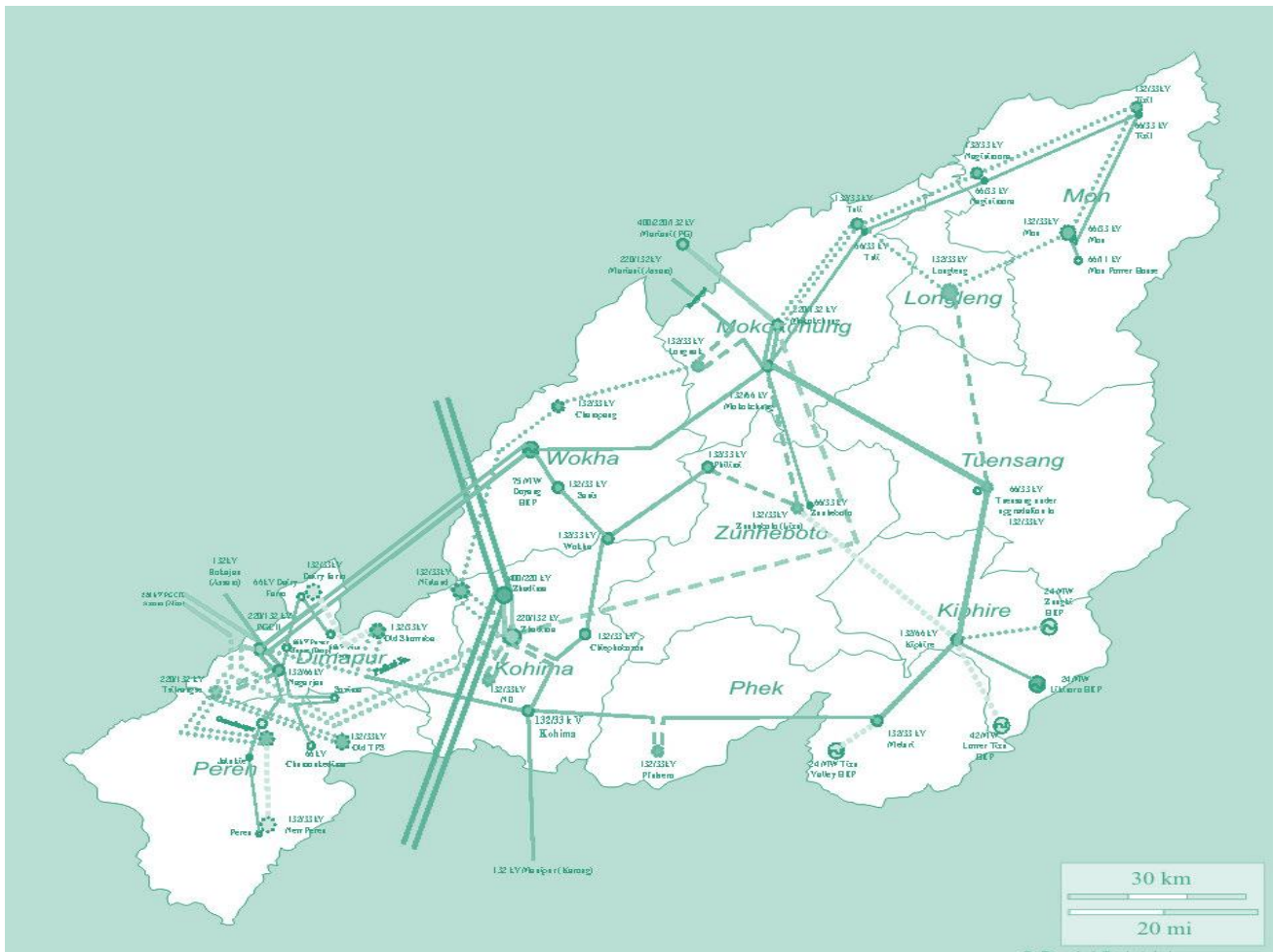




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REPORT ON INTRA STATE TRANSMISSION RESOURCE ADEQUACY PLAN FOR NAGALAND BY THE YEAR 2034-35



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 Nagaland 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 Nagaland, 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 Nagaland in 2024-25 was 189 MW, and Projected Peak Demand by 2034-35 is estimated to 482 MW, which is higher than the Electric Power Survey report. Further, existing Installed Capacity in the state is about 34.4 MW and state has planned 103.8 MW of hydro plant, 62 MW of Solar plant, 27 MW of Thermal plant & 10 MW of Biomass plant by the year 2034-35. Presently, the state has 558 ckm of 132 kV lines. It has transformation capacity of 720.5 MVA at 132 kV level.

Considering the anticipated demand, generation capacity, demand pattern, operational feedback from NERLDC and SLDC, system studies have been conducted for High Hydro (Aug) Peak Demand, Low Hydro (Feb) Peak Demand and High Solar (Feb) Low Demand scenarios for the timeframe 2031-32 & 2034-35 in consultation with Nagaland, CTUIL and Grid-India. Based on the studies, the requirement of transmission system by the year 2034-35 has been identified.

A total of 1300 MVA transformation capacity addition/augmentation and 1247 ckm of new transmission lines/reconductoring of old lines at an estimated cost of ₹ 1982.72 Crs. would be required for implementing the intra-state transmission proposals 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.

Summary of year-wise MVA capacity, ckm addition at 132 kV voltage level and tentative expenditure required for implementation of above recommended proposals is given below

Financial Year	MVA Capacity Addition		ckm Addition	Reconductoring (ckm)	Estimated Cost (in ₹ Cr.)
	132 kV	220KV	132 kV	132 kV	
FY 2030-31	350	-	127	-	384.37
FY 2031-32	320	-	465	-	850.53
FY 2032-33	130	400	06	46	210.51
FY 2033-34	-	-	-	110	44.05
FY 2034-35	100	-	372	121	493.26
Total	900	400	970	277	1982.72

To ensure reliable and adequate power supply in Nagaland by 2034-35, substantial investments and infrastructure upgrades are essential. With a projected demand of 482 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.

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

1. Demographics

Nagaland is a state in North Eastern India. It is bordered by the state of Arunachal Pradesh in the North, Assam in the West, Manipur in the South and the Sagaing Region of Myanmar in the East. Its capital city is Kohima and its largest city is Dimapur. It has an area of 16,579 square kilometres (6,401 sq mi) with a population of 1,980,602 per the 2011 Census of India, making it one of India's smallest states.

2. Electricity profile of state

2.1. Power generation-demand scenario of state:

2.1.1. In the FY 2024-25, Nagaland had peak electricity demand of 189 MW and electrical energy requirement of 938 MU. As on 28.02.2025, state has Central sector allocation of 172.36 MW which includes hydro plants (66.33 MW) and thermal plants (106.03 MW). In addition, installed capacity in state sector is 32.67 MW. The per capita consumption of the state was 445 kWh in the year 2022-23.

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

Table 2-1 Peak demand & Energy of Nagaland

Financial Year	Peak Demand(MW)	Energy(MU)
2018-19	156	888
2019-20	186	814
2020-21	160	826
2021-22	173	852
2022-23	168	926
2023-24	174	921
2024-25	189	938

Source: Power Supply Position Report, CEA

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

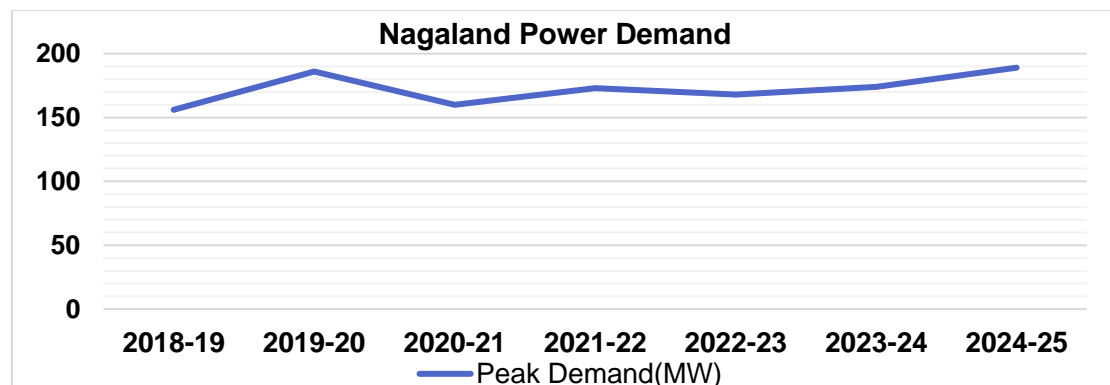


Figure 2-1 Peak Demand

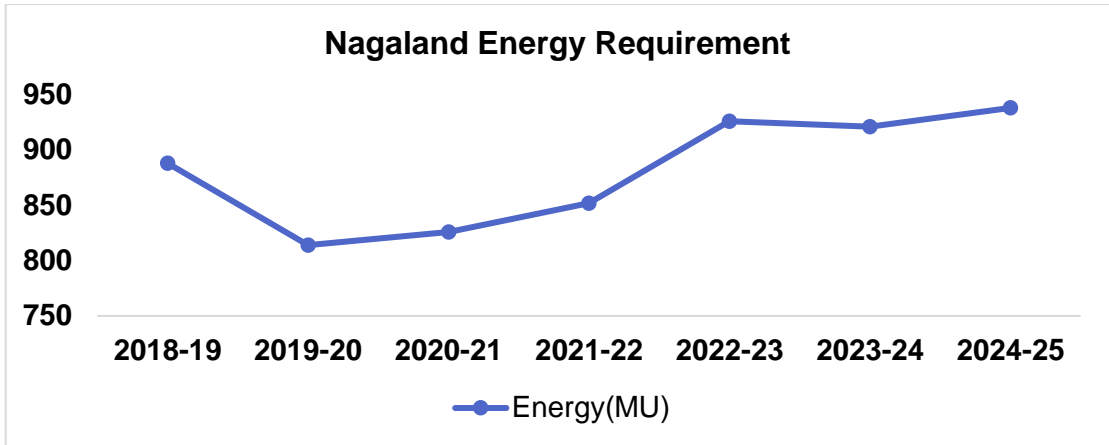


Figure 2-2 Energy Requirement

2.1.4. The peak demand of Nagaland occurs in winters and daily peak generally occurs in the evening period. The graph indicating of Seasonal Load variation in the financial year 2024-25 is given at Figure 2-3 and Figure 2-4 below.

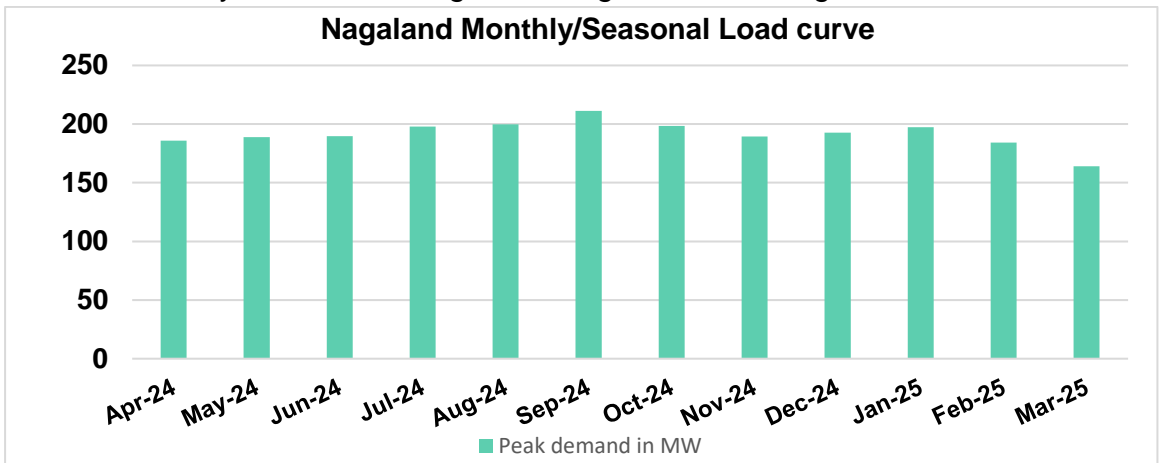


Figure 2-3 Seasonal Load Curve

The graph indicating of Hourly Load variation in the year 2024 is given at Figure 2-4.

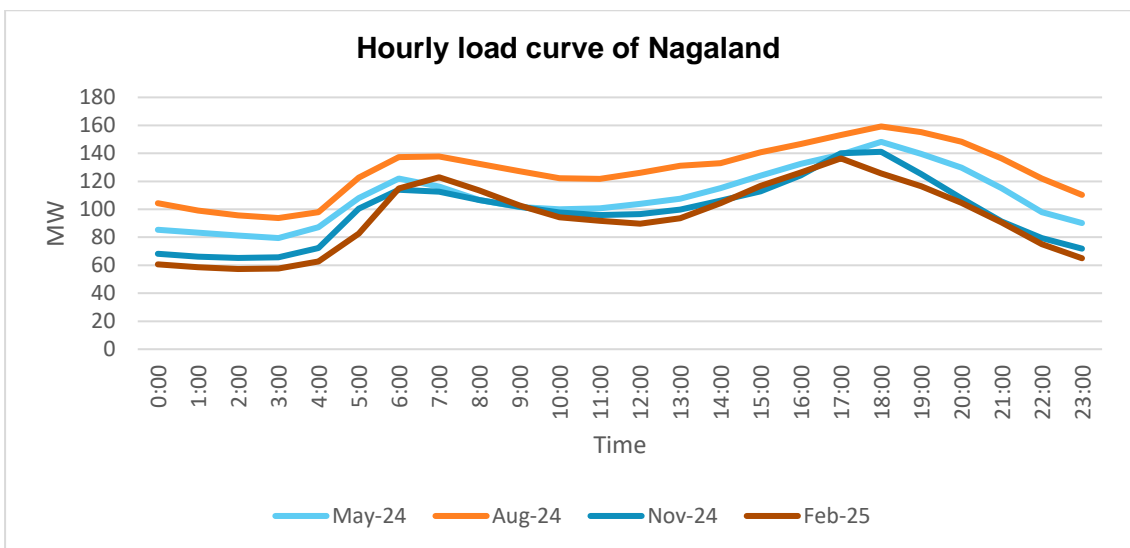


Figure 2-4 Hourly load curve of Nagaland

2.1.5. Contracted capacity (MW) by Nagaland as on March-2025 is given at Table 2-2 below:

Table 2-2 Contracted capacity by Nagaland

(All fig. in MW)

SECTOR	HYDRO	THERMAL					NUCL- EAR	R.E.S. (MNR E)	TOTAL
		COAL	LIGNITE	GAS	DIESEL	TOTAL			
State	0	0	0	0	0	0	0	32.67	32.67
Private	0	0	0	0	0	0	0	3.17	3.17
Central allocation	66.33	32.10	0	73.93	0	106.03	0	66.33	172.36
Total	66.33	32.10	0.00	73.93	0.00	106.03	0.00	102.17	208.20
%	31.85	15.41	0.00	35.51	0.00	50.93	0.00	49.07	100.00

Source: Installed Capacity Report, CEA

2.1.6. The graph indicating the generation capacity mix is given at Figure 2-5 below

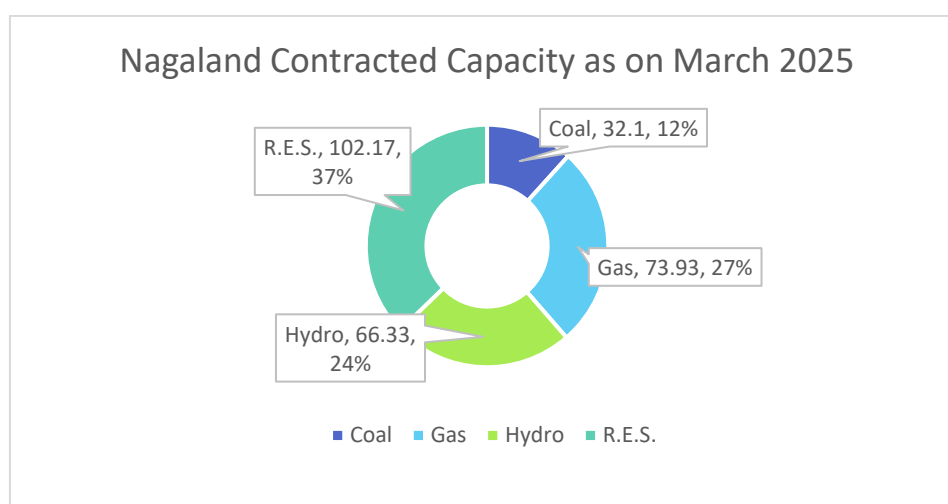


Figure 2-5 Contracted Capacity

2.1.7. As on April- 2025, the General Network Access (GNA) quantum for ISTS drawal and Available Transfer Capability (ATC) of the state is 152 MW and 231 MW respectively.

3. Existing Transmission System

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

3.1. Existing Intra State Transmission assets (as on 31.03.2025):

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

Table 3-1 Intra State Transmission assets in Nagaland

Financial Year	Voltage (kV)	Transmission lines (ckm)	Substations (MVA)
2018-19	132	282	363

2019-20	132	282	363
2020-21	132	282	363
2021-22	132	282	378
2022-23	132	282	390.5
2023-24	132	282	400.5
2024-25	132	558	720.5

Nagaland state has total 558 ckm of 132 kV transmission line and 720.5 MVA of 132 kV, Substation capacity in Intra-state transmission system.

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

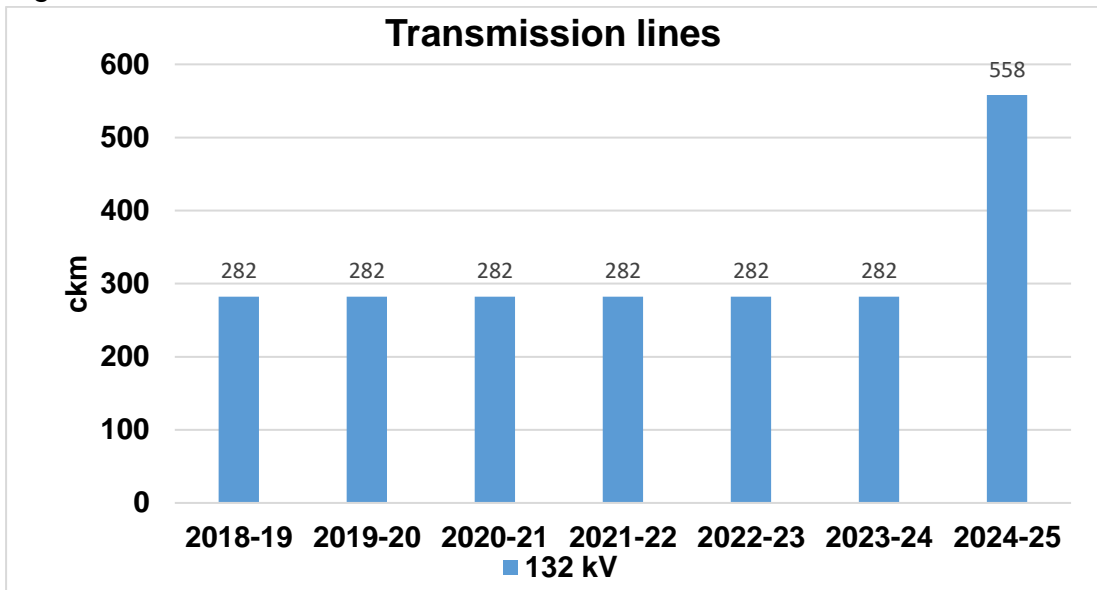


Figure 3-1 Existing Transmission Line

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

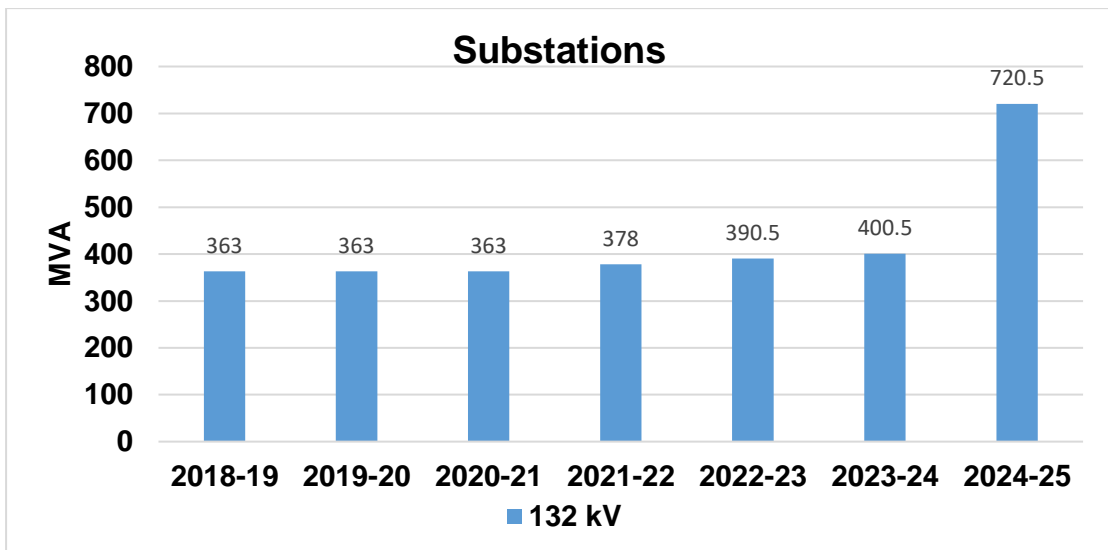


Figure 3-2 Existing Substations

3.2. Existing Inter State Transmission system in the state:

3.2.1. The state has a 400/220 kV, 1000 MVA ISTS substation at New Kohima. Further the state has two Nos. of 220/132 kV ISTS substations, having total capacity of 510 MVA at Dimapur and Mokokchung.

3.2.2. State has total 1300 ckm of ISTS network. Brief details of the ISTS network (including ISTS lines owned by states) are given at Table 3-2 below:

Table 3-2 Existing ISTS of Nagaland

Voltage level	Existing
132 kV	357 ckm + 92 ckm (ISTS line owned by state)
220 kV	343 ckm
400 kV	508 ckm
Total	1300 ckm (including 92 ckm ISTS line owned by state)

4. Under implementation Transmission System

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

The summary of under implementation Intra-state in Nagaland are given at Table 4-1 below:

Table 4-1 Under Implementation Intra-state transmission system assets in Nagaland (as on March 2025)

Voltage (kV)	Transmission lines (ckm)	Substations (MVA)
132	67.6	215
220	-	200

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

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

4.2.1. Under Construction ISTS: RTM Mode (Jun-2026)

i. NERES-XXVII: (Sept-2025)

- Reconductoring of ISTS portion of Dimapur (POWERGRID) – Dimapur (DoP, Nagaland) 132kV (ckt-2) ACSR Panther S/c line with Single HTLS conductor of 800A – 0.335km
- Reconductoring of ISTS portion of Dimapur (POWERGRID) – Kohima (DoP, Nagaland) 132kV ACSR Panther S/c line with Single HTLS conductor of 800 A – 0.335 km.

5. System operator feedback

5.1. The operational constraint faced in the Intra-state and Inter-state transmission network by NERLDC and Nagaland SLDC including transmission line

constraints, ICT constraints, nodes experiencing high voltage/ low voltage are attached at **Annexure-I**.

6. Assumptions for study:

- 6.1. Peak electricity demand (MW) of Nagaland according to the 20th EPS Report and as estimated by the State are given at Table 6-1 below:

Table 6-1 Peak electricity demand

Year	Peak demand as per 20 th EPS	Peak Demand (MW) projected by state	CAGR (w.r.t. Unrestricted peak Demand)
2024-25	179 [#] /189 [@] /211 [*]	-	
2025-26	187	224	6.16
2026-27	195	237	5.98
2027-28	204	261	7.35
2028-29	213	277	7.04
2029-30	221	304	7.58
2030-31	230	382	10.40
2031-32	235	405 ^{**}	9.76
2032-33	-	429	9.28
2033-34	-	455	8.91
2034-35	-	482 ^{**}	8.61
2036-37	282	-	-

[#] Peak demand as per 20th EPS figure for 2024-25

[@] Actual demand for 2024-25 as per "Power Supply Position Report, CEA"

^{*} Unrestricted Peak Demand (as provided by state) in FY 2024-25

^{**} Including upcoming Industrial & Traction demand

6.2. Industrial Demand:

- 6.2.1. The total expected industrial demand of Nagaland by 2031-32 & 2034-35 will be around 60 MW & 70 MW respectively. The details of upcoming heavy Industries and traction are as under.

- i. Steel Rolling Mill (15MW) at Ganeshnagar and
- ii. Cement industry (5 MW) at Wazeho (near Meluri).
- iii. The major industrial load are concentrated at Old Showba, Niuland, Liphi & Champang area of Nagaland (foothill area of Nagaland).

- 6.2.2. Traction demand has been considered as 10 MW.

- 6.3. The following Parameters were considered during the study

- a) The total intra state generation installed capacity connected at 132 kV level is 103 MW by the year 2031-32 and 209 by the year 2034-35. The details of existing and upcoming generation is given at Table 6-2 below:

Table 6-2 intra state generation installed capacity

S.No.	Name of generating plant	Type	Installed Capacity (MW)	Time frame

1.	Likimro	Hydro	24	Existing generating units
2.	Tizu Valley HEP	Hydro	24	2035
3.	Zungki	Hydro	24	2032
4.	Lower Tizu HEP	Hydro	42	2035
5.	Lower Likimro	Hydro	8.1	2029
6.	Thermal Power plant (NPPCL)	Thermal	27	2033
7.	Solar Power plant at Tizit by Tvaksas	Solar	20	2027
8.	Rooftop Solar under PMSG	Solar	32	2027
9.	Jalukie Solar	Solar	20	2035
10.	Peren Solar	Solar	20	2035

b) Peak Demand: 405 MW by the year 2031-32 and 482 MW by the year 2034-35.

c) Scenario of Study:

S.No.	Scenario	Demand Factor	Dispatch Factor			Remark
			Hydro	Solar	Thermal	
1.	High Hydro (Aug) Peak Demand	100%	90%	0%	70%	
2.	Low Hydro (Feb) Peak Demand	90%	20%	0%	85%	
3.	High Solar (Feb) Low Demand	50%	0%	100%	55%	10% Demand reduction due to Roof-top Solar

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 Nagaland SLDC and NERLDC, 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 at Table 7-1 below:

Table 7-1 study results for the timeframe of 2031-32

Parameter ↓ / Scenario →	High Hydro (Aug) Peak Demand	Low Hydro (Feb) Peak Demand	High Solar (Feb) Low Demand

Generation despatch (intra-state + ISGS located in state) (in MW)	137	49	35
Demand (in MW)	405	364	202
Net interchange ((-)import / (+)export) at ISTS-STU periphery (in MW)	-268	-315	-167

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 timeframe of 2034-35

Parameter↓ / Scenario→	High Hydro (Aug) Peak Demand	Low Hydro (Feb) Peak Demand	High Solar (Feb) Low Demand
Generation despatch (intra-state + ISGS located in state) (in MW)	196	62	75
Demand (in MW)	482	436	244
Net interchange ((-)import / (+)export) at ISTS-STU periphery (in MW)	-286	-376	-169

- 7.2. The Low Hydro (Feb) Peak Demand scenario 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 & 2034-35.
- 7.4. The planned transmission system of the state is N-1 contingency criteria compliant. The planned system addresses all the constraints in the Intra-state transmission as mentioned by Nagaland SLDC and NERLDC listed at **Annexure-I**.
- 7.5. According to CEA's generation recourse adequacy report for the year 2031-32 the generation resource adequacy study for Nagaland the demand projections from the 20th EPS (i.e. 235 MW by the year 2031-32). According to the study, Nagaland is surplus in fulfilment of its Renewable Purchase Obligations (RPO) and does not need any additional RE capacity to fulfil its Renewable Purchase Obligations.
- 7.6. The agreed system by the year 2031-32 & 2034-35 was modelled and studied considering the N-1 contingency criteria, and no constraints were observed in transmission system of Nagaland taking into account the RPO compliance. Hence, the transmission system as planned by 2031-32 & 2034-35 (including new schemes identified in this report) ensure the Transmission Resource Adequacy.

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

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

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

Sl.No.	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Remarks
1.	i. Establishment of 132/33 kV, 2x25 MVA S/s at Mon	Power supply to Mon district is catered through the lone, aged, long (165 km) S/c 66 kV line fed from 132/66 kV Substation at Mokokchung via Tuli-Naganimora-Tizit. The existing 66 kV line passes through a dense forest coupled with hilly & difficult terrain. With such a long span of 165 km, the frequency of un-scheduled disruption of line is very high and due to the remoteness of the location of the transmission line, it takes days to locate and rectify the fault/ restore the transmission line. And since there is no alternate source of power supply, there has been many instances wherein the whole district was blacked out for almost a week.	41.29	Time frame: 2030-31
	ii. Longleng – Mon 132 kV S/c line on D/c tower (44 ckm) alongwith 1 No. 132 kV line bay at Longleng		71.41	
2.	i. Establishment of 132/33 kV 2x 50 MVA S/s at Old Showuba	Presently, power supply along the foothill areas is catered through various aged and long spans of 33 kV & 11 kV lines and as such the power supply is very erratic and unreliable. Recognizing the importance of a robust Power network so as to facilitate and promote socio-economic growth such as agro-forest products manufacturing and processing plants like Tea and Rubber, cold storages etc., the Power Department therefore proposes a 132 kV system along the foothill road from Niuland town to Champang (identified petroleum oil belt in Nagaland) along with special emphasis towards Chumukedima, Old Showuba, Dhansaripar, Ganeshnagar etc. where the growth of socio-economic developmental.	47.02	Time frame: 2030-31
	ii. LILO of Dimapur (PG) – Kohima 132 kV S/c line at Old Showuba (with HTLS reconductoring from Dimapur (PG) to Old Showuba line section Sub-station) (12 km loop in 12 km loop out) with upgradation of bay equipments at PG Dimapur S/s.		40.84	

Sl.No.	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Remarks
3.	i. Establishment of 132/33 kV, 2x50 MVA S/s at Niuland		40.22	Time frame: 2031-32
	ii. Zhadima – Niuland 132kV D/c line (Zebra conductor) (54 ckm) alongwith 2 Nos. 132 kV line bays at Zhadima.		56.22	
	ii. Niuland – Champhang 132kV S/c line (55 ckm)		85.61	
4.	i. Establishment of 132/33 kV, 2x25 MVA S/s at Champang		38.49	Time frame: 2031-32
	ii. Champang – Longnak 132 kV S/c on D/c lines (64 ckm) alongwith 1 No. 132kV line bay at Longnak	101.03		
5.	i. Establishment of 132/33 kV, 2x 50 MVA S/s at Old TPS 7th Mile Dimapur	39.06	Time frame: 2030-31	
	ii. Tsi strongse – Old TPS 7th Mile Dimapur 132 kV D/c line (26 ckm) alongwith 2 Nos. 132 kV line bays at Tsi strongse	28.96		
6.	i. Establishment of 132/33 kV, 2x25 MVA S/s at Tuli	Nagaland is phasing out 66 kV network from their system.	38.60	Time frame: 2031-32
	ii. Mokokchung(PG) – Tuli 132 kV D/c transmission line (112 ckm) alongwith 2 Nos. 132 kV line bays at Mokokchung		100.16	
	iii. Tuli – Naginimora 132 kV S/c line on D/c tower – (34 ckm)		55.29	
	iv. Longleng – Tuli 132 kV S/c line		80.79	

Sl.No.	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Remarks
	on D/c tower (50 ckm) alongwith 1 No. 132kV line bay at Longleng			
7.	i. Establishment of 132/33 kV, 2x25 MVA at Naganimora	Nagaland is phasing out 66 kV network from their system.	38.57	Time frame: 2031-32
	ii. Naganimora – Tizit 132 kV S/c line on D/c tower (44 ckm)		67.60	
8.	i. Establishment of 132/33 kV, 2x10 MVA at Tizit	Nagaland is phasing out 66 kV network from their system.	36.86	Time frame: 2031-32
	ii. Tizit – Mon 132 kV S/c on D/c tower line (30 ckm)		46.09	
9.	i. Establishment of 132/33 kV, 2x50 MVA S/s at Ganeshnagar	This new sub-station is proposed to upgrade the 66/33 kV system into 132/33 kV system and phase out the 66 kV system. Once upgraded, the existing 66 kV transmission line beyond Ganeshnagar (presently charged at 33 kV) shall be permanently converted to 33 kV system. The proposal has been conceptualised with an aim to meet the demand of power from industrial sector at the State designated Industrial Growth Centre, Ganeshnagar.	41.70	Time frame: 2030-31
	ii. Tsitrongse – Ganeshnagar 132 kV D/c Line (20 ckm) alongwith 2 Nos. 132kV line bay at Tsitrongse.		23.52	
10.	i. Establishment of 132/33 kV, 2x25 MVA S/s at Dairy Farm (Kushiabil)	The existing Dairy Farm Sub-Station, with a transformation capacity of 5 MVA, 66/33 kV was commissioned in 2003 and presently caters power to entire Dairy Farm, Kushiabil area as well as portions of Dimapur town. With the passage of time and increase in load growth due to urbanization, commercial development, new industrial activities and other developmental activities along the 4 lane highway passing through the Dairy Farm area, the Sub-Station is fully loaded and unable to accommodate additional load demands. The Department is therefore compelled to impose restrictions on new load sanctions/	41.58	Time Frame: 2034-35
	ii. Old Showuba - Dairy Farm (Kushiabil) 132 kV D/c line (24 ckm) along with 2 No. of 132 kV bay at Old Showuba		27.15	

Sl.No.	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Remarks
		<p>service connections including for domestic consumers, on these feeders.</p> <p>To address these challenges and anticipating the future load demand, proposal has been made to enhance the Transformation capacity and upgrade the existing 66/33kV System into 132/33kV system and phase out the 66kV system.</p>		
11.	i. Establishment of 132/33 kV, 2x25 MVA S/s at New Peren	Power supply to Peren district is presently catered through a single 33 kV line resulting in an unstable and unreliable power supply.	39.82	Time Frame: 2034-35
	ii. Gansehnagar - Peren 132 kV D/c line (70 ckm) along with 2 No. 132 kV bay each at Ganeshnagar	Acknowledging the critical need for a resilient and robust Power network to facilitate and promote socio-economic development such as agro-forest products manufacturing and processing plants etc., Power Department proposes establishment of a 132 kV Transmission system from Ganeshnagar to Peren. Additionally, the proposal has also considered integration of 20 MW Solar power plant each at Peren & Jalukie that is coming up, for which a 132 kV infrastructure is essential to facilitate power evacuation.	68.83	
12.	i. Establishment of 132/33 kV, 2x25 MVA S/s at Medziphema	Currently, power supply to the sub-division is served by a single, aged and fragile 33kV transmission line emanating from the 132/66/33kV Nagarjan sub-station. This line, constructed in the early 1980s, traverses steep and challenging terrains, including dense vegetation in areas such as Pakala Pahar and New Chumoukedima, making it highly vulnerable to faults and external unwarranted disruptions.	39.41	Time Frame: 2030-31
	ii. LILO of Old Showuba- Kohima 132 kV S/c line at Medziphema S/s (3.15 km loop in 3.15 km loop out)	The urgency of upgrading the power infrastructure has further increased with the State Government's announcement to establish a planned Global City (Naga-Ki) within the Medziphema sub-division. This urban development initiative will require dedicated and reliable power supply infrastructure.	11.16	

8.2. New Intra-state Transmission lines which are required by 2034-35 are listed at Table 8-2 below:

Table 8-2 New Transmission lines of Nagaland

Sl.No.	Transmission System	Justification	Estimated Cost (in ₹ Cr.)	Remarks
1.	Kiphire – Zunheboto 132 kV D/c line along with 2 No. 132 kV line bay each at Kiphire and Zunheboto (140 ckm)	The proposed new Transmission line has been proposed to facilitate the transmission link between Kiphire and Mokokchung via Zunheboto. The proposal has been envisaged with an aim to have enhanced system reliability for evacuation of power generated from both existing and upcoming Hydro Projects thereby ensuring stable and uninterrupted power flow across the network.	132.26	Time Frame: 2034-35.

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

Table 8-3 Reconductoring of existing transmission lines of Nagaland

Sl. No.	Transmission System	Justification	Estimated Cost (in ₹ Cr.)	Remarks
1.	Restranging of Dimapur (Patkai junction) - Kohima 132 kV S/c line with conductor of existing ampacity along with upgradation of requisite bay equipment (46 ckm)	To mitigate frequent outage of transmission lines due to age old breakdowns and to enhance the transmission capacity of the 132kV line feeding Kohima Load Centre (Kohima, Meluri, Phek, Kiphire & Wokha) which currently handles approximately 95 MW. During exigency, additional load requirement of Manipur (from Karong sub-station) is catered from Kohima, which is restricted to 40MW due to existing transmission constraints which limits the ability to meet the increasing power demand/ requirement. <ul style="list-style-type: none"> • Ampacity of Existing conductor- ACSR Panther (465 A) • Year of commissioning- 1988 	22.46	Time Frame: 2032-33
2.	Restranging of Kiphire-Meluri-Kohima 132 kV S/c line with conductor of	To reduce frequent outage of lines due to aging infrastructure and to increase the transmission capacity of the 132 kV line. This upgrade aims to enhance system reliability and facilitate	48.5	Time Frame: 2034-35

Sl. No.	Transmission System	Justification	Estimated Cost (in ₹ Cr.)	Remarks
	existing ampacity along with upgradation of requisite bay equipment (121 ckm)	the efficient evacuation of power generated from both existing and upcoming hydroelectric projects. <ul style="list-style-type: none"> • Ampacity of Existing conductor- ACSR Panther (465 A) • Year of commissioning- 1996 		
3.	Restranging of Kiphire-Tuensang-Mokokchung 132 kV S/c line (charged at 66kV voltage level) with ACSR Panther conductor along with upgradation of requisite bay equipment (110 ckm)	The proposal for Reconductoring the existing transmission line with ACSR Panther Conductor is proposed to upgrade the ACSR Wolf conductor and phase out the 66kV system. Upon completion, the existing 132 kV transmission line, which is currently charged at 66 kV voltage, will be permanently converted to a 132 kV system. The 132 kV end equipment at Kiphire and Mokokchung has already been completed, and the 66 kV Tuensang Substation is being upgraded to a 132 kV GIS under NERPSIP. The proposal has been conceptualised with an aim to establish EHV power transmission connectivity at 132kV Level system and facilitate reliability for evacuation of the power generated from the existing and upcoming Hydro Projects. <ul style="list-style-type: none"> • Ampacity of Existing conductor- ACSR Wolf • Year of commissioning- 1991 • Ampacity of conductor after restranging: ACSR Panther 	44.05	Time Frame: 2033-34

Note: - Before taking up the reconductoring, state shall ensure Tower healthiness and communsurate rating of Bay equipment.

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

Table 8-4 Augmentation of Substations of Nagaland

Sl.No.	Transmission System	Justification	Estimated Cost (in ₹Cr.)	Remarks
1.	Augmentation of existing 3x10MVA (1- ϕ units), 132/66 kV ICT by replacing with two Nos. of 3x10 MVA (1- ϕ units), 132/33 kV ICTs at Kiphire	The existing capacity of 3x10 MVA (1- ϕ units), 132/66 kV ICT is proposed to be phased out once the 66 kV System is upgraded to 132 kV. Existing ICT capacity: 3x10 MVA (1-ϕ units), 132/66kV	42.18	Time Frame: 2032-33 After augmentation Total ICT capacity: Two Nos. of 3x10 MVA, 132/33kV(1-ϕ units)
2.	Augmentation of existing 1x12.5 MVA, 132/33 kV ICT with addition of 2x25 MVA, 132/33 kV ICT at Meluri	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required Existing ICT capacity: 1x12.5 MVA	31.37	Time Frame: 2032-33 After augmentation Total ICT capacity: 1x12.5 + 2x25 MVA
3.	Augmentation of existing two Nos. of 3x8 MVA (1- ϕ units) by replacement of one 3x8 MVA(1- ϕ units) ICT with 2x25 MVA (3- ϕ units) ICT at 132/33kV Kohima S/s	The existing capacity of 48 MVA comprises of two Nos. of 3x8 MVA (1- ϕ units). One ICT is proposed to be phased out as it is very old and was commissioned in 1988. Existing ICT capacity: Two Nos. of 3x8 MVA (1-ϕ units)	44.53	Time Frame: 2032-33 After augmentation Total ICT capacity: 3x8 MVA (1-ϕ units) + 2x25 MVA (3-ϕ units)
4.	Augmentation of existing 3x33.33 MVA (1-ϕ units) by replacement with 2x200 MVA, 220/132kV ICT at Zhadima S/s	The existing capacity of 100 MVA comprises of 3 Nos. of 1- ϕ , 33.33 MVA units which are proposed to be phased out. Existing ICT capacity: 3x33.33 MVA (1-ϕ units)	63.29	Time Frame: 2032-33 After augmentation Total ICT capacity: 2x200 MVA (3-ϕ units)
5.	Augmentation of existing 2x25 MVA, 132/66kV ICTs by replacement with 2x25 MVA, 132/33kV at Mokokchung (Aolijen) S/s	The existing capacity of 2x25 MVA, 132/66kV ICT are proposed to be phased out once the 66kV System is upgraded to 132kV). Existing ICT capacity: 2x25 MVA, 132/66 kV	26.84	Time Frame: 2031-32 After augmentation Total ICT capacity: 2x25 MVA, 132/33 kV

8.5. Evacuation system for upcoming generation projects which are required by 2034-35 are listed at Table 8-5:

Table 8-5 Evacuation system for upcoming generation projects of Nagaland

Sl.No.	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Remarks
1.	Zungki HEP – Kiphire 132 kV S/c line alongwith 2 Nos. 132 kV line bays at Kiphire S/s (22 ckm)	To evacuate the generated power from the Zungki HEP and inject the power into the grid at the nearest 132 kV sub-station, i.e. 132 kV Kiphire sub-station.	38.16	Time frame: 2031-32
2.	Lower Tizu HEP - Kiphire 132 kV D/c line alongwith 2 Nos. 132 kV line bays at Kiphire S/s (44 ckm)	To evacuate the power generated from the 42 MW Lower Tizu HEP.	44.40	Time Frame: 2034-35
3.	Tizu Valley HEP - Meluri 132 kV D/c line alongwith 2 Nos. 132 kV line bays at Meluri S/s (50 ckm)	To evacuate the power generated from the proposed 24 MW Tizu valley HEP.	47.30	Time Frame: 2034-35
4.	Lower Likimro HEP – Likimro 132 kV D/c line alongwith 2 Nos. 132 kV line bays at Likimro S/s (44 ckm)	To evacuate the power generated from the proposed 8.1 MW Lower Likimro and existing 24MW Upper Likimro HEP. DoPN proposes to phase out the present 66 kV System	43.42	Time Frame: 2034-35
5.	NPPCL thermal plant – Proposed Tuli 132 kV D/c line alongwith 2 Nos. 132 kV line bays at Tuli S/s (6 ckm)	To evacuate the power generated from the 27 MW NPPCL thermal power plant at Tuli.	6.68	Time Frame: 2032-33

8.6. The power map of the state, including the above planned system is attached at **Annexure-II.**

9. Inter-state Transmission system requirement by 2034-35.

9.1. The requirement of Inter-state transmission system (ISTS) in Nagaland would be identified after the study of complete transmission system including neighbouring states and GNA quantum indicated by the state.

10. Reactive Power Compensation:

10.1. The following reactive power compensation requirement has been identified to be implemented in the state:

Sl. No.	Name of Substation (132 kV Level)	Capacitor requirement at downstream Distribution level (in MVar)
1.	Tizit	12.5
2.	Tsitrongse	12.5

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

11.1. A total of 1300 MVA transformation capacity addition/augmentation and 1247 ckm of new transmission lines/reconductoring of old lines at an estimated cost of ₹ 1982.72 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 identified transmission system of the state by 2034-35 is as below:

132 kV Transmission system

S.No.	Transmission System	No.	Length (in ckm)	Capacity (in MVA)	Estimated Cost (in ₹Cr)*
1.	New substation	12	-	720	482.62
2.	Augmentation of existing substation	04	-	180	144.92
3.	New transmission line including LILO and 2nd Ckt Stringing	21	970	-	1176.78
4.	Reconductoring/Re-stringing of transmission line	03	277	-	115.01

220 kV Transmission system

S.No.	Transmission System	No.	Length (in ckm)	Capacity (in MVA)	Estimated Cost (in ₹Cr)*
1.	New substation	-	-	-	-
2.	Augmentation of existing substation	01	-	400	63.29
3.	New transmission line including LILO and 2nd Ckt Stringing	-	-	-	-
4.	Reconductoring of transmission line	-	-	-	-

**Note: The estimated cost of the above transmission system is based on Department of Power, Nagaland Draft SoR 2021 for supply & erection/ installation works of electrical items and Nagaland Public Works Department SoR 2021 for associated civil works.*

11.2. Summary of year-wise MVA capacity, ckm addition at 132 kV voltage level and tentative expenditure required for implementation of above recommended proposals is given Table 11-1 at below:

Table 11-1 Yearwise implementation summary of proposed transmission system

Financial Year	MVA Capacity Addition		ckm Addition	Reconductoring (ckm)	Estimated Cost (in ₹ Cr.)
	132 kV	220KV	132 kV	132 kV	
FY 2030-31	350	-	127	-	384.37
FY 2031-32	320	-	465	-	850.53
FY 2032-33	130	400	06	46	210.51

FY 2033-34	-	-	-	110	44.05
FY 2034-35	100	-	372	121	493.26
Total	900	400	970	277	1982.72

12. Conclusion

- 12.1. By the year 2034-35, the power demand of Nagaland would be increasing significantly. Total expected demand of Nagaland by the year 2034-35 is about 482 MW. This anticipated increase in demand includes the expected industrial load coming progressively from 2024-25 to 2034-35.
- 12.2. Total about 237 MW generation projects which includes Hydro, Solar, Thermal & Biomass connected with Intra-state transmission network are expected to be commissioned by 2034-35.
- 12.3. In order to meet this growing load demand, evacuation of power from Hydro, Thermal & Solar generation and for drawal of power from ISTS in accordance with GNA requirement of Nagaland by 2034-35, the intra-state as well as inter-state transmission system of Nagaland need to be strengthened. It has been observed that the transmission system infrastructure in Nagaland at voltage level of 132 kV needs to be upgraded.
- 12.4. The planned network is related to the intra-state transmission system of the State, 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-10 above in this report.
- 12.6. It is recommended that Nagaland 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 Nagaland and demand of the state is increasing, therefore, the state is advised 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 assess their GNA requirement and apply well before considering the timelines prescribed in the regulations.
- 12.8. A total of 670 MVA transformation capacity addition/augmentation and 592 ckm of new transmission lines/reconductoring of old lines at an estimated cost of ₹ 1234.90 Cr. would be required for implementing the intra-state transmission proposals for meeting the electricity demand of the state by the year 2031-32.

A total of 1300 MVA transformation capacity addition/augmentation and 1247 ckm of new transmission lines/reconductoring of old lines at an estimated cost of ₹ 1982.72 Crs. would be required for implementing the intra-state transmission proposals for meeting the electricity demand of the state by the year 2034-35

Annexure –I

Operational feedback from NERLDC/NLDC/Nagaland SLDC

a) Constraints in Nagaland Power System

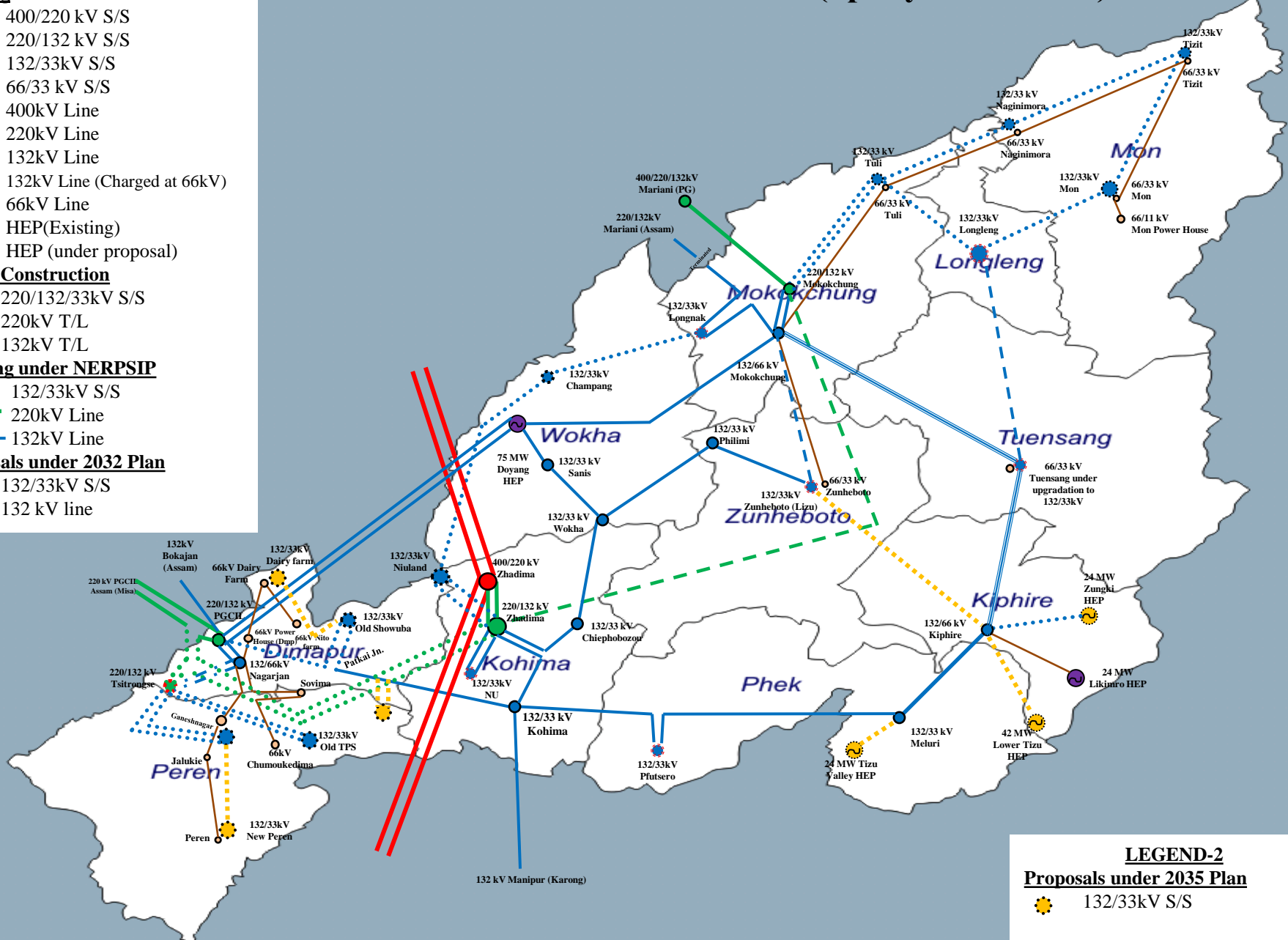
S.No.	Constraints in System	Remarks	Affected station
1.	Non compliant of N-1 in Dimapur area of Nagaland power system.	The load in the Dimapur area exceeds 130 MW and is supplied by the Dimapur-Dimapur 132 kV D/c line. A tripping of either of these lines would result in a grid disturbance in the Dimapur area of the Nagaland Power System.	Dimapur

POWER MAP OF NAGALAND (upto year 2034-35)

Annexure-II

LEGEND-1

- Existing**
- 400/220 kV S/S
 - 220/132 kV S/S
 - 132/33kV S/S
 - 66/33 kV S/S
 - 400kV Line
 - 220kV Line
 - 132kV Line
 - 132kV Line (Charged at 66kV)
 - 66kV Line
 - ⊙ HEP(Existing)
 - ⊙ HEP (under proposal)
- Under Construction**
- ⊙ 220/132/33kV S/S
 - ⋯ 220kV T/L
 - ⋯ 132kV T/L
- Ongoing under NERPSIP**
- ⊙ 132/33kV S/S
 - 220kV Line
 - 132kV Line
- Proposals under 2032 Plan**
- ⊙ 132/33kV S/S
 - ⋯ 132 kV line



LEGEND-2

Proposals under 2035 Plan

- ⊙ 132/33kV S/S
- ⋯ 132 kV line