

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 Tripura 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 Tripura, 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 Tripura in 2024-25 was 386 MW and Projected Peak Demand by 2034-35 is estimated to 698 MW. Further, existing Installed Capacity in the state is about 221 MW (120 MW state own generation + 101 MW of Monarchak GTPS NEEPCO) and state has planned 278 MW (including 101 MW of Monarchak GTPS NEEPCO) by the year 2034-35. Presently, the state has total 987 ckm of 132 kV and 1133 MVA of 132 kV transformation capacity in Intra-state transmission system.

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

A total of 1140 MVA transformation capacity addition/augmentation and 335 ckm of new transmission lines/reconductoring of old lines at an estimated cost of Rs. 1207.68 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.)
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FY 2028-29	160	81.4	-	380.92
FY 2029-30	610	08	12	212.39
FY 2030-31	175	30	30.4	162.38
FY 2031-32	145	105	48	348.28
FY 2032-33	50	20	-	103.71
Total	1140	244.4	90.4	1207.68

To ensure reliable and adequate power supply in Tripura by 2034-35, substantial investments and infrastructure upgrades are essential. With a projected demand of 698 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 Tripura by the year 2034-35

1. Demographics

Tripura is a state in North Eastern India. The third smallest state in the country, it covers 10,491.69 km² (4,050.86 sq mi) and is bordered by Bangladesh in the North, South, and West, and the Indian states of Assam and Mizoram in the East. In 2011 the state had 3,671,032 residents, constituting 0.3% of the country's population. Agartala, the capital, is located on a plain to the West.

2. Electricity profile of state

2.1. Power generation-demand scenario of state:

2.1.1. In the FY 2024-25, Tripura had peak electricity demand of 386 MW and electrical energy requirement of 1888 MU. As on 28.02.2025, state has installed capacity of 511.43 MW in Central Sector which includes hydro plants (68.49 MW) and thermal plants (437.94 MW). In addition, installed capacity in state sector is 121 MW and installed capacity in private sector is 16.26 MW. The per capita consumption of the state was 444 kWh in the year 2022-23. In addition, about 160 MW power is exported to Bangladesh from state network.

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

Table 2-1 Peak demand & Energy of Tripura

Tripura	Peak Demand(MW)	Energy(MU)
2018-19	298	1863
2019-20	320	1538
2020-21	317	1484
2021-22	328	1578
2022-23	333	1547
2023-24	362	1691
2024-25	386	1888

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 respectively below.

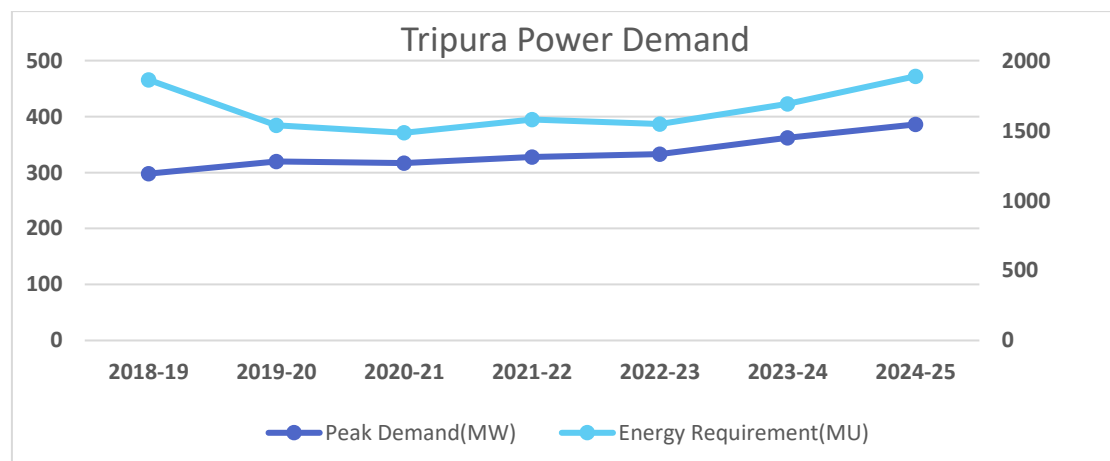


Figure 2-1 Peak Demand

State	0	0	0	105	0	105.00	0	16.01	121.01
Private	0	0	0	0	0	0	0	16.24	16.24
Central allocation	68.49	56.00	0	381.94	0	437.94	0	5.00	511.43
Total	68.49	56.00	0.00	486.94	0.00	542.94	0.00	37.25	648.68
%	10.55	8.63	0.00	75.06	0.00	83.69	0.00	5.75	100.00

Source: Installed Capacity Report, CEA

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

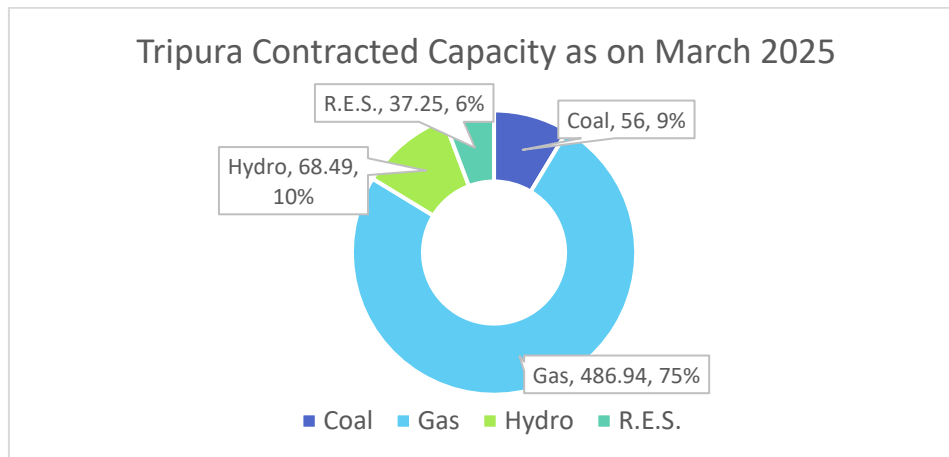


Figure 2-4 Contracted Capacity

2.1.8. As on March 2025, the General Network Access (GNA) quantum for ISTS drawal of the state is 311 MW and Available Transfer Capability (ATC) for FY 2024-25 is varying from 304 MW to 324 MW.

3. Existing Transmission System

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

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

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

Table 3-1 Intra State Transmission assets in Tripura

Financial Year	Voltage (kV)	Transmission lines (ckm)	Substation (MVA)
2018-19	132	578	448
	66	407.91	223.8
	Total	985.91	671.8
2019-20	132	578	465
	66	407.91	220.8
	Total	407.91	220.8
2020-21	132	578	506
	66	407.91	220.8
	Total	985.91	726.8

2021-22	132	617	1043
	66	407.91	220.8
	Total	1024.91	1263.8
2022-23	132	739.57	1083
	66	407.91	220.8
	Total	1147.48	1303.8
2023-24	132	987.34	1133
	66	407.91	220.8
	Total	1395.25	1353.8
2024-25	132	987.34	1133
	66	359.31	210.8
	Total	1346.65	1343.8

Tripura state has total 987 ckm of 132 kV & 359 ckm of 66 kV transmission lines. State also has Total 1133 MVA of 132 kV & 210 MVA of 66 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.

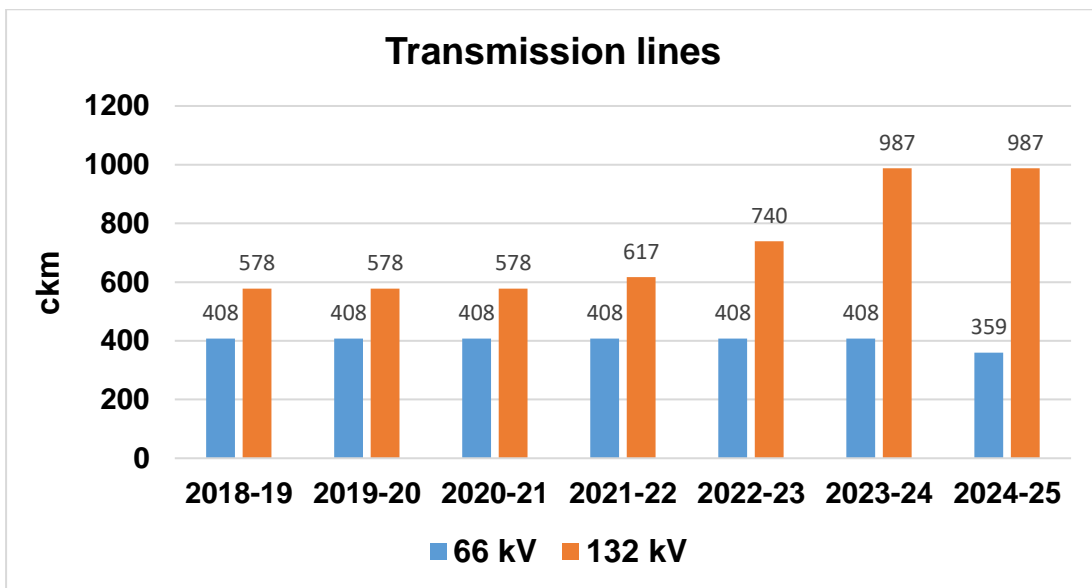


Figure 3-1 Existing Transmission Line

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

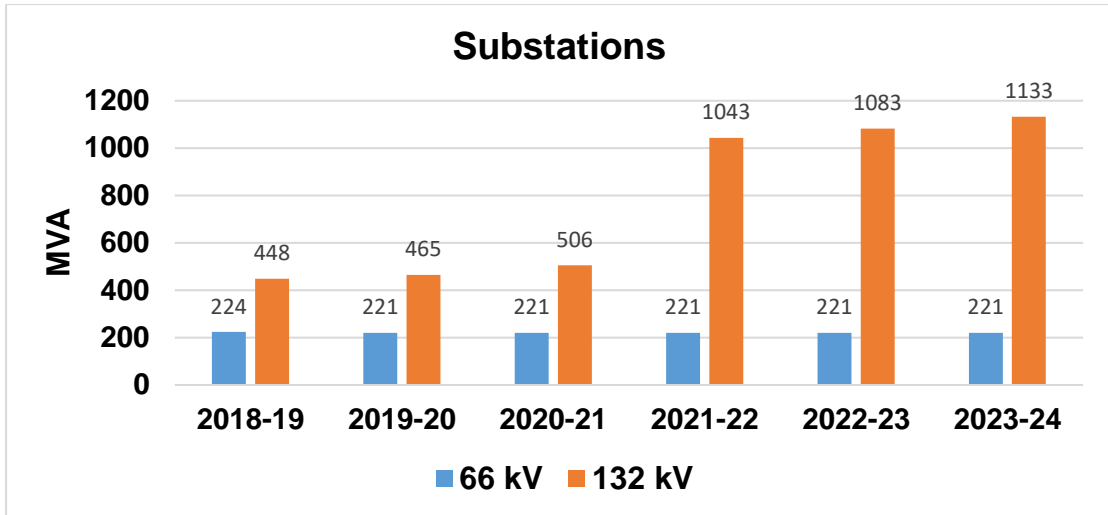


Figure 3-2 Existing Substations

3.2. Existing Inter State Transmission system in the state:

3.2.1. The state has two Nos. of 400/132 kV ISTS substations having total capacity of 1,260 MVA at PK Bari and Surajmaninagar. Further, the state has a 132/33 kV, 5 MVA ISTS substation at New Kumarghat.

3.2.2. State has total 1729 ckm of existing ISTS network and 12 ckm of planned /under construction ISTS network. Brief details of the ISTS network (including ISTS lines owned by states) are given at Table 3-2:

Table 3-2 Existing ISTS in Tripura

Voltage level	Existing	Under Construction/ Planned
132 kV	572 ckm + 29 ckm (ISTS line owned by state)	-
400 kV	1128 ckm	12 ckm
Total	1729 ckm (including 29 ckm ISTS line owned by state)	12 ckm

4. Under implementation Transmission System

4.1. **Under implementation Intra-State Transmission assets:**

The intra-state transmission assets currently under implementation in Tripura are given at Table 4-1:

Table 4-1 under implementation Intra-State Transmission assets:

S.No.	Transmission System	Tentative completion schedule
1.	Surjamaninagar-Rokhia 132 kV D/c transmission line	December - 2025
2.	Surjamaninagar – Monarchak 132 kV D/c transmission line	December - 2025

3.	2x10 MVA, 132/33 kV & 2x10 MVA, 132/11 kV ICT at 132 KV Bishramganj S/s	December - 2025
4.	Upgradation of existing 132 kV Surjamaninagar to 400/132 kV, 2x315 MVA substation at Surajmaninagar (TSECL)	2027-28
	LILO of Palatana-Surajmaninagar (ISTS) 400 kV D/c line at 400/132 kV Surajmaninagar (TSECL)	

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

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

i. **POWERGRID works associated with NERSS-V (only Tripura portion)**

- Shifting of Palatana – Surajmaninagar (TSECL) 400 kV D/c line (operated at 132 kV) to the 400/132 kV ISTS S/s at Surajmaninagar so as to form Palatana – Surajmaninagar (ISTS) 400 kV D/c line and its operation at 400 kV (24 ckm): *12 Months from Date of Award*

ii. **NERSS-XIV:**

- LILO of Palatana – Surajmaninagar (ISTS) 400 kV D/c line at 400/132 kV Surajmaninagar (TSECL) S/s along with associated 4 No. 400 kV line bays (12 ckm) - *In matching timeframe of upgradation of 400/132kV Surajmaninagar (TSECL) substation.*

5. System operator feedback:

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

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

6. Assumptions for study:

6.1. Peak electricity demand (MW) of Tripura 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
<i>Actual Peak</i>	2024-25	386	
<i>As per 20th EPS</i>	2025-26	484	25.39
	2026-27	531	17.29
	2027-28	567	13.68
	2028-29	605	11.89
	2029-30	645	10.81
	2030-31	687	10.09

<i>State Estimated Peak electricity demand</i>	2031-32	590	6.25
	2034-35	698	6.10

6.2. TPTL has also proposed 13 Nos. of new 132/33 kV substations are located in close proximity to existing 132 kV substations citing the reason that existing substations have single main and transfer bus and there would be outage of power to consumers during shutdown of the bus.

A committee has been constituted with members from CEA, TPTL, CTUIL and POWERGRID to identify the technological solutions to reduce the outage of 33 kV feeder during bus shutdown of existing 132 kV substations. Based on the committee's recommendations, the proposed of new 132/33 kV substations may be considered subsequently.

6.3. Industrial Demand:

6.3.1. The total industrial demand of 50 MW is expected by 2034-35 at Bodhjangnagar & Badarghat area of Tripura.

6.3.2. Traction demand of about 50 MW is expected by 2034-35.

6.4. The following Parameters were considered during the study

- a) The total intra state generation installed capacity of 278 MW (101 MW Including Monarchak GTPS NEEPCO) by the year 2031-32 and 2034-35 (excluding small generation projects of the state which are having low PLF). 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)	Time frame considered for the study
1.	Monarchak (NEEPCO)	GTPS	101	Existing generating units
2.	Gumti HEP	Hydro	15 (3x5)	Existing generating units
3.	Baramura	GTPS	42 (2x21)	Existing generating units
4.	Rokhia	GTPS	Present capacity- 63 Capacity of plant after Combined Cycle- 120 MW	Existing generating units (Upgradation of 63 MW capacity GTPS at Rokhia to Combined Cycle Gas Thermal Power Project with 120 MW capacity)

b) Scenario of Study:

S.No.	Scenario	Demand Factor (Scalable load)	Dispatch Factors
1.	Peak Demand	100%	Gas Based Plant: 50% Hydro Plant: 80%
2.	Low Gas and low hydro	65%	Gas Based Plant: 20% Hydro Plant: 20%

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 Tripura 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→	Peak Demand	Low Gas and low hydro
Generation despatch (intra-state + ISGS located in state) (in MW)	562 (ISTS: 430 MW + In-STS: 132 MW)	225 (ISTS: 172 MW + In-STS: 53 MW)
Demand (in MW) (including Bangladesh demand of about 160 MW)	745	541
Net interchange ((-)import / (+)export) at ISTS-STU periphery (in MW)	-643	-519

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→	Peak Demand	Low Gas and low hydro
Generation despatch (intra-state + ISGS located in state) (in MW)	1202 (ISTS: 1070 MW + In-STS: 132 MW)	225 (ISTS: 172 MW + In-STS: 53 MW)
Demand (in MW) (including Bangladesh demand of about 160 MW)	857	798
Net interchange ((-)import / (+)export) at ISTS-STU periphery (in MW)	-756	-585

7.2. The 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 2034-35.

- 7.4. The planned transmission system of the state is N-1 contingency criteria compliant. The planned system addresses the all the constraints in the Intra-state transmission as mentioned by Tripura SLDC and NERLDC at listed at **Annexure-I** and **Annexure-II** respectively.
- 7.5. According to CEA's generation recourse adequacy report for Tripura (2031-32), state is likely to witness energy deficit ranging from 1.15 MUs in 2028-29 to 73.4 MUs in different years 2031-32 with the existing and planned capacity addition. Tripura is deficit in fulfilment of its Renewable Purchase Obligations (RPO) and further needs to contract Solar, Hydro and Wind capacities to fulfill its Renewable Purchase Obligations and to meet the demand projections. The projected capacity and generation mix fulfils the RPO obligations by 2030 as specified by Ministry of Power.
- 7.6. The agreed system by the year 2034-35 was modelled and studied considering the N-1 contingency criteria, in such situation no constraints were observed in transmission system of Tripura taking into account of above RPO compliance. Hence, the transmission system as planned by 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 alongwith their associated transmission lines which are required by 2034-35 are listed at Table 8-1 below:

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

Sl.No.	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Time frame /Remarks
1.	i. Establishment of 132/33 kV 2x80 MVA S/s at Badharghat (GIS)	Ring Main Power Supply arrangement for Agartala City (Agartalla – Aralia – Surajmaninagar (TSECL) – Badharghat)	132.47	Time frame: 2028-29 Note: Considering 80% of line section through Monopole in Agartala area as per site condition
	ii. LILO of both circuit of 79 Tilla Grid-Rokhia 132 kV D/c line at Badharghat (HTLS Ampacity-800 A) (3.6 km Loop in and 3.6 km loop in).		84.24	
	iii. Surajmaninagar (ISTS)-Badharghat 132 kV D/c line (HTLS Ampacity-800 A) (48 ckm) alongwith 2 Nos. of bays at Surajmaninagar (ISTS) S/s		90.70	
2.	i. Establishment of 132/33 kV 2x50 MVA S/s at Aralia	Ring Main Power Supply arrangement for Agartala City (Agartalla – Aralia – Surajmaninagar (TSECL) – Badharghat)	91.88	Time frame: 2029-30 Note: Considering 80% of line section through Monopole in Agartala area as per site condition
	ii. LILO of both circuit of 79 Tilla Grid – Surjamaninagar 132 kV D/c line at Aralia (HTLS) (2 km loop in and 2 km loop out.)		60.5	

Sl.No.	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Time frame /Remarks
		Aralia is being met through long 33 kV lines which faces frequent outages.		
3.	i. Establishment of 132/33 kV 2x25 MVA S/s at Ompi	TSECL has informed that they are dismantling all 66 kV network and planning to upgrade to 132 kV transmission system to feed the demand at these substations.	42.51	Time frame: 2031-32
	ii. Gamaitilla – Ompi (ACSR Panther) 132 kV S/c line on D/c tower (22 ckm) alongwith 1 No. of 132 kV bay at Gamaitilla S/s		70.60	
	iii. Ompi – Amarpur (ACSR Panther) 132 kV S/c on D/c line (21 ckm) alongwith 1 No. of 132 kV bay at Amarpur S/s		72.00	
4.	i. Establishment of 132/33 kV 2x25 MVA S/s at Jatanbari S/s		42.51	Time frame: 2032-33
	ii. Amarpur – Jatanbari (ACSR Panther) 132 kV D/c line (20 ckm) alongwith 2 Nos. of 132 kV bays at Amarpur S/s		61.20	
5.	i. Establishment of 132/33 kV 2x25 MVA S/s at Boxanagar.		42.51	Time frame: 2031-32
	ii. LILO of both circuit of Rokhia – Rabindranagar 132 kV D/c line at Boxanagar (ACSR Panther) (7.5 km loop in and 7.5 km loop out)		23.40	

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 Tripura

Sl.No.	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Time frame /Remarks
1.	Palatana – Udaipur 132 kV 2 nd S/c line (HTLS) (12 ckm) alongwith associated bay at both end	Strengthening of Intra-State Transmission System with improved reliability and stability.	32.21	Time frame: 2028-29
2.	Kanchanpur – Vangmun 132 kV S/c on D/c line (ACSR Panther) (32 ckm) alongwith associated bay at both end	To provide redundancy corridor in power supply to remotely located tribal habitation	74.51	Time frame: 2031-32 Note: The line will be initially operated at 33 kV as Vangmun is 33/11 kV S/s.
3.	Amarpur – Gandacherra 132 kV S/c on D/c line (ACSR Panther) (30 km)	To provide redundancy of corridor in power	80.47	Time frame: 2030-31

Sl.No.	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Time frame /Remarks
	alongwith associated bay at both end	supply to remotely located tribal habitation		Note: The line will be initially operated at 33 kV level.
4.	LILO of 2 nd circuit of Surajmaninagar (TSECL) – Bodhjungnagar 132 kV D/c line with HTLS conductor at Surajmaninagar (ISTS) 400/132 kV S/s along with associated bays (3.5 km loop in and 3.5 km loop out)	For enhancing intra-state system reliability and stability	41.3	Time frame: 2028-29 Note: One circuit of Surajmaninagar-Bodhjungnagar 132 kV D/c line with HTLS conductor at Surajmaninagar (ISTS) 400/132 kV S/s has already been LILLOed.

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 Tripura

Sl.No.	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Time frame /Remarks
1.	Udaipur – Palatana 132kV S/c line (12 ckm) (by HTLS Conductor, Ampacity 800 Amp) along with upgradation of requisite bay equipment	Re-conductoring the line with HTLS conductor and allied accessories are proposed to cope up with increased power flow with improved reliability. <ul style="list-style-type: none"> Ampacity of Existing conductor - ACSR Panther (Ampacity 358 A) Year of commissioning-2011 Ampacity of HTLS: 800 A 	9.97	Time frame: 2029-30
2.	Restrining of P.K.Bari (TPTL) – Dharmanagar 132kV S/c line (36.5 ckm) with ACSR Panther or its equivalent conductor along with upgradation of requisite bay equipment.	Due to increased loading in the area reconductoring of this line is required. <ul style="list-style-type: none"> Ampacity of Existing conductor – AAAC Panther (Ampacity 358 A) Year of commissioning-2010 Ampacity of ACSR Panther: 395 A 	6.71	Time frame: 2031-32
3.	Restrining of Dharmanagar (TPTL) – Durllavchera (AEGCL) 132 kV S/c line (13 ckm) (<i>Inter-State Line</i>) with ACSR panther or its equivalent conductor along with upgradation of	Due to increased loading in the area reconductoring of this line is required. <ul style="list-style-type: none"> Ampacity of Existing conductor - AAAC Panther (Ampacity 358 A) 	6.74	Time frame: 2031-32 Note: The line is ISTS between Tripura and Assam.

Sl.No.	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Time frame /Remarks
	requisite bay equipment	<ul style="list-style-type: none"> Year of commissioning-2010 Ampacity of ACSR panther: 395 A 		Tripura section: 13 km
4.	Restringing of Gamaitilla – Dhalabil 132 kV S/c line (30.4 ckm) with HTLS-800 A conductor along with upgradation of requisite bay equipment	<p>Due to increased loading in the area reconductoring of this line is required.</p> <ul style="list-style-type: none"> Ampacity of Existing conductor - ACSR Panther (Ampacity 358 A) Year of commissioning-2001 Ampacity of ACSR panther: 395 A 	20.55	Time frame: 2030-31

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

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

Table 8-4 Augmentation of Substations of Tripura

Sl.No.	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Time frame /Remarks
1.	Augmentation of transformer capacity by <ul style="list-style-type: none"> replacement of all 132/33 kV ICT with 3x80 MVA or 4x50 MVA ICT and additional 132/11 kV 20 MVA ICT at 79 Tilla Grid S/s 	<p>To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required.</p> <p>Existing ICT capacity:</p> <ul style="list-style-type: none"> 132/33 kV : 2x25+3x15 MVA and 132/11 kV : 1x20 MVA 	27.16	<p>Time frame: 2029-30</p> <p>After augmentation Total ICT capacity:</p> <ul style="list-style-type: none"> 132/33 kV : 3x80 MVA or 4X50 MVA and 132/11 kV : 2x20 MVA
2.	Augmentation of transformer capacity by replacement of all 132/33 kV ICT and one additional ICT with 3x80 MVA at Surajmaninagar S/s	<p>To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required</p> <p>Existing ICT capacity: 132/33 kV 2x25 MVA</p>	13.58	<p>Time frame: 2029-30</p> <p>After augmentation Total ICT capacity: 132/33 kV 3x80 MVA</p>
3.	Augmentation of transformer capacity by replacement of ICT with 132/33 kV, 2x25MVA &	<p>To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required</p>	18.19	<p>Time frame: 2030-31</p> <p>After augmentation Total ICT capacity:</p>

Sl.No.	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Time frame /Remarks
	132/11kV, 1x15MVA S/s at PK Bari S/s	Existing ICT capacity: <ul style="list-style-type: none"> 132/33 kV : 2x15 MVA and 132/11 kV : 1x15 MVA 		<ul style="list-style-type: none"> 132/33 kV with 2x25 MVA (sourced from Surajmaninagar / 79 Tilla/ Bodhjungnagar) 132/11 kV 1x15 MVA
4.	Augmentation of transformer capacity by installation of additional 1x25 MVA ICT at 132/33 kV Mission Tilla S/s	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required Existing ICT capacity: 132/33 kV 1x25 MVA	18.19	Time frame: 2030-31 After augmentation Total ICT capacity: 2x25MVA 1 No. of 1x25 MVA ICT sourced from Surajmaninagar/ 79 Tilla/ Bodhjungnagar
5.	Augmentation of transformer capacity by replacement of all 132/33 kV ICT with 2x50MVA at 132/33 kV, Bodhjungnagar S/s	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required Existing ICT capacity : 1x25 + 1x15 MVA	24.98	Time frame: 2030-31 After augmentation Total ICT capacity: 2x50 MVA
6.	Augmentation of transformer capacity by installation of ICTs with 132/33 kV, 2x15 MVA + 132/11 kV 2x15MVA at Gamaitilla S/s	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required Existing ICT capacity: 132/11 kV, 1x15 MVA	9.30	Time frame: 2031-32 After augmentation Total ICT capacity: <ul style="list-style-type: none"> 132/33 kV : 2x15 MVA (sourced from PK bari/79 Tilla/ Bodhjungnagar) and 132/11 kV : 2x15 MVA
7.	Augmentation of transformer capacity by installation of ICTs with <ul style="list-style-type: none"> 132/33 kV, 1x16 MVA + 1x15 MVA + 132/11 kV, 1x15 MVA at Kamalpur S/s 	To cater the future load demand and to satisfy N-1 contingency criteria the Augmentation is required Existing ICT capacity: <ul style="list-style-type: none"> 132/33 kV: 1x16 MVA and 132/11 kV: 1x10 MVA 	9.30	Time frame: 2029-30 After augmentation Total ICT capacity: <ul style="list-style-type: none"> 132/33 kV : 1x16 MVA + 1x15MVA (sourced from PK bari/79 Tilla/ Bodhjungnagar) and

Sl.No.	Transmission System	Justification	Estimated Cost (in Rs. Cr.)	Time frame /Remarks
				<ul style="list-style-type: none"> 132/11kV: 1x10 MVA + 1x15MVA

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

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

9.1. The existing ISTS system in Tripura seems sufficient to draw required power from outside the state. However, the requirement of Inter-state transmission system (ISTS) in Tripura 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 locations at lower voltage levels so as to maintain minimum reactive power exchange with the grid and maintain the voltage within permission levels.

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

A total of 1140 MVA transformation capacity addition/augmentation and 335 ckm of new transmission lines/reconductoring of old lines at an estimated cost of Rs. 1207.68 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 Rs. Cr.)*
1.	New substation	5	-	410	351.88
2.	Augmentation of existing substation	7	-	730	120.70
3.	New transmission line including LILO and 2 nd Ckt Stringing	11	244	-	691.13
4.	Reconductoring of transmission line	04	90.4	-	167.54
Total		27	334.8	1140	1207.68

**Note: The estimated cost of the above transmission system is based on Schedule of Rates (SoR) 2023 of Tripura Power Transmission Limited provided by the State.*

- 11.1. 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	Reconductorin g (ckm)	Estimated Cost (in ₹ Cr.)
FY 2028-29	160	81.4	-	380.92
FY 2029-30	610	08	12	212.39
FY 2030-31	175	30	30.4	162.38
FY 2031-32	145	105	48	348.28
FY 2032-33	50	20	-	103.71
Total	1140	244.4	90.4	1207.68

12. Conclusion

- 12.1. By the year 2034-35, the power demand of Tripura would be increasing significantly. Total expected demand of Tripura by the year 2034-35 is about 698 MW. This anticipated increase in demand includes the expected industrial load coming progressively from 2024-25 to 2034-35.
- 12.2. In order to meet this growing load demand and for drawal of power from ISTS in accordance with GNA requirement of Tripura by 2034-35, the intra-state as well as inter-state transmission system of Tripura need to be strengthened. It has been observed that the transmission system infrastructure in Tripura at voltage level of 132 kV needs to be upgraded.
- 12.3. 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.
- 12.4. 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.
- 12.5. It is recommended that Tripura shall update their intra-state transmission systems on the PM GatiShakti (PMGS) National Master Plan on regular basis.
- 12.6. The quantum of GNA is nearing the ATC of the Tripura 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.

- 12.7. A total of 1140 MVA transformation capacity addition/augmentation and 335 ckm of new transmission lines/reconductoring of old lines at an estimated cost of Rs. 1207.68 Crs. would be required for implementing the intra-state transmission proposals for meeting the electricity demand of the state by the year 2034-35.
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Annexure-I

Operational feedback from Tripura SLDC

S. No.	Constraints in System	Comments	Affected station
1.	Critical loading in important 132kV lines	<p>Tripura achieved its highest power demand of 378.5 MW at 18:05 on 20.09.2024. At the time, Bangladesh drawal was 60MW to maintain the loading limit of critical elements on N-1 contingency whereas PPA with Bangladesh was 160MW ($\pm 20\%$).</p> <p>Considering N-1 contingency and present state generation (Baramura 0MW, Rokhia 19 MW and Monarchak 56 MW and ISGS generation within state periphery (Neepco 60 MW and Palatana 440MW), as per PSSE study it appears that if the total load of Tripura power system including Bangladesh considered 520 MW (360 MW + 160 MW).</p> <p>Constraint observed in the loading of 132 kV SM Nagar – SM Nagar (ISTS) and 132KV PK Bari – PK Bari (ISTS) circuits will be 161.8MW and 96.0MW respectively.</p> <p>To remove the system constraints, the following lines to be strengthen</p> <ul style="list-style-type: none"> a) 132kV SM Nagar – SM Nagar (ISTS) b) 132kV PK Bari – PK Bari (ISTS) c) 132kV Bodhjung Nagar – SM Nagar (ISTS) d) 132kV Ambassa – PK Bari (ISTS) 	Capital load of Tripura and radial load of Bangladesh.

Operational feedback from NERLDC/NLDC

S. No.	Constraints in System	Comments	Affected station
1.	Critical loading in important 132 kV lines	<p>Tripura achieved its highest power demand of 378.5 MW at 18:05 on 20.09.2024. With this amount of Tripura internal load and additional 160 MW load to Bangladesh is not feasible with present configuration, thus N-1 criteria will get severely compromise, which will result in cascading tripping in Tripura power system and lead to wide spread outage. Strengthening of the transmissions lines in Tripura system has already been agreed but yet project has not been initiated. Overloading of transmission lines in Tripura system has become a cause of serious concern and a threat to grid security and reliability. In particular, 132 kV SM Nagar (ISTS) - SM Nagar line and 132 kV PK Bari (ISTS) - PK Bari line are getting critically loaded and experiencing significant over loading for prolong period of time causing vulnerability in the Tripura system. In addition to that due to low generation from Monarchak, AgGBPS(RC Nagar), Rokhia and Baramura, the 132 kV SM Nagar (ISTS) - SM Nagar line get prematurely loaded before approaching the peak hours. Following lines in Tripura Power system was approved for reconductoring by TSECL in 2nd meeting of NERPC-TP held on 25th September 2020 but still theses lines are operating with old conductor.</p> <ul style="list-style-type: none"> • 132 kV Surajmaninagar (ISTS) -Surajmaninagar (TSECL) • 132 kV Surajmaninagar (ISTS) – Bodhjungnagar (TSECL) • 132 kV P.K. Bari (ISTS) – P.K. Bari (TSECL) • 132 kV P.K. Bari (ISTS)-Ambasa(TSECL) 	Capital load of Tripura and Radial load of South Comilla (Bangladesh)

POWER MAP OF TRIPURA
(400 KV, 132 KV & 66 KV NETWORK)

Upto year 2034-35

SILCHAR

