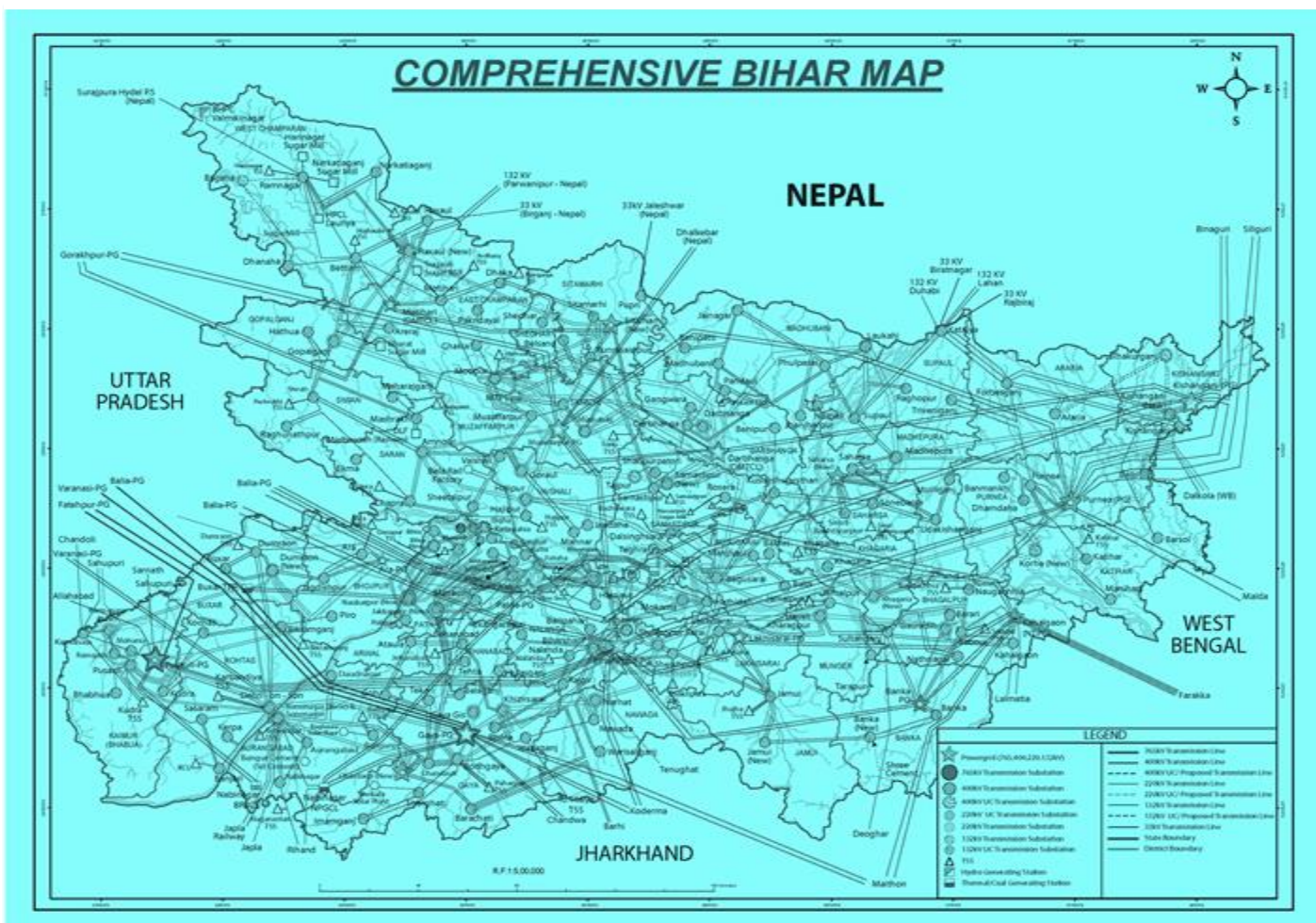




सत्यमेव जयते

REPORT ON INTRA STATE TRANSMISSION RESOURCE ADEQUACY PLAN FOR BIHAR BY THE YEAR 2034-35



CENTRAL ELECTRICITY AUTHORITY

NEW DELHI

Disclaimer

This Intra-State Transmission Resource Adequacy Plan for the State has been prepared based on data and inputs provided by the State utilities. The analysis, findings, and conclusions contained herein rely on the accuracy, completeness, and timeliness of the information furnished by the State. Any errors, omissions, or inconsistencies in the data may influence the results of this study.

The Central Electricity Authority (CEA) has facilitated and supported the State in the preparation of this plan to address intra-state transmission requirements. The recommendations of this study—including but not limited to the establishment of new substations, construction of new transmission lines, reconductoring of existing lines, and augmentation of substations—depends upon data furnished by the State utilities. It is suggested to take up new intra-state elements, commensurate to the generation/demand in the area.

Executive Summary

Electricity (Transmission System Planning, Development and Recovery of Inter-State Transmission Charges) Rules 2021, provides that CEA to draw up short term plan every year on rolling basis for up to next five years and perspective plan every alternate year on rolling basis for next ten years.

Further, Guidelines for Resource Adequacy Planning Framework for India issued by MoP on 28.06.2023 provides that CEA to prepare the Resource Adequacy Plan for each state. Generation resource adequacy studies for the Bihar State have already been carried out by CEA.

For the transmission part, this report presents a comprehensive assessment of the intra-state transmission infrastructure in Bihar, with projections and planning aimed at ensuring transmission resource adequacy by the year 2034-35. The analysis incorporates current electricity demand, projected growth, existing and planned transmission assets, and key recommendations for strengthening the state's transmission network.

The highest peak demand met by Bihar in 2024-25 was 8,078 MW, and Projected Peak Demand by 2034-35 is estimated to 18,708 MW, which is near about the Electric Power Survey report. Further, existing Installed Capacity in the state is about 7685.25 MW including allocation from Central and private Sector Generation. Presently, the state has 13,622 ckm of 132 kV lines, 6,988 ckm of 220 kV lines and 312 ckm of 400 kV lines. It has transformation capacity of 18,700 MVA at 132 kV, 14,560 MVA at 220 kV and 3,000 MVA at 400 kV level.

Considering the anticipated demand, generation capacity, demand pattern, operational feedback from ERLDC and SLDC, system studies have been conducted for Feb Solar Max, Aug Solar Max, February Night Off-peak and August Peak Load demand scenarios for the timeframe 2031-32 and 2034-35 in consultation with Bihar, CTUIL and Grid-India. Based on the studies, the requirement of transmission system by the year 2034-35 has been identified.

A total of 23,430 MVA transformation capacity addition/augmentation and 5,422 ckm of new transmission lines and 459 ckm reconductoring of old lines at an estimated cost of ₹ 12869.2 cr. would be required in the intra-state transmission system for meeting the electricity demand of the state by the year 2034-35. Further, reactive power compensation needs to be provided at various substations at distribution level for addressing low voltage issues.

To ensure reliable and adequate power supply in Bihar by 2034-35, substantial investments and infrastructure upgrades are essential. With a projected demand of 18,708 MW and local generation and contracted capacity covering only part of this, a robust and resilient transmission network becomes critical. The outlined plan, if implemented timely, will ensure resource adequacy and support economic and industrial development in the state.

Table of Contents

Executive Summary	i
1. Demographics	4
2. Electricity profile of state	4
3. Existing Transmission System	6
4. Under Implementation Transmission System	9
5. System operator feedback	11
6. Assumptions for study	12
7. Study Results	14
8. Intra-state Transmission system requirement by 2034-35.	16
9. Reactive Power Management	41
10. Inter-state Transmission system (ISTS) requirement by 2034-35.	
42	
11. Summary of identified transmission system by 2034-35:	44
12. Conclusion	45
Annexure-I	47
Annexure-II	49
Annexure-III	52

List of Tables

Table 2-1 Peak demand & Energy of Bihar.....	4
Table 2-2 Installed capacity of generating station of Bihar.....	6
Table 3-1 Intra State Transmission assets in Bihar.....	7
Table 3-2 Existing, under-implementation ISTS of Bihar.....	8
Table 4-1 Under Implementation Intra-State Transmission assets in Bihar (as on May 2025)	9
Table 6-1 Peak electricity demand.....	12
Table 6-2 Upcoming generation by 2034-35.....	13
Table 6-3 Demand and dispatch of the study	13
Table 7-1 Study Results for the time frame 2031-32.....	14
Table 7-2 Study Results for the time frame 2034-35.....	14
Table 8-1 New substations alongwith their associated transmission lines of Bihar	16
Table 8-2 New transmission lines of Bihar.....	28
Table 8-3 Reconductoring of existing transmission line of Bihar	29
Table 8-4 Augmentation of Substations of Bihar	31
Table 9-1 Reactive power compensation requirement.....	41
Table 10-1 New ISTS substations alongwith their associated transmission lines in Bihar	42
Table 10-2 Reconductoring of existing ISTS transmission line in Bihar	42
Table 10-3 Augmentation of ISTS Substations in Bihar	43
Table 11-1 Year-wise ckm, MVA and investment requirement.....	45

List of Figures

Figure 2-1 Peak Demand and Energy	4
Figure 2-2 Seasonal Load Curve	5
Figure 2-3 Hourly Load Curve	5
Figure 2-4 Contracted Capacity	6
Figure 3-1 Existing Intra-state Transmission Line.....	7
Figure 3-2 Existing Substations.....	8
Figure 4-1 Under Construction Intra-state transmission system as on May 2025	10
Figure 0-1: Line duration curve of 220kV Sasaram-Pusauli New (Nadokhar) D/C.....	49

Figure 0-2: Line duration curve of 220kV Gaya-Bodh gaya D/C	50
Figure 0-3: Voltage duration curve of 765kV Sasaram	51
<i>Figure 0-4: Voltage duration curve of 400kV Sasaram</i>	<i>51</i>

Intra State Transmission Resource Adequacy of Bihar by the year 2034-35

1. Demographics

Bihar is a state in Eastern India bounded by Nepal to the north and by the Indian states of West Bengal to the northeast and Uttar Pradesh to the west. It is divided by the River Ganges, which floods its fertile plains.

2. Electricity profile of state

2.1. Power generation-demand scenario of state:

2.1.1. In the FY 2024-25, Bihar had peak power demand of 8078 MW and total energy requirement of 44471 MU. As on April 2025, state has central sector allocation of 6445.99 MW which includes hydro plants (72.88 MW), thermal plants (6373.11 MW). In addition, the state has state sector installed capacity of 70.70 MW and private sector installed capacity of 1168.56 MW. The per capita consumption of the state is 348 kWh in the year 2022-23.

2.1.2. Peak demand & Energy of Bihar state is given at Table 2-1 below.

Table 2-1 Peak demand & Energy of Bihar

Year	Peak Demand(MW)	MW as per EPS	Energy(MU)	MUs as per EPS
2018-19	5,115	4,904	30,061	28,637
2019-20	5,835	5,308	31,627	31,017
2020-21	5,995	6,016	34,171	35,152
2021-22	7,154	6,923	36,216	36,239
2022-23	7,852	7,495	39,545	41,814
2023-24	8,049	8,184	41,514	45,560
2024-25	8,078	8,908	44,471	49,438

Source: PSP and EPS Reports of CEA

2.1.3. The graph indicating the above Peak Demand (MW) & Energy (MU) is given at Figure 2-1 below.

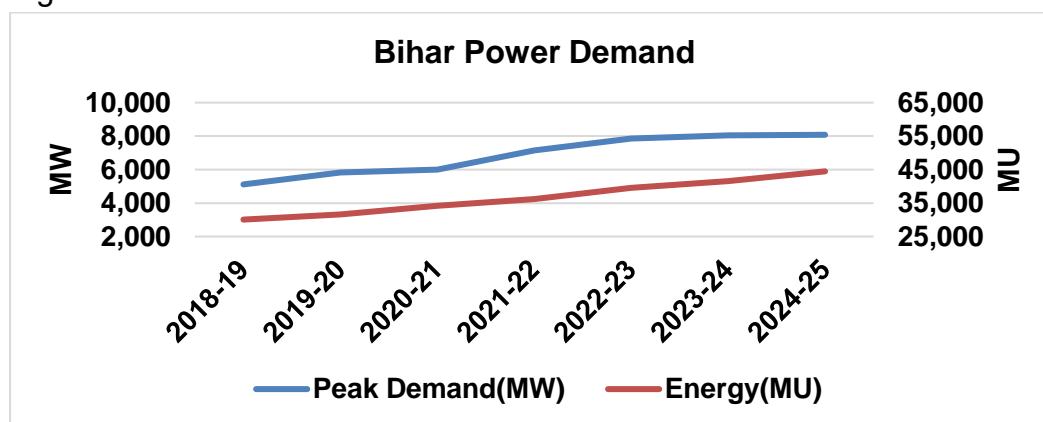


Figure 2-1 Peak Demand and Energy

2.1.4. The peak demand of Bihar occurs in summers and daily peak occurs in the evening period. The graph indicating of Seasonal Load variation is given at Figure 2-2 below.

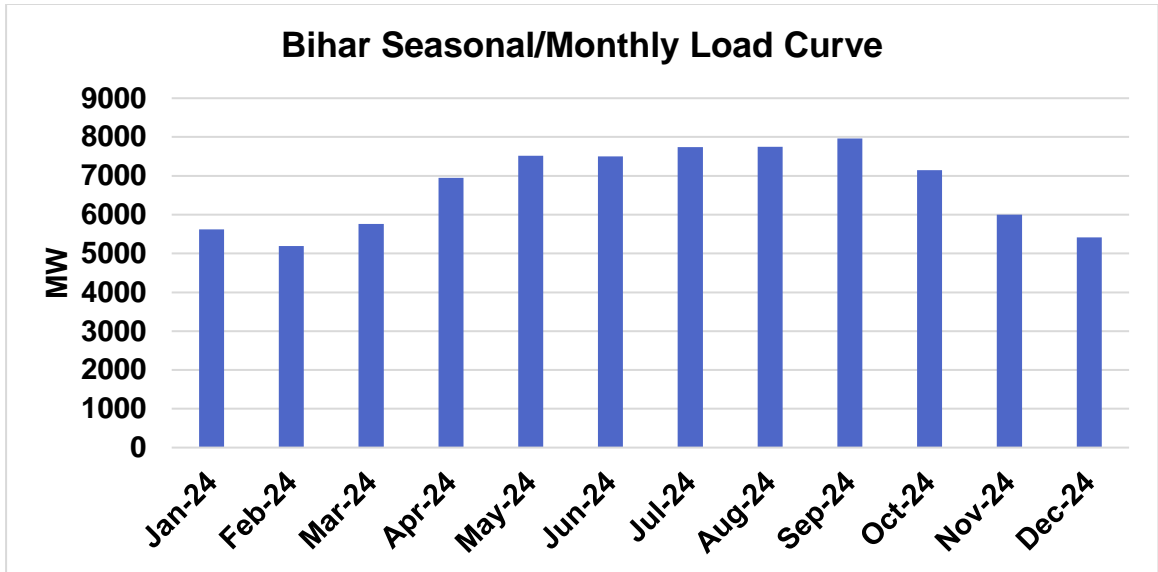


Figure 2-2 Seasonal Load Curve

2.1.5. The graph indicating of Hourly Load variation observed in the year 2024 is given at Figure 2-3 below.

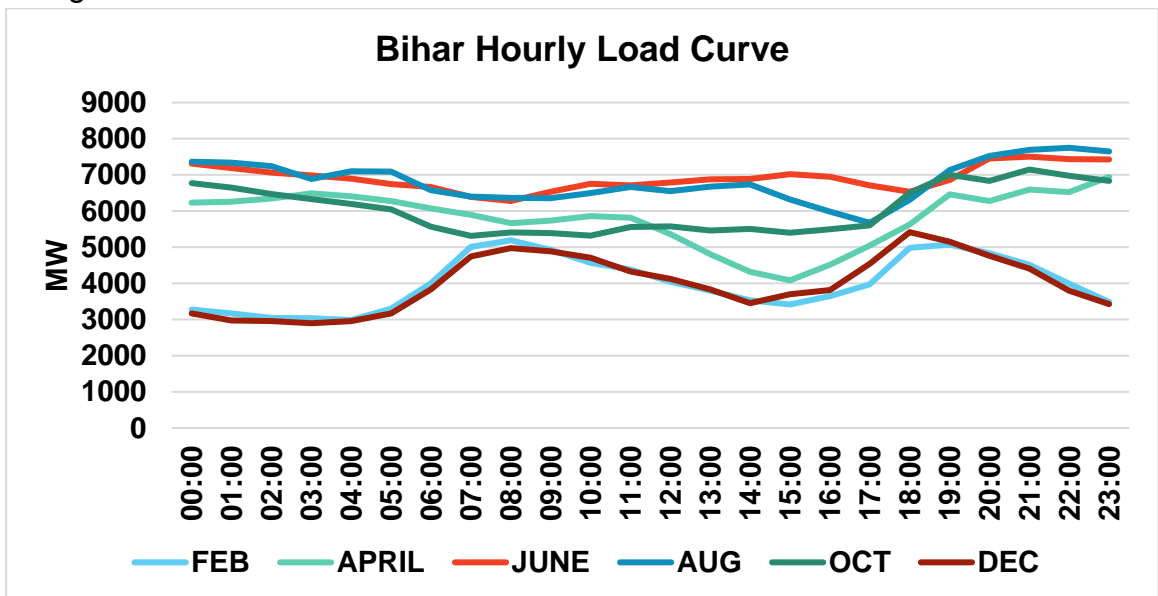


Figure 2-3 Hourly Load Curve

2.1.6. The projected peak demand of state as per the 20th EPS report will be 20765 MW by the year 2036-37.

2.1.7. Installed capacity (MW) of generating stations in Bihar as on April 2025 is given at Table 2-2 below:

Table 2-2 Installed capacity of generating station of Bihar

SECTOR	HYDRO	THERMAL					NUCL -EAR	R.E.S. (MNRE)	TOTAL
		COAL	LIGNITE	GAS	DIESEL	TOTAL			
State	0	0.00	0.00	0.00	0.00	0.00	0	70.70	70.70
Private	0	700.00	0.00	0.00	0.00	700.00	0	468.56	1168.56
Central allocation	72.88	6373.11	0.00	0.00	0.00	6373.11	0	0	6445.99
Total	72.88	7073.11	0.00	0.00	0.00	7073.11	0	539.26	7685.25
%	0.95%	92.03%	0.00%	0.00%	0.00%	92.03%	0.00%	7.02%	100.00%

Source: Installed Capacity Report, CEA

2.1.8. The graph indicating the generation capacity mix is given at Figure 2-4 below

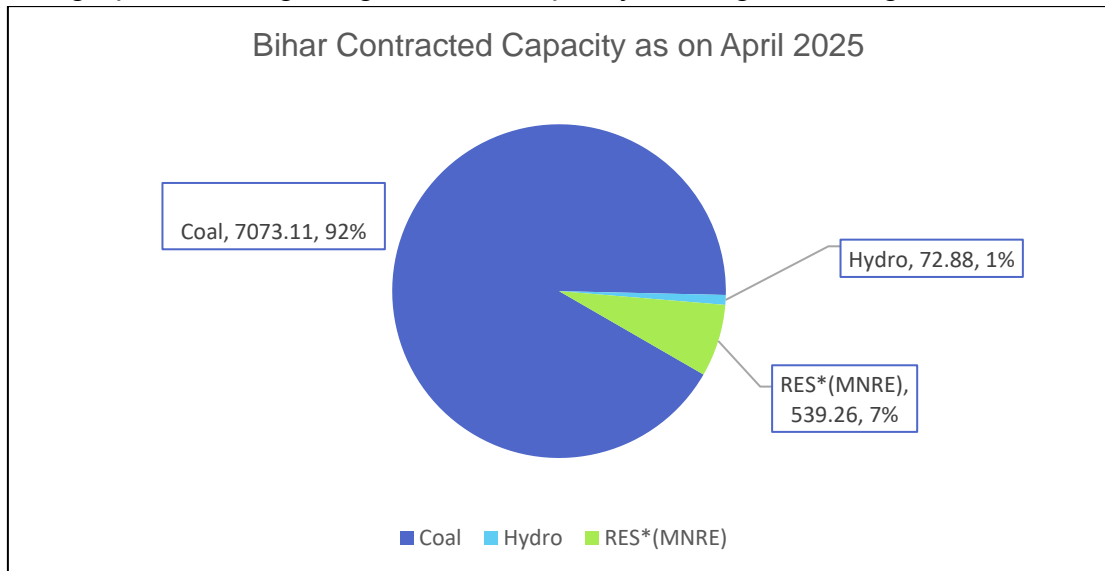


Figure 2-4 Contracted Capacity

2.1.9. As on April 2025, the General Network Access (GNA) quantum for ISTS drawal is 5043 MW and Import Available Transfer Capability (ATC) of the state is 7994 MW.

3. Existing Transmission System

The details of existing Intra-state and Inter-state transmission system in Bihar are as under.

3.1. Existing Intra State Transmission assets (as on March 2025):

3.1.1. Intra State Transmission assets of Bihar state in past five years is given at Table 3-1 below.

Table 3-1 Intra State Transmission assets in Bihar

Financial Year	Voltage (kV)	Transmission lines (ckm)	Total	Substations (MVA)	Total
2018-19	132	11542	15895	12680	20390
	220	4353		7710	
	400	0		0	
2019-20	132	11634	16519	14440	23400
	220	4885		8960	
	400	0		0	
2020-21	132	12105	16988	15890	25990
	220	4883		10100	
	400	0		0	
2021-22	132	12288	17212	16500	28440
	220	4918		11440	
	400	6		500	
2022-23	132	13192	19453	17070	32070
	220	6222		13000	
	400	39		2000	
2023-24	132	13305	19721	17700	33100
	220	6377		13400	
	400	39		2000	
2024-25	132	13622	20922	18700	36260
	220	6988		14560	
	400	312		3000	

*Source: State data

3.1.2. Bihar state has total 13,622 ckm of 132 kV, 6,988 ckm of 220 kV, 312 ckm of 400 kV transmission line and 18700 MVA of 132 kV, 14,560 MVA of 220 kV, 3,000 MVA of 400 kV Substation capacity in Intra-state transmission system.

3.1.3. The graph indicating of year on year growth of Transmission lines is given at Figure 3-1 below.

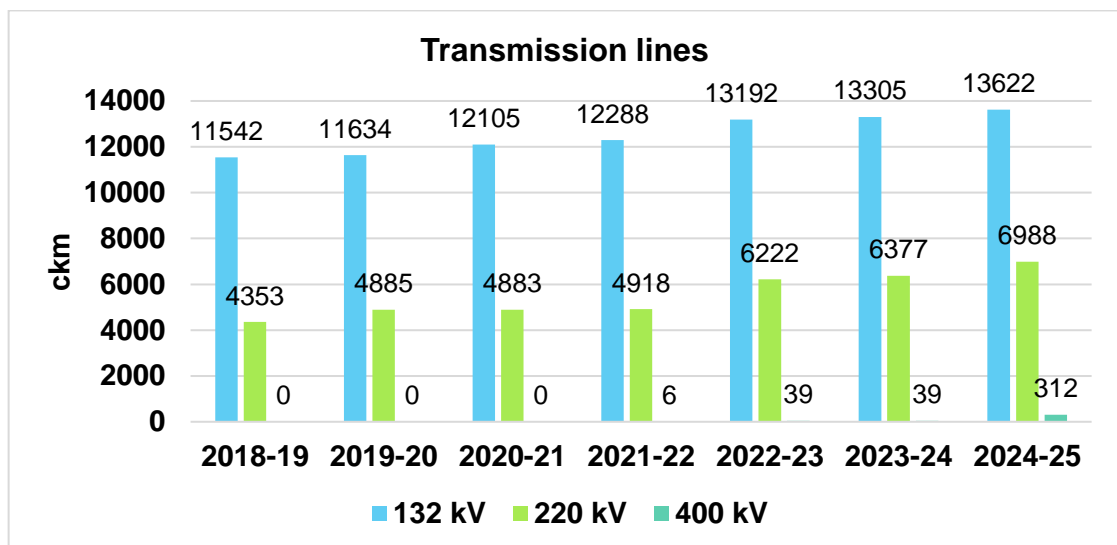


Figure 3-1 Existing Intra-state Transmission Line

3.1.4. The graph indicating of year on year growth of substation MVA capacity is given at Figure 3-2 below.

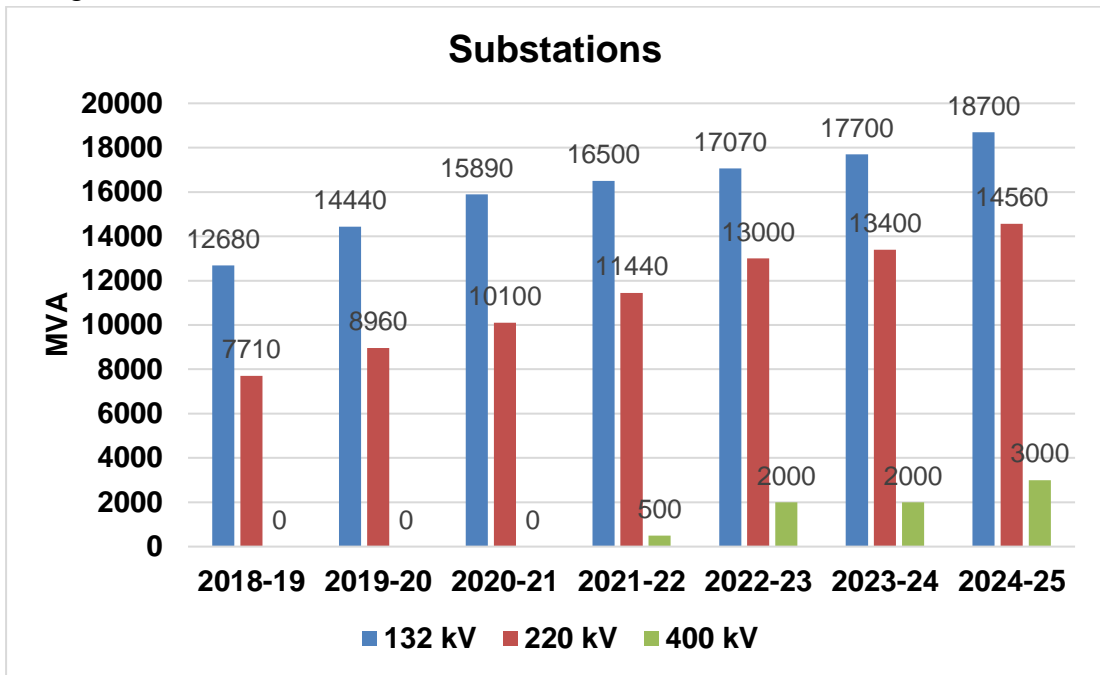


Figure 3-2 Existing Substations

3.2. Existing Inter-State Transmission system in the state:

3.2.1. The State has 16 nos. (26,475 MVA + 500 MW HVDC) existing substation capacity. Further, 1 nos. of 765/400/220 kV, 3000 MVA ISTS substation at Katihar and 1 nos. augmentation of 400/220 kV 1000 MVA at Lakhisarai under implementation.

3.2.2. The State has a total 16,964 ckm of existing ISTS network and 450 ckm + recon. 468 ckm of under construction network. Brief details of the ISTS network (including ISTS lines owned by states) are given at Table 3-2 below:

Table 3-2 Existing, under-implementation ISTS of Bihar

Transmission lines	Existing	Under Construction
132 kV	96 ckm	-
220 kV	788 ckm	-
400 kV	14960 ckm	196 ckm + 468 ckm (recond.)
765kV	1,120 ckm	254 ckm
Total	16,964 ckm	450 ckm + 468 ckm (recond.)
Sub-Station	Existing	Under Construction/Planned
220/132 kV	2 (1040 MVA) Arrah & Purnea	-

400/220 kV	6 (7575 MVA) <i>Biharsharif, Kishanganj, Muzaffarpur, New Purnea, Patna & Darbhanga</i>	Augmentation (1000 MVA) <i>Lakhisarai</i>
400/132 kV	2 (1030 MVA) <i>Lakhisarai & Motihari</i>	-
400/220/132 kV	4 (1715 MVA + 2100 MVA + 1400 MVA + 1400 MVA) <i>Banka, Chandauti, Saharsa New & Sitamarhi New</i>	-
765/400/220 kV	2 (7315 MVA + 2500 MVA) <i>Gaya & Sasaram</i>	1 (3000 MVA) <i>Katihar</i>
HVDC (Back-to- Back)	<i>Sasaram (500 MW)</i>	-
Total	16 nos. (26,475 MVA + 500 MW)	1 no. (4000 MVA)

4. Under Implementation Transmission System

4.1. Under implementation Intra-State Transmission assets (as on May 2025):

4.1.1. The summary of under implementation Intra-state transmission system in Bihar as on May 2025 are as under.

Table 4-1 Under Implementation Intra-State Transmission assets in Bihar (as on May 2025)

Voltage (kV)	Transmission lines (ckm)	Substations (MVA)
132	2891.16	2010
220	397	720
400	40	1000

4.1.2. The graph showing summary of under implementation Intra State Transmission assets of Bihar state is given at Figure 4-1 below.

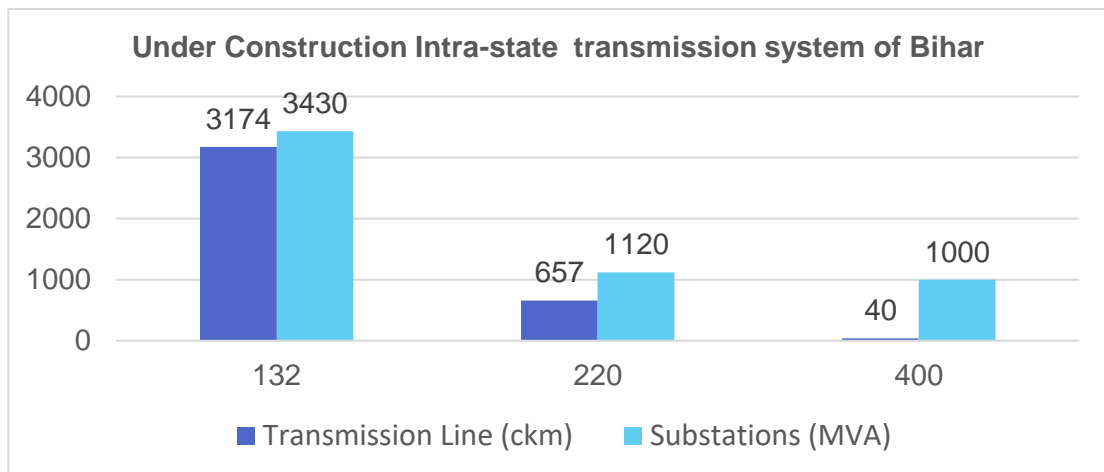


Figure 4-1 Under Construction Intra-state transmission system as on May 2025

4.2. Under implementation Inter-State Transmission assets (as on May 2025):

Detailed of under implementation ISTS network in Bihar (as on May, 2025) are as given below:

4.2.1. Under Construction ISTS (RTM mode)

i. ERES-XXXVII: 31st Aug 2025

- Creation of 220 kV level in GIS at Lakhisarai (POWERGRID) 400/132 kV S/s along with 2 no. 220 kV line bays [for termination of Lakhisarai – Haveli Kharagpur 220 kV D/c line to be implemented by BSPTCL under intra-state]
- Installation of 400/220 kV, 2x500 MVA ICTs along with associated bays at Lakhisarai (POWERGRID) 400/132 kV S/s

ii. ERES-XL: Dec 2025

- Replacement of existing 1x63 MVA fixed line reactor (along with associated 542 ohm NGR) at Malda end installed in each circuit of Purnea – Malda 400 kV D/c line with installation of new 1x63 MVA switchable line reactor [along with 450 ohm NGR (including NGR bypassing scheme)]

iii. ERES-43: Mar 2026 (only Bihar Portion)

- Reconductoring of Kahalgaon (NTPC) – Farakka (NTPC) 400 kV D/c (Twin Moose) line with Twin HTLS conductor (with ampacity of single HTLS as 1228 A) – 190 ckm
- Upgradation of associated 400 kV bay equipment at Kahalgaon (NTPC)
- Upgradation of associated 400 kV bay equipment at Farakka (NTPC)

iv. ERES-44: May 2026 (only Bihar Portion)

- Reconductoring of Siliguri (POWERGRID) – Kishanganj (POWERGRID) 220kV D/c line with HTLS conductor of ampacity 1250A
- Reconductoring of Kishanganj (POWERGRID) – Dalkhola (POWERGRID) 220kV D/c line with HTLS conductor of ampacity 1250A
- Supply and installation of OPGW along with terminal equipment at both ends of Siliguri (POWERGRID) – Kishanganj (POWERGRID) 220 kV D/c (HTLS) line (108 km)

4.2.2. Under Construction ISTS (TBCB mode)

- i. Immediate Evacuation System for North Karanpura STPP (1960 MW) – M/s NKTL (Adani) (only Bihar portion scope is given below)
- NKSTPP – Gaya 400 kV D/c (Quad) line (196 ckm): Expected by Dec 2025

4.2.3. Planned ISTS System

- i. **765 kV D/c Katihar (India) – Parbotipur (Bangladesh) – Bornagar (India) cross border transmission link – by POWERGRID (only Bihar portion of scope is given below)**
- New 765/400 kV, 2x1500 MVA substation at Katihar
 - Katihar (Bihar, India) – Parbotipur (Bangladesh) 765 kV D/c line (*Indian portion – 127 km*)
 - *Indian portion: 127 km*
 - *Bangladesh portion: 50 km*

5. System operator feedback

- 5.1. The operational constraint faced in the Intra-state transmission network by Bihar SLDC including transmission line constraints, ICT constraints, nodes experiencing high voltage/ low voltage are attached at **Annexure-I**.
The operational constraint faced in the Intra-state and Inter-state transmission network by ERLDC including transmission line constraints, ICT constraints, nodes experiencing high voltage/ low voltage are attached at **Annexure-II**.

6. Assumptions for study

- 6.1. Peak electricity demand (MW) of Bihar according to the 20th EPS Report given for year 2031-32 and 2036-37 and as estimated by the state for the year 2034-35 are given at Table 6-1 below:

Table 6-1 Peak electricity demand

Reference↓ / Parameter→	Year	Peak Demand (MW) EPS	CAGR
Actual Peak	2024-25	8049	
As per 20 th EPS	2025-26	9743	21.0
	2026-27	10553	14.5
	2027-28	11416	12.4
	2028-29	12326	11.2
	2029-30	13360	10.7
	2030-31	14276	10.0
	2031-32	15159	9.5
State Estimated Peak electricity demand	2034-35	18708	8.8
As per 20 th EPS	2036-37	20765	8.2

6.2. Industrial Demand:

The details of major upcoming Industries are as under.

- 6.2.1. The total industrial demand in intra-state system is about 2840 MW by 2034-35. The major industries which are expected by 2035 are as under
- a) Ambuja Cement (Nawada)- 25 MVA
 - b) Vistar Concrast (Patna) - 24 MVA
 - c) CtrlS (Patna) -18MVA
 - d) Nuwanagar, Buxar SEZ - 55 MW
 - e) Kumarbagh, West Champaran SEZ – 50 MW
 - f) Airport and AIIMS, Darbhanga - 30 MW

6.3. Generation capacity by 2031-32 and 2034-35

The following existing intra-state generation of Bihar has been considered.

- Barauni U#8 and U#9 : 2x250 MW
- Avaada Solar: 50 MW
- Sri Cement Solar at Banka: 30 MW
- Solar ≥ 10 MW at various locations: 115 MW
- Biomass at various 132kV location: 92.5 MW
- Apart from above cumulative 56 MW of Small Hydro and Solar plants of capacity less than 10 MW connected at 33 kV distribution level, are not modelled in the study file.

The additional generation capacity expected in the state by 2031-32 is 2546 MW. The details of upcoming generation by considered for the study time frame i.e. 2031-32 and 2034-35 are as under.

Table 6-2 Upcoming generation by 2034-35

Sl. No	Technology	Place	Capacity	Capacity in Intra-STS (MW)	Expected Commissioning
1.	Thermal	Nabinagar Stage II	3x800	850	2031-32
2.	Thermal	Buxar	2x660	1320	2025-26
3.	Thermal	Buxar Stage-II	1x660	660	2034-35
4.	Thermal	Pirpainti Unit-I	1x800	800	2032-33
5.	Thermal	Pirpainti Unit-II & Unit-III	2x800	1600	2033-34
6.	Solar	Kajra Stage-I	185 + 254 MWh (45.4 MW x 4 hrs BESS)	185	2025-26
7.	Solar	Kajra Stage-II	116 + 241 MWh (50.5 MW x 4 hrs BESS)	116	2026-27
8.	Solar	SJVNL at Banka	75	75	2025-26
9.	BESS	Muzaffarpur	80 MWh (20 MW for 4 hours)	-	2026-27
Total				5606	

6.3.1. The additional generation capacity expected in the state by 2034-35 is 5606 MW.

6.3.2. For the purpose of the study the Mundra UMPP in Gujarat state has been considered as Swing/Slack Bus.

6.4. The following Parameters were considered during the study

- a) The total intra state generation installed capacity: 5104 MW (including 714 MW RE Power) by 2031-32 and 8164 MW by 2034-35 (including 714 MW RE Power).
- b) Peak Demand: 15159 MW by the year 2031-32 and 18708 MW (including 2840 MW non-scalable industrial demand) by 2034-35
- c) The demand pattern of the State such as seasonal and hourly variation are consistent, however to capture the load variations, and high solar injection from adjacent states, the scenarios considered for the study are mentioned at Table 6-3.

Table 6-3 Demand and dispatch of the study

S.No.	Scenario	Demand Factor	Dispatch Factors		
			Thermal	Solar	BESS ((+) discharging/ (-) charging)
1.	August Solar Max (Peak-Scenario-1)	85%	60%	100%	(-)100%

2.	August Peak Demand (Monsoon Evening Peak-Scenario – 2)	100%	90%	0%	(+)100%
3.	February Solar Max (Scenario-7)	60%	60%	100%	(-)100%
4.	February Night Off-peak (Scenario-9)	50%	60%	0%	(+)100%

7. Study Results

7.1. Based on the demand and generation projections, the State has outlined its need for new transmission elements. Taking into account operational feedback from Bihar SLDC and ERLDC, as well as the provisions in the Manual on Transmission Planning Criteria (with Amendment-I), 2025, studies were conducted to identify the state's transmission system requirements, which are detailed in Paragraph 8. Taking in account of identified system and related assumptions, the import/export on tie lines by the year 2031-32 are presented in Table 7-1 below:

Table 7-1 Study Results for the time frame 2031-32

Parameter ↓ / Scenario →	August Solar Max (Peak-Scenario-1)	August Peak Demand (Monsoon Evening Peak-Scenario – 2)	February Solar Max (Scenario-7)	February Night Off-peak (Scenario-9)
Generation despatch (intra-state + ISGS located in state) (in MW)	4018 (Intra: 3378 & ISTS: 640)	6607 (Intra: 3975 & ISTS: 2632)	5937 (Intra: 3378 & ISTS: 2559)	7009 (Intra: 2697 & ISTS: 4312)
Demand (in MW)	12885	15159	9075	7598
Net interchange ((-)import / (+)export) at ISTS-STU periphery (in MW)	-9093	-10731	-5418	-4329

The import/export on tie lines by the year 2034-35 are presented in Table 7-2 below.

Table 7-2 Study Results for the time frame 2034-35

Parameter ↓ / Scenario →	August Solar Max (Peak-Scenario-1)	August Peak Demand (Monsoon Evening Peak-Scenario – 2)	February Solar Max (Scenario-7)	February Night Off-peak (Scenario-9)
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Generation despatch (intra-state + ISGS located in state) (in MW)	5854 (Intra: 5214 & ISTS: 640)	9367 (Intra: 6735 & ISTS: 2632)	7773 (Intra: 5214 & ISTS: 2559)	8845 (Intra: 4533 & ISTS: 4312)
Demand (in MW)	15954	18708	11283	9236
Net interchange ((-)import / (+)export) at ISTS-STU periphery (in MW)	-10262	-11454	-5750	-4498

- 7.2. The August Peak Demand (Monsoon Evening Peak-Scenario – 2) was found to be critical scenario during the system studies.
- 7.3. The line flows and voltage were in permissible limit as mentioned in the Manual on Transmission Planning Criteria (with Amendment-I), 2025 in the critical as well as other scenario after modelling the required additional transmission system by 2031-32 and 2034-35.
- 7.4. The planned transmission system of the state is N-1 contingency criteria compliant. The planned system addresses the all the constraints in the Intra-state transmission as mentioned by Bihar SLDC and ERLDC at **Annexure-I** and **Annexure-II** respectively. The constraints in ISTS system mentioned at **Annexure-II** would be duly taken care in the Inter-state transmission planning.
- 7.5. According to CEA’s generation recourse adequacy report for Bihar (2033-34) the current capacity mix in Bihar (BSPHCL) has 73% of Installed Capacity from fossil fuel sources. This share is likely to decrease to as low as 25% by 2033-34. The state has sufficiently surplus coal based capacity planned such that in order to meet the projected demand. Bihar (BSPHCL) is likely to not witness energy deficit throughout the period of study i.e. from 2023-24 to 2033-34 with the existing and planned capacity addition. However, Bihar (BSPHCL) is deficit in fulfilment of its Renewable Purchase Obligations (RPO) as per the MoP notification dated 20th October 2023 and needs to contract additional renewable capacities. The projected capacity and generation mix fulfils the RPO obligation. Around 1000 MW of additional Coal based capacity required in 2033-34 (beyond under construction/ planned).
- 7.6. The agreed system by the year 2031-32 and 2034-35 was modelled and studied considering the N-1 contingency criteria, in such situation no constraints were observed in transmission system of Bihar taking into account of above future contract capacity requirement. Hence, the transmission system as planned by 2031-32 and 2034-35 (including new schemes identified in this report) ensure the Resource Adequacy in the Transmission system of the State.

8. Intra-state Transmission system requirement by 2034-35.

8.1. New substations alongwith their associated transmission lines which are required by 2034-35 are listed at Table 8-1 below

Table 8-1 New substations alongwith their associated transmission lines of Bihar

S.No.	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Time frame
1.	i. Establishment of new 220/132/33 kV, 2x200+2x80 MVA Substation at Shobhan (AIIMS)	To feed the load of AIIMS, Darbhanga, requirement of a new 220/132/33 kV S/s at Shobhan (AIIMS), Darbhanga has been envisaged. Further, the proposed S/s at Shobhan would also increase the reliability of power supply in the Samastipur, Motipur and Madhubani area.	265.4	2028-29
	ii. LILO of Darbhanga (DMTCL) – Motipur 220 kV D/c line with Single Zebra at Shobhan (AIIMS) (12 ckm Loop in and 12 ckm Loop out)		15.37	
	iii. Shobhan (AIIMS) – Madhubani 132 kV D/c with Single Moose (82 ckm)		48.48	
2.	i. Establishment of new 132/33 kV, 2x80 MVA at Bhawanipur, District Purnea	Present load demand in the Bhawanipur area is approximately 40 MW, which is expected to rise to around 52 MW by FY 2027-28. Presently, the area is being fed through long 33 kV lines. In order to increase reliable power supply to Bhawanipur and nearby areas and to meet the increasing demand in the area construction of 132/33 kV sub - station at Bhawanipur has been proposed. The proposed grid substation (GSS), would reduce the 33 kV feeder length of existing distribution power	97.31	2028-29
	ii. LILO of Dhamdaha – Banmankhi 132 kV S/c line at Bhawanipur (ACSR Panther) (25 km loop in and 25 km Loop out).		27.58	

S.No.	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Time frame
		substations (PSS), resulting in better voltage profile and reduce losses.		
3.	i. Establishment of new 132/33 kV S/s, 2x80 MVA S/s at Amarpur, Banka	The construction of a 132/33 kV GSS at Amarpur, Banka along with the associated lines have been planned to cater to the load demand of approx. 63MW in present scenario and 78MW in time frame of FY 2027-28.	97	2027-28 LILO section need to be reconductor ed with HTLS.
	ii. LILO of Sultanganj – Banka 132 kV D/c line at Amarpur (20ckm Loop in and 20 ckm Loop out)	This proposal aims to improve the reliability and efficiency of the power supply in the Banka district, ensuring stable and sufficient electricity for the connected areas.	38.81	
4.	i. Establishment of new 132/33 kV, 2x80 MVA S/s at Akhgaon, Ara	Construction of 132/33kV GSS at Akhgaon (Sandesh), Ara has been planned to cater the load demand of 33kV PSSs Akhgaon, Sandesh, Azimabad, Bahiyara, Agion, Sahar and Koilwar and Narayanpur (upcoming).	98.68	2028-29
	ii. LILO of Ara (PG) Jagdishpur 132 kV D/c Line at Akhgaon (22 ckm Loop in and 22 ckm Loop out)	By construction of the proposed GSS, 33 kV feeder length of existing PSS will decrease, resulting in better voltage profile.	23.64	

S.No.	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Time frame
5.	i. Establishment of new 220/33 kV, 3x100 MVA S/s at Bairiya GIS, Patna	Construction of new GSS at Bairiya, Patna has been planned for providing power to proposed PSS at Nandlal Chhapra, Bhogipur/Sahpur, Simra and existing PSSs. There is very rapid growth in the nearby area due to construction of new ISBT and Patna metro	188.06	2028-29
	ii. LILO of Jakkanpur (BGCL) – Gaurichak (Sipara) 220kV D/c with Single Zebra at Bairiya (4 ckm Loop in and 4 ckm Loop out)		16.23	
6.	i. Establishment of new 132/33 kV, 2x50 MVA S/s at Block-Chausa, District Madhepura	The construction of a 132/33 kV GSS at Chausa, Madhepura has been planned to cater to the load demand of approx. 39MW in present scenario and 66MW in time frame of FY 2027-28. By constructing the proposed GSS, the voltage profile of 33KV PSSs will be maintained, and the load of the 132KV GSS GSS Uda Kishanganj will be shifted to propose GSS, achieving the N-1 contingency criteria. This proposal aims to improve the reliability and efficiency of the power supply in the Madhepura district, ensuring stable and sufficient electricity for the connected areas.	90.24	2026-27
	ii. Uda Kishanganj – Chausa 132 kV D/c, (Panther) (30 ckm)		21.15	
7.	i. Establishment of new 400/220/132/33 kV, 3x500+ 2x200+ 2x80 MVA S/s at	To meet Power demand of industries at SEZ (BIADA) Kumarbagh as well as start-up zone Chanpatia.	500	2029-30: for 220/132 kV

S.No.	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Time frame
	Kumarbagh & 2x125 MVAR Bus reactor	To enhance the voltage in the present situation, upgradation of 220/132 kV to 400 kV voltage can be done.		2031-32: for 400 kV level creation
	ii. LILO of Muzaffarpur (PG) – Gorakhpur 400 kV D/c (Quad) line at Kumarnagh (40 ckm Loop in and 40 ckm Loop out)		100	
	iii. LILO of Raxaul (New) – Gopalganj 220 kV D/c Line (twin moose) (25 ckm Loop in and 25 ckm Loop out)		50	
	iv. Bagha – Kumarbagh 132 kV D/c Line (140 ckm)		70	
8.	i. Establishment of new 220/132 kV, 2x200+2x80 MVA S/s at Nawanagar	SEZ (Special Economic Zone) has sought the load requirement of approx 55-60 MW.	230	2029-30
	ii. Dumraon (New) – Nawanagar 220 kV D/c Line (60 ckm)	Moreover, two PSSs namely Nawanagar and Kesath will be connected to the GSS. To provide quality and uninterrupted power, 220/132/33 kV GSS is required.	50	
9.	i. Establishment of new 220/132 kV, 2x200+2x80 MVA S/s at Dev	New GSS will improve the voltage level in the area.	220	2030-31
	ii. LILO of Chandauti (New) – Sonnagar 220 kV D/c line at Dev (60ckm Loop in and 60 ckm Loop out)	Minimum power interruption with earliest restoration of Breakdown/ shutdown.	75	

S.No.	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Time frame
	iii. Nabinagar – Dev 132 kV D/c line (90ckm)	New GSS will also decrease the 33 kV feeder length.	50	TP meeting held on 14.02.2020 would be dropped.
10.	i. Establishment of new 220/132 kV, 2x200+2x80 MVA S/s at Kasba	Peak load of existing Purnea GSS is 350MW on 132kV and 125MW on 33kV.	210	2030-31
	ii. Katihar(ISTS) – kasba 220 kV D/c Line (twin Moose) (50 ckm)	There is no 220 kV GSS in the vicinity of Purnea.	50	
	iii. LILO of Kishanganj - Madhepura 220 kV D/C line at Kasba AL59 conductor (50 ckm Loop in 50 ckm Loop out)	New GSS will improve the voltage level as it will be connected to ISTS GSS Katihar.	75	
11.	i. Establishment of new 220/132/33 kV, 2x200+2x80 MVA S/s at Bethauli	The 33 kV feeders near to aforementioned location is of larger lengths (in the range of 30-35 km) which causes acute maintenance problem in case of trippings.	210	2031-32
	ii. Bethauli – Jhanjharpur (new) 220 kV D/c line (Twin Moose) (100 ckm)	Moreover, this is a remote belt with a dense population.	100	
	iii. Shobhan – Bethauli 132 kV D/c Line (Single Moose) (60 ckm)	To feed power from distant GSS also results in severe voltage drop. Considering these facts, a new GSS with proper location is required.	33	
12.	i. Establishment of new 220/132/33 kV, 2x200+2x80 MVA S/s at Raniganj	It was proposed to construct a new 132/33 kV GSS at Raniganj to feed power and to meet	210	2031-32

S.No.	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Time frame
	ii. LILO of Kishanganj – Madhepura 220 kV D/c Line at Raniganj (50 ckm Loop in and 50 ckm Loop out)	the load growth in the area. However, it has been observed in the System Study it may be upgraded to 220 kV voltage level considering the flat voltage profile.	100	
	iii. Triveniganj – Raniganj 132 kV D/c Line (100 ckm)		55	
13.	i. Establishment of new 132/33 kV, 2x80 MVA S/s at Sonpur	To meet the increasing load demand of PSS Sonpur, Jaitiya etc.	85	2031-32
	ii. Chhapra (New)- Sonpur 132 kV D/c Line (80 ckm)	Moreover, this area is connected to Patna through JP Setu and is growing at a rapid pace. Several Industries and Green Field Airport are also to be planned, which will be getting power from Sonpur.	40	
14.	i. Establishment of new 132/33 kV, 2x80 MVA S/s at Mahisi	The 33 kV feeders areas near to aforementioned location is of larger lengths (in the range of 30-35 km) which causes acute maintenance problem in case of trippings.	85	2030-31
	ii. Jhanjharpur (new) – Mahisi 132 kV D/c line (140 ckm)	To feed power from distant GSS also results in severe voltage drop. Considering these facts, a new GSS with proper location is required.	109	
15.	i. Establishment of new 220/33 kV, 3x100 MVA S/s at Maner GIS	Construction of a new GSS at Maner, Patna has been planned for	230	2030-31

S.No.	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Time frame
	ii. Bihta (New) – Maner 220 kV D/c line (60 ckm)	providing power to PSS at Nand lal Chhapra, Bhojpur/ Sahpur, Simra and existing PSSs. There is very rapid growth in the nearby area due to construction of new ISBT and Patna metro.	50	(space for creation of 132 kV level to be kept)
	iii. Chhapra(New) – Maner 220 kV D/c (100 ckm)		250	
16.	i. Establishment of new 132/33 kV, 2x80 MVA S/s at Kesharia	Construction of 132/33kV GSS at Keshariya, East Chmparan has been planned to cater the load demand of 33kV PSSs present and upcoming. By construction of the proposed GSS, 33kV feeder length of existing PSS will decrease, resulting in better voltage profile.	85	2033-34
	ii. Motipur – Kesharia 132 kV D/c Line (90 ckm)		50	
17.	i. Establishment of new 132/33 kV, 2x80 MVA S/s at Kako	Load of Kako block & Modaganj block is increasing rapidly. The line length of Kako feeder is approx 20 km from GSS Jehanabad. This GSS will reduce the 33 kV line length and improved voltage.	85	2032-33
	ii. Kako – Kaler 132 kV D/c Line (100 ckm)		50	
18.	i. Establishment of new 132/33 kV, 2x80 MVA S/s at Sanauli	Construction of the new GSS will minimize the low 33 kV voltage of several PSS in the region.	85	2033-34
	ii. Kasba - Sanuli 132 kV D/c Line (80 ckm)		40	
19.	i. Establishment of new 132/33 kV, 2x80 MVA S/s at Chauradhano	The new GSS will improve load management in the	85	2031-32

S.No.	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Time frame
	ii. Raxaul (New) - Chahuradhano 132 kV D/c Line (110 ckm)	region and make it easier to carry out maintenance. It will reduce the load on existing GSSs, support both current and future PSSs, and help ensure a more reliable power supply.	60	
20.	i. Establishment of new 132/33 kV, 2x80 MVA S/s at Bahadurganj	Due to the long line length of 33KV line from Kishanganj (New) GSS to Bahadurganj area the quality of power is not satisfactory and low voltage problems are being faced. By shortening the length of the existing 33 kV lines, technical losses will be reduced, which will increase the overall efficiency of the power system.	85	2032-33
	ii. Thakurganj – Bahadurganj 132 kV D/c Line (80 ckm)		40	
21.	i. Establishment of new 132/33 kV, 2x80 MVA S/s at Jalalpur	Proposal from Discom for improvement of voltage level, minimum, power interruption with earliest restoration of BD/SD, fastest maintenance of 33 kV Lines near by PSS.	85	2033-34
	ii. LILO of Chapra new – Raghunathpur 132 kV D/c Line at Jalalpur (30 ckm Loop in and 30 ckm Loop out)		45	
22.	i. Establishment of new 132/33 kV, 2x80 MVA S/s at Nokha	Proposal from Discom for improvement of voltage level, minimum,	85	2032-33

S.No.	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Time frame
	ii. LILO of Dehri – Bikramganj 132 kV S/c Line at Nokha(20ckm Loop in and 20ckmLoop out)	power interruption with earliest restoration of BD/SD, fastest maintenance of 33KV Lines near by PSS. Strengthening of nearby GSS at 132KV level directly connectivity to 220KV GSS.	50	
23.	i. Establishment of 400/220 kV, 2x500 MVA S/s at Pirpainti Generation Switchyard	The entire system has been taken considering the Evacuation of 3x800 MW from Pirpainti Thermal Power Plant (PTPP).	The switchyard would be implemented by Generation Company	2032-33
	ii. Pirpainti (Gen) - Jhanjharpur 400 kV D/c Line (500ckm)	The system was studied with various possibilities of 400 kV, 220 kV and 132 kV.	750	
	iii. Pirpainti (Gen) – Begusarai 400 kV D/c line (240ckm)	The PTPP Power has been evacuated to South as well as North Bihar by evacuation power to 400 kV Bhaktiyarpur via 400/220 kV Begusarai (New) through 400 kV PTPP - Begusarai (New) DCDS, Quad Mooese.	360	
24.	i. Establishment of 400/220/132kV 3x500+3x200 MVA S/s at Jhanharpur (new)	On the other hand, the Northern part of Bihar will be benefited through 220/132/33 kV Korha via 220/132/33 kV Khagaria (New) and proposed 400/220/132 kV Jhanjharpur.	550	2032-33
	ii. LILO of Darbhanga – Laukhi 220kV D/c line at Jhanharpur 400/220/132kV S/s (60 ckm Loop in 60 ckm Loop out)		75	
	iii. LILO of Phulparas - Pandaul 132 kV D/c line at Jhanharpur 400/220/132kV S/s (to be taken up with HTLS and reconductoring of existing line with HTLS (60ckm loop	In this context, a new 220/33 kV is also planned to feed the growing load of Begusarai town.	120	

S.No.	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Time frame
	in and 60ckm Loop out)			
25.	i. Establishment of 400/220 kV, 2x500 MVA S/s at Begusarai (New)		550	2032-33
	ii. Begusarai (New) – Bakhtiyarpur 400 kV D/c (Quad Moose) (240 ckm)		360	
26.	i. Establishment of 220/33 kV, 3x100 MVA transformation capacity at Begusarai GIS		220	2032-33 (with space provision for creation of 132 kV level)
27.	ii. Begusarai GIS – Begusarai (New) 220 kV D/c (20 ckm)	40		
28.	iii. Establishment of new 132/33 kV, 2x80 MVA S/s at Amwaman	Construction of the 132/33 kV Grid Substation at Senuwaria (Amnawan), Dist.-West Champaran, will greatly improve the quality and reliability of the power supply in the area. By shortening the length of the existing 33 kV lines, technical losses will be reduced, which will increase the overall efficiency of the power system.	108.2	2027-28
	iv. Raxaul (New) – Amwaman 132 kV D/c Line (30 ckm)		37.96	
29.	i. Establishment of new 220/132 kV, 2x200 MVA S/s at Mairwa	There are 5 nos. of 132/33 kV Grid Sub-stations which are being	219.09	2027-28

S.No.	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Time frame
	ii. LILO of Chhapra (New) – Gopalganj 220 kV Line at Mairwa {300 ckm Loop in (Chappra New – Mairwa) and 240 ckm Loop out (Mairwa - Gopalganj)}	fed from 220/132 kV Gopalganj and Amnour which are Siwan, Hathua, Raghunathpur, In case of outage of Source GSS or any transmission link among Gopalganj and Amnour, there arises an acute power shortage which finally leads to load shedding.	200	
	iii. Bhorey – Mairwa 132 kV D/c Line (140 ckm)		70	
	iv. Raghunathpur – Mairwa 132kV D/c Line (100 ckm)		45	
30.	i. Establishment of new 400/220/132 kV, 3x500+3x200 MVA S/s at Kerpa New	Considering Dual Connectivity of Nabinagar Thermal Power Plant, BSPTCL has planned the Evacuation Plan for 1200 MW wherein mentioned connectivities were technically justified with the construction of 400/220/132 kV GSS at Kerpa or its nearby areas under Intra-STS and 400/220/132 kV at Kaler under ISTS.	550	2030-31
	ii. Nabinagar – Kerpa new 400 kV D/c Line (30 ckm)		60	
	iii. LILO of Pusauli – Biharsarif A 400 kV S/c Line at Kerpa New (50 ckm Loop in and 50 ckm Loop out)		200	
	iv. LILO of Pusauli – Biharsarif B 400 kV S/c Line at Kerpa New (50 ckm Loop in and 50 ckm Loop out)		150	
	v. LILO of Dehri – Pusauli 220kV D/c line (50ckm Loop in and 50ckm Loop out)		100	
	vi. LILO of Sasaram – Banjari 132 kV D/c line (50 ckm Loop in and 50 ckm Loop out)		70	

S.No.	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Time frame
31.	i. Establishment of new 220/33 kV, 2x100 MVA S/s at Punpun GIS	There is very rapid Growth in southern part of Patna. The sports city is planned in the Punpun, Patna. By construction of this GSS, load to be shifted from 220/132/33kV GSS Gaurichak(Sipara)	200	2031-32
	ii. Punpun – Jakknpur (New) 220 kV D/c Line (Single Zebra) (60 ckm)		50	
32.	i. Establishment of new 220/33 kV, 2x100 MVA S/s at Kankarbagh GIS	A new GIS sub-station in the central Patna is required for shifting load from Gaighat sub-station. There is no any future expansion space in Gaighat.	200	2029-30
	ii. Bairiya – Kankarbagh 220 kV D/c Cable (14 ckm)		100	
33.	i. Establishment of new 220/132/33 kV, 2x200 + 2x80 MVA S/s at Guraru	132/33kV Grid sub-station in Guraru area has been proposed by Discom for decreasing 33kV line length. Also there is line loading limitation in the Chandauti, Belaganj, Tehta, Khizarsarai area. Therefore, 220/132/33kV GSS is required for supplying power to these areas.	190	2032-33
	ii. Guraru – Kaler 220 kV D/c line (Twin Moose) (140 ckm)		160	
	iii. Guraru – Khizarsarai 220 kV D/c line (Zebra) (100 ckm)		75	
	iv. Guraru – Belaganj 132 kV D/c line (70 ckm)		35	
	v. Guraru – Jehanabad 132 kV D/C line (120 ckm)		60	Time Frame: 2034-35 Reconductoring of Belaganj – Tehta 132 kV S/c line with 1049 Amapacity HTLS conductor in similar time frame of the Guraru S/s. Moreover, decision for the

S.No.	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Time frame
				capacity augmentation of entire section of 132 kV Chandauti – Gaurichak entire section may be taken up after analysing the load growth of related Grids in the time of 2034-2035.

8.2. New transmission lines which are required by 2034-35 are listed at Table 8-2 below.

Table 8-2 New transmission lines of Bihar

S.No	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Time frame
1.	Hajipur (New) - PMCH 132kV D/c line(40ckm)	In order to provide second source connectivity to the critical load of PMCH.	230	2026-27
2.	Begusarai (new) – Begusarai 220 kV D/c cable (1600 sqmm) (30 ckm)	To relieve the congestion in the Intra-state network	100	2032-33
3.	Kaler (ISTS) – Goh 132 kV D/c Single Moose 80 ckm	To relieve the congestion in the Intra-state network	80	2033-34
4.	Sitamarhi (old) – Sitamarhi (new) 132 kV D/c line 20ckm	To relieve the congestion in the Intra-state network	15	2030-31 The bay space at Sitamarhi (old) would be freed up after network rearrangement; Sheohar – Sitamarhi (old) 132 kV S/s line and Sitamarhi (old) –

S.No	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Time frame
				Runnisaidpur 132 kV S/c line would be bypassed at Sitamarhi (Old) S/s to make Sheohar – Runnisaidpur 132 kV S/c line.

8.3. Reconductoring of existing transmission lines which are required by 2034-35 are listed at Table 8-3 below.

Table 8-3 Reconductoring of existing transmission line of Bihar

S.No	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Time frame
1.	Narhat – Nawada 132 kV D/c line (34 ckm)	Due to increased loading in the area reconductoring of this line is required. <ul style="list-style-type: none"> Capacity of Existing conductor- 84 MW Year of commissioning – 2017 Ampacity of HTLS conductor –1049 A 	25	2032-33
2.	Karamnasa (New) - Karamnasa 132 kV D/c line (20 ckm)	Due to increased loading in the area reconductoring of this line is required. <ul style="list-style-type: none"> Capacity of Existing conductor- 84 MW Year of commissioning – 2022 Ampacity of HTLS conductor –1049 A 	15	2032-33 High power flow is observed towards Uttar Pradesh. Uttar Pradesh may require shifting of load.
3.	Murliganj – Saharsa 132 kV S/c line (60 ckm)	Due to increased loading in the area reconductoring of this line is required. <ul style="list-style-type: none"> Capacity of Existing conductor- 84 MW 	45	2034-35

S.No	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Time frame
		<ul style="list-style-type: none"> Year of commissioning – 2024 Ampacity of HTLS conductor –1049 A 		
4.	Chhapra – Amnour 132 kV D/c line (78 ckm)	<p>Due to increased loading in the area reconductoring of this line is required.</p> <ul style="list-style-type: none"> Capacity of Existing conductor- 84 MW Year of commissioning – 2020 Ampacity of HTLS conductor –1049 A 	60	2032-33
5.	Bhita – Bhita (new) 132 kV D/c line (36 ckm)	<p>Due to increased loading in the area reconductoring of this line is required.</p> <ul style="list-style-type: none"> Capacity of Existing conductor- 84 MW Year of commissioning – 2016 Ampacity of HTLS conductor –1049 A 	27	2032-33
6.	Kajra – Jamalpur(New) 132 kV D/c line (130 ckm)	<p>Due to increased loading in the area reconductoring of this line is required.</p> <ul style="list-style-type: none"> Capacity of Existing conductor- 84 MW Year of commissioning – 2016 Ampacity of HTLS conductor –1049 A 	90	2034-35
7.	Muzaffarpur – Garaul 220 kV D/c (40 ckm)	<p>Due to increased loading in the area reconductoring of this line is required.</p> <ul style="list-style-type: none"> Capacity of Existing conductor- 180 MW 	40	2034-35

S.No	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Time frame
		<ul style="list-style-type: none"> Year of commissioning – 2021 Ampacity of HTLS conductor –1593 A 		
8.	Lakhisarai(PG) – Jamui 132 kV D/c (52 ckm)	<p>Due to increased loading in the area reconductoring of this line is required.</p> <ul style="list-style-type: none"> Capacity of Existing conductor- 84 MW Year of commissioning – 2015 Ampacity of HTLS conductor –1049 A 	40	2034-35
9.	Pusauli (PG) – Dumraon (New) 220 kV (9 ckm intra-state portion)	<p>Due to increased loading in the area reconductoring of this line is required.</p> <ul style="list-style-type: none"> Ampacity of Existing conductor- 700 A Year of commissioning – 1978 Ampacity of HTLS conductor –1539 A 	9	2034-35 Intra-STIS Portion: 9 ckm; ISTIS Portion: 41 ckm

8.4. Augmentation of Substations which are required by 2034-35 are listed at Table 8-4 below

Table 8-4 Augmentation of Substations of Bihar

S.No	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Remarks

1.	Augmentation of transformer capacity by replacement of 3x50 MVA ICT with 3x80 MVA at 132/33 kV at Hajipur (old) S/s	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required. Present Loading : 127 MW Existing transformer capacity: 3x50 MVA	33	Transformation Capacity by Time frame: 2025-26: 3x80 MVA
			11	Transformation Capacity by Time frame: 2034-35 : 4x80 MVA
2.	Augmentation of transformer capacity by replacement of 3x50 MVA ICT with 3x80 MVA at Purnea S/s	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required. Present Loading : 125 MW Existing transformer capacity: 3x50 MVA	33	Transformation Capacity by Time frame: 2025-26 : 3x80 MVA
			22	Transformation Capacity by Time frame: 2034-35 : 5x80 MVA
3.	Augmentation of transformer capacity by replacement of 1x50 MVA ICT with 1x80 MVA and adding 1x80 MVA ICT at Dumraon S/s	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required. Present Loading : 80 MW Existing transformer capacity: 2x50 MVA	25	Transformation Capacity by Time frame: 2025-26 : 2x80 +1x50 MVA
			14	Transformation Capacity by Time frame: 2034-2035 : 3x80 +1x50 MVA

4.	Augmentation of transformer capacity by replacement of 1x50 MVA ICT with 1x80 MVA at Raghnathpur S/s	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required. Present Loading : 54 MW Existing transformer capacity: 3x50 MVA	11	Time frame: 2025-26 Total capacity after Augmentation: 2x50+1x80 MVA
5.	Augmentation of transformer capacity by replacement of 2x50 MVA ICT with 2x80 MVA at Muzaffarpur S/s	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required. Present Loading : 110 MW Existing transformer capacity: 3x50	22	Transformation Capacity by Time frame: 2025-26 : 1x50+2x80 MVA
			26	Transformation Capacity by Time frame: 2034-35 : 5x80 MVA
6.	Augmentation of transformer capacity by adding 1x50 MVA ICT at Bodhgaya S/s	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required. Present Loading : 100 MW Existing transformer capacity: 3x50 MVA	6	Transformation Capacity by Time frame: 2025-26 : 4x50 MVA
			2	Transformation Capacity by Time frame: 2034-35 : 2x50+2x80 MVA
7.	Augmentation of transformer capacity by replacement of 2x20 MVA ICT with 2x50 MVA at Goh S/s	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required. Present Loading : 50 MW	12	Transformation Capacity by Time frame: 2025-26: 2x50+1x20 MVA

		Existing transformer capacity: 3x20 MVA		
8.	Augmentation of transformer capacity by replacement of 2x20 MVA ICT with 2x50 MVA at Simri Bhaktiyarpur S/s	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required. Present Loading : 30 MW Existing transformer capacity: 2x20 MVA	12	Time frame: 2025-26 Total capacity after Augmentation: 2x50
9.	Augmentation of transformer capacity by replacement of 2x20 MVA ICT with 2x50 MVA at Tarapur S/s	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required. Present Loading : 30 MW Existing transformer capacity: 2x20 MVA	12	Time frame: 2025-26 Total capacity after Augmentation: 2x50 MVA
10.	Augmentation of transformer capacity by replacement of 2x20 MVA ICT with 2x50 MVA at Tehta S/s	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required. Present Loading : 30 MW Existing transformer capacity: 2x20 MVA	12	Transformation Capacity by Time frame: 2025-26 : 2x50 MVA
			22	Transformation Capacity by Time frame: 2034-35 : 2x80 MVA
11.	Augmentation of transformer capacity by replacement of 2x20 MVA ICT with 2x50 MVA ICTs at Sahupurpatori S/s	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required.	12	Time frame: 2025-2026 Total capacity after

		Present Loading : 30 MW Existing transformer capacity: 2x20 MVA		Augmentation: 2x50 MVA
12.	Augmentation of transformer capacity by replacement of 1x20 MVA ICT with 1x50 MVA at Manjhaul S/s	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required. Present Loading : 32 MW Existing transformer capacity: 1x50+1x20 MVA	06	Time frame: 2025-26 Total capacity after Augmentation: 2x50 MVA
13.	Augmentation of transformer capacity by replacement of 1x20 and 1x50 MVA ICT with 2x80 MVA at Ramnagar S/s	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required. Present Loading : 90 MW Existing transformer capacity: 2x50+1x20 MVA	28	Transformation Capacity by Time frame: 2025-26 : 2x80+1x50 MVA
14.	Augmentation of transformer capacity by replacement of 2x20 MVA ICT with 2x50 MVA at Banka (old) S/s	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required. Present Loading : 70 MW Existing transformer capacity: 1x50+2x20 MVA	12	Transformation Capacity by Time frame: 2025-26 : 3x50 MVA
			22	Transformation Capacity by Time frame: 2034-35 : 2x80 +1x50 MVA
15.	Augmentation of transformer capacity by replacement of 1x20 and	To cater the future load demand and to satisfy N-1 contingency criteria the	22	Time frame: 2025-26

	1x50 MVA ICT with 2x80 MVA at Chakiya S/s	Augmentation is required. Present Loading : 51 MW Existing transformer capacity: 1x50+1x20 MVA		Total capacity after Augmentation: 2x80 MVA
16.	Augmentation of transformer capacity by replacement of 3x50 MVA ICT with 3x80 MVA at Siwan old	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required. Present Loading : 115 MW Existing transformer capacity: 3x50 MVA	33	Time frame: 2025-26 Total capacity after Augmentation: 3x80 MVA
17.	Augmentation of transformer capacity by replacement of 2x50 MVA ICT with 2x80 MVA at Harnaut S/s	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required. Present Loading : 70 MW Existing transformer capacity: 2x50 MVA	22	Time frame: 2025-26 Total capacity after Augmentation: 2x80 MVA
18.	Augmentation of transformer capacity by replacement of 3x50 MVA ICT with 3x80 MVA at SKMCH S/s	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required. Present Loading : 120 MW Existing transformer capacity: 3x50 MVA	33	Time frame: 2025-26 Total capacity after Augmentation: 3x80 MVA
19.	Augmentation of transformer capacity by with additional of 1x80 MVA ICT at Board Colony S/s	To cater the future load demand and to satisfy N-1 contingency criteria the	11	Transformation Capacity by Time frame: 2025-26 : 2x80 MVA

		Augmentation is required. Present Loading : 45 MW Existing transformer capacity: 1x80 MVA		
			13	Transformation Capacity by Time frame: 2034-35 : 3x80 MVA
20.	Augmentation of transformer capacity by replacement of 3x20 MVA ICT with 3x50 MVA at Rosera S/s	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required. Present Loading : 50 MW Existing transformer capacity: 3x20 MVA	18	Time frame: 2025-26 Total capacity after Augmentation: 3x50 MVA
21.	Augmentation of transformer capacity by replacement of 3x20 MVA ICT with 3x50 MVA at Dalsingsarai S/s	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required. Present Loading : 44 MW Existing transformer capacity: 3x20 MVA	18	Time frame: 2025-26 Total capacity after Augmentation: 3x50 MVA
22.	Augmentation of transformer capacity by replacement of 1x20 MVA ICT with 1x80 MVA at Lakhisarai S/s	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required.	11	Transformation Capacity by Time frame: 2025-26 : 1x80+2x50 MVA

		Present Loading : 90 MW Existing transformer capacity: 1x20+2x50 MVA	22	Transformation Capacity by Time frame: 2034-35 : 3x80 MVA
23.	Augmentation of transformer capacity by with additional of 1x500+1x200 MVA ICT at Chappra (new) S/s	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required. Existing transformer capacity: 2x500+2x200 MVA	60	Transformation Capacity by Time frame: 2034-35 : 3x500+3x200 MVA
24.	Augmentation of transformer capacity by replacement of 2x100 MVA ICT with 2x200 MVA at Dehri S/s	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required. Existing transformer capacity: 2x100 MVA	40	Transformation Capacity by Time frame: 2034-35 : 2x200 MVA
25.	Augmentation of transformer capacity by with additional of 1x200 MVA ICT at Narhat	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required. Existing transformer capacity: 2x160 MVA	20	Transformation Capacity by Time frame: 2034-35 : 2x160 MVA + 1x200 MVA
26.	Augmentation of transformer capacity by with additional of 1x200 MVA ICT at Karamnasa (new) S/s	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required. Existing transformer capacity: 2x200 MVA	20	Transformation Capacity by Time frame: 2034-35 : 3x200 MVA
27.	Augmentation of transformer capacity by additional of 1x200 MVA ICT at Khizarisarai S/s	To cater the future load demand and to satisfy N-1 contingency criteria the	20	Transformation Capacity by Time frame:

		Augmentation is required. Existing transformer capacity: 2x160 MVA		2034-35 : 2x160 MVA + 1x200 MVA
28.	Augmentation of transformer capacity by additional of 1x200 MVA ICT at Garaul 220/132kV	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required. Existing transformer capacity: 2x160 MVA	20	Transformation Capacity by Time frame: 2034-35 : 2x160 MVA + 1x200 MVA
29.	Augmentation of transformer capacity by additional of 1x200 MVA ICT at Tajpur S/s	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required. Existing transformer capacity: 2x160 MVA	20	Transformation Capacity by Time frame: 2034-35 : 2x160 MVA + 1x200 MVA
30.	Augmentation of transformer capacity by additional of 2x200 MVA ICT at Dumraon (New) S/s	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required. Existing transformer capacity: 2x160 MVA	40	Transformation Capacity by Time frame: 2034-35 : 2x160 MVA + 2x200 MVA
31.	Augmentation of transformer capacity by replacement of 3x160 MVA ICT with 3x200 MVA at Kishanganj New S/s	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required. Existing transformer capacity: 3x160 MVA	60	Transformation Capacity by Time frame: 2034-35 : 3x200 MVA
32.	Augmentation of transformer capacity by additional of 1x200 MVA ICT at Jakkanpur(New) 220/132 kV S/s	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required.	20	Transformation Capacity by Time frame: 2034-35 : 3x200 MVA

		Transformation capacity before augmentation : 2x200 MVA		
33.	Augmentation of transformer capacity by additional of 1x500 MVA ICT at Jakkanpur(New) 400/220 kV S/s	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required. Transformation capacity before augmentation: 2x500 MVA	40	Transformation Capacity by Time frame: 2034-35 : 3x500 MVA
34.	Augmentation of transformer capacity by additional of 1x100 MVA ICT at Bhusaula S/s	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required. Existing transformer capacity: 2x100 MVA	15	Transformation Capacity by Time frame: 2034-35 : 3x100 MVA
35.	Augmentation of transformer capacity by additional of 1x500 MVA ICT at Naubatpur 400/220 kV S/s	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required. Existing transformer capacity: 2x500 MVA	40	Transformation Capacity by Time frame: 2034-35 : 3x500 MVA

Note: The augmentation will be taken up for implementation progressively from 2025-2026 depending upon actual load demand and availability of space for installation of Transformer along with associated bays.

- 8.5. System studies has indicated that fault level at Biharsharif 220 kV Bus is on higher side. In order to limit the fault level in permissible range, BSPTCL is required to implement Bus-split arrangement at 200 kV level at this sub-station in a required time frame.
- 8.6. The power map of the state, including the above planned system is attached at **Annexure-III.**

9. Reactive Power Management

- 9.1. The requirement of 300 MVar STATCOM at Naubatpur 400 kV has been identified for reactive power compensation. Further, system studies of the State has identified the Reactive power compensation requirement by 2034-35 at distribution level (33 kV or 11 kV).
- 9.2. The following reactive power compensation requirements have been identified for implementation alongside the recommended Intra-state transmission system

Table 9-1 Reactive power compensation requirement

Sl. No	Name of the Substation/Node	Compensation requirement at downstream Distribution level (in MVar)
1.	NAUBATPUR 400/220 kV GIS (Intra-STC)	300 MVar STATCOM at 400 kV level shall be implemented by BSPTCL in suitable timeframe
2.	BOARD COLONY 132 kV	2x30 MVar Capacitor
3.	BHAWANIPUR 132 kV	2x30 MVar Capacitor
4.	BIKRAMGUNJ 132 kV	2x30 MVar Capacitor
5.	DAUDNAGAR 132 kV	2x30 MVar Capacitor
6.	DIGHA_NEW 132 kV	2x24 MVar Capacitor
7.	EKMA 132 kV	1x30 MVar Capacitor
8.	FORBESGANJ 132 kV	1x30 MVar Capacitor
9.	HAZIPUR 132 kV	2x30 MVar Capacitor
10.	JAKKANPUR 132 kV	1x30 MVar Capacitor
11.	JAKKANPUR-NW 132 kV	2x30 MVar Capacitor
12.	KANKARBAGH 33 kV	1x24 MVar Capacitor
13.	KATAIYYA 132 kV	2x30 MVar Capacitor
14.	KATRA 132 kV	2x30 MVar Capacitor
15.	KHAGARIA 132 kV	2x30 MVar Capacitor
16.	KUSHESHWARSTHAN 132 kV	1x30 MVar Capacitor
17.	MAHNAR 132 kV	1x30 MVar Capacitor
18.	MAHUA 132 kV	1x30 MVar Capacitor
19.	MASAUHI 132 kV	2x30 MVar Capacitor
20.	MITHAPUR 132 kV	2x30 MVar Capacitor
21.	NARKATIYAGANJ 132 kV	2x30 MVar Capacitor
22.	NAUGACHIA 132 kV	2x30 MVar Capacitor
23.	RAMNAGAR 132 kV	2x30 MVar Capacitor

24.	SIPARA 132 kV	1x30 MVar Capacitor
25.	SIWAN 132 kV	2x30 MVar Capacitor
26.	SUPAUL 132 kV	1x30 MVar Capacitor
27.	TRIVENIGANJ 132 kV	2x30 MVar Capacitor

10. Inter-state Transmission system (ISTS) requirement by 2034-35.

10.1. New substations alongwith their associated transmission lines which are required by 2034-35 are listed at Table 10-1 below

Table 10-1 New ISTS substations alongwith their associated transmission lines in Bihar

S.No.	Transmission System	Justification	Time frame
1.	i. Establishment of Kaler 400/220/132 kV, 2x500+2x200 MVA Substation	Dual Connectivity of Nabinagar Thermal Power Plant.	2028-29
	ii. Nabinagar III – Kaler (ISTS) 400 kV D/c Dedicated Transmisison line		
	iii. Kaler – Banka (PG) 400 kV D/c line		
2.	i. Establishment of Katihar 400/220 kV, 2x500 MVA Substation	Requirement in ISTS to meet the future demand of State.	2031-32 (Space for creation of 765 kV level shall be kept)
	ii. Katihar – Purnea (PG) 400 kV D/c line		
	iii. Katihar – Farakka 400 kV S/c line		
	iv. Katihar – Gokarna 400 kV S/c line		

10.2. Reconductoring of existing transmission lines which are required by 2034-35 are listed at Table 10-2 below

Table 10-2 Reconductoring of existing ISTS transmission line in Bihar

S.No	Transmission System	Justification	Time frame
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1.	Pusauli (PG) – Dumraon (New) 220 kV (41 ckm ISTS portion)	<p>Due to increased loading in the area reconductoring of this line is required.</p> <ul style="list-style-type: none"> • Ampacity of Existing conductor- 700 A • Ampacity of HTLS conductor – 1539 A 	<p>2034-35</p> <p>Intra-STS Portion: 9 ckm; ISTS Portion: 41 ckm</p>
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10.3. Augmentation of Substations which are required by 2034-35 are listed at Table 10-3 below

Table 10-3 Augmentation of ISTS Substations in Bihar

S.No	Transmission System	Justification	Remarks
1.	Augmentation of transformer capacity by replacement of 2x200 MVA ICT with 2x315 MVA at 400/220 kV at Motihari (ISTS) S/s	<p>To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required.</p> <p>Existing transformer capacity: 2x200 MVA</p>	<p>Transformation Capacity by Time frame:</p> <p>2034-35 : 2x315 MVA</p>
2.	Augmentation of transformer capacity with additional 3 rd 1x500 MVA ICT at 400/220 kV at Kishanganj (ISTS) S/s	<p>To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required.</p> <p>Existing transformer capacity: 2x500 MVA</p>	<p>Transformation Capacity by Time frame:</p> <p>2034-35 : 3x500 MVA</p>
3.	Augmentation of transformer capacity with additional 3 rd 1x200 MVA ICT at 220/132 kV at Saharsa (new) (ISTS) S/s	<p>To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required.</p> <p>Existing transformer capacity: 2x200 MVA</p>	<p>Transformation Capacity by Time frame:</p> <p>2034-35 : 3x200 MVA</p>

S.No	Transmission System	Justification	Remarks
4.	Augmentation of transformer capacity with additional 3 rd 1x200 MVA ICT at 220/132 kV switchyard of Barauni TPS of NTPC	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required. Existing transformer capacity: 2x160 MVA	Transformation Capacity by Time frame: 2034-35 : 1x200+2x160 MVA The augmentation to be implemented by Generating Company

11. Summary of identified transmission system by 2034-35:

11.1. A total of 23,430 MVA transformation capacity addition/augmentation and 5,422 ckm of new transmission lines and 459 ckm of reconductoring of old lines at an estimated cost of Rs 12869.2 Crs. would be required for implementing the intra-state transmission proposals for meeting the electricity demand of the state by the year 2034-35.

The summary of voltage wise identified transmission system of the state by 2034-35 is as below:

11.1.1. 400 kV Transmission system

S.No	Transmission system	Nos.	Length (in ckm)	Capacity (in MVA)	Estimated Cost (Rs. Cr.)*
1.	New substation	4	–	7260	2150
2.	Augmentation of existing substation	3	–	1700	140
3.	New transmission line including LILO and 2 nd Ckt Stringing	9	1530	–	2175
4.	Reconductoring of transmission line	–	–	–	–

11.1.2. 220 kV Transmission system

S.No	Transmission system	Nos.	Length (in ckm)	Capacity (in MVA)	Estimated Cost (Rs. Cr.)*
1.	New substation	13	–	5680	2792.55
2.	Augmentation of existing substation	10	–	2700	275
3.	New transmission line including LILO and 2 nd Ckt Stringing	19	1776	–	1656.6

4.	Reconducting transmission line	of	2	49	–	49
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11.1.3. 132 kV Transmission system

S.No	Transmission system	Nos.	Length (in ckm)	Capacity (in MVA)	Estimated Cost (Rs. Cr.)*	
1.	New substation	14	–	2180	1256.43	
2.	Augmentation of existing substation	22	–	3910	578	
3.	New transmission line including LILO and 2 nd Ckt Stringing	27	2116	–	1494.62	
4.	Reconducting transmission line	of	7	410	–	302

11.2. Summary of year-wise MVA capacity, ckm addition and tentative expenditure required for implementation of above recommended proposals is given at Table 11-1 below:

Table 11-1 Year-wise ckm, MVA and investment requirement

Year	Capacity Addition (in MVA)			Transmission line addition (in ckm)			Reconducting (in ckm)		Estimated Cost (in Rs. Cr.)
	132 kV	220 kV	400 kV	132 kV	220 kV	400 kV	132 kV	220 kV	
2025-26	2920	–	–	–	–	–	–	–	404
2026-27	100	–	–	70	–	–	–	–	341.39
2027-28	320	400	–	310	540	–	–	–	816.06
2028-29	320	860	–	176	32	–	–	–	780.75
2029-30	–	760	2060	140	124	80	–	–	1300
2030-31	160	1580	2100	350	530	230	–	–	2549
2031-32	320	1320	–	350	260	–	–	–	1228
2032-33	480	760	3100	290	290	1220	168	–	4107
2033-34	480	–	–	310	–	–	–	–	470
2034-35	1240	2700	1700	120	–	–	242	49	873
Total	6340	8380	8960	2116	1776	1530	410	49	12869.2

12. Conclusion

12.1. By the year 2034-35, the power demand of Bihar would be increasing significantly. Total expected demand of Bihar by the year 2034-35 is around 18,700 MW. This anticipated increase in demand includes the expected industrial load coming progressively from 2024-25 to 2034-35.

- 12.2. About 02 Nos. of Thermal power projects and 03 solar projects connected with Intra-state transmission network and 01 Nos. of Thermal project with dual connectivity are expected to be commissioned by 2034-35.
- 12.3. In order to meet this growing load demand, evacuation of power from solar and thermal generation and for drawal of power from ISTS in accordance with GNA requirement of Bihar by 2034-35, the intra-state as well as inter-state transmission system of the state need to be strengthened. It has been observed that the transmission system infrastructure in Bihar at voltage levels of 132 kV, 220 kV and 400 kV needs to be upgraded.
- 12.4. The State is also advised to plan its downstream network at distribution level in matching timeframe with this planned transmission system.
- 12.5. At some of the sub-stations there may be low voltage issues due to long lines the State is advised to installed suitable capacitor at distribution level (i.e. 33 kV or 11 kV level). The compensation requirement is given at Paragraph-9 above in this report.
- 12.6. It is recommended that Bihar shall update their intra-state transmission systems on the PM GatiShakti (PMGS) National Master Plan on regular basis.
- 12.7. The quantum of GNA is nearing the ATC of the Bihar and demand of the state is increasing, therefore, the state is advice to take up their transmission system strengthening progressively. As per CERC (Connectivity and General Network Access to the Inter-State Transmission System) Regulations, 2022 States (STUs) may apply for additional GNA once in a financial year by the month of September for the next 3 (three) financial years. Therefore, it is suggested that State shall asses their GNA requirement and apply well before considering the timelines prescribed in the regulations.
- 12.8. A total of 13,220 MVA transformation capacity addition/augmentation and 3,192 ckm of new transmission lines/cabling at an estimated cost of ₹ 7,419.20 cr. would be required for implementing the intra-state transmission proposals for meeting the electricity demand of the state by the year 2031-32.
- 12.9. Further, a total of 23,430 MVA transformation capacity addition/augmentation and 5,422 ckm of new transmission lines and 459 ckm reconductoring of old lines at an estimated cost of ₹ 12,869.20 cr. would be required for implementing the intra-state transmission proposals for meeting the electricity demand of the state by the year 2034-35.
- 12.10. To ensure reliable and adequate power supply in Bihar by 2034-35, a robust and resilient transmission network becomes critical. The outlined plan, if implemented timely, will ensure resource adequacy and support economic and industrial development in the state.

Annexure-I

Operational Feedback from Bihar SLDC.

a) Bihar SLDC has observed overloading (i.e. >80% of rated capacity) at following substations.

S. No.	132/33 kV Sub-station	Present capacity(in MVA)	Peak load(in MW)
1.	GSS Hajipur (Old)	3x50= 150 MVA	127
2.	Purnea	3x50=150 MVA	125
3.	Dumraon	2x50=100 MVA	80
4.	Siwan old	3x50=150 MVA	115
5.	Muzaffarpur	3x50=150 MVA	110
6.	Harnaut	2x50=100 MVA	70
7.	SKMCH	3x50=150 MVA	120
8.	Board Colony	1x80= 80 MVA	45
9.	Goh	3x20= 60 MVA	50
10.	Rosera	3x20=60 MVA	50
11.	Manihari	2x20=40 MVA	32
12.	Shahpurpatori	2x20=40 MVA	30
13.	Tarapur	2x20=40 MVA	30
14.	Tehta	2x20=40 MVA	30
15.	SimriBakhtiyarpur	2x20=40 MVA	30
16.	Dalsingsrarai	3x20=60 MVA	44
17.	Lakhisarai	2x50+1x20=120	90
18.	Ramnagar	2x50+1x20=120	90
19.	Banka Old	2x20+1x50=140	70
20.	Chakiya	1x20+1x50=70	51

b) The following transmission lines are not compliant of N-1 Contingency Criteria.

S.No.	Name of transmission line
1.	Piro - Bikramganj132 kV
2.	Maharajganj - Mashrakh132 kV
3.	Mahnar - Jandaha132 kV
4.	Pupri - Benipatti132 kV

5.	Benipur–Kusheshwarsthan132 kV
6.	Chakia - Motipur132 kV
7.	Pakridayal - Dhaka 132 kV
8.	Teghra - Begusarai132 kV
9.	Sonbarsa - Simri Bhaktiyarpur132 kV
10.	Kishanganj (New) –Barsoi132 kV
11.	Bakhri - Begusarai 132 kV S/c

Annexure-II

Operational feedback from ERLDC/NLDC

a) Constraints in Transmission Lines in Bihar 220 kV and above system

Sl. No	Corridor	Season/ Antecedent Conditions	Actions to be taken
1	220 kV Sasaram(PG)-Pusauli New(BSPTCL) D/C	High load in Nadokhar (Pusauli New)	Reconductoring of 220kV Sasaram-Pusauli line 1 & 2 have been completed on 05.04.2024 and 10.08.2024. Constraint will be relieved post upgradation of bay equipment. As per SLDC, the upgradation work is under progress.
2	220 kV Gaya(PG) -Bodhgaya (BSPTCL)D/C	Peak Demand Period in Bihar	Presently, 400 kV line of Gaya-NPGC has been made LILO at 400/220 kV Chandauti S/s. 220 kV Gaya-Sonenagar D/C has been made LILO at 220 kV Chandauti. 220 kV Gaya-Chandauti D/C would be further LILOed at Bodhgaya. Commissioning of 2nd 220 kV Gaya-Bodhgaya D/C post-LILO will make these circuit N-1 secure. The LILO work is expected to be completed by July 2025.

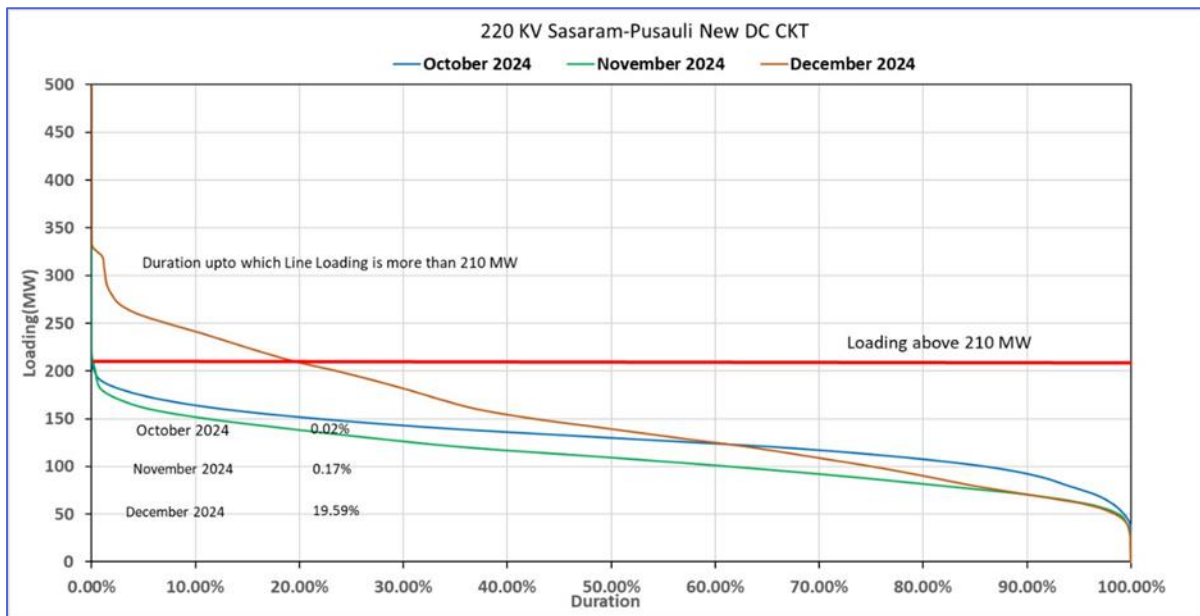


Figure 0-1: Line duration curve of 220kV Sasaram-Pusauli New (Nadokhar) D/C

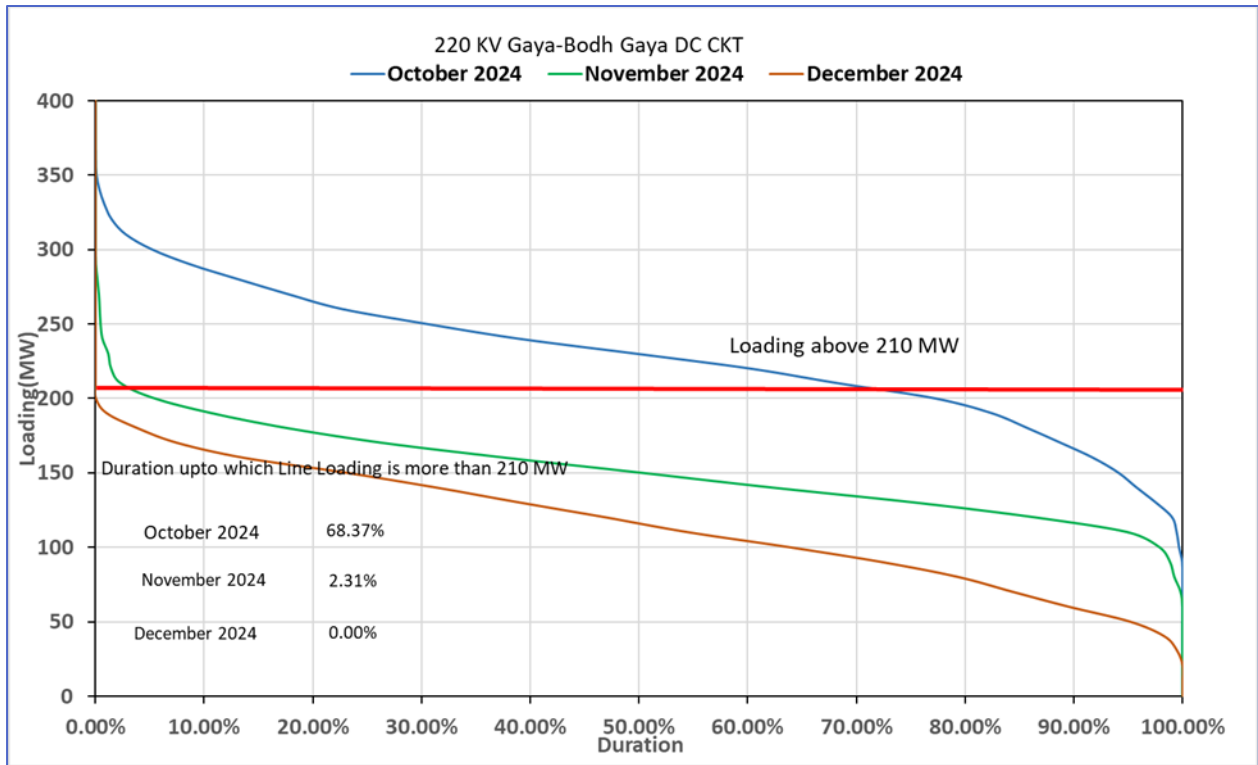


Figure 0-2: Line duration curve of 220kV Gaya-Bodh gaya D/C

b) ICT constraints in Bihar system

Sl. No	ICT	Season/ Antecedent Conditions	Actions to be taken
NIL			

c) High voltage issues in Bihar system

Sl. No	Nodes	Season/ Antecedent Conditions	Actions to be taken
1	765 kV Sasaram (PG) 400 kV Saharsa (PMTL – ISTS Bihar)	High voltage observed during winter period for very short period of time.	<ol style="list-style-type: none"> 1. Reactive power planning may be done. 2. As a short-term measure, lightly loaded lines connected to these S/S can be opened.

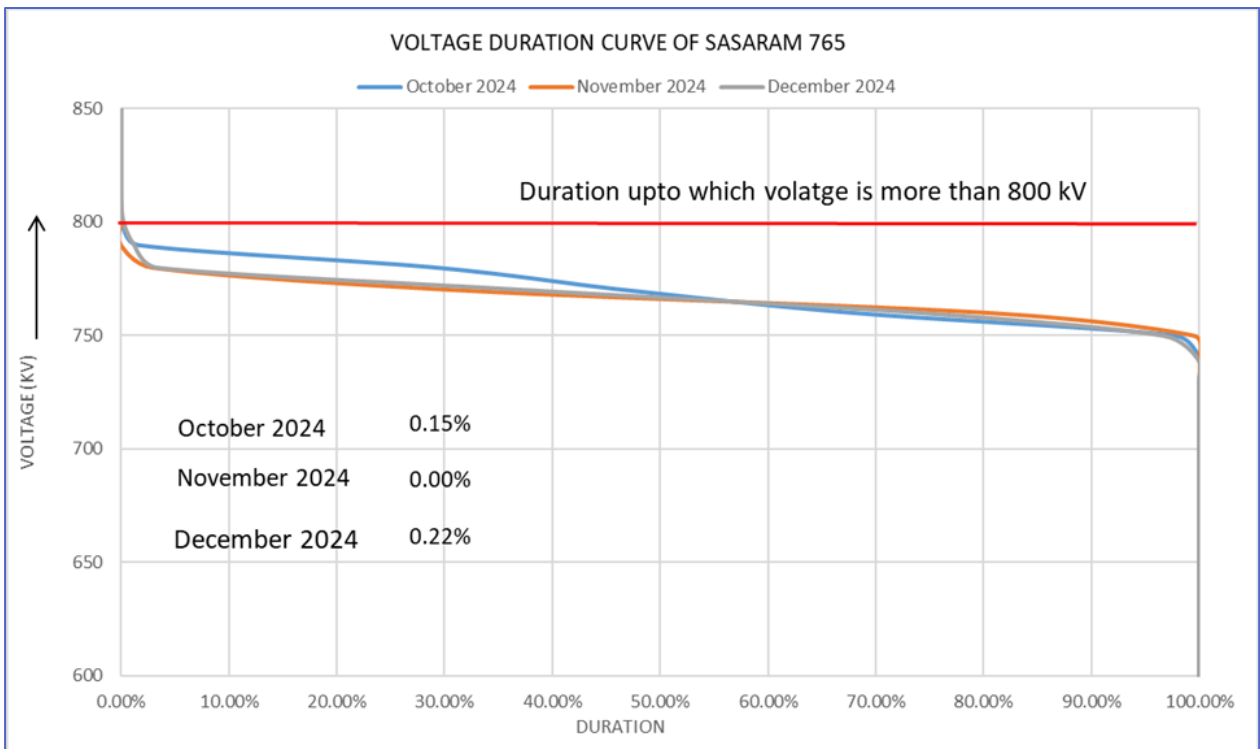


Figure 0-3: Voltage duration curve of 765kV Sasaram

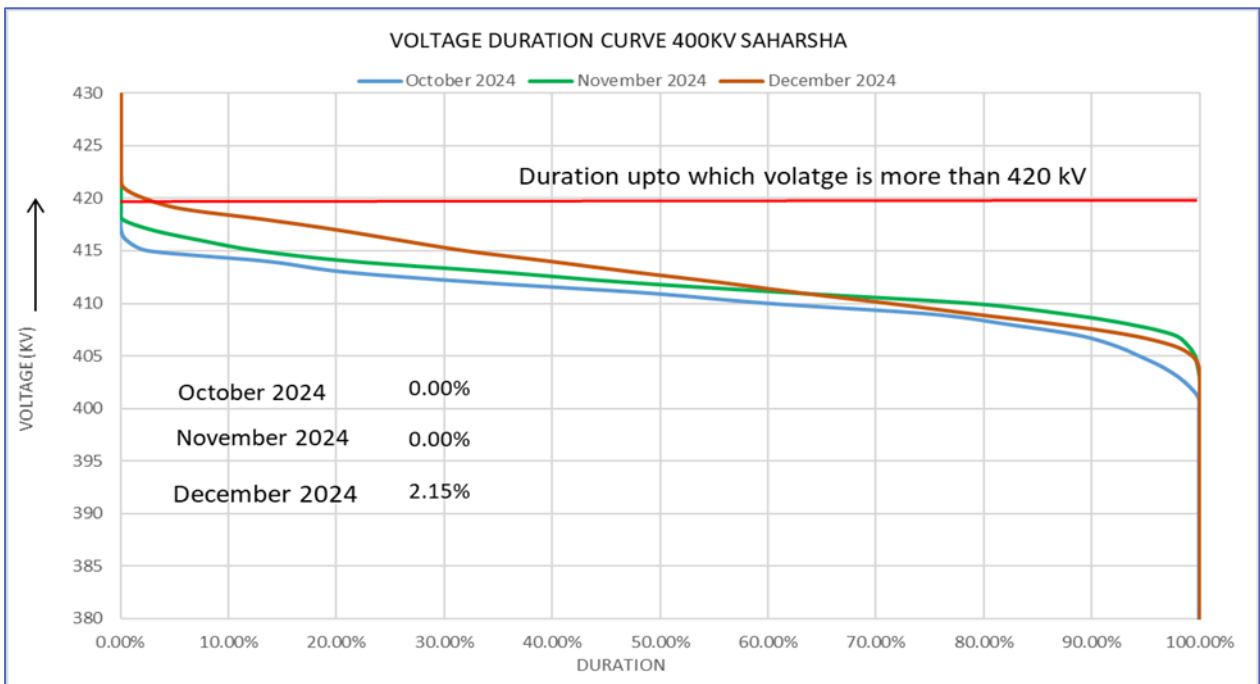
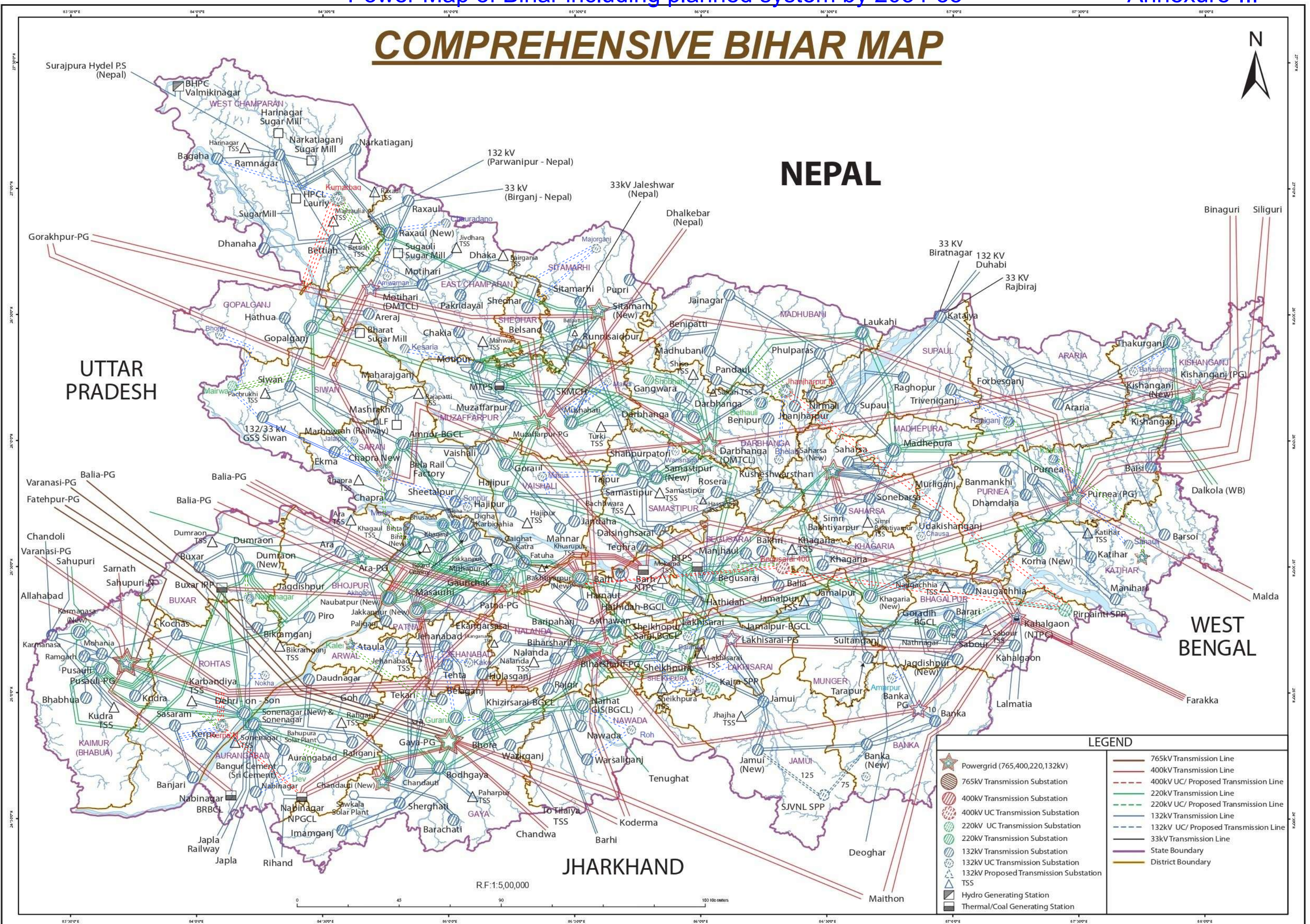


Figure 0-4: Voltage duration curve of 400kV Sasaram

COMPREHENSIVE BIHAR MAP



LEGEND	
	Powergrid (765,400,220,132kV)
	765kV Transmission Line
	400kV Transmission Line
	400kV UC/ Proposed Transmission Line
	220kV Transmission Line
	220kV UC/ Proposed Transmission Line
	132kV Transmission Line
	132kV UC/ Proposed Transmission Line
	33kV Transmission Line
	State Boundary
	District Boundary
	765kV Transmission Substation
	400kV Transmission Substation
	400kV UC Transmission Substation
	220kV UC Transmission Substation
	220kV Transmission Substation
	132kV Transmission Substation
	132kV UC Transmission Substation
	132kV Proposed Transmission Substation
	TSS
	Hydro Generating Station
	Thermal/Coal Generating Station