

CEA-PS-11-21(19)/3/2019-PSPA-I Division



भारत सरकार

Government of India

विद्युत मंत्रालय

Ministry of Power

केन्द्रीय विद्युत प्राधिकरण

Central Electricity Authority

विद्युत प्रणाली योजना एवं मूल्यांकन-I प्रभाग

Power System Planning & Appraisal-I Division

To

-As per list enclosed-

**Subject: 1st Meeting of Northern Regional Power Committee (Transmission Planning)
(NRPCTP) – Additional Agenda note & Venue details**

Sir/ Madam,

The 1st meeting of Northern Regional Power Committee (Transmission Planning) (NRPCTP) is scheduled to be held at **9:30 AM** on **24th January 2020** at Jaisalmer Marriott Resort & Spa, **Jaisalmer, Rajasthan**. The agenda notes for the meeting have already been circulated vide CEA letter No.CEA-PS-11-21(19)/3/2019-PSPA-I Division dated 06.01.2020. The agenda and the additional agenda for the meeting are available on CEA website: www.cea.nic.in (path to access: Home Page - Wing - Power System - PSPA-I - Standing Committee on Power System Planning - Northern Region).

Kindly make it convenient to attend the meeting.

Yours faithfully,

(Goutam Roy) 15/11/2020

Chief Engineer

List of Addressee:

1.	Member Secretary, NRPC, 18-A ShajeedJeet Singh Sansanwal Marg, Katwaria Sarai, New Delhi - 110016 (Fax-011-26865206)	2.	Director (W &P) UPPTCL, Shakti Bhawan Extn,3rd floor, 14, Ashok Marg, Lucknow - 226 001 (Fax:0522-2287822)	3.	Director (Projects) PTCUL, Vidhyut Bhawan, Near ISBT -Crossing, Saharanpur Road, Majra, Dehradun-248002. Uttrakhand
4.	Director (Technical), Punjab State Transmission Corporation Ltd. (PSTCL) Head Office The Mall Patiala - 147001	5.	Member (Power) BBMB, Sectot-19 B Madhya Marg, Chandigarh-1 60019 (Fax-01 72-2549857	6.	Director (Operation) Delhi Transco Ltd. Shakti Sadan, Kotla Marg, New Delhi-110002 (Fax-01123234640)
7.	Director (PP&D) RVPN, 3 rd Floor, Room no 330, Vidhyut Bhawan, Janpath, Jaipur-302005.	8.	Director (Technical) HVPNL Shakti Bhawan, Sector-6 Panchkula-134109	9.	Director (Technical) HPSEB Ltd. Vidut Bhawan, Shimla -171004 Fax-0177-2813554
10.	Managing Director, HPPTCL, Barowalias, Khalini Shimla-171002 Fax-0177-2623415	11	Chief Engineer (Operation) Ministry of Power, UT Secretariat, Sector-9 D Chandigarh -161009 Fax-0172-2637880	12	Development Commissioner (Power), Power Department, Grid Substation Complex, Janipur, Jammu, Fax: 191-2534284
13.	COO (CTU) POWERGRID, Saudamini, Plot no. 2, Sector -29, Gurgaon-122 001 (Fax-0124-2571809)	14	Director (System operation), POSOCO B-9, Qutab Institutional Area, Katwaria Sarai New Delhi – 110010	15	MD, SECI, Prius Platinum, D-3, District Centre, Saket, New Delhi -17
16	CMD, NTPC, NTPC Bhawan, Core 7, Scope Complex-6, Lodhi Road. New Delhi	17	CMD, NHPC, NHPC Office Complex, Sector-33, NHPC, Faridabad-121003 (Fax-0129-2256055)		

Additional Agenda note for 1st Meeting of Northern Regional Power Committee (Transmission Planning) (NRPCTP):

AGENDA POINTS FROM CTU

1.0 Transmission system for grant of LTA & Connectivity to Nuclear Power Plant (4X700 MW) of NPCIL in Haryana:

- 1.1. Connectivity and LTA application was received in November, 2014 from NPCIL for 1400 (2x700) MW for their Nuclear power project in Haryana, however, the total plant capacity was 2800MW). Same was discussed during the 36th, 37th & 38th Standing Committee Meeting of Northern Region. During the meetings, HVPNL informed that NPCIL has acquired land in Haryana for total 2800 MW of generation. It was also discussed that a suitable scheme for power evacuation should be planned taking implementation of the capacity of 4x700 MW in a phased manner as the final capacity of the plant would be 4x700 MW. After detailed deliberations, it was agreed that the connectivity and LTA applications for 2x700MW may be closed and NPCIL may re-apply for total capacity of 2800 MW.
- 1.2. Subsequently, NPCIL applied for Connectivity and LTA application for 2800 MW in June'2019 for proposed Nuclear power project (4 x 700 MW) in Gorakhpur, Fatehabad (Haryana). The commissioning schedule of generation as per the application is progressively from 31st Oct'2024 till 31st March'2027.
- 1.3. The proposal for grant of Connectivity was discussed in 25th meeting of NR for Connectivity & LTA Applications held on 29/07/2019. During the meeting, it was deliberated that due to increase in short circuit level with the connection of this large quantum of Nuclear capacity at proposed connectivity points at Fatehabad & Kaithal, the proposal needs to be studied further. Accordingly, the proposal was reviewed and again discussed in 30th meeting of NR for Connectivity & LTA Applications held on 30/12/2019 and following transmission system was agreed in principle for grant of Connectivity & LTA subject to approval of Standing Committee/RPC(TP) in NR :

Transmission system for Connectivity:

- Gorakhpur Haryana Anu Vidyut Pariyojana (GHAVP) - Fatehabad (PG) 400 kV (Quad) D/c line – under the scope of applicant.
- Gorakhpur Haryana Anu Vidyut Pariyojana (GHAVP) – Patran (TBCB) 400 kV (Quad) D/c line – under the scope of applicant.
- with 2x125 MVAR Bus Reactor at Generation switchyard of NPCIL (under scope of NPCIL)

Transmission system for LTA:

- 1x500 MVA ICT at Patran 400/220 kV (TBCB) substation – to be implemented under ISTS

For transfer of 2800 MW to NR (Target) studies have been carried out and details are enclosed at **Appendix-I** wherein loading on various transmission lines is in order with proposed LTA/Connectivity system. Also, short circuit values at proposed connectivity points with the proposed transmission system is also well within the limits.

Members may deliberate.

2.0 Long Term Access (LTA) to NTPC Ltd. for 356.78 MW for its proposed Tanda TPS Stage-II (1320MW)

2.1 Long Term Access (LTA) was granted to NTPC Ltd. for 356.78 MW for its proposed Tanda TPS Stage-II (2x660 MW) vide Intimation Ref. no. C/CTU/N/07/1200000954 dated 17/01/2019 with following transmission system :

(i) **1st Unit (178.39 MW LTA with proportionate quantum of NR beneficiaries w.e.f. 01/07/2019 or availability of following UPPTCL Transmission system, whichever is later) :**

- i) LILO of Azamgarh–Sultanpur 400 kV S/C line at Tanda TPS by UPPTCL
- ii) 400/220 kV, 2x315 MVA ICTs at Tanda TPS by NTPC
- iii) Tanda (NTPC)-Tanda (New) (UPPTCL) 220 kV D/C line including 220 kV bays Tanda (NTPC) by UPPTCL

(ii) **2nd Unit [balance 178.39 MW (cumulative 356.78 MW LTA) w.e.f. 01/01/2020 or availability of following UPPTCL transmission system, whichever is later]:**

Following is the alternate transmission system till availability of Tanda – Gonda – Sahajahanpur 400kV D/C line:

- i) Establishment of 400/220/132 kV, 2x500 + 2x200 MVA GIS substation at Basti
- ii) Construction of Tanda TPS–Basti 400 kV D/C quad line
- iii) On completion Tanda-Gonda 400 kV D/C (Quad) line, one ckt. of Tanda – Basti 400 kV D/C line and one ckt of Tanda - Gonda would be connected bypassing Tanda TPS 400 kV switchyard (due to limited 400 kV bays at Tanda TPS), resulting in following configuration:
 - a) Tanda TPS–Gonda 400 kV S/C Quad line.
 - b) Tanda TPS–Basti 400 kV S/C Quad line.
 - c) Gonda–Basti 400 kV S/C Quad line.

(iii) Upon commissioning of planned transmission system of UPPTCL associated with Tanda TPS Stage-II mentioned below, the same shall be treated as part of LTA system as under:

- i) Tanda TPS–Gonda 400 kV S/C Quad line
- ii) Tanda TPS–Basti 400 kV S/C Quad line
- iii) Gonda–Basti 400 kV S/C Quad line
- iv) Gonda–Shahjahanpur (PG) 400kV D/C Quad line
- v) Establishment of 2x315 MVA, 400/220kV S/s at Shahjahanpur by LILO of both circuits of Lucknow (PG)–Bareilly (PG) 400kV D/C line
- vi) Establishment of 2x315 MVA, 400/220 kV substation at Gonda
- vii) LILO of Azamgarh-Sultanpur 400 kV S/C line at Tanda TPS
- viii) Tanda (NTPC)-Tanda (New) (UPPTCL) 220 kV D/C line including 220 kV bays Tanda (NTPC)
- ix) NTPC to provide space at Tanda TPS Generation Switchyard for two nos. of 220 kV bays

Based on the information from UPPTCL regarding commissioning of transmission system, LTA of 178.39 MW associated with 1st unit of Generation project has already been operationalized w.e.f. 24/09/2019.

2.2 Regarding LTA granted with 2nd unit, status of UPPTCL was requested vide email dated 12/12/2019 to inform the commissioning status of the transmission elements so as to facilitate operationalization of the LTA from 01/01/2020. UPPTCL, vide email dated 21/12/2019 has furnished the status of commissioning/expected commissioning dates for transmission elements as per following: -

Sr. No.	Transmission Elements - In reference	Commissioning	Remark
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	to LTA granted for 2nd Unit of Tanda TPS Stage-II [balance 178 MW (cumulative 356.78 MW LTA) w.e.f. 01/01/2020 or availability of following transmission elements, whichever is later]	/Expected Commissioning Date	
1.	400/220/132 kV, 2x500+2x200 MVA GIS S/s at Basti	30/04/2020	400 kV system for evacuation shall be ready by this date. The line will be ready by 31.03.2020
2.	Tanda TPS – Basti 400 kV D/C quad line	30/04/2020	
3.	Tanda – Gonda 400 kV D/C quad line (on completion of this line one ckt. of Tanda – Basti 400 kV D/C line and one ckt. of Tanda – Gonda 400 kV D/C line would be connected bypassing Tanda TPS 400 kV switchyard due to limited 400 kV bays at Tanda TPS, resulting in following configuration:- a. Tanda TPS – Gonda 400 kV S/C quad line b. Tanda TPS – Basti 400 kV S/C quad line c. Gonda – Basti 400 kV S/C quad line		Being constructed under PPP mode. Work held up due to insolvency of ISOLUX.

2.3 UPPTCL further informed that alternate connectivity w.r.t Sr. no. 3 mentioned above table has already been agreed in 40th meeting of SCSPNR held on 22/06/2018 and 1st meeting of NRSCT held on 11/09/2018 which is given below:-

“LILO of two ckts (ckt. no. 3rd & 4th) of Gorakhpur(PG)- Lucknow(PG) 400 kV D/C (twin) existing PGCIL line at Basti”

UPPTCL requested that the same may kindly be incorporated in place of “Tanda – Gonda 400 kV D/C quad line” and “Gonda-Shahjahanpur (PG) 400 kV D/C quad line” mentioned against planned transmission system of UPPTCL in LTA (356.78 MW) granted to NTPC vide intimation Ref no. C/CTU/N/07/1200000954 dated 17/01/2019 as Construction Work of above line has been completed and all 4 ckts shall be commissioned by 30.04.2020 alongwith 400 kV Basti substation.

2.4 Accordingly, it is requested to modify transmission system for LTA to NTPC Ltd. for 356.78 MW for its Tanda TPS Stage-II (1320MW) as below :

(iv) 1st Unit (178.39 MW LTA with proportionate quantum of NR beneficiaries w.e.f. 01/07/2019 or availability of following UPPTCL Transmission system, whichever is later) :

- i) LILO of Azamgarh–Sultanpur 400 kV S/C line at Tanda TPS by UPPTCL
- ii) 400/220 kV, 2x315 MVA ICTs at Tanda TPS by NTPC
- iii) Tanda (NTPC)-Tanda (New) (UPPTCL) 220 kV D/C line including 220 kV bays Tanda (NTPC) by UPPTCL

(v) 2nd Unit [balance 178.39 MW (cumulative 356.78 MW LTA) w.e.f. 01/01/2020 or availability of following UPPTCL transmission system, whichever is later]:

Following is the alternate transmission system till availability of Tanda – Gonda –

Sahajahanpur 400kV D/C line:

- i) Establishment of 400/220/132 kV, 2x500 + 2x200 MVA GIS substation at Basti
- ii) Construction of Tanda TPS–Basti 400 kV D/C quad line
- iii) LILO of two ckts (ckt. no. 3rd & 4th) of Gorakhpur(PG)- Lucknow(PG) 400 kV D/C (twin) existing PGCIL line at Basti

(vi) Upon commissioning of planned transmission system of UPPTCL associated with Tanda TPS Stage-II mentioned below, the same shall be treated as part of LTA system as under:

- i) Tanda TPS–Gonda 400 kV S/C Quad line
- ii) Tanda TPS–Basti 400 kV S/C Quad line
- iii) Gonda–Basti 400 kV S/C Quad line
- iv) Gonda–Shahjahanpur (PG) 400kV D/C Quad line
- v) Establishment of 2x315 MVA, 400/220kV S/s at Shahjahanpur by LILO of both circuits of Lucknow (PG)–Bareilly (PG) 400kV D/C line
- vi) Establishment of 2x315 MVA, 400/220 kV substation at Gonda
- vii) LILO of Azamgarh-Sultanpur 400 kV S/C line at Tanda TPS
- viii) Tanda (NTPC)-Tanda (New) (UPPTCL) 220 kV D/C line including 220 kV bays Tanda (NTPC)
- ix) NTPC to provide space at Tanda TPS Generation Switchyard for two nos. of 220 kV bays
- x) LILO of two ckts (ckt. no. 3rd & 4th) of Gorakhpur(PG)- Lucknow(PG) 400 kV D/C (twin) existing PGCIL line at Basti

2.5 During 40th meeting of Standing Committee on NR it was discussed that there are two nos. of 400 kV D/C quad line between Lucknow (PG) and Gorakhpur (PG) with FSC on both D/C line at Lucknow end. Both the 400 kV D/C line has got 63 MVAR switchable line reactors at both ends. After LILO, the Gorakhpur- Lucknow 400 kV D/C line at Basti, Basti-Lucknow section would be about 225 km in length, for which, UPPTCL needs to provide line reactors at Basti end along with 125 MVAR bus reactor at Basti.

Members may discuss.

3.0 Transmission scheme for Solar Energy Zones (SEZs) in Rajasthan (11.1 GW – 8.1 GW ISTS + 3 GW Intra state) under Phase-II

3.1 Transmission scheme for SEZs in Rajasthan under Phase-II was agreed in 5th meeting of NRSCT held on 13.09.2019. The subject scheme also includes following transmission elements:

- a. Removal of LILO of Bawana – Mandola 400kV D/c(Quad) line at Maharani Bagh/ Gopalpur S/s. Extension of above LILO section from Maharani Bagh/Gopalpur upto Narela S/s so as to form Maharani Bagh – Narela 400kV D/c(Quad) and Maharani Bagh -Gopalpur-Narela 400kV D/c(Quad) lines
- b. ± 600 MVAR STATCOM along with 4x125 MVAR MSC & 2x125 MVAR MSR each at Fatehgarh-II & Bhadla-II S/s

LILO of Bawana-Mandola 400kV D/c(Quad) at Maharani Bagh is presently being carried out using Twin HTLS conductor on Multicircuit tower. Considering that LILO is already being constructed with HTLS conductor, it would be prudent to construct extension of LILO section with Twin HTLS conductor instead of Quad conductor. Further, considering RoW issues in Delhi area, it is proposed to construct extension of LILO section also on multi-circuit towers. With these changes same type of conductor & towers shall be utilized for extension portion also.

3.2 In view of increased penetration of Renewable Capacity, STATCOMs were agreed to provide

dynamic reactive power support & reliable power evacuation from REZ at Bhadla-II, Fatehgarh-II & Bikaner. Regarding implementation of STATCOMs at Fatehgarh-II & Bhadla-II S/s, following issues/difficulties may be encountered with +/-600MVAR STATCOM:

- +/-600MVAR STATCOM; 4x125MVAR MSC; 2x125MVAR MSR, maximum continuous rating is 1100MVAR (approx.) which require a Coupling Transformer of 1200MVAR (approx.) capacity. Coupling Transformer of such large capacity may not be feasible in 400kV class.
- In case of single STATCOM station unit running at full capacity, tripping of STATCOM station (i.e. sudden outage of 1100MVAR) may affect system stability.
- The 400kV Bus is also proposed to be divided into two sections. Therefore, by providing complete STATCOM station in only one section of the 400kV Bus will lead to the complete outage of STATCOM station in case of outage of corresponding 400kV Bus Section.
- MV Bus current continuous rating shall be so high such that Switchgear for required rating may not readily be available.

In view of above, it is proposed to split the total STATCOM capacity into two equal set of STATCOM (+/-300MVAR STATCOM; 2x125MVAR MSC; 1x125MVAR MSR) one on each side of 400kV Bus Section for both Fatehgarh-II & Bhadla-II S/S.

3.3 Members may deliberate.

4.0 220kV Outlets at Neemrana, Kotputli & Jaipur (South) 400/220 kV POWERGRID substations

4.1 During 23rd Standing Committee meetings held on 16/02/2008, due to increasing demand density, the norms for providing 220 kV bays at 400/220 kV ISTS substations were agreed as below:

- For 2x315 MVA - 6 nos. of line bays
- For 3rd 315 MVA transformer - 2 line bays
- For 500 MVA transformer - 4 nos. of line bays

In line with above decision all the new substations were being constructed with the above agreed norms for 220 kV bays. Accordingly, while implementing the new S/s at Jaipur(South), Kotputli, Neemrana 8,6 & 6 nos. of 220kV line bays were provided respectively.

4.2 Recently RVPNL, vide letter No. RVPN/ SE (P&P)/XEN-2(P&P)/AE-2/F.2/D dated 04/10/2019 has forwarded CERC order dated 05/08/2015 & requested that POWERGRID may get the norms revised/withdrawn which were earlier approved in 23rd Standing Committee meeting for providing 220kV bays with 400/220kV transformers at their GSS and the 220kV bays be decided in-consultation with STUs as per the requirement.

In regard to above it is to inform that the above issue has already been deliberated during 39th NRPC meeting held on 01-02/May/2017 that 220 kV outlets at all 400 kV ISTS stations shall be constructed in consultation with concerned STUs as per their requirement and same is being followed.

Members may note.

5.0 Up-gradation of Tehri Pooling Station–Meerut 765kV 2xS/c lines (operated at 400 kV) at its rated voltage

5.1 During the 39th SCM of NR, the issue of oscillations at Tehri complex under contingency condition was discussed and it was agreed to de-link the up-gradation of Tehri-Meerut 765 kV 2 x S/C lines (presently operated at 400 kV) along with reactive compensation with the commissioning of Tehri PSP generation project. In this regard it may be mentioned that under Tehri PSP transmission system 4x800 MVA, 765/400 kV ICTs at Tehri Pooling station were agreed, however considering the power evacuation requirement only 3x800 MVA ICTs may be covered under strengthening and 4th ICT may be with Tehri PSP. Similarly, Tehri Generation – Tehri Pooling Stn. 400 kV (Quad Conductor) may also be for Tehri PSP evacuation.

6.0 Operational feedback of POSOCO

The operational feedback of POSOCO for Q2 of 2019-20 was published by POSOCO on 25/10/2019 respectively. The transmission constraints in ISTS network for this quarters and their remedial actions as mentioned in Operational Feedback are tabulated below along with CTU inputs on the matter:

Sl. No.	Transmission Element	Description of Constraints	Remarks by CTU
1	400/220kV Amritsar	Amritsar has 2*315+1*500 MVAICTs. Since 13th June 2019, when paddy season of Punjab has started, loading of Amritsar ICTs has remained above the N-1 contingency limits for most of the time. Remarks: Since work on more 220kV lines is under progress at Amritsar(PG), it is necessary that capacity of existing ICTs be enhanced or new ICT planned at Amritsar or nearby 400kV station such as Makhu.	4 th 500 MVA, 400/220kV ICT at Amritsar is already approved during 4 th NRSCT. MOP yet to assign the work to implementing agency.
2	400/220kV Sohawal	Sohawal has 2*315MVA ICTs. N-1 non-compliance was observed at the time of high demand in Uttar Pradesh	The matter was already discussed in 3 rd NRSCT meeting. UPPTCL may clarify regarding requirement of additional ICT in view of new substations being implemented by UPPTCL in the vicinity of Sohawal.
4	Low voltage at Bhadla S/s	Large amount of solar generation has been/ is being commissioned near Bhadla area in Rajasthan. Evacuation of this solar generation is being facilitated by 400/220kV Bhadla (Rajasthan) and 765/400/220kV Bhadla (POWERGRID) substations.	STATCOM are already agreed in 5 th NRSCT for implementation at Bhadla-II, Fatehgarh-II & Bikaner along with MSC to improve voltage in Bhada, Fatehgarh & Bikaner complex.

		<p>In real time, however, it is being observed that at time of high solar generation in this pocket, voltages at 400/220kV Bhadla (Rajasthan), 400/220kV Bhadla (POWERGRID), etc. are on lower side (even below 380kV at around 12:00hrs).</p> <p>Solar generators in the area both stated owned and IPPs connected at Bhadla (Raj) and Bhadla (PG) are not absorbing/generating MVAR as per grid voltages</p>	MOP yet to assign the work to implementing agency.
5	Nodes experiencing high voltage & line tripping.	High voltage is reported at Mahendergarh, Allahabad, Fatehpur, Agra, Jaipur south & Kotuputli ISTS substations.	About 4000 MVAR Reactive compensation at various buses of NR including 500 MVAR at Kurukshetra is already agreed for implementation. Voltages are expected to be within permissible range with commissioning of above reactive compensation. Reactors & TCR which were agreed under ISTS are already taken up for implementation.

7.0 Agenda for charging of Fatehgarh-II – Bhadla Section (After LILO of Fatehgarh – Bhadla 765kV D/c line (to be operated at 400kV) at Fatehgarh-II)

7.1. Fatehgarh – Bhadla 765kV D/c line (to be operated at 400kV) is under implementation by Fatehgarh Bhadla Transmission Ltd. (FBTL) under TBCB and expected to be completed by March, 2020. Further, LILO of this line at Fatehgarh-II PS along with charging of Fatehgarh-II – Bhadla Section at 765 kV is also under implementation with completion schedule as December, 2020.

7.2. It may be observed that initially Fatehgarh – Bhadla 765kV line will be terminated at 400kV switchyard of Bhadla S/s and later on it would be required to be terminated at 765kV switchyard of Bhadla S/s. However, 400kV Switchyard and 765kV Switchyard are at two extreme ends of the substation. Thus to facilitate charging of Fatehgarh-II – Bhadla Section at 765kV re-routing of the line for about 3 km shall be required.

Members may deliberate.

8.0 Interim arrangement at Moga substation for the intermediate period between commissioning of Bikaner-Moga 765 kV D/c line and implementation of proposed 400 kV bus splitting at Moga

8.1 In order to address the issues of high loading on 765/400kV & 400/220 kV ICTs and high short circuit level at Moga (PG) 400kV bus, following bus splitting arrangement at Moga was agreed in the 3rd Meeting of NRSCT held on 24.05.2019:

400kV Bus Section-1 (GIS Bus)

- 400kV Kishenpur D/c feeders
- 400kV Hisar D/c feeders
- 2 nos. 765/400kV transformers
- 1 No. 50 MVAR

400kV Bus Section-2 (AIS Bus)

- 400kV Jalandhar D/c feeders
- 400kV Bhiwani feeder
- 400kV Fatehabad feeder
- 400kV Nakodar feeder
- 400kV Talwandi Sabo/Malkana Feeder
- 4 nos. 400/220kV transformers
- 1 No. 125 MVAR

8.2 During above meeting, it was agreed that above scheme would become part of Bikaner- Moga 765 kV D/C line as a supplementary strengthening scheme under ISTS. This Scheme shall remain associated with the transmission scheme of Bikaner-Moga 765 kV D/C line and would require to be completed in same time of the line. However, since Bikaner-Moga line is in advance stage of implementation, suitable operational measures in consultation with POSOCO shall need to be taken up. It was also agreed that a separate meeting may be convened with CEA, CTU, POSOCO and PSTCL to finalise the interim arrangement at Moga substation for the intermediate period between commissioning of Bikaner-Moga 765 kV D/c line and implementation of 400kV bus splitting at Moga.

8.3 Accordingly to deliberate the above, a meeting was held at CEA on 03.12.2019 among CEA, CTU, POSOCO and PSTCL to deliberate on the matter. During the meeting, CTU stated that as of now, 1430 MW Solar Generation projects are connected at ISTS in Bhadla/Bikaner complex which are being evacuated even in the absence of Bikaner – Moga 765kV D/c line. Till the month of June 2020, no additional solar power generation is expected to be commissioned. New solar generation of 50 MW is expected in the month of July, 2020. Further, CTU stated that they have carried out studies for two scenarios i.e. Paddy season (mid June to September) and non-paddy season and with & without Bikaner-Moga 765kV D/c line and without 400kV Bus Splitting arrangement at Moga (PG). From the load flow studies of paddy season scenario it was observed that upto 2600 MW power transfer on Bikaner-Moga 765kV D/c line the flow on the downstream system at Moga remains under normal limits. Further as per studies no overloading in Punjab system is expected during the non-paddy season. Accordingly, it was proposed to go ahead with the commissioning of Bikaner – Moga line.

8.4 After detailed deliberations, it was agreed that:

- i. CTU would share system studies with PSTCL, based on which, PSTCL may forward its observations, if any, related to off peak season (i.e. Jan-April) as Bikaner-Moga 765kV D/c line is expected to be commissioned by end of February, 2020.

- ii. Revised studies for Punjab Peak Load would be carried out for capturing the realistic scenario of Generation additions in Rajasthan so that suitable interim measures including implementation of SPS may be worked out for restricting the flow in Punjab downstream system through 765/400kV ICTs in Moga.

8.5 Accordingly, Load Flow Studies for Feb'20, June'20 and Dec'20 time frame were shared by CTU with CEA, PSTCL and POSOCO. The study report is attached at **Annexure-I**. From studies, it may be observed that loading on Moga 765/400kV and 400/220kV ICTs even under n-1 contingency is within permissible limits without proposed splitting of the bus at Moga S/s till Dec'20 timeframe. Also no critical loading has been observed on 220kV underlying network at Moga of Punjab. Thus, as of now, Bikaner – Moga 765kV D/c line can be commissioned without any constraint.

8.6 In view of above, for catering to the load requirement of Punjab till Dec'20 timeframe, there may not be requirement of any specific interim measure. However, as agreed, revised studies for Punjab Peak Load may be carried out with realistic scenario of Generation additions in Rajasthan so that suitable interim measures including implementation of SPS may be worked out for restricting the flow in Punjab downstream system through 765/400kV ICTs in Moga beyond Dec'20 timeframe.

Members may deliberate.

9.0 Data Requirements from STUs for Transmission Planning

9.1 To ensure proper development of ISTS system it is important to timely assess generation capacity & demand growth in various parts of the region and to review the upstream & downstream network associated with the transmission schemes

9.2 The CERC Planning Regulations, 2018 also mandates that Regional Power Committee(s) shall assist in preparation of base case in consultation with STUs/ Distribution licensees of the region.

9.3 In the MoP Order No 15/3/2017-Trans dated 04-11-2019, the ToR of NCT states that *CTU shall also make a comprehensive presentation before the National Committee every quarter for ensuring development of an efficient, co-ordinated and economical inter-State transmission system for smooth flow of electricity*. Accordingly, inputs are required from states for carrying out the above task.

9.4 The data requirements from STUs pertain to the following broad categories:

- i) Demand Projection (peak & off-peak, on quarterly & annual basis)
- ii) Intra-state Generation capacity addition plans along with expected commissioning schedules.
- iii) Existing and under-construction intra-state transmission network up to 220kV level except NER where data upto 132kV level shall be required.
- iv) Intra state network augmentation plans of STUs along with expected commissioning schedules.

States shall be required to provide dynamic model data for state connected power system elements including generators, FACTS devices, HVDCs, etc. in PSS®E standard models.

9.5 The requisite data needs to be provided in standard formats. Accordingly, STUs are requested to nominate primary and alternate contacts for further coordination in this regard.

Members may discuss.

10.0 Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase-II - Provision of spare ICT/Reactors and future space in the already agreed transmission scheme.

10.1 Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase-II was agreed in the 5th meeting of Northern Region Standing Committee on Transmission (NRSCT) held on 13/09/2019. Subsequently, transmission system for solar energy zones (8.1GW) under Phase-II alongwith provision of spares and future space was agreed & recommended for implementation during 6th NCT meeting held on 30/09/2019. The details of spares & future space under aforesaid schemes is given below:

Sr. No.	Approved in 5 th NRSCT Meeting held on 13.09.2019	Corresponding Future Space and Spare ICTs/Reactors Unit
1	Establishment of 400/220 kV, 4x500 MVA at Ramgarh – II PS with 420kV (2x125 MVAR) bus reactor	Future provisions: Space for 400/220 kV ICTs along with bays: 2 400 kV line bays along with switchable line reactor:2 220 kV line bays:4 420 kV reactors along with bays: 1
2	1x240 MVAR Switchable line reactor for each circuit at each end of Fatehgarh-II – Bhadla- II 765kV D/c line (2 nd)	1x80 MVAR spare reactor each at Fatehgarh-II and Bhadla-II to be used as spare for Fatehgarh-II – Bhadla-II 765kV D/c line (2 nd)
3	Establishment of 765/400 kV, 2x1500 MVA at Sikar – II with 400kV (1x125 MVAR) and 765 kV (2x330 MVAR) bus reactor	765/400kV, 500 MVA spare single phase ICT-1 110 MVAR, 765 kV, 1 ph Reactor spare unit -1 Future provisions: Space for- 765/400kV ICT along with bays -2 765 kV line bays along with switchable line reactors – 10 400 kV line bays along with switchable line reactor –6 400/220kV ICT along with bays -4 220kV bays -8 400kV bus reactor -2
4	Establishment of 400/220 kV, 6x500 MVA Pooling Station at Bikaner –II PS with suitable bus sectionalisation at 400 kV and 220 kV level and with 420kV (2x125 MVAR)bus reactor	Future provisions: Space for 400/220 kV ICTs along with bays:4 400 kV line bays:6 220 kV line bays:6 420 kV reactors along with bays: 2
5	Establishment of 765/400 kV, 3X1500 MVA GIS substation at Narela with 765 kV (2x330 MVAR) bus reactor and 400 kV (1x125 MVAR) bus reactor	765/400kV, 500 MVA spare ICT (1-phase) – 1 110 MVAR, 765 kV, 1-Ph Bus Reactor (spare unit) -1 (1x110 MVAR spare reactor at Khetri to be used as spare for Khetri – Narela 765 kV D/c line) Future provisions: Space for 765/400kV ICTs along with bays: 1 765 kV line bays along with switchable line reactor: 6

		400 kV line bays: 6+4 765kV reactor along with bays:2 400/220 kV ICTs along with bays:8 220 kV line bays: 12 400 kV bus reactor along with bays:2
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Members may approve.

11.0 Down Stream network by State utilities from ISTS Station:

Augmentation of transformation capacity in various existing substations as well as addition of new substations along with line bays for downstream network are under implementation at various locations in Northern Region. For utilization of these transformation capacities, implementation of downstream 220kV system needs to be commissioned. Monitoring of downstream network are also being carried out in monthly OCC meetings. The details have been enclosed as Annexure-II. STUs are requested to furnish the updates of the downstream system planned/under construction associated with the listed ISTS substation.

12.0 Summary of LTA/Connectivity granted in Bhadla/Fatehgarh/Bikaner Complex

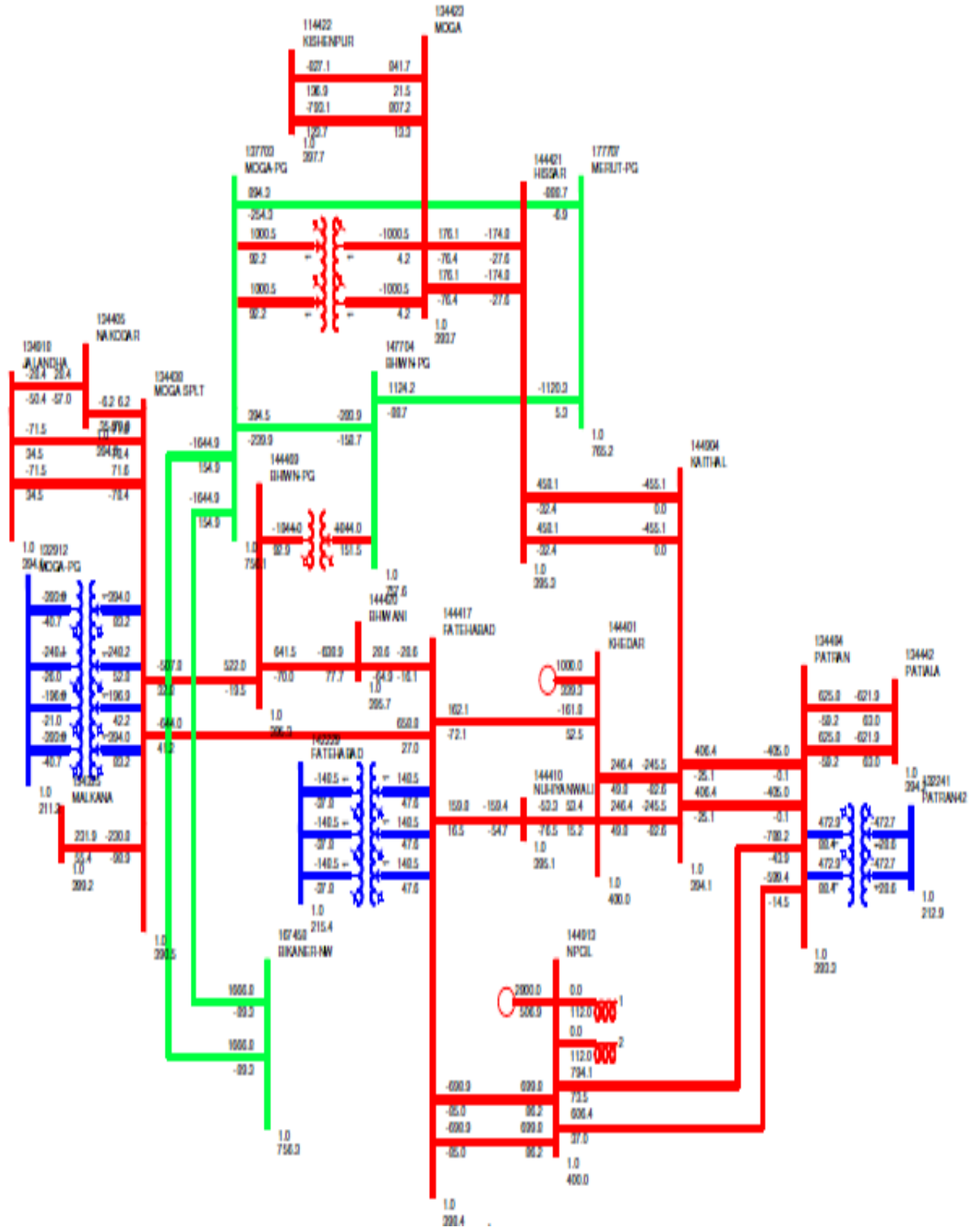
Transmission System for Solar Energy Zones in Rajasthan (8.9GW) under Phase-I and Transmission schemes were agreed for Solar Energy Zones (SEZs) in Rajasthan (8.1 GW) under Phase-II was agreed in 2nd NRSCT meeting and 5th NRSCT meeting held on 13.11.2018 and 13.09.2019 respectively. Summary of Stage-II Connectivity/LTA granted in various Connectivity/LTA meetings is given below

S.No	Substation	Stage –II Connectivity		LTA	
		Applied (MW)	Granted/Agreed for Grant (MW)	Applied (MW)	Granted/Agreed for Grant (MW)
1	Bhadla PS	1250 (8 nos.)	1050	1050 (6 nos.)	1050
2	Bhadla-II PS	3080 (7 nos.)	1830	1175 (2 nos.)	1175
3	Bikaner	2400 (8 nos.)	1800	2400 (8 nos.)	1800
4	Fatehgarh	1200 (4 nos.)	1200	1200 (4 nos.)	1200
5	Fatehgarh-II	5120 (14 nos.)	3420	2340 (7 nos.)	1590
6	Ramgarh	500 (1 Nos.)	-	-	-
	Total	13550	9300	7865	6815

The substation wise detail of Connectivity/LTA agreed/granted during 25th – 30th Connectivity and LTA meeting of NR is given at **Annexure-III**.

Members may note.

**Evacuation of Power from Gorakhpur Haryana Anu Vidyut Pariyojana (GHAVP) – 4x
700 MW**



Annexure-I

Study for power evacuation at Moga substation for the intermediate period between commissioning of Bikaner-Moga 765 kV D/c line and implementation of 400 kV bus splitting at Moga.

➤ Scenario-1: Feb'20 Time Frame

1. Load Generation Scenario

- a. Load Generation Scenario of Northern Region as well as Punjab for Feb'20 time - frame considered for this study:

	Generation (MW)	Demand (MW)	Net Surplus (MW)
Punjab	3997	6530	- 2533 (Import)
Northern Region	45622	51714	- 6092 (Import)

- b. About 10% growth in demand has been considered in peak demands met during month of Feb'19 as available on POSOCO website.
- c. Presently 1430MW solar generation has been commissioned in Bhadla/Bikaner complex of Western Rajasthan which is being evacuated without Bikaner – Moga 765kV D/c line.
- d. Renewable generation despatch in above complexes has been considered as 100% in order to simulate a stressed scenario.
- e. Further, till the month of July 2020, no additional solar power generation is expected to be commissioned.

2. Load Flow Study Cases & Results

Following load flow cases have been performed:

- a. BASE CASE – With Bikaner – Moga 765kv D/c line (**Exhibit S1-Base Case**)
- b. CASE-1 – Outage of one circuit of Bikaner – Moga 765kV D/c line (**Exhibit S1-Case-1**)
- c. CASE-2 – Outage of 1x1500MVA, 765/400kV ICT at Moga (**Exhibit S1-Case-2**)
- d. CASE-3 – Outage of 1x500MVA, 400/220kV ICT at Moga (**Exhibit S1-Case-3**)

Results of Load Flow Studies are summarized below:

TABLE-1

Sl.	Line/ICT	BASE CASE Loading (MW)	CASE-1 Loading (MW)	CASE-2 Loading (MW)	CASE-3 Loading (MW)
1	Bikaner – Moga 765kV D/c line	2x905	1x1285	2x889	2x902
2	Moga ICTs (2x1500MVA)	2x185	2x74	1x290	2x178
3	Moga ICTs (2x500+1x315+1x250MVA)	2x142+1x89+1x71	2x131+1x83+1x66	2x138+1x87+1x69	1x177+1x112+1x87
4	Moga PS – Talwandi Bhai 220kV D/c line	2x57	2x54	2x56	2x48

It may be noted that no constraints has been observed on above elements even under n-1 category without proposed splitting of the bus at Moga S/s. Also no critical loading has been observed on 220kV underlying network of Punjab. Thus, there is no constraint in commissioning of Bikaner – Moga 765kV D/c line. In fact, as per studies, a loss reduction of about 80MW has also been observed for Northern Region with charging of Bikaner – Moga 765kV D/c line.

➤ Scenario-2: June'20 Time Frame

1. Load Generation Scenario

- a. Load Generation Scenario of Northern Region as well as Punjab for June'20 time - frame considered for this study:

	Generation (MW)	Demand (MW)	Net Surplus (MW)
Punjab	6950	13302	- 6350 (Import)
Northern Region	44013	58887	- 14877 (Import)

- b. Presently 1430MW solar generation has been commissioned in Bhadla/Bikaner complex of Western Rajasthan which is being evacuated without Bikaner – Moga 765kV D/c line.
- c. Further, 4500MW power flow has been considered on Champa – Kurukshetra HVDC link.
- d. Renewable generation despatch has been considered as 100% in order to simulate a stressed scenario.
- e. As per LTA details, only 50MW additional power is expected to be commissioned in the month of July 2020 and no additional solar power generation is expected to be commissioned till Sep/Oct'20.

2. Load Flow Study Cases & Results

Following load flow cases have been performed:

- a. BASE CASE – With Bikaner – Moga 765kv D/c line (**Exhibit S2-Base Case**)
- b. CASE-1 – Outage of one circuit of Bikaner – Moga 765kV D/c line (**Exhibit S2- Case-1**)
- c. CASE-2 – Outage of 1x1500MVA, 765/400kV ICT at Moga (**Exhibit S2- Case-2**)
- d. CASE-3 – Outage of 1x500MVA, 400/220kV ICT at Moga (**Exhibit S2- Case-3**)
- e. CASE-4 – Outage of 2x660MW Generating Units at Talwandi Sabo (**Exhibit S2- Case-4 A**)

Results of Load Flow Studies are summarized below:

TABLE-2

Sl.	Line/ICT	BASE CASE Loading (MW)	CASE-1 Loading (MW)	CASE-2 Loading (MW)	CASE-3 Loading (MW)	CASE-4 Loading (MW)
1	Bikaner – Moga 765kV D/c line	2x1120	1x1573	2x1063	2x1115	2x1193
2	Moga ICTs (2x1500MVA)	2x774	2x634	1x1196	2x757	2x956 (1x1477)*
3	Moga ICTs (2x500+1x315+1x250MVA)	2x367+1x231+ 1x184	2x354+1x223+ 1x177	2x351+1x221+1 x175	1x456+1x287+ 1x228	2x387+1x243+ 1x193
4	Moga PS – Talwandi Bhai 220kV D/c line	2x170	2x166	2x165	2x145	2x184

* With outage of 1x1500MVA ICT (Exhibit S2- Case-4 B)

It may be noted that no constraints has been observed on above elements even under n-1 contingency without proposed splitting of the bus at Moga S/s. It may also be observed that about 2500MW power can be evacuated through Bikaner – Moga 765kV D/c line without overloading the 765/400kV ICTs. Also no critical loading has been observed on 220kV underlying network at Moga of Punjab. Thus, there is no constraint in commissioning of Bikaner – Moga 765kV D/c line. In fact, as per studies, a loss reduction of about 60MW has also been observed for Northern Region with charging of Bikaner – Moga 765kV D/c line.

➤ Scenario-3: Dec'20 Time Frame

1. Load Generation Scenario

- a. Load Generation Scenario of Northern Region as well as Punjab for Dec'20 time - frame considered for this study:

	Generation (MW)	Demand (MW)	Net Surplus (MW)
Punjab	4303	7138	- 2835 (Import)
Northern Region	47920	52400	- 4483 (Import)

- b. About 10% growth in demand has been considered in peak demands met during month of Dec'18 as available on POSOCO website.
- c. Transmission System for Solar Energy Zones in Rajasthan (8.9GW) under Phase-I has been considered for this study. Presently, this system is under implementation.
- d. Further, 4500MW power flow has been considered on Champa – Kurukshetra HVDC link.
- e. About 10500MW LTA (7.115MW-part of 8.9GW & 3.33 GW earlier granted) for solar generation projects has been received/granted in Fatehgarh/Bhadla/Bikaner complex of Western Rajasthan. However, 12.23GW solar generation with 100% despatch has been considered in above complexes in order to simulate a stressed scenario.

2. Load Flow Study Cases & Results

Following load flow cases have been performed:

- a. BASE CASE – With Bikaner – Moga 765kv D/c line (**Exhibit S3- Base Case**)
- b. CASE-1 – Outage of one circuit of Bikaner – Moga 765kV D/c line (**Exhibit S3- Case-1**)
- c. CASE-2 – Outage of 1x1500MVA, 765/400kV ICT at Moga (**Exhibit S3- Case-2**)
- d. CASE-3 – Outage of 1x500MVA, 400/220kV ICT at Moga (**Exhibit S3- Case-3**)
- e. CASE-4 – Outage of Bikaner – Khetri 765kV D/c line (**Exhibit S3- Case-4 A**)

Results of Load Flow Studies are summarized below:

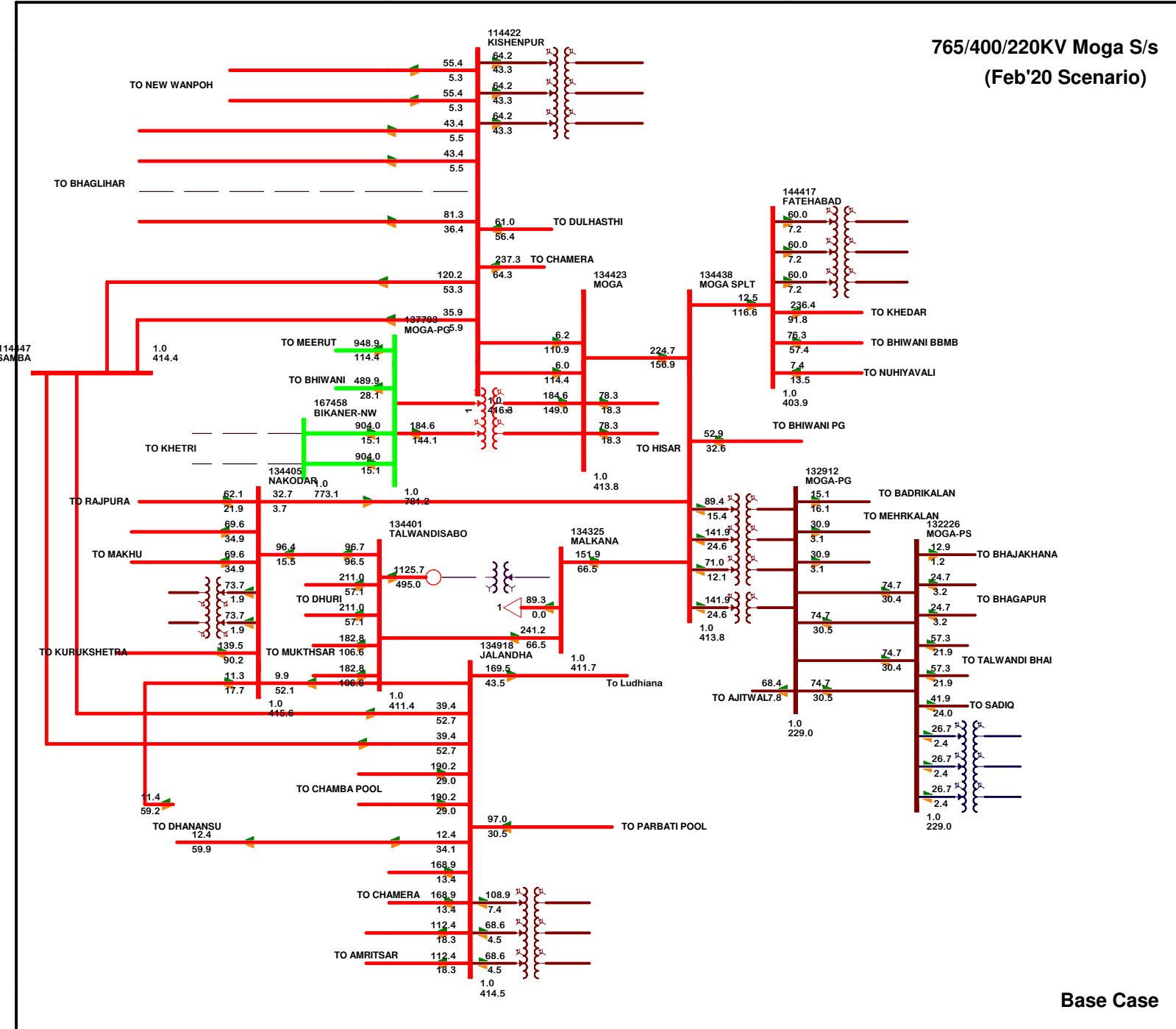
TABLE-3

Sl.	Line/ICT	BASE CASE Loading (MW)	CASE-1 Loading (MW)	CASE-2 Loading (MW)	CASE-3 Loading (MW)	CASE-4 Loading (MW)
1	Bikaner – Moga 765kV D/c line	2x1520	1x2015	2x1457	2x1517	2x2071
2	Moga ICTs (2x1500MVA)	2x674	2x458	1x1041	2x664	2x917 (1x1409)*
3	Moga ICTs (2x500+1x315+1x250MVA)	2x212+1x134+ 1x106	2x192+1x223+ 1x96	2x198+1x125+1 x99	1x265+1x167+ 1x132	2x232+1x146+ 1x116
4	Moga PS – Talwandi Bhai 220kV D/c line	2x93	2x87	2x88	2x79	2x99

* With outage of 1x1500MVA ICT (Exhibit S2- Case-4 B)

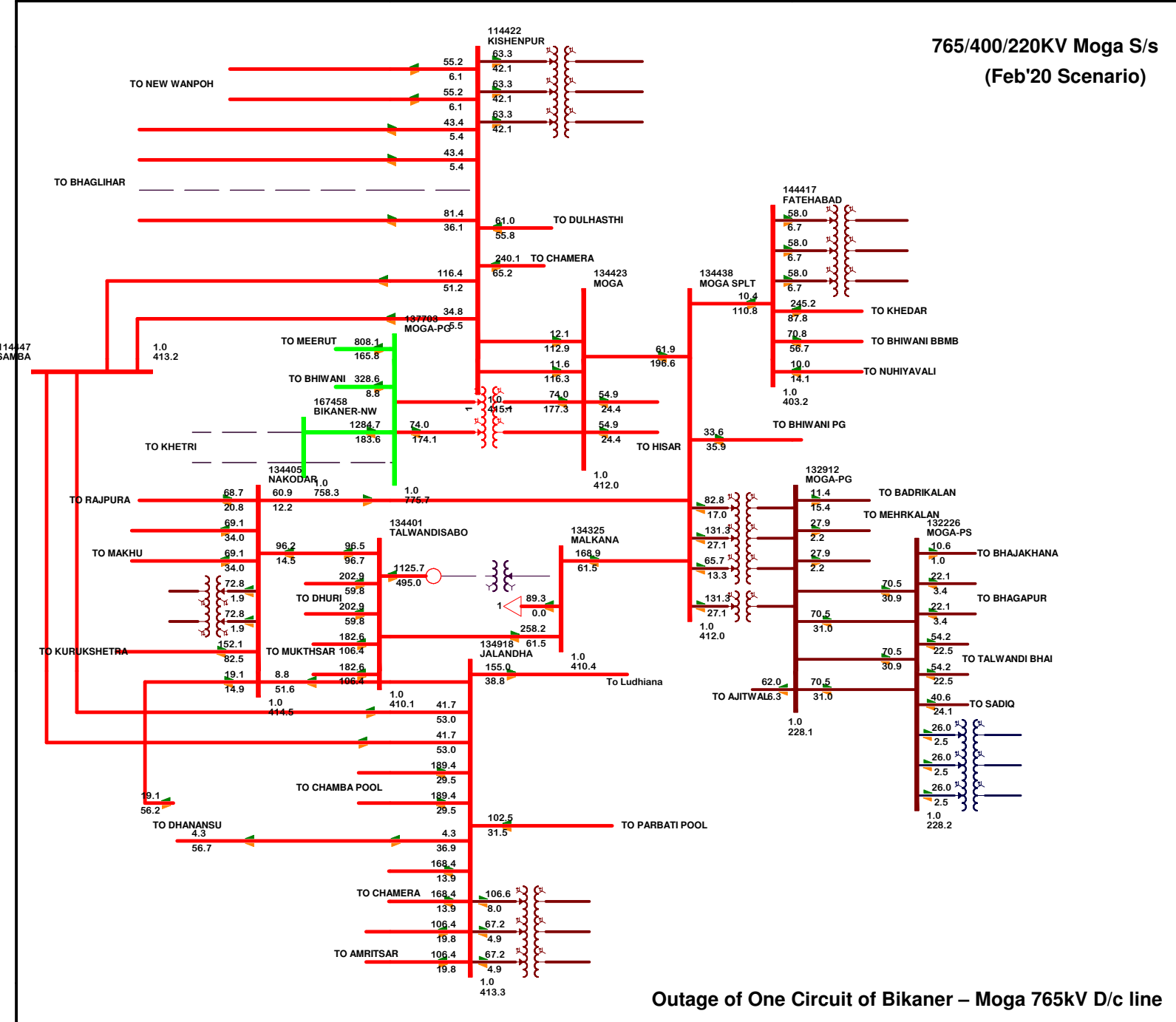
It may be noted that no constraints has been observed on above elements even under n-1 contingency without proposed splitting of the bus at Moga S/s. It may also be observed that even in case of outage of both circuits of Bikaner - Khetri 765kV D/c line (under implementation as a part of Rajasthan SEZ (8.9GW), 765/400kV ICTs at Moga do not get overloaded. Also no critical loading has been observed on 220kV underlying network of Punjab. Thus, there is no constraint in commissioning of Bikaner – Moga 765kV D/c line.

765/400/220KV Moga S/s
(Feb'20 Scenario)

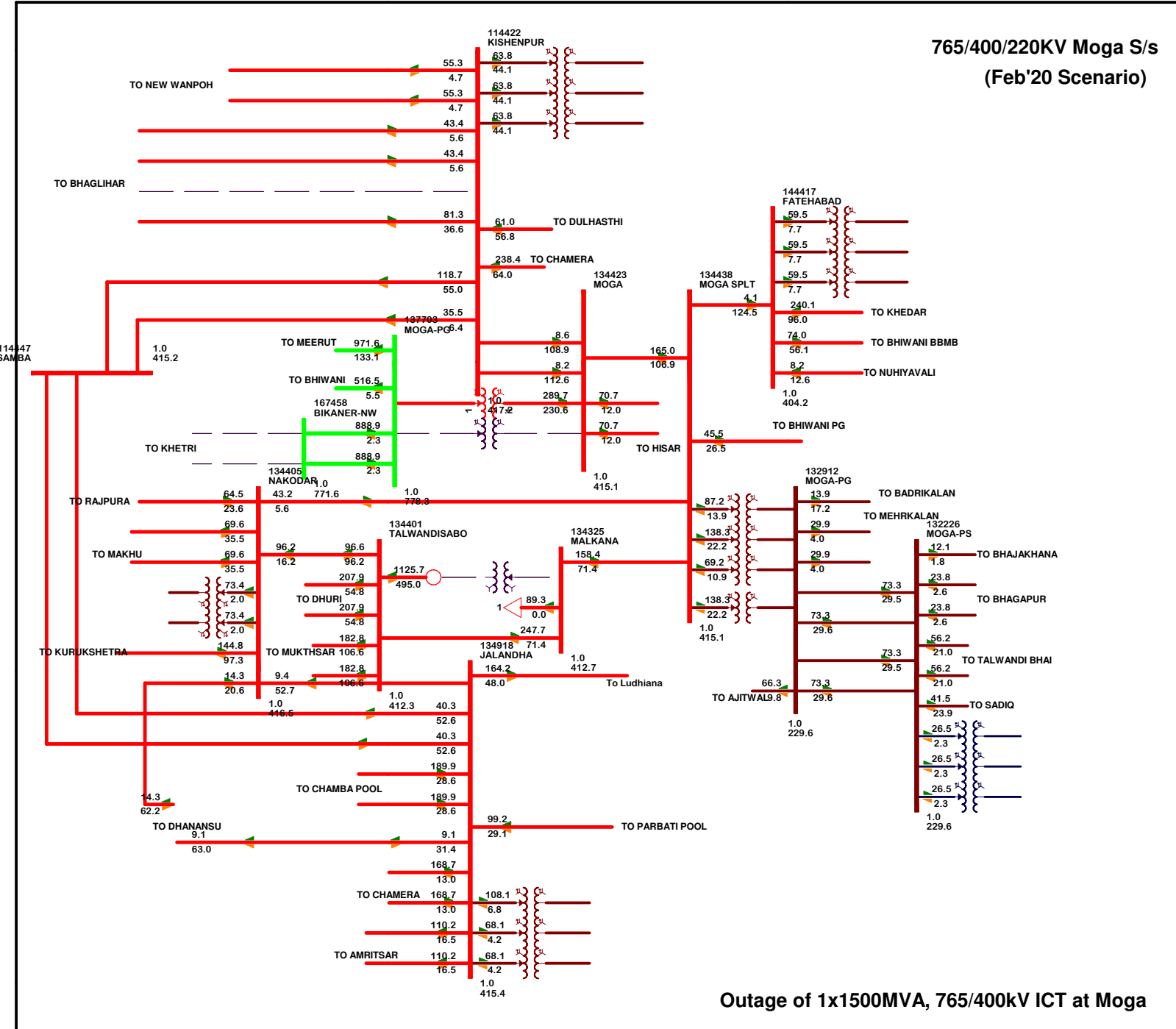


Base Case

765/400/220KV Moga S/s
(Feb'20 Scenario)

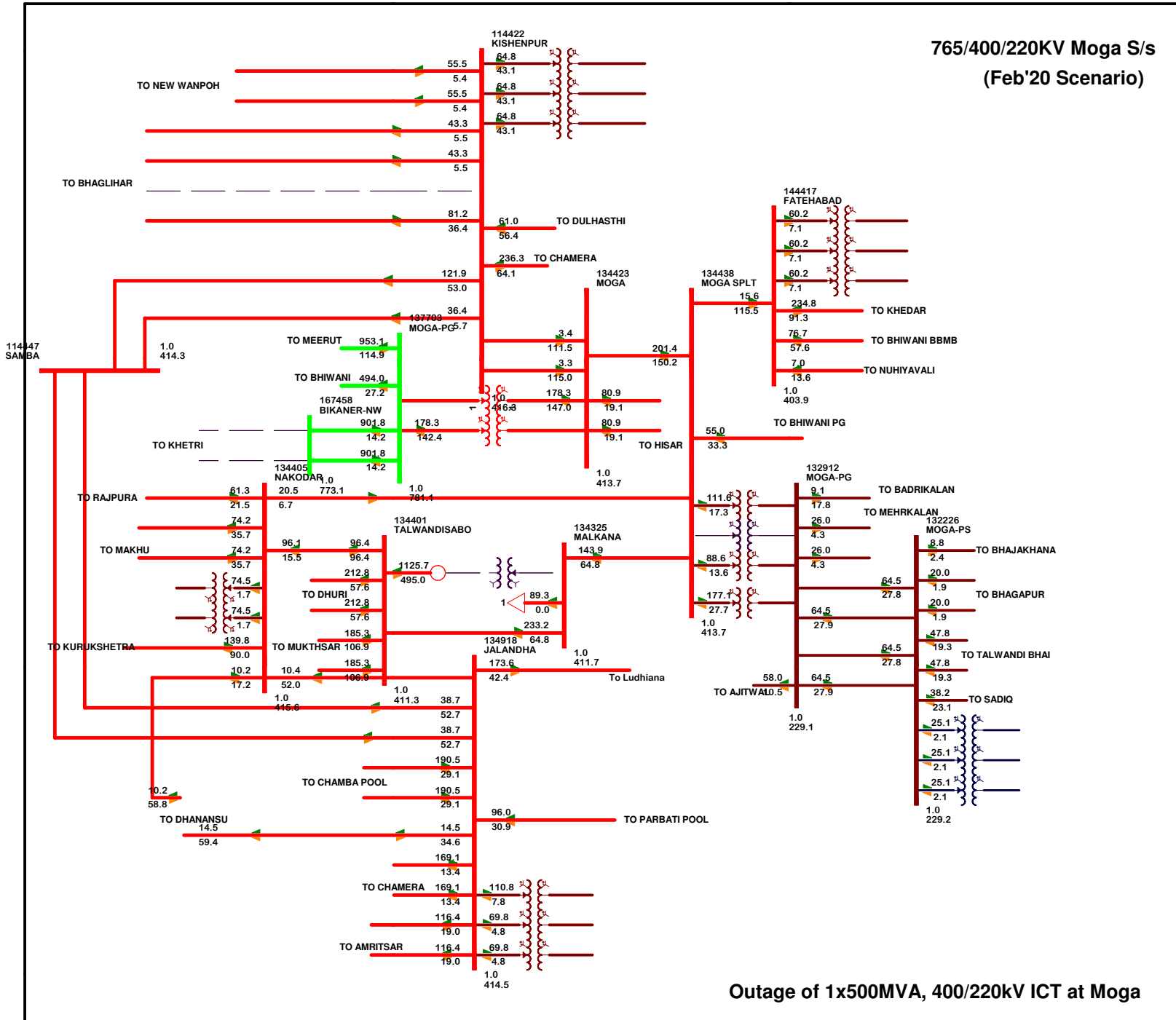


765/400/220KV Moga S/s
(Feb'20 Scenario)



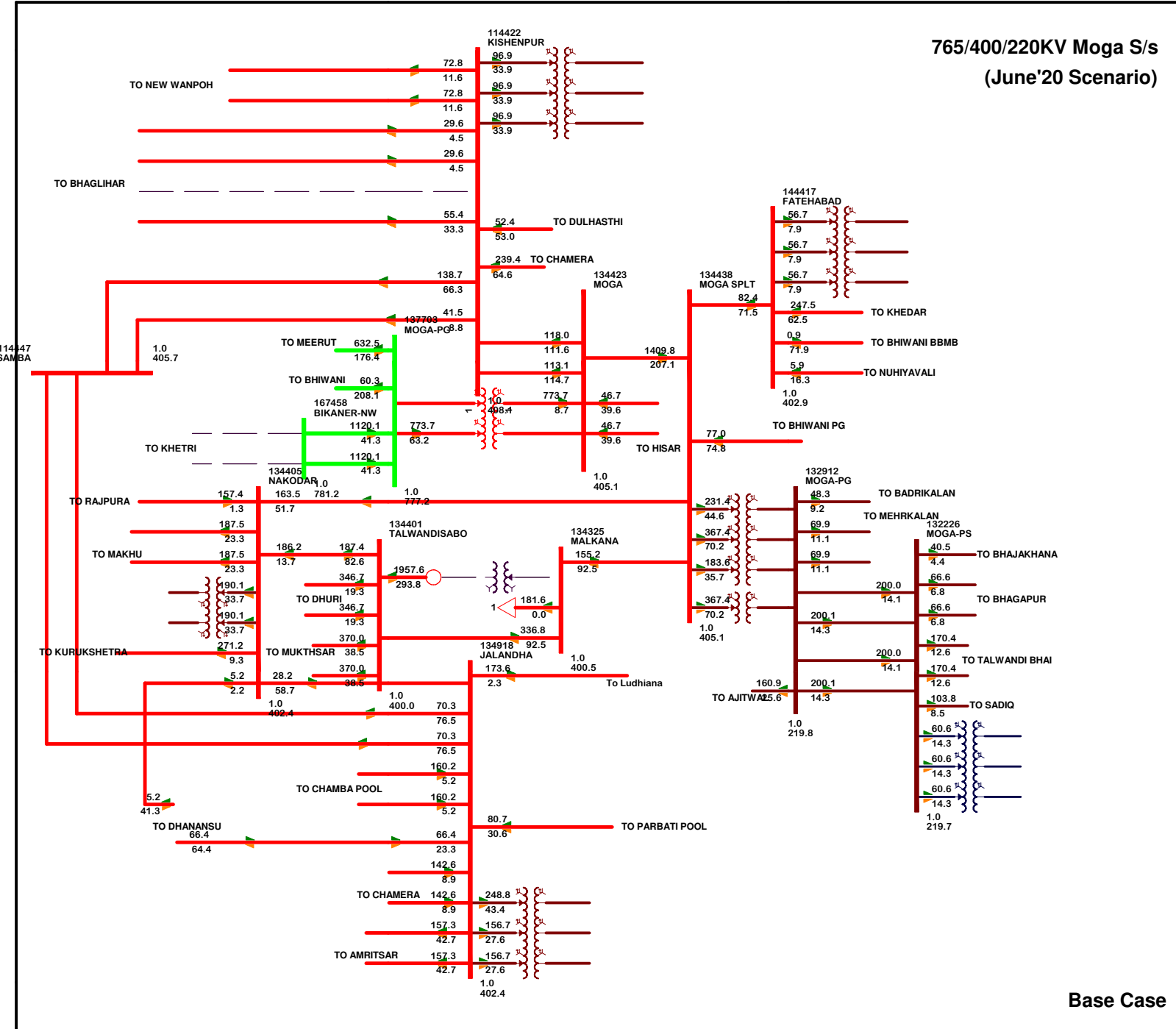
Outage of 1x1500MVA, 765/400kV ICT at Moga

765/400/220KV Moga S/s
(Feb'20 Scenario)

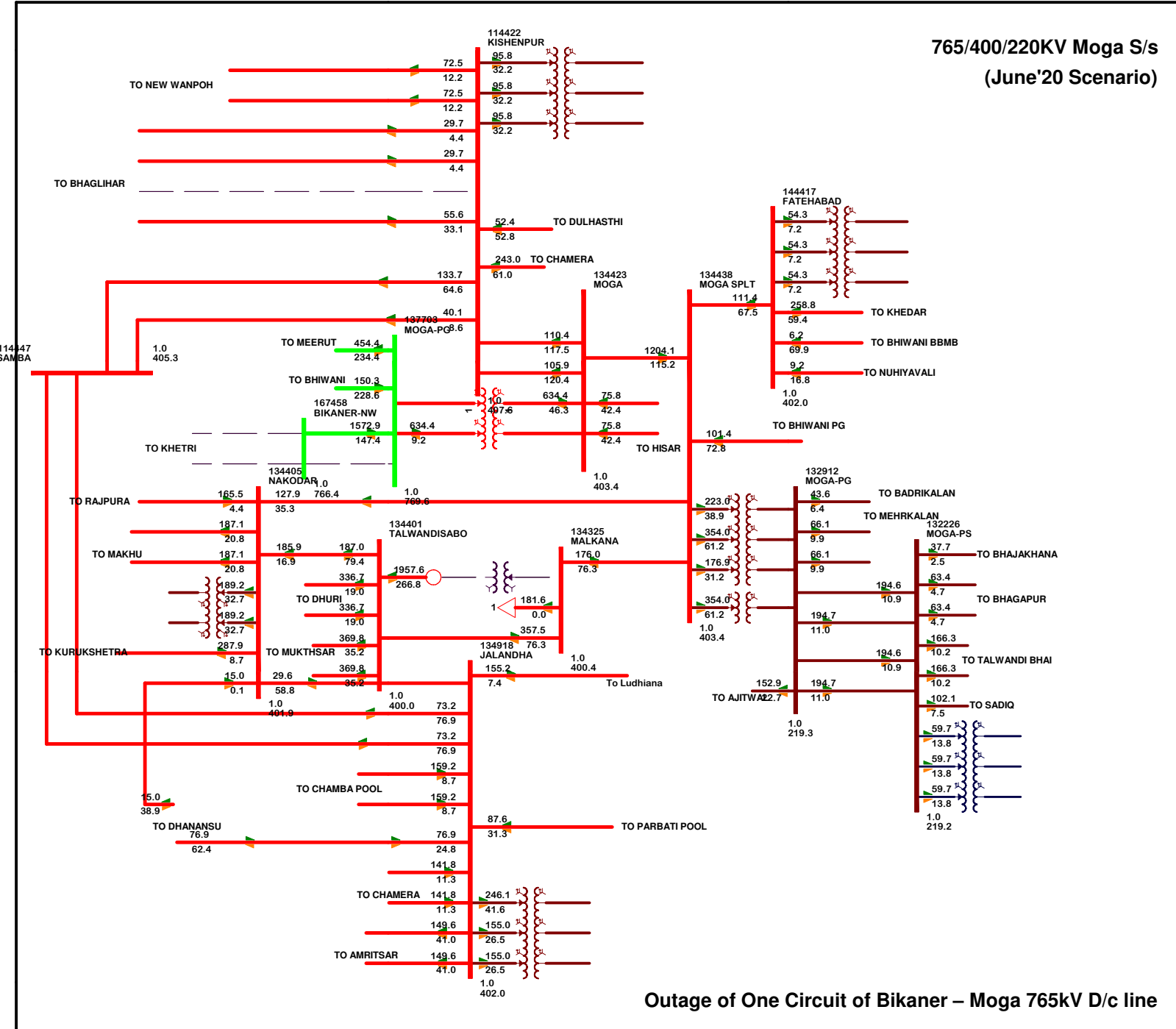


Outage of 1x500MVA, 400/220kV ICT at Moga

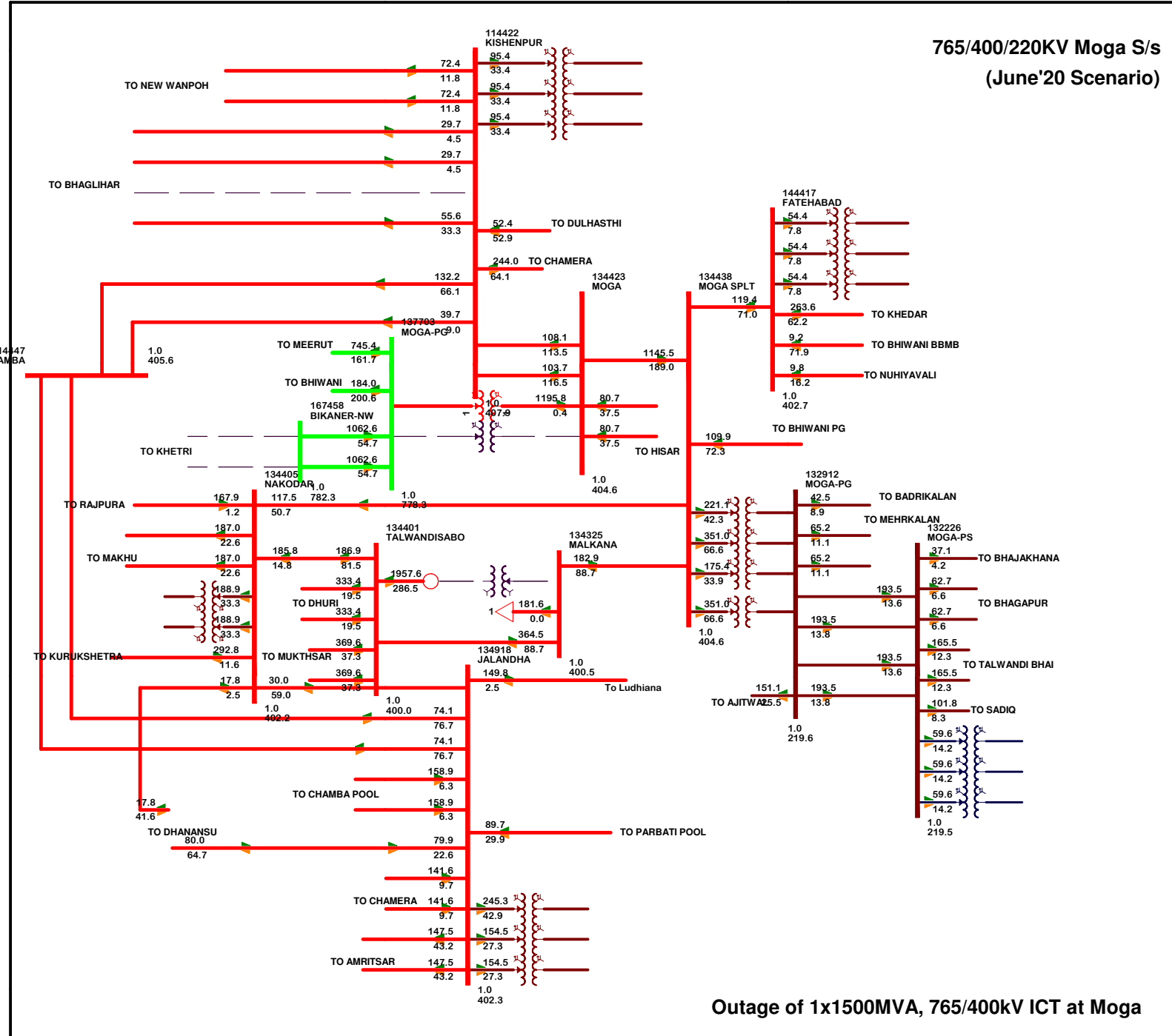
765/400/220KV Moga S/s
(June'20 Scenario)



Base Case

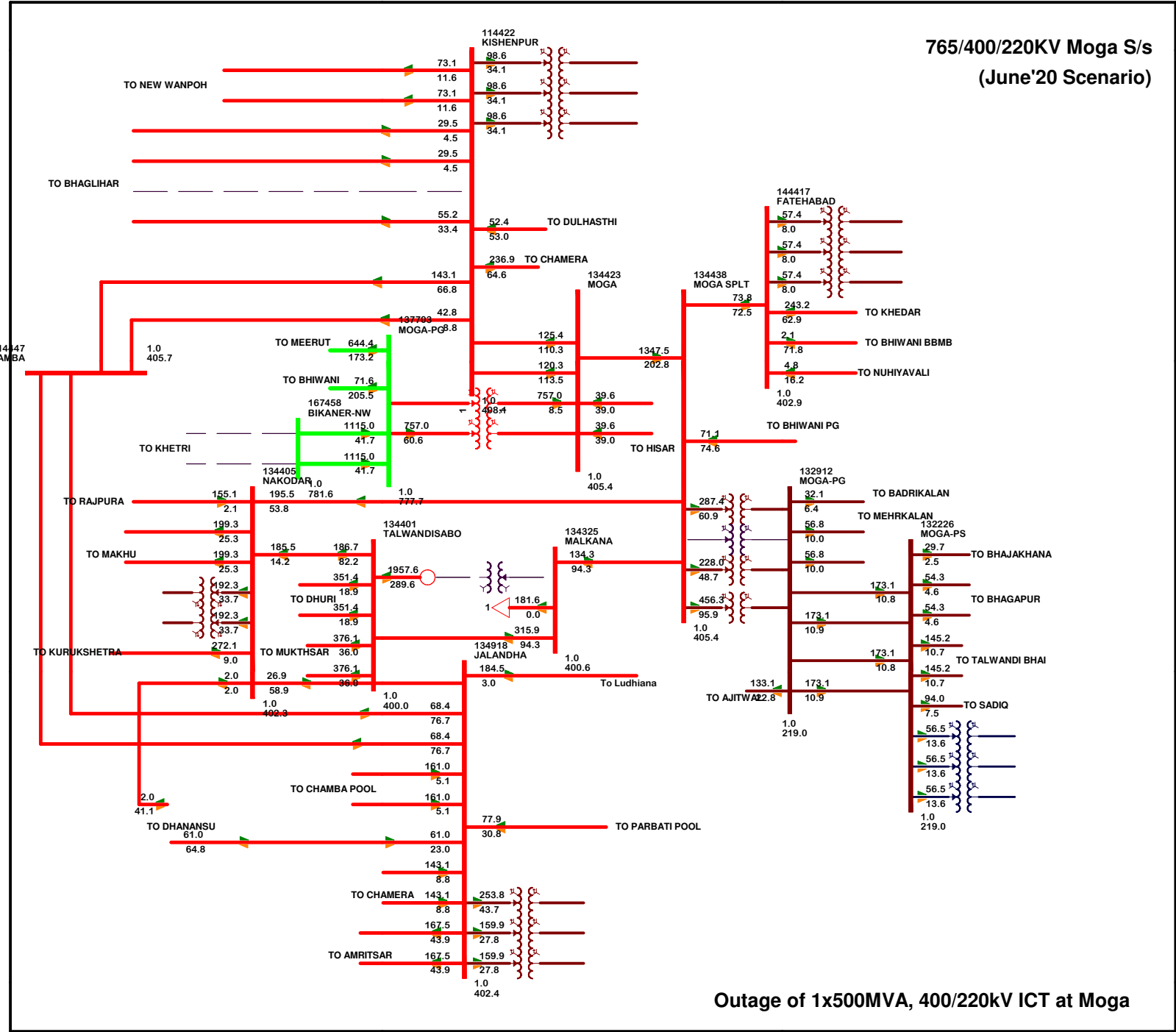


765/400/220KV Moga S/s
(June'20 Scenario)



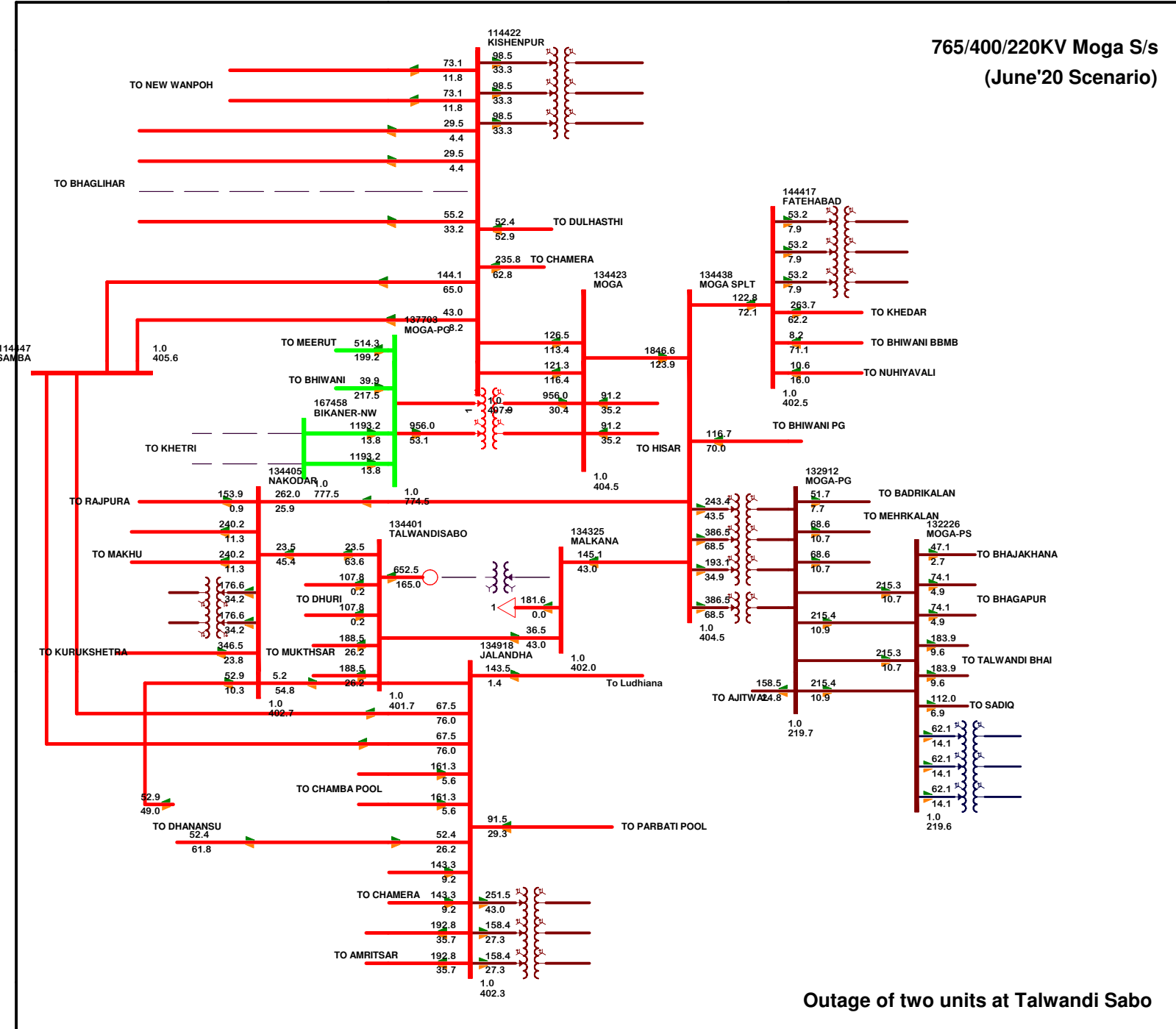
Outage of 1x1500MVA, 765/400kV ICT at Moga

765/400/220KV Moga S/s
(June'20 Scenario)



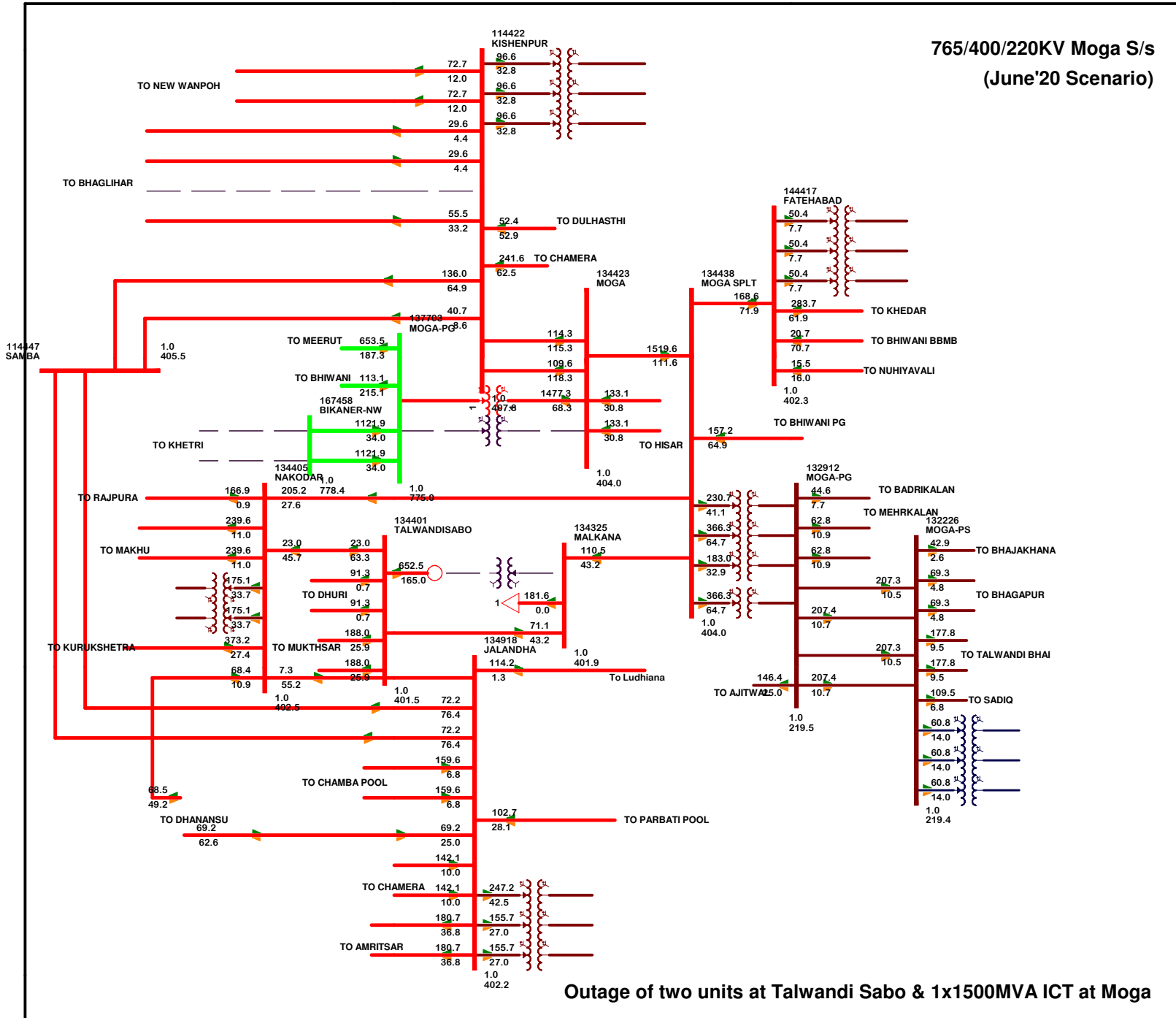
Outage of 1x500MVA, 400/220kV ICT at Moga

765/400/220KV Moga S/s
(June'20 Scenario)



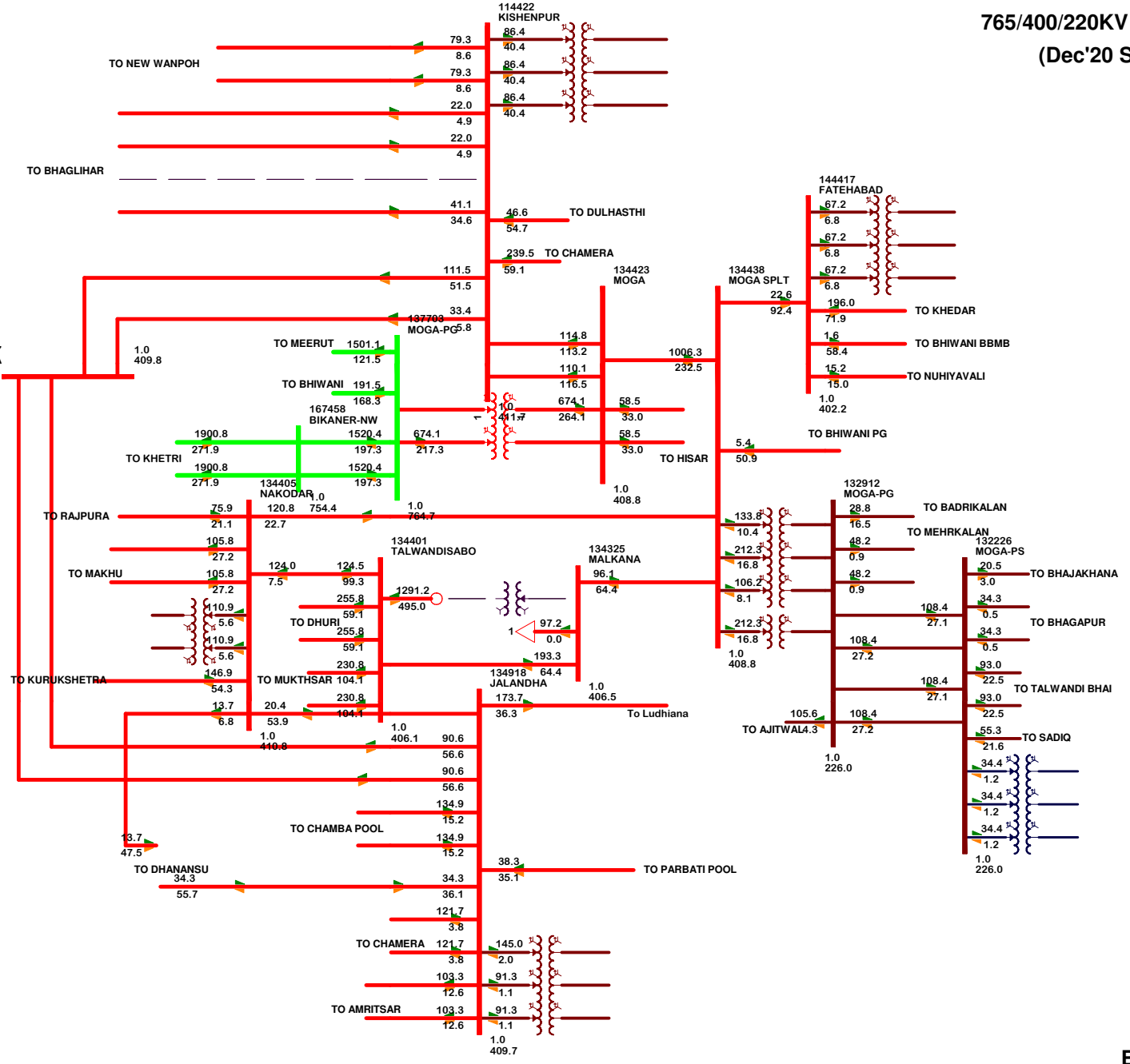
Outage of two units at Talwandi Sabo

765/400/220KV Moga S/s
(June'20 Scenario)



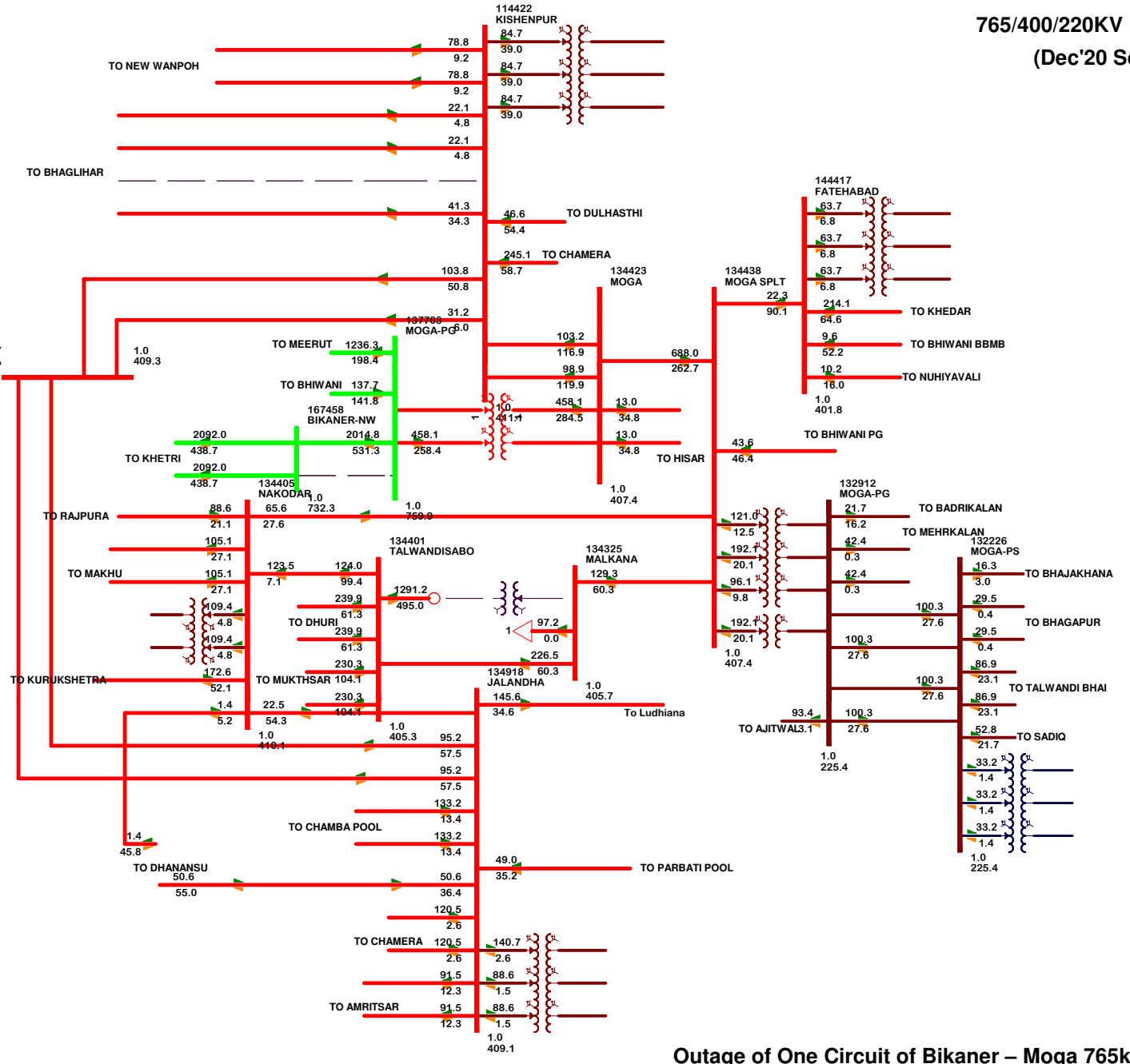
765/400/220KV Moga S/s
(Dec'20 Scenario)

114447
SAMBA



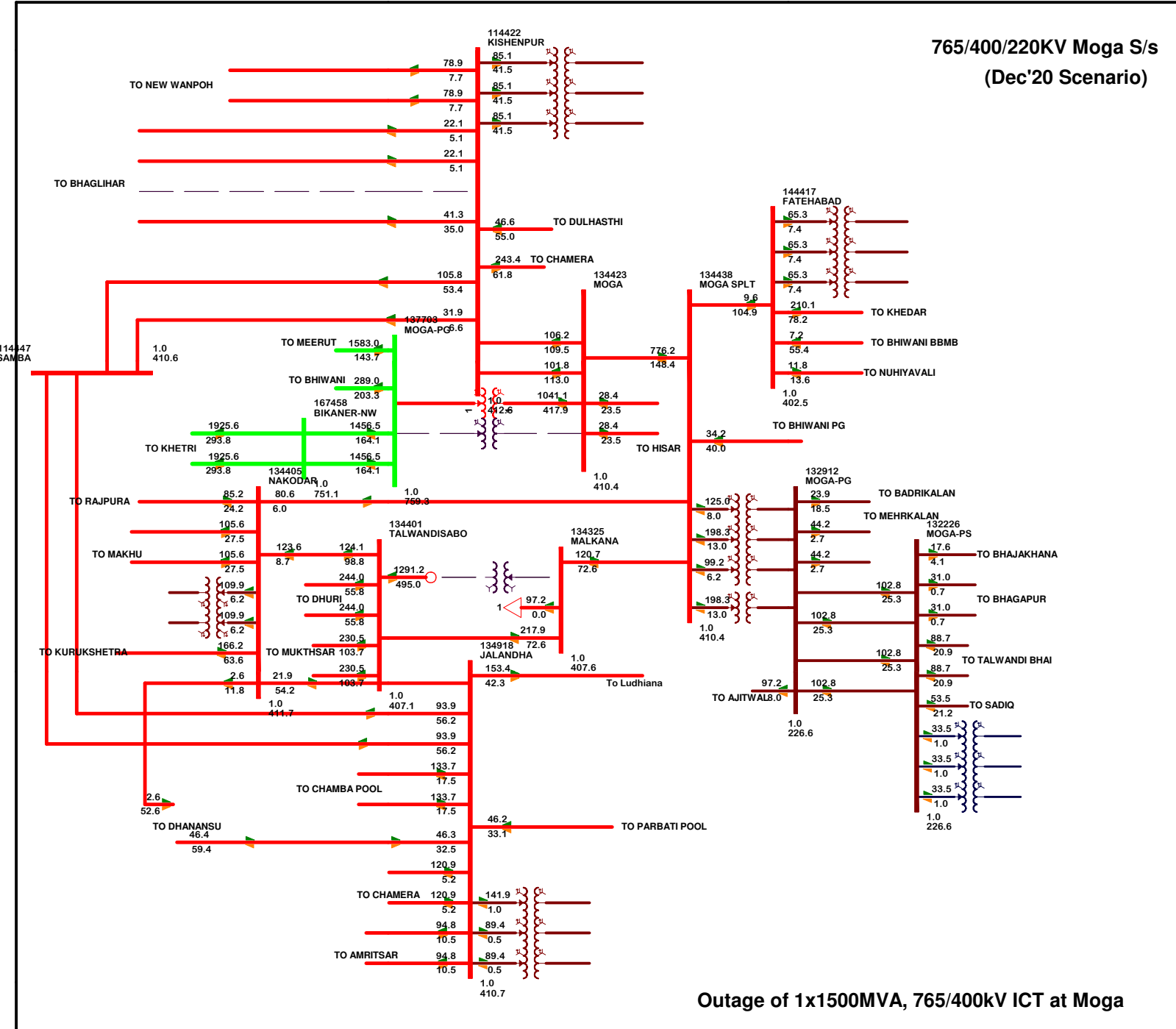
Base Case

765/400/220KV Moga S/s
(Dec'20 Scenario)



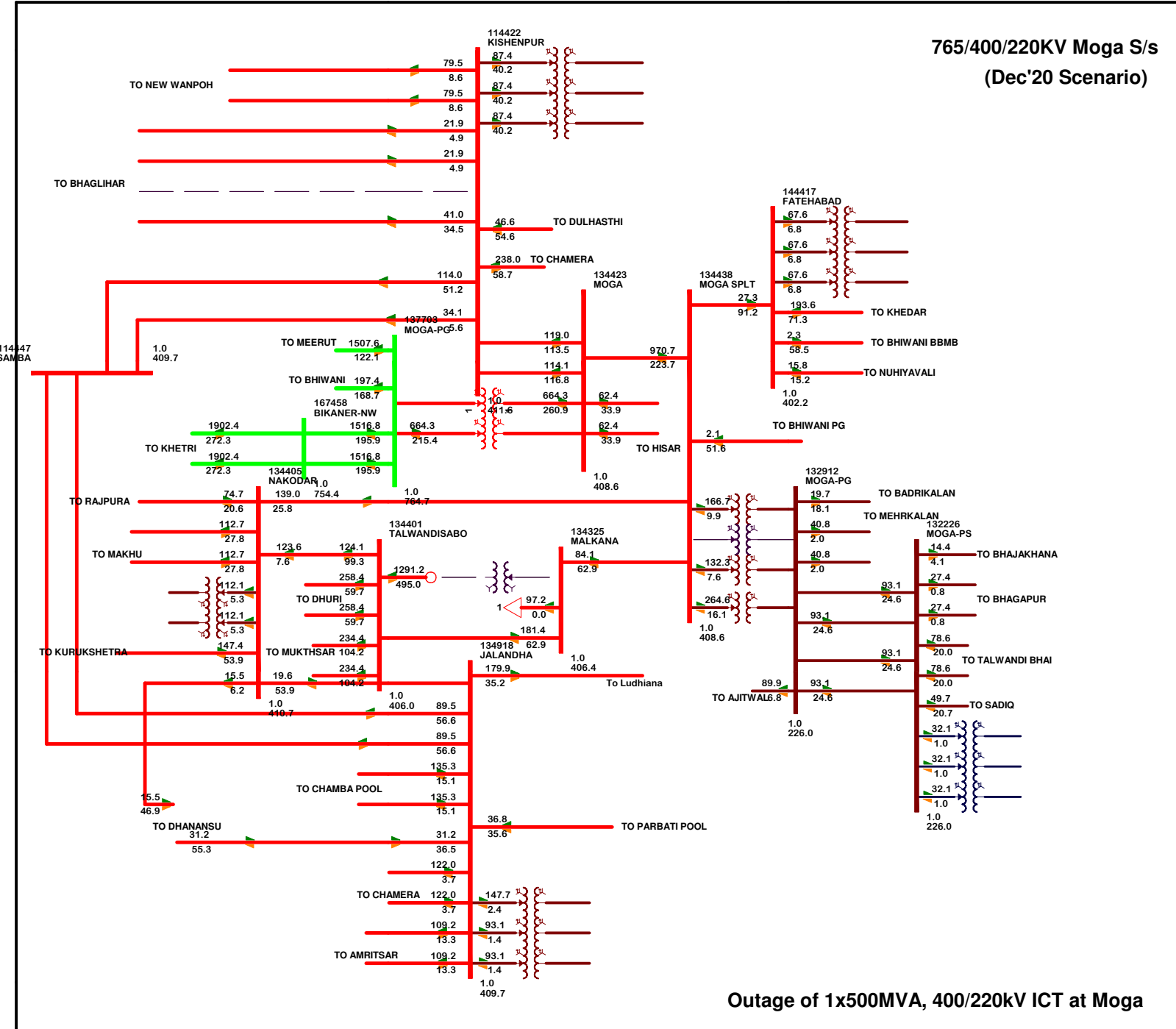
Outage of One Circuit of Bikaner – Moga 765kV D/c line

765/400/220KV Moga S/s
(Dec'20 Scenario)

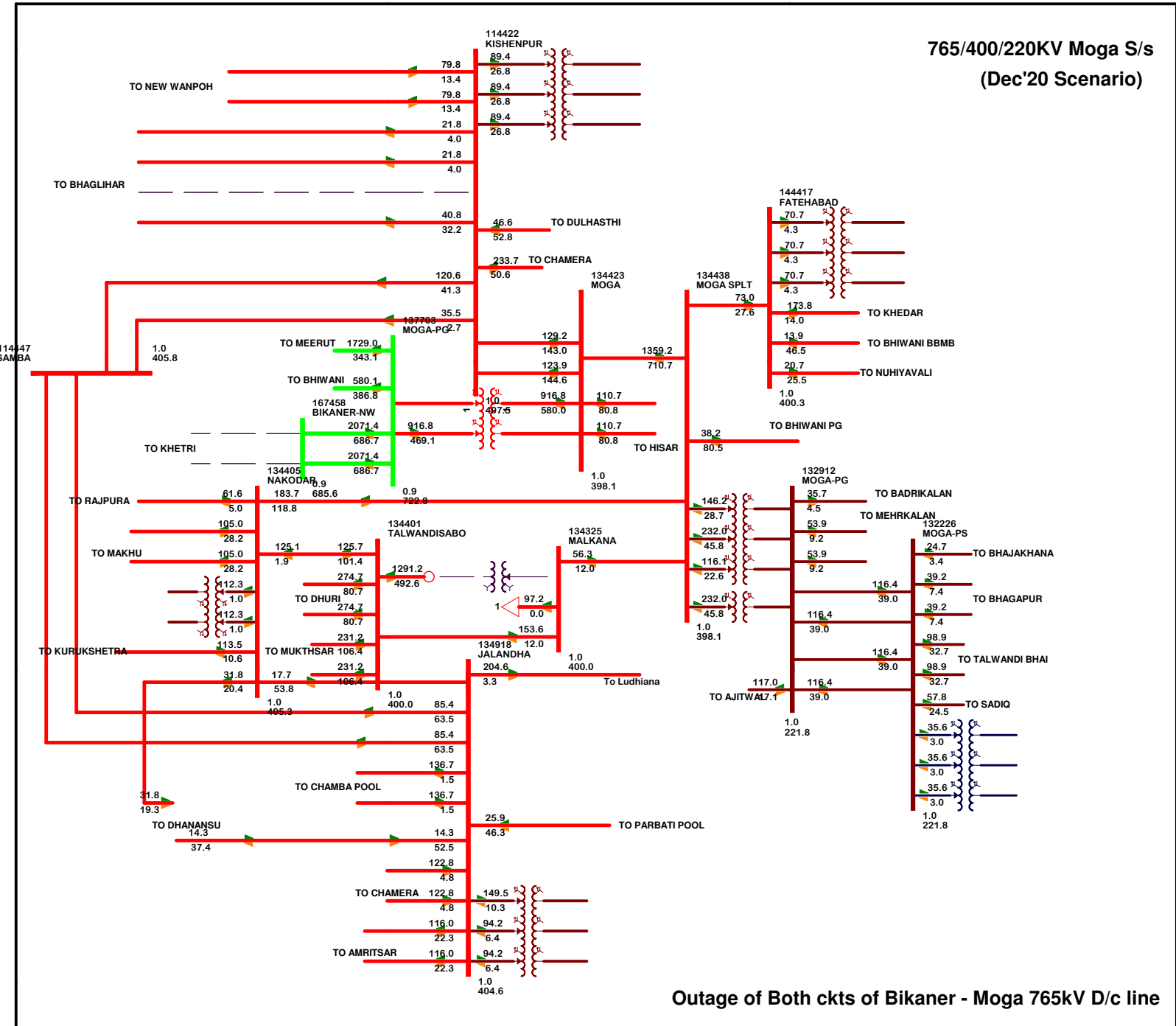


Outage of 1x1500MVA, 765/400kV ICT at Moga

765/400/220KV Moga S/s
(Dec'20 Scenario)



Outage of 1x500MVA, 400/220kV ICT at Moga



Annexure-II

S. No.	Substation	Downstream network bays	Commissioning status of S/s / Transformer	Planned 220kV system and Implementation Status
1	400/220kV, 3x315 MVA Samba	2 nos. bays utilized under ISTS. Balance 4 nos to be utilized	Commissioned (1 st & 2 nd – Mar'13, 3 rd – Oct'16) Bays – Mar'13	<ul style="list-style-type: none"> LILO of 220 kV Bishnha – Hiranagar D/c line. Target completion - Nov, 2019. <ul style="list-style-type: none"> 220kV D/c Samba (PG) – Samba (JKPDD) approved in 1st NRSCT. PDD, J&K to update.
2	400/220kV, 2x315 MVA New Wanpoh	6 Nos. of 220 kV bays to be utilized	Commissioned in Jul'14. Bays – Jul'14	<ul style="list-style-type: none"> 220 kV New Wanpoh - Mirbazar D/c line. Target completion – March, 2019. <ul style="list-style-type: none"> 220 kV Alusteng - New Wanpoh Line. Target completion - PDD, J&K to update.
3	400/220kV, 2x500 MVA Kurukshetra (GIS)	4 nos. of 220 kV bays to be utilized	Commissioned in Mar'17	<ul style="list-style-type: none"> 220kV D/c Bhadson (Kurukshetra) – Salempur with HTLS conductor equivalent to twin moose. P.O. issued on 15.10.18. Contract agreement signed on 30.11.18. Target completion - 30.04.2020. HVPNL to update.
4	400/220kV, 2x315 MVA Dehradun	Out of 6 bays, only two bays used. Balance 4 bays to be utilised.	Commissioned in Jan'17	<ul style="list-style-type: none"> 220 kV Dehradun-Jhajra line. Target completion: Nov, 2021 PTCUL to update.
5	Shahjahanpur, 2x315 MVA 400/220 kV	Partially utilized. Balance 4 Nos. of 220 kV bays to be utilized.	Commissioned in Jun/Sep'14	<ul style="list-style-type: none"> 220 kV D/C Shajahnapur (PG) - Azimpur D/C line. Target completion - Dec, 2020. <ul style="list-style-type: none"> 220 kV D/C Shahjahanpur (PG) - Gola line. Target completion - Dec, 2020. UPPTCL to update.
6	Hamirpur 400/220 kV 2x 315 MVA Sub- station (Augmentation by 3x105 MVA ICT)	2 nos. bays utilized under ISTS. Balance 6 nos. to be utilized.	1 st – Dec'13, 2 nd – Mar'14 & 3 rd – Mar'19. 4 bays – Dec'13, 2 bays – Mar'14, 2 bays – Mar'19	<ul style="list-style-type: none"> 220 kV D/C Hamirpur-Dehan line. Target completion - Dec, 2020. HPSEBL to update.
7	Kaithal 400/220 kV 1x 315 MVA Sub- station	July 2017 (Shifting of transformer from Ballabgarh)	Commissioned	<ul style="list-style-type: none"> 220 kV Kaithal(PG)-Neemwala D/c line. Target completion - 30.04.2020. HVPNL to update.

S. No.	Substation	Downstream network bays	Commissioning status of S/s / Transformer	Planned 220kV system and Implementation Status
8	Sikar 400/220kV, 1x 315 MVA S/s	2 Nos. of 220 kV bays	Commissioned	Retendering to be done in Dec'19 RRVNL to update.
9	Bhiwani 400/220kV S/s	6 nos. of 220kV bays	Commissioned	<ul style="list-style-type: none"> 220kV Bhiwani (PG) - Isherwal (HVPNL) D/c line. Target completion – Nov., 2020. HVPNL to update.
10	Jind 400/220kV S/s	6 nos. of 220kV bays	Commissioned	<ul style="list-style-type: none"> LILO of both circuits of 220kV D/c Narwana – Mund line at Jind (PG). Target completion - Nov., 2020. HVPNL to update.
11	400/220kV Tughlakabad GIS(4x 500)	10 no of 220kV bays	Commissioned	<ul style="list-style-type: none"> RK Puram – Tughlakabad (UG Cable) 220kV D/c line. Scheme will be revised Target completion – March 2023. Okhla – Tughlakabad 220kV D/c line. Mehrauli – Tughlakabad 220kV D/c line. BTPS – Tughlakabad 220kV D/c line. Commissioned. Masjid Mor – Tughlakabad 220kV D/c line. Target completion – Dec., 2021 DTL to update.
12	400/220kV Kala Amb GIS (TBCB) (7x105)	6 nos. of 220kV bays	Commissioned (Jul'17)	<p>HPSEBL has planned one no. of 220kV D/c line from Kala Amb 400/220kV S/s to 220/132kV Kala Amb S/s. Details for remaining 4 nos. of line bays may be provided. Target completion – Dec 2021</p> <ul style="list-style-type: none"> HPSEBL to update.
13	400/220kV Kadarapur Sub-station (TBCB) (2x500)	8 nos. of 220kV bays	Commissioned on 11.12.19, as informed by TBCB licensee	<p>NIT floated on 05.03.2019 with due date of submission on 22.04.2019 (opened on 23.04.2019 and under evaluation). Target completion - 31.06.2021 HVPNL to update.</p>

Establishment of new 400/220kV substations in Northern Region:

Sl. No.	Name of Substation	MVA Capacity	Expected Schedule	Downstream connectivity furnished by States in 40 th SCPSNR
1	400/220kV Dwarka-I GIS (8 nos. of 220kV bays)	4x 500	Mar'20	There are forest related issues that is expected to be resolved by March 2020. DTL to update.
2	220/66kV Chandigarh GIS (8 nos. of 66kV bays)	2x 160	Mar'20	Chandigarh to update.
3	400/220kV Jauljivi GIS Out of these 8 nos. 220kV Line Bays, 4 nos. (Pithoragath-2, & Dhauliganga-2) would be used by the lines being constructed by POWERGRID and balance 4 nos. (Almora-2, Jauljivi-2) bays would be used by the lines being constructed by PTCUL.	2x315	Mar'20	<ul style="list-style-type: none"> • 220kV Almora-Jauljibi line. • 220kV Brammah-Jauljibi line Target completion – May 2020 PTCUL to update.
4	400/220kV Sohna Road Sub-station (TBCB) (8 nos. of 220kV bays)	2x500	Jan'20	<ul style="list-style-type: none"> • LILO of both circuits of 220kV D/c Sector-69 - Roj Ka Meo line at 400kV Sohna Road. • LILO of both circuits of 220kV D/c Badshahpur-Sec77 line at 400kV Sohna Road. To be awarded by Dec, 2019. Expected by May 2021. HVPNL to update.
5	400/220kV Prithla Sub-station (TBCB) (8 nos. of 220kV bays)	2x500	Deemed commissioned w.e.f. 06/08/19	<ul style="list-style-type: none"> • LILO of both circuits of 220kV D/c Sector-69 - Roj Ka Meo line at 400kV Sohna Road. • LILO of both circuits of 220kV D/c Badshahpur-Sec77 line at 400kV Sohna Road. Target completion – Feb 2020. HVPNL to update.

Applications granted as per previous Connectivity and LTA meetings of NR

The details of Connectivity/LTA applications granted/agreed for grant in 25th – 30th Connectivity and LTA meetings of NR is given below:

Stage-I Connectivity

Sl. No.	Application No.	Applicant	Location	Date of Application	Connectivity Sought (MW)	Nature of Applicant	Proposed location for Connectivity	Dedicated Tr. System
1	1200002149	ReNew Solar energy (Jharkhand Three) Pvt. Ltd.	Jaisalmer, Rajasthan	18/06/2019	300	Solar	Fatehgarh-II	ReNew Solar Power Project – Fatehgarh-II 220kV S/C line
2	1200002233	Mahindra Susten Private Limited	Jodhpur, Rajasthan	30/07/2019	250	Solar	Bhadla-II	Mahindra Susten Solar Power Project – Bhadla-II 220kV S/c line
3	1200002179	Ayana Renewable Power One Private Limited	Bikaner, Rajasthan	04/07/2019	600	Solar	Bikaner	Ayana Power One Pvt. Ltd. Project – Bikaner 220 kV D/c line
4	1200002223	Adani Green Energy Seven Limited	Jaisalmer, Rajasthan	30/07/2019	300* (Earlier 400 MW)	Hybrid (Solar-400 MW, Wind-100 MW)	Fatehgarh-II	Adani Green Energy Seven Ltd. Solar Power Project – Fatehgarh-II 220kV D/c line
5	1200002224	Adani Green Energy Nine Limited	Jaisalmer, Rajasthan	01/08/2019	400	Hybrid (Solar-400MW, Wind-100MW)	Fatehgarh-II	Adani Green Energy Nine Solar Power Project – Fatehgarh-II 220kV D/c line
6	1200002308	NTPC LTD.	Jaisalmer, Rajasthan	29/10/2019	150	Solar	Fatehgarh-II	150 MW Solar Project at Devikoot – Fatehgarh-II 220 kV S/c line
7	1200002304	SBE Renewables Ten Private Limited	Jaisalmer, Rajasthan	31/10/2019	450 (Solar-420)	Hybrid	Fatehgarh-II	SBE Renewables Ten Private Limited Power

					MW Wind-105.3 MW)			Project – Fatehgarh-II P.S 220 kV D/c line
8	1200002322	SBE Renewables Sixteen Private Limited	Jaisalmer, Rajasthan	31/10/2019	330	Solar	Fatehgarh-II	SBE Renewables Sixteen Private Limited Power Project – Fatehgarh-II P.S 220 kV S/c line (suitable to carry 330 MW at nominal voltage)
9	1200002337	NTPC Ltd.	Bikaner, Rajasthan	07/11/19	250	Solar	Bhadla-II PS	NTPC 250 MW solar Project at Kolayat – Bhadla-II PS 220 kV S/c line (suitable to carry 300 MW at nominal voltage)
10	1200002357	TBEA Solar India Pvt Ltd	Jodhpur, Rajasthan	16/11/2019	300	Solar	Bhadla-II PS	TBEA Bhadla Solar Power Plant – Bhadla-II 220 kV S/c line (suitable to carry 300 MW at nominal voltage)
11	1200002366	Renew Solar Urja Pvt. Ltd.	Jaisalmer, Rajasthan	27/11/2019	300	Solar	Fatehgarh-II PS	Renew Jaisalmer-4 power Project – Fatehgarh-II P.S 220 kV S/c line (suitable to carry 300 MW at nominal voltage)

*Applicant vide letter dated 18/09/2019 requested to change Connectivity quantum from 400 MW to 300 MW.

Stage-II Connectivity

Sl. No.	Application No.	Applicant	Location	Date of Application	Quantum of Stage-I Sought/Granted (MW)	Stage-II Connectivity Sought (MW)/date	Quantum won / Land & Auditor Basis	Proposed location for Grant of Stage-II Connectivity	Dedicated Tr. System
1	1200001797	Adani Renewable Energy Park	Jaisalmer, Rajasthan	30/11/2018	500 (1200001123)	500/ 31/08/21	Land & Auditor Certificate	Fatehgarh-II (New) PS	Adani Solar Park – Fatehgarh-II 220kV D/c line along with bays at

		Rajasthan Ltd. (AREPRL)							generation end – to be implemented by applicant. 220kV bays at Fatehgarh-II PS shall be under the scope of ISTS.
2	1200002151	Rajasthan Solarpark Development Company Ltd. (RSDCL)	Jodhpur, Rajasthan	20/06/19	980 (1200000910)	980/ 01/08/21	Land & Auditor Certificate	Bhadla-II (New) PS	Nokh Solar Park - Bhadla-II Pooling Station 220 kV 2xD/c line along with bays at both ends – to be implemented by applicant.
3	1200002228	Ayana Renewable Power One Private Limited	Bikaner, Rajasthan	26/07/2019	600 (1200002179)	300/ 01.02.2021	SECI (ISTS-IV)	Bikaner P.S	Ayana Renewable Power One Pvt. Ltd. Plant - Bikaner Pooling Station 400 kV S/c line along with 400 kV bay. Generator Pooling Station – to be implemented by applicant 400 kV bay at Bikaner PS shall also be implemented by the applicant
4	1200002229	ReNew Solar Energy (Jharkhand Three) Private Limited	Jaisalmer, Rajasthan	26/07/2019	300 (1200002149)	300/ 23.04.2021	SECI (ISTS-IV)	Fatehgarh-II (New) PS	Jaisalmer 3 Plant – Fatehgarh-II 220 kV S/c line along with 220 kV bay at Generator Pooling Station – to be implemented by applicant 220 kV bay at Fatehgarh-II PS shall be under the scope of ISTS
5	1200002225	Adani Green Energy Seven Limited	Jaisalmer, Rajasthan	30/07/2019	300 (1200002223)	300 / 01.02.2021 (300 MW- Solar, 75 MW-	SECI (ISTS Hybrid Tranche-II)	Fatehgarh-II (New) PS	Adani Green energy Seven Ltd. Plant - Fatehgarh-II PS 220kV S/c line along with 220 kV

						Wind)			bay – to be implemented by applicant along with 220kV bay at Fatehgarh-II PS 220 kV bay at Fatehgarh-II PS shall be in the scope of ISTS.
6	1200002226	Adani Green Energy Nine Limited	Jaisalmer, Rajasthan	01/08/2019	400 (1200002224)	300/ 01.02.2021 300MW & Wind-75MW)	SECI (Hybrid Tranche-II)	Fatehgarh-II (New) PS	Adani Green Energy Nine Solar Power Project – Fatehgarh-II 220 kV S/c line– to be implemented by applicant alongwith bays at generation switchyard (suitable to carry 300 MW at nominal voltage) Bays at Fatehgarh-II S/s shall be under the scope of ISTS.
7	1200002244	Mahindra Susten Private Limited	Jodhpur, Rajasthan	07/08/2019	250 (1200002233)	250/ 31.03.2021	SECI (ISTS-IV)	Bhadla-II (New) PS	Mahindra Susten Solar Power Project – Bhadla-II 220 kV S/c line – to be implemented by applicant alongwith bays at generation switchyard (suitable to carry 300 MW at nominal voltage). Bays at Bhadla-II S/s shall be under the scope of ISTS.
8	1200002291	ACME Solar Holdings Limited	Jodhpur, Rajasthan	11/10/2019	300 (1200001926)	300/ 21/06/2021 Solar	MSEDCL	Bhadla-II P.S (Connectivity sought at 220 kV)	ACME Bhadla-I Solar Power Plant-Bhadla-II P.S 220 kV S/c line – to be implemented by applicant along with bay at generation switchyard (suitable to

									carry 300 MW at nominal voltage) 220 kV Bay at Bhadla-II S/s shall be under the scope of ISTS.
9	1200002321	SBE Renewables Ten Private Limited	Jaisalmer, Rajasthan	31/10/2019	450 (1200002304)	450/ 04/05/2021 Hybrid	SECI (Hybrid Tr-I)	Fatehgarh-II P.S (Connectivity sought at 220 kV)	SBE Renewables Ten Private Limited Power Project - Fatehgarh-II P.S 220 kV D/c line – to be implemented by applicant along with bays at generation switchyard (suitable to carry 300 MW at nominal voltage on each circuit) 220 kV Bays at Fatehgarh-II S/s shall be under the scope of applicant.
10	1200002326	SBE Renewables Sixteen Private Limited	Jaisalmer, Rajasthan	31/10/2019	330 (1200002322)	330/ 27/06/2021 Solar	SECI (ISTS-V)	Fatehgarh-II P.S (Connectivity sought at 220 kV)	SBE Renewables Sixteen Private Limited Power Project - Fatehgarh-II P.S 220 kV S/c high capacity line (suitable to carry 330 MW at nominal voltage) – to be implemented by applicant along with bay at generation switchyard 220 kV Bay at Fatehgarh-II S/s shall be under the scope of ISTS.
11	1200002359	TBEA Solar (India) Pvt. Ltd	Jodhpur, Rajasthan	23/11/19	300 (1200002357)	300/ 01/07/2021 Solar	LOA/NTPC	Bhadla-II P.S (Connectivity sought at 220 kV)	TBEA Bhadla Solar Power Plant- Bhadla-II P.S 220 kV S/c line – to be implemented by applicant along with bay at generation switchyard

									(suitable to carry 300 MW at nominal voltage) 220 kV Bay at Bhadla-II S/s shall be under the scope of ISTS.
12	1200002370	Renew Solar Urja Private Limited	Jaisalmer, Rajasthan	27/11/19	300 (1200002366)	300/ 23/08/2021 Solar	SECI (ISTS-VI)	Fatehgarh- P.S (Connectivity sought at 220 kV)	Jaisalmer 4 project-Fatehgarh-II P.S* 220 kV S/c line – to be implemented by applicant along with bay at generation switchyard (suitable to carry 300 MW at nominal voltage) 220 kV Bay at Fatehgarh-II S/s shall be under the scope of ISTS.
13	1200002339	NTPC Ltd.	Jaisalmer, Rajasthan	08/11/19	150 (1200002308)	150 (29/07/2021) Solar	SECI (Tranche-I under CPSU phase-II scheme)	Fatehgarh- P.S (Connectivity sought at 220 kV)	150 MW solar Project at Devikoot- Fatehgarh-II P.S* 220 kV S/c line – to be implemented by applicant along with bay at generation switchyard (suitable to carry 300 MW at nominal voltage) 220 kV Bay at Fatehgarh-II S/s shall be under the scope of applicant.
14	1200002340	NTPC Ltd.	Bikaner, Rajasthan	08/11/19	250 (1200002337)	250 (29/07/2021) Solar	SECI (Tranche-I under CPSU phase-II scheme)	Bhadla-II P.S (Connectivity sought at 400 kV)	250 MW solar Project at Kolayat - Bhadla-II P.S* 220 kV S/c line – to be implemented by applicant along with bay at generation switchyard (suitable to carry 300 MW at nominal voltage) 220 kV Bay at Bhadla-II S/s shall be under the scope of applicant.

Conventional Connectivity:

Sl. No.	Application ID	Name of the Applicant	Submission Date	Project Location	Connectivity location (requested)	Quantum (MW)	Proposal/Remarks
1	1200002318	Greenko Energies Private Ltd.	11/11/19	Neemuch, M.P.	765/400kV Chittorgarh Substation (PG)	1200	Geenko Energies Pvt. Ltd. generating plant- 765/400 kV Chittorgarh (PG) substation 400 kV (High capacity) D/c line from Mar'24.
2	1200002143	NPCIL	19/06/2019	Fatehabad, Haryana	1. Fatehabad (PG) 400/220 kV S/s. 2. Patran (TBCB) 400/220 kV S/s	2800/ 30.06.2024	1) GHAVP - Fatehabad (PG) 400 kV (Quad) D/c line – to be implemented by applicant. 2) GHAVP – Patran (TBCB) 400 kV (Quad) D/c line – to be implemented by applicant.

LTA Applications:

Sl. No	Application No./Date (Online)	Applicant	Connectivity/ Injection Point	Drawl Point	LTA (MW)/ Start & End Date (Sought)	Transmission system for LTA
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1	1200002161 (22/06/2019)	Mahoba Solar (UP) Pvt. Ltd.	Fatehgarh-II P.S	NR(Target)	390 (Start : 03/12/2020 End : 02/12/2045)	As per Annexure-I.
2	1200002168 (28/06/2019)	Nanti Hydro Power Pvt. Ltd.	66kV Ghanvi-II S/s of HPSEB	DTL, Delhi	11.45 (Start : 01/09/2019 End : 31/10/2037)	Existing ISTS System
3	1200002185 (09/07/2019)	Avaada Energy Private Limited	Bikaner P.S	WR (Target)	350 (Start : 25/06/2021 End : 25/06/2046)	As per Annexure-II.
4	1200002232 (29/07/2019)	ReNew Solar Energy (Jharkhand Three) Private Limited	Fatehgarh-II (new) PS	WR (Target)	300 (Start : 23/04/2021 End : 22/04/2046)	As per Annexure-I.
5	1200000913 (01.12.2017)	Rajasthan Solarpark Development Company Ltd. (RSDCL)-SPPD	Bhadla-II (new) PS	NR (Target)	925 (Start : 01/12/2021 End : 30/11/2046) Revised Connectivity Time frame: 01.10.2021	As per Annexure-III.
6	1200002239 (02/08/2019)	Mahindra Susten Private Limited	Bhadla-II (New) P.S	NR (Target)	250 (Start : 31/03/2021 End : 31/03/2046)	As per Annexure-III.
7	1200002238 (14/08/2019)	SBSR Power Cleantech Eleven Private Limited	Bikaner	NR (Target)	300 (Start : 03/01/2021 End : 02/01/2046)	As per Annexure-II.
8	1200002274 (30/09/2019)	Ayana Renewable Power One Private Limited	Bikaner P.S	WR (Target)	300 (Start : 23/04/2021 End : 23/04/2046)	As per Annexure-II.

In addition to above, LTA to NPCIL for 2800MW was also agreed for grant from 31.10.2024 to 31.10.2049 with following ISTS system:

1x500 MVA ICT at Patran 400/220 kV (TBCB) substation – to be implemented under ISTS

Members may note.

Annexure-I

Transmission system required for LTA at Fatehgarh-II PS

- 1) Establishment of 765/400kV, 3X1500MVA ICT (2nd, 3rd & 4th) pooling station at suitable location near Fatehgarh in Jaisalmer Dist(Fatehgarh-II PS)
- 2) Establishment of 400/220kV, 1X500MVA, ICT (2nd) at Fatehgarh-II Pooling station
- 3) Establishment of 765/400kV, 2x1500MVA pooling station at suitable location near Phalodi/ Bhadla in Jodhpur (Bhadla-II PS)
- 4) Establishment of 765/400kV, 2x1500 MVA S/s at suitable location near Khetri
- 5) Charging of Fatehgarh-II PS–Bhadla section at 765kV level
- 6) LILO of both ckts of 765kV Ajmer – Bikaner D/c line at Bhadla-II PS
- 7) Fatehgarh-II PS – Bhadla -II PS 765kV D/c line
- 8) Bhadla-II PS – Bhadla (PG) 400kV D/c Line (Twin HTLS)
- 9) Bikaner(PG) – Khetri S/s 765kV D/c line
- 10)Khetri – Jhatikara 765kV D/c line
- 11)Khetri – Sikar (PG) 400kV D/c line (Twin AL59)
- 12)Augmentation with 1x1000MVA,765/400kV transformer (3rd) at Bhiwani (PG)
- 13)Ajmer (PG)– Phagi 765kV D/c line
- 14)Suitable scheme to limit fault current at Moga (PG) S/s.
- 15) Required Reactive Compensation

In addition, following ISTS for Connectivity, shall also be required for effecting LTA:

- 1) Establishment of 1x1500MVA, 765/400kV, Fatehgarh-II Pooling station at suitable location near Fatehgarh.
- 2) Establishment of 1x500 MVA, 400/220kV ICT at Fatehgarh-II Pooling station

LILO of Fatehgarh (TBCB) – Bhadla (PG) 765kV D/c line (to be operated at 400kV) at Fatehgarh-II so as to establish Fatehgarh (TBCB) – Fatehgarh-II 400kV D/c line (765kV line operated at 400 kV) and Fatehgarh-II - Bhadla 765kV D/c line or Fatehgarh-II – Bhadla-II 765 kV D/c line

Annexure-II

Tr. System for LTA applications at Bikaner (PG)

- 1) Establishment of 765/400kV, 2x1500 MVA S/s at suitable location near Khetri
- 2) Bikaner(PG) – Khetri 765kV D/c line
- 3) Khetri – Jhatikara 765kV D/c line
- 4) Khetri – Sikar (PG) 400kV D/c line (Twin AL59)
- 5) Ajmer (PG) – Phagi 765kV D/c line
- 6) Augmentation with 765/400kV, 1x1000MVA transformer (3rd) at Bhiwani (PG)
- 7) Suitable bus splitting arrangement at 765/400/220 kV Moga S/s
- 8) Associated suitable Reactive Compensation

In addition, following Transmission System for Connectivity shall also be required:

- 1) Establishment of 400/220kV, 1x500 MVA ICT at Bikaner

Transmission system for LTA applications at Bhadla-II PS

- 1) Establishment of 1x1500MVA, 765/400kV, Bhadla-II (New) Pooling station
- 2) Establishment of 2x500 MVA, 400/220kV ICT (2nd & 3rd) at Bhadla-II (New) Pooling station
- 3) Bhadla-II PS – Bhadla (PG) 400kV D/c Line (Twin HTLS)
- 4) Bikaner(PG) – Khetri S/s 765kV D/c line
- 5) Khetri – Jhatikara 765kV D/c line
- 6) Khetri – Sikar (PG) 400kV D/c line (Twin AL59)
- 7) Augmentation with 1x1000MVA,765/400kV transformer (3rd) at Bhiwani (PG)
- 8) Ajmer (PG)– Phagi 765kV D/c line
- 9) Suitable bus splitting arrangement at 765/400/220 kV Moga S/s
- 10) Associated suitable Reactive Compensation

In addition, following Transmission System for Connectivity shall also be required:

1. Establishment of 1x500 MVA, 400/220kV ICT at Bhadla-II Pooling station
and
Bhadla PS – Bhadla-II (New) 400kV D/c line
or
2. Establishment of 1x1500 MVA, 765/400kV ICT & 1x500 MVA, 400/220kV ICT at Bhadla-II Pooling station
and
LILO of Ajmer – Bikaner 765 kV D/c at Bhadla-II S/s(New)
or

Bhadla-II – Fatehgarh-II 765kV D/c line & LILO of Fatehgarh (TBCB) – Bhadla (PG) 765kV D/c line (to be operated at 400kV) at Fatehgarh-II so as to establish Fatehgarh (TBCB) – Fatehgarh-II 400kV D/c line (765kV line operated at 400 kV) and Fatehgarh-II - Bhadla 765kV D/c line