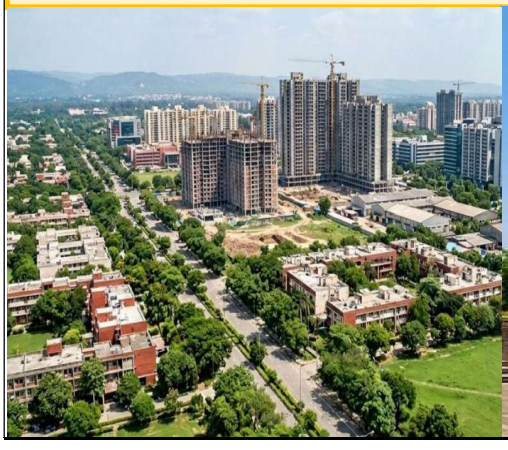
Government of India

Ministry of Power

Central Electricity Authority

Resource Adequacy Plan for Transmission System of Chandigarh up to the year 2034-35



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Executive Summary

The Union Territory of Chandigarh, a planned city, also known as the city beautiful, serving as the capital of both Punjab and Haryana, has witnessed a steady growth in electricity demand driven by urban development, increasing consumer load, EV penetration and expansion of commercial activities. A robust and reliable transmission/distribution network is essential to meet the future electricity requirements of the city and to ensure uninterrupted and quality power supply to consumers.

Chandigarh does not have any conventional power generation station of its own and primarily depends on power imports from the Inter-State Transmission System (ISTS) and neighboring states. However, the city has made significant progress in the deployment of distributed solar energy, with an installed solar capacity of about 95 MW under rooftop solar/DRE. The peak electricity demand of Chandigarh reached an all-time high of 464 MW during FY 2025-26, compared to 449 MW in FY 2024-25. As per the revised 20th Electric Power Survey (EPS), the peak demand is projected to increase to 524 MW by 2029-30 and further to 558 MW by 2034-35. However, CPDL has envisaged higher demand for the UT as compared to the EPS projections.

A comprehensive assessment of Chandigarh's transmission/distribution network, including both Intra-State and Inter-State systems, has been carried out by the Central Electricity Authority (CEA) in association with Chandigarh Power Distribution Limited (CPDL), CTUIL and Grid India. The Resource Adequacy Plan identifies the transmission/distribution infrastructure required to reliably meet the projected electricity demand up to 2034-35. The studies have been carried out on the basis of data/inputs furnished by CPDL.

The studies highlighted certain operational constraints in the existing network, voltage regulation issues in parts of the distribution network, and transmission line constraints in the upstream network. Based on load flow and contingency studies, substantial strengthening of the transmission system of UT has been planned. During the period 2025-26 to 2029-30, addition of about 461.5 MVA (66 kV & above) of transformation capacity, construction of approximately 65 ckm of 66 kV transmission lines, establishment of new substations, and upgradation of few existing 33 kV systems to 66 kV voltage level have been proposed. Further, mitigation measures for Reactive power management, such as installation of capacitor banks and Static Var Generators (SVGs) has been suggested.

For the period 2030-31 to 2034-35, additional augmentation of 272.5 MVA of transformation capacity at 66 kV voltage level & above, and reconductoring of existing transmission line with HTLS conductors have been recommended to accommodate future load growth and maintain system reliability under contingency conditions.

The proposed transmission expansion plan will enhance network reliability, improve operational flexibility, optimize utilization of existing assets, facilitate future demand growth, and ensure secure power supply to Chandigarh up to the year 2034-35.

Chapter-1

Power supply scenario in Chandigarh and projected electricity demand

1.1 Background

The state of Punjab was reorganized into Punjab, Haryana, Himachal Pradesh, and Chandigarh in 1966 and Chandigarh assumed the unique distinction of being the capital city of both, Punjab and Haryana, while it itself was declared as a Union Territory (UT) and under the direct control of the Central Government. The city of Chandigarh is located in the foothills of Shivalik and has a very small area of 114 sq kms and a population of about 10 Lakhs.

The demand for electricity in Chandigarh has experienced a steady increase over the past decade, driven by rapid urbanization, population growth, rising living standards, and the expansion of commercial activities and public infrastructure. The widespread use of air conditioners, household appliances, information technology equipment, electric vehicles, and other electrical devices has significantly contributed to the growth in electricity consumption. Seasonal variations also influence demand patterns, with the highest peak loads occurring during the summer months when cooling requirements increase substantially. In contrast, electricity demand during the winter season remains relatively lower, although the use of heating appliances and lighting contributes to moderate seasonal peaks.

Chandigarh does not possess any major conventional electricity generation station within its geographical boundaries and is therefore entirely dependent on power procured from external generating stations. The electricity requirements of the Union Territory are met through an allocated share of power from various central generating stations, including thermal, hydroelectric, and renewable energy projects, transmitted through the Northern Regional Grid. The city receives electricity at Extra High Voltage (EHV) substations, from where it is stepped down and distributed to consumers through a well-developed network of 66 kV, 33 kV, 11 kV, and low-voltage distribution systems. Continuous strengthening of substations, augmentation of transformer capacity, installation of underground cables in selected areas, adoption of smart metering, and implementation of modern grid management practices significantly enhances the reliability and quality of power supply. Furthermore, Chandigarh has promoted rooftop solar photovoltaic installations and energy-efficient technologies to supplement its imported electricity and reduce dependence on conventional sources.

As electricity demand is expected to continue growing due to economic development, urban expansion, and increasing electrification of transport and buildings, Chandigarh is expected to focus further on grid modernization, smart grid technologies, renewable energy deployment, battery energy

storage, and sustainable power management to ensure a secure, efficient, and environmentally responsible electricity supply in the future.

The complete system (transmission as well as distribution) of Chandigarh has been operated by CPDL, the 220 kV & 66 kV system in Chandigarh has been considered as transmission as well distribution system interchangeably in this report.

1.2 Present Power Scenario in Chandigarh

1.2.1 Installed Generation Capacity

The UT of Chandigarh does not have any power generating station in its territory. It imports the power from the neighboring states & ISTS through its connections with the NR Grid. It has to rely solely on the contracted/allocated generation capacity located in other States. However, in the recent years after the launch of PM Surya Ghar Yojna and PM Kusum Yojna the total solar installed capacity has reached to 95 MW in the form of DRE. *(Source: CPDL)*

1.2.2 Electricity Demand of Chandigarh

Chandigarh being the UT in the plain areas just beneath the foothills of Himalayas experiences peak electricity demand in the summer months of June and July. The demand during the solar hours in these months is significantly higher than in the rest of the year. In the summer seasons, the peak demand is observed during the afternoon and early evening hours; however, the demand significantly drops during early morning hours. In the winter seasons, the peak demand is observed during early morning and evening hours.

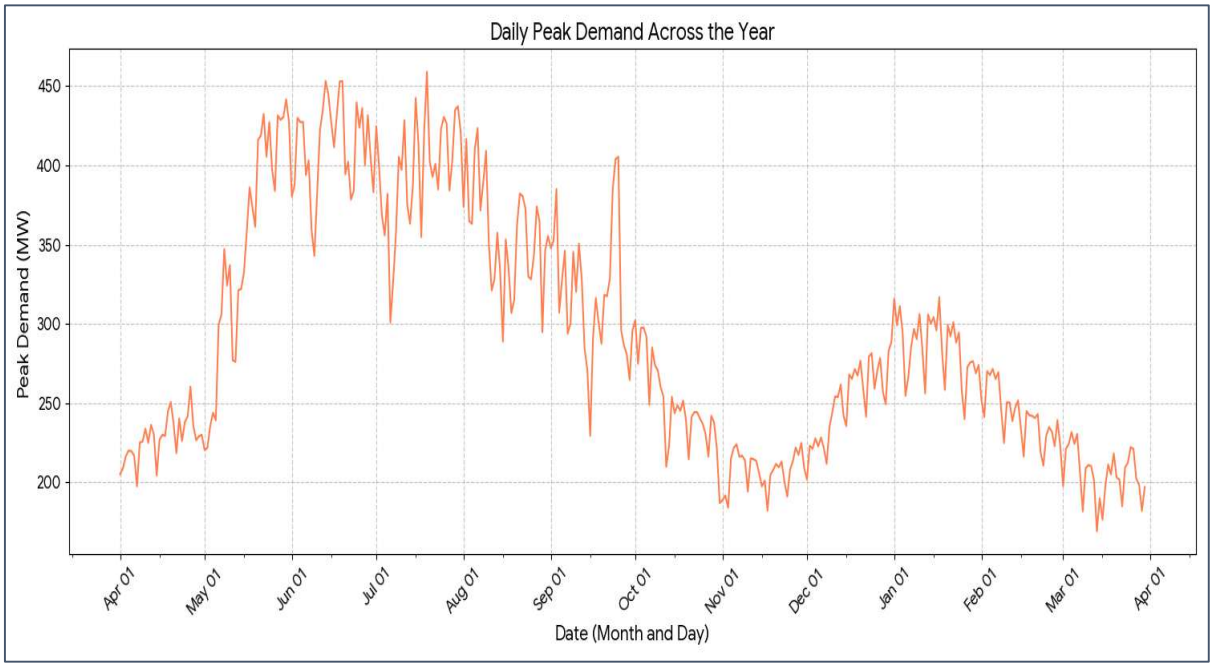

Figure 1.1: Daily peak demand in Chandigarh for the year 2024-25

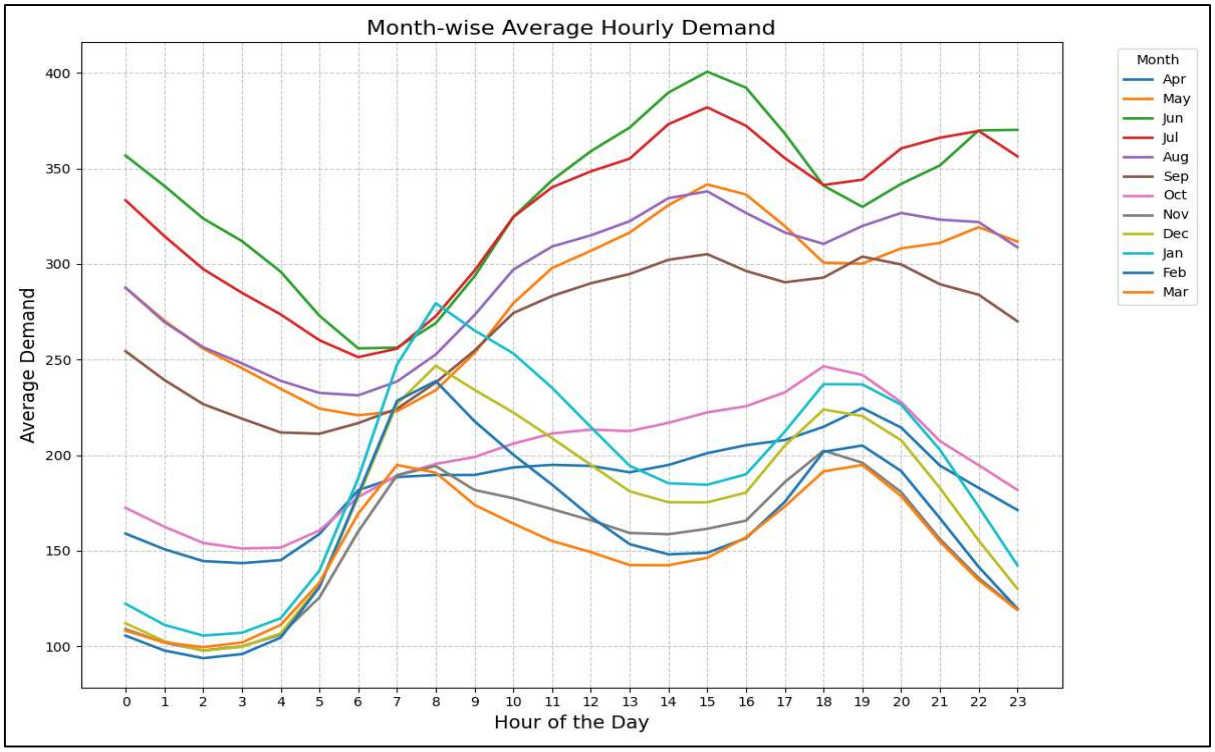

Figure 1.2: Average hourly demand for each month during 2024-25

Till date, Chandigarh has witnessed an all-time high peak demand of 464 MW in the month of June 2025, which is about 2.4% higher than the peak demand of 449 MW in the month of June 2024. From

the analysis of peak demand of Chandigarh for past 10 years, it has been observed that peak demand of Chandigarh had average growth rate of 3.2% per year.

The recorded peak demand of Chandigarh for ten years starting from FY 2015-16 to FY 2025-26 is given in the Table 1.2.

Sr. No.	Year	Peak Demand (MW)
1	2015-16	342
2	2016-17	361
3	2017-18	363
4	2018-19	369
5	2019-20	431
6	2020-21	383
7	2021-22	426
8	2022-23	407
9	2023-24	411
10	2024-25	449
11	2025-26	464

Table 1.1: Recorded Peak Demand of Chandigarh

1.3 Projected Electricity Demand of Chandigarh

As per the revised 20th Electric Power Survey (EPS) Report, peak electricity demand is projected to increase to 524 by 2029-30 and 558 MW by 2034-35. Year wise projected electricity demand of Chandigarh is given in the Table 1.3 below:

Sl. No.	Year	Projected Peak electricity demand (MW)
1	2026-27	488
2	2027-28	498
3	2028-29	511
4	2029-30	524
5	2030-31	530
6	2031-32	534
7	2032-33	542

Sl. No.	Year	Projected Peak electricity demand (MW)
8	2033-34	550
9	2034-35	558

Table 1.2: Projected electricity demand in Chandigarh

1.4 Existing Transmission Network in Chandigarh

Chandigarh has 2 Nos. of 220 kV substations at Kishangarh(CPDL) and Hallo Majra(ISTS) and 15 Nos. of 66 kV sub-stations. At present, Chandigarh has ATC (Available Transfer Capacity) of 460 MW against operationalized GNA (General Network Access) of 342 MW (as of June, 2026).

1.4.1 Intra-State Transmission System in Chandigarh

The details of the existing transmission system which includes the number of Grid sub- station (GSS), transformation capacity (MVA), length of transmission lines (circuit kilometer) is shown in Table below.

Substations: Chandigarh has total 18 numbers of GSS.

S. No.	Voltage Level	No of Substation	Transformation capacity (in MVA)
1	220kV (Kishangarh/Mani Majra)	1	300
2	66 kV	15	612.5
3	33 kV	2	89
	Total	18	1001.5

Table 1.3: Existing transmission system (Substations) (CPDL)

Sl. No.	GSS Name	Voltage Level
1	Kishangarh	220kV/66kV
2	Sector-1	66kV/11kV
3	Sector-12	66kV/11kV
4	Sector-18	66kV/11kV, 66kV/33kV, 33kV/11kV
5	Sector-32	66kV/11kV
6	Sector-34	66kV/11kV, 33kV/11kV
7	Sector-39	66kV/11kV
8	Sector-47	66kV/11kV
9	Sector-52	66kV/11kV, 66kV/33kV

10	Sector-56	66kV/11kV
11	Industrial Area Ph-I (66kV/11kV)	66kV/11kV
12	Industrial Area Ph-II	66kV/11kV
13	I.T Park	66kV/11kV
14	Mani Majra	66kV/11kV
15	Sarangpur	66kV/11kV

Table 1.5: List of substations

Transmission/Distribution Lines:

S.No.	Voltage Level	Total line length (in ckm)
1	220kV (Kishangarh/Mani Majra)	108
2	66 kV	405
3	33 kV	68
	Total	**581**

Table 1.4: Existing transmission system (Transmission Lines) (CPDL)

Capacitor Banks: The capacitor banks are installed on the 11/33 kV voltage level. Rating of capacitor banks varies from 2.5 to 5 MVAR at 11 kV Voltage level and 5 to 10 MVAR at 33 kV voltage level. Total 47 nos. capacitor banks have been installed in the CPDL network with total capacity of 221 MVAR.

Sl. No.	Substation	Voltage (kV)	Capacity (MVAR)
1	B.B.M.B Sector-28	33	10
2	B.B.M.B Sector-28	33	10
3	B.B.M.B Sector-28	33	4.8
4	Sector-52	11	5
5	Sector-52	11	5
6	Sector-52	11	6
7	Sector-52	11	10
8	Sector-39	11	5
9	Sector-39	11	5
10	Sector-39	11	2.5
11	Sector 56	11	4.8
12	Sector 56	11	4.8
13	Sector-12	11	2.5

14	Sector-12	11	2.5
15	Sector-12	11	5
16	Sector-12	11	5
17	Sector-1	11	5
18	Sector-1	11	5
19	Ind. Area Ph. 1	11	2.5
20	Ind. Area Ph. 1	11	2.5
21	Ind. Area Ph. 1	11	2.5
22	Ind. Area Ph. 1	11	4.8
23	Ind. Area Ph. 2	11	2.5
24	Ind. Area Ph. 2	11	5
25	Ind. Area Ph. 2	11	4.8
26	Sector-32	11	2.5
27	Sector-32	11	5
28	Sector-32	11	10
29	Sector-47	11	5.0
30	Sector-47	11	4.8
31	Mani-Majra	11	5.94
32	Mani-Majra	11	5.94
33	I.T. Park	11	3
34	I.T. Park	11	3
35	I.T. Park	11	5
36	Sector-18	11	2.5
37	Sarangpur	11	5
38	Sarangpur	11	5
39	Sector-17	11	5
40	Sector-17	11	2.5
41	Sector-17	11	5
42	Sector-18	11	5
43	Sector-34	11	3
44	Sector-34	11	6
45	Sector-37	11	3

46	Sector-37	11	3
47	Ind.Area Ph.1	11	3
	Total Capacity		**220.68**

Table 1.5: The details of Capacitor Bank in CPDL network

1.4.2 ISTS/NR Grid Connectivity in Chandigarh

The detail of existing ISTS/BBMB/NR Grid connectivity network with Chandigarh is given in Table 1.6 and Table 1.7:

S.No.	Name of Substation	Voltage level	Transformation Capacity (MVA)
ISTS			
1	Hallo Majra (PGCIL)	220/66 kV	320
Other states			
2	Mohali (PSTCL)	220/66 kV	480
BBMB			
3	Sec-28 (BBMB)	66/33 kV	60
		66/11 kV	45
		Total	905

Table 1.6: Existing NR Grid Connectivity of Chandigarh

S.No.	Voltage level	Name of the Line	Line length (in ckm)
1	220 kV	Nallagarh - Kishangarh	108
2	66 kV	Dhulkote - Chandigarh (BBMB)	90
	Total		**198**

Table 1.7: Existing ISTS/BBMB transmission lines

S. No.	Upstream Grid name	Import Feeder Details	Ckt Capacity (MVA)
1	220/66 Dhulkote (BBMB)	66kV Dhulkote - Sec-28 Chandigarh(BBMB) -Ckt1	20
		66kV Dhulkote - Sec-28 Chandigarh(BBMB)-Ckt2	20
2	220/66 KV Kishangarh (CPDL)	220kV Nalagarh(PG) – Kishangarh(UT) – Ckt1	240
		220kV Nalagarh(PG) – Kishangarh(UT) – Ckt2	240
3	220/66 kV Mohali (PSTCL)	66 kV Mohali – Sec-39(UT) – Ckt1	60
		66 kV Mohali – Sec-39(UT) – Ckt2	60
		66 kV Mohali – Sec-52(UT)	60
		66 kV Mohali – Sec-56(UT)	60

4	220/66 KV Hallo Majra (PGCIL)	66kV Hallo Majra - INA Ph -1	60
		66kV Hallo Majra - INA Ph -2	60
	Total		**880**

Table 1.8: Existing import feeders connecting Chandigarh with the NR Grid:

1.5 Constraints in Transmission Network in Chandigarh:

Major Operational constraints in the import feeding system to Chandigarh is given below:

S. No.	Major Constraints	Remedial Solution
1	Overloading of Dhulkote - BBMB 66kV D/c line	Reconductoring to existing Dog conductor with higher capacity conductor (Zebra)
2	Critical loading of Nallagarh - Kishangarh 220 kV D/c line during disruption of supply to Chandigarh from other sources	Reconductoring to HTLS Conductor or rearrangement of import feeders to relive the loading of line
3	Restricted loading from Mohali (PSTCL) Sub-station	Increased utilization of Hallo Majra (PG) Sub-station for importing power.

Chapter-2

Transmission System Requirement by 2029-30

2.1 Load flow studies for preparation of Resource Adequacy plan of transmission system in Chandigarh

2.1.1 Scope of Load flow studies:

System studies for the resource adequacy plan for Chandigarh's InSTS have been carried out using PSSE Software. The studies that have been carried out include the following:

(i) Steady state load flow studies

(ii) Contingency Analysis

Peak electricity demand in Chandigarh occurs in summer season typically during the month of June. Hence, for preparation of Resource Adequacy plan of Transmission system in Chandigarh, all the scenarios i.e. afternoon (solar peak generation scenario), evening (no solar generation scenario) and night (low demand) have been studied. Also, the off-peak scenario in winter season has been studied for reactive power management.

The load flow studies have been carried out for two time-frames: 2029-30 and 2034-35 for peak electricity demand scenarios occurring during summer season. To meet the projected electricity demand, augmentation required in both ISTS as well as Intra-State Transmission System has been worked out.

2.1.2 Transmission Planning Guidelines

(i) Chandigarh network has been represented generally at 66 kV and above voltage levels, where loads have been generally considered incidental on 33 kV buses.

(ii) Load power factor has been considered within ± 0.95 as per the Central Electricity Authority (Technical Standards for Connectivity to the Grid) (Amendment) Regulations, 2019.

(iii) 'N-1' criterion is generally followed for providing reliable power supply to the consumers. In certain cases, 'N-1-1' criterion has also been considered to ensure system robustness against more severe, sequential outage scenarios.

(iv) Transformation capacity of any single sub-station at 66 kV, 132 kV and 220 kV levels has been considered to be limited to 160 MVA, 500 MVA and 1000 MVA respectively as per the Manual on Transmission Planning Criteria of CEA (2025).

(v) Due to RoW constraints, re-conductoring in the existing lines with higher capacity conductors HTLS (High Temperature Low Sag), having the ampacity more than double of existing ampacity of conductor has been considered. Further, underground cables (at 66 kV level) have been proposed in case of unavailability of RoW due to urban landscape of Chandigarh.

(vi) The system voltage has been considered within the following limits as per the Manual on Transmission Planning Criteria, 2025:

66 kV	Max 72.5 kV, Min 60 kV
132 kV	Max 145 kV, Min 122 kV
220 kV	Max 245 kV, Min 198 kV

2.2 Load flow studies for the year 2029-30:

(i) The load flow studies have been carried out for the following scenarios:
   a) Peak electricity demand scenario (solar & non-solar hours) during summer season in the month of June.
   b) Off-peak electricity demand scenario during summer and winter season.

(ii) Peak electricity demand of Chandigarh in 2029-30 as per revised 20th EPS projections is 524 MW. However, CPDL has projected the peak demand to be around 560 MW by 2029-30 and the same has been considered for studies.

(iii) Under-implementation/planned ISTS schemes in neighboring area of Chandigarh to be commissioned by 2029-30, have been considered in the studies.

(iv) No generation power addition has been considered in Chandigarh; therefore, the demand of Chandigarh is proposed to be met through contracted power from generation projects in other states. Further, no BESS project in the territory of Chandigarh has been envisages by CPDL by 2029-30.

(v) The Roof top Solar and other DRE capacity (~120 MW by 2029-30) has been modelled along with the Load in the study files.

(vi) The transmission/distribution elements (new lines/ reconductoring of the existing lines and new substations/ICT augmentations) already taken up/planned for implementation by CPDL have been considered. Details are as given below:
   (a) Sub-station: The details of under-implementation/planned Substations (66 kV & above) by CPDL to be commissioned by 2029-30 are given below:

Sl. No.	Name of Sub-station	Voltage (kV)	Transformation Capacity (MVA)	Status	Timeframe
1	Industrial Area Ph-I (Upgradation)	33/ 11 →66/11	2x12.5	Planned	2029-20
3	Sector-37 (Upgradation)	33/ 11 →66/11	2x20	Planned	2026-27
4	Sector-17 (Upgradation)	33/ 11 →66/11	2x20	Planned	2026-27
5	Sector-34 (New Sub-station)	66/11	2x20	Planned	2026-27
6	New Raipur Kalan	66/11	2x20	Under Construction	2026-27
	Total		**185**		

Table 2.1: Details of New CPDL Substations

(b) ICT augmentation: The details of Under implementation ICT augmentation works at CPDL sub-stations to be completed by 2029-30 are given below:

Sl. No.	Name of Sub-station	Voltage (kV)	Existing Capacity (MVA)	Addition (MVA)	Status	Timeframe
1	I.T Park	66/11	1x20	2x20	Under Construction	2026-27
2	Sector-1	66/11	20+12.5	12.5→20	Under Construction	2026-27
3	Industrial Area Ph-I	66/11	2x12.5+20	12.5→20 + 1x20	Under Construction	2026-27
5	Industrial Area Ph-II	66/11	12.5+20	1x20	Under Construction	2026-27
6	Sector-32	66/11	2x12.5+20	2x12.5→2x20	Planned	2026-27
7	Sector-34	66/33/11	-	1x20	Planned	2027-28
8	Sector-47	66/11	2x20	1x20	Planned	2029-30

9	Sector-52	66/33 66/11	3x12.5+30	2x12.5→2x20 +1x20	Planned	2029-30
10	Sector-56	66/11	2x20	1x20	Planned	2028-29
13	Sector-18	66/11 66/33/11	2x12.5 -	1x12.5 1x20	Under Construction	2026-27
14	Sector-39	66/11	2x20+12.5	1x31.5	Planned	2028-29
15	Sector-12	66/11	3x12.5+20	1x12.5→1x20	Planned	2028-29
Total				**276.5**		

Table 2.2: Details of Under-Implementation/Planned ICT augmentations

(c) Transmission lines: Details of Under-Implementation/Planned Transmission Lines of CPDL to be commissioned by 2029-30 are given below:

Sl. No.	**Transmission/Distribution Line**		**Voltage (kV)**	**Line length (ckm)**	**Status**
	From	**To**			
1	BBMB Sec-28	Industrial Area Phase-I (Old)	66	6.9	Planned
2	Industrial Area Phase-I (Old)	Industrial Area Phase-I (New)	66	1	Planned
3	Sector-18	Sector-17	66	1	Planned
4	Hallo Majra (220 kV)	Sector-17	66	4	Planned
5	Kishangarh (220 kV)	Sector-1	66	19.53	Planned
6	Sector-39	Sector-37	66	3.5	Planned
7	Hallo Majra (220 kV)	Sector-47	66	4.0	Planned
8	Hallo Majra (220 kV)	Sector-37	66	8.5	Planned
9	Hallo Majra (220 kV)	New Raipur Kalan	66	2x4.5	Planned
10	Sector-37	Sector-34 (New)	66	3	Planned
11	Sector-34 (New)	Sector-34	66	1	Planned
12	Hallo Majra (220 kV)	Industrial Area Phase-II	66	3.6	Planned
	Total			**65.03**	

Table 2.3: Details of Transmission Lines

2.3 Load Flow Study Results:

Based on the load flow studies, following has been observed:

a) The existing, under construction and planned sub-stations by CPDL by 2029-30 would be required to cater the increasing demand in the UT of Chandigarh and to keep the system 'N-1' complaint.

b) Critical loading in few transmission lines has been observed during 'N-1' contingency. CPDL to monitor the loadings in critical lines and propose reconductoring/new lines to relieve the loading. Further, the existing Dhulkote – BBMB 66 kV D/c line is found to be overloaded; therefore, reconductoring of this line (on Dog conductor) with Zebra conductor has been proposed.

c) The loading of 220/66 kV, 100 MVA ICTs at Kishangarh has been observed reaching 90% of the rated capacity under 'N-1' contingency in certain scenarios. The actual loading of the ICTs to be monitored closely and ICT augmentation, if required, may be taken up based on the actual load growth.

d) Tap arrangement has been observed in the CPDL system. In this regard, it may be mentioned that as per Central Electricity Authority (Measures relating to Safety and Electric Supply) Regulations, 2023: *There shall not be tapping of another transmission line from the main line for 66 kV and above class of lines: Provided that during natural calamities, tapping may be allowed to ensure emergency power supply to affected areas till normalcy is restored.* The following measures to be taken by CPDL to remove the tapping arrangement:

- Tap taken from the 66kV feeder between Sector-1 GSS and Sector-12 GSS to supply power to 66/11kV Sarangpur GSS: to remove the tapping an additional 66kV bay at Sector-12 GSS for 66/11kV Sarangpur GSS has been proposed.
- Tap taken at BBMB GSS for the 66kV feeder coming from Kishangarh GSS & going to Sector-18 GSS to supply power to the 66kV consumer, Elante Mall: to remove the tapping the plan for an additional 3 Nos of 66kV bay (01 for Elante Mall consumer, 01 no for 66 kV IC from Kishangarh & 01 for OG to Sec-18 GSS) at BBMB GSS has been envisaged. Alternatively, for removal of tapings an additional bay from nearby industrial area Phase-1 GSS can be considered,
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e) Reactive power management: During the peak demand scenarios of summer seasons, the Chandigarh network experiences low voltage issues across the system, In contrast, during the off-peak scenarios of winter seasons, Chandigarh network experiences high voltage issues.

Therefore, it is essential the existing capacitor banks in the system remain operational condition during the low voltage scenarios. However, the high voltage issues in the winter seasons may aggravate with additions of underground cables in the Chandigarh network. Accordingly, suitable reactors need to be provided at various nodes in the system. Also, CPDL has been suggested to explore the possibility of installation of Static Var Generator (SVGs) to mitigate the issues of High Voltage during Winter and low voltage during summers.

2.4 Summary of State Transmission Network in Chandigarh by 2029-30

Table 2.4: Intra-State Transmission System by 2029-30

Intra-State Transmission System	220 kV level	66 kV level
Sub-stations		
Existing Substations	1	15
New Substations by 2029-30	-	5
Total substations by 2029-30	**1**	**20**
Transformation Capacity		
Existing Transformation Capacity (MVA)	300	612.5
Addition in Transformation Capacity (MVA)	-	461.5
Total Transformation Capacity by 2029-30 (MVA)	**300**	**1074**
Transmission Lines		
Existing Transmission Lines (including cable) (ckm)	108	405
Addition of Transmission Lines (including cable) by 2029-30 (ckm)	-	65
Total transmission lines (including cable) by 2029-30 (ckm)	**108**	**470**

Chapter-3

Transmission System addition planned by 2034-35

3.1 Load flow studies for the year 2034-35

(i) The load flow studies have been carried out for the following scenarios:

c) Peak electricity demand scenario (solar & non-solar hours) during summer season in the month of June.

d) Off-peak electricity demand scenario during summer and winter season.

(ii) Peak electricity demand of Chandigarh in 2034-35 as per revised 20th EPS projections is 558 MW. However, CPDL has projected the peak demand to be around 625 MW by 2034-35 and the same has been considered for studies.

(iii) Planned ISTS schemes in neighboring area of Chandigarh to be commissioned by 2034-35, have been considered in the studies.

(iv) No generation power addition has been considered in Chandigarh; therefore, the demand of Chandigarh is proposed to be met through contracted power from generation projects in other states. Further, the Roof top Solar and other DRE capacity (~100 MW by 2034-35) has been modelled along with the Load in the study files.

(v) The augmentation in the transformation capacity planned by CPDL by 2034-35 have been considered. Details are as given below:

Sl. No.	Name of Sub-station	Voltage (kV)	MVA	Status
1	Kishangarh (CPDL)	220/66	100	Under Planning
2	Mani Majra	66/11	20	Under Planning
3	Sector-1	66/11	20	Under Planning
4	Industrial Area Ph-I	66/11	20	Under Planning
5	Industrial Area Ph-II	66/11	20	Under Planning
6	Sector-32	66/11	20	Under Planning
7	Sector-52	66/11	12.5→20	Under Planning
8	Sector-17	66/33/11	20	Under Planning
9	Sector-18	66/11	2x12.5→2x20	Under Planning
10	Sector-12	66/11	2x12.5→2x20	Under Planning
11	BBMB-Sec-28	66/11	2x12.5→2x20	Under Planning

	Total	**272.5 MVA**	

Table 3.1: Planned transformation capacity addition (66 kV & above) by CPDL by 2034-35

3.2 Load Flow Study Results

Based on the load flow studies, following has been observed:

(i) The existing, under construction and planned sub-stations by CPDL by 2034-35 would be required to cater the increasing demand in the UT of Chandigarh and to keep the system 'N-1' complaint.

(ii) In addition to the already planned works, the following augmentation in the ISTS/In-STS network may be required between 2030-31 to 2034-35 for reliable supply of power in the UT of Chandigarh:

a) Transformation augmentation works:

Sl. No.	Name of Sub-station	Voltage (kV)	MVA
1	Hallo Majra (PG)	220/66	160

Table 3.2: Transformation augmentation works by 2034-35

b) Transmission lines: the reconductoring of following line with HTLS conductor may be required by 2024-35:

S.No.	Name of transmission line	Line Length (in ckm)
1	Nallagarh (400kV) – Kishangarh(CPDL) 220 kV D/c line	108

Table 3.3: Reconductoring of transmission lines by 2034-35

c) Voltage Regulation: Low voltages have been observed during certain high demand scenario at sub-stations in certain areas and high voltage issues has been observed in the winter seasons; therefore, CPDL may explore the possibility of installation of Static Var Generator (SVGs) to mitigate the issues of High Voltage during Winter and low voltage during summers.

(iii) **Requirement of additional feed:** With the growing demand of Chandigarh, the existing import feeders from NR Grid supplying power to the UT of Chandigarh would be congested in certain scenarios. Accordingly, CPDL is suggested to explore additional feed from NR Grid for providing continuous reliable supply of power to meet the growing demand of consumers of Chandigarh.

3.3 Summary of State Transmission Network in Chandigarh by 2034-35

Table 3.4: Intra-State Transmission System by 2034-35

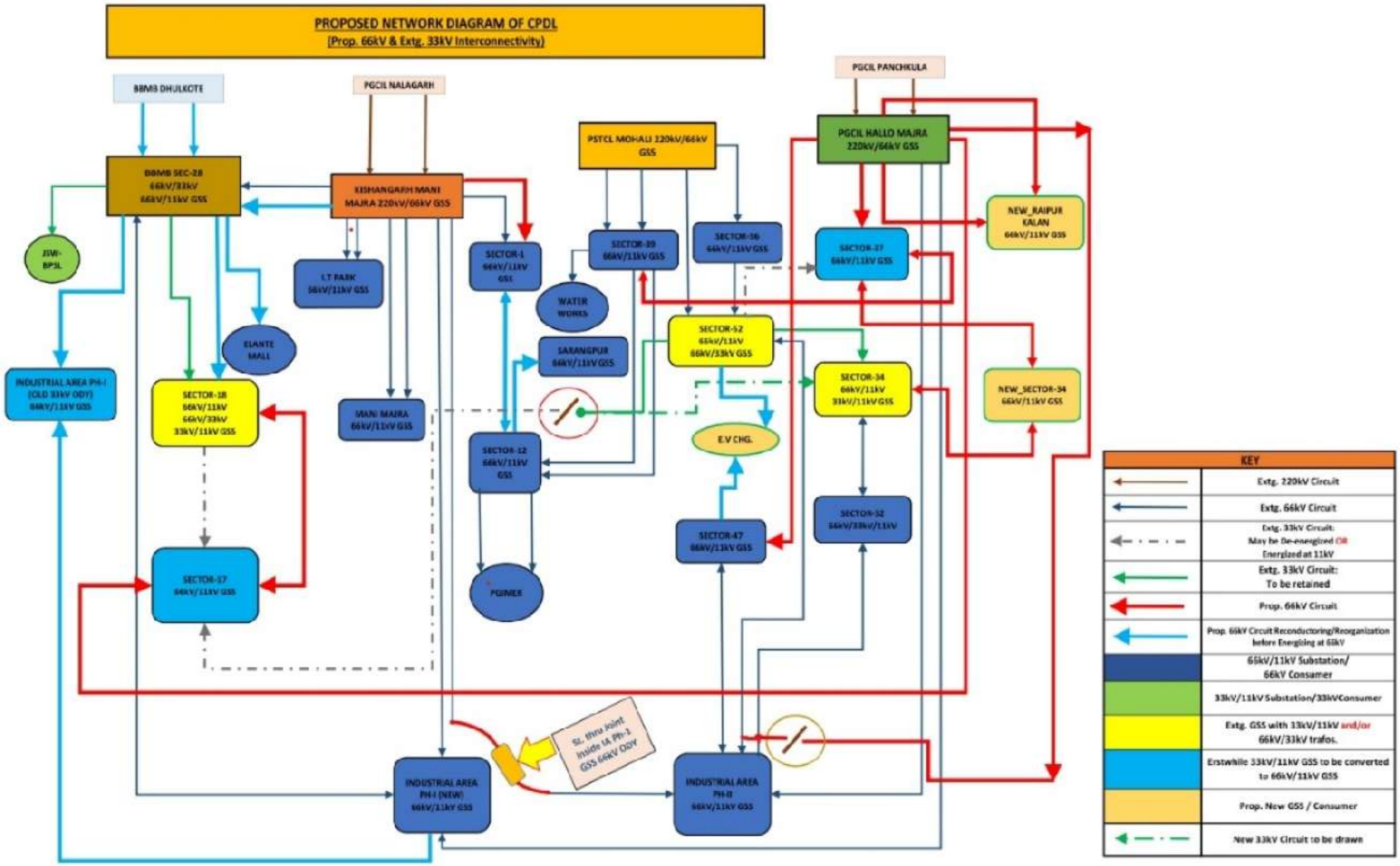
Intra-State Transmission System	220 kV level	66 kV level
Sub-stations		
Substations by 2029-30	1	20
New Substations by 2034-35	-	-
Total substations by 2034-35	**1**	**20**
Transformation Capacity		
Transformation Capacity (MVA) by 2029-30	300	1074
Addition in Transformation Capacity (MVA)	100	172.5
Total Transformation Capacity by 2034-35 (MVA)	**400**	**1246.5**
Transmission Lines		
Transmission Lines (including cable) (ckm) by 2029-30	108	470
Addition of Transmission Lines (including cable) by 2034-35 (ckm)	-	-
Total transmission lines (including cable) by 2034-35 (ckm)	**108**	**470**

Additionally, reconductoring of 220 kV line mentioned at Table 3.3 may be required.

Chapter-4

Recommendations

1. The intra-state transmission network augmentation proposed till 2034-35 in the UT of Chandigarh comprises of 65 ckm (66 kV and above) of transmission lines and 734 MVA (66 kV & above) of transformation capacity. In addition, reconductoring of 220 kV line (about 108 ckm) with HTLS conductors may also be required in the same timeframe.
2. As the delay in the implementation of network strengthening works may lead to network congestion and interruption in power supply in the UT; therefore, all the planned transmission network should be timely implemented.
3. CPDL may initiate timely actions for approval of the schemes and subsequent award well in time to ensure timely commissioning of the planned transmission schemes. Some of the planned schemes during 2030-31 to 2034-35 timeframe may be reviewed based on actual growth of electricity demand.
4. With the envisaged growth in the demand of Chandigarh, CPDL to take timely steps to increase the ATC (Available Transfer Capacity) and may review the GNA (General Network Access) for reliable power supply to the consumers.


PROPOSED NETWORK DIAGRAM OF CPDL
(Prop. 66kV & Extg. 33kV Interconnectivity)
BBMB DHULKOTE
PGCIL NALAGARH
PGCIL PANCHKULA
PSTCL MOHALI 220kV/66kV GSS
PGCIL HALLO MAJRA 220kV/66kV GSS
BBMB SEC-28 66kV/33kV 66kV/11kV GSS
KISHANGARH MANI MAJRA 220kV/66kV GSS
JSW-BPSL
LT PARK 66kV/11kV GSS
SECTOR-1 66kV/11kV GSS
SECTOR-39 66kV/11kV GSS
SECTOR-56 66kV/11kV GSS
SECTOR-37 66kV/11kV GSS
NEW_RAIPUR KALAN 66kV/11kV GSS
WATER WORKS
ELANTE MALL
SARANGPUR 66kV/11kV GSS
SECTOR-52 66kV/11kV 66kV/33kV GSS
SECTOR-34 66kV/11kV 33kV/11kV GSS
NEW_SECTOR-34 66kV/11kV GSS
INDUSTRIAL AREA PH-I (OLD 33kV ODY) 66kV/11kV GSS
SECTOR-18 66kV/11kV 66kV/33kV 33kV/11kV GSS
MANI MAJRA 66kV/11kV GSS
SECTOR-12 66kV/11kV GSS
E.V CHG.
SECTOR-47 66kV/11kV GSS
SECTOR-32 66kV/33kV/11kV
SECTOR-17 66kV/11kV GSS
PGIMER
St. thru Joint inside IA Ph-1 GSS 66kV ODY
INDUSTRIAL AREA PH-I (NEW) 66kV/11kV GSS
INDUSTRIAL AREA PH-II 66kV/11kV GSS
KEY
Extg. 220kV Circuit
Extg. 66kV Circuit
Extg. 33kV Circuit: May be De-energized OR Energized at 11kV
Extg. 33kV Circuit: To be retained
Prop. 66kV Circuit
Prop. 66kV Circuit Reconductoring/Reorganization before Energizing at 66kV
66kV/11kV Substation/ 66kV Consumer
33kV/11kV Substation/33kVConsumer
Extg. GSS with 33kV/11kV and/or 66kV/33kV trafos.
Erstwhile 33kV/11kV GSS to be converted to 66kV/11kV GSS
Prop. New GSS / Consumer
New 33kV Circuit to be drawn