



DELHI TRANSCO LIMITED

(A Govt of NCT of Delhi Undertaking)

No.F.DTL/202/Opr(Plg.)/2018-19/Mgr(CE&STU)/G-32/66

Dt. 03.08.2018

Subject: Minutes of the 2nd Steering Committee Meeting of 2018-19 held on 04.07.2018.

Sir,

The minutes of the 2nd Steering Committee Meeting of 2018-19 held on 04.07.2018 at 10:30AM in the office of General Manager (Planning), Shakti Deep Bldg., Jhandewalan Extn., New Delhi are enclosed herewith for kind information and further necessary action please.

Thanking You.

Encl: As above

Yours Faithfully,


(Susheel Gupta)

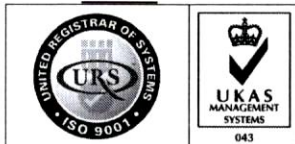
Manager (T) CE&STU

To

1. Jt. Director (Engg), DERC
2. Chief Engineer (E-I), NDMC
3. Chief Engineer (E-II), NDMC
4. CWE(Utility), MES
5. Chief Executive Officer, TPDDL
6. Chief Executive Officer, BRPL
7. Chief Executive Officer, BYPL
8. Chief Electrical Engineer (PS), DMRC
9. Head (Electrical Terminal), GMR
10. GM (Electrical) NCRTC
11. The Administrator, DDCA
12. Capt. S. Sharan, G.M.(Sarojini Nagar), NBCC
13. Sh. Mukesh Kumar, XEN (ED-IV) DSIIDC
14. GM (CM&SEM), DTL
15. GM (O&M-I), DTL
16. GM (O&M-II), DTL
17. GM (Project-I), DTL
18. GM (Project-II), DTL
19. GM (C&MM), DTL
20. GM(C&RA), DTL
21. GM (Planning), DTL
22. GM(Protection & DM), DTL
23. DGM(SO) SLDC
24. DGM (Planning), DTL

Copy for favour of kind information to:-

1. CMD, DTL
2. Secy, DERC.
3. Director(Oprs), DTL
4. ED (T) DTL
5. Spl. Secy(Power), GNCTD
6. Sh. Virender Kumar, Chief Engineer(E) DSIIDC



Office of Manager (Planning-CE&STU)

Room No – 98, Shakti Deep Building, , Jhandewalan Extn., New Delhi – 110055

Ph. No. 011-23532773

Corporate Identification No. (CIN)-U40103DL2001SGC111529

Regd office : Shakti Sadan, Kotla Road, New Delhi – 110 002

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Minutes of the 2nd Steering Committee Meeting of 2018-19 held on 04.07.2018 at 10:30AM in the office of General Manager (Planning) DTL

On the outset, General Manager (Planning) DTL welcomed the representatives of all the utilities in the meeting. The list of participants is enclosed as Annexure-I.

A. Confirmation of Minutes of 1st Steering Committee Meeting of 2018-19 held on 04.04.2018

The minutes of the 1st Steering Committee Meeting held on 04.04.2018 were circulated vide letter No. F.DTL/202/Opr(Plg.)/2018-19/Mgr(CE&STU)/G-32/12 dated 03.05.2018. No comments were received.

The Steering Committee approved the minutes of the 1st Steering Committee Meeting of 2018-19 held on 04.04.2018.

B. Follow-up action of decisions taken in previous Steering Committee meetings:

1. Establishment of 220/66/33kV Sub-station at 400kV Maharani Bagh

Evacuation at 66kV level:

In the last Steering Committee Meeting, BYPL was advised to submit their plan to evacuate power at 66 kV level from Maharani Bagh. In this regard, BYPL informed that they will not be able to evacuate power from Maharani Bagh at 66kV level as nearby area is too far from the location of Maharani Bagh and Yamuna crossing is also involved.

Similarly, BRPL was also requested to provide their evacuation plan at 66kV level. BRPL informed that at present there is only 33kV distribution network available in the vicinity of Maharani Bagh. However, they agreed to upgrade/develop the 66 kV network in near future for which they requested to allocate 06 no. 66 kV feeders to BRPL from Maharani Bagh to meet the future requirement.

After deliberations, it was decided that 2x160 MVA transformers with 12 no. feeder bays (as normally a substation of 220/66kV is envisaged with 12 no. 66kV feeder bays) shall be provided at 66 kV level out of which 02 no. bays are for DMRC for their Phase-4 project, 04 no. bays are for NCRTC to provide feed to their three Regional Rapid Transit System corridors through the Junction Station at Sarai Kale Khan and 06 no. bays are for BRPL.

Evacuation at 33kV level:

It was informed that in the Steering Committee meeting held on 10.03.2016 the Power evacuation plan at 33kV level from then planned 220/33kV GIS at Maharani Bagh was drawn out as under:

Sl. No.	Name of Feeder	Remarks
1	Kilokari circuit -1	IP – Kilokari Circuit 1, 2, 3 & 4 shall be realigned after Maharani Bagh Commissioning.
2	Kilokari circuit -2	
3	Sarai Julena circuit -1	
4	Jamia circuit -1	
5	Nizamuddin circuit -1	New circuit up to Kilokari
6	Lajpat Nagar circuit -1	New circuit up to Kilokari
7	Defence Colony circuit -1	New circuit up to Kilokari
8	Exhibition-I ckt -1	LILO of Kilokari-IP Power
9	Exhibition-II ckt -1	LILO of Kilokari-IP Power
10	Sarai Julena circuit -2	

Minutes of 2nd Steering Committee Meeting of 2018-19 held on 04.07.2018

BRPL requested to implement the 220/33kV level as decided in the previous meetings as its importance has already been explained several times.

Based on the Load flow study and for optimal utilization of the existing establishment the following configuration was proposed. The details of proposed configuration of existing 220kV GIS bays (Table-1) with configuration of new bays which are to be added (Table-2) for the scheme of 220/66/33 kV Maharani Bagh S/stn. was explained as under:

(Table-1)			
Proposed configuration after modification in the existing 220kV GIS bays at Maharani Bagh S/stn.			
Bay No.	Existing Bay Description (220kV)	New Bay Description with Proposed Changes	Remarks
1	315MVA Incomer-I	315MVA Incomer-I	No Change
2	220kV Lodhi Road Ckt-II	100MVA Transformer-I	Existing 630 sq. mm. Cable of Lodhi Road Ckts will be used for connection of 220/33kV, 100MVA Trfs to the existing 220kV GIS.
3	220kV Lodhi Road Ckt-I	100MVA Transformer-II	
4	220kV Bus Coupler-I	220kV Bus Coupler-I	
5	220kV Sarita Vihar	100 MVA Transformer-III	Existing 630 sq. mm. Cable of Pragati & Sarita Vihar Ckts will be used for connection of 220/33kV, 100MVA Trfs to the existing 220kV GIS.
6	220kV Pragati	Future Transformer bay	
7	315 MVA Incomer-II	315 MVA Incomer-II	No Change
8	220kV Masjid Moth Ckt-II	220kV Masjid MothCkt-II	No Change
9	220kV Masjid Moth Ckt-I	220kV Masjid Moth Ckt-I	No Change
10	220kV AIIMS Ckt-II	220kV AIIMS Ckt-II	No Change
11	220kV AIIMS Ckt-I	220kV AIIMS Ckt-I	No Change
12	220kV Electric Lane Ckt-II	220kV Sarita Vihar Ckt-II	To be Connected through GIS Duct and new gantry for optimum utilization of HTLS.
13	220kV Electric lane Ckt-I	220kV Sarita Vihar Ckt-I	
14	220kV Gazipur Ckt-II	25MVAR Reactor-I	To be Connected through existing 220kV cable & Gantry system of Gazipur Ckt.
15	220kV Gazipur Ckt-I	25MVAR Reactor-II	
16	500MVA Incomer-I	Spare Bay-I	Spare Bays to avoid extension of 220kV GIS in future.
17	500MVA Incomer-II	Spare Bay –II	

(Table-2)		
New 220kV GIS bays to be added as per the proposed scheme of 220/66/33 kV Maharani Bagh S/stn.		
Bay No.	New Bays Description (to be added at Maharani Bagh)	Remarks
18.	220kV Bus Section-I	To connect existing & New 220kV GIS
19.	220kV Bus Section –II	
20.	500MVA Incomer-I	To be connected with double run 1000 sq. mm. cable and respective GIS bay would have provision of Double cable connection.
21.	220kV Electric Lane Ckt-II	Existing cable to be shifted to connect in the new GIS
22.	220kV Electric Lane Ckt-I	
23.	220kV Lodhi Road Ckt-II	To be connected through GIS Duct & new Gantry for optimum utilization of HTLS
24.	220kV Lodhi Road Ckt-I	
25.	160MVA Transformer-I	To be connected through 1000 sq. mm. cable
26.	220kV Bus Coupler-II	To couple buses of the new 220kV GIS
27.	500MVA Incomer-II	To be connected with double run 1000 sq. mm. cable and respective GIS bay would have provision of Double cable connection.
28.	160MVA Transformer-II	To be connected through 1000 sq. mm. cable
29.	220kV Pragati Ckt-II	To be connected through GIS Duct & new Gantry for optimum utilization of HTLS Conductors.
30.	220kV Pragati Ckt-I	
31.	220kV Gazipur Ckt-II	To be connected through GIS Duct & new Gantry for optimum utilization of future HTLS Conductors.
32.	220kV Gazipur Ckt-I	

As such, the configuration would be as under:

➤ **15 No. 220KV New GIS bays**

- 2 No. 160 MVA, 220/66kV Transformers
- 2 No. Incomers from 400/220kV, 500MVA Transformers
- 8 No. Feeder Bays
- 1 No. Bus Coupler
- 2 No. Bus Sectionalizer

Note: The New 15 No. 220kV GIS bays shall be connected with the existing 17 No. 220kV GIS Bays.

➤ **15 No. 66kV bays**

- 2 No. I/C from Transformers
- 12 No. Feeder Bays (4 no. feeders for NCRTC+ 2 No. feeders for DMRC + 6 No. feeders for future requirement of BRPL)
- 1 No. Bus coupler bay

➤ **20 No. 33kV bays**

- 3 No. I/C from Transformers
- 12 No. Feeder bays
- 2 No. Bus section bays
- 2 No. Bus coupler bays
- 1 No. Spare I/C bay for future Trf. to meet n-1 contingency

- With 2x160 MVA, 220/66kV and 3x100 MVA, 220/33kV Power Transformers and 2x25MVAR, 220 kV Shunt Reactors.

Accordingly, DTL was advised to devise and implement the scheme and get the approval of modification to be carried out at 400kV Maharani Bagh ISTS side from Standing Committee of Power System Planning of CEA.

2. Requirement of 220/66kV Sub-station at Rani Khera

In the last Steering Committee meeting TPDDL and DSIIDC were advised to submit the detailed proposal of load requirement so that the modalities can be finalized for the establishment of 220/66kV sub-station in the area to cater the electrical demand of the proposed industrial park in the Rani Khera area.

DSIIDC informed that their total load requirement will be around 300 MVA and the electrification will be carried out in phased manner. Further, the load up to 75 MVA will be required after 2 years; however, the total envisaged load requirement is expected to come in next 10-15 years.

After discussion it was decided that the present requirement of DSIIDC does not need a 220 kV substation and the load requirement of DSIIDC will be met at 66 kV level by TPDDL for which 2 No. 66 kV feeder bays at 400 kV Mundka will be provided to TPDDL.

Further depending on the growth of the load, the 220 kV Substation will be established later on in the next business plan for which Steering Committee requested DSIIDC to keep the provision of land (measuring 100x100 Sq. meters) in their layout plan along with sufficient land for 66kV sub-stations in co-ordination with TPDDL required for evacuation of power from the 220kV substation, so that the future load demand of DSIIDC could be met.

3. Removal of T-Off portion of Mundka – Mangolpuri -1 – Nangloi circuit

In the last meeting, Steering Committee advised the following:

- i. The issue of removal of T-Off should be tried to be resolved through mutual discussion involving system operation of TPDDL and BRPL as the T-Off is not being used by BRPL but creating operational issues.
- ii. BRPL to take up all possible steps to normalize the operation of 66kV Mundka-Nangloi and 66kV Mundka-Nangloi Water works feeders as a substantial amount has been invested (about Rs. 15 Crores) but the public is not getting the benefit from utilization of the same.
- iii. The stabilization of 66kV feeders would be resulting into optimum utilization of 220/66kV, 320 MVA capacity available at Mundka S/Stn. whose loading utilization is much less (at the time of occurrence of Delhi peak of 7016MW on 10.07.2018 it was only 124MW against the capacity of 272 MW (320 MVA at 0.85 p.f.)).
- iv. The more loading of 66kV feeders at Mundka S/Stn. would ease the loading of the other existing networks.

BRPL and TPDDL were requested to update the status. They informed that the mutual discussion could not be arranged and the issue stands unresolved.

Steering committee took a serious note on the above and stressed BRPL and TPDDL to mutually resolve this long pending issue so that resources and infrastructure could be utilized optimally. They were further advised to explore the possibility of conversion of the above T-off arrangement into S/C LILO at Mundka so that both Mangolpuri and Nangloi gets separate 66kV infeed from Mundka. Steering Committee advised BRPL to take lead in the matter and in co-ordination with TPDDL connect direct new 66kV circuit from Mundka up to T-Off point to convert the T-Off point in to a LILO point at Mundka so that at least 50 to 60 MW load of 66kV Nangloi which runs from 220kV Najafgarh is shifted to 400kV Mundka. This would reduce the stress on 220kV Najafgarh S/stn which was commissioned in the year 1975 and has already served for 43 years.

4. Evacuation of 220/66kV Tughlakabad Sub-station

The evacuation plan at 66kV level from 220/66kV Tughlakabad which was finalized in the Steering Committee meeting held on 29.06.2017 is as under:

Sl. No.	Evacuation plan finalized in the Steering Committee meeting held on 29.06.2017	Timeline provided in the current meeting
1	Okhla Phase-I circuit -1	March 2019
2	Crown Plaza Ckt-1	March 2020
3	MCIE circuit -1	March 2019
4	Crown Plaza Ckt-2	March 2020
5	Batra circuit -1	Dec 2018
6	Malviya Nagar circuit -1	Dec 2018
7	MES circuit -1	Future
8	DMRC Phase-IV circuit -1	
9	DMRC Phase-IV circuit -2	
10	Future circuit -1	

The sub-station is expected to be commissioned by October 2018 as indicated by PGCIL in the 42nd meeting of Northern Regional Power Committee held on 28.06.2018. BRPL was advised to expedite the downstream power evacuation network in line with the said timeline.

BRPL was further advised to provide the cable details to the Protection Department of DTL for onward forwarding to PGCIL required for setting of relays installed on these to be connected 66kV feeders at 400/220/66kV Tughlakabad s/stn.

BRPL confirmed that they shall provide the necessary details and also informed that they have laid the cable for connecting Malviya Nagar and Batra grids by which they shall be able to evacuate around 80 to 100 MW load at 66kV level by the time of commissioning of the substation.

The Steering Committee further stressed BRPL to expedite other circuits as well for optimum utilization of the assets being created at 220/66kV Tughlakabad substation and for further reduction of stress on the existing other network elements.

5. Alternate feed for 220kV DIAL

As decided in the last Steering Committee Meeting, a joint site visit of DIAL and DTL was carried out wherein a broad consensus was arrived to use the two available 220kV GIS bays for providing 25 MVAR reactors for which suitable piece of land would be provided by DIAL.

DTL informed that the 220kV sub-station DIAL shall now be connected to 2 no. 400kV sub-stations one from Bamnauli and another from Tughlakabad (going to be energized soon) so the reliability of DIAL will further be enhanced. In order to manage reactive power and to mitigate the high voltage problem in off-peak conditions, 2 no. 25MVAR reactors are required to be installed at this sub-station and the same would only be possible after getting the suitable piece of land from the DIAL for which DTL has already sent a request to DIAL mentioning the requirement of additional strip of land measuring 20x60 sq. meters adjacent to west side boundary wall of 220kV DIAL substation of DTL to accommodate the reactors.

The representative of DIAL agreed to consider the request for the above and further assured that the alternate source for reliability of power supply to DIAL is also available from 33kV Palam which can be used in emergency and the DG backup of 42MVA is also available for providing back-up for smooth supply of the airport.

Steering Committee was also informed that for better utilisation of available resources, DTL was exploring the possibility of establishing a 220kV GIS switching station with 11 No. 220kV GIS bays (8 feeder bays + 2 future feeder bays + 1 bus coupler) in the space available at the DIAL LILO point of 220kV Bamnauli-Mehrauli D/C T/L. It was further explained that, if it could be possible, this would be a better option to enhance the reliability of DIAL and adjoining areas instead of providing another 220kV direct cable infeed consisting of more than 10km from 220kV PPK-III to 220kV DIAL which may in fact aggravate high voltage problem in the off-peak conditions.

After deliberations, Steering Committee advised DTL to explore the feasibility for providing the proposed 220kV GIS switching station at LILO point and if feasible to implement the scheme as quick as possible.

6. Establishment of 220/33KV Sub-station at Sarojini Nagar for meeting the power needs of General Pool Residential Accommodation (GPRA) Colonies at Sarojini Nagar, Netaji Nagar and Nauroji Nagar

It was informed that as decided in the last Steering Committee Meeting, to assess the factual power requirement, a meeting of NDMC, NBCC and DTL was convened on 21.05.2018. The committee was briefed about the gist of discussions held in the meeting as under:

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- (i) NDMC vide their letter dt.19.06.2017 forwarded the request of NBCC regarding electrical power requirement of their upcoming General Pool Residential Accommodation (GPRA) colonies. NDMC requested DTL to issue the estimates for establishing 220/33kV S/Stn at Sarojini Nagar to meet out the requirement of 228MVA load. The issue was discussed in number of Steering Committee meetings as detailed hereunder:-
- a) On 29.06.17 – It was decided to call a separate meeting with NBCC and NDMC for providing the road map of the establishment of the S/Stn.
 - b) On 30.10.17- The Steering Committee advised DTL to device the scheme for establishment of 220/33kV, 3x100MVA S/Stn. as per the load requirement projected by NBCC on deposit mode. For system stability 2 no. 25MVAR reactors at 220kV side were also advised to be included in the scheme.
 - c) On 17.01.18 – The issue was further discussed wherein NDMC requested DTL to provide the estimate for establishment of the S/Stn. so that necessary approval from the concerned agency could be obtained for implementation of the project as NDMC had also planned number of downstream 33kV S/Stns. on deposit mode.
 - d) On 04.04.18- Steering Committee further advised DTL to call a separate meeting of NBCC and NDMC to assess the actual power requirement which is expected to occur in phased manner so that proper decision could be taken for establishment of the 220/33kV S/Stn.
- (ii) Based on the decision of Steering Committee, NBCC vide their letter dt.09.05.2018 informed that they have submitted the year wise load requirement to NDMC of three colonies i.e. Nauroji Nagar, Netaji Nagar and Sarojini Nagar under re-development works for providing inputs to DTL for establishment of the S/Stn.

It was also informed that NBCC will provide necessary land and funds for establishment of the S/Stn. NBCC also requested DTL to provide them the estimates for establishment of 220/33kV S/Stn. for taking up further necessary action.

- (iii) The details of load requirement provided by NBCC are appended hereunder:-

Sl. No.	Year	Electrical Load(KW)		
		Nauroji Nagar (Total load) 20000 KW	Sarojini Nagar (Total Load) 82216 KW	Netaji Nagar (Total Load) 41302 KW
1	2020	10000	12845	12643
2	2021	15000	32735	35201
3	2022	20000	53719	41302
4	2023	-	76341	-
5	2024	-	82216	-

- (iv) From the above submission of NBCC, the total load requirement of 143MW is expected by the year 2024.
- (v) It was explained by NDMC in the meeting that at present the area proposed for up-gradation, are fed from 3 Nos. 33kV S/Stn. as detailed hereunder:-

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Sl. No.	Name of the S/Stn.	Capacity	Remarks
1	Kidwai Nagar	10 MVA	Proposed to be enhanced to 32MVA by Dec.2018. The main feed is through 220kV AIIMS -Trauma Centre and alternate 33kV feed from 220/33kV Ridge Valley s/stn.
2	Nehru Park	32MVA	Main feed from Ridge Valley and the secondary feed from 33kV Bapu Dham S/Stn. of NDMC.
3	Netaji Nagar	32 MVA	Main feed from 220kV Trauma Centre and second in-feed from Park Street through 33kV Guest House S/Stn. of NDMC.

Further there are alternate 11kV feeds also to meet the exigency.

(vi) NBCC representative informed that there are 8 S/Stns. (5 for Sarojini Nagar, 2 for Netaji Nagar and 01 for Nauroji Nagar) proposed to be established in these areas. These proposed 33 kV S/Stns. (8 No.) will have one main source from proposed 220 kV Substation Sarojini Nagar and alternate source from the existing nearby 33 kV grids of NDMC connected from different 220 KV S/Stn. of DTL.

(vii) DTL further intended to know the status of the land for establishment of the S/Stn. along with the clear-cut mode of land allocation/handing over and the transfer of ownership of land. It was also informed that at present L&DO, Govt. of India allocates the land to GNCTD, Power Department and subsequently the same is handed over to DTL for establishment of electrical infrastructure on lease basis. NBCC informed that vacation of the occupied quarters is in process through Directorate of Estate and after their vacation /demolition; the same will be made available to DTL for establishment of the 220/33KV S/Stn.

(viii) NBCC was requested to provide the category wise load requirement i.e Residential and Commercial demand and likely occurrence of the load demand so that proper sized equipments can be planned in the proposed sub-station, as it appears that actual load occurrence would be much less than the proposed load demand considering the load pattern of NDMC area.

(ix) DTL intended to know about schedule of the funds to be released to them for the establishment. NBCC informed that they will provide the details in their reply, after getting the tentative fund requirement/ estimate from DTL. It was again confirmed by NBCC that they will provide the necessary land and funds for establishment of the sub-station and its in-feeds, but requested to provide them the estimate at the earliest.

(x) NBCC agreed to provide the clarifications on the above issues within 3 weeks.

Subsequently, NBCC provided the details as under:

a) Category wise electric load details:

S.No	Year	Nauroji Nagar (Total Load) 20,000KW			Netaji Nagar (Total Load) 41,302KW			Sarojini Nagar (Total Load) 82,000KW			Total Load 143,000KW		
		Comm ercial	Resi- dential	Social Infra	Comm ercial	Resi- dential	Social Infra	Comm ercial	Resi- dential	Social Infra	Comm ercial	Resi- dential	Social Infra
1	2020	10,000	-	-	1,774	8,766	2,018	2,150	15,239	715	13,924	24,005	2,733
2	2021	15,000	-	-	14,556	18,345	2,336	14,069	23,082	1,600	43,625	41,427	3,936
3	2022	20,000	-	-	14,556	24,410	2,336	24,060	32,521	1,877	58,616	56,931	4,213
4	2023	20,000	-	-	14,556	24,410	2,336	24,060	52,730	5,273	58,616	77,140	7,609

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b) Details regarding land allocation modalities:

NBCC will provide necessary land and has already taken up the matter with L&DO, Govt. of India to allocate the land to Power Department, GNCTD.

c) Details regarding release of the funds:

The funds for establishment of the substation and its infeeds would be provided by NBCC. The schedule of release of the funds would be decided after getting the estimate from DTL.

Further, in the meeting, BRPL requested for 4 No. 33kV feeder bays to meet their future requirement. NDMC also requested for 4 No. 33kV feeder bays apart from 8 No. 33kV feeder bays requirement of NBCC.

It was observed that the nearby AIIMS (Trauma Centre) 220kV S/Stn. was commissioned during July, 2011 but the load of the sub-station was not picked up until the 33kV Bikaji Cama and 33kV IIT feeders of BRPL were connected. The 33kV Bikaji Cama feeder energized on 09.04.2015 and 33kV IIT feeder energized on 04.07.2016.

The loading figures of 220kV AIIMS S/Stn. substantiating the same are as under:

Year	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
Peak demand of Delhi met, in MW	4720	5028	5642	5653	5925	5846	6261	6526	7016
Date & Time	1/7/10 & 16:10	2/8/11 & 15:47	5/7/12 & 15:10	6/6/13 & 15:38	15/07/14 & 15:20	19/06/15 & 15:39	01/07/16 & 15:10	06/06/17 & 15:31	10/07/18 & 15:26
Loading of 100MVA Tr. NO.-I (MW, MVAR)	---	---	24, 7	NA	42, 11	50, 17	45, 8	63, 12	57, 10
Loading of 100MVA Tr. NO.-II (MW, MVAR)	---	---	---	NA	---	50, 17	45, 8	63, 12	57, 10
Total loading of Tr. NO.-I & II (MW, MVAR)	---	---	24, 7	62, 24	42, 11	100, 34	90, 16	126, 24	114, 20

Considering the loading pattern of the 220kV substation situated in nearby area viz AIIMS, to avoid the Stranding capacities at the proposed 220/33kV S/Stn. Sarojini Nagar, it was decided to allocate 4 No. 33kV feeder bays to BRPL. NDMC was also allocated 4 No. 33kV feeder bays as requested by them, apart from feeding the NBCC load from the substation.

In view of the proposed load of 143 MW of NBCC and to provide n-1 contingency, it was decided to keep 3x100 MVA, 220/33kV Power Transformers at the proposed 220/33kV GIS substation at Sarojini Nagar.

The Steering Committee intended to know the change in plan for development of colonies due to the ongoing legal proceedings with regard to the project. They also wanted to know whether the implementation of the S/Stn. needs to be delayed. NBCC Representatives expressed confidence in implementation of the project and requested DTL to go ahead with the work.

Considering the above facts, Steering Committee advised the following:

1. **220/33kV GIS Sarojini Nagar sub-station be established with the following configuration:**
 - a. **14 no. 220KV bays**
 - i. 3 No. 100 MVA, 220/33kV Transformers
 - ii. 4 No. feeder bays
 - iii. 2 No. bus section
 - iv. 2 No. bus coupler
 - v. 2 No. 220 kV bays for 2 no. 25MVAR Shunt Reactors
 - vi. 1 No. spare bay for future 100 MVA Trf.
 - vii. Provision of space for 5 no. future bays in the building for the future Transformer and feeder bays.
 - b. **24 no. 33KV bays**
 - i. 3 No. I/C from Transformers
 - ii. 16 No. feeder bays (8 feeders for NBCC + 4 feeders for NDMC + 4 feeders for BRPL)
 - iii. 2 No. bus section bays
 - iv. 2 No. bus coupler bays
 - v. 1 No. spare I/C bay for future Trf.
 - vi. Provision of space for 5 no. future bays in the building for future 33kV outlets and I/C.
2. **The 220kV Substation shall be provided in-feed by connecting the substation directly with 220kV Lodhi Road and 220kV AIIMS through 1200sq.mm. D/C U/G cables.**
3. **At present, there is no spare 220kV GIS bay available at AIIMS. Four No. 220 kV GIS bays are also required to be erected in continuation with the existing 220kV GIS bays at AIIMS (1 No. for 100MVA Trf, 1 No. for 50 MVAR Reactor though it was advised by 39th Standing Committee meeting of CEA held on 29th & 30th May 2017 to install 2x25MVAR but due to space constraints only 1x50MVAR reactor is proposed; and 2 No. for providing feed to the 220kV Sarojini Nagar S/Stn.). The 220kV GIS building is also required to be extended to accommodate the additional 220kV GIS bays.**
4. **2 No. 220kV GIS bays are also required to be extended at Lodhi Road 220kV GIS S/Stn. for providing feed to the 220kV Sarojini Nagar. The 2 No. 220kV GIS bays are required to be extended within the space available in the existing GIS room building as there is no space for further extension of the building.**
5. **The Steering Committee advised DTL to draw out scheme for the 220kV Sub Station along with its infeed as stated above and intimate estimate to NBCC at the earliest as requested by them.**
6. **As the substation is proposed as a deposit scheme and additional feeders are proposed to be allocated to other utilities 4 No. each to BRPL and NDMC apart from NBCC, considering the Regulatory Stipulations the entire cost (including that of infeeds) of the substation would be apportioned in the ratio of 8:8 (as out of 16 No. 33kV feeder bays envisaged in the sub-station, the requirement of NBCC is only for 8 No. 33kV Feeder bays) i.e. 50% as a deposit work of NBCC and 50% capitalization of DTL.**

7. The Steering Committee also advised for drawing out necessary schemes for extension of the 220kV GIS bays at 220kV AIIMS and Lodhi Road sub-stations as mentioned above.

C. New Issues

1. Additional load requirement of Firoze Shah Kotla Stadium on 33/66kV supply system

BYPL vide their letter no. Head-KCC/GCC, BYPL/2018-19/1411 dated 29.05.2018 have requested Delhi District Cricket Association to apply for additional load requirement on 33/66kV supply system for ensuring the reliability of power supply during the international matches. The copy of the communication addressed to Secretary (Power), GNCTD was forwarded to DTL also.

BYPL and DDCA were requested to update the current status.

The representative of DDCA was not present in the meeting; therefore, issue could not be discussed. It was decided to convene a separate meeting with BYPL and DDCA to resolve the matter.

2. System Behavior at the time of all time high peak demand (met) i.e. 7016MW at 15.26.58 hrs on 10.07.2018

The behavior of the system at the time of occurrence of Delhi peak (met) up to 04.07.2018 i.e. 6934MW at 15.27.32hrs. on 08.06.2018 was presented by SLDC.

However, the analysis has been done considering the latest all time high peak demand (met) 7016MW at 15.26.58 hrs on 10.07.2018 based on the discussions of 6934MW:

Voltage level	Total number of stations / Lines	Number of sub-stations/Ckts where n-1 reliability criteria does not meet
400kV	6 (Including 400kV Mandola & Maharani Bagh of PGCIL)	3
220kV	39 (including 220kV Yards of 400kV Harsh Vihar & Mundka & 220/66kV, 100MV at 400KV Bawana)	21
400kV lines	11 pairs (22 no.)	Nil
220kV lines	54 pairs (108 no.)	15

Substation-wise Transformer Loading (connected load) at the time of occurrence of peak demand met (i.e.7016MW) in Delhi system on 10.07.2018 at 15.26.58 hrs is as follow:

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400kV System:

Sl. No.	SUB-STATION NAME	TRANSFORMER	MVA capacity	Capacity in MW at 0.85PF	MW	MVA R	Load Shedding (in MW)	Remarks
1	MANDOLA	400/220kV 500MVA ICT-1	500	425	311	75	--	
		400/220kV 500MVA ICT-2	500	425	313	63		
		400/220kV 500MVA ICT-3	500	425	306	67		
		400/220kV 500MVA ICT-4	500	425	314	61		
		Total	2000	1700	1244	266		
2	BAWANA	400/220kV 315MVA ICT-1	315	268	201	11	--	
		400/220kV 315MVA ICT-2	315	268	159	17		
		400/220kV 315MVA ICT-3	315	268	194	13		
		400/220kV 315MVA ICT-4	315	268	158	9		
		400/220kV 315MVA ICT-5	315	268	178	-13		
		400/220kV 315MVA ICT-6	315	268	178	12		
Total	1890	1607	1068	49				
3	BAMNAULI	400/220kV 315MVA ICT-1	315	268	251	9	--	After commissioning of 400kV Tughlakabad and Dwarka ISTS, the loading of 400kV Bamnauli will be eased.
		400/220kV 500MVA ICT-2	500	425	378	14		
		400/220kV 500MVA ICT-3	500	425	376	7		
		400/220kV 315MVA ICT-4	315	268	256	-3		
		Total	1630	1386	1261	27		
4	MAHARANI BAGH	400/220kV 315MVA ICT-1	315	268	257	-10	--	After commissioning of 400kV Tughlakabad ISTS, the loading of 400kV Bamnauli will be eased. Further, CEA Standing Committee has been approached for augmentation of 315MVA trfs to 500MVA Capacity.
		400/220kV 315MVA ICT-2	315	268	259	-40		
		400/220kV 500MVA ICT-3	500	425	387	-22		
		400/220kV 500MVA ICT-4	500	425	385	-25		
		Total	1630	1386	1288	-97		
5	MUNDKA	400/220kV 315MVA ICT-2	315	268	207	-2	--	Steering committee advised for providing additional 315MVA 400/220kV Trf at Mundka (as Bay is being erected) by FY 2020-21.
		400/220kV 315MVA ICT-3	315	268	209	-9		
		400/220kV 315MVA ICT-4	315	268	202	-1		
		Total	945	803	618	-12		
6	HARSH VIHAR	400/220KV 315MVA TX-1	315	268	94	-17	--	
		400/220KV 315MVA TX-2	315	268	93	-17		
		400/220KV 315MVA TX-3	315	268	94	-17		
		Total	945	803	281	-51		

Total 400/220kV Transformation capacity	9040 MVA
Total drawal through 400/220kV System	5760 MW, 182MVAR

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220kV System:

Sl. No.	SUB-STATION NAME	TRANSFORMER	MVA capacity	Capacity in MW at 0.85PF	MW	MVAR	Load Shedding (in MW)	Remarks
1	NARELA	220/66KV 100MVA TX-1 220/66KV 100MVA TX-2 220/66KV 100MVA TX-3 Total	100 100 100 300	85 85 85 255	60 69 41 170	7 -5 1 3	--	
2	GOPALPUR	220/66KV 100MVA TX-2 200/33KV 100MVA TX-1 200/33KV 100MVA TX-3 Total	100 100 100 300	85 85 85 255	73 56 46 175	6 7 8 21	--	The 66kV GIS along with 2x160MVA trf. has been planned. The system is expected to be available by December 2019.
3	ROHINI (+) RITHALA GENERATION N = 0 MW CONNECTE D LOAD	220/66KV 100MVA TX-1 220/66KV 100MVA TX-2 220/66KV 100MVA TX-3 220/66KV 100MVA TX-4 Total Rithala Generation = 0	100 100 100 100 400 	85 85 85 85 340 	76 78 85 78 317 317	1 1 4 6 12 12	--	TPDDL confirmed to shift 70 MVA load from Rohini-I to Rohini-II by 31st August 2018.
4	ROHINI-II	220/66KV 160MVA TX-1 220/66KV 160MVA TX-2 Total	160 160 320	136 136 272	46 46 92	3 3 6	--	
5	SHALIMAR BAGH	220/33KV 100MVA TX-1 220/66KV 100MVA TX-2 220/33KV 100MVA TX-3 Total	100 100 100 300	85 85 85 255	72 90 41 203	4 -13 3 -6	--	Additional 220/66kV, 100MVA Tx. is being installed. For 33kV redundancy additional 100MVA is provided at WazirPur s/stn. Steering committee advised for providing n-1 reliability at 33kV level an additional (3rd) 220/33kV 100MVA Transformer will be provided along with associated equipments at 220kV Shalimar Bagh S/stn.
6	WAZIRPUR	220/33KV 100MVA TX-1 220/33KV 100MVA TX-2 Total	100 100 200	85 85 170	66 66 132	8 -6 2	--	Additional 100MVA Trf is planned. 220kV GIS bay is also required to be extended.
7	BAWANA	220/66KV 100MVA TX-1 Total Load 100 MVA	100 100	85 85	64 64	15 15	--	Load is inter-changeable, no space for installation of additional 100MVA Trf.
8	KANJHAWA LA	220/66KV 100MVA TX-1 220/66KV 100MVA TX-2 Total	100 100 200	85 85 170	84 79 163	5 2 7	--	160 MVA Trf. is being procured for installation and is expected to be commissioned by May, 2019.
9	DSIDC BAWANA	220/66KV 100MVA TX-1 220/66KV 100MVA TX-2 220/66KV 160MVA TX Total	100 100 160 360	85 85 136 306	110 52 51 213	15 6 3 24	--	Load is inter-changeable, however, possibility of installation of additional 160MVA Trf. shall be explored.
	DMSWL Generation = 4MW				4			
		Connected Load			217			

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Sl. No.	SUB-STATION NAME	TRANSFORMER	MVA capacity	Capacity in MW at 0.85PF	MW	MVAR	Load Shedding (in MW)	Remarks
10	NAJAFGARH	220/66KV 100MVA TX-1 220/66KV 100MVA TX-2 220/66KV 100MVA TX-3 220/66KV 100MVA TX-4 Total	100 100 100 100 400	85 85 85 85 340	59 76 59 75 269	5 3 6 3 17	--	2x160 MVA trfs are being procured for replacing 2x100MVA Trf. Order has been placed to BHEL on 11.07.2018. One Transformer is proposed to be replaced before summer 2019.
11	PAPPANKALA N-1	220/66KV 100MVA TX-2 220/66KV 100MVA TX-3 220/66KV 160MVA TX-4 220/66KV 160MVA TX-5 Total	100 100 160 160 520	85 85 136 136 442	61 74 96 110 341	0 0 18 22 40	--	BRPL is required to shift 80MW to 100MW load of 66kV G-2 grid from 220kV PPK-I to 220kV PPK-III before next summer through 2 No. 66kV feeders of 1000 sq. mm. U/G cable.
12	PAPPANKALA N-2	220/66KV 100MVA TX-1 220/66KV 100MVA TX-2 220/66KV 160MVA TX-3 220/66KV 160MVA TX-4 Total	100 100 160 160 520	85 85 136 136 442	54 57 93 86 290	7 -6 3 13 17	--	
13	PAPPANKALA N-3	220/66KV 160MVA TX-1 220/66KV 160MVA TX-2 Total	160 160 320	136 136 272	0 73 73	0 14 14		Considering loading, Steering Committee advised additional 160 MVA Tx immediately.
14	NARAINA	220/33KV 100MVA TX-1 220/33KV 100MVA TX-2 220/33KV 100MVA TX-3 Total	100 100 100 300	85 85 85 255	0 81 84 165	0 16 17 33	--	The damaged transformer no. 1 got replaced and energized on 19.07.2018.
15	MUNDKA	220/66KV 160MVA TX-2 220/66KV 160MVA TX-3 Total	160 160 320	136 136 272	61 63 124	-3 -4 -7	--	
16	PEERAGARHI	220/33KV 100MVA TX-1 220/33KV 100MVA TX-2 220/33KV 100MVA TX-3 Total	100 100 100 300	85 85 85 255	83 76 76 235	8 15 14 37	--	Load is interchangeable.
17	MEHRAULI	220/66KV 100MVA TX-1 220/66KV 100MVA TX-2 220/66KV 100MVA TX-3 220/66KV 160MVA TX-4 Total	100 100 100 160 460	85 85 85 136 391	51 78 52 132 313	-5 -2 -4 13 2	--	Load is interchangeable. BRPL is required to shift the load of 66kV Vasant Kunj B-Block to 220kV R. K Puram.
18	OKHLA	220/66KV 100MVA TX-1 220/66KV 100MVA TX-2 220/33KV 100MVA TX-3 220/33KV 100MVA TX-4 220/33KV 100MVA TX-5 Total	100 100 100 100 100 500	85 85 85 85 85 425	76 83 66 72 42 339	6 6 1 2 -5 10	--	1 No. 220/66kV, 100 MVA Trf. will be augmented to 160 MVA. Shifting of load to 220/66kV Tughlakabad by BRPL would also ease the situation.

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19	MASJID MOTH	220/33KV 100MVA TX-1	100	85	53	0	--	
		220/33KV 100MVA TX-2	100	85	53	0		
		220/33KV 100MVA TX-3	100	85	53	-1		
		Total	300	255	159	-1		
20	SARITA VIHAR	220/66KV 100MVA TX-1	100	85	66	1	--	1 No. 220/66kV, 100 MVA Trf. will be augmented to 160 MVA which is under tendering stage.
		220/66KV 100MVA TX-2	100	85	85	1		
		220/66KV 100MVA TX-3	100	85	69	1		
	TOWCL Generation = 12MW				12			
	Connected Load				232	3		
21	LODHI ROAD	220/33KV 100MVA TX-1	100	85	83	14	--	3rd Trf. is being commissioned.
		220/33KV 100MVA TX-2	100	85	84	5		
		Total	200	170	167	19		
22	VASANTKUNJ	220/66KV 100MVA TX-1	100	85	77	-11	--	Burnt 160 MVA trf. is being replaced.
		220/66KV 100MVA TX-2	100	85	79	-11		
		220/66KV 160MVA TX	160	136	0	1		
		Total	360	306	156	-21		
23	DIAL	220/66KV 160MVA TX-1	160	136	25	0	--	
		220/66KV 160MVA TX-2	160	136	25	0		
		Total	320	272	50	0		
24	RIDGE VALLEY	220/66KV 160MVA TX-1	160	136	77	19		
		220/66KV 160MVA TX-2	160	136	79	18		
		Total	320	272	156	37		
25	TRAUMA CENTER	220/33KV 100MVA TX-1	100	85	57	10	--	Additional 100MVA Trf. is planned. 220kV GIS bay is also required to be extended.
		220/33KV 100MVA TX-2	100	85	57	10		
		Total	200	170	114	20		
26	R K PURAM	220/66KV 160MVA TX-1	160	136	6	0	--	
		220/66KV 160MVA TX-2	160	136	0	0		
		220/33KV 100MVA TX-3	100	85	0	0		
		220/33KV 100MVA TX-4	100	85	0	0		
		Total	520	442	6	0		
27	WAZIRABAD	220/66KV 100MVA TX-1	100	85	48	10		Load is interchangeable.
		220/66KV 100MVA TX-2	100	85	46	9		
		220/66KV 100MVA TX-3	100	85	85	11		
		220/66KV 160MVA TX-4	160	136	91	15		
		Total	460	391	270	45		
28	PATPARGANJ	220/66KV 100MVA TX-1	100	85	27	-25		
		220/66KV 100MVA TX-2	100	85	27	-7		
		220/33KV 100MVA TX-1	100	85	39	-1		
		220/33KV 100MVA TX-3	100	85	64	-4		
		220/33KV 100MVA TX-4	100	85	40	0		
		Total	500	425	197	-37		
29	GEETA COLONY	220/33KV 100MVA TX-1	100	85	53	8		BYPL has to shift load to under loaded Preet Vihar.
		220/33KV 100MVA TX-2	100	85	54	5		
		Total	200	170	107	13		

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Sl. No.	SUB-STATION NAME	TRANSFORMER	MVA capacity	Capacity in MW at 0.85PF	MW	MVAR	Load Shedding (in MW)	Remarks
30	GAZIPUR	220/66KV 100MVA TX-1 220/66KV 100MVA TX-2 220/66KV 160MVA TX TOTAL	100 100 160 360	85 85 136 306	52 50 86 188	9 21 -2 28		Load is interchangeable
	E.D.W.P.L Generation = 4MW	Connected Load			4 192			
		Total	360	306	196	28		
31	HARSH VIHAR	220/66KV 160MVA TX-1 220/66KV 160MVA TX-2 220/66KV 160MVA TX-2 Total	160 160 160 480	136 136 136 408	106 48 47 201	8 0 0 8	--	
32	PREET VIHAR	220/33KV 100MVA TX-1 220/33KV 100MVA TX-2 220/33KV 100MVA TX-3 Total	100 100 100 300	85 85 85 255	41 41 0 82	4 4 0 8	--	
33	PARKSTREET	220/66KV 100MVA TX-1 220/66KV 100MVA TX-2 220/33KV 100MVA TX-3 220/33KV 100MVA TX-4 Total	100 100 100 100 400	85 85 85 85 340	88 82 0 75 245	1 -2 0 9 8		The commissioning of 220kV Dev Nagar would ease the loading. The 220/33kV, 100 MVA transformer No. 3 has been energized on 11.07.2018.
34	PRAGATI (IP EXTN.) (+) GT GENERATION GT GENERATION = 164MW CONNECTED LOAD AT GT	220/66KV 160MVA TX 220/66KV 160MVA TX Total	160 160 320	136 136 272	-32 -32 -64	9 9 18		
					100			
35	SUBZIMANDI	220/33KV 100MVA TX-1 220/33KV 100MVA TX-2 Total	100 100 200	85 85 170	86 85 171	5 5 10		The commissioning of 220kV Dev Nagar & Timarpur would ease the situation.
36	KASHMERE GATE	220/33KV 100MVA TX-1 220/33KV 100MVA TX-2 Total	100 100 200	85 85 170	55 53 108	5 3 8		The commissioning of 220kV Timarpur would ease the situation.
37	IP STATION	220/33KV 100MVA TX-1 220/33KV 100MVA TX-2 220/33KV 100MVA TX-3 Total	100 100 100 300	85 85 85 255	72 73 66 211	8 11 19 38		Additional 3rd 100MVA Trf. at Lodhi Road would ease the situation.
38	RAJ GHAT POWER STATION (+) RPH GENERATION= 0 MW	220/33KV 100MVA TX-1 220/33KV 100MVA TX-2 Total	100 100 200	85 85 170	51 54 105	6 15 21	--	
39	ELECTRIC LANE	220/33KV 100MVA TX-1 220/33KV 100MVA TX-2 Total	100 100 200	85 85 170	28 27 55	8 6 14	--	

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Details	MVA	Capacity in MW at 0.85PF	MW	MVAR
Total 220/66 and 220/33kV Transformation capacity	12760	10846	6916	514
Total 400/220kV Transformation capacity	9040	7684	5760	182
Load shedding at the time of peak demand met	--		0	-

Loading of 400kV Transmission Lines in and around Delhi:

Sl. No.	Name of the Element	Owner	MW	MVAR	REMARKS
1	400kV MAHARANI BAGH - DADRI CKT.	PGCIL	-804	19	ALL LINES MEET (N-1) RELIABILITY CRITERIA
2	400kV MANDOLA - BAWANA CKT-I	DTL	485	108	
3	400kV MANDOLA - BAWANA CKT-II	DTL	487	97	
4	400kV BAWANA - MUNDKA CKT-I	DTL	-227	-75	
5	400kV BAWANA - MUNDKA CKT-II	DTL	-223	-67	
6	400kV BAWANA - ABDULLAPUR CKT	PGCIL	-199	6	
7	400kV BAWANA - DEEPALPUR CKT	PGCIL	-307	-28	
8	400kV MUNDKA - JHATIKARA CKT-I	DTL	252	-22	
9	400kV MUNDKA - JHATIKARA CKT-II	DTL	-250	-21	
10	400kV MUNDKA - JHAJJAR CKT-I	APCPL	-281	-31	
11	400kV MUNDKA - JHAJJAR CKT-II	APCPL	-281	-33	
12	400kV CCGT BAWANA - BHIWANI CKT.	PGCIL	-216	-59	
13	400kV CCGT BAWANA - BAHADURGARH CKT.	PGCIL	-228	-7	
14	400kV CCGT BAWANA - BAWANA DTL -I	DTL	161	37	
15	400kV CCGT BAWANA - BAWANA DTL -II	DTL	212	38	
16	400kV BAMNAULI - JHATIKALAN CKT-I	DTL	-596	-29	
17	400kV BAMNAULI - JHATIKALAN CKT-II	DTL	-588	-16	
18	400kV BAMNAULI - BALLABHGARH CKT-I	DTL	-49	-56	
19	400kV BAMNAULI - BALLABHGARH CKT-II	DTL	-54	-55	
20	400kV BALLABHGARH - MAHARANI BAGH CKT.	PGCIL	488	77	
21	400kV DADRI - HARSH VIHAR CKT. -I	NTPC	-141	-28	
22	400kV DADRI - HARSH VIHAR CKT. -II	NTPC	+140	-28	

220kV Transmission Lines:

Sl. No.	Name of the Element	Owner	MW	MVAR	REMARKS
1	220 KV BAMNAULI-DIAL CKT.-I	DTL	119	-39	The T/L is being augmented with HTLS conductors to enhance the loading capacity.
2	220 KV BAMNAULI-DIAL CKT.-II	DTL	116	-37	
3	220 KV BAMNAULI-NAJAFGARH CKT.-I	DTL	0	0	PappanKalan-I is being connected to 400kV Dwarka through U/G cables by 2020-21.
4	220 KV BAMNAULI-NAJAFGARH CKT.-II	DTL	153	-10	
5	220 KV BAMNAULI-PAPANKALAN-I CKT.-I	DTL	154	19	PappanKalan-II is being
6	220 KV BAMNAULI-PAPANKALAN-I CKT.-II	DTL	156	24	
7	220 KV BAMNAULI-PAPANKALAN-II CKT.-I	DTL	144	10	

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8	220 KV BAMNAULI-PAPANKALAN-II CKT.-II	DTL	144	6	connected to 400kV Dwarka through U/G cables by 2020-21.
9	220 KV BAMNAULI-PAPANKALAN-III CKT.-I	DTL	144	22	HTLS Conductors.
10	220 KV BAMNAULI-PAPANKALAN-III CKT.-II	DTL	144	23	
11	220 KV NARAINA - PAPANKALAN-I CKT.	DTL	-71	-16	HTLS Conductors.
12	220 KV NARAINA - PAPANKALAN-III CKT.	DTL	-94	-20	
13	220 KV PAPANKALAN-I - PAPANKALAN-III CKT.	DTL	-118	-21	
14	220 KV BAWANA-DSIDC BAWANA CKT.-I	DTL	75	-10	
15	220 KV BAWANA-DSIDC BAWANA CKT.-II	DTL	70	0	
16	220 KV BAWANA-KANJHAWALA CKT.-I	DTL	83	0	
17	220 KV BAWANA-KANJHAWALA CKT.-II	DTL	81	0	
18	220 KV BAWANA-ROHINI-I CKT.-I	DTL	158	6	The T/L is being augmented with HTLS conductor to enhance the loading capacity which is under tendering stage.
19	220 KV BAWANA-ROHINI-I CKT.-II	DTL	160	5	
20	220 KV BAWANA-ROHINI-2 CKT.-I	DTL	46	-2	
21	220 KV BAWANA-ROHINI-2 CKT.-II	DTL	46	0	
22	220 KV BAWANA-SHALIMARBAGH CKT.-I	DTL	109	-5	Steering Committee advised for augmentation of existing ACSR Zebra conductor with HTLS conductor to enhance the loading capacity.
23	220 KV BAWANA-SHALIMARBAGH CKT.-II	DTL	109	-3	
24	220 KV BTPS - ALWAR CKT.	RRVPLN	-9	-25	
25	220 KV BTPS - BALLABGARH CKT. -I	BBMB	-146	-22	After the commissioning of Tughlakabad 400kV ISTS, the loading will be eased out.
26	220 KV BTPS - BALLABGARH CKT. -II	BBMB	-144	-20	
27	220 KV DSIDC BAWANA -NARELA CKT.-I	DTL	0	0	
28	220 KV DSIDC BAWANA -NARELA CKT.-II	DTL	0	0	
29	220 KV GAZIPUR-NOIDA-BTPS CKT.	UPPTCL	0	0	
30	220 KV GOPALPUR- SUBZIMANDI CKT.-I	DTL	88	5	
31	220 KV GOPALPUR- SUBZIMANDI CKT.-II	DTL	90	5	
32	220 KV GOPALPUR- WAZIRABAD CKT.-I	DTL	0	0	
33	220 KV GOPALPUR- WAZIRABAD CKT.-II	DTL	-69	-17	
34	220 KV GOPALPUR-MANDAULA CKT.-I	DTL	-168	-31	The T/L is being augmented with HTLS conductor to enhance the loading capacity.
35	220 KV GOPALPUR-MANDAULA CKT.-II	DTL	-139	-27	
36	220 KV IPPOWER-PATPARGANJ CKT.-I	DTL	-77	-35	
37	220 KV IPPOWER-PATPARGANJ CKT.-II	DTL	-50	-31	
38	220 KV IPPOWER-RAJGHAT CKT.-I	DTL	55	10	
39	220 KV IPPOWER-RAJGHAT CKT.- II	DTL	55	10	
40	220 KV KANJHAWALA-NAJAFGARH CKT.	DTL	0	0	
41	220 KV KASHMERIGATE-DMRC CKT.-I	DMRC	13	3	
42	220 KV KASHMERIGATE-DMRC CKT.-II	DMRC	19	-1	
43	220 KV MAHARANI BAGH-HCM LANE CKT.-I	DTL	0	0	Cable faulty.
44	220 KV MAHARANI BAGH-HCM LANE CKT.-II	DTL	58	-3	
45	220 KV MAHARANI BAGH-LODHI ROAD CKT.-I	DTL	84	24	Being augmented with HTLS conductor and is under tendering.
46	220 KV MAHARANI BAGH-LODHI ROAD CKT.-II	DTL	83	20	

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47	220 KV MAHARANI BAGH-MASJID MOTH CKT.-I	DTL	106	0	
48	220 KV MAHARANI BAGH-MASJID MOTH CKT.-II	DTL	53	0	
49	220 KV MAHARANI BAGH-TRAUMA CENTRE CKT.-I	DTL	137	-16	The circuits consist of 1200 sq.mm. cable. Load is also interchangeable.
50	220 KV MAHARANI BAGH-TRAUMA CENTRE CKT.-II	DTL	138	0	
51	220 KV MAHARANIBAGH-GAZIPUR CKT.-I	DTL	182	-30	Load is interchangeable.
52	220 KV MAHARANIBAGH-GAZIPUR CKT.-II	DTL	183	-29	
53	220 KV MAHARANIBAGH-PRAGATI	DTL	126	-35	HTLS Conductors.
54	220 KV MAHARANIBAGH-SARITA VIHAR	DTL	141	-8	
55	220 KV MEHRAULI-BTPS CKT.-I	DTL	-155	3	Commissioning of 400kV Tughlakabad S/Stn. and connectivity of 220kV Mehrauli S/Stn. with Tughlakabad would ease the loading condition of the ckts. The circuits are being augmented with HTLS conductor for which work has already been awarded.
56	220 KV MEHRAULI-BTPS CKT.-II	DTL	-153	4	
57	220 KV MEHRAULI-DIAL CKT.-I	DTL	-93	-8	
58	220 KV MEHRAULI-DIAL CKT.-II	DTL	-92	-7	
59	220 KV MEHRAULI-VASANT KUNJ CKT.-I	DTL	95	22	
60	220 KV MEHRAULI-VASANT KUNJ CKT.-II	DTL	88	21	
61	220 KV MUNDKA-KANJHAWALA CKT.	DTL	0	-6	Load is interchangeable.
62	220 KV MUNDKA-NAJAFGARH CKT.	DTL	121	15	
63	220 KV MUNDKA-PEERAGARHI CKT.-I	DTL	186	-32	The circuits consist of 1000 sq.mm. cable. Load is also interchangeable.
64	220 KV MUNDKA-PEERAGARHI CKT.-II	DTL	184	-29	
65	220 KV NARELA-MANDAULA CKT.-I	DTL	-84	6	
66	220 KV NARELA-MANDAULA CKT.-II	DTL	-86	7	
67	220 KV NARELA-PANIPAT CKT.-I	BBMB	-58	4	
68	220 KV NARELA-PANIPAT CKT.-II	BBMB	-61	4	
69	220 KV NARELA-PANIPAT CKT.-III	BBMB	-59	4	
70	220 KV NARELA-ROHTAK ROAD CKT.-I	BBMB	73	-4	BBMB is being pursued for reconductoring. As a long term solution 220kV Punjabi Bagh and Dev Nagar S/Stns. are being established by DTL which would ease the loading.
71	220 KV NARELA-ROHTAK ROAD CKT.-II	BBMB	73	-4	
72	220 KV OKHLA-BTPS CKT.-I	DTL	-171	-8	Commissioning of 400kV Tughlakabad S/Stn. and connectivity of 220kV Okhla S/Stn. with Tughlakabad would ease the loading condition of the ckts.
73	220 KV OKHLA-BTPS CKT.-II	DTL	-167	-12	
74	220 KV PATPARGANJ-GAZIPUR CKT.	DTL	-171	-13	
75	220 KV PATPARGANJ-GEETA COLONY CKT.-I	DTL	-101	-25	
76	220 KV PATPARGANJ-GEETA COLONY CKT.-II	DTL	-100	-26	
77	220 KV PATPARGANJ-PREET VIHAR CKT.-I	DTL	0	0	Load is interchangeable.
78	220 KV PATPARGANJ-PREET VIHAR CKT.-II	DTL	0	0	
79	220 KV PEERA GARHI-WAZIRPUR CKT.-I	DTL	64	-21	
80	220 KV PEERA GARHI-WAZIRPUR CKT.-II	DTL	66	-22	
81	220 KV PRAGATI-PARK STREET CKT.-I	DTL	130	-4	Park Street is being connected to 400kV Maharani Bagh via Lodhi Road.
82	220 KV PRAGATI-PARK STREET CKT.-II	DTL	130	-12	

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83	220 KV PRAGATI-SARITA VIHAR CKT.-I	DTL	75	-4	
84	220 KV PRAGATI-I P CKT.-I	DTL	77	-9	
85	220 KV PRAGATI-I P CKT.-II	DTL	79	-14	
86	220 KV HARSH VIHAR - PREET VIHAR CKT. -I	DTL	81	-40	
87	220 KV HARSH VIHAR - PREET VIHAR CKT. -II	DTL	0	-30	
88	220 KV RIDGE VALLEY-NARAINA CKT.	DTL	0	-10	
89	220 KV SARITAVIHAR-BTPS CKT.-I	DTL	0	0	
90	220 KV SARITAVIHAR-BTPS CKT.-II	DTL	0	0	
91	220 KV SHALIMAR BAGH-DMRC CKT.-I	DMRC	5	6	
92	220 KV SHALIMAR BAGH-DMRC CKT.-II	DMRC	0	0	
93	220 KV SHALIMAR BAGH-ROHINI CKT.-I	DTL	0	0	
94	220 KV SHALIMAR BAGH-ROHINI CKT.-II	DTL	0	0	
95	220 KV SHALIMAR BAGH-WAZIRPUR CKT.-I	DTL	0	-10	
96	220 KV SHALIMAR BAGH-WAZIRPUR CKT.-II	DTL	0	-9	
97	220 KV TRAUMA CENTRE-RIDGE VALLEY CKT.-I	DTL	78	-4	
98	220 KV TRAUMA CENTRE-RIDGE VALLEY CKT.-II	DTL	77	-3	
99	220 KV WAZIRABAD-GEETA COLONY CKT.-I	DTL	151	33	
100	220 KV WAZIRABAD-GEETA COLONY CKT.-II	DTL	145	35	
101	220 KV WAZIRABAD-KASHMIRIGATE CKT.-I	DTL	70	0	
102	220 KV WAZIRABAD-KASHMIRIGATE CKT.-II	DTL	69	0	
103	220 KV WAZIRABAD-MANDAULA CKT.-I	DTL	-184	-33	All the four circuits between Mandola-Wazirabad are being augmented with HTLS conductor.
104	220 KV WAZIRABAD-MANDAULA CKT.-II	DTL	-184	-33	
105	220 KV WAZIRABAD-MANDAULA CKT.-III	DTL	-184	-34	
106	220 KV WAZIRABAD-MANDAULA CKT.-IV	DTL	-191	-35	
107	220 KV VASANT KUNJ - R.K.PURAM CKT. -I	DTL	6	-10	
108	220 KV VASANT KUNJ - R.K.PURAM CKT. -II	DTL	0	0	

The following was the general discussions and decisions on system behavior at peak load conditions:

a. Plan to achieve n-1 reliability.

S.No.	Substation	Installed capacity in MW (at 0.85 pf)	Load at the time of peak demand 7016MW on 10.07.18 at 15:26 Hrs	Plan to achieve n-1 reliability
	400kV S/Stn.			
			MW/MVAR	
1.	Maharani Bagh	1386	1288/ -97	After commissioning of 2000MVA, 400/220kV ISTS at Tughlakabad loading would be eased. Standing Committee of Power System Planning CEA has also been approached to enhance the Transformation capacity from 1630 MVA to 2000MVA.
2.	Bamnauli	1386	1261/ 27	After commissioning of 2000MVA, 400/220kV ISTS at Tughlakabad and Dwarka, the loading would be eased.

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3.	Mundka	804	618/ -12	Steering Committee advised for addition of 400/220kV 315MVA Tx. (The 400kV & 220kV bays are under construction). The Tx. is likely to be commissioned in the year 2020-21. The load is also interchangeable in case of exigency.
				220kV S/Stn.
			MW/MVAR	
1.	Gopalpur	255	175/ 21	Two Tx. of 220/66kV, 160MVA capacity along with 66kV GIS are planned. Further, 66kV GIS is likely to be commissioned by 31.12.19. By next Summer, 160MVA Tx. is proposed to be installed and is to be connected to 66kV Bus through 66kV cable (TPDDL would be requested to supply 1km 1000 sq. mm. 66kV cables on loan basis) till 66kV GIS is established.
2.	Rohini	320	317/ 12	TPDDL has assured to shift about 70MVA load from Rohini-I to Rohini-II which is running with 92 MW only against the capacity of 272MW at Rohini-II.
3.	Shalimar Bagh	255	203/ 30	Additional 220/66kV, 100MVA Tx. is being installed by Dec-18. Additional 220/33kV, 100MVA Tx. is also being planned.
4.	Wazirpur	170	132/ 2	Additional 100MVA Tx. is proposed to be installed by 2020-21 for which 220kV GIS bay is to be extended. Due to space constraints in the 220kV GIS Building, OEM has been requested to explore the possibility for extension of the 220kV GIS bay.
5.	Bawana	85	64/ 15	Only One 220/66kV, 100MVA Tx. is available. This was only a temporary arrangement till the commissioning of 220kV DSIIDC S/Stn. However, Steering Committee in its meeting on 17.01.18 decided to continue the arrangement. Due to space constraint additional Tx. cannot be installed. Any way load is interchangeable.
6.	Kanjhawala	170	163/7	Additional 160MVA Tx. is proposed by 31.05.19.
7.	DSIIDC Bawana	306	217/24	In case of outage of 220/66kV, 160MVA Tx. n-1 contingency does not meet. Additional 160MVA Tx. is proposed by 2020-2021. Any way load is interchangeable.
8.	Najafgarh	340	269/17	220/66kV, 2 no. 160MVA Tx. are proposed to be installed in place of 220/66kV 100MVA Tx. Order for purchase of 9 no. 220/66kV 160MVA Tx. have been placed on BHEL on 11.07.18. Considering the delivery schedule one 220/66kV 160MVA Tx. is proposed to be installed before summer 2019.
9.	Papankalan-I	442	341/40	BRPL assured shifting of about 100MVA load from PPK-I to PPK-III before summer 2019.
10.	Peera Garhi	255	235/37	Due to space constraints additional Tx. cannot be possible. The load would be eased after the commissioning of 220/66kV Budella S/Stn. for which order has been placed on 28.06.18 with the commissioning schedule of 18 months.
11.	Mehrauli	391	313/2	The shifting of load by BRPL to the upcoming 220/66kV Tughlakabad would ease the loading position. The burnt 220/66kV, 160MVA Tx. at 220kV S/stn Vasant Kunj would also be replaced at the earliest.
12.	Okhla	425	339/10	The shifting of load by BRPL to the upcoming 220/66kV Tughlakabad would ease the loading position. One 220/66kV 100MVA Tx. would also be replaced with 160MVA by 2019-20.
13.	Sarita Vihar	255	220/3	One Tx. is proposed to be replaced with 220/66kV, 160MVA by the year 2019-20.
14.	Lodhi Road	170	167/19	3 rd 100MVA Tx. would be made available by 30.09.18.
15.	Trauma Center (AIIMS)	170	114/20	Additional 220/33kV, 100MVA Tx. is proposed by 2020-21. The 220kV GIS and 33kV GIS are required to be extended. 220kV GIS building is also required to be extended for addition of 220kV GIS bays. Till then load is required to be managed by BRPL and NDMC with adjoining source in case of exigency.
16.	Ridge Valley	272	156/37	Severe space constraints. No possibility of additional Tx. BRPL and NDMC to manage the load with adjoining sources in case of exigency. The loading of 220/66kV, 2X160MVA by BRPL at R.K. Puram would ease the loading of Ridge Valley.
17.	Geeta Colony	170	107/13	Severe space constraints. The feasibility of additional 220/33kV 100MVA is being explored. The load is also interchangeable

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				with 220kV Patparganj. BYPL should shift more load to 220kV Preet Vihar S/Stn. which is loaded only 82MW against the capacity of 255MW.
18.	Subzi Mandi	170	171/10	The 220kV Subzi Mandi Grid S/Stn. is located in very congested area. Due to lack of space there is no 220kV bus in the S/Stn. The 220/33kV Tx. are directly fed through 220kV Gopalpur-Subzi Mandi Ckt 1 & 2. To ensure 2 nd feed of Subzi Mandi and addition of 100MVA Tr. the existing 220kV AIS needs to be converted into 220kV GIS, which is not possible without affecting the power supply of 220kV Grid S/Stn. On 06.08.2015 a joint site visit along with TPDDL was also carried out to explore the possibility of conversion of the 220kV AIS to 220kV GIS without affecting the power supply of the areas fed from 220kV Subzi Mandi S/Stn. The possibility worked out was that the existing 33/11kV, 16MVA Tx. 1 & 2 should be dismantled to make space for 220kV GIS which was turned down by TPDDL due to lack of back feeding arrangement of the areas fed from these 33/11kV 16MVA Txs. As such, it could only be possible after establishment of the 220kV Timarpur S/Stn. which is proposed to be established in nearby area, the entire load of 220kV Subzi Mandi Grid S/Stn. can be shifted to the proposed 220kV Timar Pur at 33 kV level and the 220kV GIS conversion can be taken up to provide 2 nd 220kV feeders from the upcoming Dev Nagar S/Stn. and addition of 100MVA Tr.
19.	Kashmiri Gate	170	108/8	220kV GIS is required to be extended for 5 no. 220kV GIS bays. The scheme for the same is under tendering. Out of which one bay is for the additional Tx. As such, the additional Tx. is likely to be installed by 2021-22. Till then, BYPL and TPDDL are required to manage the load in case of exigency with adjoining sources.
20.	I.P. Station	255	211/38	Load is interchangeable. Further, addition of 3 rd Tx. at Lodhi Road, and commissioning of 220/33kV, 3X100MVA GIS at Rajghat by 2020-21, would ease the loading position.
21.	Parkstreet	340	245/8	Due to space constraints, the addition of Tx. at 220kV Park Street is not feasible. Major part of load is interchangeable. The commissioning of 220kV Dev Nagar S/Stn. with 220/33kV, 4X100MVA trfs. would ease the loading. The scheme for the same is under tendering and is likely to be commissioned by the year 2020-21.

b. Plan to achieve n-1 reliability for 220kV Transmission lines

S.No.	Transmission Lines	Loading at the time of peak MW/MVAR	Plan to achieve as n-1 reliability
1.	220kV Bamnauli-DIAL D/C	325/ -76	The commissioning of 2000MVA, 400/220kV ISTS at Tughlakabad would ease the loading. The line is also being augmented with HTLS conductors.
2.	220kV Bamnauli-PPK-I D/C	310/43	In case of outage of one circuit load can be met through 220kV PPK-III-PPK-I S/C lines. The connectivity with 400kV ISTS Dwarka is also proposed by the year 2020-21.
3.	220kV Bamnauli-PPK-II D/C	288/26	The connectivity with 400kV Dwarka is proposed by the year 2020-21.
4.	220kV Bamnauli-PPK-III D/C	288/45	The connectivity with 400kV Dwarka ISTS is proposed alongwith commissioning of 400kV ISTS Dwarka. PGCIL was requested to undertake the work as deposit work of DTL.
5.	220kV Bawana-Rohini-I D/C	318/11	The conductors of the circuits are being replaced with HTLS conductors. The scheme is under tendering.
6.	220kV Bawana-Shalimar Bagh D/C	218/8	The conductors are proposed to be replaced with HTLS conductors by the year 2020-21.

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7.	220kV Ballabgarh-BTPS D/C (owner BBMB)	290/47	After commissioning of 2000MVA, 400/220kV ISTS Tughlakabad the loading would be eased.
8.	220kV Mandola-Gopalpur D/C	307/48	The conductors of the circuits are being augmented with HTLS conductors, by the year 2020-21. The scheme has been approved by B.O.D on 31.07.18.
9.	220kV Maharani Bagh – Trauma Center D/C cable	275/16	The circuits are of 1200 sq. mm. copper cables. The contingency can be met with one circuit outage. However, after commissioning of the proposed 2000 sq.mm. Tughlakabad – R.K. Puram D/C cable, the loading would be eased. Further 220kV Ridge Valley – Trauma Center D/C cable ckt. Is proposed to be LILoed at R.K. Puram. (The scheme is under tendering).
10.	220kV BTPS-Mehrauli D/C	308/7	The LILO of 220kV BTPS – Mehrauli D/C line at 400/220kV ISTS Tughlakabad will be commissioned by December, 2018, The loading will be eased. The circuits are augmented with HTLS
11.	220kV Mundka - Peera Garhi D/C cable	370/61	The circuits are of 1000sq.mm. copper cable. Load is interchangeable.
12.	220kV BTPS – Okhla D/C	338/25	The connectivity of the Okhla 220kV S/Stn. with the upcoming 400/220kV ISTS at Tughlakabad would ease the loading condition.
13.	220kV Pragati-Park Street D/C cable	260/15	The circuits are of 630 sq.mm. copper cables. The connectivity of Park Street with Electric Lane and Lodhi Road is also being established.
14.	220kV Mandola-Wazirabad Ckt-I & II	388/66	The conductors of the circuits are being replaced with HTLS conductors by the year 2020-21.
15.	220kV Mandola-Wazirabad ckt 3 & 4.	375/69	

c. To meet the summer 2019 demand the following identified critical works need to be carried out by utilities.

Sl. No.	Details of Scheme	To be carried out by
1.	Addition of 1x160 MVA Transformer at 220kV Kanjhawala	DTL
2.	Addition of 220/66kV, 1x100 MVA Transformer and 220/33kV 1x 100 MVA at 220kV S/stn. Shalimar Bagh	DTL
3.	BRPL to transfer the load of Nangloi & Nangloi Water works from Najafgarh to Mundka	BRPL
4.	160MVA Tx. is proposed to be installed and connected to 66kV Bus through 66kV cable (TPDDL would be requested to supply 1km 1000 sq. mm. 66kV cables on loan basis) till 66kV GIS is established, at 220kV S/stn Gopalpur.	DTL/TPDDL
5.	TPDDL to divert load from 220kV Rohini-I to 220kV Rohini-II	TPDDL
6.	160 MVA faulty transformer presently with BHEL for repair is required to be commissioned at Pappankalan-III	DTL
7.	BRPL to shift the load of their G-2 grid substation from Pappankalan-I to Pappankalan-III by way of 66kV cable connection	BRPL
8.	Augmentation of at least one no.160 MVA transformer at Najafgarh	DTL
9.	Creation of 2 no. 220kV Bays at Okhla for getting in feed from 400/220kV S/stn. Tuglakabad.	DTL
10.	BRPL to commission the already conceived scheme to lay 66kV feeders to (i) Malviya Nagar (ii) Batra Grid from 220/66kV Tuglakabad substation.	BRPL
11.	BRPL to shift load at 220kV R.K.Puram to give relief to Mehrauli/Vasant Kunj S/stn.	BRPL
12.	The replacement of damaged 1x160 MVA Tr. at Vasant Kunj	DTL
13.	Addition of 2 no. 66kV Bays at 220kV Gazipur to feed PPG Industrial Area and Vivek Vihar for reliability.	DTL
14.	Addition of 2 no. 66kV Bays at 220kV SOW to feed Bhagirathi for reliability.	DTL

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NOTE:- The Steering Committee identified the above critical works and advised the utilities to ensure the same expeditiously.

- d. The O&M Deptt. of DTL was suggested to explore the possibility for repairing of the damaged 220/66/33kV, 100MVA Transformer lying at Pankalan-I at the earliest to have spare capacity of one such 220/66/33kV Transformer to meet any exigency.
- e. It was suggested to explore the feasibility of using maximum size cable, preferably 2000 sq. mm in the cable circuits emanating from 400kV S/Stns. to avoid situation of overloading as being happened in case of 1000 Sq mm Mundka-Peera Garhi D/C cable and, 1200 Sq.mm, Harsh Vihar-Preet Vihar-Patparganj D/C cable.
- f. It was suggested to make operational the DTS systems of 220kV U/G cables for proper monitoring of temperature and loading conditions so that the 220kV U/G cables could be operated at their optimum capacity.
- g. BRPL was advised to shift maximum load from 220kV Mehrauli/Vasant Kunj by laying 66kV Vasant Kunj B Block-R.K. Puram cable ckt. and expedite for commissioning of other 66kV outlets from 220kV R.K. Puram as envisaged and approved in Steering Committee meetings.

3. Details of Radial fed sub-stations of DTL and DISCOM and plan to provide alternate sources for reliability

It has been observed that a 1 no.400kV sub-station and 14 No. 220kV substations of DTL apart from no. of 66kV, 33kV & 11kV substations of DISCOMs are operating on radial mode (i.e., connected only to one source). In the recent meeting held in the office of Director (Operations), DTL, all DISCOMs have been advised to provide the details of such systems indicating the plan to provide duplicate source.

As far as DTL is concerned, the details were provided in the SCM held on 12.08.2016. The updated status of the same is given here under:-

At present there is one 400kV and 14 No. 220kV substations having radial source which is the main concern in respect of reliability. The details of S/Stn. which are running on radial mode and the plan to enhance reliability by way of providing additional source are as under:

400kV Harsh Vihar S/Stn. (Operation in radial mode at 400kV Level)

1. The sub-station got commissioned in the year 2014 with two 400kV infeeds from 400kV Dadri S/Stn.
2. The substation was envisaged as the evacuation of Dadri Stage-II Generating Station of NTPC which is having 2x490MW Generating units and Delhi has 75% capacity allocation from the station.
3. From the Tariff order of 400kV Dadri-Loni road Double Circuits issued by CERC vide its order dated 02.05.2017, the following facts have been revealed.
 - a) The line is dedicated Transmission system for Dadri (Stage-II) since the line is point to point connection as the 400kV Harsh Vihar (Loni Road) substation it is not a meshed system (Radial mode).
 - b) The Tariff of the line is being the part of Generation Tariff of Dadri Stage-II station and hence being shared by beneficiaries of Dadri Stage-II (fixed charges in proportion to allocation and variable charges based on scheduled energy as per schedules finalized by NRLDC).

c) The evacuation plan of Dadri Stage-II Station has been discussed and finalized in 26th Standing Committee of Power System Planning meeting, CEA. The extracts of MoM are reproduced hereunder:-

26th Standing Committee meeting held on 13.10.2008

10. Transmission system associated with Dadri II TPS (2x490 MW)

10.1 CE (SP&PA) stated that the evacuation system for Dadri II TPS was agreed in the 21st and 22nd meeting of the Standing Committee and it was proposed to have a 400 kV D/C line from Dadri to Bamnauli routed via Badarpur/Mehrauli, utilizing the corridor of 220 kV Badarpur-Mehrauli-Bamnauli line which could be upgraded to multi-circuit tower accommodating the 400 kV D/C as well as the 220 kV D/C lines on the same towers. However from the route alignment proposed by PGCIL it was seen that it was not as per the proposal agreed in the standing committee. It was observed that the route proposed by POWERGRID was passing through congested area of Delhi and Gurgaon where there would be severe constraints in obtaining R-O-W for construction of the line.

10.2 Director(OP.)DTL stated that they would not need any power at Bamnauli as there was already a proposal for Bamnauli CCGT and it would be better if the Dadri II power was injected to Loni Road. It was further informed that DTL had already identified the land near Nand Nagari at Loni Road and had also given application to DDA under section 17 for acquisition of the land. The NIT for construction of the S/S would be invited by December 2008 and final placement of contract would take about six more months with the completion schedule of 18 months from the date of award of contract. It was opined that instead of the earlier proposal, the 400 kV D/C line from Dadri II might be taken to Nand Nagri/Loni Road(DTL). The proposal was agreed by the members of the Committee. NTPC stated that the first unit of Dadri was expected in 2009 and the second at 2010 and as such they do not have any objection to the proposal, however they would like to be assured that the fault level at Dadri with this arrangement was within the limit. Accordingly it was decided that PGCIL would carry out study that 2009-10 condition for studying the impact of the Dadri generation on the fault level at Dadri with the above transmission system.

d. As long as 400kV Harsh Vihar is not connected with other 400kV system, the transmission charges of 400kV Dadri-Harsh Vihar D/C line would be part of Generation Tariff of Dadri (Stage)II Station as in case of 400kV Mundaka-Jhajjar D/C line charges and would be shared by the beneficiaries of Generating Station of Dadri Stage II Station.

e. Whenever 400kV Harsh Vihar is put in meshed system (connection with other 400kV system) 400kV Dadri-Harsh Vihar D/C line would become Inter State Transmission Line as both ends of the line situated in different states. Thereafter the owner, i.e. NTPC would need Inter State Transmission Licence similar to that of 400kV Jhajjar-Mundaka line for which Aravali Power Company Limited (APCL) got the Transmission licence from 07.11.2013. Upto 06.11.2013, the Tariff of 400kV Mundaka Jhajjar D/C line was the part of Jhajjar Power Station Tariff and from 07.11.2013 the Tariff of the said circuit becomes the part of ISTS Tariff to be shared as per sharing of Transmission Tariff Regulation of CERC, not Generation Tariff of 400kV Tariff of Jhajjar.

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f. Likewise, as long as Harsh Vihar S/Stn. is not connected with other 400kV S/Stn. and NTPC does not have Transmission licence, the tariff of 400kV Dadri-Harsh Vihar D/C line would be part of Dadri (II) Station. After the connecting of 400kV Harsh Vihar to other 400kV station and getting the Inter State Transmission licence by NTPC, the Tariff of the line would be shared by constituents under sharing of Transmission Tariff Regulation of CERC.

4. Due to radial mode operation of 400kV Hash Vihar S/Stn. in case of any problem at 400kV Dadri or 400kV Dadri - Harsh Vihar in D/C line, the 400kV Harsh Vihar S/Stn. becomes dead and the areas fed from 400kV Harsh Vihar Station get affected. So far, seven such incidents have been reported since the commissioning of 400kV HarshVihar S/Stn. as under:

Details of Supply Interruptions at 400kV GIS Sub - Station Harsh Vihar since the commissioning of 400kV Dadri-Harsh Vihar D/C line in the year 2014 to 2018 (31.07.2018)

S.No.	Ckt No.	Tripping Date	Tripping Time	Restoration Date	Restoration Time	Duration (in Hours)	Remarks
1	400kV Dadri Line - I	06.12.2014	9:44	06.12.2014	18:53	9.09	S/D at Dadri End
	400kV Dadri Line - II			06.12.2014	18:56	9.12	S/D at Dadri End
2	400kV Dadri Line - I	30.01.2017	10:50	30.01.2017	20:25	9.35	S/D at Dadri End
	400kV Dadri Line - II			30.01.2017	20:29	9.39	S/D at Dadri End
3	400kV Dadri Line - I	31.01.2017	10:01	31.01.2017	19:27	9.26	S/D at Dadri End
	400kV Dadri Line - II			31.01.2017	19:40	9.39	S/D at Dadri End
4	400kV Dadri Line - I	15.08.2017	12:36	15.08.2017	14:36	2.00	Tripped from Dadri
	400kV Dadri Line - II		13:30	15.08.2017	13:57	0.27	Tripped from Dadri
5	400kV Dadri Line - I	09.12.2017	17:29	09.12.2017	20:17	2.48	Tripped from Dadri
	400kV Dadri Line - II	09.12.2017	17:41	10.12.2017	14:21	20.41	S/D at Dadri End
6	400kV Dadri Line - I	21.04.2018	17:45	21.04.2018	18:07	0.22	Put Off
	400kV Dadri Line - II	21.04.2018	8:06	21.04.2018	19:19	11.13	S/D at Dadri End
7	400kV Dadri Line - I	26.05.2018	6:21	26.05.2018	14:29	8.08	S/D at HVR End
	400kV Dadri Line - II	26.05.2018	12:20	26.05.2018	12:54	0.34	Tripped from Dadri
	400kV Dadri Line - II	26.05.2018	13:49	26.05.2018	16:29	2.40	Tripped from Dadri

5. It was further revealed that there is only one 400kV spare GIS bay available at Harsh Vihar which is envisaged for addition of 400/220kV 315 MVA 4th transformer. In case of addition of 400kV GIS bays for providing another infeed the 400kV GIS building is required to be extended.
6. The Steering Committee was of the view that for power system reliability the sub-station should have source reliability from at least two sources. The Indian Electricity Grid Code provision also underlines the facts as follow:

Excerpts of IEGC Regulations, 2010

3.5 Planning Criterion

General Philosophy

(a) The planning criteria are based on the security philosophy on which the ISTS has been planned. The security philosophy may be as per the Transmission

Planning Criteria and other guidelines as given by CEA. The general policy shall be as detailed below:

i) **As a general rule, the ISTS shall be capable of withstanding and be Secured against the following contingency outages**

a. **Without necessitating load shedding or rescheduling of generation**

During Steady State Operation:

- *Outage of a 132 kV D/C line or,*
- *Outage of a 220 kV D/C line or,*
- *Outage of a 400 kV S/C line or,*
- *Outage of single Interconnecting Transformer, or*
- *Outage of one pole of HVDC Bipole line, or one pole of HVDC back to back Station or*
- *Outage of 765 kV S/C line*

b. **Without necessitating load shedding but could be with rescheduling of generation during steady state operation-**

- **Outage of a 400 kV S/C line with TCSC, or**
- **Outage of a 400 kV D/C line, or**
- **Outage of both pole of HVDC Bipole line or both poles of HVDC back to back Station or**
- **Outage of a 765kV S/C line with series compensation.**

ii) *The above contingencies shall be considered assuming a pre-contingency System depletion(Planned outage) of another 220 kV D/C line or 400 kV S/C line in another corridor and not emanating from the same substation. The planning study would assume that all the Generating Units operate Within their reactive capability curves and the network voltage profile are also maintained within voltage limits specified.*

(b) *The ISTS shall be capable of withstanding the loss of most severe single system infeed without loss of stability.*

(c) *Any one of these events defined above shall not cause:*

- i. *Loss of supply*
- ii. *Prolonged operation of the system frequency below and above specified Limits.*
- iii. *Unacceptable high or low voltage*
- iv. *System instability*
- v. *Unacceptable overloading of ISTS elements.*

(d) *In all substations (132 kV and above), at least two transformers shall be provided.*

(e) *CTU shall carry out planning studies for Reactive Power compensation of ISTS including reactive power compensation requirement at the generator's /bulk consumer's switchyard and for connectivity of new generator/bulk consumer to the ISTS in accordance with Central Electricity Regulatory Commission (Grant of Connectivity, Long-term Access and Medium-term Open Access in inter-state Transmission and related matters) Regulations, 2009.*

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(f) *Suitable System Protection Scheme may be planned by NLDC/RLDC in consultation with CEA, CTU, RPC and the Regional Entities, either for Enhancing transfer capability or to take care of contingencies beyond that Indicated in a (i) above.*

7. Steering Committee was of the view that the feasibility for the provision of the additional source for 400kV Harsh Vihar (Loni Road) be explored immediately and after assessment of the feasibility, the Standing Committee of Power System Planning of CEA may be approached for getting the approval.

220kV Sub-stations (Radial Mode Operation):

Sl. No.	Name of S/Stn.	Present feeding arrangement	Additional source proposed	Deliberation in the Steering Committee meeting
1	220kV Lodhi Road	220kV Maharani Bagh-Lodhi Road D/C through overhead line with 630 sq. mm cable termination at Maharani Bagh	220kV 1200 mm ² cable one ckt. from Electric Lane and second from Park Street which is being implemented by Powergrid under deposit work of DTL and likely to be completed by December 2018.	220kV Maharani Bagh – Lodhi Road D/C T/L has already been planned to be augmented with HTLS conductors. The scheme is tendering stage.
2	220kV Park Street	220kV Pragati-Park Street D/C 630 sq.mm cable	220kV 1200 mm ² cable one ckt. from Electric Lane and second from Lodhi Road which is being implemented by Powergrid under deposit work of DTL and likely to be completed by December 2018.	Expected by Dec 2018
3	220kV Electric Lane	220kV Maharani Bagh-Electric Lane D/C line with 1200mm ² cable termination at Maharani Bagh	220kV 1200 mm ² cable one ckt. from Park Street and second from Lodhi Road which is being implemented by Powergrid under deposit work of DTL and likely to be completed by December 2018.	Expected by Dec 2018
4.	220kV Subzi Mandi	220kV Gopalpur-Subzi Mandi D/C line	The 220kV Subzi Mandi Grid S/Stn. is located in very congested area. Due to lack of space there is no 220kV bus in the S/Stn. The 220/33kV Tx. are directly fed through 220kV Gopalpur-Subzi Mandi Ckt 1 & 2. To ensure 2 nd feed of Subzi Mandi, the existing 220kV AIS needs to be converted into 220kV GIS, which is not possible without affecting the power supply of 220kV Grid S/Stn. On 06.08.2015 a joint site visit along with TPDDL was also carried out to explore the possibility of conversion of the 220kV AIS to 220kV GIS without affecting the power supply of the areas fed from 220kV Subzi Mandi S/Stn. The possibility was established that the existing 33/11kV 16MVA Tx. 1 & 2 should be dismantled to make room for 220kV GIS which was turned down by TPDDL due to lack of back feeding arrangement of the areas fed from these 33/11kV 16MVA Tx. As such, it could only be possible after establishment of the 220kV Timarpur S/Stn. which is proposed to be established in nearby area, the entire load of 220kV Subzi Mandi	The second source is expected to be available by 2021-22.

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			Grid S/Stn. can be shifted to the proposed 220kV Timar Pur at 33 kV level and the 220kV GIS conversion can be taken up to provide 2 nd 220kV feeders from the upcoming Dev Nagar S/Stn.	
5	220kV Pappankalan-I	220kV Bamnauli-Pappankalan-I Ckt.-1 & 2.	Connectivity has already been established through LILO S/C of PPK-III –Naraina (HTLS Line) at PPK-I to take care of exigency. Second feed is envisaged through 220kV D/C U/G cable link with upcoming 400/220kV ISTS S/stn. at Dwarka. The same is expected by 2020-21.	Expected by 2020-21
6	220kV Pappankalan-II	220kV Bamnauli-Pappankalan-II Ckt.1 & 2.	Second feed is envisaged through 220kV D/C U/G cable link with upcoming 400/220kV ISTS S/stn. at Dwarka. The same is expected by 2020-21.	Expected by 2020-21
7	220kV Okhla	220kV BTPS-Okhla D/C O/H line	220kV Tughlakabad (400kV)-Okhla D/C line being implemented by Powergrid under deposit work of DTL.	Expected by December 2018
8	220kV Vasant Kunj	220kV Mehrauli-Vasant Kunj O/H D/C T/L	220kV R K Puram-Vasant Kunj D/C 1000sq. mm. cable.	220kV R.K Puram is also being provided the second source by LILO of 220kV AIIMS-Ridge Valley D/C line at R. K. Puram (scheme is under tendering stage), further, R. K. Puram is also being provided source from 220kV Tughlakabad by 2020-21.
9.	220kV R. K. Puram	220kV Vasant Kunj- R. K Puram D/C Cable	220kV R.K Puram is being provided the second source by LILO of 220kV AIIMS-Ridge Valley D/C line at R. K. Puram (scheme is under tendering stage), further, R. K. Puram is also being provided source through 220kV Tughlakabad by 2020-21.	220kV Tughlakabad- R.K. puram D/C TR Line is expedited by 2020-21
10	220kV Rohini II	220kV Bawana-Rohini II D/C O/H line	At present the total load of Rohini II S/Stn. is only 80MVA as the downstream most of the S/Stns. are planned as deposit work of DDA, However for optimum utilization of S/stn TPDDL has planned to shift about 70MVA Load from Rohini-I to Rohini-II by 31.08.2018. The second source was envisaged from Karampura ISTS S/stn. via 220kV Mangol Puri, however, due to shelving of the Karampura ISTS due to ROW issue, the additional source is to be explored.	
11	220kV Kashmere Gate	220kV Wazirabad-Kashmere Gate D/C O/H line	Second source is envisaged through proposed 220kV RPH-Kashmere Gate D/C O/H line. Further, will be connected with upcoming 400kV Gopal Pur via 220/33kV Timar Pur through 220kV D/C U/G Cable.	The second source is expedited by 2021-2022
12	220kV Rajghat	220kV IP-RPH D/C O/H line	Second source is envisaged through proposed 220kV RPH- Kashmiri Gate D/C over head line.	Being established by Power Grid in Deposit Scheme
13	220kV Rohtak Road	220kV Narela-Rohtak Road D/C line	2 nd source was envisaged from 400kV Karampura S/Stn. which was dropped due to non availability of land. The load is required to be met from upcoming 220kV Punjabi Bagh and Dev Nagar s/stns etc.	The line is about 35 years old and owned by BBMB. The capacity of the line is 250MW (total) being goat conductors, still catering the load of 160-170MW.
14	220kV Masjid Moth	220kV Maharani Bagh-Masjid Moth 1200 sq. mm. D/C cable	220kV Tughlakabad-Masjid Moth D/C underground cable is envisaged. The same is expected by Year 2020-21.	The connectivity with Tughlakabad would be established by 2020-21

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The Discoms have provided the details of radially fed sub stations as under:

(i) TPDDL:

Sl. No.	Name of S/Stn.	Present feeding arrangement	Additional source proposed	Deliberation in the Steering Committee meeting
1.	Pitampura 3	Currently being fed from Pitampura 1 through D/C 66 kV Line.	66 kV LRIA Grid and D/C 66 kV line from LRIA to Pitampura 3 is proposed under IPDS scheme.	If no assistance is forthcoming under IPDS scheme, it may be done under CAPEX.
2.	33kV Wazirabad	Currently being fed from 220 kV Gopalpur through D/C 33 kV line	Second connectivity is envisaged through 33 kV S/C line from 220 kV Timarpur. This being a deposit scheme, communication with DJB is underway for release of funds	Considering the strategic importance of the installation meant to provide water supply to major part of the capital, if DJB does not provide fund for duplicate source, TPDDL may consider to implement the same under CAPEX for maintaining reliable power supply.
3.	66kV Sirasapur	Currently being fed from Badli through D/C 66 kV line.	Second connectivity was planned from 220 kV SGTN. However due to delay in the project, a D/C 66 kV line from 66 kV SGTN has been put up to DERC in current CAPEX submission.	Second source would be provided along with the commission of 220/66kV SGTN S/stn. by DTL

(ii) BYPL:

Sl. No	Circle	Grid Name	Voltage level	Present feeding arrangement	Additional source proposed	Deliberation in the Steering Committee
1	Central	Anand Parbat	33/11 kV	Shastri Park ckt-1&2	2 No. 33 kV feed planned from 220 kV DEV NAGAR	Dev Nagar 220/33kV is expected by 2020-21.
2	North East	Bhagirathi	66/11 kV	Ghonda ckt-1&2	2 No. 66 kV feed planned from 220 kV WAZIRABAD	DTL to create 2 additional 66kV bays at South of Wazirabad before summer 2019.
3	North East	Dwarkapuri	33/11 kV	Bhagirathi, Seelampur	2 No. 33 kV feed planned from 220 kV PREET VIHAR	
4	South East	CBD Shahdara2	33/11 kV	Vivek Vihar, KKD ckt	1 No. 33 kV feed planned from 220 kV PREET VIHAR	
5	South East	New Kondli	66/11 kV	Kondli ckt-1&2		02 no. additional 66 kV bays required at 220 kV GAZIPUR before summer 2019
6	North East	Dilshad Garden	66/11 kV	Nandnagari ckt-1&2		New 220/66 kV Grid required as Harsh Vihar grid which is feeding these stations is very far.
7	North East	East of Loni road	66/11 kV	Ghonda ckt-1&2		
8	North East	G T Road Shahdara	33/11 kV	O/H Ghonda, Vivek Vihar ckt-2		New 220/33 kV Grid required

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9	North East	Jhilmil	33/11 kV	G.T. Road, V. Vihar ckt-1		
10	North East	Karawal Nagar	33/11 kV	Bhagirathi ckt-1&2		
11	North East	Seelampur	33/11 kV	Dwarakapuri, Ghonda O/H		
12	South East	Dallupura	66/11 kV	Kondli ckt-1&2		New 220/66 kV Grid required
13	South East	Mayur Vihar-2	66/11 kV	Dallupura ckt-1&2		
14	South East	PPGH-II	66/11 kV	GH-1 ckt-1&2		2 No. 66 kV bays required at 220 kV PPG

It was informed that in the current business plan, 220/66kV Mayur Vihar substation has been planned and likely to come in the year 2022-23. With regard to additional 220kV Sub Station requirement as suggested by BYPL, the feasibility would be accessed jointly to find suitable places for establishment of 220kV Sub Stations considering all aspects like availability of land, ROW for infeeds and feeder requirement of BYPL etc in next business plan.

(iii) BRPL:

Sl. No	Name of the Grid S/stn	Region	Voltage level(kV)	Installed capacity(MVA)	DTL source
1	C-Dot	South	66 / 11	60	220kV Mehrauli
2	DIAL-AEROCITY	South	66 / 11	80	220kV DIAL
3	G-2 Pappankalan	West	66 / 11	40	220kV Pappankalan-I
4	Jafarpur	West	66 / 11	60	220kV Najafgarh
5	Pappankalan-2	West	66 / 11	40	220kV Pappankalan-II
6	Sagar Pur	West	66 / 11	60	220kV Pappankalan-I
7	Hari Nagar	West	66 / 11	60	220kV Pappankalan-I
8	GGSH	West	66 / 11	50	220kV Pappankalan-II
9	Hastal	West	66 / 11	75	220kV Pappankalan-II
10	Mundka	West	66 / 11	50	400 kV Mundka/Neelwal
11	Fatehpur Beri	South	66 / 11	50	220kV Mehrauli
12	Mithapur	South	66 / 11	50	220kV Pappankalan-II

It was observed that all the grids as mentioned above are directly connected from either 400kV or 220kV Sub Stations of DTL. For providing second source, the possibility shall be explored jointly. However, BRPL was advised to maintain 66/33kV ring in the vicinity of grid sub stations to maintain alternate supply arrangement.

(iv) NDMC:

The representative of NDMC confirmed that there is not any 66/33kV substation with radial source.

(v) MES:

The representative of MES confirmed that they are having 4 No. 33kV sub-stations and all are having duplicate source. None of the 33kV sub-station is on radial source.

4. Status of shifting of 11kV load from 220kV sub-stations of DTL

As per 13th Business Plan of DTL and as agreed in the SCM dated 04.04.18 DTL has planned the replacement of outlived 66/11kV and 33/11kV Power transformers installed at 220 kV sub-stations as under:

S.N	Sub Station	Details of existing Tx.	Augmentation Plan	Year
1	Lodhi Road	2 no 33/11kV 20MVA	2 no 33/11kV 25MVA	2018-19
	Lodhi Road	2 no 33/11kV 16MVA	2 no 33/11kV 25MVA	2018-19
2	Najafgarh	2 no 66/11kV 20MVA	2 no 66/11kV 31.5MVA	2019-20
3	Okhla	2 no 66/11kV 20MVA	2 no 66/11kV 31.5MVA	2019-20
4	Sarita Vihar	2 no 66/11kV 20MVA	2 no 66/11kV 31.5MVA	2019-20
5	Pappankalan-I	2 no 66/11kV 20MVA	2 no 66/11kV 31.5MVA	2020-21
6	Mehrauli	2 no 66/11kV 20MVA	2 no 66/11kV 31.5MVA	2021-22

However, it has been noticed that Discoms have started shifting the 11kV loads from 220kV sub-stations of DTL. Gopalpur is one example. All Discoms were requested to indicate the status of the plan of shifting the 11kV loads from the 220kV sub-stations of DTL.

Further the load of 11kV System emanating from 220kV DTL Sub Station at the time of occurrence of Delhi Peak demand (Met) of 7016 MW on 10.07.2018 was reported as under:

Loading of 66/11kV transformer (connected load) at the time of occurrence of maximum demand (i.e.7016MW) in Delhi system on 10.07.2018 at 15.26.58hrs.

S. No.	Name of the Element	MVA rating of Tx MVA	Capacity in Amps (11kV side)	Load on 11kV I/C in Amps	Capacity utilization in %age
	220kV Narela S/S				
1	66/11kV, 20MVA Tx-I	20	1050	294	28.00
2	66/11kV, 20MVA Tx-II	20	1050	270	25.71
	Total	40	2100	564	26.86
	220kV Rohini S/S				
3	66/11kV, 20MVA Tx-I	20	1050	228	21.71
4	66/11kV, 20MVA Tx-II	20	1050	160	15.24
	Total	40	2100	388	18.48
	220kV Gazipur S/S				

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5	66/11kV, 25MVA Tx-I	25	1300	250	19.23
6	66/11kV, 20MVA Tx-II	20	1050	216	20.57
	Total	45	2350	466	19.83
	220kV Wazirabad S/S				
7	66/11kV, 20MVA Tx-III	20	1050	680	64.76
8	66/11kV, 20MVA Tx-IV	20	1050	815	77.62
	Total	40	2100	1495	71.19
	220kV Okhla S/S				
9	66/11kV, 20MVA Tx-I	20	1050	630	60.00
10	66/11kV, 20MVA Tx-II	20	1050	650	61.90
	Total	40	2100	1280	60.95
	220kV Sarita Vihar S/S				
11	66/11kV, 20MVA Tx-I	20	1050	340	32.38
12	66/11kV, 20MVA Tx-II	20	1050	230	21.90
	Total	40	2100	570	27.14
	220kV Mehrauli S/S				
13	66/11kV, 20MVA Tx-I	20	1050	232	22.10
14	66/11kV, 20MVA Tx-II	20	1050	588	56.00
	Total	40	2100	820	39.05
	220kV Vasant Kunj S/S				
15	66/11kV, 20MVA Tx-I	20	1050	300	28.57
16	66/11kV, 20MVA Tx-II	20	1050	370	35.24
	Total	40	2100	670	31.90
	220kV Najafgarh S/S				
17	66/11kV, 20MVA Tx-I	20	1050	380	36.19
18	66/11kV, 20MVA Tx-II	20	1050	530	50.48
19	66/11kV, 20MVA Tx-III	20	1050	386	36.76
	Total	60	3150	1296	41.14
	220kV Kanjhawala S/S				
20	66/11kV, 20MVA Tx-I	20	1050	520	49.52
21	66/11kV, 20MVA Tx-II	20	1050	226	21.52
	Total	40	2100	746	35.52
	220kV Pappankalan-I S/S				
22	66/11kV, 20MVA Tx-I	20	1050	565	53.81
23	66/11kV, 20MVA Tx-II	20	1050	600	57.14
24	66/11kV, 20MVA Tx-III	20	1050	595	56.67
	Total	60	3150	1760	55.87
Total			25450	10055 (170MW)	39.51

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Loading of 33/11kV transformer (connected load) at the time of occurrence of maximum demand (i.e.7016MW) in Delhi system on 10.07.2018 at 15.26.58hrs.

S.No.	Name of the Element	MVA rating of Tx	Capacity in Amps	Load on 11kV I/C	Capacity utilization in %age
		MVA	(11kV side)	in Amps	Hrs
	220kV Gopalpur S/S				
1	33/11kV, 16MVA Tx-I	16	840	ON	Load shifted to Dheerpur Substation of TPDDL.
2	33/11kV, 16MVA Tx-II	16	840	ON	
	Total	32	1680	0	
	220kV Subzi Mandi S/S				
3	33/11kV, 16MVA Tx-I	16	840	540	64.29
4	33/11kV, 16MVA Tx-II	16	840	432	51.43
	Total	32	1680	972	57.86
	220kV Patparganj S/S				
5	33/11kV, 20MVA Tx	20	1050	615	58.57
6	33/11kV, 16MVA Tx	16	840	540	64.29
	Total	36	1890	1155	61.11
	220kV Kashmere Gate S/S				
7	33/11kV, 20MVA Tx	20	1050	510	48.57
8	33/11kV, 16MVA Tx	16	840	480	57.14
	Total	36	1890	990	52.38
	220kV Lodhi Road S/S				
9	33/11kV, 20MVA Tx-I	20	1050	560	53.33
10	33/11kV, 20MVA Tx-II	20	1050	240	22.86
11	33/11kV, 16MVA Tx-III	16	840	600	71.43
12	33/11kV, 16MVA Tx-iV	16	840	600	71.43
	Total	72	3780	2000	52.91
	220kV Naraina S/S				
13	33/11kV, 16MVA Tx-I	16	840	393	46.79
14	33/11kV, 16MVA Tx-II	16	840	477	56.79
	Total	32	1680	870	51.79
	220kV Shalimarbagh S/S				
15	33/11kV, 20MVA Tx	20	1050	625	59.52
16	33/11kV, 16MVA Tx-I	16	840	690	82.14
	Total	36	1890	1315	69.58
Over all Capacity utilization in %age			14490	7302 (120MW)	50.39

BRPL:

BRPL informed that they do not have any immediate plan to shift 11 kV load from the above mentioned 220 kV Sub-stations due to non availability of land and infusion of CAPEX etc, They requested DTL to augment / replace the Transformers as agreed above.

Accordingly, Steering Committee advised DTL to go ahead with the augmentation / replacement of Transformer as agreed in Steering Committee.

BYPL:

BYPL informed that they are facing space crunch for new 33kV & 66kV Grids. Therefore, they are not able to shift the 11KV load from the sub-stations of DTL. BYPL further requested DTL to allocate some land within the DTL grids, if possible, especially at 220kV Patparganj to construct own grid for shifting of the 11kV load. In case of outage of any one of the 33/11kV transformers at 220kV Patparganj, the load shedding is inevitable (at the time of occurrence of Delhi peak demand the total load of 11kV system was 1155A against the capacity of 1050A on 20MVA/840A on 16MVA).

DTL informed that none of the 220kV grid sub-stations has space to accommodate any other system as at some sub-stations DTL is facing severe space constraints for adding bays and expansion as per system requirement. In respect of 220kV Patparganj many 220kV and 66kV elements are even operating with single bus selection mode due to space constraint affecting the reliability of power supply.

With regard to enhancement of capacity of 33/11kV transformers at 220kV Patparganj, it was decided to augment the existing 33/11kV transformers with 33/11kV, 25 MVA transformers to increase the reliability of power supply.

TPDDL:

TPDDL submitted the status as under:

Sl. No.	220kV Substation	Status of shifting of 11kV load by TPDDL
1.	220kV Gopalpur	All 11kV load already shifted to 66/11kV Dheerpur.
2.	220kV Subzi Mandi	Work is in progress for commissioning of 33/11kV Swiss Apartment. Tentative Commissioning date – 31st March 2019.
3.	220kV Kanjhawala	66/11kV Karala Grid already charged on 31 st March 2018 (9 no. of feeders already shifted from Kanjhawala to Karala).

After deliberation Steering Committee concluded that entire shifting of 11kV loads from 220kV DTL grid sub stations is not feasible. The provision of space in DTL grid substation to DISCOMs to shift the 11kV load also appears not practicable considering the space constraints. At present about 300MW load is being evacuated through 11kV System from DTL S/stns. Considering all the aspects Steering Committee advised DTL to augment / replace the out lived transformers as per the recommendations of the transformer committee of DTL and as agreed in SCM.

5. Allocation of additional 2no. 66kV feeders at 220kV Shalimar Bagh

The 4 No. 66kV feeders were provided to TPDDL (2 each for SGTN and PP1 grids by LILO of SGTN-PP1 D/C) at 220kV Shalimar Bagh to provide relief to 66kV Narela – Jahangirpuri circuit-1&2 & 66kV Gopalpur- Dheerpur Ckt-1&2 in Summer'17. At present the 66kV feeders are being fed by 1x100MVA 200/66kV transformer.

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Further, the Steering Committee in its meeting held on 29.06.2017 agreed for providing 1x160 MVA, 220/66kV Transformer along with 4 No. 66kV bays (2 No. 66kV feeders + 1 No. 66kV Incomer + 1 Bus Coupler) to meet n-1 contingency. The additional 2 No. 66kV feeders were agreed to be provided to TPDDL at 220kV Shalimar Bagh for further relief at 66kV level in the area.

TPDDL was requested to provide the feeder connectivity for taking out the 2 no. additional 66kV feeders from 220kV Shalimar Bagh.

TPDDL informed that one of the feeders will be connected to 66 kV RG-3 and the other feeder will be connected to 66 kV Prashant Vihar. These feeders would be laid and envisaged before picking up of summer 2019 peak load. TPDDL further requested to provide at least 260 MVA transformation capacity as agreed in the Steering Committee meeting at Shalimar Bagh.

6. De-capitalization of 66/33kV, 30MVA BHEL make Trf with associated equipments at 220kV Narela

In the 5th Steering Committee meeting of 2016-17 held on 04.01.2017, TPDDL was advised to shift all 33 kV feeders from 220 kV S/stn. Narela. It has been learnt that TPDDL has shifted the 33 kV load from the Narela substation. Therefore, the outlived 66/33kV, 30 MVA Power transformer along with associated equipments is required to be dismantled for further de-capitalization of the same.

The matter was deliberated and it was agreed that the outlived 66/33kV, 30 MVA Power transformer along with associated equipments be de-energized/dismantled and the 66kV bay which will become spare after dismantling of 66/33kV,30 MVA TX, be allocated to TPDDL as agreed earlier in the earlier Steering Committee meeting.

7. Load balancing at various 220kV Grid sub-stations in West Delhi and south Delhi by BRPL

i. PPK-I – PPK-II-PPK-III-Najafgarh-Mundka

During this summer season at times it was found that some of the sub-stations in the western part of Delhi were found overloaded whereas some other remained under loaded. The loadings of the transformers at the time of occurrence of Delhi peak load demand (met) of June 2018 i.e. 6934MW on 08.06.2018 at 15:28 hrs have been as under:

PPK-I			PPK-III			Najafgarh		
Trf	MW	MVAR	Trf	MW	MVAR	Trf	MW	MVAR
220/66kV, 160 MVA-I	134	16	220/66kV, 160 MVA-I	0	0	220/66kV, 100 MVA-I	84	07
220/66kV, 160 MVA-II	120	12	220/66kV, 160 MVA-II	79	14	220/66kV, 100 MVA-II	59	07
220/66kV, 100 MVA-I	81	10				220/66kV, 100 MVA-III	84	07
220/66kV, 100 MVA-II	84	-45				220/66kV, 100 MVA-IV	59	-02
Total	419	-07		79	14	Total	286	19
Capacity (MW) at 0.85pf		442		272			340	

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PPK-II			Mundka		
Trf	MW	MVAR	Trf	MW	MVAR
220/66kV, 160 MVA-I	78	-01	220/66kV, 160 MVA-I	33	-03
220/66kV, 160 MVA-II	81	09	220/66kV, 160 MVA-II	33	-03
220/66kV, 100 MVA-I	47	-01			
220/66kV, 100 MVA-II	51	04			
Total	257	11	Total	66	-06
Capacity (MW) at 0.85pf	442		272		

The 66kV line loadings from the above sub-stations have also been observed as under:

Sl. No.	PPK-I	Loading (in A)
1.	G-6 Ckt-I	ON
2.	G-6 Ckt-II	175
3.	G-2 Ckt-I	550
4.	G-2 Ckt-II	550
5.	Budella-I	420
6.	Budella-II	420
7.	Bindapur-I	500
8.	Bindapur-II	500
9.	Rewari Line	540
10.	DMRC-I	245
11.	DMRC-II	90

Sl. No.	PPK-II	Loading (in A)
1.	G-15 Ckt-I	280
2.	G-15 Ckt-II	280
3.	G-5 Matiala-I	455
4.	G-5 Matiala-II	455
5.	Hastal-I	695
6.	Hastal-II	OFF
7.	DMRC-I	700
8.	DMRC-II	No Load
9.	G-4 Dwarka-I	ON
10.	G-4 Dwarka-II	ON

Sl. No.	Najafgarh	Loading (in A)
1.	G-5 PPK-I	340
2.	G-5 PPK-II	340
3.	Budella-I	325
4.	Budella-II	325
5.	Nangloi	240
6.	Nangloi Water Works	400
7.	Jafarpur-I	400
8.	Jafarpur-II	ON

Sl. No.	Mundka	Loading (in A)
1.	66kV Mundka-I	103
2.	66kV Mundka-II	73
3.	Mangolpuri	334
4.	Ghevra	46
5.	DMRC	ON
6.	Nangloi	OFF since last 2 yrs
7.	Nangloi Water Works	Cable faulty

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8.	Paschim Vihar	Cable not connected
9.	Bay No. 614	Cable not connected
10.	Bay No. 613	Cable not connected
11.	Bay No. 606	Cable not connected
12.	Bay No. 607	Cable not connected
13.	Bay No. 608	Cable not connected
14.	Bay No. 610	Cable not connected

From the above, it has been observed that there is sufficient scope for shifting the load from the sub-stations like 220kV PPK-I and Najafgarh which cross the limit of reliability frequently.

In this context a meeting was held at PPK-III in presence of officers from Power department, GNCTD, DTL and BRPL on 03.07.2018, wherein it was decided that 2 No. 66kV cable links will be established between 220kV PPK-III and 66kV G-2 s/stn through 1000Sq. mm. U/G cable by March 2019 to shift the load from 220kV PPK-I s/stn so that load relief of the order of 80 to 100MW at 220kV PPK-I be provided in next summer season.

Further, BRPL stated that load of 220kV PPK-II and Najafgarh will be balanced once 220kV Budella s/stn of DTL is commissioned. BRPL also requested DTL to expedite the scheme of 220kV Bhartal and 220kV Dwarka Sec-5 so that further load growth of the area can be catered smoothly.

It was intimated that the order has been placed for the establishment of 220/66kV, 320 MVA sub-station at Budella on 28.06.2018. The completion schedule is 18 months. As such, the sub-station would be available only during the summer 2020. BRPL should plan the load balancing with the existing sources till then.

With regard to 220/66kV Bhartal and Dwarka, the scheme would be devised soon which can be expected by summer 2021. The evacuation plan from these sub-stations may accordingly be implemented by BRPL.

Steering committee advised BRPL to make arrangement in their own network to balance the load at 220kV sub-stations of DTL. Steering Committee also advised BRPL to take lead in the matter regarding issue of removal of T-Off portion of Mundka – Mangolpuri -1 – Nangloi circuit in co-ordination with TPDDL and connect direct new 66kV circuit from Mundka up to T-Off point to convert T-Off point in to LILO point at Mundka so that at least 50 to 60 MW load of 66kV Nangloi which runs from 220kV Najafgarh is shifted to 400kV Mundka by next summer.

8. Load balancing at various 220kV Grid sub-stations in North Delhi by TPDDL

i. Rhn-I-Rhn-II-SMB

At the time of occurrence of Delhi peak, the load at Rohini-I was to the tune of 317 MW (against the installed capacity of 400MVA (340 MW at 0.85 p.f.)) whereas that at Rohini-II was 92 MW against the installed capacity of 320MVA (272 MW at 0.85 p.f.).

TPDDL informed that work on 66 kV D/C line from RG-6 to RHN-DC-1 is in progress. After completion of the same approx. 70 MVA load will be shifted to 220 kV Rohini-2 to offload 220 kV Rohini-1 (after shifting part of current load to 220 kV Narela till 220 kV SGTN is not commissioned). The tentative commissioning date is 31st August 2018.

TPDDL further informed that the work on 66 kV D/C line from RG-34 to Bawana-6 is in progress with approximately 70% of the cable being laid. Work is currently held up due to RoW issues with DSIIIC which are expected to be resolved soon. With completion of this

scheme, approximately 55 MVA load will be shifted from 400 kV Bawana to 220 kV Rohini-2, thus bringing the loading on 220 kV Rohini-2 to over 140 MVA.

Steering Committee advised TPDDL to complete the above works as soon as possible to provide the said relief.

9. Reactive Power Compensation by DMRC

DMRC was advised to provide the status of the planned reactive power compensation in their system to avoid heavy reactive power injection during low load period.

DMRC submitted that they have already prepared the scheme and planned a meeting with O&M Department of DTL about installation of summation CT at the sub-stations of DTL connected with their RSS to implement the scheme at the respective points.

Subsequently, on 13.07.2018 a presentation of Reactive Power Management scheme devised by DMRC was arranged under the chairmanship of Dir(Opr) of DTL where in the representatives of DISCOMS and O&M department of DTL were also present. It was decided that DMRC may go ahead with reactive power management scheme. However, the need of summation CT was not found necessary for implementation of the scheme. The copy of presentation of the scheme is enclosed as Annexure-II.

10. Establishment of new 33kV GIS grid at A-43 Mayapuri by BRPL

Head (Administration), BRPL vide letter dated 22.05.2018 intimated DTL that BRPL is intending to establish a 33kV GIS at A-43 Mayapuri by augmenting the existing 11 kV sub-station from the ground floor of the building. They requested DTL to vacate the rooms occupied by DTL in the building.

A joint site visit in this regard was conducted on 18.06.2018 wherein the following discussions were held:

- i. DTL requested to provide one complete floor in the upcoming building for DTL staff & stock/store.
- ii. 02 No. of Stores & 02 no. of rooms are fully occupied with HTLS material/line material.
- iii. DTL requested to BRPL to put up the case in the up-coming Steering Committee for further course of action in the matter.

BRPL was advised to provide the details along with Steering Committee approval for augmentation of 11kV sub-station at A-43 Mayapuri to the 33kV sub-station.

BRPL informed that the issue was discussed in the Steering Committee held on 15.02.2010 wherein 02 no. 33kV bays from 220kV S/stn. Naraina were allocated to Mayapuri.

However, it was revealed from the proceedings of Steering Committee held on 11.02.2010 wherein BRPL requested 02 bays from Naraina 220kV Sub Station for A-43 Mayapuri Sub Station. In that meeting DTL informed that 05 number additional bays are under construction out of which 02 bays are already allocated to BRPL. The substation records of Naraina reveal that the 05 bays are commissioned as follow:

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S.No	33kV Feeder Name	Energisation Date
1	Inderpuri-II (TPDDL)	09.02.2011
2	Shekhawati-II (MES)	09.12.2013
3	Pandav Nagar (TPDDL)	31.03.2015
4	Mayapuri-I (BRPL)	03.08.2016
5	Mayapuri-II (BRPL)	19.06.2016

BRPL informed that A-43 Mayapuri was not ready hence the feeders for which the bays were allocated at Nariana 220kV S/stn were taken to old Mayapuri. The present requirement is for Augmentation of existing 11kV grid at A-43 Mayapuri to provide reliability and meet the load requirement of the areas.

BRPL informed that the establishment of substation has already been approved by DERC. Accordingly, BRPL has taken up the execution work. It is an existing 11 kV substation which is to be upgraded to 33/11 kV Grid substation. The 11 kV system will first be shifted to the corner of the plot and the existing building would be demolished so that necessary space can be created to construct new building for 33 kV grid substation.

BRPL further informed that tender for A-43 Mayapuri grid is at advance stage and is critical considering Summer 2019.

Steering Committee took a note of this case and agreed for the establishment of 33/11 kV, A-43 Mayapuri Grid substation. As no additional feeder bays can be provided from 220kV S/stn Nariana the in feed of substation be managed with the existing network of BRPL. However, DTL is planning to establish 220/33kV Punjabi Bagh grid substation for which DDA is being vigorously persuaded to provide the suitable space. After the commissioning of the Punjabi Bagh Sub-station, if BRPL requires, the additional feed can be provided to 33kV Mayapuri A-43 grid from 220kV Punjabi Bagh.

However in the matter of vacating the office/ store space, at A-43 Mayapuri, BRPL informed that the entire space will be required for the 33kV grid s/stn. The land is congested and hence capacitor bank has been planned on the rooftop of the building. As such the BRPL requested DTL to vacate the already occupied space so that the augmentation of the s/stn. could be carried out to ensure the reliability of power supply.

With regard to request of DTL to provide the space, BRPL assured that they would take up with their management for exploring alternate suitable space and accordingly provide the same to accommodate the existing establishments of DTL present at A-43 Mayapuri.

11. Evacuation of Power from 220/33kV GIS Rajghat

At present the Rajghat Station is having following configuration:

A. 220kV Side

- i. 220kV IP Ckt. No.1 and 220kV/33kV, 100MVA Transformer No.1 controlled through the same breaker.
- ii. 220kV IP Ckt. No.2 and 220kV/33kV, 100MVA Transformer No.2 controlled through the same breaker.

B. 33kV side

Bay No.	Nomenclature	Remarks
1	Motia Khan Ckt.	
2	Lahori Gate Ckt.	
3	Generator Transformer(11/33kV)85MVA No.2	Not in use
4	10MVAR Capacitor bank No.2	Not in operation since handing over
5	Jama Masjid Ckt. No.1	
6	Jama Masjid Ckt. No.2	
7	7.5MVA 33/6.6kV Station transformer No.2	
8	33kV Incomer of 220/33kV, 100MVA ICT No.1	
9	33kV Bus coupler	
10	Generator Transformer(11/33kV)85MVA No.1	Not in use
11	Rajghat B Generating Station	Dead
12	IG Stadium Ckt.	
13	G B Pant Ckt.	
14	7.5MVA 33/6.6kV Station transformer No.1	
15	10MVAR capacitor bank No.1	Not in operation since handing over
16	Fountain Ckt.	
17	Minto Road Ckt.	
18	Town Hall Ckt.	
19	Kamla Mkt. Ckt.	
20	DDU Marg	
21	Bus PT	
22	33kV Incomer of 220/33kV, 100MVA ICT No.2	

In the year 2014, 2000MVA, 400kV ISTS was planned at Rajghat. The 220/33kV sub-station at Rajghat was also conceived and was envisaged to be executed through Powergrid as a deposit work of DTL. Due to RoW issues the 400kV ISTS could not be established at Rajghat.

However, the 220/33kV Rajghat is now planned to be established as a GIS Substation by DTL. The scheme has already been prepared and is under financial scrutiny.

The scope of the scheme of 220/33kV GIS Rajghat is as follows:

- 10 no. 220KV bays
 - 3 Nos. 100 MVA Transformers
 - 4 No. feeder bays
 - 1 No. bus coupler
 - 1 No. 220 kV bay for 50MVAR Bus Reactor
 - 1 No. spare bay for future 100 MVA Trf.
 - Provision of space for 5 no. future bays in the building for the future Transformer and feeder bays.
- and 24 no. 33KV bays
 - 3 No. I/C from Transformers
 - 14 No. feeder bays
 - 2 No. capacitor bank bays
 - 2 No. bus section bays
 - 2 No. bus coupler bays
 - 1 No. spare I/C bay for future Trf.
 - Provision of space for 4 no. future bays in the building for future 33kV outlets
- With 3x100 MVA new Power Transformers, 1 no. 220 kV 50MVAR Bus Reactor & 2 No. 33 kV, 10 MVAR capacitor bank

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In the Steering Committee meeting held on 10.03.2016, BYPL requested for 2 No. additional 33kV bays from the existing Rajghat sub-station to provide second infeed to 33kV Grid substations Delhi Gate and G.B. Pant. BYPL had projected their requirement for Delhi Gate immediately and G. B. Pant within 2 years in the said meeting.

In view of the above, Steering Committee in its meeting held on 06.05.2016 had decided to allocate the existing capacitor bays which were not in service to provide additional feed to 33kV Grid Delhi Gate and G.B. Pant. BYPL was requested to update the status.

BYPL informed that the above said 33kV bays have not yet been utilized by them to provide additional feed to 33kV Grid Delhi Gate and G.B. Pant, however, they will utilize the same in future. BYPL further requested DTL to provide total 14 feeders (11 in Service + 2No. approved in SCM for Delhi Gate & G.B. Pant + 1No. future) from 220/33kV GIS Rajghat.

Accordingly, the evacuation plan from 220/33kV GIS Rajghat was finalized as below:

Sl. No.	Nomenclature	Remarks
1.	Motia Khan Ckt.	Existing feeders
2.	Lahori Gate Ckt.	
3.	Jama Masjid Ckt. No.1	
4.	Jama Masjid Ckt. No.2	
5.	IG Stadium Ckt.	
6.	G B Pant Ckt.	
7.	Fountain Ckt.	
8.	Minto Road Ckt.	
9.	Town Hall Ckt.	
10.	Kamla Mkt. Ckt.	
11.	DDU Marg	
12.	Delhi Gate	New feeders
13.	G.B. Pant	
14.	Future	

Steering Committee advised DTL to go ahead with the scheme of 220kV GIS at Rajghat with above evacuation plan.

12. Evacuation plan for establishment of 220/66kV Substation at Dwarka Sector-5

The evacuation plan for 400kV, 2000MVA ISTS at Dwarka has been envisaged as under:-

Sl. No.	Elements	Remarks
1	160MVA , 220/66kV Trf.No.1	Being implemented by DTL.
2	160MVA , 220/66kV Trf.No.2	Expected by 2021-22.
3	160MVA , 220/66kV Trf.No.3	Future.
4	160MVA , 220/66kV Trf.No.4	
5	220kV Dwarka-Papankalan- III, Ckt.1	Loop- in- Loop -out of 220kV Papankalan-III – Naraina & Papankalan-I line passing near the plot of 400kV Dwarka S/Stn. Being undertaken by Powergrid as a deposit work of DTL. Expected along with charging of 400kV ISTS.
6	220kV Dwarka-Papankalan- III, Ckt.2	
7	220kV Dwarka-Papankalan- I, Ckt.	
8	220kV Dwarka-Naraina, Ckt.	
9	220kV Dwarka-Budella 1200 sq.mm U/G Ckt.1	Being undertaken by DTL. Work awarded.
10	220kV Dwarka-Budella 1200 sq.mm U/G Ckt.2	Expected by 2019-20.
11	220kV Dwarka-PPK-I 2000 sq.mm U/G cable Ckt.1	Being implemented by DTL. Scheme under preparation. Expected by 2021-22.
12	220kV Dwarka-PPK-I 2000 sq.mm U/G cable Ckt.2	
13	220kV Dwarka-PPK-II 2000 sq.mm U/G cable Ckt.1	Being implemented by DTL. Scheme under preparation. Expected by 2021-22.
14	220kV Dwarka-PPK-II 2000 sq.mm U/G cable Ckt.2	
15	Future Feeder 1	
16	Future Feeder 2	

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BRPL was requested to indicate the evacuation plan for 220/66kV (2x160MVA) substation and to indicate the requirement of the substation as minimum two years are required to establish the 220kV GIS.

BRPL submitted that being in the centre of BRPL load, they had also made a request in their agenda also to create 66kV level within the 400kV substation at Dwarka sector-5 so that BRPL could plan necessary power evacuation to their 66 kV grids.

BRPL further submitted that this will not only help them to establish new 66kV substations but also in relieving the existing grids thus resulting into improving the loading condition of 220kV PPK-1 and PPK-II.

BRPL submitted the following Power evacuation plan from the proposed 220/66kV substation at Dwarka Sector-5:

Sl. No.	Name of 66kV feeder from 220/66kV Dwarka Sector-5	Alternate source of Supply	Timeline
1.	Manglapuri circuit-1	New grid	March 2020
2.	Manglapuri circuit-2		March 2020
3.	G-2 circuit-1	Already connected with 220kV PPK-I. Alternate source is proposed from 220kV PPK-3 by March 2019.	Immediate
4.	G-2 circuit-2		Do
5.	Matiyala circuit-1	Already connected with 220kV PPK-II. Alternate source is 220kV Najafgarh.	Do
6.	Matiyala circuit-2		Do
7.	Pankha Road circuit-1	Already connected with 220kV Najafgarh through Matiyala. Alternate source is PPK-I.	Do
8.	Pankha Road circuit-2		Do
9.	Future circuit -1	Future	
10.	Future circuit -2		
11.	Future circuit -3		
12.	Future circuit -4		

The above evacuation plan was agreed by the steering Committee along with the following scope of the 220/66kV Substation at Dwarka Sector-5:

- 20 No. 66kV bays
 - 3 No. I/C from 220/66kV Transformers
 - 1 No. Spare I/C bay for future 220/66kV Transformer
 - 12 No. Feeder Bays
 - 2 No. Bus Sectionalizer Bays
 - 2 No. Bus Coupler bays
- With 3x160 MVA, 220/66kV Power Transformers

Accordingly, DTL was advised to devise and implement the scheme immediately.

D. BRPL Issues

1. Status of 220 kV Budella Grid Substation

BRPL submitted that the Budella 220 kV Grid Substation is very crucial for west Delhi. Presently, the load dependability of the Vikaspuri, Janakpuri, Tilak Nagar, Paschim Vihar, Saiyyad Nangloi and other adjoining area is on two circuits from 220 kV Najafgarh to Budella -2 and one circuit from 220 kV Pappankalan-1 to Budella-1. The load growth in these areas is very high and another 220 kV Grid at the load center (Budella) is required immediately.

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BRPL requested Steering Committee to update the status and inform about the completion time line.

DTL informed that the tender for the scheme for 220/66kV Sub-station Budella has been awarded in June 2018 and the tentative commissioning of the sub-station is by December 2019.

Regarding Power evacuation plan of the proposed 220kV substation Budella, it was informed that the same has already been approved in the Steering Committee held on 04.04.2017 as under:

Sl. No.	Name of Feeder	Remarks	Timeline Submitted by BRPL in this meeting
1	PaschimVihar circuit -1	LILO of Paschim Vihar and Budella-2 double circuit	Nov 2019
2	PaschimVihar circuit -2		Nov 2019
3	Budella-2 circuit -1		Nov 2019
4	Budella-2 circuit -2		Nov 2019
5	PaschimVihar circuit -3	LILO of Paschim Vihar and Budella-1 double circuit	Nov 2019
6	PaschimVihar circuit -4		Nov 2019
7	Budella-1 circuit -1		Nov 2019
8	Budella-1 circuit -2		Nov 2019
9	DMRC circuit -1	For 4 th Phase Metro	
10	DMRC circuit -2		

BRPL requested 2 additional 66 kV Bays from the substation to connect 66kV Nangloi and Nilothi grid substations by LILO of 66 kV Nangloi-Nilothi S/C at 220 kV Budella to have 66 kV Mundka-Nangloi-Nilothi- Budella ring.

It was pointed out that in a 220 kV substation more than 10 No. 66 kV feeders are not advisable considering the limitation of 500 MVA for a 220 kV Substation. However, it was advised to install additional 3rd 160 MVA power transformers to meet the n-1 reliability criteria.

Further, BRPL was advised to explore the possibility to establish a link between 66 kV Paschim Vihar and Nangloi to ensure power evacuation from Mundka.

2. Requirement of 66kV level at 400/220kV Dwarka Sector-5

BRPL submitted that as per network enhancement plan by DTL a 400/220 kV grid is coming at Madhu Vihar, Sector-5 Dwarka. Being in the centre of BRPL Load, it is requested to create 66kV level within the said substation for BRPL to plan necessary power evacuation to its 66 kV grids. This will not only help BRPL to establish new substations but also to relieve the existing grids thus resulting into improving the loading condition of 220kV PPK-I and PPK-II.

BRPL requested to Steering committee to consider the 66kV voltage level creation at proposed 400kV substation at Dwarka sector-5.

The matter has already been covered in detail at item No. C.12 above.

3. Status of Augmentation of 2x20 MVA Trf. in to 2x31.5 MVA at 220kV Najafgarh. Scope of additional 11kV panels in the substation.

BRPL submitted that as per the decisions of earlier SCMs it was proposed to augment the 2x20 MVA Trf. in to 2x31.5 MVA at 220kV Najafgarh in the year 2019-2020.

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It was further informed that all the existing 66/11kV PTRs in 220kV Najafgarh are running fully loaded, hence augmentation of existing transformers is utmost necessary to run the supply in Najafgarh and Vikaspuri area.

BRPL requested Steering Committee to update the status.

DTL informed that the scheme for augmentation of 2x20 MVA Trf. in to 2x31.5 MVA at 220kV Najafgarh is under preparation. It may also be noted that at the time occurrence of Delhi peak demand (met) of 7016 MW on 10.07.2018 at 15:26 Hrs the total load of 11kV System at Najafgarh was 1296 Amp against the capacity 3150 Amp (only 41%).

Further, the issue regarding addition of new 11kV panels was deliberated in the Steering Committee and DTL stressed that no new 11kV feeder shall be provided to the DISCOMs from 220kV grids of DTL. DTL informed that as per transfer scheme and DERC stipulations DTL has to only maintain the existing 11kV system. As such the Steering Committee was of the view that no new 11kV feeders be added at 220kV Najafgarh. However, Steering Committee advised DTL to augment the Tx. as agreed in previous SCMs.

4. Requirement of 2 No. 66kV bays at 220kV Pappankalan-II for upcoming 66/11kV G-1 (Sec-14, Dwarka) Grid Sub-station

BRPL requested Steering Committee to update the status of providing of additional bays at Pappankalan-II.

DTL informed that the matter had already been deliberated in the last Steering Committee meeting held on 04.04.2018 wherein BRPL agreed to explore the possibility of making LILO arrangement of any of the 66kV double circuits between 220/66kV PPK-II and 66kV G-4 grid or 220/66kV PPK-III and 66kV G-4 grid for providing infeed to 66kV G-1 grid due to non feasibility of addition of two 66kV bays at 220kV Pappankalan-II S/Stn.

In view of the above, BRPL was requested to explore the possibility of making the above said LILO arrangement for providing infeed to 66kV G-1 grid due to non feasibility of addition of two 66kV bays at 220kV Pappankalan-II S/Stn.

5. Requirement of 2 no. 33kV bays at 220kV Naraina for 33/11kV Vishal Substation

BRPL informed that the infeed supply of 33/11kV Vishal Substation is dependent on Peera Garhi (one circuit) and other from TPDDL substations like Rewari line and Rohtak Road. Due to insufficient margin in TPDDL grids during summer peak seasons it is difficult to feed Vishal substation in case supply from 220kV Peera Garhi fails which has happened number of times in the past.

BRPL requested Steering Committee to allocate 2 no. bays at 220kV Naraina for making connection up to Rewari line so that two no. 33 kV circuits can directly be fed from 220kV Naraina to Vishal.

The matter was discussed and DTL informed that there is space constraint at 220/33kV Naraina sub-station and no new 33kV feeders can be provided from the 220kV sub-station Naraina for providing infeed to the 33kV Grid Vishal. It was also explained that at 220 kV Naraina, 33 kV bus is not continuous and has earlier been extended through cables to accommodate 05 number additional bays.

However, the alternate 33kV infeed to the 33/11kV Vishal Substation will be provided from the proposed 220/33kV Punjabi Bagh sub-station. BRPL was advised to manage with the existing system till 220/33kV Punjabi Bagh Substation is established.

6. Status of 220/66kV kV substation at Bhartal

BRPL submitted that keeping in view the high load growth in Dwarka, it is necessary to set up new substations by BRPL in nearby areas. Bhartal Grid Substation is required for Power evacuation at DMICDC, G-14 and IOC Bijwasan grids. As the 66kV bays are already full in 220kV PPK-3, a new 220kV grid substation is urgently required to feed BRPL new substations. BRPL requested Steering Committee to update the status.

DTL informed that the power evacuation plan of proposed 220/66kV Bhartal (Dwarka Sector-26) substation was approved in the Steering Committee meeting held on 30.10.2017 as under:

S. No.	Name of proposed Feeder	Status	Load (MW)	Time Line	Remarks
1.	DMICDC circuit-1	Proposed	25	2018-19	Customer Bulk Supply
2.	DMICDC circuit-2	Proposed	25	2018-19	
3.	G-14/G-10 circuit-1	Proposed	15	2019-20	New Grid
4.	G-14/G-10 circuit-2	Proposed	15	2019-20	
5.	IOC Bijwasan ckt-1	Existing	30	Immediate	
6.	IOC Bijwasan ckt-2	Existing	30	Immediate	
7.	Bhartal circuit-1	Proposed	15	2020-21	New Grid
8.	Bhartal circuit-2	Proposed	15	2020-21	New Grid
9	Future Ckt-1				These circuits will be used to provide feed to the Mehrauli Road, Gurugram substation of HVPNL.
10	Future Ckt-II				
	TOTAL		170		

It was further informed that the commissioning schedule of 220kV sub-station Bhartal as per Business Plan of DTL is in 2020-21.

After deliberations, the Steering Committee advised DTL to implement the 220/66kV GIS substation at Bhartal with the following configuration:

➤ **12 No. 220KV GIS bays**

- 3 No. 160 MVA, 220/66kV Transformers
- 6 No. Feeder Bays
- 1 No. Bus Coupler
- 2 No. 25 MVAR Reactors
- Provision of space for 5 no. future bays in the building for the future Transformer and feeder bays.

➤ **14 No. 66kV bays**

- 3 No. I/C from Transformers
- 10 No. Feeder Bays
- 1 No. Bus coupler bay
- Provision of space for 4 no. future bays in the building for the future Incomers and feeder bays.

➤ With 3x160 MVA, 220/66kV Power Transformers and 2x25MVAR, 220kV Reactors.

Further, it was advised to explore the feasibility of providing infeed to 220kV S/stn Bhartal from 400kV S/stn Bamanuli through 2000 sq. mm. U/G cable.

Accordingly, DTL was advised to devise and implement the scheme at the earliest.

7. Status of 220kV grid at Maidangarhi

BRPL submitted that keeping in view the high load growth in areas like Chhattarpur, Maidangarhi, Aya nagar, Jaunapur, Fatehpur beri, it is necessary to set up the new substations by BRPL in this area.

There is only one DTL substation available to feed the large area which is 220kV Mehrauli. The new DTL substation in the area will not only help in catering the new load in the area but also will fulfill the contingency requirement.

Power evacuation plan from the grid has also been provided by BRPL as under:

S.no.	BRPL 66kV Out Lets	Timeline
1	Fatehpur beri circuit-1	Existing S/stn. only radial from Mehrauli
2	Fatehpur beri circuit-2	
3	Aya Nagar circuit-1	To be established
4	Aya Nagar circuit-2	
5	C-Dot circuit-1	Existing S/stn. only radial from Mehrauli
6	C-Dot circuit-2	
7	PWD Skill centre circuit-1	To be established
8	PWD Skill centre circuit-2	
9	Future circuit -1	
10	Future circuit -2	

BRPL requested to set up new 220kV sub-station in the area.

The matter was deliberated in the Steering Committee and it was advised to BRPL that in the South Zone, DTL has installed capacity of 3580MVA and loading at the time of Delhi peak load of 7016 MW was 1672MW only. Thus, BRPL is requested to manage their distribution system in such a way to utilize this transformation capacity. However, the possibility will be explored in the next business plan for establishment of new 220kV sub-station, if required.

8. Status of 220kV grid at Nehru place

BRPL submitted that due to high industrial and commercial load growth in Okhla and Nehru place areas BRPL needs to set up new grid substations. Mainly this area has 33kV substations and the load is being catered by 220kV Okhla which is saturated and new source from 220kV Okhla may not be feasible. It is also not in the load centre of the load growth areas.

A new load of 45 MVA is proposed by CPWD for residential flats project in Srinivaspuri.

Power evacuation plan from the grid has also been provided by BRPL as under:

Sl. No.	BRPL S/Stn (33kV Outlets)
1	Nehru Place circuit-1
2	VSNL
3	Nehru Place circuit-2
4	East of Kailash
5	Balaji
6	Okhla ph-3 circuit-1
7	Okhla ph-3 circuit-2
8	Srinivaspuri - circuit-1
9	Srinivaspuri - circuit-2
10	Srinivaspuri - circuit-3

BRPL requested to update the status.

DTL informed that the land acquiring for establishment of 220kV Sub Station Nehru Place is under process. Once the land is finalized the scheme for the sub-station shall be prepared. As such the Sub Station might be available only by FY 2021-22.

9. Status of 220kV grid at Maharani Bagh

BRPL requested to implement the 220/33kV level as decided in the previous meetings as its importance has already been explained several times and requested Steering Committee to update the status.

The matter has already been covered in detail at item No. B.1.

10. Establishment of 66/11kV grid at Mitraon

BRPL informed that the areas in Division Jaffarpur are presently being fed from the Jaffarpur grid the peak load of which is around 70% of its installed capacity.

1. The load growth in the area is high with approx. 10% per annum.
2. Peak Load of only grid available in vicinity i.e. Jaffarpur grid in Jun-2018 has been around 70% of installed capacity.

As such there is no scope to lay any new feeder from the existing Grid Sub-station due to shortage of capacity; the load growth of the area cannot be met with the existing infrastructure. After 3 years the loading of grid may reach 92% and N-1 loading at 120%.

3. The length of the 11 KV feeders in this area is more than 7-8 Kms.

Total 6 no. 11 KV feeders are feeding the nearby Mitraon area from 66kV Jaffarpur grid sub station:

Sr. No.	Grid	Scada Feeder Name	Peak Loading during year 2017 (in A)
1	Jaffarpur	11 kV New CRPF	228
2	Jaffarpur	11 kV Old CRPF	250
3	Jaffarpur	11 kV Rail Master	100
4	Jaffarpur	11 kV Najafgarh Thana	185
5	Jaffarpur	11 kV Naveen place	200
6	Jaffarpur	11 kV Mitraon	199
Total (Amp.)			1162
Total (MVA)			22

As such establishment of new Grid Sub-station shall not only relieve the existing overloaded grids in vicinity but also curtail the existing 11 kV feeders lengths upto 3-4 KMs. With a proper ring formation in 11 kV feeders from the new S/Stn, it shall result into high reliability & technical loss reduction at the same time.

Infeed Arrangement: 4 No. in-feed arrangements by LILO of 220 kV Najafgarh – Jaffarpur grid.

It shall be difficult to feed two S/Stns with existing Goat conductor circuit in case of failure of one feeder from 220 kV Najafgarh. Therefore to address network exigency, BRPL is proposing replacement of Goat conductor into Double ampacity HTLS conductor. But only replacing conductor shall not suffice the requirement till DTL bay allow double capacity (1200 A) on one circuit.

Steering Committee is requested to confirm the feasibility & timelines for the same.

BRPL further explained that the space allotted to them to develop Mitraon s/stn. is partially submerged in water. At present, the available land is only suitable to install 1x25 MVA transformer to feed the area as such the transformer is proposed to be fed from temporary T arrangement from 66 kV Najafgarh-Jaffarpur D/C. The regular s/stn. would be established at Mitraon after recovery of entire land from the water. After that both the ckts. would be LILO at Mitraon.

It was explained that at present both 66 kV Jaffarpur ckts. are on same bus 66kV at Najafgarh. Due to severe space constraints at Najafgarh there is no possibility of providing bus selection in the existing configuration.

In view of above, BRPL was advised to defer the proposal of HTLS re-conductoring till establishment of 220 kV S/stn. Budella and 66 kV S/stn. Nilothi. After which the loading at 220kV Najafgarh shall be relieved for necessary modifications (i.e conversion of 66kV AIS to GIS) to provide double bus selection for 66 kV Jaffarpur Ckts.

DTL was also advised to explore the possibility of conversion 66kV AIS to GIS at Najafgarh and if feasible convert the same to GIS as the substation is more than 43 years old.

11. Establishment of 33/11kV grid at Okhla Ph-3

BRPL informed the following:

- Presently Okhla Phase – 3 area of Nehru Place Division is fed from 33/11kV East of Kailash Grid Substation.
- Feeder lengths from East of Kailash to load center are approx. 2 Km. and feeders are loaded to the extent of 240 A.
- There are some upcoming Bulk Commercial Load in Okhla Phase – 3 area.
- East of Kailash Grid Substation is loaded upto 65% of installed capacity. There is no space for addition of Power Transformer at East of Kailash Grid Substation.
- Another grid in vicinity is 33 KV Nehru Place which is also loaded to the tune of 75% of installed capacity.
- As per current load growth rate after 3 years EOK grid substation shall be loaded to 85% & Nehru Place 95%.
- To relieve East of Kailash grid Substation and to cater new upcoming load, a 33/11 kV Grid Substation at Okhla Phase – 3 has been proposed.
- The new grid substation will relieve East of Kailash & Nehru Place grid substations upto the extent of 30%.

DTL informed that there is no spare bay available at 220kV S/stn Okhla. Further, conversion of 33kV AIS into GIS is in process after which allocation will be considered if feasible. Steering Committee advised that BRPL may go ahead with the 33/11kV Okhla Ph 3 Grid construction but the bay shall only be available after 33kV AIS to GIS conversion at 220kV Okhla. Till then BRPL was advised to manage with their existing network.

12. Establishment of 66/11kV grid at G-10 Dwarka

BRPL submitted that Dwarka areas have observed a rapid growth of load in recent years due to new construction. As a utility we keep on releasing new load on existing grid substations. Due to the same, grids are overloaded & a large quantum of load commitment on these grids has been built up, and in coming years it will not be feasible to cater the entire load.

It shall also impact network health in an adverse manner.

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DDA has already allocated the space for grid substation for this area at Sec-23B which is named as G-10, Dwarka.

1. **High load growth:** The load growth in the area is high with approx. 10% annual load growth.
2. Fully loaded grid substations:
Station Peak Load of vicinity area of Sec-23B during Summer-2017 in Dwarka area is tabulated hereunder:

Sl. No.	Grid Name	Capacity in MVA	Loading in MVA	% load	Grid loading 2017	N-1 Grid loading 2017	Grid loading after 3 years
1	G-6, Dwarka	20	9.2	46%	75%	109%	100%
		20	16.7	83%			
		25	19.7	79%			
		25	22.3	89%			
2	G-4, Dwarka	25	16.4	65%	71%	141%	94%
		25	19.0	76%			

The above details suggest that all the power transformers of above grid substation area is loaded up to 75 % of their capacity. As such there is no scope to lay any new feeder from the existing Grid Sub-station due to shortage of capacity; the load growth of the area cannot be met with the existing infrastructure.

Even today none of the above grid is N-1 contingent.

3. Proposed load on new grid substation:-

Sl. No.	Name of the Feeder / Consumer	Name of the Grid	Division	New Feeder from G-10	Appx Load in Amp
1	SPG, Sec-21	New Load	PLM	Feeder No 1	110
2	SPG, Sec-21	New Load	PLM	Feeder No 2	110
3	SPG, Sec-21	New Load	PLM	Feeder No 3	110
4	SPG, Sec-21	New Load	PLM	Feeder No 4	110
5	SPG, Sec-21	New Load	PLM	Feeder No 5	110
6	SPG, Sec-21	New Load	PLM	Feeder No 6	110
7	Simplex Sec- 19	New Load	PLM	Feeder No 7	115
8	Simplex Sec- 19	New Load	PLM	Feeder No 8	115
9	Simplex Sec- 19	New Load	PLM	Feeder No 9	115
10	Simplex Sec- 19	New Load	PLM	Feeder No 10	115
11	Simplex Sec- 19	New Load	PLM	Feeder No 11	115
12	Simplex Sec- 19	New Load	PLM	Feeder No 12	115
13	Simplex Sec- 19	New Load	PLM	Feeder No 13	115
14	Sec-23 B, EWS Flats	New Load	NJF	Feeder No 14	70
15	Pochanpur	G-6	NJF	Feeder No 15	200
16	810 DDA Flat	G-6	NJF	Feeder No 16	100
17	Manish Plaza	G 4	PLM	Feeder No 17	100
18	Command Tank	G-6	PLM	Feeder No 18	100
19	EPFO	G-6	PLM	Feeder No 19	150
20	Sec-23 Police Station	G-6	PLM	Feeder No 20	150
21	Sec 23 DDA Flat	G-6	PLM	Feeder No 21	150
Proposed load in A					2485
Proposed load in MVA					47.34

Infeed Arrangement: 4 No. double circuit in-feed arrangements from 220 KV PPK-3 grid.

DTL informed that there are no spare 66kV Bays at 220kV S/stn PPK-III. However, the infeed will be provided from proposed 220kV S/stn Bhartal. Till then BRPL needs to manage with the existing network.

13. Establishment of 66/11kV grid at Goyla Khurd

BRPL submitted that the Najafgarh area Division is being fed by following grids:

- 220 KV Najafgarh (3x20 MVA) – Peak load- 80%
- DJB Najafgarh (3x25 MVA) – Peak load- 81%
- G-4, Dwarka (2x25 + 1X20 MVA) – Peak load- 60%
- G-15, Dwarka (2x20 + 1x25) MVA – Peak load- 68%

Average loading of grids – More than 70%. None of the above grid is N-1 compliant causing great risk in restoring power in the Najafgarh area.

The above details suggest that all the above grid substations are loaded upto 70 - 80 % of their capacity. As such there is no scope to lay any new feeder from the existing Grid Sub-station due to shortage of capacity, the load growth of the area cannot be met with the existing infrastructure.

Even today the above grid is not complying N-1 contingency.

Infeed Arrangement: 2 Nos. double circuit in-feed arrangements from 220 KV PPK-3 grid.

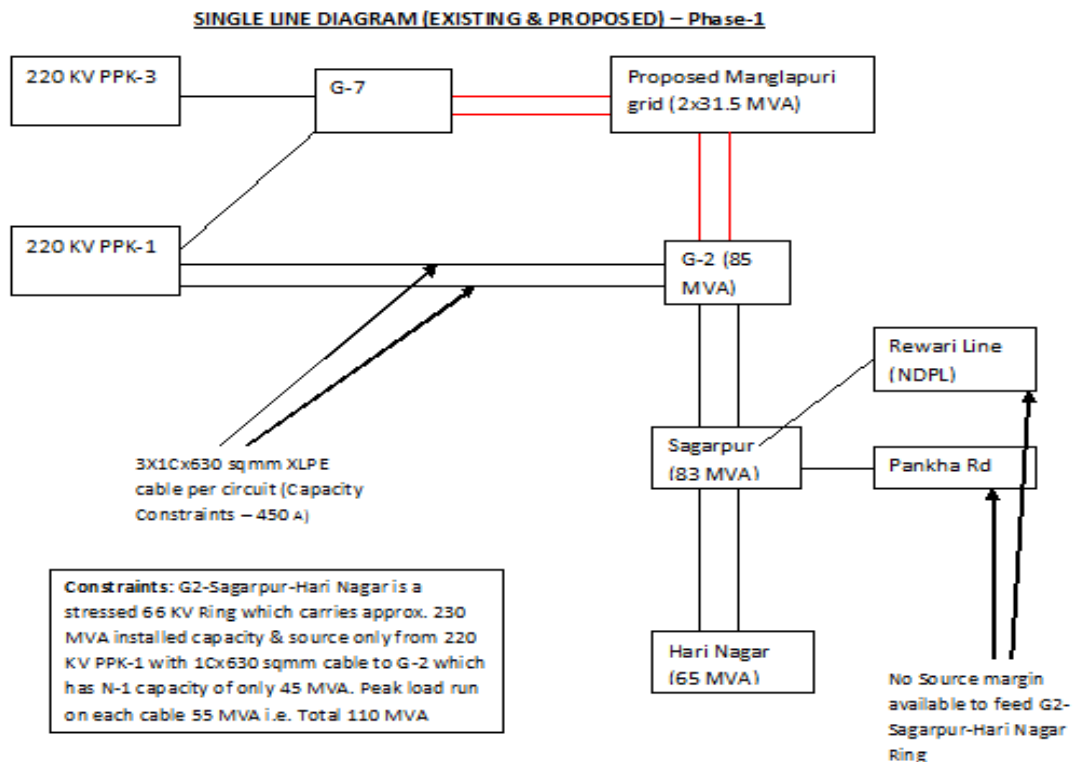
DTL informed that there are no spare 66kV Bays at 220kV S/stn PPK-III. Further, BRPL was advised to make LILO of 66kV D/C between 220kV PPK-III & 66kV G-4 grids to provide infeed to 66/11kV Grid at Goyla Khurd.

14. Establishment of 66/11kV grid at Manglapuri

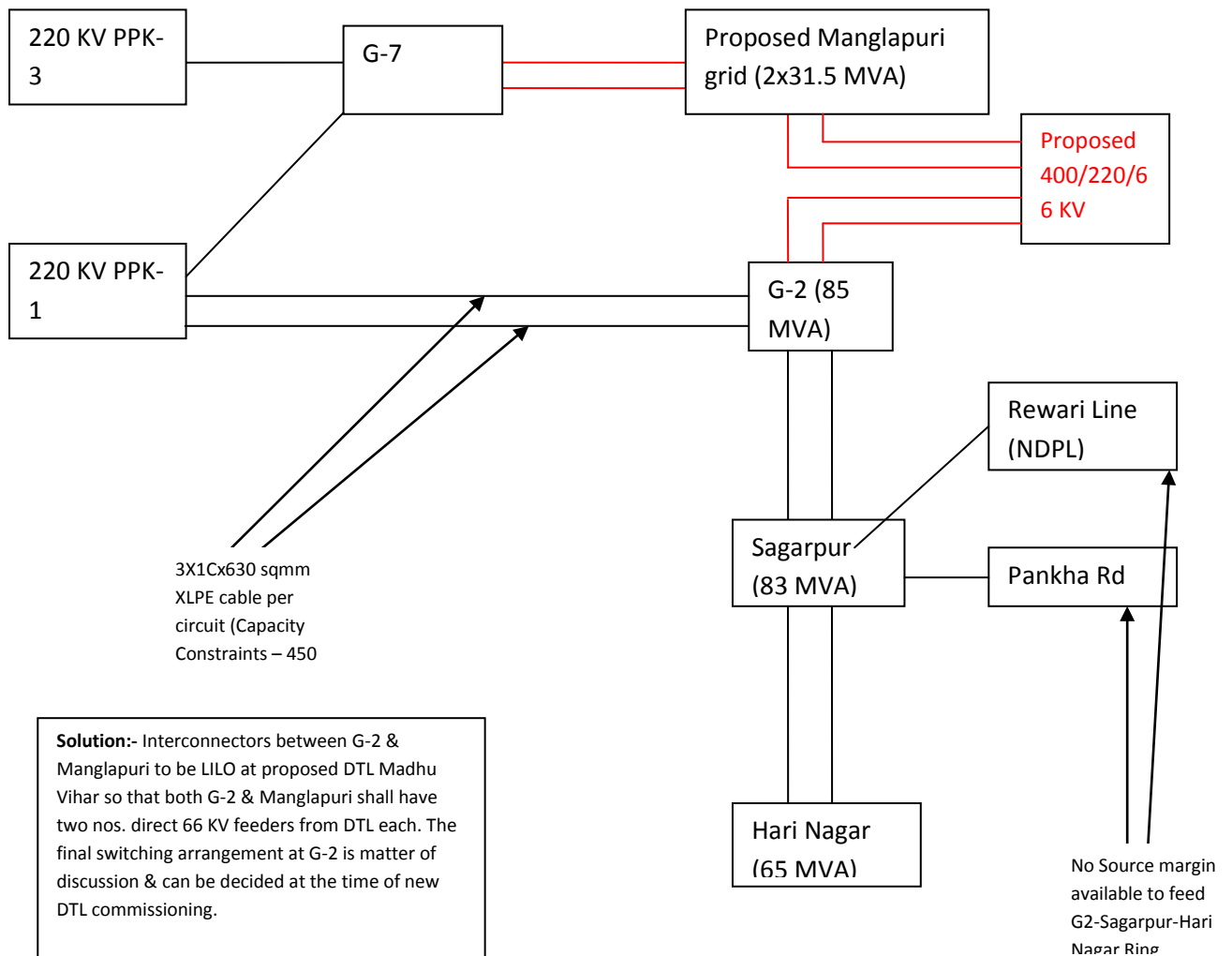
BRPL informed that the existing grids in Palam area are running fully loaded.

G-2, Dwarka (3x20 + 1x25MVA) – Peak load- 80%

Infeed is planned from G-7 Dwarka & Interconnectivity with G-2, Dwarka. The interconnector may be used while power evacuation from proposed DTL Dwarka Sec-5 grid.



SINGLE LINE DIAGRAM (EXISTING & PROPOSED) – Phase-2



The Steering Committee agreed in principle to the above proposal subject to connection of 66kV G-2 Grid with 220kV PPK-III (by laying 66kV D/C cable) to provide load relief at 220kV PPK-I.

15. Establishment of 66/11kV grid at Aya Nagar

BRPL informed that the existing grid S/Stns C-Dot & Andheria Bagh are running to the tune of 75% which is catering the high load growth areas of Aya nagar, Jaunapur, Arjangarh, ghitorni, Chhatarpur etc. of South Delhi.

To relieve the existing S/Stns, a new grid is proposed at Aya nagar. The land has been earmarked & handing over and taking over is in progress.

Infeed has been planned from 220 KV Mehrauli with double circuit source.

The matter was discussed in the Steering Committee. DTL informed that 05 number 66kV Bays are being established at 220kV S/stn Mehrauli out of which 04 no. 66kV Bays are for BRPL. BRPL was advised to utilize the said bays to provide infeed to the sub-station.

16. Addition of Power Transformer at Malviya Nagar (16/20 MVA)

BRPL informed that the Malviya Nagar Grid substation of BRPL is responsible to supply power in Saket, Malviya Nagar, Sangam Vihar, Saket Malls and other adjoining area. There are 2x20 MVA Power Transformer in Malviya Nagar Grid substation. Details of load is as under:

S. No.	Grid Name	Transformer #	Transformer Capacity (MVA)	Loading (MVA)	Loading %	Grid Loading (N-1) % 2018	Grid Loading (N-1) % 2019
1	Malviya Nagar	PTR-1	20	12.8	64%	117%	129%
2	Malviya Nagar	PTR-2	20	10.6	53%		
	Total		40	23.4	59%		

Existing PTRs 2x20 MVA installed at 66 KV Malviya Nagar grid are loaded to the tune of 60% of rated capacity. But the N-1 capacity of Malviya Nagar is 117%, which shall increase to 129% next summer-19.

To relieve the N-1 loading an additional 16/20 MVA PTR is proposed. The 16/20 MVA Power Transformer shall be taken from inventory on Zero cost.

The matter was deliberated and agreed ‘In-Principle’ by the Steering Committee.

17. Addition of Power Transformer at Hari Nagar (20 MVA)

BRPL submitted that Hari Nagar Grid substation is responsible to supply power in Hari Nagar, Beriwalla Bagh, Ajanta, Subhash Nagar, Rajouri Garden and other adjoining area. There are 3x20 MVA Power Transformer in Hari Nagar Grid substation. Details of load is as under:

S. No.	Grid Name	Transformer #	Transformer Capacity (MVA)	Loading (MVA)	Loading %	Grid Loading (N-1) % 2018	Grid Loading (N-1) % 2019
1	Hari Nagar	PTR-1	20	15.8	79%	109.5%	120%
2	Hari Nagar	PTR-2	20	16.8	84%		
3	Hari Nagar	PTR-3	20	11.2	56%		
	Total		60	43.8	73%		

Existing 3x20 MVA PTRs installed at 66 KV Hari Nagar grid are loaded to the tune of 75% of rated capacity. But the loading in comparison to N-1 criteria capacity of Hari Nagar is 110%, which shall increase to 120% next summer-19.

To meet n-1 criteria an additional 20 MVA PTR is proposed. The 20 MVA Power Transformer shall be taken from inventory on Zero cost.

The matter was deliberated and agreed ‘In-Principle’ by the Steering Committee.

18. Addition of Power Transformer at Bodella-2 (31.5 MVA)

BRPL informed that the 66/11 kV Bodella -2 grid substation of BRPL is feeding Bodella, Vikas kunj, Vikaspuri, DDA flats and other adjoining area of West Delhi. There are 4x20 MVA Power Transformer in this Grid substation. Details of load is as under:

S. No.	Grid Name	Transformer #	Transformer Capacity (MVA)	Loading (MVA)	Loading %	Grid Loading (N-1) % 2018	Grid Loading (N-1) % 2019
1	Bodella-2	PTR-1	20	15.2	76%	100%	110%
2	Bodella-2	PTR-2	20	17.4	87%		
3	Bodella-2	PTR-3	20	16.4	82%		
4	Bodella-2	PTR-4	20	11.0	55%		
	Total		80	60.0	75%		

Existing 4x20 MVA PTRs installed at 66 KV Bodella-2 grid are loaded to 75% of rated capacity. But the loading in comparison to N-1 criteria capacity of Bodella-2 is 100%, which shall increase to 110% next summer-19.

To meet n-1 criteria an additional 31.5 MVA PTR is proposed.

The matter was deliberated and agreed ‘In-Principle’ by the Steering Committee.

19. Addition of Power Transformer at Kilokari (16 MVA)

BRPL informed that the 33/11 kV Kilokari Grid substation of BRPL in South Delhi is responsible to supply power in Kilokari Village, Maharani Bagh, New Friends Colony, Siddharth Extension and other adjoining area. There are 1x20 MVA + 1x16 MVA Power Transformer in Kilokari Grid substation. Details of load is as under:

S. No.	Grid Name	Transformer #	Transformer Capacity (MVA)	Loading (MVA)	Loading %	Grid Loading (N-1) % 2018	Grid Loading (N-1) % 2019
1	Kilokari	PTR-1	16	12.3	77%	180%	198%
2	Kilokari	PTR-2	25	16.6	66%		
	Total		40	28.9	70.3%		

Existing PTRs installed at 33 KV Kilokari grid are loaded to the tune of 70% of rated capacity. But the loading in comparison to N-1 criteria of this grid is 180%, which shall increase to 198% next summer-19.

To meet the n-1 criteria an additional 16/20 MVA PTR is proposed. The 16/20 MVA Power Transformer shall be taken from inventory on Zero cost.

The matter was deliberated and agreed ‘In-Principle’ by the Steering Committee.

20. Augmentation of Power Transformer at Andheria Bagh (1X16 to 1X25) grid substation

BRPL informed that the 33/11 kV Andheria Bagh Grid substation of BRPL in South Delhi is responsible to supply power in Vasant Kunj, Andhria More, Chattarpur Village and other adjoining area. There are 1x20 MVA + 1x16 MVA Power Transformer in Andheria Bagh Grid substation. Details of load are as follow:

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S. No.	Grid Name	Transformer #	Transformer Capacity (MVA)	Loading (MVA)	Loading %	Grid Loading (N-1) % 2018	Grid Loading (N-1) % 2019
1	Andheria Bagh	PTR-1	16	11.7	73%	138%	152%
2	Andheria Bagh	PTR-2	20	10.4	52%		
	Total		36	22.1	61.39%		

Existing PTRs installed at 33 KV Andheria grid are loaded to the tune of 60% of rated capacity. But the loading in comparison to N-1 criteria capacity of this grid is 138%, which shall increase to 152% next summer-19.

To meet n-1 criteria, it is proposed to augment one 16 MVA PTR to 25 MVA.

The matter was deliberated and agreed ‘In-Principle’ by the Steering Committee.

21. Augmentation of Power Transformer at Jamia (1X16 to 1X31.5) grid substation

BRPL informed that the 33/11 kV Jamia Grid substation of BRPL in South Delhi is responsible to supply power in Jamia, Gaffar Manzil, Khijrabad, Taimur Nagar and other adjoining area. There are 3x16 MVA Power Transformer in Jamia Grid substation. Details of load are as under:

S. No.	Grid Name	Transformer #	Transformer Capacity (MVA)	Loading (MVA)	Loading %	Grid Loading (N-1) % 2018	Grid Loading (N-1) % 2019
1	Jamia	PTR-1	16	12.5	78%	108%	119%
2	Jamia	PTR-2	16	11.4	71%		
3	Jamia	PTR-3	16	10.9	68%		
	Total		48	34.8	72.3%		

Existing PTRs installed at 33 KV Jamia grid are loaded to the tune of 72% of rated capacity. But the loading in comparison to N-1 criteria capacity of this grid is 108%, which shall increase to 110% next summer-19. The normal loading of this grid will also be increased to more than 80%.

To relieve the loading of the grid, it is proposed to augment one 16 MVA PTR to 31.5 MVA.

The matter was deliberated and agreed ‘In-Principle’ by the Steering Committee.

22. Augmentation of Power Transformer PPK-2 (1X20 to 1X31.5) grid substation

BRPL informed that the 66/11 kV Pappankalan – 2 Grid substation of BRPL in South Delhi is responsible to supply power in Dharam Vihar, Toora Mandi, Nawada and other adjoining area. There are 2x20 MVA Power Transformer in Pappankalan-2 Grid substation. Details of load are as follow:

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S. No.	Grid Name	Transformer #	Transformer Capacity (MVA)	Loading (MVA)	Loading %	Grid Loading (N-1) % 2018	Grid Loading (N-1) % 2019
1	Pappankalan-2	PTR-1	20	11.2	56%	109%	120%
2	Pappankalan-2	PTR-2	20	10.6	53%		
	Total		40	21.8	54.5%		

Existing PTRs installed at 66 KV Pappankalan – 2 grid are loaded to the tune of 55% of rated capacity. But the loading in comparison to N-1 criteria capacity of this grid is 109%, which shall increase to 120% next summer-19. The normal loading of this grid will also be increased to more than 60%. This is a high load growth area. There is no space to install an additional Power Transformer at this grid.

To relieve the loading of the grid, it is proposed to augment one 20 MVA PTR to 31.5 MVA.

The matter was deliberated and agreed ‘In-Principle’ by the Steering Committee.

23. Laying of 33kV new circuit from DTL Okhla to 33/11 kV Tughlakabad S/stn

BRPL informed that at present 33 KV Tughlakabad grid has 3x25 MVA PTRs which are loaded upto 70% of their rated capacity. The grid is being fed from two Infeeds one each from 220 KV Okhla & Malviya Nagar.

In case of any feeder fault all three PTRs cannot run on single feeder.

Hence a new feeder is required to feed 33 KV Tughlakabad grid.

BRPL informed that there is an existing circuit between Okhla 220 KV and 33 KV Masjid Moth, which is at no load after commissioning of 220 kV Masjid Moth. BRPL will utilize this circuit by tapping the O/H portion of the circuits near “Tara Apartment” and lay its cables and lay its cables upto 33 kV Tughlakabad. Hence any new 33 kV bay is not required. This arrangement will help improving reliability at 33 kV Tughlakabad grid substation.

The matter was deliberated and agreed ‘In-Principle’ by the Steering Committee.

24. Laying of 33kV new circuits from Peeragarhi to A-4 Paschim Vihar and Madipur S/stn.

BRPL requested new circuits from 220 KV Peeragarhi grid to A-4 Paschim Vihar and Madipur Grids.

DTL informed that 02 number 33kV Feeder bays one each for A-4 Paschim Vihar and Madipur has already been agreed in Steering Committee meeting held on 17.01.2018. But it was retreated that no new transformer would be installed at Peera Garhi due to space constraints as decided in the SCM held on 30.10.2017 and confirmed again in the SCM held on 17.01.2018.

25. Laying of 66 kV new multi-circuits from Mundka to 66/11 kV DJB Nilothi S/stn.

BRPL submitted that to provide supply to DJB Nilothi, Bakkarwala & Dichaon grids it is essential to evacuate power from Mundka grid at 66 KV level. It is not feasible to lay & maintain the 8-10 KMs underground cable circuits.

It is proposed to explore the feasibility of Multi circuits of overhead line on monopoles with HTLS conductor.

Steering Committee is requested to approve the above proposal.

The Steering Committee deliberated the proposal and agreed 'In-Principle' for providing 04 number 66kV Bays at 400kV Mundka / Tikrikalan for connecting 66kV Multi Ckt line to 66kV Nilothi grid which will ensure more evacuation from Mundka at 66kV Level.

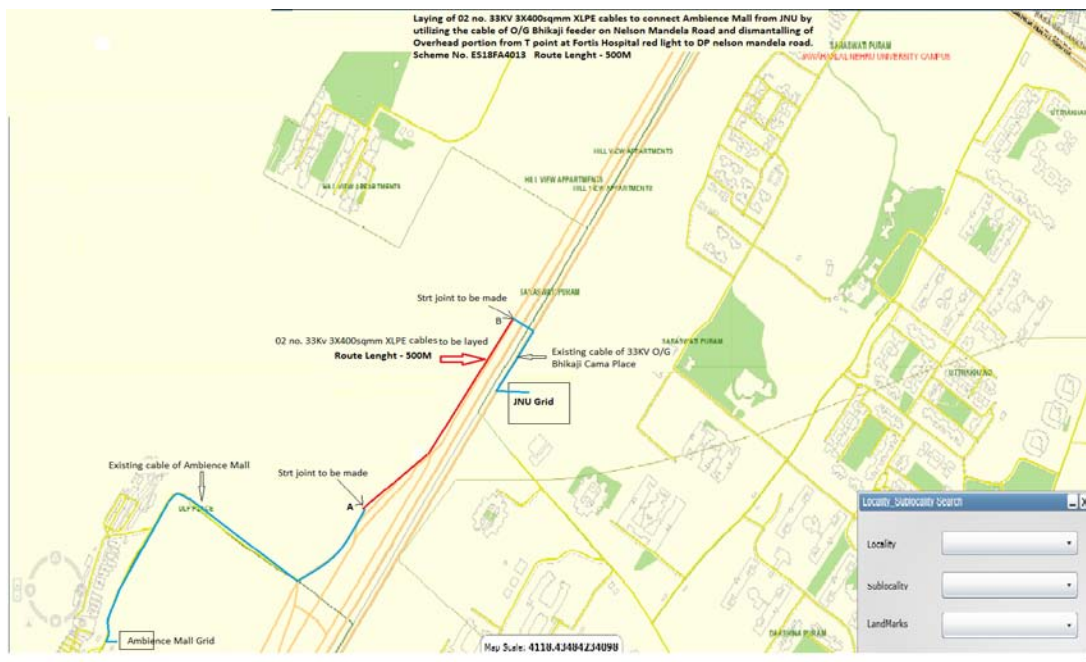
26. Laying of 33kV new circuit from JNU to Ambience mall

BRPL informed that the 33 KV Andheria Bagh grid is proposed to be converted into 66 KV level. To provide duplicate feed to existing 33 KV customer Ambience mall, it is proposed to lay a new circuit from 66/33/11 KV JNU grid substation.

BRPL further submitted that:

- 66kV Vasant Kunj B Block Grid to Andheria Bagh "T"off Ambience mall feeder is a composite feeder which connects Vasant Kunj B Block at one end and other end at Andheria Bagh and another portion from Pole outside D-4 Vasant Kunj to Ambience mall passing through the open field behind D-6 Vasant Kunj and terminating at 4 Pole near Ambience Mall.
- This feeder gets tripped frequently and we have undertaken the Tree pruning. Inspite of best efforts the feeder faces frequent break down due to accessibility issues.
- The open area after between D-4 and D-6 and behind D-6 up to Ambience mall is being used as garbage dumping area. DDA has started dumping debris in this area behind D-6 which was being used as garbage aggravating to line clearance issue.
- The problem is so severe that the 33kV O/H line can be touched from this level thereby creating a situation where accident can happen on any day and at any time. Anybody can have direct access to the conductor at some points (Over the debris).
- Similarly the area behind Ambience Mall on Nelson Mandela road is also being used as dumping yard and the clearance near to DP and Four Pole Structure is so low that any animal, Human being can come in contact with live wire.
- Considering all the above facts we have proposed that a cable of approximately 500 m route length shall be laid from Point A to B so that Ambience Mall can have double circuit with Underground Cable and the rest of Overhead line between Ambience Mall to Four Pole outside D-4 Vasant Kunj can be dismantled and all such probable reason of any electrical accidents can be avoided.
- At present 33 KV Ambience mall S/Stn has two sources:
 - Main source: JNU grid
 - Duplicate source: Andheriabagh
- Since Andheriabagh grid is proposed to be converted in 66 KV, the duplicate source will be lost to Ambience mall. To rearrange duplicate source, it is proposed to lay cable from JNU grid (Using cable of DTL RKP to JNU circuit)

Layout is given here under.



On deliberation, it was found that the scheme will help in improving the reliability of the system; hence Steering Committee agreed in-principle.

27. Conversion of D/C Goat conductor in to HTLS from 220kV Najafgarh to Jaffarpur.

With the new upcoming grid Mitraon the capacity of existing Goat conductor needs to be enhanced. It is proposed to convert it into HTLS conductor. Steering committee is requested to approve the same & Bay capacity at 220 KV Najafgarh station needs also upgradation to cater almost double ampacity.

The matter has already been discussed at item No.D 10 above where in BRPL was advised to defer the proposal of HTLS re-conductoring till establishment of 220 kV S/stn. Budella and 66 kV S/stn. Nilothi.

28. Creation of 66/33 kV level at Budella-1 grid substation.

BRPL informed that the new feeders are required in the 33 KV Ring of Mukherji Park, Pacific Mall Khyala & Chaukhandi grid substations which at present are being fed from 220 KV Peeragarhi & Paschim Vihar substation. It is proposed to LILO Chaukhandi – Pacific Mall Khyala circuit at Budella-1 after 33 KV level creation.

Additional 2 circuits shall be required at 33 KV DC Janakpuri which shall curtail the load of Pankha road grid. All the above four circuits are crucial to maintain 33 KV grids supply in the area. Further any 33 KV new customer can also be catered from the Budella-1 grid substation.

BRPL informed that earlier the scheme was devised for the Bulk consumer (M/s RJIO). But now the consumer is not coming forward with its estimated load. However BRPL needs to strengthen its 33 kV network which feeds critical grids such as DC Janakpuri & Chaukhandi. Hence the creation of 33 kV level at Budella -1 is urgently required. The scheme involves the following:

1. Installation of 2x30 MVA, 66/33 KV PTRs at Budella-1 grid.
2. Two nos. circuits from Budella-1 grid to RJIO mall.
3. 33 KV BRPL switching S/Stn within RJIO premises.

As the Steering Committee in its meeting held on 17.01.2018 has already accorded 'In-Principal' approval of the scheme. BRPL was advised to create a 33 kV level at Budella-I and associated 33 kV network as proposed.

29. Requirement of 66kV grid S/stn space for BRPL at BTPS

BRPL requested Steering Committee to allocate space for 66/11 KV Substation in BTPS for BRPL area.

It was informed that the additional grid is needed to meet the requirement of existing BTPS colony and other establishments which are being fed from the station transformer of BTPS. After the closure of BTPS generating station, these consumers are to be fed from BRPL sources. The present sources of BRPL near BTPS is far away as such additional establishment is required to be establish for which space is required at BTPS.

It was further informed that land allocation of BTPS does not rest with DTL. The land belongs to Govt. of India and allocation is done by L&DO, Ministry of Urban Development as per the report of Department of Power, GNCTD. Further, it was also informed that while transfer of the switchyard of BTPS to DTL the entire electrical system is expected to be handed over to DTL to maintain the continuity of supply. As such for maintaining the power supply for BTPS colony and other establishments there may not be any need for additional establishment. Moreover, the 66kV Molar Bandh S/stn. of BRPL is also coming in the close vicinity of BTPS, as such the additional 66kV Grid substation is not called for.

In case BRPL feels additional requirement they were advised to take up the case at appropriate level separately.

E. BYPL Issues

1. Addition of one no. 25 MVA Power Transformer with associated equipments at 66/11KV Sonia Vihar Grid Sub-Station

BYPL submitted that presently two no. 66//11 kV 25 MVA Power Transformers are installed at Sonia Vihar grid Sub-Station. Peak load of grid substation is 40 MVA which is much higher than the N-1 installed capacity of 25 MVA. Also load growth in the area is expected at the rate of 5% per annum which will lead to reach N-1 Capacity to 160% during summer of 2019. Based on above it is proposed to install 3rd power transformer of 25 MVA at this grid. Sonia Vihar grid also feeding to very important source like Sonia Vihar water (Approx 7 MW) treatment plant.

Grid	Transformer				Sub-station n-1 contingency			Projected Load in FY 19-20	N-1 Loading in FY 19-20
	Voltage Ratio in KV	Capacity	Peak Load	Peak Load	Installed Capacity	Peak Load	Peak Load		
		(MVA)	(MVA)	(%)	(MVA)	(MVA)	(%)		
SONIA	66/11	25	22	88%	25	40	160	93%	168
VIHAR	66/11	25	18	73%				76%	

- **No Grid station available nearby to back feed this area.**

The Steering Committee advised BYPL to go for the 31.5 MVA, 66/11kV Transformer instead of 25 MVA Transformer considering the economical viability as already agreed in the Steering Committee.

2. Addition of one no. 25 MVA Transformer with associated equipments at 66/11kV Dilshad Garden Grid Sub-Station

BYPL submitted that presently three no. (2 no. 20 MVA & 1 no. 25 MVA) of 66/11KV Power Transformers are installed at Dilshad garden grid Sub-Station. Peak load of grid substation is 50 MVA which is much higher than the N-1 installed capacity of 45 MVA. Also load growth in the area is expected at the rate of 5% per annum which will lead to reach N-1 Capacity to 120% during summer of 2019. Based on above it is proposed to install 4th power transformer of 25 MVA at this grid. (No Grid Station available nearby to back feed area).

Grid	As on 2017-18							Projected Load in FY 18-19	N-1 Loading in FY 18-19	Projected Load in FY 19-20	N-1 Loading in FY 19-20
	Transformer				Sub-station n-1 contingency						
	Voltage Ratio in KV	Capacity	Peak Load	Peak Load	Installed Capacity	Peak Load	Peak Load				
		(MVA)	(MVA)	(%)							
DILSHAD GARDEN	66/11	20	17	87%	45	50	111	91%	116	96%	
	66/11	25	17	66%				69%		73%	
	66/11	20	16	79%				83%		87%	

The Steering Committee advised BYPL to go for the 31.5 MVA, 66/11kV Transformer instead of 25 MVA Transformer considering the economical viability as already agreed in the Steering Committee.

3. Addition of one no. 25 MVA Transformer with associated equipments at 66/11KV Kondli Grid Sub-Station

BYPL submitted that presently two nos of 66/11KV Power Transformers are installed at Kondli Grid Sub-Station. Peak load of grid substation is 29 MVA which is much higher than the N-1 installed capacity of 20 MVA. Also load growth in the area is expected at the rate of 5% per annum which will lead to reach N-1 Capacity to 155% during summer of 2019. Based on above it is proposed to install 3rd power transformer of 25 MVA at this grid.

Grid	Transformer				Sub-station n-1 contingency			Projected Load in FY 19-20	N-1 Loading in FY 19-20
	Voltage Ratio in KV	Capacity	Peak Load	Peak Load	Installed Capacity	Peak Load	Peak Load		
		(MVA)	(MVA)	(%)					
KONDLI GRID	66/11	20	14	71%	20	29	145	75%	155
	66/11	20	15	74%				78%	

- No Grid station available nearby to back feed area.

The Steering Committee advised BYPL to go-for the 31.5 MVA, 66/11kV Transformer instead of 25 MVA Transformer considering the economical viability as already agreed in the Steering Committee.

4. Addition of one no. 25 MVA Transformer with associated equipments at 33/11kV GT Road Grid Sub-Station

BYPL submitted that presently three no. (2 no. 20 MVA & 1no. 16 MVA) of 33/11kV Power Transformers are installed at GT Road grid Sub-Station. Peak load of grid substation is 39 MVA which is higher than the N-1 installed capacity of 36 MVA. Also load growth in the area is expected at the rate of 5% per annum which will lead to reach N-1 Capacity to 117% during summer of 2019. Based on above it is proposed to install 4th power transformer of 25 MVA at this grid.

Grid	Transformer				Sub-station n-1 contingency			Projected Load in FY 19-20	N-1 Loading in FY 19-20
	Voltage Ratio in KV	Capacity	Peak Load	Peak Load	Installed Capacity	Peak Load	Peak Load		
		(MVA)	(MVA)	(%)	(MVA)	(MVA)	(%)	(%)	(%)
GT ROAD GRID	33/11	20	13	67%	36	39	108	70%	117
	33/11	16	13	84%				88%	
	33/11	20	13	65%				69%	
DSIDC JHILMIL	33/11	20	13	66%	20	30	150	69%	155
	33/11	20	17	84%				88%	

The matter was deliberated and agreed 'In-Principle' by the Steering Committee.

5. Augmentation of one no. Power Transformer from 16 MVA to 25 MVA at 33/11kV Kanti Nagar Grid Sub-Station

BYPL submitted that presently three no. (2no. 20 MVA +1no. 16MVA) 33//11 kV Power Transformers are installed at Kanti Nagar grid Sub-Station. Peak load of grid substation is 38 MVA which is higher than the N-1 installed capacity of 36 MVA. Also load growth in the area is expected at the rate of 5% per annum which will lead to reach N-1 Capacity to 111% during summer of 2019. Based on the above, the augmentation of 16 MVA Power transformer to 25 MVA Tx is proposed.

Grid	Transformer				Sub-station n-1 contingency			Projected Load in FY 19-20	N-1 Loading in FY 19-20
	Voltage Ratio in KV	Capacity	Peak Load	Peak Load	Installed Capacity	Peak Load	Peak Load		
		(MVA)	(MVA)	(%)	(MVA)	(MVA)	(%)	(%)	(%)
KANTI NAGAR	33/11	20	13	64%	36	38	106	68%	111
	33/11	20	12	62%				65%	
	33/11	16	13	82%				86%	
C BLK KRN	33/11	16	12	72%	16	21	131	76%	138
	33/11	20	9	44%				46%	

The matter was deliberated and agreed 'In-Principle' by the Steering Committee.

6. Augmentation of two no. Power Transformer from 20 MVA to 31.5 MVA at 33/11kV Anand Parvat Grid Sub-Station

BYPL informed that presently three no. 20 MVA, 33//11 kV Power Transformers are installed at Anand Parvat grid Sub-Station. Peak load of grid substation is 51 MVA which is much higher than the N-1 installed capacity of 40 MVA. Also load growth in the area is expected at the rate of 5% per annum which will lead to reach N-1 Capacity to 133% during summer of 2019. Based on above it is proposed to Augmentation of 2nos. 20 MVA Power transformer to 31.5 MVA at this grid.

Grid	Transformer				Sub-station n-1 contingency			Projected Load in FY 19-20	N-1 Loading in FY 19-20
	Voltage Ratio in KV	Capacity	Peak Load	Peak Load	Installed Capacity	Peak Load	Peak Load		
		(MVA)	(MVA)	(%)	(MVA)	(MVA)	(%)	(%)	(%)
ANAND PARVAT	33/11	20	17	83%	40	51	128	88%	133
	33/11	20	18	89%				93%	
	33/11	20	16	79%				83%	

The matter was deliberated and agreed 'In-Principle' by the Steering Committee.

7. Installation of 22 No. 33kV breakers at Shastri Park East, Ghonda, Shastri Park Central Grids

BYPL informed the following:

- (A) **At Present 66/33/11 kV Shastri park East grid feeding to very important supply at 33 kV level like DMRC, Seelampur grid, Kailash nagar grid & Dwarakpuri grid. So many switching operation require at this grid**

At present 8 no. 33 kV breaker of BHEL make are very old and Breaker mechanism is giving frequent troubles and are beyond repairable. Spare parts are not even available with OEM. Repairing Cost is more than 50 % cost of GCB & is very nearly equal to cost of new 33 KV VCB .To keep EHV grids healthy, BYPL wants to replace them with new ones so that system stability and reliability get maintained.

- (B) **At Present 66/33/11 kV Ghonda grid feeding to very important supply at 33 kV level like GT road grid & Karwal nagar, Seelampur grid .So many switching operation require at this grid**

At present 4 no. 33 kV breaker of CGL make are very old and Breaker mechanism is giving frequent troubles and are beyond repairable. Spare parts are not even available with OEM. Repairing Cost is more than 50 % cost of GCB & is very nearly equal to cost of new 33 KV VCB. Spare parts not available even with OEM & at present mechanical parts are in deteriorated state & High Contact Resistance. To keep EHV grids healthy, BYPL wants to replace them with new ones so that system stability and reliability get maintained.

(C) At Present 66/33/11 kV Shastri Park East grid feeding to very important areas at 33 kV level like Prasad Nagar, Pusa Road (NDPL), Anand Parvat grid

At present 10 no. 33 kV breaker of SIEMENS make are very old and Breaker mechanism is giving frequent troubles and are beyond repairable. Spare parts are not even available with OEM . Repairing Cost is more than 50 % cost of GCB & is very nearly equal to cost of new 33 KV VCB .To keep EHV grids healthy, BYPL wants to replace them with new ones so that system stability and reliability get maintained.

The matter was deliberated in SCM and BYPL was advised to do the replacement as per the system requirement, Further the committee was of the view that as already discussed in earlier SCM held on 12.08.2016, the approval of SCM is not required for such replacement and the utilities may take such decisions depending upon the system requirement.

8. 66/11KV Grid at Harsh Vihar

BYPL informed that DTL has already given land in 400/220/66KV Harsh Vihar S/S in lieu of land given by BYPL to DTL for installation of 220/33 KV Preet Vihar Grid substation. It has been observed by BYPL that, the 11KV outgoing route length's from allotted land is approx 5 km extra for each feeder (proposed 6 Feeders) and passes through UP, which have practical problems and also not feasible .

So BYPL is proposing two possible solutions -

a) Land swapping.

b) Permission to construct trench within DTL 400KV Grid premises for laying of 66 KV in-feed for BYPL's proposed 66/11 KV Harsh Vihar Grid and also separate trench inside DTL boundary for taking out 11KV O/G feeders, so that 11KV out going feeders can directly enter BYPL license area.

The matter was deliberated in the Steering Committee and it was advised to carry out a joint site visit at 400kV Harsh Vihar to resolve the issues.

9. Requirement of land for BYPL Grid at 220kV Patpatganj S/Stn. of DTL

BYPL submitted that at present, some of 11KV BYPL feeders are being fed directly from the 220KV PPG Grid (DTL). The Power Transformer and 11kV SWGR belongs to DTL. DTL had already requested to shift these feeders to some other BYPL Grids.

It is to submit that all nearby BYPL's Grids are already running on full capacity, so BYPL request DTL, to allow to establish the BYPL Grid with in DTL premises, so that BYPL can install the Transformers and shift the 11kV Feeders on them which are currently being fed though DTL PTR/Panels.

The matter was discussed in detail in item C.4.

DTL reiterated that there is no space available at 220kV S/stn Patparganj for installation of new 33/11kV Grid. It was also informed that due to space constraint at 220kV Patparganj some 220kV and 66kV elements are even operating with single bus selection mode affecting the reliability of power supply.

However, it was decided to augment the existing 33/11kV, 16/20MVA transformers with 33/11kV, 25 MVA transformers to increase the reliability of power supply. SCM advised DTL to plan for the augmentation of existing 33/11kV, 16/20 MVA Transformers.

10. 220kV Dev Nagar Grid (Karol Bagh)

BYPL requested DTL to give the scheduled starting and completion of the S/Stn. so that BYPL will take up the activities (Grid and O/G Feeders) in line with DTL Schedule. BYPL informed that they have applied to Forest Dept for tree cutting permission. The shifting of Delhi Jal board Pipelines, inside the premises is to be taken up by DTL.

BYPL requested DTL for providing Compound wall Drawing and Specifications in order to maintain the uniformity of Compound wall which is awaited.

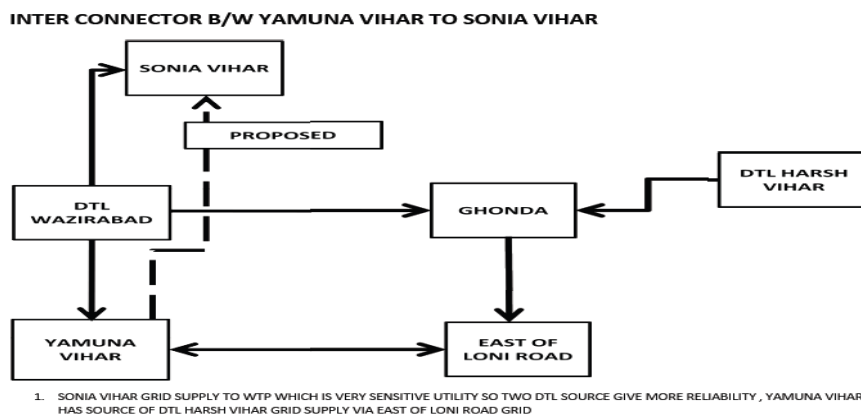
DTL informed that the scheme for 220kV Dev Nagar has already been finalized and is under tendering stage. Further, the referred drawings will be provided as and when they gets finalized. L&DO is also being pursued for allocation of additional land for shifting of DJB installations in the allotted premises. As already informed, the substation is expected to be commissioned in Year 2020-21.

11. Provide interconnector between 66/11kV Sonia Vihar Grid to Yamuna Vihar Grid with 2 no. of Bay addition

BYPL informed that at Present Sonia Vihar grid having only one feed from 220 kV Wazirabad Grid. In case of supply fail from 220 kV Wazirabad grid total load of grid around 40 MVA is affected, Also very critical load of Sonia Vihar Water treatment plant feeding from this grid. Load growth in the area is expected at the rate of 10% per annum. Based on above it is proposed for new 66 kV interconnector between Yamuna Vihar grid to Sonia Vihar grid. After new interconnector from Yamuna Vihar grid second source of 220 kV Harsh Vihar will be available at this grid.

Grid Name	Feeder Name	Peak Load	Sub-station n-1 contingency (MVA)	Projected Load in FY 19-20	N-1 Loading in FY 19-20
		(MVA)			
SONIA VIHAR	I/C WAZIRABAD CKT - 1	22	40	23	42
	I/C WAZIRABAD CKT - 2	18		19	

Single Line Diagram

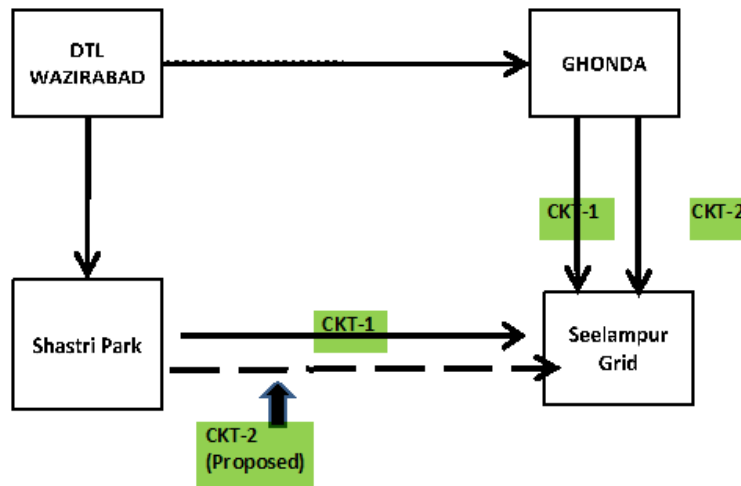


The Matter was deliberated and agreed 'In-Principle' by the Steering Committee.

12. Provide interconnector between Shastri Park East Grid to Seelampur grid

BYPL informed that at Present Seelampur grid having two feeds, one no. from Ghonda grid & one no. from Shastri park grid. Both ckt from Ghonda to Seelampur run in parallel condition total load of grid is around 50~52 MVA. In case of supply fail from Ghonda to Seelampur grid some load of Seelampur grid affected. n-1 Capacity of In-feed is greater than 100%. Load growth in the area is expected at the rate of 5% per annum. Based on above it is proposed for new 33 kV interconnector between Shastri Park East Grid to Seelampur grid. After new interconnector from Shastri Park East Grid second source of Shastri park will be available at Seelampur grid.

Grid Name	Feeder Name	Peak Load	Sub-station n-1 contingency (MVA)	Projected Load in FY 19-20	N-1 Loading in FY 19-20
		(MVA)			
SEELAMPUR	GHONDA CKT 1&2	27	47	28	49
	SHASTRI PARK	20		21	



The Matter was deliberated and agreed ‘In-Principle’ by the Steering Committee.

F. TPDDL Issues

1. Status of DTL’s critical Projects related to TPDDL licensed area

TPDDL requested DTL to provide the status of the critical projects of DTL coming under the licensed area of TPDDL.

It was also informed that regarding delay in projects, TPDDL had filed a petition in DERC. In the matter, DTL has communicated completion target dates to DERC on 04.05.2018 and 07.06.2018. In the 2nd communication, 3 project dates out of 5 were further extended. TPDDL requests DTL to clarify as to which are the final dates.

In this regard DTL informed the following:

- a. TPDDL filed a petition before DERC indicating the inordinate delays in completing projects in their licensed areas by DTL. They urged the commission to initiate legal

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proceedings under section 142 of the Electricity Act, 2003 against DTL for non compliance of provision of Electricity Act, Grid Codes etc. on account of not implementing the projects thereby affecting the reliability of power supply.

b. The preliminary hearing of the petition was held in DERC on 08.03.2018. The commission issued interim order on 12.03.2018 as under:-

1. *The instant petition has been filed by TPDDL u/s 142 of the Electricity Act, 2003 read with the DERC Grid Code Regulations, 2008; the CERC (Standards of Performance of inter-State transmission licensees) Regulations, 2012; the National Tariff Policy, 2016; and DERC Conduct of Business Regulations, 2001 seeking directions from the Commission to the Respondent, Delhi Transco Limited for performance of its obligations towards maintenance of Transmission network.*
2. *The Counsel for the Petitioner submitted that the Respondent has been in continuous violation of its various statutory obligations of augmenting the transmission lines in Delhi. The Petitioner further submitted that in a meeting held on 01.12.2014 to review the preparedness of Delhi transmission and distribution system to meet the summer peak demand of 2015, the Respondent was directed to finalize the funding agency for taking loan for implementation of the transmission schemes for Delhi within a week. Further the Respondent was directed to ensure commissioning of their part of works before May 2015 and accordingly obtain their Board's approval timely and to complete award of ICTs by Dec 14.*
3. *The Counsel for the Respondent submitted that the transmission network provided by the Respondent in Delhi is fulfilling the requirements of the transmission system criterion, as provided by the Delhi Grid Code and the Respondent has always discharged its duties as per the Tariff orders and other directions of the Commission. The Counsel for the Respondent further raised the issue about admissibility of the Petition stating that no violation of Regulation has been mentioned requiring action under Section 142 of the Electricity Act, 2003.*
4. *The parties are directed to have a joint meeting with the officers of the Commission in the 3rd week of April' 2018 to discuss the issues relating to augmentation of the transmission network as well as execution, commissioning of new projects in Delhi.*
5. *The matter is adjourned. The next date of hearing shall be intimated to the parties in due course.*
6. *Ordered accordingly.*

c. In compliance of para 4 of the order a meeting was held in the Commission on 20.04.2018 under the chairmanship of Executive Director (Engg.) wherein DTL was advised to provide the details indicating the status of DTL projects identified by

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TPDDL as critical considering power supply of the area. Accordingly, vide letter dated 04.05.2018 DTL submitted the status of the projects.

- d. On 10.05.18 the second meeting was held in the Commission to discuss the details of the projects submitted by DTL.
- e. While considering the status of tendering and other issues DTL was asked to provide the details of the projects based on the factual position of their timelines for implementation
- f. After detailed discussions with various departments the time lines were drawn out and reply was submitted to DERC copy of which was provided to TPDDL also.
- g. Based on the latest position of scheme preparation and tendering process the details of the project are as under:

Sl. No	Projects	Status
1.	220/66 KV SGTN	The sub-station package has been awarded on 26.06.2018 with completion period of 18 months.
2.	160 MVA 3rd Power Trf. at 220 kV Kanjhawala	The Transformer package was awarded to BHEL on 11.07.2018. The transformer would be commissioned by 31.05.2019.
3.	220/33 kV GIS Timarpur	DTL Board has already approved the scheme on 28.03.2018. As already intimated the NIT is expected to be floated by 30.09.2018 with expected date of award by 31.03.2019 with the completion schedule of 18 months. All possible efforts are being made to make the S/stn available by 30.09.2020
4.	220/66kV additional 2X160 MVA Transformers along with 66kV GIS Bays at 220kV Gopalpur Grid	For 66kV GIS, The bidders have quoted the exorbitantly high cost. The scheme is being reviewed and tender will be refloated. However DTL is making all out efforts to install additional 160MVA Tr before next summer for which modality would be worked out in-coordination with TPDDL.
5.	220/33kV Dev Nagar	DTL Board has already approved the scheme on 26.09.2017. As already intimated the date of award of project is expected by 31.01.2019 with the completion schedule of 24 months.
6.	220/33kV Punjabi Bagh Grid	The land required for establishment of the sub-station is not available with DTL at present and matter regarding allocation of land is being taken up with DDA in coordination with power department GNCTD.
7.	1X160MVA Power Trf. at 220kV Shalimar Bagh	Additional 220/66kV, 100MVA transformer is expected soon, work is in progress.

- h. It was again reiterated that some of the projects envisaged for providing reliability of the power supply to the areas including that of TPDDL are delayed due to reasons beyond the control of DTL. However, such issues are regularly discussed in the Steering Committee meeting and all DISCOMS are well informed. As such there was no deliberate change of targets of any of the projects.

2. Status of projects in 13th Business Plan of DTL pertaining to TPDDL area

TPDDL submitted that as per the 13th business plan (MoM of special Steering Committee meeting dated 21.03.2016) certain 400 kV projects were identified in TPDDL area. DTL is requested to share the status of the following projects.

- a. 400 kV Shalimar Bagh and D/C line from Bawana to Shalimar Bagh
- b. 400 kV Gopalpur and LILO of Bawana to Rajghat line

It has been explained that the matter has already been deliberated at length in the Steering Committee Meeting held on 30.10.2017 wherein it was informed that in the 39th Standing Committee of power system meeting for Northern region on 29th & 30th May 2017 it was decided to establish 400kV S/stn. at Gopalpur (refer item B.4. of MOM of SCM held on 30.10.2017). As such the 400kV at Shalimar Bagh has been deferred. 400kV ISTS at RPH was also shelving of due to ROW issues.

3. Overloading at DTL grids during summer 2019

TPDDL submitted that at 220 kV Rohini, at night the total loading on 100 MVA transformers routinely crosses 310 MW, at which point Tata Power-DDL has to divert part of the load to other grids. As per communication from operational staff, these transformers are old and hence cannot be loaded beyond 80 MW. Tata Power-DDL had planned to shift some load of 220 kV Rohini to 220 kV Kanjhawla, but due to shifting of 160 MVA trf from Kanjhawla, this has not been possible.

At 220 kV Naraina, the day peak has crossed 170 MW, of which Tata Power-DDL share is approximately 70 MW. The 220 kV Naraina has a capacity of 300 MVA, but one 100 MVA transformer failed in July 2017. However, this transformer has not been replaced till now resulting in overloading on the remaining transformers in this summer.

At 220 kV Shalimar Bagh, load on 220/66 kV PTR has crossed 80 MW during the day requiring shifting of load. An additional 160 MVA transformer was to be commissioned before summer 2018 but has not been commissioned till date. TPDDL requests DTL to apprise with the latest status regarding installation of 160 MVA 3rd PTR at 220 kV Kanjhawla, replacement of burnt 100 MVA transformer at 220 kV Naraina and 100 MVA 2nd 220/66 kV transformer at 220 kV Shalimar Bagh.

The status regarding transformers at 220kV Kanjhawala and Shalimar Bagh has been updated above at Sr. No F.1. Regarding the 3rd 100MVA transformer at 220kV Naraina, it is informed that the same was got commissioned/ energized on 19.07.2018.

4. Requirement of additional 100 MVA PTR at 220 kV Wazirpur

TPDDL informed that the load at 220 kV Wazirpur S/stn. had already reached 160 MVA as per summer 2017 peak. TPDDL has requested DTL to install a 3rd 100 MVA PTR at 220 kV Wazirpur to mitigate the same. The matter was deliberated upon on 08th August 2017. Keeping in view, increasing loads and conversion of one PTR at 220 kV Shalimar Bagh from 33 kV to 66 KV, TPDDL requests DTL to reconsider installation of 3rd 100 MVA PTR at 220 kV Wazirpur.

It was informed that during the joint site visit with TPDDL, it was found that there is no spare 220kV GIS bay available at the 220kV S/stn Wazirpur. As such, 220kV GIS bay is required to be extended for which only possibility seen is the extension of 220kV GIS Bay through OEM. Discussion has been held with OEM who is also considering the feasibility for the said extension. The GIS extension at 220kV Wazirpur may take considerable time.

In the mean time the possibility of addition of 220/33kV, 100MVA Transformer at Shalimar Bagh is also being explored as most of the load of 220kV Wazirpur is interchangeable. If found feasible the scheme for addition of 220/33kV, 100 MVA Transformer at 220kV Shalimar Bagh would be implemented as the same can easily be installed being AIS. Considering the loading pattern of 220kV Shalimar Bagh and 220kV Wazirpur substation the bay extension and installation of additional Transformer at 220kV Wazirpur will be undertaken though it may take considerable time. The loading position of Shalimar Bagh and Wazirpur at the time of peak demand met (7016 MW) on 10.07.2018 at 15:26 Hrs was as under:

Sub station	220/33kV 100 MVA TX. No.	Capacity in MW at 0.85pf	Load at the time of peak	
			MW	MVAR
Wazirpur	1	85	66	8
	2	85	66	-6
Total		170	132	2

Sub station	220/33kV 100 MVA TX. No.	Capacity in MW at 0.85pf	Load at the time of peak	
			MW	MVAR
Shalimar Bagh	1	85	72	4
	2	85	41	3
Total		170	113	7

Keeping in view of the above, Steering Committee advised TPDDL to manage with their existing network till commissioning of additional transformer.

5. Second source for 220 kV Rohini-2

TPDDL submitted that the work on 66 kV D/C line from RG-6 to RHN-DC-1 and is expected to be completed by 20th July 2018. After completion approx. 70 MVA load will be shifted to 220 kV Rohini-2 to offload 220 kV Rohini-1 (after shifting part of current load to 220 kV Narela till 220 kV SGTN is not commissioned). Also work is in progress on 66 kV D/C line from RG-34 to Bawana-6 with approximately 70% of the cable being laid.

Work is currently held up due to RoW issues with DSIIDC which are hoped to be resolved soon. With completion of this scheme, approximately 55 MVA load will be shifted from 400 kV Bawana to 220 kV Rohini-2, thus bringing the loading on 220 kV Rohini-2 to over 140 MVA. Thus any interruption in source for 220 kV Rohini-2 will require shifting back of load to 220 kV Rohini-1 and 400 kV Bawana which are already overloaded. TPDDL requested DTL to execute scheme for second source to 220 kV Rohini-2 on an accelerated timeline.

It was informed that the second source for 220kV Rohini-II was envisaged from Karampura ISTS S/stn. via 220kV Mangol Puri. However, due to shelving of the Karampura ISTS owing to ROW issue; the additional source is to be explored.

6. 220 kV Peeragarhi and 220 kV DSIDC Bawana do not meet n-1 reliability criteria

TPDDL informed that the load at 220 kV DSIDC Bawana was 213 MW against the installed capacity of 360 MVA. In case of outage of 160 MVA PTR, n-1 is not met. Load at 220 kV Peeragarhi was 235 MW against installed capacity of 300 MVA. TPDDL requested DTL to take steps to restore N-1 to these grid sub-stations.

It was informed that no additional Transformer would be possible at 220kV Peeragarhi due to space constraints as already decided in the Steering Committee held on 30.10.2017 which was reiterated in the Steering Committee held on 17.01.2018. Further, after the commissioning of 220/66kV Budella S/stn. (expected by 31.12.2019) the loading position of the S/stn. would be eased.

With regard to DSIDC Bawana, while discussing the n-1 criteria at the occurrence of Delhi peak at item C.2 above, it was already mentioned that the possibility of installation of additional 160MVA Transformer would be explored, even though the load is interchangeable.

G: Additional Issues

1. Evacuation from recently commissioned 220kV PPK-III and R.K. Puram substations

a. 220/66kV, 2x160 MVA Pappankaln-III S/stn.

The Evacuation plan finalized in the SCM held on 17.01.2018 along with the latest status provided in the meeting is as under:

Sl. No.	Name of Feeder	Time Line provided by BRPL in SCM	Remarks
1	G-6 Dwarka	Commissioned on 02.06.2018	
2	G-7 Dwarka	Commissioned on 02.06.2018	
3	G-4 Dwarka Ckt-I	Commissioned on 09.05.2018	
4	G-4 Dwarka Ckt-II	Commissioned on 09.05.2018	
5	DMICDC Ckt-I	2019-20	
6	DMICDC Ckt-II	2019-20	
7	DMICDC Ckt-III	2020-21	
8	DMICDC Ckt-IV	2020-21	
9	Palam RSS (DMRC)	Commissioned on 15.06.2018	
10	G-2 Dwarka Ckt-I	Mar 2019	As per SCM held on 17.01.2018, the bays are meant for Dwarka Sec 23 circuits expected to be commissioned in year 2020-21. However, in the meeting held on 03.07.2018 at PPK-III s/stn. with the officers of Power Department, DTL & BRPL it was advised to establish cable links for the G-2 S/stn. to reduce loading on PPK-I by about 80-100MW.
11	G-2 Dwarka Ckt-II	Mar 2019	

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At present the capacity of Pappankalan-III S/stn is 2x160MVA. The load at the substation has already reached up to 115MW against the installed capacity of 320MVA. After connectivity of 66kV G-2 grid of BRPL an additional 100MW load shall also be shifted from 220kV PPK-I to PPK-III. Considering the likely loading of the substation in immediate future and to ensure the reliability of power supply Steering Committee advised DTL to devise scheme for additional 160MVA transformer so that the transformer would be available in summer 2019 as the provision for 3rd transformer is available in the substation.

b. 220/66/33kV, 2x160 MVA & 2x100MVA R.K. Puram S/stn.

(i) 66kV Level:

The evacuation plan at 66kV level from 220kV substation R.K. Puram was finalized in the SCM held on 17.01.2018. Based on that the discussions were held with BRPL and the evacuation plan along with the latest status is as under:

Sl. No.	Name of Feeder	Time provided by BRPL in the SCM	Line by	Remarks
1	Vasant Kunj B Block Ckt-I	Dec 2018		
2	Vasant Kunj B Block Ckt-II	Dec 2018		
3	West of JNU Ckt-I	Mar 2020		Substation is to be established
4	West of JNU Ckt-II	Mar 2020		
5	JNU Ckt-I	Dec 2019		
6	JNU Ckt-II	Dec 2019		

(ii) 33kV Level

The evacuation plan at 33kV level from 220kV substation R.K. Puram was finalized in the SCM held on 17.01.2018. Based on that the discussions were held with BRPL and the evacuation plan along with the latest status is as under:

Sl. No.	Name of Feeder	Time Line provided by BRPL in SCM
1	Bhikaji Cama	Aug 2018
2	IIT	Dec 2018
3	R.K. Puram Ckt-I	Aug 2018
4	R.K. Puram Ckt-II	Aug 2018
5	Vasant Vihar	Mar 2019
6	Adhchini	Dec 2018
7	Masjid Moth	Dec 2019
8	Shivalik	Mar 2019
9	Siri Fort	Dec 2019

Steering Committee stressed the need for more evacuation of power at 66kV level by BRPL from 220kV R.K. Puram to reduce stress on the existing 220kV Mehrauli, Vasant Kunj, Ridge Valley substations and their associated network.

The meeting ended with thanks to the Chair.

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Annexure-I

List of Participants

Sl. No.	Name of the Officer	Designation	Organisation	Contact No.	E-mail address
1.	Sh. V.Venugopal	GM(Planning)	DTL	9871093902	venugopal.v1960@yahoo.co.in
2.	Sh.S.K.Sharma	GM(O&M)-I	DTL	9999533640	gmom1.dtl@gmail.com
3.	Sh.Birendera Prasad	GM(O&M)-II	DTL	9999533663	gmom2dtl@gmail.com
4.	Sh. S.K. Sinha	DGM(SO)	SLDC, Delhi	9999533673	sinha.surendra@yahoo.com
5.	Sh. Naveen Goel	Manager(T)	SLDC, Delhi	9999533950	naveengoel06@gmail.com
6.	Sh. Sanjeev Kumar	AM(T)	SLDC, Delhi	9999533917	sanjeevkumar2474@gmail.com
7.	Sh. Naveen Kumar	AM(T)SO Gen.Duty	SLDC, Delhi	9999533883	dtldata@gmail.com
8.	Sh. P.K. Bharadwaj	V.P.	BYPL	9313585076	pareekshit.bharadwaj@relianceada.com
9.	Sh. V.Mohana Raj Kumar	As.V.P.	BYPL	9390218124	mohana.rajkumar@relianceada.com
10.	Sh. Vivek Arya	DGM	BYPL	9350261998	vivek.arya@relianceada.com
11.	Sh. Kishan Pal	AsVP(P&E)	BYPL	9312667177	kishan.pal@relianceada.com
12.	Sh. Ashwani Aggarwal	AVP	BYPL	9350261826	ashwani.aggarwal@relianceada.com
13.	Sh. Shailesh Gupta	Sr. Manager	BYPL	8595254901	shailesh.k.gupta@relianceada.com
14.	Sh. Abhinav Srivastava	GM(CES)	BRPL	9350134826	abhinav.r.srivastava@relianceada.com
15.	Sh. K. Sheshadri	Sr.V.P.	BRPL	9350261134	sheshadri.krishnapura@relianceada.com
16.	Sh. T.R. Bhatia	Sr. V.P.	BRPL	9350261783	tilak.bhatia@relianceada.com
17.	Sh. Parveen Verma	HOD(NEG, GIS & QA)	TPDDL	9971152897	parveen.verma@tatapower-ddl.com
18.	Ms. Manisha Dhar	AM	TPDDL	9810807396	manisha.dhar@tatapower-ddl.com
19.	Sh. S.R. Meena	AGE E/M	MES	8130750809	geelectric@gmail.com
20.	Sh. G. Das	EE(P-33KV)	NDMC	9810204610	eep33.elect@ndmc.gov.in
21.	Sh. M.P. Singh	AEE (P-33KV)	NDMC	9868889692	mpsingh3221@gmail.com
22.	Sh. R.S. Gupta	Project Mgr(Elect.)	NBCC (I)Ltd.	7060407834	rsingh15dec@gmail.com
23.	Sh. Anil Kumar Gupta	GPM(India)	NBCC	9582271180	anil.sec1985@gmail.com
24.	Sh. Manish Pareek	DPM(E)	NBCC	8527293368	manish1pareek@gmail.com
25.	Sh. Bhupender Nath	Addl. G.M./Electrical	DMRC	9999533627	bhupendernath@yahoo.co.in
26.	Sh. Atul Singh	A.M.	DIAL	9599556697	atul.singh@gmrgroup.in
27.	Sh. Prabhat Rastogi	Sr.DGM(Electrical)	NCRTC	9650769393	prabhat.rastogi@ncrtc.in
28.	Sh. Adesh Kumar	Sr. DGM(Electrical)	NCRTC	8383809125	adesh.kumar@ncrtc.in
29.	Sh. Rajan Rustagi	AEE(E)	DSIIDC	9968060231	rajandsiidc01@gmail.com
30.	Sh. R.S. Meena	DGM(T) Plg.	DTL	9999533665	dgmplanning.dtl2016@gmail.com
31.	Sh. Devender Singh	DGM P-IA	DTL	9999533675	dsingh2012.dtl@gmail.com
32.	Sh. Amit Singh	Mgr(Plg.)SS&LM	DTL	9999533927	amit.singh@dtl.gov.in
33.	Sh. Susheel Gupta	Mgr(Plg.)CE&STU	DTL	9999533926	susheel.gupta@dtl.gov.in
34.	Sh. Jeetendra Kr Chaurasia	Manager(T)	DTL	9999533867	managerdtlw6@gmail.com
35.	Ms. Poonam Rathore	AM(T) to GM(Plg.)	DTL	9999533915	poonam.ltg@gmail.com
36.	Sh. Dharmendra	AM(T)Plg.	DTL	9999533731	thedharmendra@gmail.com
37.	Sh. Sunil Varshney	AM(T)SMB	DTL	9999533914	sunil_varshney@yahoo.com
38.	Ms. Shweta Verma	J.E(Elect.)SS&LM	DTL	9667330932	vshweta866@gmail.com

Contents of the presentation given by DMRC on Reactive Power Management:

1. Reactive Power Compensation Study
2. Conclusions and Recommendations

1. Reactive Power Compensation study:

DMRC conducted detailed Load flow studies for Receiving Substations (RSS) to work out the extent of Reactive Power flow in the system. From load flow studies, it was observed that during No load and light load conditions system is likely to operate on leading power factor.

In order to analyze reactive power compensation, study was conducted with various configurations, considering reactive power generated by both loaded and unloaded incomers during No load and average loading conditions.

From load flow studies, it was observed that reactive power mainly has two contributors:-

Fixed reactive power due to:-

- HV cables (220/132/66 kV) from Grid Substation of DTL
- MV cables (33kV and 25 kV inside DMRC's own network)

Dynamic/ Variable Reactive power due to:-

- Variable Train load and Station Auxiliary Loads

Reactive power compensation study

Various schemes with different combinations of fixed/ Variable Reactors and Dynamic STATCOM were studied to select most techno economical compensation scheme.

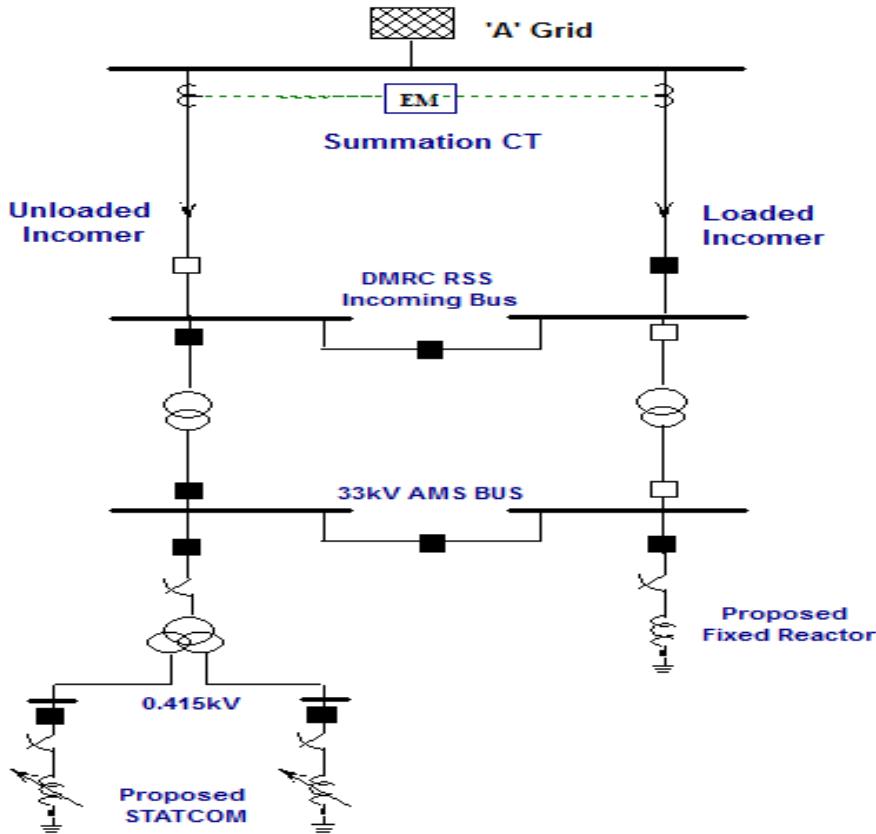
It was concluded that providing reactors at 66kV, 132kV and 220kV is complex and not feasible due to following reasons:-

- a) Two incoming feeders (main & standby) in DMRC RSS with frequent switch-overs,
- b) Space limitations, and also
- c) due to GIS substations.

Hence, additional cases were evaluated by considering Reactors and STATCOM either at 33kV or at 415V.

During discussions on final report on 15.03.2018, it was suggested to examine proposal to provide maximum compensation with fixed reactor and balance with variable STATCOMs along with summation CT set up at grid end.

Recommended Proposal: With Summation CT at grid end and with combination of fixed reactor & STATCOM with coupling transformer at 33kV AMS Bus.



Need of Summation CT

As is evident from the scheme, compensation for both “unloaded” and “loaded” feeder cables is possible by providing a common compensation at 33 kV BUS level in DMRC RSS, and by providing summation CT at Grid Substation of DTL. In this way, the compensation for both the cable feeders can be achieved, and Energy meter connected with summation CT will be able to read:-

Net Reactive Current = Leading on unloaded feeder cable – Lagging on loaded feeder cable)

Reactive power compensation study:

Option of providing STATCOMs at 415 V side of Auxiliary transformers is not viable, since amount compensation required for unity p.f. at grid end at each ASS transformers higher than the 33% of the transformer rated capacity, which is not permissible. Moreover, this scheme can effectively compensate only for local Station Auxiliary Loads.

2. Conclusions and Recommendations:

Reactive Power Compensation studies were carried out for different Substations of 66kV, 132kV and 220kV voltage level and proposing reactors (Fixed and TCR) and STATCOM for Dynamic Compensation. Different configurations were studied and load flow studies conducted to work out most techno economic solution for Reactive power compensation.

Optimum solution:-

Provide maximum reactive power compensation with fixed reactors and remaining compensation with STATCOMS, and use Summation CT at Grid Substation end.