Agenda

for

170th OCC Meeting

Date: 24.08.2020

Eastern Regional Power Committee

14, Golf Club Road, Tollygunge

Kolkata: 700033

Eastern Regional Power Committee

Agenda for 170th OCC Meeting to be held on 24th August 2020

PART A

Item No. A.1: Confirmation of minutes of 169th OCC meeting of ERPC held on 27.07.2020.

The minutes of 169th OCC meeting were uploaded in ERPC website and circulated vide letter dated 11.08.2020 to all the constituents.

Members may confirm the minutes of 169th OCC meeting.

PART B: ITEMS FOR DISCUSSION

Item No. B.1 Primary Frequency Response Testing of Generating Units—POSOCO.

NLDC vide letter dated 10th August 2020, communicated a procedure to be considered for Commercial Settlement during onsite testing of generators for Primary Response of regional generating units. Details are enclosed at **Annexure-B1**.

Members may discuss.

Item No. B.2 Testing of primary frequency response of state generating units by third party agency--ERLDC

The Hon'ble Central Electricity Regulatory Commission (CERC), vide notification dated 12th April 2017, had notified Indian Electricity Grid Code (Fifth Amendment) Regulations, 2017. As per this notification, following proviso has been added at the end of Regulation 5.2 (g) of Part 5 of the Principal Indian Electricity Grid Code (IEGC) Regulations: "Provided that periodic checkups by third party should be conducted at regular interval once in two years through independent agencies selected by RLDCs or SLDCs as the case may be. The cost of such tests shall be recovered by the RLDCs or SLDCs from the Generators. If deemed necessary by RLDCs/SLDCs, the test may be conducted more than once in two years."

In compliance of IEGC, process of testing of primary frequency response of regional generating units (eligible for RGMO as per IEGC section 5.2 (f)) has been started by POSOCO.

All the SLDCs are requested to share their action plan for testing of primary frequency response of the generating units.

Item No. B.3 Outage of important transmission system

1. 400/220 KV GIS Darbhanga (DMTCL)--Bihar

BSPTCL vide letter dated 10th August 2020 informed that temporary shutdown of 400/220 KV Darbhanga Substation was availed on 28.07.2020 at 11:29 am owing to rising water level and vulnerable situation of the Substation. This is to inform that because of this outage, all associated transmission lines of BSPTCL were out resulting in loss of approx. 200 MW of load. They are facing

hardship and difficulties due to non-adequate availability of power in the adjoining areas. This is causing growing resentment in the public. As such, earliest restoration of the Substation is of utmost importance for BSPTCL.

Therefore, it is requested to early action towards restoration of the Substation through dewatering of the area, if possible. Also, it is requested to make sound arrangement in the Grid by ensuring all safety and emergency restoration measures to avoid repetition of such type of situation in future.

DMTCL may update. Members may discuss.

2. 400 kV Barh-Motihari D/C and 400 kV Barh-Gorakhpur D/C lines.

Eastern Region Power Committee (ERPC) letter dated 21.11.2019, a six month restoration time starting from the zero date of 15.12.2019 was granted to DMTCL to restore the 400 kV D/C Barh - Motihari-Gorakhpur Lines by re-erecting 6 towers on pile foundations following the washing away of four towers on account of heavy water discharge and change in course of Gandak river last monsoon season.

DMTCL vide its letter dated 21st May 2020 informed that due to the severe impact of COVID 19 Pandemic as well as other Force Majeure events such as unseasonal heavy rains which ultimately affected the pace of DMTCL transmission line restoration work progress and requested for a suitable extension in terms of timelines for completion of restoration work.

To appraise DMTCL challenges, issues, work progress and current position related to restoration work, a consolidated presentation was submitted.

In 168th OCC meeting, DMTCL informed that due to the severe impact of COVID 19 Pandemic as well as other Force Majeure events such as unseasonal heavy rains, the progress of DMTCL transmission line restoration work got affected. DMTCL shared a detailed presentation on the work progress.

DMTCL further added that if weather conditions would be favorable then the work would have been completed by 15th July 2020.

Thereafter OCC advised DMTCL to complete the restoration work at the earliest and advised DMTCL to share the details of work progress on weekly basis to ERPC.

In 169th OCC Meeting DMTCL informed that because of bad weather conditions and high-water level in Gandak river they are getting less working hours to carry out the tower erection works. Therefore, the restoration works of 400 kV Barh-Motihari D/C and 400 kV Barh-Gorakhpur D/C lines are getting delayed. DMTCL further added that ERS of 400kV Barh-Motihari S/C line which had been used to restore the line on temporary basis was also washed out because of the heavy water flow. They informed that they are working hard to restore 400kV Barh-Motihari S/C line on permanent towers and the line would be restored within two days provided the water level recedes and they get the opportunity to work.

Thereafter OCC advised DMTCL to complete the restoration work at the earliest.

Thereafter, DMTCL also informed that the 400kV Darbhanga (DMTCL) S/s may get flooded as the water level in river Ganges has reached the highest level of last 30 years.

To this issue ERLDC opined that a bypass arrangement should be planned at 400kV Darbhanga (DMTCL) S/s so that the 400kV Kishanganj-Darbhanga-Muzaffarpur link could be kept in service in case of flooding of the substation.

OCC then advised DMTCL to interact with the respective transmission utilities for possibilities of making bypass arrangement at 400kV Darbhanga (DMTCL) S/s and submit the details to ERPC and ERLDC.

Further, OCC decided that a separate meeting with the concerned utilities may be convened to discuss the issue of bypass arrangement at 400kV Darbhanga (DMTCL) S/s in after receiving the preliminary details from DMTCL.

Thereafter DMTCL in a mail dated 13.08.2020 informed that despite extreme weather conditions, unprecedented discharge from the Valmiki dam, resulting floods, and high-water currents, their team at site has been able to complete the erection of tower location 27/0 mid-stream of Gandak river and has also completed the stringing of Barh-Motihari line (single ckt. single conductor per phase) on 07.08.2020. Post receiving required clearances, the line has been successfully charged on 08.08.2020 and power flow to the northern region of Bihar has been resumed.

Further DMTCL informed that they have submitted the details of restoration work and the issues/ challenges which impacted the restoration work progress which is given in the ***Annexure B.3.2.***

DMTCL may update the progress of restoration work.

3. 400 kV Kishenganj-Patna D/C lines:

In 162nd OCC, Powergrid informed that one circuit of 400 kV Kishenganj-Patna D/C line would be restored through ERS by December 2019. Powergrid added that permanent restoration of both the circuits of 400 kV Kishenganj-Patna D/C lines would be completed by March 2020.

MS, ERPC submitted that Powergrid had repeatedly changed their schedule of restoration of the line. He advised Powergrid to give a report on restoration schedule committed till date in chronological order along with the reason for changing the scheduled dates.

He added that a Committee would visit the site once again in 2nd week of November 2019 to access the situation.

In 163rd OCC, Powergrid informed that both circuits of 400 kV Kishenganj-Patna D/C line would be restored through ERS by December 2019. Powergrid added that permanent restoration of both the circuits of 400 kV Kishenganj-Patna D/C lines would be completed by March 2020.

Thereafter, Powergrid vide letter dated 3rd January 2020 informed that the temporary restoration of the line using ERS could not be completed due to pathetic condition of approach road, unprecedented cold weather condition and continued heavy water current in the Ganga river.

Powergrid added that restoration work is under progress in war footing basis and it is expected to be restored temporarily by 3rd/4th week of January 2020 however permanent restoration is expected to be completed by end of March 2020.

On 24th January 2020 meeting held at Patna, Powergrid informed that both circuits of 400 kV Kishenganj-Patna D/C line was restored through ERS on 22nd January 2020.

In 166th and 167th OCC, Powergrid informed that that permanent restoration of both the circuits of 400 kV Kishenganj-Patna D/C lines would be completed by April 2020.

In 168th OCC meeting Powergrid informed that both the circuits of 400 kV Kishenganj-Patna D/C line would be restored by July 2020, but they required shutdown of both the lines for 20 days.

ERLDC informed that NLDC is not permitting shutdown of both the lines simultaneously and advised to take the shutdown of one circuit at a time.

Further Powergrid informed that shutdown of one circuit at a time is not possible.
OCC then advised Powergrid to share the relevant details with ERLDC to take up with NLDC.

In 169th OCC meeting Powergrid informed that 400 kV Kishanganj-Patna D/C line is under shutdown to restore the line on permanent towers. Powergrid further explained that the restoration work of 400 kV Kishanganj-Patna D/C line was delayed due to severe rain fall and huge in-flow of water from upstream. Powergrid therefore requested to extend the shutdown of 400 kV Kishanganj-Patna D/C lineup to 30th July 2020.

Powergrid further added that they will bring 400 kV Kishanganj-Patna D/C line into service by 30th July 2020 using ERS as they could not complete the tower erection work falling in the Kosi river. Powergrid explained that because of huge discharge of water from Nepal, it was not possible to erect the tower in Kosi river during this monsoon. They informed that they would take up this work after the monsoon and shift the line to permanent towers until that 400 kV Kishanganj-Patna D/C line would be on ERS. Powergrid mentioned that single moose conductor which is capable of carrying 500 MW has been used for each circuit of the ERS.

OCC then expressed serious concern over delay in permanent restoration of 400 kV Kishanganj-Patna D/C line and advised Powergrid to restore the line on permanent towers at the earliest. OCC then agreed for extension of shutdown of 400 kV Kishanganj-Patna D/C lineup to 30th July 2020 to restore the line on ERS. Further, OCC advised Powergrid to maintain the healthiness of the ERS till restoration of the line on permanent towers.

Powergrid may update about the permanent restoration of lines.

Item No. B.4 Renewal of contract for all installed SEM's of Phase-1 and 2 including AMR of Eastern Region—Powergrid

Existing contract period for Support of AMR/AMC of Phase-1 and Phase-2 has been completed on 30-Jun-2020. Total 656 SEM and 120 locations (129 DCU) are out of AMC scope since 30.06. 2020.Currently maximum SEMs are out of AMC support (66% SEM, out of AMC). On a special request from PGCIL, TCS is continuing the AMC support for all 656 SEMs till now but further contract required to be renewed.

Considering the lockdown period since Mid of Mar-2020, maximum possible support has been provided by TCS and there is no major outage occurred for the weekly data availability of SEM.
TCS has submitted a techno-commercial proposal for renewal of their AMC Contract for another 5 years. Proposal value is total **4.98 Cr.** This proposal includes **05 years of comprehensive AMC support for all 656 meters including DCU replacement in 129 Locations**. As currently there is no active contract present with TCS for the AMC support, placing of AMC renewal LOA needs to be completed on priority basis. Based on the offer price submitted by TCS, now it is proposed to finalise the AMC contract on single tender basis with M/S. TCS.

Brief Scope of Work:

1. Comprehensive AMC support for the meters (656 SEM and 129 DCU) which have been installed in AMR Phase1 and Phase2.
2. AMC support includes replacement of Hardware which are installed at various Sub Stations (like DCU, Cables, PVC pipes, MOXA converters etc). Hardware replacement will be done as and when required.
3. As all DCU have already covered the service period (05 years plus), DCU replacement will be required. 60 number of DCUs have been considered for replacement in this proposal. (By considering the present scenario and future planning for faulty DCU replacement).
4. If more DCUs are required, then separate proposal will be submitted for the DCU replacement.
5. Connection of replaced meters will be done.

Members may discuss.

Item No. B.5 Non updating of data on Merit Portal--CEA

The data on the Merit Portal is not being filled despite repeated reminders from ERPC. It is requested that the data for the back dates be filled and in the future the data be updated regularly. Further the data is being monitored by the Ministry of Power.

As the portal is of National significance, it is of paramount importance that the details be made available on the public portal, as it shall bring in greater transparency in the working of the power sector in India. Further the merit order data is useful for optimising the power procurement cost of the state itself. Regular updating of the data can also help other states optimize their own procurement cost. This shall help each and every state of the country.

The state wise details for the month of Aug 20 are given below:

STATE	DATE
Bihar	10.08.2020 - 18.08.2020
West Bengal	16.08.2020 & 18.08.2020
Sikkim	18.08.2020
Odisha	11.08.2020 - 18.08.2020
Jharkhand	18.08.2020
	14.08.2020 - 15.08.2020

Members may note and comply.

Item No. B.6 Monthly Data on Category-wise consumption of electricity in States/UTs---CEA

1. CEA vide mail informed that Hon'ble MoSP(IC) has desired the month-wise category-wise consumption data in the various States/UTs from April,2019 to July, 2020. CEA requested all the concerned utilities of States to furnish the data at the earliest.

All the concerned utilities of States may furnish the data.

2. CEA also informed that Hon'ble MoSP(IC) has also desired to know the reasons for the use of captive power plants by Industrial Consumers despite availability of adequate power in the country.

Members may discuss.

Item No. B.7 Demand and Generation projections for PoC_Q3_2021—ERLDC.

The demand and generation projections for PoC_Q3_2020-21 is given in **Annexure B.7**. Data as received from the constituents is also attached in Annexure B7. Also Projected demand from Oct 2020 to Dec 2020 is also obtained by demand forecast using past 3 years data from 2017-2020. The same may be discussed in this forum for ratification.

Members may discuss.

Item No. B.8 Integration of Power from Renewable Energy Zones (REZs)—POSOCO.

With regard to integration of REZs expected up to 2021-22 time-frame, the All India PSSE file with different scenarios is being prepared for assessing Inter-Regional adequacy of the grid and based on which system strengthening, if any, would be carried out.

In view of the above, 9 nos. of scenarios have been prepared. Load generation scenarios, results of the system studies for Scenario-4 (High RE), June 2021-22 Afternoon Peak, study assumptions & inputs considered have already been uploaded on CTU website. The said system studies are preliminary analysis of the system conditions based on the discussions held with CEA and POSOCO.

Further system studies for balance 8 nos. of scenarios is under-preparation and shall be finalized after receipt of comments/observations from the stakeholders. It is requested to forward comments/observations on the referred scenario, if any, latest by 26-06-2020.

Comments were received from POSOCO vide letter dated 25.06.2020. No comments were received from any other constituents of ER. Accordingly, the updated system studies incorporating observations received from POSOCO were carried out for all the 9 nos. of scenarios. The system studies along with observations received from POSOCO/constituents were also discussed with CEA and POSOCO in meeting held on 23.07.2020.

In view of above, Load generation scenarios, study assumptions & inputs considered, system studies and study analysis are attached in **Annexure B.8** for comments/observations. It is requested to forward comments/observations on the above, if any, at the earliest.

Members may discuss.

Item No. B.9 Updating Operating procedure of Eastern Region, 2020–ERLDC.

The Operating Procedure of every region must be updated and revised annually by the concerned RLDC, in compliance to section 5.1(f) of the IEGC. Accordingly, ERLDC vide email dated 14th July 2020 circulated the draft Operating Procedure of Eastern Region to all regional entities of Eastern Region for their valuable suggestions and observations. The procedure is finalized and uploaded at ERLDC website by 20-07-2020, taking into consideration comments received till 18-07-20.

In 169th OCC Meeting, OCC advised all the constituents to go through the operating procedure and submit their comments, if any to ERLDC within a week.

Thereafter, ERLDC informed that they have received some observations/comments regarding Updated Operating Procedure of Eastern Region. The points are given in the tabular format:

Sl. No	Item Sl. No	Description	Brief Remarks (Details data wise details will be shared shortly)
01.	3.2.1 & 3.2.2	Voltage control	Band must be mentioned at which Reactors will be put into service and when it will be withdrawn. Rajarhat B/R switching history will be provided as reference.
02.	5.0	Outage Procedure	Already after several discussion the outage procedure has been finalized in 162nd OCC. However, the proposed procedure is not matching with the finalized one. Details will be provided.
03.	6.6	Charging procedure	In point 5, there is a proposal for constitution of committee. As per previous experiences, it is very difficult for synchronization with different members from cross verticals and will delay the activity only.
04.	6.7	FTC procedure/documents	a. RIO certificate is asked from respective licensee. In B5 format every licensee is already certifying the same, then why it is asked again. b. Necessary protection setting confirmation is already provided in B2 formats. Detail protection settings not required.

			c. Details specification of equipment's is purely, licensee prerogative as all licensee is procuring as per CEA standard clause. Further detailing is not required.
05.	6.7.3.1	Installation of SEM	For other generators/IPP/ISGS, SEM will be handed over by POWERGRID but all necessary installation and further maintenance like time drifting etc to be done by respective generators/licensee only. May be included.
06.	7.4.4.3	Patrolling Report	Details of tripping findings will be shared as it is already in place, if any tripping occurred. However, patrolling report is a licensee specific format and will not be possible to submit in any specific format as mentioned.

Observations/comments in this regard received from Powergrid is enclosed at **Annexure-B.9**.

Members may discuss.

Item No. B.10 Issues related to charging 400KV Meramundali – Bolangir (PG) line after availing the shutdown --- SLDC Odisha.

400KV Meramundali – Bolangir (PG) line availed shutdown on 12.08.2020 for replacement of 'Y' phase CVT at Meramundali end as per ERLDC approval No. ER-RQ 3597 Dt. 10.08.2020. On completion of shutdown work at the time of charging, ERLDC insisted for RIO inspection report. Further, ERLDC issued switch on code only after submission of an undertaking as follows:

"Y- Phase CVT inspection report from RIO will be submitted as early as possible and also any further equipment that will be replaced in future will be supported by proper inspection report from RIO prior to applying for switch on code".

Replacement of CT, PT, CVT, CB, LA isolator etc. is quite common in day to day maintenance. The prevailing COVID-19 pandemic situation synchronizing the visit of Electrical Inspectors with maintenance work is quite difficult. So, obtaining inspection report of Electrical Inspector for maintenance of each of these elements is not practically feasible.

Therefore, it is requested to review the procedure of these elements to smoothly carry out maintenance work in the prevailing situation.

Members may discuss.

Item No. B.11 Modification of outage approval procedure for the lines connected to IPPs --- SLDC Odisha.

Modification may please be made for outage approval procedure for the following 400KV radial lines and equipments which has minimal or no impact on system so that concerned SLDC can approve the shutdown of following 400KV elements:

(a) 400 KV Meramundali – JSPL Ckt. I & II.

(b) 400 KV Meramundali – GMR(GKEL) SC Feeder.

(c) 400 KV new Duburi – TSL DC line (charged in 220KV).

Members may discuss.

Item No. B.12 Agenda of NTPC Talcher, Kaniha.

1. The Calibration of the energy meters (SEMs) at TSTPS premises is overdue (last calibration carried out between 19.09.2013 to 04.10.2013). This was pointed by various audit teams including Govt. auditors and was raised in OCC meetings. The annual audit report of Talcher-Solar CDM project for 2019-20 is kept abeyance only because of the above issue. Calibration of these meters (Solar meters in priority) to be carried out at the earliest.

2. Ramp Rate issue: frequent ramp-up and ramp-down (187 to 274 occasions on monthly basis) and in consecutive blocks affecting ramping performance as well as machine health. (Copy of letter submitted to ERLDC/ERPC in July-2020 enclosed as **Annexure B.12**). Similar scheduling was also observed recently for the date 02Aug-20 (Block 48-55), 12Aug-20 (Block 8-11, 39-41). Consecutive block ramp up/down scheduling (Direction change) may be avoided.

3. Due to inherent nature of boilers in TSTPS, to avoid flame failure tripping, we must take support of secondary fuel oil to carryout soot blowing in low load operation. This has increased the specific oil consumption beyond normative (0.5 ml/KWh). Low load scheduling may be reviewed and avoided

Members may discuss.

Item No. B.13 Constitution of a committee for independent verification of self-declarations and auditor's / accountant's certificates on random basis and in the case of complaints.

CEA vide letter dated 17th August 2020 informed that In pursuance of DPIIT order No. P-45021/2/2017-PP(BE-II) dated 04.06.2020 regarding Public Procurement (Preference to Make in India), order 2017 (PPP-MII)-'clause 9(d)' and MoP Order No. 11/05/2018/Coord dated 28.07.2020-'clause 6', a Committee has been constituted for independent verification of self-declarations and auditor's/ accountant's certificates on random basis and in case of complaints. The composition of the Committee is given below:

Chairperson	Member (Planning), CEA
Member	Chief Engineer (PSETD), CEA
Member	Chief Engineer (HETD), CEA
Member	Chief Engineer (TETD), CEA
Member	Chief Engineer (DP&R), CEA
External Expert	As may be co-opted by CEA
Convener	Chief Engineer (R&D), CEA

In this regard, it is required to submit to this office the procurement wise details and self-declaration certificates submitted by the suppliers regarding local contents of the purchases.

Before furnishing the details to Verification Committee, the self-declarations certificate about local contents etc. may also be verified at your end and an analysis report of the same may be furnished.

Compliance report regarding cyber security/safety of the equipment/process to be rendered as safe to connect, regular safety audit certificates (as mentioned in the **Annexure-III** of the aforesaid MoP Order) based on the requirement of the tender issued by the procuring entity may also be furnished in respect of each purchases.

Also, procuring entities are requested to add a clause in their tender documents mentioning that the

"*Self-declarations/ auditor's/ accountant's certificates submitted by the manufacturer/ supplier may be verified randomly by the committee constituted as per MoP Order 28-07-2020. In case of false documents/misrepresentation of the facts requisite action against such manufacturer/ supplier will be taken based on the recommendation of the Committee*."

The communication in this regard may be made with Ms. Sheetal Jain, Deputy Director, CEA, R K Puram, New Delhi 110066. Phone No. 011-26732286 Email **cerndcea@gmail.com**

Members may note and comply.

Item No. B.14 Request for data of the equipment/components to be included in Approved List of Model and Manufacturers (ALMM) Development of a Web Portal and creation of required fields in the Portal.

CEA vide mail communicated that MOP has brought out the Order No. 11/05/2018-Coord dated 23-07-2020 (Copy enclosed in **Annexure B.14**) mentioning creation of ALMM. As you are aware that a dynamic Web Portal is to be developed for ALMM. In this regard it is requested that equipment wise rating of all the equipments used in your Organization and their parameters that are considered mandatory (to be filled in the "respective fields" of the Portal) and are usually considered during the procurements/ tendering may be provided to this office in a tabulated form. These data will facilitate the creation of required 'data fields' in the Portal for easy accessibility and navigation.

Product wise Vendor details may also be given.

Kindly provide information on email: **cerndcea@gmail.com.**

Members may note and comply.

Item No. B.15 Scheduling of ISGS units to meet the technical minimum requirement–SLDC, Odisha.

It is observed that in-spite of zero requisition submission for certain ISGS stations like Farakka-I, II & III and Kahalgaon-I & II through out of 96 blocks of a day, as a normal practice ERLDC is scheduling certain quantum of power from those generating stations in some blocks of the day to meet technical minimum requirement of unit.

Sometimes, this forcefully scheduled power is creating under drawl situations at high frequency conditions when system demand is low. Further, to do away with this power, GRIDCO is forced to sell this power at a lower cost than the variable cost of the scheduled power, thereby creating a financial burden and audit issue. Therefore, ERLDC may please be advised to review the practice of scheduling of power from ISGS stations during zero requisition period. Further, it is requested that in case of zero requisition by any constituent, the power share of that constituent may be scheduled among the other beneficiaries who are availing power during other part of the day.

In 169th OCC Meeting, SLDC Odisha requested ERLDC to explore the requirement of power to other beneficiaries of the respective stations during zero requisition period to avoid injection of power during low demand conditions in Odisha.

Thereafter, ERLDC informed that the schedule is being enforced to ensure the technical minimum of the unit. The other beneficiaries of the station are also being consulted while giving such schedule. Because of huge variation in demand pattern it is difficult to avoid such conditions.

OCC then advised SLDC, Odisha to plan their own resources such as hydro generation to manage

such conditions and coordinate with ERLDC, if necessary.

SLDC Odisha as per mail dated 14.08.2020 had again raised the issue along with the details of ISGS share requisition, schedule of Odisha and other states under ERLDC for the month of June 2020 are given which is attached at **Annexure B.15**.

SLDC Odisha may explain.

PART C: ITEMS FOR UPDATE

Item No. C.1: ER Grid performance during July 2020.

The average and maximum consumption of Eastern Region and Max/Min Demand (MW), Energy Export for the month of July – 2020 were as follows:

Month	Average Consumption (mu)	Maximum Consumption(mu)/ Date	Maximum Demand (MW) Date/Time	Minimum Demand (MW) Date/Time	Schedule Export (Mu)	Actual Export (Mu)
July, 2020	464	505 MU; 18/07/20	22914MW. 18-07-2020; 22:48	15279MW;19-07-2020; 17:06	3882	3730

ERLDC will present Highlight/ Performance of Eastern Regional Grid during OCC meeting.

ERLDC may present the performance of Eastern Regional Grid.

Item No. C.2: Performance primary frequency response of generating stations in Eastern Region for the event in the month of July 2020.

Frequency response characteristics (FRC) has been analyzed pan India for four events of sudden frequency change that occurred during the month of July 2020. The details of those events and the overall response of Eastern region have been summarized and given at **Annexure-C2**.

Members may note and comply.

Item No. C.3: Status of UFRs healthiness installed in Eastern Region

UFR healthiness certificate for July 2020 has been received from WBSETCL.

Members may update.

Item No. C.4: Status of Islanding Schemes healthiness installed in Eastern Region

At present, the following islanding schemes are in service:

1. CESC as a whole Islanding Scheme, CESC
2. BkTPS Islanding Scheme, WBPDCL
3. Tata Power Islanding Scheme, Haldia
4. Chandrapura TPS Islanding Scheme, DVC
5. Farakka Islanding Scheme, NTPC
6. Bandel Islanding Scheme, WBPDCL

In 108th OCC meeting, respective constituents agreed to certify that the islanding schemes under their control area are in service on monthly basis.

In 168th OCC meeting DVC informed that during the preliminary study they identified that the implementation of islanding scheme with Mejia units 7 and 8 was not possible therefore now they had considered Chandrapura unit 7 & 8 for the implementation of islanding scheme.

ERLDC advised DVC to submit at least a preliminary draft plan to ERPC and ERLDC.

DVC vide mail dated 24.07.2020 has forwarded the proposed Islanding scheme, the details are given in ***Annexure C.4.***

Healthiness certificate for July 2020 has been relieved from NTPC, BKTPP, BTPS and Tata Power Islanding scheme.

Members may update and discuss.

A. Status of Islanding Scheme of IB-TPS.

Islanding scheme of IBTPS was discussed and finalized in earlier OCC and PCC meeting, OPGC ensured that the islanding scheme will be in place within 6 months post finalization of scheme.

In 167thOCC, OCC advised OPGC to share the status of islanding scheme to ERPC.

In the 169th OCC Meeting OPGC representative was not present.

OPGC may update the status of Islanding scheme.

B. Status of Islanding Scheme of KBUNL

As the islanding Scheme discussion is not progressing, it is desired that one Meeting at ERPC or KBUNL may be called where the scheme finalization may be completed.

In 167thOCC, KBUNL informed that they are ready to implement the islanding scheme, but they need confirmation from Bihar on availability of radial load at Gopalganj.

OCC advised BSPTCL to go through the islanding scheme finalized in earlier OCC Meetings and advised to take necessary action to provide the radial load for the islanding scheme.

In the 168th OCC meeting after detailed deliberation, OCC decided to conduct a separate meeting with KBUNL and BSPTCL to discuss the islanding scheme of KBUNL within this week.

In line with decision taken in 168th OCC, a meeting was held through WebEx on 22-June-2020 for discussing and finalizing islanding scheme of KBUNL St-II. Meeting was attended by participants from BSPTCL, Bihar SLDC, KBUNL (NTPC) and ERLDC. Minutes of Meeting was attached in Annexure C.4 of the 169th OCC Meeting minutes document.

In 169th OCC Meeting ERLDC informed that as per the decision taken in the separate meeting, Bihar and KBUNL must submit some details to ERLDC for finalization of the scheme.

ERLDC further added that they had received some details from SLDC Bihar, but few details are yet to be received. Further ERLDC mentioned that no details have been received from KBUNL.

Thereafter, OCC advised Bihar and KBUNL to submit all the relevant details to ERLDC at the earliest.

KBUNL and SLDC BIHAR may update.

Item No. C.5: Bus split arrangement at 400 KV Sundergarh (Jharsuguda)--ERLDC

In the 16th meeting of Standing Committee on Power System Planning of ER, held at New Delhi on 2nd May 2014, bus splitting arrangement at Sundergarh (Jharsuguda) substation at 765kV & 400kV voltage levels was agreed. The bus split scheme at Sundergarh has been completed in Nov '19. Comments were also sought on the proposal of CTU shared with email.

Subsequently ERLDC has independently carried out the Bus-splitting simulation studies. In the simulation 400 kV Buses at OPGC was considered as coupled (which is how system is operating at present), while in the shared by CTU study same was decoupled. Through simulation it was observed that system remains N-1 secured without any skewed flow when Sundergarh operates in Bus Split mode at 400 kV level, which is in line with CTU study report.

Fault level pre and post bus split observed in simulation is as follows:

Substation	Fault level before bus Splitting	Fault level Post bus Splitting
400 kV Sundergarh (Jharsuguda)	66.5 kAmps	46.4 kAmps /46.5 kAmps

Subsequently by letter dated 14th July 2020 CTU suggested to implement bus split arrangement at 400 kV Jharsuguda citing reference to CEA 3rd July 2020 letter.

In the 169th OCC meeting Powergrid informed that they were ready to operationalize the bus split arrangement at400 kV Jharsuguda S/s.

Further, ERLDC informed that they had carried out a simulation study wherein it was found that there is no issue in meeting N-1 contingency with the Bus splitting at 400 kV Jharsuguda S/s and the results were almost matching with the CTU study. They further informed that the bus splitting scheme could be put in service. However, two group protection settings must be implemented at 400 kV Jharsuguda S/s and nearby substations for proper operation of protection relays during common bus operation and split bus operation at 400kV Jharsuguda S/s. Similarly, the zone settings of remote end substations are to be reviewed considering changes in the longest and shortest line.

It was also informed that the protection issues were already discussed in 92nd PCC Meeting held on 22nd July 2020 wherein PCC advised all the concerned constituents to review the protection settings considering the above-mentioned points.

After detailed deliberation, OCC agreed for operationalization of the bus split arrangement at400 kV Jharsuguda S/s. OCC then advised Powergrid to coordinate with the remote end substations for implementation of the revised protection settings and inform a suitable date to ERLDC for putting the bus splitting scheme in operation.

ERLDC and Powergrid may update.

Item No. C.6: Transfer capability determination by the states.

Latest status of State ATC/TTC declared by states for the month of September-2020

Sl. No	State/Utility	TTC (MW)		RM(MW)		ATC Import (MW)		Remark
		Import	Export	Import	Export	Import	Export	
1	BSPTCL	6450	--	129	--	6321	--	Sep-20
2	JUSNL	1144	--	33	--	1111	--	Sep-20
3	DVC	1628	2742	66	52	1562	2690	Jun-20
4	OPTCL	2112	1071	83	60	2029	1011	Aug-20
5	WBSETCL	4492	--	400	--	4092	--	Aug-20
6	Sikkim	295	--	2.5	--	292.5	--	Dec-19

Sikkim has stopped sending the TTC values as well as PSSE files.

Members may update.

Item No. C.7: Mock Black start exercises in Eastern Region – ERLDC

Mock black start date for financial year 2019-20 is as follows:

Sl.No	Name of Hydro Station	Schedule	Tentative Date	Schedule	Tentative Date
		Test-I		Test-II	
1	U.Kolab	Last week of May, 2019	Done on 19th July 2019	Last Week of January 2020	28 March 2020
2	Maithon	1st week of June 2019	Taken up only after replacing the governing systems of the units	1st Week of February 2020	After June 2020
3	Rengali	2nd week of June 2019	Done on 27th June 2019	Last week of November 2020	Done on 17th January 2020
4	U. Indarvati	3rd week of June 2019	Done on 7th November 2019	2nd week of February 2020	March 2020
5	Subarnarekha	1st week of October 2019	Done 20th August 2019	1st week of January 2020	After Aug 2020
6	Balimela	3rd week of October 2019	Done on 17th July 2019	1st week of March 2020	*Done on 12th Feb 2020*

7	Teesta-V	2nd week of May 2019	Done on 28th Nov 2019	Last week of February 2020	
8	Chuzachen	Last Week of Dec 2019	Done on 5th December 2019	Last week of March 2020	
9	Burla	Last Week of June 2019	Done on 20th July 2019	Last week of February 2020	Done on 11th Feb 2020
10	TLDP-III	1st Week of June 2019	November-19	2nd Week of January 2020	
11	TLDP-IV	Last Week of June 2019	December-19	1st Week of February 2020	
12	Teesta-III	Last Week of Oct 2019		First Week of March 2020	
13	Jorthang	First Week of May 2019		First Week of Feb 2020	
14	Tasheding	2nd Week of May 2019		2nd Week of Feb 2020	
15	Dikchu	Sep 2019		3rd Week of Feb 2020	Attempted on 19th Feb 2020 but not Successful

In the 169th OCC Meeting, Odisha informed that they are planning to conduct the mock black start exercise for Burla and Rengali in Sept 2020. They further informed that because of COVID-19 situations they were unable to carry out the black start exercise for Balimela HEP as per schedule in July 20 and they will conduct the same by Sep 2020.

Members may update.

Item No. C.8: Multiple outages of Isolators& Circuit Breakers at Ramchanderpur S/S (JUSNL)--ERLDC

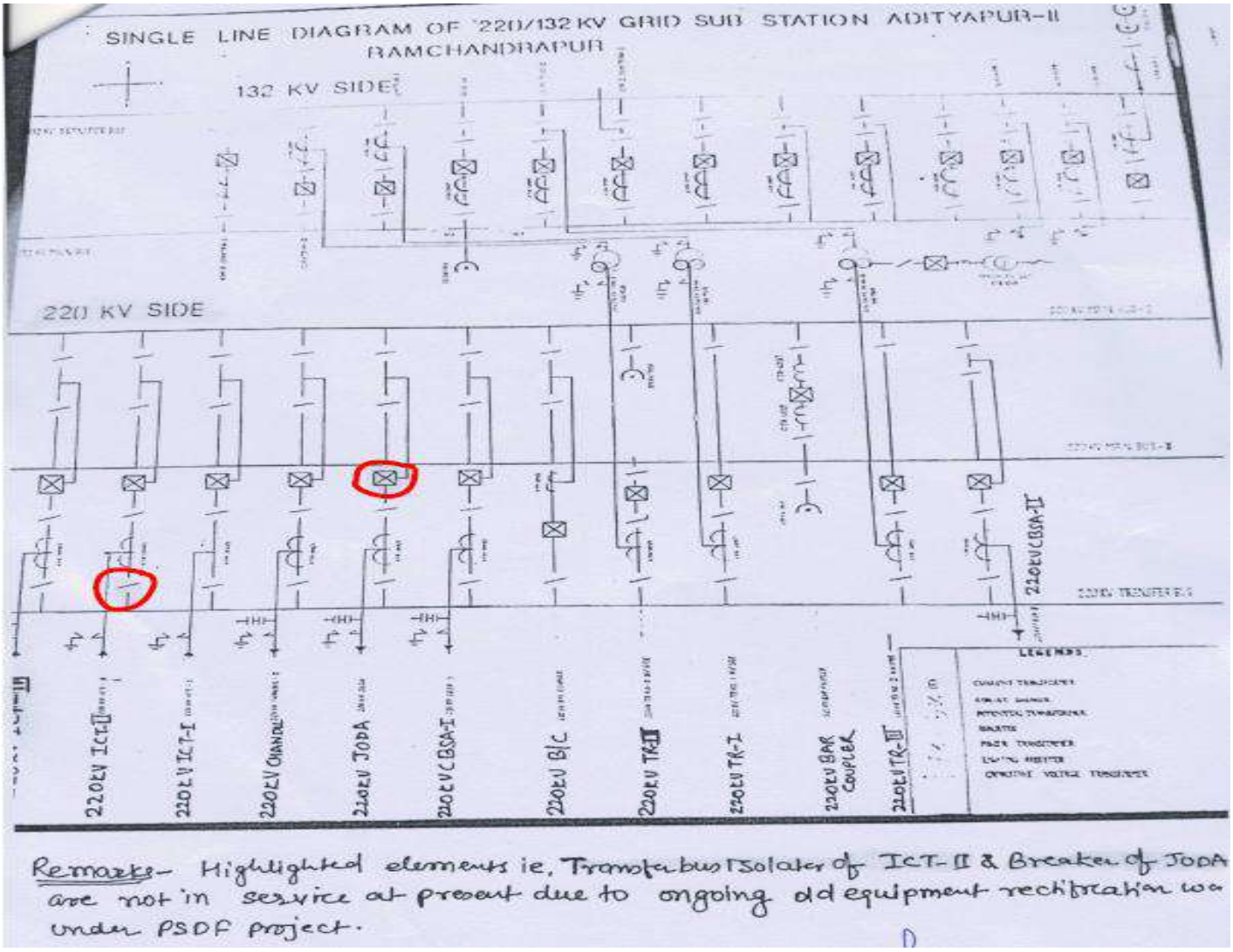
ERLDC had issued shutdown to indenting agency PGCIL of 400KV/220KV 315 MVA ICT-2 at JAMSHEDPUR for 29/Jun/2020 from 09:00-17:00 Hrs vide approval number: APP NO : RQ3258 to facilitate replacement of porcelain insulator string with Polymer insulator string at Jamshedpur S/S switchyard due to high pollution. After returning shutdown closing code was issued ER/06/C/01349 at 29/06/2020 16:30 Hrs. However, It could be charged from 400 KV side only as 220 KV side(Ramchanderpur) ICT-2 could not be charged due to problem in Bph CB pole of this ICT-2 at Ramchanderpur (Entire 220kV switchyard at Ramchanderpur is owned & maintained by JUSNL).

Being a double main transfer bus scheme at Ramchanderpur ICT still could not be taken into service via transfer bus coupler as Isolator associated with ICT-2 connecting to transfer bus was not resent. While issuing consent for the above shutdown vide mail dated Fri, Jun 26, 1:33 PM JUSNL didn't mention the non-availability transfer bus coupler Isolator associated with ICT-2. Being an important load center and connecting point to other regions such non-availability of key elements are unwarranted. It has also come into notice that several isolators and breaker remains either out of service or non-existent at Ramchanderpur S/S. Being an ISTS connected station availability of all elements are necessary for secure and reliable system operation.

Following are list of List of Isolators & Circuit Breakers that remains out of service & non

Breaker/Isolator Number	Associated Element Name	Status(In Service/Out of Service/Non-existent)	Reason for not being in service & Duration of outage
Breaker	220 kV Joda Breaker	Out of service	Due to ongoing Old equipment replacement work under PSDF project. Expected to be functional within 10-15 days depending upon availability of S/D.
isolator	220kV Tr. Bus isolator of ICT-2	Out of service	Due to ongoing Old equipment replacement work under PSDF project. Expected to be functional within 10-15 days depending upon availability of S/D.
isolator	220kV Main Bus-2 isolator of Tr no-1	Non- existent	Not Present since inception of this GSS.
isolator	220kV Main Bus-1 isolator of Tr no-2	Non- existent	Not Present since inception of this GSS.
isolator	220kV Main Bus-2 isolator of Tr no-3	Non- existent	Not Present since inception of this GSS.

THE SLD OF 220 KV RAMACHANDERPUR S/S (JUSNL)



In the 169th OCC Meeting, Jharkhand informed that replacement of isolator and circuit breakers is in progress under PSDF project. They have applied for shutdown from 1st Aug for normalizing all the Breakers and Isolators.

Thereafter, ERLDC informed that they are not getting any information on healthiness of the elements as a result they are facing problem in real time operation.

OCC then advised SLDC, Jharkhand and other utilities to ensure availability of all elements in ISTS connected stations for secure and reliable system operation and inform about any outage of the elements in their substation to ERLDC at the earliest.

JUSNL may update about the restoration of above elements.

Item No. C.9: Prolonged outage of bays in Koderma (DVC) substation: ERLDC

The main CB of 400 KV Koderma-Bokaro-2 at Koderma was out since 25.12.2019 due to damage in the double interrupter chamber and the line is charged through the tie CB with B/R-2. On 15.07.2020, due to leakage of oil pressure of the main CB of B/R-2, DVC requested emergency S/D of the line due to the unavailability of main CB. Tie CB of B/R-1 and Gaya-1 was also out since 22.10.2019 due to oil leakage from B-ph CT and problem in CB hydraulic mechanism. Such prolonged outages of breakers at such an important substation which has connectivity to ISTS system as well as generating station hamper the reliability and security of the system operation.

In 169th OCC Meeting, DVC mentioned that bays of the Gaya line are made available. Work has already been started for restoring the Koderma line bays and the same would be available by 2nd Aug 20.

DVC may update the status of restoration of above mention bays.

Item No. C.10: PSS tuning status in Eastern Region. --ERLDC

Details of units where PSS have not been tuned in last three years were given in Annexure C.13 of 169th OCC minutes. It was observed that utilities such as OPGC, OHPC, WBSEDCL, NTPC, GMR and few others have not yet submitted their plan for PSS tuning to ERLDC/ERPC.

A report on analysis of PSS tuning done so far was also circulated separately.

In 169th OCC Meeting, OCC advised all the concerned generators to submit the plan for PSS tuning to ERLDC and ERPC.

Thereafter, OCC advised ERLDC to discuss the issue along with RGMO in a separate meeting.

Members may update.

Item No. C.11: Finalization of procedure for PSS tuning of power plants -- ERLDC

Power System Stabilizer (PSS) tuning is an ongoing exercise in Eastern regional grid after observation of various low frequency oscillation from time to time in the grid. In line with this, OCC has decided that all generating plants in eastern region will submit their PSS tuning plan to ERLDC/ERPC and the test reports for validation.

Considering above and other technical and regulatory requirement of CEA and CERC PSS tuning is being done at different generating station, however at present no formal guideline is available for carrying out the same. Due to which it was observed that result shared by the generating units are not standardized and sometimes some tests are missed out.

To take care of the same a draft procedure for PSS tuning is prepared to be shared in the upcoming OCC Meeting. All are requested to go through it and give comments so that it can be finalized.

In 169th OCC Meeting, OCC advised all the generators to go through the draft procedure enclosed in **Annexure-B9** *of 169th OCC Minutes document and submit their comments to ERLDC within 15 days.*

OCC then advised ERLDC to place this procedure in the separate meeting on RGMO wherein most of the generators are present in the meeting.

ERLDC may update.

Item No. C.12: Operationalizing Bus splitting at Biharshariff--ERLDC

Bus split arrangement at Biharshariff was already commissioned, however it was not put in service as split bus arrangement was causing uneven loading in 400/220 kV ICTs at Biharsariff. Thus, earlier it was decided that the same will be put in service after commissioning of 4th ICT at Biharsariff. After commissioning of 4th ICT simulation studies are carried out at ERLDC and same is also shared with Bihar SLDC. From the study it is observed that Bus-split at Biharshariff has no significant effect on loading of 400 KV lines but 400/220 KV ICT flows is getting significantly skewed.

- N-1 contingency of 500 MVA ICT-IV leads to 265 MW loading on ICT –II (315 MVA rating) where in base case without bus-split, total ICT loading at Biharshariff was 560 MW and Bihar demand 4650MW.
- If we consider summer peak case having 6000 MW Bihar demand with 660 MW Biharshariff ICTs loading, N-1 contingency of 500 MVA ICT-IV leads to 301 MW loading on ICT –II (315 MVA rating).

In 169th OCC Meeting, ERLDC informed that Bihar had submitted a report wherein Bihar agreed for the implementation of bus-split arrangement.

Further, ERLDC added that Bihar has to make load shedding scheme to avoid the tripping of 315 MVA ICT on overload during tripping of 500 MVA ICT.

Thereafter, OCC opined that depending on the power flows after putting the bus splitting scheme in service, the SPS scheme should be decided.

OCC then advised Powergrid to make necessary changes in protection settings for implementation of the bus-split arrangement and to coordinate with remote end sub-stations. OCC further, advised Powergrid to intimate a suitable date to ERLDC for putting the bus splitting scheme in service at Biharshariff.

Powergrid and BSPTCL may update.

Item No. C. 14: Nomination of nodal persons for communication related to tripping of grid elements and primary frequency response observed at generating stations --ERLDC.

For smooth communication regarding this transfer of data, all the regional generating stations, transmission utilities and SLDCs were requested in 168th OCC meeting to nominate at least two persons as nodal person(s) for tripping analysis of any grid element and for primary frequency response analysis of generating units. Nomination was not received from new regional generating and all SLDCs. List is shown in following table. These generating units and SLDCs are requested to nominate at the earliest.

Entity	Nomination for communication for tripping related information	Nomination for communication for FRC/ FGMO/ RGMO related information
NTPC Darlipalli	**Yet to be received**	Nomination received
Adhunik	**Yet to be received**	Nomination received
GMR	**Yet to be received**	Nomination received
KBUNL	**Yet to be received**	Nomination received
Rangit	**Yet to be received**	Nomination received
Jharkhand SLDC/JUSNL	Nomination received	**Yet to be received**
WB SLDC	**Yet to be received**	**Yet to be received**

Members may update.

PART D: OPERATIONAL PLANNING

Item No. D.1: Anticipated power supply position during September 2020.

The abstract of peak demand (MW) vis-à-vis availability and energy requirement vis-à-vis availability (MU) for the month of September 2020 were prepared by ERPC Secretariat on the basis of LGBR for 2019-20 and feedback of constituents, keeping in view that the units are available for generation and expected load growth etc. is enclosed at **Annexure D1.**

Members may confirm.

Item No. D.2: Shutdown proposal of transmission lines and generating units for the month of August 2020.

Generator shutdown for September 2020 is shown below.

Proposed Maintenance Schedule of Thermal Generating Units of ER during 2020-21 in the month of Sept 20 (as finalised in draft LGBR meeting held on 06.12.2019)							
System	**Station**	**Unit**	**Capacity (MW)**	**Period**		**No. of Days**	**Reason**
				From	**To**		
ODISHA	TTPS	4	60	13.09.20	22.10.20	40	AOH
WBPDCL	Santaldih TPS	6	250	01.09.20	28.09.20	28	Capital Overhauling
NTPC	KhSTPS	6	500	01.09.20	05.10.20	35	Boiler + HPT + IPT

ERLDC may place the list of transmission lines shutdown discussed on 19th August 2020.

1. **Shutdown for Diversion of 220kV D/C Siliguri-Kishanganj TL in between location no.-187 & 188 and 168 & 169 due to development of 4-Lane Islampur Bypass by NHAI—Powrgrid.**

NHAI is constructing a 4-Lane Islampur bypass on NH-31.Due to development of the by-pass road , NHAI have asked to shift 4 nos. tower of 220kV D/C Siliguri-Kishanganj TL due to vertical clearance violation with respect to CEA norms.

As a part of that in order to shift the towers, 2 Nos. new foundation, 2 Nos. new tower erection &1.35 KM Stringing to be done for tower shifting in between Loc No.-168 & 169 and 2 Nos. new foundation, 2 Nos. new tower erection & 1.75 KM Stringing to be done for tower shifting in between Loc No.-187 & 188.

They are planning to complete the tower foundation activity by 09.09.2020 (if weather remains favourable & no disturbance due to ROW) and further in order to take up the Erection & Stringing work at both the stretches simultaneously (in between location no.-187 & 188 and 168 & 169), it is proposed to accord Shut-down of 220kV D/C Siliguri-Kishanganj TL from 10.09.2020 to 30.09.2020 on continuous basis.

Since the transmission line diversion work has been taken up due to NH-31 road construction work carried out by NHAI which is a Central Govt. Organization under Ministry of Road Transport as such the outage of the line suffered due to this diversion work may be considered as deemed available.

220kV D/C Siliguri-Kishanganj TL in between location no.-187 & 188

220kV D/C Siliguri-Kishanganj TL in between location no.-168 & 169

Members may update.

Item No. D3: **Major Generating Units/Transmission Element outages/shutdown in ER Grid (as on 10.06.2020).**

SL. No	Station	State	Agency	Unit No	Capacity	Reason(s)	Outage Time	
1	BALIMELA HPS	ODISHA	OHPC	1	60	R & M WORK	05-Aug-2016	00:00
2	BALIMELA HPS	ODISHA	OHPC	2	60	R & M WORK	20-Nov-2017	00:00
3	BURLA HPS/HIRAKUD I	ODISHA	OHPC	1	49.5	R & M WORK	14-Mar-2018	17:20
4	BURLA HPS/HIRAKUD I	ODISHA	OHPC	5	37.5	R & M WORK	25-Oct-2016	09:00
5	BURLA HPS/HIRAKUD I	ODISHA	OHPC	6	37.5	R & M WORK	16-Oct-2015	09:00
6	BURLA HPS/HIRAKUD I	ODISHA	OHPC	7	37.5	ANNUAL MAINTENANCE	06-Dec-2019	12:00
7	CHANDRAPURA TPS	DVC	DVC	3	130	TURBINE BLADE DAMAGE	30-Jul-2017	00:00
8	KOLAGHAT	WEST BENGAL	WBPDCL	1	210	POLLUTION PROBLEM	10-May-2018	23:05
9	KOLAGHAT	WEST BENGAL	WBPDCL	2	210	ESP FIELD MAINTENANCE	26-Dec-2019	22:48
10	FSTPP	WEST BENGAL	NTPC	5	500	Feed water control valve gland leakage	13-Aug-2020	14:20
11	JITPL	ODISHA	JITPL	2	600	BOTTOM ASH SCRAPPER CONVEYOR PROBLEM	06-Aug-2020	00:05
12	KBUNL	BIHAR	NTPC, BSPHCL	2	195	SHAFT VIBRATION HIGH	24-Jul-2020	02:41
13	KHSTPP	BIHAR	NTPC	3	210	BREACH IN ASH POND DYKE	06-Aug-2020	16:04
14	KHSTPP	BIHAR	NTPC	4	210	BREACH IN ASH POND DYKE	06-Aug-2020	15:18
15	KHSTPP	BIHAR	NTPC	5	500	TURBINE VIBRATION	05-Aug-2020	20:51
16	KHSTPP	BIHAR	NTPC	6	500	BREACH IN ASH POND DYKE	06-Aug-2020	15:25
17	KHSTPP	BIHAR	NTPC	7	500	BREACH IN ASH POND DYKE	10-Aug-2020	12:26
18	NABINAGAR(BRBCL)	BIHAR	NTPC	2	250	Generator bearing high vibration	12-Aug-2020	02:20
19	BALIMELA HPS	ODISHA	OHPC	4	60	SPARKING IN PMG	02-Mar-2020	17:40
20	BARAUNI TPS	BIHAR	BSPHCL	6	110	ELECTRICAL PROTECTION TRIP; PROBLEM IN BEARING GEAR MOTOR	25-Feb-2020	06:56
21	DPL	WEST BENGAL	WBPDCL	7	300	ID FAN TRIPPED	09-Aug-2020	03:34
22	MUZAFFARPUR TPS	BIHAR	BSPHCL	1	110	BTL	10-Aug-2020	23:18
23	U. KOLAB	ODISHA	OHPC	3	80	GUIDE BEARING TEMPERATURE HIGH	07-Jan-2020	07:55
24	WARIA TPS	DVC	DVC	4	210	BOILER TUBE LEAKAGE	02-Mar-2020	17:54

Generators/ constituents are requested to update the expected date of revival of the units.

Hydro Unit Outage report:

SL. No	Station	State	Agency	Unit No	Capacity	Reason(s)	Outage	
1	BALIMELA HPS	ODISHA	OHPC	1	60	R & M WORK	05-Aug-2016	00:00
2	BALIMELA HPS	ODISHA	OHPC	2	60	R & M WORK	20-Nov-2017	00:00

3	BURLA HPS/HIRAKUD I	ODISHA	OHPC	1	49.5	R & M WORK	14-Mar-2018	17:20
4	BURLA HPS/HIRAKUD I	ODISHA	OHPC	5	37.5	R & M WORK	25-Oct-2016	09:00
5	BURLA HPS/HIRAKUD I	ODISHA	OHPC	6	37.5	R & M WORK	16-Oct-2015	09:00
6	BURLA HPS/HIRAKUD I	ODISHA	OHPC	7	37.5	ANNUAL MAINTENANCE	06-Dec-2019	12:00

It is seen that about 282 MW hydro capacities in Odisha is under forced outage / planned outage in the period of peak monsoon and therefore not available for providing the much-needed peaking support during evening peak. SLDC / OHPC may please indicate restoration plan of the units.

Line Long Outage Report:

SL NO	Transmission Element / ICT	Agency	Outage DATE	Reasons for Outage	Expected Restoration date
1	220/132 KV 100 MVA ICT I AT LALMATIA	FSTPP/JUSNL	22-01-2019	Failure of HV side breaker	
2	220 KV PANDIABILI - SAMANGARA D/C	OPTCL	03-05-2019	Tower collapse	
3	400 KV MOTIHARI(DMTCL)-GORAKHPUR-I	POWERGRID/DMTCL	13-08-2019	Tower Collapsed at location 27/0(132) due to change of river course of GANDAK river. Part of the line charged as 400KV Barh - Gorakhpur-since 05.02.20 as an interim arrangement bypassing Motihari LILO portion.	
4	400 KV MOTIHARI(DMTCL)-GORAKHPUR-II	POWERGRID/DMTCL	13-08-2019	Tower Collapsed at location 27/0(132) due to change of river course of GANDAK river.	
5	400 KV BARH-MOTIHARI(DMTCL) -I	POWERGRID/DMTCL	04-09-2019	Tower Collapsed at location 27/0(132) due to change of river course of GANDAK river. Part of the line charged as 400KV Barh - Gorakhpur-since 05.02.20 as an interim arrangement bypassing Motihari LILO portion.	
6	400KV-MERAMUNDALI-NEW DUBRI-D/C	OPTCL	20-03-2020	3 number Tower Collapsed at location 17 ,18 & 19 10 Km from Meramundali S/S.	
7	220 kV Howrah - KTPP II	WBSETCL	01-04-2020	Tower collapse at loc no 66 due to soil erosion	
8	400 KV KOLAGHAT-NEW CHANDITALA	WBSETCL	25-04-2020	Line was opened to restore 220 kV Howrah – kolaghat using some portion 400KV KTPP-New Chanditalackt.	
9	220/132 KV 100 MVA ICT 3 at Chandil	JUSNL	30-04-2020	Fire Hazard	
10	132 KV NEW KISHANGANJ -BARSOI S/C and 132KV-PURNEA (PG)-KISHANGANJ(OLD) S/C	BSPTCL	02-07-2020	Out due to heavy soil erosion at loc no 140 and 141 by river Kankai. line charged as 132 KV Purnea (PG) - Barsoiw.e.f 21.07.20 at 19:05 Hrs temporarily by suitable jumper arrangement at the crossing point of 132 kV Kisanganj(New) - Barsoi and 132 kV Purnea(PG) - Kisanganj (old).	

11	220kV Barauni-Hajipur Ckt-1	BSPTCL	28-09-2019	Tower collapse at location 38 & 39. Ckt-2 is on ERS since 13.01.2020.	
12	220KV-DARBHANGA (DMTCL)-DARBHANGA-2	BSPTCL	28-07-2020	Waterlogging in 400/220 KV Darbhanga (DMTCL) S/s due to flood	
13	220KV-DARBHANGA(DMTCL)-LAUKAHI-1	BSPTCL	28-07-2020	Waterlogging in 400/220 KV Darbhanga (DMTCL) S/s due to flood	
14	220kV HAJIPUR-AMNOUR-1	BSPTCL	05-08-2020	220/132/33KV Amnour GIS substation of BGCL under SLDC Bihar was switched off at 02:19 hrs on 05.08.20 due to Flood.	
15	220kV HAJIPUR-AMNOUR-2	BSPTCL	05-08-2020	220/132/33KV Amnour GIS substation of BGCL under SLDC Bihar was switched off at 02:19 hrs on 05.08.20 due to Flood.	

As per long outage list, most of the important grid elements, inter-state as well as intra-state, are under outage for long time due to tower collapse and other issues.

Transmission licensees/ Utilities are requested to update expected restoration date & work progress regarding restoration regularly to ERLDC/ERPC on monthly basis by 5th of each month so that status of restoration can be reviewed in OCC. Utilities are also requested to update outage of any elements within their substation premises like isolator/breaker to ERLDC/ERPC regularly.
(Reported as per Clause 5.2(e) of IEGC)

Members may update.

Item No. D.4 Commissioning of new units and transmission elements in Eastern Grid in the month of July 2020.

The details of new units/transmission elements commissioned in the month of July -2020 based on the inputs received from beneficiaries:

SL NO	Element Name	Owner	Charging Date	Charging Time	Remarks
1	400KV/220KV 500 MVA ICT 3 AT MAITHON(PG	PGCIL	29.07.20	11:09	
2	220 kV Purnea - Khagaria - LILO	BSPTCL	28.07.20	13:25	
3	132 KV PurnaBarsoi l	BSPTCL	21.07.20	19:05	(Reconfiguration of 132 kvPurnea (pg)- Kishanganj (old) and 132 kv Kishanganj new-Barsoi T/L to feed Barsoi)
4	220KV New Bolangir - Bolangir PGCIL Circuit – II.	OPTCL	30.07.20	23:13	
5	400KV-RAJARHAT-GOKARNA-1	PGCIL	12.07.09	16:09	
6	400KV-RAJARHAT-FSTPP-1	PGCIL	12.07.09	13:15	

Members may update.

Item No. D.5 UFR operation during the month of July 2020.

Frequency profile for the month is as follows:

Month	Max (Date/Time)	Min (Date/Time)	% Less IEGC Band	% Within IEGC Band	% More IEGC Band
July, 2020	50.39; 05/07/2020; 03:44:00	49.62; 14/07/202022:08:00	**6.7**	**78.17**	**15.13**

Hence, no report of operation of UFR has been received from any of the constituents.

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पावर सिस्टम ऑपरेशन कॉर्पोरेशन लिमिटेड
(भारत सरकार का उद्यम)
POWER SYSTEM OPERATION CORPORATION LIMITED
(A Govt. of India Enterprise)

केन्द्रीय कार्यालय : 61, आई एफ सी आई टावर, 7,8 एवं 9वीं मंजिल, नेहरु प्लेस, नई दिल्ली -110019
Corporate Office : 61, IFCI Tower, 7,8 & 9th Floor, Nehru Place, New Delhi- 110019
CIN : U40105DL2009GOI188682, Website : www.posoco.in, E-mail : posococc@posoco.in, Tel.: 011- 40234672

संदर्भ: POSOCO/NLDC/SO/Primary Response Testing/ **दिनांक:** 10th Aug 2020

सेवा मे,

Member Secretary-NRPC/WRPC/SRPC/ERPC/NERPC

सन्दर्भ :

1. POSOCO communication dated 12th Oct 2018, dated 23rd May 2019, dated 26th Jun 2019 and dated 4th Oct 2019.
2. POSOCO communication dated 22nd Apr 2020 informing generators about allocation of units for primary response testing by M/s Siemens Ltd.
3. POSOCO communication dated 13th May 2020 informing generators about allocation of units for primary response testing by M/s Solvina India Pvt. Ltd.

विषय: Regarding – Primary frequency response testing of Generating Units as per IEGC

महोदय,

Please refer to the above correspondences in reference to Primary Frequency Response testing of generators as per Indian Electricity Grid Code (IEGC). As per information available at NLDC, with the active support of RPCs, some of the generating stations have already finalized Letter of Award (LoA) with the identified testing agencies i.e. M/s Siemens ltd. and M/s Solvina India Pvt. Ltd., while others are in process of finalizing the LoA. As requested earlier, a further nudge from the RPC forum would definitely help in early placing of LoAs by all the generating stations.

It is expected that generators would soon request RPCs for approving program schedule i.e. dates for carrying out onsite testing. Apart from the above, the commercial settlement would also be required to be carried out by RPC secretariat. In this regard, some points are attached for consideration. The points are enclosed as *Annexure-1*. Hope that this would be helpful while finalizing the program for onsite testing and settlement of commercial issues.

The cooperation of RPCs is requested for successfully carrying out the primary response testing of generators.

सधन्यवाद,

भवदीय

10/08/2020

(देबाशिस दे)
कार्यपालक-निदेशक-रा॰भा॰प्रे॰कें॰

प्रतिलिपि सूचनार्थ:

1. Executive Director, WRLDC/SRLDC/ERLDC/NERLDC
2. CGM(I/c), NRLDC

Annexure-I

Commercial Settlement during onsite testing of generators for Primary Response

The Hon'ble Central Electricity Regulatory Commission (CERC), vide notification dated 12th April 2017, had notified Indian Electricity Grid Code (Fifth Amendment) Regulations, 2017. As per this notification, following proviso has been added at the end of Regulation 5.2 (g) of Part 5 of the Principal Indian Electricity Grid Code (IEGC) Regulations: "*Provided that periodic checkups by third party should be conducted at regular interval once in two years through independent agencies selected by RLDCs or SLDCs as the case may be. The cost of such tests shall be recovered by the RLDCs or SLDCs from the Generators. If deemed necessary by RLDCs/SLDCs, the test may be conducted more than once in two years.*"

The regulations specify that the onus of testing lies with generators. In compliance of the regulation mentioned above, POSOCO has carried out necessary actions. The requirements of the onsite testing are mentioned in the Expression of Interest (EoI) documents. The onsite testing of primary response is to be carried out at three different generation levels. The generation of unit may be required to vary from its antecedent generation. This means that unit would be required to operate at three different levels and its output would vary further in response to frequency input injection.

The test is one of various tests which are carried out by plants e.g. Performance Guarantee(PG) Tests, Reactive Power Capability tests, PSS tuning etc. The modalities to handle this change in output of generating units may be same as being done for similar tests as mentioned above. Following could be the alternatives for scheduling and accounting during the above period:

i. Generators themselves arrange for the schedule as being done for all other tests such as PG tests etc.
   a. Through their long term and medium term beneficiaries and beneficiaries agree for such scheduling by RLDCs during testing period.
   b. Through sale in Real Time Market by generators.

ii. Generators are given schedule through RRAS mechanism. RRAS Regulations do not allow such scheduling.

iii. Generators are totally dependent on DSM with normal scheduling.

In all above cases normal Deviation settlement Mechanism (DSM) Regulations can be appliable.

There has been request from some of generators that DSM during such testing period may be relaxed i.e. Actual Generation (AG) is made equal to Scheduled Generation (SG).

However, it need to be kept in mind that this testing is to be done for all generators including Independent Power Producers (IPP), merchant plants etc. and therefore the option of RRAS is not available to all the generators. Similarly, making SG=AG would be difficult for generator selling only under Short-Term Open Access (STOA). Therefore, in order to be non-discriminatory, Alternative-1 given above seems to be best suited. The similar methodology may also be adopted to carry out tests on generating units when they are on Reserve Shutdown or get tripped during the testing.

Further, in order to avoid centralised interference and affecting the schedule, any centralised dispatch instruction would not be given to the plant. Thus the unit shall be excluded from AGC during the testing and time blocks of testing would not be considered for ramping assessment. The plant shall be excluded from RRAS/SCED to manage their schedules.

It is requested that these points may please be deliberated in the RPC meetings and same is finalised apart from scheduling the testing program for tests at different stations. It is also suggested that while deciding the onsite testing program low demand season can be avoided to the extent possible. The testing of hydro based generating plants may be carried out during fall of monsoon to avoid spillage of water and achieve maximum rated generation capacity.

Note: *It may be noted that in multi-unit generating stations, the generating stations can also manage schedule through change in actual generation in other units (units not under testing) corresponding to actual change required in units under testing.*

Darbhanga-Motihari Transmission Company Limited

August 11, 2020

Ref. No.: DMTCL.REG.EXM.019.00.11082020

To,
Chief Engineer (Transmission)
Bihar State Power Transmission Co. Ltd.
04th Floor, Transmission Vidyut Bhawan
Bailey Road, Patna – 800021

Sub.: Force majeure events affecting restoration work of 400 kV D/C Barh-Motihari-Gorakhpur Line - Update on our Force Majeure (FM) event

Ref.:

1. DMTCL Force Majeure event update via notification no. DMTCL.REG.EXM.012.00.10072020, dated 10.07.2020
2. DMTCL Force Majeure event update via notification no. DMTCL.REG.EXM.011.00.27062020, dated 27.06.2020
3. DMTCL Force Majeure event update via notification no. DMTCL.REG.EXM.009.00.10062020, dated 10.06.2020
4. DMTCL Force Majeure event update via notification no. DMTCL.REG.EXM.007.00.23052020, dated 23.05.2020
5. DMTCL Force Majeure event update via notification no. DMTCL.REG.EXM.004.00.08052020, dated 08.05.2020;
6. DMTCL update on Force Majeure event vide letter no. DMTCL.REG.EXM.003.00.22042020, dated 22.04.2020;
7. DMTCL update on Force Majeure event vide letter no. DMTCL.REG.EXM.002.00.04042020, dated 04.04.2020;
8. DMTCL Force Majeure event notification no. DMTCL.REG.EXM.050.00.25.03.2020, dated 25.03.2020;

Dear Sir,

Further to our notice of Force Majeure dated 25.03.2020 and subsequent updates on FM event as under reference above (Ref 1-7), we had updated that restoration site has been effected due to Covid-19 pandemic and subsequent lockdowns, unseasonal rains and unprecedented discharge from Valmiki barrage in Gandak river which has adversely affected the restoration work progress. Accordingly, vide our letter dated 10.07.2020 we had informed that we shall endeavor to restore the lines partially through temporary arrangement using tower location no. 27/0 and permanent restoration would take a longer time owing to FM events such as unseasonal heavy rains and Covid19 situation; for which timeline extension of 5 months post monsoon season has also been requested.

In relation to temporary restoration, **we are pleased to inform you that despite extreme weather conditions, unprecedented discharge from the Valmiki dam and resulting floods (as has been widely published across the print, social and television medias), and high-water currents, our team at site has been able to complete the erection of tower location 27/0 mid-stream of Gandaki river and has also completed the stringing of Barh-Motihari line (single ckt. single conductor per phase) on 07.08.2020. Post receiving required clearances, the line has been successfully charged on 08.08.2020 and power flow to the northern region of Bihar has resumed (in just about a month after the ERS system was washed away on 08.07.2020)**. *(Site pictures attached in Annexure-1 for reference)*.

In addition to this, we want to bring to your kind attention that severe limitations and challenges that has been faced by site teams in the restoration work due to conditions as mentioned below:

Extension of lockdown period by Govt. of Bihar

Due to increasing number of Covid-19 cases in many districts in Bihar, lockdown which was imposed across Bihar till 31.07.2020 was further extended till 16.08.2020 as situation is still grave *(Government of Bihar order attached in Annexure-2)*. In addition to this DM of Motihari has issued orders imposing restriction on activities on account of covid-19 pandemic. *(Order attached in Annexure-3 for reference)*

Impact of heavy rains at site

Heavy rains are still continuing at site which have hampered the progress of work. Due to rains, teams working at site were having very limited period in day for working also its was difficult to do erection and stringing on wet structure/tower. Erection and stringing activity were carried out with the help of big boats. Extra boats were deployed for expediting the erection and stringing activity at additional cost. Material movement to the tower location 27/0 which is in the middle of river was also done with the help of boats which consumes significant amount of time in loading and unloading.

Impact of heavy and uneven discharge from Valmiki barrage

From the last weeks of June-20 the discharge of water from Valmiki barrage which is in the upstream of the river Gandak has been unprecedented *(Newspaper coverage for heavy discharge in Annexure 4 for reference)* which was on record high on 21st-July-2020 - 4,36,500 cusec of water was discharged from Valmiki barrage which is approximately near to the highest discharge level in last four years which was there in Aug-2017 *(Comparative graph of discharge in previous years in Annexure-5)* which has resulted in flooding of the Gandak river banks and complete restoration area where work was in progress. Also, in the month of July uneven discharge was observed which resulted in washing away of riverbanks on Gopalganj side where our ERS poles were erected, resulting in bending of ERS poles and subsequently tripping of line and later washing away of ERS pole.

Due to such high and unceasing discharge from barrage, restoration work is severely hampered, and it has further affected:

- Balance piling work on tower locations on Gopalganj end (Tower no. 26/0 (Barh-Motihari line) and 26/3 (Motihari-Gorakhpur line). No progress could be achieved there as currently complete area is flooded with water
- Access to tower locations – Access road used for material and manpower movement from Areraj end got completely washed away and road from Gopalganj end got submerged in water. For temporary restoration works we had to use boats are for manpower and material movement

Notwithstanding above issues faced which has made the construction activity challenging, teams were able to complete the temporary restoration by charging the Barh-Motihari line on 08.08.2020. Further we assure you that, as a prudent operator, we will continue with our pursuit to recommence restoration works as soon as it becomes safe to work in the river and water levels recedes. We therefore request you to kindly take note of the update above and consider the present situation as persistence of force majeure event as notified through our Force Majeure intimation dated 25.03.2020.

We will keep you updated on a regular basis based on emerging site situations and subsequent Orders passed by Government of India and the state of Bihar in relation to the ongoing Force Majeure owing to COVID-19 lockdown, heavy rains and unprecedented discharge from Valmiki barrage during this time of the year.

Thanking you,

For,
Darbhanga-Motihari Transmission Company Limited

Vijayanand Semletty
Authorized Signatory

Encl.:

Annexure 1 – Site pictures of temporary restoration work
Annexure 2 – Bihar government order for lockdown extension till 16.08.2020 due to increase in Covid-19 cases
Annexure 3 – Motihari DM order for restriction imposed due to covid-19
Annexure 4 – Newspaper coverage of heavy discharge from Valmiki barrage in Gandak river and its effect
Annexure 5 - Comparative graph of discharge from Valmiki barrage in previous years

Generation Projection (Oct 2020 - Dec 2020)

Annexure B.7

				Generation declared Commercial from 1st Jan'20 to 30th Jun'20					Generation declared/expected to be declared Commercial from 1st Jul'20 to 30th Sep'20							
Sl. No.	Entities	Region	Projections based on 3 Years Data	Bus Name	Unit No.	Installed Capacity	Gen. considered	Sub Total	Bus Name	Unit No.	Installed Capacity	Gen. considered	Sub Total	TOTAL	Comments From DICs /Others (if any)	Figure as per Comments/PoC Data
			(MW)			(MW)	(MW)	(MW)			(MW)	(MW)	(MW)	(MW)		
29	Karcham Wangtoo	NR	1072											1072		
30	Bairasul	NR	110											110		
31	Chamera 1	NR	555											555		
32	Chamera 2	NR	236											236		
33	Chamera 3	NR	232											232		
34	Naptha Jhakri	NR	1602											1602	As per data given by SJVN	1610
35	Lanco Budhil	NR	71											71		
36	DULHASTI	NR	374											374		
37	Salal	NR	713											713		
38	Sewa-II	NR	128											128		
39	URI 1 HPS	NR	486											486		
40	URI II HPS	NR	239											239		
41	Sree Cement	NR	190											190		
42	Parbati III	NR	370											370		
43	Rampur HEP	NR	448											448	As per data given by SJVN	449
44	KOLDAM	NR	885											885	As per NTPC	792
45	Kishanganga	NR	295											295		
46	Sainj HEP	NR	102											102		
47	Tanda Stg-2	NR		Tanda Stg-2	5	660	432	432						432	As per NTPC	433
48	Bhadla Solar	NR_RJ												0		
49	West Bengal	ER	4892											4892		
50	Odisha	ER	3362	OPGC Stage-II	4	660	432	432						3794	As per Data given by Odisha	4168
51	Bihar	ER	110											110		
52	Jharkhand	ER	353											353		
53	Sikkim	ER	0											0		
54	Chujachan	ER	118											118		
55	DVC	ER	4175											4175		
56	Durgapur Steel	ER														
57	Koderma TPP	ER														
58	Bokaro TPS	ER														
59	Raghunathpur	ER														

Generation Projection (Oct 2020 - Dec 2020)

Annexure B.7

Sl. No.	Entities	Region	Projections based on 3 Years Data	Generation declared Commercial from 1st Jan'20 to 30th Jun'20					Generation declared/expected to be declared Commercial from 1st Jul'20 to 30th Sep'20					TOTAL	Comments From DICs /Others (if any)	Figure as per Comments/PoC Data
				Bus Name	Unit No.	Installed Capacity	Gen. considered	Sub Total	Bus Name	Unit No.	Installed Capacity	Gen. considered	Sub Total			
			(MW)			(MW)	(MW)	(MW)			(MW)	(MW)	(MW)	(MW)		
60	MPL	ER	996											996		
61	Teesta V	ER	532											532		

Generation Projection (Oct 2020 - Dec 2020) — Annexure B.7

Sl. No.	Entities	Region	Projections based on 3 Years Data	Generation declared Commercial from 1st Jan'20 to 30th Jun'20					Generation declared/expected to be declared Commercial from 1st Jul'20 to 30th Sep'20					TOTAL	Comments From DICs /Others (if any)	Figure as per Comments/PoC Data
				Bus Name	Unit No.	Installed Capacity	Gen. considered	Sub Total	Bus Name	Unit No.	Installed Capacity	Gen. considered	Sub Total			
			(MW)			(MW)	(MW)	(MW)			(MW)	(MW)	(MW)	(MW)		
62	Kahalgaon	ER	2208											2208	As per NTPC	2171
63	Farakka	ER	1953											1953		1960
64	Talcher	ER	931											931		
65	Rangit	ER	63											63		
66	Adhunik Power	ER	384											384		
67	Barh	ER	1208											1208	As per NTPC	1238
68	Kamalanga TPP (GMR)	ER	605											605		
69	JITPL	ER	626											626		
70	Jorethang	ER	91											91		
71	Bhutan	ER	832	Mangdechu HEP	1	180	178	713						1544		
				Mangdechu HEP	2	180	178									
				Mangdechu HEP	3	180	178									
				Mangdechu HEP	4	180	178									
72	Teesta-III	ER	1016											1016		
73	Dikchu HEP	ER	108											108		
74	Nabinagar BRBCL	ER	704											704		
75	Tashiding HEP	ER	88											88		
76	Kanti Bijlee Stg-2 (KBUNL)	ER												0	As per last quarter	350
77	Nabinagar STPS (NPGC)	ER	620											620		
78	Darlipalli STPP ST-I	ER		Darlipalli STPP ST-I	1	800	524	524						524	As per NTPC	560
79	MP	WR	5260											5260	As per data given by MP	6164
80	Maharashtra	WR	13913											13913		
81	Chattisgarh	WR	2330											2330		
82	Gujarat	WR	10889											10889	As per data given by Gujarat	11852
83	Goa	WR	0											0		
84	D&D	WR	0											0		
85	DNH	WR	0											0		
86	Vindhyachal	WR	4586											4586	As per NTPC	4415
87	Ratnagiri Dabhol	WR	656											656		

DEMAND FORECAST USING PAST 3 YEARS DATA (Oct 2020 - Dec 2020)

										1	2	3	4		
	2017-18			2018-19			2019-20								
	Oct-17	Nov-17	Dec-17	Oct-18	Nov-18	Dec-18	Oct-19	Nov-19	Dec-19	2017-18 Average	2018-19 Average	2019-20 Average	Projected Demand for (Oct 2020 - Dec 2020) before normalization	Data given by DICs	Comments
Chandigarh	244	189	189	217	199	251	237	211	306	207	222	251	271		
Delhi	4,723	3,965	4,008	4,713	3,788	4,417	4,605	3,631	5,245	4,232	4,306	4,494	4,606		
Haryana	7,860	6,593	7,042	7,948	6,445	6,865	7,779	6,138	7,049	7,165	7,086	6,989	6,904		
Himachal Pradesh	1,425	1,491	1,560	1,520	1,605	1,700	1,542	1,629	1,729	1,492	1,608	1,633	1,719	1670	As per data given by HP
Jammu & Kashmir	2,063	1,988	2,206	2,285	2,204	2,464	2,434	2,193	2,484	2,086	2,318	2,370	2,543		
Punjab	8,337	5,713	6,050	7,990	6,071	6,440	7,348	5,503	6,767	6,700	6,834	6,539	6,530		
Rajasthan	10,357	11,215	11,290	11,450	11,809	13,276	10,533	11,980	13,464	10,954	12,178	11,992	12,747		
Uttar Pradesh	17,966	13,247	14,427	16,745	15,627	14,706	17,347	15,271	17,412	15,213	15,693	16,677	17,324		
Uttarakhand	1,920	1,886	2,025	1,943	1,897	2,158	1,797	1,818	2,233	1,944	1,999	1,949	1,970		
Northern Region	**50,289**	**42,390**	**45,360**	**49,635**	**44,899**	**44,899**	**49,615**	**44,189**	**51,159**						
Chattisgarh	3,635	3,231	3,202	4,270	3,774	3,401	4,079	3,544	3,748	3,356	3,815	3,790	4,088		
Gujarat	16,590	14,735	14,664	16,606	14,610	14,272	16,499	15,992	16,097	15,330	15,163	16,196	16,429	16,400	As per data given by Gujarat
Madhya Pradesh	10,453	11,797	12,301	11,496	10,007	13,215	8,820	13,147	14,623	11,517	11,573	12,197	12,442	13,302	As per data given by MP
Maharashtra	18,248	21,012	19,956	23,159	22,378	21,089	20,750	21,471	22,403	19,739	22,209	21,541	22,966		
Daman & Diu	349	336	362	341	329	328	347	332	338	349	333	339	330	250	As per Data given by Daman & Diu
Dadra Nagar Haveli	790	781	766	780	704	803	805	805	821	779	762	810	815	650	As per data given by DNH
Goa	517	494	490	536	513	512	590	611	625	500	520	609	651		
ESIL	619	641	691	641	704	708	519	487	560	619	684	522	511		
Western Region	**46,392**	**49,569**	**49,635**	**55,821**	**54,171**	**53,292**	**50,631**	**54,375**	**56,739**						
Andhra Pradesh	7,750	8,166	8,400	9,453	9,056	8,190	7,988	8,426	9,118	8,105	8,900	8,511	8,911		
Telangana	7,538	7,750	9,424	10,600	9,735	9,019	8,532	9,408	11,182	8,237	9,785	9,707	10,713		
Karnataka	8,404	9,688	10,100	10,766	11,233	11,230	9,090	10,670	12,803	9,397	11,076	10,854	11,900		
Kerala	3,535	3,645	3,553	3,644	3,678	3,727	3,576	3,714	3,705	3,578	3,683	3,665	3,729		
Tamil Nadu	13,485	14,222	13,648	14,333	13,827	13,986	14,319	13,829	13,710	13,785	14,049	13,953	14,096		
Pondicherry	369	350	345	368	354	368	415	396	373	355	363	395	411		
Goa SR															
Southern Region	**38,905**	**40,720**	**42,458**	**45,226**	**43,837**	**45,302**	**41,492**	**42,827**	**48,664**						
Bihar	4,515	3,917	4,038	5,084	4,425	4,151	5,020	4,323	4,614	4,157	4,553	4,652	4,950		
DVC	2,573	2,731	2,737	2,837	2,837	2,957	2,831	2,807	2,848	2,680	2,877	2,829	2,944		
Jharkhand	1,206	1,245	1,200	1,247	1,289	1,291	1,277	1,280	1,356	1,217	1,276	1,304	1,353		
Odisha	4,370	4,108	4,151	5,219	4,516	4,042	4,656	4,026	4,198	4,210	4,592	4,293	4,449	4000	As per Data given by Odisha
West Bengal	7,777	6,610	6,045	8,850	7,551	6,225	8,219	6,801	6,021	6,811	7,542	7,014	7,325		
Sikkim	90	96	94	93	101	106	96	102	111	93	100	103	108		
Bhutan															
Eastern Region	**19,836**	**18,161**	**17,733**	**22,733**	**20,322**	**18,023**	**21,706**	**19,212**	**18,068**						

DEMAND FORECAST USING PAST 3 YEARS DATA (Oct 2020 - Dec 2020)

										1	2	3	4		
	2017-18			2018-19			2019-20								
	Oct-17	Nov-17	Dec-17	Oct-18	Nov-18	Dec-18	Oct-19	Nov-19	Dec-19	2017-18 Average	2018-19 Average	2019-20 Average	Projected Demand for (Oct 2020 - Dec 2020) before normalization	Data given by DICs	Comments
Arunachal Pradesh	139	136	136	125	128	131	137	146	139	137	128	141	139		
Assam	1,745	1,478	1,453	1,704	1,525	1,418	1,770	1,508	1,380	1,559	1,549	1,553	1,547		
Manipur	170	178	187	185	189	211	183	201	216	178	195	200	213		
Meghalaya	300	339	368	336	352	365	338	350	365	336	351	351	361		
Mizoram	86	90	95	97	102	111	102	107	125	90	103	111	123		
Nagaland	135	132	127	131	135	133	148	148	153	131	133	150	156		
Tripura	327	276	259	269	258	228	291	257	224	287	252	257	235		
N. Eastern Region	**2,499**	**2,380**	**2,314**	**2,700**	**2,620**	**2,511**	**2,878**	**2,639**	**2,530**						
All India (sum of all regions)	**1,57,921**	**1,53,220**	**1,57,500**	**1,76,115**	**1,65,849**	**1,64,027**	**1,66,322**	**1,63,242**	**1,77,160**	**1,56,214**	**1,68,664**	**1,68,908**	1,86,509		
All India Peak Met	**1,57,394**	**1,49,036**	**1,51,567**	**1,70,604**	**1,61,678**	**1,62,609**	**1,64,259**	**1,55,321**	**1,70,492**	**1,52,666**	**1,64,964**	**1,63,357**	1,71,021		

Notes

1. Projections are based on the past 3 years' monthly Peak Demand Met data available on the website of CEA
2. The above projections are being done for financial year 2020-2021 (Q3) i.e Oct, 2020-Dec, 2020
3. Projections are being done based on the forecast function available in MS Office Excel

All-India Studies for integration of power from identified Renewable Energy Zones in 2021-22

1st meeting of Southern Region Power Committee (Transmission Planning) (SRPC(TP)) meeting was held on 16.12.2019 wherein various issues related to All-India studies for integration of power from identified Renewable Energy zones were discussed with the constituents. During the meeting, it was decided that comments / observations / suggestions may be submitted by the SR constituents on the All-India system studies already circulated vide email dated 19.11.2019 and based on observations received from constituents and deliberations held with POSOCO/CEA during the meeting held on 10.12.2019 on the referred circulated LGB/system studies circulated vide email dated 19.11.2019, 9 nos. of scenarios shall be prepared and circulated to the constituents.

In view of the above, LGB for 9 nos. of scenarios and system studies file for Scenario-4, June 2021-22 Afternoon Peak was prepared. Load generation scenarios, results of the system studies, study assumptions & inputs considered were uploaded on CTU website and were also circulated to all the regional constituents for their comments/observations vide emails dated 20.05.2020 (SR), 08.06.2020 (WR) and 11.06.2020 (NR, ER & NER).

Comments were received from POSOCO vide letter dated 25.06.2020. Further, observations pertaining to certain transmission network data updation of STU network and generation dispatches were also received from TANTRANSCO vide email dated 02.06.2020 and KPTCL vide email dated 08.06.2020. KPTCL has stated that the 9 nos. of load generation balance scenarios and assumptions considered for study pertaining to Karnataka is in line with the historical pattern. No comments were received from any other constituents. Accordingly, the system studies file was updated incorporating the above observations of the constituents and system studies were carried out for all the 9 nos. of scenarios. The system studies along with observations received from POSOCO/constituents were also discussed with CEA and POSOCO in meeting held on 23.07.2020.

Load generation scenarios, study assumptions & inputs considered, system studies and study analysis are attached for comments/observations. Comments/observations on the referred system studies may be forwarded to following email ids :

anilsehra@powergridindia.com; ankush.patel@powergridindia.com.

Assumptions considered for preparation of load generation scenarios for integration of RE in 2021-22

1. Time frame : 2021-22

2. Scenarios : Total 9 nos, June, 2021, August, 2021 and February, 2022, for afternoon peak, evening peak and night off-peak scenarios

3. Load Demand : as per the 19th EPS (SR – 62975 MW, All India – 225751 MW)

4. Demand factors : as per CEA report dated 30.01.2020 (same have been apportioned as per all-India peak)

	February			**June**			**August**		
Region	Afternoon peak (%)	Evening Peak (%)	Night off peak (%)	Afternoon peak (%)	Evening Peak (%)	Night off peak (%)	Afternoon peak (%)	Evening Peak (%)	Night off peak (%)
Northern	70	78	48	85	97	67	82	96	72
Western	93	92	67	82	85	66	75	84	60
Southern	88	93	66	74	85	60	80	90	60
Eastern	68	90	55	78	95	66	75	97	70
North-Eastern	53	91	40	65	97	50	70	99	56
All-India	88	95	65	86	95	75	85	96	76

5. Generation: In order to meet the required demand of a region, RE has been considered as must-run, nuclear and hydro has been considered as per the scenario and the balance demand is met by thermal generation.

6. With respect to the thermal generation dispatches, out of the total requirement of thermal generation, 55-65% of the requirement has been met by ISGS/IPPs and balance by state generation in each scenario.

7. In case of ISGS & IPP thermal generation, plants with cheaper variable cost have been considered progressively so as to meet the requisite requirement and balance plants with costly power have been switched-off.

8. In case of state embedded thermal generation, state generation dispatch has been considered with 55% technical minimum for every thermal unit, balance units are switched off.

9. Generation capacity to be made available upon unavailability of solar generation in evening shall be met by switching on and increasing dispatch of gas based power plants and hydro power plants, keeping the same thermal generation units running in afternoon peak and evening peak scenarios.

10. For accounting the availability of solar roof-top generation, equivalent load shall be reduced from respective Regions while preparing study files.

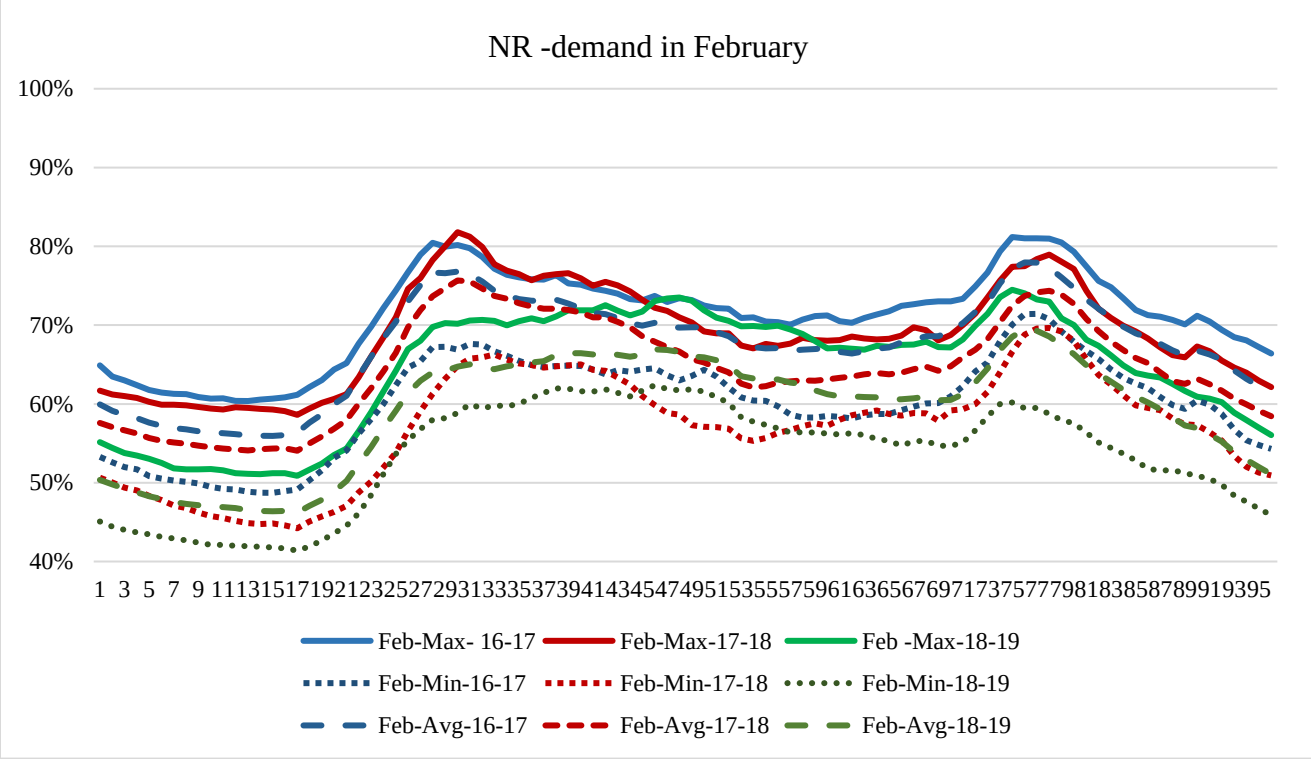
CEA report dated 30.01.2020 for Consideration of demand factor for carrying out Transmission Planning studies

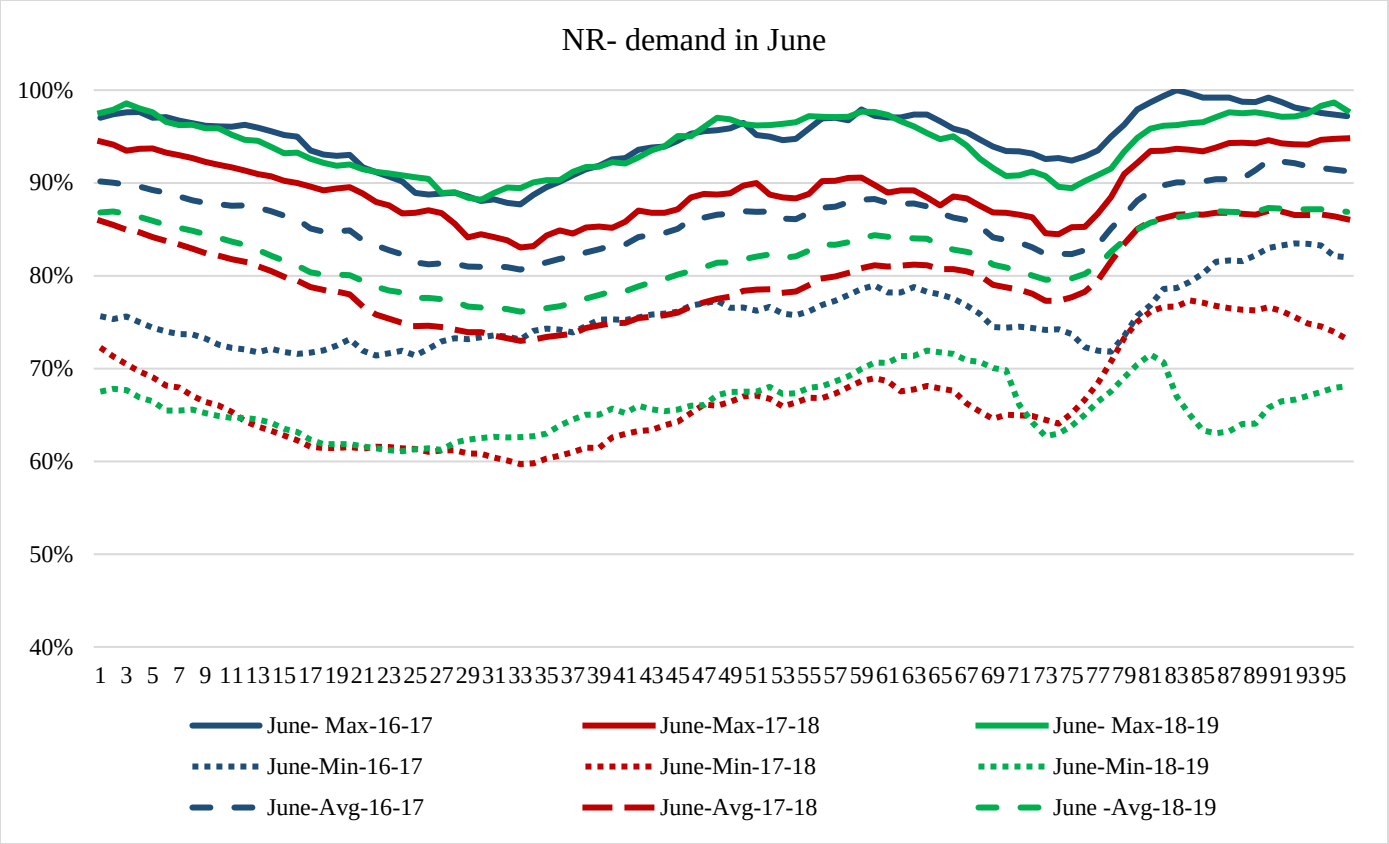
1.1 Load-generation balance scenarios for carrying out all –India studies for integration of 175GW RE capacity by the year 2022 had been prepared for the following representative scenarios:

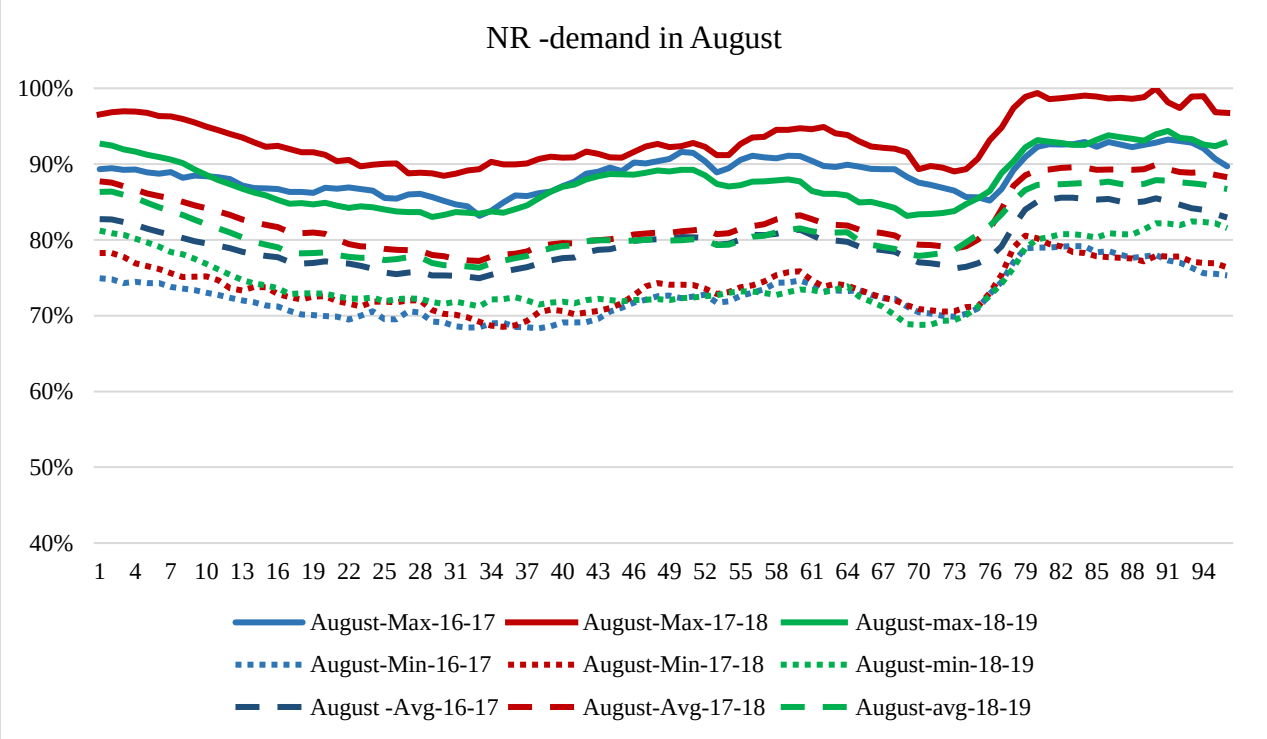
i. June 2021 (for afternoon peak, evening peak, night off peak)
ii. August 2021 (for afternoon peak, evening peak, night off peak)
iii. February 2022 (for afternoon peak, evening peak, night off peak)

For calculation of the demand factor for the above representative scenarios, demand data (15 minutes interval) for the years 2016-17, 2017-18 and 2018-19, as obtained from POSOCO has been analyzed. The graph showing region wise variation of maximum, minimum and average demand in a month as a percentage of peak demand in the region during the year, for the representative scenarios as given below.

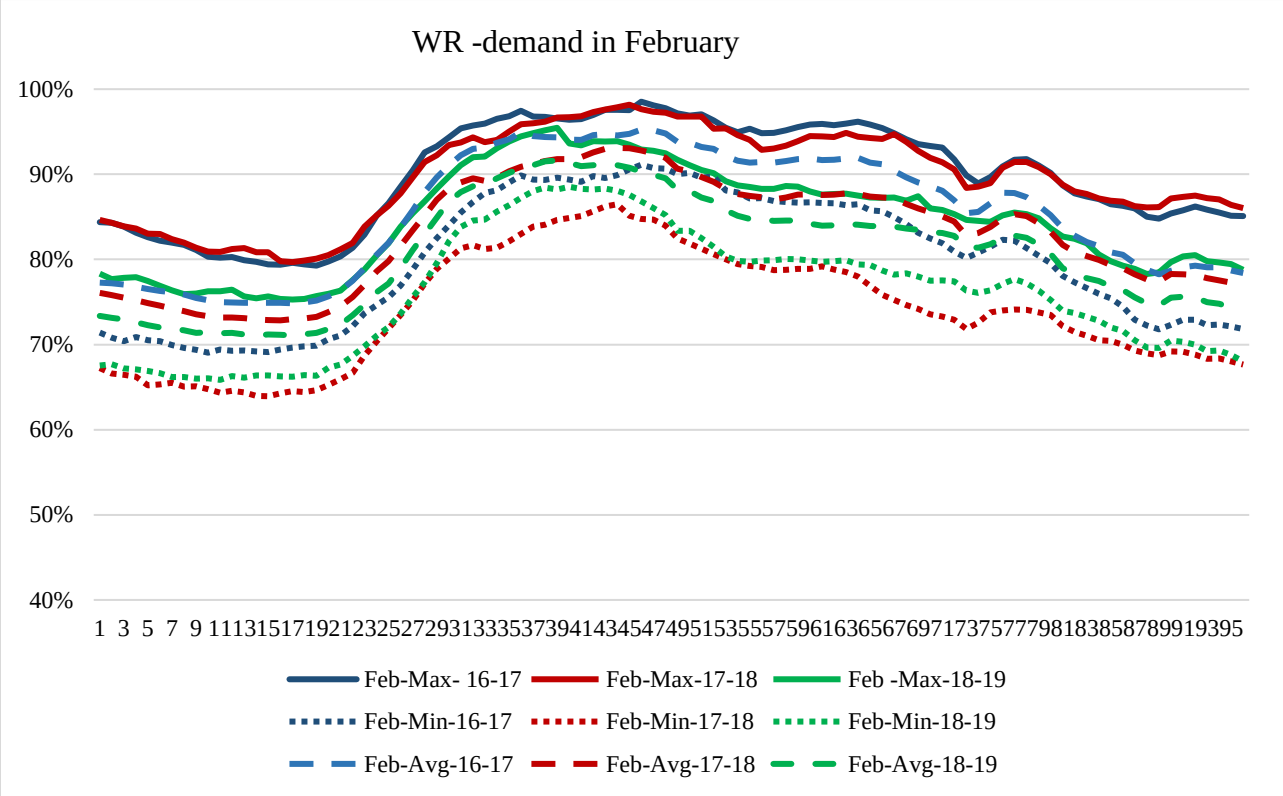
1.2 Northern Region Demand

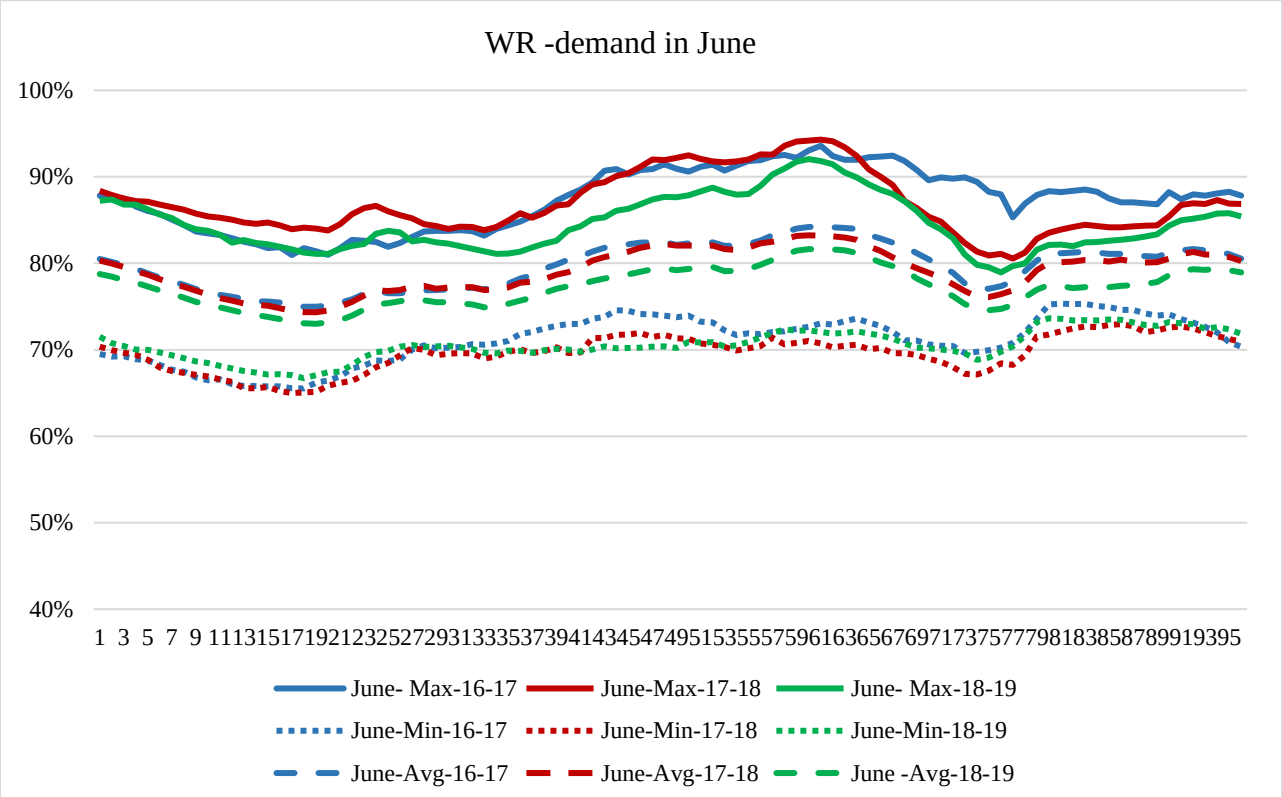


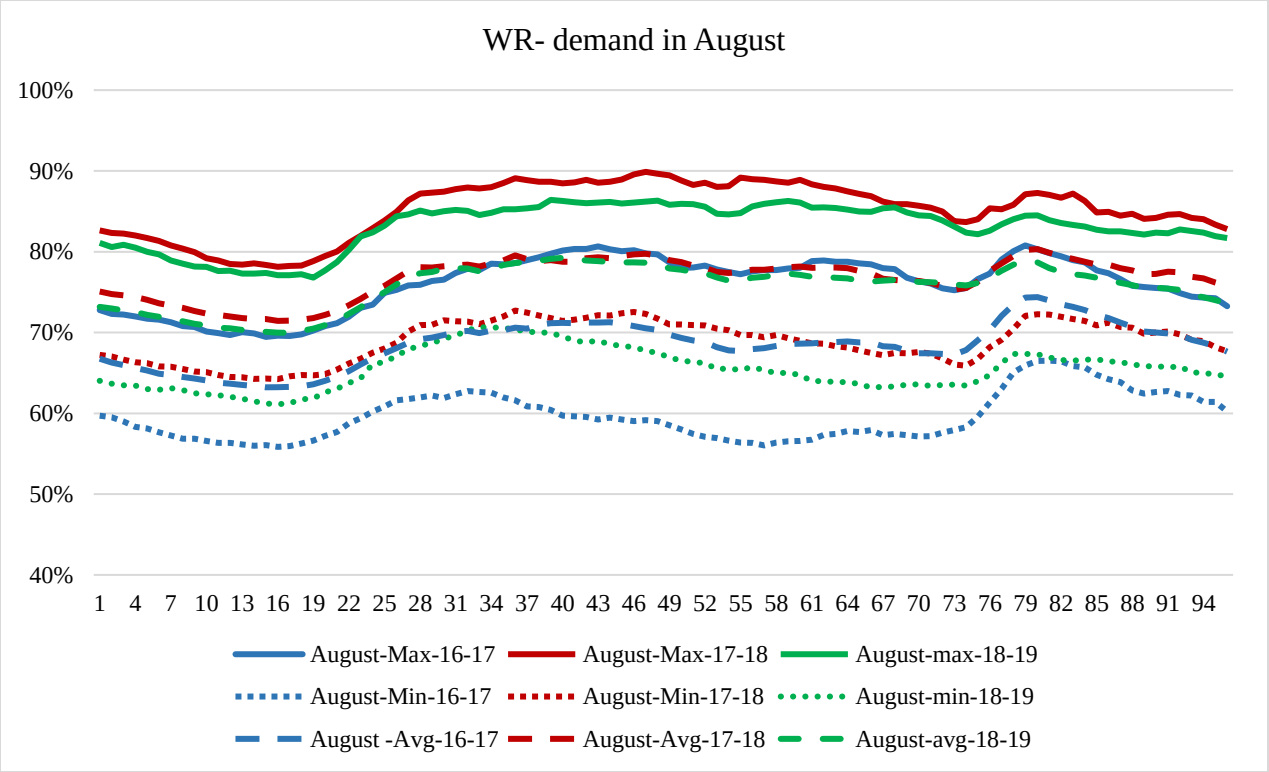

NR- demand in June
100%
90%
80%
70%
60%
50%
40%
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65 67 69 71 73 75 77 79 81 83 85 87 89 91 93 95
June- Max-16-17
June-Max-17-18
June- Max-18-19
June-Min-16-17
June-Min-17-18
June-Min-18-19
June-Avg-16-17
June-Avg-17-18
June -Avg-18-19


NR -demand in August
100%
90%
80%
70%
60%
50%
40%
1 4 7 10 13 16 19 22 25 28 31 34 37 40 43 46 49 52 55 58 61 64 67 70 73 76 79 82 85 88 91 94
August-Max-16-17
August-Max-17-18
August-max-18-19
August-Min-16-17
August-Min-17-18
August-min-18-19
August -Avg-16-17
August-Avg-17-18
August-avg-18-19

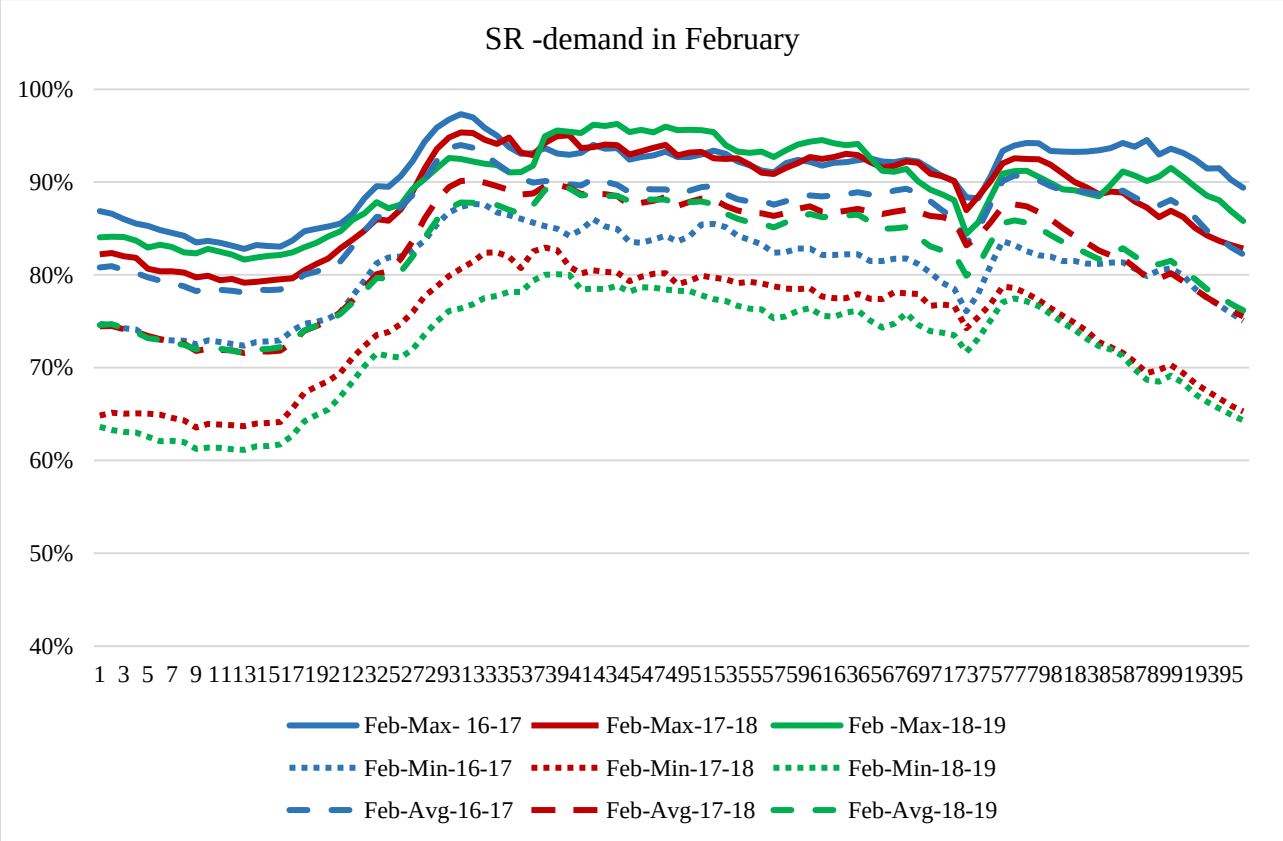
1.3 Western Region Demand

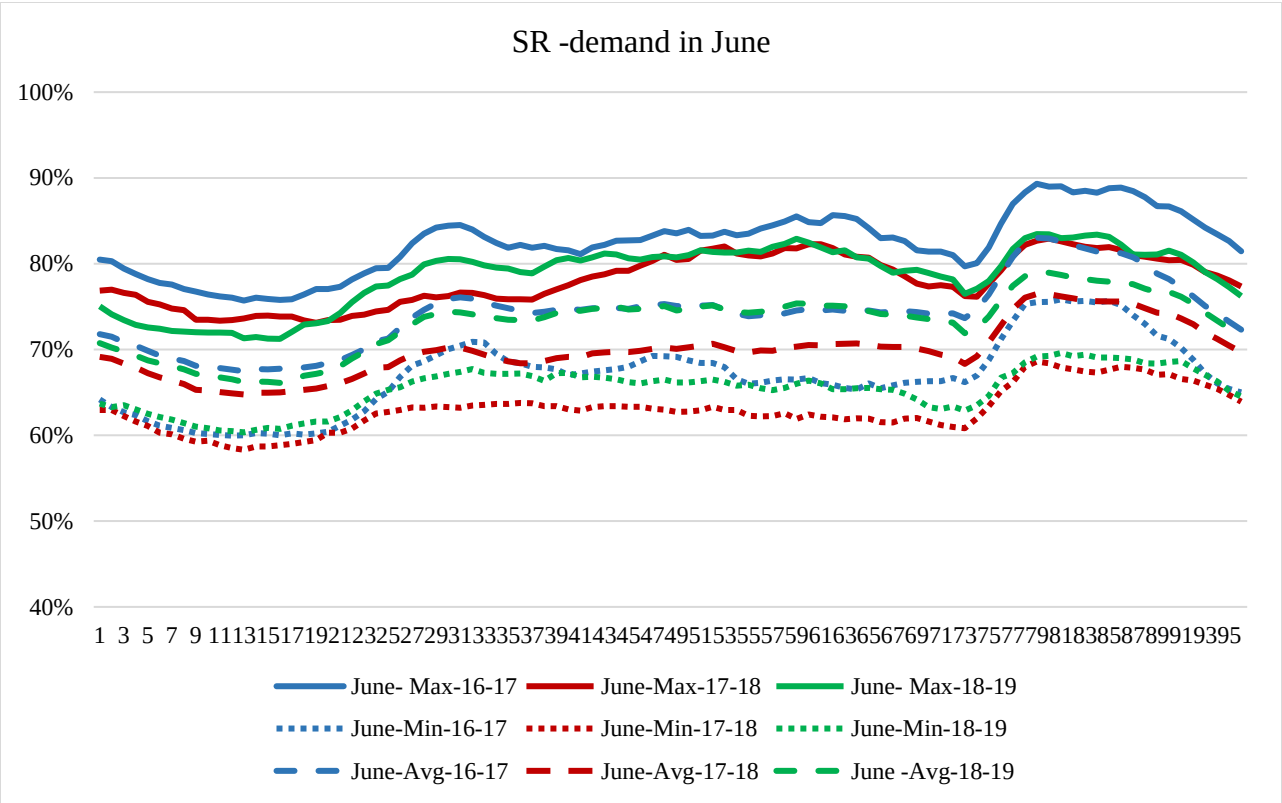


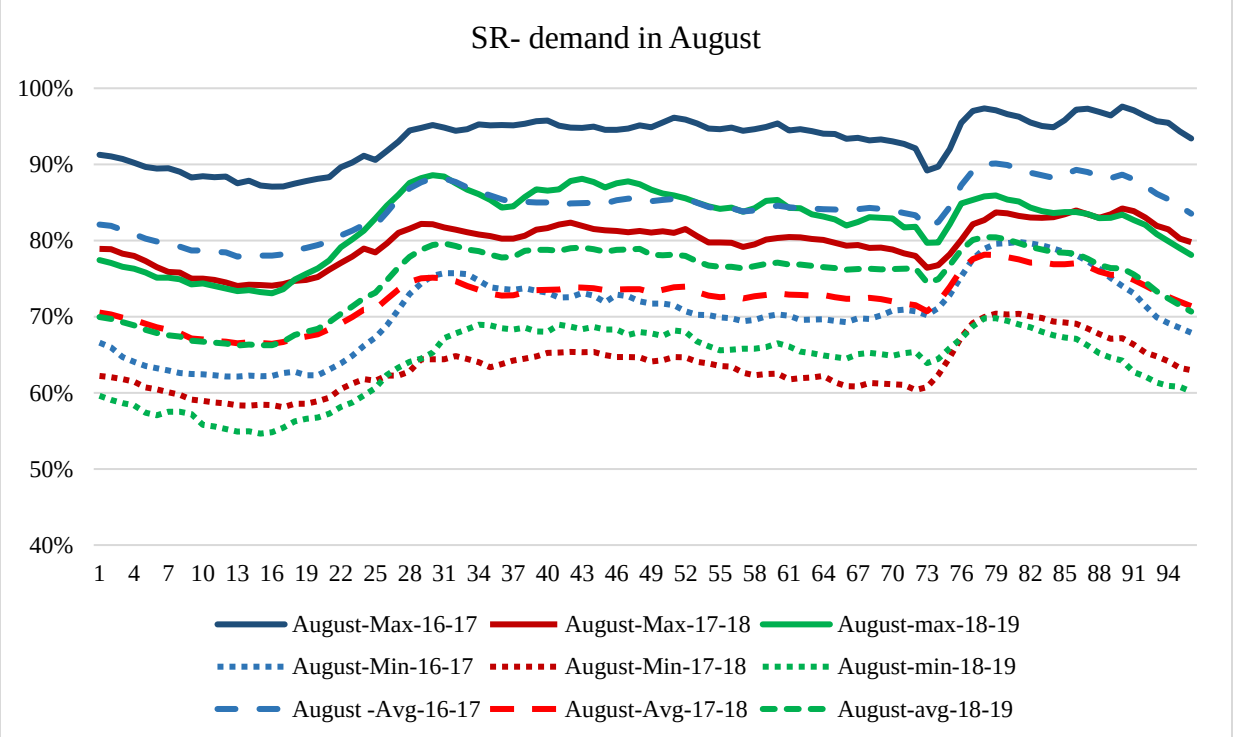




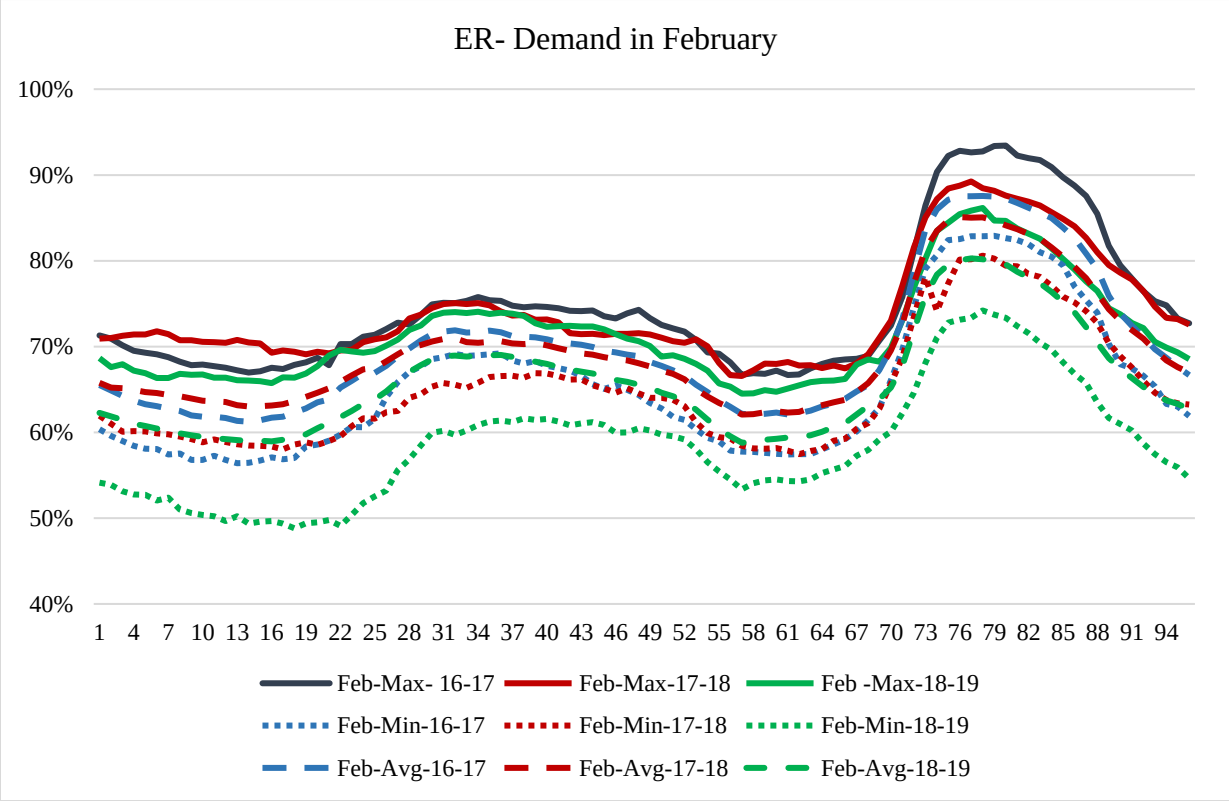
1.4 Southern Region Demand

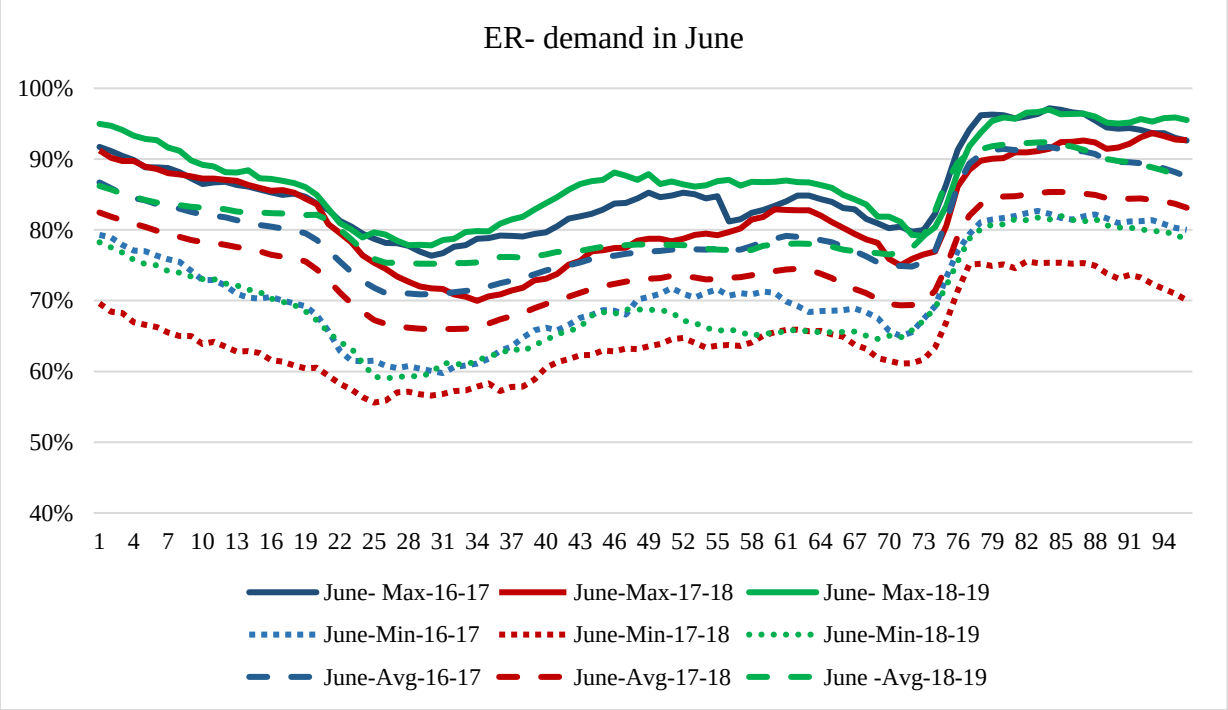


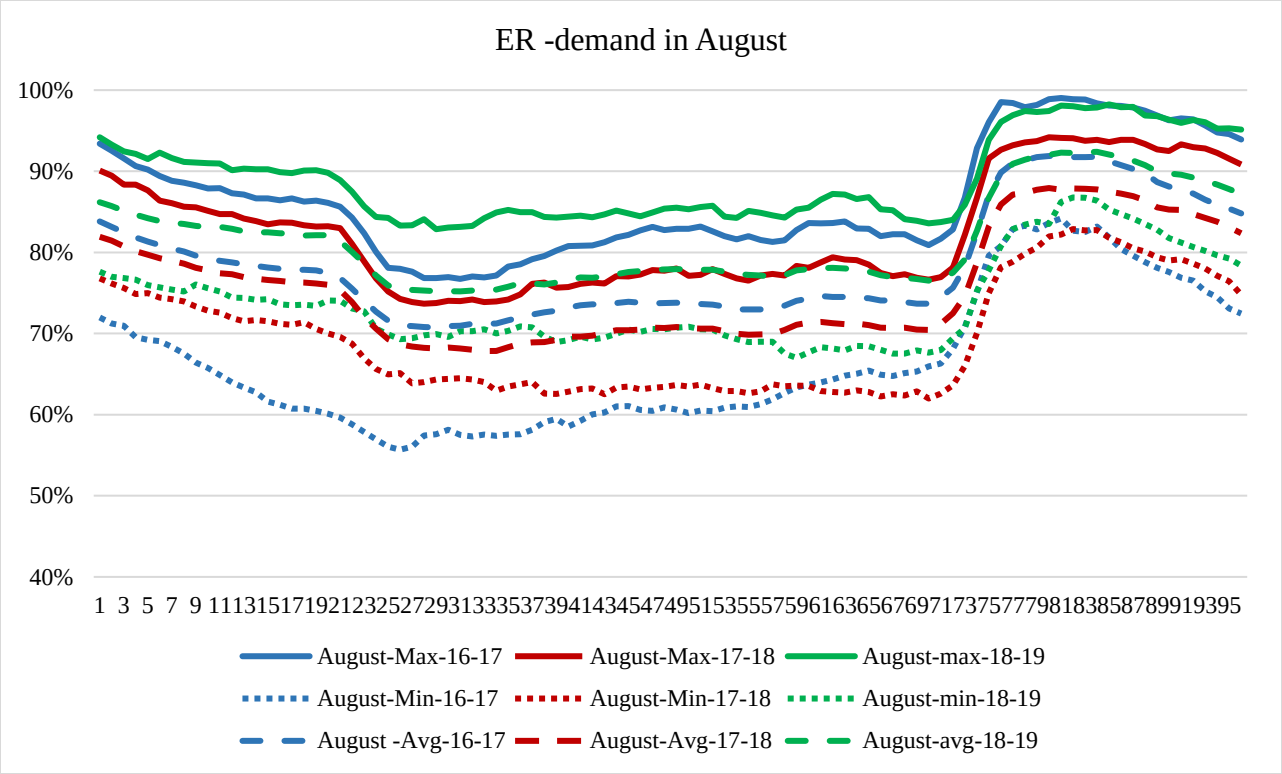

SR -demand in June
100%
90%
80%
70%
60%
50%
40%
1 3 5 7 9 11131517192123252729313335373941434547495153555759616365676971737577798183858789919395
June- Max-16-17
June-Max-17-18
June- Max-18-19
June-Min-16-17
June-Min-17-18
June-Min-18-19
June-Avg-16-17
June-Avg-17-18
June -Avg-18-19


SR- demand in August
100%
90%
80%
70%
60%
50%
40%
1 4 7 10 13 16 19 22 25 28 31 34 37 40 43 46 49 52 55 58 61 64 67 70 73 76 79 82 85 88 91 94
August-Max-16-17
August-Max-17-18
August-max-18-19
August-Min-16-17
August-Min-17-18
August-min-18-19
August -Avg-16-17
August-Avg-17-18
August-avg-18-19

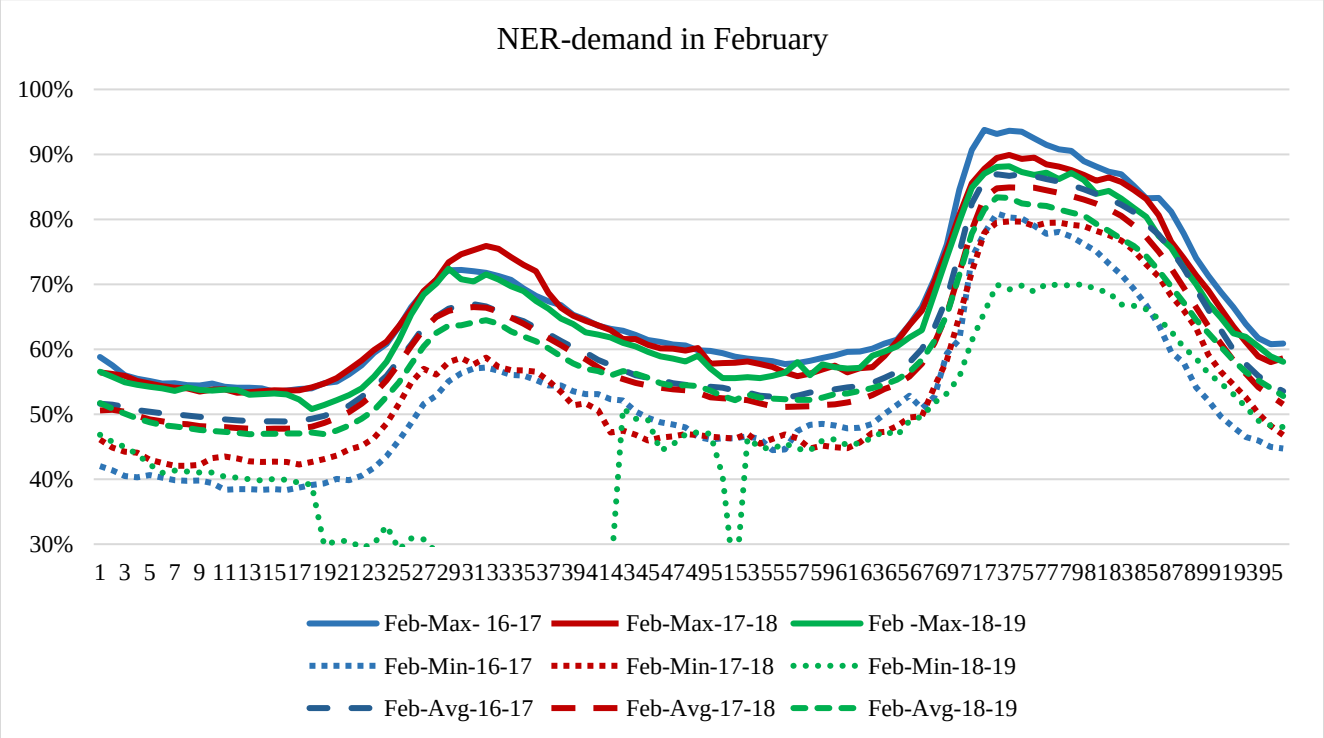
1.5 Eastern Region Demand



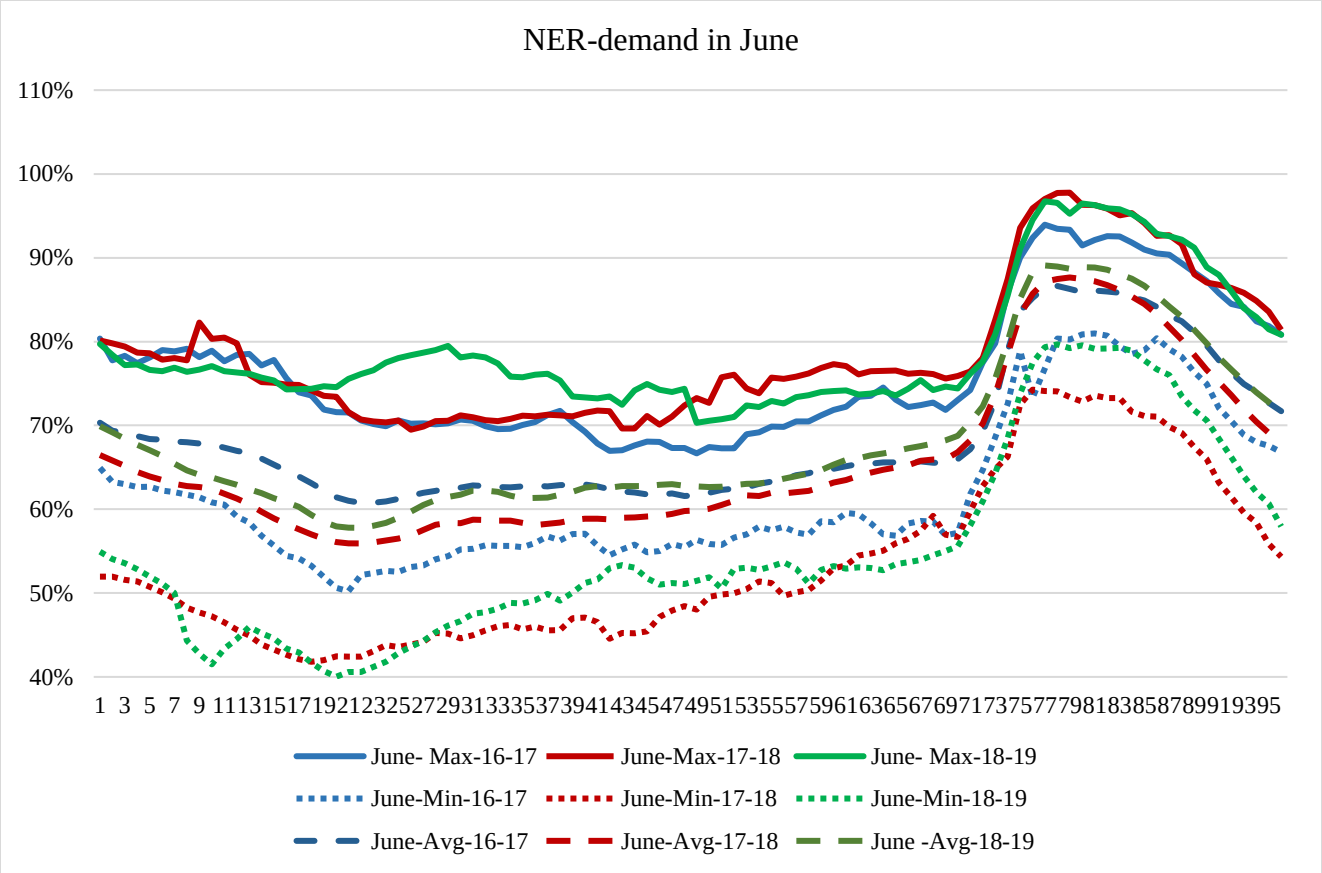


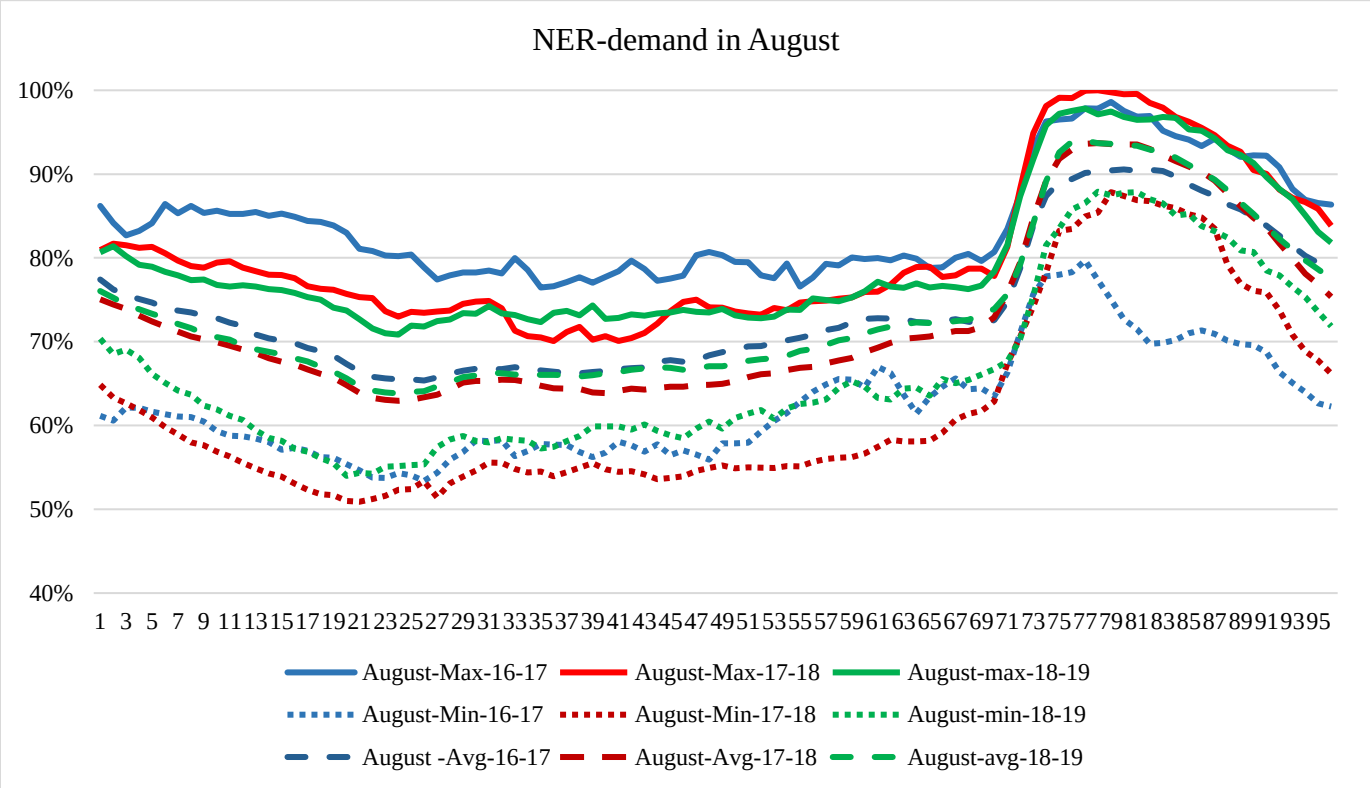


1.6 North Eastern Region Demand



Note: There appears to be some discrepancy in the NER demand data.


NER-demand in June
110%
100%
90%
80%
70%
60%
50%
40%
1 3 5 7 9 11131517192123252729313335373941434547495153555759616365676971737577798183858789919395
June- Max-16-17
June-Max-17-18
June- Max-18-19
June-Min-16-17
June-Min-17-18
June-Min-18-19
June-Avg-16-17
June-Avg-17-18
June -Avg-18-19


NER-demand in August
100%
90%
80%
70%
60%
50%
40%
1 3 5 7 9 11131517192123252729313335373941434547495153555759616365676971737577798183858789919395
August-Max-16-17
August-Max-17-18
August-max-18-19
August-Min-16-17
August-Min-17-18
August-min-18-19
August -Avg-16-17
August-Avg-17-18
August-avg-18-19

1.7 These daily variation curves have been obtained by taking maximum/average/minimum demand of the day in a month for each time block. The maximum daily curve has been used for determining the demand factor of Evening Peak (between 72-85 time block). The average daily curve has been used for the afternoon peak (45-55 time block) and minimum daily curve has been used for night off peak period (10-20 time block).

1.8 Based on analysis of previous years (2016-17, 2017-18, 2018-19) electricity demand, following factors have been calculated which will be used for calculating the future electricity demand for carrying out transmission planning studies.

	February			**June**			**August**		
Region	Afternoon peak (%)	Evening Peak (%)	Night off peak (%)	Afternoon peak (%)	Evening Peak (%)	Night off peak (%)	Afternoon peak (%)	Evening Peak (%)	Night off peak (%)
Northern	70	78	48	85	97	67	82	96	72
Western	93	92	67	82	85	66	75	84	60
Southern	88	93	66	74	85	60	80	90	60
Eastern	68	90	55	78	95	66	75	97	70
North-Eastern	53	91	40	65	97	50	70	99	56
All-India	88	95	65	86	95	75	85	96	76

All India Revised LGB 2021-22

Installed Capacity

Region	Thermal Central	Thermal State	Thermal Private		Hydro	Nuclear	Solar	Solar Rooftop	Wind	Other Renewabl	Diesel	Gas	Total	EPS Peak Demand	App. Peak Demand
NR	11880	35345	0		21640	3020	27741	4500	4299	1360	0	2519	**112304**	**73770**	69301
WR	19000	36975	37075		8168	3240	26880	4500	25860	0	0	10659	**172357**	**71020**	66717
SR	12890	35748	6640		11922	3320	30618	4500	31302	2863.7	1185	4075	**145062**	**62975**	59160
ER	24650	10585	4850		8182	0	250	400	0	0	0	0	**48917**	**28046**	26347
NER	750	133	0		2220	0	100	100	0	0	0	1821	**5124**	**4499**	4226
	69170	**118786**	**48565**		**52131**	**9580**	**85589**	**14000**	**61461**	**4224**	**1185**	**19073**	**483764**	**225751**	225751
		236521						**165273**						240310	

Scenario 1 : Afternoon peak Aug 2021

Availability factor	Thermal Central	Thermal State	Thermal Private		Hydro	Nuclear	Solar	Solar rooftop	Wind	Other Renewabl	Diesel	Gas		National DF	Regional DF
NR	30%	31%			70%	80%	50%	50%	40%	0%	0%	0%		84%	82%
WR	44%	28%	53%		40%	80%	50%	50%	50%	0%	0%	0%		76%	75%
SR	4%	26%	11%		40%	80%	50%	50%	50%	0%	0%	0%		82%	80%
ER	25%	25%	43%		70%	80%	50%	50%	0%	0%	0%	0%		76%	75%
NER	0%	0%			70%	80%	50%	50%	0%	0%	0%	0%		71%	70%
		28%												85%	191888

Availability	Thermal Central	Thermal State	Thermal Private	% of I.C.	Hydro	Nuclear	Solar	Solar rooftop	Wind	Other Renewabl	Diesel	Gas	Total availability	Demand Factor	Surplus/Deficit	Net Availability	Net Demand
NR	3614	10922	0		15148	2416	13871	2250	1720	0	0	0	49940	61638	-11698	47690	59388
WR	8448	10459	19731		3267	2592	13440	2250	12930	0	0	0	73117	54274	18843	70867	52024
SR	506	9162	726		4769	2656	15309	2250	15651	0	0	0	51029	51335	-306	48779	49085
ER	6182	2605	2090		5727	0	125	200	0	0	0	0	16930	21433	-4503	16730	21233
NER	0	0	0		1554	0	50	50	0	0	0	0	1654	3209	-1555	1604	3159
Total	**18750**	**33149**	**22547**		**30465**	**7664**	**42794**	**7000**	**30301**	**0**	**0**	**0**	**192670**	**191888**	**781**	**185670**	**184888**
		74446		**31%**				**80095**						188320	
45%	**StateTh**	33149	**ISGS Th**	40515											

Scenario 2 : Evening peak Aug 2021

Availability factor	Thermal Central	Thermal State	Thermal Private		Hydro	Nuclear	Solar	Solar rooftop	Wind	Other Renewabl	Diesel	Gas		National DF	Regional DF
NR	46%	38%			95%	85%	0%	0%	70%	0%	0%	85%		95%	96%
WR	68%	35%	81%		70%	85%	0%	0%	75%	0%	0%	85%		83%	84%
SR	6%	32%	16%		70%	85%	0%	0%	75%	0%	0%	85%		89%	90%
ER	36%	31%	67%		90%	85%	0%	0%	0%	0%	0%	85%		96%	97%
NER	0%	0%			90%	85%	0%	0%	0%	0%	0%	85%		98%	99%
		35%												**96%**	**216721**

Availability	Thermal Central	Thermal State	Thermal Private	% of I.C.	Hydro	Nuclear	Solar	Solar rooftop	Wind	Other Renewabl	Diesel	Gas	Total availability	Demand Factor	Surplus/Deficit	Net Availability	Net Demand
NR	5519	13580	0		20558	2567	0	0	3009	0	0	2141	47373	70142	-22769	47373	70142
WR	12976	12841	29907		5717	2754	0	0	19395	0	0	9060	92651	59087	33564	92651	59087
SR	711	11327	1056		8345	2822	0	0	23477	0	0	3464	51201	56136	-4935	51201	56136
ER	8827	3253	3230		7364	0	0	0	0	0	0	0	22674	26945	-4271	22674	26945
NER	0	0	0		1998	0	0	0	0	0	0	1548	3546	4411	-866	3546	4411
Total	**28033**	**41001**	**34193**		**43982**	**8143**	**0**	**0**	**45881**	**0**	**0**	**16212**	**217445**	**216721**	**724**	**217445**	**216721**
		103227		**44%**				**45881**						218812	
40%	**StateTh**	41001	**ISGS Th**	61502											

Scenario 3 : Night off peak Aug 2021

Availability factor	Thermal Central	Thermal State	Thermal Private		Hydro	Nuclear	Solar	Solar rooftop	Wind	Other Renewabl	Diesel	Gas		National DF	Regional DF
NR	46%	39%			70%	80%	0%	0%	25%	0%	0%	65%		79%	72%
WR	68%	35%	81%		40%	80%	0%	0%	30%	0%	0%	65%		66%	60%
SR	6%	32%	16%		40%	80%	0%	0%	30%	0%	0%	65%		66%	60%
ER	36%	31%	67%		70%	80%	0%	0%	0%	0%	0%	65%		77%	70%
NER	0%	0%			70%	80%	0%	0%	0%	0%	0%	65%		62%	56%
		35%												76%	171571

Availability	Thermal Central	Thermal State	Thermal Private	% of I.C.	Hydro	Nuclear	Solar	Solar rooftop	Wind	Other Renewabl	Diesel	Gas	Total availability	Demand Factor	Surplus/Deficit	Net Availability	Net Demand
NR	5519	13622	0		15148	2416	0	0	1075	0	0	1637	39416	58542	-19126	39416	58542
WR	12976	12880	29907		3267	2592	0	0	7758	0	0	6928	76309	46967	29342	76309	46967
SR	736	11362	1056		4769	2656	0	0	9391	0	0	2649	32618	41646	-9028	32618	41646
ER	8992	3263	3230		5727	0	0	0	0	0	0	0	21213	21638	-426	21213	21638
NER	0	0	0		1554	0	0	0	0	0	0	1183	2737	2777	-40	2737	2777
Total	**28223**	**41128**	**34193**		**30465**	**7664**	**0**	**0**	**18223**	**0**	**0**	**12398**	**172294**	**171571**	**723**	**172294**	**171571**
		103544		**44%**				**18223**						155663	
40%	**StateTh**	41128	**ISGS Th**	61692											

All India Revised LGB 2021-22

Installed Capacity

Region	Thermal Central	Thermal State	Thermal Private		Hydro	Nuclear	Solar	Solar Rooftop	Wind	Other Renewabl	Diesel	Gas	Total	EPS Peak Demand	App. Peak Demand
NR	11880	35345	0		21640	3020	27741	4500	4299	1360	0	2519	**112304**	**73770**	69301
WR	19000	36975	37075		8168	3240	26880	4500	25860	0	0	10659	**172357**	**71020**	66717
SR	12890	35748	6640		11922	3320	30618	4500	31302	2863.7	1185	4075	**145062**	**62975**	59160
ER	24650	10585	4850		8182	0	250	400	0	0	0	0	**48917**	**28046**	26347
NER	750	133	0		2220	0	100	100	0	0	0	1821	**5124**	**4499**	4226
	69170	**118786**	**48565**		**52131**	**9580**	**85589**	**14000**	**61461**	**4224**	**1185**	**19073**	**483764**	**225751**	225751
	236521						**165273**							240310	

Scenario 4 : Afternoon peak Jun 2021

Availability factor	Thermal Central	Thermal State	Thermal Private		Hydro	Nuclear	Solar	Solar rooftop	Wind	Other Renewabl	Diesel	Gas		National DF	Regional DF
NR	30%	31%			60%	80%	70%	60%	30%	0%	0%	0%		86%	85%
WR	44%	28%	53%		30%	80%	60%	60%	40%	0%	0%	0%		83%	82%
SR	4%	26%	11%		40%	80%	60%	60%	40%	0%	0%	0%		75%	74%
ER	25%	25%	43%		60%	80%	60%	60%	0%	0%	0%	0%		79%	78%
NER	0%	0%			60%	80%	60%	60%	0%	0%	0%	0%		66%	65%
		28%												86%	194146

Availability	Thermal Central	Thermal State	Thermal Private	% of I.C.	Hydro	Nuclear	Solar	Solar rooftop	Wind	Other Renewabl	Diesel	Gas	Total availability	Demand Factor	Surplus/Deficit	Net Availability	Net Demand
NR	3614	10875	0		12984	2416	19419	2700	1290	0	0	0	53297	63292	-9996	50597	60592
WR	8448	10418	19731		2450	2592	16128	2700	10344	0	0	0	72811	58782	14029	70111	56082
SR	506	9124	726		4769	2656	18371	2700	12521	0	0	0	51372	47038	4334	48672	44338
ER	6182	2593	2090		4909	0	150	240	0	0	0	0	16165	22081	-5916	15925	21841
NER	0	0	0		1332	0	60	60	0	0	0	0	1452	2952	-1500	1392	2892
Total	**18750**	**33010**	**22547**		**26444**	**7664**	**54127**	**8400**	**24155**	**0**	**0**	**0**	**195097**	**194146**	**951**	**186697**	**185746**
	74307			**31%**			**86682**							192343			
45%	**StateTh**	33010	**ISGS Th**	40346													

Scenario 5 : Evening peak Jun 2021

Availability factor	Thermal Central	Thermal State	Thermal Private		Hydro	Nuclear	Solar	Solar rooftop	Wind	Other Renewabl	Diesel	Gas		National DF	Regional DF
NR	46%	39%			90%	80%	0%	0%	70%	0%	0%	85%		96%	97%
WR	68%	35%	81%		60%	80%	0%	0%	75%	0%	0%	85%		84%	85%
SR	6%	32%	16%		70%	80%	0%	0%	75%	0%	0%	85%		84%	85%
ER	36%	31%	67%		85%	80%	0%	0%	0%	0%	0%	85%		94%	95%
NER	0%	0%			85%	80%	0%	0%	0%	0%	0%	85%		96%	97%
		35%												95%	214463

Availability	Thermal Central	Thermal State	Thermal Private	% of I.C.	Hydro	Nuclear	Solar	Solar rooftop	Wind	Renewable	Diesel	Gas	Total availability	Demand Factor	Surplus/Deficit	Net Availability	Net Demand
NR	5519	13665	0		19476	2416	0	0	3009	0	0	2141	46225	70897	-24671	46225	70897
WR	12976	12920	29907		4901	2592	0	0	19395	0	0	9060	91751	59810	31941	91751	59810
SR	711	11398	1056		8345	2656	0	0	23477	0	0	3464	51107	53035	-1928	51107	53035
ER	8827	3274	3230		6955	0	0	0	0	0	0	0	22286	26398	-4112	22286	26398
NER	0	0	0		1887	0	0	0	0	0	0	1548	3435	4324	-889	3435	4324
Total	**28033**	**41257**	**34193**		**41563**	**7664**	**0**	**0**	**45881**	**0**	**0**	**16212**	**214803**	**214463**	**340**	**214803**	**214463**
	103483			**44%**			**45881**							216460			
40%	**StateTh**	41257	**ISGS Th**	61886													

Scenario 6 : Night off peak Jun 2021

Availability factor	Thermal Central	Thermal State	Thermal Private		Hydro	Nuclear	Solar	Solar rooftop	Wind	Other Renewabl	Diesel	Gas		National DF	Regional DF
NR	46%	39%			70%	80%	0%	0%	20%	0%	0%	60%		73%	67%
WR	68%	35%	81%		40%	80%	0%	0%	25%	0%	0%	60%		72%	66%
SR	6%	32%	16%		50%	80%	0%	0%	25%	0%	0%	60%		66%	60%
ER	36%	31%	67%		70%	80%	0%	0%	0%	0%	0%	60%		72%	66%
NER	0%	0%			70%	80%	0%	0%	0%	0%	0%	60%		55%	50%
		35%												75%	169313

Availability	Thermal Central	Thermal State	Thermal Private	% of I.C.	Hydro	Nuclear	Solar	Solar rooftop	Wind	Other Renewabl	Diesel	Gas	Total availability	Demand Factor	Surplus/Deficit	Net Availability	Net Demand
NR	5519	13698	0		15148	2416	0	0	860	0	0	1511	39152	54044	-14893	39152	54044
WR	12976	12951	29907		3267	2592	0	0	6465	0	0	6395	74554	51253	23301	74554	51253
SR	711	11427	1056		5961	2656	0	0	7826	0	0	2445	32081	41316	-9235	32081	41316
ER	8827	3282	3230		5727	0	0	0	0	0	0	0	21067	20240	827	21067	20240
NER	0	0	0		1554	0	0	0	0	0	0	1092	2646	2460	187	2646	2460
Total	**28033**	**41359**	**34193**		**31657**	**7664**	**0**	**0**	**15150**	**0**	**0**	**11444**	**169500**	**169313**	**187**	**169500**	**169313**
	103585			**44%**			**15150**							154844			
40%	**StateTh**	41359	**ISGS Th**	62039													

All India Revised LGB 2021-22

Installed Capacity

Region	Thermal Central	Thermal State	Thermal Private		Hydro	Nuclear	Solar	Solar Rooftop	Wind	Other Renewabl	Diesel	Gas	Total	EPS Peak Demand	App. Peak Demand
NR	11880	35345	0		21640	3020	27741	4500	4299	1360	0	2519	**112304**	**73770**	69301
WR	19000	36975	37075		8168	3240	26880	4500	25860	0	0	10659	**172357**	**71020**	66717
SR	12890	35748	6640		11922	3320	30618	4500	31302	2863.7	1185	4075	**145062**	**62975**	59160
ER	24650	10585	4850		8182	0	250	400	0	0	0	0	**48917**	**28046**	26347
NER	750	133	0		2220	0	100	100	0	0	0	1821	**5124**	**4499**	4226
	69170	**118786**	**48565**		**52131**	**9580**	**85589**	**14000**	**61461**	**4224**	**1185**	**19073**	**483764**	**225751**	225751
		236521						**165273**						240310	

Scenario 7 : Afternoon peak Feb 2022

Availability factor	Thermal Central	Thermal State	Thermal Private		Hydro	Nuclear	Solar	Solar rooftop	Wind	Other Renewabl	Diesel	Gas		National DF	Regional DF
NR	34%	45%			30%	80%	80%	60%	10%	0%	0%	0%		71%	70%
WR	51%	40%	55%		20%	80%	70%	60%	0%	0%	0%	0%		95%	93%
SR	38%	36%	45%		20%	80%	70%	60%	0%	0%	0%	0%		90%	88%
ER	55%	38%	55%		30%	80%	70%	60%	0%	0%	0%	0%		69%	68%
NER	55%	0%			30%	80%	70%	60%	0%	0%	0%	0%		54%	53%
		40%												88%	198661

Availability	Thermal Central	Thermal State	Thermal Private	% of I.C.	Hydro	Nuclear	Solar	Solar rooftop	Wind	Other Renewabl	Diesel	Gas	Total availability	Demand Factor	Surplus/Deficit	Net Availability	Net Demand
NR	4085	15823	0		6492	2416	22193	2700	430	0	0	0	54139	52727	1412	51439	50027
WR	9719	14958	20389		1634	2592	18816	2700	0	0	0	0	70808	67440	3368	68108	64740
SR	4927	12854	2984		2384	2656	21432	2700	0	0	0	0	49938	56586	-6648	47238	53886
ER	13524	3997	2665		2455	0	175	240	0	0	0	0	23056	19473	3583	22816	19233
NER	411	0	0		666	0	70	60	0	0	0	0	1207	2435	-1228	1147	2375
Total	**32667**	**47632**	**26038**		**13630**	**7664**	**62686**	**8400**	**430**	**0**	**0**	**0**	**199148**	**198661**	**487**	**190748**	**190261**
		106337		**45%**				**71516**						194561			
45%	**StateTh**	47633	**ISGS Th**	58218													

Scenario 8 : Evening peak Feb 2022

Availability factor	Thermal Central	Thermal State	Thermal Private		Hydro	Nuclear	Solar	Solar rooftop	Wind	Other Renewabl	Diesel	Gas		National DF	Regional DF
NR	53%	48%			70%	80%	0%	0%	35%	0%	0%	85%		79%	78%
WR	79%	43%	85%		70%	80%	0%	0%	20%	0%	0%	85%		94%	92%
SR	59%	39%	70%		70%	80%	0%	0%	20%	0%	0%	85%		95%	93%
ER	85%	41%	85%		70%	80%	0%	0%	0%	0%	0%	85%		92%	90%
NER	85%	0%			70%	80%	0%	0%	0%	0%	0%	85%		93%	91%
		43%												95%	214463

Availability	Thermal Central	Thermal State	Thermal Private	% of I.C.	Hydro	Nuclear	Solar	Solar rooftop	Wind	Other Renewabl	Diesel	Gas	Total availability	Demand Factor	Surplus/Deficit	Net Availability	Net Demand
NR	6316	16986	0		15148	2416	0	0	1505	0	0	2141	44511	58546	-14034	44511	58546
WR	15028	16022	31514		5717	2592	0	0	5172	0	0	9060	85105	66480	18625	85105	66480
SR	7642	13794	4624		8345	2656	0	0	6260	0	0	3464	46784	59590	-12806	46784	59590
ER	20953	4297	4123		5727	0	0	0	0	0	0	0	35100	25682	9417	35100	25682
NER	638	0	0		1554	0	0	0	0	0	0	1548	3739	4166	-427	3739	4166
Total	**50575**	**51099**	**40260**		**36492**	**7664**	**0**	**0**	**12937**	**0**	**0**	**16212**	**215240**	**214463**	**776**	**215240**	**214463**
		141934		**60%**				**12937**						210781			
36%	**StateTh**	51099	**ISGS Th**	90059													

Scenario 9: Night off peak Feb 2022

Availability factor	Thermal Central	Thermal State	Thermal Private		Hydro	Nuclear	Solar	Solar rooftop	Wind	Other Renewabl	Diesel	Gas		National DF	Regional DF
NR	41%	47%			30%	80%	0%	0%	10%	0%	0%	30%		50%	48%
WR	60%	43%	65%		20%	80%	0%	0%	0%	0%	0%	30%		69%	67%
SR	45%	38%	53%		20%	80%	0%	0%	0%	0%	0%	30%		68%	66%
ER	65%	40%	65%		30%	80%	0%	0%	0%	0%	0%	30%		57%	55%
NER	65%	0%			30%	80%	0%	0%	0%	0%	0%	30%		41%	40%
		42%												65%	146738

Availability	Thermal Central	Thermal State	Thermal Private	% of I.C.	Hydro	Nuclear	Solar	Solar rooftop	Wind	Other Renewabl	Diesel	Gas	Total availability	Demand Factor	Surplus/Deficit	Net Availability	Net Demand
NR	4830	16736	0		6492	2416	0	0	430	0	0	756	31660	36648	-4988	31660	36648
WR	11492	15783	24099		1634	2592	0	0	0	0	0	3198	58797	49247	9550	58797	49247
SR	5844	13585	3536		2384	2656	0	0	0	0	0	1222	29227	43017	-13789	29227	43017
ER	16023	4237	3153		2455	0	0	0	0	0	0	0	25866	15965	9902	25866	15965
NER	488	0	0		666	0	0	0	0	0	0	546	1700	1863	-163	1700	1863
Total	**38675**	**50341**	**30787**		**13630**	**7664**	**0**	**0**	**430**	**0**	**0**	**5722**	**147250**	**146738**	**511**	**147250**	**146738**
		119803		**51%**				**430**						141781			
42%	**StateTh**	50341	**ISGS Th**	68951													

CGS & IPP Thermal generations considering various scenarios

REGION	STATE	PROJECT NAME	UNIT	CAPACITY (MW)	Status (Existing/UC)	Despatch Scenario 1	Despatch Scenario 2	Despatch Scenario 3	Despatch Scenario 4	Despatch Scenario 5	Despatch Scenario 6	Despatch Scenario 7	Despatch Scenario 8	Despatch Scenario 9
						Dispatch considered	Dispatch considered	Dispatch considered	Dispatch considered	Dispatch considered	Dispatch considered	Dispatch considered	Dispatch considered	Dispatch considered
WR	Chhatisgarh	JP Nigri	2x660	1320	Existing	726	1122	1122	726	1122	1122	726	1122	858
WR	Chhatisgarh	ACBIL,IPP	2x135+2*30	330	Existing	181.5	280.5	280.5	181.5	280.5	280.5	181.5	280.5	214.5
NR	Rajasthan	Barsingsar	2x125	250	Existing	137.5	212.5	212.5	137.5	212.5	212.5	137.5	212.5	162.5
WR	MP	*SASAN (Unit 1-6)	**6x660 (37.5%)	3960	Existing	2178	3366	3366	2178	3366	3366	2178	3366	2574
WR	Chhatisgarh	Korba West Power Corp. Ltd. (IPP)	1x600	600	Existing	330	510	510	330	510	510	330	510	390
NR	UP	Rihand TPS	2x500 +2x500+2x500	3000	Existing	1650	2550	2550	1650	2550	2550	1650	2550	1950
NR	UP	Singrauli STPS	5x200+2x500	2000	Existing	1100	1700	1700	1100	1700	1700	1100	1700	1300
WR	Chhatisgarh	JPL Stage II,IPP	4x600	2400	Existing	1320	2040	2040	1320	2040	2040	1320	2040	1560
WR	Chhatisgarh	KSTPS	3x200+3x500+1 x 500	2600	Existing	1430	2210	2210	1430	2210	2210	1430	2210	1690
WR	Chhatisgarh	Sipat STPS	2X500+3X660	2980	Existing	1639	2533	2533	1639	2533	2533	1639	2533	1937
ER	Odisha	GKEL	(2x350)	700	Existing	385	595	595	385	595	595	385	595	455
WR	Chhatisgarh	SKS	2x300+2X300	1200	Existing	660	1020	1020	660	1020	1020	660	1020	780
WR	MP	VSTPS	6x210+2x500+2 x 500+3x500	4760	Existing	2618	4046	4046	2618	4046	4046	2618	4046	3094
ER	Jharkhand	ADHUNIK	(2x270)	540	Existing	297	459	459	297	459	459	297	459	351
WR	Gujarat	*CGPL	**3x830 +1x830+ 1x830	4150	Existing	2282.5	3527.5	3527.5	2282.5	3527.5	3527.5	2282.5	3527.5	2697.5
WR	Chhatisgarh	JINDAL Stage I,	4x250	1000	Existing	550	850	850	550	850	850	550	850	650
WR	Chhatisgarh	JINDAL(JSPL TPP)unit3 DCPP(IPP)	4x135	540	Existing	297	459	459	297	459	459	297	459	351
WR	Chhatisgarh	SpectrumCoal Private Ltd.	2x50	100	Existing	55	85	85	55	85	85	55	85	65
WR	Chhatisgarh	ESSAR Mahan	2x600	1200	Existing	660	1020	1020	660	1020	1020	660	1020	780
WR	Chhatisgarh	GMR-Chhatisgarh Energy Ltd	2x685	1370	Existing	753.5	1164.5	1164.5	753.5	1164.5	1164.5	753.5	1164.5	890.5
WR	Chhatisgarh	KPCL	2x600	1200	UC	660	1020	1020	660	1020	1020	660	1020	780
WR	Chhatisgarh	Vandana Vidyut,IPP	1x135	135	Existing	74.25	114.75	114.75	74.25	114.75	114.75	74.25	114.75	87.75
WR	Chhatisgarh	TRN Energy	2x300	600	Existing	330	510	510	330	510	510	330	510	390
WR	Chhatisgarh	NSPCL Bhilai TPP(*)	2x250	500	Existing	275	425	425	275	425	425	275	425	325
ER	Odisha	JITPL	(2x600)	1200	Existing	660	1020	1020	660	1020	1020	660	1020	780
ER	Odisha	IBEUL U-1	(2x350)	350	Existing	192.5	297.5	297.5	192.5	297.5	297.5	192.5	297.5	227.5
ER	Odisha	IBEUL U-2	(2x350)	350	UC	192.5	297.5	297.5	192.5	297.5	297.5	192.5	297.5	227.5
ER	Odisha	OPGC U-2	2x660	660	UC	363	561	561	363	561	561	363	561	429
WR	Chhatisgarh	Maruti Clean Coal Power Ltd	1x300	300	Existing	165	255	255	165	255	255	165	255	195
WR	MP	Jaypee Bina	2x250 (70%)	500	Existing	275	425	425	275	425	425	275	425	325
WR	MP	Gadarwara STPS	1*800+1*800	1600	UC	880	1360	1360	880	1360	1360	880	1360	1040
WR	MP	Khargone TPP	2*660	1320	UC	726	1122	1122	726	1122	1122	726	1122	858
WR	Chhatisgarh	DB Power,IPP	2x600	1200	Existing	660	1020	1020	660	1020	1020	660	1020	780

WR	Chhatisgarh	RKM Powergrn ltd	4x360	1440	Existing	792	1224	1224	792	1224	1224	792	1224	936
WR	Chhatisgarh	LANCO-Amarkantak	2x300	600	Existing	330	510	510	330	510	510	330	510	390
ER	Odisha	Talcher	(2x500)	1000	Existing	550	800	800	550	800	800	550	850	650
ER	Odisha	Darlipalli	2x800	1600	UC	880	1280	1280	880	1280	1280	880	1360	1040
WR	MP	Jhabua Power (Avanta)	1x600	600	Existing	330	480	480	330	480	480	330	510	390
ER	West Bengal	ANDAL	(2x500)	1000	Existing	550	800	800	550	800	800	550	850	650
ER	Odisha	Talcher	(4x500)	2000	Existing	1100	1600	1600	1100	1600	1600	1100	1700	1300
SR	Andhra Pradesh	Thermal Powertech.	2x660	1320	Existing	726	1056	1056	726	1056	1056	726	1122	858
ER	Bihar	KhSTPP-II	(3x500)	1500	Existing	825	1200	1200	825	1200	1200	825	1275	975
WR	MAHARASHTRA	GMR Warora	2x300	600	Existing	330	480	480	330	480	480	330	510	390
WR	MAHARASHTRA	Dhariwal-I& II (STU)	1x300	300	Existing	165	240	240	165	240	240	165	255	195
WR	Chhatisgarh	Lara	1*800+1*800	1600	Existing	880	1280	1280	880	1280	1280	880	1360	1040
WR	Chhatisgarh	BALCO	4x300+4*67.5+4*1 35	2010	Existing	1105.5	1608	1608	1105.5	1608	1608	1105.5	1708.5	1306.5
ER	Bihar	KhSTPP-I	(4x210)	840	Existing	462	672	672	462	672	672	462	714	546
SR	Tamil Nadu	NLC TPS-I Exp.		420	Existing	231	336	336	231	336	336	231	357	273
NR	UP	Tanda TPS Extension	2x660	1320	UC	726	1056	1056	726	1056	1056	726	1122	858
WR	Chhatisgarh	KSK Mahanadi,IPP(Unit 1,2 and Unit 4)	3x600	1800	Existing	990	1440	1440	990	1440	1440	990	1530	1170
WR	Chhatisgarh	KSK Mahanadi,IPP(Unit 3,5 and Unit 6)	3x600	1800	UC	990	1440	1440	990	1440	1440	990	1530	1170
WR	Gujarat	*Mundra(APL)	**4*330 +2*660+3*660	4620	Existing	2541	3696	3696	2541	3696	3696	2541	3927	3003
SR	Tamil Nadu	NLC TPS-II Exp. Units 1 & 2		500	Existing	275	375	400	275	375	375	274	425	325
ER	Bihar	BARH	(2x660)	1320	Existing	726	990	1056	726	990	990	723.36	1122	858
ER	Bihar	Barh-1	3x660	1980	UC	1089	1485	1584	1089	1485	1485	1085.04	1683	1287
ER	West Bengal	FSTPP-III	(1x500)	500	Existing	0	0	0	0	0	0	274	425	325
ER	West Bengal	RTPS	(2x600)	1200	Existing	0	0	0	0	0	0	657.6	1020	780
ER	Bihar	NABINAGAR-I	(4x250)	1000	Existing	0	0	0	0	0	0	548	850	650
ER	Bihar	Nabinagar-2	3x660	1980	UC	0	0	0	0	0	0	1085.04	1683	1287
ER	Jharkhand	North Karanpura	3x660	1980	UC	0	0	0	0	0	0	1085.04	1683	1287
ER	Jharkhand	BOKARO'B'	(1x210)	210	Existing	0	0	0	0	0	0	115.08	178.5	136.5
ER	Jharkhand	CHANDRAPURA	(2x250)	500	Existing	0	0	0	0	0	0	274	425	325
ER	West Bengal	WARIA	(1x210)	210	Existing	0	0	0	0	0	0	115.08	178.5	136.5
ER	Jharkhand	Bokaro-A'	(1x500)	500	Existing	0	0	0	0	0	0	274	425	325
SR	Tamil Nadu	NNTPS (Replacement)		1000	Existing	0	0	0	0	0	0	548	850	650
SR	Andhra Pradesh	NCC	2x660	1320	Existing	0	0	0	0	0	0	723.36	1122	858
SR	Andhra Pradesh	Simhapuri	4x150	600	Existing	0	0	0	0	0	0	328.8	510	390
SR	Andhra Pradesh	Meenakshi	2x150+2x350	1000	Existing	0	0	0	0	0	0	548	850	650
WR	MP	Moserbaer(Annupur TPP)	2x600	1200	Existing	0	0	0	0	0	0	657.6	1020	780
SR	Telangana	RSTPS St.III (U-7)		500	Existing	0	0	0	0	0	0	274	425	325
ER	West Bengal	FSTPP-I & II	(3x200+2x500)	1600	Existing	0	0	0	0	0	0	876.8	1360	1040
SR	Tamil Nadu	NLC TS-II Stg1		630	Existing	0	0	0	0	0	0	345.24	535.5	409.5
SR	Tamil Nadu	NLC TS-II Stg.2		840	Existing	0	0	0	0	0	0	460.32	714	546
ER	Jharkhand	KODERMA	(2x500)	1000	Existing	0	0	0	0	0	0	548	850	650
SR	Telangana	RSTPS St.I & II (U-1 to U-6)		2100	Existing	0	0	0	0	0	0	1150.8	1785	1365
ER	Bihar	KBUNL	(2x195)	390	Existing	0	0	0	0	0	0	213.72	331.5	253.5
ER	Jharkhand	MPL	(2x525)	1050	Existing	0	0	0	0	0	0	575.4	892.5	682.5
SR	Tamil Nadu	IL&FS Tamil Nadu	2x600	1200	Existing	0	0	0	0	0	0	657.6	1020	780

ER	West Bengal	MEJIA	(4x210+250x2)	1340	Existing	0	0	0	0	0	0	734.32	1139	871
ER	West Bengal	MEJIA-II	(2x500)	1000	Existing	0	0	0	0	0	0	548	850	650
NER	Assam	BTPS		750	Existing	0	0	0	0	0	0	411	637.5	487.5
NR	UP	Tanda TPS	4x110	440	Existing	0	0	0	0	0	0	241.12	374	286
SR	Tamil Nadu	NTPL - Tuticorin JV		1000	Existing	0	0	0	0	0	0	548	850	650
WR	MAHARASHTRA	Mauda	2x500+2x660	2320	Existing	0	0	0	0	0	0	1271.36	1972	1508
SR	Andhra Pradesh	Simhadri stg II		1000	Existing	0	0	0	0	0	0	548	850	650
NR	UP	Unchahar -I TPS	2x210	420	Existing	0	0	0	0	0	0	230.16	357	273
SR	Andhra Pradesh	Simhadri stg I		1000	Existing	0	0	0	0	0	0	548	850	650
NR	UP	Unchahar -III TPS	1x210	210	Existing	0	0	0	0	0	0	0	0	0
NR	UP	Unchahar -II TPS	2x210	420	Existing	0	0	0	0	0	0	0	0	0
WR	MAHARASHTRA	Solapur	2*660	1320	Existing	0	0	0	0	0	0	0	0	0
SR	Tamil Nadu	Coastal Energen	2x600	1200	Existing	0	0	0	0	0	0	0	0	0
NR	Haryana	ISTPS Jhajjar	3x500	1500	Existing	0	0	0	0	0	0	0	0	0
NR	UP	Unchahar -IV TPS	1x500	500	Existing	0	0	0	0	0	0	0	0	0
NR	UP	Dadri NCPS Stage-II	2x490	980	Existing	0	0	0	0	0	0	0	0	0
SR	Tamil Nadu	NTECL Vallur TPS		1500	Existing	0	0	0	0	0	0	0	0	0
SR	Karnataka	Kudgi TPS		2400	Existing	0	0	0	0	0	0	0	0	0
NR	UP	Dadri NCTPS	4x210	840	Existing	0	0	0	0	0	0	0	0	0
				117735		**41297**	**62226**	**62416**	**41297**	**62226**	**62226**	**58705**	**90835**	**69462**

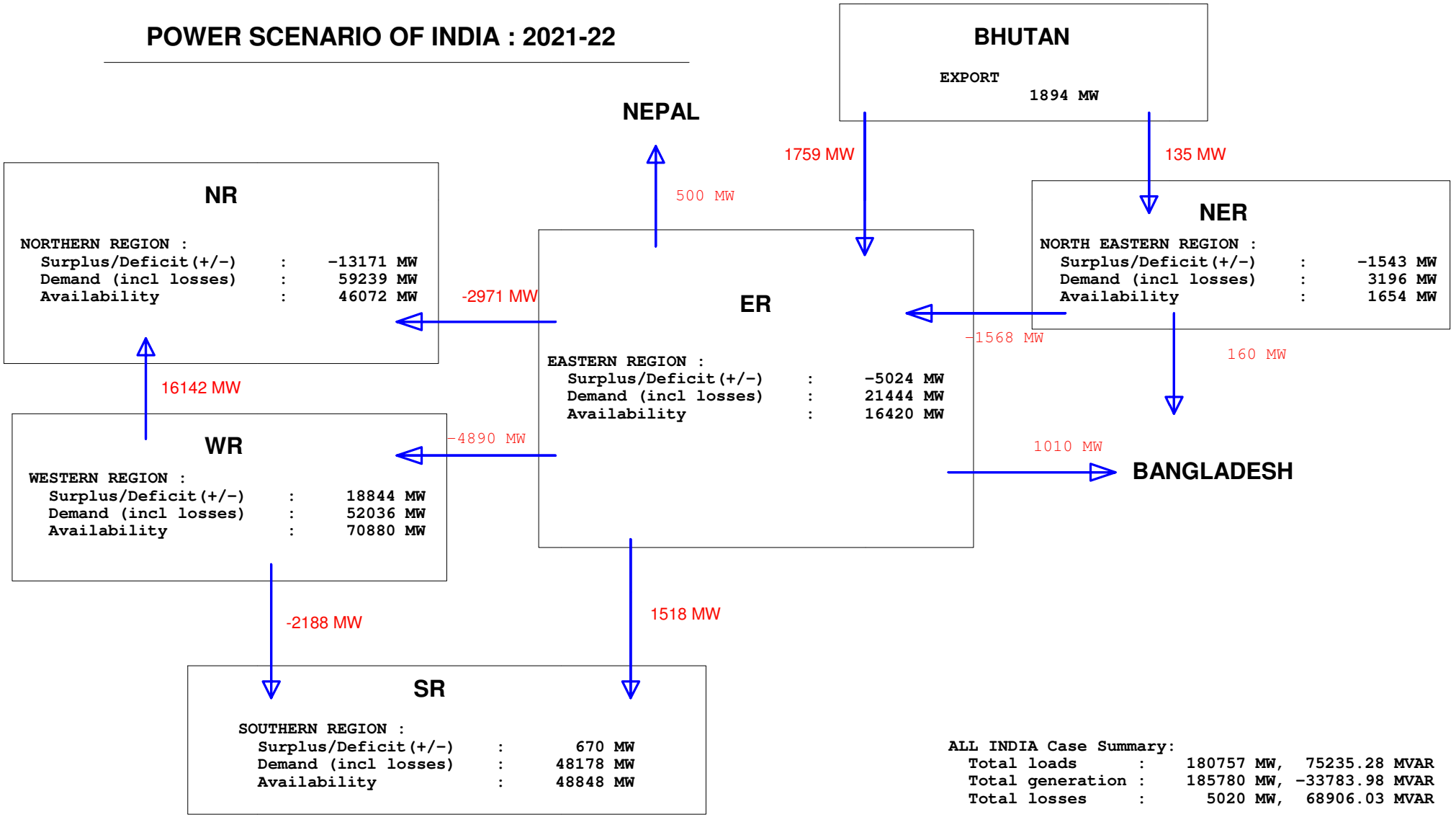
State Thermal generations considering various scenarios

							Scenario 1			Scenario 2			Scenario 3			Scenario 4			Scenario 5			Scenario 6			Scenario 7			Scenario 8			Scenario 9		
S.No	REGION	STATE	PROJECT NAME	UNIT	CAPACITY (MW)	Status (Existing/ UC)	No of units in operation	Despatch per unit	Total plant dispatch	No of units in operation	Despatch per unit	Total plant dispatch	No of units in operation	Despatch per unit	Total plant dispatch	No of units in operation	Despatch per unit	Total plant dispatch	No of units in operation	Despatch per unit	Total plant dispatch	No of units in operation	Despatch per unit	Total plant dispatch	No of units in operation	Despatch per unit	Total plant dispatch	No of units in operation	Despatch per unit	Total plant dispatch	No of units in operation	Despatch per unit	Total plant dispatch
1	WR	MP	AMARKANTAK	2X120	240	Existing	1	83	83	1	102	102	1	103	103	1	83	83	1	103	103	1	103	103	1	97	97	1	104	104	1	103	103
1	WR	MP	AMARKANTAK	1X210	210	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	WR	MP	SATPURA-II	1x200	200	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	WR	MP	SATPURA-II	1x210	210	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	WR	MP	SATPURA-III & IV	2x210	420	Existing	1	146	146	1	179	179	1	179	179	1	145	145	1	180	180	1	180	180	1	170	170	1	182	182	1	180	180
3	WR	MP	SATPURA-III & IV	2x250	500	Existing	1	174	174	1	213	213	1	214	214	1	173	173	1	214	214	1	215	215	1	202	202	1	217	217	1	214	214
4	WR	MP	S GANDHI TPS I & II	4x210	840	Existing	2	146	292	2	179	358	2	179	359	2	145	291	2	180	360	2	180	361	2	170	339	2	177	354	2	174	347
5	WR	MP	S GANDHI TPS III	1x500	500	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	WR	MP	SSTP(Shri Singhaji Thermal Power	2x600	1200	Existing	1	417	417	1	511	511	1	513	513	1	415	415	1	514	514	1	515	515	1	485	485	1	521	521	1	514	514
9	WR	MP	SSTP(Shri Singhaji Thermal Power	2x600	1200	Existing	1	417	417	1	511	511	1	513	513	1	415	415	1	514	514	1	515	515	1	485	485	1	521	521	1	514	514
10	WR	MP	BLA POWER	1x45(35%)	45	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	WR	Chhatisgarh	KORBA (E)	4x50	200	Existing	2	35	69	2	43	85	2	43	85	2	35	69	2	43	86	2	43	86	2	40	81	2	42	84	2	41	83
29	WR	Chhatisgarh	KORBA (E)	2x120	240	Existing	1	83	83	1	102	102	1	103	103	1	83	83	1	103	103	1	103	103	1	97	97	1	104	104	1	103	103
30	WR	Chhatisgarh	KORBA (W)	4x210	840	Existing	2	146	292	2	179	358	2	179	359	2	145	291	2	180	360	2	180	361	2	170	339	2	177	354	2	174	347
30	WR	Chhatisgarh	KORBA (W)	1x500	500	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	WR	Chhatisgarh	KORBA (E) ext-I	2x250	500	Existing	1	174	174	1	213	213	1	214	214	1	173	173	1	214	214	1	215	215	1	202	202	1	217	217	1	214	214
36	WR	Chhatisgarh	SVPL TPP	1x63	63	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
49	WR	Chhatisgarh	Marwa TPS	2x500	1000	Existing	1	347	347	1	426	426	1	427	427	1	346	346	1	429	429	1	430	430	1	404	404	1	434	434	1	428	428
58	WR	MAHARASHTRA	CHANDRAPUR	2x210	420	Existing	1	146	146	1	179	179	1	179	179	1	145	145	1	180	180	1	180	180	1	170	170	1	182	182	1	180	180
58	WR	MAHARASHTRA	CHANDRAPUR	3x500	1500	Existing	1	347	347	1	426	426	1	427	427	1	346	346	1	429	429	1	430	430	2	404	808	2	434	868	2	428	856
59	WR	MAHARASHTRA	CHANDRAPUR Extension	2x500	1000	Existing	1	347	347	1	426	426	1	427	427	1	346	346	1	429	429	1	430	430	1	404	404	1	434	434	1	428	428
60	WR	MAHARASHTRA	TROMBAY	2x500	1000	Existing	1	347	347	1	426	426	1	427	427	1	346	346	1	429	429	1	430	430	1	404	404	1	434	434	1	428	428
60	WR	MAHARASHTRA	TROMBAY	1X250	250	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61	WR	MAHARASHTRA	KORADI	2x210	420	Existing	1	146	146	1	179	179	1	179	179	1	145	145	1	180	180	1	180	180	1	170	170	1	182	182	1	180	180
62	WR	MAHARASHTRA	KORADI	3x660	1980	Existing	1	458	458	1	562	562	1	564	564	1	457	457	1	566	566	1	567	567	2	533	1066	2	573	1146	2	565	1130
63	WR	MAHARASHTRA	NASIK	3x210	630	Existing	1	146	146	1	179	179	1	179	179	1	145	145	1	180	180	1	180	180	2	170	339	2	182	365	2	180	360
64	WR	MAHARASHTRA	KHAPERKHEDA	4x210	840	Existing	2	146	292	2	179	358	2	179	359	2	145	291	2	180	360	2	180	361	2	170	339	2	177	354	2	174	347
64	WR	MAHARASHTRA	KHAPERKHEDA	1x500	500	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
65	WR	MAHARASHTRA	PARLI	2x210	420	Existing	1	146	146	1	179	179	1	179	179	1	145	145	1	180	180	1	180	180	1	170	170	1	182	182	1	180	180
65	WR	MAHARASHTRA	PARLI	3x250	750	Existing	1	174	174	1	213	213	1	214	214	1	173	173	1	214	214	1	215	215	2	202	404	2	217	434	2	214	428
66	WR	MAHARASHTRA	BHUSAWAL	2x210	420	Existing	1	146	146	1	179	179	1	179	179	1	145	145	1	180	180	1	180	180	1	170	170	1	182	182	1	180	180
66	WR	MAHARASHTRA	BHUSAWAL	2x500	1000	Existing	1	347	347	1	426	426	1	427	427	1	346	346	1	429	429	1	430	430	1	404	404	1	434	434	1	428	428
67	WR	MAHARASHTRA	REL DAHANU	2x250	500	Existing	1	174	174	1	213	213	1	214	214	1	173	173	1	214	214	1	215	215	1	202	202	1	217	217	1	214	214
68	WR	MAHARASHTRA	PARAS	2x250	500	Existing	1	174	174	1	213	213	1	214	214	1	173	173	1	214	214	1	215	215	1	202	202	1	217	217	1	214	214
69	WR	MAHARASHTRA	JSW Ratnagiri(Jaigad)	4x300	1200	Existing	2	208	417	2	256	511	2	256	513	2	208	415	2	257	514	2	258	515	2	242	485	2	253	506	2	248	496
70	WR	MAHARASHTRA	Mihan TPP(Abhijit)	4x61.5	246	Existing	2	43	85	2	52	105	2	53	105	2	43	85	2	53	105	2	53	106	2	50	99	2	52	104	2	51	102
71	WR	MAHARASHTRA	Wardha Warora Power Co Ltd.	4x135	540	Existing	2	94	188	2	115	230	2	115	231	2	93	187	2	116	231	2	116	232	2	109	218	2	114	228	2	112	223
72	WR	MAHARASHTRA	Vidharbha Industry, Butibori	2x300	600	Existing	1	208	208	1	256	256	1	256	256	1	208	208	1	257	257	1	258	258	1	242	242	1	260	260	1	257	257
73	WR	MAHARASHTRA	APML,Tiroda-Ph-I(400 kV)	3x660	1980	Existing	1	458	458	1	562	562	1	564	564	1	457	457	1	566	566	1	567	567	2	533	1066	2	573	1146	2	565	1130
74	WR	MAHARASHTRA	APML,Tiroda-Ph-II(765 kV)	2x660	1320	Existing	1	458	458	1	562	562	1	564	564	1	457	457	1	566	566	1	567	567	1	533	533	1	573	573	1	565	565
75	WR	MAHARASHTRA	IEPL (Ideal Energy Power Ltd,	1x270	270	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
76	WR	MAHARASHTRA	IBL (India Bulls Limited, Amravati) Ratan India	5x270	1350	Existing	2	188	375	2	225	450	2	226	452	2	187	374	2	227	454	2	228	455	4	216	865	4	234	935	4	230	920
78	WR	MAHARASHTRA	Indrajeet	1x77	77	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
79	WR	MAHARASHTRA	Indorama	1x49	49	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	WR	MAHARASHTRA	Finolex, Ratnagiri	1x43	43	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81	WR	MAHARASHTRA	JSW Boisar, Vashi Circle	1x37.6	37.6	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
82	WR	MAHARASHTRA	Uttam Galwa	1x60	60	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
83	WR	MAHARASHTRA	Gupta Energy ltd	2x60	120	Existing	1	42	42	1	51	51	1	51	51	1	42	42	1	51	51	1	52	52	1	48	48	1	52	52	1	51	51
84	WR	MAHARASHTRA	Topworth Urja	1x30	30	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
85	WR	MAHARASHTRA	Ultratech Cement ltd.	1x46	46	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
86	WR	MAHARASHTRA	Vayunandana Power ltd	1x10	10	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
88	WR	MAHARASHTRA	ISMT Ltd	40	40	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
89	WR	MAHARASHTRA	Suryalakshmi Cotton & Mills Ltd	25	25	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
90	WR	MAHARASHTRA	Grace Industries Ltd	33	33	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
91	WR	MAHARASHTRA	Prithvi Ferro Alloys Pvt. Ltd	18	18	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
92	WR	MAHARASHTRA	RCF, , Pen circle	30	30	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
93	WR	MAHARASHTRA	BILT Power, Baramati ® circle	5	5	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
94	WR	MAHARASHTRA	Reliance Patalganga	20	20	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
95	WR	MAHARASHTRA	Sunflag , Bhandara Circle	15	15	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
96	WR	MAHARASHTRA	BILT Power Chandrapur circle	10	10	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
97	WR	MAHARASHTRA	Gopani Chandrapur circle	12	12	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
98	WR	MAHARASHTRA	ONGC, Vashi circle	59.6	59.6	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
99	WR	MAHARASHTRA	IG Petro, Vashi circle	4.2	4.2	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100	WR	MAHARASHTRA	Technocraft Industries, Kalyan	5	5	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
101	WR	MAHARASHTRA	Ratan India Pvt Ltd.(Sinner)	2x270	540	Existing	1	188	188	1	230	230	1	231	231	1	187	187	1	231	231	1	232	232	1	218	218	1	234	234	1	231	231
102	WR	MAHARASHTRA	RPL URJA YEOTMAL		10	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
103	WR	MAHARASHTRA	Siddhabali Ispat, Chandrapur		20	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
125	WR	Gujarat	A.E.Co.(Torrent Power)	2x121	242	Existing	1	84	84	1	103	103	1	103	103	1	84	84	1	104	104	1	104	104	1	98	98	1	105	105	1	104	104
125	WR	Gujarat	A.E.Co.(Torrent Power)	1x120	120	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
126	WR	Gujarat	UKAI	2x200	400	Existing	1	139	139	1	170	170	1	171	171	1	138	138	1	171	171	1	172	172	1	162	162	1	174	174	1	171	171
126	WR	Gujarat	UKAI	1x210	210	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
126	WR	Gujarat	UKAI	1x500	500	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
127	WR	Gujarat	GANDHI NAGAR	3x210	630	Existing	1	146	146	1	179	179	1	179	179	1	145	145	1	180	180	1	180	180	2	170	339	2	182	365	2	180	360
128	WR	Gujarat	WANAKBORI	7x210	1470	Existing	4	139	557	4	177	707	4	177	709	4	138	553	4	178	712	4	179	714	6	167	1003	6	180	1082	6	177	1063

129	WR	Gujarat	SIKKA	2x250	500	Existing	1	174	174	1	213	213	1	214	214	1	173	173	1	214	214	1	215	215	1	202	202	1	217	217	1	214	214
130	WR	Gujarat	KUTCH LIGNITE	2x75	150	Existing	1	52	52	1	64	64	1	64	64	1	52	52	1	64	64	1	64	64	1	61	61	1	65	65	1	64	64
130	WR	Gujarat	KUTCH LIGNITE	2x70	140	Existing	1	49	49	1	60	60	1	60	60	1	48	48	1	60	60	1	60	60	1	57	57	1	61	61	1	60	60
131	WR	Gujarat	SURAT LIGNITE	4x125	500	Existing	2	87	174	2	107	213	2	107	214	2	87	173	2	107	214	2	107	215	2	101	202	2	105	211	2	103	207
132	WR	Gujarat	AKRIMOTA	2x125	250	Existing	1	87	87	1	107	107	1	107	107	1	87	87	1	107	107	1	107	107	1	101	101	1	109	109	1	107	107
135	WR	Gujarat	Essar Vadinar	2x600	1200	Existing	1	417	417	1	511	511	1	513	513	1	415	415	1	514	514	1	515	515	1	485	485	1	521	521	1	514	514
136	WR	Gujarat	BECL	2x250	500	Existing	1	174	174	1	213	213	1	214	214	1	173	173	1	214	214	1	215	215	1	202	202	1	217	217	1	214	214
137	WR	Gujarat	OPGS	2x150	300	Existing	1	104	104	1	128	128	1	128	128	1	104	104	1	129	129	1	129	129	1	121	121	1	130	130	1	128	128
205	ER	Bihar	BARAUNI	(2x110)	210	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	89	89	1	96	96	1	94	94
206	ER	Bihar	MUZAFFARPUR	(2x110)	220	Existing	1	76	76	1	94	94	1	94	94	1	76	76	1	94	94	1	95	95	1	89	89	1	96	96	1	94	94
209	ER	Jharkhand	TENUGHAT	(2x210)	420	Existing	1	146	146	1	179	179	1	179	179	1	145	145	1	180	180	1	180	180	1	170	170	1	182	182	1	180	180
223	ER	Odisha	TTPS -I	(4x62.5)	240	Existing	1	43	43	1	53	53	1	53	53	1	43	43	1	54	54	1	54	54	2	50	101	2	53	105	2	54	107
224	ER	Odisha	TTPS -II	(2x110)	220	Existing	1	76	76	1	94	94	1	94	94	1	76	76	1	94	94	1	95	95	1	89	89	1	96	96	1	94	94
225	ER	Odisha	IB.TPS	(2x210)	420	Existing	1	146	146	1	179	179	1	179	179	1	145	145	1	180	180	1	180	180	1	170	170	1	182	182	1	180	180
226	ER	Odisha	VEDANTA	(1x600)	600	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
227	ER	Odisha	GMR	(1x350)	350	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
235	ER	Odisha	OPGC U-1	2x660	660	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
236	ER	West Bengal	BANDEL	(4x82.5)	240	Existing	1	57	57	1	70	70	1	71	71	1	57	57	1	71	71	1	71	71	2	67	133	2	72	143	2	71	141
236	ER	West Bengal	BANDEL	(1x210)	210	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
237	ER	West Bengal	SANTALDIH	(2x250)	500	Existing	1	174	174	1	213	213	1	214	214	1	173	173	1	214	214	1	215	215	1	202	202	1	217	217	1	214	214
238	ER	West Bengal	KOLAGHAT	(6x210)	1260	Existing	4	132	526	4	178	711	4	178	714	4	131	522	4	179	716	4	180	718	5	168	838	5	181	904	5	178	889
239	ER	West Bengal	BAKRESHWAR	(5x210)	1050	Existing	2	146	292	2	175	350	2	176	351	2	145	291	2	176	353	2	177	354	4	168	673	4	182	727	4	179	715
240	ER	West Bengal	SAGARDIGHI	(2x300)	600	Existing	1	208	208	1	256	256	1	256	256	1	208	208	1	257	257	1	258	258	1	242	242	1	260	260	1	257	257
240	ER	West Bengal	SAGARDIGHI	(2x500)	1000	Existing	1	347	347	1	426	426	1	427	427	1	346	346	1	429	429	1	430	430	1	404	404	1	434	434	1	428	428
241	ER	West Bengal	DPL	(1x110)	110	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
241	ER	West Bengal	DPL	(1X300)	300	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
241	ER	West Bengal	DPL	(1X250)	250	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
242	ER	West Bengal	TITAGARH	(4x60)	240	Existing	2	42	83	2	51	102	2	51	103	2	42	83	2	51	103	2	52	103	2	48	97	2	51	101	2	50	99
243	ER	West Bengal	SOUTHERN	(2x67.5)	135	Existing	1	47	47	1	58	58	1	58	58	1	47	47	1	58	58	1	58	58	1	55	55	1	59	59	1	58	58
244	ER	West Bengal	BUDGE-BUDGE	(3x250)	750	Existing	1	174	174	1	213	213	1	214	214	1	173	173	1	214	214	1	215	215	2	202	404	2	217	434	2	214	428
245	ER	West Bengal	HEL	(2x300)	600	Existing	1	208	208	1	256	256	1	256	256	1	208	208	1	257	257	1	258	258	1	242	242	1	260	260	1	257	257
266	NER	Assam	Assam		133	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
285	SR	Andhra Pradesh	Vijayawada	6 X 210	1260	Existing	4	132	526	4	178	711	4	178	714	4	131	522	4	179	716	4	180	718	5	168	838	5	181	904	5	178	889
286	SR	Andhra Pradesh	Vijayawada	1x 500	500	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
287	SR	Andhra Pradesh	Muddanur	5 X 210	1050	Existing	2	146	292	2	175	350	2	176	351	2	145	291	2	176	353	2	177	354	4	168	673	4	182	727	4	179	715
288	SR	Andhra Pradesh	Krishnapattanam Stage - I	2 x 800	1600	Existing	1	556	556	1	682	682	1	684	684	1	554	554	1	686	686	1	687	687	1	646	646	1	695	695	1	685	685
289	SR	Andhra Pradesh	RTTP IV Stage	1 x600	600	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
290	SR	Andhra Pradesh	Hinduja	2 x 520	1040	Existing	1	361	361	1	443	443	1	444	444	1	360	360	1	446	446	1	447	447	1	420	420	1	451	451	1	445	445
306	SR	Andhra Pradesh	Krishnapatnam TPP (JVP) Stage II (1x800 MW)	1x800	800	UC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
307	SR	Andhra Pradesh	Vijayawada TPS Stage V (1x800	1x800	800	UC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
317	SR	Telangana	Kothagudem D (V Stage)	2 X 250	500	Existing	1	174	174	1	213	213	1	214	214	1	173	173	1	214	214	1	215	215	1	202	202	1	217	217	1	214	214
318	SR	Telangana	Kothagudem St-VI	1 x 500	500	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
319	SR	Telangana	Kothagudem St-VII	1 x 800	800	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
320	SR	Telangana	Ramagundam B	1 X 62.5	62.5	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
321	SR	Telangana	Kakatiya TPP	1x500	500	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
321	SR	Telangana	Kakatiya TPP	1x600	600	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
322	SR	Telangana	Singareni	2x600	1200	Existing	1	417	417	1	511	511	1	513	513	1	415	415	1	514	514	1	515	515	1	485	485	1	521	521	1	514	514
372	SR	Telangana	Bhadradri(Manuguru)	4x270	1080	UC	2	188	375	2	230	460	2	231	461	2	187	374	2	231	463	2	232	464	2	218	436	2	228	456	2	223	446
373	SR	Telangana	Yaadadri (Damaracherla) TPP	3x800	2400	UC	1	556	556	1	682	682	1	684	684	1	554	554	1	686	686	1	687	687	2	646	1293	2	695	1389	2	685	1370
384	SR	Karnataka	Raichur	7 X 210	1470	Existing	4	139	557	4	177	707	4	177	709	4	138	553	4	178	712	4	179	714	6	167	1003	6	180	1082	6	177	1063
384	SR	Karnataka	Raichur	1 x 250	250	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
385	SR	Karnataka	Bellary	2 x 500	1000	Existing	1	347	347	1	426	426	1	427	427	1	346	346	1	429	429	1	430	430	1	404	404	1	434	434	1	428	428
385	SR	Karnataka	Bellary	1x700	700	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
386	SR	Karnataka	Yeramars TPS	2 x 800	1600	Existing	1	556	556	1	682	682	1	684	684	1	554	554	1	686	686	1	687	687	1	646	646	1	695	695	1	685	685
387	SR	Karnataka	UPCL	2 x 600	1200	Existing	1	417	417	1	511	511	1	513	513	1	415	415	1	514	514	1	515	515	1	485	485	1	521	521	1	514	514
388	SR	Karnataka	Torangalu (Jindal)	2 x 130	260	Existing	1	90	90	1	111	111	1	111	111	1	90	90	1	111	111	1	112	112	1	105	105	1	113	113	1	111	111
388	SR	Karnataka	Torangalu (Jindal)	4 x 300	1200	Existing	2	208	417	2	256	511	2	256	513	2	208	415	2	257	514	2	258	515	2	242	485	2	253	506	2	248	496
460	SR	Tamil Nadu	Tuticorin	5 X 210	1050	Existing	2	146	292	2	175	350	2	176	351	2	145	291	2	176	353	2	177	354	4	168	673	4	182	727	4	179	715
461	SR	Tamil Nadu	Mettur	4 X 210	840	Existing	2	146	292	2	179	358	2	179	359	2	145	291	2	180	360	2	180	361	2	170	339	2	177	354	2	174	347
462	SR	Tamil Nadu	Mettur TPS St-III	1 x 600	600	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
463	SR	Tamil Nadu	Neyveli -I NLC	6x50	300	Existing	4	31	125	4	42	169	4	42	170	4	31	124	4	43	171	4	43	171	5	40	200	5	43	215	5	42	212
463	SR	Tamil Nadu	Neyveli -I NLC	3X100	300	Existing	1	69	69	1	85	85	1	85	85	1	69	69	1	86	86	1	86	86	2	81	162	2	87	174	2	86	171
464	SR	Tamil Nadu	Neyveli Zero (STCMS)	1 X 250	250	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
465	SR	Tamil Nadu	North Chennai	3x210	630	Existing	1	146	146	1	179	179	1	179	179	1	145	145	1	180	180	1	180	180	2	170	339	2	182	365	2	180	360
465	SR	Tamil Nadu	North Chennai	2 x 600	1200	Existing	1	417	417	1	511	511	1	513	513	1	415	415	1	514	514	1	515	515	1	485	485	1	521	521	1	514	514
483	SR	Tamil Nadu	Ennore Expn TPS	2 x 660	1320	UC	1	458	458	1	562	562	1	564	564	1	457	457	1	566	566	1	567	567	1	533	533	1	573	573	1	565	565
485	SR	Tamil Nadu	North Chennai St-III (2015-16)	1 x 800	800	UC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
486	SR	Tamil Nadu	Ennore (SEZ) TPS at Kaltupalli	2 x 660	1320	UC	1	458	458	1	562	562	1	564	564	1	457	457	1	566	566	1	567	567	1	533	533	1	573	573	1	565	565
487	SR	Tamil Nadu	Udangudi TPS (TNEB)	2 x 660	1320	UC	1	458	458	1	562	562	1	564	564	1	457	457	1	566	566	1	567	567	1	533	533	1	573	573	1	565	565
488	SR	Tamil Nadu	UPPUR	2 x 800	1600	UC	1	556	556	1	682	682	1	684	684	1	554	554	1	686	686	1	687	687	1	646	646	1	695	695	1	685	685
489	SR	Tamil Nadu	OPGC	2x360	720	UC	1	250	250	1	307	307	1	308	308	1	249	249	1	309	309	1	309	309	1	291	291	1	313	313	1	308	308
490	SR	Tamil Nadu	SEPC	1x525	525	UC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
579	NR	Rajasthan	Shree Cement TPS	2X150	300	Existing	1	104	104	1	128	128	1	128	128	1	104	104	1	129	129	1	129	129	1	121	121	1	130	130	1	128	128
589	NR	Haryana	Panipat	2x210	420	Existing	1	146	146	1	179	179	1	179	179	1	145	145	1	180	180	1	180	180	1	170	170	1	182	182	1	180	180
589	NR	Haryana	Panipat	2x250	500	Existing	1	174	174	1	213	213	1	214	214	1	173	173	1	214	214	1	215	215	1	202	202	1	217	217	1	214	214
590	NR	Haryana	DCRTPP (Yamuna Nagar)	2x300	600	Existing	1	208	208	1	256	256	1	256	256	1	208	208	1	257	257	1	258	258	1	242	242	1	260	260	1	257	257
591	NR	Haryana	RGTPP Khedda	2x600	1200	Existing	1	417	417	1	511	511	1	513	513	1	415	415	1	514	514	1	515	515	1	485	485	1	521	521	1	514	514
592	NR	Haryana	Jhajjar-CLP (IPP)	2X660	1320	Existing	1	458	458	1	562	562	1	564	564	1	457	457	1	566	566	1	567	567	1	533	533	1	573	573	1	565	565
630	NR	Punjab	Guru Gobind Singh TPS Ropa	6x210	1260	Existing	4	132	526	4	178	711	4	178	714	4	131	522	4	179	716	4	180	718	5	168	838	5	181	904	5	178	889
631	NR	Punjab	Lehra Mohabbat TPS	2x210	420	Existing	1	146	146	1	179	179	1	179	179	1	145	145	1	180	180	1	180	180	1	170	170	1	182	182	1	180	180

631	NR	Punjab	Lehra Mohabbat TPS	2x250	500	Existing	1	174	174	1	213	213	1	214	214	1	173	173	1	214	214	1	215	215	1	202	202	1	217	217	1	214	214
632	NR	Punjab	Rajpura	2x700	1400	Existing	1	486	486	1	596	596	1	598	598	1	484	484	1	600	600	1	601	601	1	565	565	1	608	608	1	600	600
633	NR	Punjab	Talwandi Saboc	3x660	1980	Existing	1	458	458	1	562	562	1	564	564	1	457	457	1	566	566	1	567	567	2	533	1066	2	573	1146	2	565	1130
634	NR	Punjab	GOINDWAL (GVK)	2x270	540	Existing	1	188	188	1	230	230	1	231	231	1	187	187	1	231	231	1	232	232	1	218	218	1	234	234	1	231	231
641	NR	Rajasthan	Kota TPS	2x110	220	Existing	1	76	76	1	94	94	1	94	94	1	76	76	1	94	94	1	95	95	1	89	89	1	96	96	1	94	94
641	NR	Rajasthan	Kota TPS	3x210	630	Existing	1	146	146	1	179	179	1	179	179	1	145	145	1	180	180	1	180	180	2	170	339	2	182	365	2	180	360
641	NR	Rajasthan	Kota TPS	2x195	390	Existing	1	135	135	1	166	166	1	167	167	1	135	135	1	167	167	1	168	168	1	158	158	1	169	169	1	167	167
642	NR	Rajasthan	Suratgarh TPS	6x250	1500	Existing	4	157	627	4	212	847	4	212	850	4	155	622	4	213	853	4	214	855	5	200	998	5	215	1077	5	212	1058
643	NR	Rajasthan	RAMGARH GT EXT	1x35.5	35.5	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
643	NR	Rajasthan	RAMGARH GT EXT	2x37.5	75	Existing	1	26	26	1	32	32	1	32	32	1	26	26	1	32	32	1	32	32	1	30	30	1	33	33	1	32	32
643	NR	Rajasthan	RAMGARH GT EXT	1X110	110	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
643	NR	Rajasthan	RAMGARH GT EXT	1x50	50	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
644	NR	Rajasthan	Giral LTPS	2x125	250	Existing	1	87	87	1	107	107	1	107	107	1	87	87	1	107	107	1	107	107	1	101	101	1	109	109	1	107	107
645	NR	Rajasthan	Dholpur CCPI	3x110	330	Existing	1	76	76	1	94	94	1	94	94	1	76	76	1	94	94	1	95	95	2	89	178	2	96	191	2	94	188
646	NR	Rajasthan	Chhbra TPS	4x250	1000	Existing	2	174	347	2	213	426	2	214	427	2	173	346	2	214	429	2	215	430	2	202	404	2	211	422	2	207	413
646	NR	Rajasthan	Chhbra TPS	2x660	1320	Existing	1	458	458	1	562	562	1	564	564	1	457	457	1	566	566	1	567	567	1	533	533	1	573	573	1	565	565
647	NR	Rajasthan	RajWest	8x135	1080	Existing	5	87	433	5	113	565	5	114	568	5	86	430	5	114	570	5	114	572	6	109	653	6	116	694	6	114	681
648	NR	Rajasthan	VS Lignite Power Pvt Ltc	1x135	135	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
649	NR	Rajasthan	Kalisindl	2X600	1200	Existing	1	417	417	1	511	511	1	513	513	1	415	415	1	514	514	1	515	515	1	485	485	1	521	521	1	514	514
650	NR	Rajasthan	Kawai	2X660	1320	Existing	1	458	458	1	562	562	1	564	564	1	457	457	1	566	566	1	567	567	1	533	533	1	573	573	1	565	565
651	NR	Rajasthan	Suratgarh TPS Extension	2x660	1320	UC	1	458	458	1	562	562	1	564	564	1	457	457	1	566	566	1	567	567	1	533	533	1	573	573	1	565	565
660	NR	UP	Obra A	2x50	100	Existing	1	35	35	1	43	43	1	43	43	1	35	35	1	43	43	1	43	43	1	40	40	1	43	43	1	43	43
660	NR	UP	Obra A	1X94	94	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
661	NR	UP	Obra B	5X200	1000	Existing	2	139	278	2	167	333	2	167	334	2	138	277	2	168	336	2	169	337	4	160	641	4	173	693	4	170	681
662	NR	UP	Harduaganj - E	1x60	60	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
662	NR	UP	Harduaganj - E	1x105	105	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
663	NR	UP	Harduaganj - C	2x250	500	Existing	1	174	174	1	213	213	1	214	214	1	173	173	1	214	214	1	215	215	1	202	202	1	217	217	1	214	214
664	NR	UP	Paricha - A,B,C	2x110	220	Existing	1	76	76	1	94	94	1	94	94	1	76	76	1	94	94	1	95	95	1	89	89	1	96	96	1	94	94
664	NR	UP	Paricha - A,B,C	2x210	420	Existing	1	146	146	1	179	179	1	179	179	1	145	145	1	180	180	1	180	180	1	170	170	1	182	182	1	180	180
664	NR	UP	Paricha - A,B,C	2x250	500	Existing	1	174	174	1	213	213	1	214	214	1	173	173	1	214	214	1	215	215	1	202	202	1	217	217	1	214	214
665	NR	UP	Anpara - A	3x210	630	Existing	1	146	146	1	179	179	1	179	179	1	145	145	1	180	180	1	180	180	2	170	339	2	182	365	2	180	360
666	NR	UP	Anpara - B	2x500	1000	Existing	1	347	347	1	426	426	1	427	427	1	346	346	1	429	429	1	430	430	1	404	404	1	434	434	1	428	428
667	NR	UP	Anpara - C(IPP	2x600	1200	Existing	1	417	417	1	511	511	1	513	513	1	415	415	1	514	514	1	515	515	1	485	485	1	521	521	1	514	514
668	NR	UP	Rosa (IPP)	4x300	1200	Existing	2	208	417	2	256	511	2	256	513	2	208	415	2	257	514	2	258	515	2	242	485	2	253	506	2	248	496
669	NR	UP	Bajaj Energy Pvt. Ltd(IPP)	10x45	450	Existing	6	29	176	6	38	228	6	38	228	6	29	175	6	38	229	6	38	230	8	36	288	8	39	312	8	38	307
671	NR	UP	Anpara - D	2x500	1000	Existing	1	347	347	1	426	426	1	427	427	1	346	346	1	429	429	1	430	430	1	404	404	1	434	434	1	428	428
672	NR	UP	Lalitpur	3x660	1980	Existing	1	458	458	1	562	562	1	564	564	1	457	457	1	566	566	1	567	567	2	533	1066	2	573	1146	2	565	1130
673	NR	UP	Bara	3x660	1980	Existing	1	458	458	1	562	562	1	564	564	1	457	457	1	566	566	1	567	567	2	533	1066	2	573	1146	2	565	1130
674	NR	UP	Meja	1x660	660	Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
675	NR	UP	JP Churk	3x60	180	Existing	1	42	42	1	51	51	1	51	51	1	42	42	1	51	51	1	52	52	2	48	97	2	52	104	2	51	103
676	NR	UP	Meja Extensior	1x660	660	UC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
					118785.4		**175**		**33149**	**175**		**41001**	**175**		**41128**	**175**		**33010**	**175**		**41257**	**175**		**41359**	**217**		**47632**	**217**		**51099**	**217**		**50341**

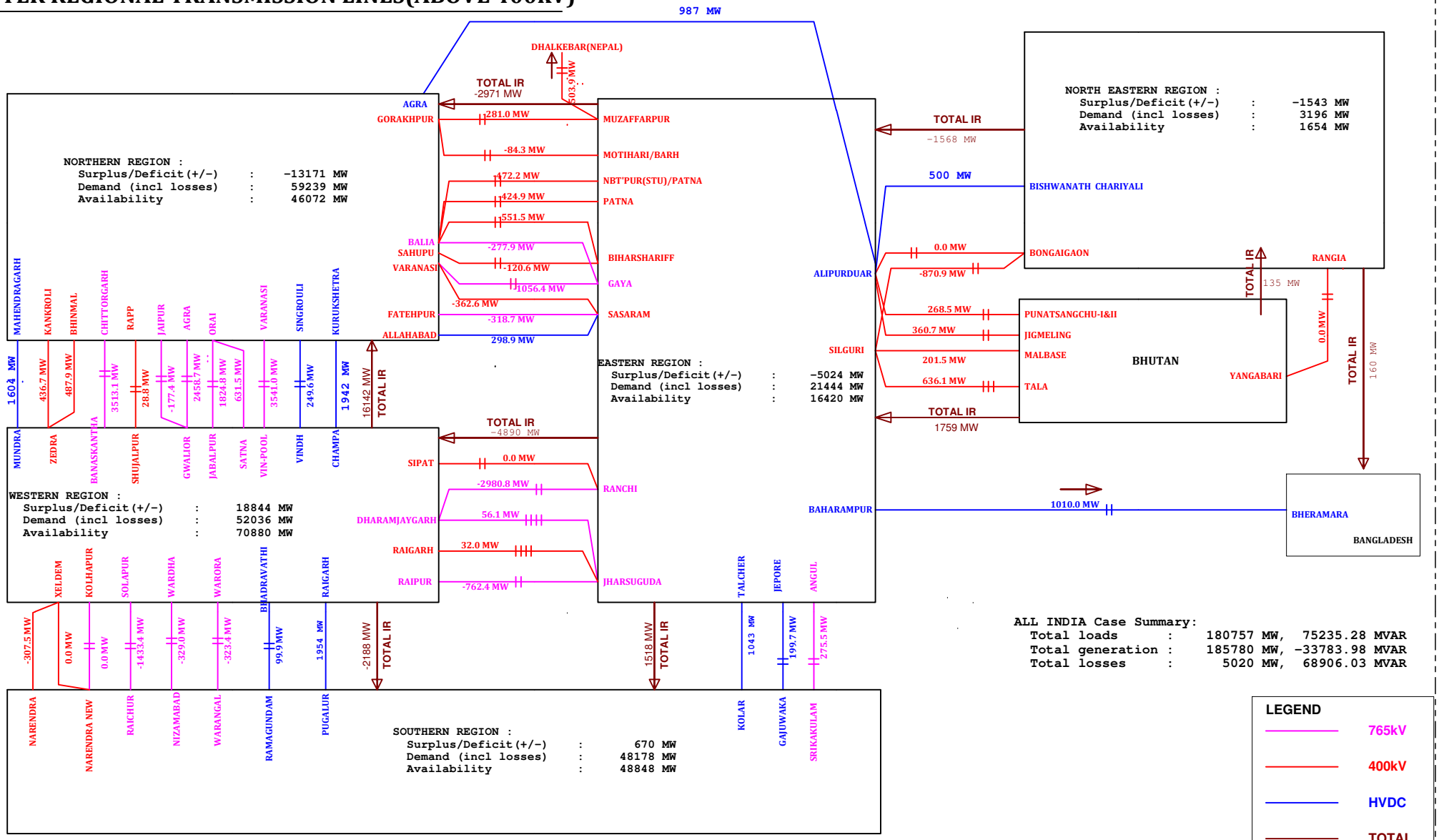
POWER SCENARIO OF INDIA : 2021-22



ALL INDIA Case Summary:

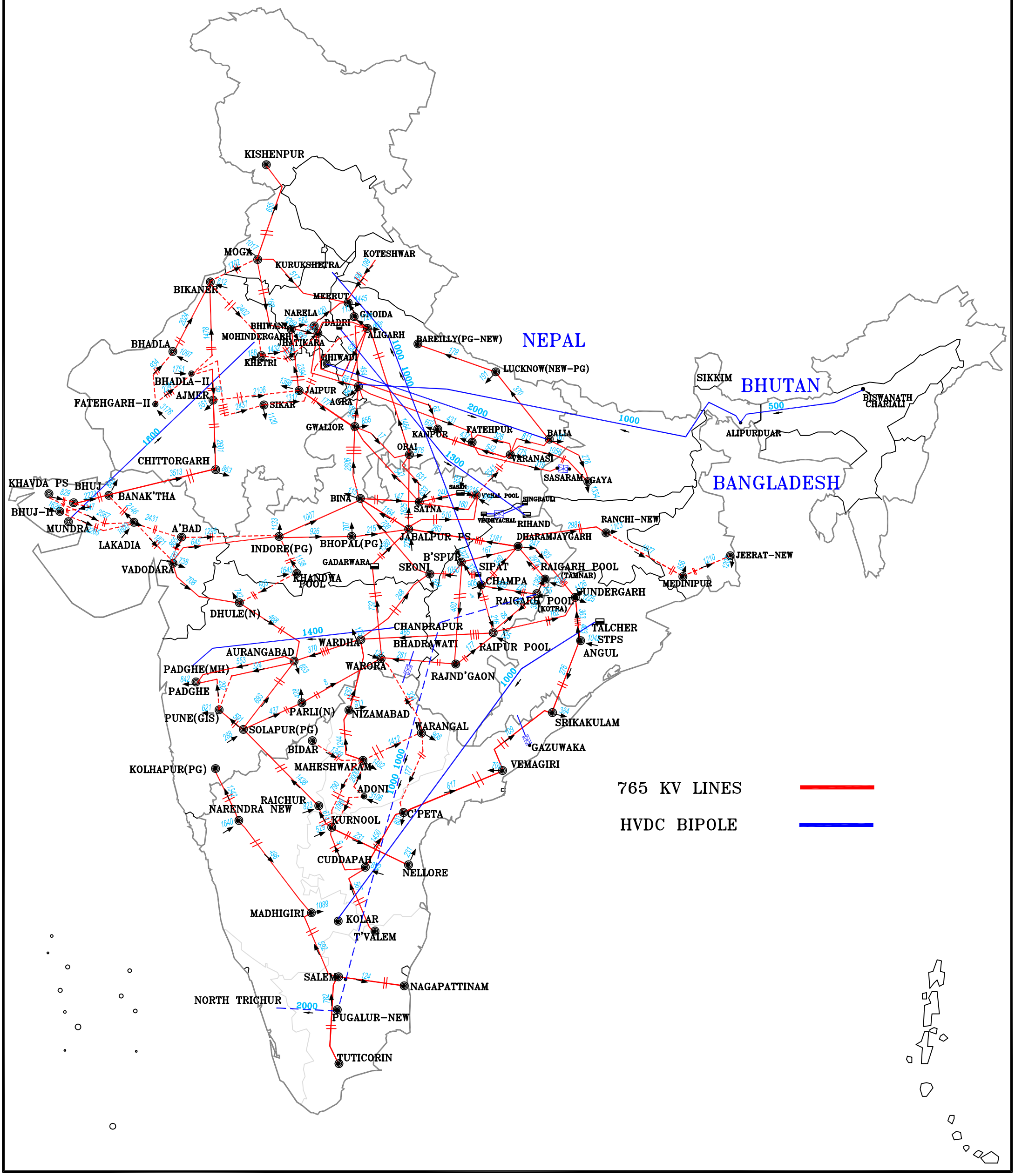
Total loads	:	180757 MW,	75235.28 MVAR
Total generation	:	185780 MW,	-33783.98 MVAR
Total losses	:	5020 MW,	68906.03 MVAR

INTER REGIONAL TRANSMISSION LINES(ABOVE 400kV)

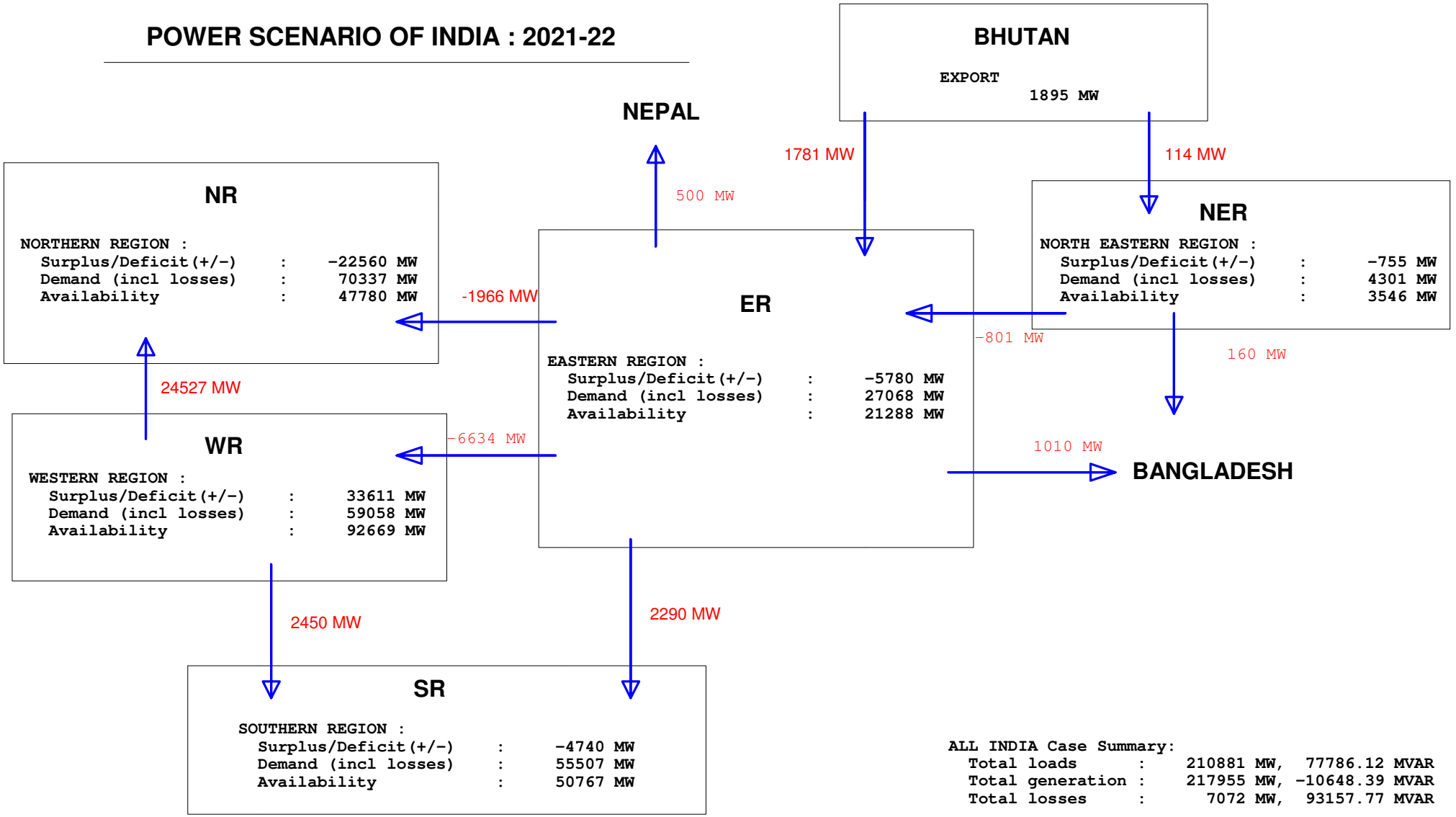


All-India Studies for 2021-22

765kV ISTS lines and HVDC links



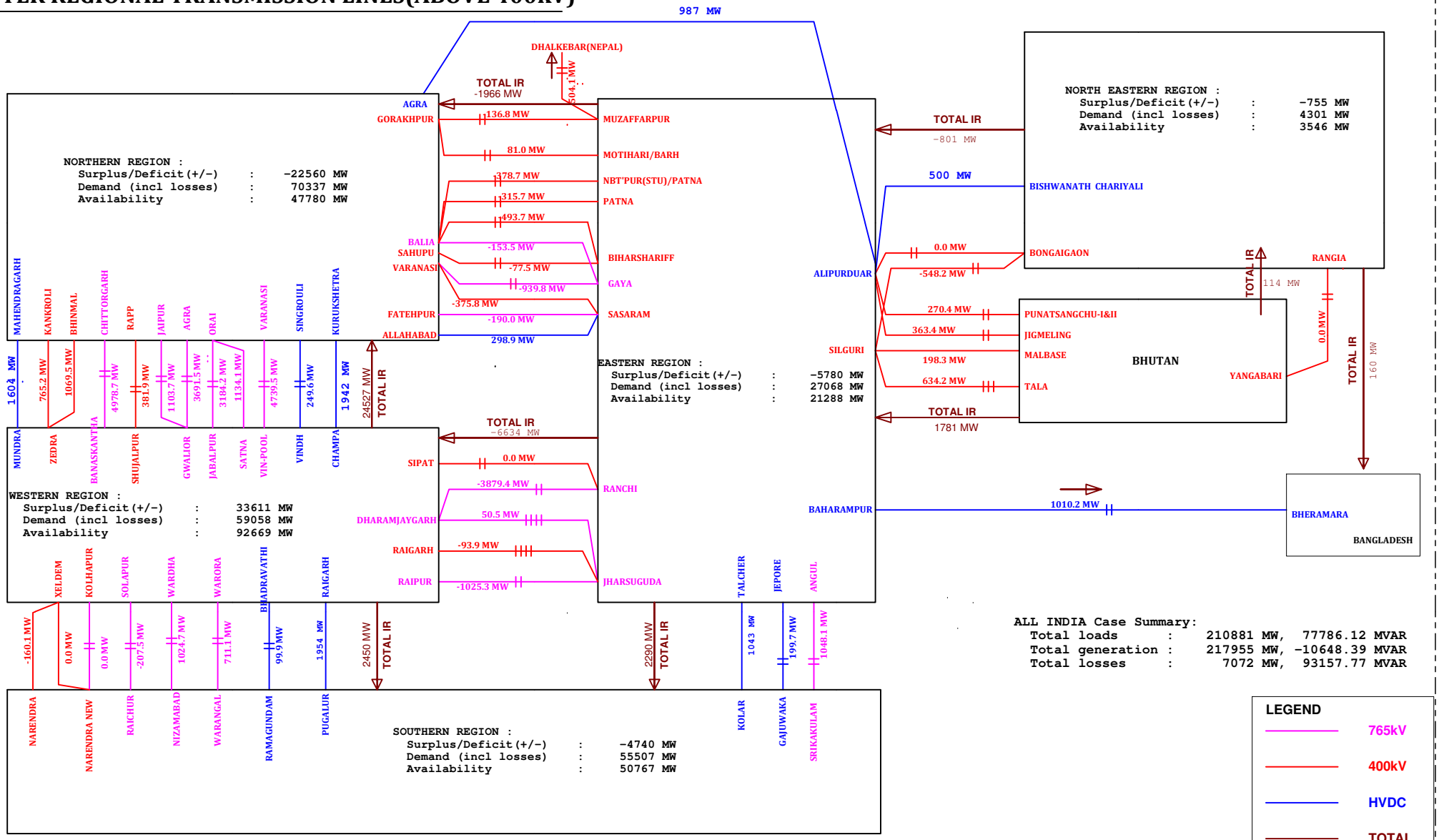
POWER SCENARIO OF INDIA : 2021-22



ALL INDIA Case Summary:

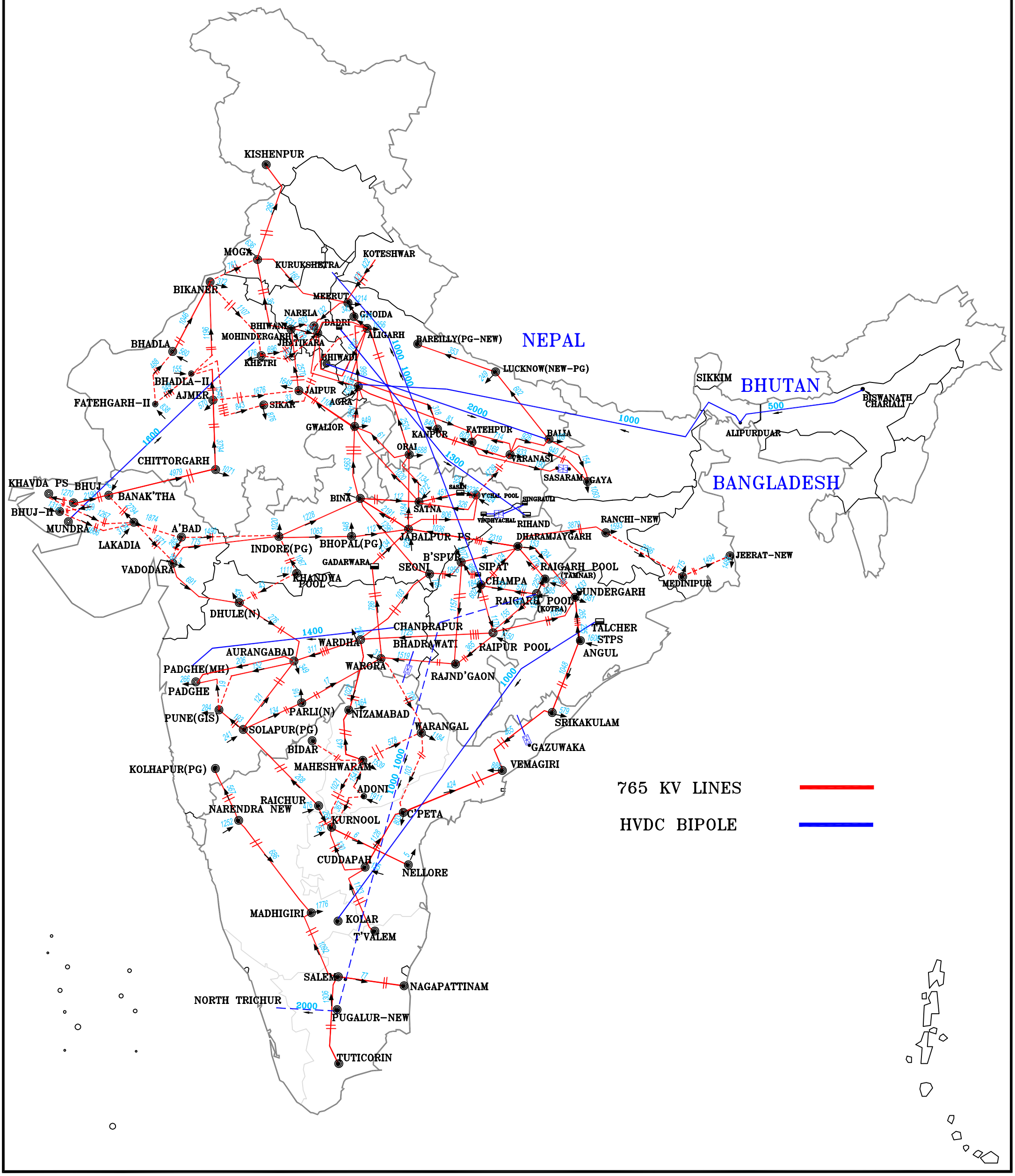
Total loads	:	210881 MW,	77786.12 MVAR
Total generation	:	217955 MW,	-10648.39 MVAR
Total losses	:	7072 MW,	93157.77 MVAR

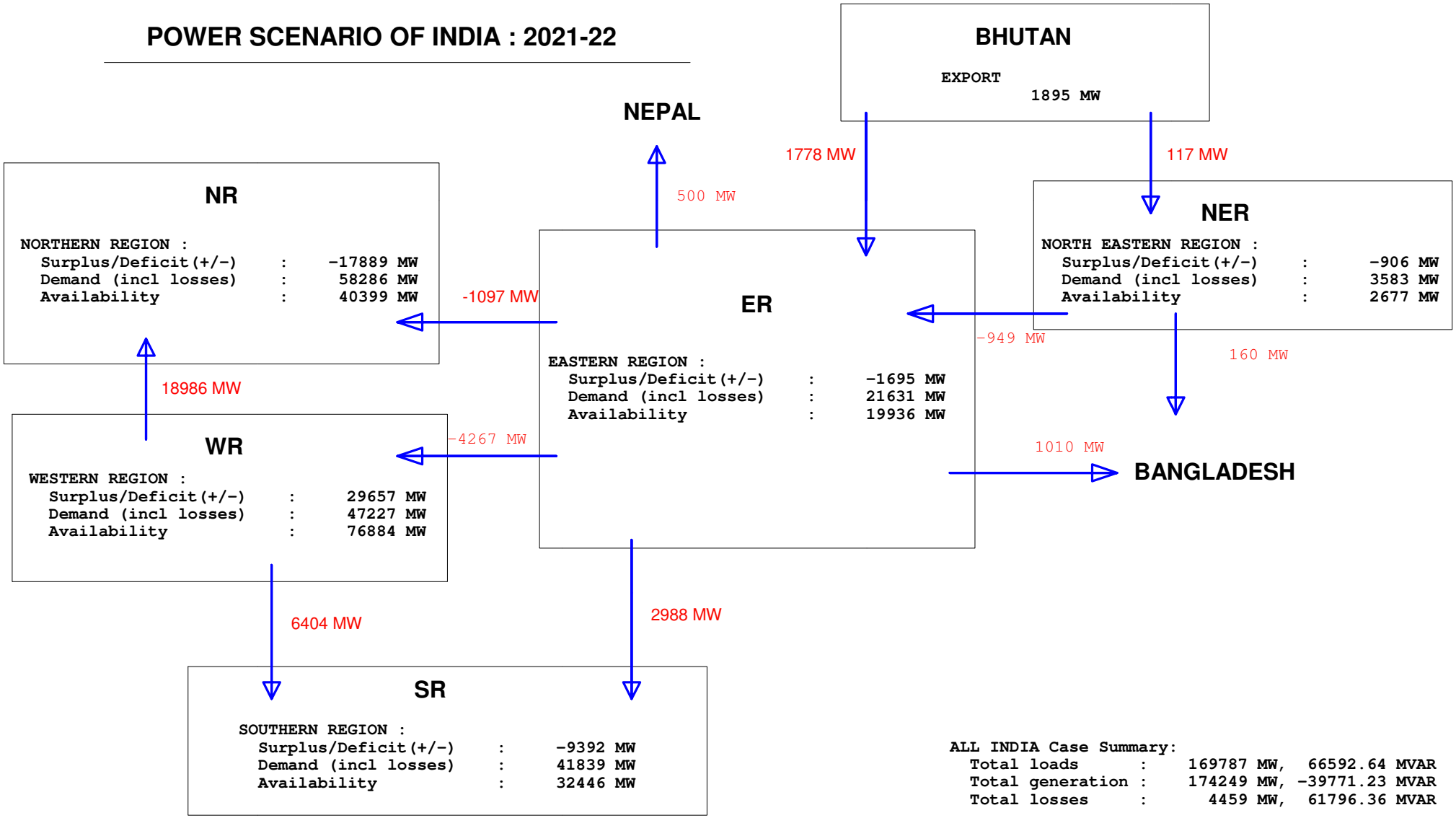
INTER REGIONAL TRANSMISSION LINES(ABOVE 400kV)



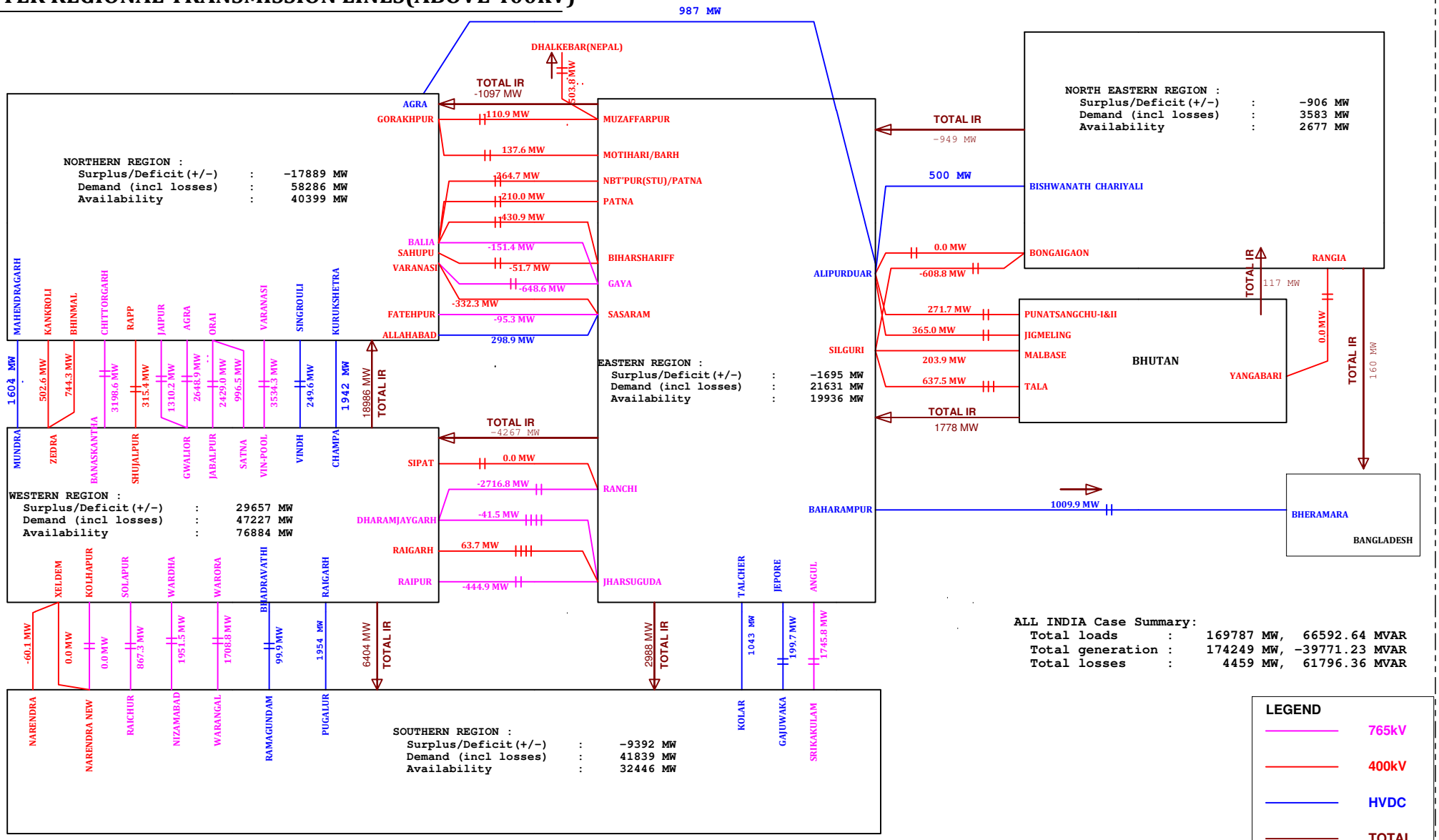
All-India Studies for 2021-22

765kV ISTS lines and HVDC links



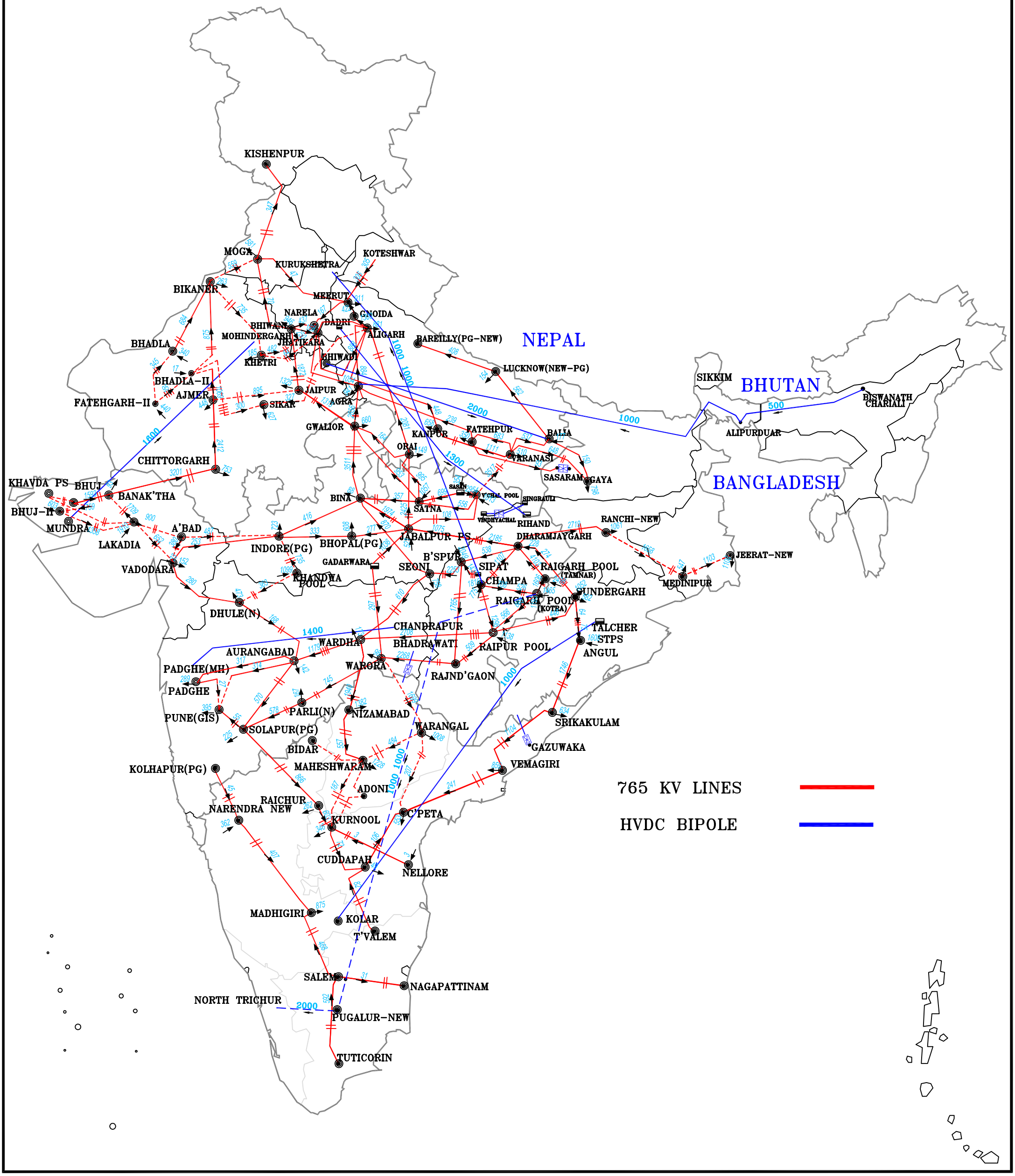

POWER SCENARIO OF INDIA : 2021-22
BHUTAN
EXPORT
1895 MW
1778 MW
117 MW
NEPAL
500 MW
NR
NORTHERN REGION :
Surplus/Deficit(+/-) : -17889 MW
Demand (incl losses) : 58286 MW
Availability : 40399 MW
-1097 MW
ER
EASTERN REGION :
Surplus/Deficit(+/-) : -1695 MW
Demand (incl losses) : 21631 MW
Availability : 19936 MW
NER
NORTH EASTERN REGION :
Surplus/Deficit(+/-) : -906 MW
Demand (incl losses) : 3583 MW
Availability : 2677 MW
-949 MW
160 MW
18986 MW
WR
WESTERN REGION :
Surplus/Deficit(+/-) : 29657 MW
Demand (incl losses) : 47227 MW
Availability : 76884 MW
-4267 MW
1010 MW
BANGLADESH
6404 MW
2988 MW
SR
SOUTHERN REGION :
Surplus/Deficit(+/-) : -9392 MW
Demand (incl losses) : 41839 MW
Availability : 32446 MW
ALL INDIA Case Summary:
Total loads : 169787 MW, 66592.64 MVAR
Total generation : 174249 MW, -39771.23 MVAR
Total losses : 4459 MW, 61796.36 MVAR

INTER REGIONAL TRANSMISSION LINES(ABOVE 400kV)

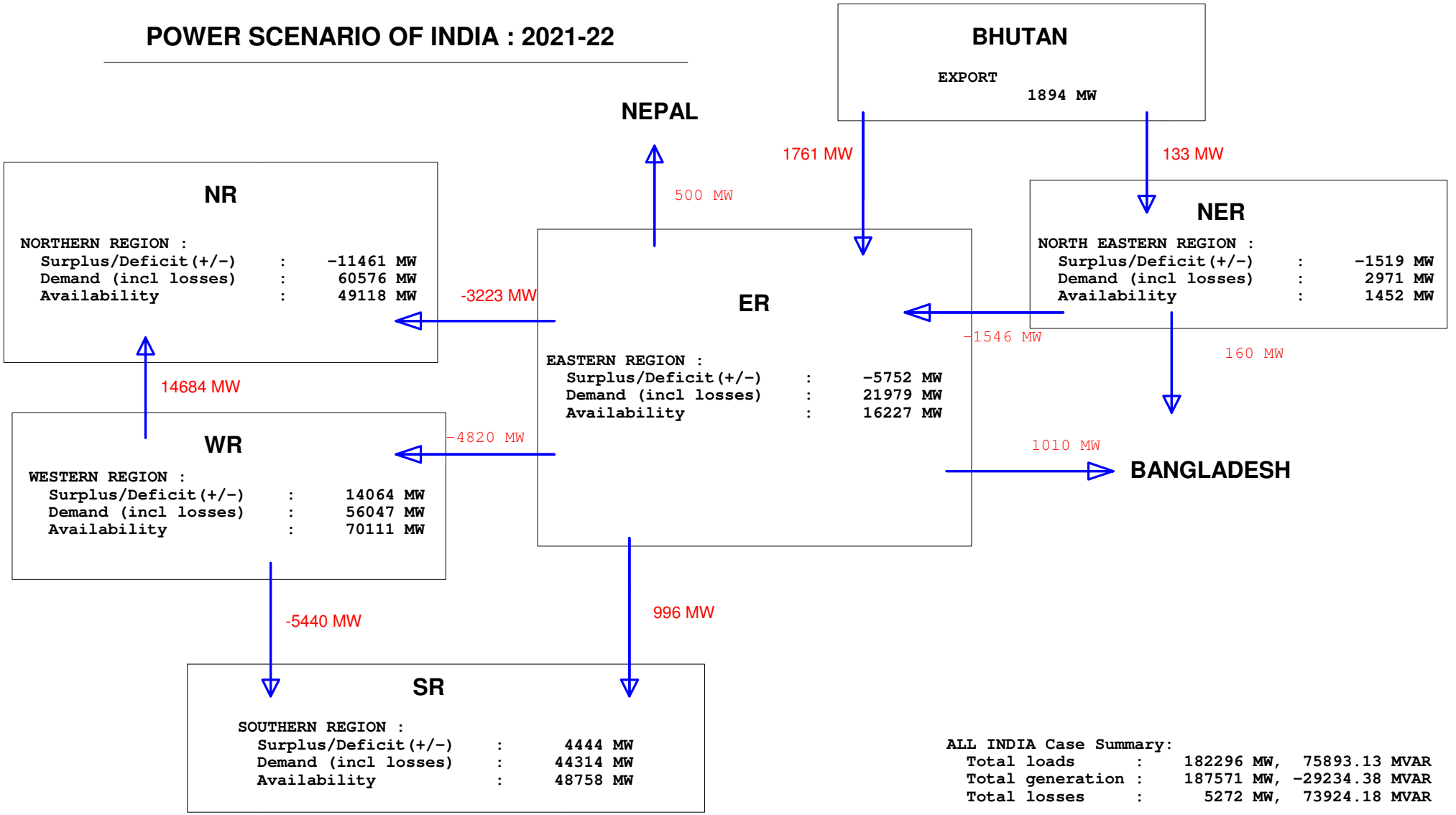


All-India Studies for 2021-22

765kV ISTS lines and HVDC links



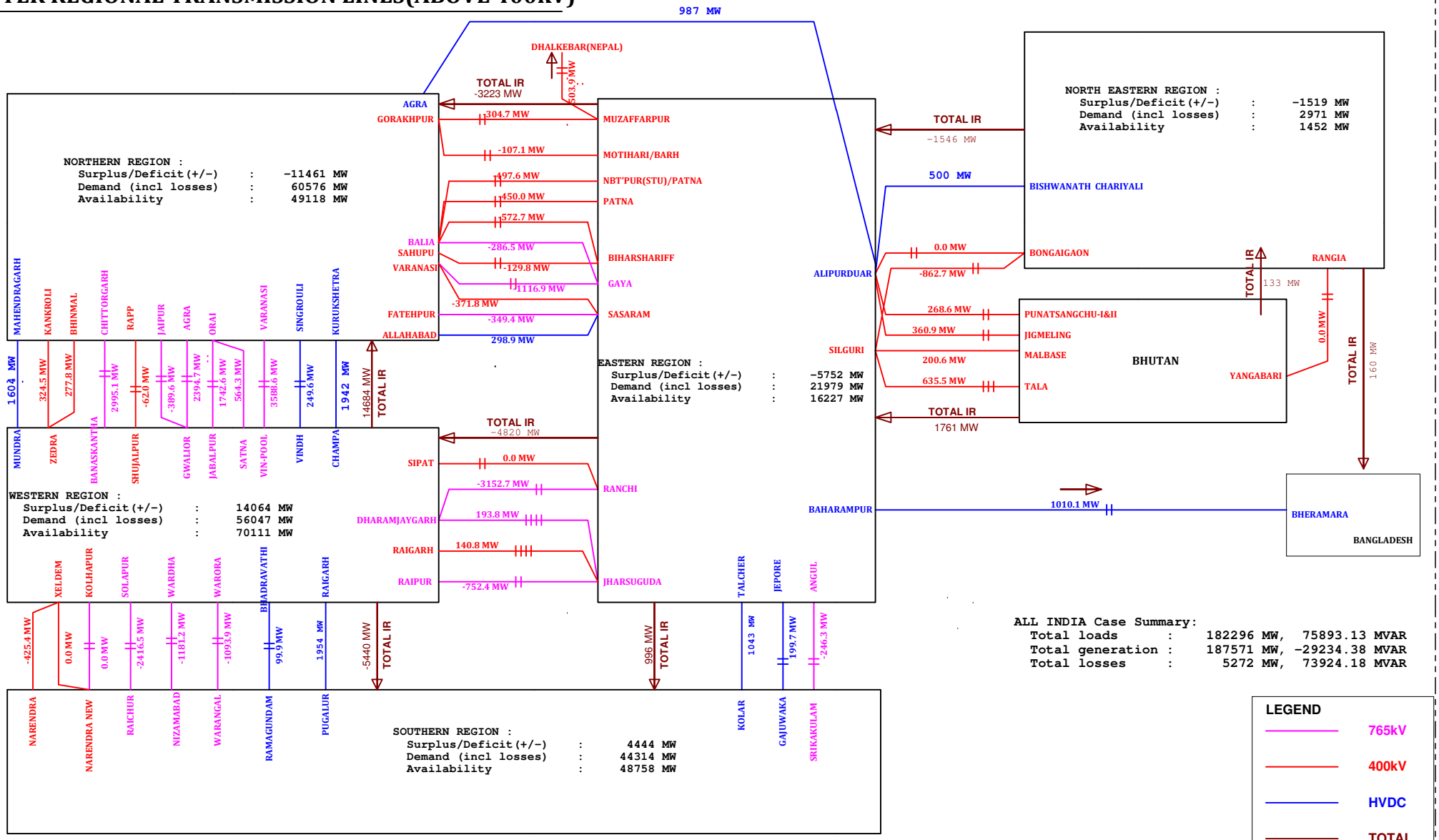
POWER SCENARIO OF INDIA : 2021-22



ALL INDIA Case Summary:

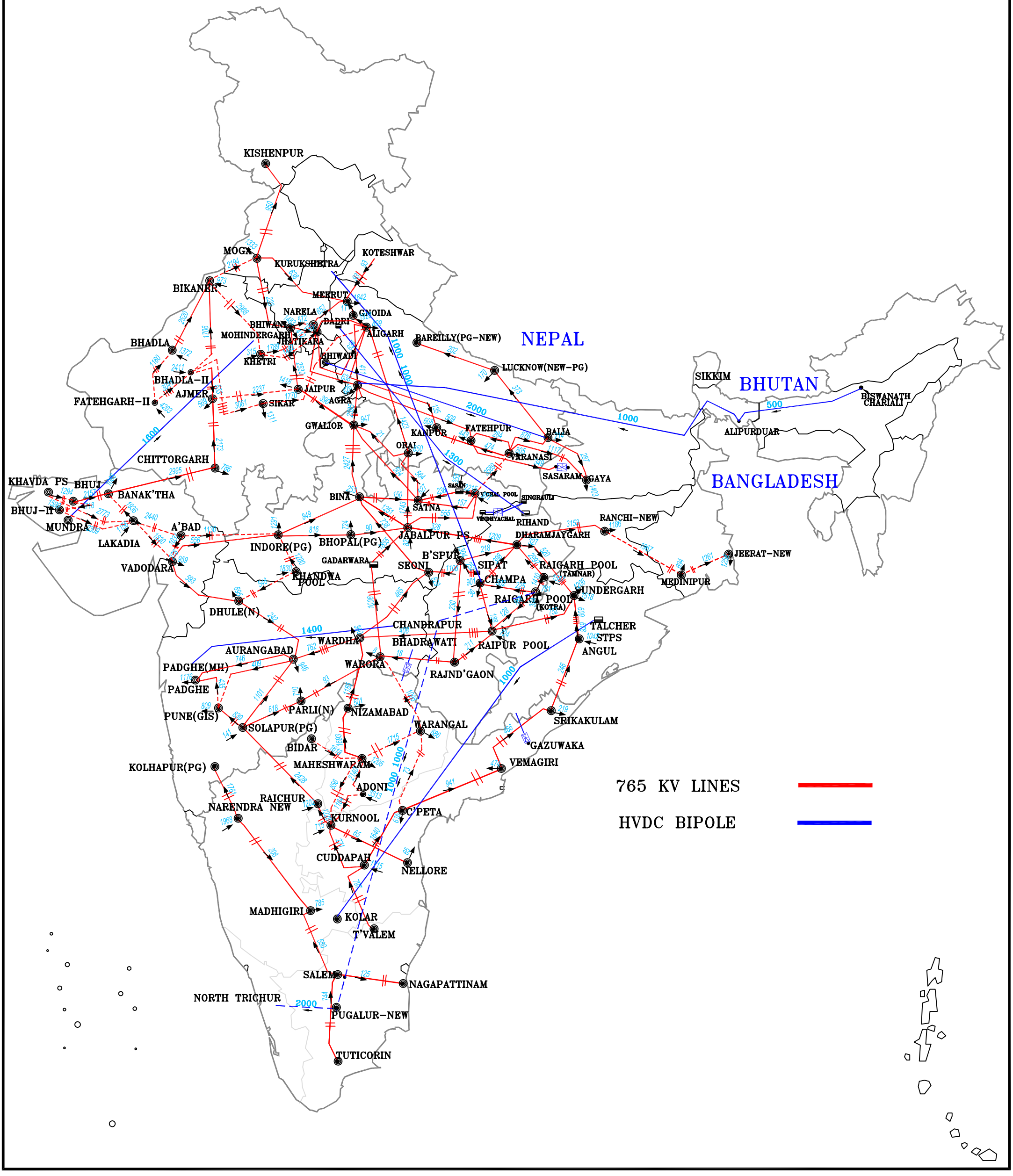
Total loads	:	182296 MW,	75893.13 MVAR
Total generation	:	187571 MW,	-29234.38 MVAR
Total losses	:	5272 MW,	73924.18 MVAR

INTER REGIONAL TRANSMISSION LINES(ABOVE 400kV)

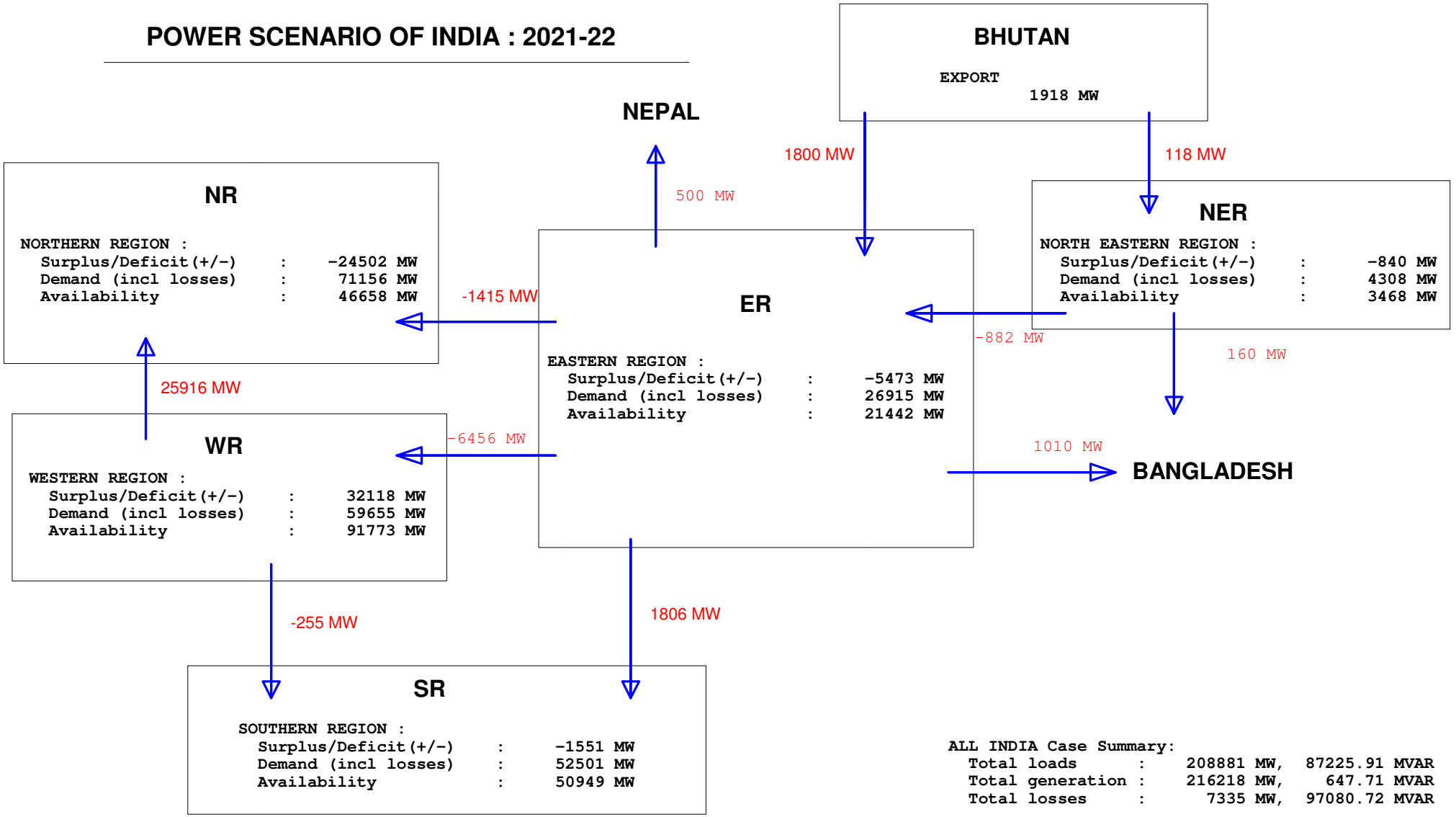


All-India Studies for 2021-22

765kV ISTS lines and HVDC links



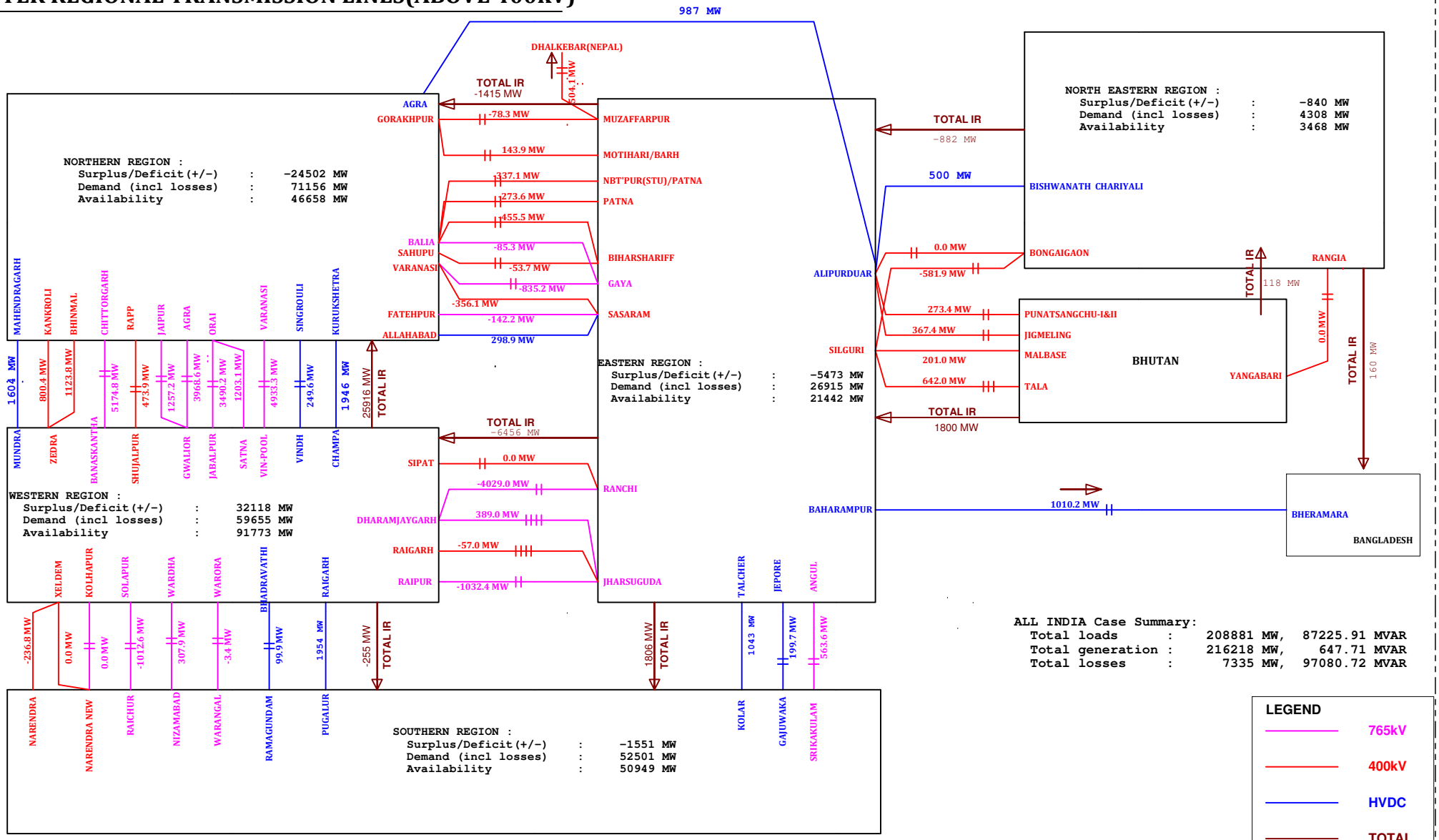
POWER SCENARIO OF INDIA : 2021-22



ALL INDIA Case Summary:

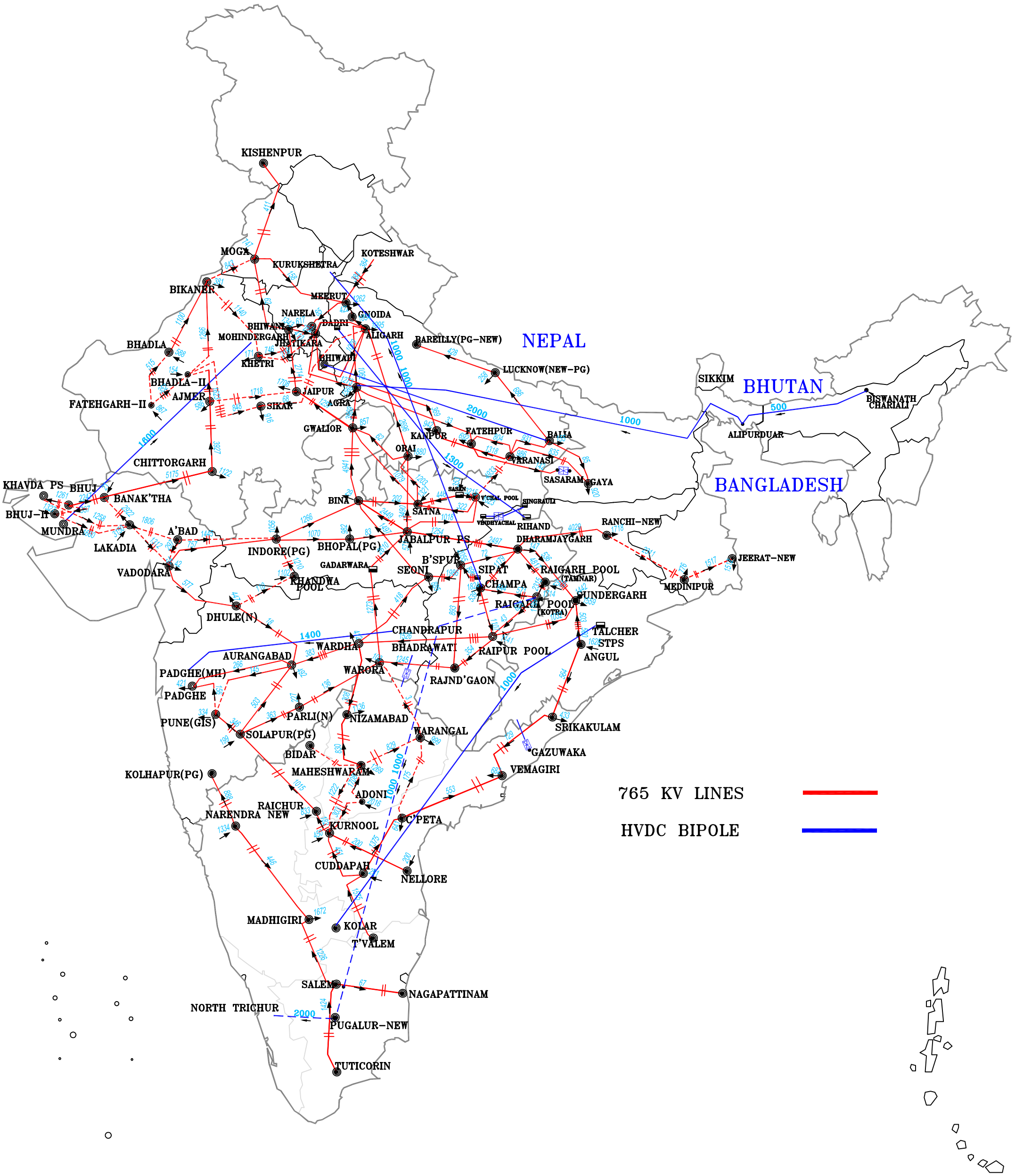
Total loads	:	208881 MW,	87225.91 MVAR
Total generation	:	216218 MW,	647.71 MVAR
Total losses	:	7335 MW,	97080.72 MVAR

INTER REGIONAL TRANSMISSION LINES(ABOVE 400kV)

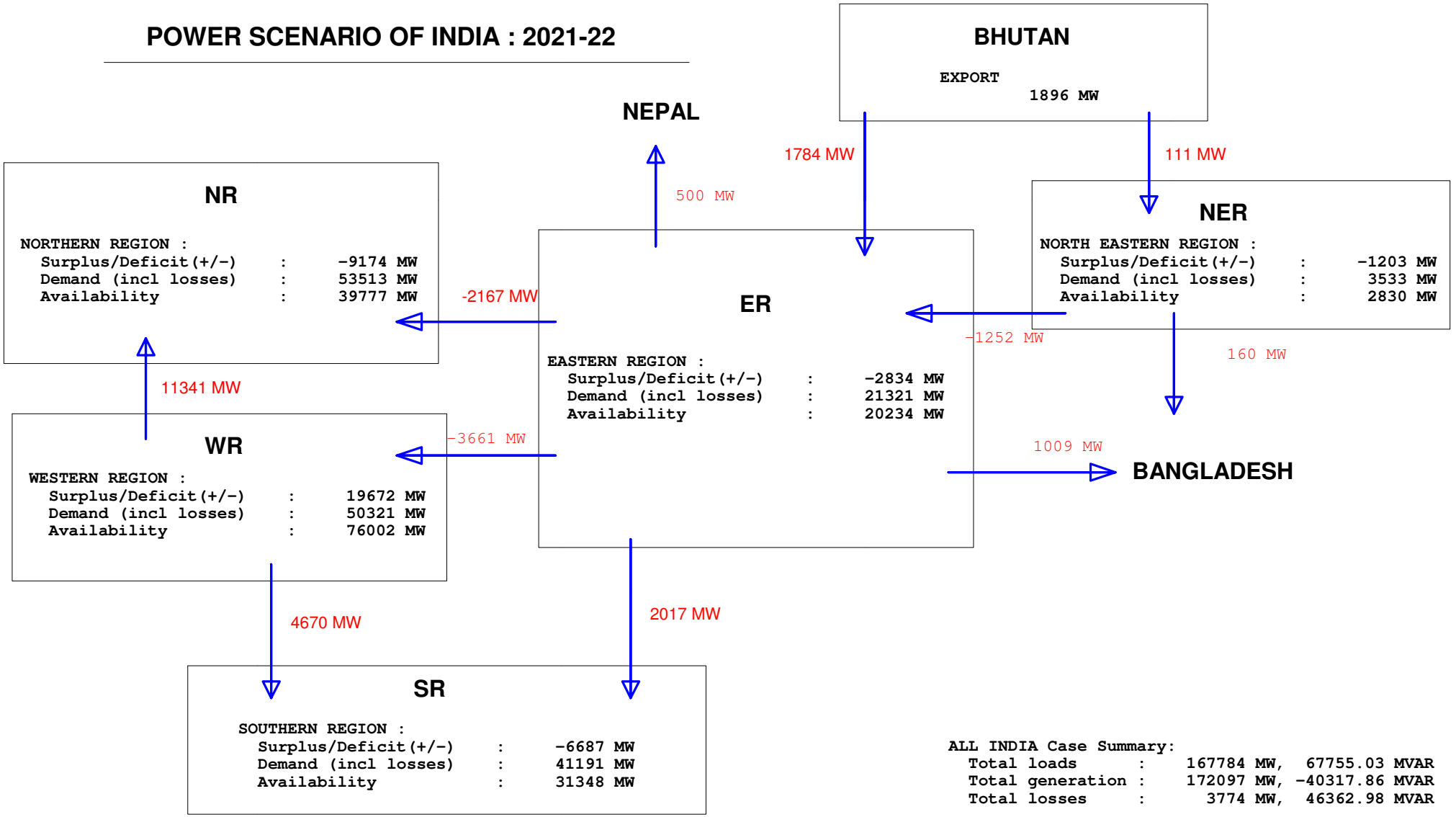


All-India Studies for 2021-22

765kV ISTS lines and HVDC links



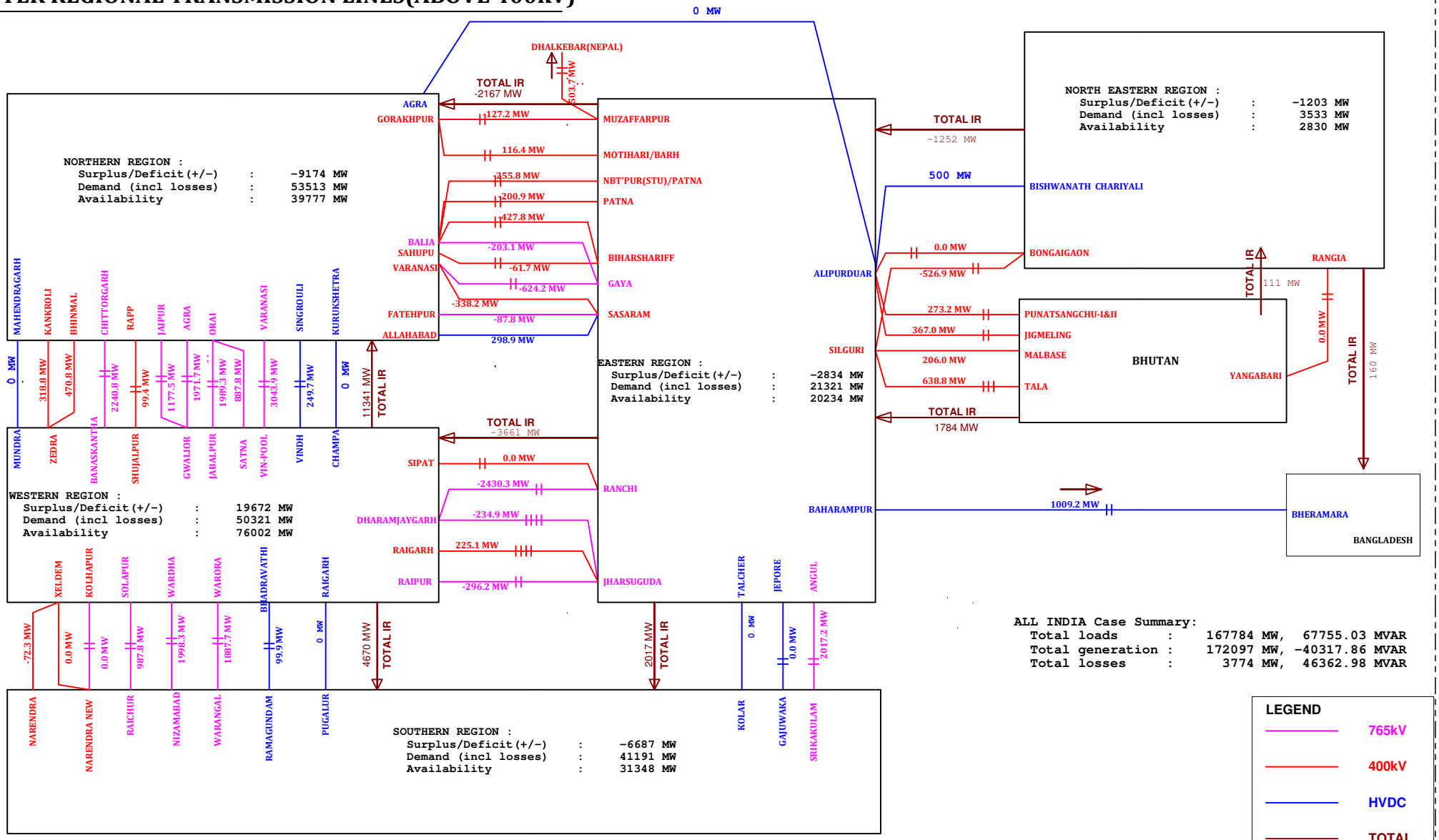
POWER SCENARIO OF INDIA : 2021-22



ALL INDIA Case Summary:

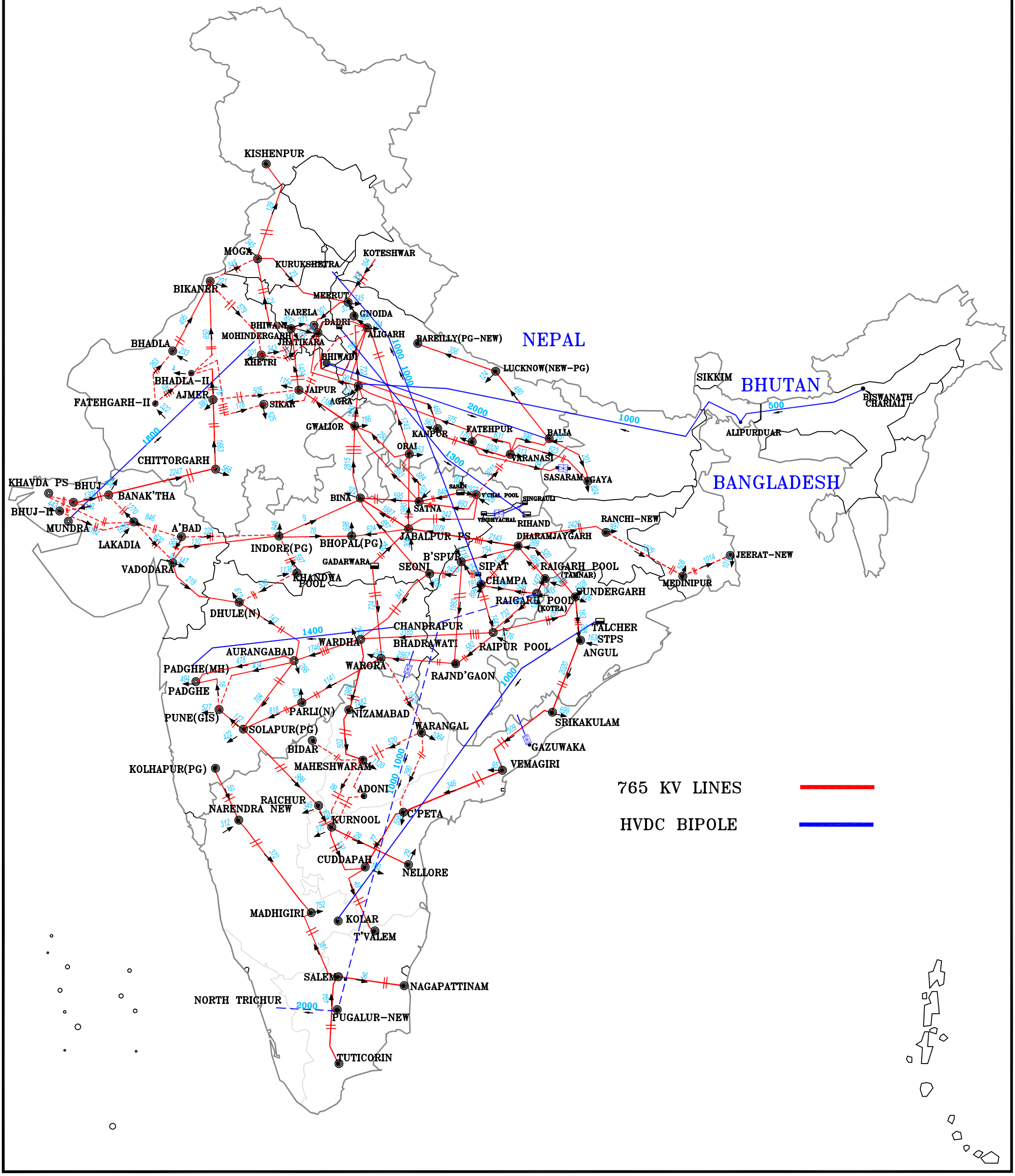
Total loads	:	167784 MW,	67755.03 MVAR
Total generation	:	172097 MW,	-40317.86 MVAR
Total losses	:	3774 MW,	46362.98 MVAR

INTER REGIONAL TRANSMISSION LINES(ABOVE 400kV)

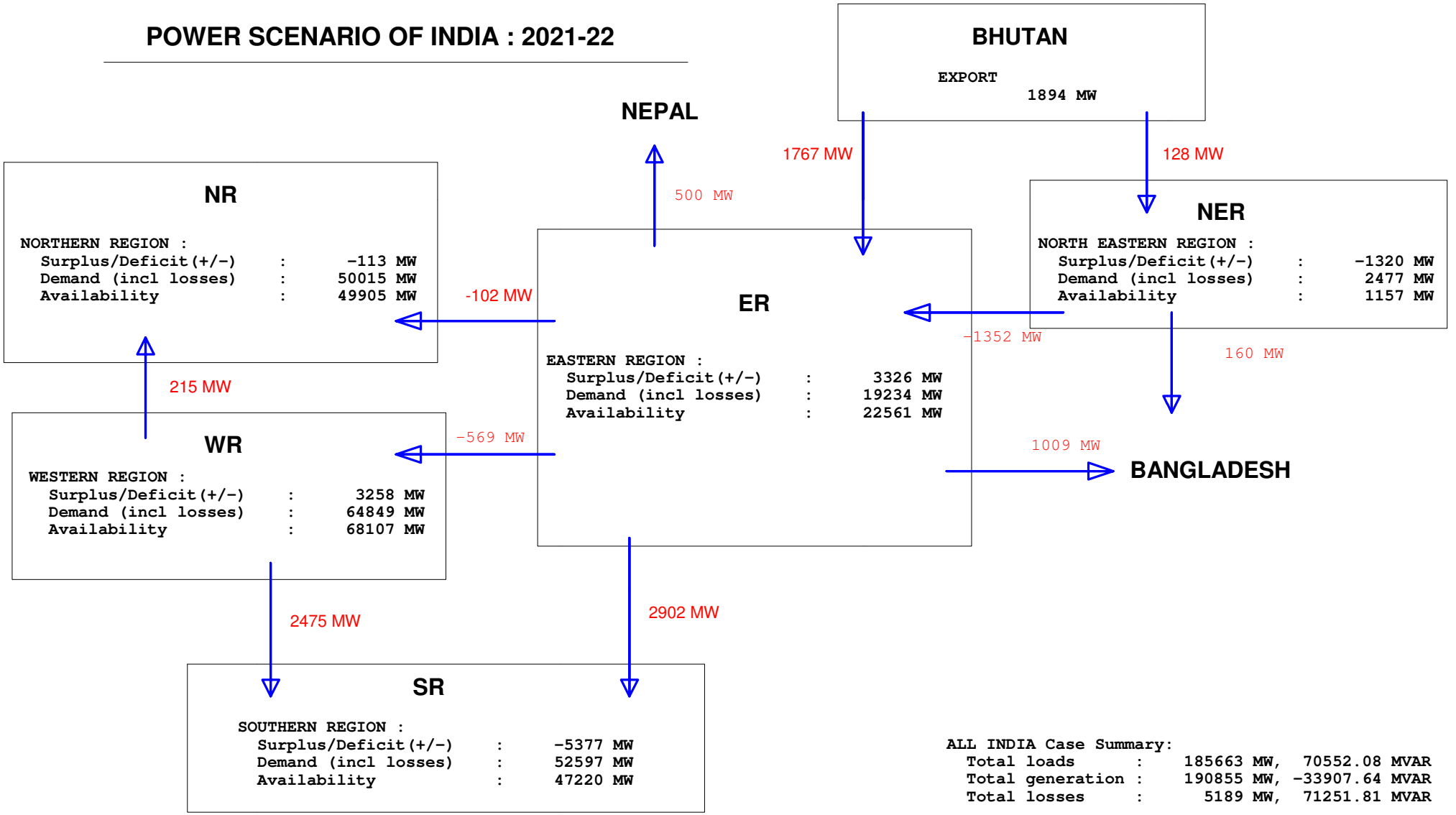


All-India Studies for 2021-22

765kV ISTS lines and HVDC links



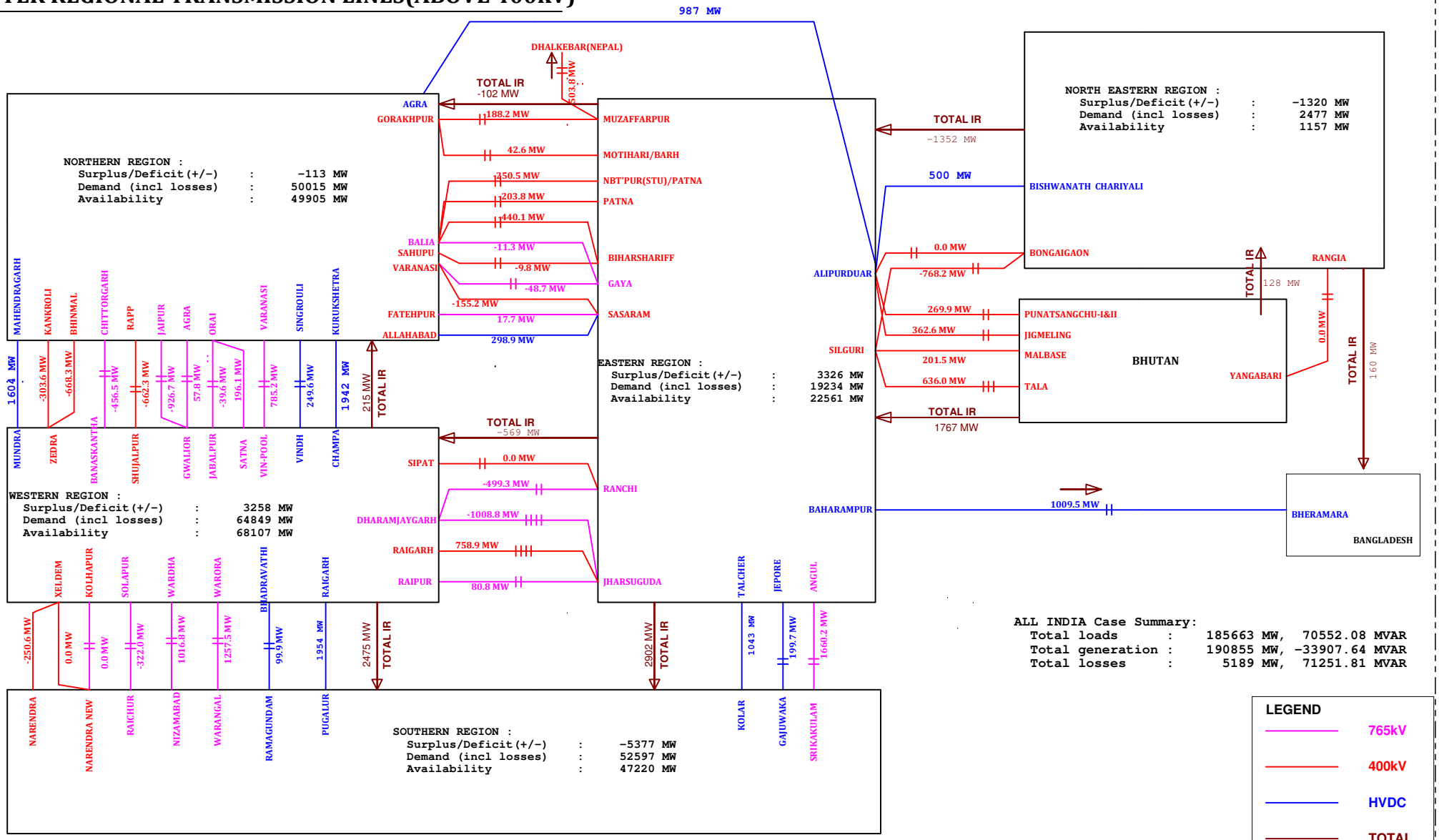
POWER SCENARIO OF INDIA : 2021-22



ALL INDIA Case Summary:

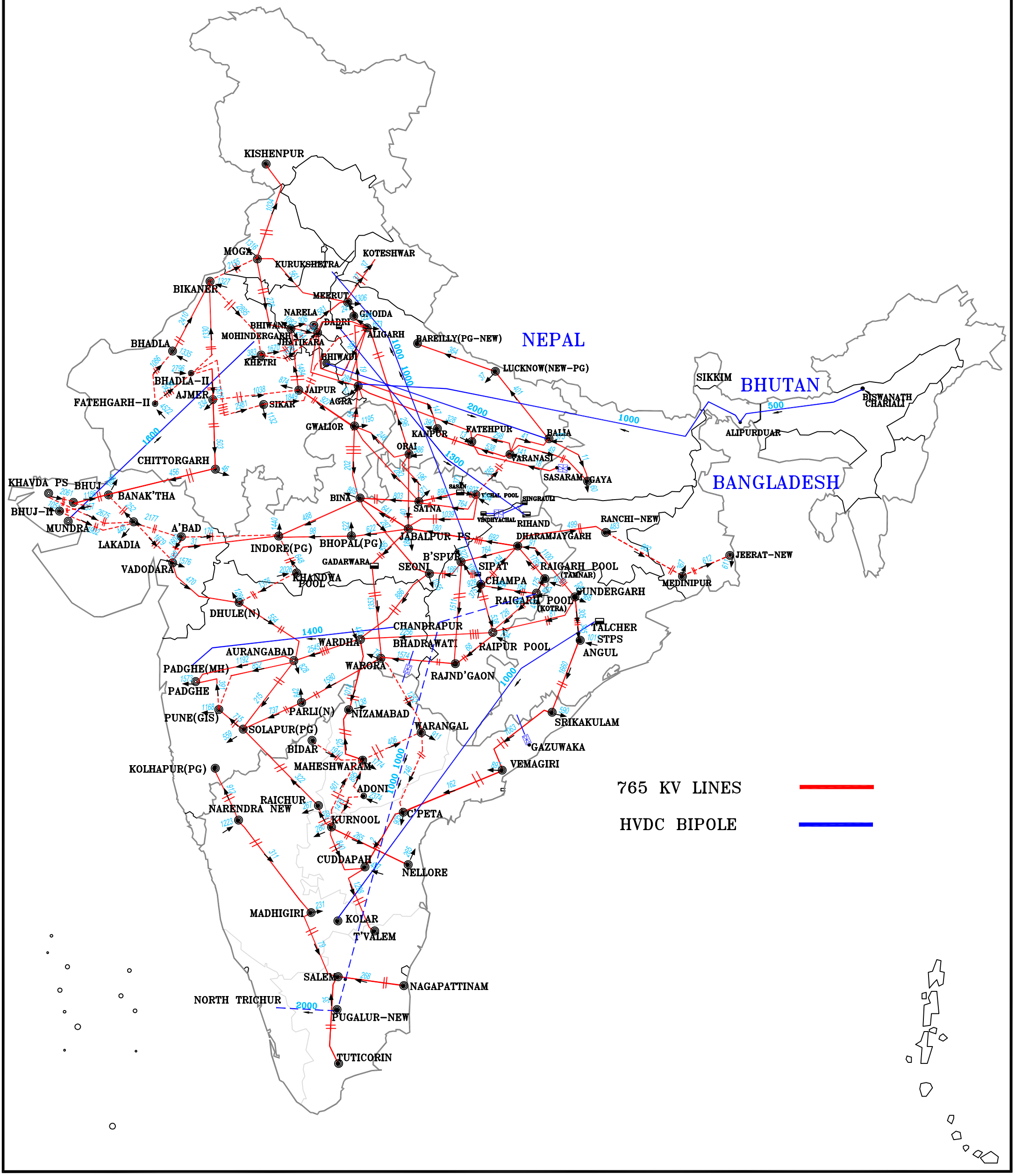
Total loads	:	185663 MW,	70552.08 MVAR
Total generation	:	190855 MW,	-33907.64 MVAR
Total losses	:	5189 MW,	71251.81 MVAR

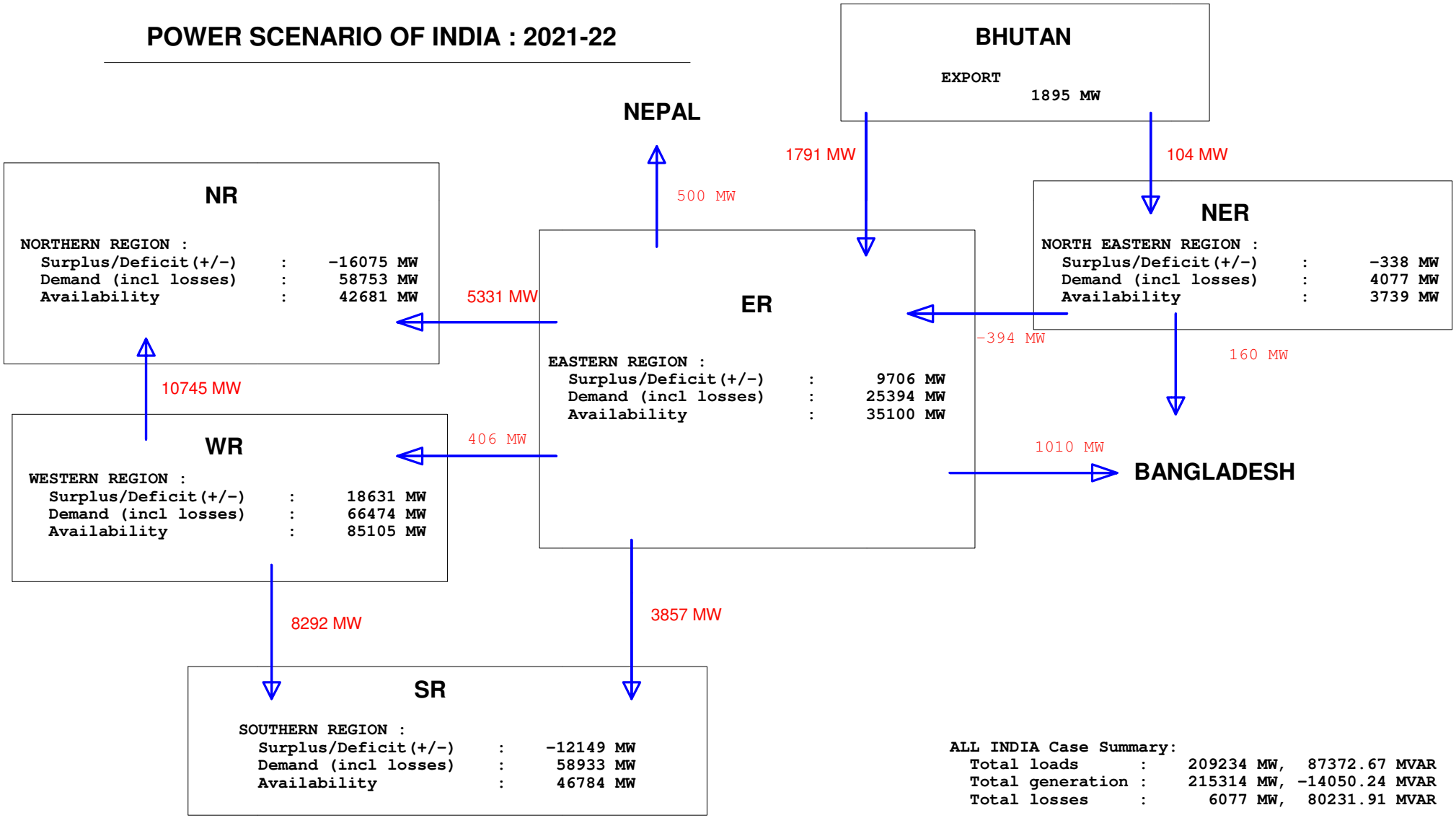
INTER REGIONAL TRANSMISSION LINES(ABOVE 400kV)



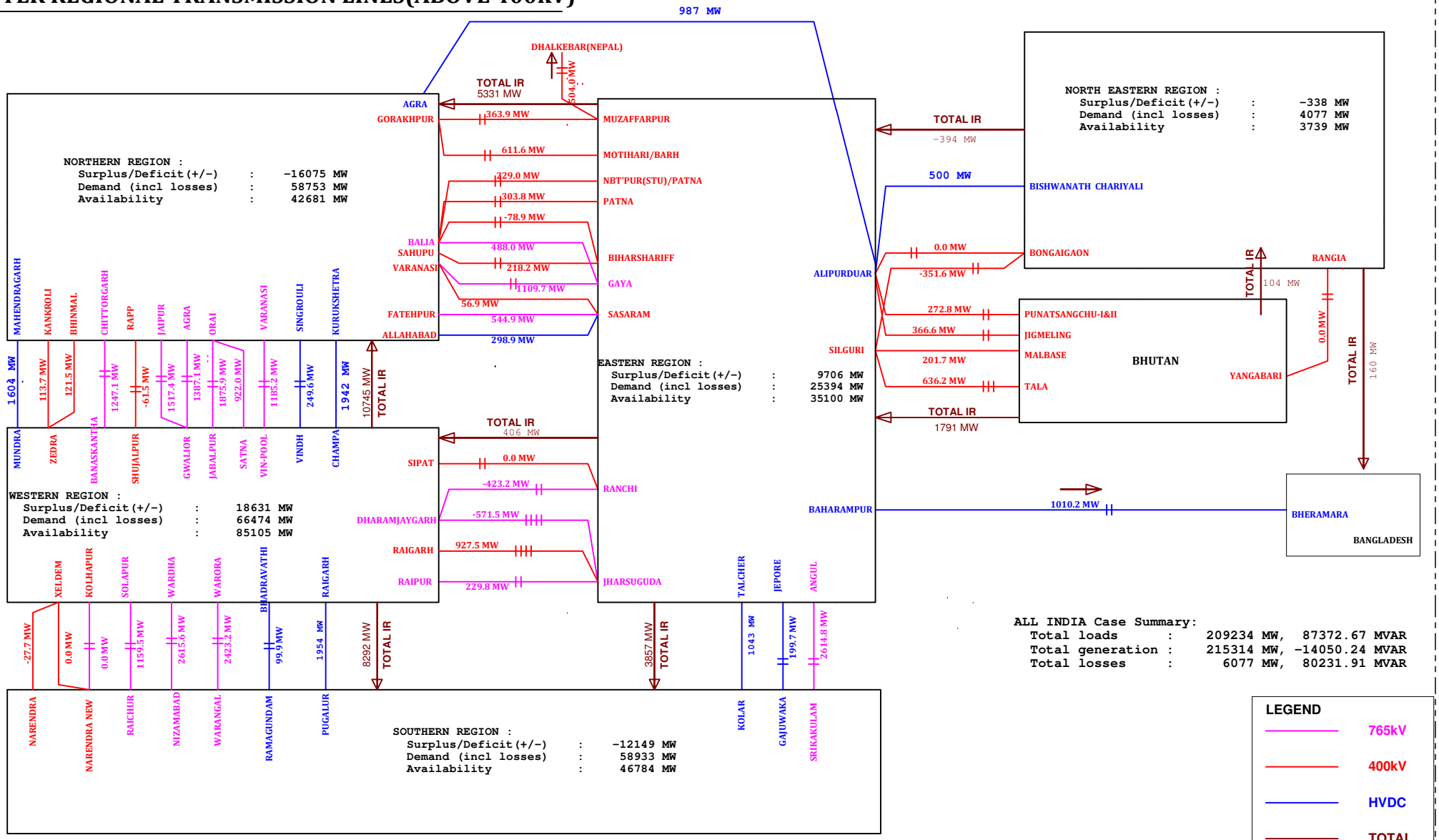
All-India Studies for 2021-22

765kV ISTS lines and HVDC links



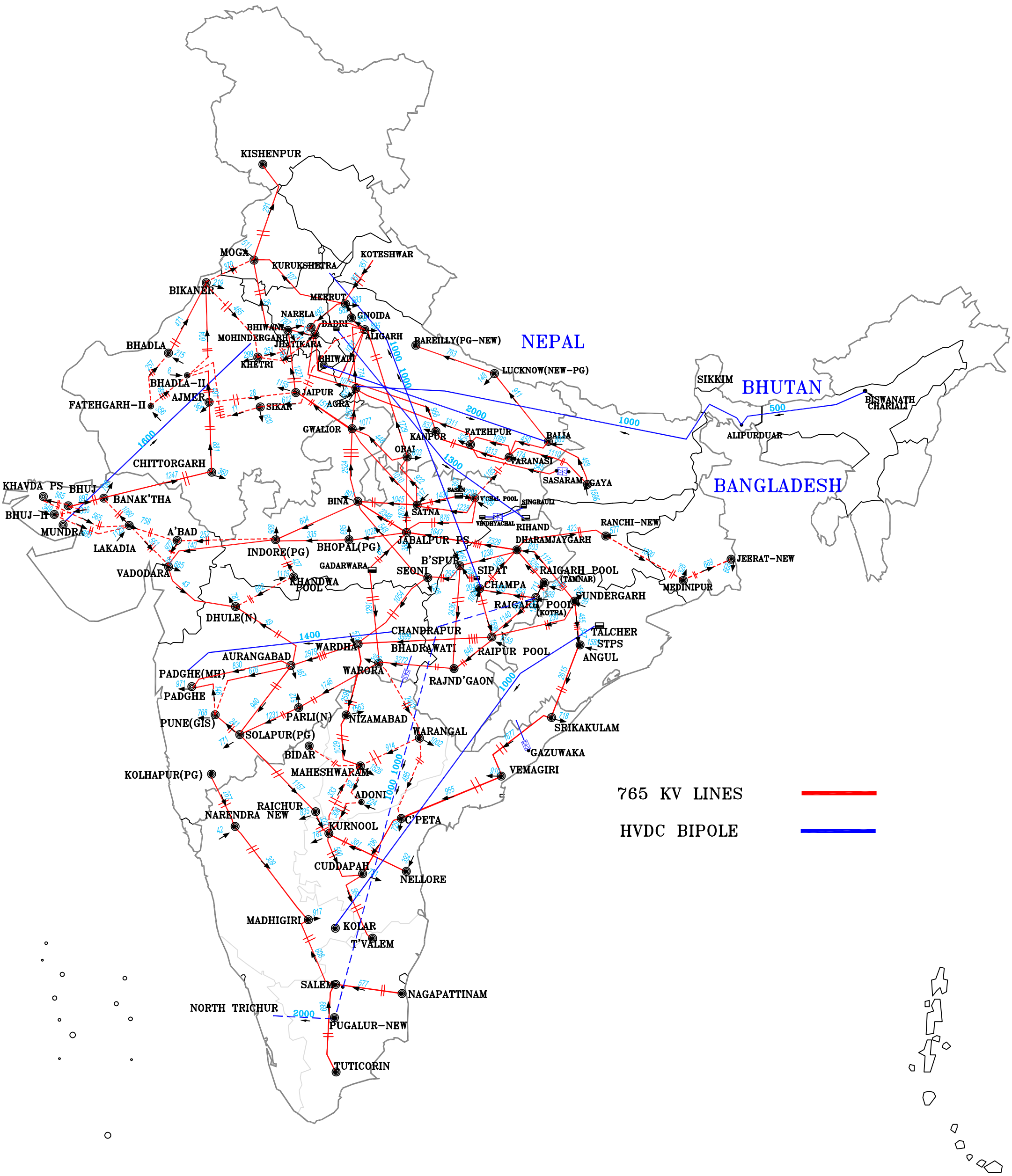

POWER SCENARIO OF INDIA : 2021-22
BHUTAN
EXPORT
1895 MW
NEPAL
1791 MW
104 MW
500 MW
NR
NORTHERN REGION :
Surplus/Deficit(+/-) : -16075 MW
Demand (incl losses) : 58753 MW
Availability : 42681 MW
NER
NORTH EASTERN REGION :
Surplus/Deficit(+/-) : -338 MW
Demand (incl losses) : 4077 MW
Availability : 3739 MW
5331 MW
ER
EASTERN REGION :
Surplus/Deficit(+/-) : 9706 MW
Demand (incl losses) : 25394 MW
Availability : 35100 MW
-394 MW
160 MW
10745 MW
406 MW
1010 MW
BANGLADESH
WR
WESTERN REGION :
Surplus/Deficit(+/-) : 18631 MW
Demand (incl losses) : 66474 MW
Availability : 85105 MW
8292 MW
3857 MW
SR
SOUTHERN REGION :
Surplus/Deficit(+/-) : -12149 MW
Demand (incl losses) : 58933 MW
Availability : 46784 MW
ALL INDIA Case Summary:
Total loads : 209234 MW, 87372.67 MVAR
Total generation : 215314 MW, -14050.24 MVAR
Total losses : 6077 MW, 80231.91 MVAR

INTER REGIONAL TRANSMISSION LINES(ABOVE 400kV)

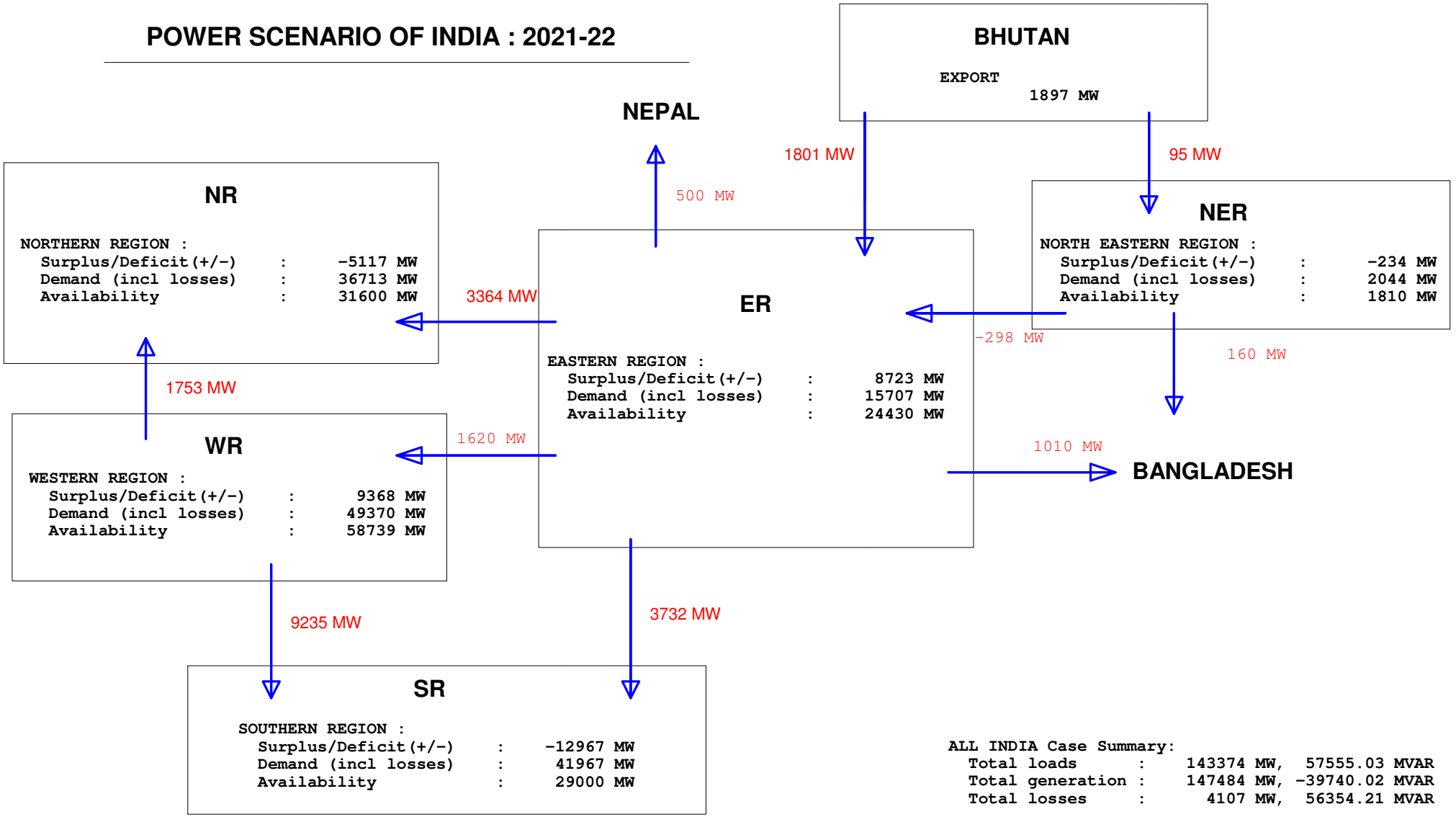


All-India Studies for 2021-22

765kV ISTS lines and HVDC links



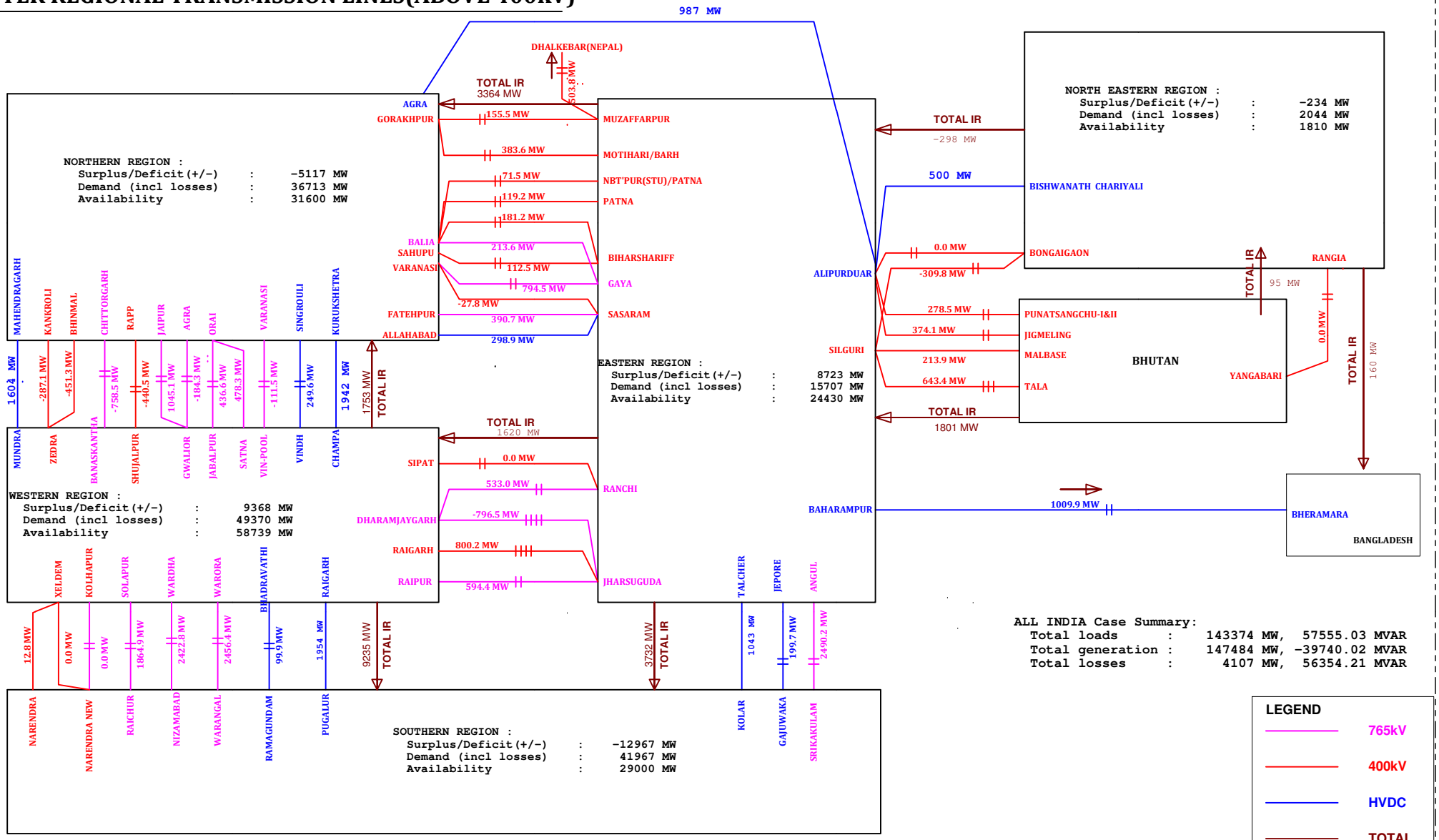
POWER SCENARIO OF INDIA : 2021-22



ALL INDIA Case Summary:

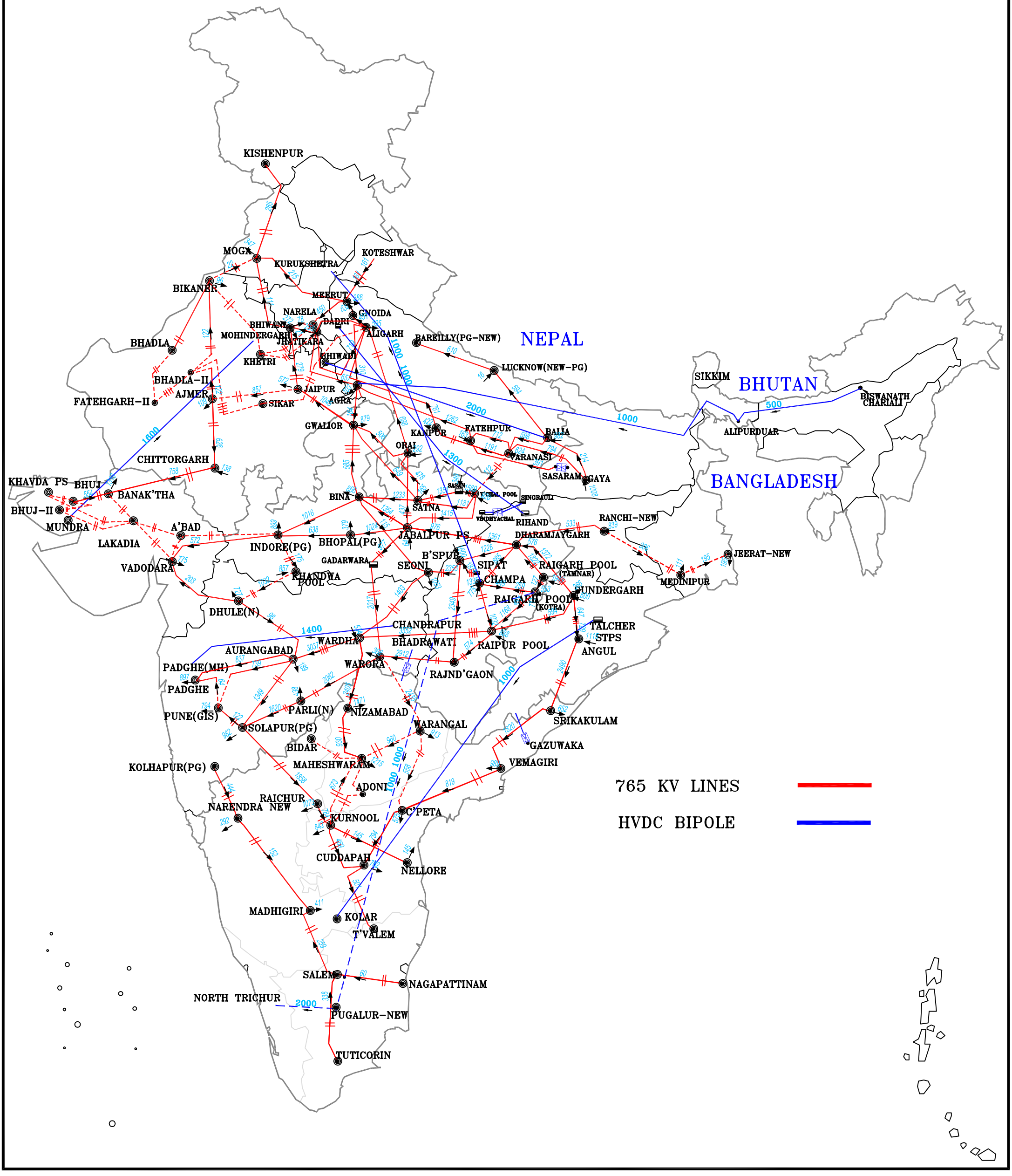
Total loads	:	143374 MW,	57555.03 MVAR
Total generation	:	147484 MW,	-39740.02 MVAR
Total losses	:	4107 MW,	56354.21 MVAR

INTER REGIONAL TRANSMISSION LINES(ABOVE 400kV)



All-India Studies for 2021-22

765kV ISTS lines and HVDC links



Study analysis of system conditions for RE integration in 2021-22

Based on the load-generation scenarios developed in consultation with CEA, POSOCO, CTU and regional constituents, system studies have been carried-out for identification of power flow patterns across various regions as per the generation available to meet the load in the identified scenarios. Identification of adequacy of Inter-regional transmission capacity available by 2021-22 timeframe to cater to the required power flows, identification of likely bottlenecks in the transfer of power in such scenarios both for import as well as export in each region has been evaluated through referred studies. Constraints likely to be observed in Intra-State/ISTS network within the region are also highlighted. Apart from the above, issues related to sufficiency of spinning reserve available to cater to increase in peak load in the evening together with the non-availability of solar generation and issues related to voltage conditions in various scenarios has been discussed.

1. Adequacy of Inter-regional (IR) links for facilitating power transfer

From the study results, it has been observed that there shall be huge impact of RE integration on the inter-regional flows ranging from import in a particular scenario to export in the other. IR links need to have sufficient capacity to facilitate both the above system conditions. IR links between various regions were planned based on the existing system conditions and the likely load-generation scenario at the time of planning. Though the same are sufficient both for facilitating import and export in most of the corridors, however in certain corridors, it has been observed that the IR links can cater only to either import or export. For example, the IR links between WR-SR and ER-SR were planned in order to facilitate the import of power from generation surplous WR & ER to power deficit SR. However, upon integration of RE generation in the RE rich states of Andhra Pradesh, Karnataka & Tamil Nadu, the power flow pattern shall reverse in high RE scenario and southern region shall export the surplous power to other regions. Accordingly, the exisiting/planned transmission system has been studied for re-alignment with the referred changes scenario and for sufficiency of the same.

Maximum export/import of various regions as per the LGB are tabulated below:

Region	**Max Export**	**Scenario**	**Max Import**	**Scenario**
NR	1412	Scenario 7 : Afternoon peak Feb 2022	-24671	Scenario 5 : Evening peak Jun 2021
WR	33564	Scenario 2 : Evening peak Aug 2021	None	Scenario 7 : Afternoon peak Feb 2022
SR	4334	Scenario 4 : Afternoon peak Jun 2021	-13789	Scenario 9: Night off peak Feb 2022
ER	9902	Scenario 9: Night off peak Feb 2022	-5916	Scenario 4 : Afternoon peak Jun 2021
NER	9368	Scenario 1 : Afternoon peak Aug 2021	-1500	Scenario 4 : Afternoon peak Jun 2021

Maximum import/export capability of a particular region shall depend not only on the adequacy of the number of inter-regional links between the participating region and the adjacent region but also on the power-flow pattern through various IR gates which in-turn shall depend on the generation and load considered in the participating and adjacent region and their distribution.

Power flow on IR links for facilitating maximum import/export was studied for all the scenarios. As per the system studies, maximum power transfer observed through IR links between two regions amongst all the scenarios are tabulated below :

Corridor (From-To)	**Max Power flow**	**Scenario**	**Max power flow**	**Scenario**
ER-NR	5331	Scenario 8 : Evening peak Feb 2022	-3223	Scenario 4 : Afternoon peak Jun 2021
WR-NR	25916	Scenario 5 : Evening peak Jun 2021/ Scenario 2 Evening peak Aug 2021	None	Scenario 7 : Afternoon peak Feb 2022
ER-WR	1620	Scenario 9: Night off peak Feb 2022	-6634	Scenario 2 : Evening peak Aug 2021
WR-SR	9235	Scenario 9: Night off peak Feb 2022	-5440	Scenario 4 : Afternoon peak Jun 2021
ER-SR	3857	Scenario 8 : Evening peak Feb 2022	None	Scenario 4 : Afternoon peak Jun 2021
NER-ER	-298	Scenario 9: Night off peak Feb 2022	-1568	Scenario 1 : Afternoon peak Aug 2021

From the above and adequacy of existing/planned IR links in various Inter-regional corridors, constraints were likely to be faced in the following cases :

- Export of power from SR to WR in Scenario 4 : Afternoon peak Jun 2021
- Import of power from WR by ER in Scenario 5 : Evening peak Jun 2021& Scenario 2 Evening peak Aug 2021

A. Export of power from SR to WR in Scenario 4 : Afternoon peak Jun 2021

System studies indicate that the following transmission elements become N-1 insecure in the referred scenario:

- Narendra (New) 2X1500 MVA, 765/400kV ICTs
- Kolhapur 2X1500 MVA, 765/400kV ICTs
- Kolhapur (PG) - Kolhapur(MSETCL) 400kV D/c line
- Kolhapur(MSETCL) – Karad (MSETCL) 400kV D/c line

The following transmission strengthening options were studied in order to relieve the overloading:

i. Alternative-I (Kolhapur (PG) - Pune (GIS) 765kV D/c line) - With proposed strengthening loadings of the critical lines are generally found to be in order.

ii. Alternative-II (Kolhapur (PG) - Solapur (PG) 765kV D/c line) - With proposed strengthening loadings of critical lines are generally found to be in order. However, more power tends to flow through 400kV network.

iii. Alternative-III (LILO of Solapur(PG) - Pune(GIS) 765kV S/c line at Kolhapur (PG)) - LILO length is around 200 km, length of both the sections after LILO becomes greater than 300 km.

It may be mentioned that the option of reversal of power flow on Raigarh–Pugalur HVDC link with 2000 MW dispatch was also done, but 765/400 kV ICTs of Raigarh (Kotra) were observed to be overloaded and hence the same is not technically feasible.

Out of the three alternatives studied, maximum power flows through 765 kV network in Alternative-I as Kolhapur (PG) is getting directly connected to load centre viz. Pune. Accordingly, from techno-economic point of view Alternative-I is more prudent. Further, reconductering of Kolhapur (PG) – Kolhapur (MSETCL) 400kV D/c line and augmentation of 1x1500 MVA, 765/400 kV ICT is required to be done at Narendra (new) ICT for meeting N-1 criteria.

In view of the above, the following transmission system shall be required in order to enable export of surplus power from SR to WR:

- Kolhapur(PG) - Pune (GIS) 765kV D/c line
- Reconductoring of Kolhapur (PG) - Kolhapur(MSETCL) 400kV D/c line with conductor having minimum capacity of 2100MVA per circuit at nominal voltage
- Augmentation of Narendra (New) by 1x1500MVA, 765/400kV ICTs

System studies for the proposed transmission system are attached at **Annexure-I**

B. <u>Import of power by NR from WR in Scenario 5 : Evening peak Jun 2021 & Scenario 2 Evening peak Aug 2021</u>

System studies indicate that the following transmission elements are overloaded in the referred scenario:

- Bhinmal-Zerda 400 kV S/c line
- Kankroli-Zerda 400 kV S/c line

Accordingly, option for reconductering is to be explored for the above referred transmission lines.

2. Adequacy of ISTS/Intra-state network within regions

From the study results, it is observed that loading of most of the transmission lines are within permissible limits in most of the scenarios and no major loading violations are seen. However, constraints are observed in certain transmission

lines in certain scenarios of high RE. List of all such transmission lines which are likely to get overloaded along with possible mitigation measures are tabulated below:

Transmission line	**Scenario**	**Remarks**
Kolhapur-Kolhapur PG 400 kV	1,4	Resolved with proposed system strengthening beyond Kolhapur
Greater Noida- Grater Noida (UP) 400 kV	2,5,8	To be discussed with STU
Meramundli- Khuntuni 400kV	2,5	Intra-state strengthening already planned

Further, considering the increase in generation and load demand, constraints are observed in certain ICTs at ISTS and State substations for which system strengthening, if required, shall be taken-up in a phased manner in consultation with the constituent.

3. Adequacy of spinning reserve for change in generation from morning peak to evening peak

From the LGB, it is observed there a huge and sudden deficit of power created due to non-availability of solar generation in the evening to meet the peak load demand in the evening. This deficit is required to be met by the already running thermal generation machines of the afternoon peak and switching-on of other generations like gas etc. In order to utilize the maximum reserve capacity of the available generation, maximum number of possible thermal machines in each region are kept running at technical minimum in the afternoon scenario. This reserve capacity is first utilized for meeting the deficit caused in the evening. Balance deficit shall have to be met by ramping other available generation including switching-on of gas machines.

Deficit caused in evening scenario and required ramping by various generation is tabulated as follows:

(In MW)	Reduction in Solar	Increase in demand	Required net increase in gen	Contribution			
				Thermal	Hydro	Gas	Wind
August 2021	49	24	73	29	13	16	15
June 2021	62	20	82	29	15	16	20
Feb 2022	71	15	86	35	23	16	12

(In % contribution)	Reduction in Solar	Increase in demand	Required net increase in gen	Contribution			
				Thermal	Hydro	Gas	Wind
August 2021	49	24	73	40%	18%	22%	21%
June 2021	62	20	82	35%	18%	20%	24%
Feb 2022	71	15	86	41%	27%	19%	14%

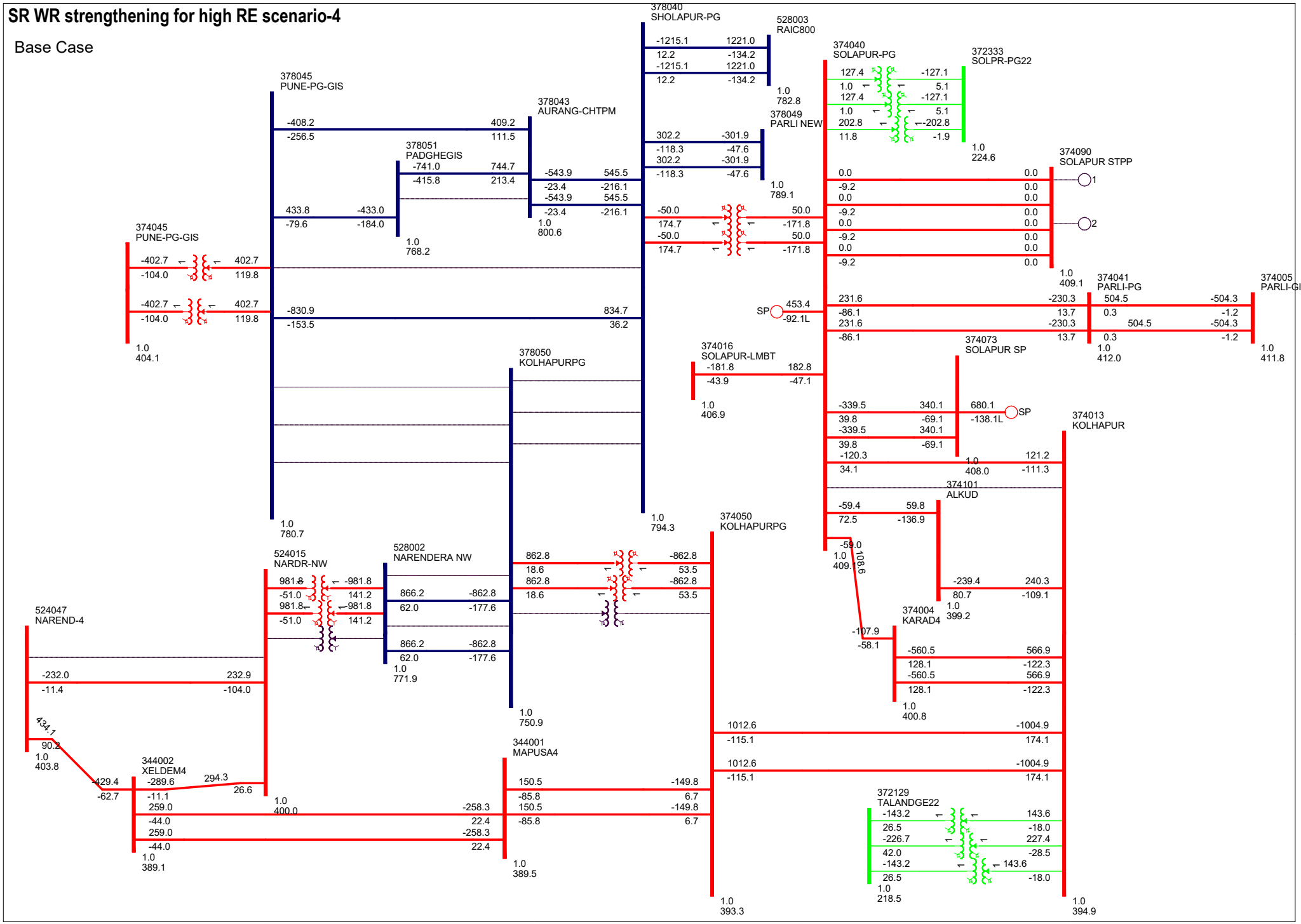
Change in dispatch	Max ramping in terms of % dispatch			
	Thermal	Hydro	Gas	Wind
August 2021	55 - 85	40-70	0-85	40-70
June 2021	55 - 85	60-90	0-85	30-70
Feb 2022	55 - 85	30-70	0-85	10-35

From the above, it is seen that huge operational flexibility shall be required in the spinning reserve in order to meet the deficit caused in various scenarios from afternoon peak to evening peak. Various options and challenges associated with them needs to be assessed in this regard related to lowering of technical minimum of thermal generating machines from 55%, utilization of quick start generation like hydro generation with storage/gas machines, utilization of storage facility in renewable generation….etc.

4. Voltage conditions in transmission system and other related issues

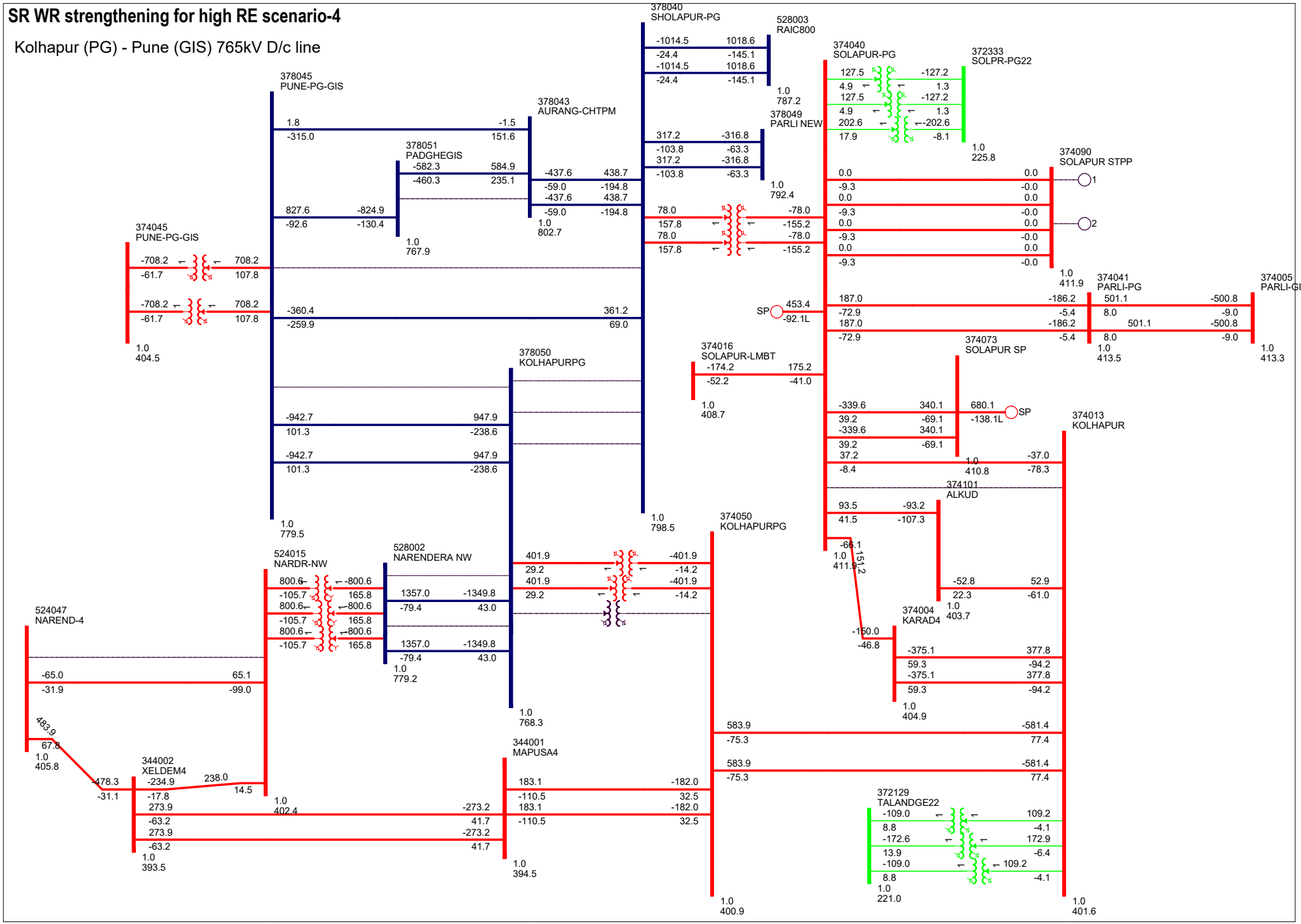
With the injection of high amount of RE into the Indian Grid and subsequent switching-off of thermal generation, additional reactive support is required at various locations. Though adequate reactive compensation is planned in the form of switchable line reactors, bus reactors, STATCOMs, SVCs at the time of inception of transmission projects, however in certain cases wherein the load is low and adequate thermal generation is not available, it has been found that a number of nodes experience high voltages. In such case of off-peak conditions, certain lightly loaded lines may be required to be taken out-of-service in order to avoid high voltage situations.

---x-x-x----


SR WR strengthening for high RE scenario-4
Base Case
378040
SHOLAPUR-PG
528003
RAIC800
374040
SOLAPUR-PG
372333
SOLPR-PG22
378045
PUNE-PG-GIS
378043
AURANG-CHTPM
378049
PARLI NEW
378051
PADGHEGIS
374090
SOLAPUR STPP
374045
PUNE-PG-GIS
374041
PARLI-PG
374005
PARLI-GIRWAL
374016
SOLAPUR-LMBT
374073
SOLAPUR SP
378050
KOLHAPURPG
374013
KOLHAPUR
374101
ALKUD
374050
KOLHAPURPG
374004
KARAD4
524015
NARDR-NW
528002
NARENDERA NW
524047
NAREND-4
344002
XELDEM4
344001
MAPUSA4
372129
TALANDGE22
SP

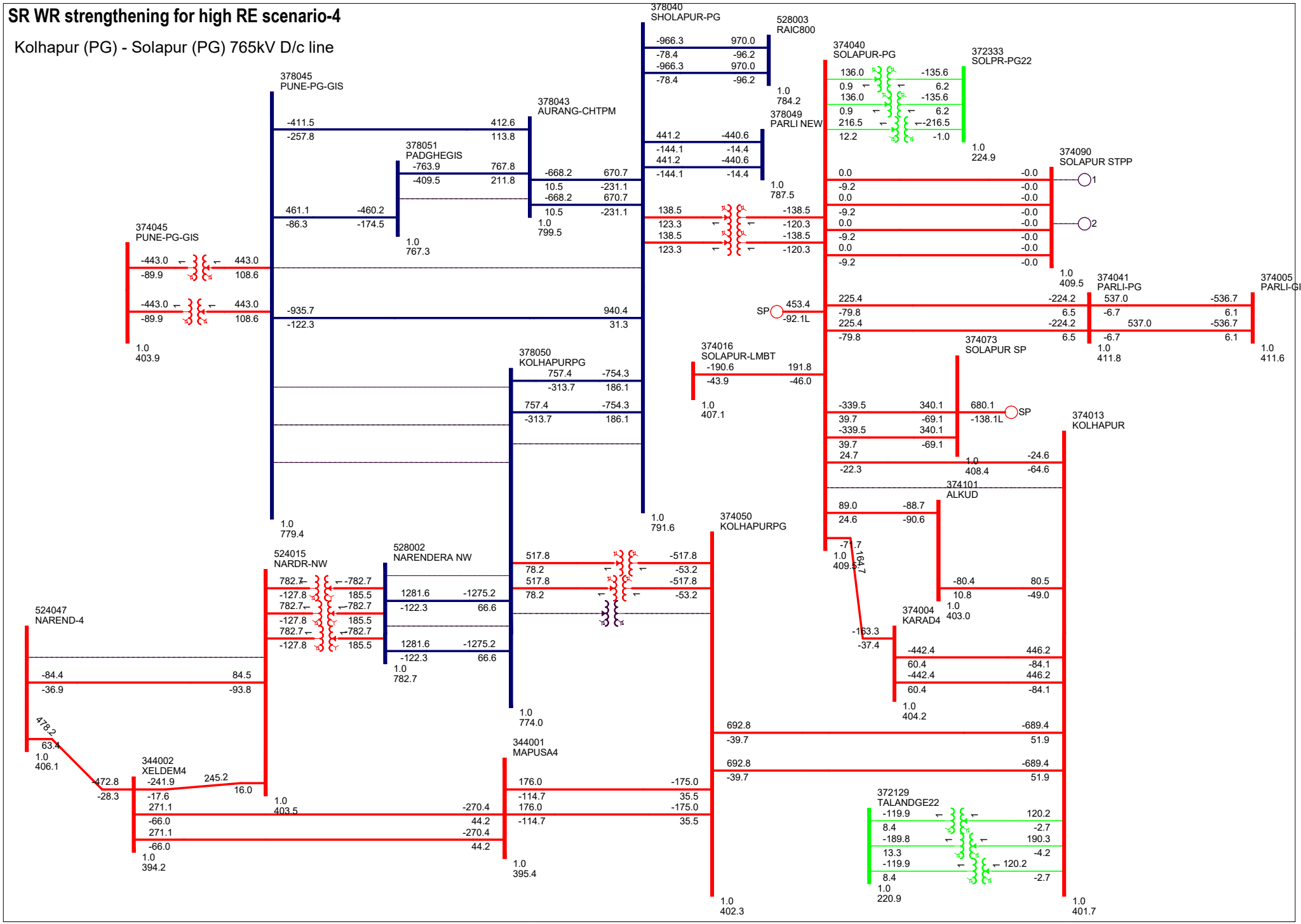
SR WR strengthening for high RE scenario-4

Kolhapur (PG) - Pune (GIS) 765kV D/c line



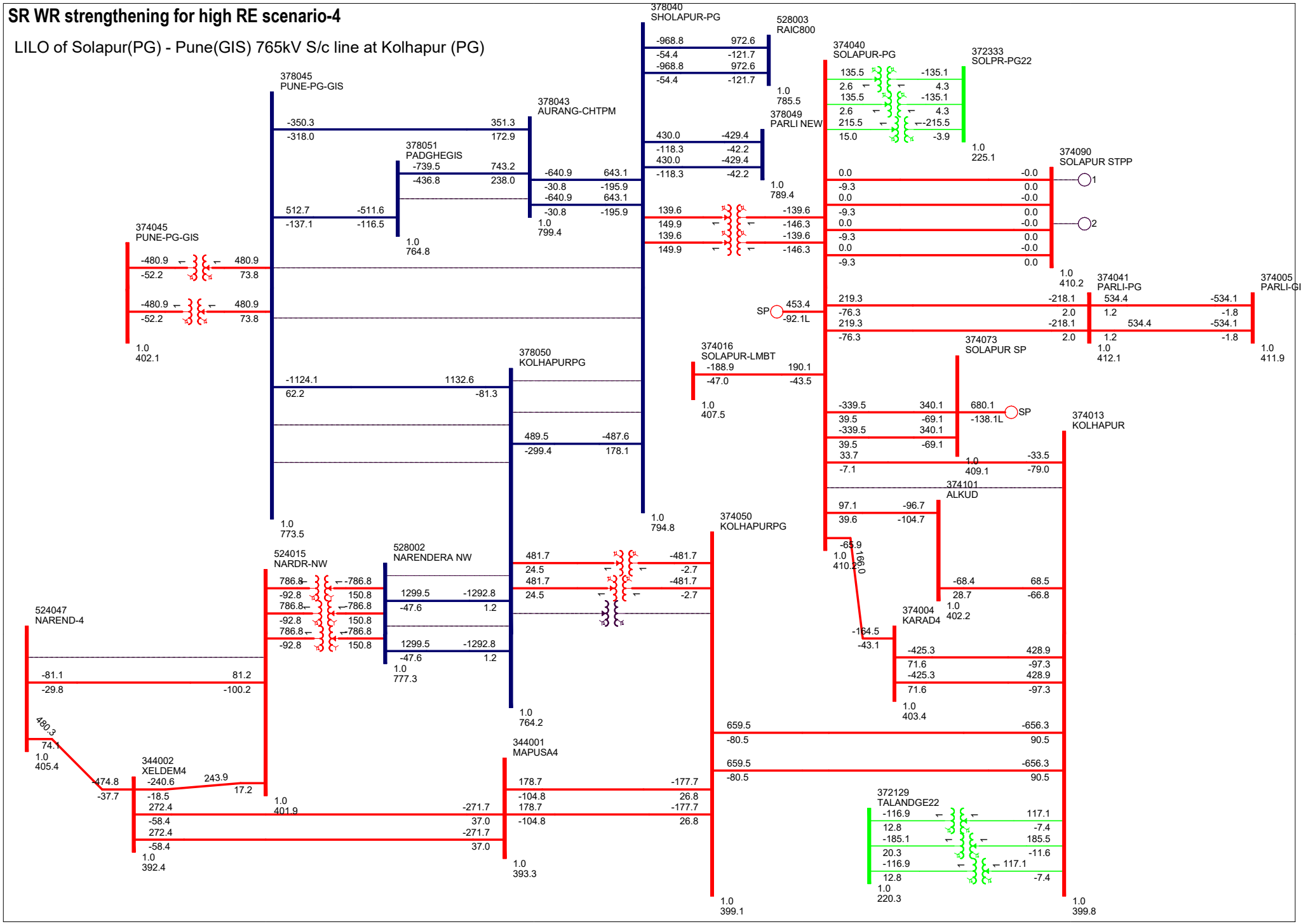
SR WR strengthening for high RE scenario-4

Kolhapur (PG) - Solapur (PG) 765kV D/c line



SR WR strengthening for high RE scenario-4

LILO of Solapur(PG) - Pune(GIS) 765kV S/c line at Kolhapur (PG)



Annexure B.9

To
G. Rao
EE (Power System)
ERPC, Kolkata

Date- 17.08.2020

Sub: - Consolidated observation from POWERGRID regarding updated procedure of ERLDC-Reg:

Dear Sir,

The RLDC Operating Procedure is prepared under Para 5.1 (f) of IEGC which mandates The Indian Electricity Grid Code (IEGC) regulation 5.1 (f) mandates RLDC to develop and maintain the Operating Procedure in consultation with the regional entities for guidance of the staff of RLDC. The Operating Procedure has to be consistent with the IEGC to enable compliance with the requirement of the IEGC. It is worth highlighting the Procedure is for Guidance of RLDC to ensure compliance of IEGC, creation of additional procedures is not envisages. Still considering the agenda points and continuation with earlier mail followings may be noted:-

Clause 3.7	In case of any requirement, ERLDC will issue specific instruction for STATCOM to change their set point based on anticipated event to provide grid support.	Specific instructions may be issued on case to case basis, but Broad guidelines to be issued for assisting RLDC operators in changing the set points of STATCOM. Criteria/Condition for enabling various set points to be mentioned specifically.
Clause 3.1	During conditions of high voltage in the grid, the switchable filter banks installed at the HVDC terminal stations shall be switched off wherever feasible in consultation with the NLDC and at the terminal substations. Reactive power documents of ER may be referred for HVDC filter bank switching as per Mono/Bi-polar pole, Power order, RVO etc.	HVDC filter banks are switched by HVDC controller as per Power Order requirements. Manual switching of HVDC filter banks for voltage control may to be avoided and used only in case extreme necessity. Moreover, HVDC filters are specifically meant for HVDC system only, for controlling AC system voltage, other means like Reactors/Line switching are generally to be followed.
Clause 3.2.1.a	The Bus reactor be switched in	Broad guidelines of voltage band for switching in and switching out of reactor to be mentioned. At Rajarhat, even it is observed that, reactor even taken into service at 400-405 KV band and numerous switching done in a short period.
Clause 3.2.1.a	Checking possibility of rerouting /change of power flow on HVDC terminals so that loading on parallel EHV network can be altered that may result in reduction in voltage.	To be shifted before the Filter Switching action.

Chapter 5	Outage Planning Procedure	Already after several discussions the outage procedure has been finalized in 162nd OCC. However the proposed procedure is not matching with the finalized one.
Clause 5.5.9	While applying outage of a transmission element where two end point of that element Is connected with two generating stations, charging sequence must be declared along with the outage application.	The charging sequence can not be declared by transmission line owner along with outage requisition. The same may be decided by RLDC or the generating stations as per the system condition in real time.
Clause 5.5.11	Similarly, if owner of transmission lines is different from bay owner, then both asset owner should apply combined outages to minimise outage period.	The outage may be allowed subject to system condition. To combine apply outage is not possible/feasible in wake of different organizational norms, resource mobilisation, weather suitability etc.
Clause 5.5.10	It is advised that outages must be availed in combined manner ex: AMP work of Line reactors should be done along with Line outages to avoid multiple times outage of transmission element.	Transmission line and Line reactor are two totally different type of equipment with different maintenance requirements. By doing AMP separately, it helps is overall optimisation of outage time and utilisation of resources. Switchable reactors are separate element and bay, thus they can be taken separately under outage. In case the voltage is high, RLDC may defer the shutdown of line reactor on case to case basis.
Clause 5.5.13	Reason of availing any outage should be comprehensive and time duration of outages should be reasonable. Indenting agency shall submit patrolling report, site photographs, substation diagrams and weather condition well before availing the shutdown.	The requirement for said documents may be explained. The S/D is requested only after due diligence based on interal procedure and assesment and can't be shared. The weather information is already available to RLDC through IMD. No requirement of site photographs, patrolling reports, substation diagram, for RLDC Operating staff is envisaged.
Clause 5.5.14	In case of first time synchronisation of any new element, ERLDC will conduct system study along with CTU study can suggest any SPS if required.	Does not pertain to Chapter 5.
Clause 5.5.19	Vide clause 5.7.4 (g) of IEGC ERLDC is authorised to defer any planned outage in case of any of the following taking into account the statutory requirements:	Planned shutdown involves resource allocation and mobilisation, manpower management etc and cancellation of S/D results into huge financial loss and therefore should be deferred only in case of extreme necessity. Keeping in view, RLDC shall provide the reason for decline of outage along with supporting system study, Contingency Analysis results to the indenting utility.

Clause 5.6.3	If RLDC require any further information regarding the applied shutdown, the same should be provided by 12:00hrs of D-3 working days by indenting agency to RLDC	The information shall be submitted by D-2 days. It might not be possible for utility to arrange the information within 2 hrs. Considering that the outage request can be submitted till 10:00 hrs on D-3. Moreover discussion in 162nd OCC to be followed in this regard.
Clause 6.2	Whenever any protection system including main protection, Bus Bar protection, LBB protection, Auto reclose etc. at generating station or grid substation is required to be taken out of service for any maintenance/replacement work, an operational code would be taken from SLDC/ERLDC.	This shall be for information and records only, for RLDC/SLDC. This is in accordance with IEGC 5.6.2/b.
Clause 6.5.6	Single pole auto-reclose facility on 400 kV / 220 kV lines should always be in service. ERLDC's approval would be required for taking this facility out of service.	No approval required from RLDC. Only information requires to be sent prior to taking AR out of service. This is in accordance with IEGC 5.6.2/b.
Clause 6.6	In this regard, the following guidelines may be followed by all ISTS licensees / CTU / STU:- Efforts to be made to anti-theft charge the line as far as possible from the nearest distribution line.	As per IEGC, the Operating Procedure document is for guidance of RLDC staff for Operation of Grid as per existing Grid Code. Thus creating new procedures for CTU/ISTS/STU is beyond the scope of the document.
Clause 6.6.3	STU / SLDC after examining the proposal may accord approval, if feasible, with necessary modifications of protection scheme of their distribution system.	As per IEGC, the Operating Procedure document is for guidance of RLDC staff for Operation of Grid as per existing Grid Code. Mandating Guidelines to CTU/ISTS/STU/SLDC staff is beyond the scope of the document.
Clause 6.6.5	On receipt of such request, ERPC to constitute a committee comprising representatives from ERPC, NLDC, ERLDC, owner of the new line, STUs / SLDCs likely to be affected and CTU for a joint study on the effects of such interconnection on the integrated grid.	Such procedure shall cause delay in antitheft charging. Which could result in theft in the line. Moreover, advising RPC is beyond the scope of the document.
Clause 6.7.1.1 and 6.7.1.2	FTC of ISTS elements…....Detailed Technical Specifications to be sumitted by utilities	Detailed Specification of the elements is a design detail and not required by RLDC for system operation. The operating parameters details which are essential for grid operation shall be shared like conductor parameter, line length, conductor configuration etc.
6.7.2.3	In addition to these documents, charging instructions, details of approval of the transmission scheme from the Standing Committee / CTU, availability of line reactors as per approved scheme, approval for changes in the approved scheme, technical parameters of the	This is an interaction between RLDC and CTU/STU, this shall not cause any delay in first time charging of element belonging to transmisison utility.

	made available by CTU/STU, as the case may be, to RLDCs/NLDC.	
6.7.2.4	Within 3 days of submission of above information by the Transmission Licensee, concerned RLDC shall acknowledge the receipt of the same, as per Format II, and seek clarifications, if any. The transmission licensee shall submit the desired information/documents to the concerned RLDC within next three days.	3 days time to acknowledge is too high, the response and query if any need to be provided within 24 hrs.
6.7.2	All attempts would be made by the real time operating personnel at the ERLDC to facilitate charging and commissioning of the new element at the earliest, subject to availability of real time data and favourable system conditions ensuring system reliability and security.	RLDC shall submit the reasons for delay, if any, to respective transmission licensee.
6.7.4.4	In case of an inter-regional element, both the respective RLDCs would be involved and a copy of the communications may be forwarded to NLDC also in such cases.	Communication to NLDC shall be done by RLDC since its an internal communication
7.4.4.3.	Patrolling Report of Transmission line tripped under fault	Healthiness certificate (Certification by Tr.Licensee in mail/letter, not covering any format) shall be provided to RLDC. Patrolling report does not pertain to system operation requirements, thus not required. No statute mandates submission of patrolling report. DR/EL and operational data is mandated and same shall be submitted.

This is a consolidated study of the points and may be looked into. Moreover, till now with existing procedures also, the operation is running smoothly, and as such if not mandated by regulations, frequent changing of the procedure is not proper also.

Thanks

P. Ghosh 17.08.2022

Partha Ghosh
CM (AM)
ERTS-II

cc: Sr. GM (SOSS)/ERLDC/POSOCO.

एन टी पी सी लिमिटेड
(भारत सरकार का उद्यम)
NTPC Limited
(A Govt. of India Enterprise)

Ref: 9501/O&M/GM/ **Date: 21st Jul' 2020**

To
Executive Director,
ERLDC, Kolkatta

Respected Sir,

Sub: regarding consecutive ramp up/down and non-achieving desired ramp rate

The ramping capability of minimum 1% per min has been implemented since 1st Apr-20. Since then, Generating stations are coping up to maintain the desired ramp-rate by augmenting or retuning the system. Here at TSTPS, we have also retune the system to maintain the ramp up/down capability. The following are the observation hampering our ramping performance as well as machine health.

1. Cyclic ramp-up and ramp-down in consecutive blocks affecting our ramping performance as well as machine health
2. Sometimes ramping of small value as low as 0.1MW is considered in first block and 1% ramping in succeeding block thereby depriving the benefit of first block 0.5% ramping for F/D computation

In the first case, detailed block-wise data (for the date 5th Jul-20, Bl-21 to Bl-25) is shown in Annexure-A where the SG is changing in every block between tech min (511MW) and 653 MW. Similar scheduling was also observed recently for the date 12-Jul-20 20 (block 04-11, 929.5-787MW and block 20-34, 511-653MW), 13-Jul-20 (block 02-07, 929.5-787MW) and 20-Jul-20 (block 12-26, 929.5-611MW). As per the regulation, generating units are required for flexible operation primarily to balance the ever-increase variable renewable energy and to some extent stabilisation of grid. Ramping in one direction for a sustainable period before change in ramping direction is desirable to generating machines barring some occasional emergency requirement. But the often/block-to-block cyclic ramping is needlessly stressing our generating unit, as it is very difficult for mechanical systems of the unit to manage change in electrical system of the grid.

Even then, going by ideal condition to maintain the schedule (assuming AG of 646MW at end of Block-21) station can never achieve 1% ramp-rate with declared 1% ramp in such situation.
To achieve 0.5% ramp for ramp performance assessment in such situation, station has to ramping up or down in the multiple of 142MW in each succeeding blocks which will never be possible after one or two blocks (shown in the table/graph case-1 of Annexure-A).
By restricting the machine ramp to 1% as declared and considering the tech min load in such situation; station will never achieve 0.5% ramp for ramp performance assessment for the total period (shown in the table/graph case-2 of Annexure-A).

Hence this condition may be reviewed and consecutive ramp up/down in such situation may be avoided.

In the second case, detailed block-wise data (for the date 31st May-20, Bl-93 to Bl-95) is shown in Annexure-B where absolute ramp of 0.1MW and 142MW in Bl-94 and 95 respectively was given. For a large station like TSTPS-1, 0.1MW ramp (0.010753% per block) is almost no ramp and in the succeeding block station has to demonstrate 1% ramp instead of 0.5% because of this 0.1MW ramp in the preceding block.

As per the guidelines *"while calculating F, for the blocks where the scheduled ramp in preceding block was zero, or in the opposing direction, if the ramp in actual generation is greater than or equal to 0.5%/min, that block shall be counted in F (i.e. ISGS shall be considered to have achieved 1%/min in that block)*".

Hence in such case, minimum value of change in SG may be reviewed so as to consider it as a ramp and accordingly SG may be rounded off to nearest decimal for ramp consideration.

(N S Rao)
General Manager (O&M)

Copy:

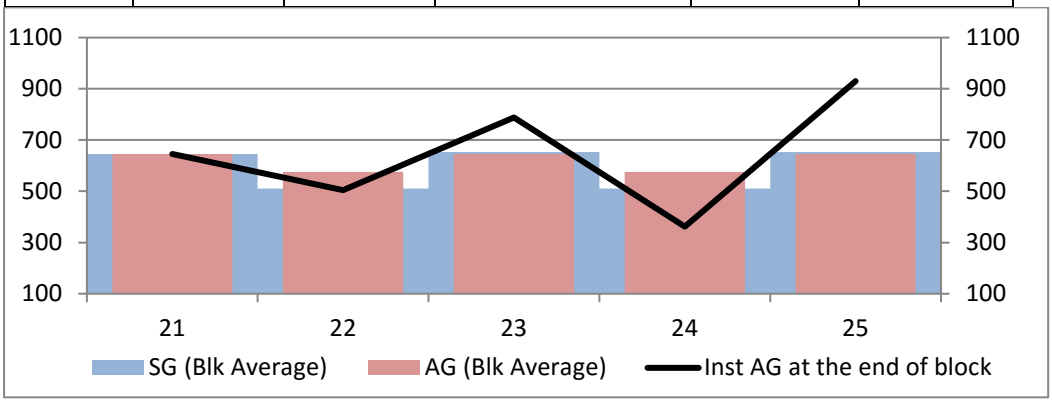
1. Member Secretary (ERPC): for kind information
2. General Manager (SIIS), CC-NTPC: for kind information

Annexure-A

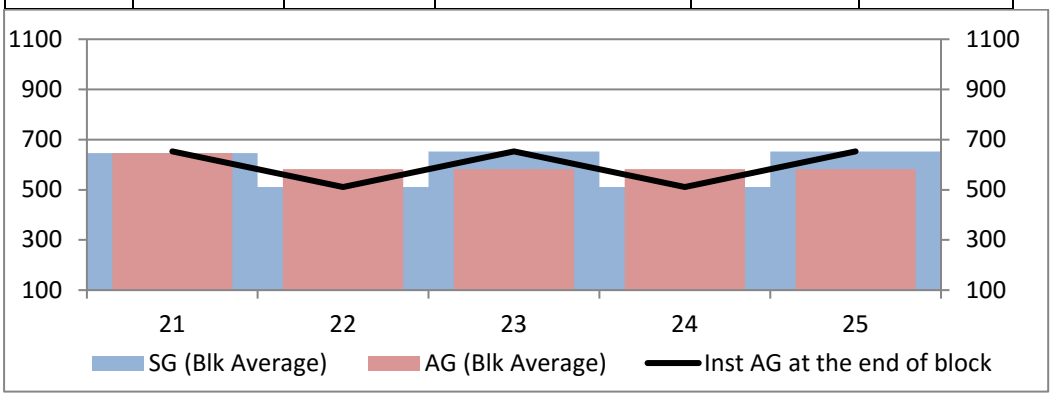
Date: 5th Jul-20, TSTPS-1

Blk No	DC	SG	Scheduled Ramp Rate (MW/Block)	AG	Actual Ramp Rate (MW/Block)	Desired ramp %/min for F Calculation (0.95 or 0.475)	F (True/False) Actual Ramp ≥ 1%/min
20	950	788	-52	766.3	-70	0.475	FALSE
21	950	646	-142	644.7	-121.6	0.95	FALSE
22	950	511	-135	538.3	-106.4	0.95	FALSE
23	950	653	+142	567.9	+29.6	0.475	FALSE
24	950	511	-142	546.7	-21.2	0.475	FALSE
25	950	653	+142	607.3	+60.6	0.475	FALSE
26	950	795	+142	756.8	149.5	0.95	TRUE

Case-1	To achieve 0.5% Ramp (71MW), machine ramping not possible and also generation reduced below tech min.				
Block No	SG (Blk Average)	AG (Blk Average)	Inst AG at the end of block	Require machine Ramp	Ramp (wrt Avg AG)
21	646	646	646		
22	511	575	504	-142	-71
23	653	646	788	284	71
24	511	575	362	-426	-71
25	653	646	930	568	71



Case-2	Restricting machine ramp to 1% and considering tech min load: 0.5% ramp will never be achieved				
Block No	SG (Blk Average)	AG (Blk Average)	Inst AG at the end of block	Require machine Ramp	Ramp (wrt Avg AG)
21	646	646	653		
22	511	582	511	-142	-64
23	653	582	653	142	0
24	511	582	511	-142	0
25	653	582	653	142	0



Annexure-B

Date: 31st May-20, TSTPS-1

Blk No	Net Injection Schedule (MW)	Scheduled Ramp Rate (MW/Blk)	Actual Ex bus Avg Generation (MW)	Actual Ramp Rate (MW/Block)	Desired ramp %/min for F Calculation (0.95 or 0.475)	F (True/False) Actual Ramp ≥ 1%/min
92	927.05771	0	930.69778	-4.043728	0.95	FALSE
93	927.40196	0.344251	931.40212	0.70434	0.475	FALSE
94	927.30196	-0.1	935.94081	4.538692	0.475	FALSE
95	785.30196	-142	845.60902	-90.3318	0.95	FALSE
96	643.30196	-142	683.31014	-162.2989	0.95	TRUE

Annexure B.14

No.11/05/2018-Coord.
Government of India
Ministry of Power

Shram Shakti Bhawan, New Delhi
Dated the 23rd July, 2020.

ORDER

Sub: Measures for contributing towards 'Atmanirbhar Bharat' and 'Make in India' through phased indigenisation in Power Sector.

Whereas Ministry of Power after analysis of data relating to import of the equipment in power sector and consultations with the stakeholders engaged in manufacturing of the equipment as well as developers of power projects in generation, transmission, and distribution, has taken note of the fact that despite Government of India policy of 'Make in India', many equipment in this sector are being imported even though sufficient domestic manufacturing capacity and competition exists.

Whereas DPIIT from time to time since 2017 has issued orders with the latest version issued vide No.P-45021/2/2017-PP (BE-II) on 04.06.2020 to promote Make in India and domestic manufacturing of goods and services in India with a view to enhancing income and employment and the said order needs to be fully implemented in power sector.

Whereas, for power sector to become an integral part of national campaign of 'Atmanirbhar Bharat' and to contribute to 'Make in India' policy of Government of India, it is essential that developers in the generation, transmission, and distribution of power, are also encouraged to effectively and wholeheartedly contribute in this endeavor.

Whereas Power is a sensitive and strategically important sector and is a critical infrastructure for development of our country, as our national defense, vital emergency services, critical national infrastructure, communication, data services, health services, logistics, manufacturing etc. all depends on reliable power supply and any possibility of malware/cyber threat in the power systems leads to vulnerability with the potential of bringing down the whole system with consequential impact on all other sectors of our country. Therefore, 'Atmanirbhar Bharat' has a much higher level of significance for this sector. Therefore, there is a need to encourage, adopt and use only 'Make in India' equipment/materials/parts/items in the power sector in order to protect the safety and security of our country.

Now therefore the following order is issued:

1. This order is issued in consonance with the order of the DPIIT referred above.

2. All equipment/materials/parts/items required in the power sector which are domestically manufactured with sufficient domestic capacity shall necessarily

be used from the domestic manufacturers only as per the extant provisions of the Public Procurement (Preference to Make in India) Orders issued by DPIIT and MoP.

Contd……2/-

3. In respect of equipment/materials/parts/items wherein domestic capacity is not available and imports are inevitable, the MoP shall list out all these equipment and prepare an Action Plan for their indigenisation over a specified time frame of 2-3 years. For this an enabling policy framework through support to Start-ups, phased manufacturing programme, vendor development, Research & Development, tax & other incentives needs to be developed.

4. Till such time indigenous manufacturing capacity for all equipment/materials/ parts/items required in the power sector are developed, the goods so imported shall be tested in certified laboratories designated by MoP to check the presence of any embedded malware/trojans or other cyber threats and also to check adherence to Indian Standards. For testing of goods from prior reference countries, the testing protocol shall be approved by Ministry of Power (MoP).

5. Ministry of Power shall prepare an 'Approved list of Models and Manufacturers' (ALMM) in power sector. All Power Projects which are bid out as per the standard bidding guidelines will be required to procure equipment from manufacturers figuring in the approved list.

6. Financing from REC and PFC will be structured in such a manner that lower rates of interest will be charged on the developers who will use domestically manufactured equipment.

This issues with the approval of Hon'ble MoS (IC) for Power and NRE.

(R.K. Das)
Under Secretary to the Government of India
Tel. No.011-23752495

To:

1. All Ministries/ Departments of Government of India (As per list)
2. Secretary (Coordination), Cabinet Secretariat
3. PS to Hon'ble PM, Prime Minister's Office
4. Vice Chairman, NITI Aayog
5. Director General, Comptroller and Auditor General of India
6. Secretary, DPIIT, Chairman of Standing Committee for implementation of Public Procurement Order, 2017

7. Joint Secretary, DPIIT, Member-Convener of Standing Committee for implementation of Public Procurement Order, 2017
8. Chairperson, CEA
9. CMDs of CPSEs/ Chairmen of DVC & BBMB/ MD of EESL/ DG(NPTI)/ DG(CPRI)/ DG(BEE)
10. All JSs/ EA, MoP

Copy to:

1. PS to MoS (IC) for Power and NRE
2. Sr. PPS to Secretary (Power)
3. Sr. PPS to Additional Secretaries in MoP

Annexure B.15

ISGS Share Requisition & Schedule of Odisha & Other States Under ERLDC for the Month Of June 2020

Date	Entity	FSTPS I & II(In MU)			FSTPS III(In MU)			KHTPS I(In MU)			KHTPS II(In MU)			TSTPP I(In MU)		
		Entitlement	Requisition	Schedule	Entitlement	Requisition	Schedule	Entitlement	Requisition	Schedule	Entitlement	Requisition	Schedule	Entitlement	Requisition	Schedule
1	Bihar	11.2368	4.6110	5.0578	2.4208	1.6621	1.8202	7.6791	5.5863	5.9591	1.6135	1.2707	1.2945	9.2010	8.2327	8.5851
	Jharkhand	3.0686	0.8473	1.1059	1.9067	0.5204	1.0316	0.5872	0.4466	0.4629	0.4045	0.2865	0.2904	1.7105	1.3846	1.3943
	Sikkim	0.5834	0.1481	0.2060	NA	NA	NA	0.2844	0.1600	0.1675	0.1069	0.1036	0.1036	0.5354	0.5242	0.5292
	West Bengal	11.4273	1.4953	3.0934	4.2344	0.9716	2.2556	1.1136	0.5684	0.6592	0.0000	0.0000	0.0000	2.0546	1.3911	1.4801
	Odisha	4.8780	1.0800	1.7284	1.8698	0.8959	1.3618	2.7959	2.2716	2.3983	0.6642	0.5673	0.5687	7.0939	6.4289	6.4906
2	Bihar	11.2368	4.1779	4.9078	2.4208	1.5858	1.7583	6.6926	5.5115	5.6378	1.6135	1.3687	1.3859	9.2010	8.9354	8.9433
	Jharkhand	3.0686	1.0983	1.3325	1.9067	1.1979	1.4227	0.5087	0.4217	0.4439	0.4045	0.3666	0.3666	1.7105	1.5677	1.5677
	Sikkim	0.5834	0.2583	0.2944	NA	NA	NA	0.2477	0.1915	0.2064	0.1069	0.0646	0.0694	0.5354	0.5354	0.5354
	West Bengal	11.4273	2.6459	3.8708	4.2344	2.3959	2.9801	0.9699	0.6089	0.6869	0.0000	0.0000	0.0000	2.0546	1.9690	1.9690
	Odisha	4.8780	0.0000	0.8163	1.8698	0.0000	0.5037	2.4352	0.0000	0.3196	0.6642	0.0000	0.0399	7.0939	0.0000	0.0904
3	Bihar	11.2368	5.7390	5.7563	2.4208	1.9466	1.9623	7.1513	6.0586	6.1306	1.6135	1.5390	1.5403	9.1909	9.1909	9.1909
	Jharkhand	3.0686	1.3938	1.5139	1.9067	1.5961	1.6893	0.5483	0.5116	0.5247	0.4045	0.3666	0.3712	1.7085	1.5806	1.5700
	Sikkim	0.5834	0.2735	0.2888	NA	NA	NA	0.2648	0.1953	0.2007	0.1069	0.0802	0.0804	0.5348	0.5348	0.5348
	West Bengal	11.4273	5.0210	5.3378	4.2344	2.9345	3.2395	1.0371	0.9675	0.9916	0.0000	0.0000	0.0000	2.0523	2.0523	2.0523
	Odisha	4.8780	0.0000	0.3960	1.8698	0.0000	0.2921	2.6038	0.0000	0.1741	0.6642	0.0000	0.0289	7.0861	0.0000	0.0000
4	Bihar	11.2368	4.8959	5.1789	2.0927	1.5633	1.6635	7.2744	5.3440	5.7734	1.5245	1.0958	1.1285	8.8012	7.4295	7.8442
	Jharkhand	3.0686	1.3044	1.4142	1.6483	1.1757	1.3334	0.5540	0.5042	0.5241	0.3822	0.3485	0.3567	1.6366	1.5631	1.5866
	Sikkim	0.5834	0.3647	0.3647	NA	NA	NA	0.2693	0.2634	0.2636	0.1010	0.0977	0.0977	0.5122	0.5122	0.5122
	West Bengal	11.4273	5.9166	6.2720	3.6605	2.9548	3.2197	1.0547	1.0547	1.0547	0.0000	0.0000	0.0000	1.9654	1.9654	1.9654
	Odisha	4.8780	0.0000	0.2014	1.6163	0.0000	0.1846	2.6480	0.0000	0.1862	0.6276	0.0000	0.0048	6.7862	0.0000	0.0209
5	Bihar	11.2368	2.7224	4.6287	2.4208	0.9857	1.6593	6.4741	2.4463	4.4011	1.3559	0.5125	0.6886	9.1930	5.2032	6.4107
	Jharkhand	3.0686	0.8532	1.2422	1.9067	1.2275	1.3968	0.4930	0.3348	0.4019	0.3400	0.2299	0.2460	1.7090	1.5110	1.5628
	Sikkim	0.5834	0.2051	0.2638	NA	NA	NA	0.2397	0.2090	0.2219	0.0899	0.0899	0.0899	0.5349	0.5349	0.5349
	West Bengal	11.4273	3.7574	4.8260	4.2344	2.6054	3.2450	0.9386	0.7566	0.8732	0.0000	0.0000	0.0000	2.0528	2.0528	2.0528
	Odisha	4.8780	0.0000	0.0355	1.8698	0.0000	0.5448	2.3565	0.0869	0.9093	0.5582	0.0205	0.1484	7.0877	1.8787	2.7730
6	Bihar	11.2368	3.1977	4.2998	2.4208	1.2065	1.5655	6.6789	3.1122	4.3155	1.2553	0.6236	0.7235	9.2010	7.4713	7.5368
	Jharkhand	3.0686	1.3024	1.5204	1.9067	1.0807	1.4515	0.5074	0.4952	0.5021	0.3147	0.3119	0.3119	1.7105	1.6913	1.6913
	Sikkim	0.5834	0.1709	0.2498	NA	NA	NA	0.2472	0.2112	0.2255	0.0832	0.0760	0.0768	0.5354	0.5354	0.5354
	West Bengal	11.4273	4.5988	5.5707	4.2344	2.7384	3.4129	0.9680	0.9564	0.9615	0.0000	0.0000	0.0000	2.0546	2.0546	2.0546
	Odisha	4.8780	0.0000	0.7382	1.8698	0.0000	0.4992	2.4304	0.1257	0.8365	0.5167	0.0197	0.1229	7.0939	1.6257	2.0237
7	Bihar	11.2368	4.0398	4.9952	2.4208	1.7437	1.7744	6.1836	4.6596	5.2940	0.7786	0.6559	0.7396	9.2010	7.8712	7.9212
	Jharkhand	3.0686	0.8861	1.3323	1.9067	1.0336	1.4363	0.4775	0.3861	0.4360	0.1952	0.1570	0.1782	1.7105	1.4515	1.4986
	Sikkim	0.5834	0.3647	0.3647	NA	NA	NA	0.2291	0.2291	0.2291	0.0516	0.0516	0.0516	0.5354	0.5354	0.5354
	West Bengal	11.4273	3.7106	4.8238	4.2344	2.2436	3.0908	0.8973	0.6725	0.8056	0.0000	0.0000	0.0000	2.0546	1.7121	1.7356
	Odisha	4.8780	0.0000	0.7542	1.8698	0.0000	0.5726	2.2530	0.0000	0.6303	0.3205	0.0000	0.1544	7.0939	1.1823	1.6042
8	Bihar	11.2368	5.2150	5.2667	2.4208	1.9630	1.9881	7.6791	7.0200	7.0275	1.1067	1.0703	1.0703	9.2010	9.2010	9.2010
	Jharkhand	3.0686	1.7136	1.7635	1.9067	1.6871	1.6872	0.5872	0.5872	0.5872	0.2775	0.2775	0.2775	1.7105	1.7105	1.7105
	Sikkim	0.5834	0.3305	0.3354	NA	NA	NA	0.2844	0.2814	0.2814	0.0733	0.0711	0.0711	0.5354	0.5354	0.5354
	West Bengal	11.4273	5.1344	5.5014	4.2344	3.1340	3.3965	1.1136	0.9976	1.0230	0.0000	0.0000	0.0000	2.0546	2.0546	2.0546
	Odisha	4.8780	0.0000	0.7542	1.8698	0.0000	0.5726	2.7959	0.0000	0.6303	0.4556	0.0000	0.1544	7.0939	1.1823	1.6042
9	Bihar	11.2368	5.1070	5.1318	2.4208	1.8854	1.8854	7.6791	7.1392	7.1302	0.9656	0.9133	0.9133	9.2010	9.2010	9.2010
	Jharkhand	3.0686	1.9183	1.9183	1.9067	1.9067	1.9067	0.5872	0.5872	0.5872	0.2421	0.2421	0.2421	1.7105	1.7105	1.7105
	Sikkim	0.5834	0.3571	0.3571	NA	NA	NA	0.2844	0.2814	0.2814	0.0640	0.0319	0.0319	0.5354	0.5354	0.5354
	West Bengal	11.4273	6.1024	6.4855	4.2344	4.0756	4.0616	1.1136	1.1136	1.1136	0.0000	0.0000	0.0000	2.0546	2.0546	2.0546
	Odisha	4.8780	0.0000	0.0141	1.8698	0.0000	0.1595	2.7959	0.9028	0.8951	0.3975	0.0972	0.0955	7.0939	5.4021	5.2988
10	Bihar	11.2832	7.8798	7.8703	2.4208	2.2699	2.2751	7.6791	7.6791	7.6791	0.9373	0.9373	0.9373	9.2010	9.2010	9.2010
	Jharkhand	3.0814	2.2205	2.2371	1.9067	1.8670	1.8647	0.5872	0.5872	0.5872	0.2350	0.2350	0.2350	1.7105	1.7105	1.7105
	Sikkim	0.5858	0.4092	0.4107	NA	NA	NA	0.2844	0.2695	0.2695	0.0621	0.0344	0.0344	0.5354	0.5354	0.5354
	West Bengal	11.4745	7.0885	7.2148	4.2344	4.0415	4.0671	1.1136	1.0208	1.0208	0.0000	0.0000	0.0000	2.0546	1.9262	1.9262
	Odisha	4.8981	0.5283	0.6206	1.8698	0.2337	0.2743	2.7959	1.1941	1.1706	0.3859	0.1105	0.1285	7.0939	6.4525	6.3339

Date	Entity	FSTPS I & II(In MU)			FSTPS III(In MU)			KHTPS I(In MU)			KHTPS II(In MU)			TSTPP I(In MU)		
		Entitlement	Requisition	Schedule	Entitlement	Requisition	Schedule	Entitlement	Requisition	Schedule	Entitlement	Requisition	Schedule	Entitlement	Requisition	Schedule
11	Bihar	11.2434	9.0029	9.1148	2.4208	2.1732	2.1845	7.6420	7.4500	7.4500	0.5430	0.5430	0.5430	9.2010	9.2010	9.2010
	Jharkhand	3.0704	1.7049	1.8931	1.9067	1.6153	1.7269	0.5845	0.5581	0.5581	0.1361	0.1361	0.1361	1.7105	1.6369	1.6422
	Sikkim	0.5837	0.4839	0.4931	NA	NA	NA	0.2830	0.2771	0.2775	0.0360	0.0360	0.0360	0.5354	0.5354	0.5354
	West Bengal	11.4340	5.8520	6.2684	4.2344	1.7952	2.7559	1.1082	0.8689	0.8692	0.0000	0.0000	0.0000	2.0546	1.9476	1.9486
	Odisha	4.8808	0.3558	0.8057	1.8698	0.1558	0.5675	2.7823	0.6225	0.6240	0.2235	0.0554	0.0544	7.0939	4.2051	4.1435
12	Bihar	11.2434	7.8703	7.8813	2.4208	2.0593	2.0816	7.6724	7.2380	7.2380	1.0343	0.9923	0.9929	9.2010	9.1848	9.1848
	Jharkhand	3.0704	0.9747	1.3947	1.9067	0.9810	1.2884	0.5866	0.3664	0.3679	0.2593	0.1741	0.1741	1.7105	1.3528	1.3719
	Sikkim	0.5837	0.2021	0.2967	NA	NA	NA	0.2841	0.2162	0.2151	0.0685	0.0595	0.0595	0.5354	0.5354	0.5354
	West Bengal	11.4340	3.6769	5.4586	4.2344	1.8768	2.7141	1.1126	0.4630	0.4830	0.0000	0.0000	0.0000	2.0546	1.1985	1.2243
	Odisha	4.8808	0.5336	1.5112	1.8698	0.2337	0.7650	2.7934	0.5800	2.5836	0.4258	0.0897	0.0881	7.0939	2.4110	2.4144
13	Bihar	11.2434	6.6945	7.0731	2.4208	1.5598	1.6413	7.6791	5.7907	5.8123	1.0876	0.9673	0.9673	9.2010	8.9518	8.9518
	Jharkhand	3.0704	0.9610	1.5974	1.9067	1.0137	1.5143	0.5872	0.3491	0.3627	0.2727	0.1818	0.1820	1.7105	1.4540	1.4502
	Sikkim	0.5837	0.0372	0.1870	NA	NA	NA	0.2844	0.2518	0.2562	0.0721	0.0713	0.0713	0.5354	0.5354	0.5354
	West Bengal	11.4340	5.3669	6.5049	4.2344	2.0447	2.9913	1.1136	0.6380	0.6493	0.0000	0.0000	0.0000	2.0546	1.7196	1.7148
	Odisha	4.8808	0.2668	1.4930	1.8698	0.1948	0.8440	2.7959	1.8057	1.8487	0.4477	0.2892	0.2843	7.0939	6.2822	6.1731
14	Bihar	11.2434	6.6945	7.0731	2.4208	1.5598	1.6413	7.6791	5.7907	5.8123	1.0876	0.9673	0.9673	9.2010	8.9518	8.9518
	Jharkhand	3.0704	0.9610	1.5974	1.9067	1.0137	1.5143	0.5872	0.3491	0.3627	0.2727	0.1818	0.1820	1.7105	1.4540	1.4502
	Sikkim	0.5837	0.0372	0.1870	NA	NA	NA	0.2844	0.2518	0.2562	0.0721	0.0713	0.0713	0.5354	0.5354	0.5354
	West Bengal	11.4340	5.3669	6.5049	4.2344	2.0447	2.9913	1.1136	0.6380	0.6493	0.0000	0.0000	0.0000	2.0546	1.7196	1.7148
	Odisha	4.8808	0.0000	1.2061	1.8698	0.0000	0.6212	2.7790	0.0000	0.3058	0.4511	0.0187	0.0413	7.0939	1.2956	1.4116
15	Bihar	11.2434	5.4747	6.2401	2.4208	1.6273	1.6591	7.6791	5.0925	5.1660	1.1006	0.8049	0.8049	9.2010	7.3925	7.4092
	Jharkhand	3.0704	0.4403	1.2900	1.9067	0.4279	1.0813	0.5872	0.2992	0.3571	0.2759	0.1808	0.1845	1.7105	1.3077	1.3708
	Sikkim	0.5837	0.0904	0.2599	NA	NA	NA	0.2844	0.2399	0.2445	0.0729	0.0729	0.0729	0.5354	0.5354	0.5354
	West Bengal	11.4340	4.4460	5.8647	4.2344	2.0663	2.6401	1.1136	0.8932	0.9534	0.0000	0.0000	0.0000	2.0546	1.7549	1.8269
	Odisha	4.8808	0.0000	1.3824	1.8698	0.0000	0.7915	2.7959	0.0000	0.3314	0.4531	0.0000	0.0056	7.0939	0.7923	1.4805
16	Bihar	11.1792	2.8733	5.0450	2.4208	1.4777	1.4777	7.6791	3.8380	5.0239	1.0989	0.5946	0.6072	9.2010	5.3966	6.5444
	Jharkhand	3.0513	0.6697	1.3361	1.9067	1.1766	1.1766	0.5872	0.3446	0.4283	0.2755	0.1776	0.1823	1.7105	1.3957	1.5235
	Sikkim	0.5803	0.1205	0.2809	NA	NA	NA	0.2844	0.2695	0.2721	0.0728	0.0720	0.0721	0.5354	0.5298	0.5321
	West Bengal	11.3676	4.7707	6.8541	4.2344	3.1334	3.1334	1.1136	0.6380	0.8138	0.0000	0.0000	0.0000	2.0546	1.7121	1.8462
	Odisha	4.8525	0.0400	1.3217	1.8698	0.6226	0.6103	2.7959	0.0000	0.5883	0.4524	0.0000	0.0119	7.0939	0.4478	1.9210
17	Bihar	10.5295	5.4812	5.7722	2.4208	1.9385	1.9385	7.6791	6.4326	6.4809	1.1006	0.9914	0.9922	9.2010	9.0284	9.0299
	Jharkhand	2.8717	1.3697	1.7248	1.9067	1.3968	1.3968	0.5872	0.4740	0.4815	0.2759	0.2204	0.2204	1.7105	1.5159	1.5198
	Sikkim	0.5464	0.3194	0.3829	NA	NA	NA	0.2844	0.1836	0.1883	0.0729	0.0450	0.0453	0.5354	0.5354	0.5354
	West Bengal	10.7040	3.5758	5.3216	4.2344	2.9933	2.9933	1.1136	0.6844	0.7388	0.0000	0.0000	0.0000	2.0546	2.0546	2.0546
	Odisha	4.5692	0.0000	1.1260	1.8698	0.5655	0.5543	2.7959	0.0000	0.1820	0.4531	0.0000	0.0027	7.0939	0.9956	1.0712
18	Bihar	9.8343	6.4909	6.7905	2.4208	1.8104	1.8968	7.6791	6.4442	6.5148	1.3197	1.0840	1.0984	9.1847	8.8343	8.8572
	Jharkhand	2.6856	1.7175	2.0986	1.9067	1.3225	1.5593	0.5872	0.4903	0.5048	0.3309	0.2759	0.2812	1.7075	1.6704	1.6760
	Sikkim	0.5105	0.4361	0.4597	NA	NA	NA	0.2844	0.2725	0.2746	0.0875	0.0864	0.0864	0.5344	0.5344	0.5344
	West Bengal	10.0009	5.4794	6.4770	4.2344	1.7336	2.9903	1.1136	0.8352	0.9007	0.0000	0.0000	0.0000	2.0509	2.0509	2.0509
	Odisha	4.2691	0.0000	1.0419	1.8698	0.0000	0.5439	2.7959	0.0000	0.2037	0.5433	0.0000	0.0226	7.0814	1.4779	1.6262
19	Bihar	9.8343	4.0600	5.9600	2.4208	1.5308	1.5308	7.6791	4.9879	5.6311	1.5756	1.0429	1.0900	9.2010	6.9734	7.2649
	Jharkhand	2.6856	0.6704	1.3884	1.9067	0.9709	0.9731	0.5872	0.2639	0.3681	0.3950	0.1333	0.1679	1.7105	0.8870	1.0724
	Sikkim	0.5105	0.1010	0.2577	NA	NA	NA	0.2844	0.2281	0.2386	0.1044	0.0960	0.0967	0.5354	0.5354	0.5354
	West Bengal	10.0009	3.9044	6.7364	4.2344	3.3276	3.3276	1.1136	0.8120	0.9111	0.0000	0.0000	0.0000	2.0546	2.0546	2.0546
	Odisha	4.2691	0.0000	1.3759	1.8698	0.6199	0.6076	2.7959	0.1747	0.6830	0.6486	0.3069	0.3369	7.0939	1.6757	2.6719
20	Bihar	9.8343	6.0792	6.3186	2.4208	1.6400	1.6400	7.5177	5.8387	5.8539	1.5019	1.1165	1.1422	8.7663	7.5020	7.5330
	Jharkhand	2.6856	0.4789	0.9375	1.9067	1.0886	1.0886	0.5729	0.3112	0.3686	0.3766	0.2269	0.2737	1.6244	1.2000	1.2218
	Sikkim	0.5105	0.2606	0.3156	NA	NA	NA	0.2783	0.2383	0.2434	0.0995	0.0868	0.0883	0.5098	0.5098	0.5098
	West Bengal	10.0009	7.9188	8.3077	4.2344	3.8605	3.8605	1.0900	1.0900	1.0900	0.0000	0.0000	0.0000	1.9565	1.9565	1.9565
	Odisha	4.2691	0.1239	0.8477	1.8698	0.4083	0.4015	2.7366	0.3495	0.6765	0.6183	0.0861	0.1749	6.7554	1.9034	2.2983

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		Entitlement	Requisition	Schedule	Entitlement	Requisition	Schedule	Entitlement	Requisition	Schedule	Entitlement	Requisition	Schedule	Entitlement	Requisition	Schedule
21	Bihar	9.8343	6.1677	6.4953	2.4208	1.7306	1.7306	7.5808	5.5203	5.7509	1.5563	1.1325	1.1745	8.8345	7.8670	7.8914
	Jharkhand	2.6856	0.7506	1.5271	1.9067	1.2335	1.2335	0.5792	0.2895	0.4049	0.3902	0.1974	0.2458	1.6433	0.9459	1.0690
	Sikkim	0.5105	0.2606	0.3506	NA	NA	NA	0.2807	0.2001	0.2240	0.1031	0.0794	0.0815	0.5141	0.5141	0.5141
	West Bengal	10.0009	2.7126	4.8883	4.2344	2.4841	2.4841	1.0992	0.5082	0.7513	0.0000	0.0000	0.0000	1.9729	1.6532	1.7021
	Odisha	4.2691	0.0000	1.3352	1.8698	0.7876	0.7720	2.7599	0.0000	0.6160	0.6407	0.0000	0.0906	6.8120	0.0000	0.6505
22	Bihar	10.2775	6.2470	6.8811	2.4208	1.7094	1.7094	7.3723	4.9293	5.0805	1.5883	1.0768	1.0932	9.0560	7.9315	7.9591
	Jharkhand	2.8115	0.7834	1.4803	1.9067	1.3237	1.3237	0.5646	0.3559	0.4089	0.3982	0.2490	0.2536	1.6841	1.6122	1.6195
	Sikkim	0.5338	0.2340	0.3267	NA	NA	NA	0.2730	0.1782	0.1993	0.1052	0.0937	0.0938	0.5270	0.5270	0.5270
	West Bengal	10.4556	3.6243	5.6091	4.2344	2.9237	2.9237	1.0691	0.6747	0.8105	0.0000	0.0000	0.0000	2.0223	2.0223	2.0223
	Odisha	4.4632	0.2668	1.4839	1.8698	0.8951	0.8775	2.6841	0.4447	0.8679	0.6538	0.1025	0.1248	6.9826	2.2213	2.3493
23	Bihar	11.2434	7.7625	7.7527	2.4208	1.7528	1.7528	6.0276	5.0147	5.1939	1.3720	1.2530	1.2556	8.9806	8.5563	8.5497
	Jharkhand	3.0704	1.7265	1.9436	1.9067	1.6133	1.6133	0.4609	0.4136	0.4234	0.3440	0.3081	0.3118	1.6693	1.6693	1.6693
	Sikkim	0.5837	0.3723	0.4006	NA	NA	NA	0.2232	0.1930	0.2074	0.0909	0.0675	0.0683	0.5225	0.5225	0.5225
	West Bengal	11.4340	5.5886	6.2522	4.2344	2.9074	2.9074	0.8741	0.6556	0.7382	0.0000	0.0000	0.0000	2.0052	2.0052	2.0052
	Odisha	4.8808	0.2668	1.1419	1.8698	0.8193	0.8032	2.1946	0.8230	1.2729	0.5648	0.2142	0.2336	6.9237	3.8696	3.8272
24	Bihar	11.2434	7.2390	7.4444	2.4208	1.9676	1.9676	6.0276	5.3818	5.5823	1.3147	1.3147	1.3147	9.2010	9.2010	9.2010
	Jharkhand	3.0704	1.6593	2.0168	1.9067	1.4673	1.4673	0.4609	0.4563	0.4569	0.3296	0.3262	0.3262	1.7105	1.7105	1.7105
	Sikkim	0.5837	0.2021	0.2817	NA	NA	NA	0.2232	0.1535	0.1612	0.0871	0.0871	0.0871	0.5354	0.5354	0.5354
	West Bengal	11.4340	4.8045	7.0335	4.2344	3.3359	3.3359	0.8741	0.8741	0.8741	0.0000	0.0000	0.0000	2.0546	2.0546	2.0546
	Odisha	4.8808	0.4058	1.4252	1.8698	0.6533	0.6405	2.1946	0.3658	0.5317	0.5412	0.0902	0.0955	7.0939	2.6977	0.0962
25	Bihar	11.2434	4.8798	5.8468	2.4208	1.5178	1.5178	6.0276	4.1011	5.0609	1.3147	0.8606	0.8963	9.2010	6.9204	7.2853
	Jharkhand	3.0704	2.1114	2.2742	1.9067	1.6144	1.6144	0.4609	0.3756	0.4156	0.3296	0.2953	0.2970	1.7105	1.5142	1.5595
	Sikkim	0.5837	0.2925	0.3311	NA	NA	NA	0.2232	0.2000	0.2051	0.0871	0.0871	0.0871	0.5354	0.5354	0.5354
	West Bengal	11.4340	8.5223	8.7929	4.2344	3.9639	3.9639	0.8741	0.8741	0.8741	0.0000	0.0000	0.0000	2.0546	2.0546	2.0546
	Odisha	4.8808	0.8894	1.3768	1.8698	0.5931	0.5803	2.1946	0.8230	1.3150	0.5412	0.2030	0.2254	7.0939	5.9116	6.1275
26	Bihar	11.2434	2.7144	5.3290	2.4208	0.8324	1.5156	6.6376	3.2451	4.8278	1.4270	0.7286	0.8629	9.2010	5.7276	6.5779
	Jharkhand	3.0704	1.2214	1.7968	1.9067	0.7487	1.2459	0.5059	0.3254	0.3968	0.3578	0.2474	0.2617	1.7105	1.5352	1.6081
	Sikkim	0.5837	0.1223	0.3097	NA	NA	NA	0.2458	0.2141	0.2223	0.0946	0.0848	0.0848	0.5354	0.5354	0.5354
	West Bengal	11.4340	1.8067	5.0768	4.2344	0.8213	2.4057	0.9625	0.4189	0.6605	0.0000	0.0000	0.0000	2.0546	1.7977	1.8486
	Odisha	4.8808	0.0889	1.9582	1.8698	0.0779	0.9808	2.4165	0.2286	0.9172	0.5874	0.0584	0.1263	7.0939	2.7155	3.5820
27	Bihar	11.2434	6.3740	6.4373	2.4208	1.5685	1.5685	6.5229	5.4502	5.6247	1.4454	1.2458	1.2719	9.2010	8.4894	8.5072
	Jharkhand	3.0704	1.2670	1.8306	1.9067	1.3734	1.3734	0.4973	0.3469	0.3769	0.3624	0.2640	0.2739	1.7105	1.4991	1.5089
	Sikkim	0.5837	0.3989	0.4552	NA	NA	NA	0.2415	0.2054	0.2154	0.0958	0.0958	0.0958	0.5354	0.5354	0.5354
	West Bengal	11.4340	2.2442	4.6471	4.2344	2.3601	2.3601	0.9458	0.3343	0.5222	0.0000	0.0000	0.0000	2.0546	1.8221	1.8351
	Odisha	4.8808	0.0000	1.5064	1.8698	0.8377	0.7813	2.3747	0.1867	0.7059	0.5950	0.0451	0.1158	7.0939	1.8426	1.9520
28	Bihar	11.2455	3.2662	5.7109	2.4208	1.5969	1.5969	6.7898	3.2205	4.6583	1.4994	0.8184	0.8837	9.2010	7.8855	8.0947
	Jharkhand	3.0710	0.7509	1.4835	1.9067	1.3533	1.3533	0.5176	0.2472	0.3606	0.3759	0.1906	0.2065	1.7105	1.0608	1.1029
	Sikkim	0.5838	0.2234	0.3569	NA	NA	NA	0.2514	0.2467	0.2467	0.0994	0.0994	0.0994	0.5354	0.5354	0.5354
	West Bengal	11.4361	1.5000	4.3956	4.2344	2.1321	2.1321	0.9844	0.1275	0.4233	0.0000	0.0000	0.0000	2.0546	0.9603	1.1094
	Odisha	4.8818	0.0000	1.7670	1.8698	0.9542	0.9355	2.4715	0.0000	0.7300	0.6173	0.0000	0.0309	7.0939	0.1750	0.7927
29	Bihar	11.2477	5.6616	5.6616	1.8156	1.1372	1.1372	5.7057	5.1158	5.2558	1.4031	1.1753	1.1899	9.2010	8.5038	8.5038
	Jharkhand	3.0716	1.1245	1.5788	1.4300	0.9046	0.9046	0.4367	0.3134	0.3787	0.3518	0.2859	0.2859	1.7105	1.3418	1.3418
	Sikkim	0.5839	0.1094	0.2550	NA	NA	NA	0.2113	0.1468	0.1669	0.0930	0.0800	0.0800	0.5354	0.5354	0.5354
	West Bengal	11.4383	1.6073	4.5649	3.1758	1.7169	1.7169	0.8273	0.6185	0.6913	0.0000	0.0000	0.0000	2.0546	2.0546	2.0546
	Odisha	4.8827	0.3812	1.6256	1.4023	0.7581	0.7423	2.0772	0.3524	0.8330	0.5776	0.1043	0.1285	7.0939	1.4051	1.3719
30	Bihar	11.2477	6.5454	6.4057	0.0000	0.0000	0.0000	5.1791	4.6726	4.8049	1.4462	1.2974	1.2974	9.2010	8.6768	8.6914
	Jharkhand	3.0716	2.2338	2.2629	0.0000	0.0000	0.0000	0.3969	0.3788	0.3804	0.3626	0.3476	0.3476	1.7105	1.7105	1.7105
	Sikkim	0.5839	0.2279	0.2456	NA	NA	NA	0.1918	0.1655	0.1661	0.0958	0.0958	0.0958	0.5354	0.5354	0.5354
	West Bengal	11.4383	6.5069	6.7663	0.0000	0.0000	0.0000	0.7512	0.7512	0.7512	0.0000	0.0000	0.0000	2.0546	2.0546	2.0546
	Odisha	4.8827	0.6099	0.9011	0.0000	0.0000	0.0000	1.8860	0.7506	0.9889	0.5953	0.2989	0.2934	7.0939	6.0980	5.9730

पावर सिस्टम ऑपरेशन करपोरेशन लिमिटेड
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Date: 16-08-2020

Report on governor response observed at generators in the Eastern Region for the July 2020 events of sudden frequency change

Frequency response characteristics (FRC) have been analyzed pan India for four events of sudden frequency change that occurred in July 2020. The details of these events and the overall response of the Eastern region have been summarized in Table 1.

Table 1: Summary of the events and Frequency Response Characteristic (FRC) of the Eastern Region for the events

Event	Frequency Change	ER FRC
Event 1: On 14th July 2020, at 14:10:51.560 Hrs, 975 MW generation loss at Koyna in WR.	**50.00 Hz to 49.90 Hz**. Later stabilized at 49.96 **Hz.**	**11 %**
Event 2: On 16th July 2020 at 16:27:21.480 Hrs, 1400 MW generation loss at Teesta III and Dikchu	**49.99 Hz to 49.86 Hz**. Later stabilized at 49.91 **Hz.**	**35 %**
Event 3: On 20th July 2020 at 20:50:21:800 Hrs, 1213 MW wind generation loss at Rajasthan	**50.10 Hz to 49.97 Hz**. Later stabilized at 50.02 **Hz.**	**19 %**
Event 4: On 22nd July 2020 at 12:49:18:800 Hrs, 1402 MW solar generation loss at Bhadla in NR	**50.03 Hz to 49.86 Hz**. Later stabilized at 49.95 **Hz.**	**14 %**

Analysis of Frequency Events is provided below and covers the following aspects :

1. Non Sharing of **generation end data (generation output in MW and frequency/speed measured at generator end) and FRCs** despite of repeated reminders to generating stations and **SLDCs**. List of regional generating stations/SLDCs from which generation end data/FRC yet to be received is shown in table 2.
2. Based on data received from generating stations & SLDCs and SCADA data archived at ERLDC, regional generating stations and state control areas performance have been analyzed and summarized in table 3.
3. Based on data received from generating stations & SLDCs, the performance of state generating stations has been analyzed and summarized in table 4.
4. Some thermal units were found to be running at higher than installed capacity causing their poor response and governor response margin was not available. This practice to be avoided and Governor Response Margin has not to be utilised in line with IEGC regulation.

Table 2: List of regional generating stations/SLDCs from which generation end data/FRC yet to be received (as per status on 14th August 2020)

Generating Station/ SLDC	Event 1	Event 2	Event 3	Event 4
NTPC Kahalgaon	**Yet to be received**	**Yet to be received**	**Yet to be received**	**Yet to be received**
Adhunik	Data received	Data received	Data received	**Yet to be received**
Bihar SLDC	**Yet to be received**	**Yet to be received**	**Yet to be received**	**Yet to be received**
Jharkhand SLDC	**Yet to be received**	**Yet to be received**	**Yet to be received**	**Yet to be received**
WB SLDC	**Yet to be received**	**Yet to be received**	**Yet to be received**	**Yet to be received**

Table 3: performance of regional generating stations and state control areas for the events in July 2020*

Generating Station/ SLDC	Event 1	Event 2	Event 3	Event 4
NTPC Farakka	**Satisfactory for unit 6. Non satisfactory for other units**	**Satisfactory for unit 6. Non satisfactory for other units**	**Delayed response observed for unit 6**. To meet the schedule, generation for unit 4 & 5 was being reduced. Response has not been observed.	**Delayed response observed for unit 6. Non satisfactory for other units**
NTPC Kahalgaon	**Non – satisfactory** Stage 1 FRC: 17% and stage 2 FRC: 22% of ideal response as per ERLDC SCADA data	**Non – satisfactory** Stage 1 FRC: 31% and stage 2 FRC: 24% of ideal response as per ERLDC SCADA data	**Non – satisfactory** Stage 1 FRC: 20% and stage 2 FRC: -11% of ideal response as per ERLDC SCADA data	**Non – satisfactory** Stage 1 FRC: 17% and stage 2 FRC: 17% of ideal response as per ERLDC SCADA data
NTPC Talcher	**Satisfactory for unit 2** in term of response provided**. No response observed in stage 2 units.** Unit 5 was running at more than installed capacity.	**Data not provided for stage 1. No response observed in stage 2 units.** 3 and 6 were running at more than installed capacity.	Unit 1 was ramping prior to the event. **Non – satisfactory** response for unit 2 and Unit 4 and 5. Response has been observed for unit 6 but non-satisfactory.	**Non – satisfactory** response for all units. Unit 1,2, 5 and 6 were running at more than installed capacity.
NTPC Barh	Units were being ramped up prior to the event.	**Response observed for unit 4 but tuning is required. Non satisfactory for unit 5.**	**Response observed for unit 5 but tuning is required. Non satisfactory for unit 4.**	**Satisfactory response form unit 4. Response observed for unit 5 but tuning is required.**
NTPC Darlipalli	Unit was not in service	Unit was not in service	Unit was not in service	Unit was not in service
BRBCL	**Non satisfactory** for unit 2 & 3. Units were being run at more than I/C. Unit 1 was not in service.	Units were being ramped up prior to the event. Unit 1 was not in service.	**Non satisfactory** for unit 2 & 3. Unit 1 was not in service.	**Non satisfactory** for unit 2 & 3. Unit 2 was being run at more than I/C. Unit 1 was not in service.

Generating Station/ SLDC	Event 1	Event 2	Event 3	Event 4
NPGC Nabinagar	**Machine was hunting** prior to the event and hunting continues 1 min after the frequency dip	Response has been observed but below satisfactory level. (8 MW response in place of 21 MW)	**Hunting has been observed** in Plant generation. Amount of generation increase was satisfactory.	**Hunting has been observed** in Plant generation. Amount of generation increase was satisfactory.
GMR	**Non-Satisfactory** for both the units.	**Non-Satisfactory** for both the units.	**Non-Satisfactory** for both the units.	**Non-satisfactory** for unit 1. Satisfactory for unit 2.
JITPL	**Non-Satisfactory** Unit 1 was not in service. Unit 2 was being run at more than I/C.	**Non-Satisfactory** Unit 1 was not in service. Unit 2 was being run at more than I/C.	**Non-Satisfactory** Unit 1 was not in service. Unit 2 was being run at more than I/C.	**Non-Satisfactory** Unit 1 was not in service. Unit 2 was being run at more than I/C. Unit 2's response was not adequate and did not last for more than 10 s
MPL	**Satisfactory**	**Satisfactory**	Units were being ramped up prior to the event.	**Satisfactory** (Unit 1's response may be tuned further)
Adhunik	**Satisfactory** for unit 2. Unit 1 was not in service	**Satisfactory** for unit 2. Unit 1 was not in service	**Non-Satisfactory**	**Non – satisfactory** FRC 3% of ideal response as per ERLDC SCADA data
Teesta V	**Non-satisfactory**. Units were being run at more than I/C	**Non-satisfactory** for all units. Units were being run at more than I/C	**Satisfactory for unit 1. Non satisfactory for unit 2 & 3**. Unit 2 was being run at more than I/C	**Satisfactory for unit 1 & 2. Non satisfactory for unit 3**. All units were being run at more than I/C
Teesta III	Units were being run at more than 110% of I/C. No margin was available.	Unit tripped during the event	Unit was not in service	Units were being run at more than 110% of I/C. No margin was available.
Dikchu	**Satisfactory.**	Unit tripped during the event	**Satisfactory.**	**Satisfactory.**
Bihar SLDC	**Satisfactory** FRC 130% of ideal response as per ERLDC SCADA data	**Non – satisfactory** FRC -261% of ideal response as per ERLDC SCADA data	**Non – satisfactory** FRC -50% of ideal response as per ERLDC SCADA data	**Satisfactory** FRC 99% of ideal response as per ERLDC SCADA data
Jharkhand SLDC	**Satisfactory** FRC 179% of ideal response as per ERLDC SCADA data	**Non – satisfactory** FRC -14%% of ideal response as per ERLDC SCADA data	**Non – satisfactory** FRC 65% of ideal response as per ERLDC SCADA data	**Non – satisfactory** FRC -76% of ideal response as per ERLDC SCADA data
DVC SLDC	**Non – Satisfactory** (FRC is 19.7% of ideal response)	**Non – Satisfactory** (FRC is 37.7% of ideal response)	**Non – Satisfactory** (FRC is 14.8% of ideal response)	**Satisfactory** (FRC is 76% of ideal response)
GRIDCO SLDC	**Non – Satisfactory** (FRC is -11% of ideal response)	**Satisfactory** (FRC is 86% of ideal response)	**Satisfactory** (FRC is 78% of ideal response)	**Non – Satisfactory** (FRC is 25% of ideal response)

Generating Station/ SLDC	Event 1	Event 2	Event 3	Event 4
WB SLDC	**Non – satisfactory** FRC 20% of ideal response as per ERLDC SCADA data	**Non – satisfactory** FRC 44% of ideal response as per ERLDC SCADA data	**Non – satisfactory** FRC -13% of ideal response as per ERLDC SCADA data	**Non – satisfactory** FRC 11% of ideal response as per ERLDC SCADA data

***Response of the generating stations are shown in Annexure 1**

Table 4: performance of state generating stations for the events in July 2020 (Based on data received from SLDC/generating stations) **

Category	Event 1	Event 2	Event 3	Event 4
Satisfactory response	HEL, DSTPS unit 1, Bokaro A, Mejia unit 7 & 8, Balimela unit 6	HEL, DSTPS unit 1, Mejia Unit 7,	HEL, Balimela unit 6	HEL, Koderma unit 1 & 2, Bokaro Unit 1, Mejia Unit 7 & 8, DSTPS Unit 1 & 2.
Response has been observed but tuning required	Mejia Unit 5 & 6	--	--	--
Non-Satisfactory response	Bakreswar unit 4 & 5, Koderma Unit 2, DSTPS unit 2, RTPS, BBGS, Balimela other units, Rengali, U Kolab, Indravati, Burla, IBTPS, Mejia Unit 5 & 6	BBGS, Koderma Unit 2, Bokaro A, Mejia Unit 8, Mejia Unit 5 & 6, CTPS unit 7 & 8.	KTPP unit 5, BBGS, Balimela other units, Rengali, U Kolab, Indravati, Burla, IBTPS	KTPP unit 5, BBGS, Mejia Unit 5 & 6 and CTPS Unit 7 & 8.

****Response of these generating stations are shown in Annexure 2**

Remarks on the governor response observed at generating stations:

- **Adhunik:** The resolution of data shared by Adhunik may be improved. During events 1 & 2, a satisfactory response has been observed in terms of the amount of generation level increase. But around 2-3 min was taken for providing a full response. Time taken for providing a full response may be analysed and should be as per droop setting and free governor response.
- **Barh:** Resolution of data shared during events 3 and 4 may be improved. In the case of events 2 and 4, around 8 MW sustained response has been observed for Barh unit 4. But as per 5% droop setting, the ideal response for Barh unit should be around 18 MW. In the case of event 3, around 7 MW sustained response has been observed for Barh unit 5. However, as per the 5% droop setting, the ideal response for Barh unit should be around 21 MW.
- **Talcher**: During event 1, the duration of response provided by unit 2 may be increased in line with sustaining the response as per IEGC. The resolution of data shared for stage 2 units may be improved for all events. During all events, some units were being run at more than installed capacity.
- **GMR**: During event 1, Around 3 MW response has been observed for unit 2. The ideal response was around 6 MW as per the 5% droop setting. During event 2, the Delayed response has been observed for unit 1

- **HEL:** During events 1, 3 and 4, the duration of response provided by HEL units may be increased.
- **Mejia:** Duration of response Mejia units 5 & 6 may be increased in case of event 1. Response from Mejia unit 5 is oscillatory in case of event 1 and 4. In the case of event 2, oscillatory response for both units 5 & 6 was observed which may be checked.
- **Koderma**: Duration of response Koderma Unit 1 and 2 may be increased in case of event 4.
- **GRIDCO**: The resolution of data shared may be improved.

Remedial action taken by generating units to improve the primary frequency response:

- **Adhunik**: Vide mail dated 31st July 2020, APNRL informed they have tuned the logic and online testing was also done by simulating RGMO output. During testing, satisfactory output has been observed.

Philosophy towards formulation and implementation of Grid Islanding Scheme considering 2 x 250 MW units (U # 7 & 8) of Chandrapura TPS, DVC connected to 220KV Grid System

The present islanding scheme in DVC is under service at Chandrapura TPS considering Unit # 1, 2 & 3 having capacity of 3 x 130MW (namely, CTPS – A plant) along with connected load of CTPS – A itself. However, U # 1 & 2 were put out of bar.

Hence, a new suitable venue in DVC is felt to be identified towards formulation and implementation of a new Grid Islanding scheme. Accordingly, U # 7 & 8 of Chandrapura TPS having capacity of 2 x 250MW (namely, CTPS – B plant) has been considered after much thinking and threadbare discussions. These units are connected to 220KV grid. Single line connection diagram (DVC Grid) is shown in Annexure – I.

The Grid islanding scheme is proposed to be implemented in two stages namely,

stage I : Islanding from grid &

stage II : Load – Generation balance through sequential load shedding

considering the 2 x 250MW generators of CTPS – B plant along with connected loads of CTPS – A (120 MVA), BIADA (73 MVA), Putki (180 MVA), Patherdih (141 MVA) & Nimiaghat (40 MVA).

The feasibility of the scheme at this preliminary stage is elaborated as below:-

1. Minimum generation of a unit to be considered as 170MW.
2. Monitoring of Total Generation in MW to be implemented using feed from Ex-Bus MW transducers available at 220kV Switchyard of CTPS – B.
3. The Grid Islanding relay (R1) to be placed at CTPS – B end considering 220KV Bus voltage & frequency of CTPS – B as reference.

   [Note :

   a. The old Islanding panel, placed at CTPS – A, may be used after shifting of the same from CTPS – A to CTPS – B. The OEM of this panel i.e. GE (erstwhile ALSTOM) confirmed that the existing panel could be suitably modified.

   b. Entire scheme design including setting of different relays will be taken care of after freezing of the scheme outline.]

4. After actuation of R1 relay – R2, R3, R4, R5, and R6 Relays which will be connected to IEC-61850 compliant substation bus of CTPS – A (220KV), CTPS – A(132KV), Putki (132KV), Patherdih (132KV) & Nimiaghat (132KV) will get actuated through –

   a. OPGW network with gateway & SDH (synchronous digital hierarchy) to be used for communication of inter-tripping logic through tele-protection GOOSE messaging after creation of VLAN.

   b. Media converter (AC/DC operated) for Gateway-SDH link/connectivity to be incorporated, if required (where length between gateway-SDH is greater than 50mtr.).

   and give trip command (stage – I tripping) as per following –

Substation Bus (IEC - 61850)	Relay	Trip command to -
CTPS_B	R1	CTPS – Dhanbad line (L # 203, 204) CTPS – BTPS line (L # 205, 206)
CTPS_A (220KV)	R2	CTPS – Kalyaneswari line (L # 201, 202) CTPS – BSL line (L # 253 & 254)
CTPS_A (132KV)	R3	CTPS – Gola (L # 6 & 7) CTPS – Purulia (L # 58 & 59) CTPS – Ramkanali/Jamuria (L # 60, 61) CTPS - Rajabera (L # 62, 63)
Patherdih	R5	Patherdih - MHS line (L # 14 & 15) Patherdih - Sindri line (L # 49 & 50) 132/25KV Transformer (Traction Load)
Nimiaghat	R6	Nimiaghat – Giridih line (L # 86 & 87) 132/25KV Transformer (Traction Load)

All Railway feeders/Traction load connected to the above buses to be disconnected during stage 1 operation to avoid unbalance loading.

5. The islanded connection after stage – I tripping is shown in Annexure – II and connected loads (CD in MVA) will be as below having average value of 416 MVA –

CTPS_A	119.90	MVA
BIADA	73.05	MVA
Putki	180.45	MVA
Patherdih	141.40	MVA
Nimiaghat	40.00	MVA
Total Load	554.80	MVA
75% of load	416.10	MVA

Apparently there will be no problem in Load – Generation balance in normal condition –

Generation considered: 225 x 2 MW = 450 MW

Average Load connected: 416 MVA or 400 MW

Considering droop of the TG is 5%,

(450 – 400) MW = 50 MW corresponds to $\frac{5}{450}$ x 50 = 0.56 %

If occurrence freq. is 50 Hz, then it may shoot up to 50 + 50 x 0.56 % = 50.28 Hz.

It will be easily taken care of.

6. However, if

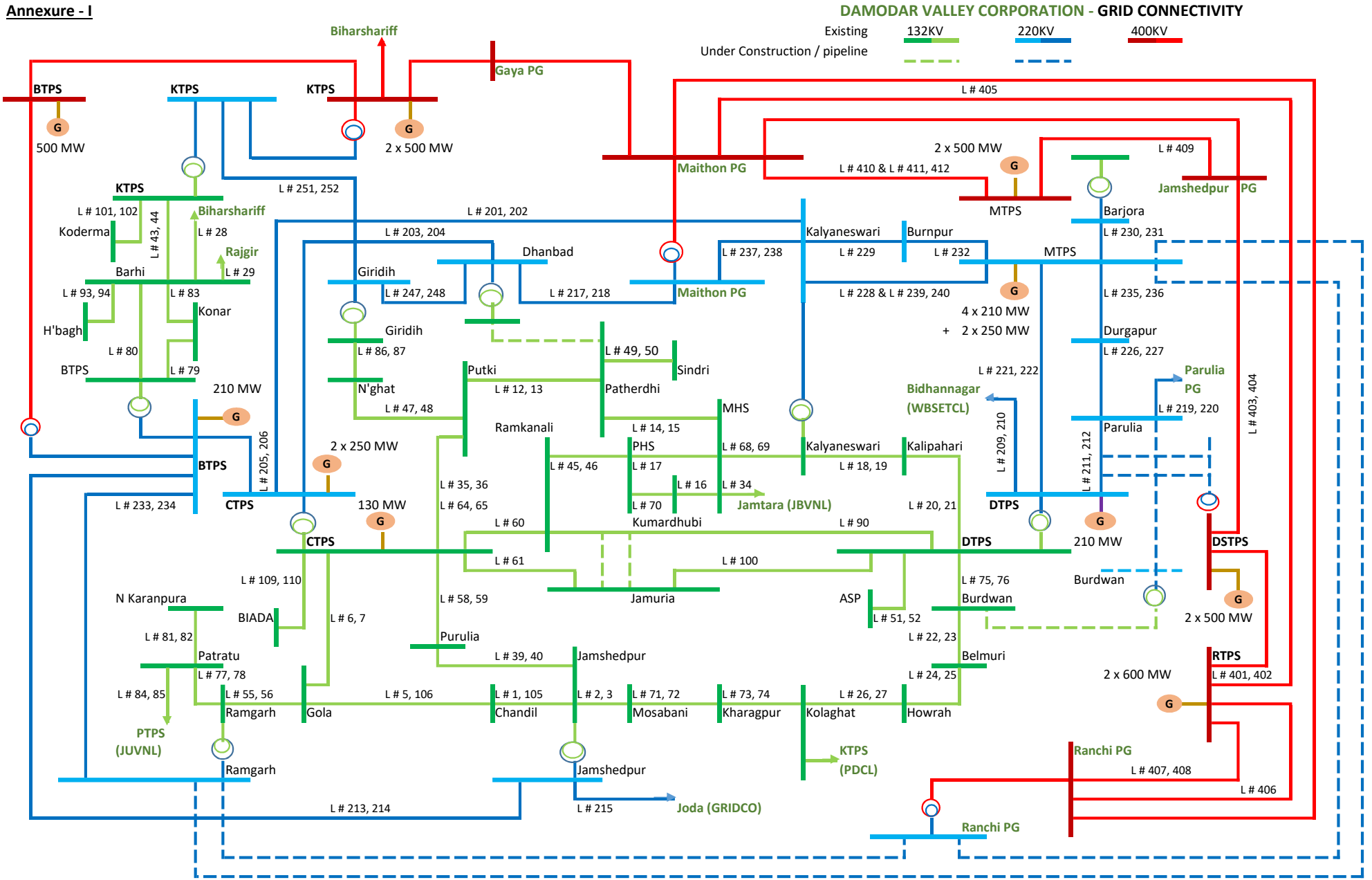
a. Gen.>>Load demand or freq. would exceed a given set point, then one unit (lowest MW) will get tripped and

b. Only one unit is in service then

subsequent Load – Generation balancing is to be made by sequential load shedding (stage – II) at different substations as furnished below through protection telemetry (as discussed above) –

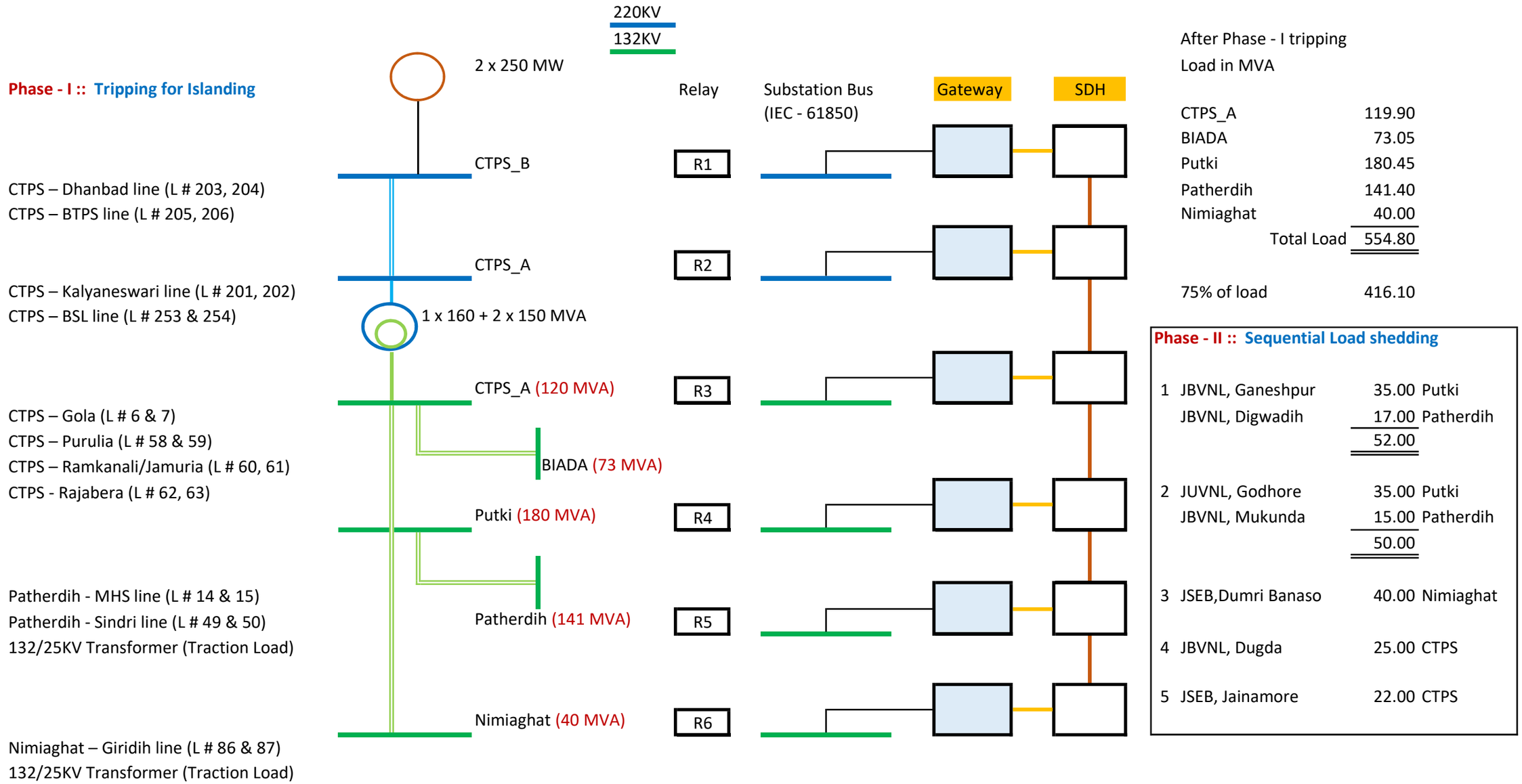
Phase - II :: Sequential Load shedding			
1	JBVNL, Ganeshpur	35.00	Putki
	JBVNL, Digwadih	17.00	Patherdih
		52.00	
2	JUVNL, Godhore	35.00	Putki
	JBVNL, Mukunda	15.00	Patherdih
		50.00	
3	JSEB, Dumri Banaso	40.00	Nimiaghat
4	JBVNL, Dugda	25.00	CTPS
5	JSEB, Jainamore	22.00	CTPS

Annexure - I


DAMODAR VALLEY CORPORATION - GRID CONNECTIVITY
Existing
132KV
220KV
400KV
Under Construction / pipeline
Biharshariff
Gaya PG
BTPS
KTPS
KTPS
G
500 MW
G
2 x 500 MW
L # 405
Maithon PG
L # 410 & L # 411, 412
2 x 500 MW
G
MTPS
L # 409
Jamshedpur PG
Barjora
KTPS
L # 251, 252
L # 201, 202
L # 101, 102
L # 43, 44
Biharshariff
Koderma
L # 28
L # 203, 204
Kalyaneswari
Burnpur
L # 230, 231
Rajgir
Dhanbad
L # 237, 238
L # 229
L # 232
MTPS
Barhi
L # 29
Giridih
L # 247, 248
L # 217, 218
Maithon PG
L # 228 & L # 239, 240
G
L # 235, 236
L # 93, 94
L # 83
Konar
4 x 210 MW
+ 2 x 250 MW
H'bagh
Giridih
Durgapur
L # 80
L # 86, 87
L # 49, 50
L # 226, 227
BTPS
L # 79
Putki
Sindri
L # 221, 222
Parulia PG
210 MW
N'ghat
L # 12, 13
Patherdhi
Bidhannagar (WBSETCL)
L # 219, 220
L # 47, 48
MHS
Parulia
L # 403, 404
Ramkanali
L # 14, 15
L # 209, 210
L # 211, 212
2 x 250 MW
PHS
L # 68, 69
Kalyaneswari
Kalipahari
BTPS
L # 45, 46
L # 17
L # 18, 19
L # 205, 206
L # 35, 36
L # 16
L # 34
L # 233, 234
CTPS
130 MW
L # 64, 65
Jamtara (JBVNL)
L # 70
L # 20, 21
DTPS
L # 60
Kumardhubi
L # 90
CTPS
DTPS
210 MW
DSTPS
L # 61
L # 100
L # 109, 110
L # 75, 76
Burdwan
N Karanpura
L # 58, 59
Jamuria
ASP
Burdwan
2 x 500 MW
BIADA
L # 6, 7
L # 51, 52
L # 81, 82
Purulia
L # 22, 23
Patratu
L # 39, 40
Jamshedpur
Belmuri
RTPS
L # 77, 78
L # 24, 25
2 x 600 MW
L # 84, 85
L # 55, 56
L # 5, 106
L # 1, 105
L # 2, 3
L # 71, 72
L # 73, 74
L # 26, 27
L # 401, 402
G
PTPS (JUVNL)
Ramgarh
Gola
Chandil
Mosabani
Kharagpur
Kolaghat
Howrah
KTPS (PDCL)
Ranchi PG
Ramgarh
Jamshedpur
L # 407, 408
L # 406
L # 213, 214
L # 215
Joda (GRIDCO)
Ranchi PG

Islanding Scheme at CTPS

Annexure - II



After Phase - I tripping
Load in MVA

CTPS_A	119.90
BIADA	73.05
Putki	180.45
Patherdih	141.40
Nimiaghat	40.00
Total Load	554.80
75% of load	416.10

Phase - II :: Sequential Load shedding

1	JBVNL, Ganeshpur	35.00	Putki
	JBVNL, Digwadih	17.00	Patherdih
		52.00	
2	JUVNL, Godhore	35.00	Putki
	JBVNL, Mukunda	15.00	Patherdih
		50.00	
3	JSEB,Dumri Banaso	40.00	Nimiaghat
4	JBVNL, Dugda	25.00	CTPS
5	JSEB, Jainamore	22.00	CTPS

ANNEXURE D1

ANTICIPATED POWER SUPPLY POSITION FOR THE MONTH OF SEPTEMBER-20

SL.NO		PARTICULARS	PEAK DEMAND IN MW	ENERGY IN MU
1		BIHAR		
	i)	NET MAX DEMAND	6450	3685
	ii)	NET POWER AVAILABILITY- Own	545	250
	iii)	Central Sector+Bi-Lateral	4442	2637
	iv)	SURPLUS(+)/DEFICIT(-)	-1464	-797
2		JHARKHAND		
	i)	NET MAXIMUM DEMAND	1450	840
	ii)	NET POWER AVAILABILITY- Own Source	386	219
	iii)	Central Sector+Bi-Lateral+IPP	1004	669
	iv)	SURPLUS(+)/DEFICIT(-)	-60	48
3		DVC		
	i)	NET MAXIMUM DEMAND	2970	1860
	ii)	NET POWER AVAILABILITY- Own Source	5287	3279
	iii)	Central Sector+MPL	529	357
	iv)	Bi- lateral export by DVC	1587	1143
	v)	SURPLUS(+)/DEFICIT(-) AFTER EXPORT	1258	633
4		ODISHA		
	i)	NET MAXIMUM DEMAND	5100	3020
	ii)	NET POWER AVAILABILITY- Own Source	4032	2517
	iii)	Central Sector	2104	1344
	iv)	SURPLUS(+)/DEFICIT(-)	1036	842
5		WEST BENGAL		
5.1		WBSEDCL		
	i)	NET MAXIMUM DEMAND	7335	4015
	ii)	IPCL DEMAND	83	60
	iii)	TOTAL WBSEDCL's Energy Requirement (incl.B'Desh+Sikkim+IPCL)	7628	4226
	iv)	NET POWER AVAILABILITY- Own Source	4655	2436
	v)	Contribution from DPL	465	322
	vi)	Central Sector+Bi-lateral+IPP&CPP+TLDP	2846	1971
	vii)	EXPORT (TO B'DESH & SIKKIM)	210	151
	viii)	SURPLUS(+)/DEFICIT(-) AFTER EXPORT	338	504
5.2		CESC		
	i)	NET MAXIMUM DEMAND	2050	1080
	ii)	NET POWER AVAILABILITY- Own Source	750	527
	iii)	FROM OTHER SOURCE (INCL. IPP/CPP-29-30 MU/M)	760	180
	iv)	IMPORT FROM HEL	540	373
	v)	TOTAL AVAILABILITY OF CESC	2050	1080
	vi)	SURPLUS(+)/DEFICIT(-)	0	0
6		WEST BENGAL (WBSEDCL+DPL+CESC)		
		(excluding DVC's supply to WBSEDCL's command area)		
	i)	NET MAXIMUM DEMAND	9468	5155
	ii)	NET POWER AVAILABILITY- Own Source	5870	3285
	iii)	CS SHARE+BILATERAL+IPP/CPP+TLDP+HEL	4146	2524
	iv)	SURPLUS(+)/DEFICIT(-) BEFORE WBSEDCL'S EXP.	548	655
	v)	SURPLUS(+)/DEFICIT(-) AFTER WBSEDCL'S EXP.	338	504
7		SIKKIM		
	i)	NET MAXIMUM DEMAND	100	45
	ii)	NET POWER AVAILABILITY- Own Source	8	3
		- Central Sector	185	127
	iii)	SURPLUS(+)/DEFICIT(-)	93	85
8		EASTERN REGION		
	i)	NET MAXIMUM DEMAND	25037	14604
	ii)	BILATERAL EXPORT BY DVC	1587	1143
	iii)	EXPORT BY WBSEDCL	210	151
	iv)	NET TOTAL POWER AVAILABILITY OF ER	28536	17213
		(INCLUDING CS ALLOCATION +BILATERAL+IPP/CPP+HEL)		
	v)	ENERGY SURPLUS(+)/DEFICIT(-) OF ER	1703	1315
		AFTER EXPORT (v = iv - i -ii - iii)		