretary WRPC on 11/12/2017 on Compensation mechanism for gas based generating stations implementation in WR. In the discussions it was suggested that a special meeting among WRPC and NTPC officials be held to deliberate on issues being faced on compensation mechanism for gas based stations.

The participants discussed various aspects pertaining to the issue and following are the brief of the discussion:

1. NTPC informed WRPC that OEMs have provided Heat Balance Diagrams (HBD) in respect of new machines for 100% and 80% loading. The characteristic curves of Kawas and Gandhar have not been provided by OEM for degraded SHR and APC.

2. NTPC further informed that as SHR and APC figures are not given by OEM for Full module/ half module operation for any of the gas stations, the same has been worked out on "Actuals" as is recorded in real time operation over the years. Both HBD and degradation curves are to be interpreted together to arrive at SHR and APC figures at various loadings.

3. In view of the information provided by NTPC at serial no 1 and 2, it was agreed as a way forward that NTPC shall provide the degraded curves for SHR and APC based on HBD and actual observed values in the tables as mentioned at Sl. No. 2 to WRPC for preparation of compensation statement of Gas stations.
4. It was also agreed the observed data provided as per serial no 2 can be verified by WRPC/Beneficiaries of the stations .

The meeting ended with a vote of thanks.

****

22/01/18

Meeting with NTPC. (15/12/17

Annex 1

List of Participants for Special meeting to discuss Compensation Data for Gas Stations held on 15.12.2017 at WRPC, Mumbai						
	Name	Designation	Organisation	e-mail	Mobile No.	signature
1	SANDEEP GUPTA	AGM(OS)	NTPC LTD	Sandeepgupta@ntpc.co.in	9650994688	
2	ANIL NAUTIYAL	GM(OS)	NTPC Ltd	anilnautiyal@ntpc.co.in	9004497012	
3	P A Pande	AGM(C)	NTPC Ltd	pravin.ntpc@gmail.com	9004496010	
4	S BALASUBRAMANYA	AGM	NTPC Ltd	SBALASUBRAMANYA@ntpc.co.in	9429408129	
5	HARISH AMETA	Dy. Mgr.	NTPC Ltd	harishameta@ntpc.co.in	9408705061	
6	VIJAY PRAKASH MISRA	DGM	NTPC Ltd.	vpmishra@ntpc.co.in	9004497240	
7	D.N. Gawali	E.E	WRPC	Comml-wrpc@nic.in	7738666765	
8	J. K. RATHOD	S.E.	WRPC	"	"	
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						

Gandhar

ANNEXURE D.9-2

Observation of parameters during visit to Jhanor-Gandhar for partial loading operation on 15th Mar18 for the purpose of Compensation Mechanism

Observations Witnessed by

1. **WRPC**
2. **MSEDCL**
3. **GUVNL**
4. **MPPMCL**
5. **NTPC**

Observation of parameters during visit to Jhanor-Gandhar for partial loading operation on 15th Mar18 for the purpose of Compensation Mechanism

Full Module Check - 15th mar18 with GT# 1,2 & 3 and STG

%Loading	Load Set Point Time	Reading Time	Gross Gen (MW)	Export (MW) as per SEM'S meters	Gas Consumption SCM	Gas GCV (Kcal/SCM)	Colony Load - MW	Heat Rate KCAL/Kwh	APC(%)	Ambient Temp
55	16:00	17:15 to 17:30	358.91	348.48	87198.72	9435.84	0.16	2292.5	2.86	37.31
65	17:35	18:15 to 18:30	429.06	417.84	97688.62	9586.01	0.20	2182.6	2.57	36.22
75	18.35	19:15 to 19:30	493.06	480.88	108883.68	9529.58	0.35	2104.5	2.40	33.30
85	19:35	20:15 to 20:30	559.10	547.76	121573.51	9579.74	0.35	2083.1	1.97	33.41

J. K. RATHOD
S. E.
WRPC

16/3/2018
(SANDEEP GUPTA)
AGM (OS-GT/RLC)
NTPC

(CHAIRMAN)
MTDC

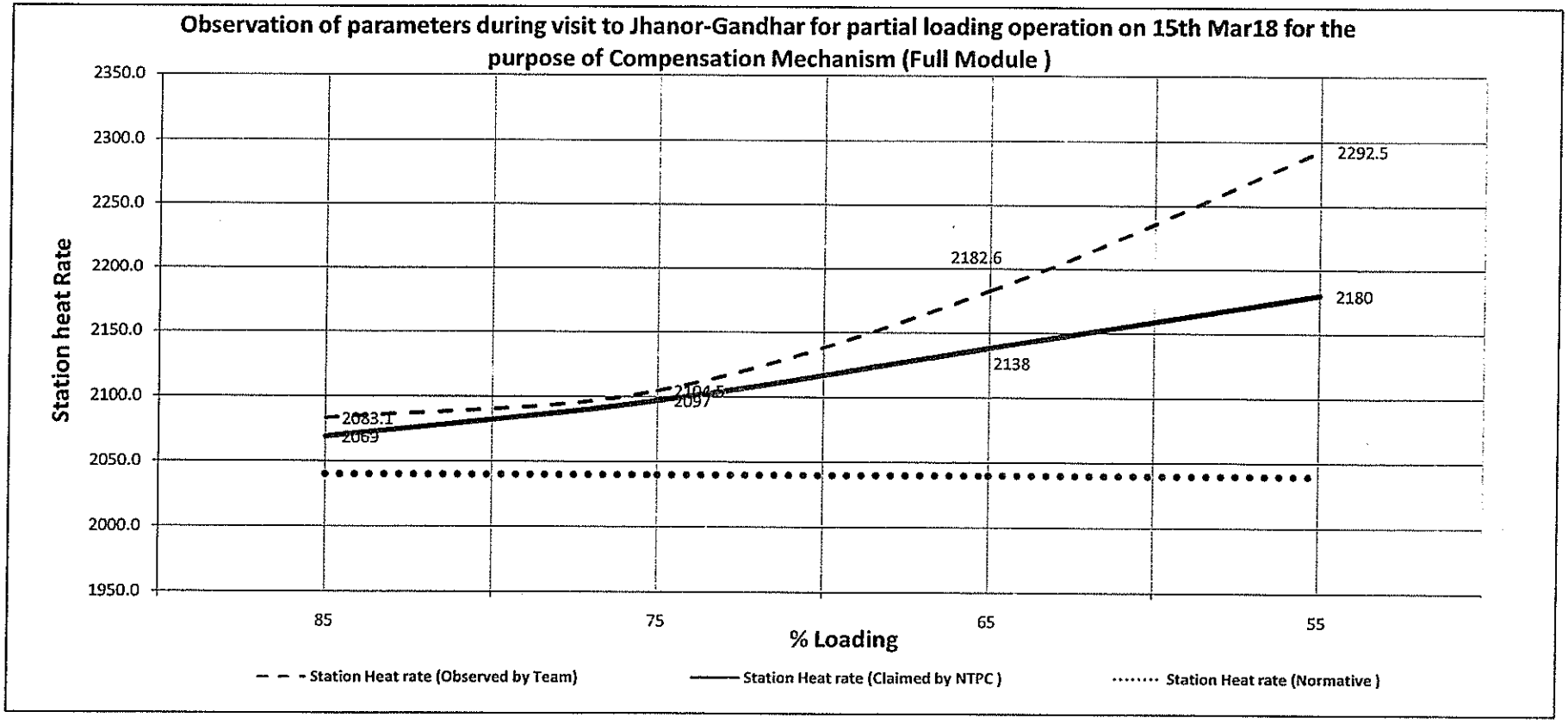
Pramod Chandhary
MPPMCL

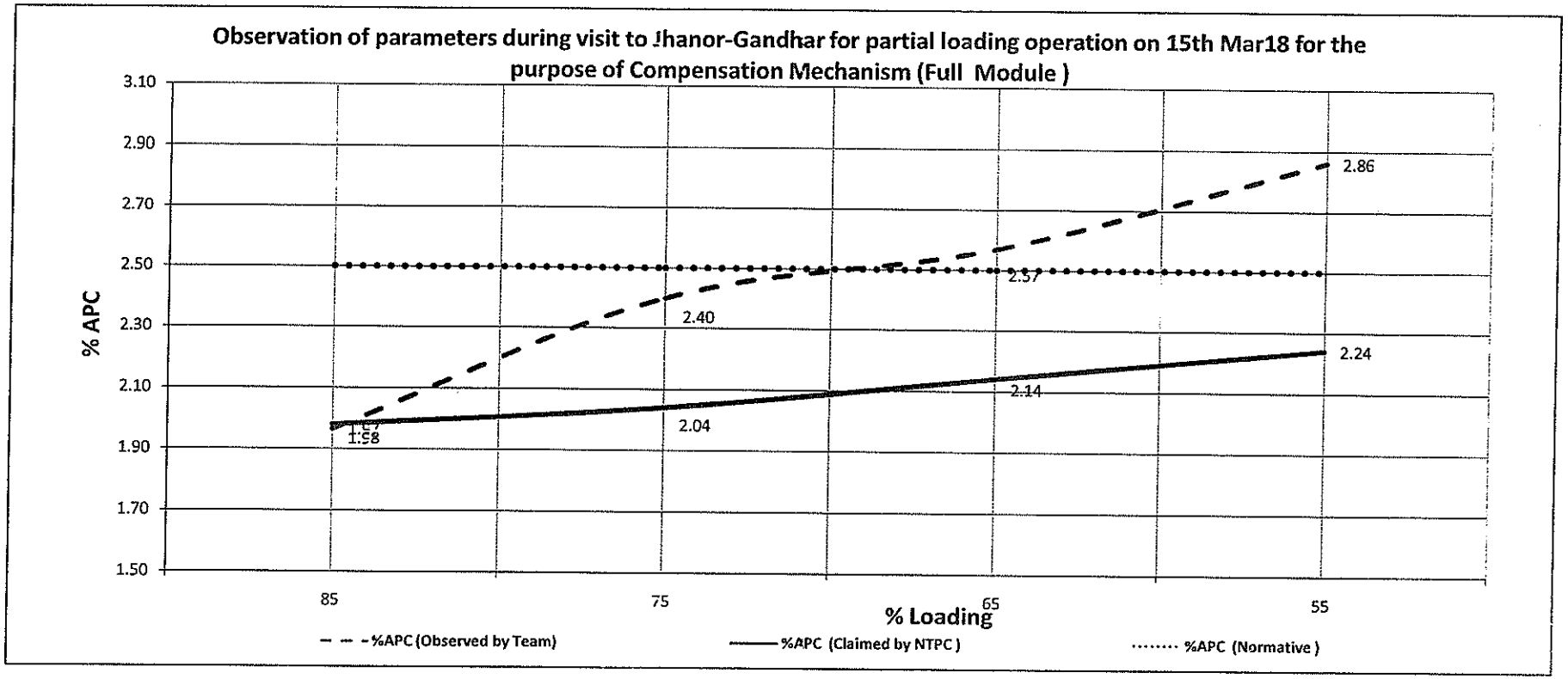
GUVNL (S.K.Nair)

P.S. Patil
EE (LM)
MSEDCL

Observation of parameters during visit to Jhanor-Gandhar for partial loading operation on 15th Mar18 for the purpose of Compensation Mechanism (Full Module)			
% Loading	Station Heat rate (Observed by Team)	Station Heat rate (Claimed by NTPC)	Station Heat rate (Normative)
85	2083.1	2069	2040
75	2104.5	2097	2040
65	2182.6	2138	2040
55	2292.5	2180	2040

% Loading	%APC (Observed by Team)	%APC (Claimed by NTPC)	%APC (Normative)
85	1.97	1.98	2.50
75	2.40	2.04	2.50
65	2.57	2.14	2.50
55	2.86	2.24	2.50


Observation of parameters during visit to Jhanor-Gandhar for partial loading operation on 15th Mar18 for the purpose of Compensation Mechanism (Full Module)
Station heat Rate
2350.0
2300.0
2250.0
2200.0
2150.0
2100.0
2050.0
2000.0
1950.0
2292.5
2182.6
2180
2138
2104.5
2097
2083.1
2069
85
75
65
55
% Loading
Station Heat rate (Observed by Team)
Station Heat rate (Claimed by NTPC)
Station Heat rate (Normative)


Observation of parameters during visit to Jhanor-Gandhar for partial loading operation on 15th Mar18 for the purpose of Compensation Mechanism (Full Module)
3.10
2.90
2.70
2.50
2.30
2.10
1.90
1.70
1.50
% APC
2.86
2.57
2.40
2.24
2.14
2.04
1.98
85
75
65
55
% Loading
%APC (Observed by Team)
%APC (Claimed by NTPC)
%APC (Normative)

Observation of parameters during visit to Jhanor-Gandhar for partial loading operation on 15th Mar18 for the purpose of Compensation Mechanism

Half Module Check - 15th mar18 with GT# 1 & 2 and STG

	Load Set Point Time	Reading Time	Gross Gen (MW)	Export (MW) as per SEMS meters	Gas Consumption SCM	Gas GCV (Kcal/SCM)	Colony Load - MW	Heat Rate KCAL/Kwh	APC(%)	Ambient Temp
85	10.05	10:30 to 10:45	366.59	356.96	81588.98	9479.01	0.24	2109.65	2.56	27.7
75	11.05	11:30 to 11:45	329.22	319.76	73364.15	9526.38	0.24	2122.91	2.80	30.9
65	12:50	13:15 to 13:30	282.62	273.76	66233.18	9421.60	0.22	2207.96	3.06	33.9
55	13:50	14:15 to 14:30	238.59	229.20	58517.11	9426.81	0.16	2312.02	3.87	34.1

J. K. RATHOD
S.E., WRPC

16/3/2018
(SANDEEP GUPTA)
TAMCOS-GT/REE)
MTPL

Pramod Chandhary
MPPMCL

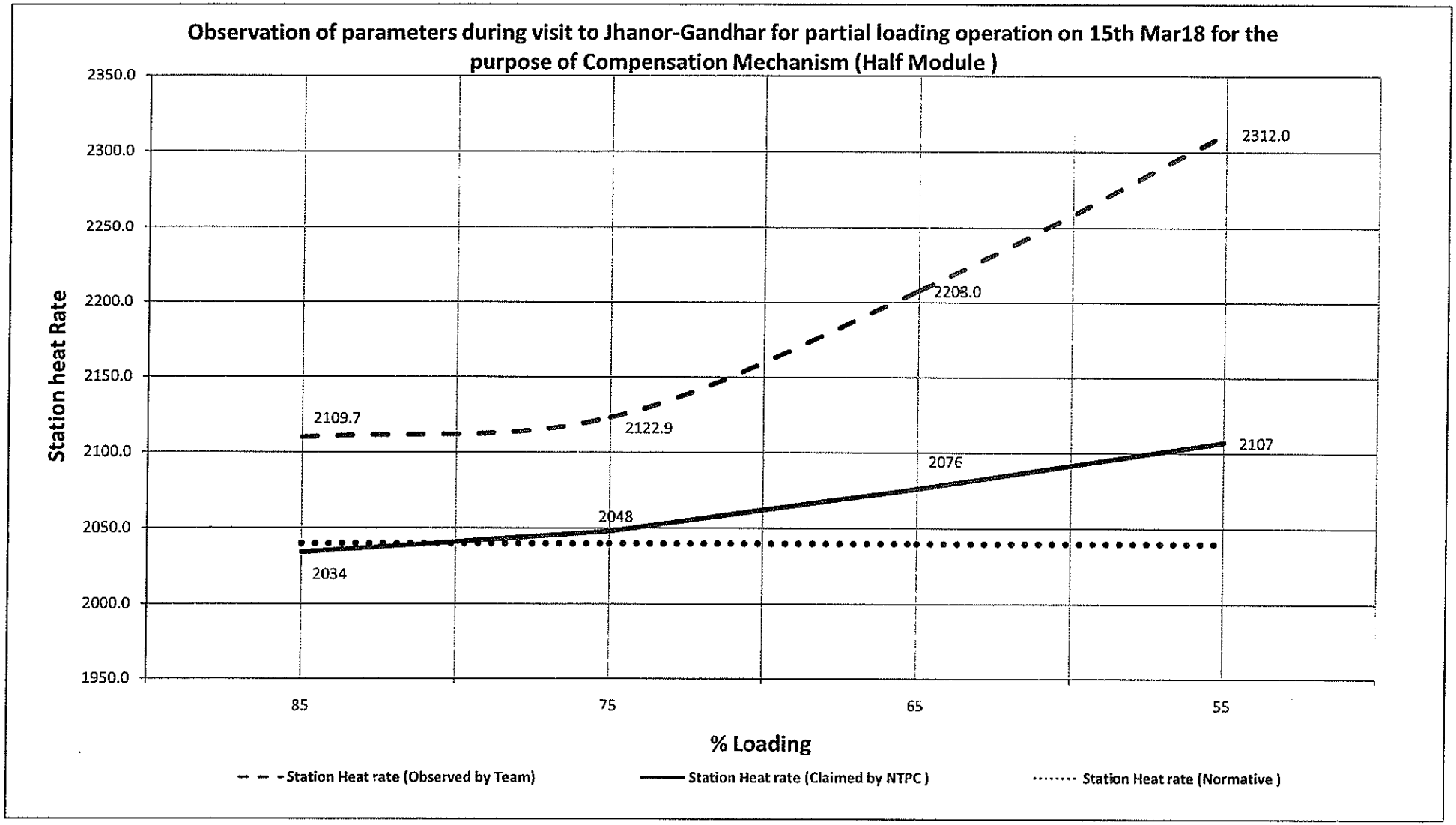
(S. K. Nair)
(GUVNL)

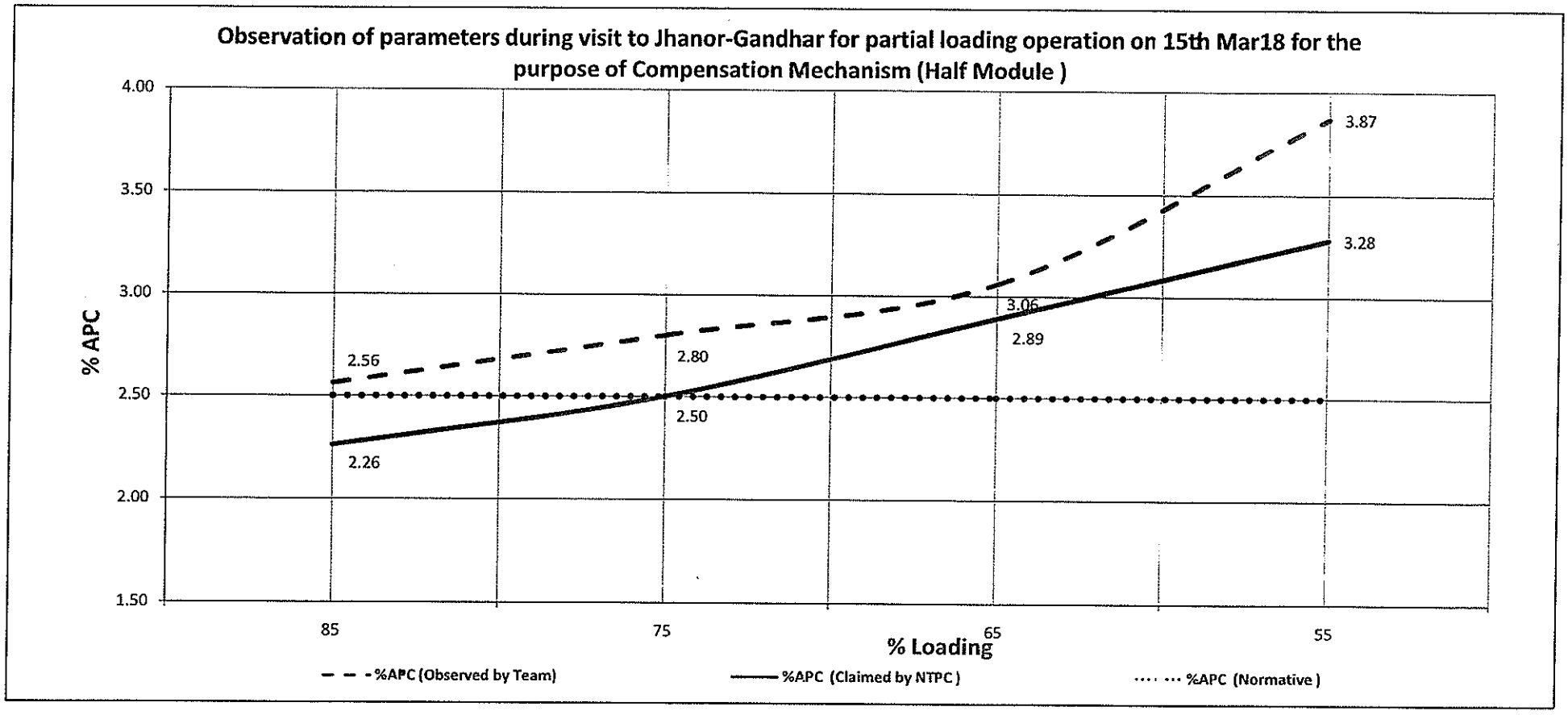
S. S. Patil
EE (LM)
MSEDCL

(CHAIRMAN)
MTPC

Observation of parameters during visit to Jhanor-Gandhar for partial loading operation on 15th Mar18 for the purpose of Compensation Mechanism (Half Module)			
% Loading	Station Heat rate (Observed by Team)	Station Heat rate (Claimed by NTPC)	Station Heat rate (Normative)
85	2109.7	2034	2040
75	2122.9	2048	2040
65	2208.0	2076	2040
55	2312.0	2107	2040

% Loading	%APC (Observed by Team)	%APC (Claimed by NTPC)	%APC (Normative)
85	2.56	2.26	2.50
75	2.80	2.50	2.50
65	3.06	2.89	2.50
55	3.87	3.28	2.50


Observation of parameters during visit to Jhanor-Gandhar for partial loading operation on 15th Mar18 for the purpose of Compensation Mechanism (Half Module)
Station heat Rate
2350.0
2300.0
2250.0
2200.0
2150.0
2100.0
2050.0
2000.0
1950.0
2312.0
2208.0
2109.7
2122.9
2107
2076
2048
2034
85
75
65
55
% Loading
Station Heat rate (Observed by Team)
Station Heat rate (Claimed by NTPC)
Station Heat rate (Normative)


Observation of parameters during visit to Jhanor-Gandhar for partial loading operation on 15th Mar18 for the purpose of Compensation Mechanism (Half Module)
4.00
3.50
3.00
2.50
2.00
1.50
% APC
85
75
65
55
% Loading
2.56
2.80
3.06
3.87
2.26
2.50
2.89
3.28
- - -%APC (Observed by Team)
——— %APC (Claimed by NTPC)
···· ··· %APC (Normative)

Observation of parameters during visit to Kawas for partial loading Operation on 8th & 9th March 2018 for the purpose of Compensation Mechanism

Test Witnessed by

1. WRPC
2. MSEDCL
3. GUVNL
4. MPPMCL
5. NTPC

Observation of parameters during visit to Kawas for partial loading Operation on 08.03.2018 for the purpose of Compensation Mechanism

FULL Module CHECK 08.03.2018 with GT1A,GT1B & ST1C

Loading %	Load set point time	Reading Block starting Time	Gen MW (as per C&I Transducers)	Export MW (as per SEM Meters)	GAIL Gas (SCM)	GCV(Kcal/scm)	Colony (MW)	Variav (MW)	Heat rate(actual)	APC% (actual)	Ambient Temp(Celcius)
100	11:45	12:30	317.08	309.84	65836	9520.4502	0.239	0.5028	1976.72	2.37	33.55
85	13:00	14:00	265.66	259.656	56510	9522.2138	0.215	0.5028	2025.51	2.37	35.84
75	14:30	15:30	241.78	236.208	52360	9517.5537	0.21	0.5017	2061.15	2.42	36.03
65	16:00	17:00	214.63	207.192	48054	9528.1445	0.185	0.5017	2133.28	3.61	37.38
55	17:30	18:30	182.95	175.728	43355	9546.1523	0.24	0.4984	2262.23	4.09	29.4

J.K. RATHOD, S.E.
WRPC

8/3/2018
(SANDEEP CUPTA)
AGM(OS-GT&REC)
NTPC

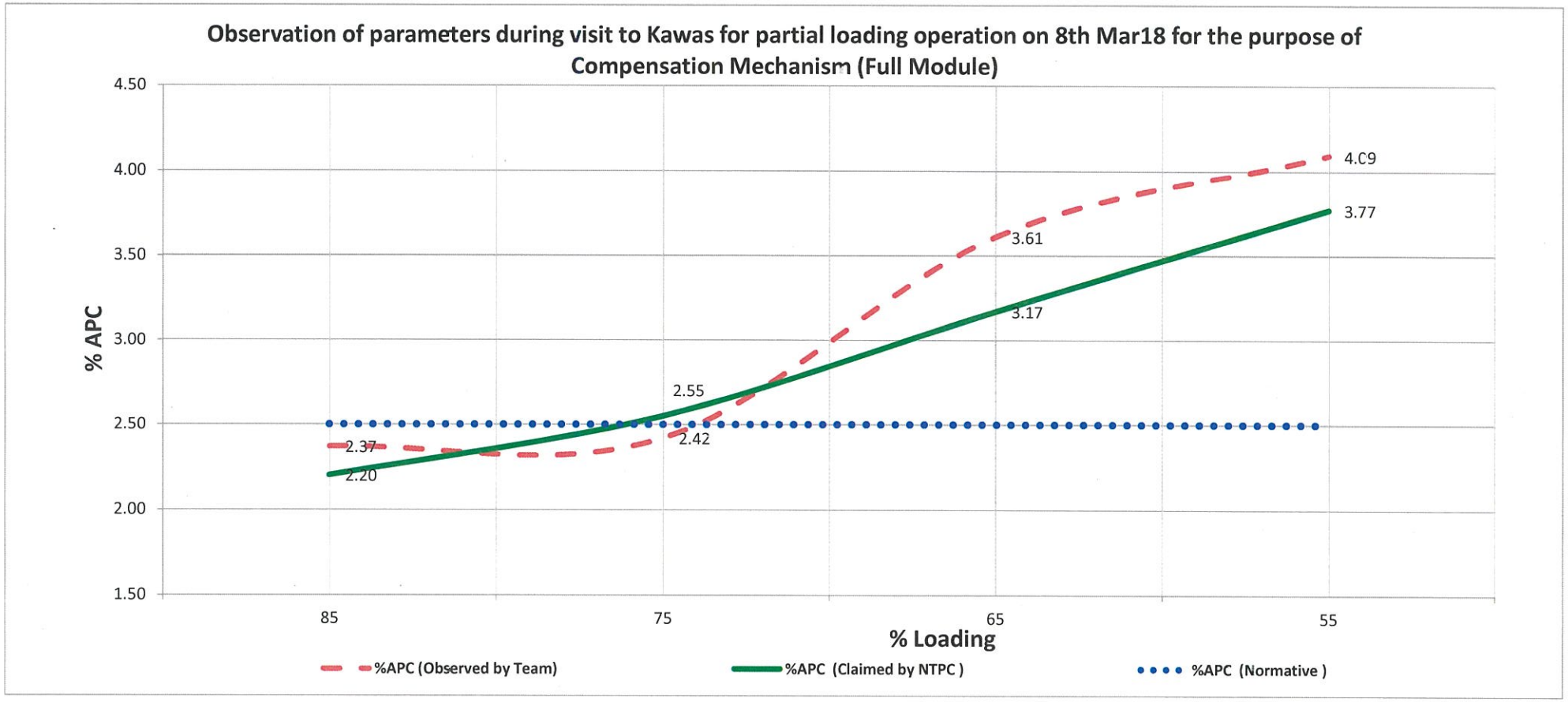
R.V. Saxena
AGM (Comml)
MPPMCL

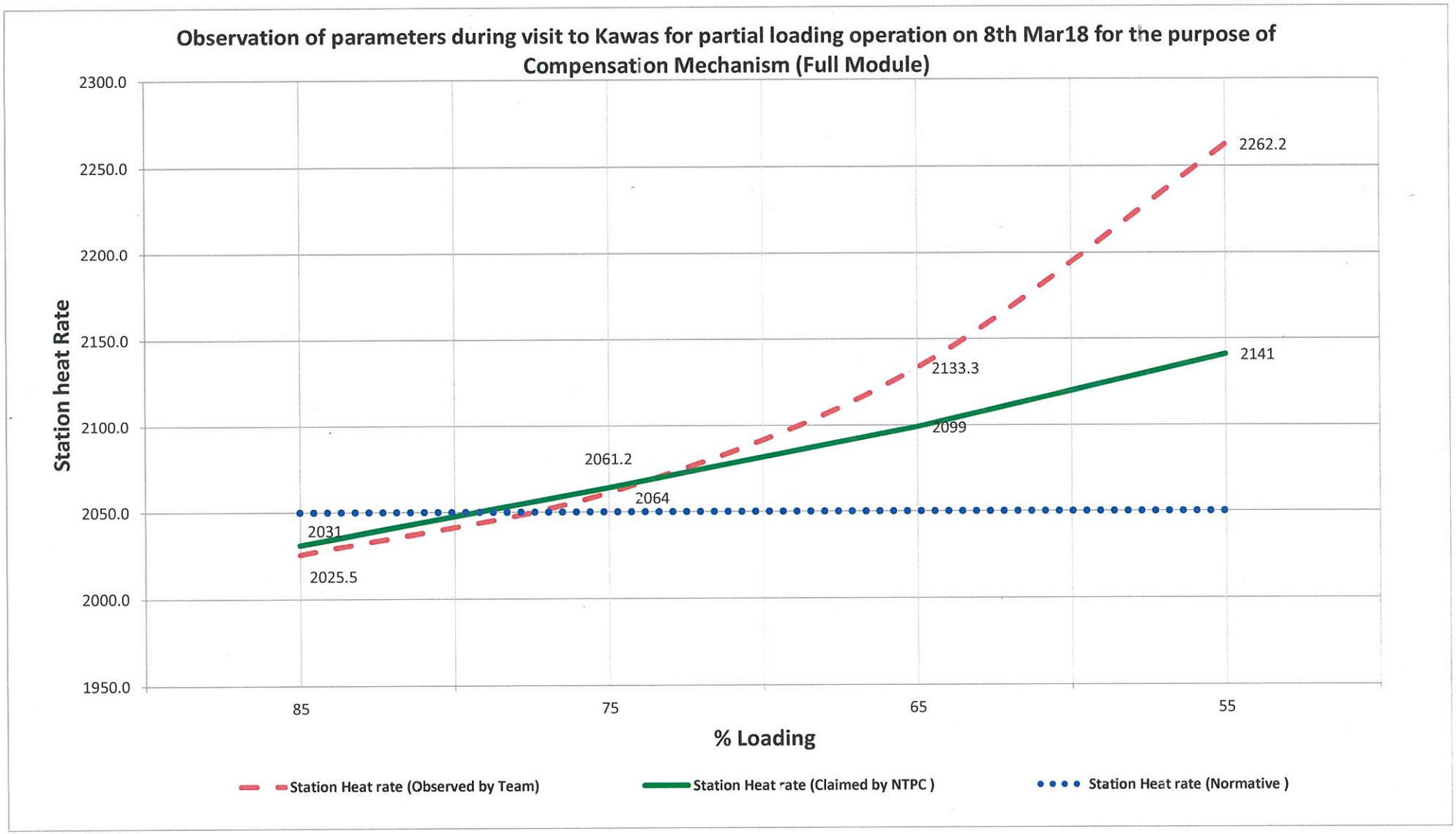
K.H. Chudasama
GUVNL

S.S. Patil
EE(COM)
08.03.18
MSEDCL

Observation of parameters during visit to Kawas for partial loading operation on 8th Mar18 for the purpose of Compensation Mechanism (Full Module)			
% Loading	Station Heat rate (Observed by Team)	Station Heat rate (Claimed by NTPC)	Station Heat rate (Normative)
85	2025.5	2031	2050
75	2061.2	2064	2050
65	2133.3	2099	2050
55	2262.2	2141	2050

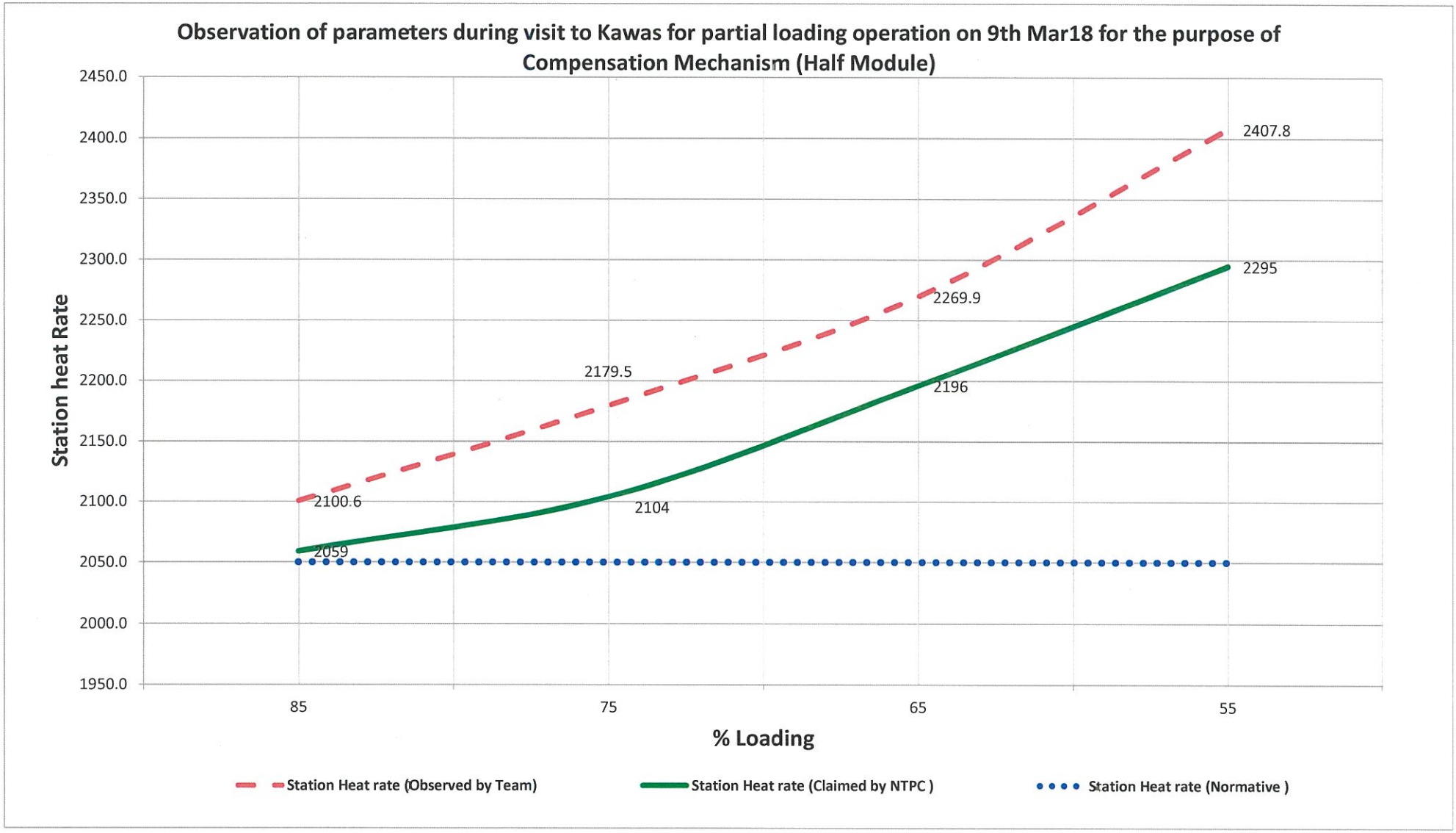
% Loading	%APC (Observed by Team)	%APC (Claimed by NTPC)	%APC (Normative)
85	2.37	2.20	2.50
75	2.42	2.55	2.50
65	3.61	3.17	2.50
55	4.09	3.77	2.50

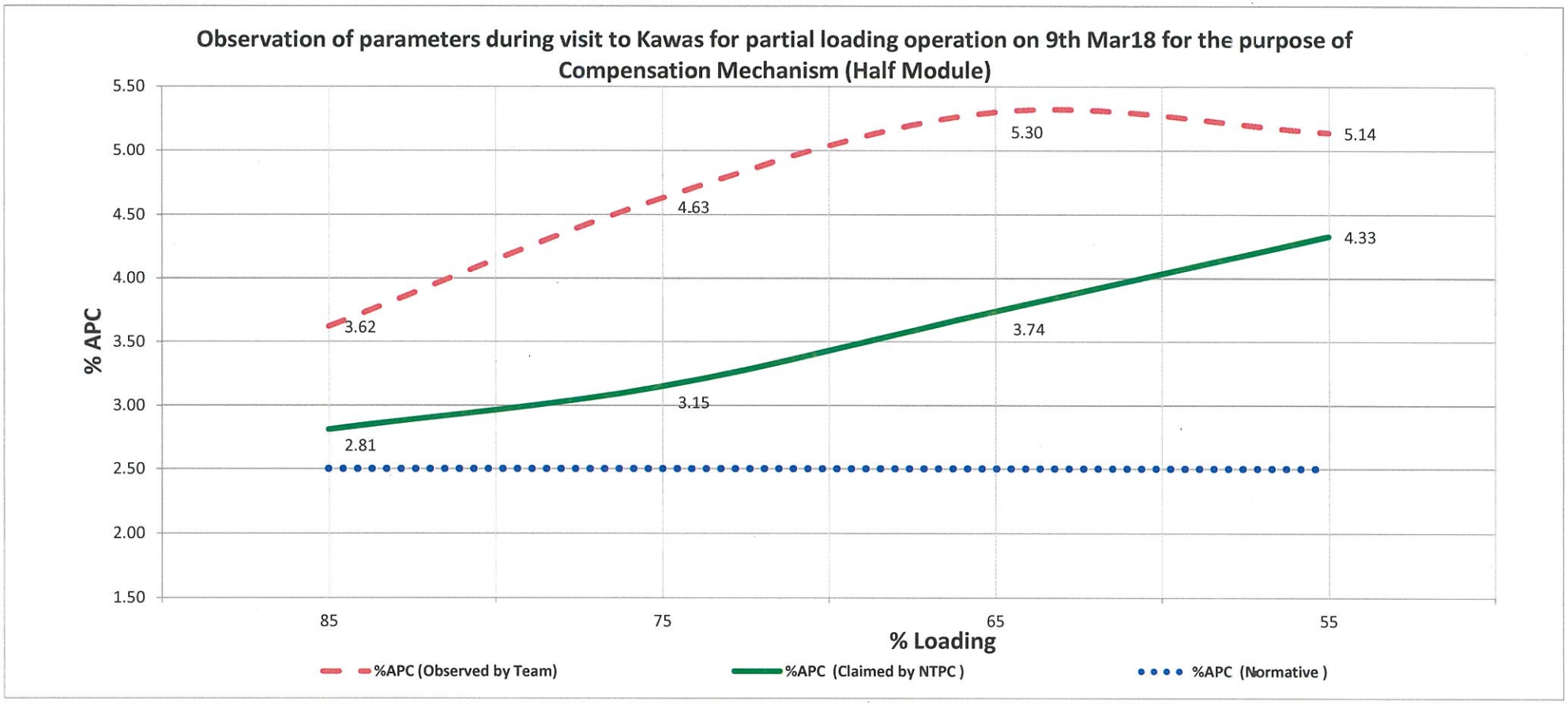

Observation of parameters during visit to Kawas for partial loading operation on 8th Mar18 for the purpose of Compensation Mechanism (Full Module)
4.50
4.00
3.50
3.00
2.50
2.00
1.50
% APC
85
75
65
55
% Loading
4.09
3.77
3.61
3.17
2.55
2.42
2.37
2.20
%APC (Observed by Team)
%APC (Claimed by NTPC)
%APC (Normative)


Observation of parameters during visit to Kawas for partial loading operation on 8th Mar18 for the purpose of Compensation Mechanism (Full Module)
Station heat Rate
2300.0
2250.0
2200.0
2150.0
2100.0
2050.0
2000.0
1950.0
85
75
65
55
% Loading
2262.2
2133.3
2061.2
2064
2031
2025.5
2141
2099
Station Heat rate (Observed by Team)
Station Heat rate (Claimed by NTPC)
Station Heat rate (Normative)

Observation of parameters during visit to Kawas for partial loading operation on 9th Mar18 for the purpose of Compensation Mechanism (Half Module)			
% Loading	Station Heat rate (Observed by Team)	Station Heat rate (Claimed by NTPC)	Station Heat rate (Normative)
85	2100.6	2059	2050
75	2179.5	2104	2050
65	2269.9	2196	2050
55	2407.8	2295	2050

% Loading	%APC (Observed by Team)	%APC (Claimed by NTPC)	%APC (Normative)
85	3.62	2.81	2.50
75	4.63	3.15	2.50
65	5.30	3.74	2.50
55	5.14	4.33	2.50


Observation of parameters during visit to Kawas for partial loading operation on 9th Mar18 for the purpose of Compensation Mechanism (Half Module)
Station heat Rate
2450.0
2400.0
2350.0
2300.0
2250.0
2200.0
2150.0
2100.0
2050.0
2000.0
1950.0
2407.8
2295
2269.9
2179.5
2196
2100.6
2104
2059
85
75
65
55
% Loading
Station Heat rate (Observed by Team)
Station Heat rate (Claimed by NTPC)
Station Heat rate (Normative)


Observation of parameters during visit to Kawas for partial loading operation on 9th Mar18 for the purpose of Compensation Mechanism (Half Module)
% APC
5.50
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
85
75
65
55
% Loading
3.62
4.63
5.30
5.14
2.81
3.15
3.74
4.33
%APC (Observed by Team)
%APC (Claimed by NTPC)
%APC (Normative)

ANNEXURE D.9-3

GUJARAT URJA VIKAS NIGAM LIMITED

Sardar Patel Vidyut Bhavan, Race Course, Vadodara 390007

Tele. No. : 0265-2310582 to 86 (PBX) Fax : 0265-2344543, 2337918	Ref. No.: GUVNL : GM (Comm.): 474 Date : 23/04/2018

To
Member Secretary
Western Region Power Committee
F-3, MIDC Area
Andheri (East)
Mumbai 400 093 Fax no: 022 - 2837 0193

Sub: Compensation to NTPC for partial loading of Kawas and Jhanor stations.

Sir,

This has reference to the discussions regarding partial loading compensation for Kawas and Gandhar Gas Power Plant during the 77th Commercial Committee Meeting held on 20.04.2018. The representatives of Maharashtra, Madhya Pradesh and Gujarat were of the view that NTPC is not having the characteristic curve provided by manufacturer as stated by Hon'ble CERC at Clause 4.1 (v) of Annexure-II of CERC order dated 5.05.2017. Moreover the tests for varying load conditions conducted at Kawas and Jhanor power plants were only for 1 day. Therefore, NTPC may approach Hon'ble CERC with the test results & data and seek approval for the compensation mechanism for the gas based stations. Further, WRPC sought views from beneficiaries regarding grant of interim relief to NTPC.

In this regard it is to state that the matter was discussed at length, GUVNL is of the view that interim payment cannot be paid to NTPC as the matter needs prudence check and approval by Hon'ble CERC.

Thanking You,

Yours faithfully,

(K. P. Jangid)
General Manager (Comm.)

MAHAVITARAN
Maharashtra State Electricity Distribution Co Ltd

Maharashtra State Electricity Distribution Co. Ltd.
Prakashgad, Plot No.G-9, Bandra (East), Mumbai – 400 051
☎ (P) 26476843, (O) 26474211 / 26472131, Fax- 26475012, Website: www.mahadiscom.in

Ref. No: MC 9724 DATE: 27 APR 2018

To,
Superintending Engineer (Comml.)
Western Regional Power Committee
F-3, MIDC Area, Andheri (East), Mumbai - 400 093

Subject: MSEDCL' say on NTPC's Agenda point raised in 77th CCM meeting regarding Partial Loading compensation for Kawas and Gandhar Gas Power Plant.

Reference:
1. No. : WRPC/Comml.-I/CCM/Agenda/2018I 3792- Date: 16.04.2018
2. No. WRPC/Comml-I/corr I 2017 I 634- Date: 22.1.2018
3. Discussion in CCM Meeting Dated 20.04.2018

Dear Sir,

This is in connection with issue raised by NTPC in 77th CCM meeting held on 20.04.2018 at WRPC. The NTPC requested to release of accounts for partial loading compensation for gas stations in WR. In this regard, forum requested to all beneficiaries to submit its say. MSEDCL's say on this issue is as under:

Hon'ble CERC vide notification No. L-1/18/2010-CERC dated 06.04.2016 issued 4th amendment in IEGC. The relevant clause of the amendment is as follows -

"In case of gas based Central Generating Station or inter-State Generating Station, compensation shall be decided based on the characteristic curve provided by the manufacturer *and after prudence check of the actual operating parameters of Station Heat Rate, Auxiliary Energy Consumption, etc."*

Further Hon'ble CERC in its order in case No. No. L-1/219/2017-CERC issued on 5th May 2017 has given approval of the detailed procedure for taking unit(s) under Reserve Shut Down and Mechanism for Compensation for Degradation of Heat Rate, Aux Compensation and Secondary Fuel Consumption, due to Part Load Operation and Multiple Start/Stop of Units . In this regard, in respect of compensation to Gas based Central Generating Station or inter-State Generating Station, it is mentioned as under :

"For Gas based generating stations, degraded SHR and AEC shall be decided based

on the characteristic curve provided by manufacturer. If the characteristic curve is not provided for the entire range of the operating range i.e. up to 55% of module rating, then the extrapolation of the curve provided by the manufacturer shall be done to extend the curve up to 55% of module loading. "

However NTPC in its meeting dated 15.12.2017 informed WRPC that OEMs have provided Heat Balance Diagrams (HBD) in respect of new machines for 100% and 80% loading. The characteristic curves of Kawas and Gandhar have not been provided by OEM for degraded SHR and APC. NTPC further informed that as SHR and APC figures are not given by OEM for Full module/ half module operation for any of the gas stations, the same has been worked out on "Actuals" as is recorded in real time operation over the years. Both HBD and degradation curves are to be interpreted together to arrive at SHR and APC figures at various loadings.

It is also observed regarding SHR & APC claimed by NTPC that correction facto has been applied on value of observed. Hence it can be seen that value of SHR & APC are not taken as per guidelines issued by Hon'ble Commission i.e from characteristic curves provided by OEM. Hence it is requested that NTPC should approach Hon'ble commission for deciding compensation mechanism for part loading of Gas based station. Further as regards to interim arrangement of providing compensation to gas based station till decision of Hon'ble commission is concerned in this matter , it is respectfully submitted that compensation mechanism shall worked out only after Hon'ble Commission issue order on NTPC's petition in view of above cited issues regarding compensation claimed by NTPC for gas based Thermal station.

It is requested to record above say in minutes of meeting of CCM held on 20.04.2018.

With Regards

Yours Faithfully

K Bharat

Chief Engineer (Power Purchase)

Copy S.w.r.to:

Director (Commercial), MSEDCL, Mumbai

एनटीपीसी लिमिटेड
(भारत सरकार का उद्यम)
NTPC Limited
(A Govt. of India Enterprise)

पश्चिम क्षेत्र-१ मुख्यालय
WESTERN REGION -1 HEADQUARTER

Ref No: WR-1HQ/Comml/WRPC/

To,
Member Secretary,
Western Region Power Committee,
F-3, MIDC, Marol, Andheri (E),
Mumbai-400093

Date: 27.04.2018

Sub: SUBMISSION OF COMMENTS AS PER DISCUSSIONS in CCM meeting on 20.04.2018 ON PARTIAL LOADING COMPENSATION FOR GAS STATIONS

Dear Sir,

Please refer to commercial committee meeting held on 20.04.2018 at Mumbai. It was decided that NTPC and all stake holders shall submit the comments on the partial load compensation for Gas Stations within a week.

In line with above NTPC comments on above subject are enclosed for necessary action at your end, as per the enclosure.

Regards,

Yours sincerely,
Anil Nautiyal 27.04.2018
(Anil Nautiyal)
GM (Comml)

Encl: Comments

समृद्धि वेंचर पार्क, द्वितीय तल, एम.आई.डी.सी., मरोल, अंधेरी (पूर्व), मुंबई - 400 093. टेलिफोन - 022-2831 0213 / 15 फैक्स : 91-022-2825 9331
Samruddhi Venture Park, 2nd Floor, MIDC, Marol, Andheri (E), Mumbai - 400 093. Tel: 022-2831 0213 / 15 Fax : 91-022-2825 9331
पंजीकृत कार्यालय : एनटीपीसी भवन,स्कोप काम्पलैक्स, 7 इन्स्टीट्यूशनल एरिया, लोधी रोड, नई दिल्ली - 110 003.
कॉर्पोरेट पहचान संख्या : L40101DL1975GOI007966 टेलि : 011-2436 0100, फैक्स : 011- 2436 1018 ईमेल ntpccc@ntpc.co.in वेबसाईट : www.ntpc.co.in
Registered Office : NTPC Bhawan, SCOPE Complex, 7, Institutional Area, Lodi Road, New Delhi-110 003
CORPORATE IDENTIFICATION NUMBER : L40101DL1975GOI007966 Tel. 011-2436 0100, Fax:011- 24361018 Email : ntpccc@ntpc.co.in Website : www.ntpc.co.in

NTPC Comments on Implementation of Compensation Mechanism in Western Region

- In regards to the compensation mechanism for Gas based Generating stations, the Clause 6.3(B) of IEGC 4th amendment regulations provides as under:

Quote

"3(iv) In case of gas based Central Generating Station or inter-State Generating Station, compensation shall be decided based on the characteristic curve provided by the manufacturer and after prudence check of the actual operating parameters of Station Heat Rate, Auxiliary Consumption, etc."

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

Unquote

- Subsequently, CERC vide its order dated 05.05.2017 approved the detailed procedure for taking unit(s) under Reserve Shut Down and Mechanism for Compensation for Degradation of Heat Rate, Aux Compensation and Secondary Fuel Consumption, due to Part Load Operation and Multiple Start/Stop of Units, making it effective from 15.5.2017. As per clause 4.1(v) in Appendix-II of this order, the mechanism of compensation for Gas stations has been provided as below:

Quote

"For Gas based generating stations, degraded SHR and AEC shall be decided based on the characteristic curve provided by manufacturer. If the characteristic curve is not provided for the entire range of the operating range i.e. up to 55% of module rating, then the extrapolation of the curve provided by the manufacturer shall be done to extend the curve up to 55% of module loading."

Unquote

- In view of the above regulatory provisions, NTPC submitted the compensation data in line with characteristic curves for degradation of Station Heat Rate (SHR) and Auxiliary energy Consumption (AEC) at different loading, as supplied by Original Equipment Manufacturer (OEM) for Jhanor Gandhar GPS and Kawas GPS.

- NTPC informed WRPC on 15/12/2017 that OEMs have provided Heat Balance Diagrams (HBD) in respect of new machines for 100% and 80% loading along with performance degradation curves for Kawas and Gandhar. These machines have now already run for more than 20 years.

- It was also explained that since SHR and APC figures are not given by OEM for half module or part module operation for any of the gas stations, the same has been worked out on "Actuals" based on parameters recorded in real time operation over the years. This was done as per discussions with NRPC while finalizing the methodology for working out Compensation Procedure for NTPC Gas Stations of Northern Region. Both HBD and degradation curves are to be interpreted together to arrive at SHR and APC figures at various loadings. Accordingly, tables for part load compensations of SHR and APC were submitted.

- NTPC has provided the degraded curves for SHR and APC based on HBD and actual observed values pertaining to Kawas and Gandhar to WRPC for preparation of compensation statement. Similar documents are already submitted to NRPC w.r.t. NR stations of NTPC.

- Subsequently, for the verification of degradation parameters submitted by NTPC, a committee comprising the representatives of RPC, NTPC, MP, Maharashtra and Gujarat was constituted by WRPC to visit both the Gas stations and study the degradation in SHR and AEC on different loading of the machines. The committee visited Gandhar GPS on 8th & 9th March'18 and Kawas GPS on 15th & 16th of March'18. On the basis of this study, the observed data was superimposed on the characteristic curves submitted by NTPC for both the stations. The curves prepared by committee comprising the representatives of RPC, NTPC, MP, Maharashtra and Gujarat clearly show that the values/curves prepared by NTPC are better than the values/curve prepared by the committee. The report of the committee has also been circulated by WRPC to the beneficiaries.

- Based on this study by the committee, NTPC approached WRPC vide letter dated 26.3.2018 for issuance of compensation account pertaining to Gandhar and Kawas GPS.

- The agenda was tabled by WRPC in 77th Commercial Committee Meeting held in Mumbai on 20th April 2018. During the discussion, NTPC requested to adopt & agree upon any of the curves available with the forum. It was also requested to the forum to roll out the mechanism and agree upon the interim payment for the compensation pertaining to these stations, subject to the outcome of the matter as per the provisions at Para-5 of the Hon'ble Commission's order dated 5th May 2017 in the matter of approval of detailed procedure for Reserve Shut-down and mechanism for compensation for degradation in SHR, AEC & SFC, due to part Load operations and multiple Start/stop of units.

- The forum may further appreciate that NTPC gas stations are deprived of getting any compensation due to low part load operations from the date of 4th Amendment in Indian electricity Grid Code Regulations, wherein the

technical minimum loading has been defined @ 55% of Installed capacity of the unit/machine.

- Accordingly, it is requested that all the constituents may agree upon for adopting either of the characteristic curves, as proposed by NTPC or as prepared by the committee and also to start interim payment of the compensation to NTPC, which is due since 15th of May 2017.

ANNEXURE- D.10

Declaration of Transmission elements into commercial operation by ISTS licensees

PGCIL vide email dated 11.04.18 has intimated the list of transmission elements into commercial operation for the period from 01.05.2017 to 22.03.2018.

Sl. No.	Asset	Project	DOCO
1	Solapur(POWERGRID)-Kolhapur(MSETCL)	Establishment of Fibre Optic Communication System in Western Region under Master Communication Plan	01-May-17
2	Kolhapur(MSETCL)-Kolhapur(POWERGRID)		
3	Seoni(POWERGRID)-Bina(POWERGRID)(Part Line)		
4	Betul(POWERGRID)-Khandwa(POWERGRID)	Establishment of Fibre Optic Communication System in Western Region under Master Communication Plan(Additional Requirement)	01-May-17
5	Mauda(NTPC)-Wardha (POWERGRID)	Establishment of Fibre Optic Communication System in Western Region under Master Communication Plan (Additional Requirement)	01-Sep-17
6	Wardha (POWERGRID)-Aurangabad (POWERGRID)	Establishment of Fibre Optic Communication System in Western Region under Master Communication Plan	01-Sep-17
7	Mauda (NTPC)-Betul (POWERGRID)		
8	Installation of 1x250MVA, 400/220/33kV ICT-I at Bhadrawati HVDC Back-to-Back station	Installation of Transformer &Procurement of Spare Converter Transformer for B'wati HVDC BTB Station	08-Sep-17
9	Pole-II of ±800kV, Champa & Kurukshetra HVDC Terminals alongwith associated bays .(1x1500MW HVDC Terminals at Champa & Kurukshetra)	WR-NR HVDC Interconnector for IPP Projects in Chhattisgarh	16-Sep-17
10	765kV 2nos.330MVAr Switchable Line Reactors charged as Bus Reactors alongwith associated bays at Dharamjaigarh 765/400kV for 765kV D/c Jharsuguda-Dharamjaigarh Line-2	Common System Associated With East Coast Energy Pvt Limited and NCC Power Projects Limited LTOA Generation Projects in	21-Sep-17

		Srikakulam Area Part-B	
11	Solapur(NTPC)-Solapur(Powerrid) 400kV D/c (Quad) line alongwith associated bays at Solapur(PG)	Transmission System for Solapur STPP(2x660MW) Part-A	01-Oct-17
12	LILO of both circuits of Mundra UMPP – Limbdi 400kV D/C (triple snowbird) line along with 4 nos. 400kV line bays at Bachau SS.	Transmission System Strengthening associated with Mundra UMPP (Part A)	30-Oct-17
13	500 MVA, 400/220 kV ICT (ICT # III) along with associated bays and 2 nos. 220 kV line bays at Satna SS (220 kV PGCIL-Chhatarpur line & 220 kV Satna –PGCIL IV line (MPPTCL))	Western Region System Strengthening Scheme – XVI	27-Nov-17
14	400 kV Birsinghpur - Damoh	Establishment of Fibre Optic Communication System under Master Communication Plan in Western Region	30-Nov-17
15	400 kV LILO of Itarsi - Dhule at Khandwa		
16	400 kV Dehgam - Ranchodpura		
17	400kV Vindhyachal NTPC (Stg IV) – Vindhyachal Pooling		
18	400 kV LILO of Navsari-Boisar at Magarwada		
19	400 kV LILO of Vapi-Kudus at Kala		
20	400 kV Vindhyachal NTPC (Stg V) – Vindhyachal NTPC (Stg I)		
21	400 kV Mundra-Bachau		
22	400kV Ranchhodpur – Bachau		
23	765kV Gwalior – Agra		
24	765 kV Bina – Gwalior		
25	400kV Navsari-Magarwada		
26	220 kV Gandhar-Haldarwa		
27	220kV Kawas-Haldarwa		
28	220kV Damoh (PG)- Damoh (MPPTCL)		
29	220kV Satna (PG) – Satna (MPPTCL)		
30	Part of 400kV D/c Aurangabad-Boisar TL from 313/0 to 332/0 (D/C portion strung on M/c twin-quad portion comprising of 400kV D/c Aurangabad-Boisar and 400kV D/c Navasari-Boisar)	Transmission System Associated with Mundra Ultra Mega Power Project (UMPP)	29-Dec-17
31	Part of 400kV D/c Aurangabad-Boisar TL from Aurangabad SS to 313/0 on D/c Towers and fr om 332/0 to Boisar SS(on Multi Circuit towers)	Transmission system strengthening in western part of WR for IPP generation projects in Chattisgarh	29-Dec-17

32	• 765kV D/C Aurangabad (POWERGRID)-Padghe (POWERGRID) Transmission Line along with associated bays and 2x240MVAr Line Reactor at Padghe (POWERGRID) GIS Station. • 400kV D/C Padghe(POWERGRID)-Padghe/Kudus(MSETCL) Transmission line along with associated bays. • 765kV, 240MVAr Bus Reactor along with associated bays at Padghe (POWERGRID) GIS Station. • 765/400kV 1500MVA ICT-I & ICT-2 along with associated bays at Padghe (POWERGRID) GIS	CG-IPP-Set-E (System strengthening in North/West part of WR for IPP in Chhattisgarh)	31-Dec-17
33	Part of 400 kV D/C Vapi - Kudus T/L (*) from 45A/0 to 69/0 (D/C portion strung on M/C Twin-Twin portion comprising of 400 kV D/C Navsari-Boisar and 400 kV D/C Vapi-Kudus) and Part of 400 kV D/C Vapi - Kudus T/L (*) from 69/0 - 104/0	Transmission System Associated with Mundra Ultra Mega Power Project (UMPP)	31-Dec-17
34	Part of 400 kV D/C Vapi - Kudus TL (*) from 104/0 to Kudus SS along with associated bays at Kudus SS (MSETCL) .	Western Region System Strengthening Scheme-V	31-Dec-17
35	Aurangabad (POWERGRID)-Padghe (POWERGRID).	Establishment of Fibre Optic Communication System in Western Region under Master Communication Plan	01-Mar-18
36	Wardha(POWERGRID)-Pandurna (Repeater)		
37	63 MVAr switchable line reactor along with 500 Ohms NGR at Rajgarh (POWERGRID) end of Khargone TPS – Rajgarh (POWERGRID) 400 kV line (formed after LILO of one circuit of Khandwa – Rajgarh 400 kV D/C line at Khargone TPS, being implemented under TBCB)	POWERGRID works associated with Transmission System Strengthening in WR associated with Khargone TPS	01-Mar-18
38	2 nos. 400 kV line bays at 765/400 kV Vindhyachal Pooling Station of POWERGRID (for Vindhyachal (IV/V) STPP switchyard (NTPC) – Vindhyachal Pooling Station (POWERGRID) 400 kV 2nd D/C (quad) line)	POWERGRID Works associated with System Strengthening for IPPs in Chattisgarh and other generation projects in Western Region	18-Mar-18
39	234MVA 3 No. Spare Converter Transformer(3 winding) at Bhadrawati HVDC	Installation of Transformer &Procurement of Spare Converter Transformer for B'wati HVDC BTB Station	22-Mar-18

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Annexure- D.11

Status of Letter of credit(LC) opening against Deviation charges liability for 2018-19.

Sl No.	WR Entity who have to open LC	No of weeks in which UI payable	Average payable weekly UI (Rs in lakhs)	LC Amount (Rs in lakhs)	Status of LC opening
1	CSPDCL	24	122	134	Not yet opened
2	MP Power Management Co. Ltd.	31	294	323	Not yet opened
3	MSLDC UI Settlement account	44	322	354	Not yet opened
4	Goa	36	56	62	Not yet opened
5	D&D	52	105	116	Not yet opened
6	D&NH	42	112	123	Not yet opened
7	JINDAL POWER LIMITED	7	36	40	Not yet opened
8	NSPCL	13	9	9	Not yet opened
9	ACBIL	28	25	27	Not yet opened
10	RGPPL	16	42	46	Not yet opened
11	BALCO	46	88	96	Not yet opened
12	CGPL UMPP MUNDRA	47	58	64	Not yet opened
13	DCPP JSPL	17	25	27	Not yet opened
14	Essar Power MP ltd	23	34	37	Not yet opened
15	KSK Mahanadi	13	14	16	Not yet opened
16	GMR Warora Energy ltd	15	16	18	Not yet opened
17	KORBA WEST POWER Corp. LTD	52	7	8	Not yet opened
18	D. B.Power	8	55	60	Not yet opened
19	JAYPEE NIGRI TPP	21	32	35	Not yet opened
20	Essar Steel Ltd	52	107	117	Not yet opened
21	DGEN (Torrent Energy Limited)	52	6	7	Not yet opened
22	GMR Chhattisgarh Energy ltd	39	17	19	Not yet opened
23	Dhariwal Infrastructure Ltd.	12	7	8	Not yet opened
24	RKM POWERGEN	34	20	22	Not yet opened
25	MB POWER	23	38	41	Not yet opened
26	JHABUA POWER	45	29	31	Not yet opened
27	SKS POWER	36	24	26	Not yet opened
28	TRN Energy ltd	16	11	12	Not yet opened
29	BARC	26	9	10	Not yet opened
30	KAPS 3&4(INFIRM)	52	2	2	Not yet opened

****

Annexure-D.12

Status of Deviation Charges Payable/Receivable to WR Deviation Pool Fund Account

Last updated on 21/05/18

	Total dues	*Payments overdue*
	Principal	*Principal*
CSPDCL		
MP Power Management Co. Ltd.		
GETCO LTD.		
MSLDC UI Settlement account		
Goa		
D&D	26,88,054	
D&NH		
NTPC	-11,72,30,236	
NR		
SR		
ER	1,00,32,97,012	40,11,09,379
JINDAL POWER LIMITED	81,55,840	80,71,470
HVDC Vin.		
HVDC Bha.		
LancoAmarkantak Power Ltd	-21,68,065	
NSPCL	-34,74,370	
ACBIL	-49,19,898	
RGPPL	-2,33,17,998	
BALCO	-4,75,759	
CGPL UMPP MUNDRA	34,33,249	
DCPP JSPL		
Essar Power MP Ltd	-13,75,130	7,03,147
SASAN Power Limited		
KSK Mahanadi	37,87,399	80,27,295
VandanaVidyut Ltd	10,00,23,191	10,00,23,191
EMCO Energy ltd.		
Korba West Power Co.Ltd	47,50,190	18,15,904
D. B.Power		
JaypeeNigrie TPP		
Essar Steel India Ltd	76,58,836	4,00,76,197

DGEN (Torrent Energy Limited)	-92,420	
GMR Chhattisgarh Energy Ltd	**56,95,449**	**46,52,576**
Dhariwal Infrastructure Ltd.		
RKM Powergen Pvt ltd.	-91,528	**70,43,771**
MB Power (Madhya Pradesh) Ltd.	**60,10,072**	
Jhabua Power Ltd	**1,12,655**	**29,32,614**
SKS POWER GENERATION (CHHATTISGARH) LTD	**59**	
TRN Energy Ltd.	**19,00,557**	
BARC (PAO, PREFRE, Tarapur)		
HVDC CHAMPA		
KAPS 3&4(INFIRM)		

Note : This includes :

1. DSM Accounts issued up to 05nd week of 2018-19 ie., 23.04.18 TO 29.04.18.

2. DSM Payments received and distributed up to 21.05.18

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Annexure-D-13

Status of Reactive Energy Charges Payable to REC Pool Account

Last updated on 21/05/18

(+) Payable / (-) Receivable from Pool

Amount in Rs.

	Total dues	***Total overdues***
	Principal	***Principal***
GETCO	-2,92,366	-2,92,366
MPMPCL	-2,58,430	-2,58,430
CSPDCL	-1,44,683	-1,44,683
MSEDCL	-18,340	-18,340
Goa	-2,424	-2,424
DD	**8,16,222**	**8,16,222**
DNH	-99,979	-99,979
TOTAL	0	0

***When Receivables are more than payable, total of all receivables made equal to payable.**

***When all are receivable, all receivables made zero .**

Note : This includes :

1. **REC Accounts issued upto 05th week of 2018-19 ie.,23.04.2018 to 29.04.2018**
2. **REC Payments received up to 21.05.18**

****

Interest calculation statement of Deviation Pool Account for the period from 1st Oct '2016 to 31th March' 2018

The summary of interest payable/receivable for Deviation pool account along with payment status as on 21.05.18 is as given below :

Constituent	*Total Interest Due (Till Sept-16)*	*Total Interest Due (Oct16-Jun17)*	*Total Interest Due (July17-Mar18)*
CSPDCL			**53,188**
MP Power Management Co. Ltd.			-96,393
GETCO LTD.			-7,555
MSLDC UI Settlement account			-6,91,182
Goa			-6,010
D&D			**4,79,661**
D&NH			-56,240
NTPC			-4,88,118
JINDAL POWER LIMITED			**6,650**
HVDC Vin.			-1,581
HVDC Bha.			-4,568
LancoAmarkantak Power Ltd			-74,168
NSPCL			-22,735
ACBIL			-47,247
RGPPL		**2,45,186**	-16,601
BALCO			**1,62,707**
CGPL UMPP MUNDRA		**2,23,202**	**2,35,121**
DCPP JSPL			**27,223**
Essar Power MP Ltd			**5,35,245**
SASAN Power Limited			-5,10,210
KSK Mahanadi			**53,168**
VandanaVidyut Ltd	**2,76,85,720**	**1,06,96,317**	**1,10,42,213**
GMR Warora Energy Ltd.			-94,236
KORBA WEST POWER Co. LTD		**9,49,274**	**14,70,995**
D. B.Power			-22,487
JAYPEE NIGRI TPP			**4,264**
Essar Steel India Ltd		**12,05,437**	**34,26,318**
DGEN (Torrent Energy Limited)			-1,243
GMR Chhattisgarh Energy Ltd			**9,28,130**
Dhariwal Infrastructure Ltd.			**1,022**
RKM Powergen Pvt Ltd.			**4,88,792**
MB Power (Madhya Pradesh) Ltd.			**3,24,309**
Jhabua Power Ltd			**15,39,106**
SKS POWER GENERATION (CHHATTISGARH) LTD			**1,94,240**
TRN Energy Ltd.			-26,016
BARC (PAO, PREFRE, Tarapur)			-4,640
HVDC CHAMPA			**1,223**
KAPS 3&4(INFIRM)		**26**	**2,127**

Note: +ve indicates payable by the constituent and –ve indicates receivable by the constituent

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Annexure-D.15-2

Interest calculation statement of RRAS for the period from 11th Apr '2016 to 31th March'2018

The summary of interest payable/receivable for Deviation pool account along with payment status as on 21.05.18 is as given below:

Constituent	*Total (in Rs.)*
NTPC	-2853990
RGPPL	-401361
CGPL	-200747
NSPCL	-319566
SASAN	158636
Total Rs.	-3617029

Annexure-D.15-13

Interest calculation statement of REC account for the period from 01st Oct '2016 to 31th March'2018

The summary of interest payable/receivable for Deviation pool account along with payment status as on 21.05.18 is as given below:

Constituent	Net interest payable/ receivable (in Rs.)
GETCO LTD.	-3,85,832
MP Power Management Co. Ltd.	-6,46,497
CSPDCL	97,548
MSEDCL	**6,65,931**
Goa	-27,901
D&D	**2,64,506**
D&NH	-53,011
Total Rs.	-85,255

Annexure-D.15-4

Interest calculation statement of Congestion charge Account for the period from 1st Jul'2016 to 31st Mar'2018.

Constituent	Net interest payable/ receivable (in Rs.)
CSPDCL	**-1,05,573**
MP Power Management Co. Ltd.	**12,93,533**
GETCO LTD.	**-1,491**
MSLDC UI Settlement account	**6,87,507**
Goa	**297**
D&D	**-64**
D&NH	**-18,051**
NTPC	**-49,720**
JINDAL POWER LIMITED	**-2,54,620**
HVDC Vin.	**166**

HVDC Bha.	**164**
LancoAmarkantak Power Ltd	**1,23,923**
NSPCL	**86**
ACBIL	**-39,147**
RGPPL	**-36,799**
BALCO	**-52,458**
CGPL UMPP MUNDRA	**-599**
DCPP JSPL	**1,165**
Essar Power MP Ltd	**-10,00,102**
SASAN Power Limited	**2,57,012**
KSK Mahanadi	**82,022**
VandanaVidyut Ltd	**-2,29,471**
GMR Warora	**290**
Korba West Power Co.Ltd	**-9,169**
D. B.Power	**-34,361**
JaypeeNigrie TPP	**-28,249**
Essar Steel India Ltd	**7,727**
DGEN (Torrent Energy Limited)	**320**
GMR Chhattisgarh Energy Ltd	**-68,113**
Dhariwal Infrastructure Ltd.	**3,223**
RKM POWERGRN Pvt Ltd.	**-4,349**
MB POWER LTD	**13,240**
JHABUA POWER LTD	**-35,930**
SKS POWER	**-982**
TRN	**260**
BARC	**-128**
Total Rs.	**5,01,557**

****

ANNEXURE- D-17

The updated status of the protection audit observations/recommendations as on December 2017, is as given below;

Protection Audit carried out in Year	State /utility	No of S/s Audited	Obseravations in Category A (Procurement not required)			Obseravations in Category B (Procurement required)			Status FC/PC/ NC	Remarks if any
			No of Deficien-cies Observed	No of Deficien-cies rectified	No of Deficien-cies pending	No of Deficien-cies Observed	No of Deficien-cies rectified	No of Deficienc-ies pending		
	Gujarat								FC	Protection Audit completed before 2012 and all are complied
	MP	12	80	79	1	76	38	38	PC	
	Maharashtra	122	114	114	0	53	53	0	FC	
	Chhattisgarh	13	15	15	1	61	4	57	PC	
	PGCIL									
	NTPC	4	8	8	0	5	5	0	FC	
2012-13	IPPs	1	11	11	0	0	0	0	FC	
	Gujarat									
	MP	25	83	82	1	42	14	28	PC	
	Maharashtra	154	147	146	1	92	85	7	PC	
	Chhattisgarh	5	18	12	6	21	6	15	PC	
	PGCIL									
2013-14	IPPs									
	Gujarat									
	MP	18	94	89	5	55	30	25	PC	
	Maharashtra	107	210	205	5	93	91	2	PC	
	Chhattisgarh	Nil	Nil	Nil	Nil	Nil	Nil	Nil		
	PGCIL									
2014-15	IPPs									
	Gujarat									
	MP	17	79	76	3	35	16	19	PC	
	Maharashtra	120	251	242	9	225	221	4	PC	
	Chhattisgarh	1	1	1	0	1	0	1	PC	
	PGCIL									
2015-16	IPPs									
	Gujarat									
	MP									
	Maharashtra	106	204	161	43	11	3	8	PC	
	Chhattisgarh	Nil	Nil	Nil	Nil	Nil	Nil	Nil		
	PGCIL									
2016-17	IPPs									

ANNEXURE D.18-1

SPS for JP Nigrie, MB Power and for High Loading of Sugen-Vapi S/C, held on 23.08.2017 at WRPC, Mumbai.

A meeting to design SPS for JP Nigrie, MB Power and High Loading of Sugen-Vapi S/C was conducted on 23.8.2017. MS, WRPC welcomed all the participants for the meeting. The List of participants of the meeting is enclosed at **Annexure**.

A. SPS of JP Nigrie and MB Power:

JP Nigrie (2x660MW) is connected to the grid through 400kV JP Nigrie-Satna D/C (Quad conductor, 161 km each). There is no other interconnection to this station. WRLDC informed that system blackout has occurred at JP Nigrie on many occasions under N-1 contingency due to sudden high loading on the parallel circuit followed by power swing and low frequency oscillation. Also very high current was observed when one circuit is out and other circuit is under A/R and the relay has detected and tripped the line for power swing. Therefore SPS was suggested to take care of N-1 contingency of JP Nigrie-Satna ckt.

MB Power (2x600MW) is connected to the grid through 400kV MB Power-Jabalpur PS D/C (Triple snowbird, 256km each). There is no other interconnection to this station.

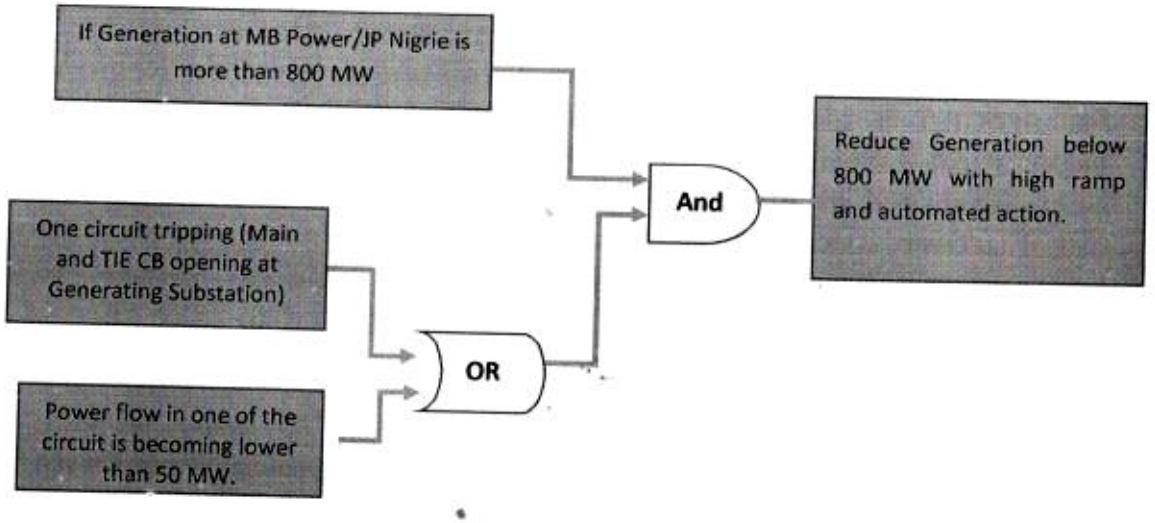
WRLDC informed that on 07/07/17, low frequency oscillations were observed at MB Power generating station under N-1 condition and the oscillation has persisted in Western Region grid for around 5 minutes. The absence of PSS and High angular separation (around 27 degree) were the two issues which has been observed at MB Power on tripping of MB Power-Jab PS one ckt. Further, in case of MB Power also there is high probability of tripping of the line in temporary fault due to power swing detection by relay. Therefore SPS was suggested to take care of N-1 contingency of MB Power-Jab PS ckt.

MB Power was requested to take the PSS into service in consultation with the OEM immediately. MB power representative informed that there were issues of ownership transfers. However they have successfully negotiated with the transferee company of the project and the OEM and by Sept. 2017 the PSS would be tuned and taken into service.

Conditions for SPS at JP Nigrie and MB Power stations:-

1. The SPS would be armed and kept in service whenever the generation at JP Nigrie and MB Power stations is more than 800 MW.
2. Triggering signal would be initiated for SPS action when both Main and Tie breaker position (at Nigrie/MB Power) of any of the line is OPEN for (Satna/Jabalapur PS lines respectively) **OR** line flow on any of the line (Nigrie- Satna /MB Power-Jabalapur PS) becomes less than 50 MW, when the generation is more than 800MW.
3. The generation to be reduced to 800 MW when one ckt is under planned shut down or as suggested by WRLDC. The SPS would be disarmed before opening the line manually. The SPS would be armed immediately after the restoration of line and the generation would be ramped up only after the SPS is armed.
4. The operators at the power station should be able to arm/disarm the SPS based on the above guidelines and the status of SPS must be clearly visible on the control panel.
5. The digital status of SPS arming/disarming signal should also be send to WRLDC.

The logic at both these generating stations which should be implemented by JP Nigrie and MB Power is as follows:



Further, it was decided during the meeting to further explore the possibility of power swing blocking for zone 1 when one line is already out and a temporary single phase fault on the other line.

This issue will be taken in the upcoming PCM in order to decide whether any configuration is available in the relay.

B. SPS for High Loading/Tripping of 400 kV Sugen-Vapi S/C

GETCO representative informed that during the last month, high loading of 400 kV Sugen-Vapi S/C of the order of 650-700MW was observed due the outage of Tarapur Unit 3 and 4, KAPS 1 & 2 and also outage of HVDC Mundra-Mahendragarh. Gujarat SLDC has suggested SPS in case of high loading above 750 MW or tripping of 400 kV Sugen-Vapi Line with generation reduction at Sugen and Load shedding at DD and DNH.

WRLDC informed that following actions in real time are taken to control Sugen-Vapi loading:-

a) Maximising HVDC Chandrapur-Padghe Bipole flow.
b) Advising MSLDC to run generation at Koyna or Ghatghar.
c) Opening of 400 kV Uno Sugen-Pirana (TPL) circuit and GPEC-Jhanor when loading is more than 700 MW which provide a relief of 30-40 MW.

After discussion, the following was decided:-

1. The above issue is temporary in nature and has aroused due to outage of entire generation at TAPS and KAPS.
2. The interim arrangement done with one ckt of 400 kV Jhanor-Navsari and one ckt of 400 kV Ukai-Kosamba to form Jhanor-Kosamba and Ukai-Navsari (Interim arrangement approved in the 36th SCM) may be restored which will relieve the loading on Sugen-Vapi and improves system reliability. The 400 kV Jhanor-Navsari D/C would be parallel path in case of tripping of 400 kV Sugen-vapi circuit and the system would be N-1 secure.
3. Further, in the 499th OCC meeting held on 22.8.17, it was informed by TAPS that their Unit 3 will be restored in Sept 2017 and unit 4 in Oct'17. This will reduce the loading of the present 400 kV Sugen –Vapi circuit to large extent.
4. In addition, in the TRM meeting of WR held on 21.8.17, PGCIL WRTS-1 informed that they will be charging the 400 kV Aurangabad(PG)-Boisar D/C in the Month of Sept'17. These circuits will attenuate the above problem as observed presently.

In view of the above it was decided that presently there is no requirement of SPS for 400 kV Sugen-Vapi circuit. Also, it was suggested that Gujarat will restore the interim arrangement of the 400 kV Jhanor-Navsari one circuit and 400 kV Ukai-Kosamba one circuit after ascertaining that the commissioning of that 400/220 kV Kosamba ICT 4 and any other issue in the down stream network of GETCO.

The meeting ended with thanks to the Chair.

xxxxxxx

ANNEXURE-D.18-2

The current SPS operating condition at CGPL is given below:

SN.	Description
1	Condition: If net export is more than 3300 MW ***and*** one ckt of CGPL-Bachhau D/C trips Action: Backing down automatically to bring down the generation to 3100 MW. Further manual backing down of around 200 MW has to be done to bring down the flow of CGPL-Bachhau other ckt to 950 MW.
2	Condition: If net export is more than 3300 MW and if CGPL-Chorania or CGPL-Mansar or one ckt of CGPL-Jetpur D/C trips Action: Backing down automatically to bring down the generation to 3300 MW.
3	Condition: In case of D/C tripping of CGPL-Bachhau, CGPL-Jetpur or CGPL-Mansar S/C and CGPL-Chorania S/C Action: Trip one unit immediately. Unit running at maximum generation to be selected for tripping to get full 800 MW reduction immediately to take care of system stability. (If export is between 3300 -3500 MW then trip one unit & If export exceed 3500 MW then Trip one unit and runback other).
4	Condition: If net export is more than 3300 MW and in case of D/C tripping of Bachhau-Ranchopura Action: Backing down automatically to bring down the generation to 3300 MW.

****

CGPL SPS -Revision

WRLDC

Loading Limits of Lines/ICT from CGPL Complex

As per 447th OCC Minutes

- The Loading of Line Emanating from CGPL has been decided as 950 MW.
- It has to be increased in step manner based on experience.
- ***Among Six lines 400 kV CGPL-Bhachau 1 & 2 has operated till 1100 MW.***
- Other four Lines to Chorania and Jetpur has operated up to 900 MW.

PGCIL Vide its e-mail dt. 08-01-18 has updated the loading Limit

- 400 kV CGPL-Jetpur each ckt (Triple Snowbird) – 1200MW
- 400 kV CGPL-Bhachau 1 & 2 each ckt (Triple Snowbird) – 1200MW
- 400 kV CGPL-Bhachau 3 & 4 each ckt(Triple Snowbird) – 1200MW
- 400 kV Bhachau-Chorania and 400 kV Bhachau-Mansar-Chorania each ckt (Triple Snowbird) – 1200MW
- 400 kV Bhachau-Ranchodpura each ckt (Triple Snowbird) – 1200MW
- 400/220 kV 315 MVA Bhachau ICTs – 300MW
- 400 kV Bhachau-Versana each ckt (Twin Moose) – 750MW

Inferences from the Dynamic Study for CGPL Complex

Scenario	Dynamic Study	Load Flow
For All N-1, N-1-1, N-2 Cases System	System is stable	In Few Cases N-2 and N-1-1 cases, Loading of 400 kV Triple Snowbird Lines were exceeding its limit
For N-1 cases on CGPL and Bhachau lines with a 100 ms Fault	System is stable	Loading of lines are within limit
For N-1 cases on CGPL lines with more than 150 ms Fault	System is Not Stable	Loading of lines are within limit
For N-1 cases of Bhachau lines with more than 150 ms Fault	System is Not Stable	Loading of lines are within limit.
For N-4 of CGPL-Bhachau Lines	System is Stable with two units in service.	Angular and voltage instability is not observed if only two units are in service.

During N-1 Contingency of Elements from CGPL and Bhachau

- No Thermal Loading observed on any of the transmission lines from CGPL and Bhachau.
- However in Cases of tripping of 400 kV CGPL-Bhachau one circuit, other parallel circuit loading is increasing and depending on operating condition can go above 1200 MW.
- **Manual reduction by CGPL and WRLDC : To keep CGPL-Bhachau other three circuits within 1200 MW.**
- For each 100 MW generation backing down at CGPL, CGPL-Bhachau ckts loading get relieved by around 25 MW.
- This is the Scenario for Any planned outage/ Forced or emergency outage of lines.

loading of Any CGPL-Bhachau circuits	Reduction at CGPL Generation (MW)
> 1400	600 MW
>1300 and <1400	400 MW
>1200 and <1300	200 MW

This also takes care of 400 kV CGPL-Jetpur D/C tripping

During N-1-1 or N-2 Contingency of 400 kV CGPL-Bhachau two circuits.

- With Two CGPL-Bhachau ckt tripping, Loading on Other two CGPL Bhachau ckts increases up to 1400 MW.
- Fast reduction in Generation MW is desired.
- Past SPS operation : Generation Backing in One unit : 350 MW takes 4 Minute 32 Second.

CGPL Generation	Contingency	Action Plan
> 3500 MW	If CGPL-Bhachau one ckt trip "&" Another CGPL-Bhachau circuit trip within the next four minutes.	Trip One unit of CGPL "Or" Generation Reduction by 600 MW (Fast generation reduction in Two Units within 4 Minutes)
> 3500 MW	If CGPL-Bhachau Two circuits trip simultaneously within 5 Seconds Interval.	Trip One unit of CGPL

During N-3 Contingency of Tripping of 400 kV CGPL-Bhachau three Circuits

CGPL Generation	Contingency	Action Plan
> 3500 MW (All Units in Service)	If CGPL-Bhachau three circuit trips simultaneously.	Trip two units of CGPL with Maximum Generation "AND" Reduce the generation the Generation in One Unit by 300 MW. Generation to be brought to 2200 MW.
> 2800 MW and < 3500 MW	If CGPL-Bhachau three circuit trips simultaneously.	Trip One unit of CGPL with Maximum Generation "AND" Reduce generation in other One Unit to 300 MW. Generation to be brought to 2200 MW.
>2200 MW < 2800 MW	If CGPL-Bhachau three circuit trips simultaneously.	Trip One Unit of CGPL.

During N-4 Contingency of 400 kV CGPL-Bhachau 4 Circuits

- Condition of Blackout of 400 kV Bhachau Bus and all associated elements.
- **Only 400 kV CGPL-Jetpur D/C will be there for evacuation of power from CGPL.**
  - Angular separation will be more than 40 Degrees
  - Voltage at Jetpur will drastically reduce below 300 kV and will cause tripping of loads and voltage collapse.
  - Issue of Load Encroachment in Zone 3.
- **Tripping of Two units at CGPL :**
  - Voltage of Jetpur will be 360 kV and Amreli is 365 kV
  - Angular Separation between CGPL-Jetpur is 43 Degree
- **Tripping of Three units at CGPL :**
  - Voltage of Jetpur will be 391 kV and Amreli is 392 kV
  - Angular Separation between CGPL-Jetpur is 26 Degree

Contd..

CGPL Generation	Contingency	Action Plan
>3500 MW (All Units in Service)	If CGPL-Bhachau four circuit trips simultaneously.	Trip three units of CGPL with Maximum Generation. and Reduce the generation the Generation in One Unit by 300 MW. (Generation to be brought to 1500 MW)
> 2800 MW and < 3500 MW	If CGPL-Bhachau Four circuit trips simultaneously.	Trip One unit of CGPL with Maximum Generation and reduce generation in other One Unit to 300 MW. Generation to be brought to 2200 MW. (Generation to be brought to 1500 MW)
>2200 MW < 2800 MW	If CGPL-Bhachau Four circuit trips simultaneously.	Trip One Unit of CGPL (Generation to be brought to 1500 MW)

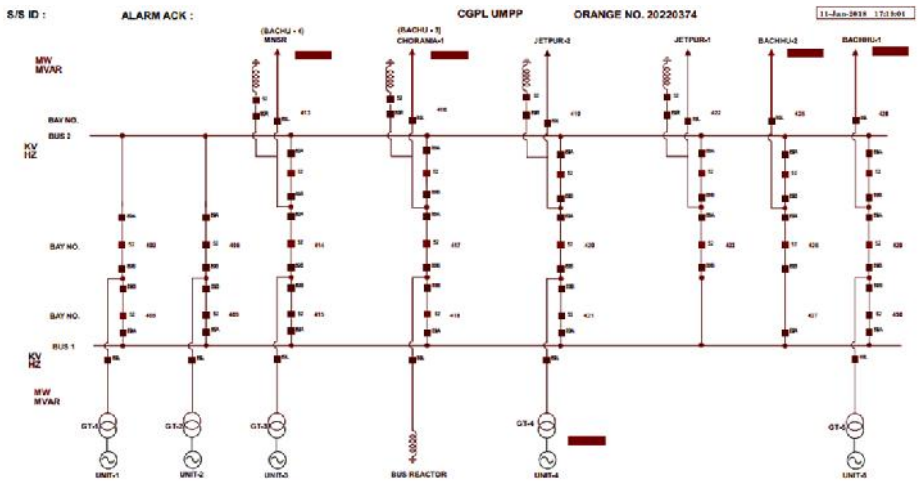
During N-1-1 or N-2 Contingency of 400 kV Bhachau-Ranchodpura D/C and 400 kV Bhachau-Mansar, 400 kV Bhachau-Choronia ckts

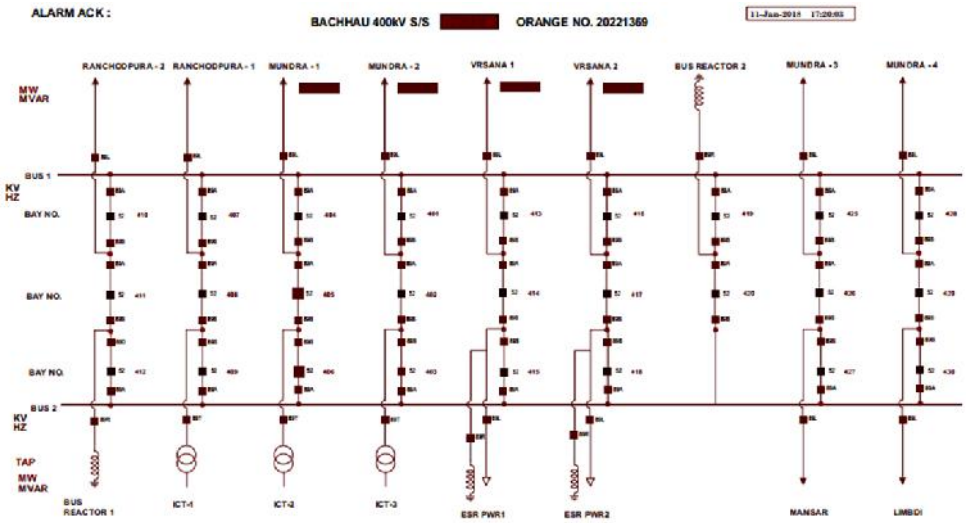
- No Overloading is Observed.
- Voltage and Angle are within Limit.
- However, System is not ready for N-1 of 400/220 kV Bhachua ICT tripping. So immediate load trimming Scheme has to be implemented on these ICTs to take care of overloading under such condition till the new ICT.

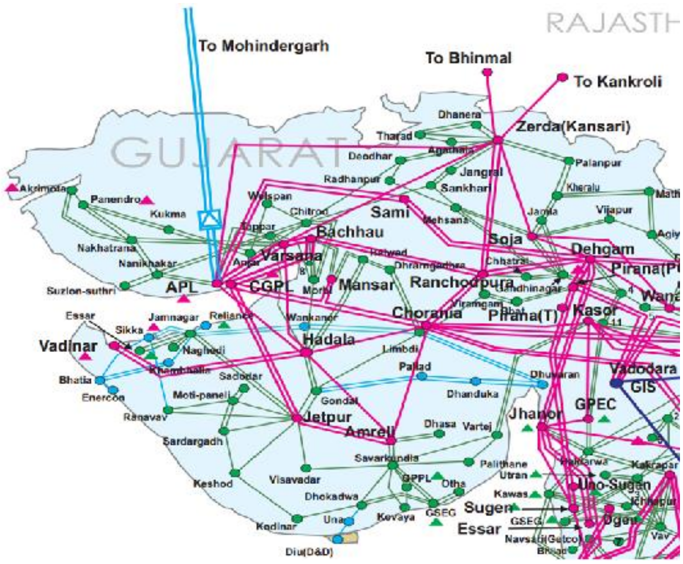
During N-3 Contingency of 400 kV Bhachau-Ranchodpura D/C and 400 kV Bhachau-Mansar, 400 kV Bhachau-Choronia ckts

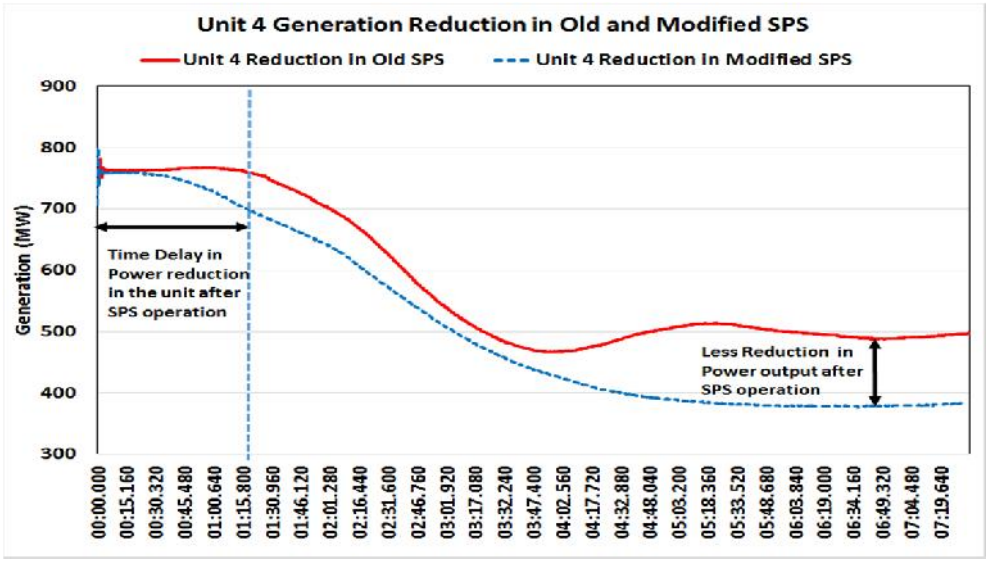
- No Overloading is Observed.
- Voltage and Angle are within Limit.
- **System is not ready for N-1 of 400/220 kV Bhachua ICT tripping :**
  - Load trimming Scheme has to be implemented on these ICTs to take care of overloading under such condition till the new ICT.
- **System is also not ready for N-1 of 400 kV Bhachau-Varsana one circuit (750 MW):**
  - SPS signal to CGPL for 1000 MW immediate generation relief.
  - Tripping of one Unit and Generation backing down by additional 200 MW.

Power Swing Criteria




ALARM ACK :
BACHHAU 400kV S/S
ORANGE NO. 20221369
RANCHODPURA - 2
RANCHODPURA - 1
MUNDRA - 1
MUNDRA - 2
VRSANA 1
VRSANA 2
BUS REACTOR 2
MUNDRA - 3
MUNDRA - 4
MW
MVAR
BUS 1
KV
HZ
BAY NO.
BAY NO.
BAY NO.
BUS 2
KV
HZ
TAP
MW
MVAR
BUS
REACTOR 1
ICT-1
ICT-2
ICT-3
ESR PWR1
ESR PWR2
MANSAR
LIMBDI


RAJASTH
To Mohindergarh
To Bhinmal
To Kankroli
GUJARAT
Zerda(Kansari)
Bachhau
Sami
Soja
Dehgam
Varsana
CGPL
APL
Mansar
Ranchodpura
Chorania
Pirana(T)
Kasor
Vadinar
Hadala
Jetpur
Amreli
Jhanor
GPEC
Vadodara
GIS
Sugen
Essar
Uno-Sugen


Unit 4 Generation Reduction in Old and Modified SPS
Unit 4 Reduction In Old SPS
Unit 4 Reduction In Modified SPS
Generation (MW)
900
800
700
600
500
400
300
Time Delay in Power reduction in the unit after SPS operation
Less Reduction in Power output after SPS operation
00:00.000
00:15.160
00:30.320
00:45.480
01:00.640
01:15.800
01:30.960
01:46.120
02:01.280
02:16.440
02:31.600
02:46.760
03:01.920
03:17.080
03:32.240
03:47.400
04:02.560
04:17.720
04:32.880
04:48.040
05:03.200
05:18.360
05:33.520
05:48.680
06:03.840
06:19.000
06:34.160
06:49.320
07:04.480
07:19.640

ANNEXURE D.19

भारत सरकार
Government of India
केन्द्रीय विद्युत प्राधिकरण
Central Electricity Authority
पश्चिम क्षेत्रीय विद्युत समिति
Western Regional Power Committee
एफ -3, एमआयडीसी क्षेत्र, अंधेरी (पूर्व), मुंबई - 400 093
F-3, MIDC Area, Andheri (East), Mumbai - 400 093
दूरभाष Phone: 022- 28221681; 28250004; 28200195; फैक्स Fax : 022 – 28370193
Website : www.wrpc.gov.in E-mail:prc-wrpc@nic.in , protectionwrpc@gmail.com

आई एस ओ ः 9001-2008

ISO: 9001-2008

No. : WRPC/Protection/Mumbaiislanding/2018/ 3620 **Date:** 11 APR 2018

To,

1. Head- PSCC, Tata Power Company Limited,Trombay,Mumbai
2. GM(O&M),Reliance Infrastructure Lmited,Mumbai
3. CE,SLDC,MSETCL,Kalwa
4. CE(P AC),MSETCL,Kalwa
5. GM, WRLDC,Mumbai
6. DGM(ES),BEST Undertaking,Mumbai

विषय: मुंबई आइलैंडिंग योजना की समीक्षा करने के लिए **13.03.2018 को आयोजित बैठक के रिकॉर्ड नोट**
Sub: Record notes of the meeting held on 13.03.2018 to review Mumbai Islanding Scheme

Sir/महोदय,

मुंबई आइलैंडिंग योजना की समीक्षा करने के लिए **13.03.2018** को आयोजित बैठक के रिकॉर्ड नोट इसके साथ आपकी सूचनार्थ और आपकी आवश्यक कार्रवाई हेतु संलग्न हैं।

बैठक के रिकॉर्ड नोट पक्षेविस की वेबसाइट www.wrpc.gov.in. पर भी अपलोड किए गए हैं।

Please find attached herewith the Record notes of the meeting held on 13.03.2018 to review Mumbai Islanding Scheme your information and necessary action.

The Record notes of the meeting has also been uploaded in WRPC website at www.wrpc.gov.in

Yours' faithfully/भवदीय,

11/04/18

J.K. Rathod/ जे के राठौड़ ,
SE (Protection)/ अधीक्षण अभियंता (रक्षण)

संलग्नक: यथोपरि
Encl.: As above

Record notes of the meeting held on 13.03.2018 to review Mumbai Islanding Scheme

A meeting to review Mumbai Islanding scheme was held on 13.03.2018 at WRPC Mumbai. The list of participant is enclosed at **Annexure-I.**

Member Secretary, WRPC welcomed all the participants of the meeting on review of Mumbai Islanding Scheme. He informed that the islanding scheme of Mumbai transmission system was first commissioned in 1981 by TATA Power with the embedded generation within the Mumbai. This scheme had successfully saved Mumbai from several blackouts (on 27 occasions so far) during Major grid disturbances. This scheme has been revised several times by WRPC in line with the development of Mumbai Network and the settings advised by WRPC were adopted. At present Trombay unit #6 remaining out since long time due to no schedule owing to costly gas. This unit is not likely to revive in present scenario. At the time of last review of Mumbai islanding scheme, Trombay unit #6 was a part of embedded generation of the island. Also, the demand of island has steeply increased in last few years due to fast pace of growth in electricity consumption by commercial and domestic category of consumers., Due to reduction in embedded generation and growth in Mumbai demand there is increased power flow from outside to Mumbai through tie-lines to meet the demand of the island. He further added that recently BEST had come out with a tender for procurement of 750 MW power. This implies that embedded generation in Mumbai will not be able to meet power requirement in the event of Island formation and thus it is the appropriate time to review the Mumbai Islanding Scheme in order to save the city from blackout in the exigent situation. He further informed that the review of Mumbai Islanding Scheme was discussed in brief in 131st PCM held on 27/28.02.2018 at WRPC Mumbai wherein it was decided to hold a separate meeting involving TATA Power, BEST, MSETCL, Reliance Infrastructure, WRLDC and WRPC.

SE (P), WRPC briefed about power scenario in Mumbai. He informed that total embedded generation in Mumbai system is 1877 MW which is approximately 50% of the peak demand (3825 MW). In case of Grid

Disturbance, generation will not be able to meet the demand. So there is an urgent need to review the existing Mumbai islanding scheme. In order to ensure successful operation of separation of Mumbai island in the event of grid disturbance and to ensure survival of formed island, it is utmost important to identify some additional loads for load shedding in Mumbai

With the above brief background, he requested Tata Power to give presentation on existing Mumbai Islanding Scheme.

TATA Power representative gave a presentation (Enclosed at **Annexure-2**) on the existing Mumbai Islanding scheme. The Mumbai Power System is connected with MSETCL through Boisar, Borivali, Kalwa and Trombay. The brief on the existing Islanding scheme is as given below:

Stage I:

- Major disturbance is sensed by frequency decay. At 48.0 / 47.9 Hz under-frequency load shedding takes place by way of opening designated feeders, prior to islanding, to ensure generation rich island.
- Combination of under-frequency condition (47.9 Hz) and power flow (from Mumbai area) into the grid will trigger islanding scheme.
- Islanding scheme operation will result in tripping of all tie line breakers and Tata Power system along with R-infra Dahanu system will be isolated from rest of the grid

Stage II:

- Further, if frequency continues to sink, coupled with reversal of power (Power flow from Tata Power to RInfra) then Tata Power system gets isolated from R-infra at 47.7Hz
- Redundancy is provided in the form of Main 1 & Main 2 islanding schemes.
- In case of failure or stuck breaker condition, at 47.0 Hz LBBU of that breaker operates and gets isolated from the network.
- Islanding signal from 220kV Trombay tie point provides trigger for Unit 5, 6 & 8 to respond to frequency between 49.5 – 50 HZ by varying generation by 20 /10 MW for every 0.1 Hz variation

- Bhivpuri 24MW 3 Units, Khopoli 24MW 1 unit & Bhira old 25 MW, 5 units changes over to speed control mode at 47.9 Hz.
- 150 MW Bhira Pump Storage Unit changes over to speed control mode if df/dt is > 5Hz/sec.

High Frequency Control in Islanded Mode:

- If frequency recovers to more than 50.2 HZ, auto restoration scheme at Borivali resumes 20 MW load in three stages at frequency settings of 50.3, 50.5 & 51.0 Hz respectively, which helps to stabilize islanded system frequency.
- At 51.5 Hz, high frequency anti acceleration protection on Trombay Unit 5,6 &8 will drop load with 5% droop.
- At 51.5 Hz , 30 sec time delay, Unit 7A class C trip & 56 Sec time delay – Class A . At 53.0 Hz - Instantaneous , Unit 7A – Class C trip & 0.6 sec time delay Class A trip.
- In case frequency does not recover after islanding,
    - At 47.5 Hz, 30 sec time delay Unit 7A Class C protection will operate and unit will continue to operate on house load.
    - At 47.0 Hz, 2 sec time delay, 220kV GT breakers of Units 5, 6 & 8 will open and Units will run on house load.- Class C
    - At 46.0 Hz, 0.6 sec time delay – Class C & at 2 Sec – Class A
    - At 46.5 Hz, at Bhira, Set 2/5 gets isolated from the grid and feeds station auxiliary.

Hydro Islanding Scheme (For fast restoration)

- At 45.0 Hz, Hydro islanding scheme operates and trip all outgoing lines & transfer breaker. Hydro units remains on line and available for building the network. BPSU & Set No.1 at Bhira also trips.
- With this arrangement the generating units at all three hydro stations are kept running supplying own auxiliary power.

MS, WRPC enquired with BEST Officials regarding the status of power procurement from outside Mumbai through open access. BEST representative informed that they would purchase power through open access from outside Mumbai to reduce their overall cost of power purchase. However the agreement between TPC and BEST have been extended for one more year.

ED WRLDC opined that as far as system operation is concerned, generation within Mumbai should be given preference to supply within Mumbai, so that adequate generation is available within Mumbai. TATA power has thermal generation capacity of 2x500MW+250MW+180MW and Hydro capacity of 447MW and Reliance Dahanu has a thermal capacity of 2x250MW. These generating units should always be kept on-bar to meet any contingency to have minimal dependency on external sources. With one Unit of 500 MW at TATA power Trombay out of service since long, it is very much essential that at least 1x500+250MW+180MW generating Units at TATA Power Trombay be kept in service as spinning reserve. He further added that we cannot afford to keep any of these units out of service. He requested SLDC Maharashtra to take up the issue with appropriate authorities to address the commercial issues involved, including measures such as keeping these units on bar through Ancillary services.

WRPC opined that since PPA between TATA and BEST has been extended for one more year, and the measures suggested by ED WRLDC would take time to be in place, it would be appropriate to review the Mumbai Islanding Scheme under the present generation and load (demand) scenario in Mumbai, so that any grid disturbance in the near future can save the Mumbai city from going into dark. The other measures as suggested by ED WRLDC can be taken up by WRLDC, SLDC Maharashtra, TATA power, BEST & Reliance Energy at appropriate authorities/forums.

After detailed discussions, the following conclusions were drawn;

(i) At present the total generation normally in operation in the Island is around 1880MW without Unit 6 at TATA Trombay. (TATA Trombay=500MW+250MW+180MW, TATA Hydro= 447MW & Reliance Dahanu=500MW)

(ii) Total Maximum Demand met in the Island in recent past =3825MW

(iii) Import from Maharashtra System is around 2200MW.

(iv) The demands of utilities in Mumbai City & present load shedding quantum identified is as follows;

Quantum of Existing Load Shedding **Table-1**

Sr. No.	Utility	Normal Load (MW)	Present Load Shedding quantum (MW)	Net Load after island formation (MW)
	(1)	**(2)**	**(3)**	**(4)**
1	RETL-Reliance	1300	800	500
2	TPC-Reliance	600	450	150
3	BEST	900	310	590
4	TPC	500	160	340
5	MSEDCL	200	200	0
6	Railways	170	0	170
Total		**3670**	**1920**	**1750**

After detailed discussion on existing quantum of load shedding it was felt by the participants that additional 300 MW load is required to be identified for shedding for successful formation and survival of island in the worst case scenario i.e in case of **peak demand of Mumbai =3850MW**. 300 MW additional load shedding was decided by taking into account embedded **generation** (including losses) of around **1650MW** and **Import** from Maharashtra System of around **1900MW. The details are as follows;**

The Demand before Island formation is 3850MW. After formation of Island the Import from Maharashtra of 1900MW will be lost (The load to be catered will be 3850-1900= 1950MW) . So Net Demand in the Island after Island formation will be 1950MW. Actual generation in the Island including losses will be around 1650MW (The load-generation mismatch i.e generation shortfall will be = 1950-1650MW=300MW). Therefore the additional load of 300MW needs to be shed in addition to existing load shedding implemented in the Mumbai Island.

(v) Reliance representative informed that they are shedding required load so that their load is matching with the generation at Reliance Dahanu plant. Members insisted that Reliance should always maintain their load to balance generation at Reliance Dahanu, at all the times under the Islanded condition.

(vi) It was felt that the Railway load is essential load therefore there shall not be any load shedding in Railway System.

(vii) After long deliberations it was decided to distribute the additional load of 300MW, required to be wired up for shedding among TPC & BEST in proportion to their normal loads as follows;

TPC=(500x300)/1400=107MW.

BEST=(900x300)/1400=193MW.

The representatives of TPC and BEST agreed on the additional quantum of load shedding given above.

(viii) TPC representative stated that it will take around 6 months to procure and commission the UFRs, since it requires customized UFR panels to be integrated with SCADA.

BEST representative also recorded similar views.

(ix) Members felt that the time lines given by TPC & BEST be reduced and they shall procure and commission/wire up the UFRs to shed

the above additional loads in 1-2 months. However TPC & BEST maintained their views.

(x) It was suggested that already UFRs are provided in the TPC & BEST system. These existing UFRs can be used to extend the trip command to additional loads existing at the same S/S for time being, till procurement & commissioning (wiring up) of the new UFRs. TPC & BEST should immediately hold a meeting to identify such locations and the additional loads.

MS WRPC requested TPC & BEST representatives to implement (wire up) the above additional load for shedding as early as possible. There should not be any hesitancy in implementation of above loads, since these are the rarest of the rare conditions under which the Island would be formed. But it is utmost important that the island survive after its formation. He stated that public life & safety would seriously be affected, if the Mumbai City is without power supply. He further requested all the utilities in the Mumbai City to co operate in this matter and save the city from being without power supply in the event of a grid failure, since such a densely populated city without power supply may lead to law & order issues and consequences would be beyond imagination, since Mumbai is commercial capital of country.

Decisions :

(1) TPC and BEST shall identify additional load of 107 MW and 193 MW respectively to be shedded for Mumbai Islanding Scheme.

(2) TPC and BEST shall take up the issue of procurement of UFRs with their management to operationalise the revised load shedding at the earliest. Till such time TPC/BEST shall implement the suggested methodology as given at point (x) above.

(3) DISCOM wise quantum of revised load shedding shall be as per Table 2 (given below)

Quantum of Revised Load Shedding **Table-2**

Sr. No.	Utility	Normal Load (MW)	Revised Load Shedding quantum (MW)
	(1)	**(2)**	**(3)**
1	RETL-Reliance	1300	800
2	TPC-Reliance	600	450
3	BEST	900	503
4	TPC	500	267
5	MSEDCL	200	200
6	Railways	170	0
Total		**3670**	**2220**

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

****

ANNEXURE-I

List of participants for the meeting to review Mumbai Islanding on 13.03.2018 10.30 hrs at WRPC Mumbai

S.N.	Name	Designation/ Organisation	Mob no.	Email	Signature
1.	Sonu. W. Korekar	Asst. V.P. Rinfra.T	9324216663	sonu.korekar@relianceada.com	[signature]
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22.	T.K. BHASKARAN	Head - PSCC	9220550622	tkbhaskaran@tatapower.com	
23.	PRADEEP KUMAR CANDOLKAR	SR. ENGG/WRLDC-POSOCO			
24.	Chitrankshi G.	Manager, WRLDC	9869004892	chitrankshi@posoco.in	

S.N.	Name	Designation/ Organisation	Mob no.	Email	Signature
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30.	J.K. RATHOD	S.E. WRPC	"	"	[signature]
31.	Ratnesh K. Yadav	AD-I, WRPC	9969940099	ratneshkumar[illegible]@gmail.com	[signature]
32.					
33.					
34.					
35.					
36.					
37.					

ANNEXURE D.20-1-2

भारत सरकार
Government of India
केन्द्रीय विद्युत प्राधिकरण
Central Electricity Authority
पश्चिम क्षेत्रीय विद्युत समिति
Western Regional Power Committee
एफ -3, एमआयडीसी क्षेत्र, अंधेरी (पूर्व), मुंबई - 400 093
F-3, MIDC Area, Andheri (East), Mumbai - 400 093
दूरभाष Phone: 022- 28221681; 28250004; 28200195; फैक्स Fax : 022 – 28370193
Website : www.wrpc.gov.in E-mail:prc-wrpc@nic.in , protectionwrpc@gmail.com

आई एस ओ : 9001-2008
ISO: 9001-2008

No. : WRPC/Protection/AUFLS/2018/ 3626 - **Date:** 11 APR 2018

To,

As per list/ सूची के अनुसार

विषय: विद्यमान एयूएफएलएस योजना में स्तरों और मात्रा की समीक्षा करने के लिए 13.03.2018 को आयोजित बैठक के रिकॉर्ड नोट

Sub: Record notes of the meeting held on 13.03.2018 to review the stages and quantum in the existing AUFLS scheme

Sir/महोदय

विद्यमान एयूएफएलएस योजना में स्तरों और मात्रा की समीक्षा करने के लिए 13.03.2018 को आयोजित बैठक के रिकॉर्ड नोट आपकी सूचनार्थ और आवश्यक कार्यवाई हेतु इसके साथ संलग्न हैं।

बैठक के रिकॉर्ड नोट पक्षेविस की वेबसाइट www.wrpc.gov.in. पर भी अपलोड किए गए हैं।

Please find attached herewith the Record notes of the meeting held on 13.03.2018 to review the stages and quantum in the existing AUFLS scheme for your information and necessary action.

The Record notes of the meeting has also been uploaded on WRPC website at www.wrpc.gov.in.

Yours' faithfully/भवदीय,

16/04/18

J.K. Rathod/ जे के राठौड़
SE (Protection)
अधीक्षणअभियंता(रक्षण)

संलग्नक: यथोपरि
Encl.: As above

The List

1. CE, SLDC, GETCO, Gotri, Vadodara.
2. S.E. (Testing), GETCO, Baroda. Fax-0265-2351218
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16. Addl. Chief Engineer (R & C), Gujarat Energy Trans. Corpn. Ltd., Vadodara-390 007
17. **CE, NPC,CEA for information**

Record notes of the meeting held on 13.03.2018 to review stages and quantum in the existing Automatic Under Frequency Load Shedding Scheme

In line with the decision taken in the 131st PCM held on 27th & 28th Feb. 2018, a meeting to review the stages and quantum in the existing Automatic Under Frequency Load Shedding Scheme was held on 13.03.2018 at WRPC Mumbai. The list of participant is enclosed at **Annexure-I.** The existing frequency settings and quantum of load shedding of WR constituents is enclosed at **Annexure –II.**

Member Secretary WRPC welcomed the participants of the meeting. He informed that in the 7th NPC meeting held on 08.09.2017 at Indore, NPC has sought the views of participants on the matter of reviewing of quantum of load shedding and stages of frequency under AUFLS. He further informed that in the NPC meeting it was agreed that there is a need for review of the quantum of load shedding without introduction of additional slabs/stages of frequency and therefore, RPCs were requested to discuss this issue. The views of RPCs would be put up in next meeting of NPC.

He further informed that the issue was deliberated in the 131st PCM held on 27 & 28th February 2018, in which WRLDC was of the view that there is a wide variation in the system frequency during system operation. Raising the AUFLS slabs would arrest these wide variations. However, WRPC informed that the flat frequency AUFLS is not aimed at smoothening out the frequency and it is a defense mechanism to arrest the fall of system frequency and try to bring back it to near the nominal/operating frequency range. There are other mechanisms already available in the system such as primary response, secondary response and tertiary response to address the variations in the system frequency around nominal frequency. Therefore any revision in the slabs and quantum of the flat

frequency AUFLS may be decided by considering the fact that it is a defense mechanism. Further raising the slabs has to be judiciously decided based on the system inertia and the resources available (such as primary, secondary and tertiary responses) with the system operator.

SE(P) WRPC informed that in the 131st PCM the sub-Committee decided that a separate meeting be held to discuss the issue of raising the AUFLS slab and slab wise quantum of load shedding in detail. He requested WRLDC to give details of the frequency profile for the last few years.

WRLDC representative gave a brief presentation on the system frequency variations in last few years. It was highlighted that the frequency never touched 49.2 Hz after the 2012 grid disturbance. Further it was informed that during past period of more than three years, frequency of grid did not go below 49.5 Hz and therefore WRLDC proposed that the slab of frequency stages be raised by 0.2Hz from the existing 49.2Hz, 49.0Hz, 48.8Hz and 48.6Hz to 49.4Hz, 49.2Hz, 49.0Hz and 48.8Hz respectively.

WRLDC representative also informed that the Frequency Response Characteristics (FRC) from the recent past data have shown that the power number is around 9000MW/Hz. The Zalte Committee report prepared by WRPC after the grid disturbance of 2012 have given the philosophy for arriving at the quantum of load shedding to be identified for AUFLS. This philosophy was adopted by NPC (in the 2nd NPC meeting held on 16th July 2013) for arriving at the quantum of load to be shed at different frequency settings for all India grid. The regional shares for Northern region(NR), Western region (WR), Southern region(SR), Eastern region (ER) and North-eastern region(NER) were worked out based on the peak demands of these regions.

SE (P), WRPC informed that as per the actual data of frequency profile available in WRLDC web site, frequency never touched 49.5 HZ during the period of more than last three years and therefore if the first slab is raised to 49.4 HZ,

there would not be any frequent operation of AUFLS and at the same time AUFLS would continue to work as a last defense mechanism.
WRPC stated that it is appropriate to raise the first stage to 49.4 Hz from existing 49.2 Hz. WRLDC, based on the Zalte Committee philosophy, have worked out the quantum and in the first stage of proposed frequency setting of 49.4 Hz, the quantum of load shedding for all India grid with power number of 9000MW/Hz, works out to be around 15000MW.

SE(P) WRPC supported the views of WRLDC and suggested that if the frequency setting of 1st Stage is raised to 49.4 Hz, it would be more comfortable to system operators for bringing back the system to normalcy from unforeseen exigency condition and also there would not be any frequent unnecessary operation of AUFLS. He further added that the raising the first stage to 49.4 HZ would certainly reduce vulnerability of grid without any financial burden to the stake holders.

WRPC raised query on whether there were any system constraints or threat to the system when the frequency touched around 49.5Hz, if so, the details of the same may be shared by WRLDC with the forum. This would be useful in deciding the frequency setting. In reply, WRLDC stated that it would be more comfortable to the system operator to bring back the system frequency to the nominal value from 49.4 HZ instead of 49.2 HZ. WRLDC further added that the system constraints/ threats to the grid depend upon so many other system parameters in real time in integrated grid operation and therefore at different point of time, level of vulnerability of grid failure is different even if the frequency is same.

Based on the above discussions following was decided;

1. Gujarat SLDC, MP SLDC and Maharshtra SLDC agreed with the views of WRLDC. Chattisgarh SLDC representative was not present in the meeting.
2. In general it was agreed that the frequency setting of 1st stage of AUFLS be raised from existing 49.2 Hz to 49.4Hz.
3. The proposed revised stages are :

AUFLS	Existing frequency (Hz)	Proposed frequency (Hz)	Quantum of load shedding (MW)
Stage-I	49.2	49.4	Same as per existing quantum (Annexure-II)
Stage-II	49.0	49.2	
Stage-III	48.8	49.0	
Stage-IV	48.6	48.8	

4. All participants agreed to keep state-wise load shedding quantum same as existing as per annexure-II.

The meeting ended with a vote of thanks to the Chair.

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ANNEXURE-I

List of participants for the AUFLS meeting on 13.03.2018 15.00 hrs at WRPC Mumbai

S.N.	Name	Designation/ Organisation	Mob no.	Email	Signature
1.	Ratnesh Kumar Yadav	Asst Director-I/WRPC	9969948089	ratneshkumar7437@gmail.com	
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16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					

Annexure-II

The existing slabs and quantum of load shedding under UFR is as follows;

AUFLS implementation status in WR as on 31.03.2015									
(all figures are in MWs)		**49.2 Hz**		**49.0 Hz**		**48.8 Hz**		**48.6 Hz**	
		Actual	**Target**	**Actual**	**Target**	**Actual**	**Target**	**Actual**	**Target**
Guj	**Average**	**773**	**580**	**726**	**580**	**1117**	**580**	**1025**	**590**
MP	**Average**	**468**	**460**	**450**	**460**	**460**	**460**	**465**	**465**
CG	**Average**	**110**	**150**	**114**	**150**	**117**	**155**	**91**	**155**
MH	**Average**	**1122**	**805**	**1215**	**810**	**1044**	**815**	**1071**	**820**
Goa	**Average**		**25**	**25**	**25**	**25**	**25**	**25**	**25**
DD	**Average**	**10**	**10**	**15**	**15**	**16**	**15**	**15**	**15**
DNH	**Average**	**30**	**30**	**30**	**30**	**35**	**35**	**35**	**35**
Total		**2513**	**2060**	**2575**	**2070**	**2814**	**2085**	**2727**	**2105**

ANNEXURE- D.24

Action taken on 35th TCC/WRPC decisions

S. N.	Item/ Issue	Action By	Action taken
	A. Confirmation		
1	Confirmation of the Minutes of 34th Meeting of WRP Committee	WRPC	Confirmed
	B. Follow-up / Status update of previous issues		
2	LILO of 220 KV S/C Haldarva – Jhagadia line at NTPC Jhanor PS – regarding extending necessary support by Jhanor to GETCO	GETCO, NTPC.	Work under progress
3	Increase in GETCO Transmission loss due to high power flow on + 500 KV Mundra-Mohindergarh Bi-Pole HVDC line	GETCO, WRLDC	Joint study done
4	Interconnection between CGPL UMPP and Adani Mundra STPS in Gujarat – provision of 400/220 KV ICT at CGPL Mundra and compensation mechanism for 220 KV S/C CGPL Mundra – Nanikhakhar line & bays	PGCIL	Rating of ICT decided during 43rd SCM, work to be started by PGCIL
5	Operation of Kadana and Bhira in Pumping Mode	GETCO, TATA Power	Under progress
6	Status of pump mode operation of SSP	GETCO	Shall take up the issue with NCA and NVDD.
7	Multiple tripping of evacuation lines at CGPL on13.07.2016 leading to tripping 5x830 MW generators and 400 kV lines at 400 kV Bachhau S/S.	CGPL/ PGCIL	PGCIL may update
8	New Interface Energy Meters, AMR system and meter data processing system: installation	PGCIL	PGCIL may update
9	SAMAST: status of implementation of recommendations		
10	Signing of TPA by State Govt with GoI & RBI	MahaTransco	MSETCL may update
11	Progress of downstream network of constituents whose terminating bays are under construction by	WRPC to convene TRM regularly.	Regularly monitoring in TRM

	POWERGRID		
12	Ongoing transmission schemes (765/400 KV & above): status of completion		Regularly monitoring in OCC meeting
13	Extension of LILO arrangement for evacuation of power by ESSAR Power M.P. Ltd., 2x600 MW ("EPMPL")	EPMPL	Taken up with CERC, APTEL
	C. Items for Noting purpose		
	(a) Commercial		
14	5-minute scheduling: Impact of forthcoming five minutes scheduling and energy accounting.	WRPC	A meeting of the Group was held on 22.02.2018
15	DOCO: Declaration of Transmission elements into commercial operation by ISTS licensees	For noting.	---
16	LC: Status of Letter of credit (LC) opening against Deviation charges liability for 2017-18	For noting.	---
17	Status of pool account fund		
	(i) Deviation Settlement Mechanism (DSM) & RRAS	For noting.	---
	(ii) Reactive Energy Charges (REC)	For noting.	---
	(iii) Congestion Charges	For noting.	---
18	Status of Reconciliation	For noting.	---
	(b) Operation		
19	Performance of WR grid: during July to October 2017	For noting.	---
20	Anticipated power supply position in WR: January to March 2018	For noting.	---
21	New generating units in WR: during the current year 2017-18	For noting.	---
22	Installation of FGD in generating units:	For noting.	---
	(c) Protection		
23	SPS formulated for JP-Nigirie and MB Power:	For noting.	---
	(d) Details about WRPC Secretariat		
24	Establishment charges	For noting.	---

25	Meetings conducted	For noting.	---
26	Status of staff position	For noting.	---
27	Action Taken Report for MoM of 34th WRPC meeting (27-28 July, 2017)	For noting.	---
28	Any Other Item		
	(1) Installation of additional ICT at Kakrapar	GETCO & CTU	Site visit report submitted.
	(2) Additional Transformer of 1 x 500 MVA capacity at Jabalpur, PGCIl s/s	PGCIL	Work completed
	(3) WRLDC SCADA	For noting.	---
29	Date and venue of next WRPC meeting	For noting.	---

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Annexure- D.25

CYBER SECURITY IN POWER SYSTEM

"There are only two types of companies: Those that have been hacked and those that will be hacked." Robert S. Mueller, III, Director FBI made this famous quote but almost by the time he made the quote it was out of date – it should be 'There are only two types of companies: Those that have been hacked and those that don't know they have been hacked.'

VIJAY MENGHANI
CHIEF ENGINEER (IT),
CENTRAL ELECTRICITY AUTHORITY
CISO, MINISTRY OF POWER

Cyber security : Many battles and A war

If you know the enemy and know yourself, you need not fear the result of a hundred battles.
If you know yourself but not the enemy, for every victory gained you will also suffer a defeat.
If you know neither the enemy nor yourself, you will succumb in every battle."

Each of these three points of 5th Century B.C book directly applies to the world of cyber Security.

India : # 5 Most attacked Country

- Real Time Cyber Threat Map: https://cybermap.kaspersky.com/ or http://threatmap.fortiguard.com/

Terminology

Internet cookies

- Internet cookie : An HTTP cookie (also called web cookie, **Internet** cookie, browser cookie, or simply cookie) is a small piece of data sent from a website and stored on the user's computer by the user's web browser while the user is browsing. While in most of the case it will be safe , in few cases it can act as carrier of malware. It speed up browsing but can be used for malicious purpose.
- **Session Cookie**
- Also known as a "temporary cookie", this type of cookie attaches itself to a user's computer when they enter and browse a website. The cookie is then erased when the user closes the Web browser or exits the site. A session cookie does not collect information from a user's computer or activity while it sits on the system.
- **To Do:** Disabling session cookies in your browser can be difficult. This is due to their "first party" nature, which means they belong to the website the user is visiting and subsequently all administrative ability rests with the administrators of the website.
- Also, most well-known sites such as Facebook and Google are required to have session cookies embedded in their programming, making it very difficult for users to get around them.

Internet cookies

- **Persistent Cookie**
- Unlike session cookies, a persistent cookie does not disappear after a user exits a site. These types of cookies have a specific expiration date with the cookie continuing to transmit information to a website's server every time a user visits the site until the expiry date comes up.
- For this reason, persistent cookies are also known as "tracking cookies" as marketers can use the information obtained from the cookies to study user behavior over a certain period of time.
- Persistent cookies are also used to keep users logged into certain website, thus eliminating the need for them to enter their log in credentials each time they want to access the site.
- **From a security perspective, it's important to note that users should not enable the "keep me logged in" function offered on websites. This is not a safe practice and can be dangerous if any unwanted third-party were to gain access to your device.**
- **To Do:** Some websites and web browsers allow users to disable their cookies. However, this cause problems in the functionality of the website or browser as information needed to run the sites such as user IDs and recently saved searches will not be available if the user has disabled the cookies that retrieve this information.
- In lieu of disabling cookies altogether, a safer option might be to clear your cache of cookies every once and a while to free up space on your device and get rid of any unwanted cookies.

Internet cookies

- **Third-Party Cookie**
- A good example of third-party cookies is through advertisements or banners for third-party products or services present on a website. Cookies are also present in the social media "buttons" commonly found on websites. When a user encounters an article or a piece of information, the website will provide the option to share the content thereby activating the designated social media's cookies.
- **To Do:** It's possible to block third-party cookies from your device. Browsers such as Google Chrome, Firefox, and Internet Explorer have options in their Settings menu that allows users to turn off their third-party cookies.
- While some users might see the benefit of cookies, many view them to be an infringement on user privacy and steps are taken to disable them whenever possible.

Type of Malware

- Many PC users consider malware, viruses, spyware, adware, worms, Trojans, etc. as the same thing. While all these infections harm our computers, they are not the same. They are all types of malicious software that each behave differently.
- The word malware is a combination of two words "malicious" and "software". It is a generic term used to describe all of the hostile and intrusive program codes including viruses, spyware, worms, Trojans, or anything that is designed to perform malicious operations on a computer.

Type of Malware

- **Virus** – this is a term that used to be generic. Any bad software used to be a virus; however, we use the term "malware" now. We use the word "virus" to describe a program that self-replicates after hooking itself onto something running in Windows®.
- **Worm** – a worm is another kind of self-replicating program but generally doesn't hook itself onto a Windows process. Worms generally are little programs that run in the background of your system.
- **Trojan** – software that you thought was going to be one thing, but turns out to be something bad. Named for the fabled "Trojan Horse" that appeared to be a gift but in fact carried a dangerous payload.
- **Drive-by download** – this is probably the most popular way to get something nasty into your computer. Most of the time, it comes from visiting a bad web page. That web page exploits a weakness in your browser and causes your system to become infected.
- **keylogger** - Software or hardware that tracks keystrokes and keyboard events, usually surreptitiously / secretly, to monitor actions by the user of an information system.

Type of Malware

- **Adware** – not truly malware and almost never delivered using one of the methods above. Adware is software that uses some form of advertising delivery system. Sometimes the way that advertisements are delivered can be deceptive in that they track or reveal more information about you than you would like. Most of the time, you agree to the adware tracking you when you install the software that it comes with. Generally, it can be removed by uninstalling the software it was attached to.
- **Spyware** – software that monitors your computer and reveals collected information to an interested party. This can be benign when it tracks what webpages you visit; or it can be incredibly invasive when it monitors everything you do with your mouse and keyboard.
- **Ransomware** – lately a very popular way for Internet criminals to make money. This malware alters your system in such a way that you're unable to get into it normally. It will then display some kind of screen that demands some form of payment to have the computer unlocked. Access to your computer is literally ransomed by the cyber-criminal.
- **Scareware** – software that appears to be something legit (usually masquerading as some tool to help fix your computer) but when it runs it tells you that your system is either infected or broken in some way. This message is generally delivered in a manner that is meant to frighten you into doing something. The software claims to be able to fix your problems if you pay them. Scareware is also referred to as "rogue" software – like rogue antivirus.

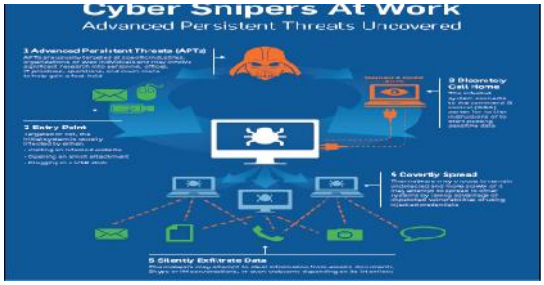
More dangerous Malware Botnet and RootKit

- **Botnet:** Some malware get into your computer and appear to do nothing at all. Such malware may have no obvious symptoms, but it has infected your computer along with a group of other computers, forming what is called a "botnet". This botnet can be directed by an Internet criminal to do any number of things including spam delivery and attacking Internet sites. Internet criminals don't want to do anything direct that may be tracked back to them, so they employ botnets to do their dirty work for them.
- **Rootkit** :"rootkit" or "bootkit" used to describe a certain type of malware. Generally, this refers to methods that the malware uses to hide itself deep inside the inner workings of Windows so as to avoid detection. (Used in many attacks like in Iran, Ukraine, Japan)
- Modern malware are combo of many things. Something like Tidserv/Alureon uses drive-by download to get into your system. Once it's in, it creates a bootkit so it starts before Windows even starts, and it creates a worm-like application that uses rootkit techniques to hide itself. Once it all starts up, it can act like spyware or it can hijack many Windows functions to do just about everything from putting advertising popups on your system to **allowing someone to take remote control of your system.**

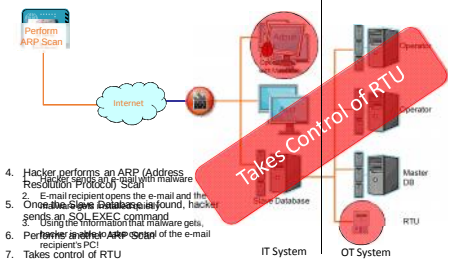
Advance Persistent Threat (APT)

- **The six steps of an APT attack**
- To improve your cyber security and successfully prevent, detect, and resolve advanced persistent threats, you need to understand how APTs work:
- The cyber criminal, or threat actor, gains entry through an email, network, file, or application vulnerability and inserts malware into an organization's network. The network is considered compromised, but not breached.
- The advanced malware probes for additional network access and vulnerabilities or communicates with command-and-control (CnC) servers to receive additional instructions and/or malicious code.
- The malware typically establishes additional points of compromise to ensure that the cyber attack can continue if one point is closed.
- Once a threat actor determines that they have established reliable network access, they gather target data, such as account names and passwords. Even though passwords are often encrypted, encryption can be cracked. Once that happens, the threat actor can identify and access data.
- The malware collects data on a staging server, then exfiltrates the data off the network and under the full control of the threat actor. At this point, the network is considered breached.
- Evidence of the APT attack is removed, but the network remains compromised. The cyber criminal can return at any time to continue the data breach.
- Traditional cyber security measures such as defense-in-depth, firewalls and antivirus cannot protect against an APT attack, and leave organizations vulnerable to data breaches

Advance Persistent Threat (APT)



A Cyber Attack Example – Telemetry System



4. Hacker performs an ARP (Address Resolution Protocol) Scan
5. Once data base is found, hacker sends an SQL EXEC command
6. Perform another ARP Scan
7. Takes control of RTU

Courtesy : S P.K Agarwal, Director , POSOCO

Hackers & their Motive

- **Script Kiddie** – They are inexperienced crackers, who use scripts and programs developed by others. They often don't know what they're clicking or initiating, nor do they have any idea of the scope, or consequences of their actions.
- **hacker**
  Definition: An unauthorized user who attempts to or gains access to an information system. A hacker is someone who thinks outside the box, is technologically-inclined, and finds unconventional solutions to problems, focusing on what is important
  - A black hat hacker is that cracker, or malicious hacker.
  - A white hat hacker does what a black hat hacker does, breaking into companies and systems, with their permission, of course, in hopes of finding and exploiting vulnerabilities. So the company can fix those vulnerabilities before a black hat hacker can get in.
  - A grey hat hacker is somewhere in the middle.
- **MICE :money, ideology, compromise or coercion, ego or extortion**. **MEECES: money, ego, entertainment, cause, entrance, and status.**

AAA Model

- Authentication: The process of verifying the identity or other attributes of an entity (user, process, or device). When you claim you are someone, that's called identification. When you prove it, that's authentication.
- Authorization: A process of determining, by evaluating applicable access control information, whether a subject is allowed to have the specified types of access to a particular resource. The process or act of granting access privileges or the access privileges as granted.
- Availability :The property of being accessible and usable upon demand. In cybersecurity, applies to assets such as information or information systems.

Social Engineering

- Social engineering involves preying on humans who are gullible and naive, and will always be the weakest link in cybersecurity system.
- The art and science of getting people to comply to your wishes and an outside hacker's use of psychological tricks on legitimate users of a computer system.
- In order to obtain information, he needs to gain access to the system.
- Social engineering is when a hacker tricks someone into doing something they normally wouldn't and shouldn't do from a cybersecurity perspective.
  - You can patch a computer, but you can't patch people.
  - You can teach them, but they forget and make mistakes.
- As computer vulnerabilities get harder to exploit, people become the most obvious target.
- Using social engineering, hackers can commit fraud, network intrusion, industrial espionage, identity theft, and simply disrupt systems and networks.
- Potential targets include telephone companies; answering services; big name corporations; financial institutions; military and governmental agencies; hospitals; and even you.

Phishing, Spear Phishing, Whaling, Clone

- Email versions of social engineering include phishing, spear phishing, and whaling.
- **Phishing** involves sending out bait mostly through email to a large number of people, hoping some users will bite by sending user names, passwords, and even credit card information.
- **Spear Phishing**: It targets specific users of a specific company. Instead of just random email addresses that may or may not be valid.
- **Whaling**:" In whaling" attack, fraudsters attempt to harpoon an executive and steal their login credentials.
- **Clone Phishing**: Clone phishing requires the attacker to create a nearly identical replica of a legitimate message to trick the victim into thinking it is real. The email is sent from an address resembling the legitimate sender, and the body of the message looks the same as a previous message. The only difference is that the attachment or the link in the message has been swapped out with a malicious one.

- Check Sender and attachment carefully before downloading or clicking

Pharming, Watering Hole

- Pharming is the hijacking of a legitimate website's IP address and or domain name.
- It redirects unsuspecting users to a fake site and collects information that users enter like passwords, banking information, and other PII.
- A Watering Hole is a computer attack strategy in which the victim is in a particular group, whether it's an organization, an industry, or a region.
- In this attack the hacker guesses or observes which websites the group often uses. And then the hacker infects one or more of those sites with malware.
- Eventually some member of the targeted group gets infected.

Air Gap, Data Diode ,PowerHammer

- Air Gap:Air gapping is a security measure that involves isolating a computer or network and preventing it from establishing an external connection. For example, an air gapped computer is one that is physically segregated and incapable of connecting wirelessly or physically with other computers or network devices. It is mainly used for separating Operation (OT) and Information Technology (IT)
- Air-gapped networks are used to protect many types of critical systems, including those that support the stock market, the military, the government and industrial power industries.
- To prevent unauthorized data extrusion through electromagnetic or electronic exploits, there is often a specified amount of space between the air gapped system and outside walls and between its wires and the wires for other technical equipment. For a system with extremely sensitive data, a Faraday cage can be used to prevent electromagnetic radiation (EMR) escaping from the air-gapped equipment
- A **data diode** is a one-way information transfer device that connects two networks of different security levels and allows information to be sent to the more secure network without the risk of information leakage.
- **PowerHammer**：For exfiltering Data from Air-gapped Computer through Power Line

DoS , Ddos and DNS attack

- **Denial of service (DoS)**
  An attack that prevents or impairs the authorized use of information system resources or services.
- ***Distributed Denial of Service(DDoS):*** DDoS is a type of **DoS attack** where multiple compromised systems, which are often infected with a Trojan, are used to target a single system causing a Denial of Service (DoS) attack. Victims of a DDoS attack consist of both the end targeted system and all systems maliciously used and controlled by the hacker in the distributed attack.
- A Denial of Service (DoS) attack is different from a DDoS attack. The DoS attack typically uses one computer and one Internet connection to flood a targeted system or resource. The DDoS attack uses multiple computers and Internet connections to flood the targeted resource. DDoS attacks are often global attacks, distributed via botnets
- Domain Name Server9DNS) : It is a protocol that is mainly focused on translating name of a site (the domain name), into the Internet address (IP address).
- DNS attack aim at denying this function , reverse DNS queries or redirecting users and traffic to fake /malicious domain in some other country.

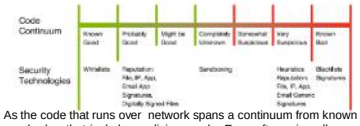
Honeypot

- Imagine a server with lots of PII: Personally-Identifiable Information
- Imagine passwords stored in plaintext, credit card numbers, addresses, and even healthcare-related information.
- Imagine the administrators deliberately not putting any form of cybersecurity on the server.
- What is this, a bad dream? No, this is by design.
- A server like this is called a **honeypot**.
- A network of these machines is called a honeynet.
- Decoy systems are deployed on networks designed to lure potential attackers away from critical systems.
- This also allows security specialists to collect information about attackers' activities.
- Typically these honeypots encourage attackers to stay on the system long enough for administrators to document and respond to the attack.
- It also allows administrators to refine the firewall rules based on observed attacker behaviors.

Dark Market , Tor and Carding

- Dark Market : In the case of dark net markets, “dark net” is a misnomer to represent markets only accessible as hidden services. These markets generally use Bitcoin or other crypto currencies for payment, often for illicit items.
- Tor :According to the Tor Project, “Tor is free software and an open network that helps you defend against traffic analysis, a form of network surveillance that threatens personal freedom and privacy, confidential business activities and relationships, and state security.”
- Transaction mostly include Credit card information , email id s and password and Skimmer or card cloner.
- **Carding** is a term describing the trafficking of credit card, bank account and other personal information online as well as related fraud services. Activities also encompass procurement of details, and money laundering techniques.[1]

Sandbox

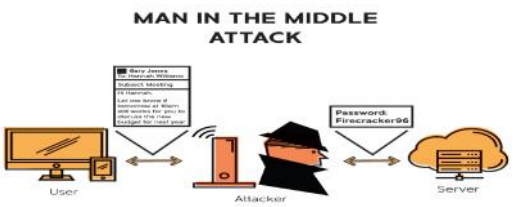


- As the code that runs over network spans a continuum from known good code to known bad or that includes malicious code. Even after using all necessary tool, which mostly capture known malware , there is possibility of new threat.
- A sandbox is a safe isolated environment that replicates an end user operating environment where you can run code, observe it and rate it based on activity rather than attributes.
- You can run executable files, allow contained network traffic and more that can contain hidden malware in a sandbox.
- The sandbox provides a safe environment in which to execute and observe malicious code such as file/ disc operations, network connections, registry/system configuration changes, etc.

Man In Middle attack, Zero day

- In cryptography and computer security, a **man-in-the-middle attack** (**MITM**) is an attack where the attacker secretly relays and possibly alters the communication between two parties who believe they are directly communicating with each other.
- The **real risk of open Wi-Fi networks** is that hackers can position themselves between the network and users and execute a man-in-the-middle (MITM) attack, redirecting all network traffic through their computer before it goes on to the router. Doing so allows hackers to see all the information heading out into the Internet, including communications, personal information, and web traffic
- Zero day :A **zero-day exploit** is an attack that exploits a previously unknown security **vulnerability**. A **zero-day** attack is also sometimes defined as an attack that takes advantage of a security **vulnerability** on the same **day** that the **vulnerability** becomes generally known

MIMA



Cyber Security

- ***Cyber security refers to the protection of the networks, hardware, and software from attacks, damage, or unauthorized access and rejection of services.***
- ***It basic involves:***
  - Identify Infrastructure
  - Assess/Evaluate Vulnerabilities/Threats/Risks
  - Implement Security Controls
  - Verify Implementation of Security Controls
  - Ensure Compliance to Audit

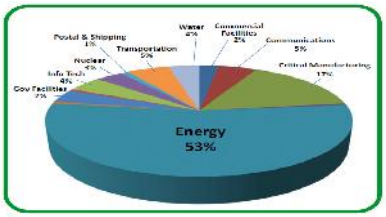
Recent Cyber Attacks

- Cyber-attack in the form of ransomware virus hitting more than 150 countries on 12.05.2017.
- Black out in three cities of USA: A series of power outages in Los Angeles, San Francisco, and New York City left commuters stranded on 21.04.2017, yet to be recognized, whether due to cyber-attack.
- Cyber Attack on Ukraine's power grid on 23.12.2015 and 17.12.2016.
- Cyber Attack on Hydropower Generation in New York in year 2013.
- Cyber Attack on Korea Hydro and Nuclear Co Limited in December, 2014.
- **Security breach in Iran's Nuclear plant in 2010**.

2017 -18 : Cyber attacks

- **2017**
- February: The Cloudbleed bug was discovered by Google Project Zero team.
- April: A hacker group calling itself "The Dark Overlord" posted unreleased episodes of *Orange Is the New Black* TV series online after they failed to extort online entertainment company Netflix.
- May: WannaCry ransomware attack started on Friday, 12 May 2017, and has been described as unprecedented in scale, infecting more than 230,000 computers in over 150 countries.
- May: 25,000 digital photos and ID scans relating to patients of the Grozio Chirurgija cosmetic surgery clinic in Lithuania were obtained and published without consent by an unknown group demanding ransoms.
- June: 2017 Petya cyberattack.
- May–July 2017: The Equifax breach.
- September 2017: Deloitte breach.
- **Indian Power Sector: Nov 2017 : Hydro Utility in Northern Region**
  - **Feb,2018 : Discom website , ransom call in Bitcoin**
  - **March, 2018 : Discom Billing System**
- **8.4.2018 : Cyber attack on Iran IT Network Large Number of CISCO switches attacked as necessary patch was not uploaded.**
- **May,, 2018 ;NCCIPC reported many vulnerabilities in State Power Utilities websites.**

Utility as target of Cyber attack



According to US Deptt Of Home land security's Industrial Control system Computer Emergency response team (ICS-CERT) , majority of Cyber attacks in 2013 were related to Energy Industry.

Areas Vulnerable to Cyber Attacks

- **Hardware Layer:** Embedded components such as Programmable Logic Controllers (PLCs) and Remote Terminal Units (RTUs) are hardware modules executing software required for information communication and control.
- **Firmware Layer:** The firmware resides between the hardware and software. It includes data and instructions able to control the hardware.
- **Software Layer:** Power Control Systems employ a variety of software platforms and applications, and vulnerabilities in the software base may range from simple coding errors to poor implementation of access control mechanisms.
- **Network Layer:** Vulnerabilities can be introduced into the power control system network in different ways namely the firewalls, modems, fieldbus network, communications systems and routers, remote access points and protocols and control network.
- **Process Layer:** All the aforementioned power control system layers interact to implement the target power control system processes.

Issues in Cyber security

- To frame a cyber-security program to facilitate development of Cyber Security Standards
- create a platform for sharing cyber security incidents
- strengthening of the cyber security system in power generation, transmission, and distribution sectors.

- There are six areas, which need to be addressed for cyber security:
  1. **Vulnerability assessment** in order to categorize the devices in terms of high risk and general vulnerabilities.
  2. **Vulnerability assessment area**, extended to attacks from an insider, attack on the computer monitoring and controlling devices, attack on the SCADA network, and programming of malware into the control system devices.
  3. Prepare framework for **testing of equipment**.
  4. **Asset mapping** of all critical infrastructure equipment and periodic monitoring of these equipment for cyber security compliance.
  5. Provide a complete **monitoring solution** to report on malicious connections.
  6. **Auditing** and conformance procedure.
- Formulate provisions in regards to bidding to incorporate provisions for acceptance of technical standards and testing certificate of other countries.

Cyber Security Initiatives in India

- 17.10.2000: Information Technology Act,2000 (No. 21 of 2000) – IT Act ,notified.This was amended in 2008. It is the primary law in India dealing with Cyber Crime and electronic commerce.
- 10.01.2014:National Critical Information Infrastructure Protection centre (NCIIPC) was created by Government of India under section 70 A of IT Act.
- Two important documents of NCIIPC:
  1. Guidelines for protection of critical Infrastructure (CII)
  2. Framework for evaluation of Cyber Security
- Computer Emergency response Teams (CERT-In) under section 70(B) and sector specific CERTs constituted
- As per Rule 12(1) (a) of IT Rules 2013, it is mandatory to report specific cyber security incidents to CERT-In.
- **ISGF Documentation**: ISGF has prepared a framework for laying down procedures for securing India's Smart Grid from cyber-attacks.
- **ISO: 27001**: The Government of India, under the Information Technology Act, 2000 and the Rules therein for Reasonable Security Practices published in 2011, require all organisations to implement ISO:27001 as the recommended Information Security Management System for legal compliance.

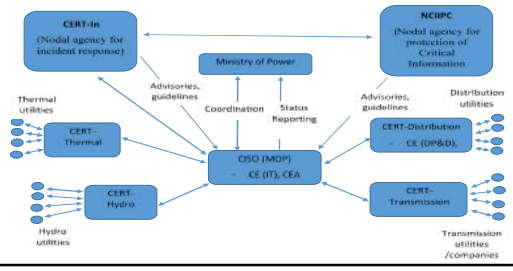
Cyber Security in Power sector

- Indian Electricity Grid code Clause 4.6.5
  " All utilities shall have cyber security framework to identify the critical cyber asset and protect them so as to support reliable operation of the Grid."
- IS-16335 :2015 Power Control Systems-Security Requirement

It specifies requirement for identification and protection of critical assets for all entities involved in generation, transmission , distribution and trading of electric power .

- **CERC (Communication System for inter-State transmission of Electricity) Regulations, 2016.**
  - "CEA shall formulate and notify technical standards, cyber security requirements, protocol for the communication system for Power Sector within the country including the grid integration with the grid of the neighbouring countries".
  - 13. Cyber Security:
    (i) Communication infrastructure shall be planned, designed and executed to address the network security needs as per standard specified by CEA.

Organization structure for Cyber Security in Power system



Cyber Security in Power system

- Vulnerability:
  - Generation : UMPP and Renewable generating stations(like Solar Inverter)
  - Transmission: Protection system and communication
  - System Operation: SCADA-EMS
  - Distribution: Smart meters
- February ,2013 CEA brought out report on Guidelines mandating clearance from " Security Angle" wherever sensitive equipment is procured from overseas as well as for the procurement of electronic products by Government or its agencies for Power sector
  - It lists out Critical equipment in Power sector considering physical and cyber security aspects.
  - Also list out Electronic products deployed in Power system having security implication.

Constitution of Committee under Member (E&C)

- Ministry of Power vide letter dated 21.3.2017 constituted a committee under Chairmanship of Member (E&C).
- **To look into issues of power firms seeking to enter Indian Power transmission sector and to study the related issues of Cyber Security.**
- **To look into matter related to Standards of Technical specification, Testing standards and Sourcing of equipment/materials.**
- Members of the Committee:
  - Director (Transmission),MOP.
  - Sh.V.N. Kothari, Director D/O Commerce
  - Chief Engineer (PSETD),CEA
  - Chief Engineer (IT),CEA
  - Director(Projects), PGCIL
  - ED(NTAMC), PFCIL
  - Director (Public policy & Economic Taxation), IEEMA
  - Co-opted Chief Engineer (legal), Chief Engineer (F&CA) & GM (POSOCO)
- Meetings held on 28.3.2017 and 20.4.2017
- Report submitted on 19.7.2017

Issue 1 Foreign Firms in Transmission

1. Relevant service is "Service incidental to energy distribution (CPC 887) .

2. The GATS schedule in the WTO, India has not taken any commitments on this particular service and, therefore, we retain the full policy space to restrict the tendering process as per its requirements and considerations. With regard to non-committed sectors, such as, in this particular case, India can place restrictions on national treatment or market access.

Issue 1. Foreign Firms in Transmission(Contd.)

- While we are in a position to limit the participation of foreign countries in the tendering process here in India, the case of Japan, South Korea and Singapore stand out separately since we have a Free Trade Agreement (FTA) with them.
  - Even in the case of these three countries, there is a provision to exclude them in two specific instances.
  - The first being the case where the purchase made is for the Government only and for non-commercial use. An example in this regard would be any purchase made by the BSF or the BRO etc. The other instance is that we can invoke a security exception which is permissible under Article XVI of GATS.
- However, it seems that due caution has to be exercised in invoking the **security exception and the Department of Commerce has pointed out that it has not really been tested in any case so far**
- **"principle of reciprocity"** - if any foreign country debars firms of a country from bidding in their market on a flimsy ground, the same stance could be adopted by country for firms from that particular foreign country.

Issue 1. Foreign Firms in Transmission(Contd.)

- National Capital Good Policy 2016

" To make procurement of Heavy Electric Equipment under local competitive bidding and not under international competitive bidding (ICB) in domestically funded projects under Ministry of Power, Ministry of Steel and Ministry of Non-Conventional Energy , CPSUs and in the projects funded by PFC and REC."

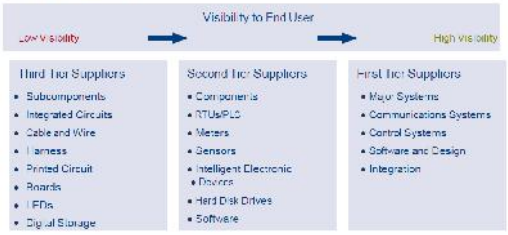
- CEA Notification vide CEA/PEETD/205/218-296 dated 19.5.2016

(http://www.cea.nic.in/reports/others/ps/psetd/domestic_competitive_bidding_2016.pdf)

- Preferred market access in Telecom : http://www.dot.gov.in/pma-policy
- However only these restriction would not be sufficient to deal with Cyber security

Supply chain of a utility

Figure 1: Utility Supply Chain



International experience

- The Australian Government in 2012 had intervened to block a privately owned Chinese Communication Company from winning lucrative contracts to help build the $ 36 billion fiber optic National Broadband Network. The decision, it seems was based on the advice from the Australian Security Intelligence Organization (ASIO).
- China Cyber Security Law (w.e.f.1.6.2017)
- Article 23 Critical network equipment and special cybersecurity products can only be sold or provided after being certified by a qualified establishment, and are incompliance with national standards. China's cyberspace administrative bodies and the relevant departments under the State Council will **draft a catalogue of critical network equipment and special products.**
- Article 35 Critical information infrastructure operators that purchase network products and services that might affect national security must pass a national security review.

Issue No. 2 Technical standards for material and equipment

- CEA Technical standards for construction and connectivity to grid does not specifically provide for Cyber security. These stipulates technical requirements .
- In procurement procedure testing following provisions may be incorporated:
  - The organization shall induct only those network elements which have been tested as per relevant contemporary Indian or international Security Standards (e.g. ISO/IEC 15408 standards, for Information Security Management System against ISO 27000 series Standards, BIS standards IS 16335: 2015 for power control systems etc.).
  - Vulnerability and Penetration test of Main and Back-up system shall be conducted during the FAT (Factory Acceptance Test). Accredited labs (like M/S Standardisation Testing and Quality Certification, a GOI enterprise) shall carry out third party security audit (Vulnerability and Penetration test) of SCADA/EMS system at site.
  - "Safe to connect' certification from supplier of hardware, software including their manufacturer, vendor, and service provider

Action to be taken

- Framing and implementation of Institutional and Legal, Technical, Contractual and Universal testing of equipment policy.
- **Institutional and Legal framework:** Every organization shall establish:
  - an institutional framework for ensuring compliance of legal, contractual and technical framework to make the system nearly 100% secure from cyber-attacks,
  - legal framework to incorporate various mandatory provisions for compliances from procurement to installation to operation.
- **Technical framework:** The security policy to lay down technical framework to be followed for the operation of the system to ensure cyber-security.
- **Contractual framework and Universal Testing:** The bidding documents should be so framed so as to encourage only firms which are manufacturing equipment in India to participate in the bid, including certification from the supplier that the equipment is "Safe to Connect".
  - The equipment procured under the specified guidelines shall be required to be tested for 100% reliability from any vulnerability from malware and cyber-attacks.

Action points on Cyber Security

- Review of CEA Regulations to incorporate suitable provisions for compliance of Cyber Security .
- Testing standards and procedure for cyber security compliance .
- Creation of test bed at CPRI .
- Guidelines for procurement to incorporate provisions for more local content and cyber security compliance.
- Scheme of testing and cyber security audit of all SCADA/EMS .
- CEA is coordinating cyber security in power sector. Further action to enhance cyber security awareness, preparation of crisis management plan and Cyber security audit in state utility specifically in distribution utilities is required, for this CEA will interact vigorously with State and formulate action plan so activities like appointment of CISO, identification of critical assets and crisis management plan is completed in a time bound manner.
- Formation of a umbrella organisation on cyber security issues in power sector " Power Security Council of India "
- Training and certification program on Cyber Security to be formulated

Progress in Regulation

- **Draft Amendment in Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Amendment Regulations,2016**

(10) Cyber Security : Due attention and importance shall be given to Cyber Security for automation and control systems in the Electric Sector. The firewall and Virtual Private Network (VPN) technology or any other state-of art technology shall be built up for security of the system. The access to systems and devices shall be further protected by using user authentication and authorization. The standards like NERC-CIP, IEEE and IEC addressing Cyber Security for control system and Guidelines of National Critical Information Infrastructure Protection Centre (NCIIPC), Government of India, shall be followed.

Progress in Regulation

Draft Central Electricity Authority (Technical Standards for Communication System in Power Sector) Regulations 2017. **Comments invited**

(10) The cyber security program should use reasonable endeavors to address the following functions:

1) Understanding of cyber security risks to the systems, assets and risk assessment and

implement risk management strategies.

2) To have controls and safeguards necessary to protect or deter cyber security threats with implementation of access control, data security, data protection.

3) Continuous monitoring to provide proactive and real time alerts of cyber security related events

4) Analysis of observation(s) related to various activities related to violation of cyber security; and implement mitigation policy.

Progress in Regulations (Contd.)

Draft Central Electricity Authority (Technical Standards for Communication System in Power Sector) Regulations 2017

5) Business continuity plans/Disaster Management Plan to maintain resilience and recovery capabilities after a cyber-breach.

6) Adequate training to the persons, who are authorized to have access to the

communication system, on cyber security to continuously update the threat perception.

7) Carry out cyber security audit within predefined interval, through Govt. approved agencies to ensure security.

8) Implementation of relevant provision(s) contained in the Cyber Security Policy issued by Govt. of India from time to time.

Constitution of Task Forces and Committees

- Task Force-I **(constituted on 26.12.2017)**
  - Review regulations and incorporate suitable provisions in regards to Cyber Security in Power Sector
- Task Force-II **(constituted on 28.12.2017)**
  - Formulate testing standards and procedures for cyber security compliance in Power Sector
- Task Force-III **(constituted on 28.12.2017)**
  - Formulation of testing of all SCADA/EMS procured under APDRP scheme

Constitution of Task Forces and Committees

- Task Force-IV **(constituted on 28.12.2017)**
  - Enhancing cyber security awareness, preparation of crisis management plan, cyber security audit and identification of critical assets in state utilities
- Task Force-V **(constituted on 28.12.2017)**
  - Act as knowledge warehouse for cyber security related events and issues in Power Sector
- Committee **(constituted on 23.10.2017)**
  - Identify goods & services required for the development & operation of Power Sector

Cyber Security Preparedness

- Since last two years through CERT (Thermal, Hydro , Transmission and Distributions) efforts are made to sensitize and prepare all utilities for cyber security in power system
- Not much progress and lot need to be done .
- Organisation structure and documents are **necessary but not sufficient** as cyber security threat is too pervasive and it strike weak points too suddenly and more dangerous than a natural disaster .

Social Engineering : Man & Mind

ONLY AMATEUEURS ATTACK MACHINES, PROFESSIONALS TARGET PEOPLE

IF YOU THINK TECHNOLOGY CAN SOLVE YOUR SECURITY PROBLEMS, THEN YOU DON'T UNDERSTAND THE PROBLEMS AND YOU DON'T UNDERSTAND THE TECHNOLOGY.

Response to a question you never had

Creating distrust

Invest in both : Technology and People

Present Status 1: Appointment of organization & plant level Chief Information Security Officers (CISO)

- Single point of contact between organization and CEA/Sectoral CERT/CERT-In for all cyber security matters
- Accountability for implementing Cyber Security policies at organization level

Present Status

- 4 Nodal officers – Sectoral CERTs
- 121 Nodal officers – power utilities/IPPs
  - CERT-Thermal (32)
  - CERT-Hydro (29)
  - CERT-Transmission (20)
  - CERT-Distribution (40)

Way Forward

- Request State Chief Secretaries to facilitate nomination of CISOs of state utilities
- Request IPP heads to submit CISO nominations

2. Identify organization-wise Critical Infrastructure

- For implementing security policies & controls over the identified critical infrastructure
- Security auditing of the identified critical infrastructure.
- Vulnerability assessment & penetration testing of identified critical infrastructure

Present Status

- NTPC, NHPC and PGCIL have identified their infrastructure in respect of business criticality and implemented ISO 27001 controls

Way Forward

- Instruct nodal officers of power utilities/IPPs to identify their critical infrastructure and submit status to CEA (within 15 days)
- Collection of security policies & control implementation status from nodal officers of power utilities/IPPs (within 1 month)
- Request nodal officers to conduct security audit, vulnerability assessment & penetration testing of the identified critical infrastructure

3. Formulate Crisis Management Plan (CMP)

- Organization specific plan for tackling IT/operation related crisis

Present Status

- NTPC, NHPC and PGCIL have drafted their CMPs
- NHPC has submitted CMP for Hydro sector
- Distribution CMP has been prepared and issued in December,2017.
- CERT-In conduct workshops on CMP

Way Forward

- Request CERT-In to conduct CMP workshops for power sector utilities (within 15 days)
- Instruct nodal officers of utilities/IPPs to attend CERT-In workshop on CMP (within 1 month)
- After workshops, instruct nodal officers to prepare their organization specific CMP (within 2 months)

4. Security Mock Drills

- Readiness of organization to tackle cyber incidences
- Mock drills are facilitated by CERT-In

Present Status

- PGCIL participated in mock drill in the past

Way Forward

- Instruct NTPC, NHPC and PGCIL to participate in mock drills at their organization level in co-ordination with CERT-In (within 3 months)
- Nodal officers of other utilities (sector specific) and CEA representatives can be invited in mock drills for acclimatization.
- Thereafter, instruct other utilities to conduct mock drill at their end in coordination with CERT-In (within 6 months)

5. Information Sharing & Analysis Centre (ISAC) – Power

- Common platform for sharing & analyzing cyber security incidences in Power Sector

Present Status

- ISAC-Power static page is available on CEA website
- ISAC-Power page provides information about nodal officers, links to IT act, rules, guidelines & presentations

Way Forward

- Develop dynamic and database supported ISAC-Power portal for better coordination between stakeholders.
  - Concept paper for ISAC-Power
  - Design & develop ISAC-Power portal (

6. Trainings / workshops on Cyber Security

Present Status

- CERT-In organizing cyber security workshops.
- Sectoral CERTs organizing workshops/presentations (last workshop conducted on 15.02.17 by PGCIL)
- **CEA taken imitative and organized four Regional workshops in Bangalore, Mumbai ,Kolkatta & Delhi**

Way Forward

- Request to DG, NPTI to conduct cyber security courses for power utilities.
- Nodal officers of power utilities to register themselves for CERT-In workshops.
- All Nodal officers to submit quarterly reports to CEA on training attended / organized by them on cyber security

CISO Nomination (WR)

	CISO Nomination Status	
Sector	Received	Not Received
Hydro	Chhattisgarh (CSPGCL), Gujrat (GSECL), MP (MPPGCL, NHDC), Maharashtra (Dodson-Lindblom, JSW, MAHAGENCO, Tata Power)	Narmada Control Authority
Thermal	Gujrat (BECL, GIPCL, GSPC, GSECL, GIPCL, Jyoti Ltd), Chhattisgarh (CSPC, Jindal Power Ltd, GMR), MP (MPPGCL), Maharashtra (MAHAGENCO, NPCIL, RGPPL, JSW Energy Ltd, Tata Power, Reliance Inf. Ltd.)	Chhattisgarh (LANCO Amarkantak/Pathadi, ACB, VESPL, BALCO, VVL, KSK Mahanadi Power Co. Ltd WPCL, RKMPPL), Maharashtra (WPCL- Warora, Abhijeet MADC, APL, EEL, IEPL, VIP, GEPL, DIPL, HNPCL), Goa (Reliance(Goa), MP (BLA Power P. Ltd, IPPVL, JhaPL)
Transmission	Gujrat, Maharashtra, MP	Goa,
Distribution	Gujrat (PGVCL, Torrent Power), MP (MKVVCL), Maharashtra (Brihan Mumbai, MSEDCL, Reliance Inf. Ltd., Tata Power)	Daman, Dadra & nagar Haveli, Goa, Gujrat (GUVNL, MGVCL, Jubilant Infrastructure Ltd.), M.P. Paschim Kshetra Vidut Vitran Company Ltd. , M.P. Poorvi Kshetra Vidut Vitran Company Ltd., Reliance Energy Ltd.

Quarterly Preparedness Monitoring - AGENDA

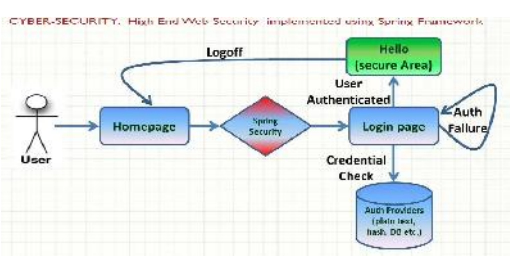
(Status as on :)

S.No.	State	Sector (G/T/D)	Utilities	Status of CISO Nomination	Critical Infra Identified	Crisis management Plan Prepared	Status of CS mock drill	Status of Training/ Workshops organized/ participated by utility	Action taken on CERT-In/NCIIPC Advisories
1	Tamilnadu	T	TANGEDCO	Yes/No	Yes/No	Yes/No	Done on ___		

Telangana SLDC –Cyber Security Measures

CYBER SECURITY

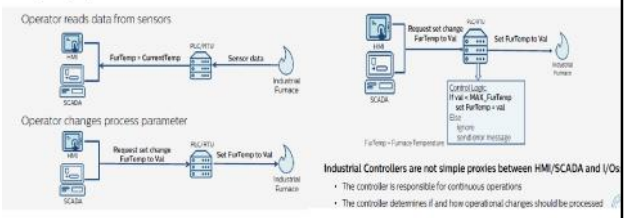
- A systematic approach to security is followed with all our systems. Policies for maintaining secure operations are adopted. Network, Systems and Databases are divided into distinct security zones. Security is applied at multiple levels for enhanced redundancy and resilience.
- The security principles of authentication, authorisation and auditing are addressed at Network, System and Application level of the infrastructure such that availability, confidentiality and integrity are ensured.
- Physical Security is also implemented at SLDC by
  - establishing Access control for SLDC entrance
  - Surveillance System within SLDC
  - Security Personnel is made available at SLDC entrance 24 X 7 and 365 days.
- All Log in/ Log out and cable plug in/plug out shall also be logged in Central Maintenance Console.
- Cyber security audit is conducted annually as part of AMC by CERT authorised IT security Solution Providers & IS Auditors for vulnerability assessment. So far, Cyber Security Audit is conducted three times since the commissioning of the new SCADA System



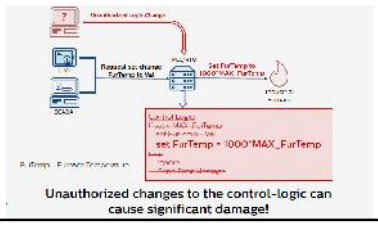
Tools

No	Name	Download URL
1	TeraTerm	https://ttssh2.osdn.jp/index.html.en
2	WinSCP	https://winscp.net/eng/docs/start
3	GeoIP	https://www.maxmind.com/en/geoip2-services-and-databases
4	Sigcheck	https://docs.microsoft.com/en-us/sysinternals/downloads/sigcheck
5	HashMyFiles	http://www.nirsoft.net/utils/hash_my_files.html
6	FTK Imager	https://accessdata.com/product-download/ftk-imager-lite-version-3.1.1
7	Strings	https://technet.microsoft.com/en-us/sysinternals/bb897439.aspx
8	TCPView	https://docs.microsoft.com/en-us/sysinternals/downloads/tcpview
9	WireShark	https://www.wireshark.org/
10	Process Explorer	https://docs.microsoft.com/en-us/sysinternals/downloads/process-explorer
11	Process Monitor	https://docs.microsoft.com/en-us/sysinternals/downloads/procmon
12	Reg Ripper	https://github.com/keydet89/RegRipper2.8
13	Event Viewer	Windows -|Admin Tools|-|Event Viewer|
14	Autoruns	https://docs.microsoft.com/en-us/sysinternals/downloads/autoruns
15	Windows Registry Recover	http://www.mitec.cz/wrr.html
16	Windows Prefetch Folder	C:¥Windows¥Prefetch

Control system attack



Control system attack



Case Study : Stuxnet attack on Iran Nuclear Station Natanz Anatomy of Cyber Physic attack

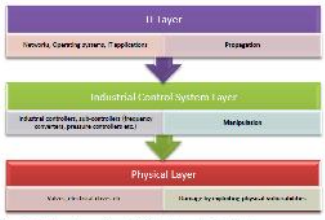


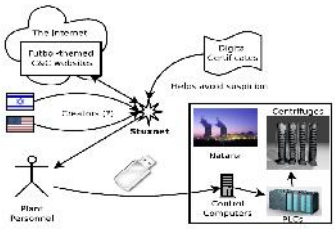
Figure 1: The three layers of a sophisticated cyber-physical attack

For its targets, Stuxnet contains, among other things, code for a man-in-the-middle attack that fakes industrial process control sensor signals so an infected system does not shut down due to detected abnormal behavior. Such complexity is very unusual for malware. The worm consists of a layered attack against three different systems:

- The Windows operating system,
- Siemens PCS 7, WinCC and STEP7 industrial software applications that run on Windows and
- One or more Siemens S7 PLCs.

W32.Stuxnet

- Stuxnet is a threat targeting a specific industrial control system likely in Iran, such as a gas pipeline or power plant. The ultimate goal of Stuxnet is to sabotage that facility by reprogramming programmable logic controllers (PLCs) to operate as the attackers intend them to, most likely out of their specified boundaries.
- Features:
- Self-replicates through removable drives exploiting a vulnerability allowing auto-execution. • Microsoft Windows Shortcut 'LNK/PIF' Files Automatic File Execution Vulnerability (BID 41732)
- Spreads in a LAN through a vulnerability in the Windows Print Spooler. • Microsoft Windows Print Spooler Service Remote Code Execution Vulnerability (BID 43073)
- Spreads through SMB by exploiting the • Microsoft Windows Server Service RPC Handling Remote Code Execution Vulnerability (BID 31874).
- Copies and executes itself on remote computers through network shares.•
- Copies and executes itself on remote computers running a WinCC database server.•
- Copies itself into Step 7 projects in such a way that it automatically executes when the Step 7 project is • loaded.
- Updates itself through a peer-to-peer mechanism within a LAN.•
- Exploits a total of four unpatched Microsoft vulnerabilities, two of which are previously mentioned vulner• abilities for self-replication and the other two are escalation of privilege vulnerabilities that have yet to be disclosed.
- Contacts a command and control server that allows the hacker to download and execute code, including up• dated versions.
- Contains a Windows rootkit that hide its binaries.•
- Attempts to bypass security products.•
- Fingerprints a specific industrial control system and modifies code on the Siemens PLCs to potentially sabotage the system.
- Hides modified code on PLCs, essentially a rootkit for PLCs



Using multiple vulnerability and fake RealTek Certificates

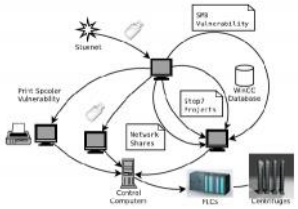


Figure 4: Stuxnet employs many ways to reach its target PLCs.

Two attacks with same target

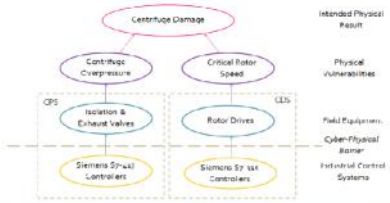


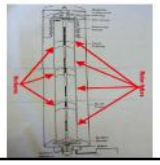
Figure 2: Synopsis of the two different attacks implemented in Stuxnet. Both use a manipulation of industrial control systems to achieve physical damage, exploiting different physical vulnerabilities of the equipment (centrifuge rotors) that basically lead to the same physical result

Technology and experience

- http://onlinetonegenerator.com/

The rotor sped of centrifuge was increased from 59000 RPM (980Hz) to 83000 RPM (1400 Hz)

The sound was clearly different and could have been felt in cascade room of centrifuge Hall. Each cascade contain 164 centrifuge.



New IT initiatives and need of support from States

- National Power Portal : npp.gov.in
- CEA –ISRO Geo Spatial Map: https://vedas.sac.gov.in/powergis_main
- Short Term Power Procurement Optimization Program
- Coal Movement Monitoring Portal (To be launched soon)
- E Registration of Generating stations (Under Preparation)

New IT initiatives and need of support from States

- National Power Portal(NPP) –Dashboard and Data analytic for power sector at one place
  - Data entry for all six application is being done and report is being generated in testing phase. Launched by Hon'ble Power Minister on 14th November,2017
  - Five to be held in next two months.
  - While data of Coal supply is fed regularly in NPP, the data entry **by generating station for daily generation report (DGR) in NPP is yet to pickup.**
  - If there is requirement of training , CEA can arrange regional workshops
- Geo Spatial Energy Map
  - NITI Aayog on the instruction of PMO initiated this project .
  - ISRO and CEA are preparing Geo spatial map o all Generation, transmission and distribution assets.
  - Any state which want GIS mapping of its assets above 33 kV (initially) , can get it done free of cost
  - Map would be useful for operation and asset management .
  - **Format for Data shared by concerned Divisions of CEA with all state utilities . Data from Transmission and Distribution utilities is awaited.**

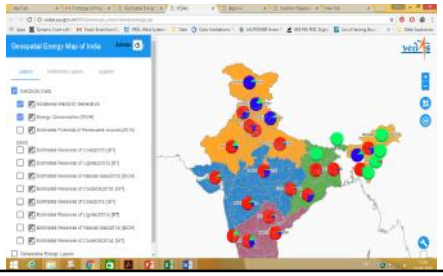
Installed Capacity

75

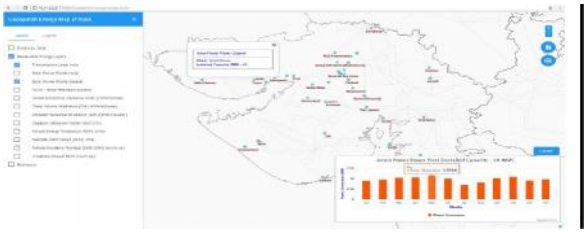
State wise Information

76

ISRO-CEA Geo spatial Energy Map



Geo Spatial Map with layer control



Shared Responsibility

"As the world is increasingly interconnected, everyone shares the responsibility of securing cyberspace."

— Newton Lee, Counterterrorism and Cybersecurity: Total Information Awareness