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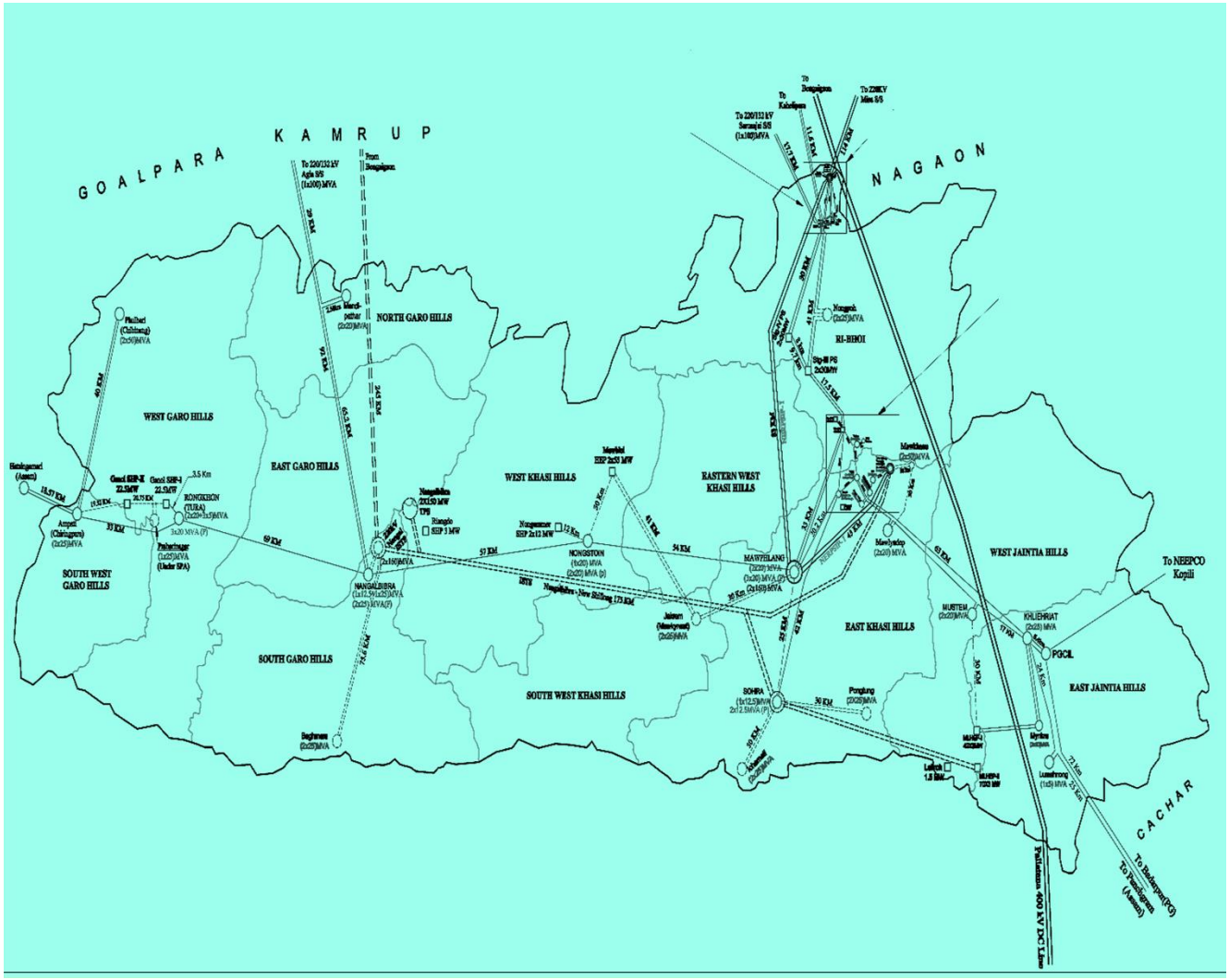
REPORT ON INTRA STATE TRANSMISSION RESOURCE ADEQUACY PLAN FOR MEGHALAYA BY THE YEAR 2034-35



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 Meghalaya 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 Meghalaya, 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 Meghalaya in 2024-25 was 409 MW, and Projected Peak Demand by 2034-35 is estimated to 630 MW. Further, existing Installed Capacity in the state is about 377 MW and state has planned 483 MW hydro capacity by 2034-35. Presently, the state has total 1344.61 ckm of 132 kV, 485.88 ckm of 220 kV, 4.22 ckm of 400 kV transmission line. It has transformation capacity of 843 MVA at 132 kV level, 960 MVA of 220 kV level and 630 MVA of 400 kV level.

Considering the anticipated demand, generation capacity, demand pattern, operational feedback from NERLDC and SLDC, system studies have been conducted for low hydro high demand and high hydro low demand scenarios for the timeframe 2031-32 & 2034-35 in consultation with Meghalaya, CTUIL and Grid-India. Based on the studies, the requirement of transmission system by the year 2034-35 has been identified.

A total of 1118 MVA transformation capacity addition/augmentation and 1336 ckm of new transmission lines/reconductoring of old lines at an estimated cost of ₹ 2441.49 Cr. 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	**220** kV	**132** kV	**220** kV	**132** kV	**220** kV	
FY 2026-27	327.5	-	28	-	84.9	-	215.94
FY 2027-28	170	-	50	-	-	-	165.30
FY 2028-29	-	-	30	-	62.26	-	135.33
FY 2029-30	50	-	5	-	-	-	62.60
FY 2030-31	50	-	60	-	-	-	154.76
FY 2031-32	50	-	206.27	-	-	-	379.56
FY 2032-33	100	320	70	460	-	-	794.99
FY 2033-34	50	-	60	-	-	-	99.98
FY 2034-35	-	-	112	100	7.86	-	433.03
Total	**797.5**	**320**	**621.27**	**560**	**155.02**		**2441.49**

To ensure reliable and adequate power supply in Meghalaya by 2034-35, substantial investments and infrastructure upgrades are essential. With a projected demand of 630 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 Meghalaya by the year 2034-35

1. Demographics

Meghalaya was previously part of Assam, but on 21st January 1972, the districts of Khasi, Garo and Jaintia Hills became the new state of Meghalaya. The population of Meghalaya as of 2014 was estimated to be 3,211,474. Meghalaya covers an area of approximately 22,430 square kilometres.

2. Electricity profile of state

2.1. Power generation-demand scenario of state:

2.1.1. In the FY 2024-25, Meghalaya had peak electricity demand of 409 MW and total electrical energy requirement of 2046 MU. As on 28.02.2025, state has central sector allocation of 256.67 MW which includes hydro plants (95.38 MW) and thermal plants (161.29 MW). In addition, installed capacity in state sector is 377.03 MW and installed capacity in private sector is 18.04 MW. Per capita consumption of the state was 730 kWh.

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

Table 2-1 Peak demand & Energy of Meghalaya

Financial Year	Peak Demand(MW)	Energy(MU)
2018-19	374	1957
2019-20	371	2112
2020-21	384	2031
2021-22	408	2256
2022-23	404	2237
2023-24	405	2236
2024-25	409	2046

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:

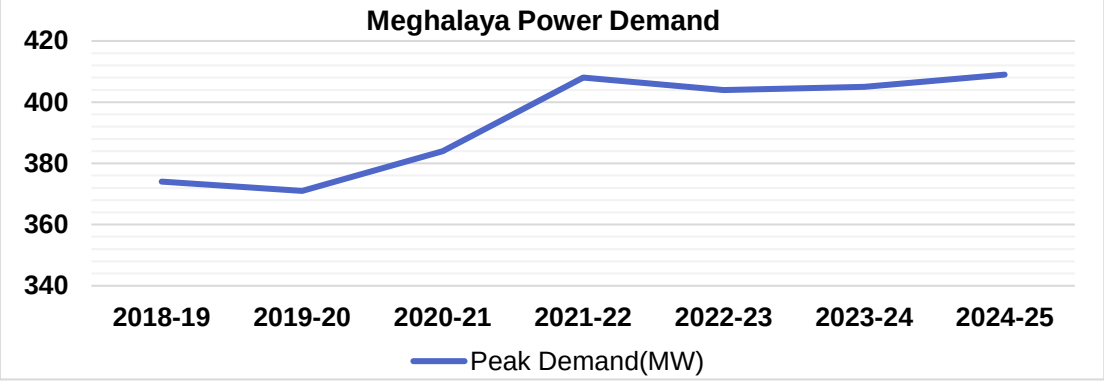

Figure 2-1 Peak Demand

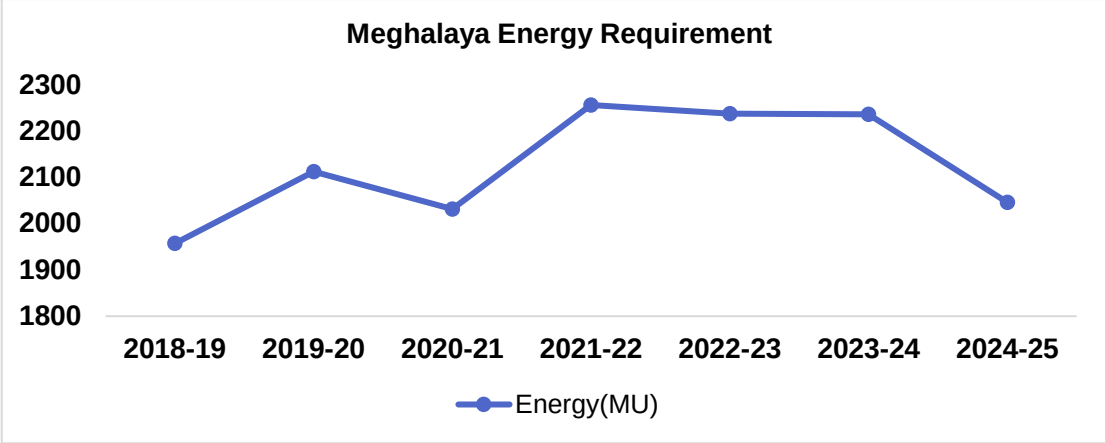

Figure 2-2 Energy Requirement

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

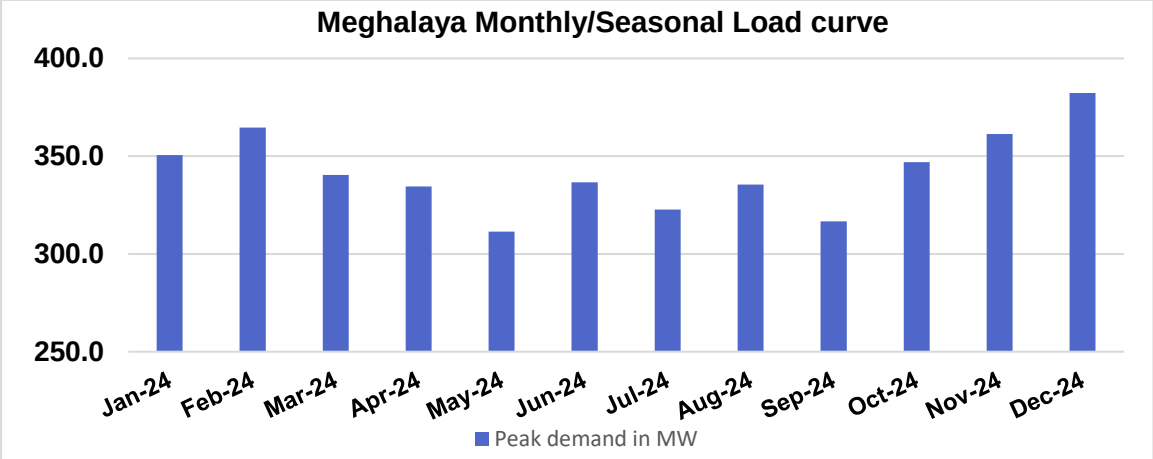

Figure 2-3 Seasonal Load Curve

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

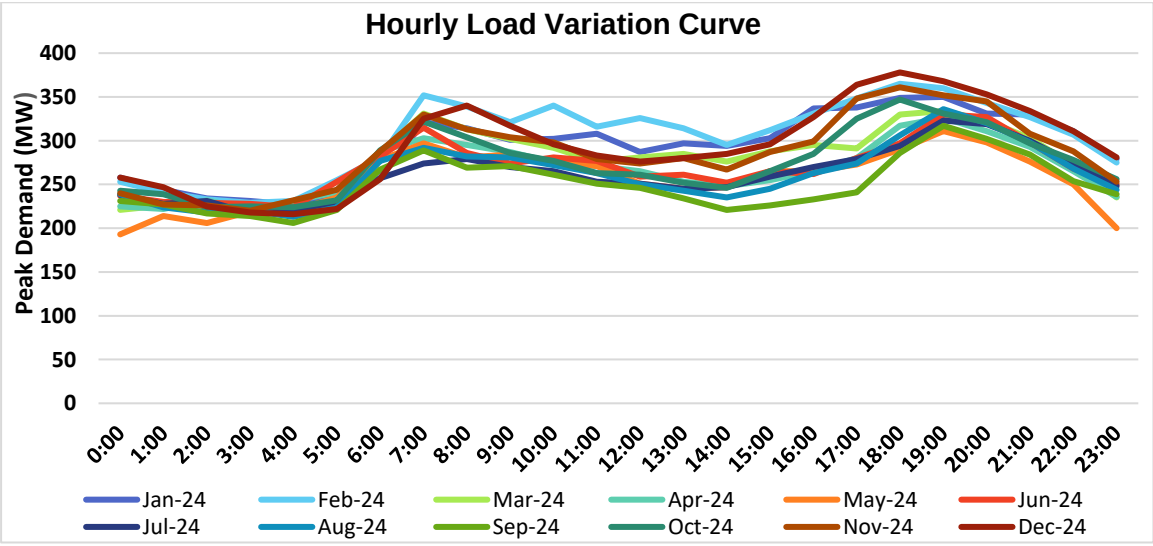

Figure 2-4 Hourly Load Variation Curve

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

Table 2-2 Contracted capacity by Meghalaya

(All fig. in MW)

SECTOR	HYDRO		THERMAL				NUCL-EAR	R.E.S. (MNRE)	TOTAL
		COAL	LIGNITE	GAS	DIESEL	TOTAL			
State	322	0	0	0	0	0	0	55.03	377.03
Private	0	0	0	0	0	0	0	18.08	18.08
Central allocation	95.38	51.6	0	109.69	0	161.29	0	0	256.67
Total	**417.38**	**51.6**	**0**	**109.69**	**0**	**161.29**	**0**	**73.11**	**651.78**
%	**64.04**	**7.91**	**0**	**16.83**	**0**	**24.74**	**0**	**11.21**	**100.00**

Source: Installed Capacity Report, CEA

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

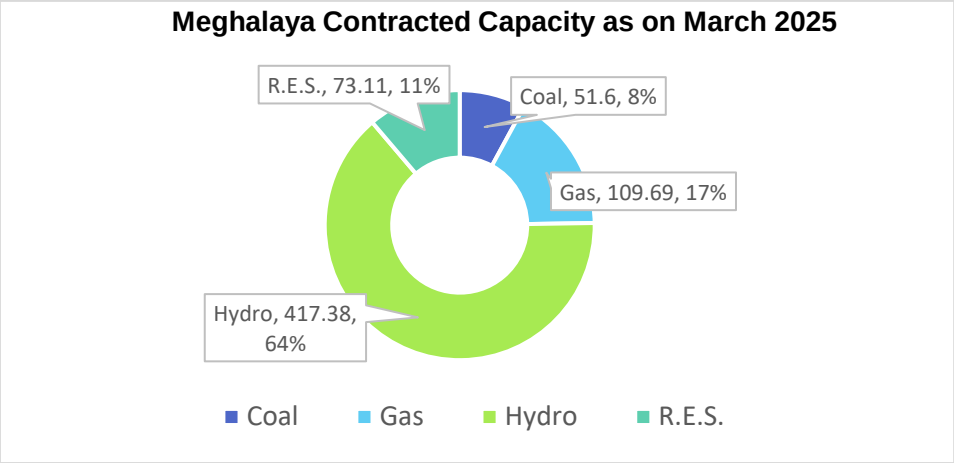

Figure 2-5 Contracted Capacity

2.1.8. As on April- 2025, the General Network Access (GNA) quantum for ISTS drawal and Available Transfer Capability (ATC) of the state is 290 MW and 315 MW respectively.

3. Existing Transmission System

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

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

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

Table 3-1 Intra State Transmission assets in Meghalaya

Financial Year	Voltage (kV)	Transmission lines (ckm)	Substations (MVA)
2018-19	132	973.97	543
	220	226.82	320
	400	4.22	630
Total		**1205.01**	**1493**
2019-20	132	1023.25	643
	220	226.82	320
	400	4.22	630
Total		**1254.29**	**1593**
2020-21	132	1023.25	643
	220	226.82	320
	400	4.22	630
Total		**1254.29**	**1593**
2021-22	132	1115.39	643
	220	226.82	320
	400	4.22	630
Total		**1346.43**	**1593**
2022-23	132	1115.39	643
	220	226.82	320
	400	4.22	630
Total		**1346.43**	**1593**
2023-24	132	1218.61	843
	220	485.88	960
	400	4.22	630
Total		**1708.71**	**2433**
2024-25	132	1344.61	843
	220	485.88	960
	400	4.22	630
Total		**1834.71**	**2433**

Meghalya state has total 1344.61 ckm of 132 kV, 485.88 ckm of 220 kV, 4.22 ckm of 400 kV transmission line and 843 MVA of 132 kV, 960 MVA of 220 kV, 630 MVA of 400 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:

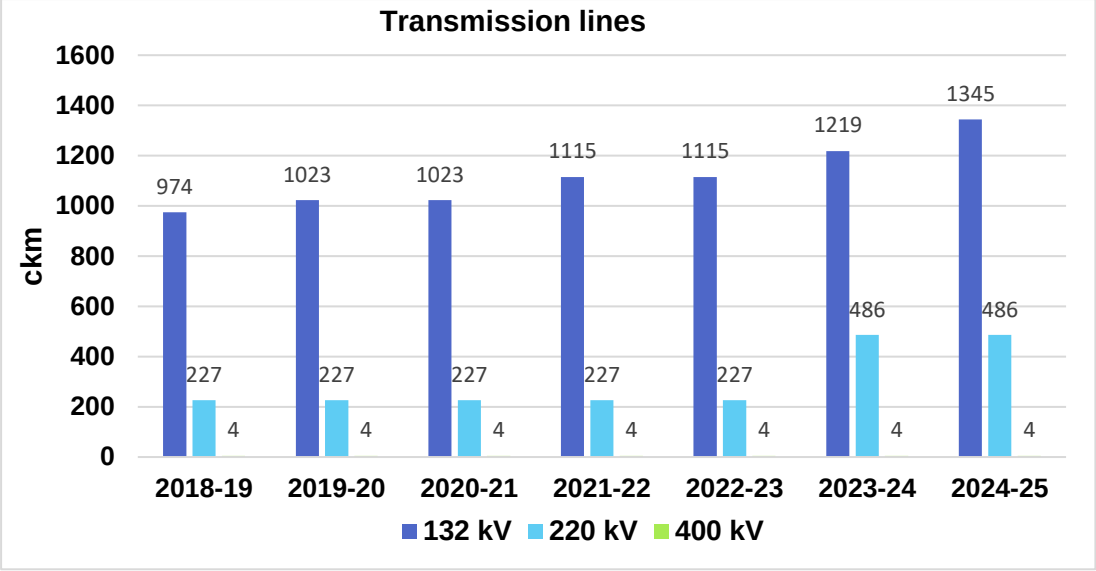

Figure 3-1 Existing Transmission Line

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

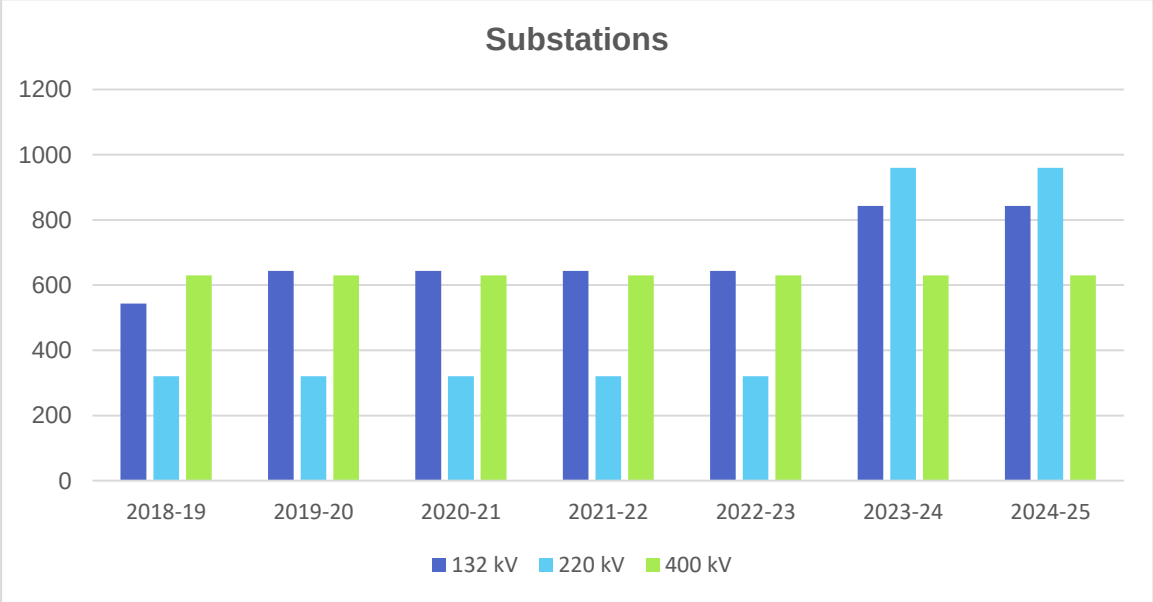

Figure 3-2 Existing Substations

3.2. <u>Existing Inter State Transmission system in the state:</u>

3.2.1. The State has a 132 kV ISTS switching station at Khliehriat. Further, a 220/132 kV, 320 MVA ISTS substation at Nangalbibra is under implementation which is scheduled for completion in Oct-2025.

3.2.2. State has total 1049 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 Meghalaya

Voltage level	Existing ISTS network
132 kV	205 ckm + 181 ckm (ISTS line owned by state)
220 kV	-
400 kV	663 ckm
Total	**1049 ckm** (including 181ckm ISTS line owned by State)

4. Under implementation Transmission System

4.1. **Under implementation Intra-State Transmission assets (as on May- 2025):** As on May-2025, the intra-state transmission assets which are under implementation in the Meghalaya are given at Table 4-1 below:

Table 4-1 Details of under implementation intra-state transmission assets

S.No.	Transmission System	MVA	ckm	Tentative completion schedule
1.	Construction of 132/33, 2x25 MVA substation at **Nongpoh**	2x25		2027-28 (Tendering stage)
2.	LILO of both the circuits of Stage-III Power House- Umtru Power House 132 kV D/c line on Multi circuit towers at Nongpoh – (5km loop in and 5km loop out)		20	
3.	Augmentation of S/s by Replacement of 132/33 kV, 2x20 MVA ICTs with 2x50 MVA ICTs at **Nehu S/s**	2x50		2026-27 (Tendering stage)

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

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

4.2.1. **Under Construction ISTS: RTM Mode**

i. **NERES-XXI: Part-A** *(Meghalaya portion only)* **(Jan 2026) –** by POWERGRID

- Upgradation of Single Main and Transfer Bus to Double Bus arrangement with GIS at 132kV Khliehriat (POWERGRID) switching station along with upgradation of necessary Control, Protection, Communication, Automation & LT auxiliary system.

4.2.2. **Under Construction ISTS under TBCB**

i. **Establishment of new 220/132kV substation at Nangalbibra** (*Meghalaya portion only*)**: (Nangalbibra Bongaigaon Transmission Limited, a subsidiary of Sterlite): (Oct 2025)**

- Establishment of new 220/132kV, 2x160MVA substation at Nangalbibra.
- Bongaigaon (POWERGRID) – Nangalbibra 400kV D/c line (initially operated at 220kV) – 280ckm
- Hatsinghmari (Assam) – Ampati (Meghalaya) 132kV D/c line – 60ckm
- Extension at Ampati (Meghalaya) S/s:
  - 2 no. of 132kV line bays for termination of Hatsinghmari (Assam) – Ampati (Meghalaya) 132kV D/c line.

5. System operator feedback

5.1. The operational constraint faced in the Intra-state and Inter-state transmission network by NERLDC & Meghalaya 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 Meghalaya 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

Reference↓ / Parameter→	**Year**	**Peak Demand (MW)**	**CAGR**
Actual Peak	2024-25	409	
As per 20th EPS	2025-26	474	15.89
	2026-27	492	9.68
	2027-28	510	7.63
	2028-29	528	6.59
	2029-30	546	5.95
	2030-31	561	5.41
State Estimated Peak electricity demand	2031-32	575*	4.99
	2034-35	630*	4.41
As per 20th EPS	2036-37	670	4.20

** including industrial demand*

6.2. **Industrial Demand:**

6.2.1. The total industrial demand of about 200 MW is expected to coming by 2032 at following locations.

i. Export Promotion Industrial Park (EPIP)-I (45 MW),
ii. EPIP-II (30 MW),
iii. Mynkre (90 MW) and
iv. Lumshong (30 MW) area of Meghalaya
v. Mendipathar (15 MW) area of Meghalaya

6.3. The following Parameters were considered during the study

a) The total intra state generation installed capacity is 24 MW by the year 2031-32 and 443 MW by the year 2034-35. The details of existing and upcoming generation is given at Table 6-2 below:

Table 6-2 Details of existing & upcoming intra state generation

S.No.	Name of Plant	Type	Installed Capacity (MW)	Location	Time frame considered for the study
1.	Myntdu Leshka Stage-II HEP	Hydro	210 MW	East & West Jaintia Hills	2034-35
2.	Ganol Stage-II SHP	Hydro	14 MW	West Garo Hills	2033-34
3.	Nongummer	Hydro	24 MW	West Khasi Hills	2031-32
4.	Mawblei Storage	Hydro	110MW	West Khasi Hills	2034-35
5.	UMIEW (Mawphu stage-II) NEEPCO	Hydro	85MW	East Khasi Hills	2034-35

The other upcoming Small Hydro Generation i.e. Riangdo (3 MW), Nan-Ramnian Umkhynri Stage-I (9 MW), Umrina Stage-I (6 MW), Umshamphu (4 MW), Amkshar Stage-I (4.5 MW) & Umran (13.5 MW) shall be connected at lower voltage level (33 kV or below) and therefore are not considered during study.

b) Scenario of Study:

S.No.	Scenario	Demand Factor	Dispatch Factors
1.	Low Hydro & Peak Demand	100%	30%
2.	High Hydro & Low Demand	60%	90%

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 Meghalaya 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 Low Demand**	**Low Hydro Peak Demand**
Generation despatch (intra-state + ISGS located in state) (in MW)	349.7	116.6
Demand (in MW)	317.3	582.6
Net interchange ((-)import / (+)export) at ISTS-STU periphery (in MW)	32.4	-466.0

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 Low Demand**	**Low Hydro Peak Demand**
Generation despatch (intra-state + ISGS located in state) (in MW)	726.8	242.3
Demand (in MW)	387.9	632.7
Net interchange ((-)import / (+)export) at ISTS-STU periphery (in MW)	338.9	-390.4

7.2. The Peak Demand scenario with low hydro 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 Meghalaya SLDC and NERLDC listed at **Annexure-I**.

7.5. According to CEA's generation resource adequacy report for Meghalaya (2031-32) is likely to have unserved energy in coming years and needs to contract coal based capacities for meeting energy requirements other than the planned capacities. The quantum of coal-based capacities required to be contracted is about 208 MW by the year 2031-32.

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 Meghalaya 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 Meghalaya

Sl.No.	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Timeframe/ Remarks
1.	i. **Creation of 220 kV level at existing 132/33 kV Sohra S/s with installation of 2x160 MVA, 220/132kV ICT**	For evacuation of power from generation projects in the Sohra area towards the load centres in the capital area.	40.00	**Time frame: 2032-33** **Note:** Nangalbibra (ISTS) – New Shillong (MePTCL) 220 kV D/c line – (300 ckm) is not required to be implemented. *(this line was earlier agreed in 3rd meeting of NERPCTP)*
	ii. Nangalbibra (ISTS) – Sohra (MePTCL) 220 kV D/c line – (240 ckm) alongwith associated bays at both end		393.60	
	iii. New Shillong– Sohra (MePTCL) 220 kV D/c line – (220 ckm) alongwith associated bays at both end		180.40	
2.	i. **Establishment of 132/33 kV, 2x25 MVA S/s Killing (New) near the existing Killing 400/220/132 kV S/s**	To meet the load and provide reliable downstream connectivity, the proposal of Killing (New) 132/33 kV, 2x25 MVA GIS S/s at/nearby existing Killing 400/220/132 kV S/s is proposed.	53.10	**Time frame: 2029-30**
	ii. Killing (existing) – Killing (New) 132 kV D/c line (5 ckm) along with 2 Nos. 132kV line bays at Killing 400/220/132kV S/s		9.50	
3.	**i. Establishment of 132/33 kV, 2x25 MVA S/s at Baghmara**	To evacuavte Power from Nangalbibra ISTS To meet N-1, this line may be implemented as D/c line from Nangalbibra ISTS.	30.45	**Time frame: 2031-32**
	ii. Nangalbibra (ISTS) – Baghmara 132 kV D/c line– (150 ckm) along with 2 Nos. 132 kV line bays at Nangalbibra (ISTS) S/s		313.74	
4.	**i. Establishment of 132/33 kV, 2x25 MVA S/s at Pongtung**	Pongtung (near Mawlynnong) is a toursit destination as well as border area and needs reliable power supply. As such, to resolve the issue of long 33 kV lines, Pongtung (near Mawlynnong) 132/33 kV, 2x25 MVA Sub station is proposed.	38.36	**Time frame: 2030-31**
	ii. Sohra – Pongtung 132 kV D/c line (60 ckm) along with 2 Nos. 132kV line bays at Sohra 132/33kV S/s		116.40	

Sl.No.	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Timeframe/ Remarks
1.	i. **Creation of 220 kV level at existing 132/33 kV Sohra S/s with installation of 2x160 MVA, 220/132kV ICT**	For evacuation of power from generation projects in the Sohra area towards the load centres in the capital area.	40.00	**Time frame: 2032-33** **Note:** Nangalbibra (ISTS) – New Shillong (MePTCL) 220 kV D/c line – (300 ckm) is not required to be implemented. *(this line was earlier agreed in 3rd meeting of NERPCTP)*
	ii. Nangalbibra (ISTS) – Sohra (MePTCL) 220 kV D/c line – (240 ckm) alongwith associated bays at both end		393.60	
	iii. New Shillong– Sohra (MePTCL) 220 kV D/c line – (220 ckm) alongwith associated bays at both end		180.40	
5.	**i. Establishment of 132/33 kV, 2x50 MVA S/s at Mawkhanu**	To meet the future load demand the S/s is required	49.82	**Time frame: 2027-28**
	ii. New Shillong – Mawkhanu D/c line (20 ckm) along with 2 Nos. 132 kV line bays at New Shillong 132/33kV S/s		42.66	
6.	i. **Establishment of 132/33 kV, 2x25 MVA S/s at Happy Valley, Shillong**	To relieve the loading on 132 kV Mawlyndep S/s and to cater to demand on the eastern part of Shillong	38.36	**Time frame: 2032-33**
	ii. LILO of 132 KV Mawlyndep-NEHU S/c line at Happy Valley, Shillong – (5km loop in and 5km loop out)		42.65	
7.	i. **Establishment of 132/33 KV, 2 x 25 MVA S/s at IchamatiS/s**	To cater the load demand of upcoming Cement companies (i.e. Lafarge Cement)	38.36	**Time frame: 2033-34**
	ii. Sohra-Ichamati 132 kV D/c line along with 2 Nos. 132 kV line bays at Sohra S/s (60 ckm)		61.62	
8.	**i. Establishment of 132/33 kV, 2x25 MVA S/s at Jakrem/Mawkyrwat**	To relieve the loading on 132 kV Mawphlang S/s and for providing reliable power supply to south western parts of Meghalaya	38.36	**Time frame: 2032-33**

Sl.No.	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Timeframe/ Remarks
1.	i. **Creation of 220 kV level at existing 132/33 kV Sohra S/s with installation of 2x160 MVA, 220/132kV ICT**	For evacuation of power from generation projects in the Sohra area towards the load centres in the capital area.	40.00	**Time frame: 2032-33** **Note:** Nangalbibra (ISTS) – New Shillong (MePTCL) 220 kV D/c line – (300 ckm) is not required to be implemented. *(this line was earlier agreed in 3rd meeting of NERPCTP)*
	ii. Nangalbibra (ISTS) – Sohra (MePTCL) 220 kV D/c line – (240 ckm) alongwith associated bays at both end		393.60	
	iii. New Shillong– Sohra (MePTCL) 220 kV D/c line – (220 ckm) alongwith associated bays at both end		180.40	
	ii. Mawphlang-Jakrem/Mawkyrwat 132 kV D/c line along with 2 Nos. 132 kV line bays at Mawphlang S/s (60 ckm)		61.62	

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 Meghalaya

Sl.No.	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Timeframe/ Remarks
1.	New Shillong – IIM 132 kV S/c line (8 ckm) alongwith associated bay at both end	To cater the increased load in the area.	31.88	**Time frame: 2026-27**
2.	Mawkhanu -Mawlyndep 132 kV S/c line (30 ckm) alongwith associated bay at both end	To reduce loading of Khliehriat – Mustem – Mawlyndep 132kV corridor	119.58	**Time frame: 2028-29**
3.	Nangalbibra (ISTS) – Nangalbibra (MePTCL) 132 kV D/c line with Single Moose conductor (20 ckm) alongwith associated bays at Nangalbibra (MePTCL) end.	In 1st NERPC-TP meeting this line was agreed to be implemented in matching timeframe of Nangalbira (ISTS) S/s	39.66	**Time frame: 2026-27** ***Note:*** *2 Nos. of 132 kV line bays at Nangalbibra (ISTS) is already implemented under ISTS*
4.	MLHEP-I – Mustem 132 kV S/c line (30 ckm)	To provide N-1 contingency for evacuation from MLHEP-1	60	**Time frame: 2027-28**

Sl.No.	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Timeframe/ Remarks
	alongwith associated bay at both end			

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 lines of Meghalaya

S.No	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Timeframe/ Remarks
1.	Restringing of NEHU – Mawlyndep- Mustem-Khliehriat 132 kV S/c line (56 ckm) with panther conductor along with upgradation of requisite bay equipment	Due to increased loading in the area reconductoring of this line is required. • Existing conductor - ACSR Panther, (Ampacity: 350 A) • Year of commissioning- 1967 • Restringing with panther (tower assessment review)	12.26	**Time frame: 2026-27**
2.	Umiam Stage1-Umiam 132kV S/c line (5 ckm) along with upgradation of requisite bay equipment	Due to increased loading in the area reconductoring of this line is required. • Existing conductor - ACSR Panther (Ampacity: 350 A) • Year of commissioning- 1996 • Ampacity of HTLS: 800 A	5.46	**Time frame: 2026-27**
3.	Umiam-NEHU S/c line (6.2 ckm) along with upgradation of requisite bay equipment	Due to increased loading in the area reconductoring of this line is required. • Existing conductor - ACSR Panther(Ampacity: 350 A) • Year of commissioning- 1996 • Ampacity of HTLS: 800 A	6.36	**Time frame: 2026-27**
4.	Umiam Stage1-Mawlai 132KV S/c line (12.35 ckm) along with upgradation of requisite bay equipment	Due to increased loading in the area reconductoring of this line is required. • Existing conductor - ACSR Panther(Ampacity: 350 A) • Year of commissioning- 1964 • Ampacity of HTLS: 800 A	10.52	**Time frame: 2026-27**
5.	Mawphlang-Mawlai 132KV S/c line (20.26 ckm) along with upgradation of requisite bay equipment	Due to increased loading in the area reconductoring of this line is required. • Existing conductor - ACSR Panther(Ampacity: 350 A) • Year of commissioning- 1977 • Reconductoring with panther (tower assessment review)	6.21	**Time frame: 2028-29**
6.	Restringing of Mawlai – Sohra 132kV S/c line (42 ckm) (being LILOed	Due to increased loading in the area reconductoring of this line is required.	9.54	**Time frame: 2028-29**

S.No	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Timeframe/ Remarks
	at Mawphlang) with panther conductor along with upgradation of requisite bay equipment	• Existing conductor - ACSR Panther(Ampacity: 350 A) • Year of commissioning- 1974 • Restringing with panther (tower assessment review)		
7.	Khliehriat- Khliehriat (PG) – circuit- 2 132 kV line (5.35 ckm) along with upgradation of requisite bay equipment	To cater to the increase in ISTS power flow due to increase in demand. • Existing conductor - ACSR Panther(Ampacity: 350 A) • Year of commissioning- 2006 • Ampacity of HTLS: 800 A	5.55	**Time frame: 2026-27**
8.	Mawlai – Nehu 132 kV S/c line (7.86 ckm) along with upgradation of requisite bay equipment	Due to increased loading in the area reconductoring of this line is required. • Existing conductor – ACSR Panther(Ampacity: 350 A) • Year of commissioning- 1996 • Ampacity of HTLS: 800 A	8.02	**Time frame: 2034-35**

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 Meghalaya

S.No	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Timeframe/ Remarks
1.	Augmentation of 132/33 kV, 1x12.5 MVA ICTs with additional 1x12.5 MVA ICTs at **Sohra S/s**	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required Existing ICT capacity: 1x12.5 MVA	0.35	**Time frame: 2026-27** After augmentation Total ICT capacity: **2x12.5 MVA** ***Note**: 1 No. of ICT to be sourced from Nangalbibra*
2.	Augmentation of 132 kV bus alongwith replacement of 132/33 kV, 1x12.5 (out of 1x12.5+1x25) MVA ICTs with 1x25 MVA ICTs at **Nangalbibra S/s**	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required Existing ICT capacity: 1x12.5 + 1x25 MVA	28.00	**Time frame: 2026-27** After augmentation Total ICT capacity: **2x25 MVA**
3.	Augmentation of S/s by Replacement of 132/33 kV, 1x5 (out of 2x20 + 1x5) MVA ICTs with 1x20 MVA ICTs at **Rongkhon S/s**	To cater the future load demand in Tura and to satisfy N-1 contingency criteria the Augmentation is required.	0.80	**Time frame: 2027-28** After augmentation Total ICT capacity: **3x20 MVA**

S.No	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Timeframe/ Remarks
		Existing ICT capacity: 2x20 + 1x5 MVA		**Note**: *1 No. of ICT to be sourced from Mawlai or Nehu)*
4.	Augmentation of 132 KV bus at 132 kV Mawlai S/s alongwith Replacement of 132/33 KV, 3x20 MVA ICTs with 3x50 MVA ICTs at **Mawlai S/s**	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required. Existing ICT capacity: 3x20 MVA	79.23	**Time frame: 2027-28** After replacement Total ICT capacity: **3x50 MVA** **Note**: *Conversion from AIS to GIS.*
5.	Augmentation of 132/33 kV, 1x50 MVA ICTs with additional 1x50 MVA ICTs at **EPIP-II S/s**	Augment, Upgrade, Modernise old substations to ensure reliability and extend life span. Existing ICT capacity: 1x50 MVA	12.02	**Time frame: 2027-28** After augmentation Total ICT capacity**: 2x 50 MVA**
6.	Augmentation of 132/33 kV, 1x20 MVA ICTs with additional 1x20 MVA ICTs at **Nongstoin S/s**	Augment, Upgrade, Modernise old substations to ensure reliability and extend life span. Existing ICT capacity: 1x20 MVA	0.20	**Time frame: 2026-27** After augmentation Total ICT capacity: **2x20 MVA** **Note**: *1 No. of ICT to be sourced from NEHU or Mawlai*
7.	Augmentation of 132/33 kV, 2x20 MVA ICTs with additional 1x20 MVA ICTs at **Mawphlang** S/s	Augment, Upgrade, Modernise old substations to ensure reliability and extend life span. Existing ICT capacity: 2x20 MVA	0.15	**Time frame: 2026-27** After augmentation Total ICT capacity: **3x20 MVA** **Note**: *1 No. of ICT to be sourced from NEHU or Mawlai*
8.	Augmentation of S/s by Replacement of 132/33 kV, 2x20 MVA ICTs with 2x50 MVA ICTs at **Mendipatha**r S/s	To cater the future load demand, the Augmentation is required. Existing ICT capacity: 2x20 MVA	24.67	**Time frame: 2026-27** After augmentation Total ICT capacity: **2x50 MVA**

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 Meghalaya

S.No	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Timeframe/ Remarks
1.	MLHEP-II – Sohra 220 kV D/c line (100 ckm) along with 2 Nos. 220 kV line bays at Sohra S/s	Evacuation of power from Leshka II Hydro Project (210 MW)	310.00	**Time frame: 2034-35** matching with generation project (expected by 2034-35)
2.	Ganol-II – Praharinagar 132 kV S/c line (20.75 ckm) with 1 Nos. 132 kV line bay at Praharinagar S/s	Evacuation of power from Ganol-II Hydro Project (14 MW)	10.36	**Time frame: 2033-34** matching with generation project (expected by 2033-34)
3.	Ganol-II – Ganol-I 132 kV S/c line (19.52 ckm) with 1 Nos. 132 kV line bay at Ganol-I S/s		8.58	
4.	Nongummer-Nongstoin 132 KV D/c line (16 ckm)	Evacuation of power from Nongummer SHEP (2x12 MW)	16.43	**Time frame: 2031-32**
5.	Mawblei-Mawkyrwat/Jakrem 132 kV D/c line (82 ckm)	Evacuation of power from Mawblei HEP (2x55 MW)	84.20	**Time frame:2034-35**
6.	Mawblei-Nongstoin 132 kV S/c line (30 ckm) for redundancy evacuation		30.81	

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 Meghalaya 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 state to install capacitor banks around the below listed locations at lower voltage levels so as to maintain minimum reactive power exchange with the grid and maintain the voltage within permission levels:

Sl. No.	Name of Substation (132 kV Level)	Capacitor requirement at downstream Distribution level (in MVAr)
1.	Ampati	15
2.	Lumshnong	15
3.	Phulbari	15

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

A total of 1118 MVA transformation capacity addition/augmentation and 1336 ckm of new transmission lines/reconductoring of old lines at an estimated cost of ₹ 2441.49 Cr. 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:

220 kV Transmission system

S.No	Transmission system	No.	Length (in ckm)	Capacity (in MVA)	Estimated Cost (in ₹ Cr.)*
1.	New substation	01	-	320	40
2.	Augmentation of existing substation	-	-	-	-
3.	New transmission line	03	560	-	884
4.	Reconductoring of transmission line	-	-	-	-

132 kV Transmission system

S.No.	Transmission System	No.	Length (in ckm)	Capacity (in MVA)	Estimated Cost (in ₹Cr)*
1.	New substation	07	-	400	286.81
2.	Augmentation of existing substation	08	-	397.50	117.07
3.	New transmission line	16	621.27	-	1049.69
4.	Reconductoring of transmission line	08	155.02	-	63.92

**Note: The estimated cost of the above transmission system is based on SoR of POWERGRID (March 2022) & Meghalaya Public Works Department (2021-22).*

11.1. Summary of year-wise MVA capacity, ckm addition at 132 kV & 220 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	**220** kV	**132** kV	**220** kV	**132** kV	**220** kV	
FY 2026-27	327.5	-	28	-	84.9	-	215.94
FY 2027-28	170	-	50	-	-	-	165.30
FY 2028-29	-	-	30	-	62.26	-	135.33
FY 2029-30	50	-	5	-	-	-	62.60
FY 2030-31	50	-	60	-	-	-	154.76
FY 2031-32	50	-	206.27	-	-	-	379.56

FY 2032-33	100	320	70	460	-	-	794.99
FY 2033-34	50	-	60	-	-	-	99.98
FY 2034-35	-	-	112	100	7.86	-	433.03
Total	**797.5**	**320**	**621.27**	**560**	**155.02**		**2441.49**

12. Conclusion

12.1. By the year 2034-35, the power demand of Meghalaya would be increasing significantly. Total expected demand of Meghalaya by the year 2034-35 is about 630 MW. This anticipated increase in demand includes the expected industrial load coming progressively from 2024-25 to 2034-35.

12.2. About 05 Nos. of hydro power projects connected with Intra-state transmission network (at 132 kV & above voltage level) are expected to be commissioned by 2034-35.

12.3. In order to meet this growing load demand, evacuation of power from hydro generation and for drawal of power from ISTS in accordance with GNA requirement of Meghalaya by 2034-35, the intra-state as well as inter-state transmission system of Meghalaya need to be strengthened. It has been observed that the transmission system infrastructure in Meghalaya 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 Meghalaya 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 Meghalaya 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 647.5 MVA transformation capacity addition/augmentation and 526.43 ckm of new transmission lines/reconductoring of old lines at an estimated cost

of ₹ 1113.49 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 1118 MVA transformation capacity addition/augmentation and 1336 ckm of new transmission lines/reconductoring of old lines at an estimated cost of ₹ 2441.49 Cr. 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/Meghalaya SLDC

Constraints in Meghalaya Power System

S.No	Constraints in System	Comments	Affected station
1.	Non-Compliant of N-1 criteria of Khliehriat-Khliehriat(POWERGRID) 132 kV 2xS/c line	Khliehriat – Khliehriat-II 132 kV line experiences overloading under an N-1 contingency of the Khliehriat – Khliehriat-I 132 kV line, particularly during the lean hydro season when Meghalaya's power import exceeds 310 MW. *Note: Khliehriat-Khliehriat-I 132 kV line has already been reconductored with HTLS. However, Khliehriat-Khliehriat-II 132 kV line, which belongs to MeECL, still requires reconductoring to enhance reliability and mitigate overloading issues.*	Captial area of Meghalaya System
2.	Non-Compliant of N-1 criteria of Umiam-1-Mawlai 132 kV line, especially during the hydro season.	Umiam-Umiam-I 132 kV line experiences overloading under an N-1 contingency of Umiam-I–Mawlai 132 kV line, when Meghalaya internal genertaion is high (no mgenertaion from Leshka).	Captial area of Meghalaya System
3.	Non-Compliant of N-1 criteria of Khliehriat-Mustem 132 kV & Khliehriat-NIEGRIMS 132 kV line	Khliehriat-Mustem 132 kV line experiences overloading under an N-1 contingency of Khliehriat-NIEGRIMS 132 kV line (or vice-versa), particularly during the lean hydro season when Meghalaya's power draw exceeds 310 MW.	Captial area of Meghalaya System

Power Transmission Map of Meghalaya (Existing, Ongoing & Proposed) up to 2034-35 (As on May, 2025).

Annexure-II