भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
केन्द्रीय विद्युत प्राविकरण
Central Electricity Authority

भारत के बीसवें विद्युत शक्ति सर्वेक्षण की रिपोर्ट (भाग - तृतीय)

(मेगा सिटी)

REPORT ON TWENTIETH ELECTRIC POWER SURVEY OF INDIA
(VOLUME-III)
(Mega Cities)

नई दिल्ली — दिसंबर - 2024
New Delhi — December– 2024

Contents

Abbreviations

AGR - Annual Growth Rate
Ajmer VVNL - Ajmer Vidyut Vitran Nigam Limited
APCPDCL - Central Power Distribution Company of Andhra Pradesh Limited APEPDCL - Eastern Power Distribution Company of Andhra Pradesh Limited APGENCO - Andhra Pradesh Power Generation Corporation
APNPDCL - Northern Power Distribution Company of Andhra Pradesh Limited APSPDCL - Southern Power Distribution Company of Andhra Pradesh Limited APTRANSCO - Transmission Corporation of Andhra Pradesh Limited
BESCOM - Bangalore Electricity Supply Company Limited BEST - Brihanmumbai Electric Supply and Transport CAGR - Compounded Annual Growth
CEA - Central Electricity Authority
DGVCL - Dakshin Gujarat Vij Company Ltd. DISCOM - Distribution Company
DPL - Durgapur Projects Ltd.
DVC - Damodar Valley Corporation
DVVNL - Dakshinanchal Vidyut Vitran Nigam Limited
EER - Electrical Energy Requirement
EPS - Electric Power Survey
GEB - Gujarat Electricity Board
GESCOM - Gulbarga Electricity Supply Company Limited GETCO - Gujarat Energy Transmission Corp. Ltd.
GSECL - Gujarat State Electricity Corp. Ltd. GUVNL - Gujarat Urja Vikas Nigam Ltd.
HESCOM - Hubli Electricity Supply Company Limited
HT - High Tension
IPCL - India Power Co. Ltd.
JBVNL - Jharkhand Bijli Vitaran Nigam Ltd. JDVVNL - Jodhpur Vidyut Vitran Nigam Limited JSEB - Jharkhand State Electricity Board
JUSCO - Jamshedpur Utility Services Company Limited JUSNL - Jharkhand Urja Sancharan Nigam Ltd.
JUUNL - Jharkhand Urja Utpadan Nigam Ltd. JUVNL - Jharkhand Urja Vikas Nigam Ltd.
JVVNL - Jaipur Vidyut Vitran Nigam Limited KEB - Karnataka Electricity Board
KERC - Karnataka Electricity Regulatory Commission KESCO - Kanpur Electric Supply Company
KPCL - Karnataka Power Corporation Ltd.
KPTCL - Karnataka Power Transmission Corporation Ltd.
LT - Low Tension
Mahagenco - Maharashtra State Power Generation Co. Ltd. Mahatransco - Maharashtra State Electricity Transmission Co. Ltd. Mahavitaran - Maharashtra State Electricity Distribution Co. Ltd. MESCOM - Mangalore Electricity Supply Company Limited
MGVCL - Madhya Gujarat Vij Company Ltd.
MVVNL - Madhyanchal Vidyut Vitran Nigam Limited NCR - National Capital Region
NPCL - Noida Power Company Limited PEUM - Partial End Use Method
PGVCL - Paschim Gujarat Vij Company Ltd.
PuVVNL - Purvanchal Vidyut Vitran Nigam Limited
PVVNL - Paschimanchal Vidyut Vitran Nigam Limited

RRVPNL - Rajasthan Rajya Vidyut Prasharan Nigam Limited RVUNL - Rajasthan Vidyut Utpadan Nigam Limited
SPDCL - Sikkim Power Development Corporation Limited
STU - State Transmission Utility
T&D - Transmission & Distribution
TSGENCO - Telangana Genco
TSNPDCL - Northern Power Distribution Company of Telangana Ltd
TSSPDCL - The Telangana Southern Power Distribution Company Limited TSTRANSCO - Transmission Corporation of Telangana Limited
TSUISL - Tata Steel Utilities and Infrastructure Services Ltd. UGVCL - Uttar Gujarat Vij Company Ltd.
UPPCL - Uttar Pradesh Power Corporation Limited
UPPTCL - Uttar Pradesh Power Transmission Corporation Limited UPRJVUNL - Uttar Pradesh Rajya Jal Vidyut Utpadan Nigam Limited UPRVUNL - Uttar Pradesh Rajya Vidyut Utpadan Nigam Limited
UPSEB - Uttar Pradesh Electricity Board
WBPDCL - West Bengal Power Development Corporation Ltd. WBSEB - West Bengal State Electricity Board
WBSEDCL - West Bengal State Electricity Distribution Company Ltd. WBSETCL - West Bengal State Electricity Transmission Company Ltd.

Chapter 1: **Executive Summary**

The electricity demand forecast is an important input for the planning of the power sector to meet the future power requirement of various sectors. Therefore, a periodic Electric Power Survey (EPS) of the country is conducted by the Central Electricity Authority (CEA) to assess electricity demand on medium and long term basis. So far, 19 EPS have been conducted. The 20th EPS Committee, constituted by the CEA in May 2020, has decided for carrying out Electric Power Survey of Mega Cities also. Accordingly, this volume III of Electric Power Survey of Mega Cities has been prepared. It was envisaged to include 45 Mega Cities, as detailed below in this exercise.

Sl. No.	Region	Mega Cities
1.	Northern (12)	Agra, Amritsar, Dehradun, Jammu, Jaipur, Jodhpur, Kanpur, Kota, Lucknow, Prayagraj, Varanasi & Srinagar.
2.	Western (12)	Ahmedabad, Aurangabad, Bhopal, Gwalior, Indore, Jabalpur, Mumbai, Nagpur, Panaji, Pune, Raipur & Surat
3.	Southern (8)	Bengaluru, Chennai, Coimbatore, Hyderabad, Madurai, Thiruvananthapuram, Tiruchirappalli & Vishakhapatnam
4.	Eastern (6)	Bhubaneswar, Gangtok, Kolkata, Patna, Port Blair & Ranchi
5.	North Eastern (7)	Agartala, Aizawl, Guwahati, Imphal, Itanagar, Kohima & Shillong

Table 1-1 List of Mega Cities

The EPS of Mega Cities covering 45 Mega Cities viz. Agartala, Aizawl, Amritsar, Bhopal, Bhubaneswar, Chennai, Coimbatore, Dehradun, Guwahati, Gwalior, Indore, Jabalpur, Jaipur, Madurai, Raipur, Shillong, Tiruchirappalli, Thiruvananthapuram, Agra, Aurangabad, Bengaluru, Gangtok, Hyderabad, Jammu, Jodhpur, Kanpur, Kolkata, Kota, Lucknow, Mumbai, Nagpur, Port Blair, Prayagraj, Pune, Ranchi, Surat, Srinagar, Varanasi, Vishakhapatnam, Ahmedabad, Imphal, Itanagar, Kohima, Panaji and Patna.

1.1 Methodology

In this report, the Partial End Use Methodology (PEUM) has been used to forecast electricity demand. The electricity demand forecast for each Mega City has been carried out by considering electricity consumption under various categories of electricity consumers viz. Domestic, Commercial, Public Lighting, Public Water Works (LT, HT), Irrigation, Industrial (LT, HT), Railway Traction & Bulk Supply (Non- Industrial Consumers & Licenses).

The input data for this study comprises of the category-wise data of all Mega Cities from the year 2011-12 to 2022-23. Based on these input data, the year-wise electricity projection has been carried out for each Mega City for the year 2023-24 to 2032-33 with the year 2022-23 being taken as the base year.

Chapter 2: **Forecast Summary**

2.1 Summary of Energy Requirement Forecast with CAGR

Sl. No.	Mega City	Energy Requirement in MU			CAGR in %		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1.	**Agra**	2231	2671	3262	3.66	4.08	3.9
2.	**Agartala**	399	591	861	8.21	7.81	8.0
3.	**Ahmedabad**	8570	9255	10579	1.55	2.71	2.13
4.	**Aizawl**	357	446	574	4.55	5.16	4.9
5.	**Amritsar**	1921	2388	2997	4.45	4.65	4.6
6.	**Aurangabad**	2586	2952	3439	2.68	3.10	2.9
7.	**Bengaluru**	16545	19800	23858	3.66	3.80	3.7
8.	**Bhopal**	1779	2319	2943	5.44	4.88	5.2
9.	**Bhubaneshwar**	2174	3534	5614	10.20	9.70	10.0
10.	**Chennai**	17443	21361	26335	4.14	4.28	4.2
11.	**Coimbatore**	3606	4650	5995	5.22	5.21	5.2
12.	**Dehradun**	2541	3260	4141	5.11	4.90	5.00
13.	**Gangtok**	127	147	172	3.06	3.11	3.1
14.	**Guwahati**	1930	2764	3932	7.45	7.30	7.4
15.	**Gwalior**	1167	1577	2154	6.20	6.42	6.3
16.	**Hyderabad**	22576	32913	44802	7.83	6.36	7.1
17.	**Imphal**	563	784	1070	6.83	6.42	6.6
18.	**Indore**	3106	3746	4379	3.65	3.34	3.5
19.	**Itanagar**	224	259	308	2.96	3.50	3.2
20.	**Jabalpur**	1080	1302	1549	3.81	3.53	3.7
21.	**Jaipur**	5326	7246	9473	6.35	5.51	5.93
22.	**Jammu**	3486	3943	4577	2.49	3.03	2.8
23.	**Jodhpur**	1563	2349	3595	8.49	8.88	8.7
24.	**Kanpur**	3955	5054	6331	5.03	4.61	4.8

25.	**Kohima**	127	153	184	3.79	3.68	3.7
26.	**Kolkata**	20336	23228	28588	2.69	4.24	3.46
27.	**Kota**	1207	1447	1685	3.69	3.09	3.4
28.	**Lucknow**	5691	7242	9348	4.94	5.24	5.09
29.	**Madurai**	1804	2337	3057	5.31	5.52	5.4
30.	**Mumbai**	23982	30200	38019	4.72	4.71	4.7
31.	**Nagpur**	2603	3076	3612	3.40	3.26	3.3
32.	**Panaji**	155	196	266	4.75	6.31	5.5
33.	**Patna**	3009	3671	4307	4.06	3.25	3.7
34.	**Port Blair**	178	202	224	2.56	2.09	2.33
35.	**Prayagraj**	2254	2795	3422	4.4	4.13	4.26
36.	**Pune**	10515	12536	14774	3.58	3.34	3.5
37.	**Raipur**	7909	12782	20400	10.08	9.80	9.9
38.	**Ranchi**	1720	2143	2587	4.49	3.84	4.2
39.	**Shillong**	479	671	942	6.97	7.02	7.00
40.	**Srinagar**	2189	1938	2229	-2.40	2.83	0.22
41.	**Surat**	16107	20751	27016	5.20	5.42	5.3
42.	**Thiruvananthapuram**	1485	1798	2190	3.90	4.02	3.96
43.	**Tiruchirappalli**	1256	1512	1864	3.78	4.28	4.0
44.	**Varanasi**	1929	2520	3259	5.50	5.27	5.4
45.	**Vishakhapatnam**	5394	6803	8470	4.75	4.48	4.61

2.2 Summary of Peak Demand Forecast

Sl. No.	Mega City	Peak Demand in MW			CAGR in %		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1.	Agra	495	593	726	3.70	4.12	3.91
2.	Agartala	104	162	248	9.30	8.89	9.10
3.	Ahmedabad	1900	2090	2401	1.92	2.81	2.37
4.	Aizawl	87	111	146	5.08	5.69	5.39
5.	Amritsar	394	492	622	4.54	4.78	4.66
6.	Aurangabad	356	454	560	5.00	4.27	4.64
7.	Bengaluru	3118	4004	5176	5.13	5.27	5.20
8.	Bhopal	476	686	963	7.59	7.02	7.31
9.	Bhubaneshwar	538	878	1402	10.31	9.81	10.06
10.	Chennai	3677	4571	5720	4.45	4.59	4.52
11.	Coimbatore	501	793	1253	9.60	9.59	9.60
12.	Dehradun	476	614	782	5.22	4.95	5.08
13.	Gangtok	46	63	85	6.25	6.30	6.28
14.	Guwahati	414	595	851	7.56	7.41	7.49
15.	Gwalior	382	542	778	7.28	7.50	7.39
16.	Hyderabad	3454	5682	8876	10.47	9.33	9.90
17.	Imphal	154	215	295	6.93	6.53	6.73
18.	Indore	630	852	1133	6.20	5.88	6.04
19.	Itanagar	48	55	66	3.06	3.60	3.33
20.	Jabalpur	252	314	385	4.44	4.16	4.30
21.	Jaipur	1093	1494	1964	6.45	5.62	6.04
22.	Jammu	734	860	1047	3.22	4.00	3.61
23.	Jodhpur	316	541	1026	11.32	13.66	12.49
24.	Kanpur	740	954	1204	5.22	4.76	4.99
25.	Kohima	26	33	42	5.00	5.00	5.00
26.	Kolkata	3739	4642	5751	4.42	4.38	4.40

27.	**Kota**	240	290	341	3.82	3.33	3.58
28.	**Lucknow**	1645	2074	2704	4.74	5.45	5.10
29.	**Madurai**	278	378	520	6.37	6.57	6.47
30.	**Mumbai**	4244	5396	6744	4.92	4.56	4.74
31.	**Nagpur**	684	863	1082	4.76	4.62	4.69
32.	**Panaji**	38	46	59	3.71	5.25	4.48
33.	**Patna**	658	823	1014	4.56	4.27	4.42
34.	**Port Blair**	35	39	43	2.19	1.97	2.08
35.	**Prayagraj**	548	680	834	4.42%	4.15	4.23
36.	**Pune**	2099	2692	3414	5.10	4.86	4.98
37.	**Raipur**	1376	2085	3120	8.66	8.39	8.53
38.	**Ranchi**	407	488	566	3.66	3.02	3.34
39.	**Shillong**	133	175	265	5.64	8.65	7.14
40.	**Srinagar**	356	442	587	4.45	5.82	5.13
41.	**Surat**	2907	3717	4782	5.04	5.17	5.11
42.	**Thiruvananthapuram**	279	353	449	4.78	4.94	4.86
43.	**Tiruchirappalli**	425	474	543	2.24	2.74	2.49
44.	**Varanasi**	604	795	1041	5.65	5.53	5.59
45.	**Vishakhapatnam**	878	1108	1380	4.76	4.49	4.62

2.3 Year-wise Summary of Energy Requirement Forecast:

(All figures are in MU)

Sl. No.	Mega City	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33
1.	**Agra**	2231	2287	2373	2469	2567	2671	2779	2893	3029	3147	3262
2.	**Agartala**	399	432	468	506	547	591	638	689	743	800	861
3.	**Ahmedabad**	8570	8585	8819	8957	9100	9255	9429	9638	9904	10265	10579
4.	**Aizawl**	357	373	390	408	427	446	466	492	518	545	574
5.	**Amritsar**	1921	2014	2111	2198	2291	2388	2503	2619	2748	2894	2997
6.	**Aurangabad**	2586	2651	2718	2786	2854	2952	3050	3149	3241	3318	3439
7.	**Bengaluru**	16545	17179	17822	18469	19121	19800	20493	21241	22064	22995	23858
8.	**Bhopal**	1779	1879	1983	2091	2203	2319	2440	2566	2700	2826	2943
9.	**Bhubaneshwar**	2174	2400	2648	2918	3212	3534	3883	4264	4677	5127	5614
10.	**Chennai**	17443	18164	18912	19690	20504	21361	22278	23295	24405	25484	26335
11.	**Dehradun**	2541	2675	2814	2957	3106	3260	3422	3594	3778	3961	4141
12.	**Coimbatore**	3606	3786	3981	4195	4419	4650	4892	5144	5437	5710	5995
13.	**Gangtok**	127	130	134	139	143	147	152	157	162	167	172
14.	**Guwahati**	1930	2074	2233	2398	2574	2764	2968	3187	3423	3669	3932
15.	**Gwalior**	1167	1242	1320	1402	1488	1577	1671	1770	1872	1968	2154
16.	**Hyderabad**	22576	24340	26321	28419	30622	32913	35289	37897	40145	42290	44802
17.	**Imphal**	563	603	645	688	735	784	835	890	947	1007	1070
18.	**Indore**	3106	3223	3343	3466	3590	3716	3842	3971	4098	4200	4379
19.	**Itanagar**	224	230	237	244	251	259	268	278	288	297	308
20.	**Jabalpur**	1080	1123	1167	1212	1257	1302	1348	1395	1449	1494	1549
21.	**Jaipur**	5326	5647	6020	6413	6821	7246	7690	8189	8625	9042	9473
22.	**Jammu**	3486	3484	3558	3697	3825	3943	4049	4154	4217	4404	4577
23.	**Jodhpur**	1563	1694	1837	1993	2163	2349	2554	2782	3038	3306	3595
24.	**Kanpur**	3955	4160	4372	4592	4819	5054	5295	5544	5799	6062	6331
25.	**Kohima**	127	132	137	142	148	153	159	163	171	177	184
26.	**Kolkata**	20336	21019	21728	22463	23228	24023	24856	25725	26635	27588	28588

27.	**Kota**	1207	1252	1298	1344	1397	1447	1494	1547	1599	1641	1685
28.	**Lucknow**	5691	5945	6223	6543	6883	7242	7625	8043	8503	8949	9348
29.	**Madurai**	1804	1901	2003	2109	2220	2337	2460	2593	2735	2892	3057
30.	**Mumbai**	23982	25298	26470	27693	28857	30200	31516	32933	34511	36251	38019
31.	**Nagpur**	2603	2695	2788	2883	2978	3076	3178	3287	3405	3510	3612
32.	**Panaji**	155	162	169	177	186	196	207	221	240	251	266
33.	**Patna**	3009	3127	3260	3397	3534	3671	3809	3957	4074	4175	4307
34.	**Port Blair**	178	183	188	193	198	202	206	210	215	219	224
35.	**Prayagraj**	2254	2354	2460	2568	2679	2795	2914	3038	3167	3305	3422
36.	**Pune**	10515	10908	11307	11710	12119	12536	12965	13419	13893	14315	14774
37.	**Raipur**	7909	8719	9600	10566	11624	12782	14048	15433	16947	18598	20400
38.	**Ranchi**	1720	1846	1904	1976	2065	2143	2212	2289	2381	2473	2587
39.	**Shillong**	479	513	549	587	628	671	719	770	824	881	942
40.	**Srinagar**	2189	2040	2154	1941	1829	1938	1993	2039	2073	2183	2229
41.	**Surat**	16107	16936	17813	18741	19718	20751	21849	23024	24286	25616	27016
42.	**Thiruvananthapuram**	1485	1544	1604	1665	1730	1798	1871	1951	2042	2128	2190
43.	**Tiruchirappalli**	1256	1304	1353	1404	1456	1512	1570	1632	1701	1780	1864
44.	**Varanasi**	1929	2025	2136	2258	2388	2520	2662	2829	2971	3128	3259
45.	**Vishakhapatnam**	5394	5660	5935	6217	6507	6803	7110	7429	7761	8108	8470

2.4 Year-wise Summary of Peak Demand Forecast:

(All figures are in MW)

Sl. No.	Mega City	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33
1.	**Agra**	495	507	527	548	570	593	618	643	674	700	726
2.	**Agartala**	104	114	124	136	148	162	176	192	209	228	248
3.	**Ahmedabad**	1900	1931	1986	2019	2053	2090	2131	2181	2243	2327	2401
4.	**Aizawl**	87	91	96	101	106	111	117	124	131	138	146
5.	**Amritsar**	394	414	434	452	472	492	516	541	569	600	622
6.	**Aurangabad**	356	374	393	412	433	454	477	506	526	540	560
7.	**Bengaluru**	3118	3283	3454	3631	3812	4004	4202	4418	4654	4919	5176
8.	**Bhopal**	476	512	552	594	638	686	736	790	848	906	963
9.	**Bhubaneshwar**	538	594	656	723	797	878	966	1062	1166	1279	1402
10.	**Chennai**	3677	3840	4010	4188	4374	4571	4781	5015	5269	5519	5720
11.	**Coimbatore**	501	548	600	659	723	793	869	952	1048	1146	1253
12.	**Dehradun**	476	502	528	556	584	614	645	677	712	747	782
13.	**Gangtok**	46	49	52	55	59	63	67	71	75	80	85
14.	**Guwahati**	414	445	480	516	554	595	640	688	740	793	851
15.	**Gwalior**	382	410	440	472	506	542	580	621	663	704	778
16.	**Hyderabad**	3454	3810	4219	4667	5154	5682	6253	6898	7510	8138	8876
17.	**Imphal**	154	165	176	189	201	215	229	245	261	277	295
18.	**Indore**	630	670	712	757	803	852	902	955	1010	1061	1133
19.	**Itanagar**	48	49	50	52	54	55	57	59	62	64	66
20.	**Jabalpur**	252	264	276	288	301	314	327	340	355	369	385
21.	**Jaipur**	1093	1160	1238	1320	1406	1494	1587	1692	1784	1872	1964
22.	**Jammu**	734	739	760	795	829	860	890	922	945	997	1047
23.	**Jodhpur**	316	350	388	432	483	541	608	684	788	899	1026
24.	**Kanpur**	740	780	821	863	908	954	1001	1050	1100	1151	1204
25.	**Kohima**	26	27	29	30	32	33	35	37	38	40	42
26.	**Kolkata**	3739	3905	4078	4259	4446	4642	4846	5058	5279	5510	5751
27.	**Kota**	240	250	259	269	280	290	300	312	323	332	341

28.	**Lucknow**	1645	1689	1771	1866	1967	2074	2188	2313	2450	2583	2704
29.	**Madurai**	278	296	315	335	356	378	402	428	456	487	520
30.	**Mumbai**	4244	4490	4709	4937	5153	5396	5628	5873	6147	6444	6744
31.	**Nagpur**	684	717	752	788	825	863	903	947	993	1037	1082
32.	**Panaji**	38	39	41	42	44	46	48	51	54	56	59
33.	**Patna**	658	686	718	752	786	823	860	902	937	971	1014
34.	**Port Blair**	35	36	37	37	38	39	39	40	41	42	43
35.	**Prayagraj**	548	573	598	625	652	680	709	740	771	805	834
36.	**Pune**	2099	2210	2324	2443	2565	2692	2826	2968	3118	3260	3414
37.	**Raipur**	1376	1517	1628	1769	1921	2085	2263	2454	2660	2882	3120
38.	**Ranchi**	407	434	444	457	474	488	499	513	529	545	566
39.	**Shillong**	133	143	153	164	175	188	201	216	231	248	265
40.	**Srinagar**	356	386	395	399	413	442	474	504	533	558	587
41.	**Surat**	2907	3061	3213	3372	3541	3717	3905	4105	4317	4542	4782
42.	**Thiruvananthapuram**	279	293	307	321	337	353	370	390	411	433	449
43.	**Tiruchirappalli**	425	434	444	454	464	474	485	497	511	526	543
44.	**Varanasi**	604	635	671	710	752	795	841	896	943	995	1041
45.	**Vishakhapatnam**	878	922	966	1012	1060	1108	1158	1210	1264	1321	1380

2.5 Year-wise T&D Losses Forecast:

(in %)

Sl. No.	Mega City	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	20231-32	2032-33
1.	Agra	10.17	9.40	9.00	8.90	8.80	8.80	8.80	8.80	8.70	8.61	8.51
2.	Agartala	10.60	10.55	10.50	10.45	10.40	10.36	10.31	10.26	10.21	10.16	10.11
3.	Ahmedabad	5	5	5	5	5	5	5	5	5	5	5
4.	Aizawl	18.72	17.69	16.72	15.80	14.93	14.11	13.33	13.33	13.33	13.33	13.33
5.	Amritsar	15.85	15.55	15.19	14.26	13.36	12.42	11.81	10.85	9.93	9.38	8.87
6.	Aurangabad	21.04	19.78	18.59	17.48	16.43	16.28	16.12	15.97	15.83	15.68	15.53
7.	Bengaluru	8.27	8.04	7.81	7.58	7.35	7.12	6.89	6.66	6.43	6.20	5.97
8.	Bhopal	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
9.	Bhubaneshwar	5.14	5.14	5.14	5.14	5.14	5.14	5.14	5.14	5.14	5.14	5.14
10.	Chennai	7.63	7.43	7.23	7.03	6.83	6.63	6.43	6.23	6.03	5.83	5.63
11.	Coimbatore	15.46	15.31	15.16	15.01	14.86	14.70	14.52	14.34	14.16	13.98	13.80
12.	Dehradun	7.44	7.44	7.44	7.44	7.44	7.44	7.44	7.44	7.44	7.44	7.44
13.	Gangtok	26.44	25.17	23.96	22.81	21.71	20.67	19.67	18.73	17.83	16.97	16.15
14.	Guwahati	11.50	11.50	11.42	11.26	11.15	11.09	11.02	11.00	10.99	10.97	10.95
15.	Gwalior	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
16.	Hyderabad	9.96	9.60	9.24	8.88	8.52	8.16	7.80	7.44	7.08	6.72	6.36
17.	Imphal	17.03	16.44	15.86	15.31	14.77	14.25	13.76	13.27	12.81	12.36	11.93
18.	Indore	11.04	10.69	10.35	10.02	9.70	9.39	9.08	8.79	8.51	8.24	7.98
19.	Itanagar	22.38	19.85	17.60	15.61	13.84	12.28	11.17	10.17	9.25	8.42	7.66
20.	Jabalpur	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
21.	Jaipur	7.18	7.02	6.88	6.76	6.66	6.56	6.46	6.36	6.26	6.16	6.06
22.	Jammu	41.17	38.38	36.86	36.50	36.03	35.56	35.09	34.63	34.17	34.05	33.90
23.	Jodhpur	12.08	11.98	11.88	11.78	11.68	11.58	11.48	11.38	11.28	11.18	11.08
24.	Kanpur	9.77	9.57	9.37	9.17	8.97	8.77	8.57	8.37	8.17	7.97	7.77
25.	Kohima	20.25	19.25	18.44	17.61	16.76	15.90	15.01	13.16	13.18	12.27	11.29
26.	Kolkata	9.31	8.97	8.65	8.35	8.06	7.78	7.52	7.27	7.03	6.8	6.58
27.	Kota	18.39	17.88	16.95	16.02	15.55	14.80	13.89	12.96	11.94	10.77	9.88

28.	**Lucknow**	23.68	22.95	22.75	22.55	22.35	22.15	21.95	21.75	21.55	21.35	21.15
29.	**Madurai**	8.08	7.97	7.86	7.75	7.64	7.53	7.42	7.31	7.20	7.09	6.98
30.	**Mumbai**	7.79	8.10	8.12	8.06	7.99	7.93	7.87	7.80	7.75	7.69	7.63
31.	**Nagpur**	13.87	13.59	13.32	13.05	12.79	12.54	12.29	12.04	11.80	11.56	11.33
32.	**Panaji**	12.96	12.63	12.30	11.99	11.69	11.39	11.10	10.82	10.54	10.27	10.01
33.	**Patna**	18.49	17.42	16.39	15.41	14.47	13.57	12.71	11.90	11.13	10.39	9.70
34.	**Port Blair**	9.87	9.67	9.46	9.25	9.03	8.81	8.58	8.36	8.13	7.9	7.66
35.	**Prayagraj**	14.00	13.90	13.80	13.70	13.60	13.50	13.40	13.30	13.20	13.10	13.00
36.	**Pune**	11.93	11.78	11.63	11.49	11.34	11.20	11.06	10.93	10.79	10.66	10.52
37.	**Raipur**	5.59	5.59	5.59	5.59	5.59	5.59	5.59	5.59	5.59	5.59	5.59
38.	**Ranchi**	18.70	17.56	16.48	15.48	14.53	13.64	12.81	12.02	11.50	11.00	10.50
39.	**Shillong**	12.72	12.29	11.87	11.46	11.07	10.69	10.69	10.69	10.69	10.69	10.69
40.	**Srinagar**	51.15	38.50	29.87	19.59	13.69	13.46	13.22	13.00	12.79	12.69	12.50
41.	**Surat**	6.25	6.59	6.58	6.58	6.59	6.60	6.61	6.62	6.62	6.63	6.64
42.	**Thiruvanantha puram**	9.99	9.79	9.59	9.39	9.19	8.99	8.79	8.59	8.39	8.19	7.89
43.	**Tiruchirappalli**	8.89	8.64	8.39	8.14	7.91	7.66	7.41	7.16	6.91	6.66	6.41
44.	**Varanasi**	13.52	12.92	12.32	11.92	11.52	10.92	10.35	9.95	9.22	9.02	8.82
45.	**Vishakhapatna m**	4.65	4.65	4.65	4.64	4.64	4.64	4.64	4.63	4.63	4.63	4.63

Chapter 1: Introduction

The primary objective of the electrical energy forecast is to assess the electricity demand so that the utilities are able to plan and arrange the power infrastructure to meet demand in full and provide electricity to all. The electricity demand forecast also works as a tool for planning the Demand Side Management (DSM) strategy on long term basis for optimizing the peak demand and also plan long term tariff policy.

With the aforementioned aim, a periodic Electric Power Survey (EPS) of the country is conducted by the Central Electricity Authority (CEA) to assess electricity demand on medium and long term basis. So far, 19 EPS have been conducted. The 20th EPS Committee, constituted by the CEA in May, decided that the 20th EPS would be brought out in four volumes, as detailed below:

1) Volume I: Discom-wise, state/UT-wise, region-wise and all-India electricity demand projection by partial end use method (PEUM).
2) Volume II: Electric Power Survey of National Capital Region (NCR).
3) Volume III: Electric Power Survey of Mega Cities.
4) Volume IV: Electricity demand projection by econometric method.

Accordingly, this Volume III of Electric Power Survey of Mega Cities has been prepared. It was envisaged to include 45 Mega Cities, as detailed below, in this exercise.

Sl. No	Region	Mega Cities
1.	Northern (12)	Agra, Amritsar, Dehradun, Jammu, Jaipur, Jodhpur, Kanpur, Kota, Lucknow, Prayagraj, Srinagar & Varanasi
2.	Western(12)	Ahmedabad, Aurangabad, Bhopal, Gwalior, Indore, Jabalpur, Mumbai, Nagpur, Panaji, Pune, Raipur & Surat
3.	Southern(8)	Bengaluru, Chennai, Coimbatore, Hyderabad, Madurai, Thiruvananthapuram, Tiruchirappalli & Vishakhapatnam
4.	Eastern (6)	Bhubaneswar, Gangtok, Kolkata, Patna, Port Blair & Ranchi
5.	North Eastern(7)	Agartala, Aizawl, Guwahati, Imphal, Itanagar, Kohima & Shillong

Table 3-1Region-wise list of Mega Cities

The Electric Power Survey of Mega Cities covering 45 Mega Cities viz. Agra, Amritsar, Dehradun, Jammu, Jaipur, Jodhpur, Kanpur, Kota, Lucknow, Prayagraj, Srinagar & Varanasi, Ahmedabad, Aurangabad, Bhopal, Gwalior, Indore, Jabalpur, Mumbai, Nagpur, Panaji, Pune, Raipur, Surat, Bengaluru, Chennai, Coimbatore, Hyderabad, Madurai, Thiruvananthapuram, Tiruchirappalli & Vishakhapatnam, Bhubaneswar, Gangtok, Kolkata, Patna, Port Blair & Ranchi, Agartala, Aizawl, Guwahati, Imphal, Itanagar, Kohima & Shillong.

Chapter 3: **Power Forecast Methodology**

Partial End Use Methodology (PEUM) that is traditionally being used by CEA for carrying out Electric Power Survey has been adopted for this study also for forecasting electricity demand of Mega Cities. It is a bottom up approach based on the energy need of end users.

As working out electricity demand by considering electricity consumption of individual end users would be exhaustive, a partial approach has been taken and electricity demand forecast has been carried out for various categories of electricity consumers viz. Domestic, Commercial, Public Lighting, Public Water Works (LT, HT), Irrigation, Industrial (LT, HT), Railway Traction & Bulk Supply (Non- Industrial Consumers & Licences). The time series method has been used to derive growth indicators for each category of consumer for each Mega Cities with assigning higher weight to recent trends so as to incorporate benefits of energy conservation initiatives and the impacts of technological changes.

The input data for this study comprises of the category-wise data of all Mega Cities from the year 2011-12 to 2022-23. Based on these input data, the year-wise electricity projection has been carried out for each Mega City for the year from 2023-24 to 2032-33 with the year 2022-23 being taken as the base year. These furnished data were scrutinized by comparing it with the data available with CEA and reconciled further with all the concerned utilities.

The input data for the period 2011-12 to 2022-23 was scrutinized for the study and the year-wise EER was worked out up to 2032-33 by taking 2022-23 as the base year. The Annual Growth Rate (AGR) and Compounded Annual Growth (CAGR) for No. of consumers, Connected Load and Energy Consumption for the past years of various categories of Load has been analysed thoroughly and then forecast of electricity requirement for various categories of Load for each Mega City has been made using the aforesaid method. The forecasts of electricity demand were discussed with respective DISCOMS to elicit their views/suggestions on the likely growth rate for various categories of electricity consumption policies/programs which would have bearing on the future electricity demand. Power demand forecast of the Mega Cities has been prepared with mutual consensus with all the concerned power utilities.

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Agra

Chapter 4: **Agra**

4.1 Introduction

Agra is a historic city and one of the world's best-known tourist destinations. The city boasts of two world heritage sites –Taj Mahal, one of the Seven Wonders of the World and Agra Fort, apart from numerous historical monuments in and around the city. It records the highest foreign tourist footfall (about 17% of total foreign tourists) in the country.

Economy:

The main economy of the city is based on handicrafts industry and tourism. Other items manufactured in the city include textiles, metal utensils, bicycles, ink and sporting goods. A flourishing cottage industry also exists for the manufacture of items such as glass bangles, cutlery, carpets and marble products.

Climate:

Agra has a tropical steppe climate with warm winters, hot, dry summers, and a monsoon season. Temperatures can reach up to 48.6°C, with dangerous hot winds (loo) from April to June. Monsoon rains start in early July and end by mid-September, but are less intense than in other parts of India. By mid-October, the weather moderates. Winters are often foggy due to low winds and moisture. The average annual maximum temperature is 32.9°C, peaking at 41.9°C in May and dropping to 22.7°C in January.

4.2 Brief description of Power Utilities:

Uttar Pradesh State Electricity Board (UPSEB) which was responsible for generation, transmission and distribution of electricity in Uttar Pradesh, was divided into following companies by the State Government after Uttar Pradesh Electricity Reforms Act, 1999 came into effect:

- Uttar Pradesh Power Corporation Limited (UPPCL) to look after procurement and distribution of electricity.
- Uttar Pradesh Power Transmission Corporation Limited (UPPTCL) to look after transmission of electricity.
- Uttar Pradesh Rajya Vidyut Utpadan Nigam Limited (UPRVUNL) to look after power generation from all thermal power projects of the state.
- Uttar Pradesh Rajya Jal Vidyut Utpadan Nigam Limited (UPRJVUNL) is responsible for hydro power generation in the state.

For efficient operation & management, UPPCL is further restructured into:

- Madhyanchal Vidyut Vitran Nigam Limited (MVVNL), Lucknow
- Paschimanchal Vidyut Vitran Nigam Limited (PVVNL), Meerut
- Purvanchal Vidyut Vitran Nigam Limited (PUVVNL), Varanasi
- Dakshinanchal Vidyut Vitran Nigam Limited (DVVNL), Agra
- Kanpur Electric Supply Company (KESCO), Kanpur
- Lucknow Electricity Supply Administration (LESA) –Lucknow City Discom.
- Uttar Pradesh Power Transmission Corporation Limited (UPPTCL) –
  (State Transmission Utility)

Initially, DVVNL had the responsibility of power supply in Agra. But in 2009, this role was transferred to Torrent Power Limited under Distribution franchise model. As of today Torrent Power Limited is responsible for Distribution of Electricity Supply in Agra.

4.3 Existing Power Scenario:

The total electricity consumption of Agra in the year 2022-23 was 2004 MU and with 10.17% T&D losses, the requirement was 2231 MU. The peak demand of the city was 495 MW. The Domestic sector was the biggest consumer of electricity (60%), followed by Commercial (20%) & Industrial (17%) sector.

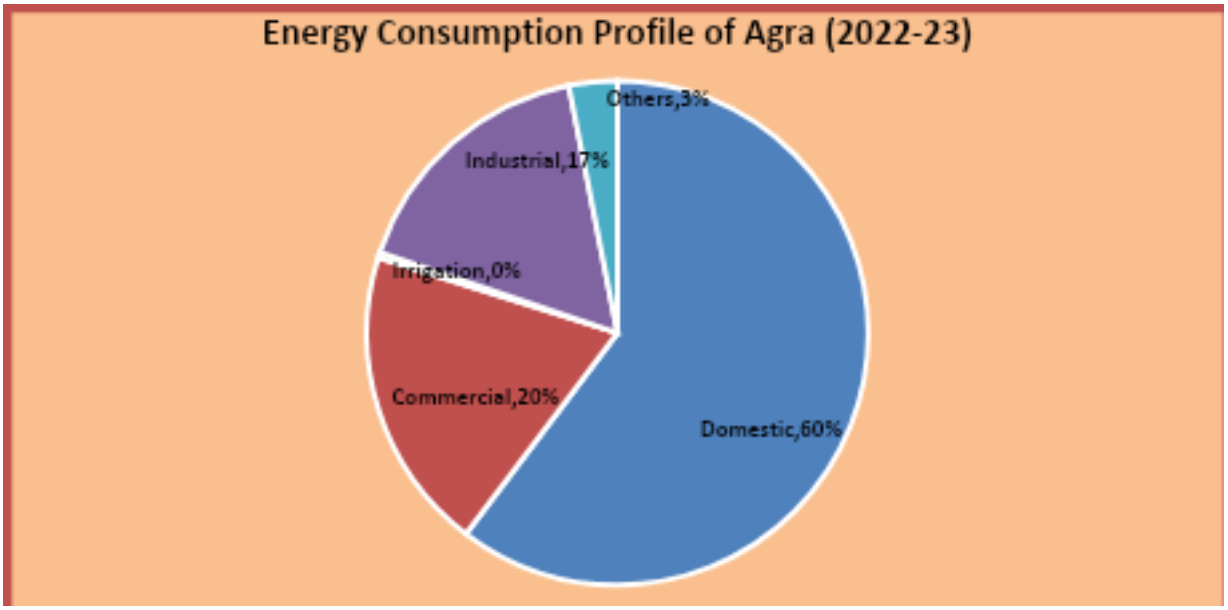

Figure 5-1 Energy Consumption Profile of Agra (2022-23)

On comparison of Agra with Uttar Pradesh for the year 2022-23, it is observed that the energy requirement of Agra was 1.48% of the total energy requirement of the state.

2022-23	Agra City	Uttar Pradesh	% Share of Agra City
Energy in MU	2231	151152	1.48
Peak Demand in MW	495	26028	1.90

Table 5-1 Comparison of Agra with Uttar Pradesh in 2022-23

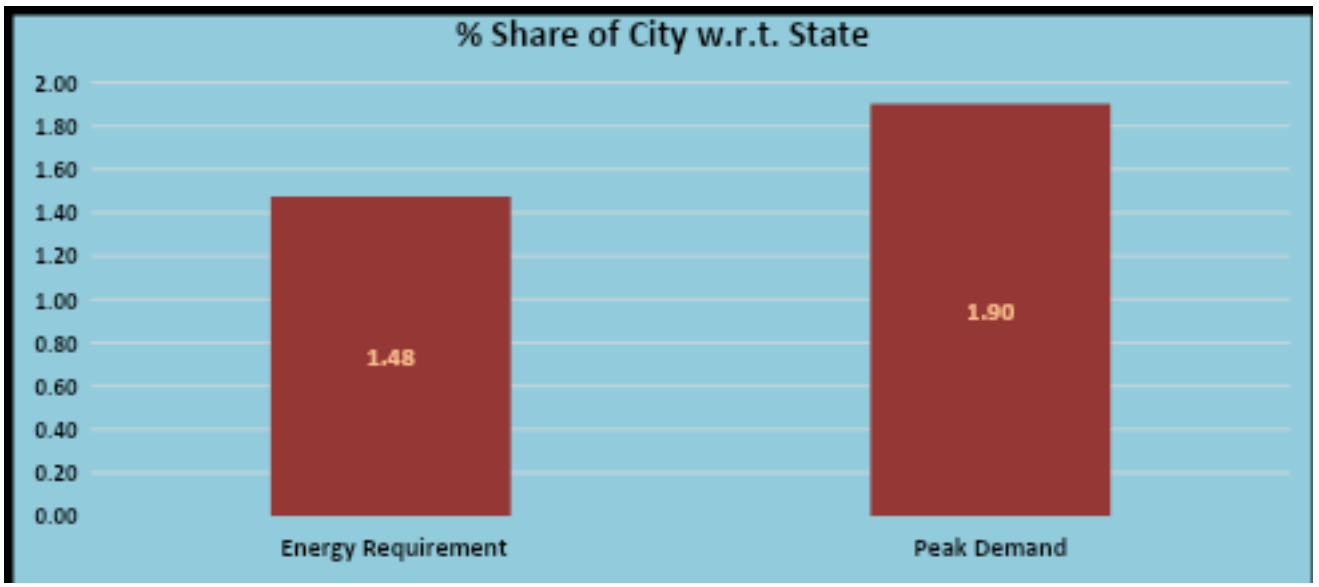

Figure 5-2 Comparison between Agra and Uttar Pradesh in 2022-23.

4.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Agra was 2231 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 2671 MU by the year 2027-28 with a 3.66% CAGR for the period 2022-23 to 2027-28. With a CAGR of 4.08% for the period 2027-28 to 2032-33, its energy requirement is estimated as 3262 MU by the year 2032-33.

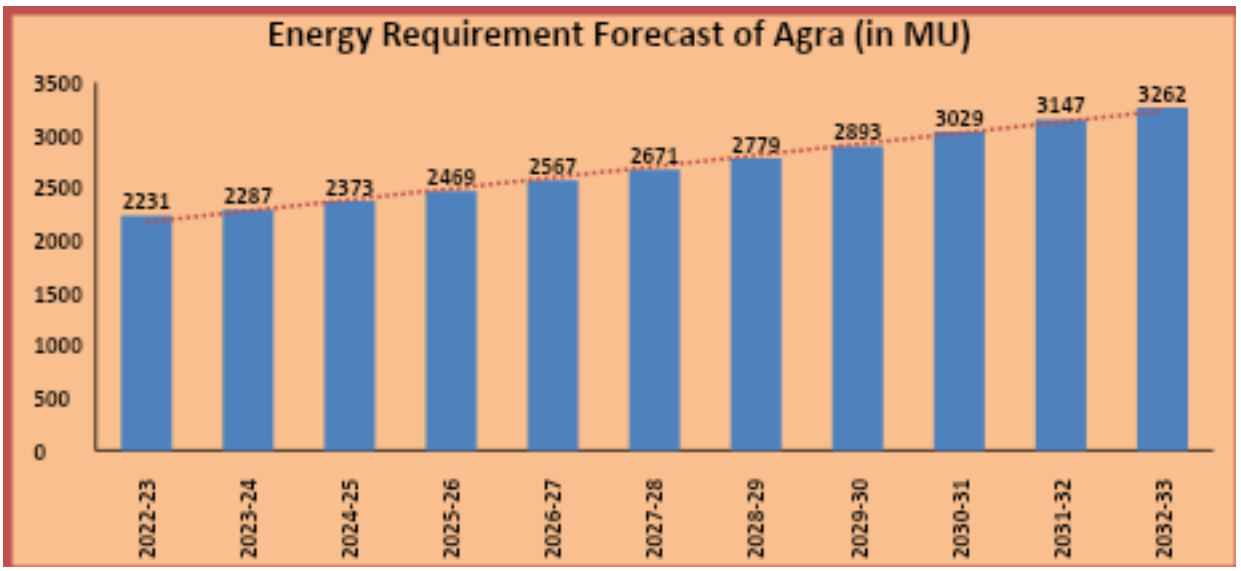
Energy Requirement Forecast of Agra (in MU)
3500
3000
2500
2000
1500
1000
500
0
2231
2287
2373
2469
2567
2671
2779
2893
3029
3147
3262
2022-23
2023-24
2024-25
2025-26
2026-27
2027-28
2028-29
2029-30
2030-31
2031-32
2032-33

Figure 5-3 Energy Requirement Forecast of Agra in MU

Peak Demand of Agra is expected to see 3.70% CAGR upto 2027-28 and will reach 593 MW in comparison to 495 MW in year 2022-23. It is expected to reach 726 MW in year 2032-33 with a CAGR of 4.12% after 2027- 28.

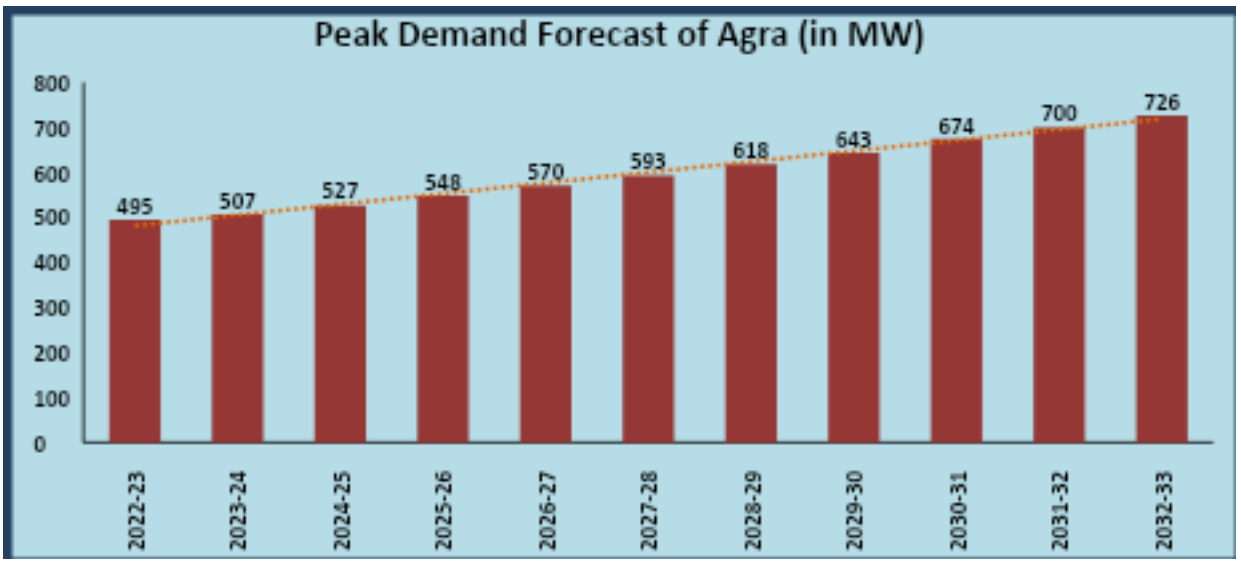

Figure 5-4 Peak Demand Forecast of Agra in MW

The category-wise energy consumption forecast of Agra are as follows:

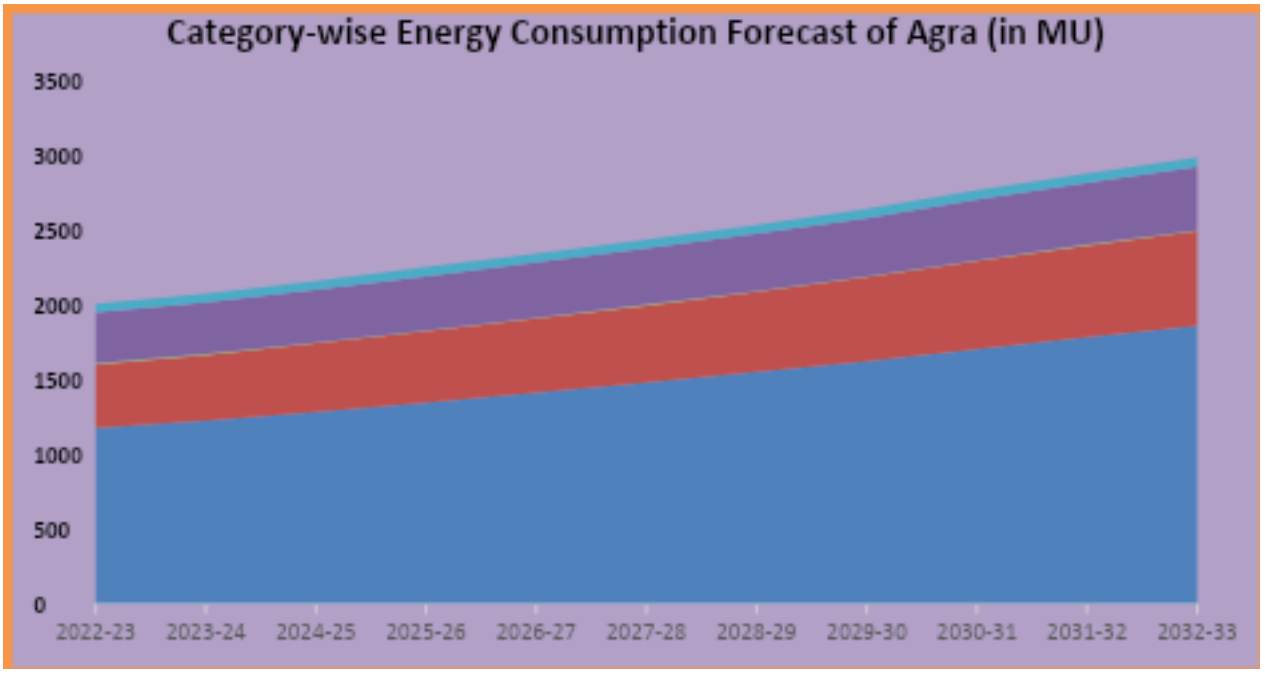

Figure 5-5 Category-wise Energy Consumption Forecast of Agra

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)	CAGR (In %)

		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	**Domestic**	1175	1478	1859	4.70	4.70	4.70
2	**Commercial**	426	515	633	3.85	4.22	4.04
3	**Irrigation**	6	6	6	0.20	0	0
4	**Industrial**	339	376	423	2.05	2.39	2.22
5	**Others**	58	61	63	1.11	0.61	0.86
6	**Total**	2004	2436	2978	3.98	4.10	4.04

Table 5-2 Expected CAGR of Agra – Category-wise Consumption

4.5 Transmission & Distribution Losses:

T&D losses of Agra were at 10.17% in 2022-23. The target level is to bring it down to about 8.80% and 8.51% by the end of 2027-28 & 2032-33 respectively.

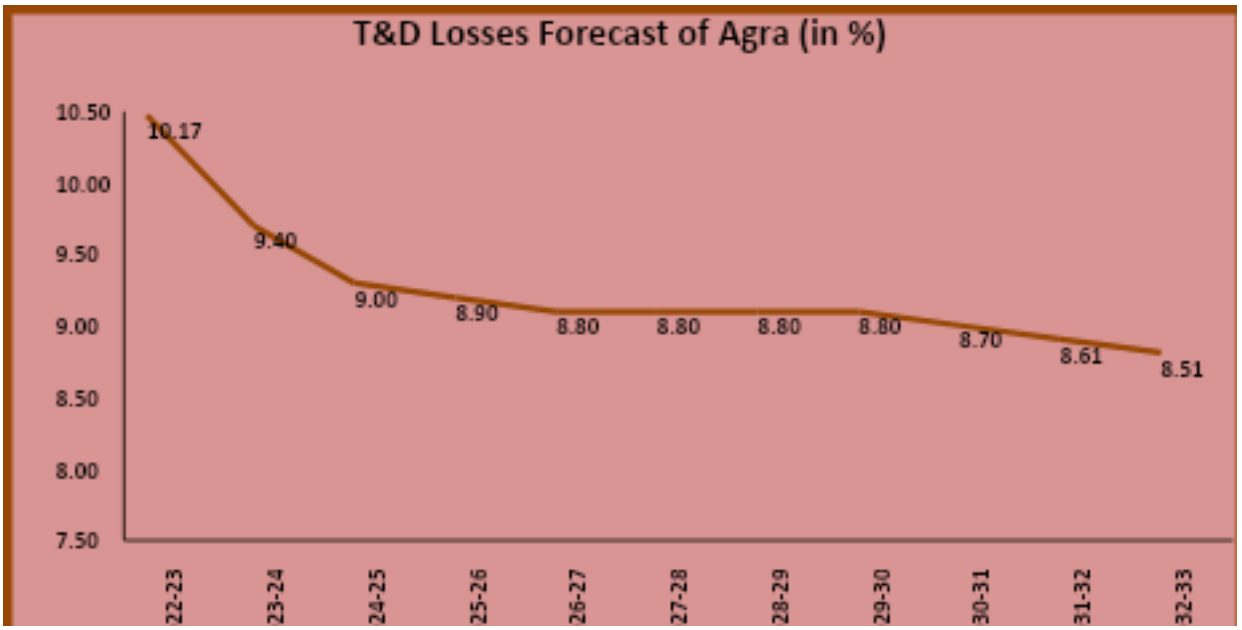

Figure 5-6 T&D Loss Forecast of Agra

4.6 Summary of Power forecast of Agra city:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	2231	2671	3262	3.66	4.08
2	**Peak Demand (in MW)**	495	593	726	3.70	4.12
3	**T&D Losses (in %)**	10.17	8.80	8.51		

Table 5-3 Power forecast summary of Agra

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Agra											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	1175	1223	1284	1346	1411	1478	1548	1623	1704	1783	1859
Commercial	426	440	458	476	495	515	536	560	587	612	633
Public lighting	28	29	29	29	30	30	30	31	31	31	31
Public Water Works	24	24	25	25	25	25	26	26	26	26	26
Irrigation	6	6	6	6	6	6	6	6	6	6	6
LT Industries	134	135	139	142	145	148	150	152	153	153	158
HT Industries	205	209	214	219	223	228	232	236	253	259	265
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	0	0	0	0	0	0	0	0	0	0	0
Others (if Any)	5	5	5	5	5	5	5	5	5	5	5
Total (Energy Consumption)	**2004**	**2072**	**2160**	**2249**	**2341**	**2436**	**2534**	**2639**	**2766**	**2876**	**2984**
T&D losses -MU	227	215	214	220	226	235	245	255	264	271	278
T&D losses -in %	10.17	9.40	9.00	8.90	8.80	8.80	8.80	8.80	8.70	8.61	8.51
Energy Requirement - MU	**2231**	**2287**	**2373**	**2469**	**2567**	**2671**	**2779**	**2893**	**3029**	**3147**	**3262**
Annual Load Factor - %	51.48	51.46	51.44	51.42	51.40	51.38	51.36	51.34	51.32	51.30	51.28
Peak Load - MW	**495**	**507**	**527**	**548**	**570**	**593**	**618**	**643**	**674**	**700**	**726**

Table 5-4 Category-wise and Year-wise Summary of Agra.

Agartala

Chapter 5: **Agartala**

5.1 Introduction

Agartala is the capital of Tripura. Historically, the city has been an important border-trading town with trading linkages with Bangladesh. It is situated near the Bangladesh border astride the Haroa River along with numerous villages in an intensively cultivated plain. It is the 3rd largest city after Imphal in North-east India.

Economy

Agriculture is the primary sector of the economy of Tripura. Paddy is the principal crop here. Fisheries are one of the main sources for their income. They also engage in cottage, Rubber plantation, tea, bamboo stick and small scale industries which brings good revenue to the city.

Climate

The climate of the city is mainly a subtropical climate with relatively high humidity 28 °C throughout the year. The average temperature during summers is around 28 °C. The monsoon season starts during June and lasts till September. Rainfall is heavy and frequent leading to average rainfall of around 220 cms. Winters are mild and pleasant with temperature ranges from 10 °C to 24 °C.

5.2 Brief description of Power Utilities:

Tripura State Electricity Corporation Limited (TSECL) mainly responsible for the distribution of electricity in Tripura including Agartala.

5.3 Existing Power Scenario:

The total electricity consumption of Agartala in the year 2022-23 was 356 MU and with 10.6 % T&D losses, the requirement was 399 MU. The peak demand of the city was 104 MW. The Domestic sector was the biggest consumer of electricity (68%) followed by Commercial (9%).

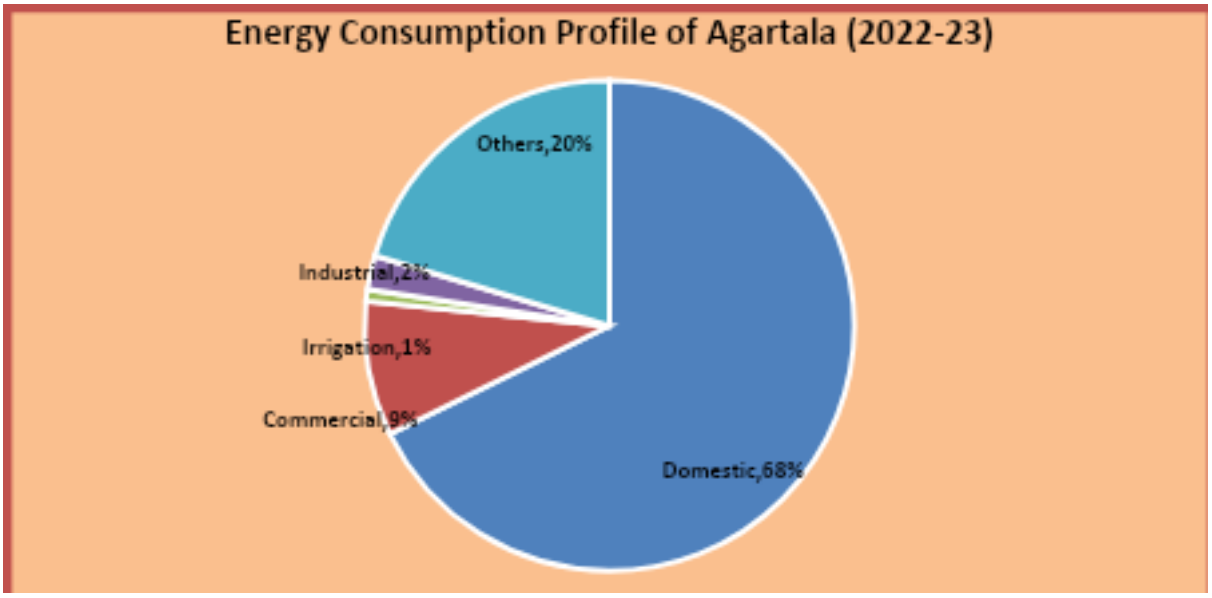

Figure 6-1 Energy Consumption Profile of Agartala (2022-23)

*Others category in Fig 6.1 includes load of public lighting, public water works, bulk supply and any other load.

In comparison of Agartala with Tripura for the year 2022-23, it is observed that the energy requirement of Agartala was 24.21 % of the total energy requirement of the state.

2022-23	Agartala City	Tripura	% Share of Agartala City
Energy in MU	399	1648	24.21
Peak Demand in MW	104	356	29.21

Table 6-1 Comparison between AGARTALA with Tripura in the year 2022-23

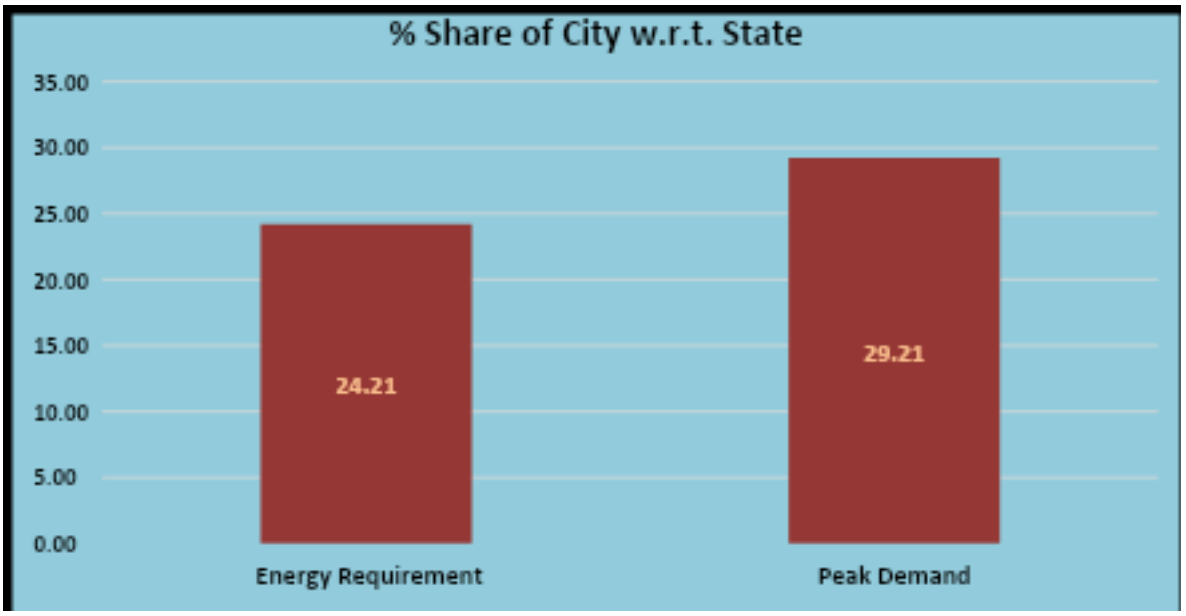

Figure 6-2 Comparison between Agartala and Tripura in 2022-23

5.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Agartala was 399 MU in the year 2022-23. It is expected that the energy requirement of the city will reach 591 MU by the year 2027-28 with a 8.21 % CAGR for the period 2022-23 to 2027-28. With a CAGR of 7.81 % for the period 2027-28 to 2032-33, its energy requirement is estimated as 861 MU by the year 2032-33.

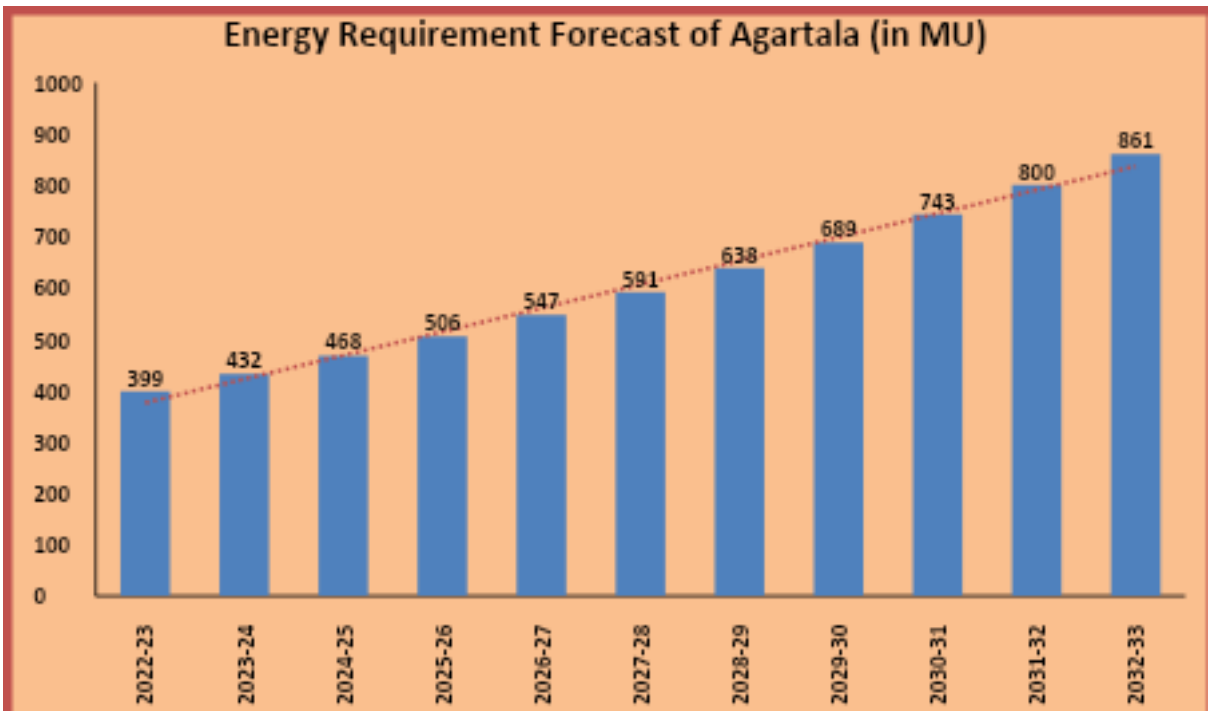

Figure 6-3 Energy Requirement Forecast of Agartala (in MU).

Peak Demand of Agartala is expected to see 9.30% CAGR upto 2027-28 and will reach 162 MW in comparison to 104 MW in the year 2022-23. It is expected to reach 248 MW in the year 2032-33 with a CAGR of 8.89% after 2027- 28.

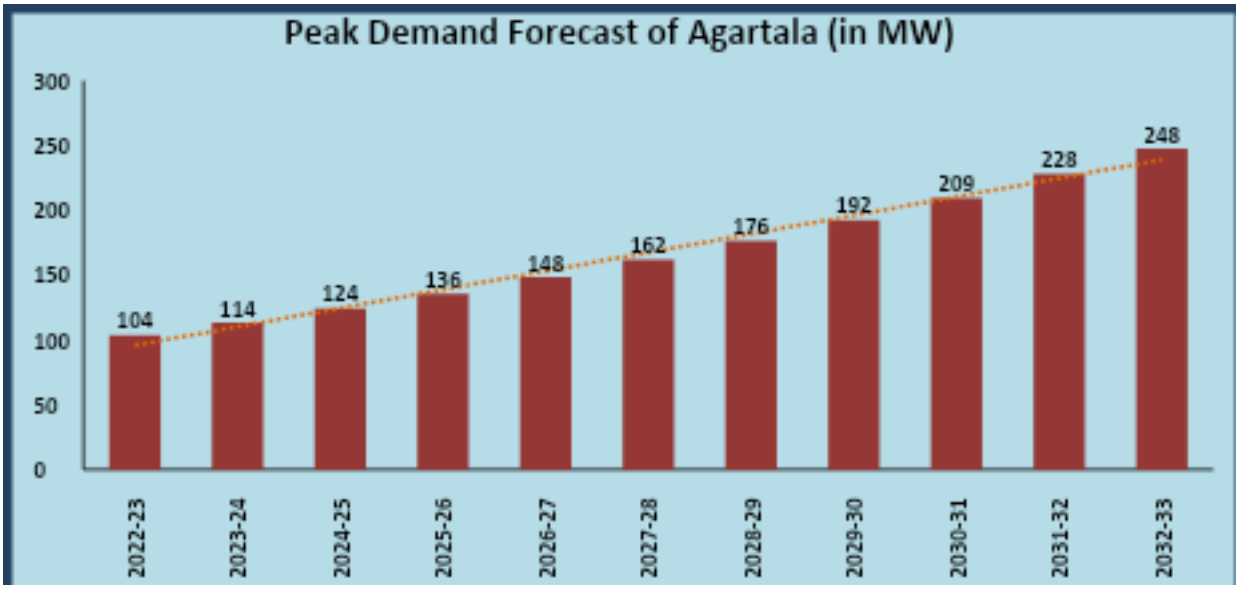

Figure 6-4 Peak Demand Forecast of Agartala (in MW).

The category-wise energy consumption forecast of Agartala are as follows:

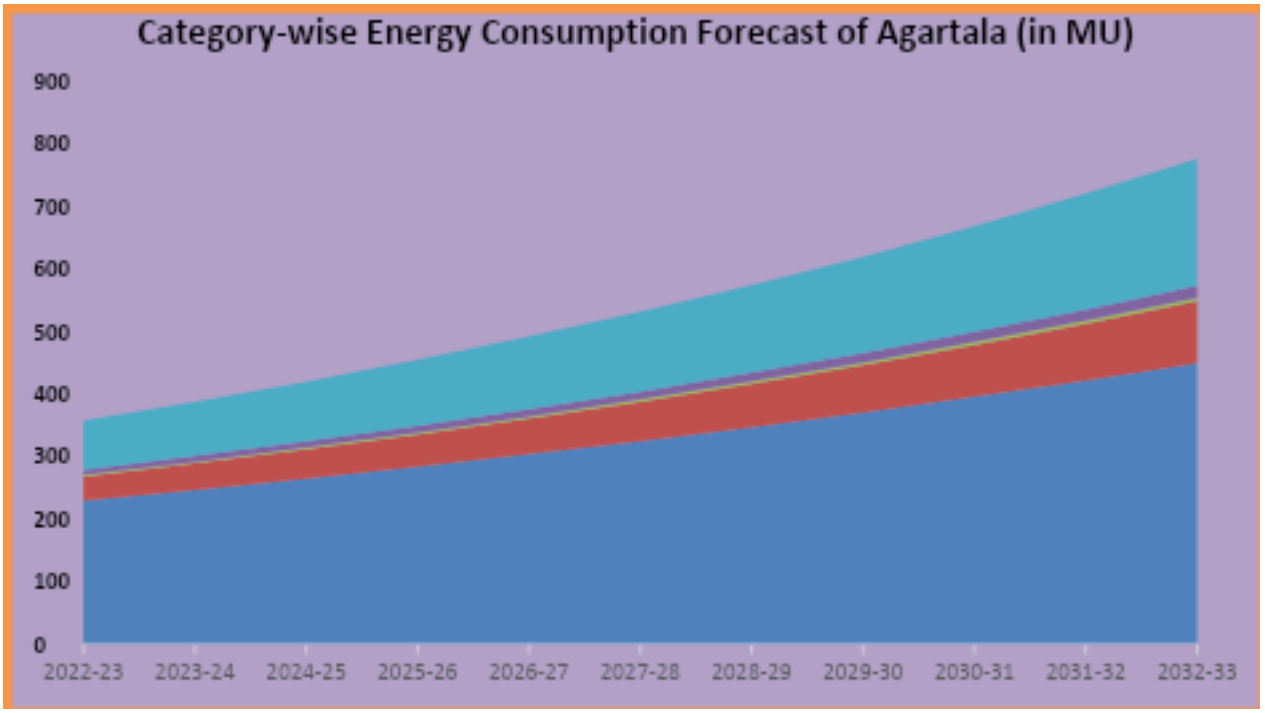

Figure 6-5 Category-wise Energy Consumption Forecast of Agartala (in MU)

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	**Domestic**	229	324	448	7.20	6.70	6.95
2	**Commercial**	38	62	99	10.20	9.70	9.95
3	**Irrigation**	2	4	6	9.20	8.70	8.95
4	**Industrial**	8	13	19	8.73	8.23	8.48
5	**Others**	78	127	202	10.20	9.70	9.95
6	**Total**	356	530	774	8.27	7.86	8.07

Table 6-2 Expected CAGR of AGARTALA - Category-wise Consumption

5.5 Transmission & Distribution Losses:

T&D losses of Agartala were at 10.60 % in 2022-23. The target level is to bring it down to about 10.36 % and 10.11 % by the end of 2027-28 & 2032-33 respectively.

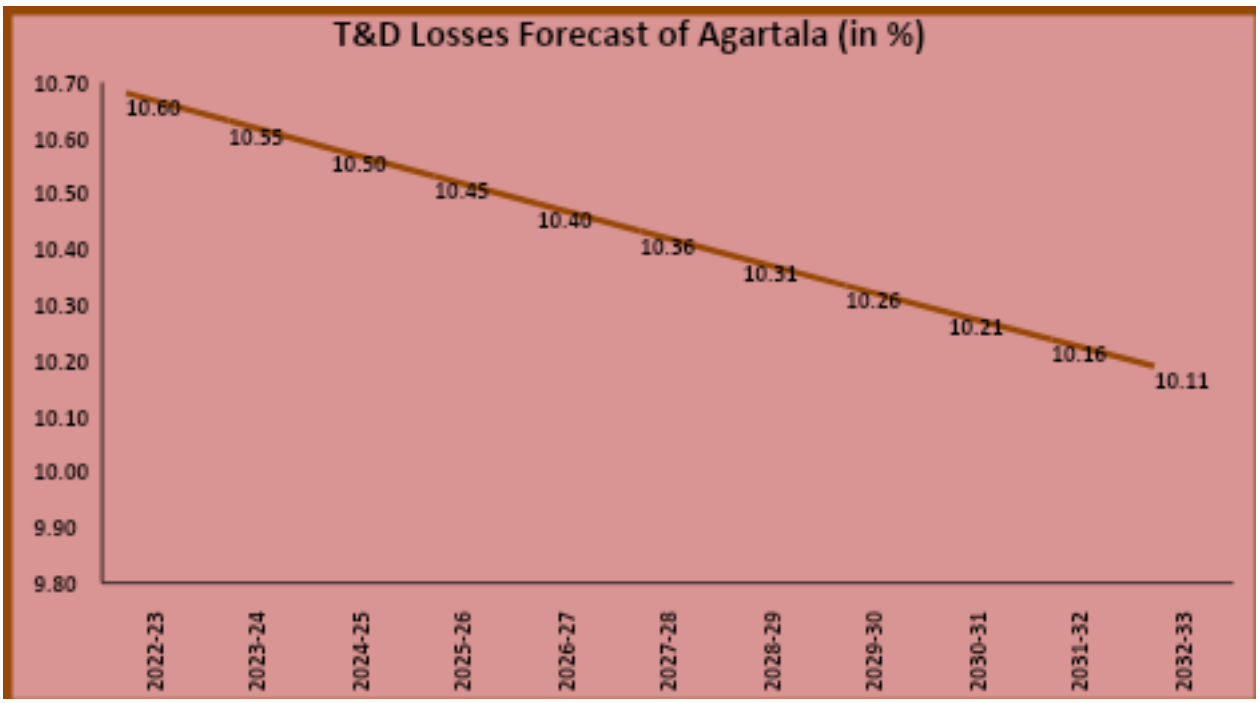

Figure 6-6 T&D Losses Forecast of Agartala (in %)

5.6 Summary of Power forecast of Agartala city:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	399	591	861	8.21	7.81
2	**Peak Demand (in MW)**	104	162	248	9.30	8.89
3	**T&D Losses (in %)**	10.60	10.36	10.11		

Table 6-3Power forecast summary of AGARTALA

****

AGARTALA											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	229	246	264	282	303	324	346	370	394	420	448
Commercial	38	42	47	52	57	62	69	75	83	91	99
Public lighting	9	10	11	12	13	15	16	18	19	21	23
Public Water Works	14	16	17	19	21	23	25	28	30	33	36
Irrigation	2	3	3	3	4	4	4	5	5	5	6
LT Industries	7	7	8	9	9	10	11	12	13	14	15
HT Industries	2	2	2	2	2	3	3	3	3	4	4
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	55	61	67	74	82	90	99	109	119	131	143
Others (if Any)	0	0	0	0	0	0	0	0	0	0	0
Total (Energy Consumption)	**356**	**386**	**419**	**453**	**490**	**530**	**573**	**618**	**667**	**719**	**774**
T&D losses -MU	42	46	49	53	57	61	66	71	76	81	87
T&D losses -in %	10.60	10.55	10.50	10.45	10.40	10.36	10.31	10.26	10.21	10.16	10.11
Energy Requirement - MU	**399**	**432**	**468**	**506**	**547**	**591**	**638**	**689**	**743**	**800**	**861**
Annual Load Factor - %	43.87	43.43	42.99	42.56	42.14	41.72	41.30	40.89	40.48	40.07	39.67
Peak Load - MW	**104**	**114**	**124**	**136**	**148**	**162**	**176**	**192**	**209**	**228**	**248**

Table 6-4 Category-wise and Year-wise Summary of Agartala.

Ahmedabad

Chapter 6: **Ahmedabad**

6.1 Introduction:

Ahmedabad, the largest city in Gujarat, India, is located on the banks of the Sabarmati River, 25 km from the capital, Gandhinagar. Known for its historical and cultural significance, Ahmedabad houses the Gandhi Ashram and the Calico Museum of Textiles. As the 5th most populous city in India, it's also recognized as a UNESCO World Heritage City. The Narendra Modi Stadium in Ahmedabad is the world's largest cricket stadium, accommodating 132,000 spectators

Economy:

Ahmedabad is the second-largest cotton textile center in India and a leading supplier of denim and exporter of gemstones and jewelry. The city also hosts major pharmaceutical companies, automobile manufacturers, and IT firms. Ongoing developments include the Sardar Vallabhbhai Patel Sports Enclave and new industrial estates in Sanand."

Climate:

Ahmedabad has a hot semi-arid climate, with marginally less rain than required for a tropical climate. The weather is hot from March to June; the average summer maximum is 43 °C and the average minimum is 24 °C. From November to February, the average maximum temperature is 30 °C (86 °F) and the average minimum is 13 °C. Cold winds from the north are responsible for a mild chill in January. The southwest monsoon brings a humid climate from mid-June to mid-September. The average annual rainfall is about 800 mm.

6.2 Brief description of Power Utilities:

Presently Torrent Power is responsible for distribution of electricity in Ahmedabad. Torrent Power Ahmedabad having Distribution in an area of 356 Sq. Km. which includes Ahmedabad & Gandhinagar Cities.

6.3 Existing Power Scenario

The total electricity consumption of Ahmedabad City in the year 2022-23 was 8137 MU and with 5.00% T&D losses, the requirement was 8453 MU. The peak demand of the city was 1900 MW. The Domestic sector was the biggest consumer of electricity (40%) & Industrial (40%) equally and followed by commercial (17%).

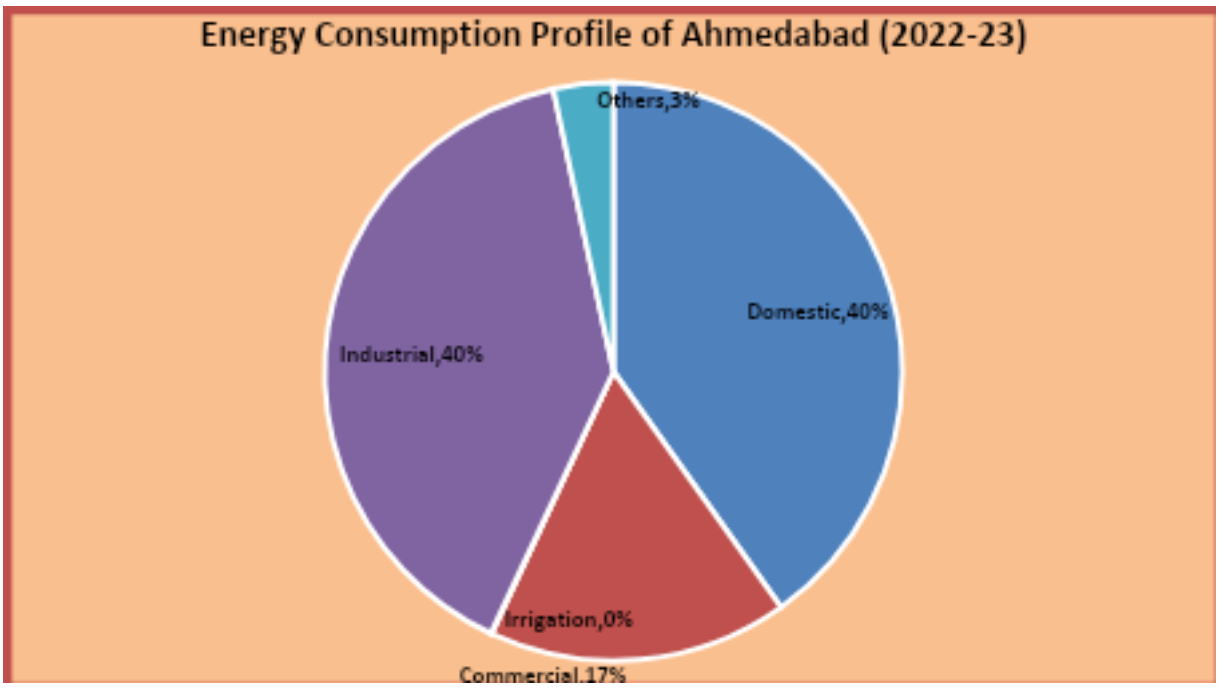

Figure 7-1 Energy Consumption Profile of Ahmedabad (2022-23)

In a comparison of Ahmedabad City with Gujarat for the year 2022-23, it is observed that the energy requirement was 6.06% of the total energy requirement of the state.

2022-23	Ahmedabad City	Gujarat	% Share of Ahmedabad City
Energy in MU	8453	139566	6.06
Peak Demand in MW	1900	21550	8.82

Table 7-1 Comparison of Ahmedabad City with Gujarat in 2022-23

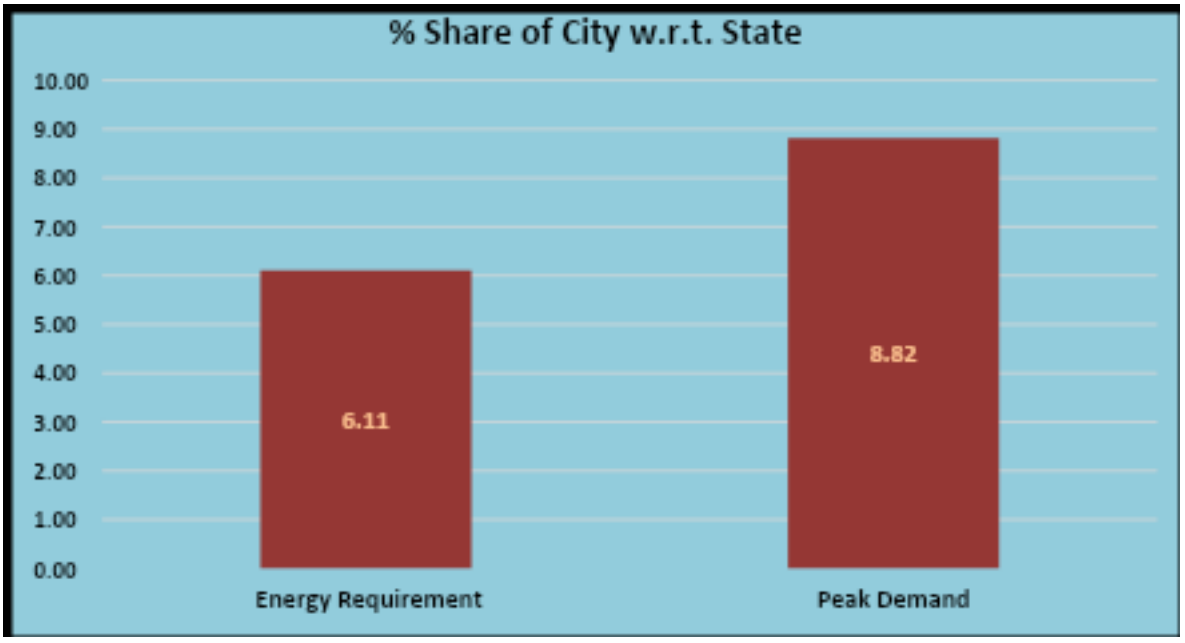

Figure 7-2 Comparison between Ahmedabad City and Gujarat in 2022-23.

6.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Ahmedabad City was 8453 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 9273 MU by the year 2027-28 with a 1.87% CAGR for the period 2022-23 to 2027-28. With a CAGR of 2.56% for the period 2027-28 to 2032-33, its energy requirement is estimated as 10522 MU by the year 2032-33.

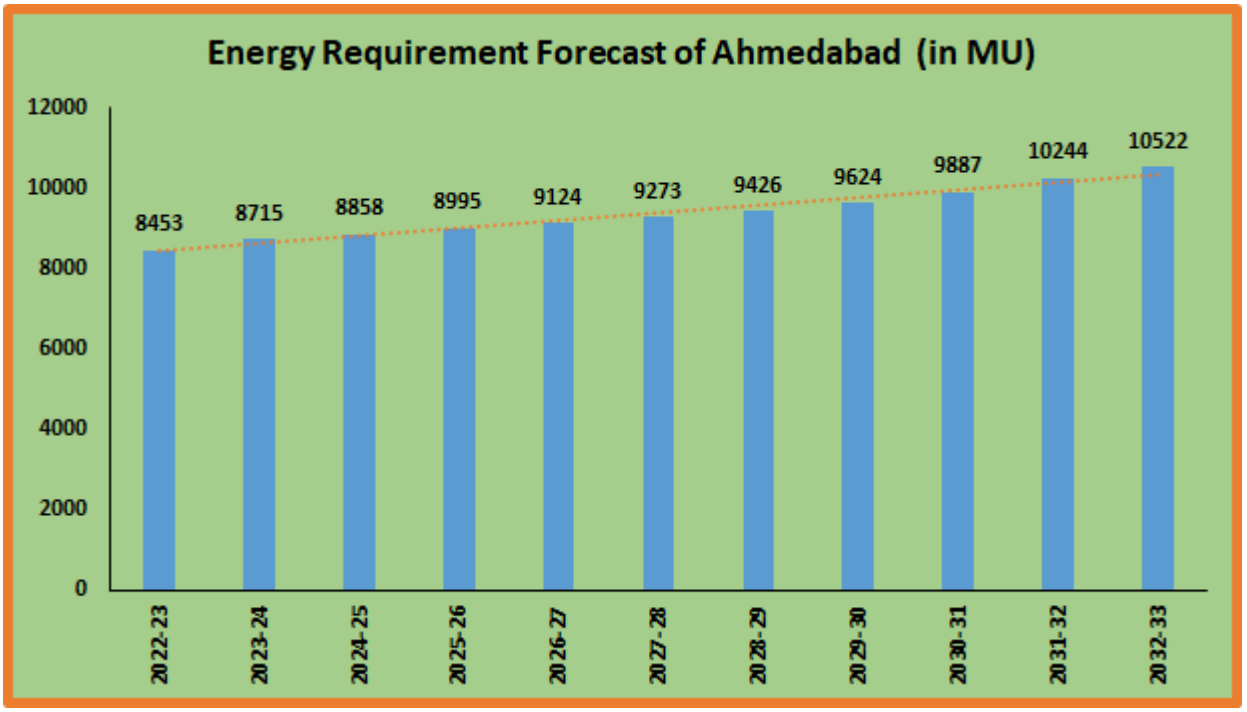

Figure 7-3 Energy Requirement Forecast of Ahmedabad (in MU)

Peak Demand of the Ahmedabad City is expected to see 2.55% CAGR upto 2027-28 and will reach 2155 MW in comparison to 1900 MW in the year 2022-23. It is expected to reach 2474 MW in the year 2032-33 with a CAGR of 2.80% after 2027-28.

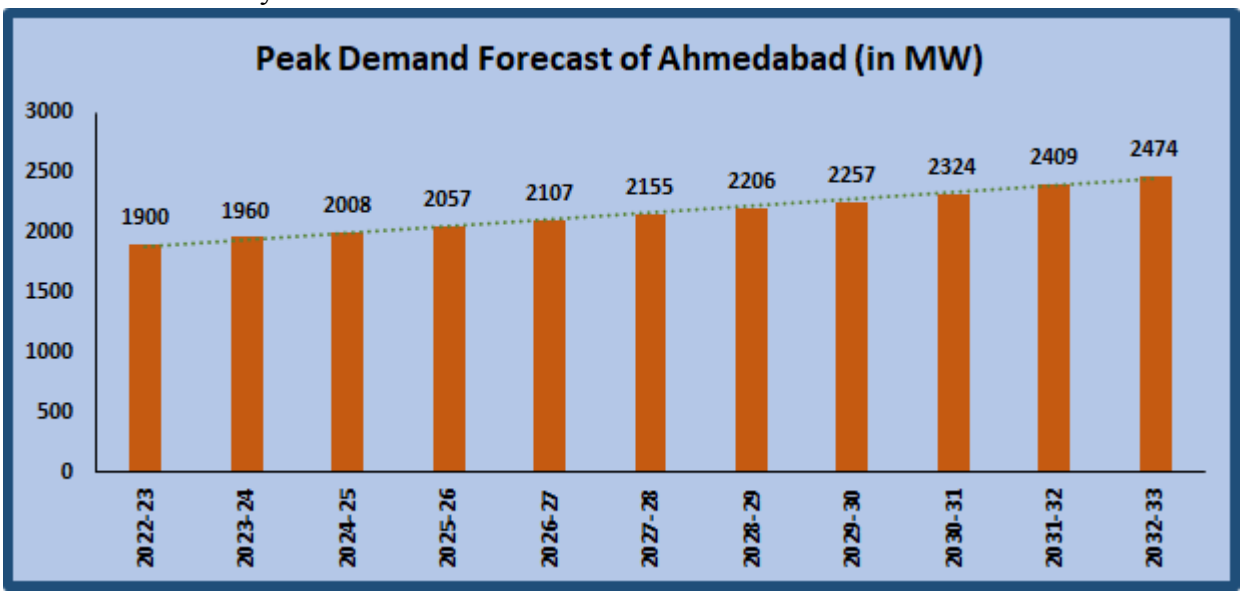

Figure 7-4 Peak Demand Forecast of Ahmedabad (in MW)

The category-wise energy consumption forecast of Ahmedabad City are as follows:

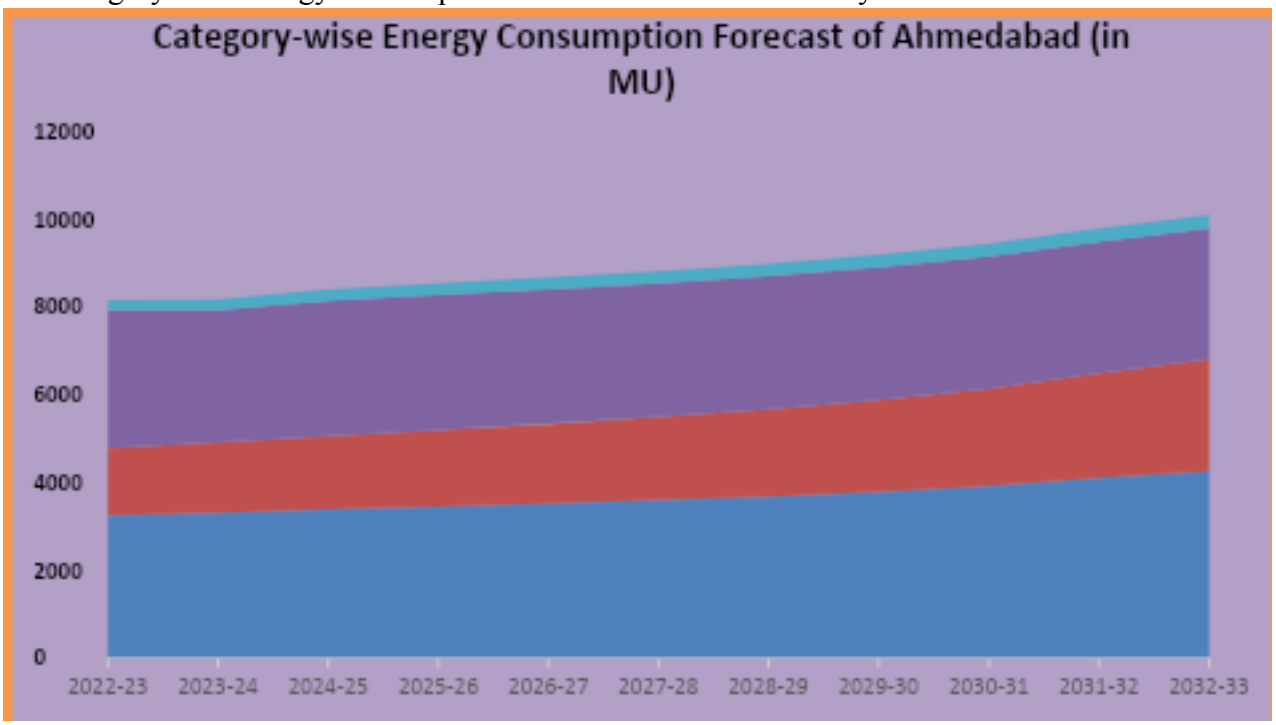

Figure 7-5 Category-wise Energy Consumption Forecast of Ahmedabad (in MU)

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	**Domestic**	3230	3583	4246	2.09	3.46	2.77
2	**Commercial**	1528	1888	2536	4.33	6.08	5.20
3	**Irrigation**	3	3	3	0.00	0.00	0.00
4	**Industrial**	3138	3046	2978	0.00	0.00	0.00
5	**Others**	239	275	310	2.87	2.42	2.64
6	**Total**	**8137**	**8795**	**10074**	**1.57**	**2.75**	**2.16**

Table 7-2 Expected CAGR of Ahmedabad City Category-wise Consumption

6.5 Transmission & Distribution Losses:

T&D losses of Ahmedabad City were estimated as 5.0% in year 2022-23. The target is to maintain T&D Loses around this level.

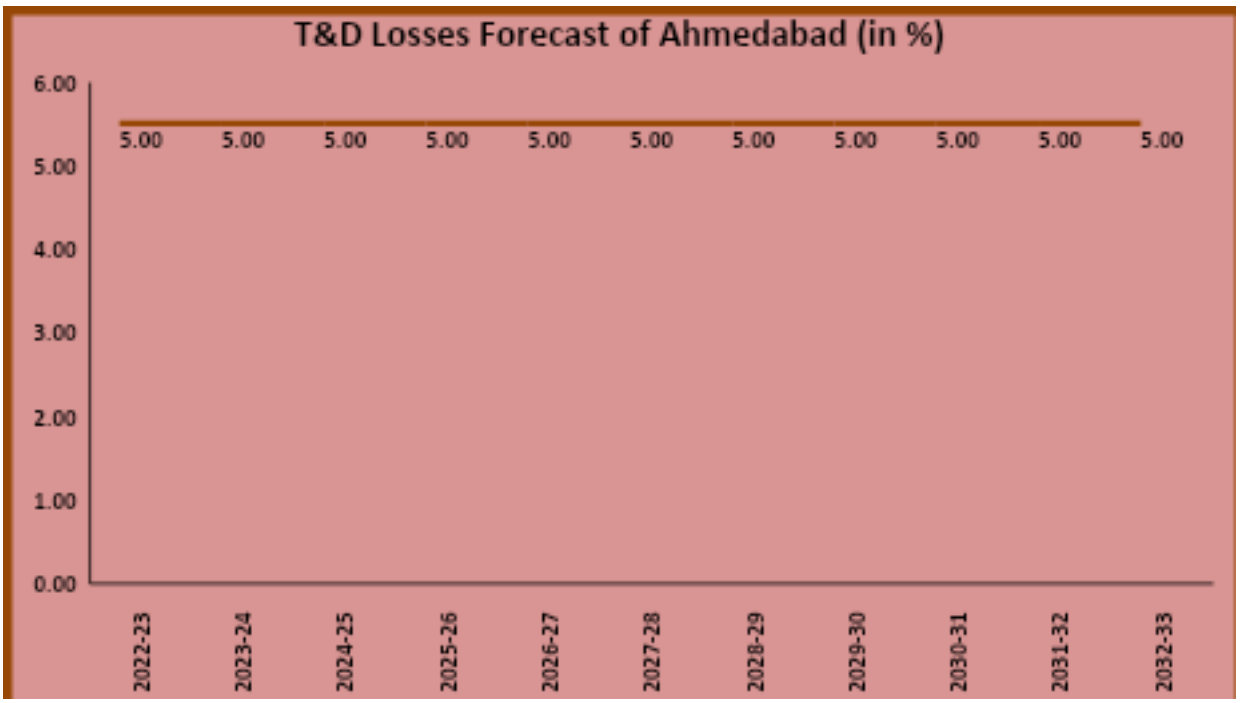

Figure 7-6 T&D Losses Forecast of Ahmedabad (in %)

6.6 Summary of Power forecast of Ahmedabad city:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	Energy Requirement (in MU)	8453	9273	10522	1.87	2.56
2	Peak Demand (in MW)	1900	2155	2474	2.55	2.80
3	T&D Losses (in %)	4	5	4.80		

Table 7-3 Power forecast summary of Ahmedabad

****

Ahmedabad City											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	3230	3301	3370	3439	3509	3583	3666	3768	3902	4092	4246
Commercial	1528	1593	1661	1731	1806	1888	1979	2086	2214	2378	2536
Public lighting	50	52	53	54	55	56	57	58	59	60	61
Public Water Works	141	144	148	152	155	159	162	165	168	171	174
Irrigation	3	4	4	4	4	4	4	4	4	4	4
LT Industries	1141	1138	1129	1111	1082	1061	1026	999	982	963	913
HT Industries	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	48	50	53	55	58	60	63	66	69	72	74
Others (if Any)	0	0	0	0	0	0	0	0	0	0	0
Total (Energy Consumption)	8137	8280	8416	8546	8671	8812	8960	9150	9403	9746	10016
T&D losses -MU	316	435	442	448	454	460	466	474	484	497	505
T&D losses -in %	3.74	5.00	4.99	4.98	4.97	4.96	4.94	4.93	4.90	4.86	4.80
Energy Requirement - MU	8453	8715	8858	8995	9124	9273	9426	9624	9887	10244	10522
Annual Load Factor - %	50.79	50.75	50.35	49.91	49.44	49.11	48.77	48.67	48.57	48.55	48.54
Peak Load - MW	1900	1960	2008	2057	2107	2155	2206	2257	2324	2409	2474

Table 7-4 Category-wise and Year-wise Summary of Ahmedabad

Aizawl

Chapter 7: **Aizawl**

7.1 Introduction:

Aizawl city is the capital of Mizoram. It is the most populated city in the state. Timber and bamboo are famous and collected from hilly forests.

Economy:

As the capital of Mizoram, Aizawl is the administrative centre of the state. The economy of the city is mainly dependent on these government services, agriculture, forest products, minerals etc. Mainly 65% of the population of the state depends on agriculture. Apart from that Tourism is another sector that helps to improve the economy of the state.

Climate:

The climate of Aizawl District is the subtropical highland climate with distinct seasonal variations. During the monsoon season viz. June-August there is heavy rainfall ranging between 250 cm to 300 cm. The monsoon period is characterized by high humidity and frequent rain which contributes to the lush green environment but also causes flooding. During winters the average temperature of January is 13°C.

7.2 Brief description of Power Utilities:

The Power and Electricity Department, Mizoram (PEDMIZO) Mizoram State Electricity Board (MSEB) mainly responsible for generation, transmission and distribution of electricity in Mizoram, including Aizawl.

7.3 Existing Power Scenario:

The total electricity consumption of Aizawl in the year 2022-23 was 290 MU and with 19 % T&D losses, the requirement was 357 MU. The peak demand of the city was 87 MW. The Domestic sector was the biggest consumer of electricity (59%) followed by Commercial (11%).

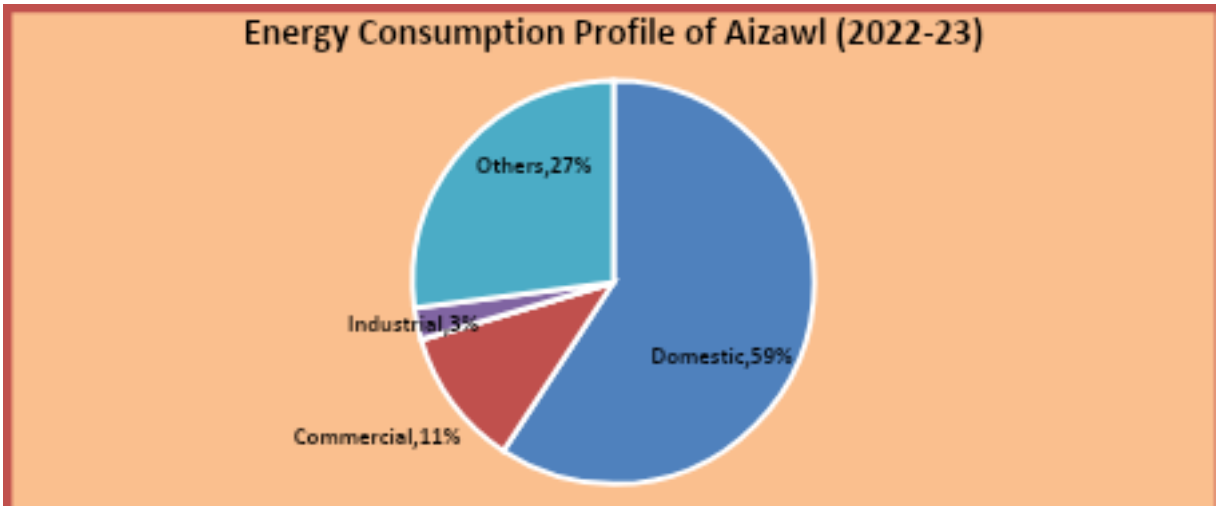

Figure 8-1 Energy Consumption Profile of Aizawl in 2022-23.

*Others category in Fig 8.1 includes load of public lighting, public water works, bulk supply and any other load

On comparison of Aizawl with Mizoram for the year 2022-23, it is observed that the energy requirement of Aizawl was 39.80% of the total energy requirement of the state.

2022-23	Aizawl City	Mizoram	% Share of AIZAWL City
Energy in MU	357	897	39.80
Peak Demand in MW	87	170	51.18

Table 8-1 Comparison of AIZAWL with Mizoram in 2022-23

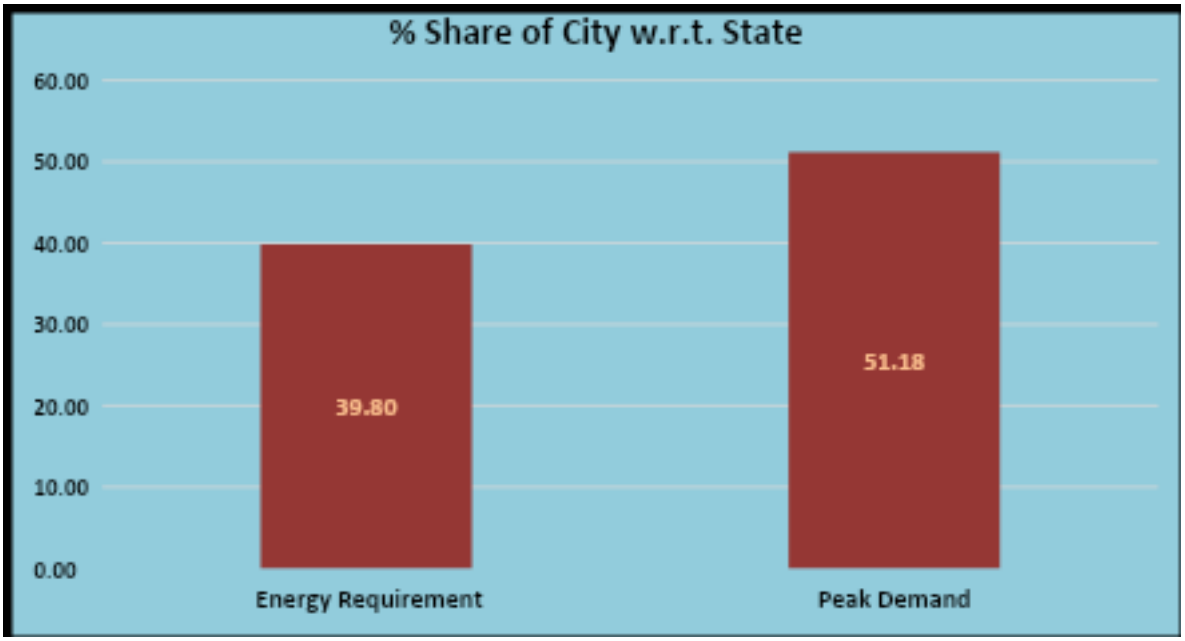

Figure 8-2 Comparison between Aizawl and Mizoram in the year 2022-23.

7.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Aizawl was 357 MU in the year 2022-23. It is expected that the energy requirement of the city will reach 446 MU by the year 2027-28 with a 4.55 % CAGR for the period 2022-23 to 2027-28. With a CAGR of 5.16 % for the period 2027-28 to 2032-33, its energy requirement is estimated as 574 MU by the year 2032-33.

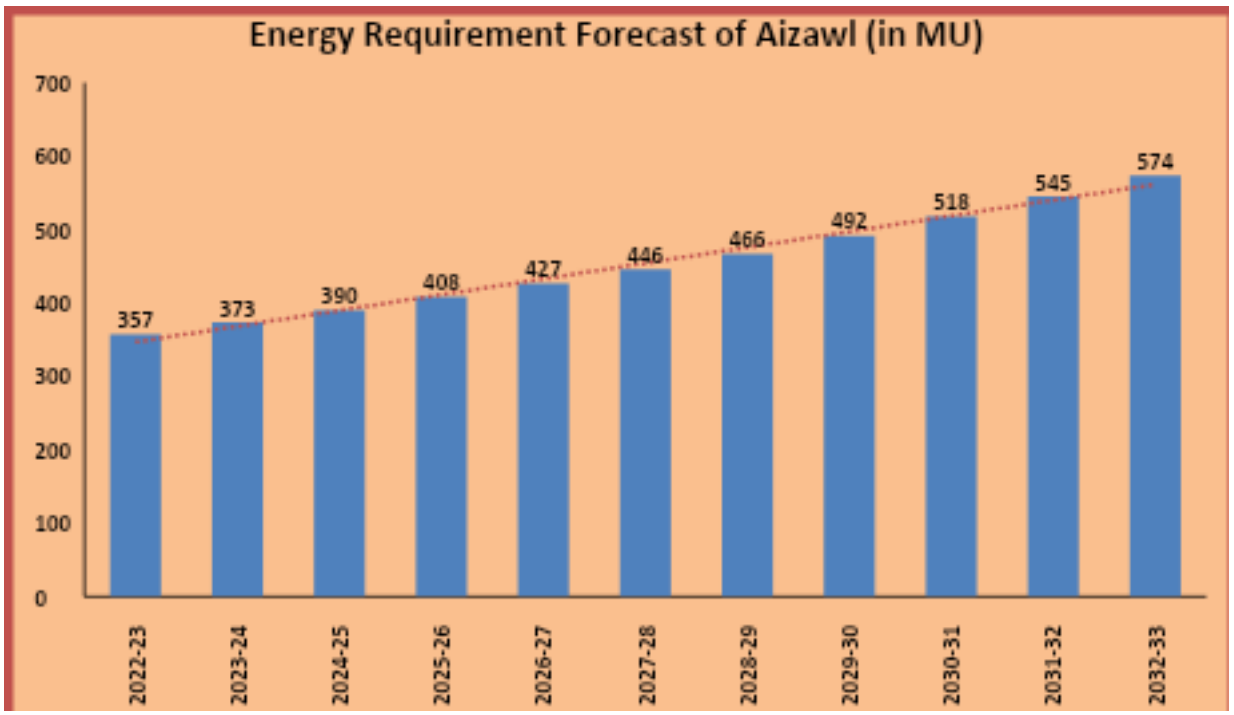

Figure 8-3 Energy Requirement Forecast of Aizawl (in MU)

Peak Demand of Aizawl is expected to see 5.08 % CAGR upto 2027-28 and will reach 111MW in comparison to 87 MW in year 2022-23. It is expected to reach 146 MW in year 2032-33 with a CAGR of 5.69 % after 2027- 28.

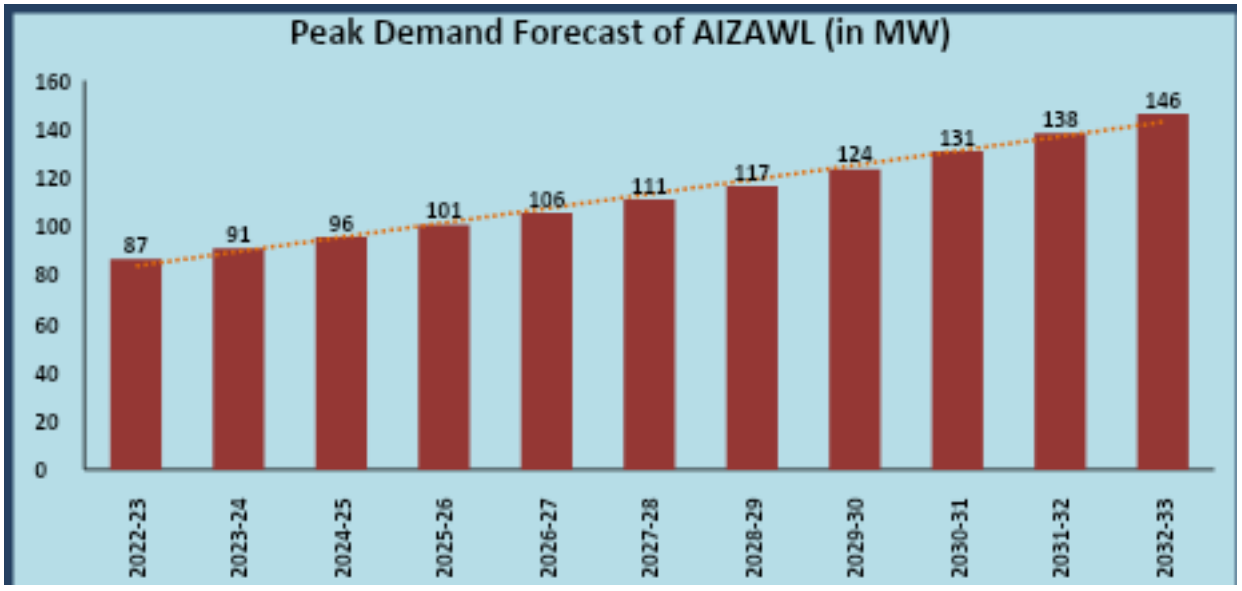

Figure 8-4 Peak Demand Forecast of AIZAWL (in MW)

The category-wise energy consumption forecast of Aizawl are as follows:

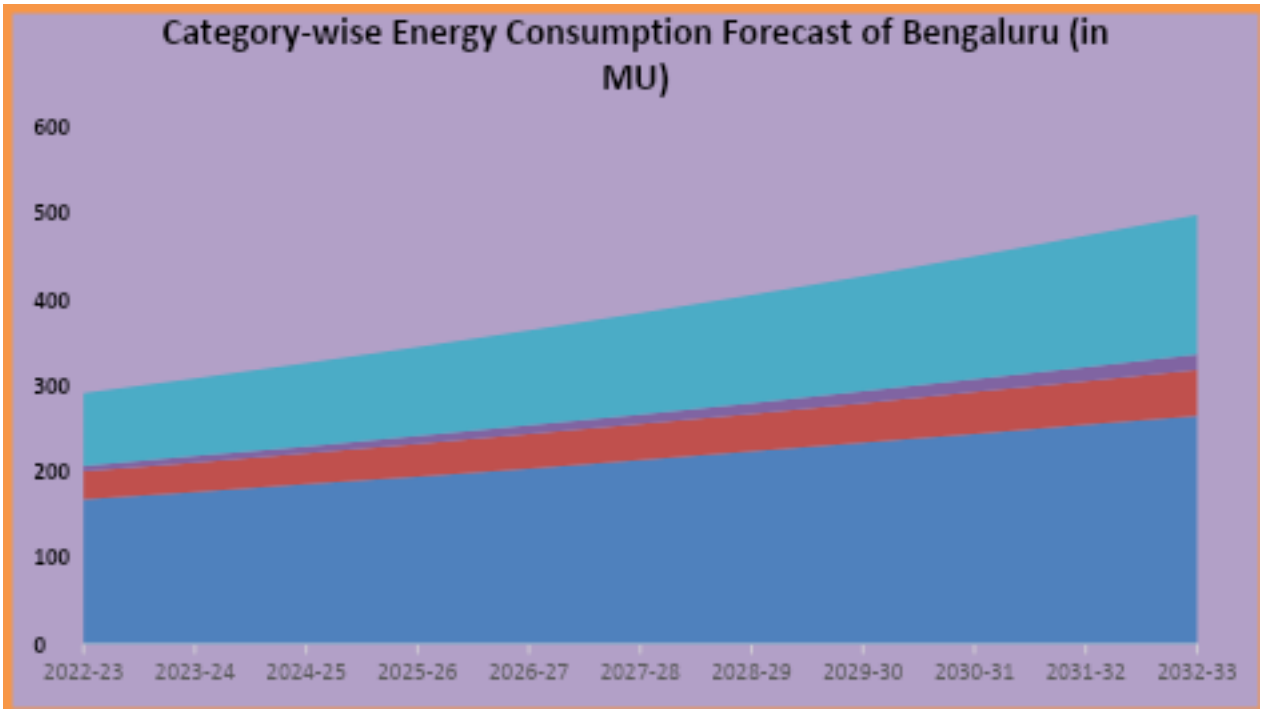

Figure 8-5 Category-wise Energy Consumption Forecast of AIZAWL (in MU)

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	**Domestic**	167	213	264	4.93	4.43	4.68
2	**Commercial**	32	42	53	5.39	4.89	5.14
3	**Irrigation**	0	0	0	0	0	0
4	**Industrial**	7	11	18	10.60	10.10	10.35
5	**Others**	84	117	162	6.92	6.64	6.78
6	**Total**	290	383	497	5.71	5.35	5.53

Table 8-2 Expected CAGR of AIZAWL - Category-wise Consumption

7.5 Transmission & Distribution Losses:

T&D losses of Aizawl were estimated at 18.72 % in 2022-23. The target level is to bring it down to about 14.11 % and 13.33 % by the end of 2027-28 & 2032-33 respectively.

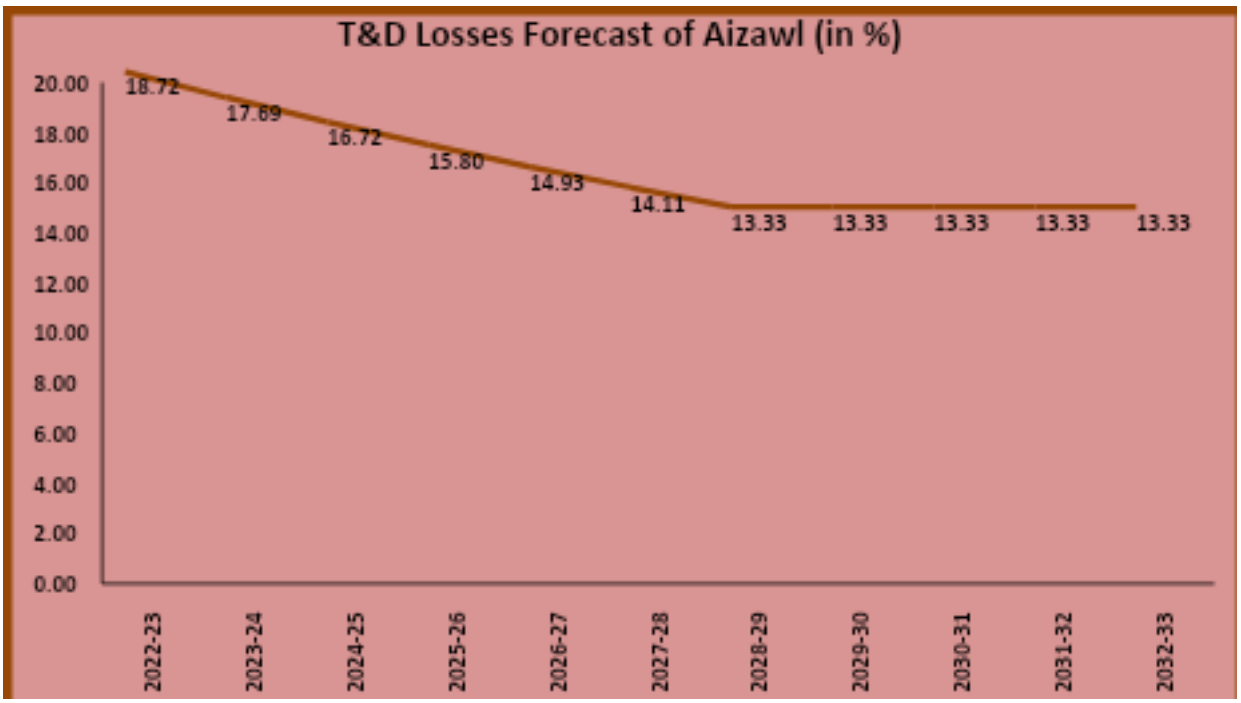

Figure 8-6 T&D Losses Forecast of Aizawl (in %)

7.6 Summary of Power forecast of Aizawl city:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	357	446	574	4.55	5.16
2	**Peak Demand (in MW)**	87	111	146	5.08	5.69
3	**T&D Losses (in %)**	18.72	14.11	13.33		

Table 8-3 Power forecast summary of Aizawl

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AIZAWL											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	167	176	185	194	203	213	223	233	243	254	264
Commercial	32	34	36	38	40	42	44	46	48	51	53
Public lighting	4	5	5	6	7	7	8	9	10	11	12
Public Water Works	51	54	57	60	63	66	70	73	76	80	83
Irrigation	0	0	0	0	0	0	0	0	0	0	0
LT Industries	2	2	2	2	3	3	3	3	4	4	5
HT Industries	5	6	6	7	7	8	9	10	11	12	13
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	28	31	34	37	40	44	48	52	56	61	66
Others (if Any)	0	0	0	0	0	0	0	0	0	0	0
Total (Energy Consumption)	**290**	**307**	**325**	**344**	**363**	**383**	**404**	**426**	**449**	**473**	**497**
T&D losses -MU	67	66	65	64	64	63	62	66	69	73	76
T&D losses -in %	18.72	17.69	16.72	15.80	14.93	14.11	13.33	13.33	13.33	13.33	13.33
Energy Requirement - MU	**357**	**373**	**390**	**408**	**427**	**446**	**466**	**492**	**518**	**545**	**574**
Annual Load Factor - %	47.03	46.79	46.56	46.33	46.09	45.86	45.63	45.41	45.18	44.95	44.73
Peak Load - MW	**87**	**91**	**96**	**101**	**106**	**111**	**117**	**124**	**131**	**138**	**146**

Table 8-4 Category-wise and Year-wise Summary of Aizwal.

Amritsar

Chapter 8: Amritsar

8.1 Introduction

Amritsar is an important city of Punjab and is a major commercial, cultural, and transportation center. It is also the center of Sikhism and the site of the Sikh's principal place of worship.

Economy:

Amritsar is a center for textile and chemical industries and is also a hub for food milling and processing, silk weaving, tanning, canning, and machine manufacturing.

Climate:

Amritsar district experiences extremes of climatic conditions. Summers are extremely hot and winter is very cold. The average minimum and maximum temperature is 0.6^0 C to 1^o C and 41.8^o to 45.4^o C in winter and summer respectively. Monsoon generally starts in the first week of July. The mean annual rainfall fluctuate around 417.7 mm, the major part of which is received during the months of July, August and September with a few showers of rain during winter months.

8.2 Brief description of Power Utilities:

Punjab State Power Corporation Limited (PSPCL) is responsible for generation, transmission and distribution of electricity in Punjab including Amritsar.

8.3 Existing Power Scenario:

The total electricity consumption of Amritsar in the year 2022-23 was 1617 MU and with 15.85% T&D losses, the requirement was 1921 MU. The peak demand of the city was 394 MW. The Domestic sector was the biggest consumer of electricity (52%) followed by Industrial (24%) & Commercial (20%).

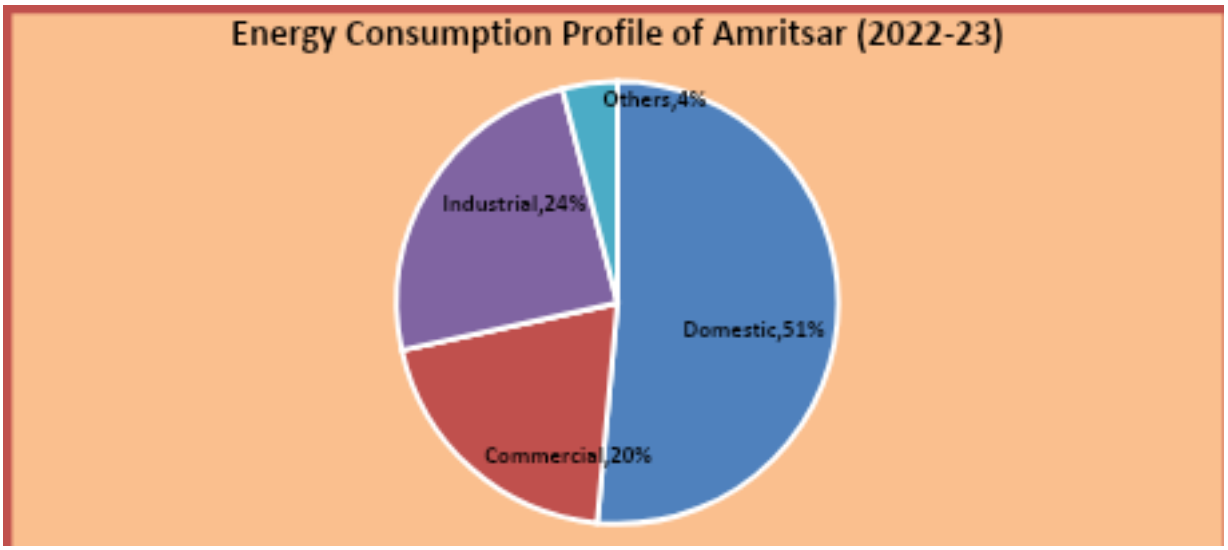

Figure 9-1 Energy Consumption Profile of Amritsar (2022-23)

In a comparison of Amritsar with Punjab for the year 2022-23, it is observed that the energy requirement of Amritsar was 2.89% of the total energy requirement of the state.

2022-23	Amritsar City	Punjab	% Share of Amritsar City
Energy in MU	1921	66464	2.89
Peak Demand in MW	394	14327	2.75

Table 9-1 Comparison of Amritsar with Punjab in 2022-23

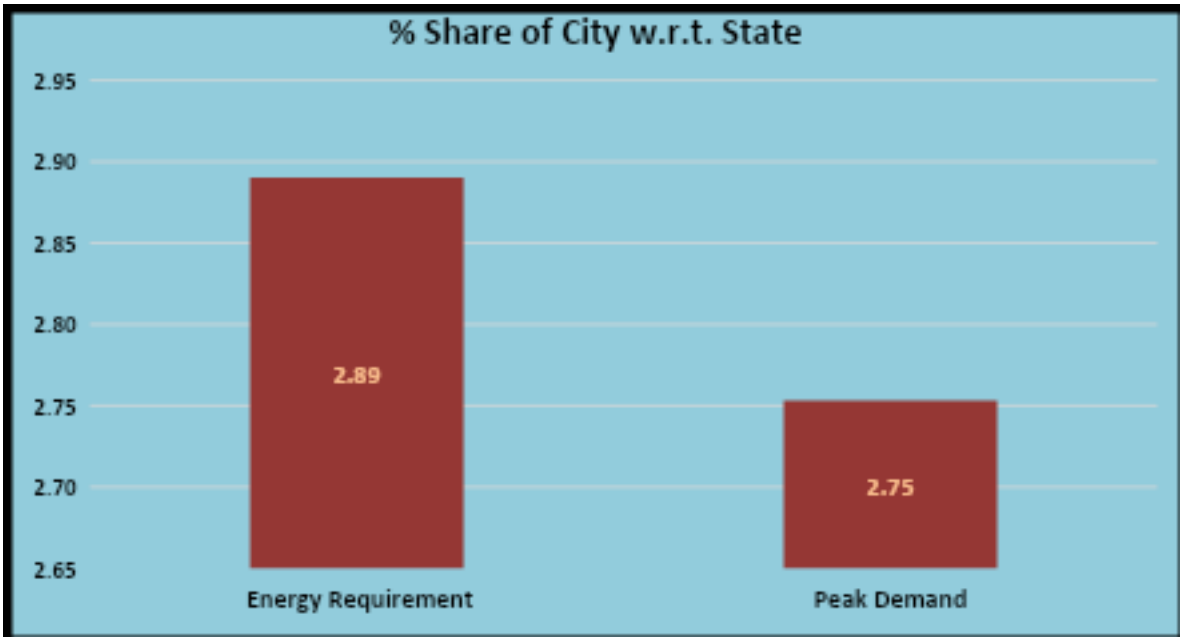

Figure 9-2 Comparison of Amritsar with Punjab in the year 2022-23

8.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Amritsar was 1921 MU in the year 2022-23. It is expected that the energy requirement of the city will reach 2388 MU by the year 2027-28 with a 4.45 % CAGR for the period 2022-23 to 2027-28. With a CAGR of 4.65 % for the period 2027-28 to 2032-33, its energy requirement is estimated as 2997 MU by the year 2032-33.

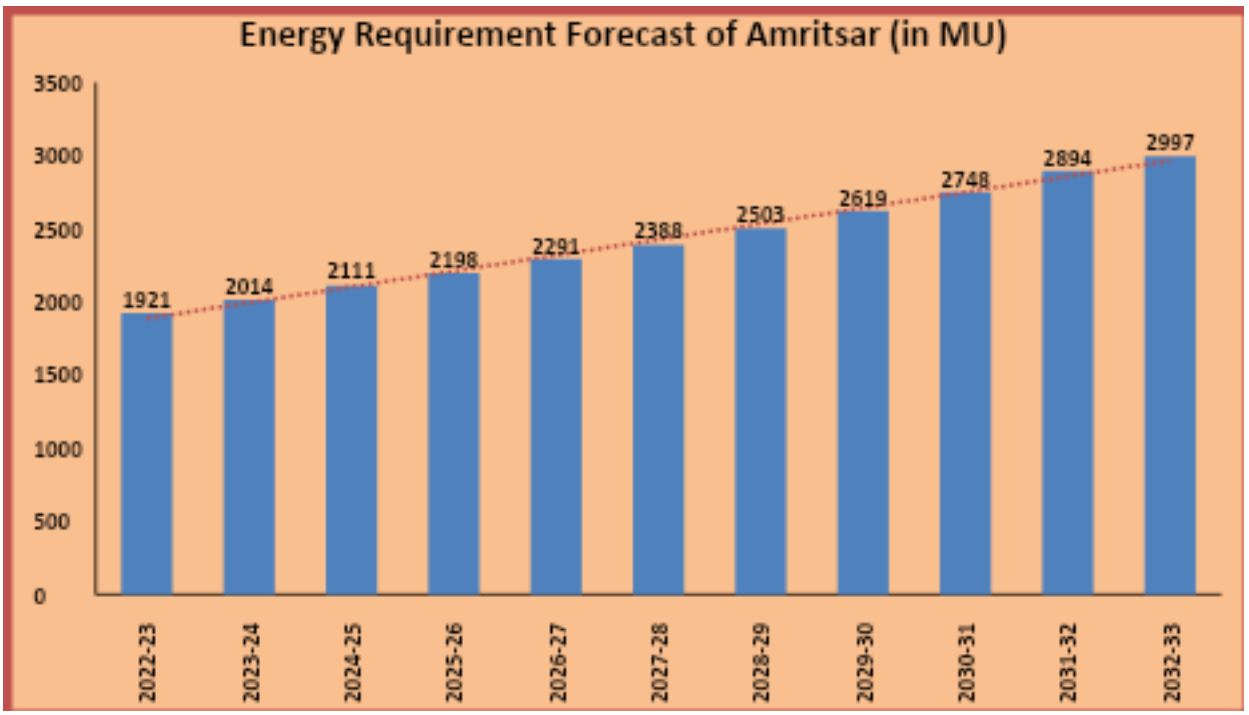

Figure 9-3 Energy Requirement Forecast of Amritsar (in MU)

Peak Demand of the Amritsar is expected to see 4.54 % CAGR upto 2027-28 and will reach 492 MW in comparison to 394 MW in the year 2022-23. It is expected to reach 622 MW in the year 2032-33 with a CAGR of 4.78%

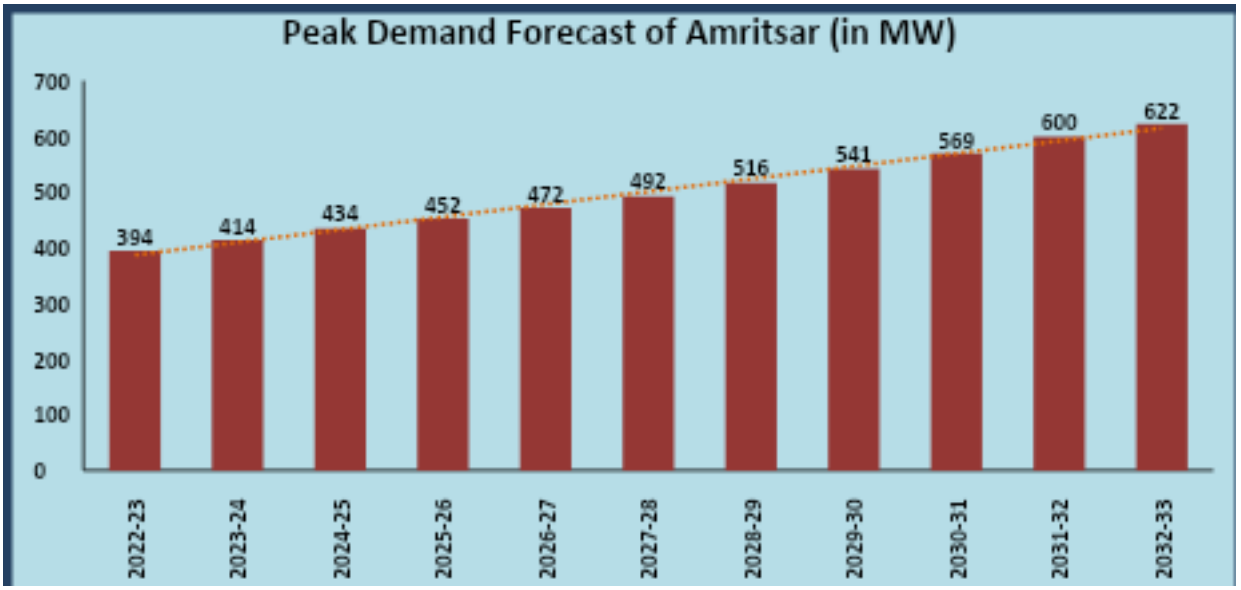

Figure 9-4 Peak Demand Forecast of Amritsar (in MW).

The category-wise energy consumption forecast of Amritsar are as follows:

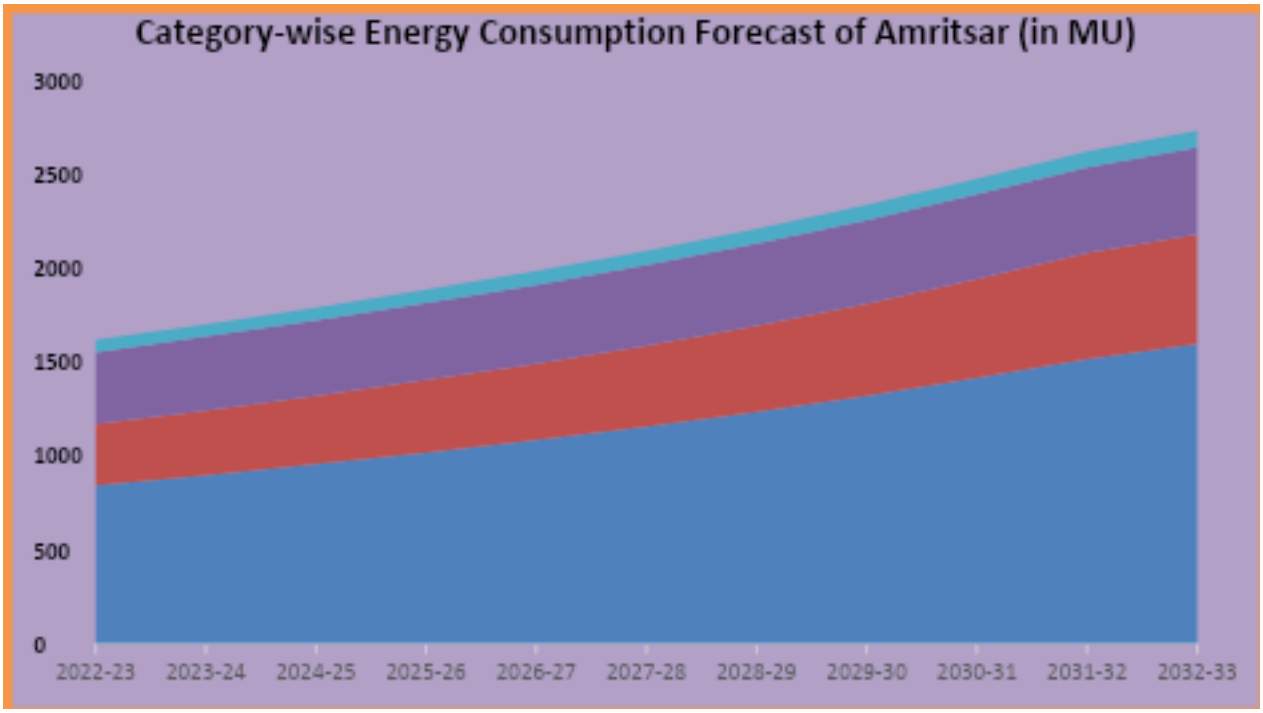

Figure 9-5 Category-wise Energy Consumption Forecast of Amritsar (in MU).

The category-wise CGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	**Domestic**	843	1155	1595	6.51	6.67	6.59
2	**Commercial**	327	432	585	5.77	6.25	6.01
3	**Irrigation**	0	0	0	0	0	0
4	**Industrial**	383	428	462	2.24	1.56	1.90
5	**Others**	64	76	88	3.41	2.98	3.20
6	**Total**	1617	2092	2731	5.29	5.48	5.38

Table 9-2 Expected CAGR of Amritsar - Category-wise Consumption

8.5 Transmission & Distribution Losses:

T&D losses of Amritsar were 15.85% in the year 2022-23. The target level is to bring it down to about 12.42% and 8.87% by the end of 2027-28 & 2032-33 respectively.

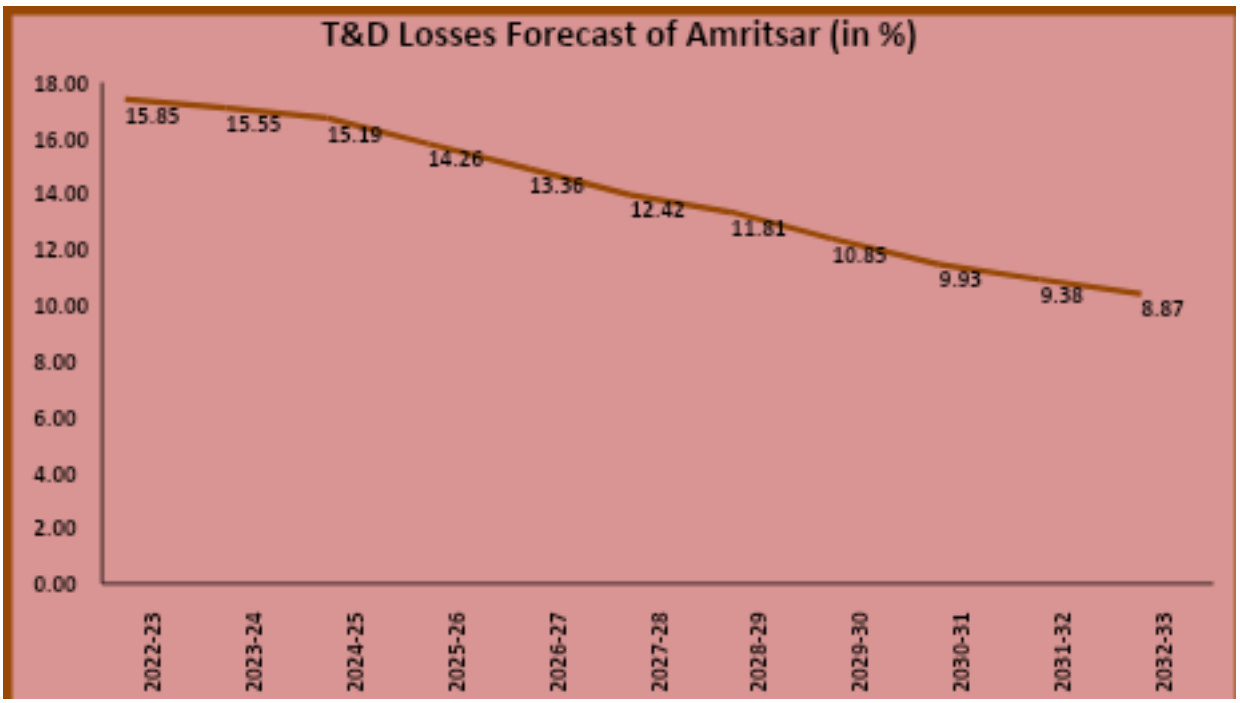

Figure 9-6 T&D Losses Forecast of Amritsar (in %).

8.6 Summary of Power forecast of Amritsar city:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	Energy Requirement (in MU)	1921	2388	2997	4.45	4.65
2	Peak Demand (in MW)	394	492	622	4.54	4.78
3	T&D Losses (in %)	15.85	12.42	8.87		

Table 9-3 Power forecast summary of Amritsar

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Table 9-4

Amritsar											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2(**
Domestic	843	898	956	1018	1084	1155	1233	1319	1416	1517	
Commercial	327	345	365	385	408	432	459	490	526	562	
Public lighting	11	11	11	11	11	11	11	12	12	12	
Public Water Works	10	10	11	11	11	11	11	12	12	12	
Irrigation	0	0	0	0	0	0	0	0	0	0	
LT Industries	198	204	210	215	221	226	231	236	242	246	
HT Industries	185	188	192	195	199	202	205	208	209	211	
Railway Traction	0	0	0	0	0	0	0	0	0	0	
Bulk Supply	44	45	47	49	51	53	56	58	60	62	
Others (if Any)	0	0	0	0	0	0	0	0	0	0	
Total (Energy Consumption)	**1617**	**1701**	**1791**	**1885**	**1985**	**2092**	**2207**	**2335**	**2476**	**2622**	
T&D losses -MU	**304**	**313**	**321**	**314**	**306**	**297**	**296**	**284**	**273**	**272**	
T&D losses -in %	**15.85**	**15.55**	**15.19**	**14.26**	**13.36**	**12.42**	**11.81**	**10.85**	**9.93**	**9.38**	
Energy Requirement – MU	**1921**	**2014**	**2111**	**2198**	**2291**	**2388**	**2503**	**2619**	**2748**	**2894**	
Annual Load Factor - %	**55.60**	**55.54**	**55.50**	**55.47**	**55.41**	**55.36**	**55.32**	**55.22**	**55.16**	**55.10**	
Peak Load - MW	394	414	434	452	472	492	516	541	569	600	

Category-wise and Year-wise Summary of Amritsar

Aurangabad

Chapter 9: Aurangabad

9.1 Introduction

Aurangabad, colloquially known as Chhatrapati Sambhaji Nagar, is a major city in Maharashtra, India, and the largest in the Marathwada region. Nestled on hilly terrain in the Deccan Traps, it ranks fifth in population among Maharashtra's urban areas. Aurangabad is a key tourist hub with UNESCO World Heritage Sites such as the Ajanta and Ellora caves.

Economy:

Maharashtra Industrial Development Corporation (MIDC) established industrial estates, including Waluj and Chikalthana. The Shendra-Bidkin Industrial Park is under development, with major firms like Siemens, Bajaj Auto, and NLMK operating in the region.

Climate:

Aurangabad features a semi-arid climate with annual mean temperatures range from 17 to 33 °C. In the cold season, the may drop down to about 2 to 4 °C. Most of the rainfall occurs in the monsoon season from June to September. Average annual rainfall is 710 mm.

9.2 Brief description of Power Utilities:

Maharashtra State Electricity Distribution Company limited, a wholly owned corporate entity under the Maharashtra Government, was incorporated under the Companies Act, in June, 2005 after restructuring the erstwhile Maharashtra State Electricity Board. It is responsible for distribution of electricity in Auranagbad.

9.3 Existing Power Scenario:

The total electricity consumption of Aurangabad in the year 2022-23 was 2042 MU and with 21.04% T&D losses, the requirement was 2586 MU. The peak demand of the city was 356 MW. The Industrial sector was the biggest consumer of electricity (69%) followed by Domestic (21%) & commercial (5%).

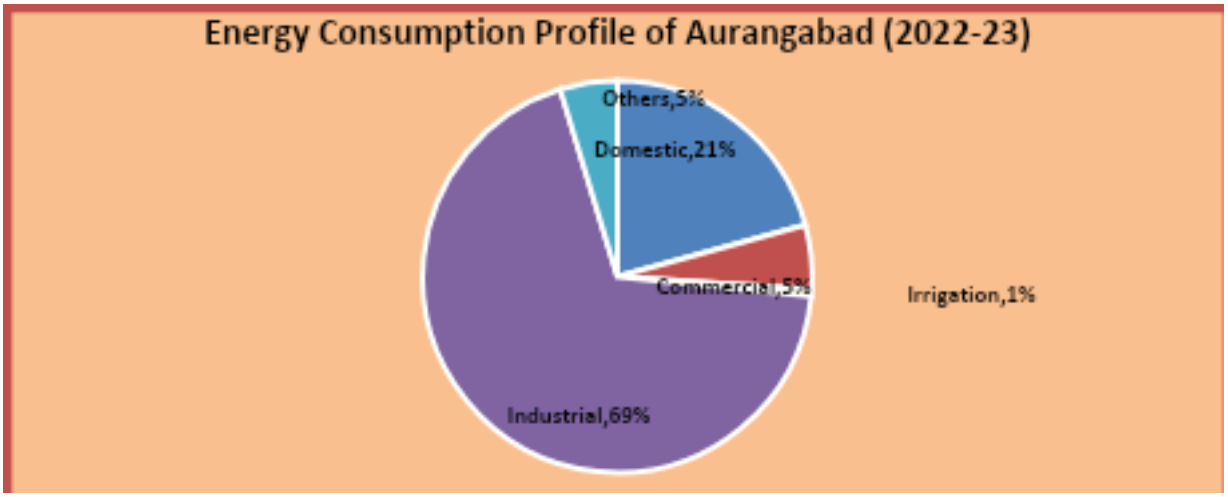

Figure 10-1 Energy Consumption Profile of Aurangabad (2022-23)

In a comparison of Aurangabad City with Maharashtra for the year 2022-23, it is observed that the energy requirement of Aurangabad was 1.42% of the total energy requirement of the state.

2022-23	Aurangabad City	Maharashtra	% Share of Aurangabad City
Energy in MU	2586	183777	1.41
Peak Demand in MW	356	30203	1.18

Table 10-1 Comparison of Aurangabad with Maharashtra in 2022-23.

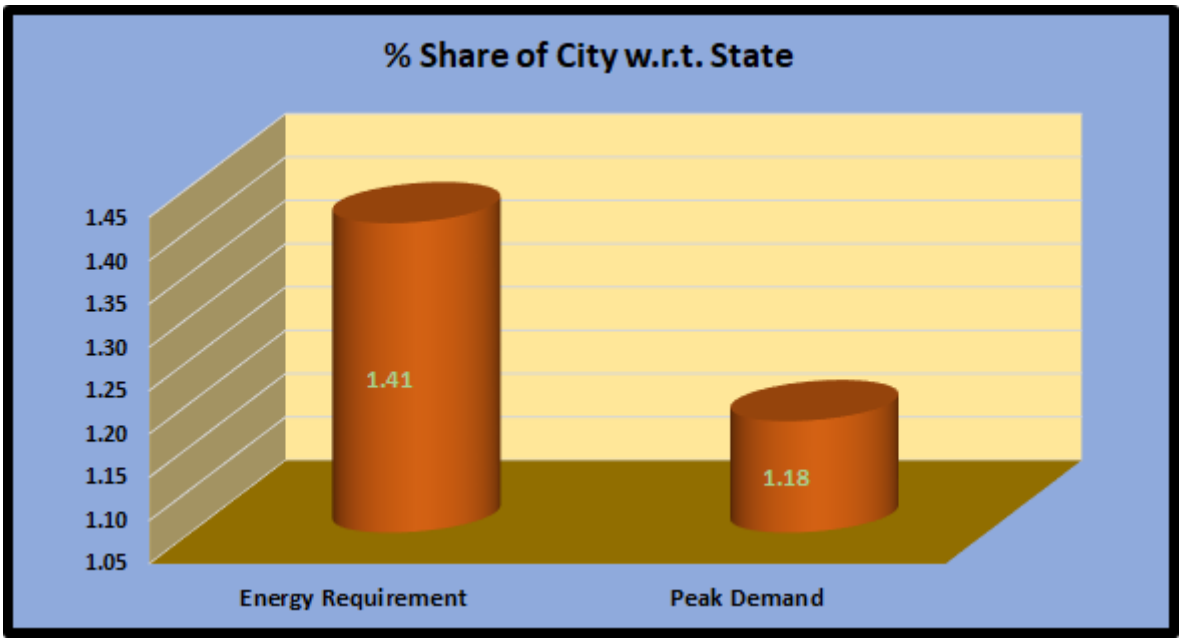

Figure 10-2 Comparison of Aurangabad City and Maharashtra in the year 2022-23.

9.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Aurangabad was 2586 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 2952 MU by the year 2027-28 with a 2.68% CAGR for the period 2022-23 to 2027-28. With a CAGR of 3.10% for the period 2027-28 to 2032-33, its energy requirement is estimated as 3439 MU by the year 2032-33.

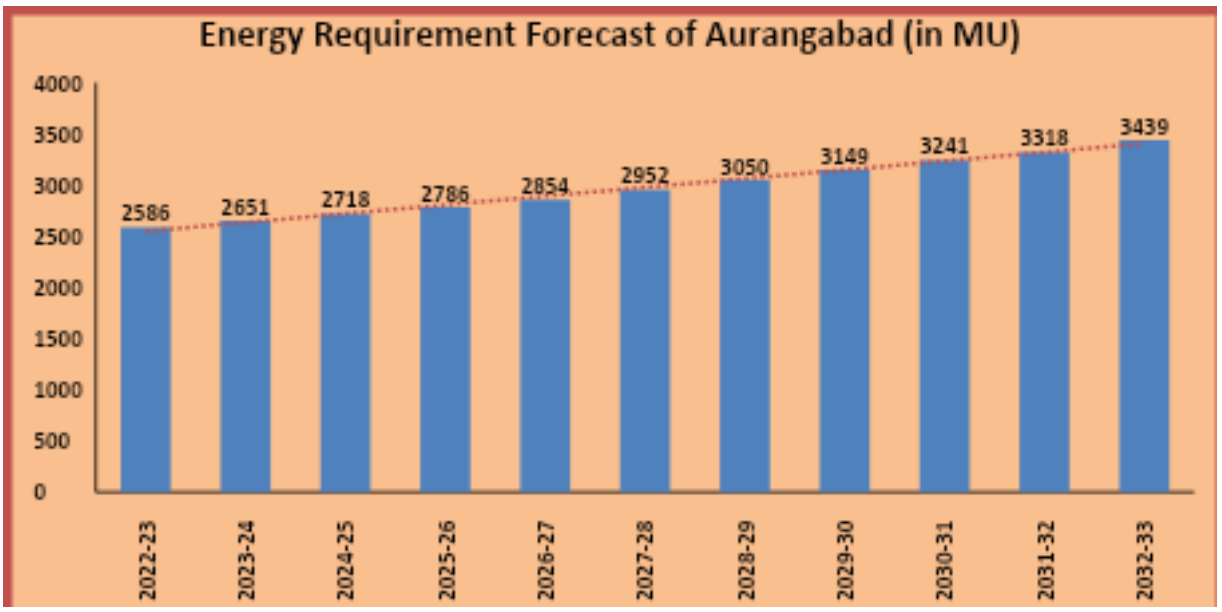

Figure 10-3 Energy Requirement Forecast of Aurangabad (in MU).

Peak Demand of the Aurangabad is expected to see 5.00% CAGR upto 2027-28 and will reach 454 MW in comparison to 356 MW in the year 2022-23. It is expected to reach 560 MW in the year 2032-33 with a CAGR of 4.27% after 2027-28.

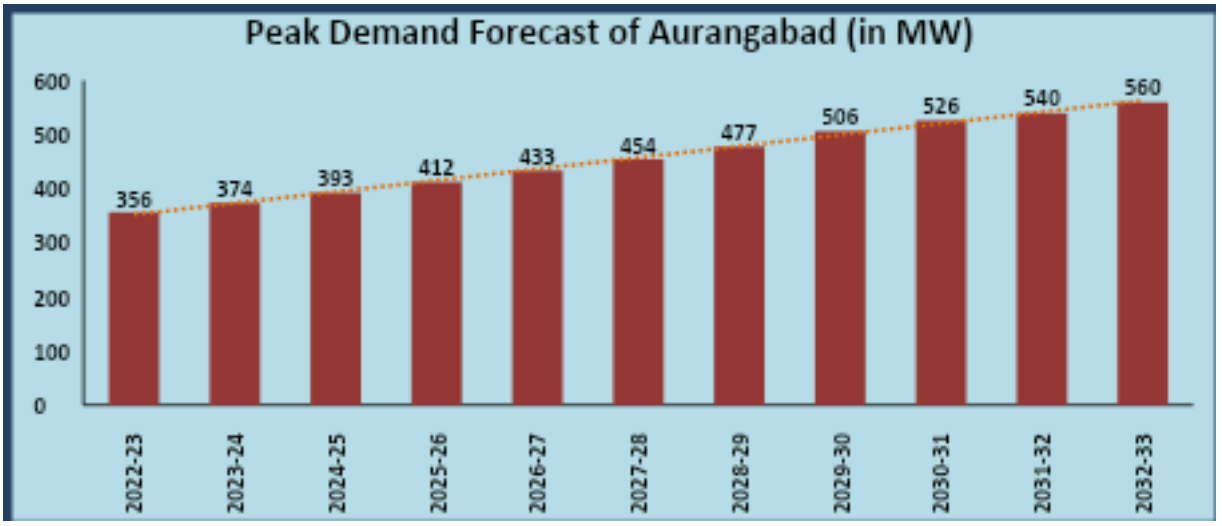

Figure 10-4 Peak Demand Forecast of Aurangabad (in MW).

The category-wise energy consumption forecast of Aurangabad are as follows:

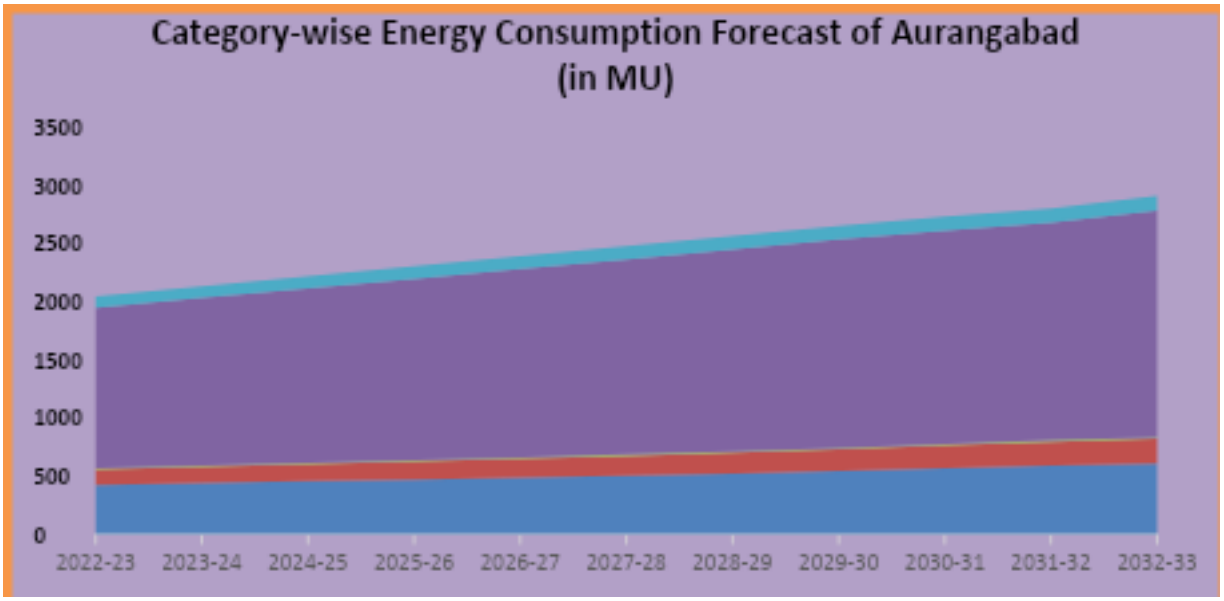

Figure 10-5 Category-wise Energy Consumption Forecast of Aurangabad (in MU)

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	Domestic	421	503	603	3.64	3.69	3.67
2	Commercial	135	167	213	4.34	4.94	4.64
3	Irrigation	12	13	14	2.20	1.58	1.89
4	Industrial	1377	1676	1948	4.01	3.05	3.53
5	Others	97	112	127	2.95	2.53	2.74
6	**Total**	**2042**	**2472**	**2905**	**3.89**	**3.28**	**3.59**

Table 10-2 Expected CAGR of Aurangabad Category-wise Consumption

9.5 Transmission & Distribution Losses:

T&D losses of Chennai were estimated as 21.04% in year 2022-23. The target level is to bring it down to about 16.28% and 15.53% by the end of 2027-28 & 2032-33 respectively.

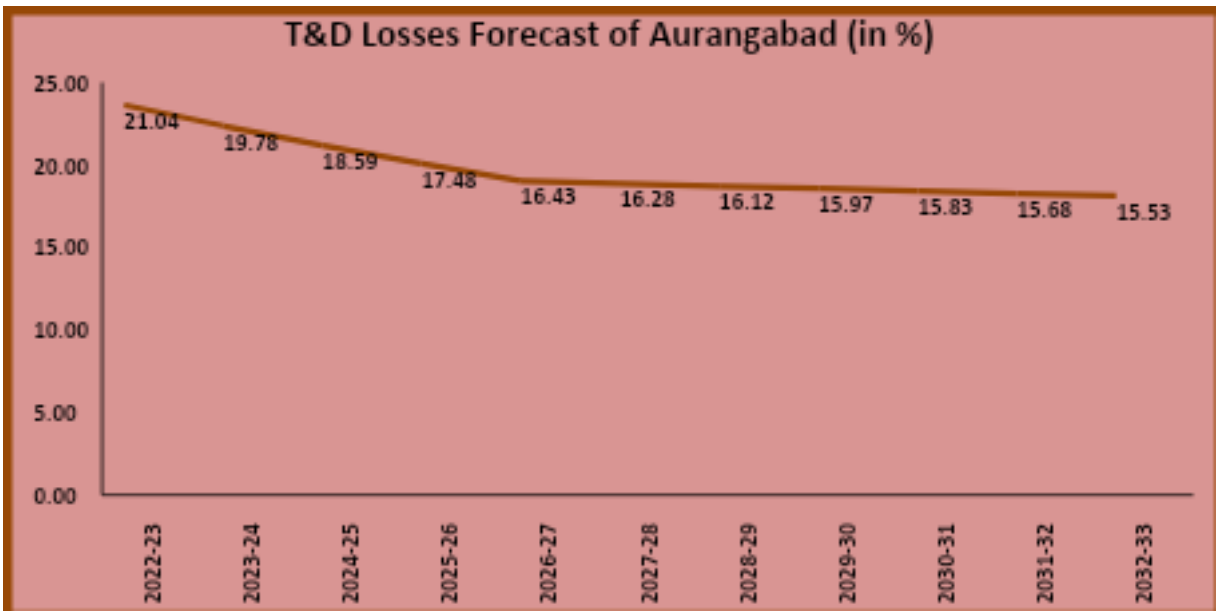

Figure 10-6 T&D Losses Forecast of Aurangabad (in %).

9.6 Summary of Power forecast of Aurangabad city:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	2586	2952	3439	2.68	3.10
2	**Peak Demand (in MW)**	356	454	560	5.00	4.27
3	**T&D Losses (in %)**	21.04	16.28	15.53		

Table 10-3 Power forecast summary of Aurangabad

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Aurangabad											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	421	437	453	469	486	503	521	542	565	586	603
Commercial	135	141	147	154	160	167	175	184	195	205	213
Public lighting	14	14	14	15	15	15	15	16	16	16	16
Public Water Works	19	19	20	20	21	21	21	22	22	23	23
Irrigation	12	12	12	12	13	13	13	13	14	14	14
LT Industries	174	185	196	207	219	231	243	255	267	279	297
HT Industries	1203	1252	1302	1351	1399	1446	1490	1534	1567	1590	1651
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	47	49	51	53	55	58	60	62	65	67	69
Others (if Any)	17	17	17	18	18	18	18	18	18	19	19
Total (Energy Consumption)	**2042**	**2127**	**2213**	**2299**	**2385**	**2472**	**2558**	**2646**	**2728**	**2798**	**2905**
T&D losses -MU	544	524	505	487	469	480	492	503	513	520	534
T&D losses -in %	21.04	19.78	18.59	17.48	16.43	16.28	16.12	15.97	15.83	15.68	15.53
Energy Requirement - MU	**2586**	**2651**	**2718**	**2786**	**2854**	**2952**	**3050**	**3149**	**3241**	**3318**	**3439**
Annual Load Factor - %	82.92	80.96	79.04	77.16	75.29	74.17	72.97	71.00	70.34	70.14	70.11

Peak Load - MW	**356**	**374**	**393**	**412**	**433**	**454**	**477**	**506**	**526**	**540**	**560**

Table 10-4 Category-wise and Year-wise Summary of Aurangabad.

Bengaluru

Chapter 10: Bengaluru

10.1 Introduction

Bangalore is one of the fastest-growing cities and third most populous city of India. The Bengaluru city is the centre of Indian High-tech Industry. It is home to many top-tier engineering and research institutions. Bangalore is known as the "Silicon Valley of India" because it is the nation's leading software exporter as well as a major semiconductor hub.

Economy:

Bangalore is one of the fastest-growing metropolises in India. This city contributes 38% of India's total IT exports. Its economy is primarily service oriented and industrial, dominated by information technology, telecommunication, biotechnology, and manufacturing of electronics, machinery, automobiles, food, etc.

Climate:

The coolest month is January with an average low temperature of 15.1 °C and the hottest month is April with an average high of 34.1 °C. Bangalore receives rainfall from both the northeast and the southwest monsoons, and the wettest months is September, followed by October and August.

10.2 Brief description of Power Utilities:

Until 2002, the Karnataka Electricity Board (KEB) handled electricity transmission and distribution across the state. It was then broken up, with Karnataka Power Transmission Corporation Ltd (KPTCL) established to manage the transmission business. KPTCL buys power from power generating companies like Karnataka Power Corporation Limited (KPCL) and other IPPs (Independent Power Producers) and sell them to their respective DISCOMS.

- Mangalore Electricity Supply Company (MESCOM)
- Bangalore Electricity Supply Company (BESCOM)
- Hubli Electricity Supply Company (HESCOM)
- Gulbarga Electricity Supply Company (GESCOM)
- Chamundeshwari Electricity Supply Company (CESCOM)
- Bangalore Electricity Supply Company (BESCOM) has the responsibility of power distribution in Bengaluru City.

10.3 Existing Power Scenario:

The total electricity consumption of Bengaluru in the year 2022-23 was 15177 MU and with 8.27% T&D losses, the requirement was 16545 MU. The peak demand of the city was 3118 MW. The Domestic sector was the biggest consumer of electricity (45%) followed by & Commercial (23%) & Industrial (18%).

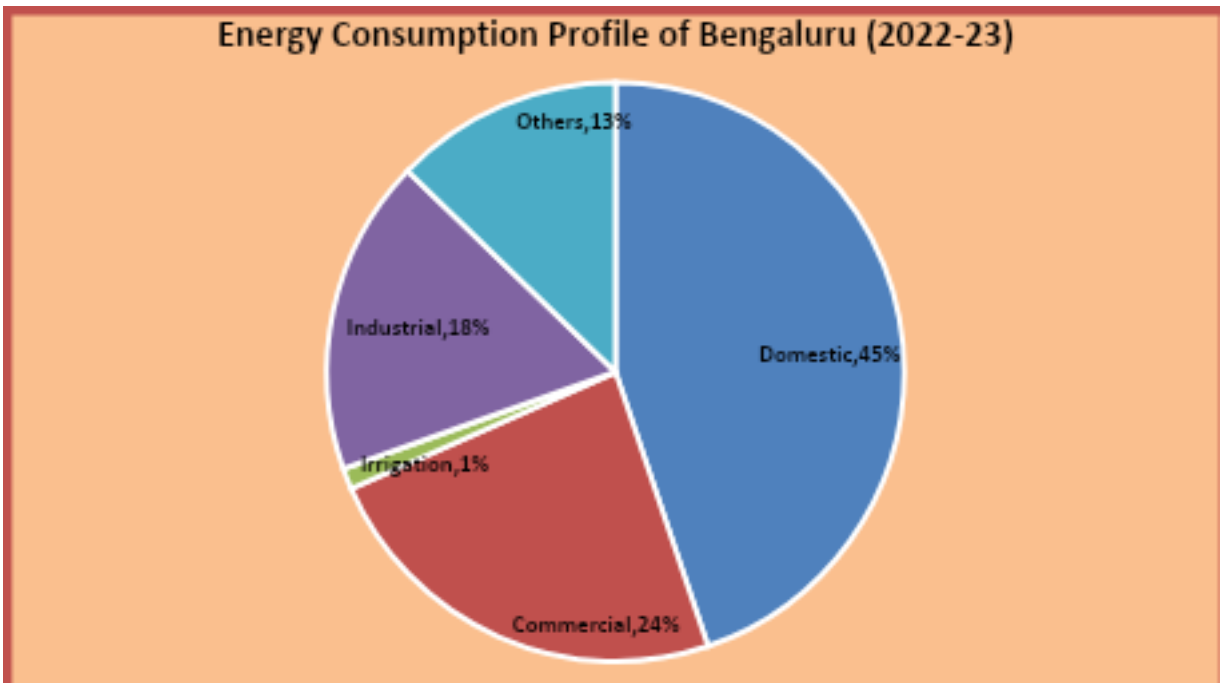

Figure 11-1 Energy Consumption Profile of Bengaluru (2022-23).

In a comparison of Bengaluru City with Karnataka for the year 2022-23, it is observed that the energy requirement of Bengaluru was 22.00% of the total energy requirement of the state.

2022-23	Bengaluru City	Karnataka	% Share of Bengaluru City
Energy in MU	16545	75202	22.00
Peak Demand in MW	3118	15075	20.68

Table 11-1 Comparison of Bengaluru City with Karnataka in 2022-23.

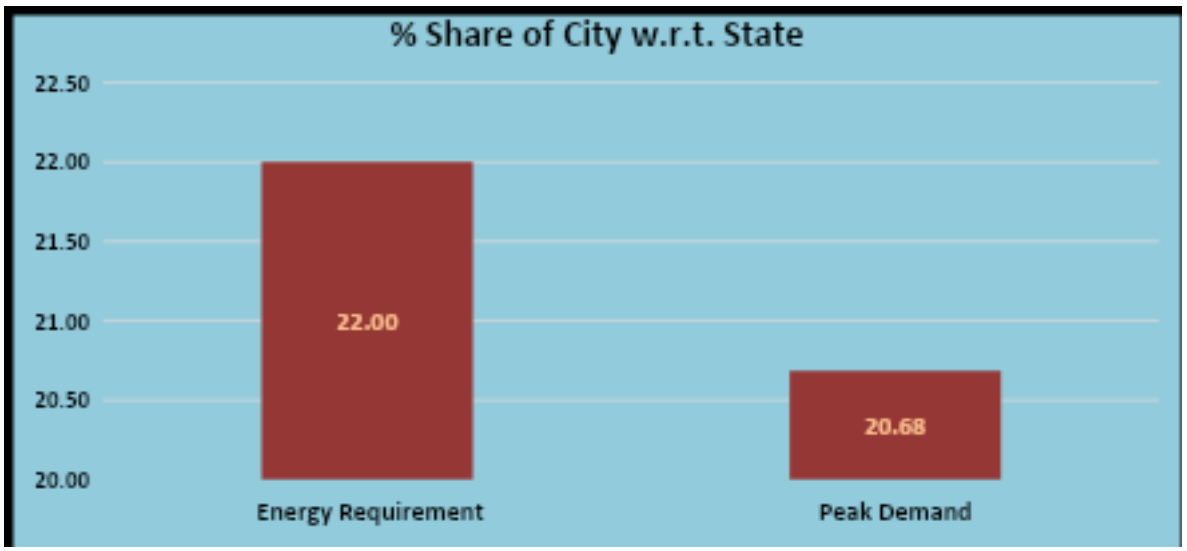

Figure 11-2 Comparison of Bengaluru City and Karnataka in the year 2022-23.

10.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of

Bengaluru was 16545 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 19800 MU by the year 2027-28 with a 3.66% CAGR for the period 2022-23 to 2027-28. With a CAGR of 3.80% for the period 2027-28 to 2032-33, its energy requirement is estimated as 23858 MU by the year 2032-33.

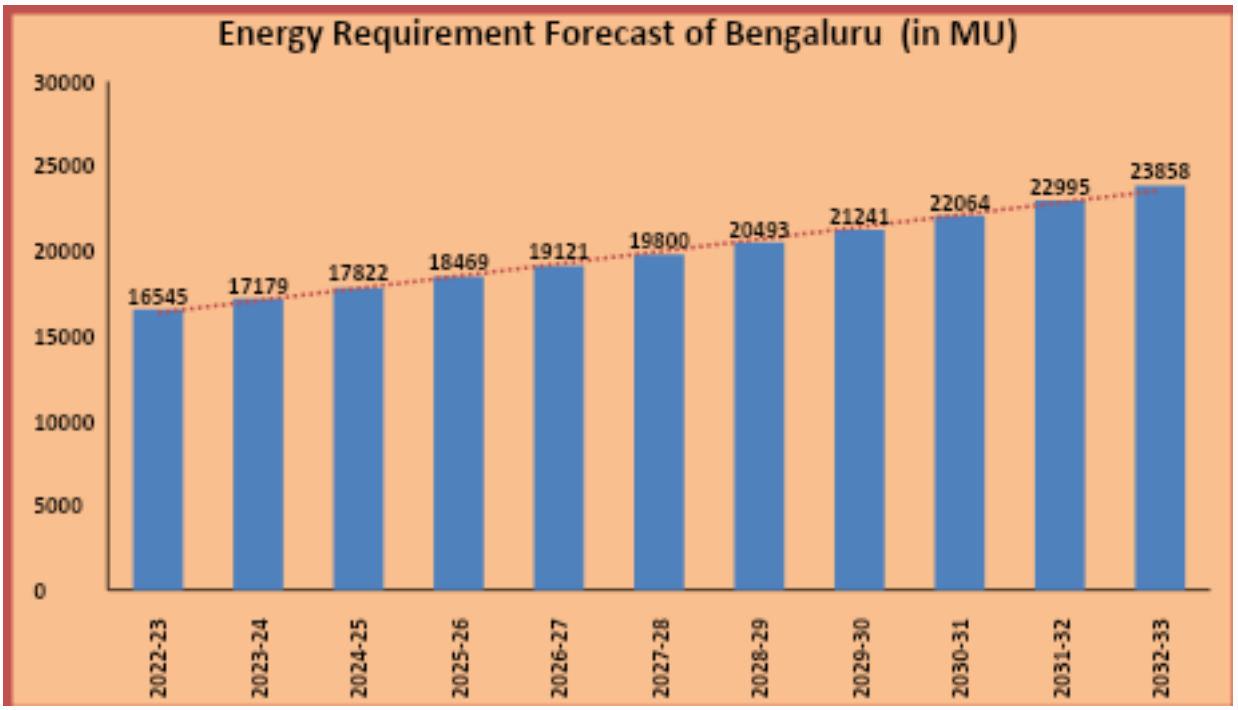

Figure 11-3 Energy Requirement Forecast of Bengaluru (in MU).

Peak Demand of the Bengaluru is expected to see 5.13% CAGR upto 2027-28 and will reach 4004 MW in comparison to 3118 MW in the year 2022-23. It is expected to reach 5176 MW in the year 2032-33 with a CAGR of 5.27% after 2027- 28.

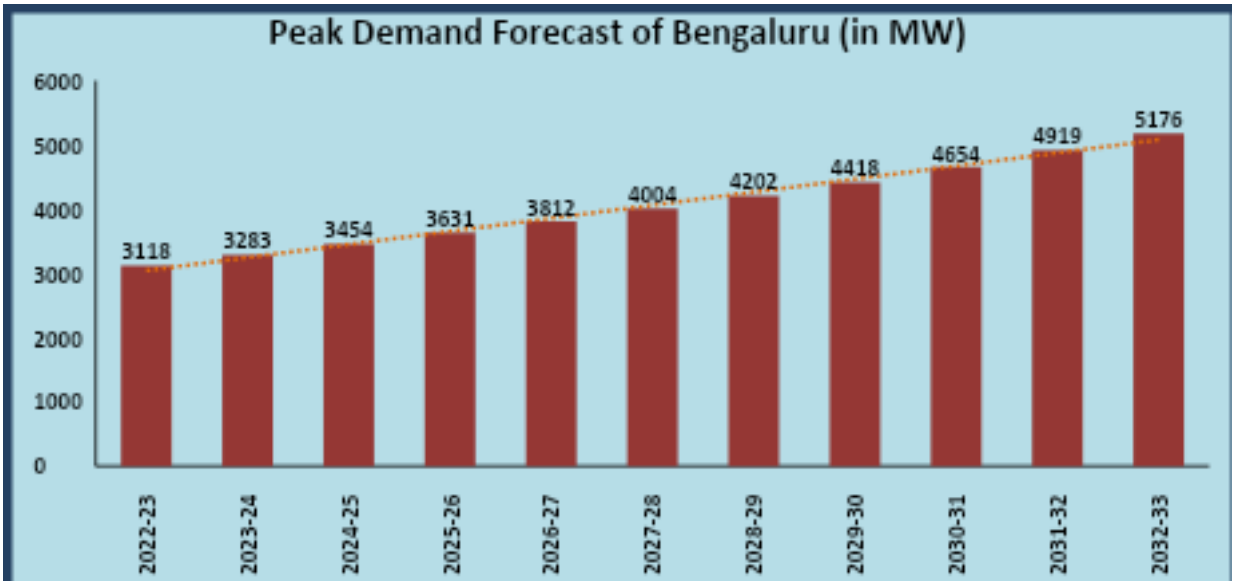

Figure 11-4 Peak Demand Forecast of Bengaluru (in MW).

The category-wise energy consumption forecast of Bengaluru are as follows:

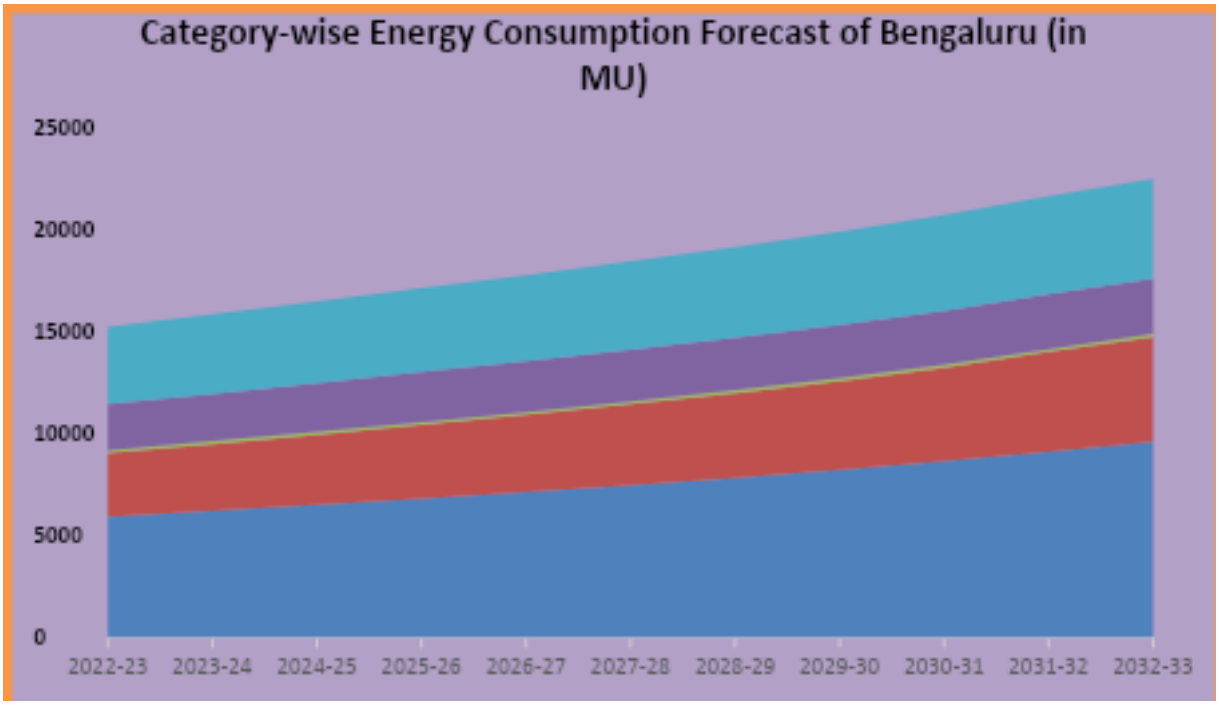

Figure 11-5 Category-wise Energy Consumption Forecast of Bengaluru (in MU).

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	Domestic	5901	7451	9557	4.78	5.10	4.94
2	Commercial	3112	3943	5134	4.85	5.42	5.13
3	Irrigation	147	152	157	0.65	0.65	0.65
4	Industrial	2244	2519	2692	2.33	1.34	1.83
5	Others	3772	4326	4895	2.78	2.50	2.64
6	Total	15177	18390	22277	3.92	3.91	3.91

Table 11-2 Expected CAGR of Bengaluru - Category-wise Consumption

10.5 Transmission & Distribution Losses:

T&D losses of Bengaluru were 8.27% in year 2022-23. The target level is to bring it down to about 7.12% and 5.97% by the end of 2027-28 & 2032-33 respectively.

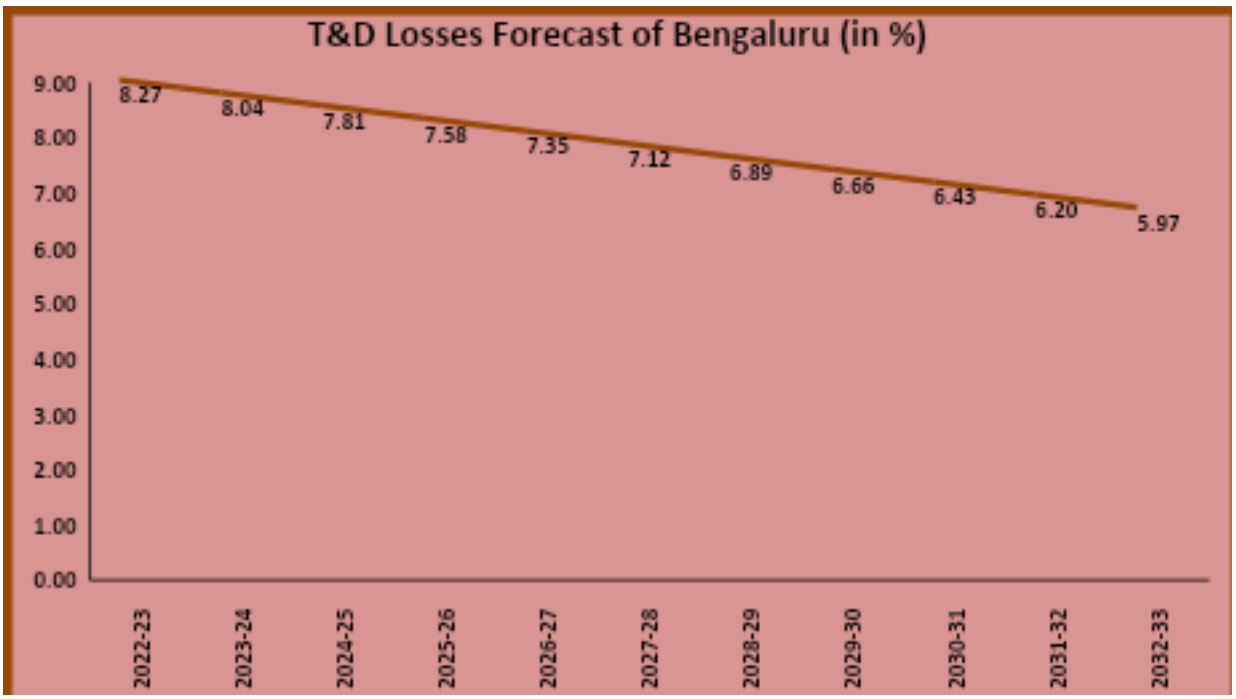

Figure 11-6 T&D Losses Forecast of Bengaluru (in %).

10.6 Summary of Power forecast of Bengaluru city:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	16545	19800	23858	3.66	3.80
2	**Peak Demand (in MW)**	3118	4004	5176	5.13	5.27
3	**T&D Losses (in %)**	8.27	7.12	5.97		

Table 11-3 Power forecast summary of Bengaluru.

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Bengaluru											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	5901	6191	6490	6798	7118	7451	7804	8185	8607	9096	9557
Commercial	3112	3265	3424	3589	3761	3943	4137	4349	4587	4861	5134
Public lighting	349	354	359	363	367	371	374	377	380	382	384
Public Water Works	643	681	721	762	804	849	895	942	991	1041	1094
Irrigation	147	148	149	150	151	152	153	154	155	156	157
LT Industries	735	761	785	802	810	827	834	852	881	911	912
HT Industries	1510	1550	1591	1628	1662	1691	1714	1735	1750	1765	1780
Railway Traction	180	196	213	232	251	272	295	319	344	372	401
Bulk Supply	277	285	293	301	309	317	324	332	339	346	353
Others (if Any)	2322	2364	2405	2444	2482	2517	2551	2582	2611	2638	2663
Total (Energy Consumption)	**15177**	**15798**	**16430**	**17069**	**17715**	**18390**	**19081**	**19826**	**20645**	**21569**	**22433**
T&D losses -MU	1368	1381	1392	1400	1406	1410	1412	1415	1419	1426	1425
T&D losses -in %	8.27	8.04	7.81	7.58	7.35	7.12	6.89	6.66	6.43	6.20	5.97
Energy Requirement - MU	**16545**	**17179**	**17822**	**18469**	**19121**	**19800**	**20493**	**21241**	**22064**	**22995**	**23858**
Annual Load Factor - %	60.58	59.73	58.90	58.07	57.26	56.46	55.67	54.89	54.12	53.36	52.61
Peak Load - MW	**3118**	**3283**	**3454**	**3631**	**3812**	**4004**	**4202**	**4418**	**4654**	**4919**	**5176**

Table 11-4 Category-wise and Year-wise Summary of Bengaluru.

Bhopal

Chapter 11: **Bhopal**

11.1 Introduction:

Bhopal is a city and capital of Madhya Pradesh. It is also one of the greenest and 16th largest city in India. Bhopal has various educational & research institutions and ISRO's Master Control Facility, BHEL and AMPRI, NCSM.

Economy:

Bhopal's economy is primarily industrial and includes the manufacturing of pharmaceuticals, automobiles, textiles, jewelry, and electronics. Other industries include cotton and flour milling, cloth weaving and painting, as well as making matches, sealing wax, and sporting equipment. The residents of this city are also engaged in large retail businesses and handicrafts, like zardozi and batua (a small string purse) are some of the products of the old Bhopal city.

Climate:

Bhopal has a humid subtropical climate with cool & dry winters, a hot summer and a humid monsoon season. Summers start in late March and go on until mid-June, the average temperature being around 30 °C. The monsoon starts in late June and ends in late September. The average temperature is around 25 °C and the humidity is quite high. Winters in Bhopal are cool with average daily temperatures around 18 °C. Average annual rainfall is about 1101 mm.

11.2 Brief description of Power Utilities:

In accordance with the Madhya Pradesh Reform Act, vertically integrated MPSEB was unbundled into five independent corporations with MPSEB as the holding company in July 2002. Services are provided by the following companies/commission under the Department of Energy as follows:

1. M.P. Paschim Kshetra Vidyut Vitaran Company Limited, Indore (responsible for power distribution in Indore & Ujjain Region).

2. M.P. Poorve Kshetra Vidyut Vitaran Company Limited, Jabalpur (responsible for power distribution, in Jabalpur, Sagar, Rewa and Shahdol Region).

3. M.P. Madhya Kshetra Vidyut Vitaran Company Limited, Bhopal (responsible for power distribution, in Bhopal and Gwalior Region).

4. M.P. Power Generating Company Limited, Jabalpur (responsible for electricity generation in the entire State of Madhya Pradesh).

5. M.P. Transmission Company Limited, Jabalpur (responsible for power transmission and load discharge in the entire State of Madhya Pradesh).

11.3 Existing Power Scenario:

The total electricity consumption of Bhopal in the year 2022-23 was 1637 MU and with 8.00% T&D losses, the requirement was 1779 MU. The peak demand of the city was 476 MW. The Domestic sector was the biggest consumer of electricity (60%) followed by Commercial (17%) & Industrial (13%).

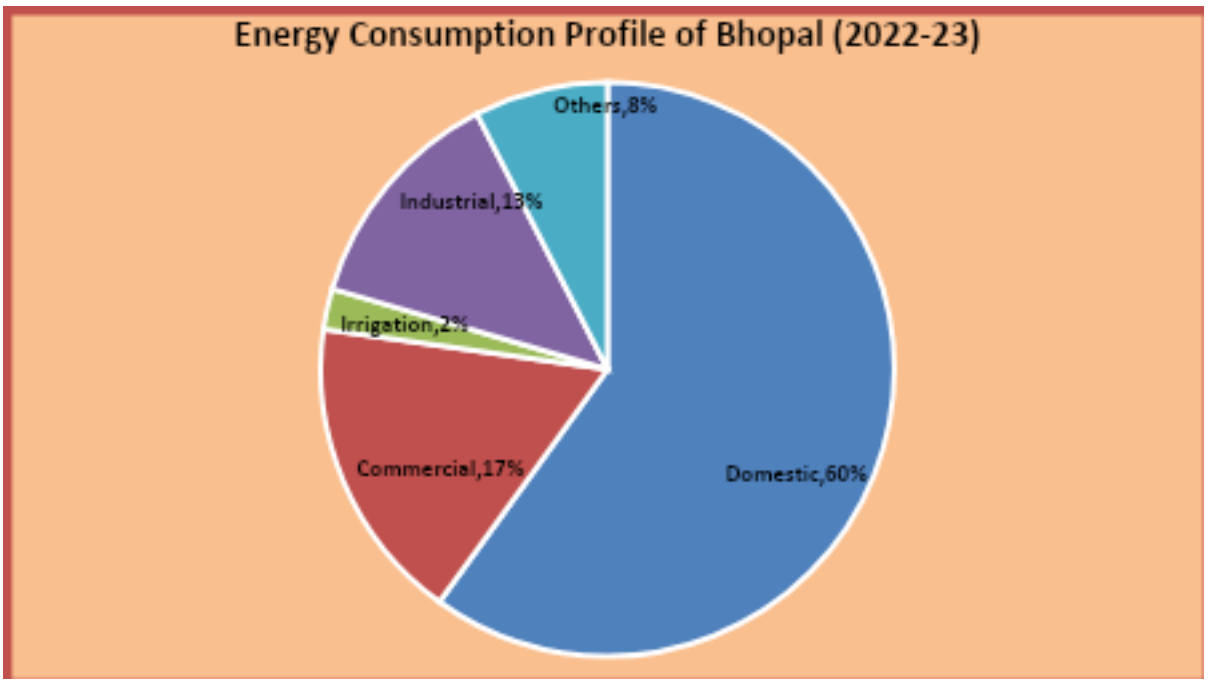

Figure 12-1 Energy Consumption Profile of Bhopal (2022-23).

Table 12-1 Comparison of Bhopal with Madhya Pradesh in 2022-23

In a comparison of Bhopal City with Madhya Pradesh for the year 2022-23, it is observed that the energy requirement of Bhopal was 1.80% of the total energy requirement of the state.

2022-23	Bhopal City	Madhya Pradesh	% Share of Bhopal City
Energy in MU	1779	98863	1.80
Peak Demand in MW	476	17009	2.80

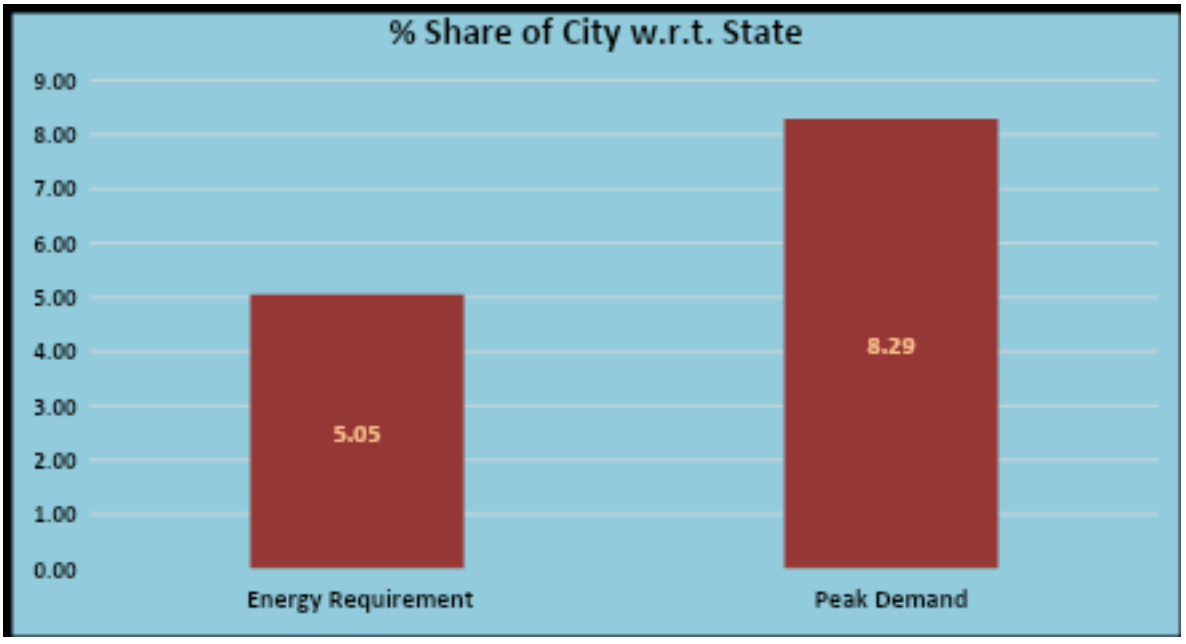

Figure 12-2 Comparison of Bhopal City and Madhya Pradesh in the year 2022-23

11.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Bhopal

was 1779 MU in the year 2022-23. It is expected that the energy requirement of the city will reach 2319 MU by the year 2027-28 with a 5.44% CAGR for the period 2022-23 to 2027-28. With a CAGR of 4.88% for the period 2027-28 to 2032-33, its energy requirement is estimated as 2943 MU by the year 2032-33.

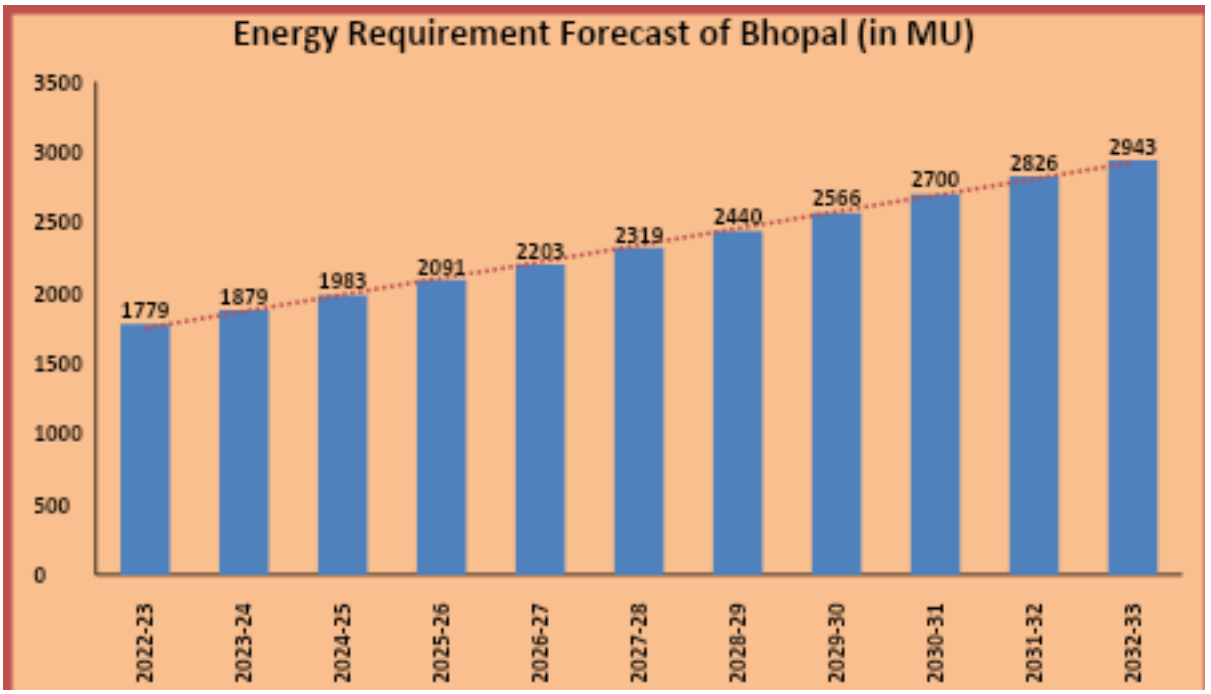

Figure 12-3 Energy Requirement Forecast of Bhopal (in MU)

Peak Demand of the Bhopal is expected to see 7.59% CAGR upto 2027-28 and will reach 686 MW in comparison to 476 MW in the year 2022-23. It is expected to reach 963 MW in the year 2032-33 with a CAGR of 7.02% after 2027-28.

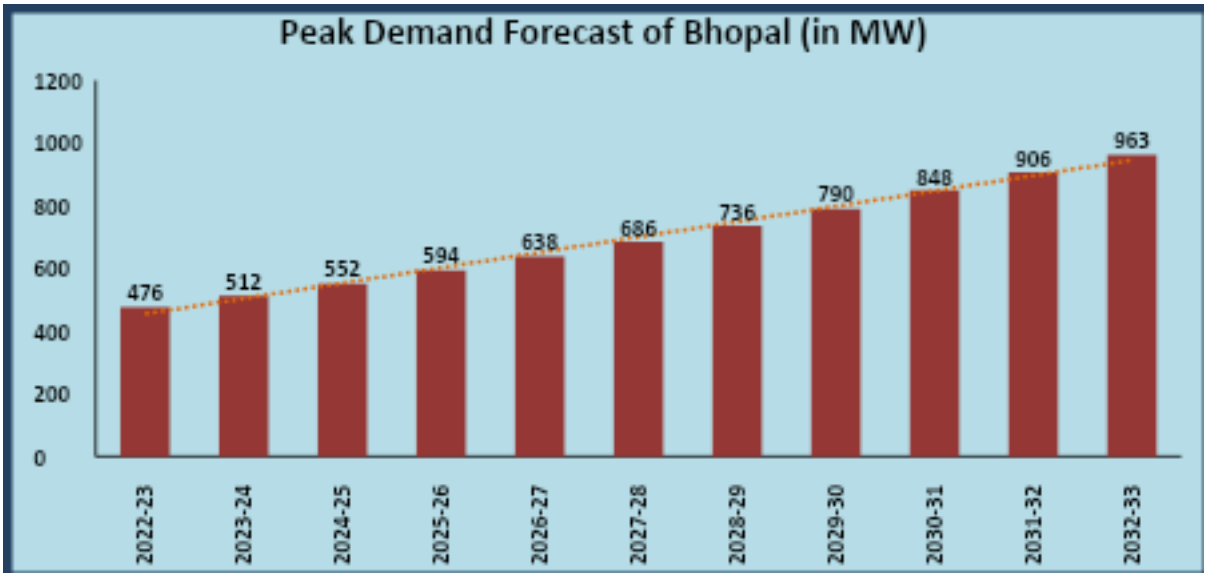

Figure 12-4 Peak Demand Forecast of Bhopal (in MW).

The category-wise energy consumption forecast of Bhopal are as follows:

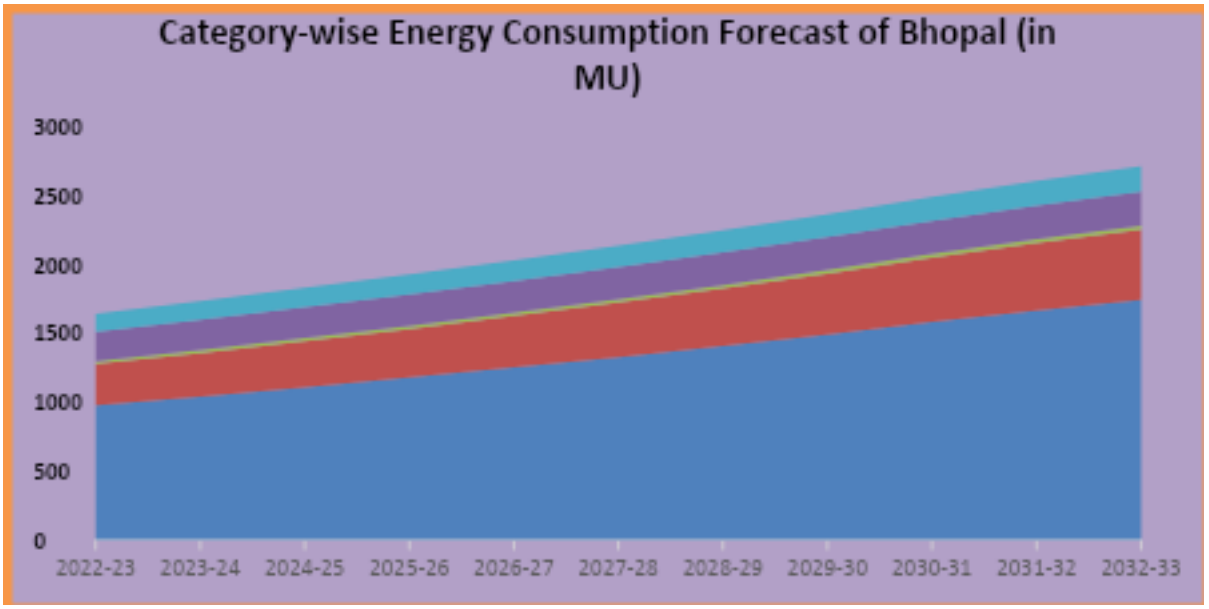

Figure 12-5 Category-wise Energy Consumption Forecast of Bhopal (in MU)

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	Domestic	974	1325	1740	6.34	5.60	5.97
2	Commercial	298	394	508	5.74	5.23	5.48
3	Irrigation	21	26	31	3.96	3.58	3.77
4	Industrial	215	234	246	1.69	1.00	1.35
5	Others	128	155	183	3.80	3.37	3.59
6	**Total**	**1637**	**2133**	**2677**	**5.44**	**4.88**	**5.16**

Table 12-2 Expected CAGR of Bhopal - Category-wise Consumption

11.5 Transmission & Distribution Losses:

T&D losses of Bhopal were 8.00% in year 2022-23. The target level is to maintain T&D losses around this level.

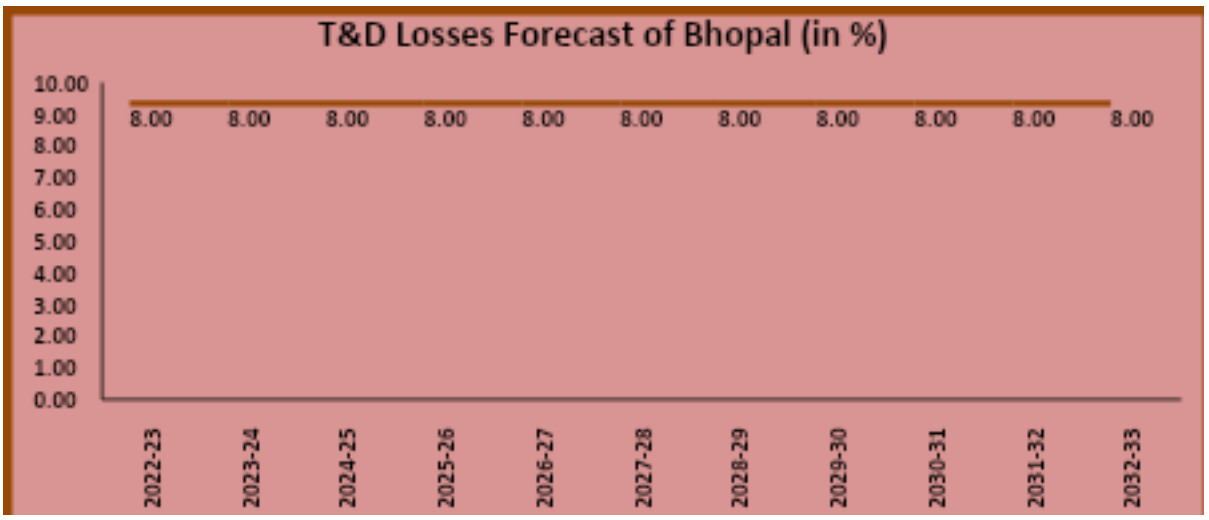

Figure 12-6 T&D Losses Forecast of Bhopal (in %)

11.6 Summary of Power forecast of Bhopal city:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in%)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	1779	2319	2943	5.44	4.88
2	**Peak Demand (in MW)**	476	686	963	7.59	7.02
3	**T&D Losses (in %)**	8.00	8.00	8.00		

Table 12-3 Power forecast summary of Bhopal city

****

Bhopal											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	974	1038	1105	1175	1248	1325	1404	1489	1578	1661	1740
Commercial	298	315	334	353	373	394	416	440	465	488	508
Public lighting	33	34	34	35	36	36	37	37	38	38	38
Public Water Works	69	72	75	78	81	85	88	91	95	98	102
Irrigation	21	22	23	24	25	26	27	28	29	30	31
LT Industries	34	35	36	37	38	39	40	41	42	43	44
HT Industries	182	185	188	190	193	195	197	198	199	200	202
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	0	0	0	0	0	0	0	0	0	0	0
Others (if Any)	26	28	29	31	32	34	35	37	39	41	42
Total (Energy Consumption)	**1637**	**1728**	**1824**	**1923**	**2026**	**2133**	**2244**	**2361**	**2484**	**2600**	**2708**
T&D losses -MU	142	150	159	167	176	186	195	205	216	226	235
T&D losses -in %	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
Energy Requirement - MU	**1779**	**1879**	**1983**	**2091**	**2203**	**2319**	**2440**	**2566**	**2700**	**2826**	**2943**
Annual Load Factor - %	42.70	41.85	41.01	40.19	39.39	38.60	37.83	37.07	36.33	35.60	34.89
Peak Load - MW	**476**	**512**	**552**	**594**	**638**	**686**	**736**	**790**	**848**	**906**	**963**

Table 12-4 Category-wise and Year-wise Summary of Bhopal.

BHUBANESHWAR

Chapter 12: **Bhubaneshwar**

12.1 Introduction:

Bhubaneshwar is the capital of Odisha. It is also known as 'The City of Temples'.

Economy:

Bhubaneshwar's economy is diverse, encompassing trade, industry, education, tourism, and government services. The city boasts a growing industrial sector with a focus on IT, manufacturing, and food processing, supported by several industrial parks and IT estates. Tourism thrives with attractions such as ancient temples and museums, enhancing the city's cultural appeal.

Climate:

Bhubaneshwar has a tropical wet-and-dry climate with distinct seasonal variations. Summers (March to June) are hot and humid, with temperatures ranging from 25°C to 40°C (77°F to 104°F). The monsoon season (June to September) brings substantial rainfall, averaging 1,500 to 2,000 mm (59 to 79 inches) annually. Winters (October to February) are mild and pleasant, with temperatures between 10°C and 25°C (50°F to 77°F), offering cooler, less humid conditions ideal for outdoor activities and tourism.

12.2 Brief description of Power Utilities

TP Central Odisha Distribution Limited (TPCODL) is responsible for distribution of electricity in Bhubaneswar. TP Central Odisha Distribution Limited (TPCODL) is a Joint Venture of Tata Power and the Government of Odisha with the majority stake being held by Tata Power Company (51%).

12.3 Existing Power Scenario

The total electricity consumption of Bhubaneswar in the year 2022-23 was 2062 MU and with 5% T&D losses, the requirement was 2174 MU. The peak demand of the city was 538 MW. The Domestic sector was the biggest consumer of electricity (51%) followed by Commercial (36%) and Industrial (6%).

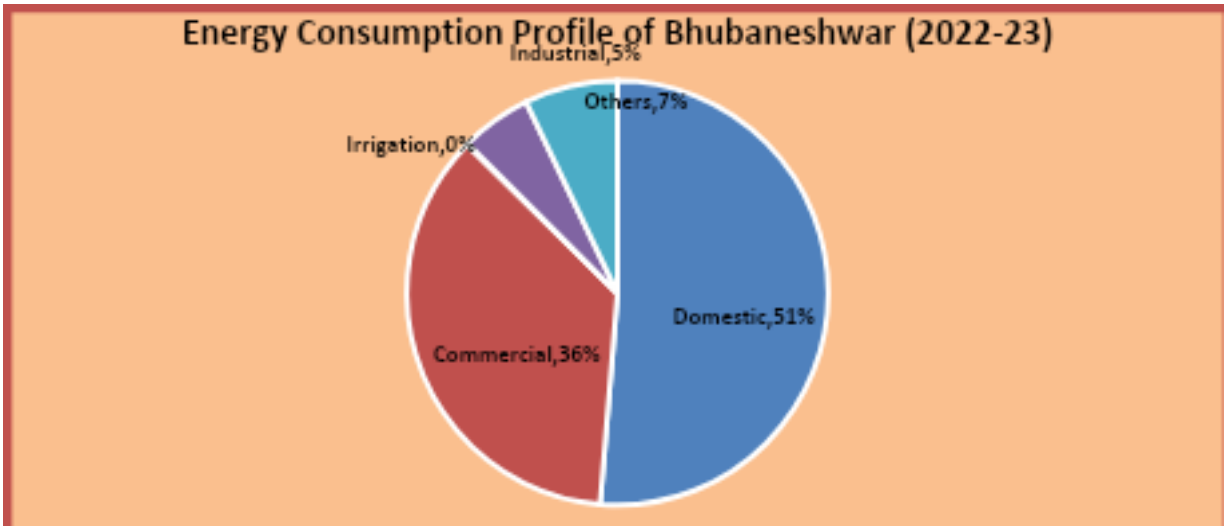

Fig 13.1: Energy Consumption Profile of Bhubaneshwar (2022-23).

In comparison of Bhubaneshwar with Odisha for the year 2022-23, it is observed that the energy requirement of Bhubaneshwar was 5.05 % of the total energy requirement of the state.

2022-23	Bhubaneshwar City	Odisha	% Share of Bhubaneshwar City
Energy in MU	2174	43060	5.05
Peak Demand in MW	538	6490	8.29

Table 13-1 Comparison of BHUBANESHWAR with Odisha in 2022-23

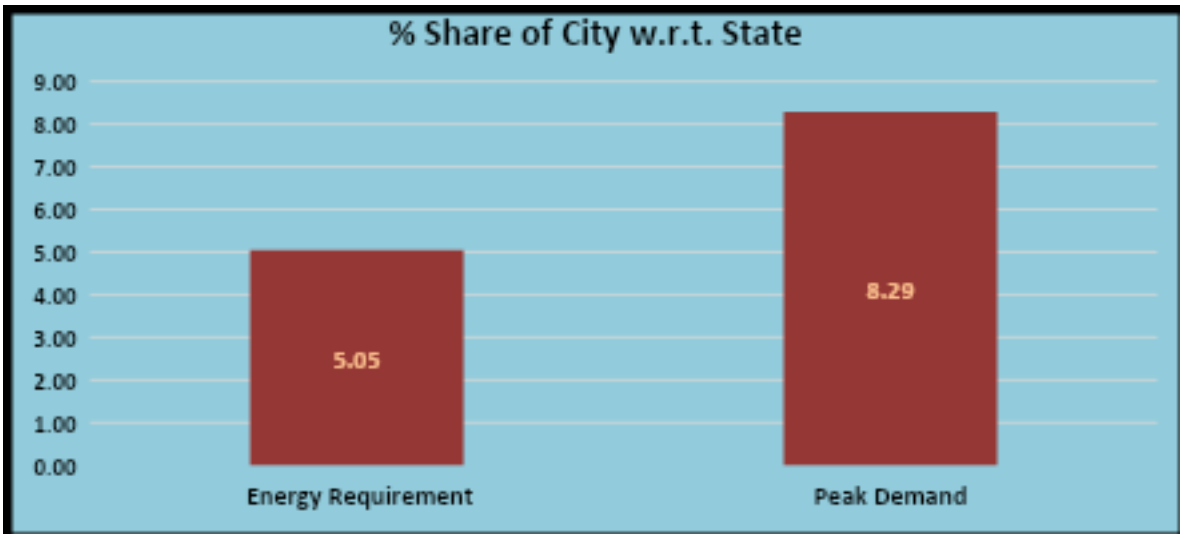

Figure 13-1 Comparison of Bhubaneshwar with Odisha in the year 2022-23.

Based on total electricity consumption and T&D Losses, the total energy requirement of Bhubaneshwar was 2174 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 3534 MU by the year 2027-28 with a 10.20 % CAGR for the period 2022-23 to 2027-28. With a CAGR of 9.70 % for the period 2027-28 to 2032-33, its energy requirement is estimated as 5614 MU by the year 2032-33.

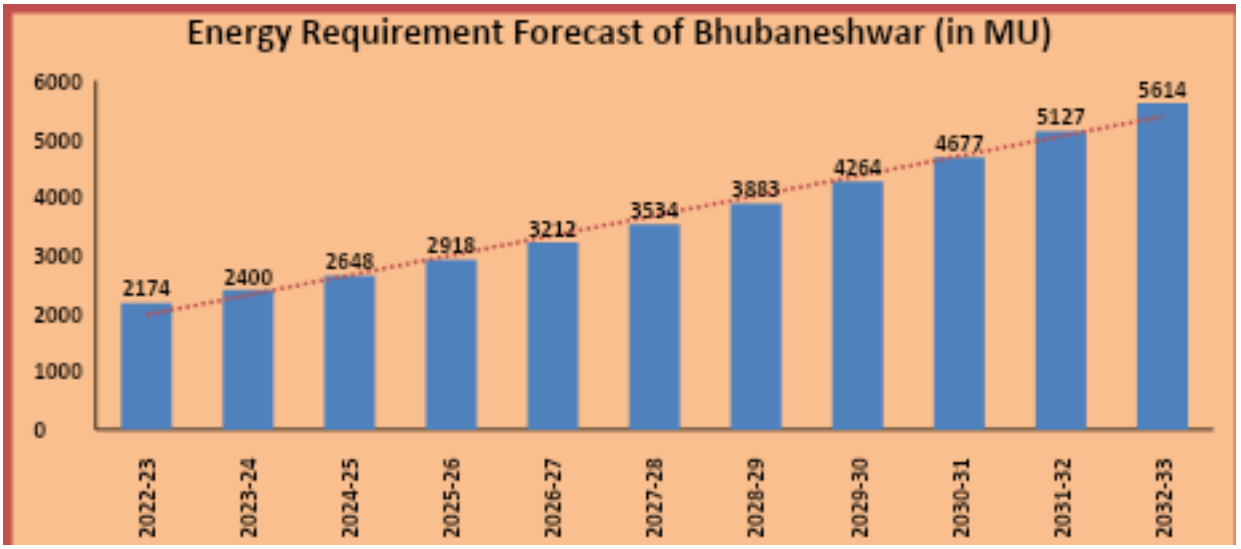

Figure 13-2 Energy Requirement Forecast of Bhubaneshwar (in MU).

Peak Demand of Bhubaneshwar is expected to see 10.31 % CAGR up to 2027-28 and will reach 878 MW in comparison to 538 MW in year 2022-23. It is expected to reach 1402 MW in year 2032-33 with a CAGR of 9.81 % after 2027- 28.

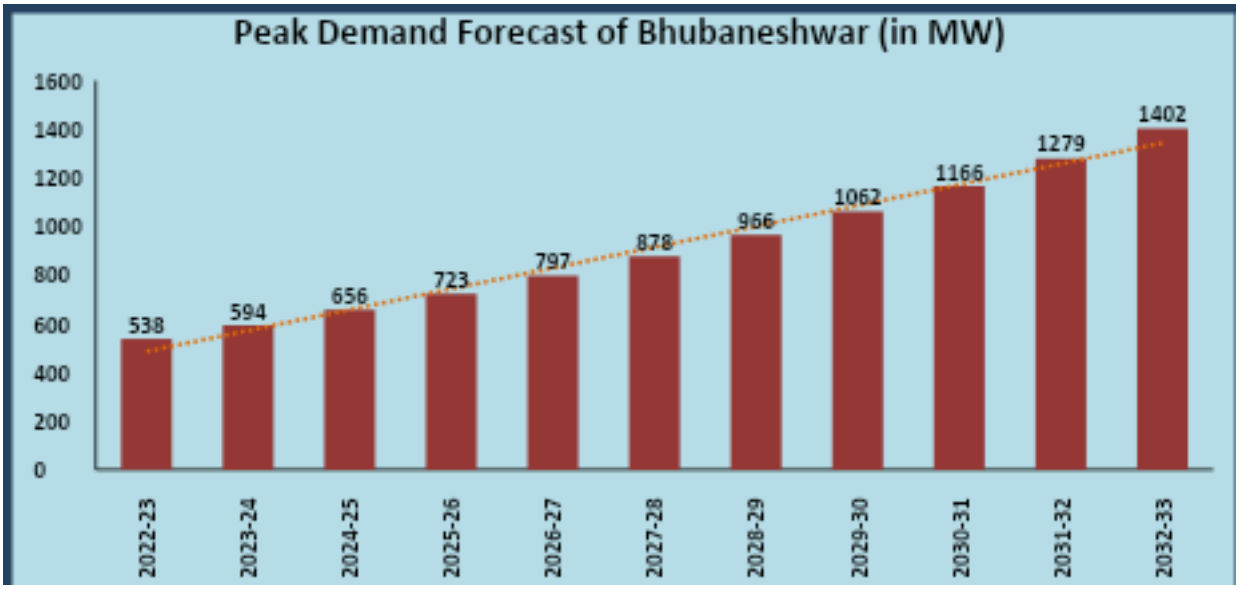

Figure 13-3 Peak Demand Forecast of Bhubaneshwar (in MW).

The category-wise energy consumption forecast of BHUBANESHWAR are as follows:

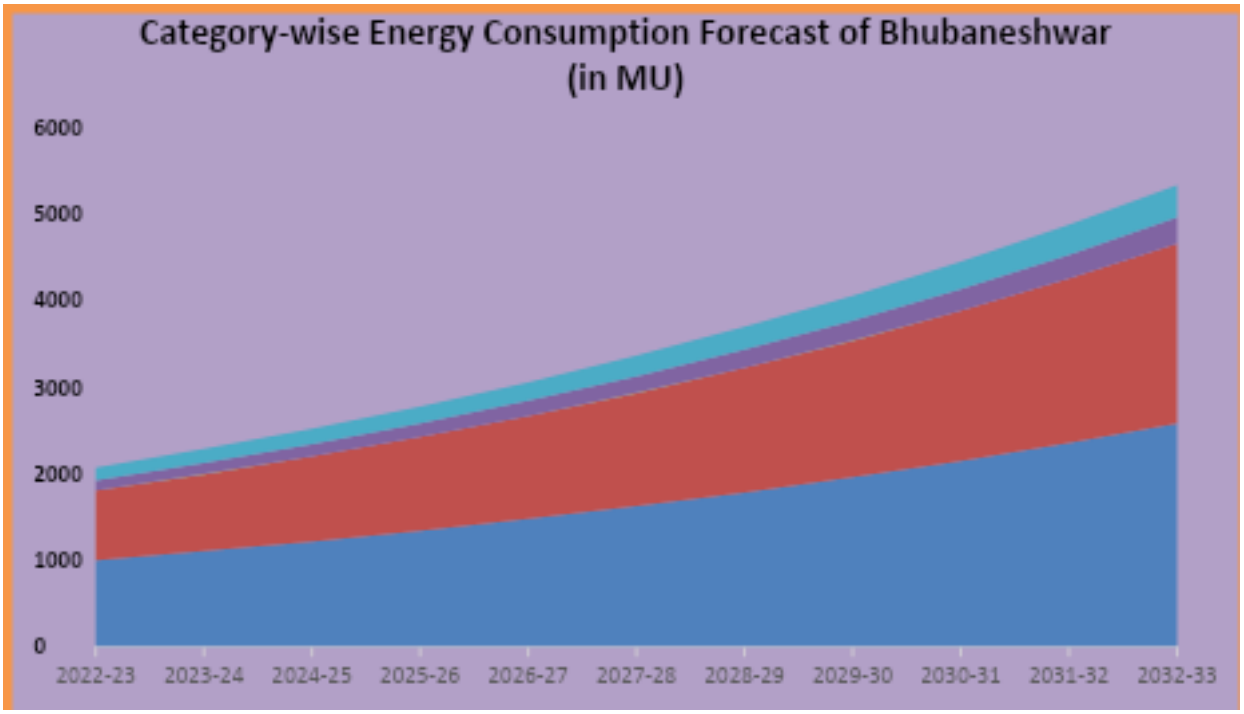

Figure 13-4 Category-wise Energy Consumption Forecast of Bhubaneshwar (in MU).

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	**Domestic**	995	1617	2569	10.20	9.70	9.95
2	**Commercial**	804	1307	2076	10.20	9.70	9.95
3	**Irrigation**	1	2	4	10.20	9.70	9.95
4	**Industrial**	116	189	300	10.20	9.70	9.95
5	**Others**	146	237	376	10.20	9.70	9.95
6	**Total**	2062	3352	5325	10.20	9.70	9.95

Table 13-2 Expected CAGR of BHUBANESHWAR - Category-wise Consumption

12.4 Transmission & Distribution Losses:

T&D losses of Bhubaneshwar were 5.14 % in 2022-23. The target is to maintain T&D losses around this level.

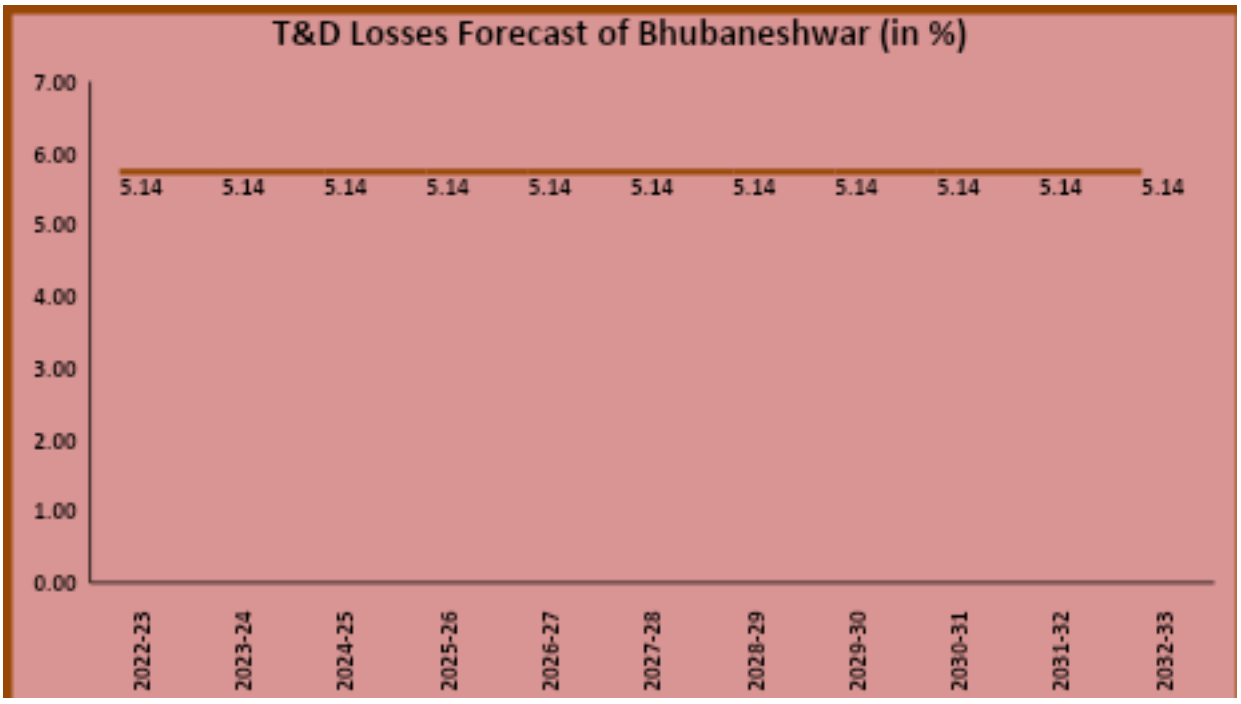

Figure 13-5 T&D Losses Forecast of Bhubaneshwar (in %)

12.5 Summary of power forecast of Bhubaneshwar city:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	2174	3534	5614	10.20	9.70
2	**Peak Demand (in MW)**	538	878	1402	10.31	9.81
3	**T&D Losses (in %)**	5.14	5.14	5.14		

Table 13-3 Power forecast summary of BHUBANESHWAR

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Bhubaneshwar											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	995	1099	1212	1335	1470	1617	1777	1952	2141	2346	2569
Commercial	804	888	979	1079	1188	1307	1436	1577	1730	1896	2076
Public lighting	18	20	22	24	26	29	32	35	38	42	46
Public Water Works	83	92	101	112	123	135	149	163	179	196	215
Irrigation	1	2	2	2	2	2	3	3	3	3	4
LT Industries	30	33	37	40	45	49	54	59	65	71	78
HT Industries	86	95	105	115	127	140	154	169	185	203	222
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	45	49	54	60	66	73	80	88	96	105	115
Others (if Any)	0	0	0	0	0	0	0	0	0	0	0
Total (Energy Consumption)	**2062**	**2277**	**2512**	**2768**	**3047**	**3352**	**3684**	**4045**	**4437**	**4863**	**5325**
T&D losses -MU	112	123	136	150	165	182	200	219	240	263	288
T&D losses -in %	5.14	5.14	5.14	5.14	5.14	5.14	5.14	5.14	5.14	5.14	5.14
Energy Requirement - MU	**2174**	**2400**	**2648**	**2918**	**3212**	**3534**	**3883**	**4264**	**4677**	**5127**	**5614**
Annual Load Factor - %	46.17	46.13	46.08	46.04	45.99	45.94	45.90	45.85	45.81	45.76	45.71
Peak Load - MW	**538**	**594**	**656**	**723**	**797**	**878**	**966**	**1062**	**1166**	**1279**	**1402**

Table 13-4 Category-wise and Year-wise Summary of Bhubaneshwar.

Chennai

Chapter 13: **Chennai**

13.1 Introduction:

Chennai is the capital of Tamil Nadu. Chennai is a major center for medical tourism and is termed "India's health capital". Chennai houses a major portion of India's automobile industry and hence the name "Detroit of India".

Economy:

The automotive industry of Chennai accounts for more than 35% of India's overall automotive components and automobile output, earning the nickname “Detroit of India”. Chennai contributes more than 50 per cent of India's leather exports and a major electronics hardware exporter also.

Climate:

Chennai has a dry-summer tropical wet and dry climate. The hottest time of the year is from April to June with an average temperature of 35–40 °C. The coldest time of the year is in December–January, with average temperature of 19–25 °C and the lowest recorded temperature of 13.9 °C. Chennai receives most of its rainfall from the North West monsoon between October and December while smaller amounts of rain come from the South West monsoon between June and September. The average annual rainfall is about 120 cm.

13.2 Brief description of Power Utilities:

The Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) is an undertaking owned by the Government of Tamil Nadu is responsible for electrical power generation and distribution in Chennai.

13.3 Existing Power Scenario:

The total electricity consumption of Chennai in the year 2022-23 was 16111 MU and with 7.63% T&D losses, the requirement was 17443 MU. The peak demand of the city was 3677 MW. The Domestic sector was the biggest consumer of electricity (49%) followed by Commercial (22%) & Industrial (15%).

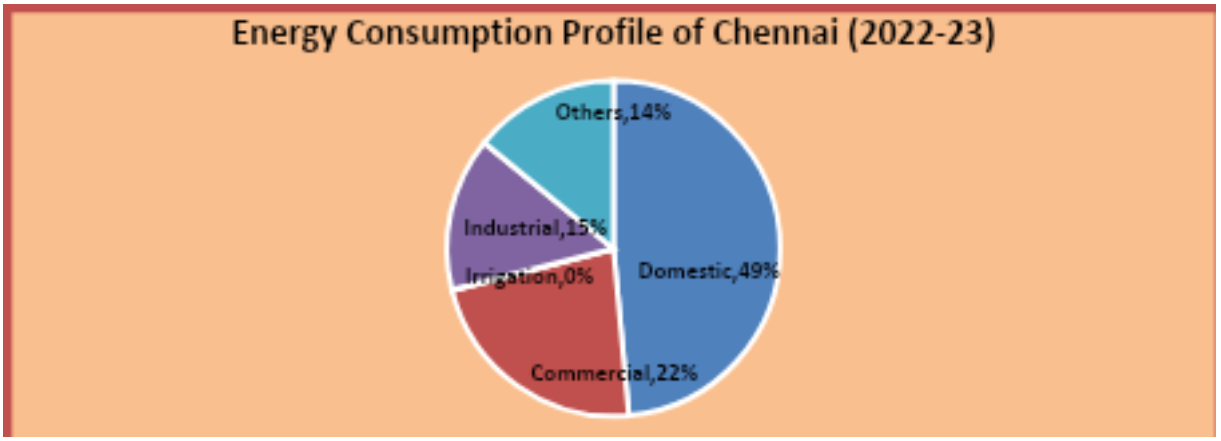

Figure 14-1 Energy Consumption Profile of Chennai (2022-23).

In a comparison of Chennai City with Tamil Nadu for the year 2022-23, it is observed that the energy requirement of Chennai was 15.06% of the total energy requirement of the state.

2022-23	Chennai City	Tamil Nadu	% Share of Chennai City
Energy in MU	17443	115788	15.06
Peak Demand in MW	3677	17361	21.18

Table 14-1 Comparison of Chennai with Tamil Nadu in 2022-23

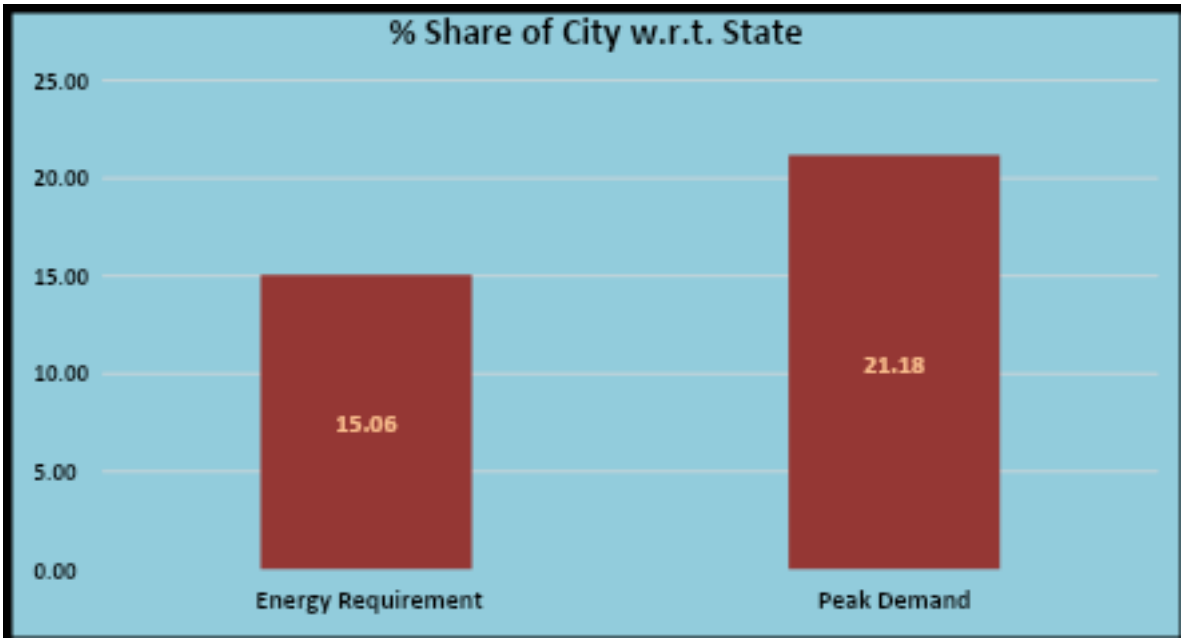

Figure 14-2 Comparison of Chennai City with Tamil Nadu in the year 2022-23.

13.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Chennai was 17443 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 21361 MU by the year 2027-28 with a 4.14% CAGR for the period 2022-23 to 2027-28. With a CAGR of 4.28% for the period 2027-28 to 2032-33, its energy requirement is estimated as 26335 MU by the year 2032-33.

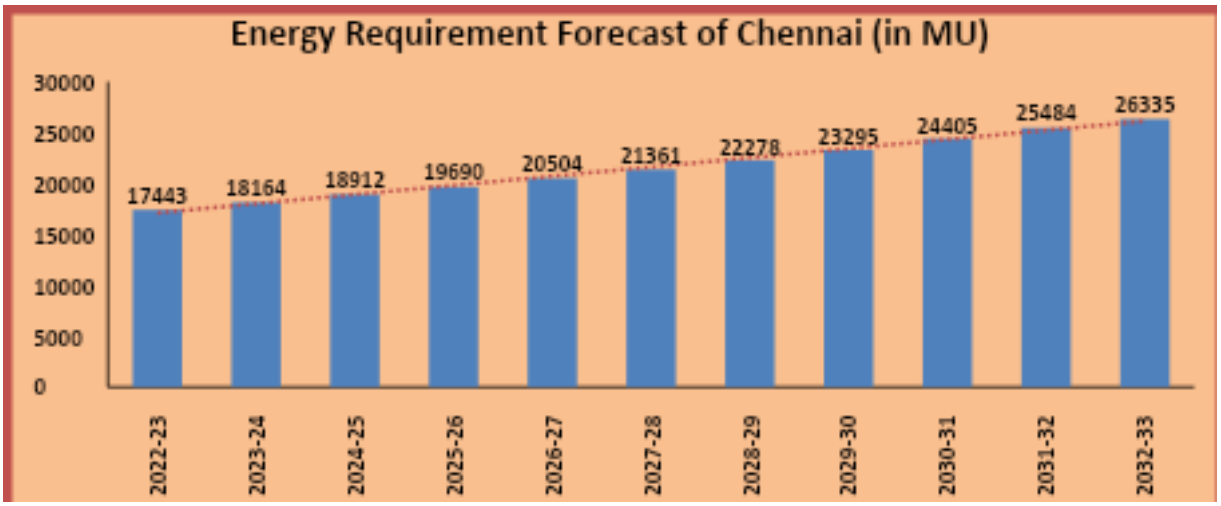

Figure 14-3 Energy Requirement Forecast of Chennai (in MU).

Peak Demand of the Chennai is expected to see 4.45% CAGR upto 2027-28 and will reach 4571 MW in comparison to 3677 MW in the year 2022-23. It is expected to reach 5720 MW in the year 2032-33 with a CAGR of 4.59% after 2027-28. TANGEDCO has intimated that data center load of approximately 1500 MVA is scheduled to come up in Chennai Mega city region by FY 2027-28 in Ambattur region. Accordingly, the power forecast for Chennai mega city has been done considering data center load of approximately 1500MVA.

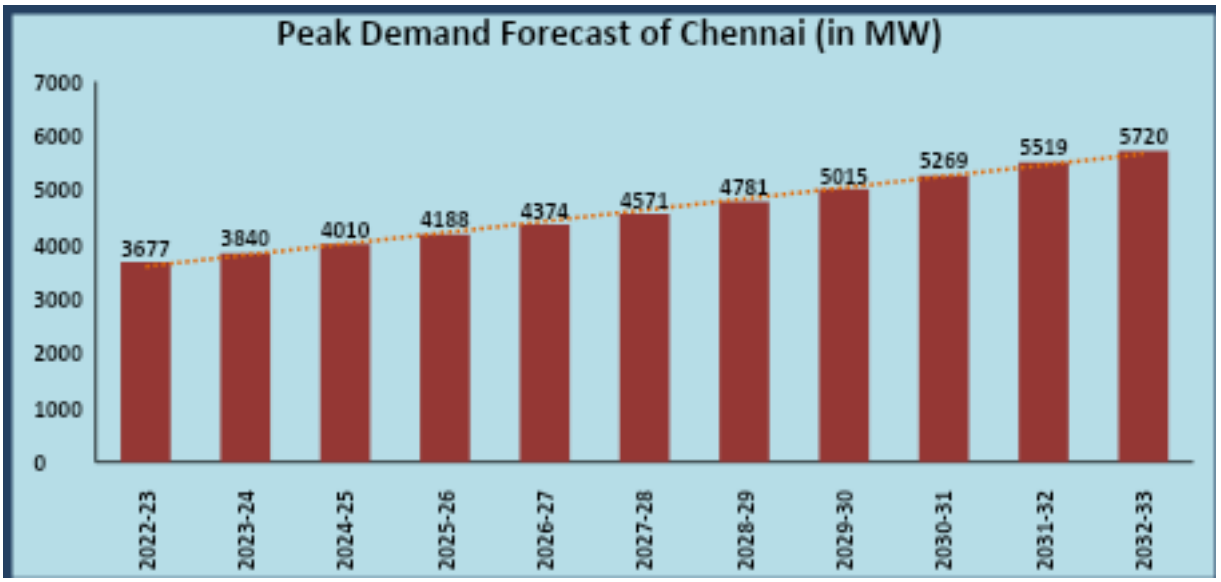

Figure 14-4 Peak Demand Forecast of Chennai (in MW).

The category-wise energy consumption forecast of Chennai are as follows:

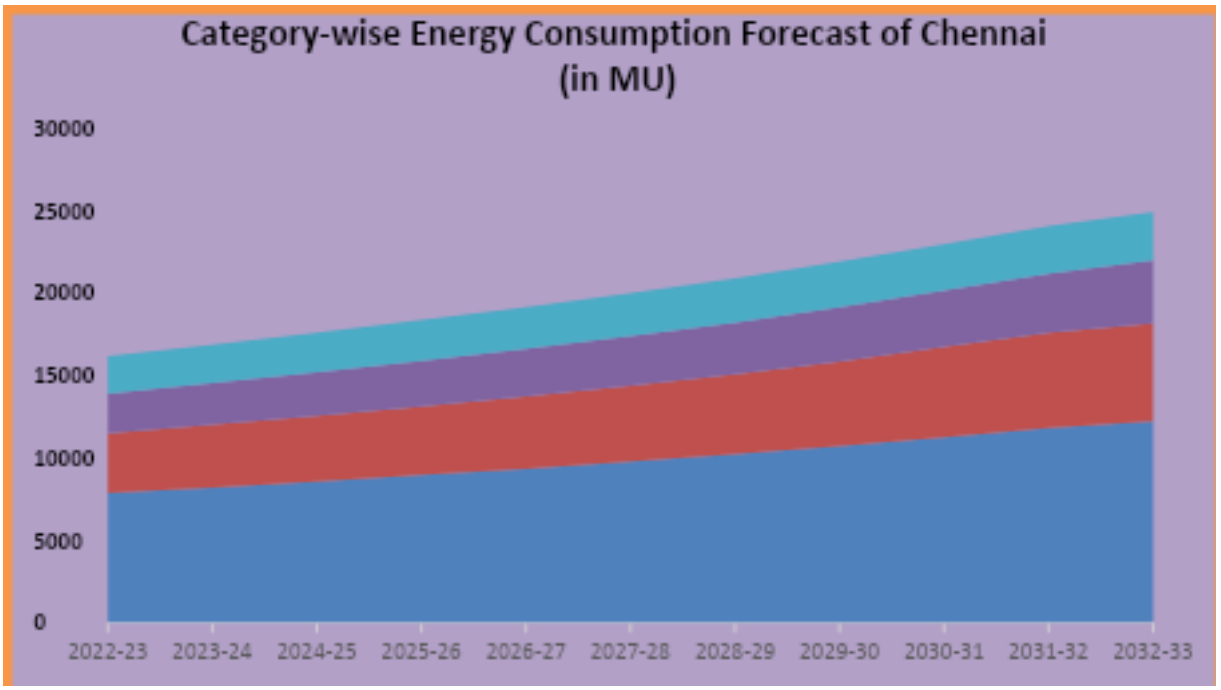

Figure 14-5 Category-wise Energy Consumption Forecast of Chennai

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	Domestic	7836	9735	12169	4.44	4.56	4.50
2	Commercial	3635	4587	5953	4.76	5.35	5.06
3	Irrigation	5	5	5	1.20	0	0
4	Industrial	2373	3014	3790	4.90	4.69	4.79
5	Others	2262	2602	2934	2.84	2.43	2.63
6	Total	16111	19944	24851	4.36	4.50	4.43

Table 14-2 Expected CAGR of Chennai- Category-wise Consumption

13.5 Transmission & Distribution Losses:

T&D losses of Chennai were 7.63% in year 2022-23. The target level is to bring it down to about 6.63% and 5.63% by the end of 2027-28 & 2032-33 respectively.

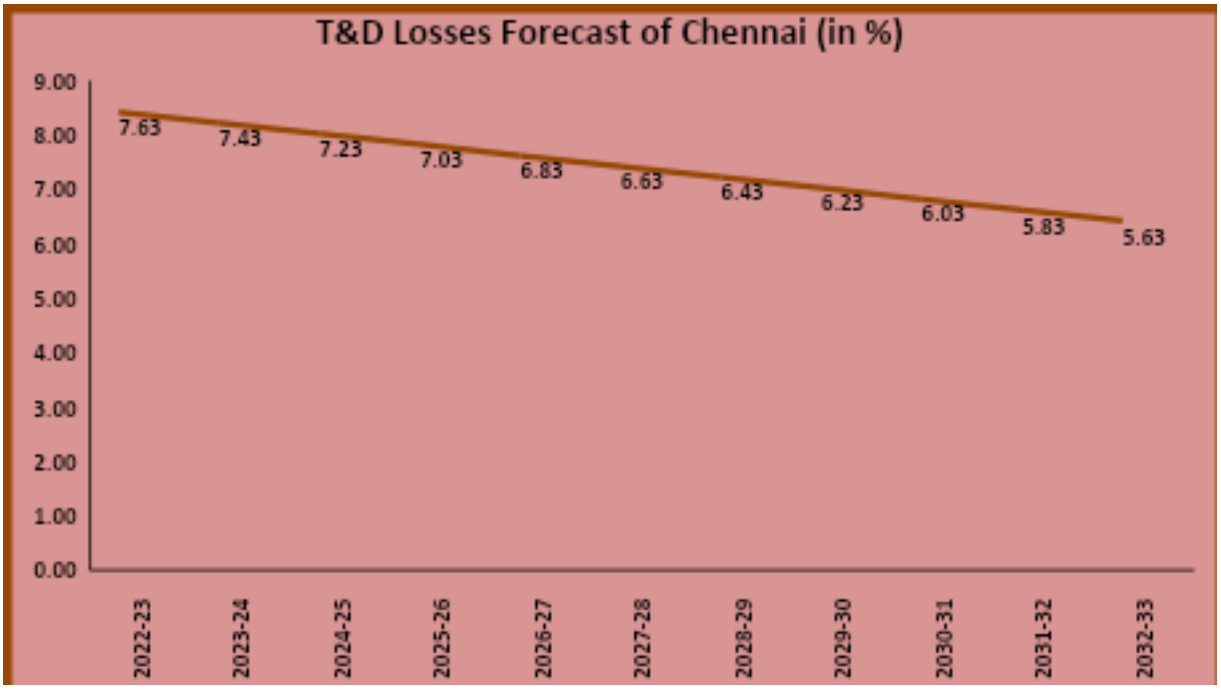

Figure 14-6 T&D Losses Forecast of Chennai (in %)

13.6 Summary of power forecast of Chennai city:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	17443	21361	26335	4.14	4.28
2	**Peak Demand (in MW)**	3677	4571	5720	4.45	4.59
3	**T&D Losses (in %)**	7.63	6.63	5.63		

Table 14-3 Power forecast summary of Chennai

****

Chennai											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	7836	8186	8548	8924	9318	9735	10184	10677	11231	11777	12169
Commercial	3635	3803	3980	4166	4367	4587	4833	5115	5446	5772	5953
Public lighting	217	223	228	233	238	242	247	251	256	260	264
Public Water Works	0	0	0	0	0	0	0	0	0	0	0
Irrigation	5	5	5	5	5	5	5	5	5	5	5
LT Industries	722	731	740	748	755	761	766	770	773	775	779
HT Industries	1651	1758	1873	1994	2122	2253	2386	2538	2673	2800	3011
Railway Traction	140	150	161	173	185	198	212	226	242	258	274
Bulk Supply	448	466	484	501	520	538	556	574	593	611	629
Others (if Any)	1456	1491	1526	1559	1592	1624	1655	1684	1713	1740	1767
Total (Energy Consumption)	**16111**	**16814**	**17544**	**18305**	**19102**	**19944**	**20845**	**21843**	**22932**	**23998**	**24852**
T&D losses -MU	1332	1350	1368	1385	1401	1417	1433	1452	1473	1487	1484
T&D losses -in %	7.63	7.43	7.23	7.03	6.83	6.63	6.43	6.23	6.03	5.83	5.63
Energy Requirement - MU	**17443**	**18164**	**18912**	**19690**	**20504**	**21361**	**22278**	**23295**	**24405**	**25484**	**26335**
Annual Load Factor - %	54.16	54.00	53.83	53.67	53.51	53.35	53.19	53.03	52.87	52.71	52.56
Peak Load - MW	**3677**	**3840**	**4010**	**4188**	**4374**	**4571**	**4781**	**5015**	**5269**	**5519**	**5720**

Table 14-4 Category-wise and Year-wise Summary of Chennai.

Coimbatore

Chapter 14: **Coimbatore**

14.1 Introduction:

Coimbatore is the second largest city in the Tamil Nadu after Chennai in terms of the population. Being a hub of textile industry in South India, the city is referred to as the "Manchester of South India".

Economy:

A major hub for manufacturing, education and healthcare in Tamil Nadu, Coimbatore is among the fastest growing tier-II cities in India. It houses more than 25,000 small, medium and large industries with the primary industries being engineering and textiles. Coimbatore is called the “Manchester of South India” due to its extensive textile industry, fed by the surrounding cotton fields. TIDEL Park Coimbatore in ELCOT SEZ was the first special economic zone (SEZ) set up in 2006. Coimbatore is also referred to as "the Pump City" as it supplies nearly 50% of India's requirements of motors and pumps. The city is one of the largest exporters of jewelry renowned for diamond cutting, cast and machine-made jewelry.

Climate:

The city has a hot semi-arid climate with a wet season lasting from September to November due to the North East Monsoon. It experiences hot and humid summers from March to June with temperatures ranging from 25 °C to 38 °C. The monsoon season starts from July and lasts till October. The city receives moderate rainfall from the south-west monsoon and occasional heavy rainfall from the north-east monsoon. The winter season starts from November and ends in February. The temperatures during this season range from 20 °C to 30 °C.

14.2 Brief description of Power Utilities:

The Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) is an undertaking owned by the Government of Tamil Nadu is responsible for electrical power generation and distribution in Coimbatore.

14.3 Existing Power Scenario:

The total electricity consumption of Coimbatore in the year 2022-23 was 3049 MU and with 15.46% T&D losses, the requirement was 3606 MU. The peak demand of the city was 501 MW. The Domestic sector was the biggest consumer of electricity (42%) followed by Industrial (25%) & Commercial (19%).

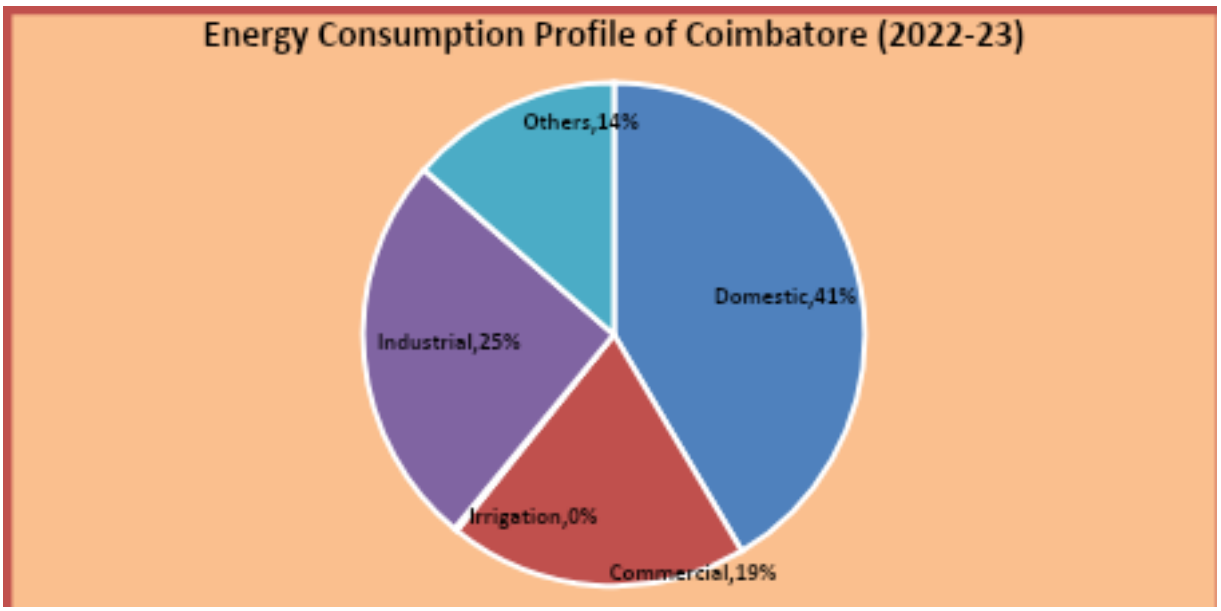

Figure 15-1 Energy Consumption Profile of Coimbatore (2022-23).

In a comparison of Coimbatore City with Tamil Nadu for the year 2022-23, it is observed that the energy requirement of Coimbatore was 15.06% of the total energy requirement of the state.

2022-23	Coimbatore City	Tamil Nadu	% Share of Coimbatore City
Energy in MU	3606	115788	3.11
Peak Demand in MW	501	17361	2.89

Table 15-1 Comparison of Coimbatore with Tamil Nadu in 2022-23

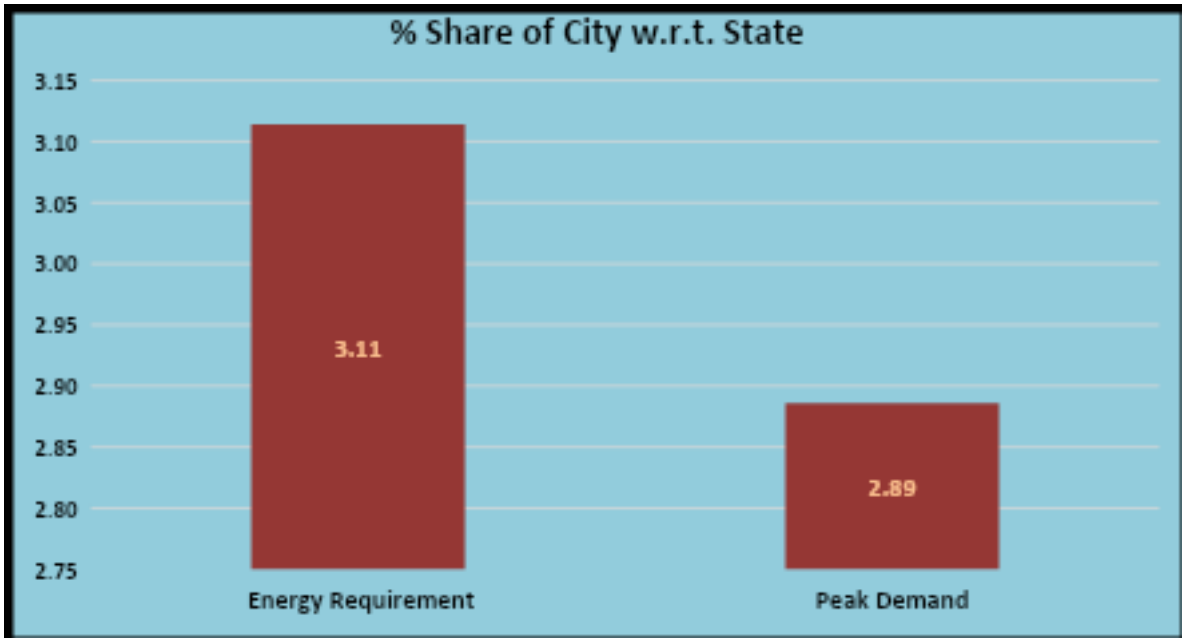

Figure 15-2 Comparison of Coimbatore City with Tamil Nadu in the year 2022-23.

14.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of

Coimbatore is 3606 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 4650 MU by the year 2027-28 with a 5.22% CAGR for the period 2022-23 to 2027-28. With a CAGR of 5.21% for the period 2027-28 to 2032-33, its energy requirement is estimated as 5995 MU by the year 2032-33.

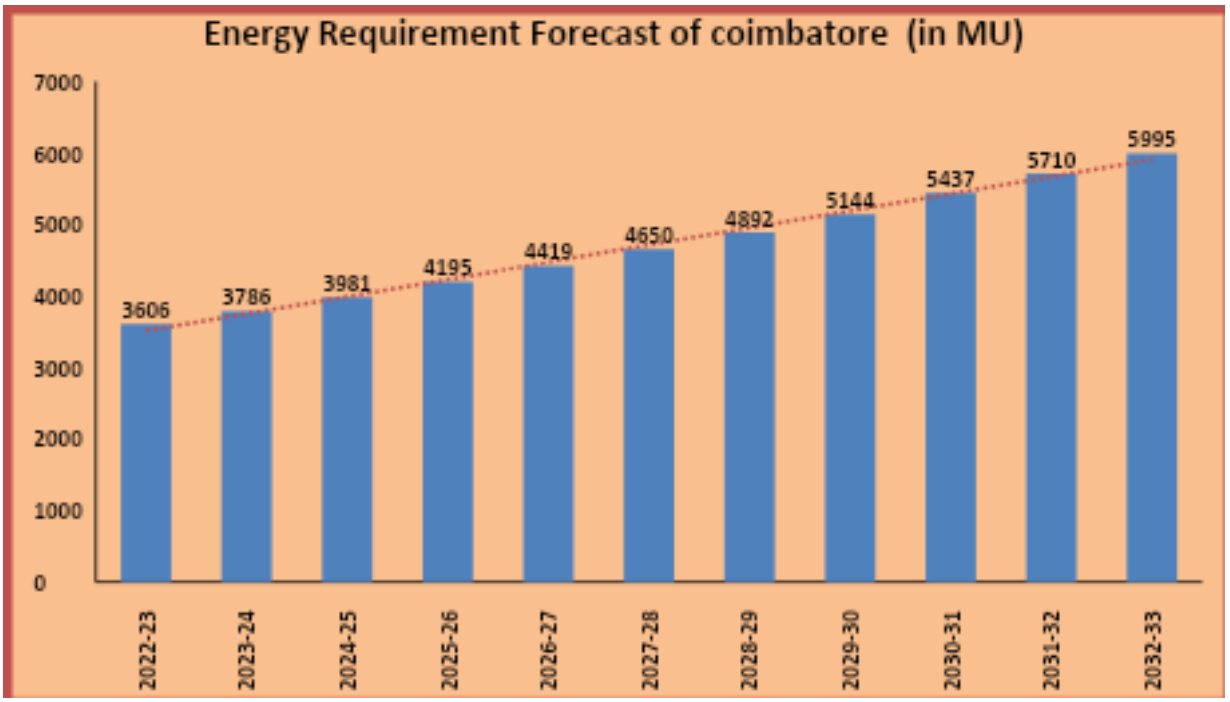

Figure 15-3 Energy Requirement Forecast of Coimbatore (in MU).

Peak Demand of the Coimbatore is expected to see 9.60% CAGR upto 2027-28 and will reach 793 MW in comparison to 501 MW in the year 2022-23. It is expected to reach 1253 MW in the year 2032-33 with a CAGR of 9.59% after 2027-28.

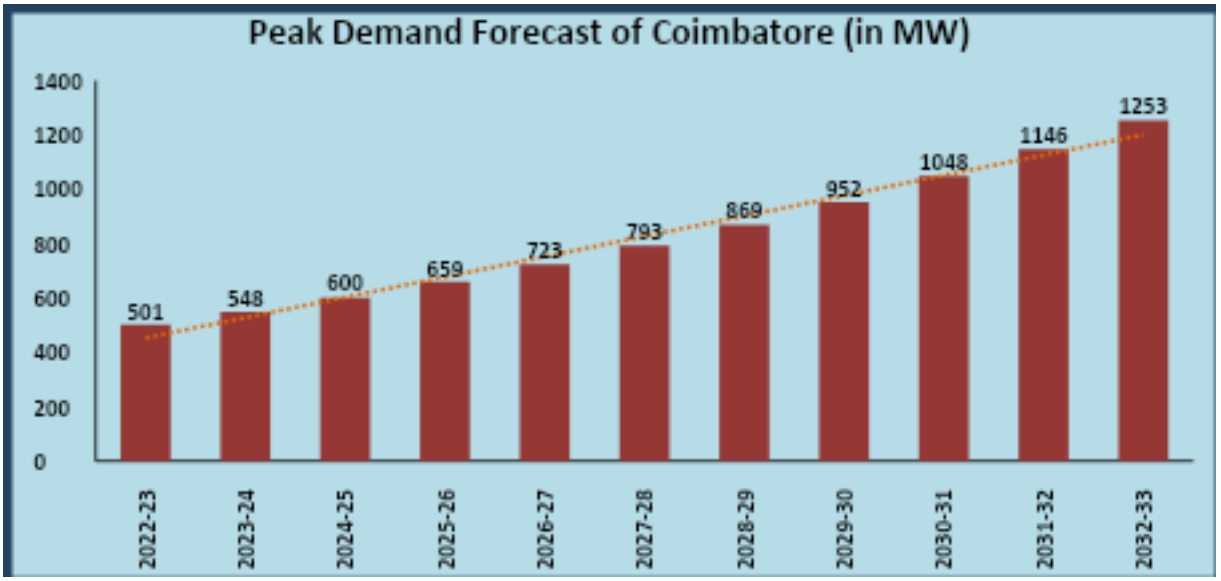

Figure 15-4 Peak Demand Forecast of Coimbatore (in MW).

The category-wise energy consumption forecast of Coimbatore are as follows:

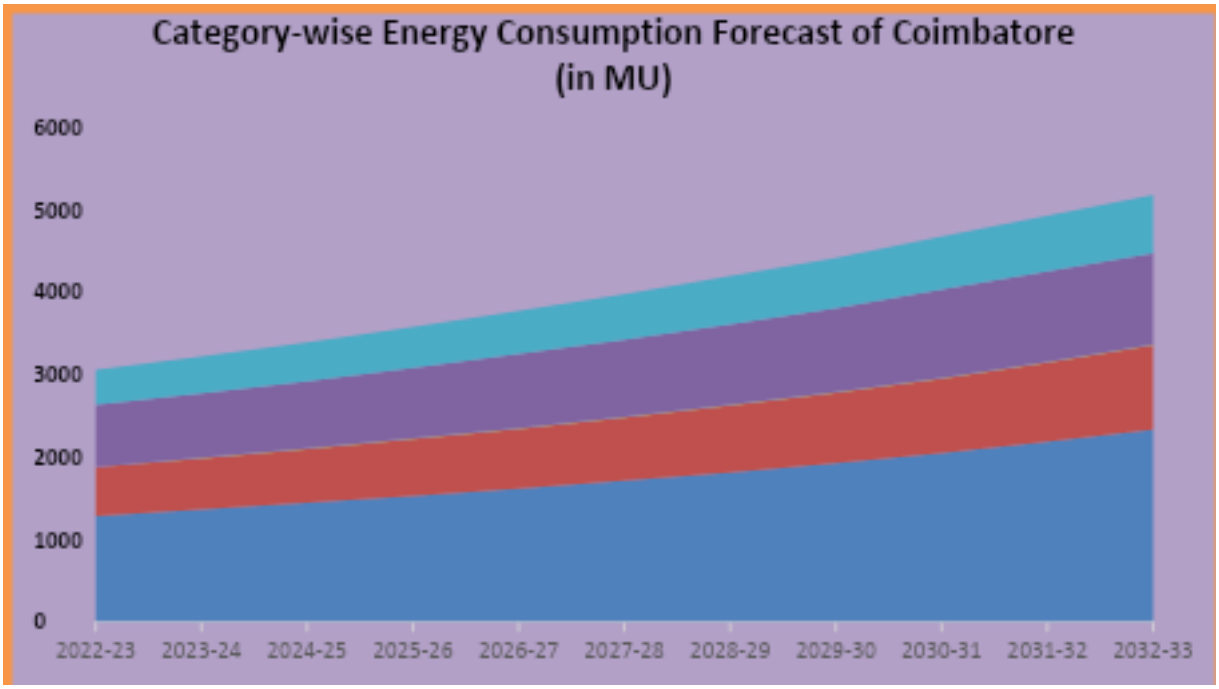

Figure 15-5 Category-wise Energy Consumption Forecast of Coimbatore (in MU).

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	**Domestic**	1277	1706	2320	5.97	6.34	6.16
2	**Commercial**	590	765	1029	5.34	6.12	5.73
3	**Irrigation**	6	6	7	2.18	1.71	1.94
4	**Industrial**	756	938	1104	4.42	3.32	3.87
5	**Others**	421	552	707	5.54	5.08	5.31
6	**Total**	3049	3967	5168	5.41	5.43	5.42

Table 15-2 Expected CAGR of Coimbatore - Category-wise Consumption

14.5 Transmission & Distribution Losses:

T&D losses of Coimbatore were 15.46% in year 2022-23. The target level is to bring it down to about 14.70% and 13.80% by the end of 2027-28 & 2032-33 respectively.

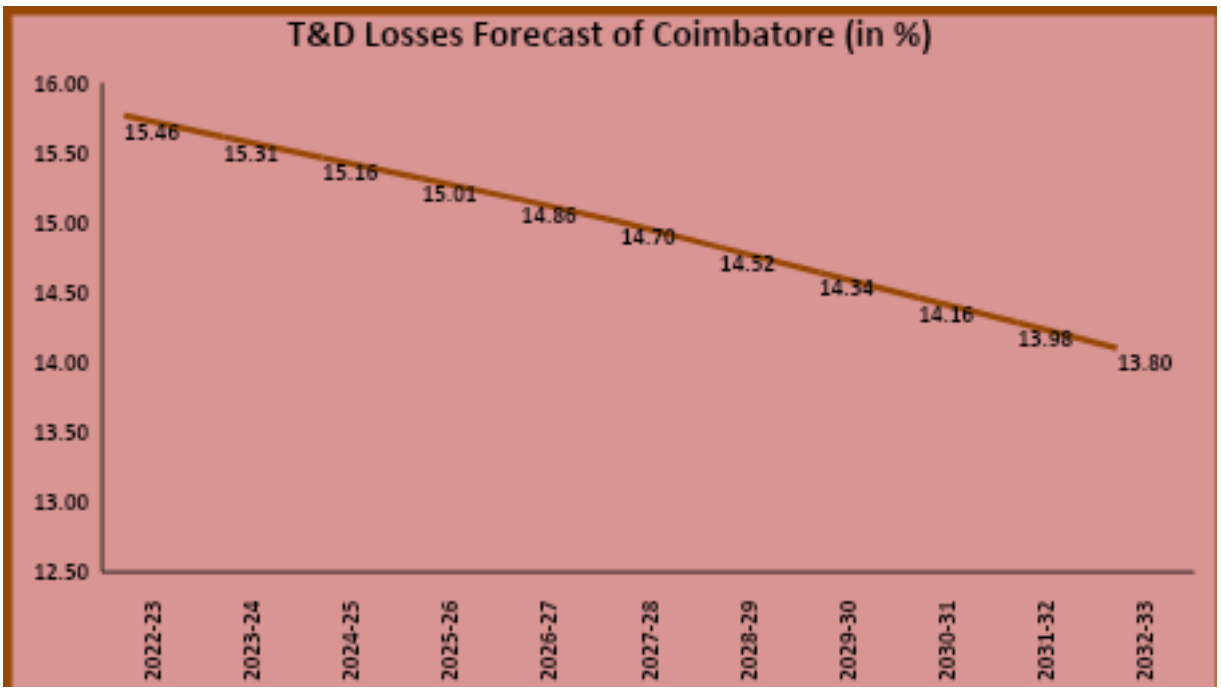

Figure 15-6 T&D Losses Forecast of Coimbatore (in %).

14.6 Summary of power forecast of Coimbatore city:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	3606	4650	5995	5.22	5.21
2	**Peak Demand (in MW)**	501	793	1253	9.60	9.59
3	**T&D Losses (in %)**	15.46	14.70	13.80		

Table 15-3 Power forecast summary of Coimbatore

****

Coimbatore							
Electrical Energy Consumption, Energy Requirement and Peak Electricity							
(Category-wise and Year-wise Summary)							
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**
Domestic	1277	1354	1435	1520	1610	1706	1808
Commercial	590	621	654	689	726	765	807
Public lighting	73	76	79	82	85	88	91
Public Water Works	0	0	0	0	0	0	0
Irrigation	6	6	6	6	6	6	7
LT Industries	418	432	446	460	473	487	500
HT Industries	338	348	366	394	423	451	480
Railway Traction	0	0	0	0	0	0	0
Bulk Supply	80	86	91	98	104	111	118
Others (if Any)	269	284	301	318	335	353	372
Total (Energy Consumption)	**3049**	**3207**	**3378**	**3566**	**3762**	**3967**	**4182**
T&D losses -MU	557	580	603	630	656	683	710
T&D losses -in %	15.46	15.31	15.16	15.01	14.86	14.70	14.52
Energy Requirement - MU	**3606**	**3786**	**3981**	**4195**	**4419**	**4650**	**4892**
Annual Load Factor - %	82.12	78.84	75.69	72.66	69.75	66.96	64.28
Peak Load - MW	501	548	600	659	723	793	869

Table 15-4 Category-wise and Year-wise Summary of Coimbatore.

Dehradun

Chapter 15: **Dehradun**

15.1 Introduction:

Dehradun is the capital city of Uttarakhand. The city is famous for its picturesque landscape and slightly milder climate and provides a gateway to the surrounding region.

Economy:

Dehradun has experienced strong economic growth in the last 20 years. Dehradun has experienced a commercial and information technology upswing, amplified by the establishment of software technology parks of India (STPI) and SEZs (Special economic zones) throughout. Tourism Industry is also accorded priority status in the Dehradun Region.

Climate:

The climate of Dehradun is humid subtropical. Summer temperatures can reach up to 44 °C. Winter temperatures are usually between 1°C and 20 °C and fog is quite common in winters. During the monsoon season, there is often heavy and protracted rainfall.

15.2 Brief description of Power Utilities:

In Dehradun, the primary government power utility is the Uttarakhand Power Corporation Limited (UPCL). UPCL is responsible for the distribution of electricity in the region. They manage the supply of electricity, maintenance of infrastructure, and customer service.

15.3 Existing Power Scenario:

The total electricity consumption of Dehradun in the year 2022-23 was 2352 MU and with 7.44% T&D losses, the requirement was 2541 MU. The peak demand of the city was 476 MW. The Domestic sector was the biggest consumer of electricity (46%) followed by Commercial (26%) & Industrial (19%).

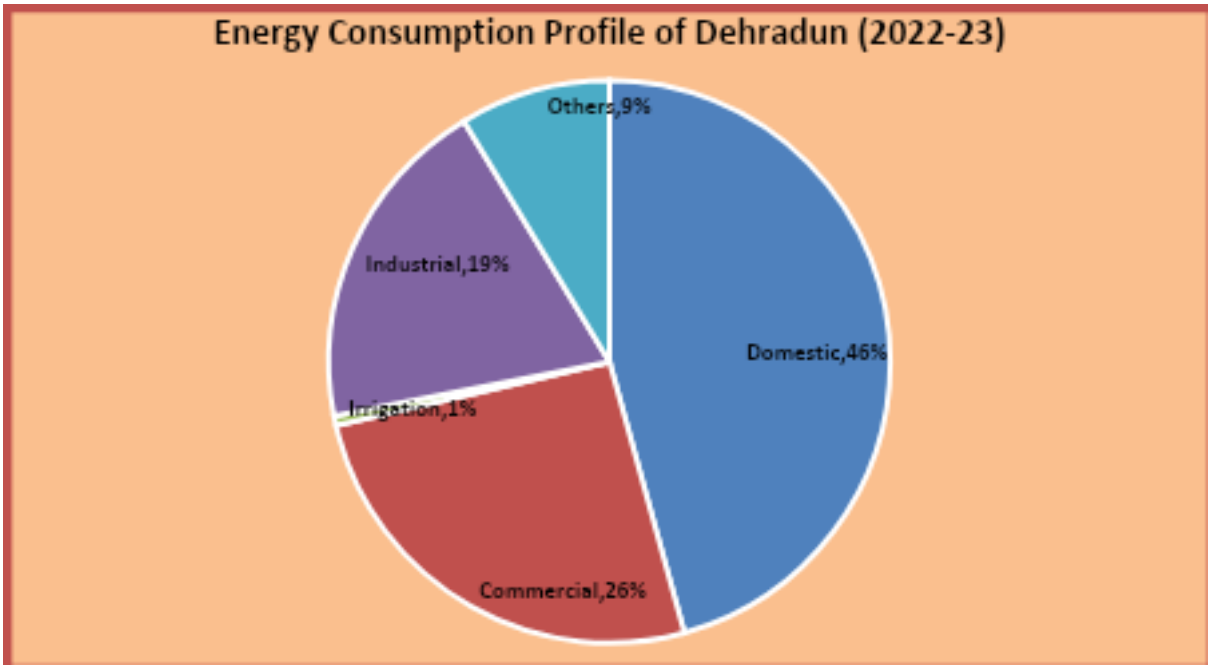

Figure 16-1 Energy Consumption Profile of Dehradun (2022-23).

On comparison of Dehradun with Uttarakhand for the year 2022-23, it is observed that the energy requirement of Dehradun was 16% of the total energy requirement of the state.

2022-23	Dehradun	Uttarakhand	% Share of Dehradun City
Energy in MU	2541	16301	16
Peak Demand in MW	476	2603	18

Table 16-1 Comparison of Dehradun with Uttarakhand in 2022-23

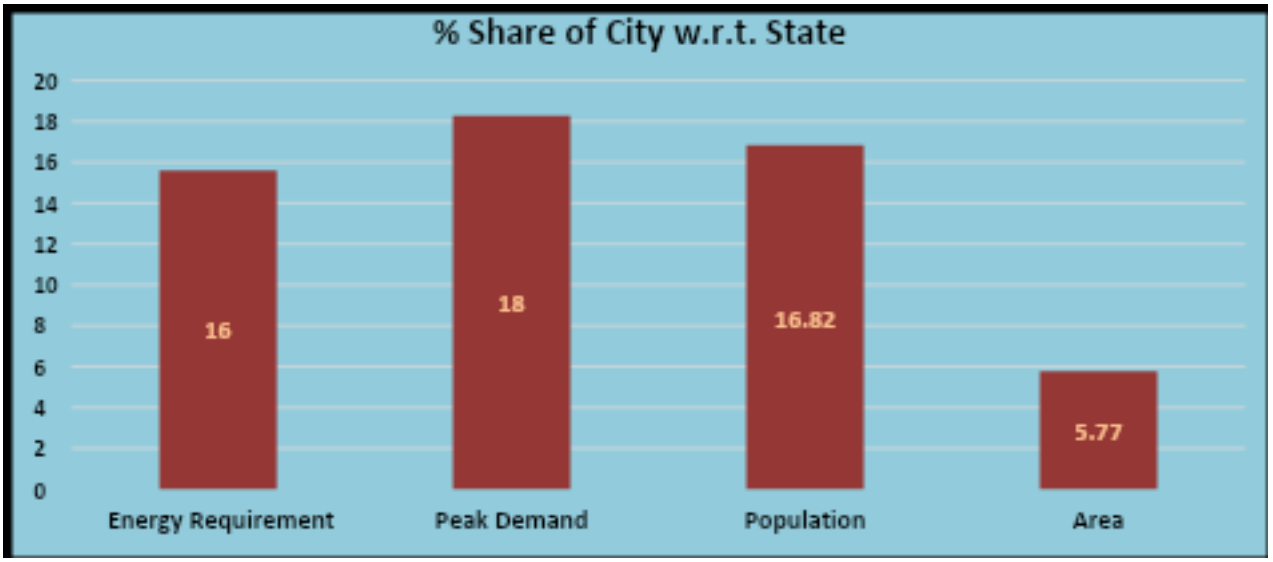

Figure 16-2 Comparison of Dehradun with Uttarakhand in the year 2022-23.

15.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Dehradun is 2541 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 3260 MU by the year 2027-28 with a 5.11% CAGR for the period 2022-23 to 2027-28. With a CAGR of 4.90% for the period 2027-28 to 2032-33, its energy requirement is estimated as 4141 MU by the year 2032-33.

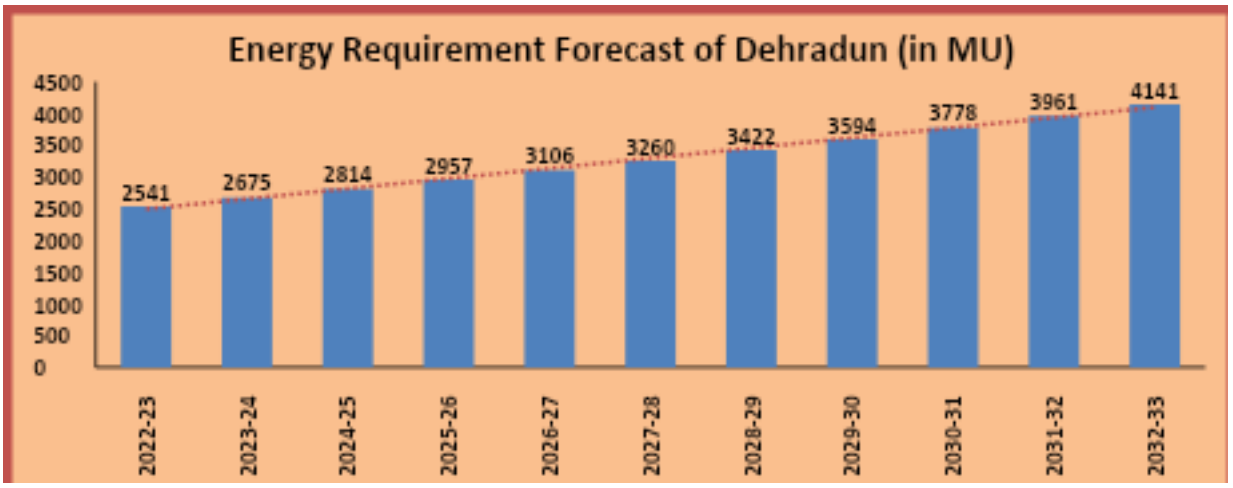

Figure 16-3 Energy Requirement Forecast of Dehradun (in MU)

Peak Demand of Dehradun is expected to see 5.22% CAGR upto 2027-28 and will reach 614 MW in comparison to 476 MW in year 2022-23. It is expected to reach 782 MW in year 2032-33 with a CAGR of 4.95% after 2027- 28.

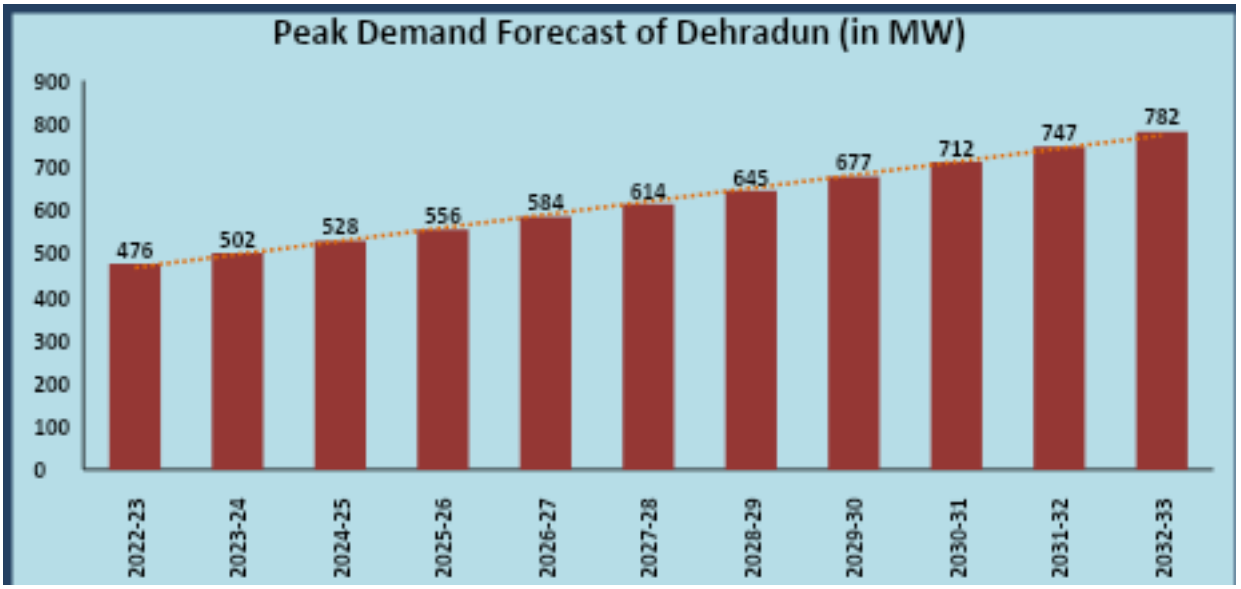

Figure 16-4 Peak Demand Forecast of Dehradun (in MW)

The category-wise energy consumption forecast of Dehradun are as follows:

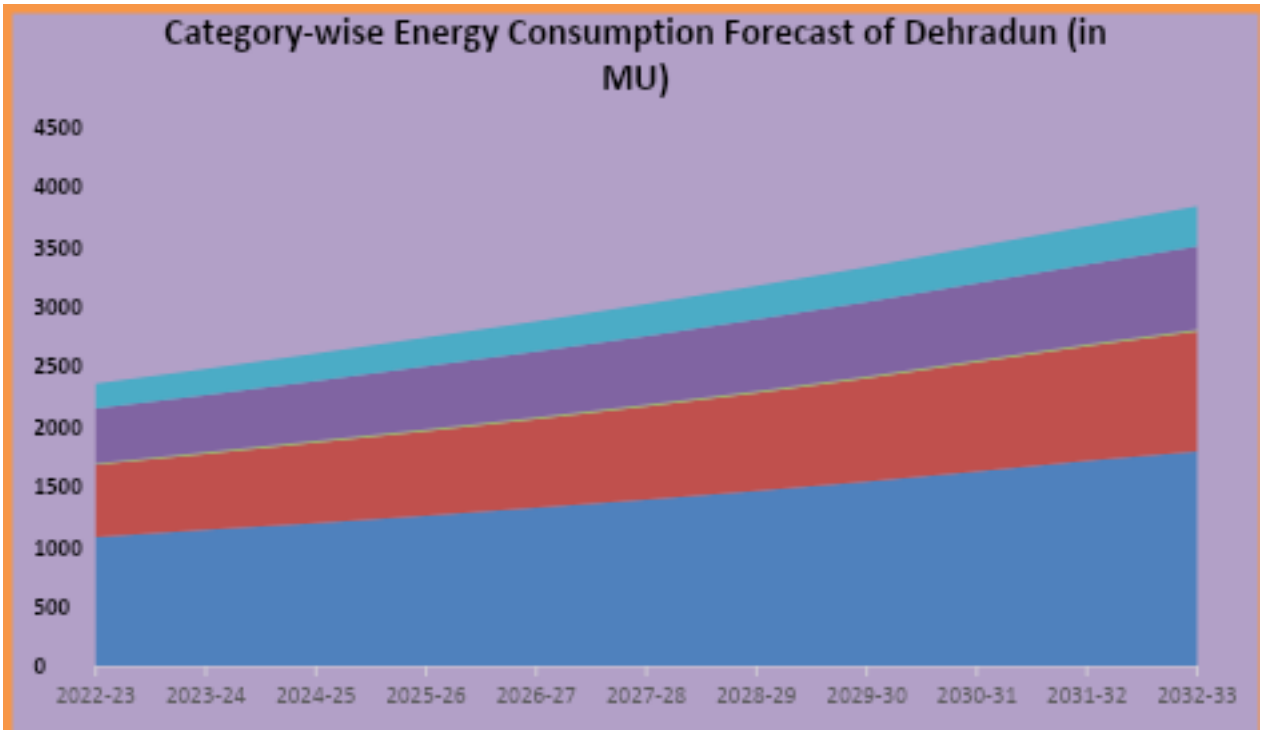

Figure 16-5 Category-wise Energy Consumption Forecast of Dehradun (in MU)

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	Domestic	1074	1387	1788	5.24	5.21	5.23

2	**Commercial**	603	777	998	5.19	5.13	5.16
3	**Irrigation**	13	16	19	4.30	3.60	3.95
4	**Industrial**	454	571	693	4.69	3.92	4.30
5	**Others**	206	266	335	5.20	4.70	4.95
6	**Total**	2352	3018	3833	5.11	4.90	5.01

Table 16-2 Expected CAGR of Dehradun - Category-wise Consumption

15.5 Transmission & Distribution Losses:

T&D losses of Dehradun were 7.44% in 2022-23. The target is to maintain T&D Losses around this level.

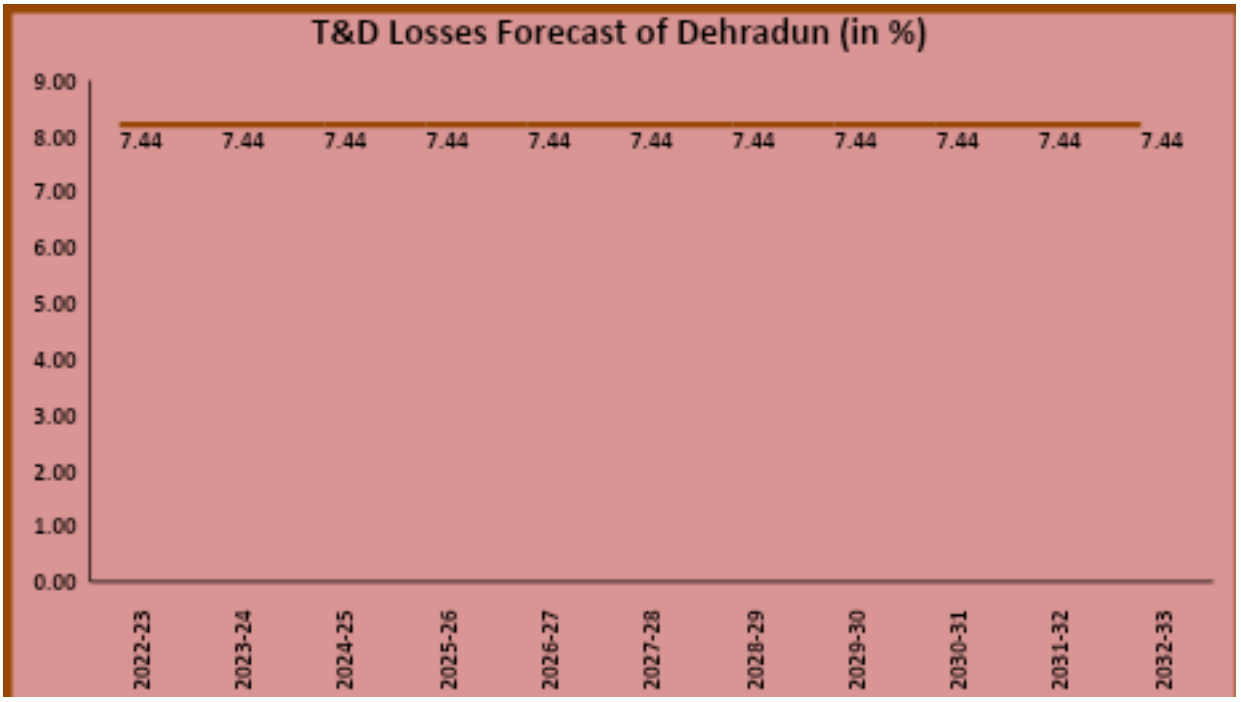

Figure 16-6 T&D Losses Forecast of Dehradun (in %)

15.6 Summary of power forecast of Dehradun city:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	2541	3260	4141	5.11	4.90
2	**Peak Demand (in MW)**	476	614	782	5.22	4.95
3	**T&D Losses (in %)**	7.44	7.44	7.44		

Table 16-3 Power forecast summary of Dehradun

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Dehradun											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	1074	1132	1192	1254	1319	1387	1459	1537	1624	1709	1788
Commercial	603	636	669	704	740	777	817	860	907	954	998
Public lighting	14	14	15	16	17	18	18	19	20	21	22
Public Water Works	193	203	214	225	237	248	261	273	286	299	313
Irrigation	13	14	14	15	16	16	17	17	18	19	19
LT Industries	33	33	34	35	36	37	38	38	39	39	40
HT Industries	422	444	466	488	511	535	558	581	603	624	652
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	0	0	0	0	0	0	0	0	0	0	0
Others (if Any)	0	0	0	0	0	0	0	0	0	0	0
Total (Energy Consumption)	2352	2476	2605	2737	2875	3018	3168	3327	3497	3666	3833
T&D losses -MU	189	199	209	220	231	243	255	267	281	295	308
T&D losses -in %	7.44	7.44	7.44	7.44	7.44	7.44	7.44	7.44	7.44	7.44	7.44
Energy Requirement - MU	2541	2675	2814	2957	3106	3260	3422	3594	3778	3961	4141
Annual Load Factor - %	60.94	60.88	60.82	60.76	60.70	60.63	60.60	60.57	60.54	60.51	60.48
Peak Load - MW	476	502	528	556	584	614	645	677	712	747	782

Table 16-4 Category-wise and Year-wise Summary of Dehradun.

Gangtok

Chapter 16: **Gangtok**

16.1 Introduction:

Gangtok is the capital and the largest town of Sikkim state. It is also the headquarters of the East Sikkim district. It is located in the Eastern Himalayan range. It is a center of Tibetan Buddhist culture and learning, with the presence of several monasteries, religious educational institutions, and centres for Tibetology.

Economy:

Tourism is one of the cornerstones of Gangtok's economy. Ecotourism has emerged as an important economic activity in the region which includes trekking, mountaineering, river rafting and other nature oriented activities. It does not have a large manufacturing base but has a thriving cottage industry in watch-making, country-made alcohol and handicrafts.

Climate:

The climate of the city is characterized by chilly weather in winter, cold and humid throughout the year. The average annual maximum temp. is 18.70 C. The average annual minimum temp. is 11.70 C. The average annual rainfall of the city is 365.9 cm.

16.2 Brief description of Power Utilities:

The Energy & Power Department of Sikkim is engaged in the generation of electricity, its transmission to various load centers and finally distribution to the consumers of all categories.

16.3 Existing Power Scenario:

The total electricity consumption of Gangtok in the year 2022-23 was 93 MU and with 26 % T&D losses, the requirement was 127 MU. The peak demand of the city was 46 MW. The Domestic sector was the biggest consumer of electricity (47%) followed by Commercial (26%) and Industrial (10%).

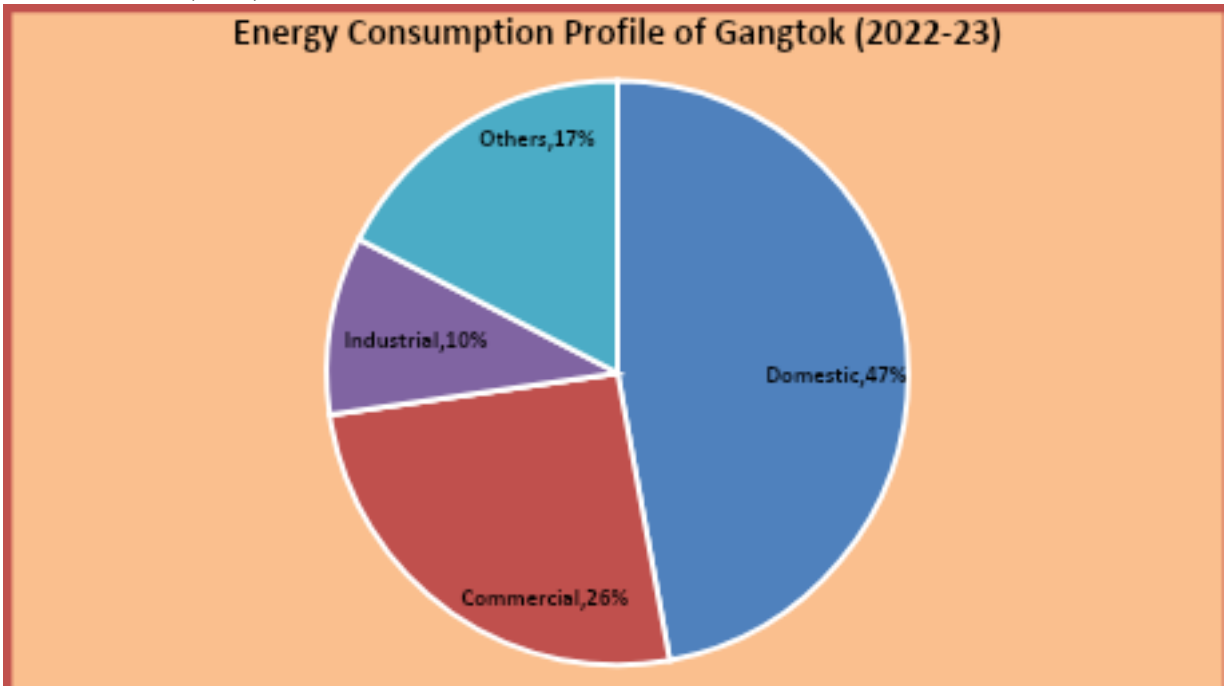

Figure 17-1 Energy Consumption Profile of Gangtok (2022-23).

*Others category in Fig 17.1 includes load of public lighting, public water works, bulk supply and any other load

In comparison of Gangtok with Sikkim for the year 2022-23, it is observed that the energy requirement of Gangtok was 19.81 % of the total energy requirement of the state.

2022-23	Gangtok City	Sikkim	% Share of Gangtok City
Energy in MU	127	651	19.51
Peak Demand in MW	46	141	32.62

Table 17-1 Comparison of Gangtok with Sikkim in 2022-23

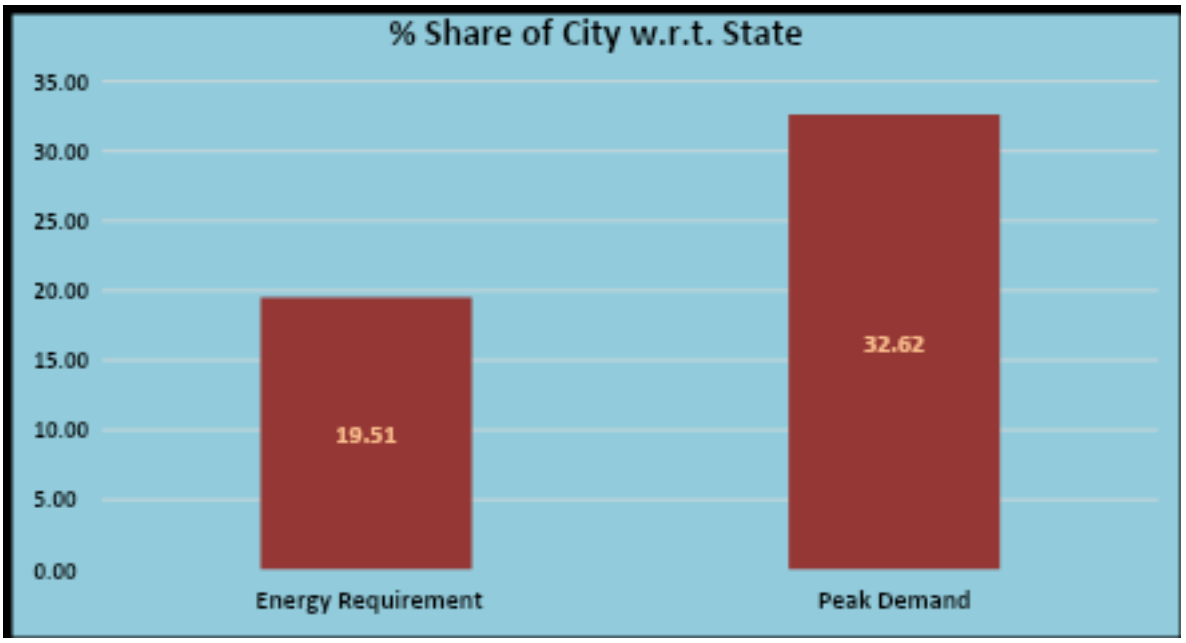

Figure 17-2 Comparison of Gangtok with Sikkim for the year 2022-23.

16.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Gangtok was 127 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 147 MU by the year 2027-28 with a 3.06 % CAGR for the period 2022-23 to 2027-28. With a CAGR of 3.11 % for the period 2027-28 to 2032-33, its energy requirement is estimated as 172 MU by the year 2032-33.

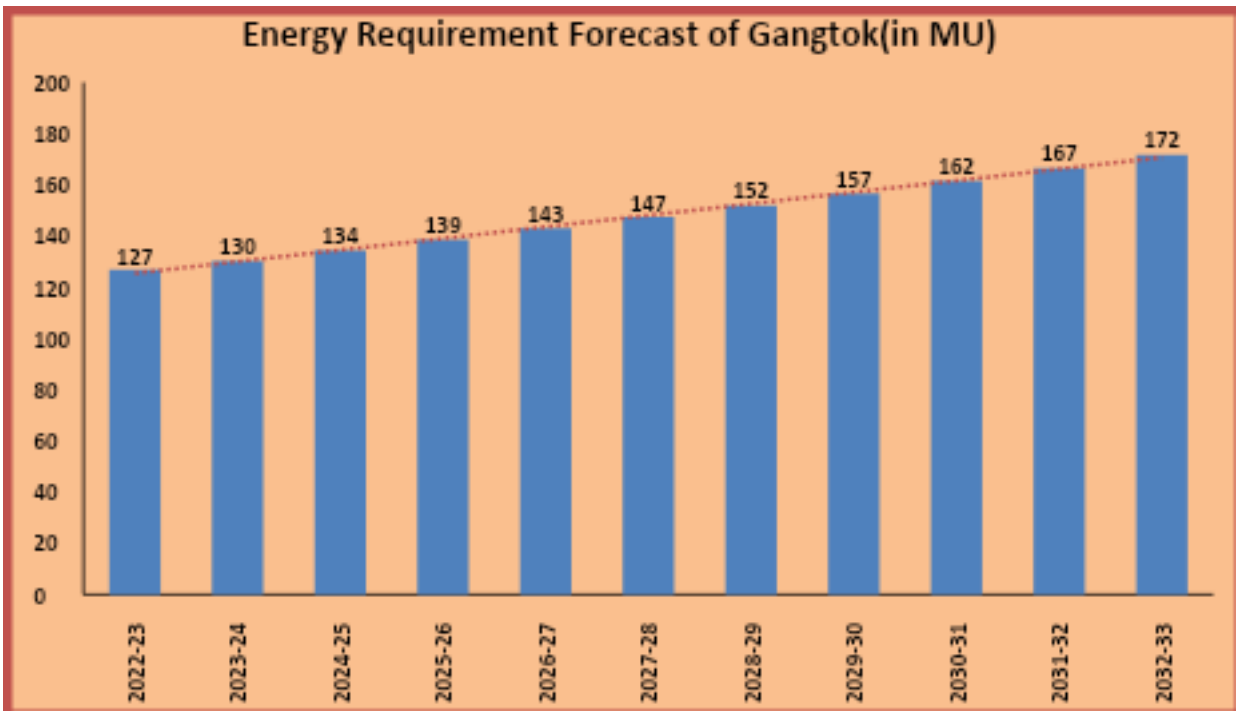

Figure 17-3 Energy Requirement Forecast of Gangtok(in MU).

Peak Demand of Gangtok is expected to see 6.25 % CAGR upto 2027-28 and will reach 63 MW in comparison to 46 MW in the year 2022-23. It is expected to reach 85 MW in the year 2032-33 with a CAGR of 6.30 % after 2027- 28.

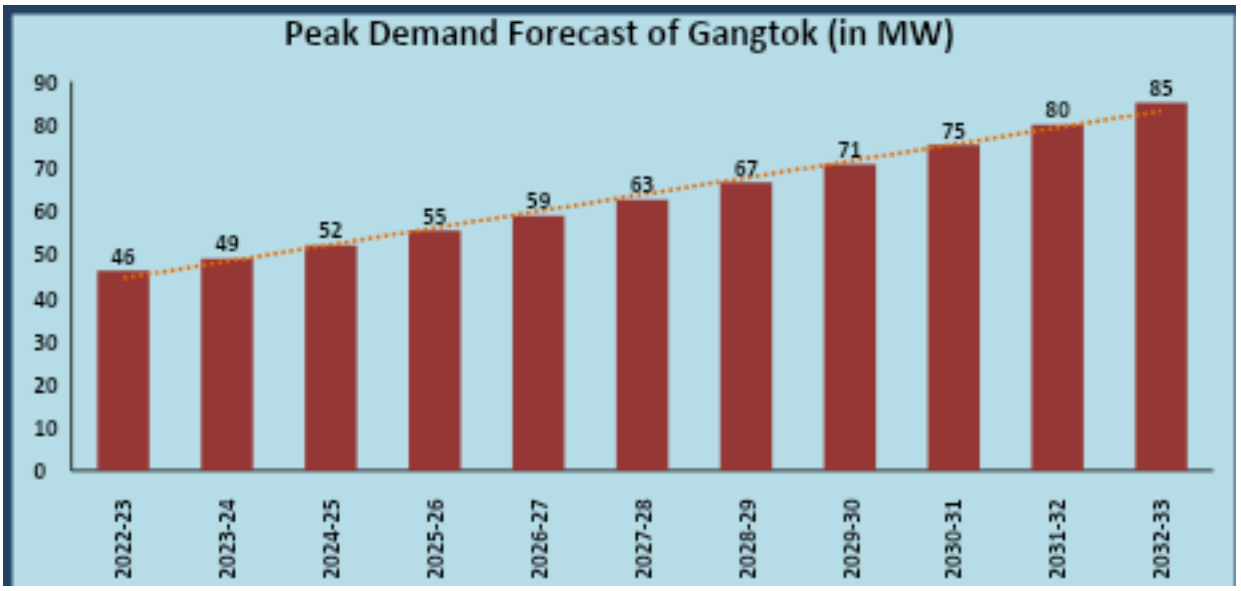

Figure 17-4 Peak Demand Forecast of Gangtok(in MW).

The category-wise energy consumption forecast of Gangtok are as follows:

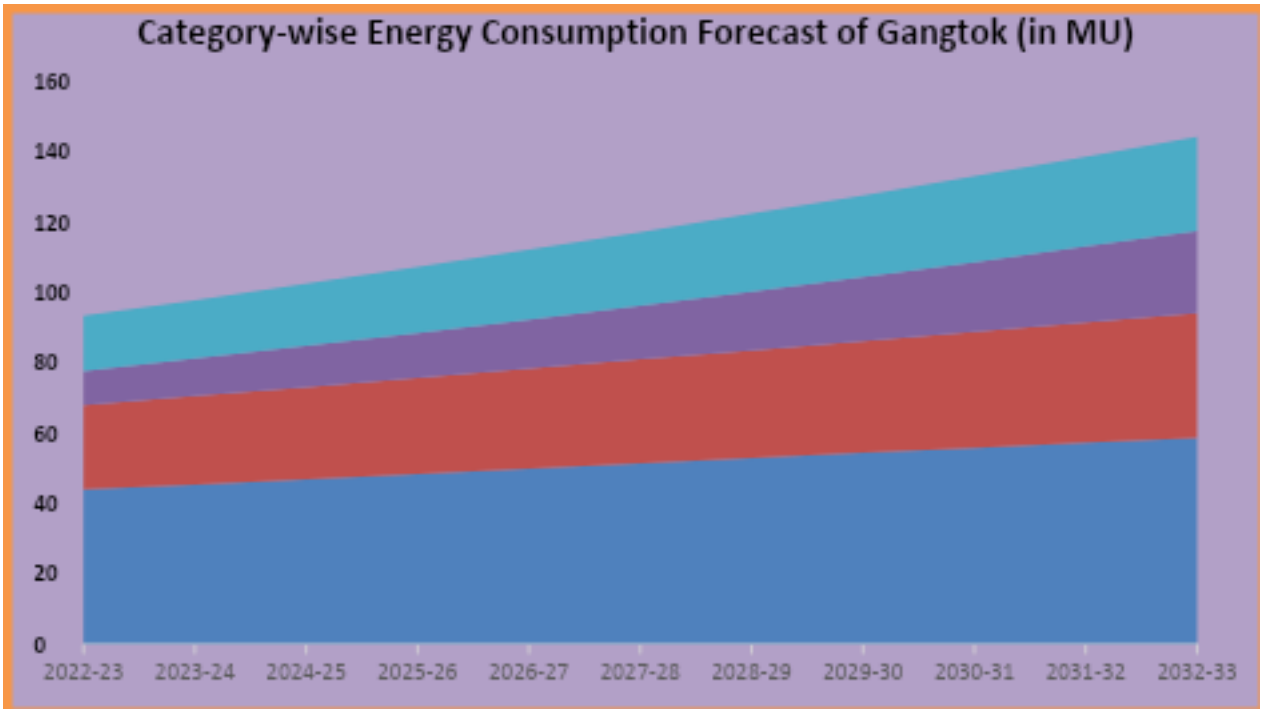

Figure 17-5 Category-wise Energy Consumption Forecast of Gangtok (in MU)

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	**Domestic**	44	51	59	3.20	2.70	2.95
2	**Commercial**	24	29	35	4.21	3.71	3.96
3	**Irrigation**	0	0	0	0	0	0
4	**Industrial**	10	15	23	9.44	8.94	9.19
5	**Others**	16	21	27	5.86	4.99	5.43
6	**Total**	93	117	144	4.63	4.26	4.45

Table 17-2 Expected CAGR of Gangtok - Category-wise Consumption

16.5 Transmission & Distribution Losses:

T&D losses of Gangtok were 26.44 % in 2022-23. The target level is to bring it down to about 20.67 % and 16.15 % by the end of 2027-28 & 2032-33 respectively.

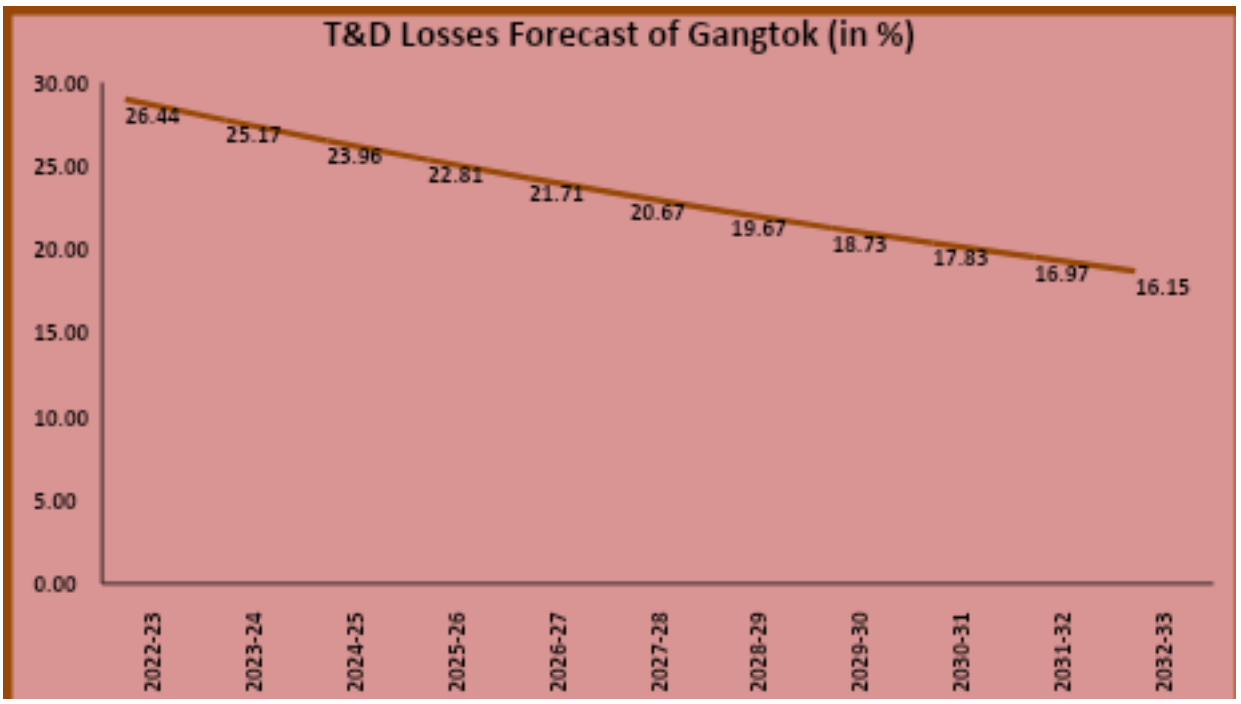

Figure 17-6 T&D Losses Forecast of Gangtok (in %)

16.6 Summary of power forecast of Gangtok city:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	127	147	172	3.06	3.11
2	**Peak Demand (in MW)**	46	63	85	6.25	6.30
3	**T&D Losses (in %)**	26.44	20.67	16.15		

Table 17-3 Power forecast summary of Gangtok

****

Gangtok											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	44	45	47	48	50	51	53	54	56	57	59
Commercial	24	25	26	27	28	29	31	32	33	34	35
Public lighting	1	1	1	1	1	1	1	1	1	2	2
Public Water Works	0	0	0	0	0	0	0	0	0	0	0
Irrigation	0	0	0	0	0	0	0	0	0	0	0
LT Industries	0	0	0	0	0	0	0	0	0	0	0
HT Industries	10	11	12	13	14	15	17	18	20	21	23
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	15	16	17	18	19	20	21	22	23	24	25
Others (if Any)	0	0	0	0	0	0	0	0	0	0	0
Total (Energy Consumption)	**93**	**98**	**102**	**107**	**112**	**117**	**122**	**127**	**133**	**138**	**144**
T&D losses -MU	34	33	32	32	31	30	30	29	29	28	28
T&D losses -in %	26.44	25.17	23.96	22.81	21.71	20.67	19.67	18.73	17.83	16.97	16.15
Energy Requirement - MU	**127**	**130**	**134**	**139**	**143**	**147**	**152**	**157**	**162**	**167**	**172**
Annual Load Factor - %	31.26	30.32	29.41	28.53	27.67	26.84	26.04	25.25	24.50	23.76	23.05
Peak Load - MW	**46**	**49**	**52**	**55**	**59**	**63**	**67**	**71**	**75**	**80**	**85**

Table 17-4 Category-wise and Year-wise Summary of Gangtok.

Guwahati

Chapter 17: **Guwahati**

17.1 Introduction:

Guwahati is the largest city in the Assam. A major riverine port city, Guwahati is situated on the south bank of the Brahmaputra and in the foothills of the Shillong plateau. It has an oil refinery and a state farm, and its industries include tea processing, milling of agricultural products, and soap manufacturing.

Economy:

Manufacturing sector in Guwahati contributes a substantial share to the economy of the city. Petroleum manufacturing is an important economic activity of the city. The Guwahati Refinery, located at Noonmati, is the most important manufacturing industry in the city. Assam is one of the highest tea-producing areas in the world, contributing 80% of India's export and 55% of the country's total tea production.

Climate:

The climate in Guwahati is subtropical humid temperate that is influenced by its geographical location and proximity to Brahmaputra river flowing in Assam. The average annual temperature in Guwahati is 24.6 °C. The average annual rainfall is 1698 mm. When compared with winter, the summers have much more rainfall. The driest month is December, with 6 mm of rain. In June, the precipitation reaches its peak; with an average of 315 mm, August is the warmest month of the year and January is the coldest month of the year.

17.2 Brief description of Power Utilities:

In Guwahati, Assam Power Distribution Company Limited (APDCL) responsible for distribution and supply of electricity.

17.3 Existing Power Scenario:

The total electricity consumption of Guwahati in the year 2022-23 was 1708 MU and with 12 % T&D losses, the requirement was 1930`MU. The peak demand of the city was 414 MW. The Domestic sector was the biggest consumer of electricity (47%) followed by Commercial (24%) and Industrial (16%).

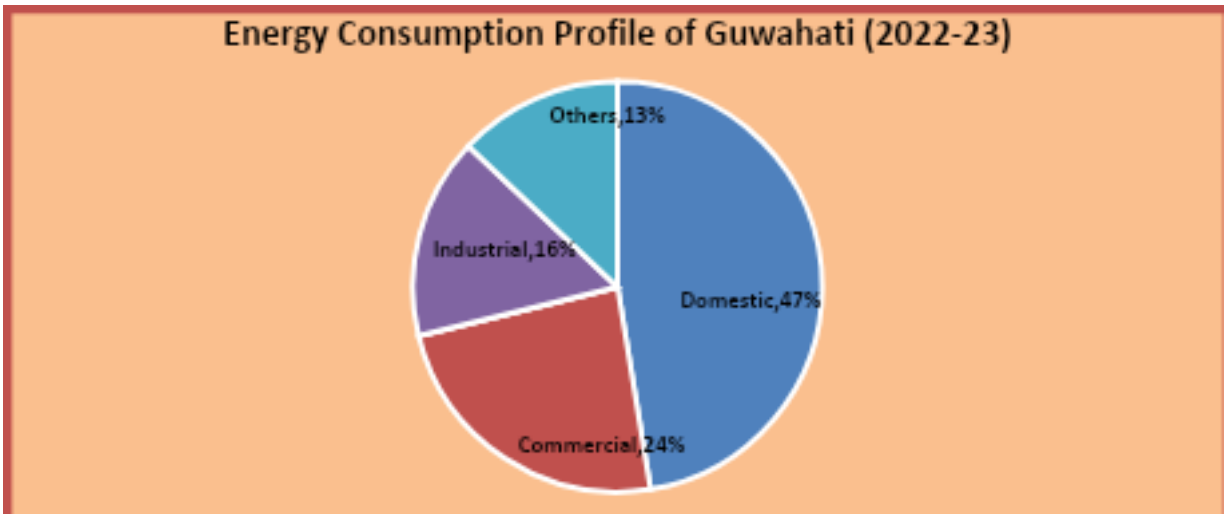

Figure 18-1 Energy Consumption Profile of Guwahati (2022-23)

On comparison of Guwahati with Assam for the year 2022-23, it is observed that the energy requirement of Guwahati was 16.41 % of the total energy requirement of the state. In contrast, its contribution to population and area was only 3.08 % and 0.28 % respectively.

2022-23	Guwahati City	Assam	% Share of GUWAHATI City
Energy in MU	1930	11972	16.12
Peak Demand in MW	414	2376	17.42

Table 18-1 Comparison of Guwahati with Assam in 2022-23.

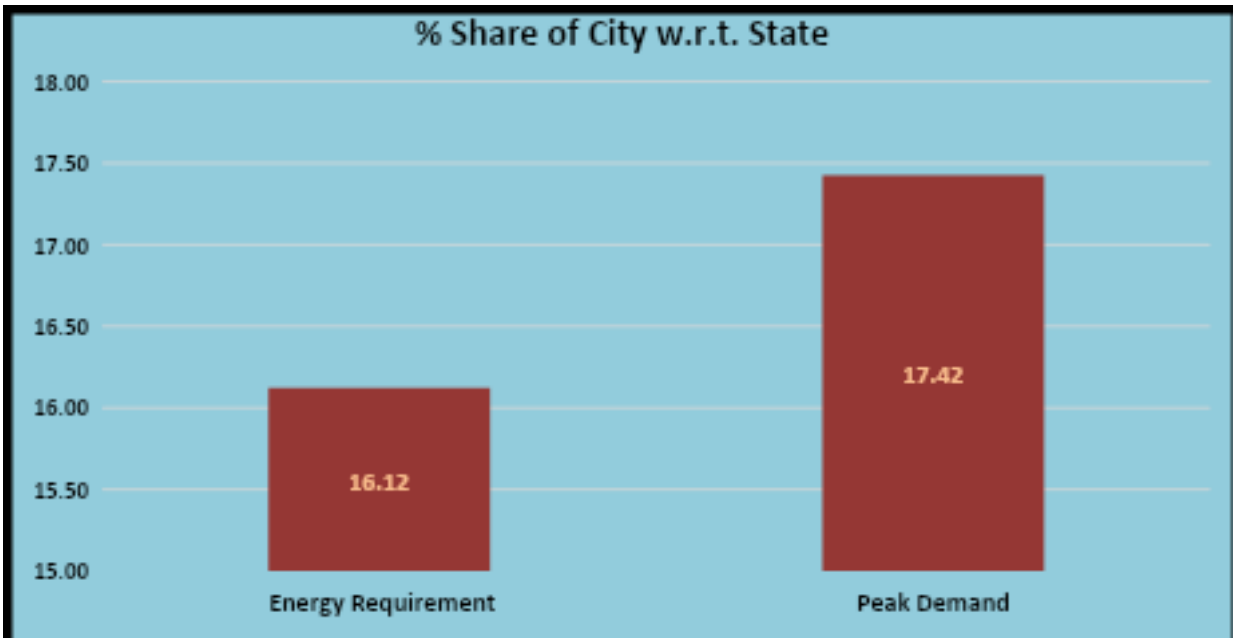

Figure 18-2 Comparison of Guwahati with Assam in the year 2022-23.

17.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Guwahati was 1930 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 2764 MU by the year 2027-28 with a 7.45 % CAGR for the period 2022-23 to 2027-28. With a CAGR of 7.30 % for the 2027-28 to 2032-33, its energy requirement is estimated as 3932 MU by the year 2032-33.

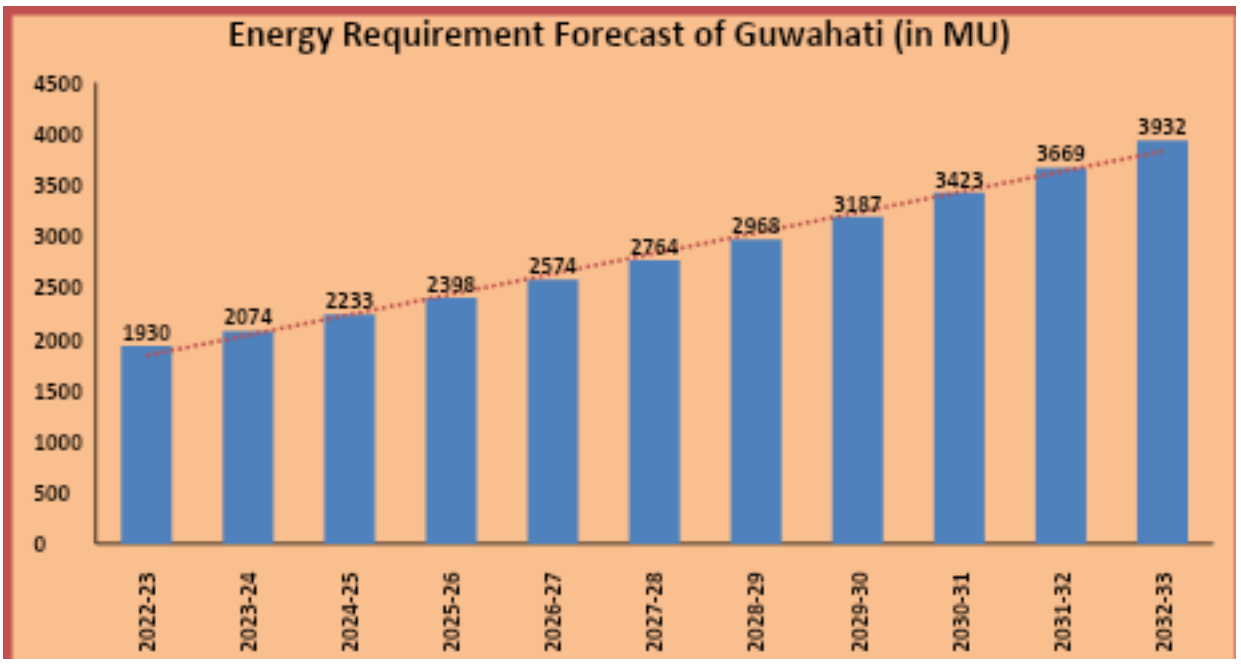

Figure 18-3 Energy Requirement Forecast of Guwahati (in MU)

Peak Demand of Guwahati is expected to see 7.56 % CAGR upto 2027-28 and will reach 595 MW in comparison to 414 MW in year 2022-23. It is expected to reach 851 MW in year 2032-33 with a CAGR of 7.41 % after 2027- 28.

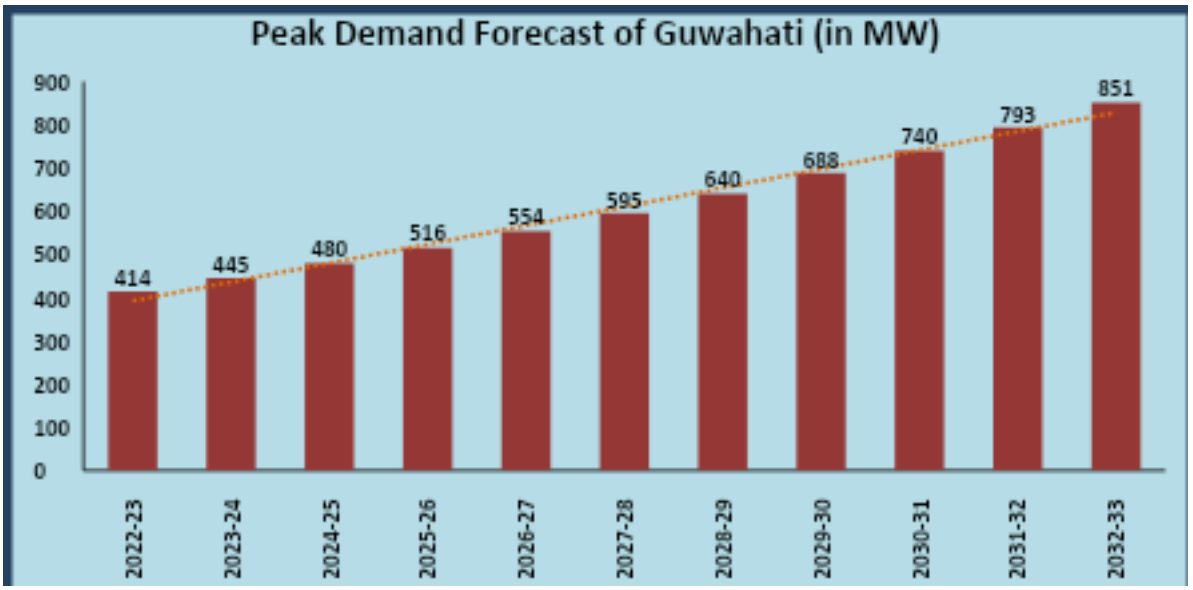

Figure 18-4 Peak Demand Forecast of Guwahati (in MW).

The category-wise energy consumption forecast of Guwahati are as follows:

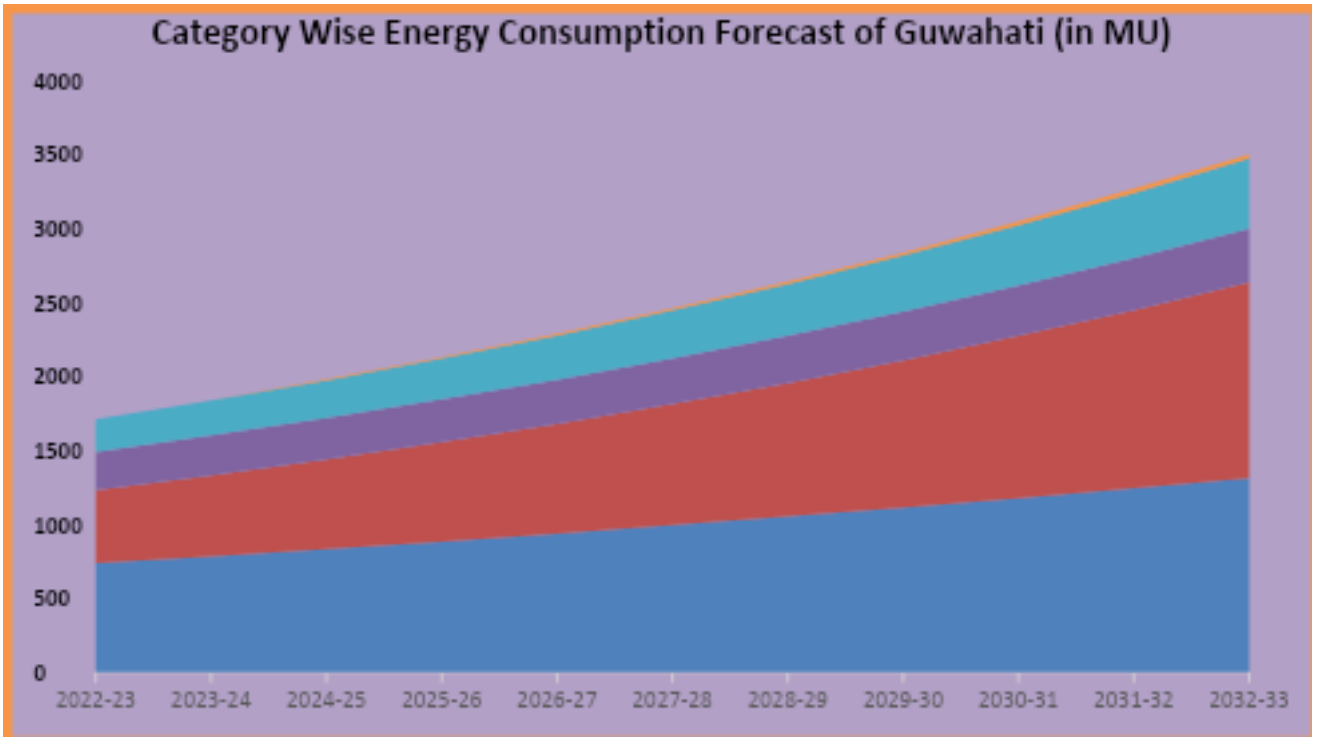

Figure 18-5 Category-wise Energy Consumption Forecast of Guwahati (in MU)

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	Domestic	735	993	1310	6.20	5.70	5.95
2	Commercial	495	819	1326	10.60	10.10	10.35
3	Electric Vehicle	0	14	31		17.72	
4	Industrial	259	308	360	3.52	3.15	3.34
5	Others	219	324	475	8.17	7.96	8.07
6	Total	1708	2458	3501	7.55	7.33	7.44

Table 18-2 Expected CAGR of Guwahati - Category-wise Consumption

17.5 Transmission & Distribution Losses:

T&D losses of Guwahati were 11.5% in 2022-23. The target level is to bring it down to about 11 % and 10.95 % by the end of 2027-28 & 2032-33 respectively.

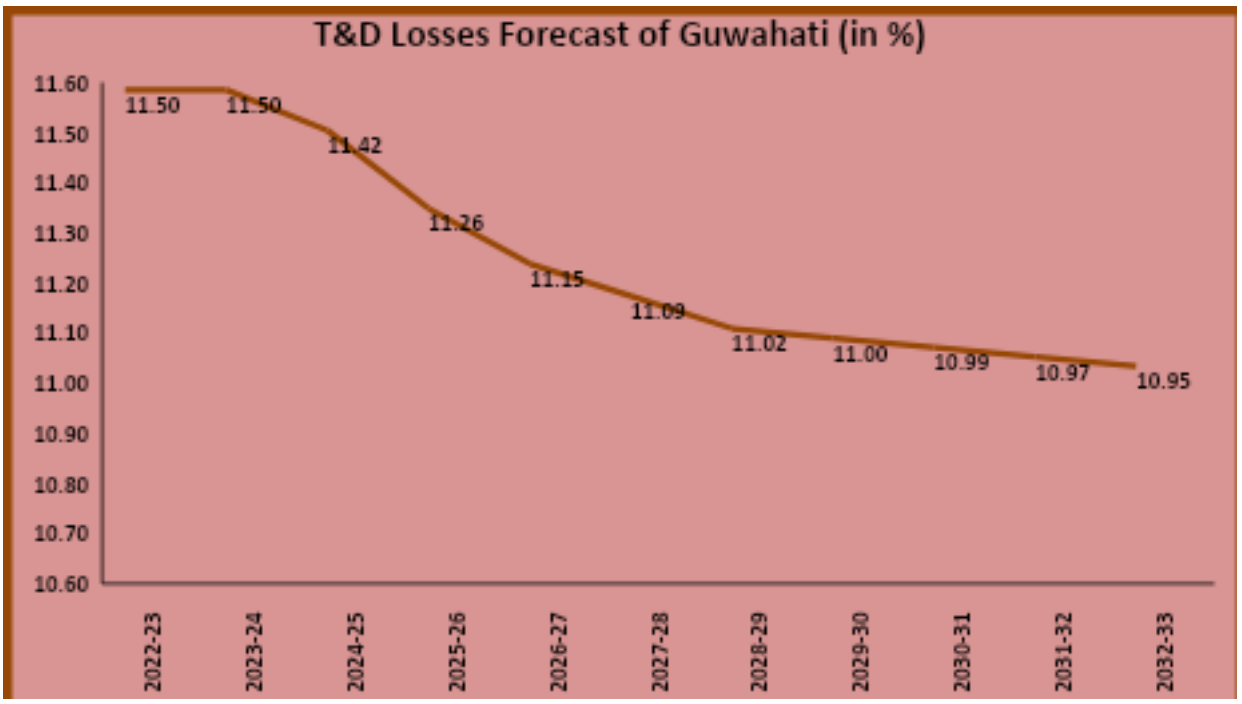

Figure 18-6 T&D Losses Forecast of Guwahati (in %)

17.6 Summary of power forecast of Guwahati city:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in%)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	1930	2764	3932	7.45	7.30
2	**Peak Demand (in MW)**	414	595	851	7.56	7.41
3	**T&D Losses (in %)**	12	11	10.95		

Table 18-3 Power forecast summary of GUWAHATI

****

GUWAHATI											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	735	782	831	883	937	993	1052	1113	1176	1242	1310
Commercial	495	549	607	672	742	819	904	996	1096	1206	1326
Public lighting	6	6	6	7	7	7	8	8	9	9	10
Public Water Works	27	30	34	38	43	48	54	61	68	77	86
EV	0	0	6	9	11	14	17	22	28	30	31
LT Industries	9	10	11	12	14	15	17	18	20	23	25
HT Industries	250	259	267	276	284	293	301	310	318	326	335
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	168	182	197	213	230	248	268	288	310	334	358
Others (if Any)	19	19	19	19	20	20	20	20	20	20	20
Total (Energy Consumption)	1708	1836	1978	2128	2287	2458	2641	2837	3047	3267	3501
T&D losses -MU	222	239	255	270	287	307	327	351	376	402	430
T&D losses -in %	11.50	11.50	11.42	11.26	11.15	11.09	11.02	11.00	10.99	10.97	10.95
Energy Requirement - MU	1930	2074	2233	2398	2574	2764	2968	3187	3423	3669	3932
Annual Load Factor - %	53.27	53.21	53.16	53.11	53.05	53.00	52.95	52.89	52.84	52.79	52.74
Peak Load - MW	414	445	480	516	554	595	640	688	740	793	851

Table 18-4 Category-wise and Year-wise Summary of Guwahati.

Gwalior

Chapter 18: **Gwalior**

18.1 Introduction:

Gwalior is a city in the central Indian state of Madhya Pradesh.

Economy:

Gwalior has a strong textile industry, with numerous textile mills and garment manufacturing units. The city is known for producing fabrics and garments that cater to both domestic and international markets. It is famous for its traditional handicrafts, including leather products, brassware, and traditional jewellery, which have a significant market presence.

Climate:

Gwalior has a sub-tropical climate with hot summers from late March to early July, the monsoon season from late June to early October and a cool dry winter from early November to late February. Temperatures peak in May and June with daily averages being around 33-48 °C. Gwalior receives 750 mm of rain on average per year, most of which is concentrated in the Monsoon months. August is the wettest month with about 250 mm of rain. Winter in Gwalior starts in late October and is generally very mild with daily temperatures averaging in the14-16 °C range.

18.2 Brief description of Power Utilities:

M.P. Madhya Kshetra Vidyut Vitaran Company Limited, Bhopal is responsible power distribution, supply in Bhopal and Gwalior Region.

18.3 Existing Power Scenario:

The total electricity consumption of Gwalior in the year 2022-23 was 1051 MU and with 10.00% T&D losses, the requirement was 1167 MU. The peak demand of the city was 382 MW. The Domestic sector was the biggest consumer of electricity (64%) followed by Commercial (15%) & Industrial (9%).

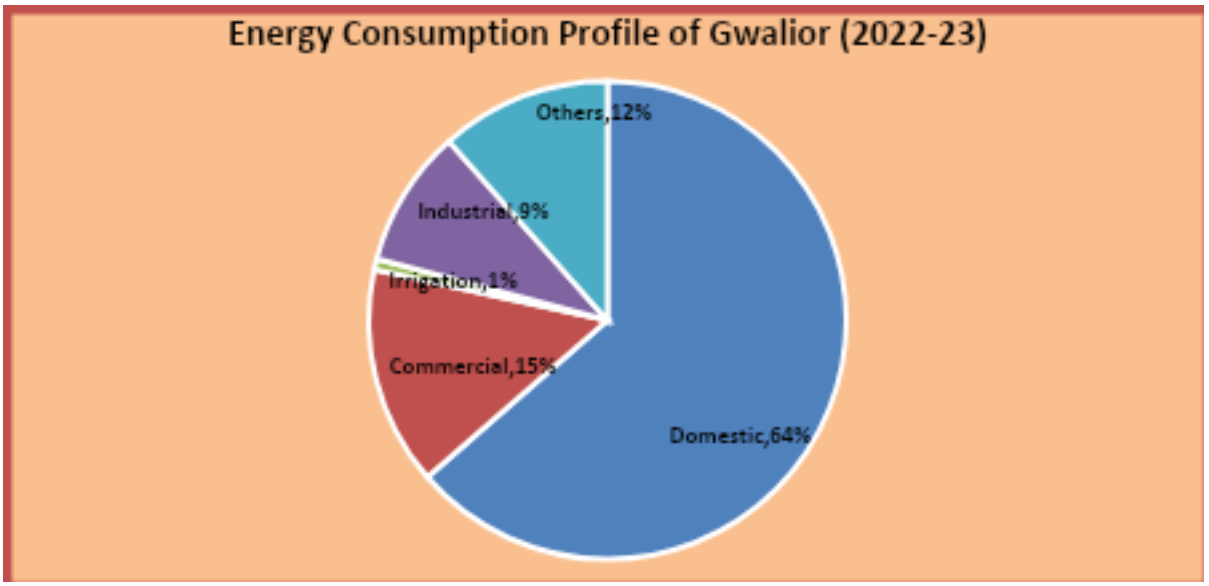

Figure 19-1 Energy Consumption Profile of Gwalior (2022-23)

In a comparison of Gwalior City with Madhya Pradesh for the year 2022-23, it is observed that

the energy requirement of Gwalior was 1.18% of the total energy requirement of the state.

2022-23	Gwalior City	Madhya Pradesh	% Share of Gwalior City
Energy in MU	1167	98863	1.18
Peak Demand in MW	382	17009	2.25

Table 19-1 Comparison of Gwalior City with Madhya Pradesh in 2022-23

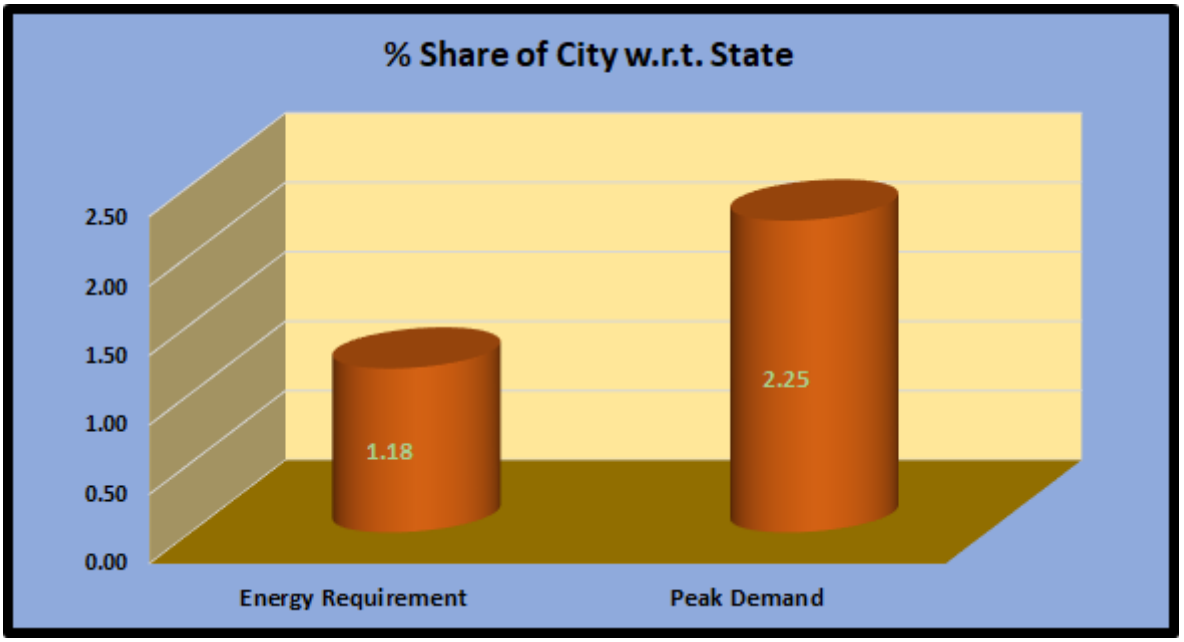

Figure 19-2 Comparison of Gwalior City with Madhya Pradesh in the year 2022-23

18.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Gwalior was 1167 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 1577 MU by the year 2027-28 with a 6.20% CAGR for the period 2022-23 to 2027-28. With a CAGR of 6.42% for the period 2027-28 to 2032-33, its energy requirement is estimated as 2154 MU by the year 2032-33.

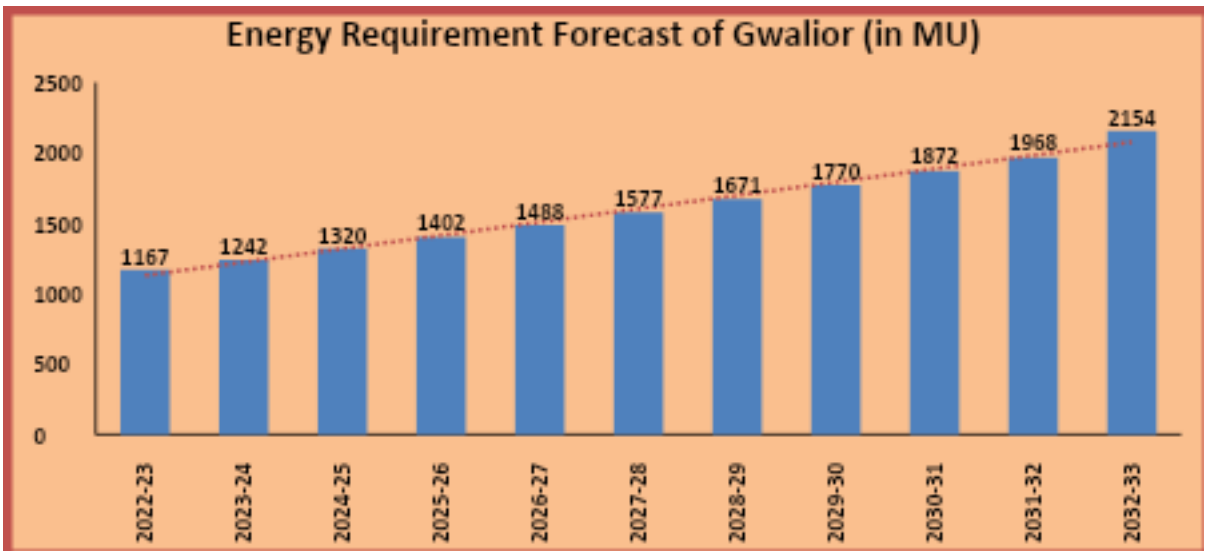

Figure 19-3 Energy Requirement Forecast of Gwalior (in MU)

Peak Demand of the Gwalior is expected to see 7.28% CAGR up to 2027-28 and will reach 542 MW in comparison to 382 MW in the year 2022-23. It is expected to reach 778 MW in the year 2032-33 with a CAGR of 7.50% after 2027-28.

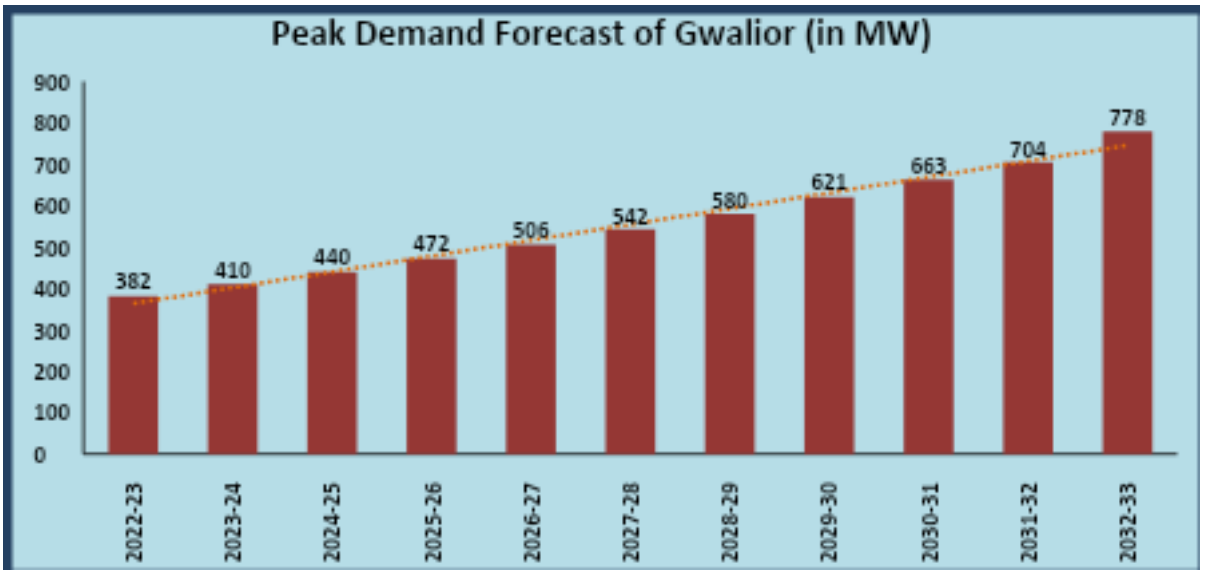

Figure 19-4 Peak Demand Forecast of Gwalior (in MW).

The category-wise energy consumption forecast of Gwalior are as follows:

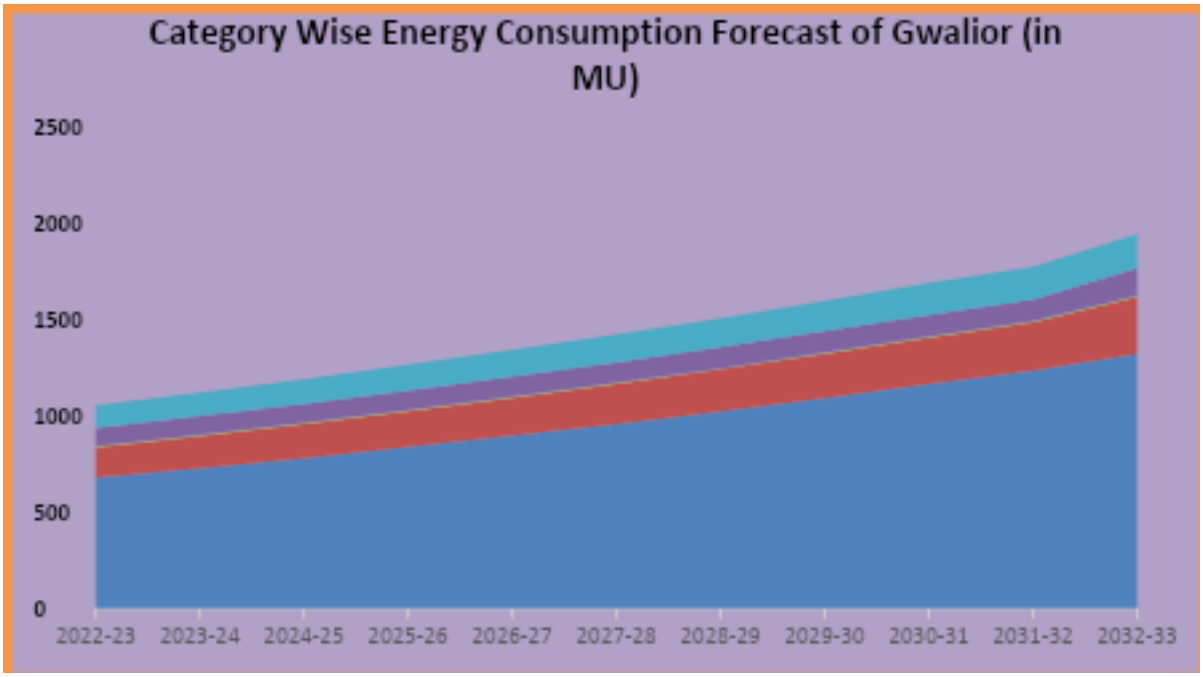

Figure 19-5 Category-wise Energy Consumption Forecast of Gwalior (in MU)

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	Domestic	676	956	1320	7.17	6.67	6.92
2	Commercial	158	205	293	5.35	7.39	6.36
3	Irrigation	7	7	7	0.18	1.03	0.61
4	Industrial	93	107	141	2.91	5.72	4.31
5	Others	117	145	177	4.33	4.05	4.19
6	**Total**	1051	1420	1938	6.20	6.43	6.32

Table 19-2 Expected CAGR of Gwalior - Category-wise Consumption

18.5 Transmission & Distribution Losses:

T&D losses of Gwalior were estimated as 10.00% in year 2022-23. The target is to maintain T&D losses around this level.

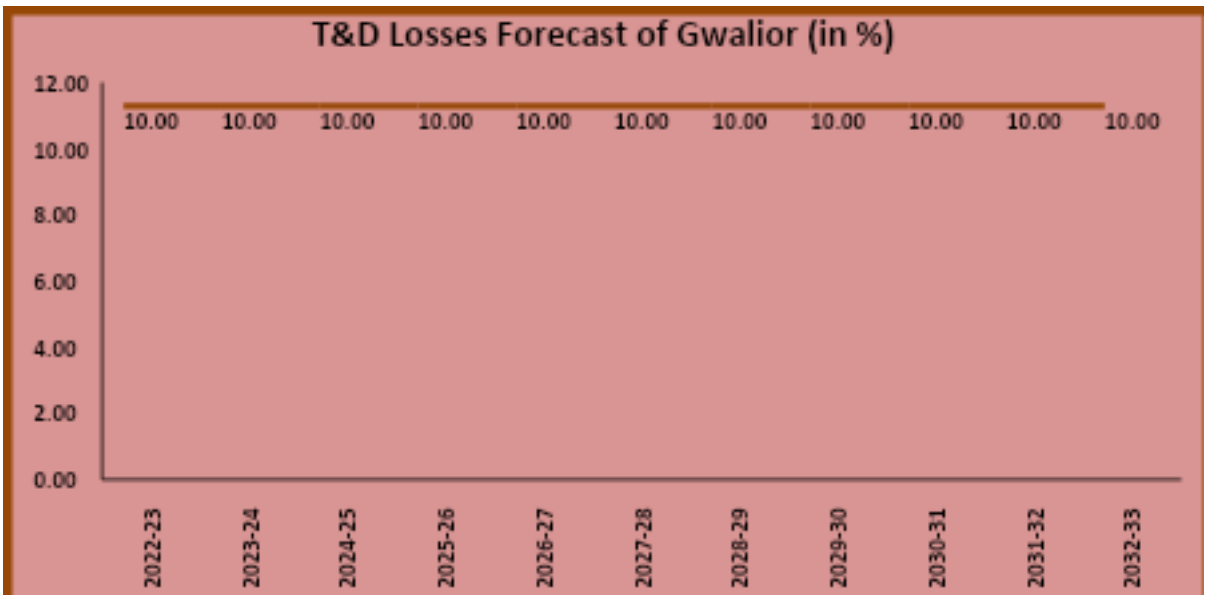

Figure 19-6 T&D Losses Forecast of Gwalior (in %)

18.6 Summary power forecast of Gwalior city:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	1167	1577	2154	6.20	6.42
2	**Peak Demand (in MW)**	382	542	778	7.28	7.50
3	**T&D Losses (in %)**	10	10	10		

Table 19-3 Power forecast summary of Gwalior

****

Gwalior											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	676	726	779	835	894	956	1021	1090	1162	1231	1320
Commercial	158	167	176	185	195	205	216	227	239	250	293
Public lighting	24	26	28	30	32	35	38	41	44	47	51
Public Water Works	80	83	86	89	91	94	97	100	102	105	108
Irrigation	7	7	7	7	7	7	7	7	7	7	7
LT Industries	42	43	44	46	47	48	49	50	50	50	56
HT Industries	51	53	54	56	57	59	60	62	63	63	85
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	2	2	2	2	2	2	2	2	2	2	2
Others (if Any)	11	11	12	12	13	13	14	15	15	16	16
Total (Energy Consumption)	**1051**	**1118**	**1188**	**1261**	**1339**	**1420**	**1504**	**1593**	**1685**	**1771**	**1938**
T&D losses -MU	117	124	132	140	149	158	167	177	187	197	215
T&D losses -in %	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Energy Requirement - MU	**1167**	**1242**	**1320**	**1402**	**1488**	**1577**	**1671**	**1770**	**1872**	**1968**	**2154**
Annual Load Factor - %	34.92	34.57	34.22	33.88	33.54	33.21	32.88	32.55	32.22	31.90	31.58
Peak Load - MW	**382**	**410**	**440**	**472**	**506**	**542**	**580**	**621**	**663**	**704**	**778**

Table 19-4 Category-wise and Year-wise Summary of Gwalior.

Hyderabad

Chapter 19: **Hyderabad**

19.1 Introduction:

Hyderabad is the capital and the largest city of the Indian State of Telangana. The city has emerged as an Indian hub of pharmaceuticals, biotechnology and information technology. The formation of the special economic zones of Hardware Park and HITECH City dedicated to the information technology, has encouraged leading multinationals to setup operations in Hyderabad.

Economy:

From the 1950s to the 1970s, Indian enterprises, such BHEL, NFC, NMDC, BEL, ECIL, DRDO, HAL, CCMB, CDFD State Bank of Hyderabad and Andhra Bank were established in the city. The Automotive Industry in Hyderabad is also emerging and making it an automobile hub. Automobile companies including as Hyundai, Allwyn, Praga Tools, HMT Bearings, Ordinance Factory Medak, Deccan Auto and Mahindra & Mahindra have unit in the Hyderabad Economic Zone.

Climate:

Hyderabad has a tropical and wet dry climate. The annual mean temperature is 26.6 °C. Summers (March–June) are hot and dry, with average highs in the mid-to-high 30 °C, maximum temperatures often exceed 40 °C between April & June. The coolest temperatures occur in the month of December & January, when the lowest temperature occasionally dips to 10 °C.

19.2 Brief description of Power Utilities:

Telangana Southern Power Distribution Company Limited (TGSPDCL) has the responsibility of power distribution in Hyderabad City.

19.3 Existing Power Scenario:

The total electricity consumption of Hyderabad in the year 2022-23 was 20328 MU and with 9.96% T&D losses, the requirement was 22576 MU. The peak demand of the city was 3454 MW. The Domestic sector was the biggest consumer of electricity (37%) followed by Industrial (27%) & Commercial (22%).

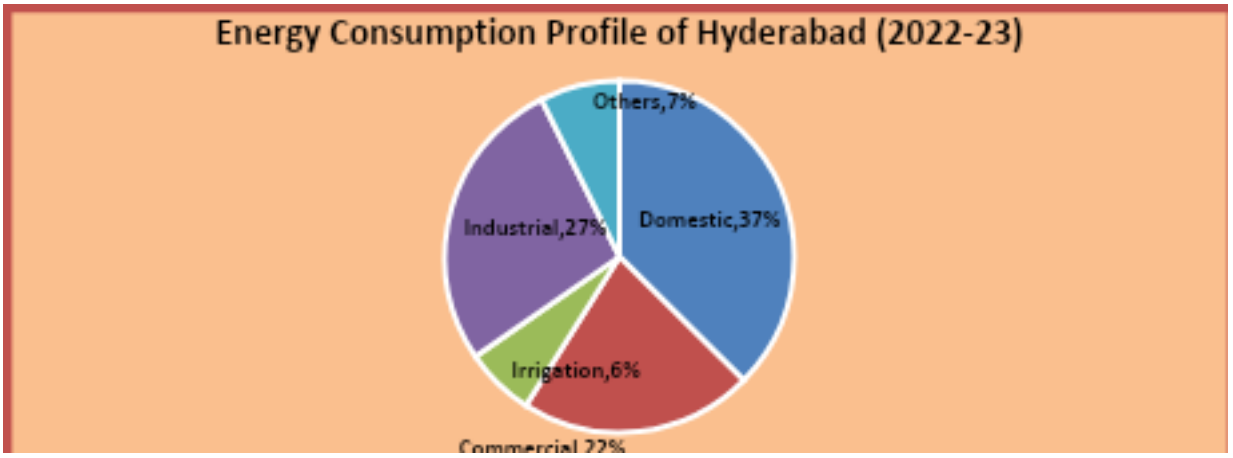

Figure 20-1 Energy Consumption Profile of Hyderabad (2022-23)

In a comparison of Hyderabad City with Telangana for the year 2022-23, it is observed that the energy requirement of Hyderabad was 30.83% of the total energy requirement of the state.

2022-23	Hyderabad City	Telangana	% Share of Hyderabad City
Energy in MU	22576	73229	30.83
Peak Demand in MW	3454	14663	23.56

Table 20-1 Comparison of Hyderabad with Telangana in 2022-23

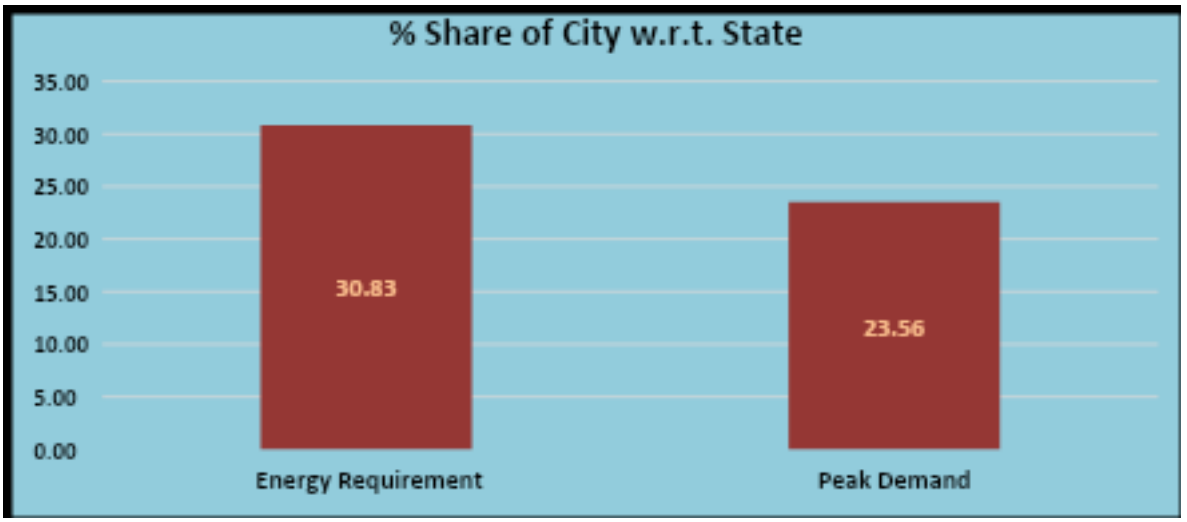

Figure 20-2 Comparison of Hyderabad City with Telangana in the year 2022-23.

19.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Hyderabad was 22576 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 32913 MU by the year 2027-28 with a 7.83% CAGR for the period 2022-23 to 2027-28. With a CAGR of 6.36% for the period 2027-28 to 2032-33, its energy requirement is estimated as 44802 MU by the year 2032-33.

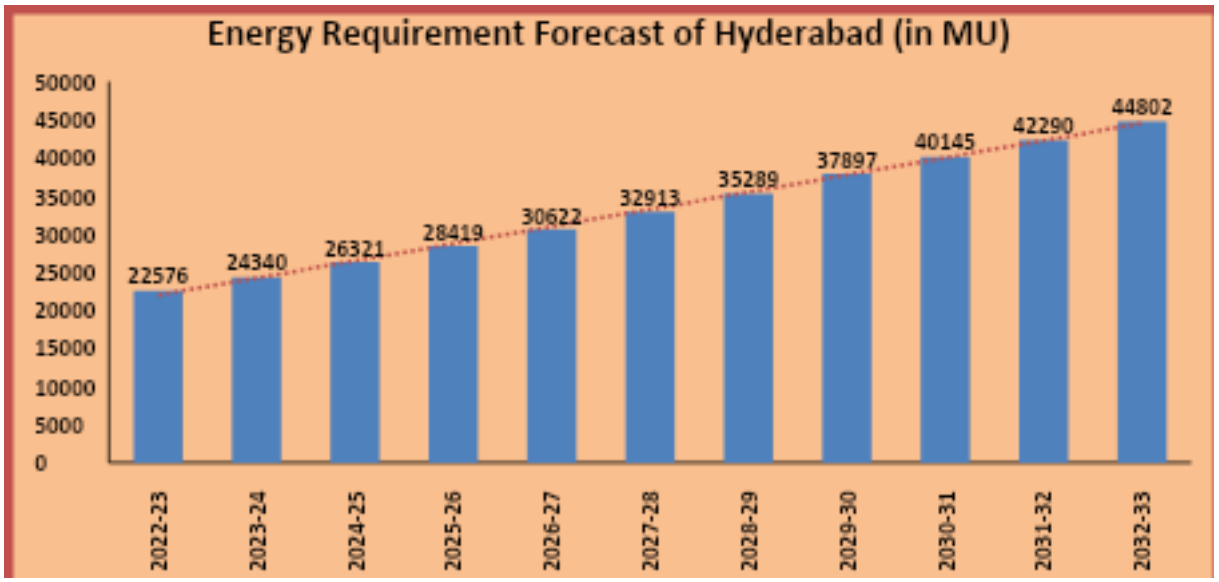

Figure 20-3 Energy Requirement Forecast of Hyderabad (in MU)

Peak Demand of the Hyderabad is expected to see 10.47% CAGR upto 2027-28 and will reach 5682 MW in comparison to 3454 MW in the year 2022-23. It is expected to reach 8876 MW in the year 2032-33 with a CAGR of 9.33% after 2027-28.

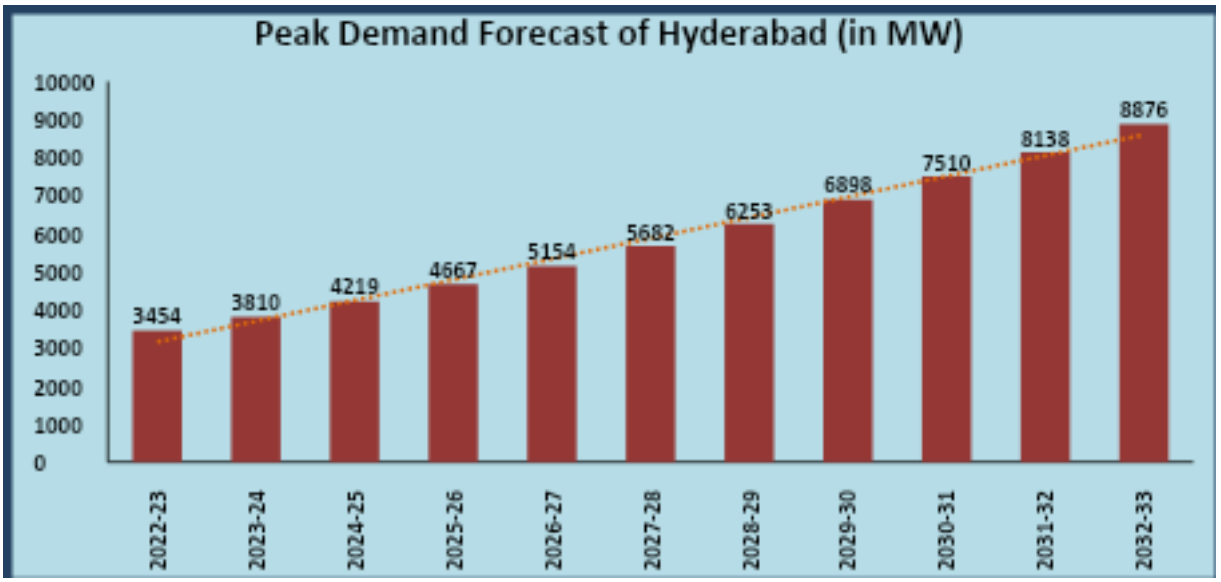

Figure 20-4 Peak Demand Forecast of Hyderabad (in MW)

The category-wise energy consumption forecast of Hyderabad are as follows:

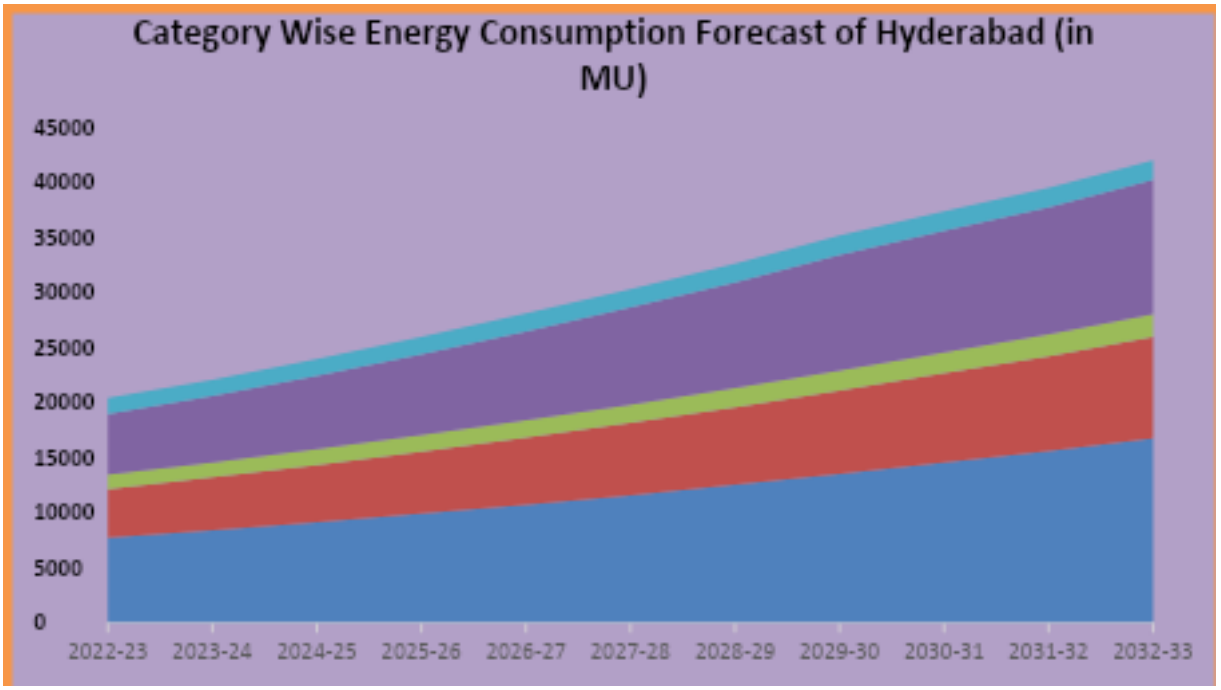

Figure 20-5 Category-wise Energy Consumption Forecast of Hyderabad (in MU)

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33

1	Domestic	7674	11546	16668	8.51	7.62	8.07
2	Commercial	4417	6541	9222	8.17	7.11	7.64
3	Irrigation	1287	1676	2078	5.42	4.40	4.91
4	Industrial	5508	8814	12179	9.86	6.68	8.26
5	Others	1442	1650	1806	2.74	1.82	2.28
6	Total	20328	30227	41953	8.26	6.78	7.51

Table 20-2 Expected CAGR of Hyderabad - Category-wise Consumption

19.5 Transmission & Distribution Losses:

T&D losses of Hyderabad were estimated as 9.96% in year 2022-23. The target level is to bring it down to about 8.16% and 6.36% by the end of 2027-28 & 2032-33 respectively.

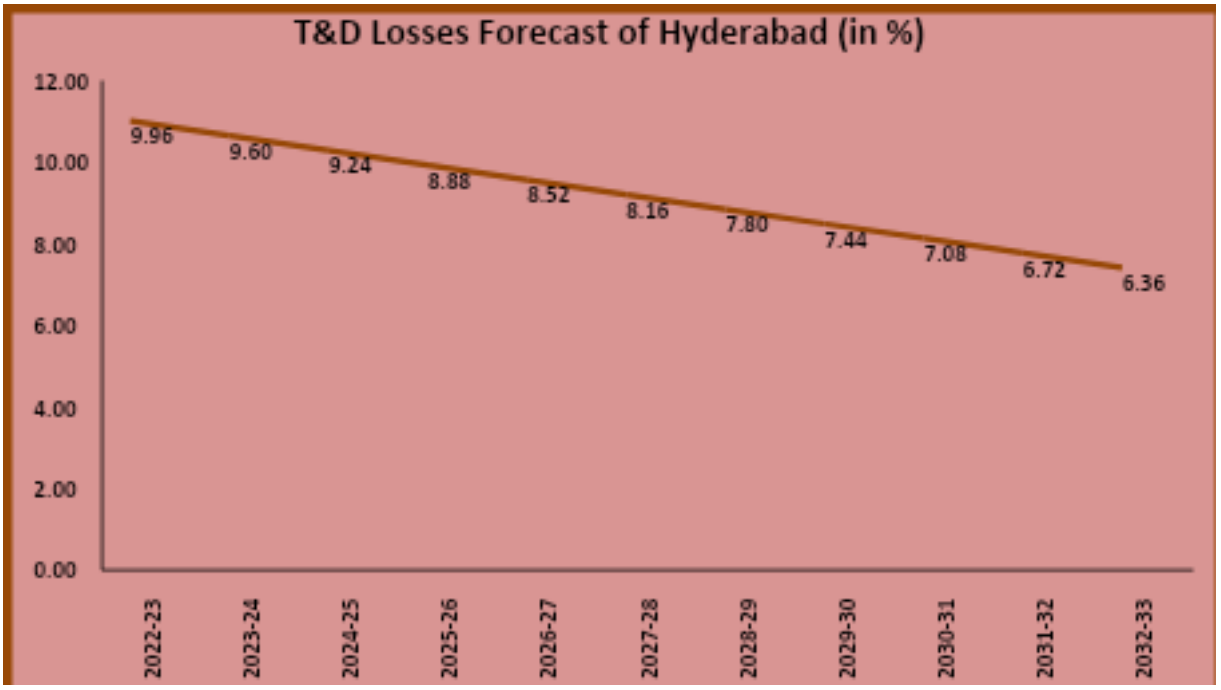

Figure 20-6 T&D Losses Forecast of Hyderabad (in %)

19.6 Summary of power forecast of Hyderabad city:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	Energy Requirement (in MU)	22576	32913	44802	7.83	6.36
2	Peak Demand (in MW)	3454	5682	8876	10.47	9.33
3	T&D Losses (in %)	9.96	8.16	6.36		

Table 20-3 Power forecast summary of Hyderabad

****

Hyderabad											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	7674	8357	9085	9857	10677	11546	12469	13452	14505	15542	16668
Commercial	4417	4798	5201	5627	6073	6541	7032	7547	8092	8598	9222
Public lighting	155	159	163	167	171	174	177	180	183	185	187
Public Water Works	47	48	50	51	52	53	54	55	56	56	57
Irrigation	1287	1359	1434	1509	1596	1676	1756	1837	1918	1998	2078
LT Industries	649	666	682	697	709	720	729	736	740	741	749
HT Industries	4859	5335	5957	6634	7345	8093	8864	9785	10297	10789	11430
Railway Traction	187	199	211	224	236	249	262	275	289	302	316
Bulk Supply	513	527	541	554	566	578	588	597	606	613	619
Others (if Any)	540	553	565	576	587	597	605	613	619	624	628
Total (Energy Consumption)	**20328**	**22004**	**23889**	**25896**	**28013**	**30227**	**32537**	**35078**	**37304**	**39449**	**41954**
T&D losses -MU	2248	2336	2432	2523	2608	2685	2752	2819	2842	2841	2849
T&D losses -in %	9.96	9.60	9.24	8.88	8.52	8.16	7.80	7.44	7.08	6.72	6.36
Energy Requirement - MU	**22576**	**24340**	**26321**	**28419**	**30622**	**32913**	**35289**	**37897**	**40145**	**42290**	**44802**
Annual Load Factor - %	74.62	72.92	71.22	69.52	67.82	66.12	64.42	62.72	61.02	59.32	57.62
Peak Load - MW	**3454**	**3810**	**4219**	**4667**	**5154**	**5682**	**6253**	**6898**	**7510**	**8138**	**8876**

Table 20-4 Category-wise and Year-wise Summary of Hyderabad.

Imphal

Chapter 20: **Imphal**

20.1 Introduction:

Imphal is the capital city of the Indian state of Manipur.

Economy:

Imphal's economy is diverse, driven by agriculture, trade, government services, handicrafts, and tourism. The fertile Imphal Valley supports significant agricultural activity, including staple and cash crops. As the capital of Manipur, it houses numerous government offices that provide employment. Imphal is renowned for its traditional handicrafts, such as handloom textiles and Manipuri jewelry, which bolster both the economy and cultural heritage. Tourism thrives with attractions like Kangla Fort and Loktak Lake, supporting local businesses.

Climate:

Imphal experiences a subtropical highland climate with notable seasonal variations. Summers (March to June) are relatively mild, with temperatures between 20°C and 35°C (68°F to 95°F) and moderate humidity. The monsoon season (June to September) brings heavy rainfall, averaging 1,500 to 2,000 mm (59 to 79 inches), leading to high humidity and occasional flooding. Winters (October to February) are cool and comfortable, with temperatures ranging from 5°C to 20°C (41°F to 68°F).

20.2 Brief description of Power Utilities:

The former Electricity Department of the Government of Manipur was restructured into two state-owned entities, Manipur State Power Company Ltd. (MSPCL) and Manipur State Power Distribution Company Ltd. (MSPDCL), effective February 1, 2014, under the Manipur State Electricity Reforms Transfer Scheme 2013, as required by the Electricity Act 2003. MSPDCL is responsible for distribution of electricity in Imphal.

20.3 Existing Power Scenario:

The total electricity consumption of Imphal in the year 2022-23 was 467 MU and with 17 % T&D losses, the requirement was 563 MU. The peak demand of the city was 154 MW. The Domestic sector was the biggest consumer of electricity (66%) followed by Commercial (11%).

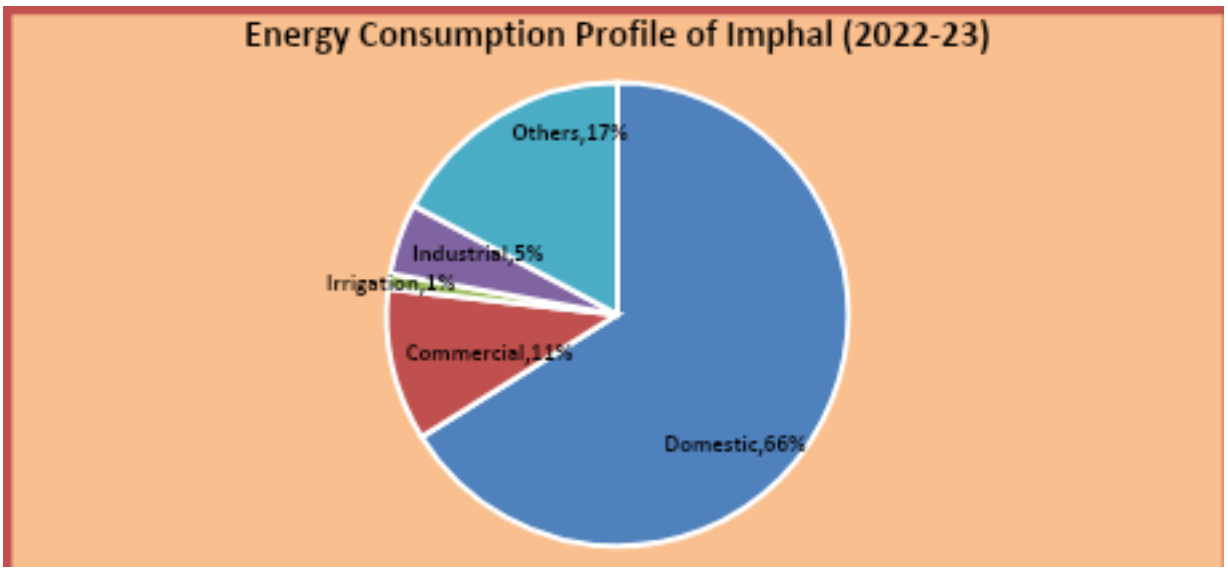

Figure 21-1 Energy Consumption Profile of Imphal (2022-23).

*Others category in Fig 21.1 includes load of public lighting, public water works, bulk supply and any other load

On comparison of Imphal with Manipur for the year 2022-23, it is observed that the energy requirement of Imphal was 51.73% of the total energy requirement of the state.

2022-23	IMPHAL City	Manipur	% Share of IMPHAL City
Energy in MU	563	1089	51.70
Peak Demand in MW	154	276	55.80

Table 21-1 Comparison of Imphal with Manipur in 2022-23.

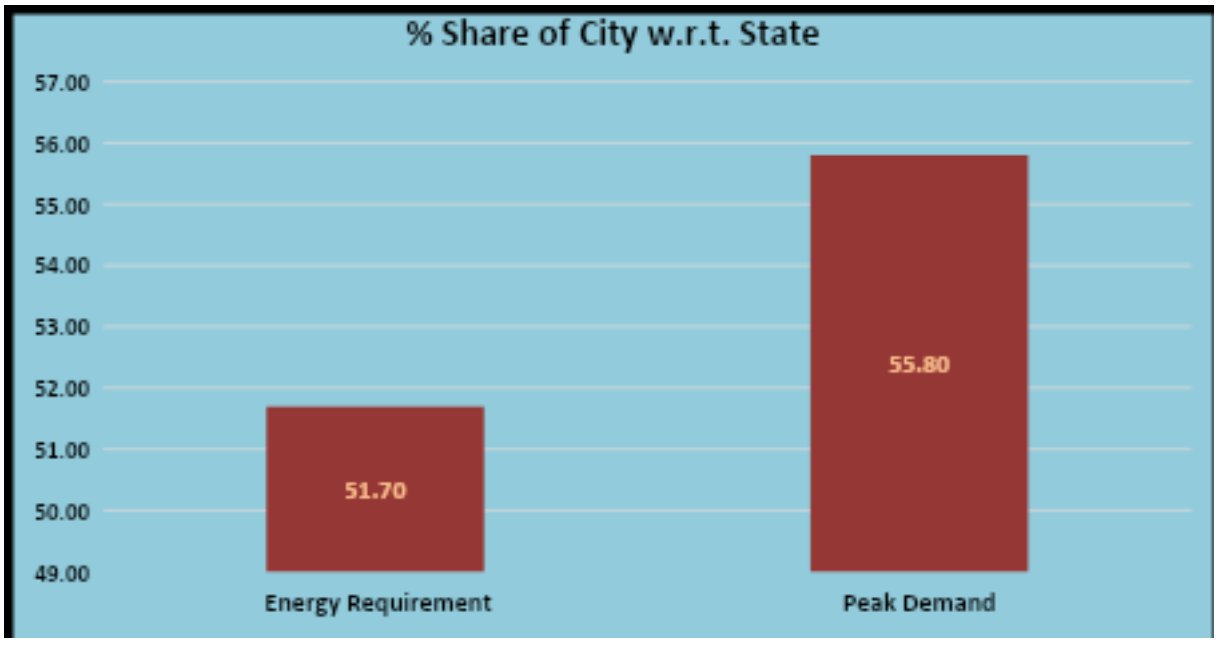

Figure 21-2 Comparison of Imphal with Manipur in the year 2022-23.

20.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Imphal was 563 MU in the year 2022-23. It is expected that the energy requirement of the city will

reach to 784 MU by the year 2027-28 with a 6.83 % CAGR for the period 2022-23 to 2027-28. With a CAGR of 6.42 % for the period 2027-28 to 2032-33, its energy requirement is estimated as 1070 MU by the year 2032-33.

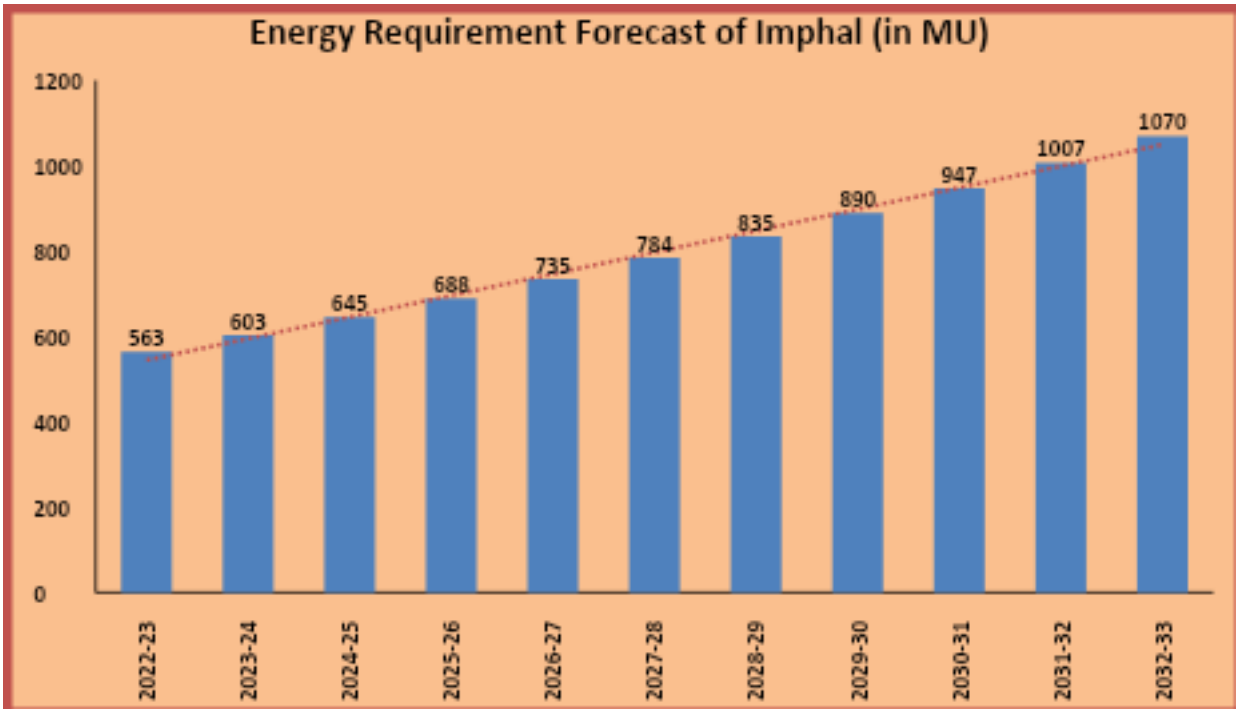

Figure 21-3 Energy Requirement Forecast of Imphal (in MU)

Peak Demand of Imphal is expected to see 6.93 % CAGR upto 2027-28 and will reach 215 MW in comparison to 154 MW in year 2022-23. It is expected to reach 295 MW in year 2032-33 with a CAGR of 6.53 % after 2027- 28.

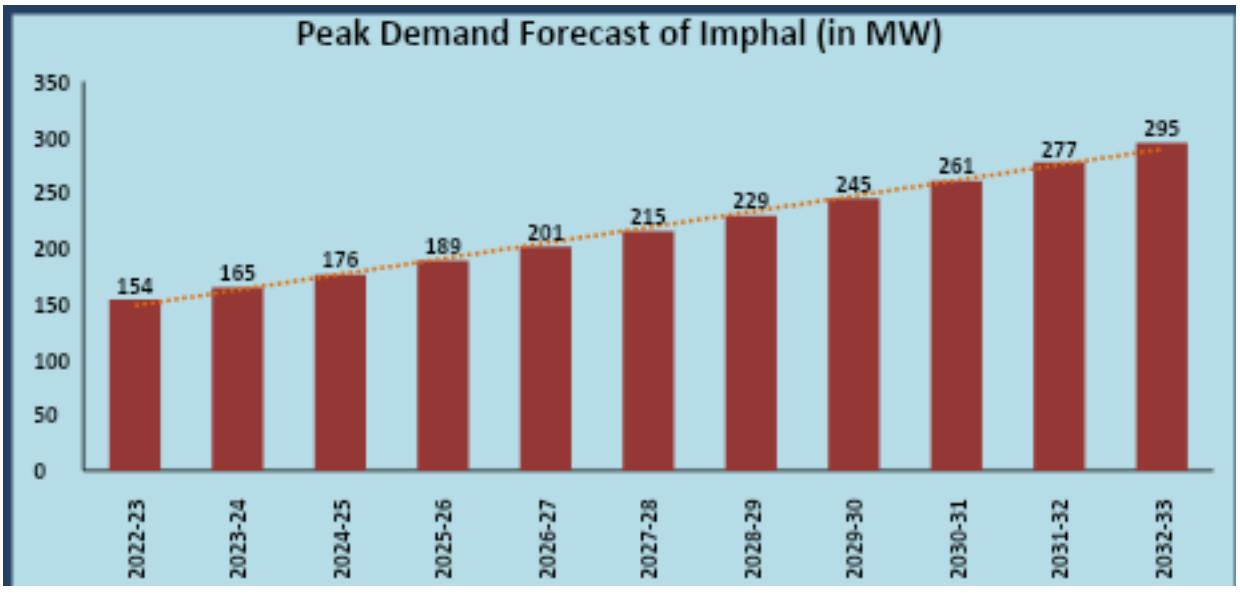

Figure 21-4 Peak Demand Forecast of Imphal (in MW)

The category-wise energy consumption forecast of Imphal are as follows:

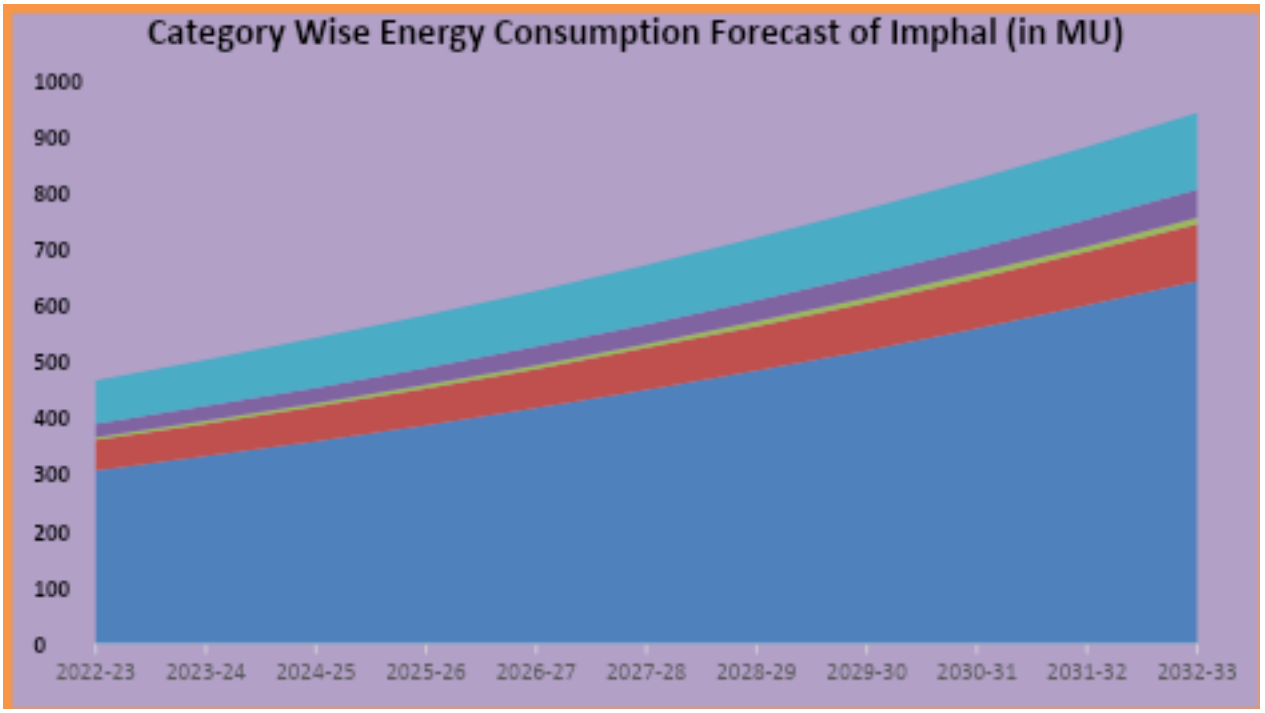

Figure 21-5 Category-wise Energy Consumption Forecast of Imphal (in MU).

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	Domestic	308	450	644	7.92	7.42	7.67
2	Commercial	54	74	100	6.70	6.20	6.45
3	Irrigation	5	8	11	8.70	7.31	8.00
4	Industrial	24	35	50	7.80	7.36	7.58
5	Others	77	105	137	6.38	5.45	5.91
6	Total	467	672	942	7.53	6.98	7.26

Table 21-2 Expected CAGR of Imphal - Category-wise Consumption

20.5 Transmission & Distribution Losses:

T&D losses of Imphal were 17 % in 2022-23. The target level is to bring it down to about 14 % and 12 % by the end of 2027-28 & 2032-33 respectively.

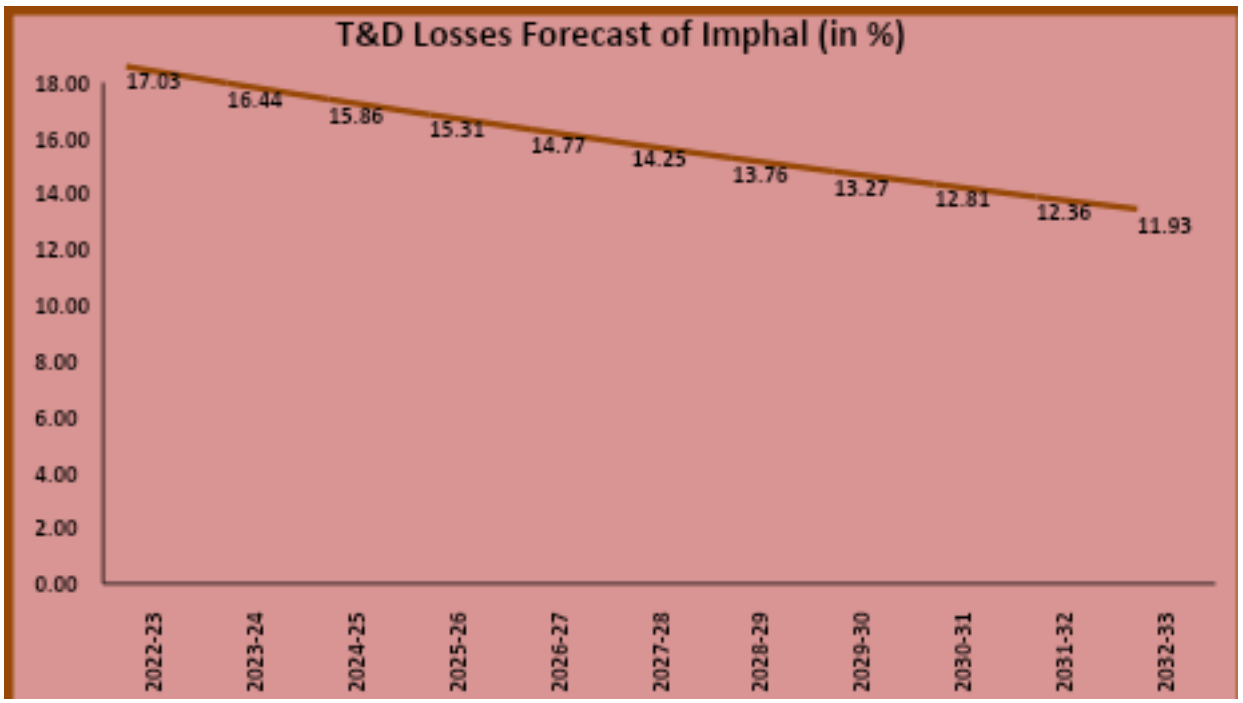

Figure 21-6 T&D Losses Forecast of Imphal (in %)

20.6 Summary of power forecast of Imphal city:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	563	784	1070	6.83	6.42
2	**Peak Demand (in MW)**	154	215	295	6.93	6.53
3	**T&D Losses (in %)**	17	14	12		

Table 21-3 Power forecast summary of Imphal

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IMPHAL											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	308	333	359	388	418	450	485	521	560	601	644
Commercial	54	57	61	65	70	74	79	84	89	95	100
Public lighting	5	6	7	8	9	10	11	12	13	14	15
Public Water Works	16	17	18	19	20	22	23	24	26	27	29
Irrigation	5	6	6	7	7	8	8	9	10	11	11
LT Industries	15	16	18	19	21	23	25	27	29	31	34
HT Industries	9	9	10	11	11	12	13	14	14	15	16
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	56	59	63	66	70	73	77	81	85	89	93
Others (if Any)	0	0	0	0	0	0	0	0	0	0	0
Total (Energy Consumption)	**467**	**504**	**542**	**583**	**626**	**672**	**720**	**771**	**825**	**882**	**942**
T&D losses -MU	96	99	102	105	109	112	115	118	121	124	128
T&D losses -in %	17.03	16.44	15.86	15.31	14.77	14.25	13.76	13.27	12.81	12.36	11.93
Energy Requirement - MU	**563**	**603**	**645**	**688**	**735**	**784**	**835**	**890**	**947**	**1007**	**1070**
Annual Load Factor - %	41.81	41.77	41.73	41.69	41.65	41.60	41.56	41.52	41.48	41.44	41.40
Peak Load - MW	**154**	**165**	**176**	**189**	**201**	**215**	**229**	**245**	**261**	**277**	**295**

Table 21-4 Category-wise and Year-wise Summary of Imphal.

Indore

Chapter 21: **Indore**

21.1 Introduction:

Indore is the largest and most populous city in the Indian state of Madhya Pradesh. It is the commercial hub of Madhya Pradesh. It is consistently ranked as the cleanest city in India. It has been ranked as India's cleanest city seven years (2017 to 2023) and also declared as India's first 'water plus' city under the Swachhta Survekshan 2021.

Economy:

Indore is a commercial center for goods and services. The city has IT Parks, Crystal IT Park, Pardeshipura IT Park, Electronic Complex and Individual Special Economic Zones (SEZs) such as TCS SEZ, Infosys SEZ, Impetus SEZ, Diamond Park, Gems and Jewellery Park, Food Park, Apparel Park, Namkeen Cluster and Pharma Cluster.

Climate:

Indore lies on a borderline between a humid subtropical climate and a tropical savanna climate. Three distinct seasons are observed: summer, monsoon and winter. Indore gets moderate rainfall of 700 to 800 mm during June-September due to the southwest monsoon.

21.2 Brief description of Power Utilities:

M.P. Paschim Kshetra Vidyut Vitaran Company Limited, Indore is responsible for power distribution, supply in Indore & Ujjain Region

21.3 Existing Power Scenario:

The total electricity consumption of Indore in the year 2022-23 was 2763 MU and with 11.04% T&D losses, the requirement was 3106 MU. The peak demand of the city was 630 MW. The Domestic sector was the biggest consumer of electricity (48%) followed by Commercial (24%) & Industrial (24%).

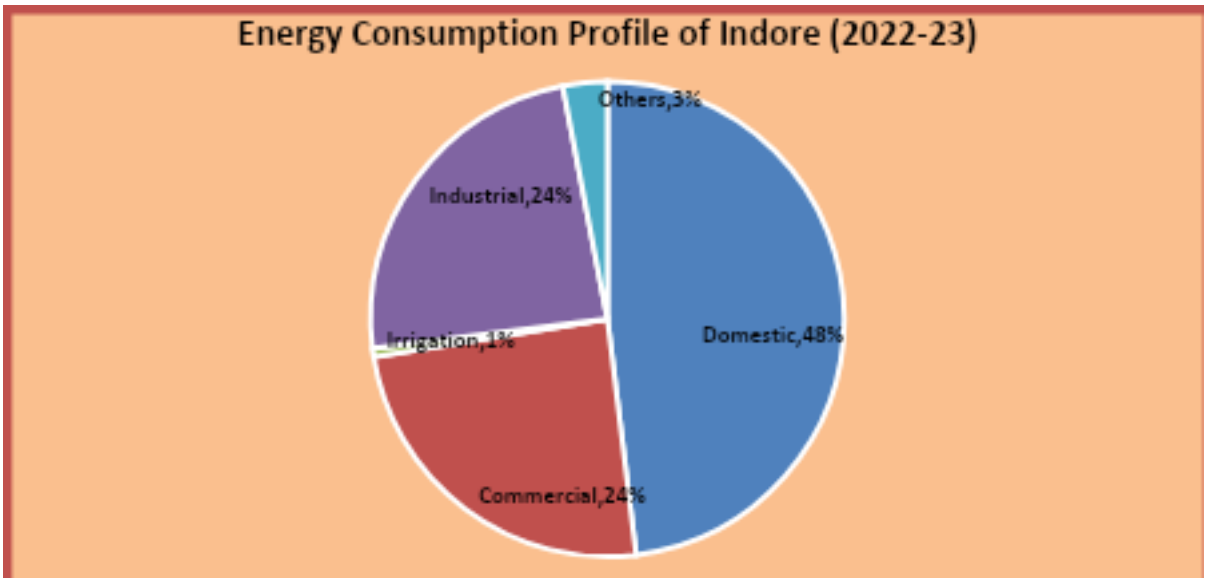

Figure 22-1 Energy Consumption Profile of Indore (2022-23)

In a comparison of Indore City with Madhya Pradesh for the year 2022-23, it is observed that

the energy requirement of Indore was 3.14% of the total energy requirement of the state whereas its contribution in population and area was only 8.81% and 0.17% respectively.

2022-23	Indore City	Madhya Pradesh	% Share of Indore City
Energy in MU	3106	98863	3.14
Peak Demand in MW	630	17009	3.70

Table 22-1 Comparison of Indore City with Madhya Pradesh in 2022-23

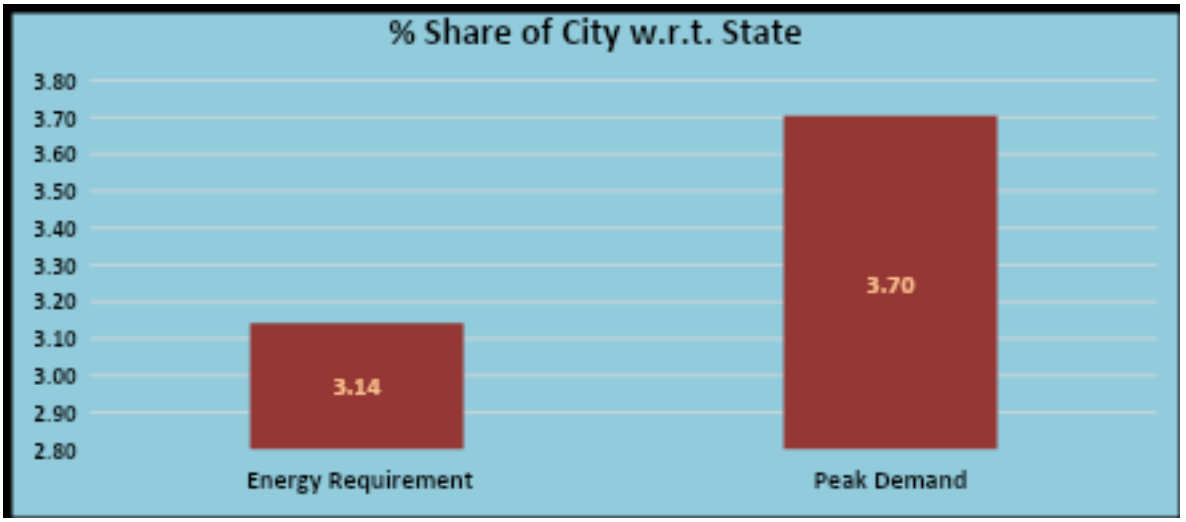

Figure 22-2 Comparison of Indore City and Madhya Pradesh in the year 2022-23.

21.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Indore was 3106 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 3716 MU by the year 2027-28 with a 3.65% CAGR for the period 2022-23 to 2027-28. With a CAGR of 3.34% for the period 2027-28 to 2032-33, its energy requirement is estimated as 4379 MU by the year 2032-33.

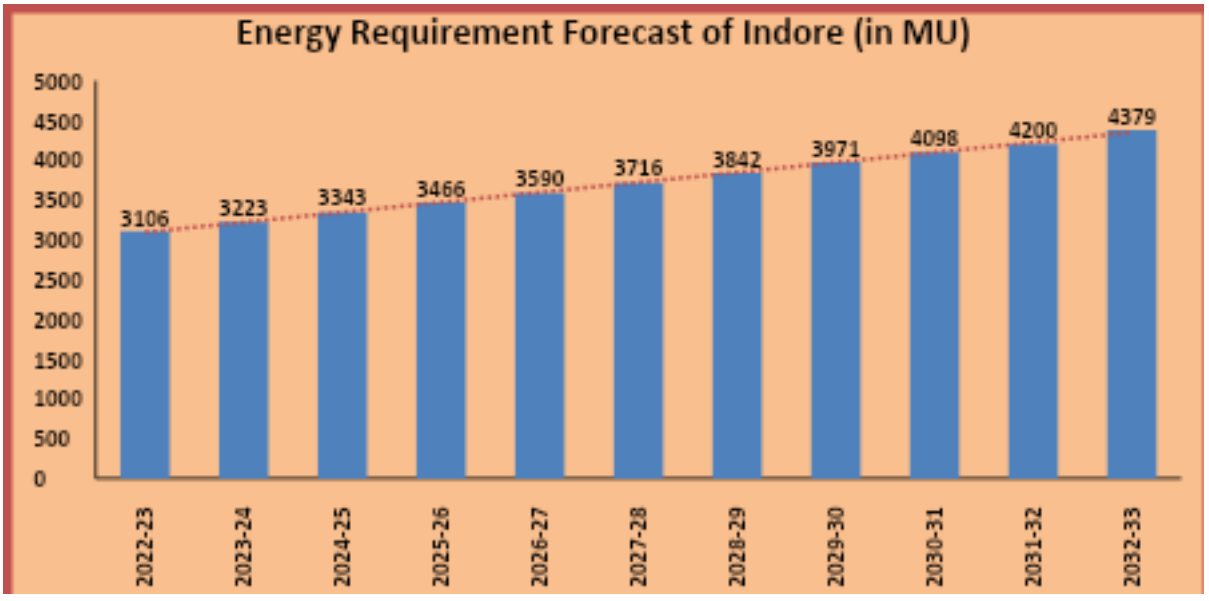

Figure 22-3 Energy Requirement Forecast of Indore (in MU)

Peak Demand of the Indore is expected to see 6.20% CAGR upto 2027-28 and will reach 852

MW in comparison to 630 MW in the year 2022-23. It is expected to reach 1133 MW in the year 2032-33 with a CAGR of 5.88% after 2027-28.

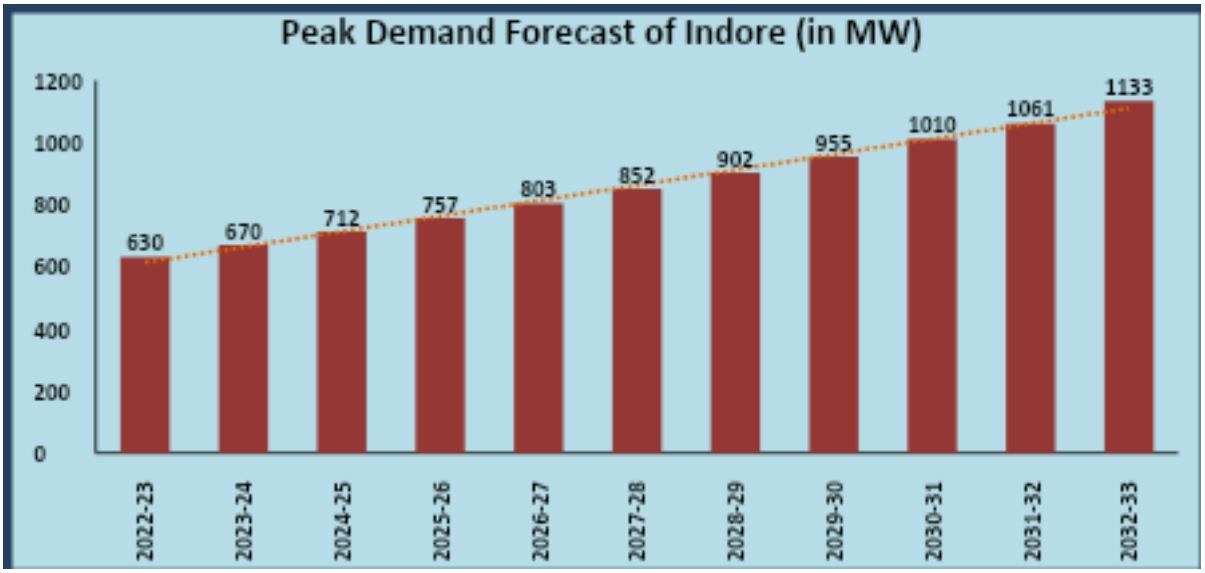

Figure 22-4 Peak Demand Forecast of Indore (in MW)

The category-wise energy consumption forecast of Indore are as follows:

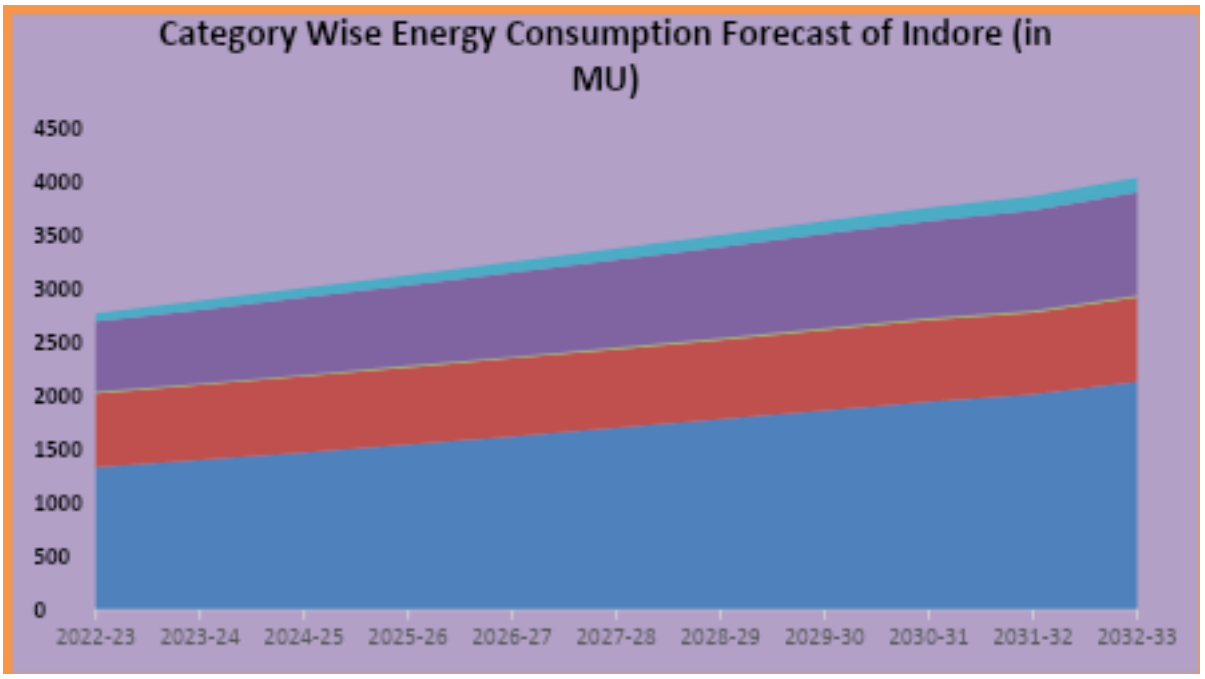

Figure 22-5 Category-wise Energy Consumption Forecast of Indore (in MU)

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	Domestic	1323	1691	2127	5.03	4.69	4.86

2	Commercial	688	735	784	1.31	1.30	1.30
3	Irrigation	15	17	19	2.28	1.85	2.06
4	Industrial	656	817	960	4.49	3.28	3.88
5	Others	79	107	141	6.15	5.69	5.92
6	**Total**	2763	3367	4030	4.04	3.66	3.85

Table 22-2 Expected CAGR of Indore - Category-wise Consumption

21.5 Transmission & Distribution Losses:

T&D losses of Indore were 11.04% in year 2022-23. The target level is to bring it down to about 9.39% and 7.98% by the end of 2027-28 & 2032-33 respectively.

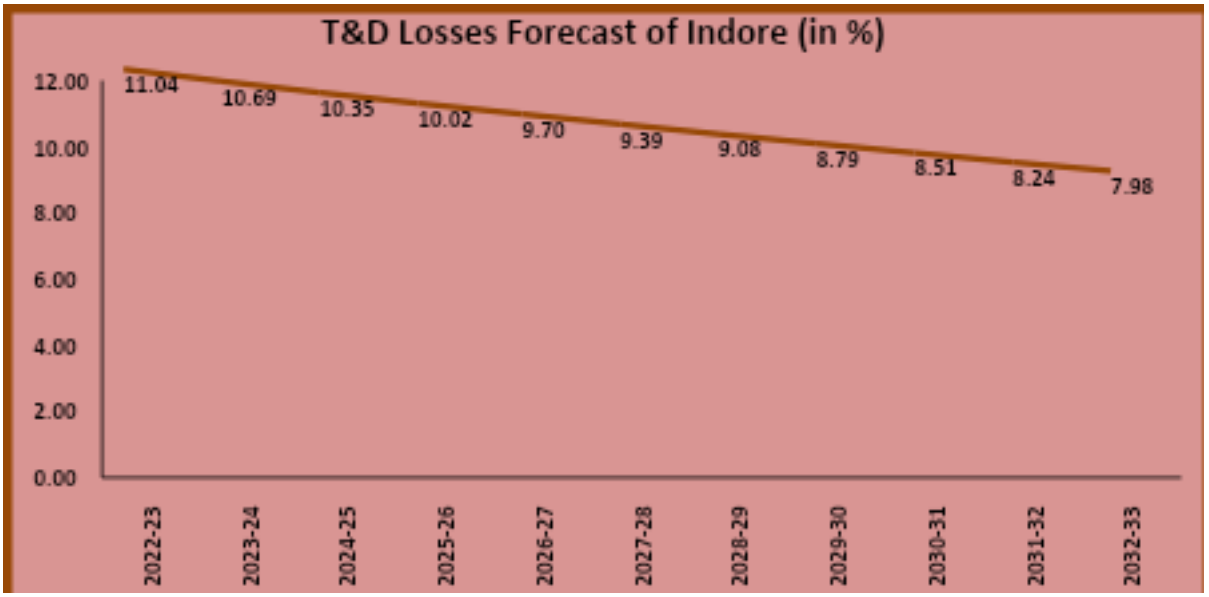

Figure 22-6 T&D Losses Forecast of Indore (in %)

21.6 Summary of Power forecast of Indore city:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	3106	3716	4379	3.65	3.34
2	**Peak Demand (in MW)**	630	852	1133	6.20	5.88
3	**T&D Losses (in %)**	11.04	9.39	7.98		

Table 22-3 Power forecast summary of Indore

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Indore											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	1323	1393	1464	1538	1614	1691	1771	1852	1936	2007	2127
Commercial	688	698	708	717	726	735	743	751	760	761	784
Public lighting	40	43	45	47	49	52	54	57	60	62	65
Public Water Works	39	42	45	48	51	55	59	62	67	71	76
Irrigation	15	16	16	16	17	17	18	18	18	19	19
LT Industries	228	232	237	241	244	247	249	250	251	252	253
HT Industries	429	455	483	511	540	570	600	630	658	682	707
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	0	0	0	0	0	0	0	0	0	0	0
Others (if Any)	0	0	0	0	0	0	0	0	0	0	0
Total (Energy Consumption)	**2763**	**2879**	**2998**	**3119**	**3242**	**3367**	**3493**	**3622**	**3749**	**3854**	**4030**
T&D losses -MU	343	345	346	347	348	349	349	349	349	346	349
T&D losses -in %	11.04	10.69	10.35	10.02	9.70	9.39	9.08	8.79	8.51	8.24	7.98
Energy Requirement - MU	**3106**	**3223**	**3343**	**3466**	**3590**	**3716**	**3842**	**3971**	**4098**	**4200**	**4379**
Annual Load Factor - %	56.24	54.89	53.58	52.29	51.03	49.81	48.61	47.45	46.31	45.20	44.11
Peak Load - MW	**630**	**670**	**712**	**757**	**803**	**852**	**902**	**955**	**1010**	**1061**	**1133**

Table 22-4 Category-wise and Year-wise Summary of Indore.

Itanagar

Chapter 22: **Itanagar**

22.1 Introduction:

Itanagar is the capital of Arunachal Pradesh, a state in northeastern India. It is situated north of the Brahmaputra River in the southwestern part of the state. Itanagar is not only the capital city of Arunachal Pradesh, but also the largest city in Arunachal Pradesh. Itanagar is known for its scenic beauty, cultural diversity, and strategic significance.

Economy:

Itanagar's economy is multifaceted, driven by agriculture, trade, government services, handicrafts, and tourism. Agriculture thrives with the cultivation of rice, maize, vegetables, and fruits due to fertile land. As a commercial hub, Itanagar's markets facilitate the trade of agricultural produce and handicrafts, benefiting from its strategic location. Traditional handicrafts, such as woven textiles and bamboo products, enrich the cultural heritage and economy.

Climate:

Itanagar experiences a subtropical highland climate with distinct seasonal variations. Summers (March to June) are warm but pleasant, with temperatures between 20°C and 30°C (68°F to 86°F). The monsoon season (June to September) brings heavy rainfall, averaging 2,000 to 3,000 mm (79 to 118 inches) annually, with high humidity and frequent showers leading to lush greenery and occasional flooding. Winters (October to February) are mild and comfortable, with temperatures ranging from 10°C to 20°C (50°F to 68°F).

22.2 Brief description of Power Utilities:

In Itanagar, the Dept of Power Arunachal Pradesh (DoPAP) is responsible for distribution of electricity.

22.3 Existing Power Scenario:

The total electricity consumption of Itanagar in the year 2022-23 was 174 MU with 22.38% T&D losses, the requirement was 224 MU. The peak demand of the city was 48 MW. The Industrial sector was the biggest consumer of electricity (46%) followed by Domestic (30%) and Commercial (18%).

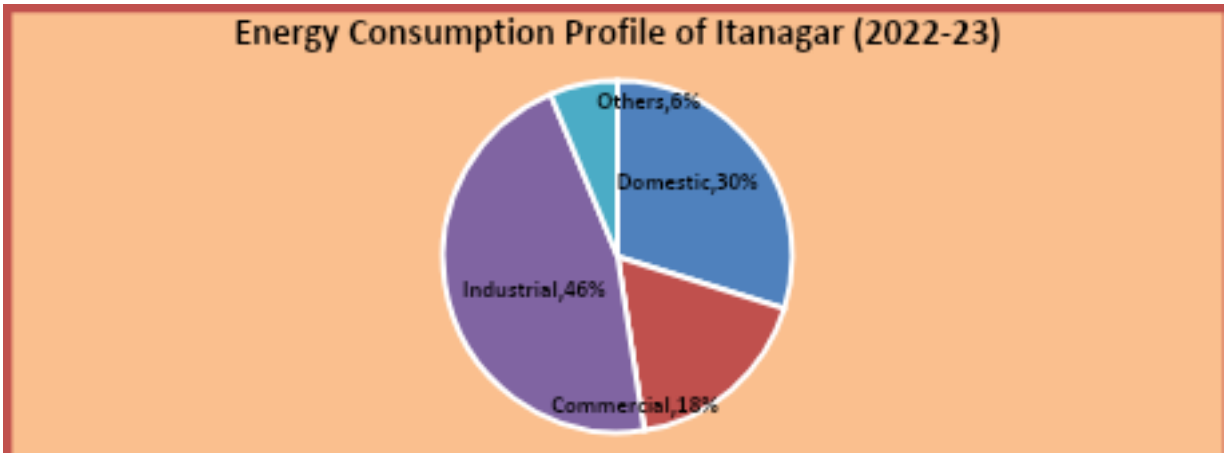

Figure 23-1 Energy Consumption Profile of Itanagar (2022-23)

*Others category in Fig 23.1 includes load of public lighting, public water works, bulk supply and any other load

On comparison of Itanagar with Arunachal Pradesh for the year 2022-23, it is observed that the energy requirement of Itanagar was 24.94 % of the total energy requirement of the state.

2022-23	Itanagar City	Arunachal Pradesh	% Share of ITANAGAR City
Energy in MU	224	916	24.45
Peak Demand in MW	48	180	26.67

Table 23-1 Comparison of Itanagar with Arunachal Pradesh in 2022-23

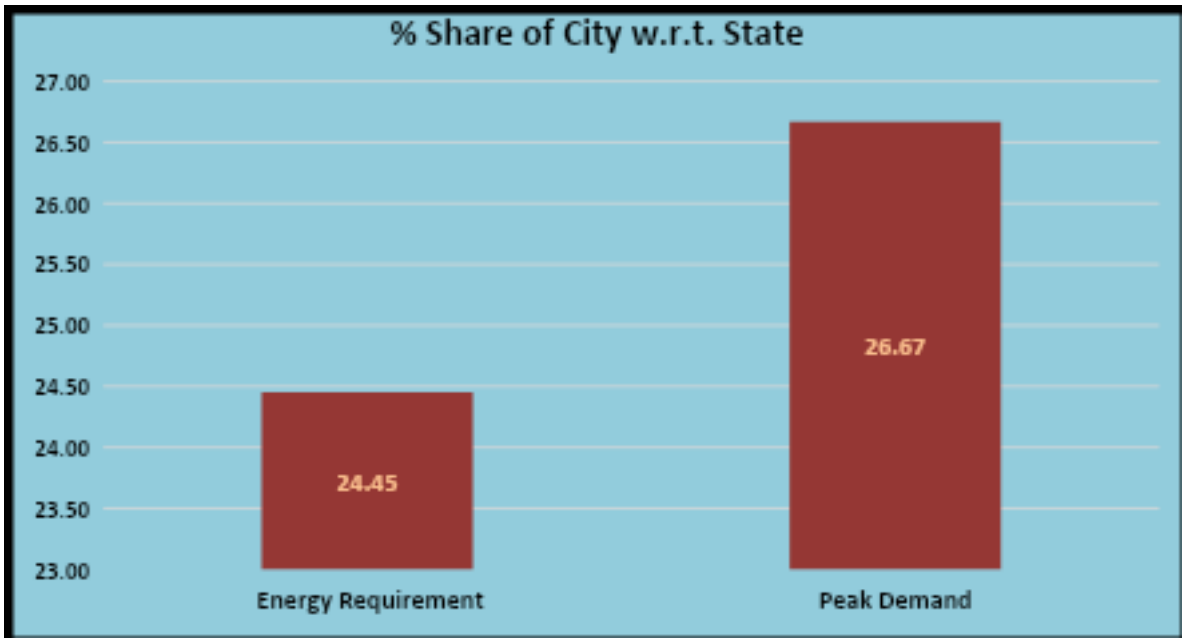

Figure 23-2 Comparison of Itanagar and Arunachal Pradesh in the year 2022-23.

22.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Itanagar was 224 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 259 MU by the year 2027-28 with a 2.96 % CAGR for the period 2022-23 to 2027-28. With a CAGR of 3.50 % for the period 2027-28 to 2032-33, its energy requirement is estimated as 308 MU by the year 2032-33.

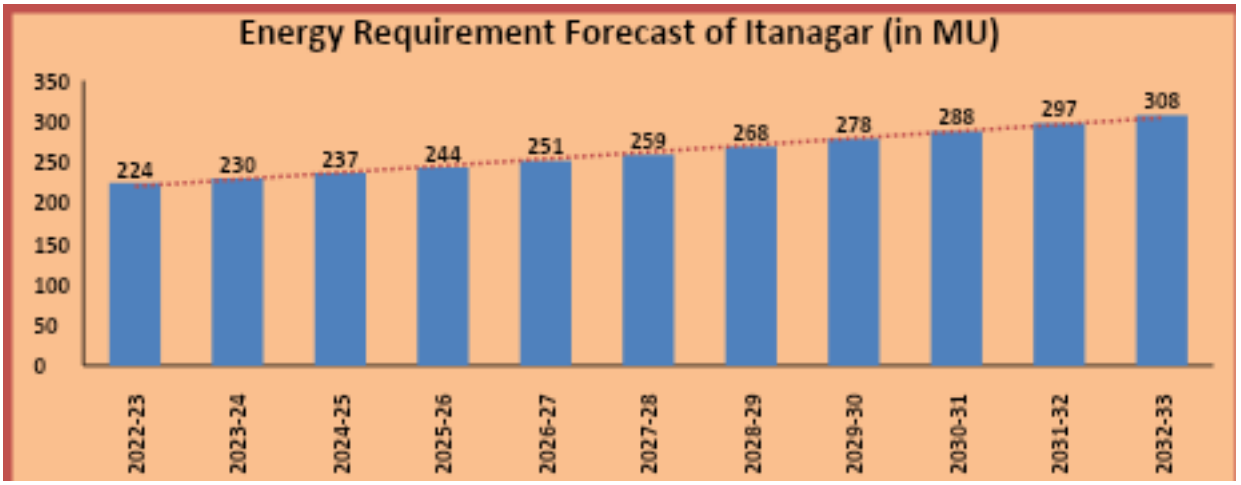

Figure 23-3 Energy Requirement Forecast of Itanagar (in MU)

Peak Demand of Itanagar is expected to see 3.06 % CAGR upto 2027-28 and will reach 55

MW in comparison to 48 MW in year 2022-23. It is expected to reach 66 MW in year 2032-33 with a CAGR of 3.60 % after 2027- 28.

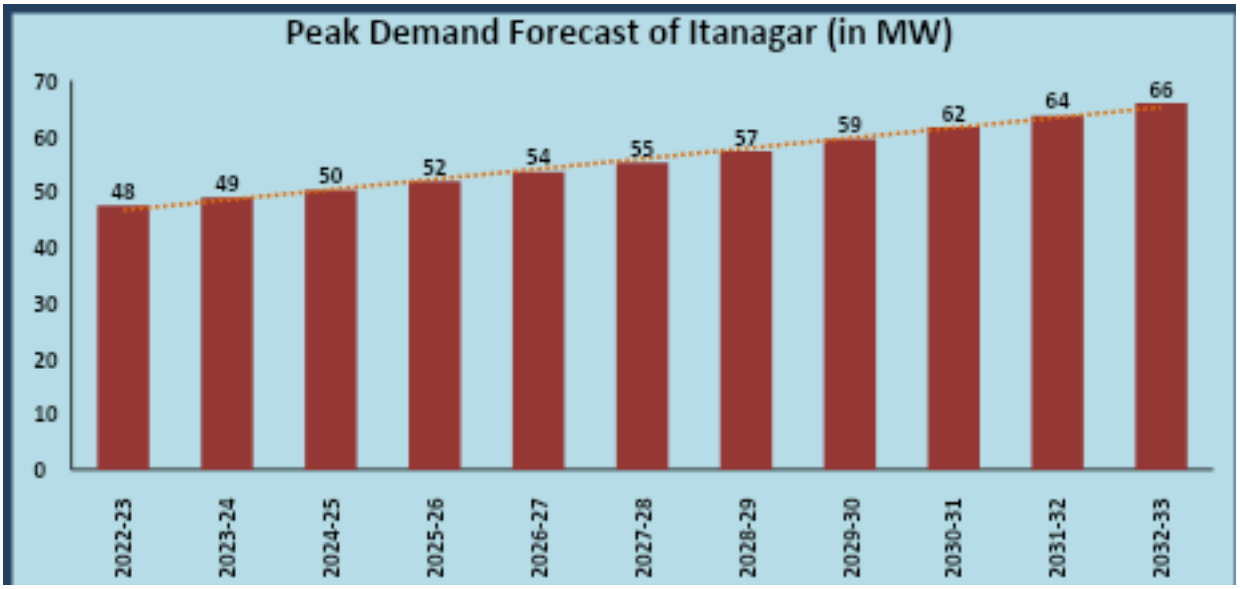

Figure 23-4 Peak Demand Forecast of Itanagar (in MW)

The category-wise energy consumption forecast of Itanagar are as follows:

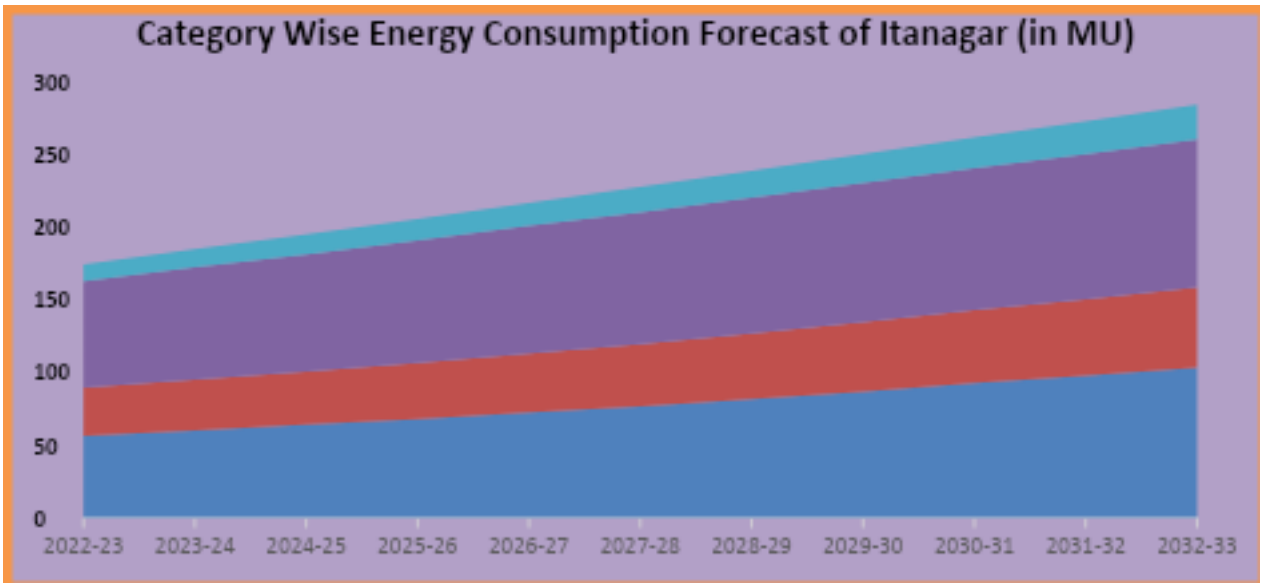

Figure 23-5 Category-wise Energy Consumption Forecast of Itanagar (in MU)

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	**Domestic**	56	77	103	6.41	6.17	6.29
2	**Commercial**	33	43	55	5.34	5.11	5.23

3	**Irrigation**	0	0	0	0	0	0
4	**Industrial**	73	91	102	4.28	2.41	3.34
5	**Others**	11	17	24	9.00	6.64	7.82
6	**Total**	174	227	284	5.51	4.57	5.04

Table 23-2 Expected CAGR of Itanagar - Category-wise Consumption

22.5 Transmission & Distribution Losses:

T&D losses of Itanagar were 22.38% in 2022-23. The target level is to bring it down to about 12.28 % and 7.66 % by the end of 2027-28 & 2032-33 respectively.

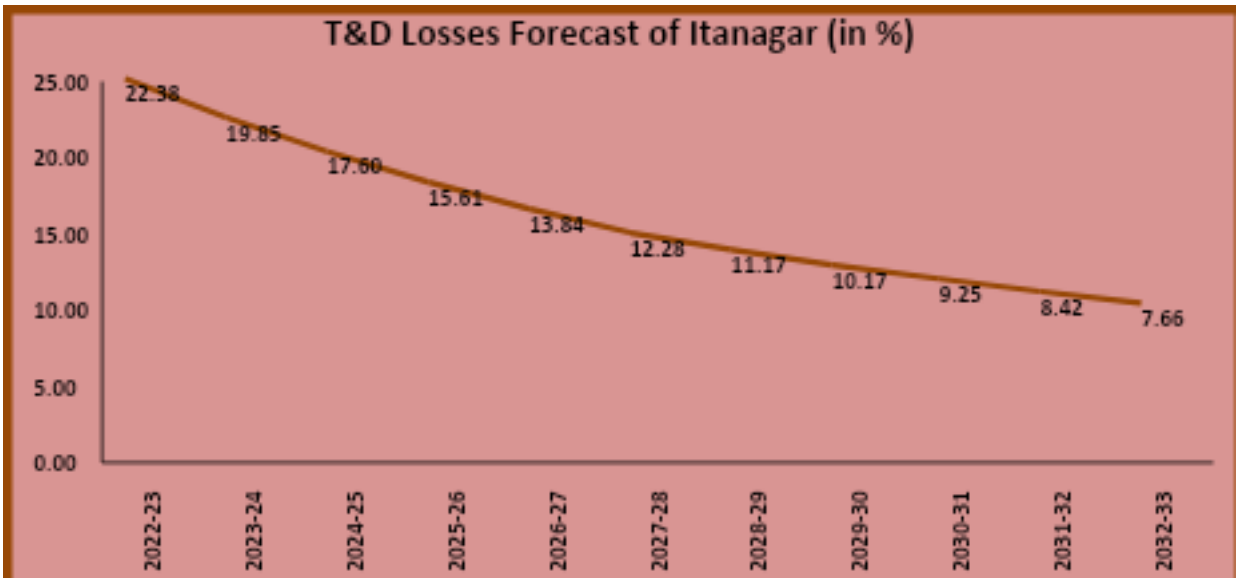

Figure 23-6 T&D Losses Forecast of Itanagar (in %).

22.6 Summary of Power forecast of Itanagar city:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	224	259	308	2.96	3.50
2	**Peak Demand (in MW)**	48	55	66	3.06	3.60
3	**T&D Losses (in %)**	22	12	7		

Table 23-3 Power forecast summary of Itanagar

****

Itanagar											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	56	60	64	68	72	77	81	87	93	97	103
Commercial	33	35	37	39	41	43	45	48	50	52	55
Public lighting	2	2	3	3	3	3	4	4	4	5	5
Public Water Works	0	0	0	0	0	0	0	0	0	0	0
Irrigation	0	0	0	0	0	0	0	0	0	0	0
LT Industries	0	0	0	0	0	0	0	0	0	1	1
HT Industries	73	77	80	84	87	90	93	95	97	99	101
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	6	7	7	8	8	8	9	9	10	10	11
Others (if Any)	3	4	4	5	5	6	6	7	7	8	8
Total (Energy Consumption)	**174**	**185**	**195**	**206**	**217**	**227**	**238**	**250**	**261**	**272**	**284**
T&D losses -MU	50	46	42	38	35	32	30	28	27	25	24
T&D losses -in %	22.38	19.85	17.60	15.61	13.84	12.28	11.17	10.17	9.25	8.42	7.66
Energy Requirement - MU	**224**	**230**	**237**	**244**	**251**	**259**	**268**	**278**	**288**	**297**	**308**
Annual Load Factor - %	53.81	53.76	53.71	53.65	53.60	53.55	53.49	53.44	53.39	53.33	53.28
Peak Load - MW	**48**	**49**	**50**	**52**	**54**	**55**	**57**	**59**	**62**	**64**	**66**

Table 23-4 Category-wise and Year-wise Summary of Itanagar.

Jabalpur

Chapter 23: Jabalpur

23.1 Introduction:

Jabalpur city is situated on the banks of Narmada River in the state of Madhya Pradesh. The city is known for the marble rocks on the river Narmada at Bhedaghat. It is known for its educational institutions, including universities and colleges.

Economy:

The land of the Narmada basin with tis fertile alluvial soil gives good yields sorghum, wheat, rice and millet in the villages around of Jabalpur. Jabalpur has a variety of industries largely based in mineral substances of economic value found in the district, although the ready-made garments industry is a substantial portion of production in Jabalpur. Jabalpur has vehicle factory, Grey Iron Foundry, Gun Carriage Factory and Ordnance Factory Khamaria.

Climate:

Jabalpur has a humid subtropical climate where summer begins in late March, lasting until June. May is the hottest month, with an average temperature exceeding 40 °C. Summer is followed by the southwest monsoon, which lasts until early October and produces 889 mm of rain from July to September. The average annual precipitation is nearly 1386 mm. The winter begins in late November and lasts until early March. January is the coldest month, with an average daily temperature near 15 °C.

23.2 Brief description of Power Utilities:

M.P. Poorve Kshetra Vidyut Vitaran Company Limited, (MPPKVVCL), Jabalpur has the responsibility of power distribution in Jabalpur City.

23.3 Existing Power Scenario:

The total electricity consumption of Jabalpur in the year 2022-23 was 972 MU and with 10.00% T&D losses, the requirement was 1080 MU. The peak demand of the city was 252 MW. The Domestic sector was the biggest consumer of electricity (65%) followed by Commercial (15%) & Industrial (11%).

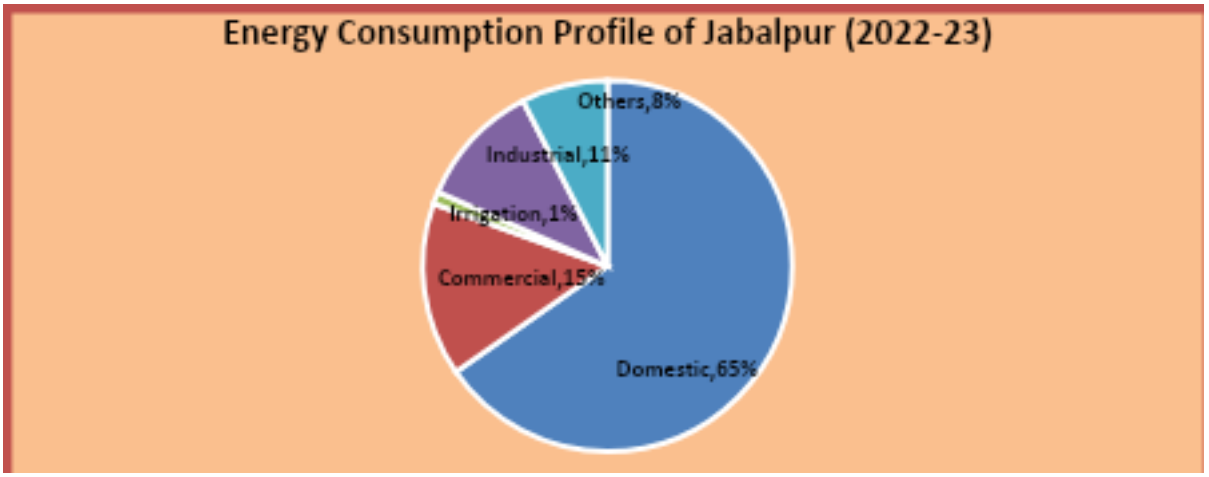

Figure 24-1 Energy Consumption Profile of Jabalpur (2022-23)

In a comparison of Jabalpur City with Madhya Pradesh for the year 2022-23, it is observed that the energy requirement of Jabalpur was 1.09% of the total energy requirement of the state.

2022-23	Jabalpur City	Madhya Pradesh	% Share of Jabalpur City
Energy in MU	1080	98863	1.09
Peak Demand in MW	252	17009	1.48

Table 24-1 Comparison of Jabalpur City with Madhya Pradesh in 2022-23

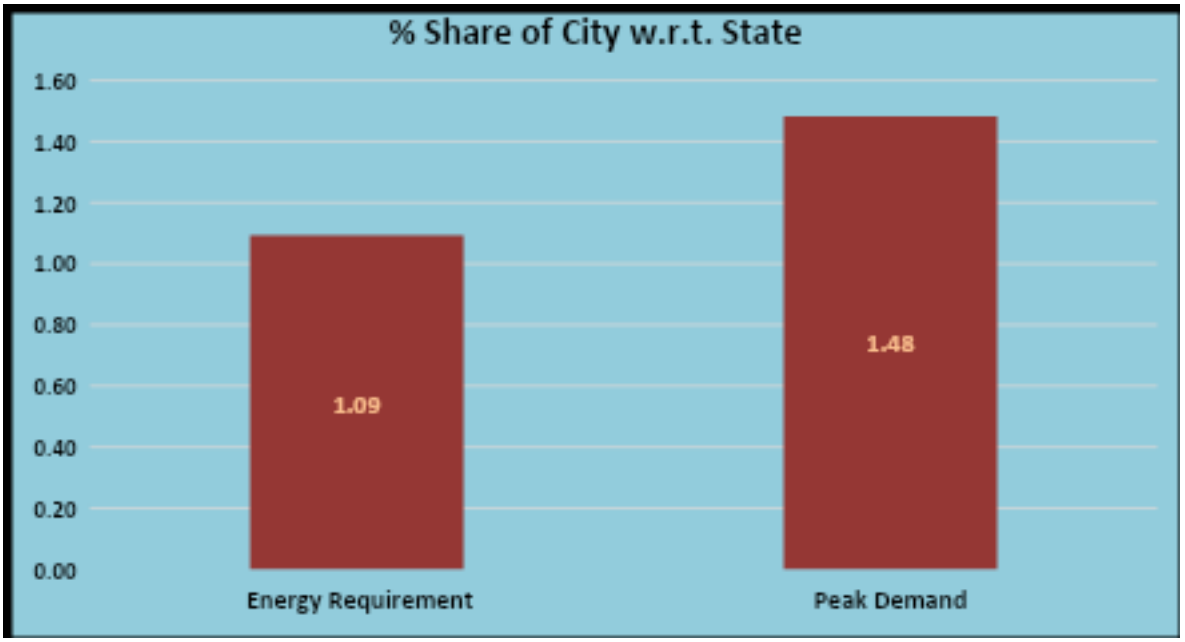

Figure 24-2 Comparison of Jabalpur City and Madhya Pradesh in the year 2022-23.

23.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Jabalpur was 1080 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 1302 MU by the year 2027-28 with a 3.81% CAGR for the period 2022-23 to 2027-28. With a CAGR of 3.53% for the period 2027-28 to 2032-33, its energy requirement is estimated as 1549 MU by the year 2032-33.

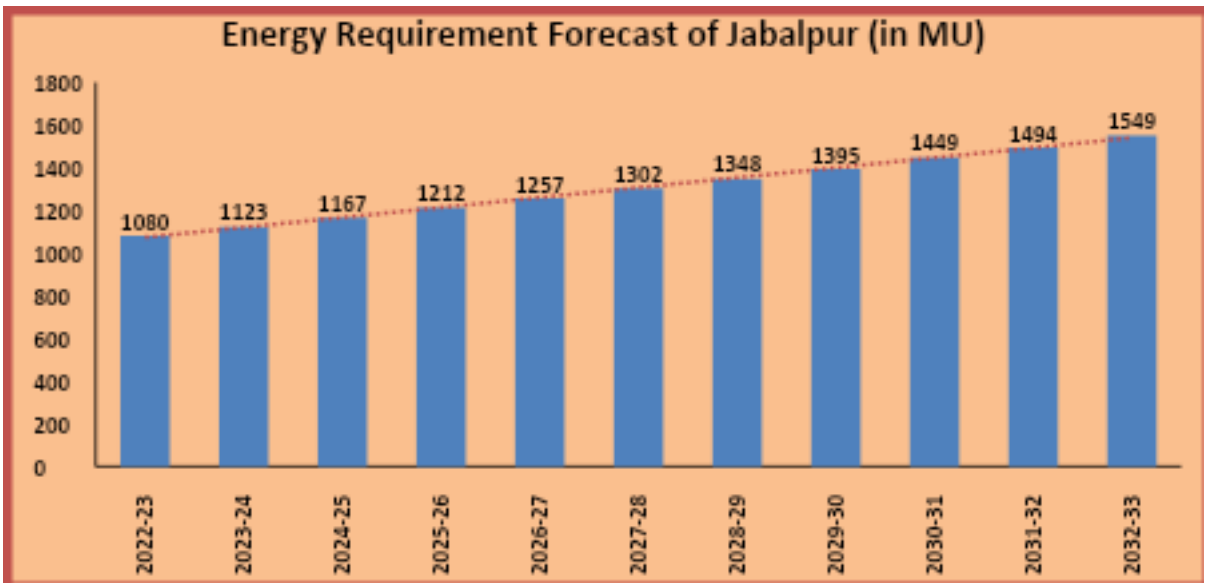

Figure 24-3 Energy Requirement Forecast of Jabalpur (in MU)

Peak Demand of the Jabalpur is expected to see 4.44% CAGR up to 2027-28 and will reach 314 MW in comparison to 252 MW in the year 2022-23. It is expected to reach 385 MW in the year 2032-33 with a CAGR of 4.16% after 2027-28.

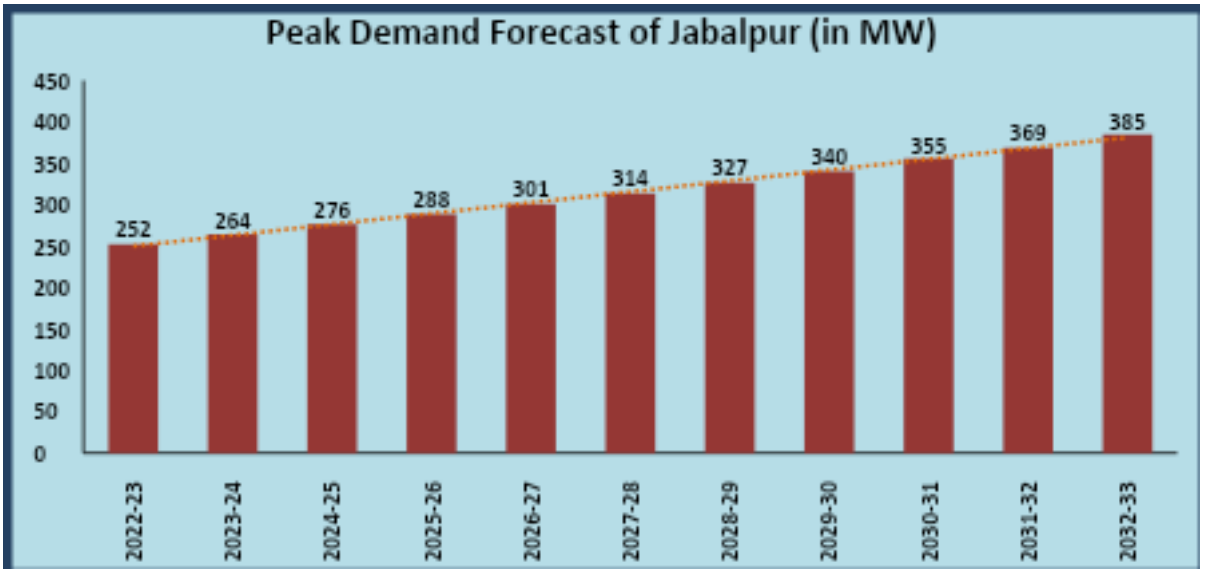

Figure 24-4 Peak Demand Forecast of Jabalpur (in MW)

The category-wise energy consumption forecast of Jabalpur are as follows:

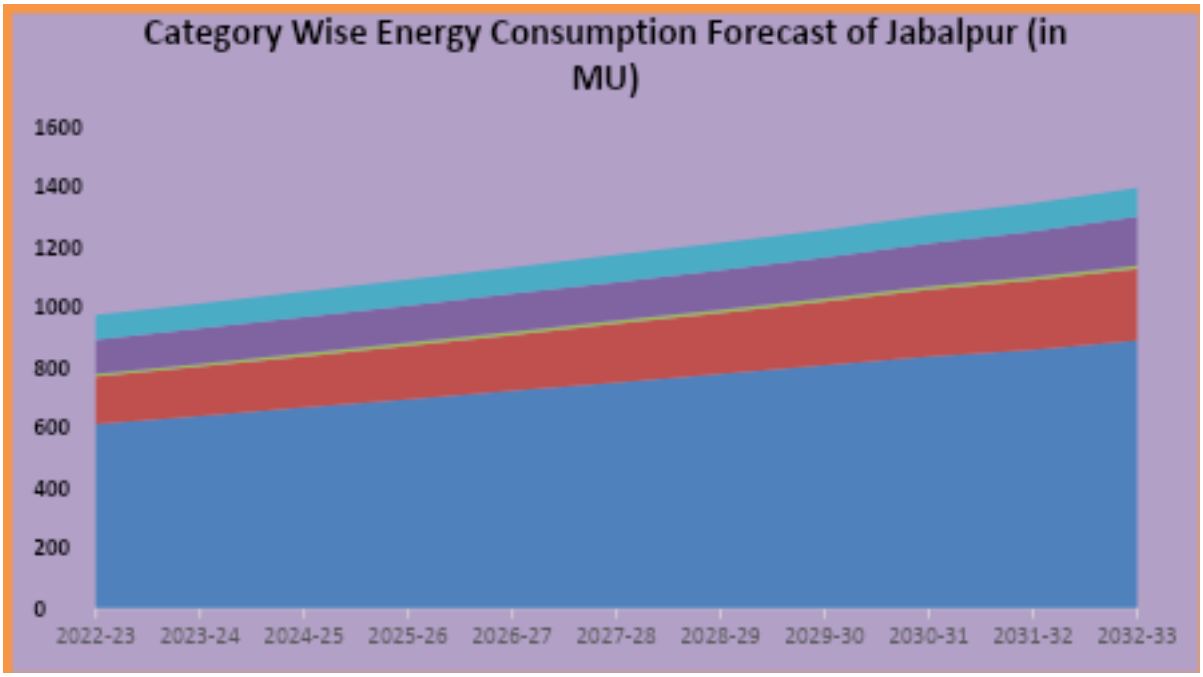

Figure 24-5 Category-wise Energy Consumption Forecast of Jabalpur (in MU)

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	**Domestic**	611	750	888	4.16	3.46	3.81
2	**Commercial**	156	194	237	4.40	4.18	4.29
3	**Irrigation**	10	11	11	1.21	0.00	0.60
4	**Industrial**	112	128	161	2.71	4.60	3.65
5	**Others**	82	90	96	1.82	1.43	1.62
6	**Total**	972	1172	1394	3.81	3.53	3.67

Table 24-2 Expected CAGR of Jabalpur - Category-wise Consumption

23.5 Transmission & Distribution Losses:

T&D losses of Jabalpur were 10.00% in year 2022-23. The target is to maintain T&D Losses around this level.

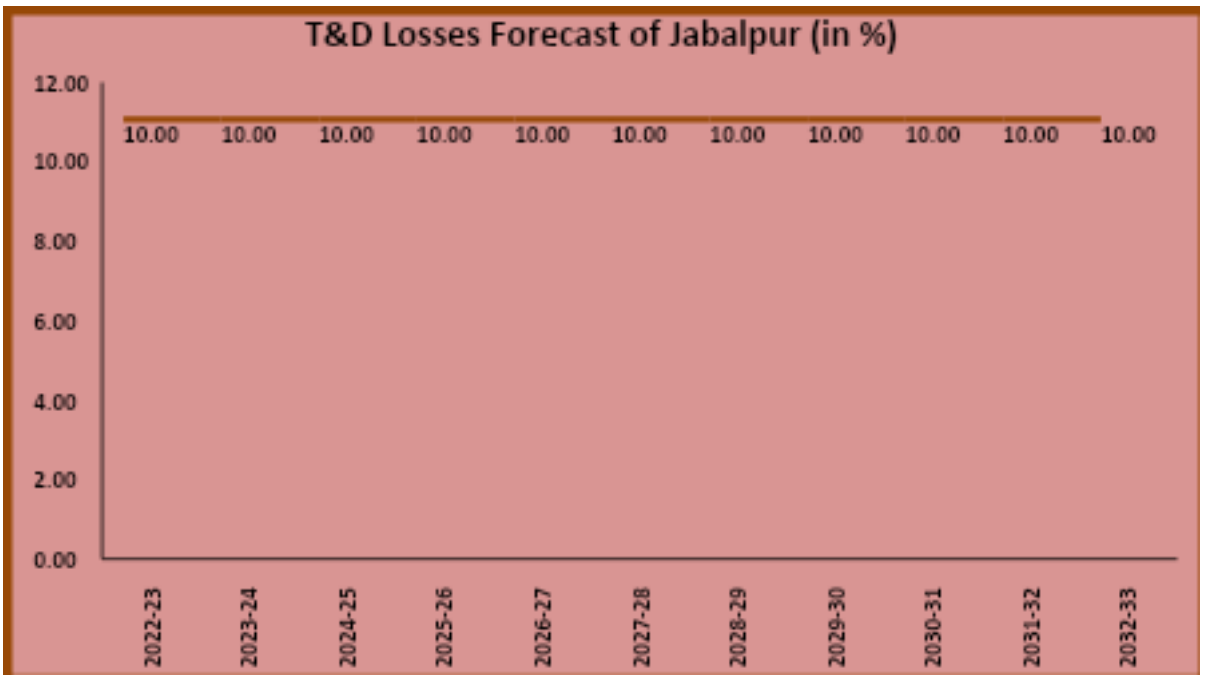

Figure 24-6 T&D Losses Forecast of Jabalpur (in %)

23.6 Summary of power forecast of Jabalpur city:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	1080	1302	1549	3.81	3.53
2	**Peak Demand (in MW)**	252	314	385	4.44	4.16
3	**T&D Losses (in %)**	10	10	10		

Table 24-3Power forecast summary of Jabalpur

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Jabalpur											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	611	638	665	693	721	750	778	807	835	858	888
Commercial	156	163	170	178	185	194	202	211	221	230	237
Public lighting	20	20	20	20	21	21	21	21	21	22	22
Public Water Works	18	18	18	18	18	19	19	19	19	19	19
Irrigation	10	10	11	11	11	11	11	11	11	11	11
LT Industries	32	34	36	37	39	40	42	43	44	45	47
HT Industries	80	82	84	85	87	88	89	90	98	105	113
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	33	33	34	34	34	35	35	35	36	36	36
Others (if Any)	12	12	13	14	15	15	16	17	18	18	19
Total (Energy Consumption)	**972**	**1011**	**1050**	**1091**	**1131**	**1172**	**1213**	**1255**	**1304**	**1344**	**1394**
T&D losses -MU	108	112	117	121	126	130	135	139	145	149	155
T&D losses -in %	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Energy Requirement - MU	**1080**	**1123**	**1167**	**1212**	**1257**	**1302**	**1348**	**1395**	**1449**	**1494**	**1549**
Annual Load Factor - %	48.84	48.55	48.26	47.97	47.68	47.39	47.11	46.83	46.55	46.27	45.99
Peak Load - MW	**252**	**264**	**276**	**288**	**301**	**314**	**327**	**340**	**355**	**369**	**385**

Table 24-4 Category-wise and Year-wise Summary of Jabalpur.

Jaipur

Chapter 24: **Jaipur**

24.1 Introduction:

Jaipur is the capital and the largest city of the north western Indian State of Rajasthan.

Economy:

The economy of Jaipur is fueled by tourism, gemstone cutting, the manufacture of jewelry and luxury textiles, and information technology. Jaipur has emerged as a hub of automotive industries with JCB, Hero Moto Corp and Robert Bosch having their manufacturing plants in Jaipur. The Government of Rajasthan have built Asia's largest incubator in Jaipur – the Bhamashah Techno Hub. Jaipur is a major hub for arts and crafts. It has many traditional shops selling antiques, jewelry, handicrafts, gems, bangles, pottery, carpets, textiles, leather and metal products.

Climate:

Jaipur is located in semi-arid zone. As per the Indian Meteorological Department, the mean minimum temperature recorded is in the month of January which is 7.8˚C and maximum in the month of May and June i.e. 43.0˚ C. Annual mean rainfall recorded is 673.9 mm.

24.2 Brief description of Power Utilities:

Jaipur Vidyut Vitran Nigam Limited (JVVNL) has the responsibility of power distribution in Jaipur City.

24.3 Existing Power Scenario:

The total electricity consumption of Jaipur in the year 2022-23 was 4943 MU and with 7.18 % T&D losses, the requirement was 5326 MU. The peak demand of the city was 1093 MW. The Domestic sector was the biggest consumer of electricity domestic (47%) followed by Commercial (24%) & Industrial (23%).

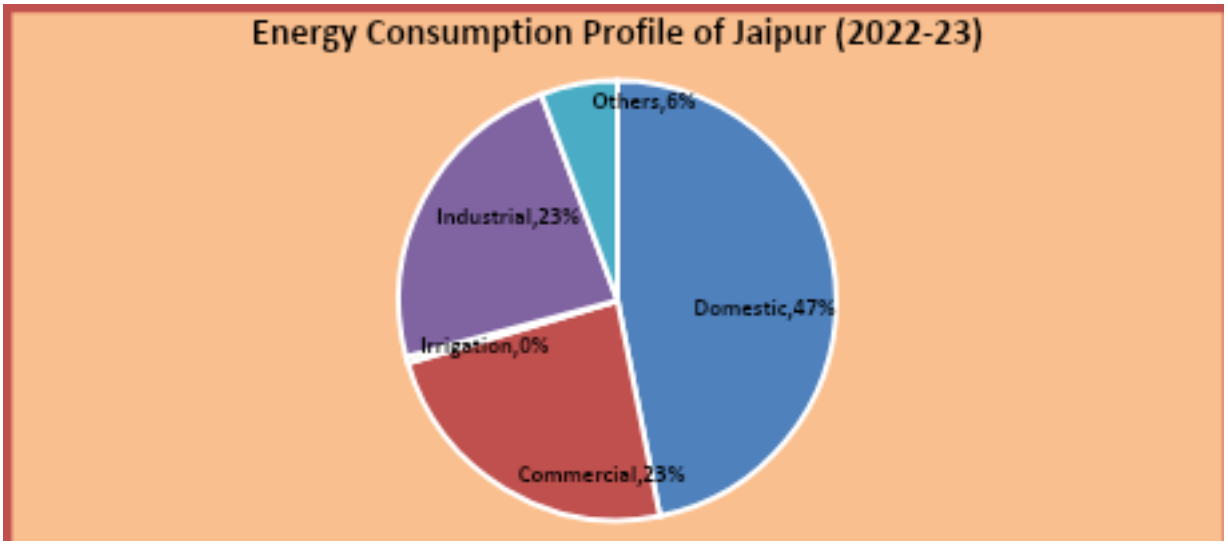

Figure 25-1 Energy Consumption Profile of Jaipur (2022-23)

On comparison of Jaipur with Rajasthan for the year 2022-23, it is observed that the energy

requirement of Jaipur was 5.22% of the total energy requirement of the state.

2022-23	Jaipur City	Rajasthan	% Share of Jaipur City
Energy in MU	5307	101757	5.22
Peak Demand in MW	1090	16291	6.69

Table 25-1 Comparison of Jaipur with Rajasthan in 2022-23

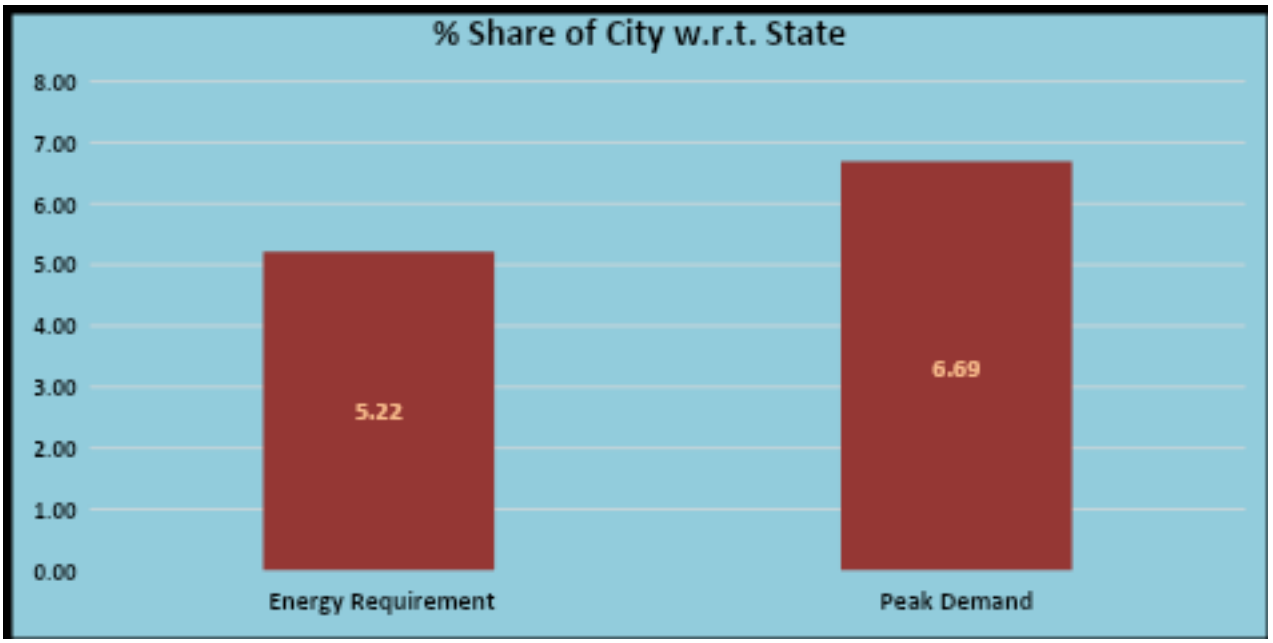

Figure 25-2 Comparison of Jaipur and Rajasthan in the year 2022-23.

24.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Jaipur was 5326 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 7246 MU by the year 2027-28 with a 6.35% CAGR for the period 2022-23 to 2027-28. With a CAGR of 5.51% for the period 2027-28 to 2032-33, its energy requirement is estimated as 9473 MU by the year 2032-33.

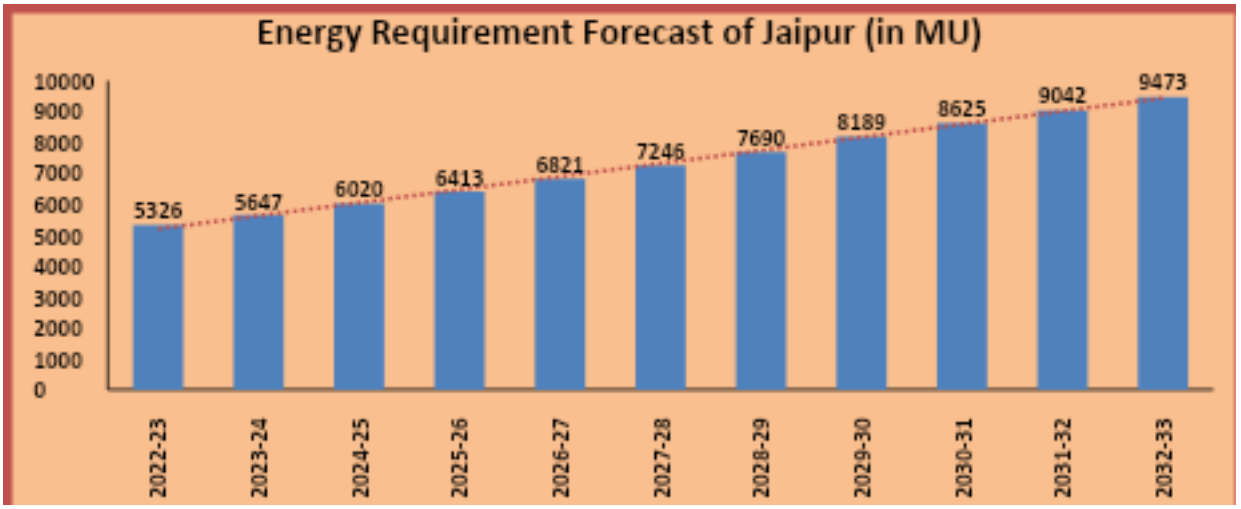

Figure 25-3 Energy Requirement Forecast of Jaipur (in MU)

Peak Demand of jaipur is expected to see 6.35% CAGR upto 2027-28 and will reach 1494 MW in comparison to 1093 MW in year 2022-23. It is expected to reach 1964 MW in year 2032-33

with a CAGR of 5.62% after 2027- 28.

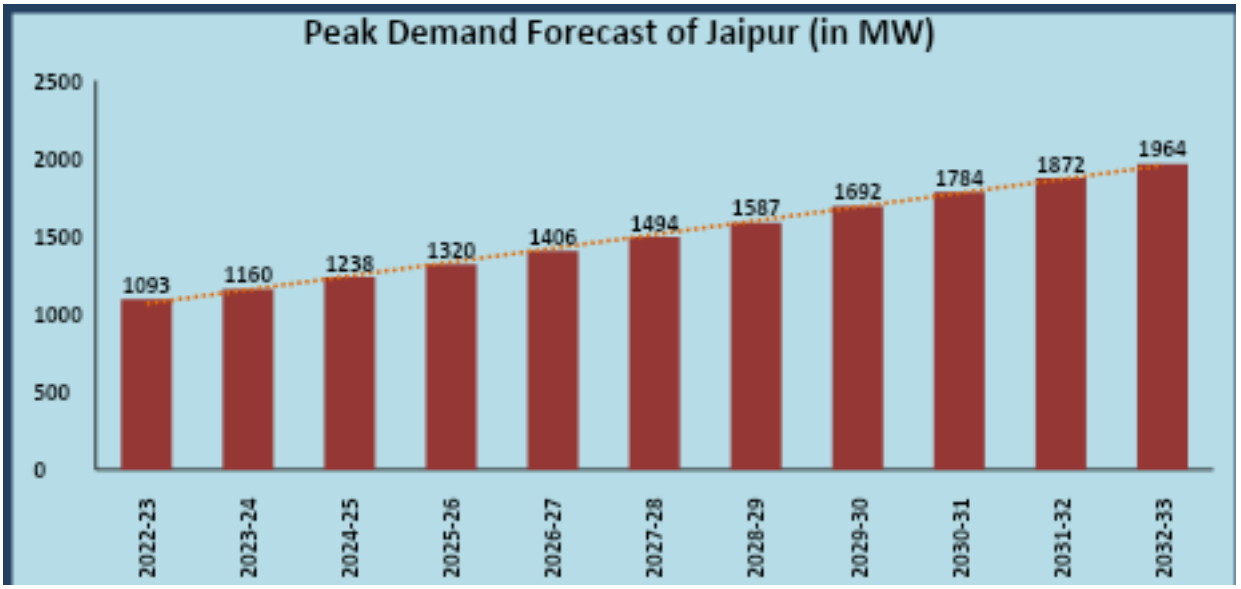

Figure 25-4 Peak Demand Forecast of Jaipur (in MW)

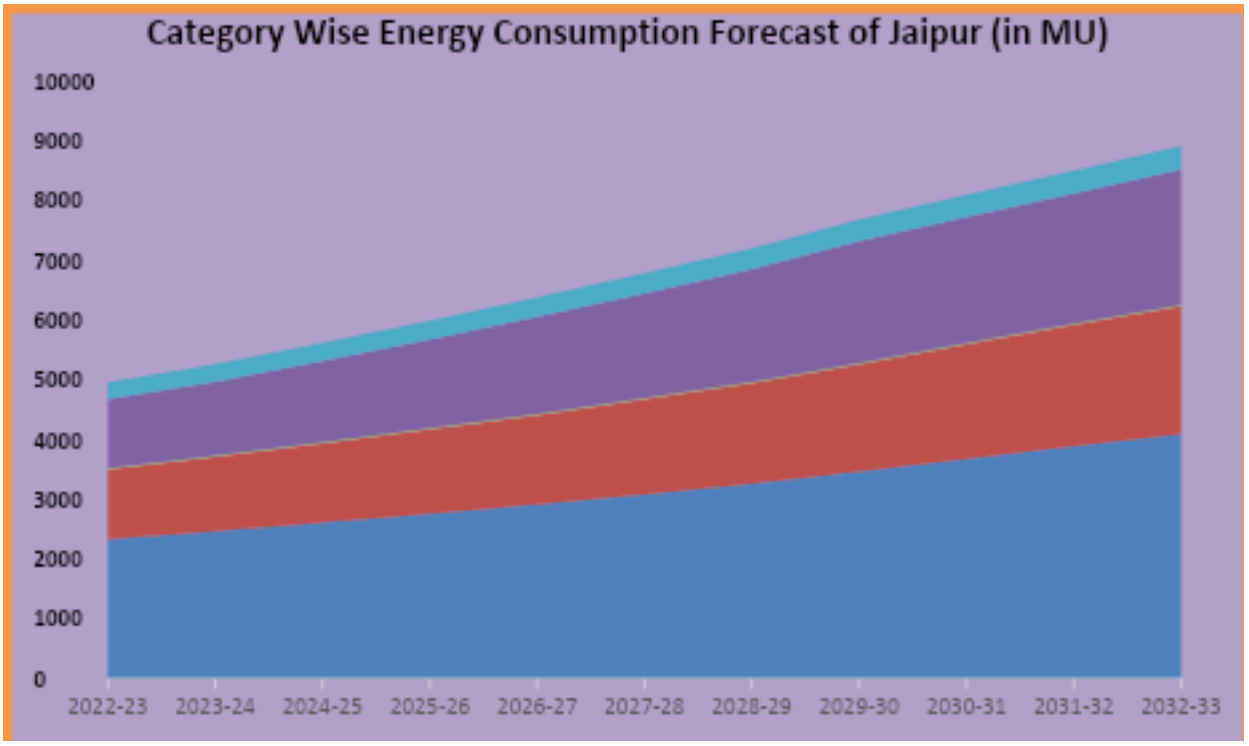

Figure 25-5 Category-wise Energy Consumption Forecast of Jaipur (in MU).

The category-wise CAGR expected in energy consumption is tabulated below

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	Domestic	2322	3077	4083	5.79	5.82	5.81

2	Commercial	1169	1584	2146	6.27	6.27	6.27
3	Irrigation	22	22	22	0.00	0.00	0.00
4	Industrial	1152	1754	2256	8.77	5.17	6.95
5	Others	279	335	392	3.68	3.24	3.46
6	Total	4943	6771	8899	6.49	5.62	6.06

Table 25-2 Expected CAGR of Jaipur- Category-wise Consumption

24.5 Transmission & Distribution Losses:

T&D losses of Jaipur were 7.18% in 2022-23. The target level is to bring it down to about 6.56% and 6.06% by the end of 2027-28 & 2032-33 respectively.

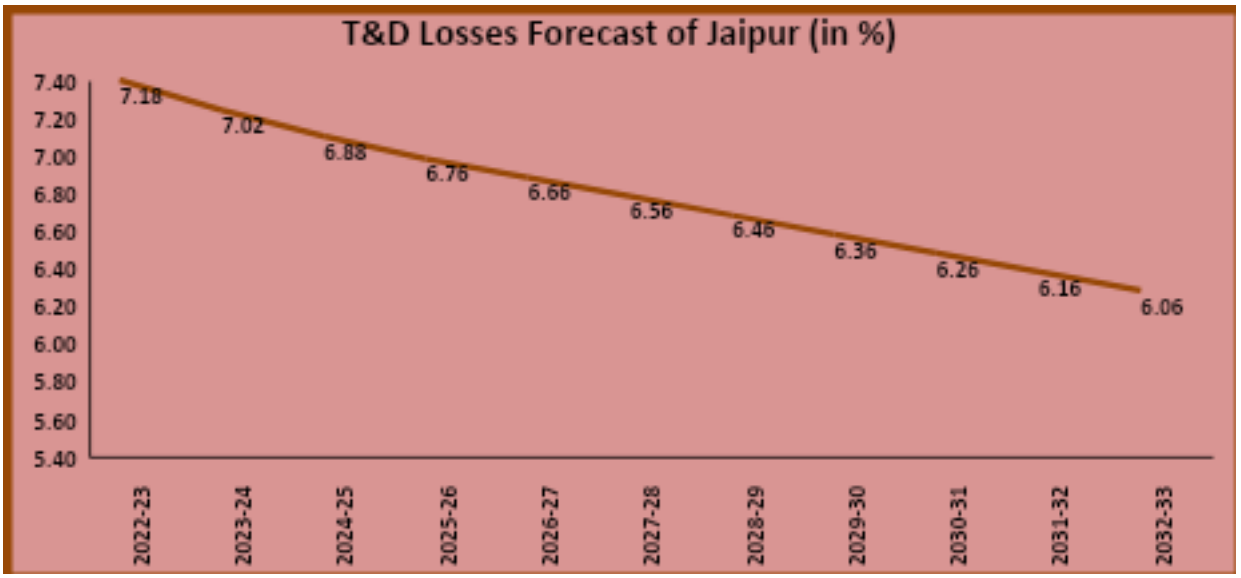

Figure 25-6 T&D Losses Forecast of Jaipur (in %)

24.6 Summary of Power forecast of Jaipur city:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	5326	7246	9473	6.35	5.51
2	**Peak Demand (in MW)**	1093	1494	1964	6.45	5.62
3	**T&D Losses (in %)**	7.18	6.56	6.06		

Table 25-3 Power forecast summary of Jaipur

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Jaipur											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	2322	2459	2603	2753	2910	3077	3256	3451	3670	3881	4083
Commercial	1169	1243	1322	1404	1491	1584	1683	1792	1914	2032	2146
Public lighting	42	43	43	44	44	45	45	45	46	46	46
Public Water Works	148	155	162	169	177	184	192	200	208	216	224
Irrigation	22	22	22	22	22	22	22	22	22	22	22
LT Industries	308	325	342	360	377	394	410	425	439	450	476
HT Industries	843	911	1016	1129	1243	1360	1475	1620	1671	1720	1780
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	90	93	96	99	103	106	109	113	116	119	122
Others (if Any)	0	0	0	0	0	0	0	0	0	0	0
Total (Energy Consumption)	4943	5251	5606	5980	6367	6771	7193	7668	8085	8485	8899
T&D losses -MU	382	396	414	434	454	475	497	521	540	557	574
T&D losses -in %	7.18	7.02	6.88	6.76	6.66	6.56	6.46	6.36	6.26	6.16	6.06
Energy Requirement - MU	**5326**	**5647**	**6020**	**6413**	**6821**	**7246**	**7690**	**8189**	**8625**	**9042**	**9473**
Annual Load Factor - %	55.60	55.55	55.50	55.45	55.40	55.35	55.30	55.25	55.20	55.15	55.05
Peak Load - MW	**1093**	**1160**	**1238**	**1320**	**1406**	**1494**	**1587**	**1692**	**1784**	**1872**	**1964**

Table 25-4 Category-wise and Year-wise Summary of Jaipur.

Jammu

Chapter 25: **Jammu**

25.1 Introduction:

Jammu is a city in Indian administered Jammu & Kashmir union territory and winter capital of J&K. Jammu acts as the gateway city in terms of tourism, pilgrimage and trade activities in J&K.

Economy:

Tourism is the largest industry in Jammu. The city is also a focal point of pilgrims going to Shri Mata Vaishno Devi and also to the Kashmir Valley. Many small and medium-scale industries in the traditional sectors and areas like food processing, agro-based units and metallic and non-metallic products are also located in the city. It also has several plastics, polythene, paint, printing, polish, hardware, bakery- industries, food-grain mills, art & crafts, woolen mills and artistic embroidery.

Climate:

The climate of the city is characterized by sub-tropical extreme climate while it is hot and dry in summer and cold in winter. The average annual maximum temperature is 29.7 C. The average annual minimum temperature is 17.9 C. The average annual rainfall of the city is 140 cm.

25.2 Brief description of Power Utilities:

Jammu Power Development Corporation Limited is responsible for distribution of electricity in Jammu.

25.3 Existing Power Scenario:

The total electricity consumption of Jammu in the year 2022-23 was 2051 MU and with 41.17% T&D losses, the requirement was 3486 MU. The peak demand of the city was 734 MW. The Domestic sector was the biggest consumer of electricity (36%).

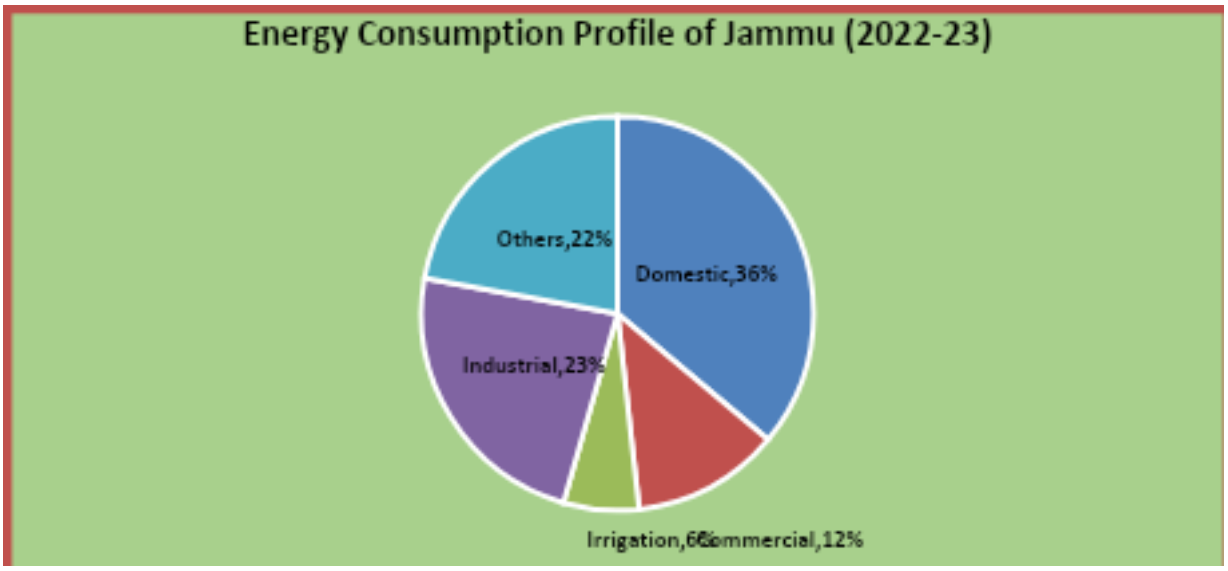

Figure 26-1 Energy Consumption Profile of Jammu (2022-23)

In a comparison of Jammu with J&K for the year 2022-23, it is observed that the energy requirement of Jammu was 18.24% of the total energy requirement of the state.

2022-23	Jammu City	J&K	% Share of Jammu City
Energy in MU	3486	19568	18.24
Peak Demand in MW	734	3075	23.87

Table 26-1 Comparison of Jammu with J&K in 2022-23

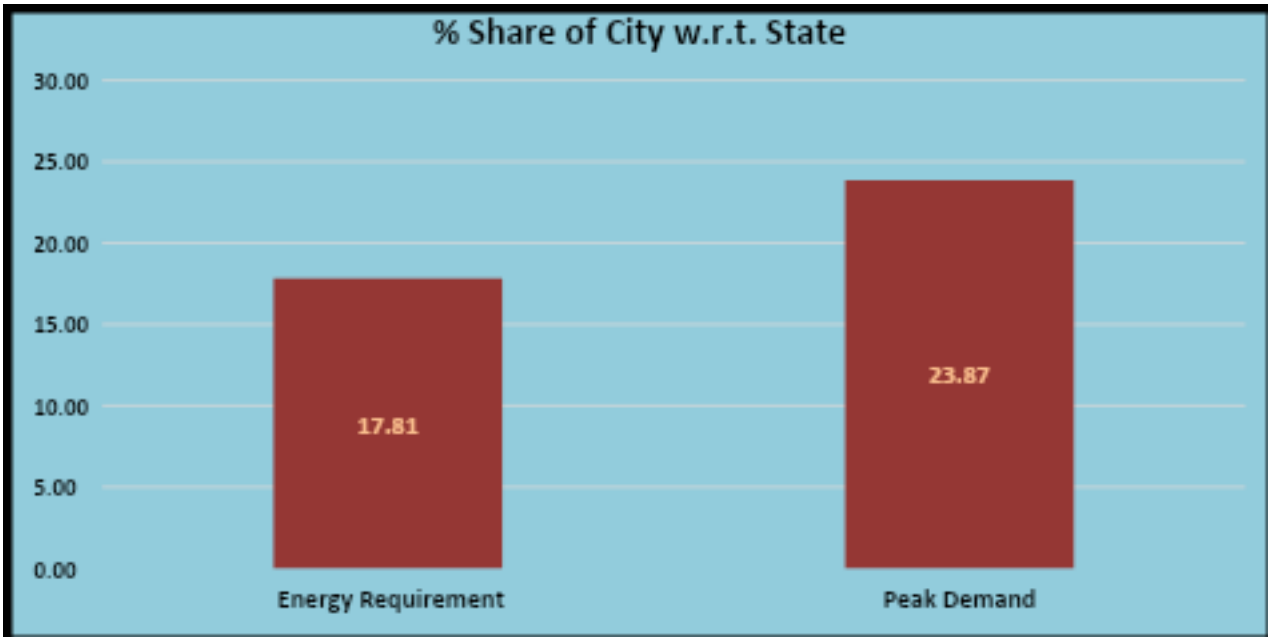

Figure 26-2 Comparison of Jammu and J&K in the year 2022-23.

25.4 Power Forecast:

Based on total electricity consumption and T&D losses, the energy requirement of Jammu was 3486 MU in year 2022-23. It is expected that the energy requirement of the city will reach 3943 MU by the year 2027-28 with a 2.49% CAGR for the period 2022-23 to 2027-28. With a CAGR of 3.03% for the period 2027-28 to 2032-33, its energy requirement is estimated as 4577 MU by the year 2032-33.

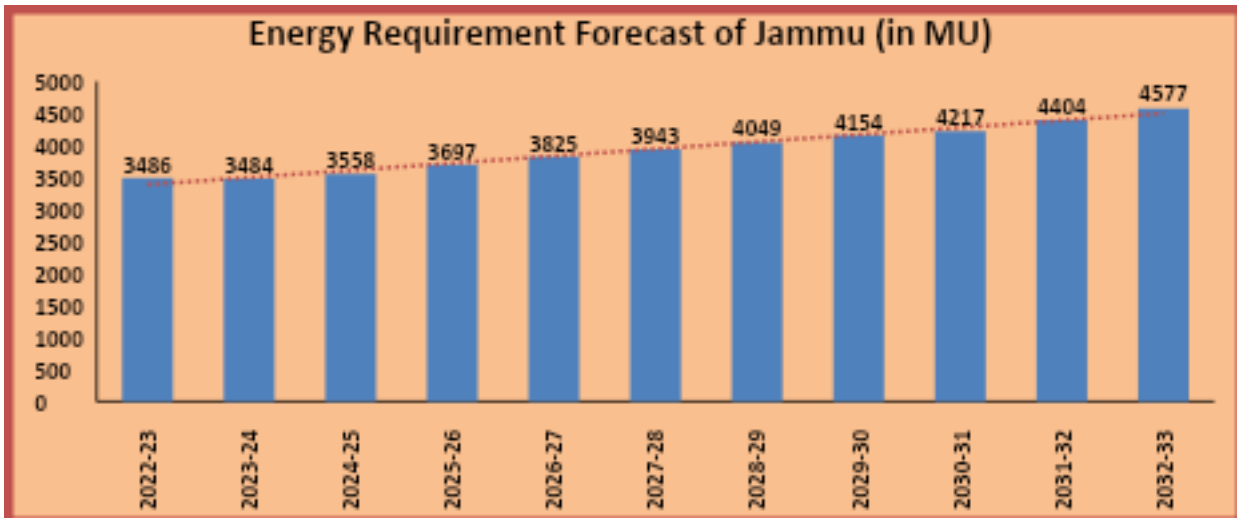

Figure 26-3 Energy Requirement Forecast of Jammu (in MU)

Peak Demand of the Jammu is expected to see 3.22% CAGR up to 2027-28 and will reach 860

MW in comparison to 734 MW in the year 2022-23. It is expected to reach 1047 MW in the year 2032-33 with a CAGR of 4.00% after 2027-28.

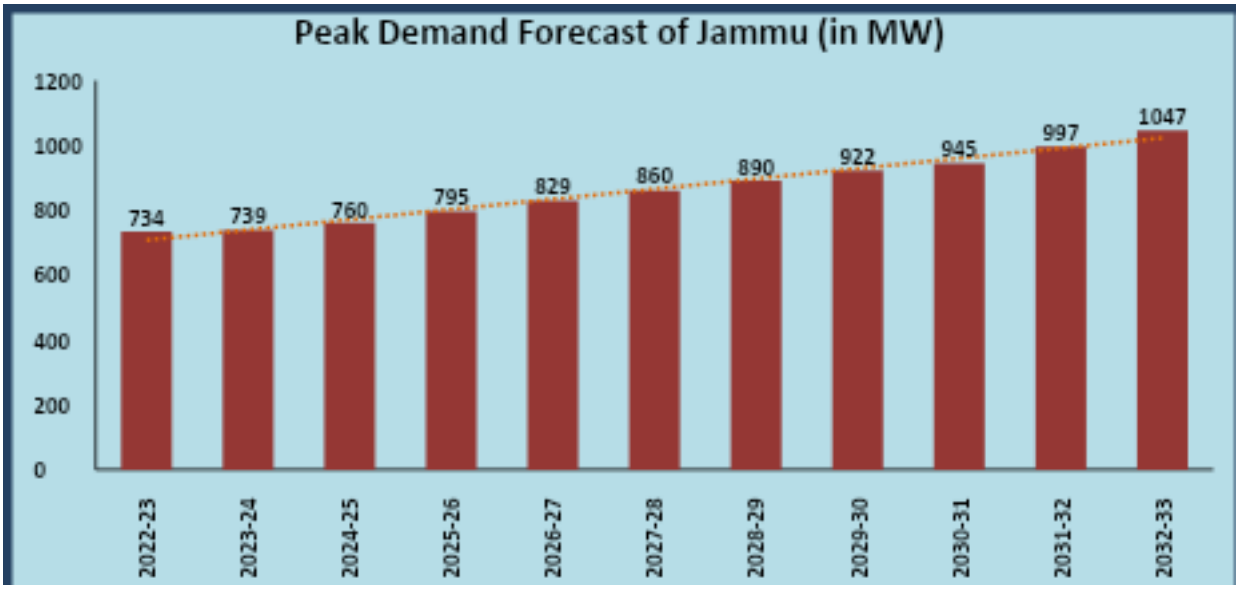

Figure 26-4 Peak Demand Forecast of Jammu (in MW)

The category-wise energy consumption forecast of Jammu are as follows:

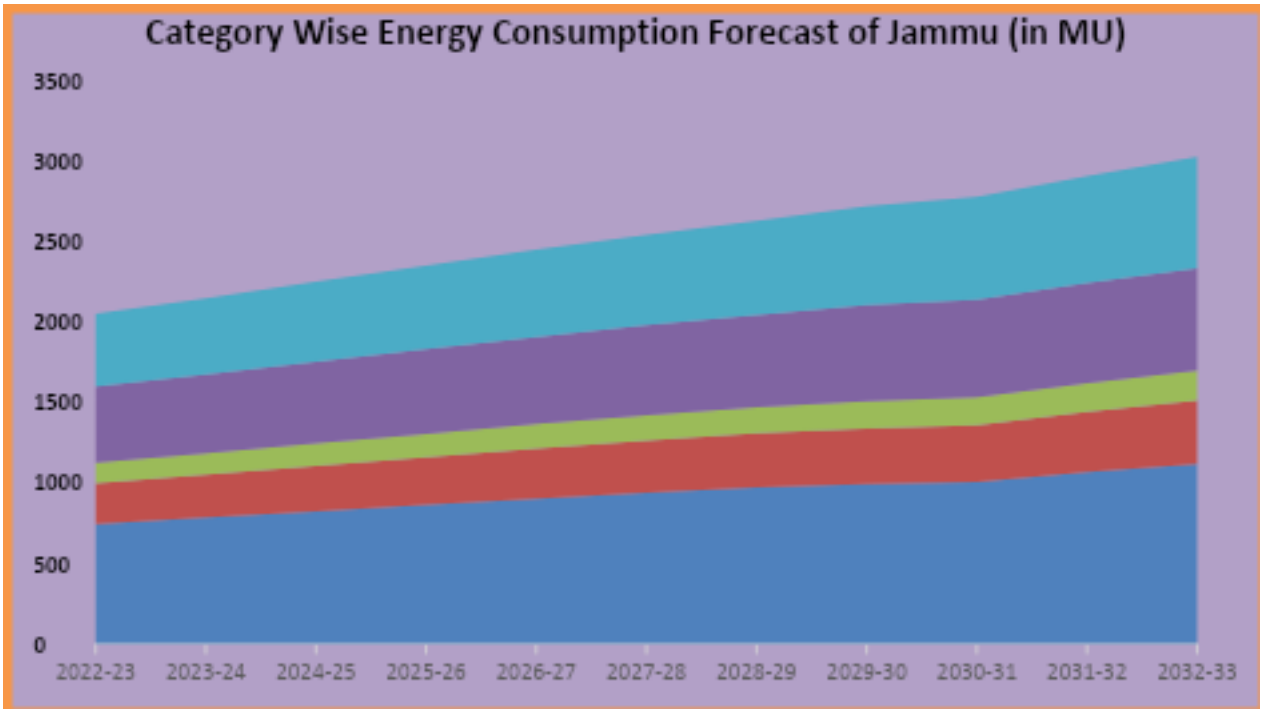

Figure 26-5 Category-wise Energy Consumption Forecast of Jammu (in MU)

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)	CAGR (In %)

		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	Domestic	744	938	1118	4.74	3.58	4.15
2	Commercial	253	325	393	5.16	3.89	4.52
3	Irrigation	127	156	188	4.20	3.70	3.95
4	Industrial	473	558	635	3.37	2.61	2.99
5	Others	454	564	692	4.42	4.18	4.30
6	Total	2051	2541	3025	4.38	3.55	3.96

Table 26-2 Expected CAGR of Jammu - Category-wise Consumption

25.5 Transmission & Distribution Losses:

T&D losses of Jammu were 41.17% in year 2022-23. The target level is to bring it down to about 35.56% and 33.90% by the end of 2027-28 & 2032-33 respectively.

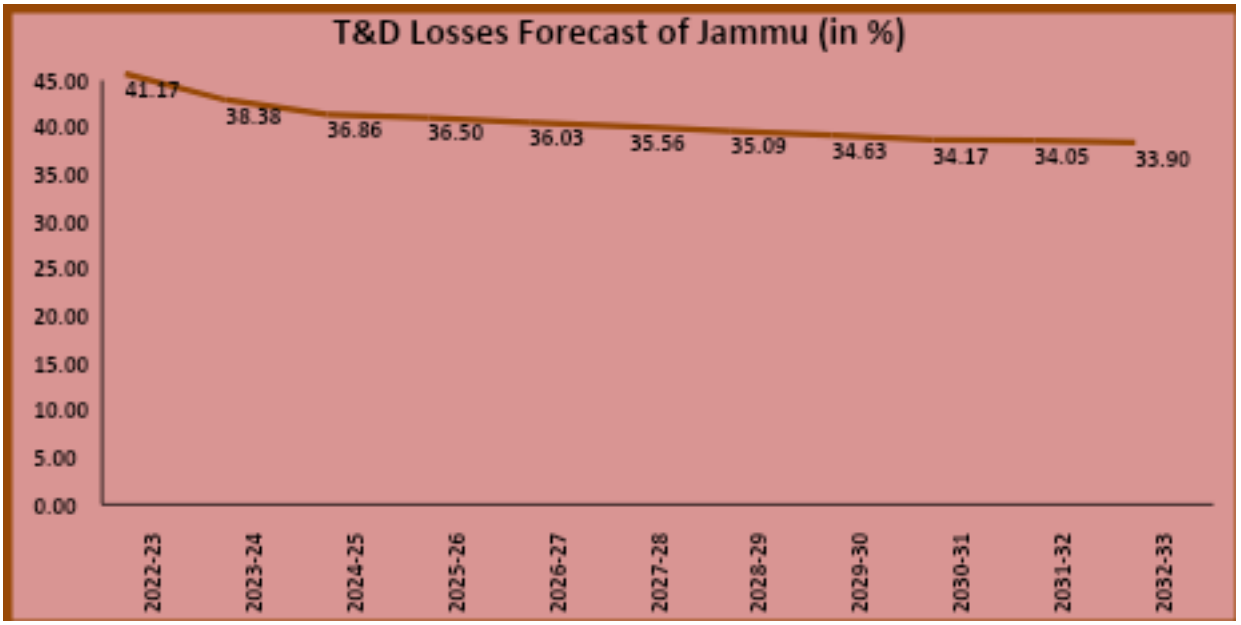

Figure 26-6 T&D Losses Forecast of Jammu (in %)

25.6 Summary of power forecast of Jammu city:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	3486	3943	4577	2.49	3.03
2	**Peak Demand (in MW)**	734	860	1047	3.22	4.00
3	**T&D Losses (in %)**	41.17	35.56	33.90		

Table 26-3 Power forecast summary of Jammu

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Jammu											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	744	783	823	863	901	938	970	994	1003	1066	1118
Commercial	253	267	282	297	311	325	336	343	353	373	393
Public lighting	78	85	92	100	108	117	127	138	149	161	173
Public Water Works	281	293	306	318	332	345	358	372	386	399	413
Irrigation	127	133	139	145	150	156	163	169	175	181	188
LT Industries	74	77	80	83	85	86	86	87	88	89	90
HT Industries	399	411	427	443	458	471	485	510	520	531	545
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	96	97	98	99	101	102	102	103	104	105	105
Others (if Any)	0	0	0	0	0	0	0	0	0	0	0
Total (Energy Consumption)	**2051**	**2147**	**2247**	**2348**	**2447**	**2541**	**2628**	**2716**	**2776**	**2904**	**3025**
T&D losses –MU	1435	1337	1311	1349	1378	1402	1421	1439	1441	1499	1552
T&D losses -in %	41.17	38.38	36.86	36.50	36.03	35.56	35.09	34.63	34.17	34.05	33.90
Energy Requirement – MU	**3486**	**3484**	**3558**	**3697**	**3825**	**3943**	**4049**	**4154**	**4217**	**4404**	**4577**
Annual Load Factor - %	54.20	53.82	53.44	53.07	52.69	52.33	51.91	51.44	50.93	50.42	49.91
Peak Load – MW	**734**	**739**	**760**	**795**	**829**	**860**	**890**	**922**	**945**	**997**	**1047**

Table 26-4 Category-wise and Year-wise Summary of Jammu.

Jodhpur

Chapter 26: **Jodhpur**

26.1 Introduction:

Jodhpur is the second largest city in the Rajasthan state, after Jaipur. It is situated in the western part of Rajasthan. Jodhpur is also known as the cultural capital of Rajasthan.

Economy:

The main economy of the city is based on handicrafts industry and tourism. Other items manufactured in the city include textiles, metal utensils, bicycles, ink and sporting goods. A flourishing cottage industry also exists for the manufacture of items such as glass bangles, cutlery, carpets and marble products. Jodhpur is also known for its solid wooden furniture market.

Climate:

The city climate is warm and semi dry. The summers are very hot and characterized by warm wind called "loo" whereas winters are very cold. The average annual maximum temperature is 33.6 C. The average annual minimum temperature is 19.8 C. The average annual rainfall of the city is 36 cm.

26.2 Brief description of Power Utilities:

Jodhpur Vidyut Vitran Nigam Limited (JDVVNL) has the responsibility of power distribution in Jodhpur City.

26.3 Existing Power Scenario:

The total electricity consumption of Jodhpur was 1374 MU and with 12.08% T&D losses, the requirement was 1563 MU in the year of 2022-23. The peak demand of the city was 316 MW. The Domestic sector was the biggest consumer of electricity (49%) followed by Commercial (20%) & Industrial (15%).

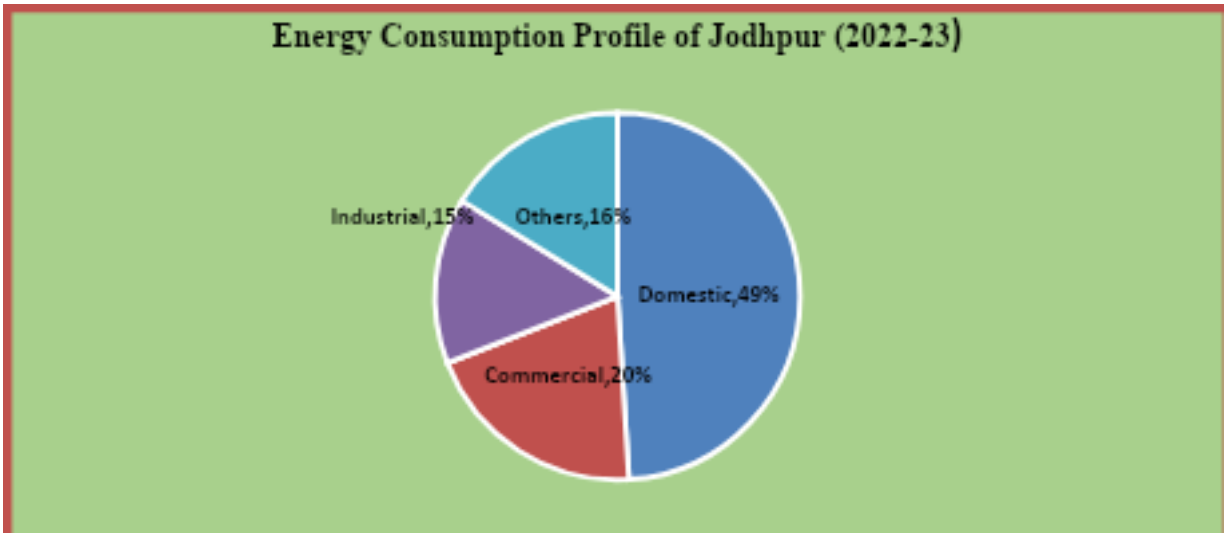

Figure 27-1 Energy Consumption Profile of Jodhpur (2022-23)

On comparison of Jodhpur with Rajasthan for the year 2022-23, it is observed that the energy requirement of Jodhpur was 1.74% of the total energy requirement of the state.

2022-23	Jodhpur City	Rajasthan	% Share of Jodhpur City
Energy in MU	1374	101757	1.35
Peak Demand in MW	316	16291	1.94

Table 27-1 Comparison of Jodhpur with Rajasthan in 2022-23.

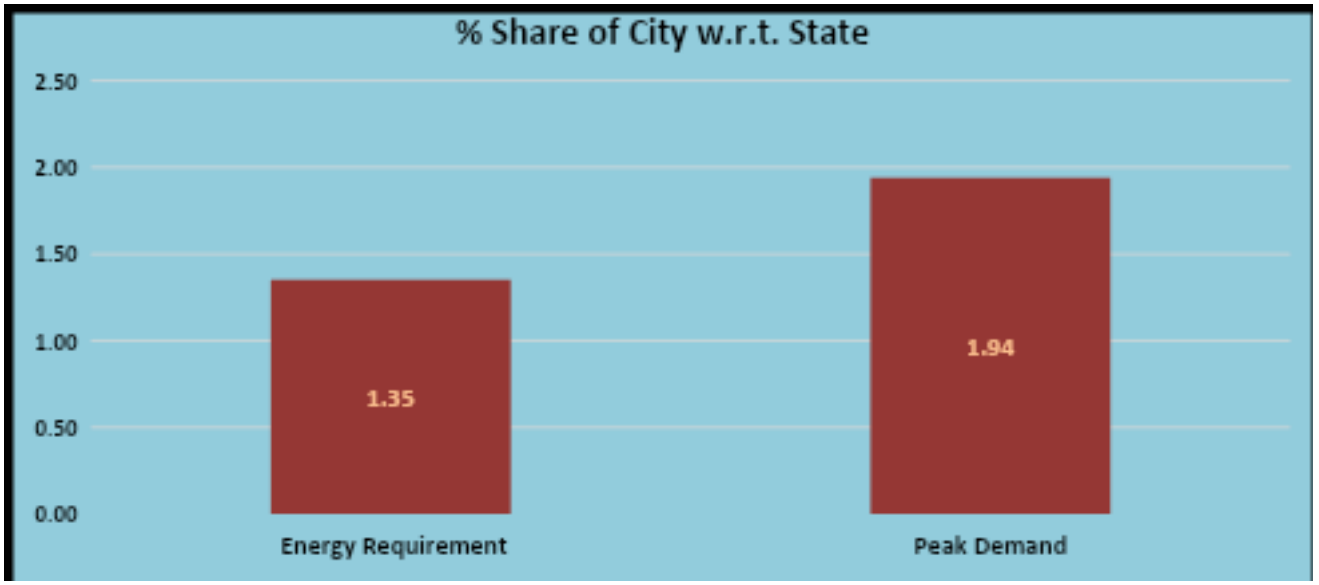

Figure 27-2 Comparison of Jodhpur and Rajasthan in the year 2022-23.

26.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Jodhpur was 1563 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 2349 MU by the year 2027-28 with an 8.49% CAGR for the period 2022-23 to 2027-28. With a CAGR of 8.88% for the period 2027-28 to 2032-33, its energy requirement is estimated as 3595 MU by the year 2032-33.

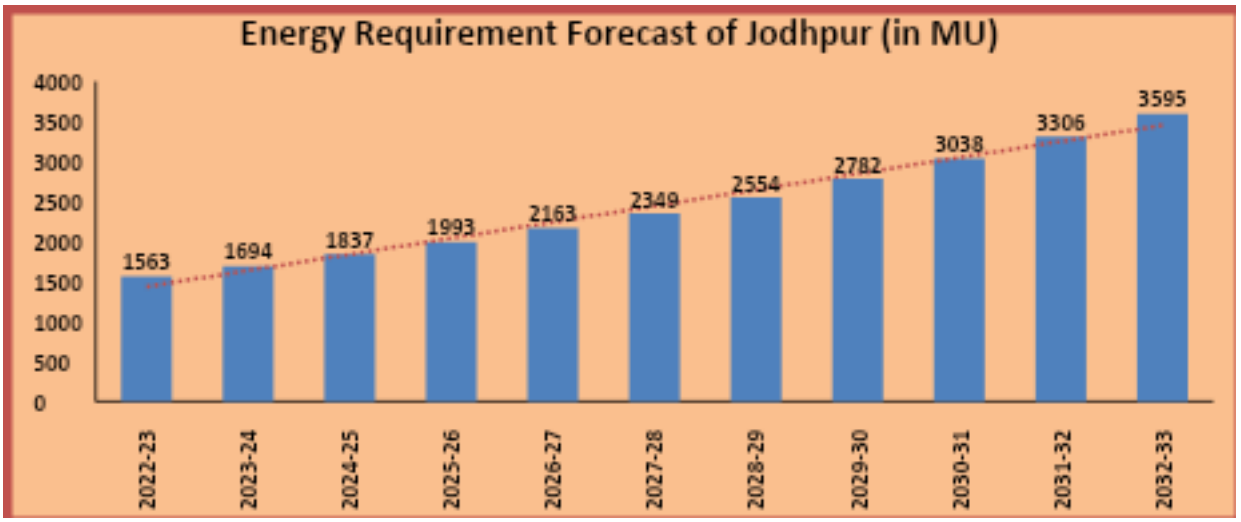

Figure 27-3 Energy Requirement Forecast of Jodhpur (in MU)

Peak Demand of Jodhpur is expected to see 11.32% CAGR upto 2027-28 and will reach 541 MW in comparison to 316 MW in year 2022-23. It is expected to reach 1026 MW in year 2032-33 with a CAGR of 13.66% after 2027- 28.

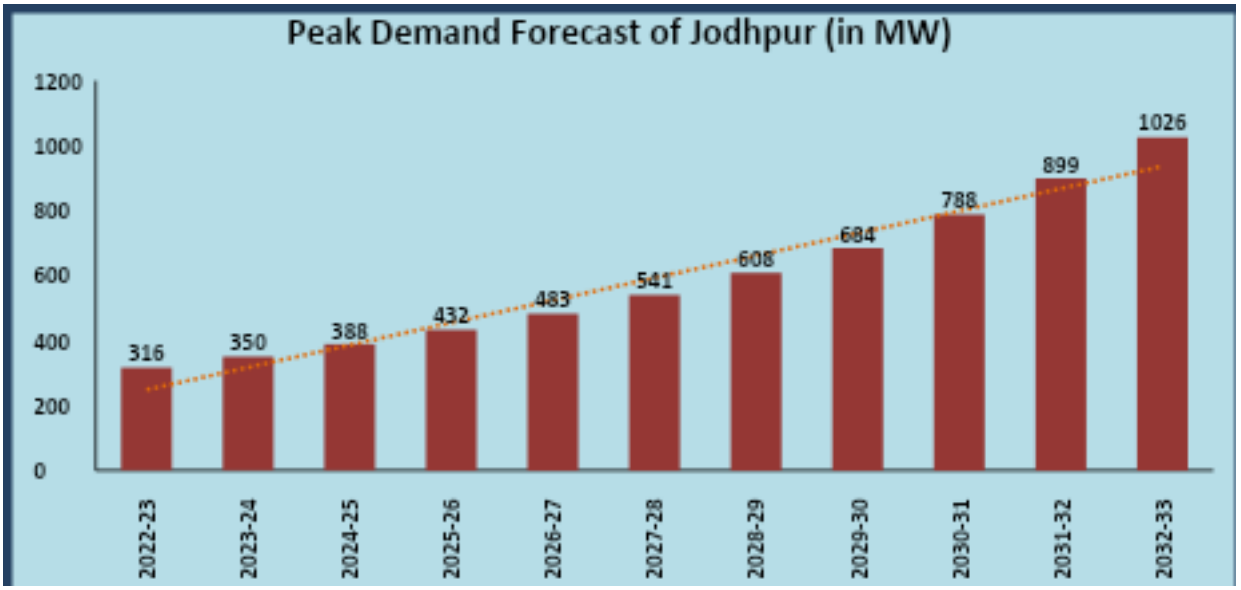

Figure 27-4 Peak Demand Forecast of Jodhpur (in MW)

The category-wise energy consumption forecast of Jodhpur are as follows:

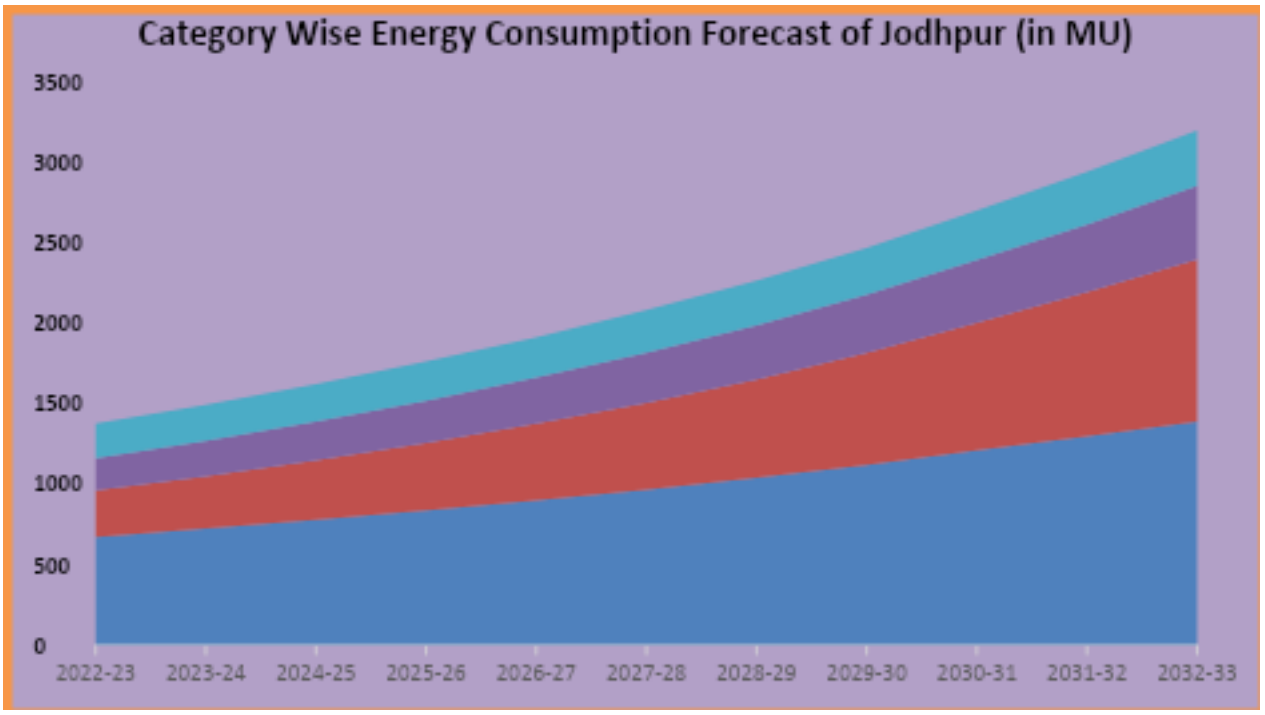

Figure 27-5 Category-wise Energy Consumption Forecast of Jodhpur (in MU).

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	**Domestic**	668	964	1387	7.60	7.56	7.58
2	**Commercial**	288	540	1008	13.34	13.32	13.33

3	**Irrigation**	0	0	0	0	0	0
4	**Industrial**	201	310	455	9.00	8.01	8.50
5	**Others**	216	264	345	4.06	5.52	4.79
6	**Total**	1374	2077	3196	8.61	9.00	8.81

Table 27-2 Expected CAGR of Jodhpur - Category-wise Consumption

26.5 Transmission & Distribution Losses:

T&D losses of Jodhpur were 12.08% in 2022-23. The target level is to bring it down to about 11.58% and 11.08% by the end of 2027-28 & 2032-33 respectively.

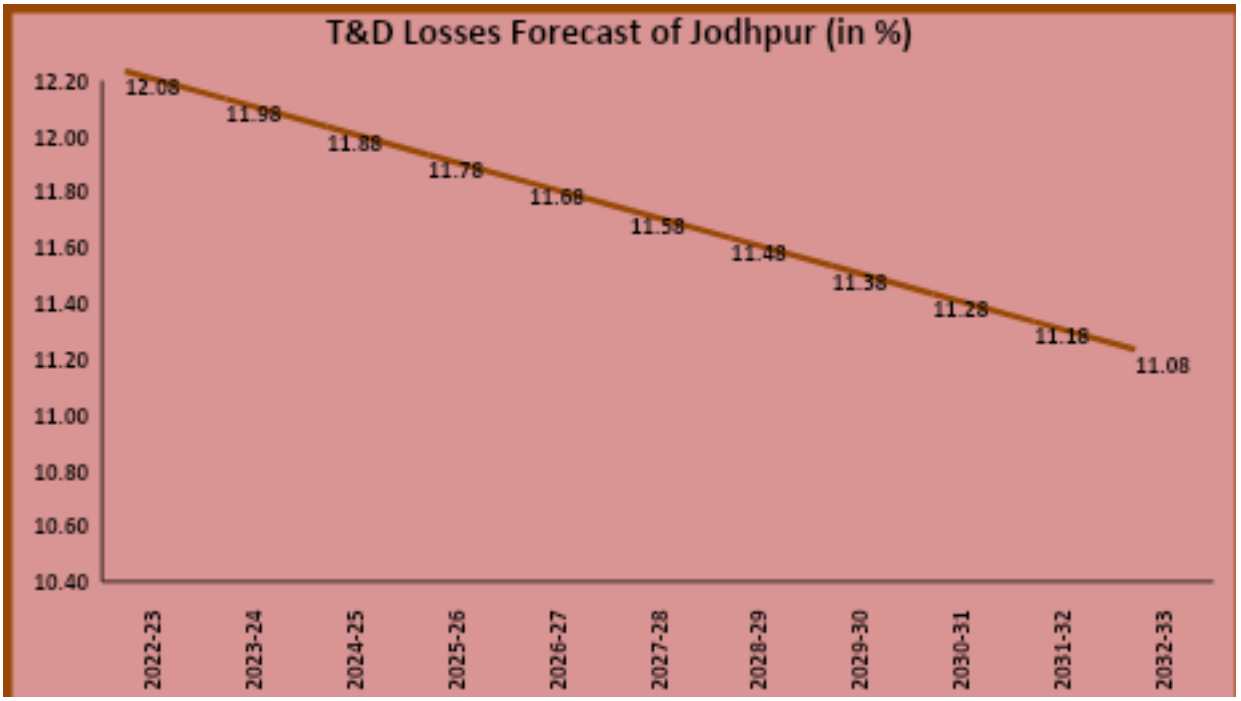

Figure 27-6 T&D Losses Forecast of Jodhpur (in %)

26.6 Summary of power forecast of Jodhpur city:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in%)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	1563	2349	3595	8.49	8.88
2	**Peak Demand (in MW)**	316	541	1026	11.32	13.66
3	**T&D Losses (in %)**	12.08	12	11.08		

Table 27-3 Power forecast summary of Jodhpur

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Jodhpur											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	668	720	775	834	896	964	1037	1117	1206	1296	1387
Commercial	288	327	371	420	476	540	612	695	791	896	1008
Public lighting	32	37	43	50	58	68	78	91	105	122	141
Public Water Works	32	33	34	34	35	36	36	37	38	38	39
Irrigation	0	0	0	0	0	0	0	0	0	0	0
LT Industries	173	188	204	221	239	259	279	301	324	347	377
HT Industries	29	32	36	41	46	51	56	62	67	72	78
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	10	10	11	12	12	13	14	14	15	16	16
Others (if Any)	143	144	145	146	147	148	148	149	149	149	149
Total (Energy Consumption)	1374	1491	1619	1758	1910	2077	2261	2466	2695	2937	3196
T&D losses –MU	189	203	218	235	253	272	293	317	343	370	398
T&D losses -in %	12.08	11.98	11.88	11.78	11.68	11.58	11.48	11.38	11.28	11.18	11.08
Energy Requirement – MU	1563	1694	1837	1993	2163	2349	2554	2782	3038	3306	3595
Annual Load Factor - %	56.41	55.23	54.00	52.66	51.18	49.59	47.97	46.42	44.00	42.00	40.00
Peak Load – MW	316	350	388	432	483	541	608	684	788	899	1026

Table 27-4 Category-wise and Year-wise Summary of Jodhpur.

Kanpur

Chapter 27: **Kanpur**

27.1 Introduction:

Kanpur is situated on the southern bank of Ganga River and is the biggest city of Uttar Pradesh and is a main centre of commercial and industrial activities.

Economy:

The City formerly known as Manchester of the country is now also called the commercial capital of the state. It is one of the biggest producers of textile and leather products. Apart from leather and textile industry, the fertilizer, chemicals, two wheelers, soaps, pan masala, hosiery and engineering industries are also operating prominently in the city.

Climate:

The climate of the city is characterized by a hot summers. The average annual maximum temp. is 31.90 C. The average annual minimum temp. is 18.80 C .The average annual rainfall of the city is 79.2 cm.

27.2 Brief description of Power Utilities:

Kanpur Electric Supply Company (KESCO), Kanpur is responsible for distribution of electricity in Kanpur.

27.3 Existing Power Scenario:

The total electricity consumption of Kanpur in the year 2022-23 was 3568 MU and with 9.77% T&D losses, the requirement was 3955 MU. The peak demand of the city was 740 MW. The Domestic sector was the biggest consumer of electricity (48%) followed by Industrial (32%) & Commercial (11%).

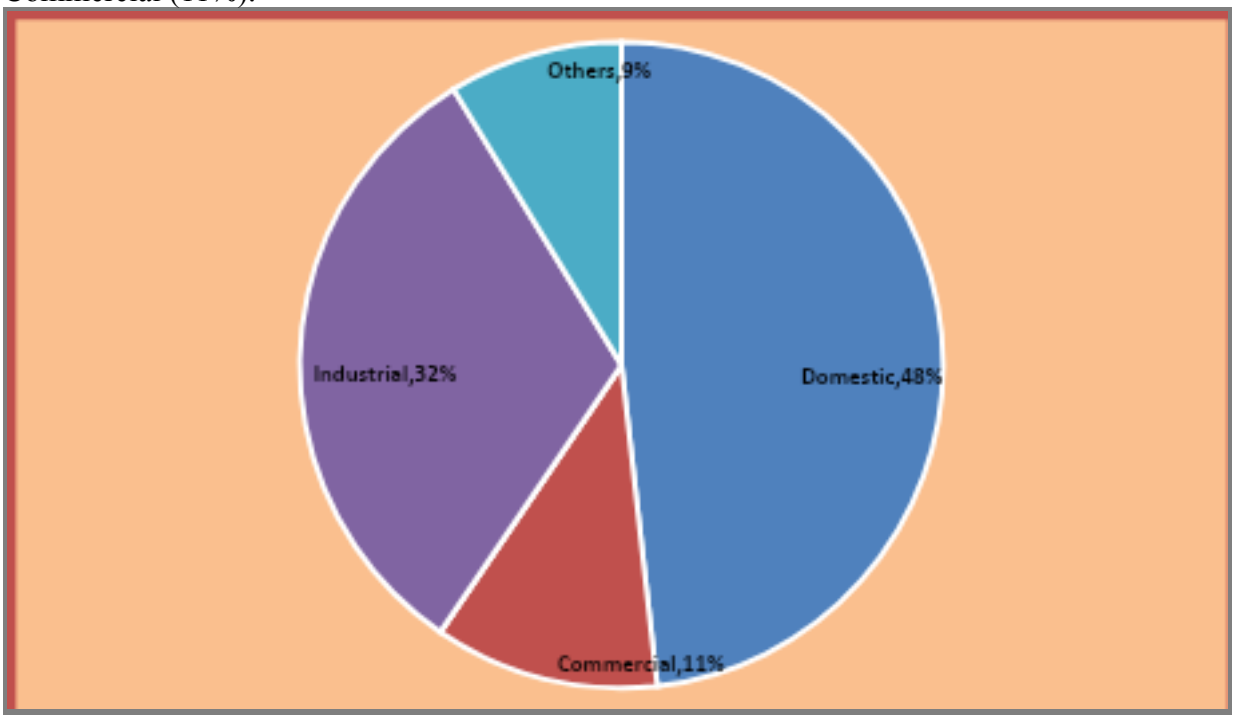

Figure 28-1 Energy Consumption Profile of Kanpur (2022-23).

In a comparison of Kanpur with Uttar Pradesh for the year 2022-23, it is observed that the energy requirement of Kanpur was 3.05% of the total energy requirement of the state.

Sl. No.	Particulars	Kanpur	Uttar Pradesh	Kanpur as % of Uttar Pradesh
1.	Energy Requirement (in MU)	3955	129580	3.05
2.	Peak Demand (in MW)	740	24994	2.96

Table 28-1 Comparison of Kanpur with Uttar Pradesh in 2022-23.

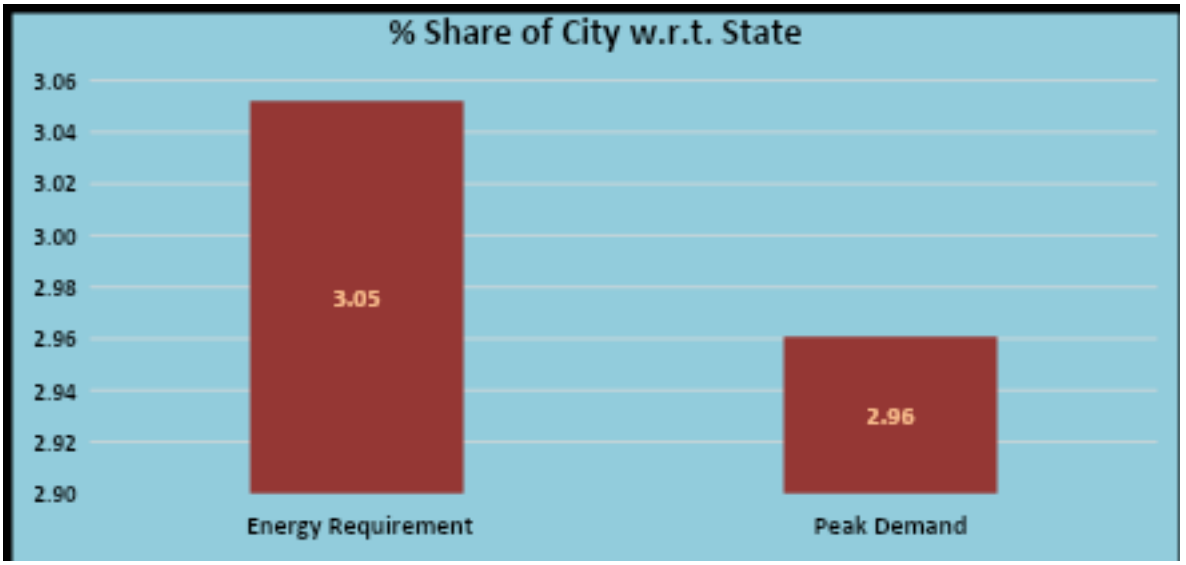

Figure 28-2 Comparison of Kanpur and Uttar Pradesh in the year 2022-23.

27.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Kanpur was 3955 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 5054 MU by the year 2027-28 with a 5.03% CAGR for the period 2022-23 to 2027-28. With a CAGR of 4.61% for the period 2027-28 to 2032-33, its energy requirement is estimated as 6331 MU by the year 2032-33.

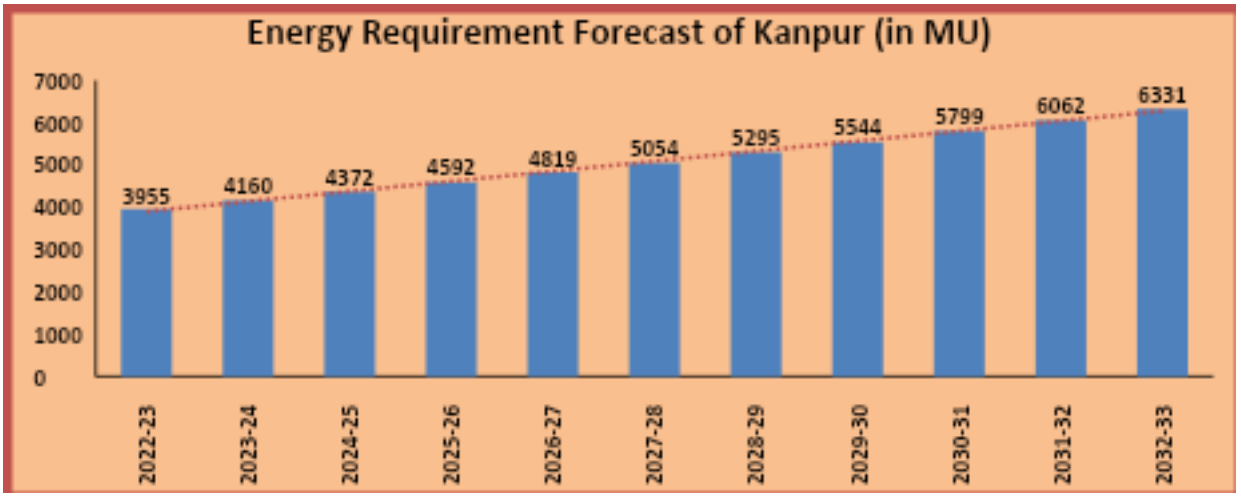

Figure 28-3 Energy Requirement Forecast of Kanpur (in MU)

Peak Demand of the Kanpur is expected to see 5.22% CAGR upto 2027-28 and will reach 954 MW in comparison to 740 MW in the year 2022-23. It is expected to reach 1204 MW in the year 2032-33 with a CAGR of 4.76% after 2024- 25.

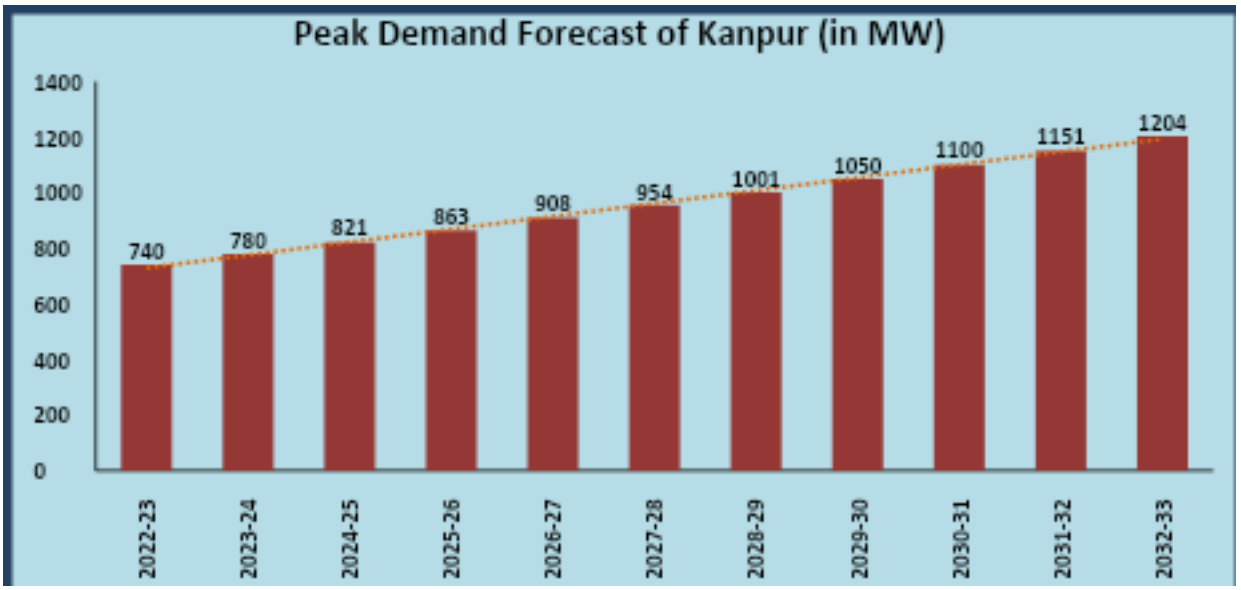

Figure 28-4 Peak Demand Forecast of Kanpur (in MW)

The category-wise energy consumption forecast of Kanpur are as follows:

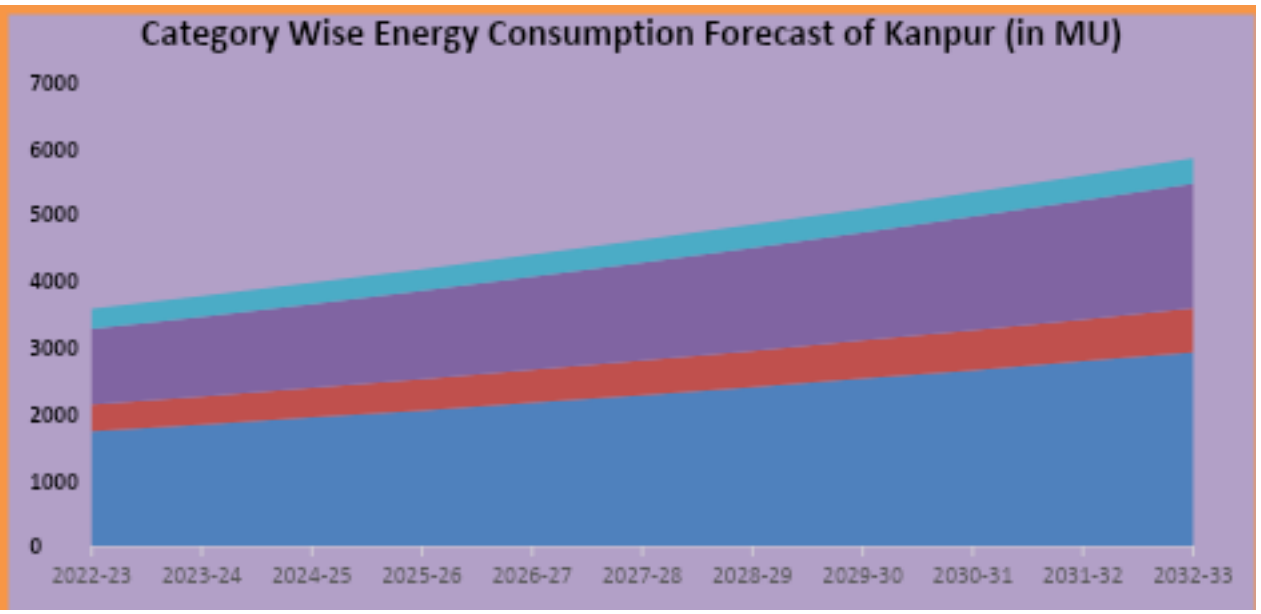

Figure 28-5 Category-wise Energy Consumption Forecast of Kanpur (in MU)

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)	CAGR (In %)

		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	**Domestic**	1728	2273	2921	5.64	5.14	5.39
2	**Commercial**	404	522	658	5.27	4.77	5.02
3	**Irrigation**	0	0	0	0	0	0
4	**Industrial**	1135	1478	1883	5.43	4.96	5.19
5	**Others**	302	338	377	2.24	2.25	2.25
6	**Total**	3568	4611	5839	5.26	4.84	5.05

Table 28-2 Expected CAGR of Kanpur - Category-wise Consumption

27.5 Transmission & Distribution Losses:

T&D losses of Kanpur were 9.97% in year 2021-22. The target level is to bring it down to about 8.77% and 7.77% by the end of 2027-28 & 2032-33 respectively.

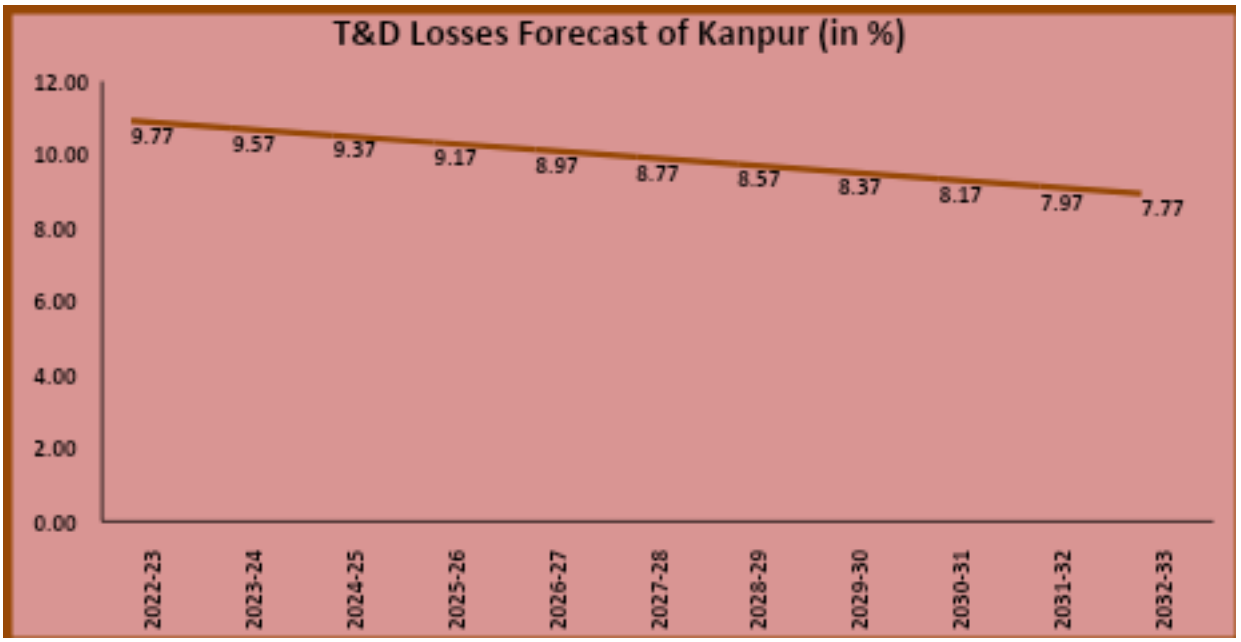

Figure 28-6 T&D Losses Forecast of Kanpur (in %)

27.6 Summary of power forecast of Kanpur city:

Sl. No.	Particulars	2022-23	2027-28	2032-33	CAGR in %	
					2022-23 to 2027-28	2027-28 to 2032-33
1.	**Energy Requirement in MU**	3955	5054	6331	5.03	4.61
2.	**Peak Demand in MW**	740	954	1204	5.22	4.76
3.	**T&D Losses (%)**	9.77	8.77	7.77	-	-

Table 28-3 Power forecast Summary of Kanpur

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Kanpur											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	1728	1829	1934	2043	2156	2273	2395	2520	2650	2783	2921
Commercial	404	426	448	472	496	522	548	574	602	630	658
Public lighting	36	36	37	37	37	38	38	38	39	39	39
Public Water Works	115	122	128	135	141	149	156	163	171	179	187
Irrigation	0	0	0	0	0	0	0	0	0	0	0
LT Industries	374	391	408	425	442	460	478	496	514	533	551
HT Industries	760	808	857	909	962	1018	1076	1137	1199	1264	1331
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	0	0	0	0	0	0	0	0	0	0	0
Others (if Any)	151	151	151	151	151	151	151	151	151	151	151
Total (Energy Consumption)	3568	3762	3963	4171	4387	4611	4842	5080	5326	5579	5839
T&D losses –MU	386	398	410	421	432	443	454	464	474	483	492
T&D losses -in %	9.77	9.57	9.37	9.17	8.97	8.77	8.57	8.37	8.17	7.97	7.77
Energy Requirement – MU	3955	4160	4372	4592	4819	5054	5295	5544	5799	6062	6331
Annual Load Factor - %	61.00	60.89	60.78	60.75	60.56	60.44	60.38	60.30	60.20	60.10	60.02
Peak Load – MW	740	780	821	863	908	954	1001	1050	1100	1151	1204

Table 28-4 Category-wise and Year-wise Summary of Kanpur.

Kohima

Chapter 28: **Kohima**

28.1 Introduction:

Kohima, is a hilly district of India's North Eastern and officially became the capital after the state of Nagaland was inaugurated in 1963.

Economy:

Kohima's economy is supported by agriculture, trade, government services, handicrafts, and tourism. The hilly terrain is ideal for growing rice, maize, and vegetables using traditional and terrace farming methods. The city acts as a commercial hub, benefiting from its location along National Highway 29. Traditional crafts, including bamboo work and Naga jewelry, boost the economy and attract tourists.

Climate:

Kohima experiences a subtropical highland climate with distinct seasonal variations due to its altitude. Summers (March to June) are mild, with temperatures ranging from 15°C to 25°C and moderate humidity. The monsoon season (June to September) brings heavy rains, averaging 1,500 to 2,000 mm annually. Winters (October to February) are cool and comfortable, with temperatures between 5°C and 15°C.

28.2 Brief description of Power Utilities:

In Kohima, Department of Power Nagaland is responsible for distribution of electricity.

28.3 Existing Power Scenario:

The total electricity consumption of Kohima in the year 2022-23 was 101MU and with 20% T&D losses, the requirement was 127 MU. The peak demand of the city was 26 MW. The Domestic sector was the biggest consumer of electricity (71%) followed by Commercial (9%).

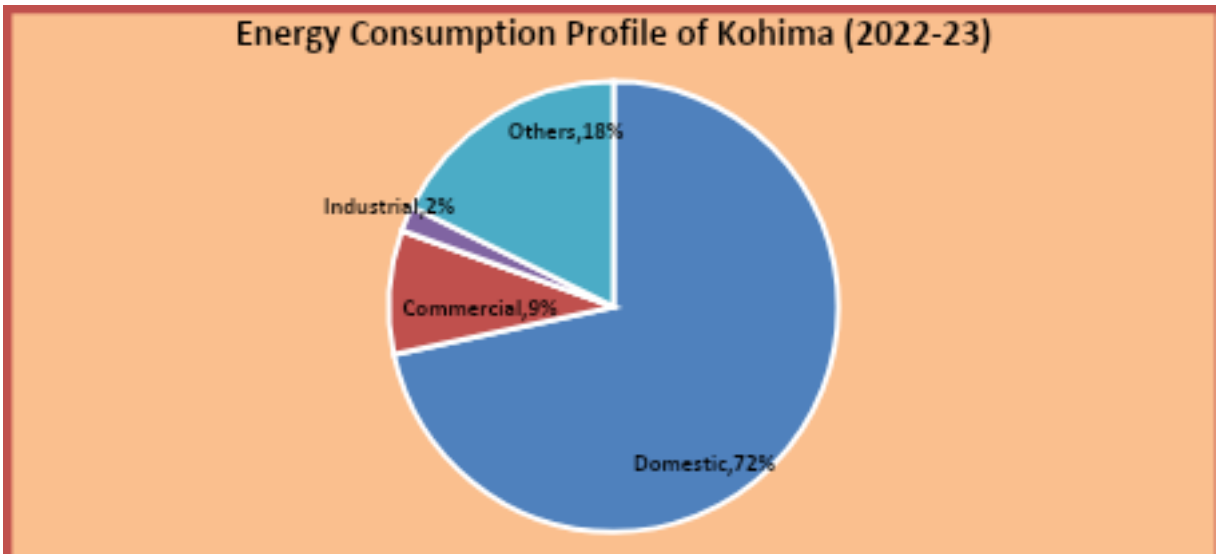

Figure 29-1 Energy Consumption Profile of Kohima (2022-23)

*Others category in Fig 29.1 includes load of public lighting, public water works, bulk supply and any other load

On comparison of Kohima with Nagaland for the year 2022-23, it is observed that the energy requirement of Kohima was 14.25 % of the total energy requirement of the state.

2022-23	Kohima City	Nagaland	% Share of Kohima City
Energy in MU	127	909	13.97
Peak Demand in MW	26	163	15.95

Table 29-1 Comparison of Kohima with Nagaland in 2022-23

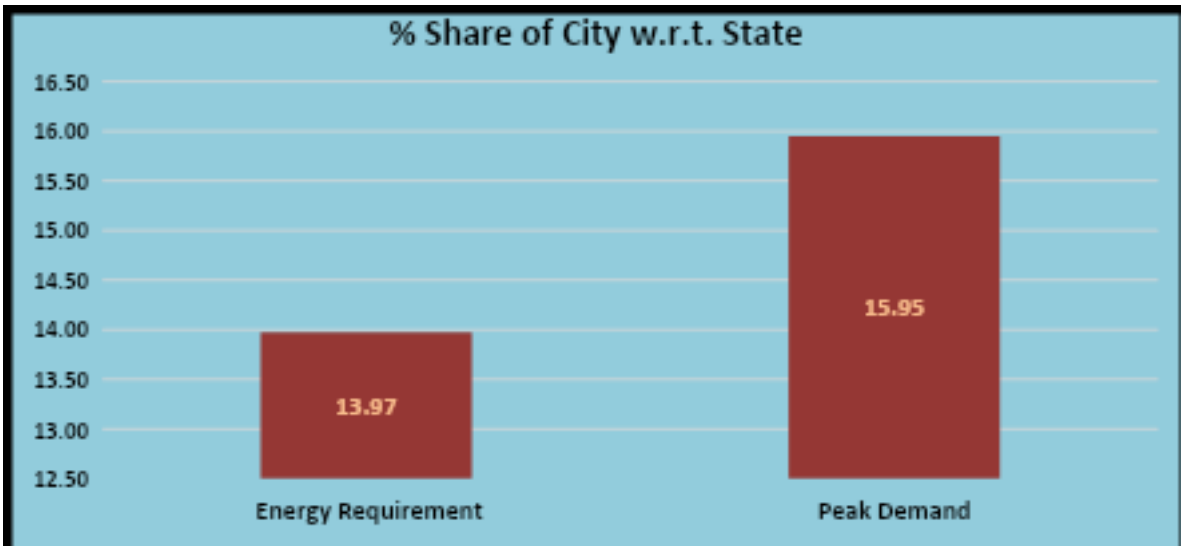

Figure 29-2 Comparison of Kohima and Nagaland in the year 2022-23.

28.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Kohima was 127 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 153 MU by the year 2027-28 with a 3.79% CAGR for the period 2022-23 to 2027-28. With a CAGR of 3.68 % for the period 2027-28 to 2032-33, its energy requirement is estimated as 184 MU by the year 2032-33.

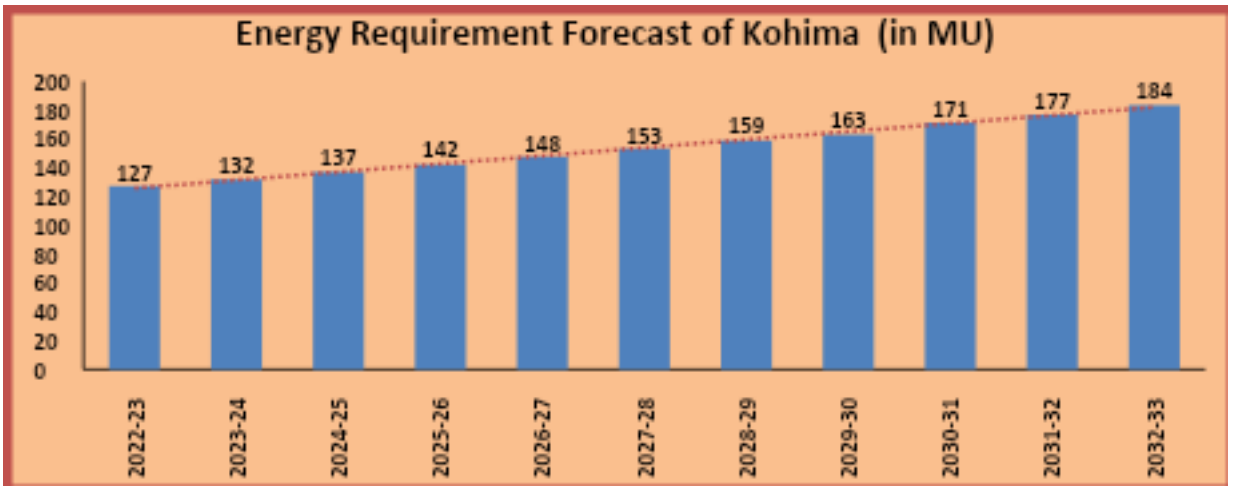

Figure 29-3 Energy Requirement Forecast of Kohima (in MU).

Peak Demand of Kohima is expected to see 5.00 % CAGR upto 2027-28 and will reach 33 MW

in comparison to 26 MW in year 2022-23. It is expected to reach 42 MW in year 2032-33 with a CAGR of 5.00% after 2027- 28.

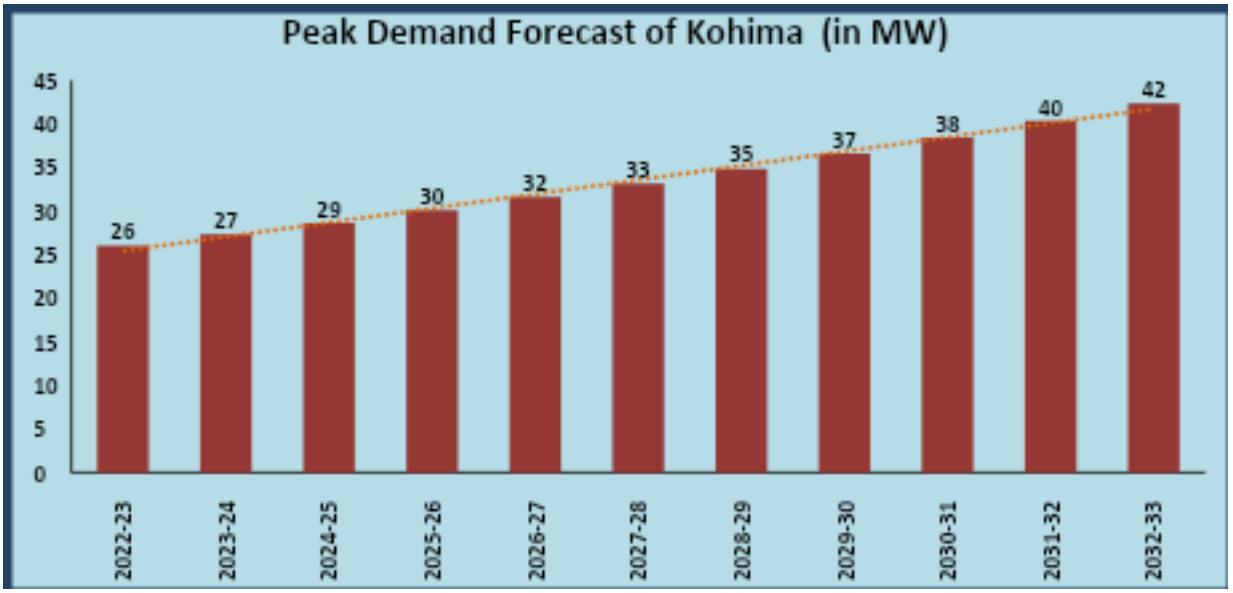

Figure 29-4 Peak Demand Forecast of Kohima (in MW)

The category-wise energy consumption forecast of Kohima are as follows:

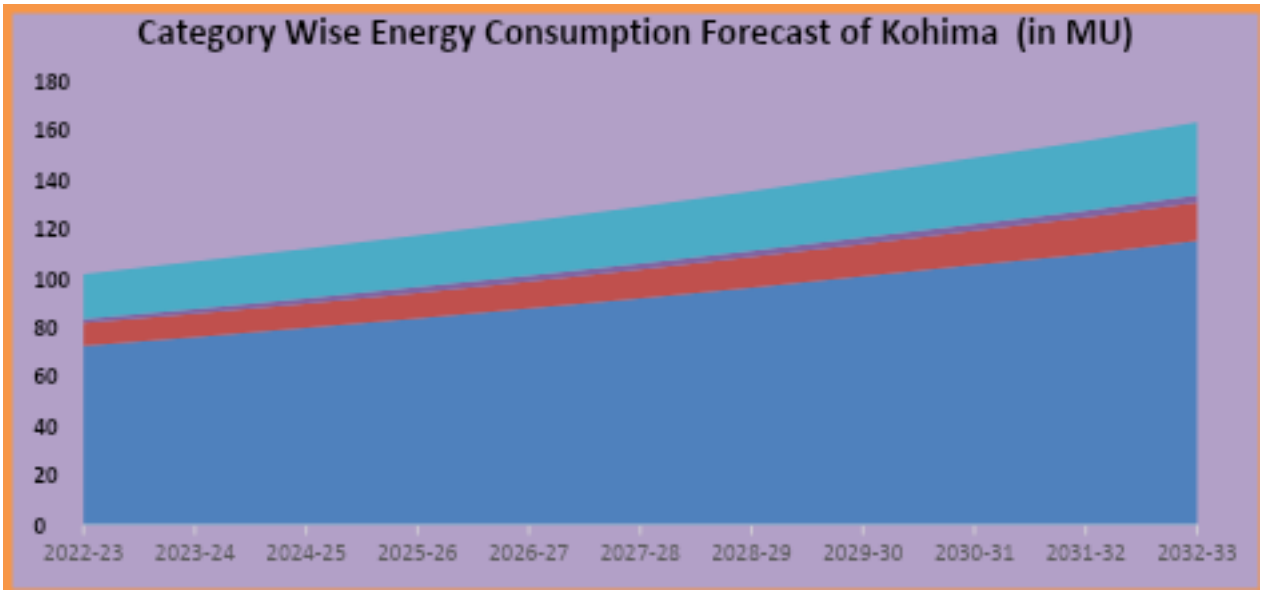

Figure 29-5 Category-wise Energy Consumption Forecast of Kohima (in MU)

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	**Domestic**	73	92	115	4.82	4.64	4.73

2	**Commercial**	9	12	15	5.13	5.94	5.53
3	**Irrigation**	0	0	0	0	0	0
4	**Industrial**	2	2	3	5.80	3.02	4.40
5	**Others**	18	23	29	5.00	5.00	5.00
6	**Total**	101	129	163	4.90	4.79	4.84

Table 29-2 Expected CAGR of Kohima - Category-wise Consumption

28.5 Transmission & Distribution Losses:

T&D losses of Kohima were 20.25% in 2022-23. The target level is to bring it down to about 15.90% and 11.29% by the end of 2027-28 & 2032-33 respectively.

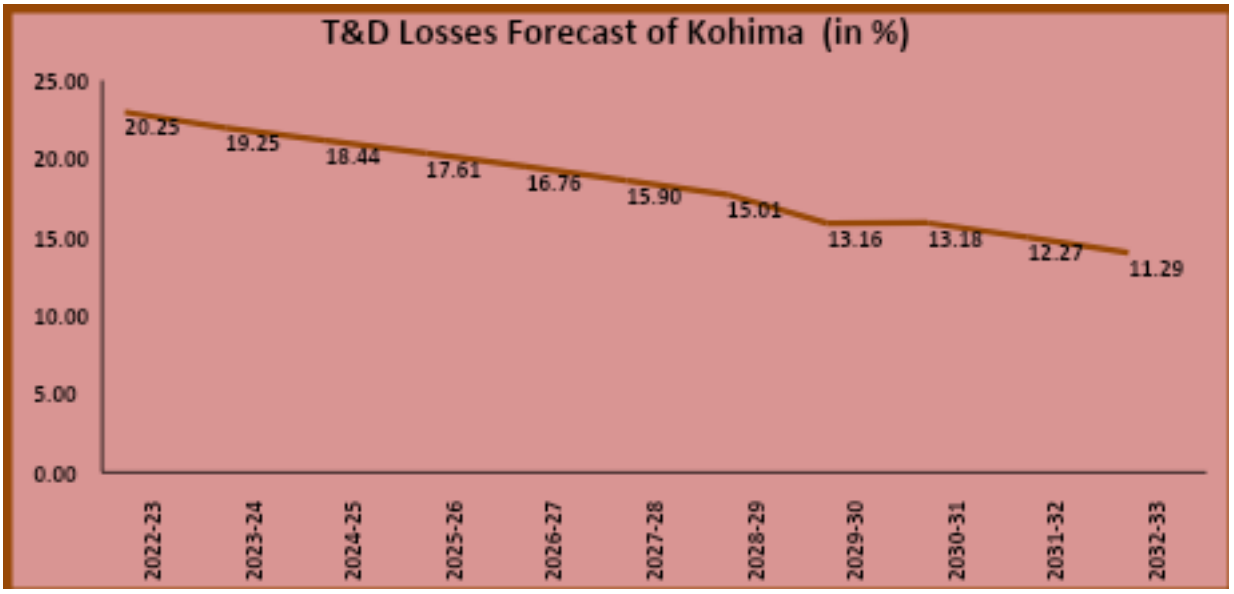

Figure 29-6 T&D Losses Forecast of Kohima (in %)

28.6 Summary of power forecast of Kohima city:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	127	153	184	3.79	3.68
2	**Peak Demand (in MW)**	26	33	42	5.00	5.00
3	**T&D Losses (in %)**	20	16	11		

Table 29-3 Power forecast summary of Kohima

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Kohima											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	73	76	80	84	88	92	96	101	105	110	115
Commercial	9	9	10	10	11	12	12	13	14	15	15
Public lighting	1	1	1	1	1	1	1	1	1	2	2
Public Water Works	0	0	0	0	0	0	0	0	0	0	0
Irrigation	0	0	0	0	0	0	0	0	0	0	0
LT Industries	2	2	2	2	2	2	3	3	3	3	3
HT Industries	0	0	0	0	0	0	0	0	0	0	0
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	5	5	6	6	6	6	7	7	7	8	8
Others (if Any)	12	13	13	14	15	15	16	17	18	19	20
Total (Energy Consumption)	**101**	**106**	**112**	**117**	**123**	**129**	**135**	**142**	**149**	**155**	**163**
T&D losses -MU	26	25	25	25	25	24	24	21	23	22	21
T&D losses -in %	20.25	19.25	18.44	17.61	16.76	15.90	15.01	13.16	13.18	12.27	11.29
Energy Requirement - MU	**127**	**132**	**137**	**142**	**148**	**153**	**159**	**163**	**171**	**177**	**184**
Annual Load Factor - %	55.88	55.14	54.54	53.93	53.33	52.72	52.12	50.95	50.87	50.11	49.50
Peak Load - MW	**26**	**27**	**29**	**30**	**32**	**33**	**35**	**37**	**38**	**40**	**42**

Table 29-4 Category-wise and Year-wise Summary of Kohima.

Kolkata

Chapter 29: **Kolkata**

29.1 Introduction:

Kolkata, earlier known as Calcutta, is the capital of the state of West Bengal and is the principal commercial, cultural and educational center of East India. It is one of India's oldest urban areas. Historically, the city was the trading and commercial capital of India.

Economy:

Kolkata's economy is mainly based on its manufacturing industries, it's financial and trade activities and its role as a major port. It is also a major center for printing, publishing, and newspaper circulation, as well as for recreation and entertainment. Kolkata has a diversified industrial base with major industrial sectors including steel, mining, minerals, heavy engineering, pharmaceuticals, cement, textiles, food processing and jute. IT industries are also growing very fast.

Climate:

Kolkata has a tropical wet and dry climate. The average annual maximum temp. is 31.60 C. The average annual minimum temp. is 22.60 C. The average annual rainfall of the city is 177.8 cm.

29.2 Brief description of Power Utilities:

The electricity distribution in Kolkata city is being supplied by two distribution utilities i.e. CESC and WBSEDCL. CESC is serving 567 sq.km within the Kolkata Metropolitan area while the electricity to remaining area is supplied by WBSEDCL.

29.3 Existing Power Scenario:

The total electricity consumption of Kolkata in the year 2022-23 was 18443 MU and with 9.3% T&D losses, the requirement was 20336 MU. The peak demand of the city was 3739 MW. Domestic sector was the biggest consumer of electricity (40%) followed by Commercial (19%). In case of WBSEDCL, the Industrial sector was the biggest consumer of electricity (39%) followed by Commercial (30%). While in case of CESC, Domestic sector was the biggest consumer of electricity (51%) followed by Industrial (21%)

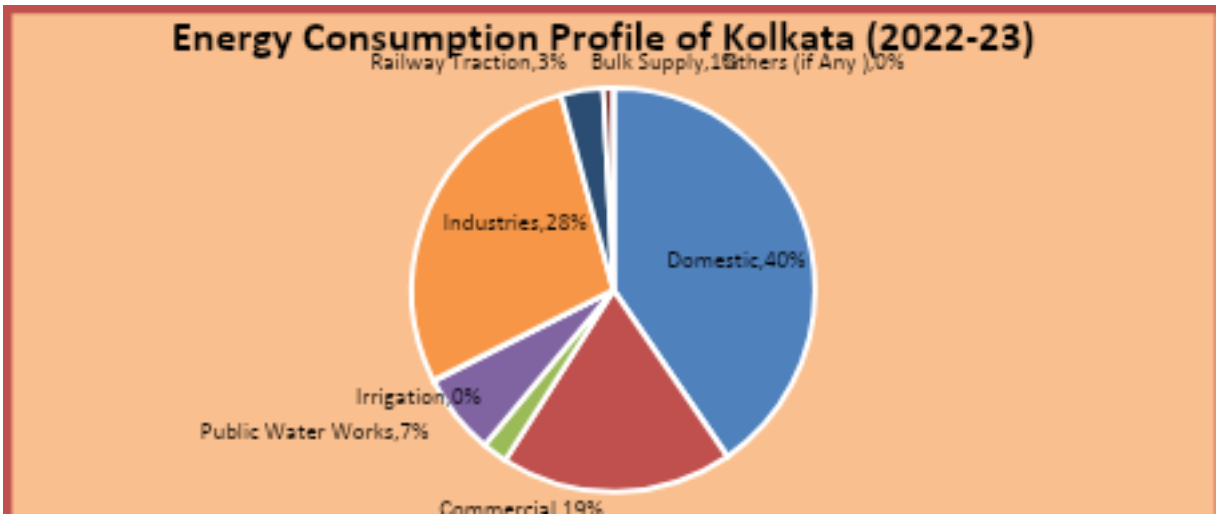

Figure 30-1 Energy Consumption Profile of Kolkata (2022-23)

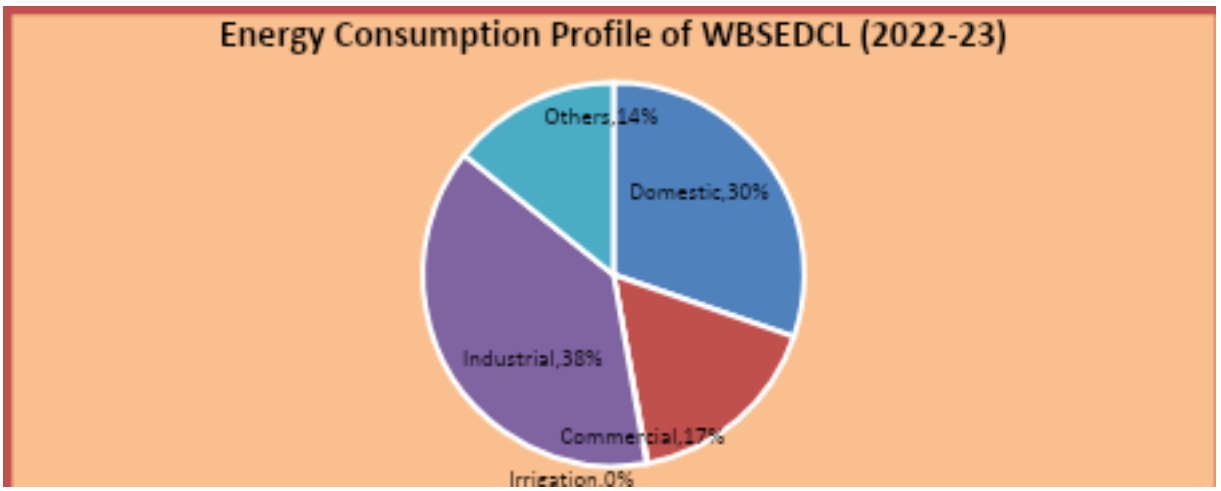

Figure 30-2 Energy Consumption Profile of WBSEDCL (2022-23).

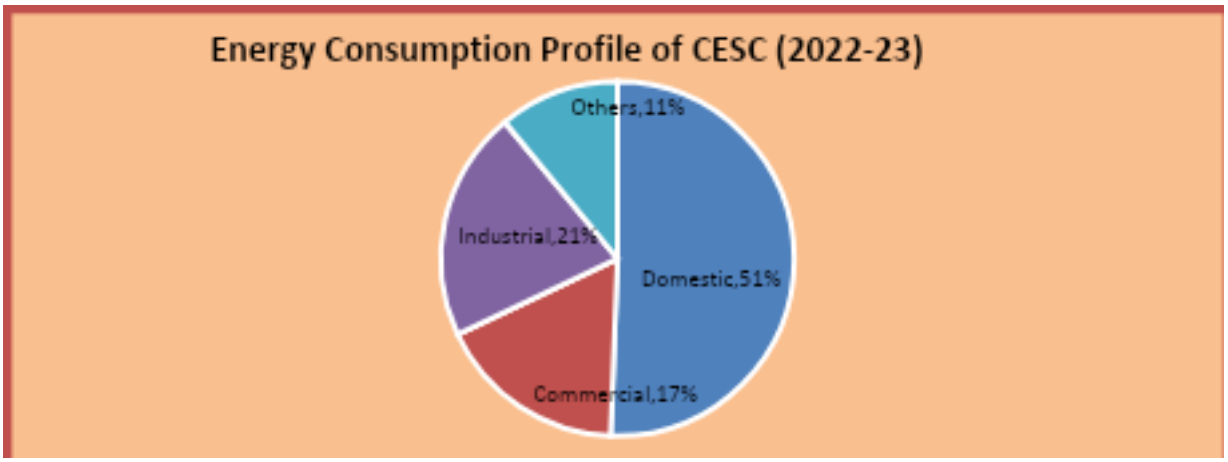

Figure 30-3 Energy Consumption Profile of CESC (2022-23)

On comparison of Kolkata with West Bengal for the year 2022-23, it is observed that the energy requirement of Kolkata was 33.97% of the total energy requirement of the state.

2022-23	**Kolkata**	**West Bengal**	**% Share of Kolkata City**
Energy in MU	20336	60163	33.80
Peak Demand in MW	3739	10150	36.84

Table 30-1 Comparison of Kolkata with West Bengal in 2022-23

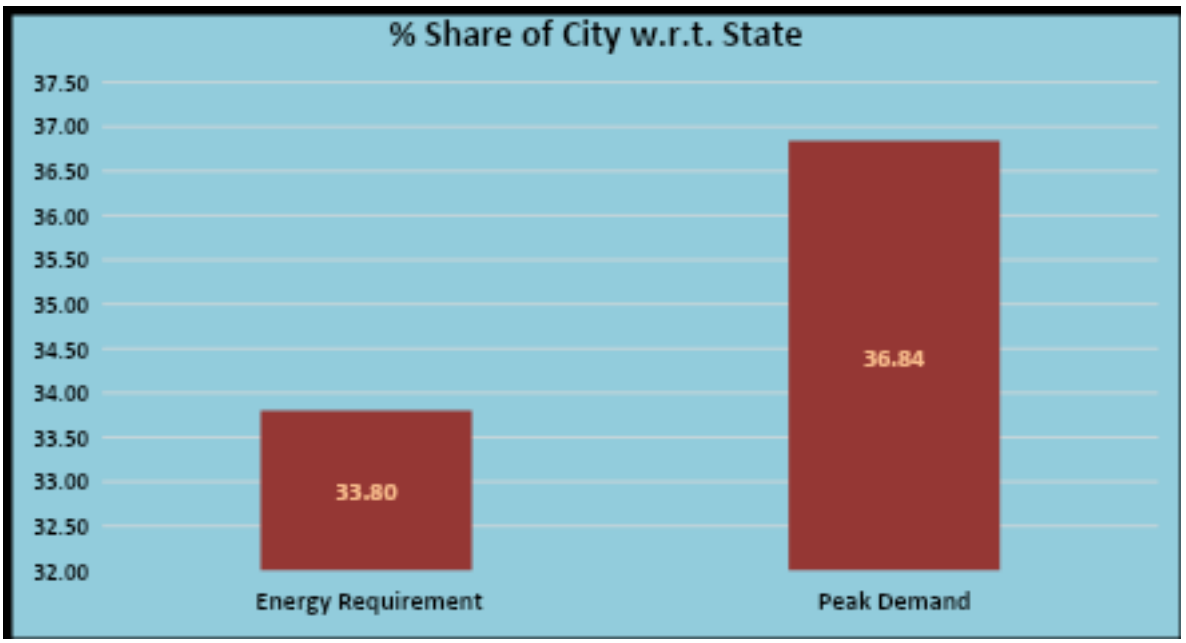

Figure 30-4 Comparison of Kolkata and West Bengal in the year 2022-23.

29.4 Power Forecast: WBSEDCL

Based on total electricity consumption and T&D Losses, the total energy requirement of WBSEDCL was 9323 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 11969 MU by the year 2027-28 with a 5.12 % CAGR for the period 2022-23 to 2027-28. With a CAGR of 5.33 % for the period 2027-28 to 2032-33, its energy requirement is estimated as 15521 MU by the year 2032-33.

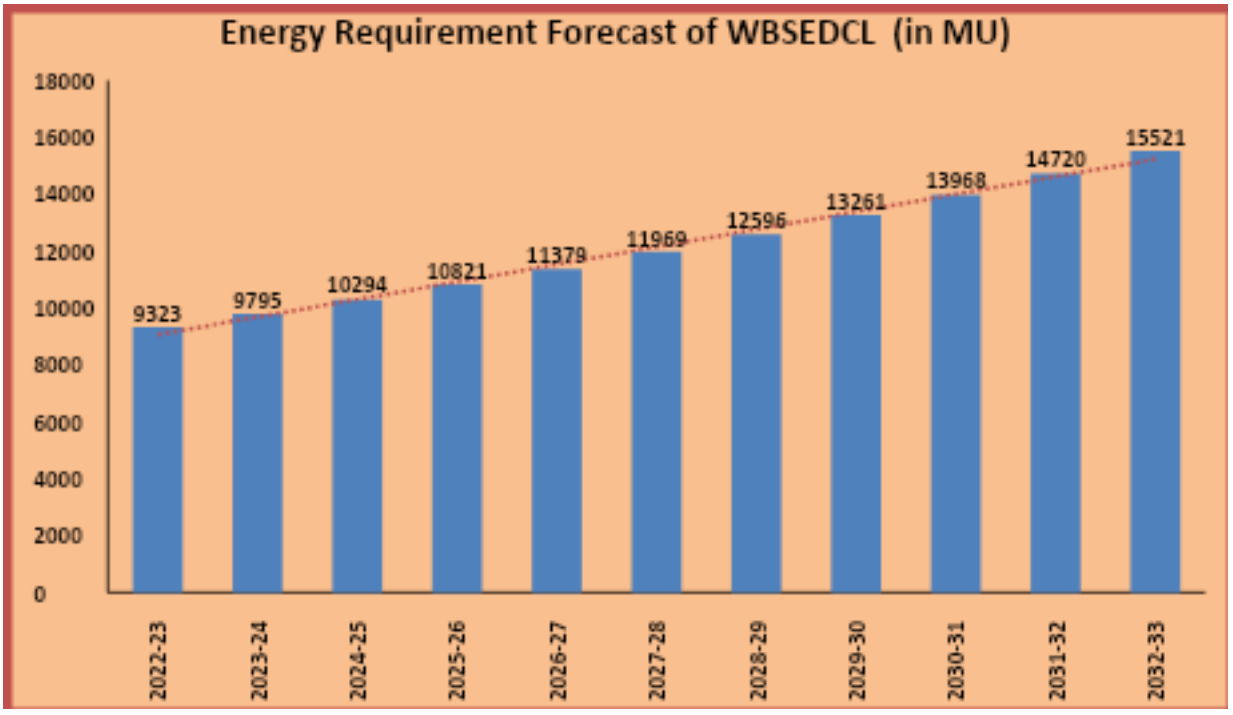

Figure 30-5 Energy Requirement Forecast of WBSEDCL (in MU)

Peak Demand of WBSEDCL is expected to see 5.23 % CAGR up to 2027-28 and will reach 1829 in comparison to 1417 MW in year 2022-23. It is expected to reach 2383 MW in year 2032-33 with a CAGR of 5.44% after 2027- 28.

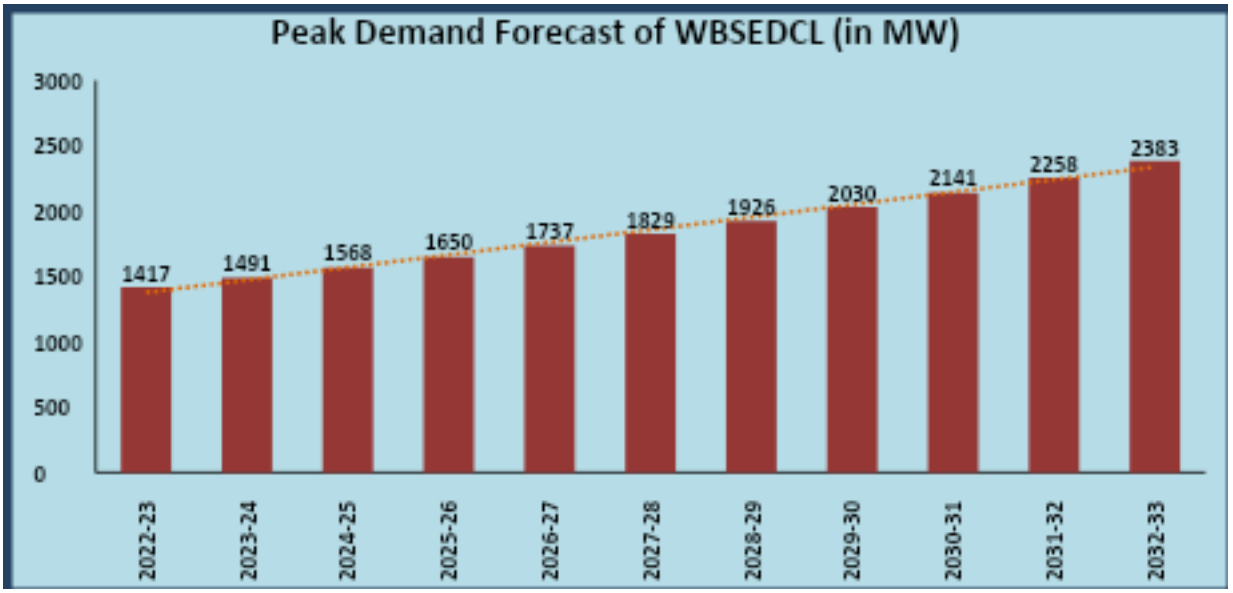

Figure 30-6 Peak Demand Forecast of WBSEDCL (in MW)

The category-wise energy consumption forecast of WBSEDCL are as follows:

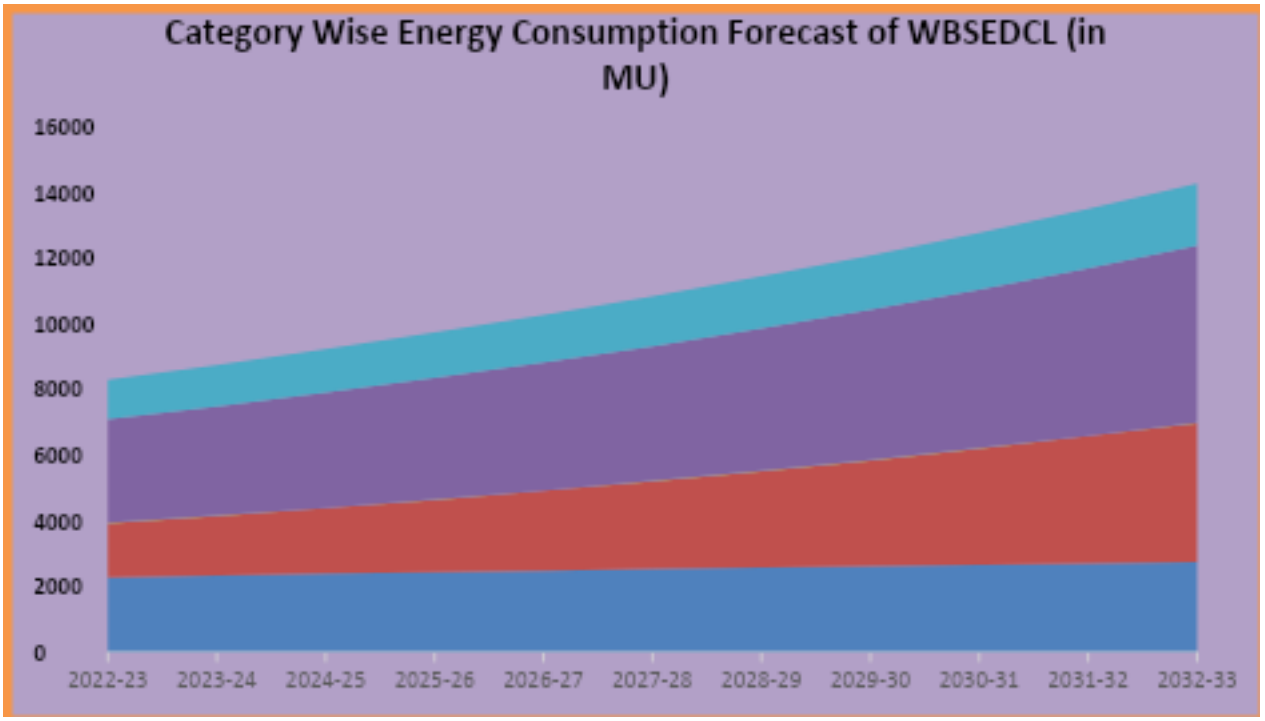

Figure 30-7 Category-wise Energy Consumption Forecast of WBSEDCL (in MU)

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	**Domestic**	2266	2516	2725	2.11	1.61	1.86

2	**Commercial**	1640	2666	4235	10.20	9.70	9.95
3	**Irrigation**	10	12	14	4.20	3.70	3.95
4	**Industrial**	3151	4104	5385	5.42	5.58	5.50
5	**Others**	1204	1518	1882	4.74	4.39	4.57
6	**Total**	8272	10815	14241	5.51	5.66	5.58

Table 30-2 Expected CAGR of WBSEDCL - Category-wise Consumption

29.5 Power Forecast: CESC

Based on total electricity consumption and T&D Losses, the total energy requirement of CESC is estimated as 11013 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 12054 MU by the year 2027-28 with a 1.82 % CAGR for the period 2022-23 to 2027-28. With a CAGR of 1.63 % for the period 2027-28 to 2032-33, its energy requirement is estimated as 13068 MU by the year 2032-33.

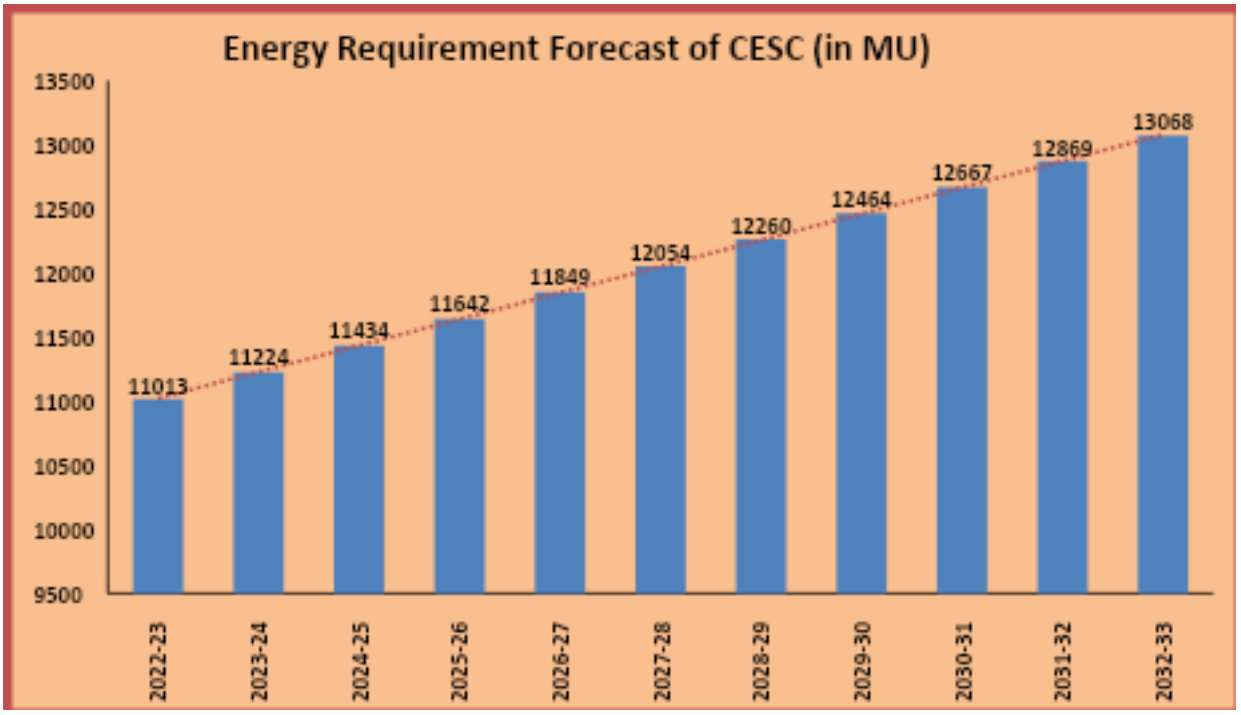

Figure 30-8 Energy Requirement Forecast of CESC (in MU)

Peak Demand of CESC is expected to see 3.92 % CAGR upto 2027-28 and will reach 2813 MW in comparison to 2321 MW in year 2022-23. It is expected to reach 3368 MW in year 2032-33 with a CAGR of 3.67 % after 2027- 28.

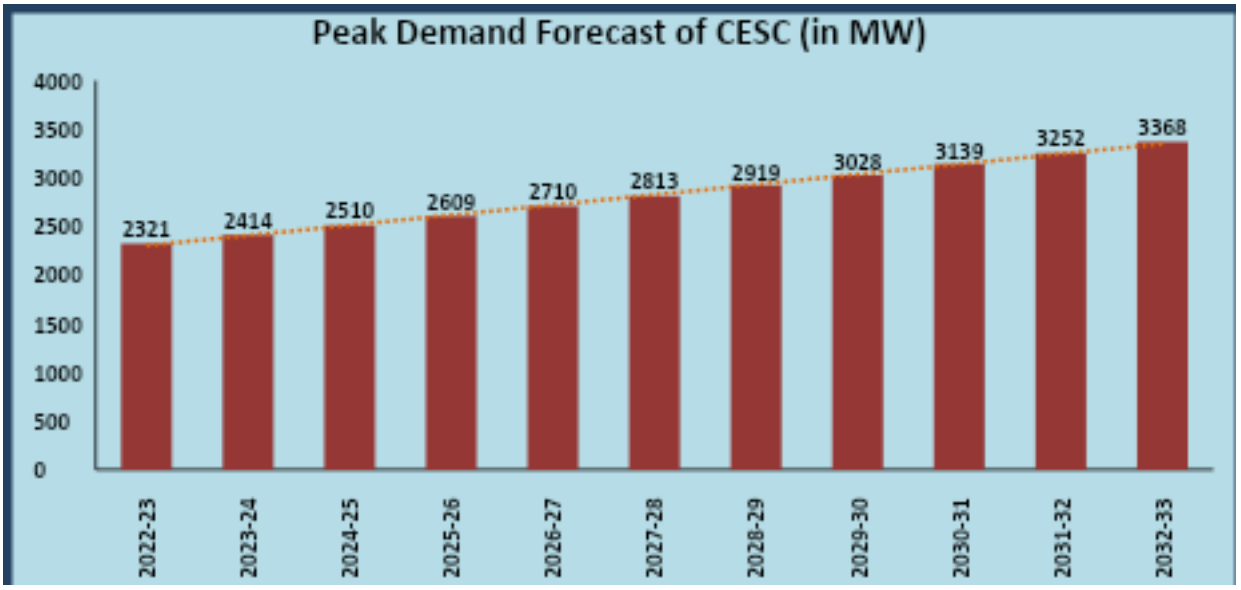

Figure 30-9 Peak Demand Forecast of CESC (in MW)

The category-wise energy consumption forecast of CESC are as follows:

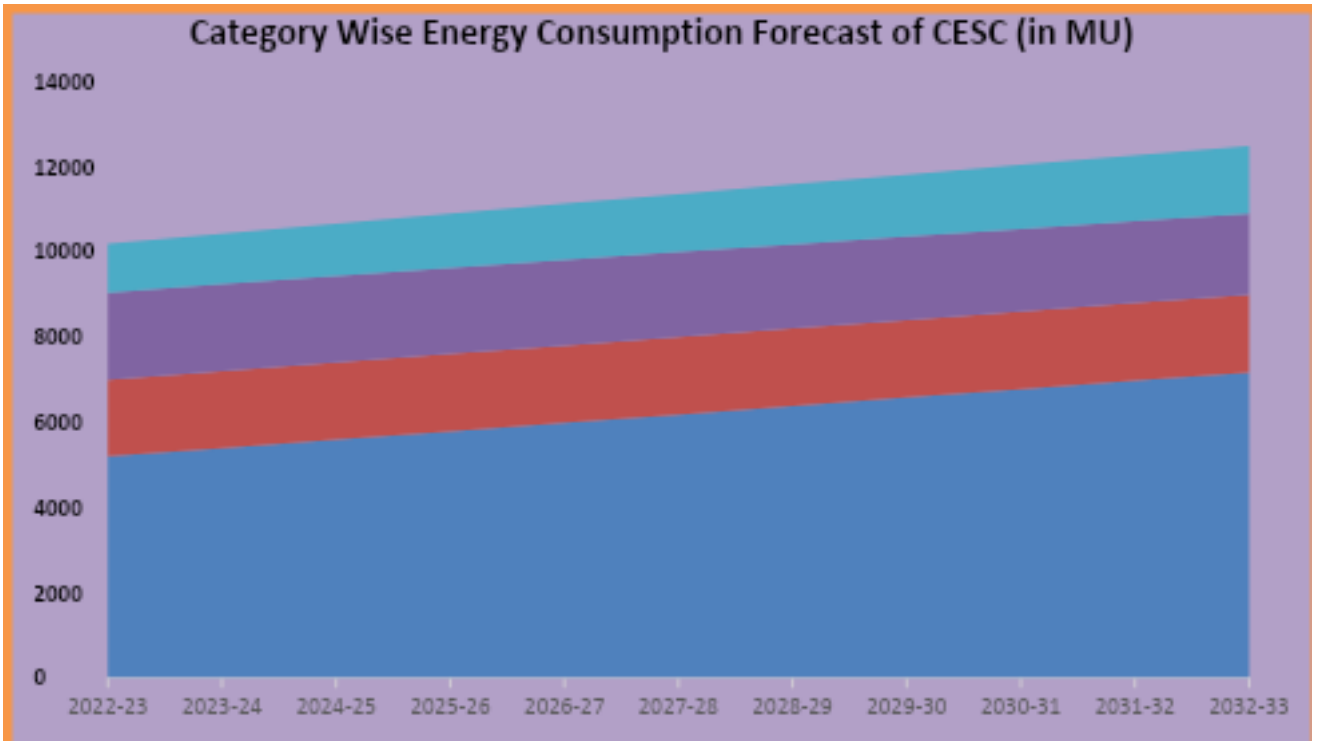

Figure 30-10 Category-wise Energy Consumption Forecast of CESC (in MU)

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	**Domestic**	5189	6167	7153	3.51	3.01	3.26

2	**Commercial**	1793	1815	1791	0.24	-0.26	-0.01
3	**Irrigation**	0	0	0	0	0	0
4	**Industrial**	2046	1995	1897	-0.51	-1.00	-0.75
5	**Others**	1143	1362	1590	3.56	3.15	3.36
6	**Total**	10172	11338	12432	2.19	1.86	2.03

Table 30-3 Expected CAGR of CESC - Category-wise Consumption

29.6 Transmission & Distribution Losses: WBSEDCL

T&D losses of WBSEDCL were 11.28% in 2022-23. The target level is to bring it down to about 9.64% and 8.24% by the end of 2027-28 & 2032-33 respectively.

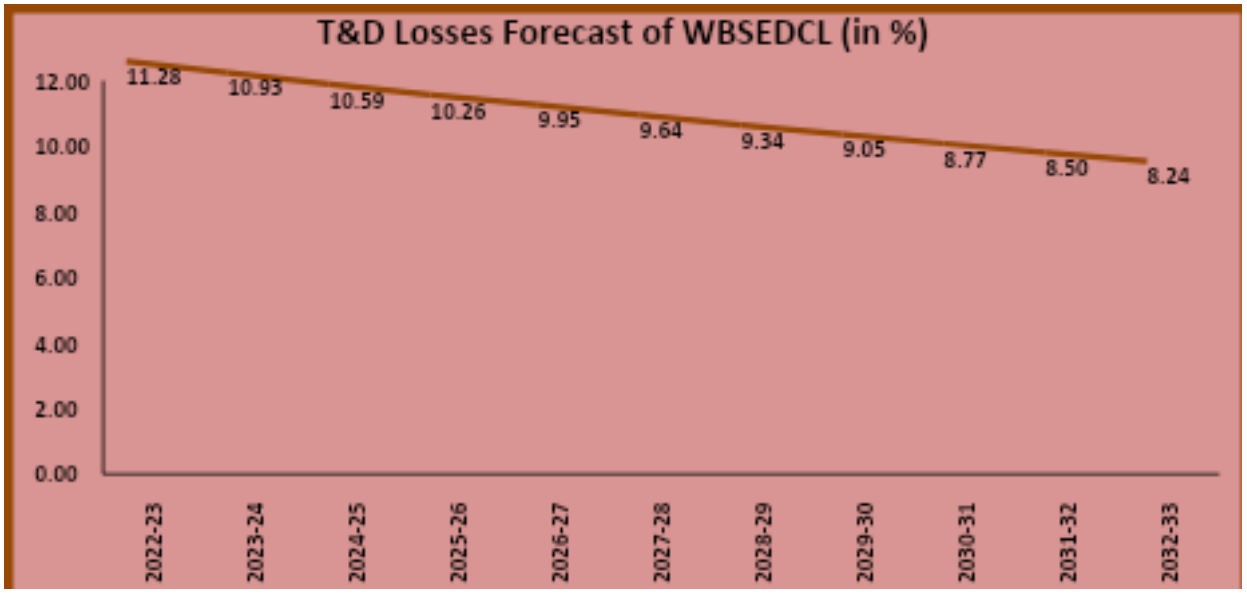

Figure 30-11 T&D Losses Forecast of WBSEDCL (in %)

29.7 Transmission & Distribution Losses: CESC

T&D losses of CESC were estimated at 7.6 % in 2022-23. The target level is to bring it down to about 5.9 % and 4.6 % by the end of 2027-28 & 2032-33 respectively.

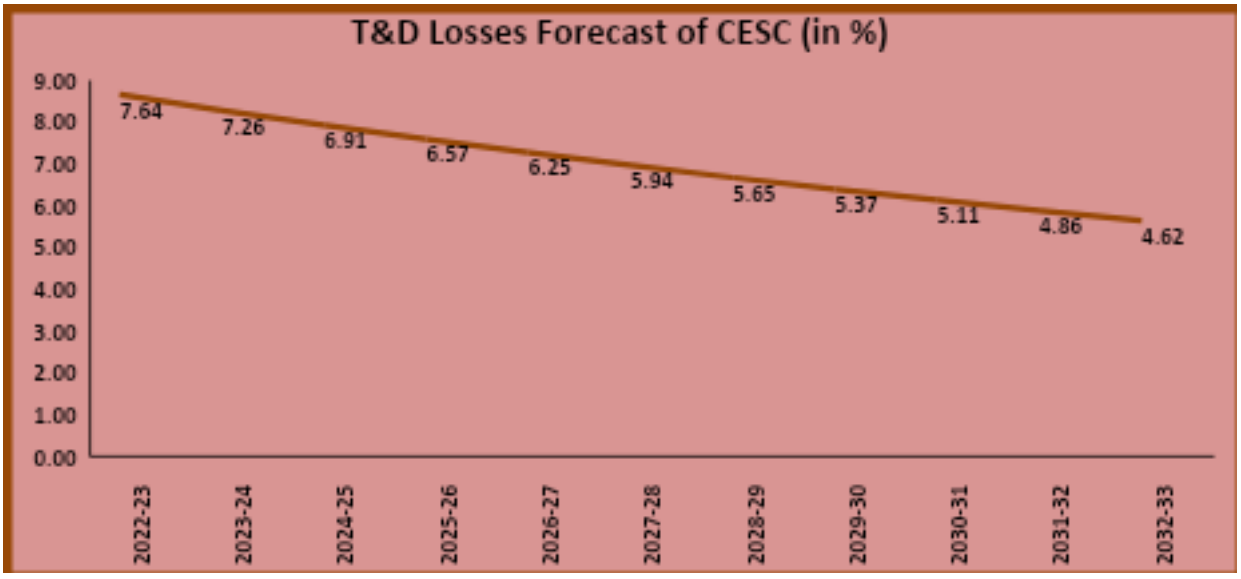

Figure 30-12 T&D Losses Forecast of CESC (in %)

29.8 Summary of power forecast of WBSEDCL:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in%)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	Energy Requirement (in MU)	9323	11969	15521	5.12	5.33
2	Peak Demand (in MW)	1417	1829	2383	5.23	5.44
3	T&D Losses (in %)	11	10	8.24		

Table 30-4 Power forecast summary of WBSEDCL

29.9 Summary of power forecast of CESC:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in%)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	Energy Requirement (in MU)	11013	12054	13068	1.82	1.63
2	Peak Demand (in MW)	2321	2813	3368	3.92	3.67
3	T&D Losses (in %)	7.6	5.9	4.6		

Table 30-5 Power forecast summary of CESC

29.10 Summary of power forecast of Kolkata:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	Energy Requirement (in MU)	20336	23228	28588	2.69	4.24
2	Peak Demand (in MW)	3739	4642	5751	4.42	4.38
3	T&D Losses (in %)	9.3	7.78	6.59		

Table 30-6 Power forecast summary of Kolkata

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WBSEDCL											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	2266	2319	2370	2420	2469	2516	2561	2605	2647	2687	2725
Commercial	1640	1811	1997	2201	2424	2666	2930	3217	3529	3868	4235
Public lighting	97	107	118	131	144	158	174	191	209	229	251
Public Water Works	671	700	730	761	792	824	856	889	921	955	988
Irrigation	10	10	10	11	11	12	12	13	13	14	14
LT Industries	291	336	387	446	513	590	678	778	893	1023	1171
HT Industries	2861	2986	3115	3246	3379	3514	3651	3790	3930	4071	4214
Railway Traction	436	456	475	495	515	536	557	578	599	621	643
Bulk Supply	0	0	0	0	0	0	0	0	0	0	0
Others (if Any)	0	0	0	0	0	0	0	0	0	0	0
Total (Energy Consumption)	8272	8725	9204	9710	10247	10815	11419	12060	12742	13468	14241
T&D losses -MU	1051	1070	1090	1111	1132	1154	1177	1201	1226	1252	1279
T&D losses -in %	11.28	10.93	10.59	10.26	9.95	9.64	9.34	9.05	8.77	8.50	8.24
Energy Requirement - MU	9323	9795	10294	10821	11379	11969	12596	13261	13968	14720	15521
Annual Load Factor - %	75.09	75.01	74.94	74.86	74.79	74.71	74.64	74.56	74.49	74.42	74.34
Peak Load - MW	1417	1491	1568	1650	1737	1829	1926	2030	2141	2258	2383

Table 30-7 Category-wise and Year-wise Summary of WBSEDCL

CESC											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	5189	5382	5576	5772	5969	6167	6365	6563	6760	6957	7153
Commercial	1793	1801	1807	1812	1814	1815	1817	1819	1821	1823	1825
Public lighting	276	287	298	309	320	332	343	354	366	377	388
Public Water Works	531	552	573	595	617	640	662	685	708	730	753
Irrigation	0	0	0	0	0	0	0	0	0	0	0
LT Industries	783	784	785	785	784	782	780	777	773	768	763
HT Industries	1263	1255	1246	1236	1225	1212	1199	1184	1168	1152	1134
Railway Traction	188	198	208	219	230	242	254	266	278	291	304
Bulk Supply	146	147	147	147	147	147	146	146	145	144	143
Others (if Any)	2	2	2	2	2	2	2	2	2	2	2
Total (Energy Consumption)	10172	10409	10644	10877	11109	11338	11567	11795	12021	12244	12465
T&D losses -MU	841	815	790	765	740	716	693	669	647	624	602
T&D losses -in %	7.64	7.26	6.91	6.57	6.25	5.94	5.65	5.37	5.11	4.86	4.62
Energy Requirement - MU	11013	11224	11434	11642	11849	12054	12260	12464	12667	12869	13068
Annual Load Factor - %	54.16	53.07	52.00	50.95	49.92	48.91	47.93	46.96	46.02	45.09	44.18
Peak Load - MW	2321	2414	2510	2609	2710	2813	2919	3028	3139	3252	3368

Table 30-8 Category-wise and Year-wise Summary of CESC

Kolkata											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	7456	7701	7946	8192	8438	8682	8926	9168	9407	9644	9878
Commercial	3434	3612	3805	4013	4238	4481	4747	5036	5350	5691	6060
Public lighting	374	395	417	440	464	490	517	545	575	606	640
Public Water Works	1201	1252	1304	1356	1410	1464	1518	1574	1629	1685	1741
Irrigation	10	10	10	11	11	12	12	13	13	14	14
LT Industries	1073	1120	1172	1231	1297	1372	1458	1555	1665	1791	1934
HT Industries	4124	4242	4361	4482	4603	4726	4850	4974	5098	5223	5348
Railway Traction	624	654	684	714	746	778	810	844	878	912	947
Bulk Supply	146	147	147	147	147	147	146	146	145	144	143
Others (if Any)	2	2	2	2	2	2	2	2	2	2	2
Total (Energy Consumption)	18444	19133	19848	20588	21356	22153	22986	23855	24763	25712	26707
T&D losses -MU	1893	1886	1880	1875	1872	1870	1869	1870	1872	1876	1881
T&D losses -in %	9.31	8.97	8.65	8.35	8.06	7.78	7.52	7.27	7.03	6.80	6.58
Energy Requirement - MU	20336	21019	21728	22463	23228	24023	24856	25725	26635	27588	28588
Annual Load Factor - %	62.1	61.4	60.8	60.2	59.6	59.1	58.6	58.1	57.6	57.2	56.7
Peak Load - MW	3739	3905	4078	4259	4446	4642	4846	5058	5279	5510	5751

Table 30-9 Category-wise and Year-wise Summary of Kolkata

Kota

Chapter 30: **Kota**

30.1 Introduction:

Kota is the third largest city along with a popular tourist destination of Rajasthan State after Jaipur & Jodhpur. The city is known for gold jewelry, Kota–Doria sarees, silk sarees, famous Kota-Stone and coaching institutes for engineering & medical entrance exam

Economy:

Kota is one of the important industrial center in Rajasthan. Its industrial base includes a well-developed RIICO Industrial park with over 2100 units comprising units engaged in cotton and oilseed milling, textile weaving, agro food processing, fertilizer, cement, metal handicrafts and Kota stone. It also boasts of one of the largest fertilizer plant in Asia, a precision unit and atomic power station.

Climate:

The climate of the city is characterized by hot summers and bracing cold winters. The average annual maximum temp. is 33^0 C The average annual minimum temp. is 21.8^0 C The average annual rainfall of the city is 72.2 cm.

30.2 Brief description of Power Utilities:

Jaipur Vidyut Vitran Nigam Limited (JVVNL) has the responsibility of power distribution in Kota City.

30.3 Existing Power Scenario:

The total electricity consumption of Kota in the year 2022-23 was 985 MU and with 18.39 % T&D losses, the requirement was 1207 MU. The peak demand of the city was 240 MW. The Domestic sector was the biggest consumer of electricity (50%) followed by Industrial (20%) & Commercial (14%).

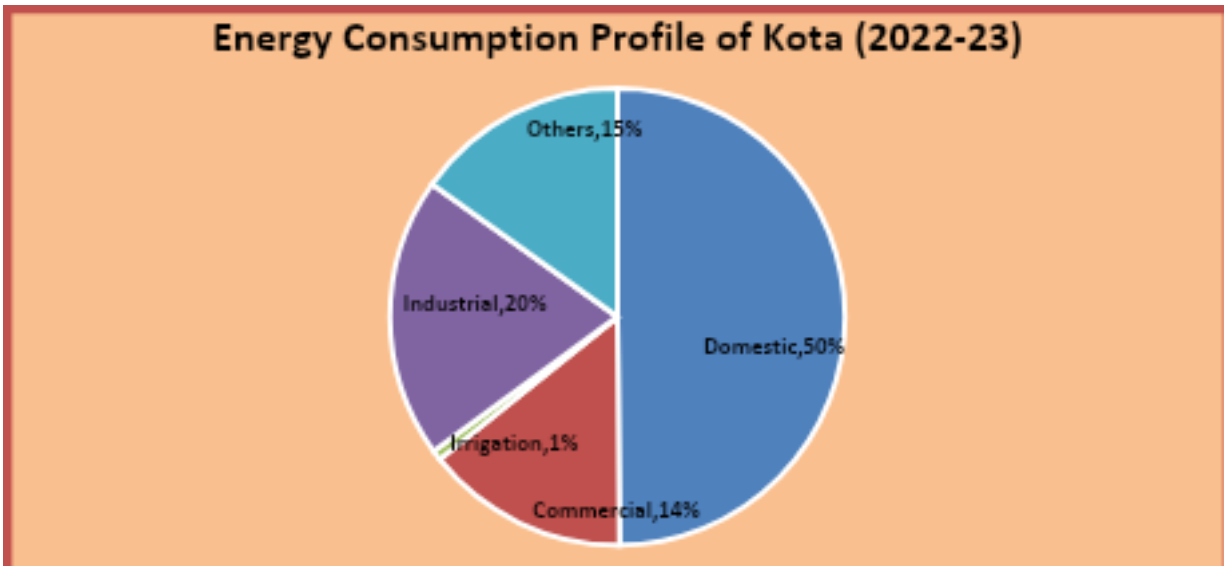

Figure 31-1 Energy Consumption Profile of Kota (2022-23)

On comparison of Kota with Rajasthan for the year 2022-23, it is observed that the energy

requirement of Kota was 1.34% of the total energy requirement of the state.

2022-23	Kota City	Rajasthan	% Share of Jaipur City
Energy in MU	1207	101757	1.19
Peak Demand in MW	240	16291	1.47

Table 31-1 Comparison of Kota with Rajasthan in 2022-23

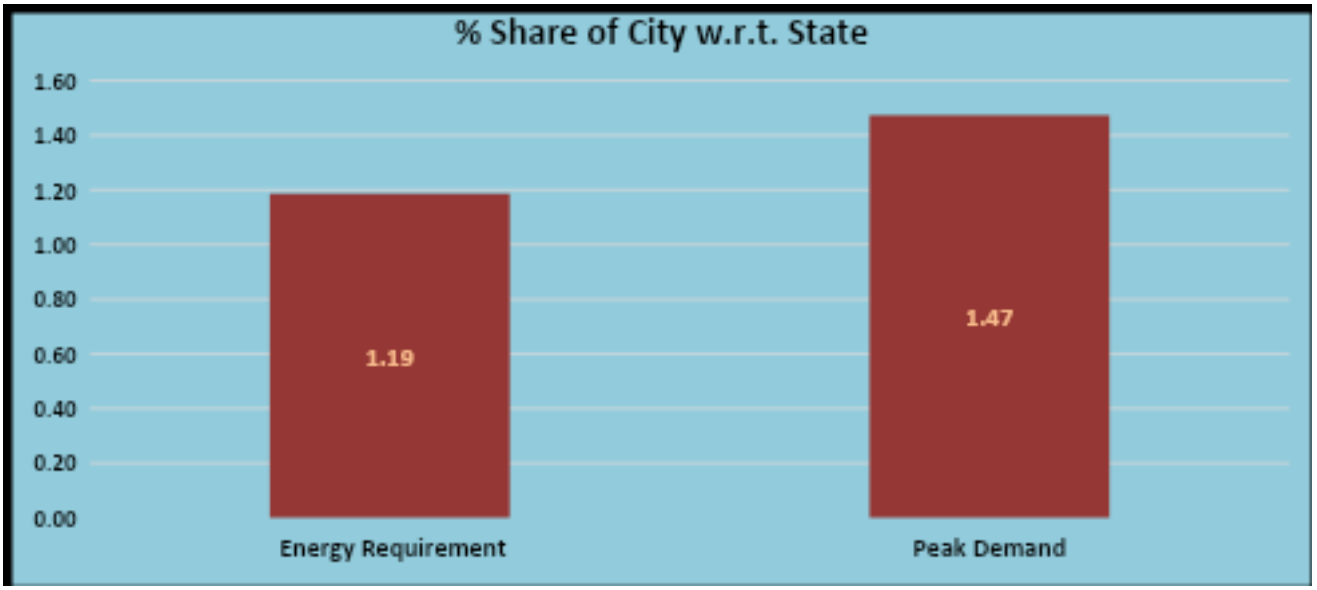

Figure 31-2 Comparison of Kota and Rajasthan in the year 2022-23

30.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Kota was 1207 MU in year 2022-23. It is expected that the energy requirement of the city will reach to 1447 MU by the year 2027-28 with 3.69 % CAGR for the period 2022-23 to 2027-28. With CAGR of 3.09 % for the period 2027-28 to 2032-33, its energy requirement is estimated as 1685 MU by the year 2032-33.

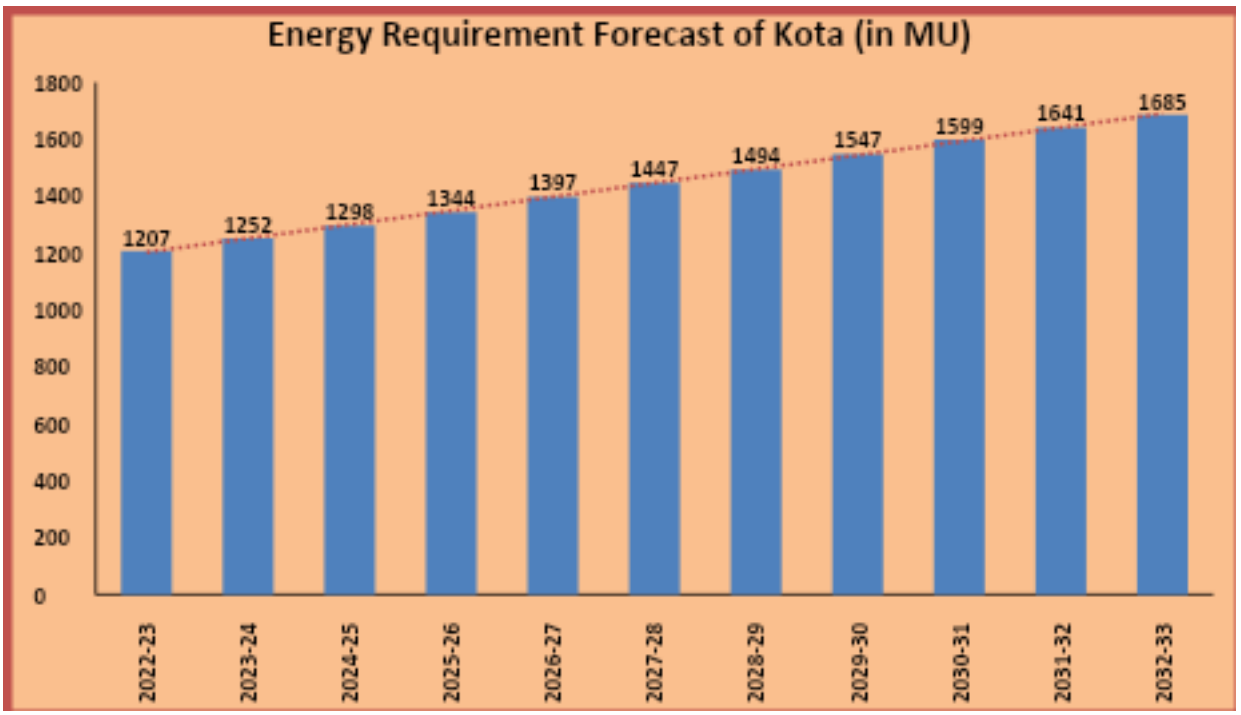

Figure 31-3 Energy Requirement Forecast of Kota (in MU)

Peak Demand of the Kota is expected to see 3.82% CAGR up to 2027-28 and will reach 290 MW in comparison to 240 MW in year 2022-23. It is expected to reach 341 MW in year 2032-33 with a CAGR of 3.33% after 2027-28.

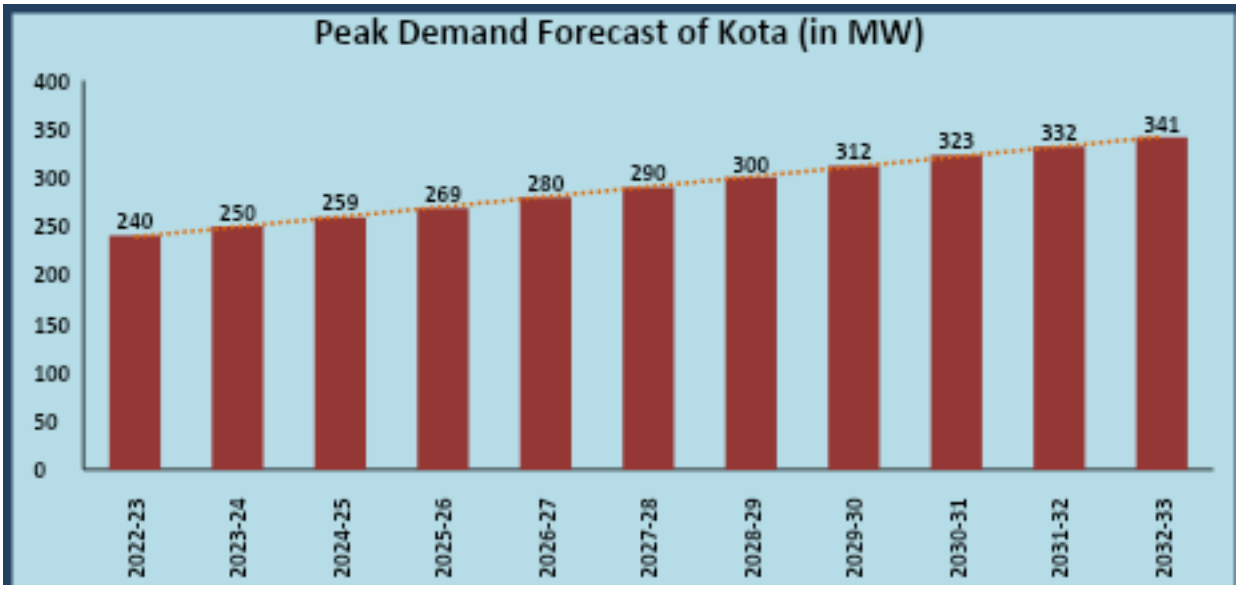

Figure 31-4 Peak Demand Forecast of Kota (in MW)

The category-wise energy consumption forecast of Kota are as follows:

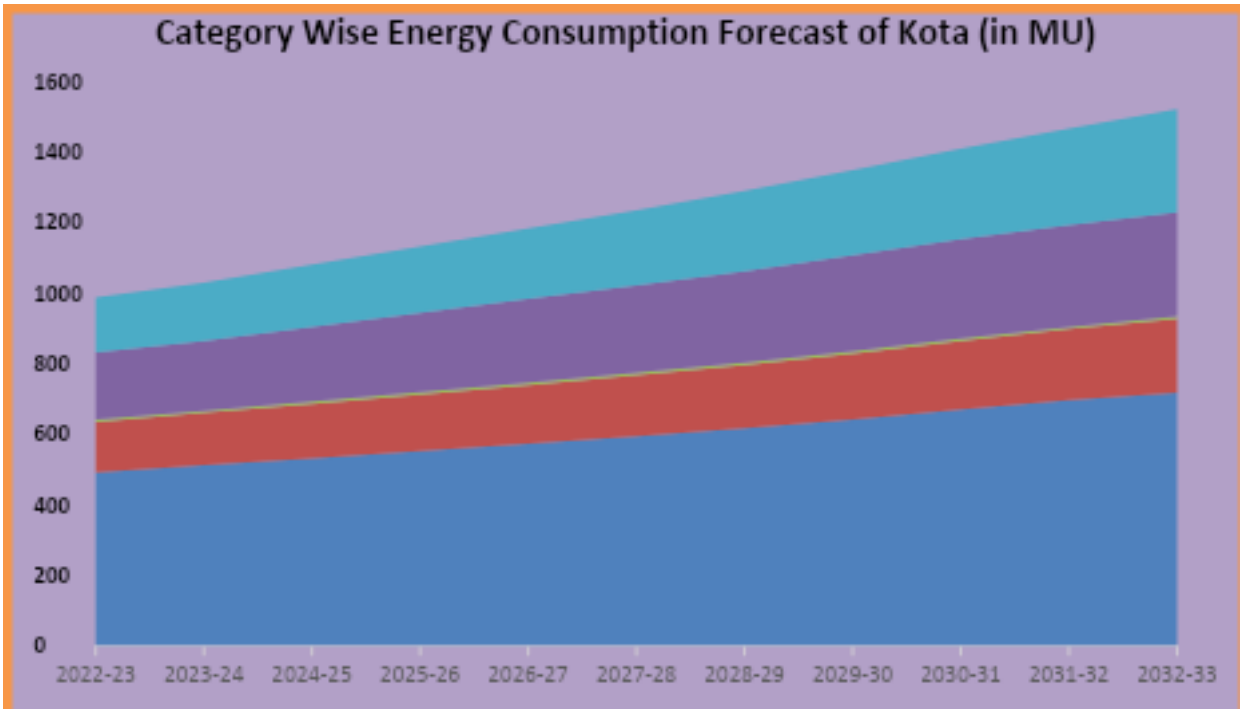

Figure 31-5 Category-wise Energy Consumption Forecast of Kota (in MU)

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	**Domestic**	491	593	717	3.85	3.87	3.86
2	**Commercial**	142	172	208	3.88	3.87	3.87
3	**Irrigation**	7	7	7	1.21	0	0
4	**Industrial**	191	248	294	5.43	3.44	4.43
5	**Others**	155	213	293	6.55	6.58	6.57
6	**Total**	985	1233	1518	4.59	4.15	4.37

Table 31-2 Expected CAGR of Kota - Category-wise Consumption

30.5 Transmission & Distribution Losses:

T&D losses of Kota were 18.39% in year 2022-23. The target level is to bring it down to about 14.80% and 9.88% by the end of 2027-28 & 2032-33 respectively.

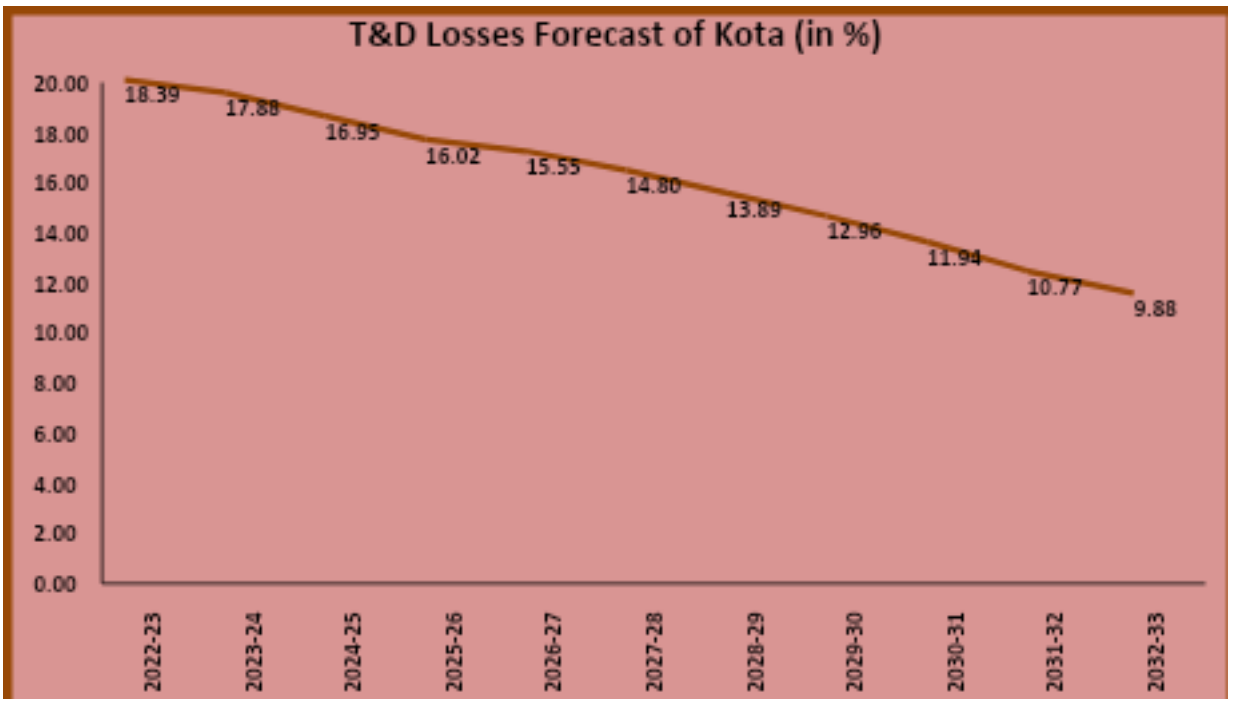

Figure 31-6 T&D Losses Forecast of Kota (in %)

30.6 Summary of power forecast of Kota city:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	1207	1447	1685	3.69	3.09
2	**Peak Demand (in MW)**	240	290	341	3.82	3.33
3	**T&D Losses (in %)**	18.39	14.80	9.88		

Table 31-3 Power forecast summary of Kota

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Kota											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	491	510	530	550	571	593	616	641	669	694	717
Commercial	142	148	154	159	166	172	179	186	194	201	208
Public lighting	18	18	18	18	18	18	18	18	19	19	19
Public Water Works	92	100	110	120	131	142	155	169	183	199	216
Irrigation	7	7	7	7	7	7	7	7	7	7	7
LT Industries	30	31	32	33	34	35	36	37	37	38	39
HT Industries	161	167	179	191	203	213	222	235	243	250	255
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	45	47	48	49	51	52	53	54	56	57	58
Others (if Any)	0	0	0	0	0	0	0	0	0	0	0
Total (Energy Consumption)	985	1028	1078	1129	1180	1233	1286	1347	1408	1465	1518
T&D losses -MU	222	224	220	215	217	214	208	201	191	177	166
T&D losses -in %	18.39	17.88	16.95	16.02	15.55	14.80	13.89	12.96	11.94	10.77	9.88
Energy Requirement - MU	1207	1252	1298	1344	1397	1447	1494	1547	1599	1641	1685
Annual Load Factor - %	57.32	57.15	57.11	57.05	57.01	56.98	56.77	56.56	56.42	56.39	56.33
Peak Load - MW	240	250	259	269	280	290	300	312	323	332	341

Table 31-4 Category-wise and Year-wise Summary of Kota.

Lucknow

Chapter 31: **Lucknow**

31.1 Introduction:

Lucknow is the capital city of Uttar Pradesh. It is a prominent administrative and commercial centre of the state.

Economy:

The service sector forms the main economic base of the city. Lucknow is a major center for research and development (R&D) and houses several research and development institutions. Besides that, the other major industries in the Lucknow include aeronautics, machine tools, distillery chemicals and furniture.

Climate:

The climate of the city is mild and generally warm and temperate. The average annual maximum temp. is 32^0 C. The average annual minimum temp. is 18.6^0 C. The average annual rainfall of the city is 100 cm.

31.2 Brief description of Power Utilities:

Madhyanchal Vidyut Vitran Nigam Limited (MVVNL), Lucknow is responsible for the distribution of power in Lucknow city.

31.3 Existing Power Scenario:

The total electricity consumption of Lucknow in the year 2022-23 was 4343 MU and with 23.68% T&D losses, the requirement was 5691 MU. The peak demand of the city was 1645 MW. The Domestic sector was the biggest consumer of electricity (48%) followed by Industrial (32%).

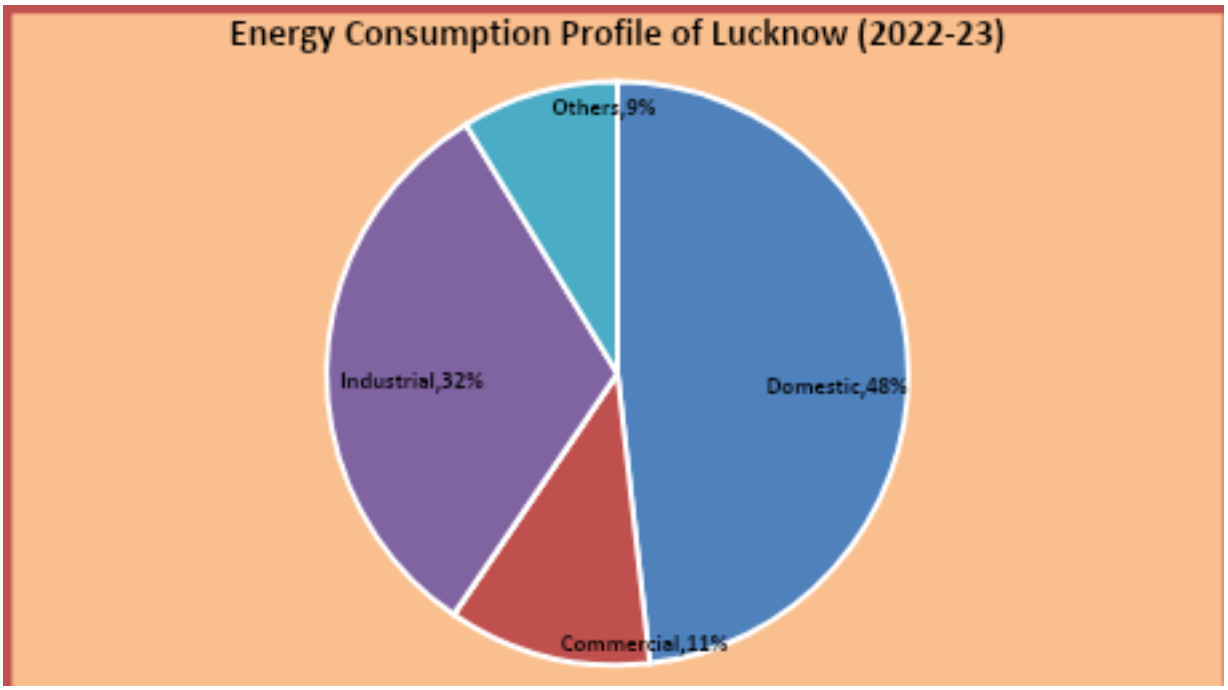

Figure 32-1 Energy Consumption Profile of Lucknow (2022-23)

On comparison of Lucknow with Uttar Pradesh for the year 2022-23, it is observed that the energy requirement of Lucknow was 4.39% of the total energy requirement of the state.

Sl No	Particulars	Lucknow	Uttar Pradesh	Lucknow as % of Uttar Pradesh
1.	Energy Requirement (in MU)	5691	151152	3.77
2.	Peak Demand (in MW)	1645	26028	6.32

Table 32-1 Comparison of Lucknow with Uttar Pradesh in 2022-23

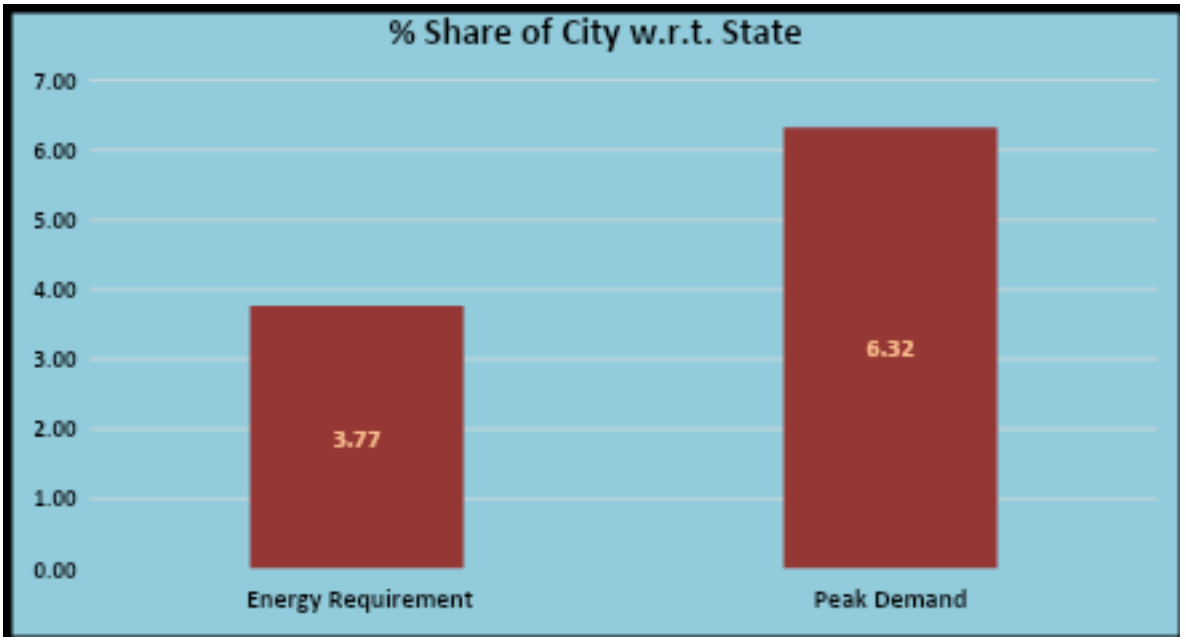

Figure 32-2 Comparison of Lucknow and Uttar Pradesh in the year 2022-23.

31.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Lucknow is estimated as 5691 MU in year 2022-23. It is expected that the energy requirement of the city will reach to 7242 MU by the year 2027-28 with 4.94% CAGR for the period 2022-23 to 2027-28. With CAGR of 5.24% for the period 2027-28 to 2032-33, its energy requirement is estimated as 9348 MU by the year 2032-33.

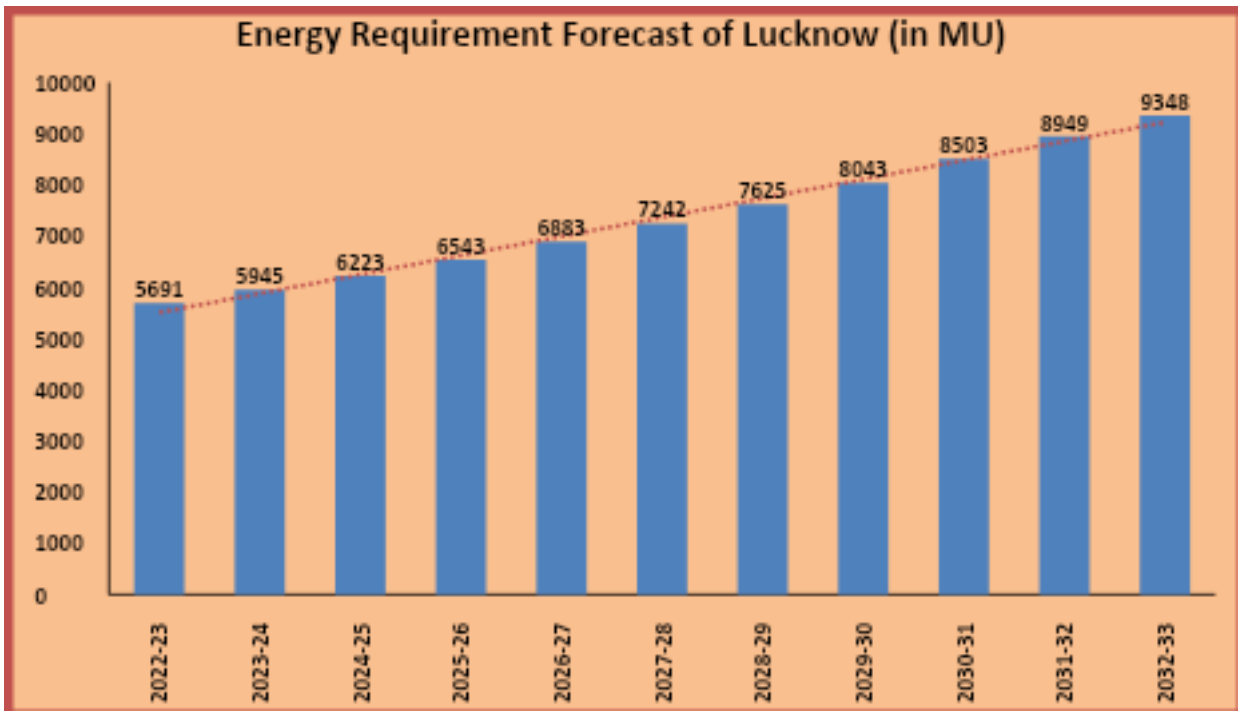

Figure 32-3 Energy Requirement Forecast of Lucknow (in MU)

Peak Demand of Lucknow is expected to see 4.75% CAGR up to 2027-28 and will reach 2074 MW in comparison to 1645 MW in year 2022-23. It is expected to reach 2704 MW in year 2032-33 with a CAGR of 5.45% after 2024- 25.

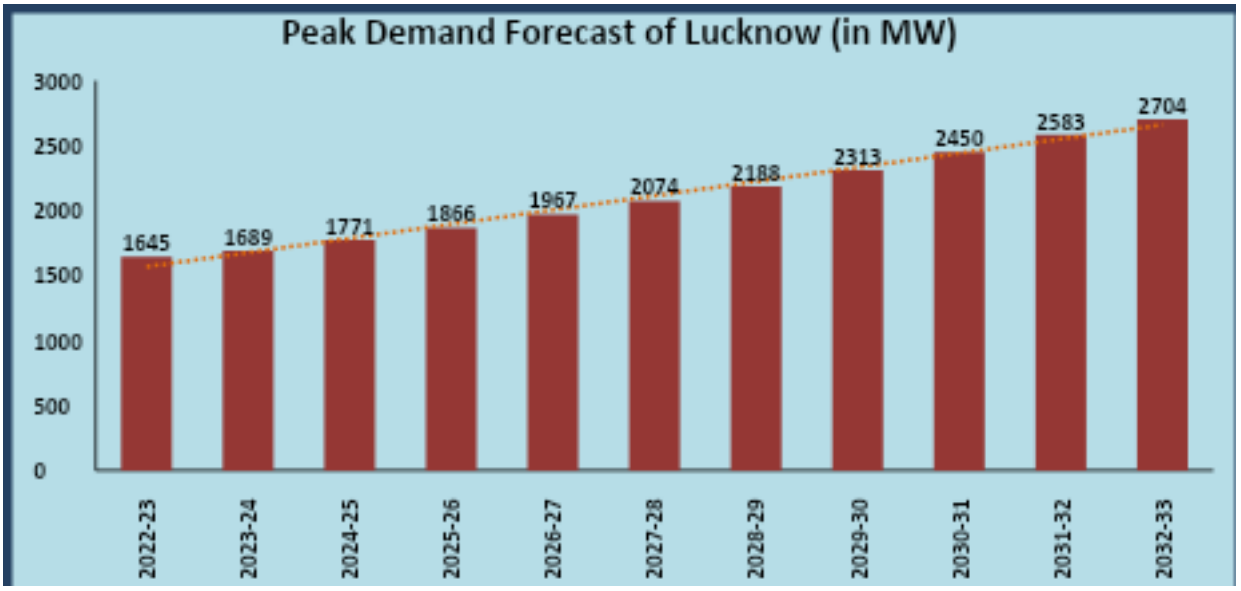

Figure 32-4 Peak Demand Forecast of Lucknow (in MW)

The category-wise energy consumption forecast of Lucknow are as follows:

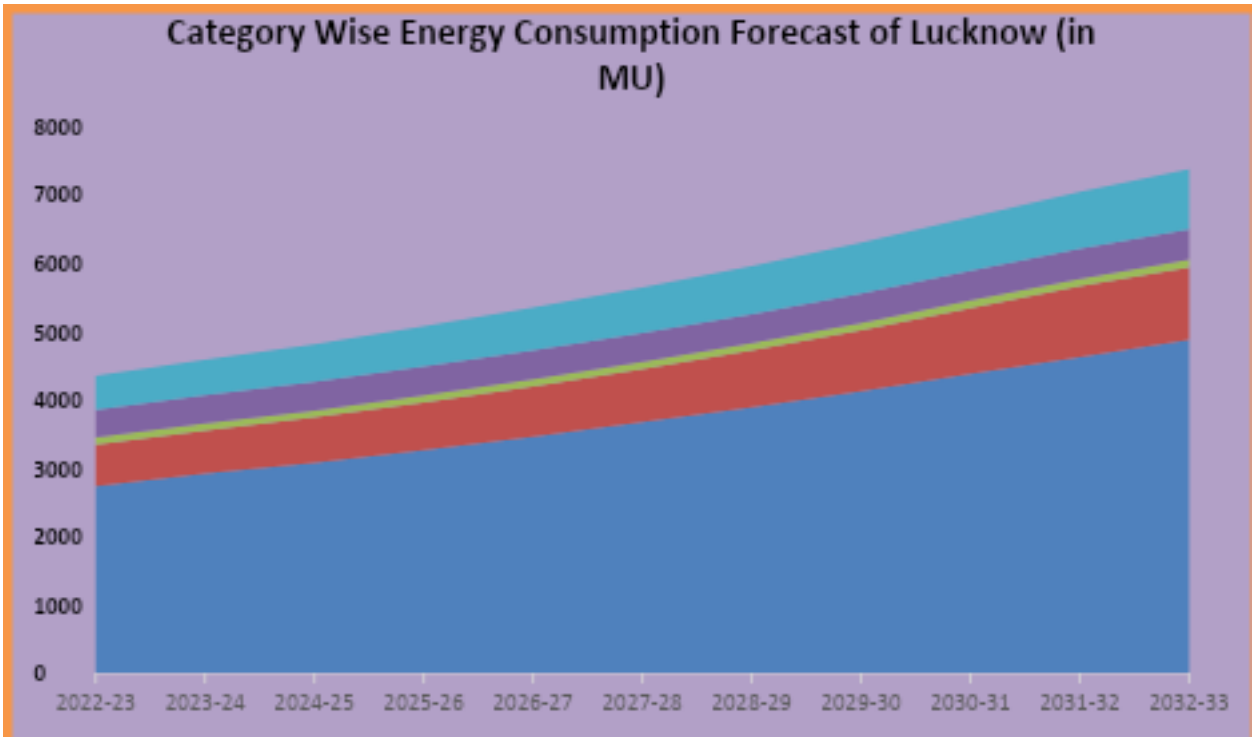

Figure 32-5 Category-wise Energy Consumption Forecast of Lucknow (in MU)

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR in %		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1.	Domestic	2729	3668	4878	6.09	5.87	5.98
2.	Commercial	612	777	1054	4.89	6.29	5.59
3.	Irrigation	100	110	117	1.75	1.33	1.54
4.	Industrial	410	422	436	0.58	0.66	0.62
5.	Others	492	662	885	6.11	5.99	6.05
6.	Total	4343	5638	7370	5.36	5.50	5.43

Table 32-2 Expected CAGR of Lucknow - Category-wise Consumption

31.5 Transmission & Distribution Losses:

T&D losses of Lucknow were estimated as 23.68% in the year 2022-23. The target level is to bring it down to about 22.15% and 21.15% by the end of 2027-28 & 2032-33 respectively.

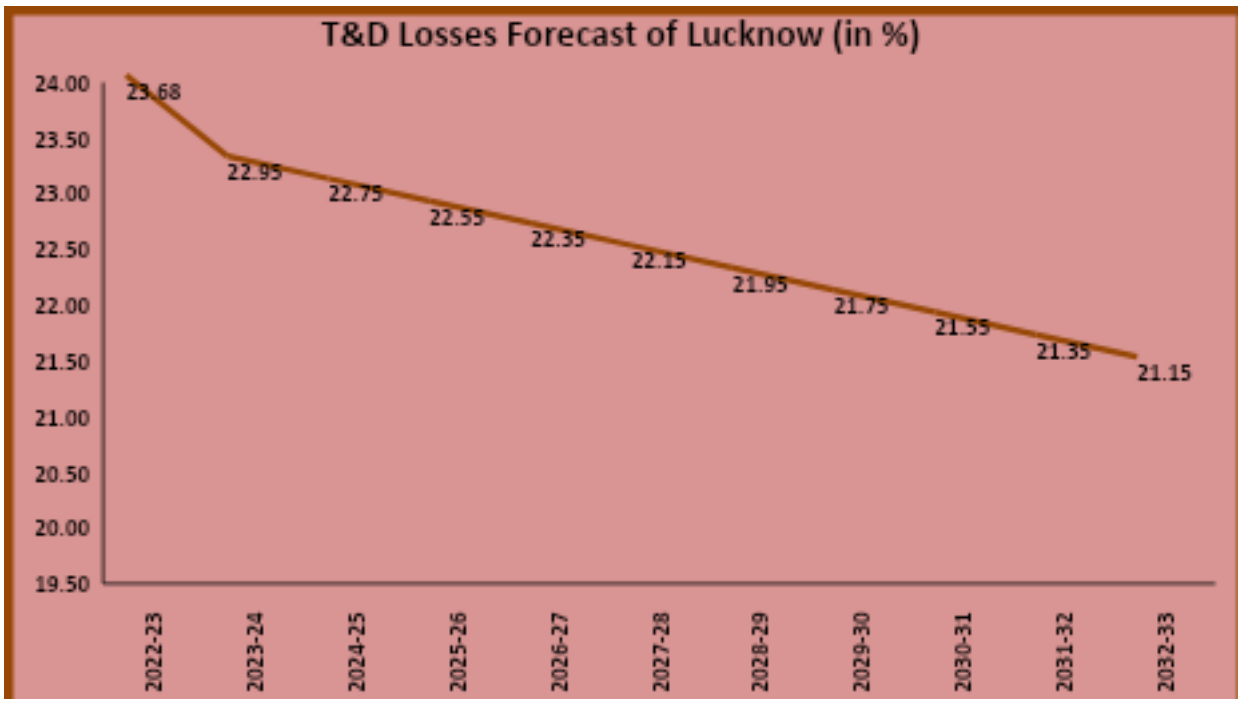

Figure 32-6 T&D Losses Forecast of Lucknow (in %)

31.6 Summary of power forecast of Lucknow city:

Sl. No.	Particulars	2022-23	2027-28	2032-33	CAGR in %	
					2022-23 to 2027-28	2027-28 to 2032-33
1.	Energy Requirement in MU	5691	7242	9348	4.94	5.24
2.	Peak Demand in MW	1645	2074	2704	4.75	5.45
3.	T&D Losses in %	23.68	22.15	21.15		

Table 32-3 Power forecast summary of Lucknow

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Lucknow											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	2729	2913	3072	3261	3459	3668	3888	4123	4376	4624	4878
Commercial	612	633	664	698	735	777	826	886	960	1030	1054
Public lighting	175	179	184	188	193	198	202	207	211	215	220
Public Water Works	317	342	370	399	430	464	500	537	578	620	665
Irrigation	100	102	103	105	108	110	111	113	114	116	117
LT Industries	68	69	70	71	72	73	74	75	76	77	78
HT Industries	342	343	344	345	347	349	350	352	354	356	358
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	0	0	0	0	0	0	0	0	0	0	0
Others (if Any)	0	0	0	0	0	0	0	0	0	0	0
Total (Energy Consumption)	4343	4580	4807	5068	5345	5638	5951	6293	6670	7038	7371
T&D losses -MU	1348	1364	1416	1476	1539	1604	1674	1750	1833	1911	1977
T&D losses -in %	23.68	22.95	22.75	22.55	22.35	22.15	21.95	21.75	21.55	21.35	21.15
Energy Requirement - MU	5691	5945	6223	6543	6883	7242	7625	8043	8503	8949	9348
Annual Load Factor - %	39.50	40.18	40.10	40.02	39.94	39.86	39.78	39.70	39.62	39.54	39.46
Peak Load - MW	1645	1689	1771	1866	1967	2074	2188	2313	2450	2583	2704

Table 32-4 Category-wise and Year-wise Summary of Lucknow.

Madurai

Chapter 32: **Madurai**

32.1 Introduction:

Madurai formerly known by its' colonial name Madura is a major city in the South Indian State of the Tamil Nadu. Madurai is the third largest city in the Tamil Nadu after Chennai & Coimbatore in terms of the population and the 27th largest urban agglomeration in India as per the census 2011.

Economy:

Madurai was traditionally an agrarian society, with rice paddies as the first main crop and cotton crops second main crop. Madurai is famed for its jasmine plantations called Madurai Malli. Madurai is one of the few rubber growing areas in South India and there are rubber-based industries in Madurai. Kappalpur which is sub-urban of Madurai is business hub for automotive industries such as KUN BMW, Isuzu, etc.

Climate:

The climate of Madurai is tropical with a dry season from January to March and a rainy season from September to November. Temperatures during summer generally reach a maximum of 42 °C and a minimum of 26.3 °C. Winter temperatures range between 29.6 °C and 18 °C. .

32.2 Brief description of Power Utilities:

The Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) is an undertaking owned by the Government of Tamil Nadu is responsible for electrical power generation and distribution in Madurai.

32.3 Existing Power Scenario:

The total electricity consumption of Madurai in the year 2022-23 was 1658 MU and with 8.08% T&D losses, the requirement was 1804 MU. The peak demand of the city was 278 MW. The Domestic sector was the biggest consumer of electricity (58%) followed by Commercial (20%) & Industrial (13%).

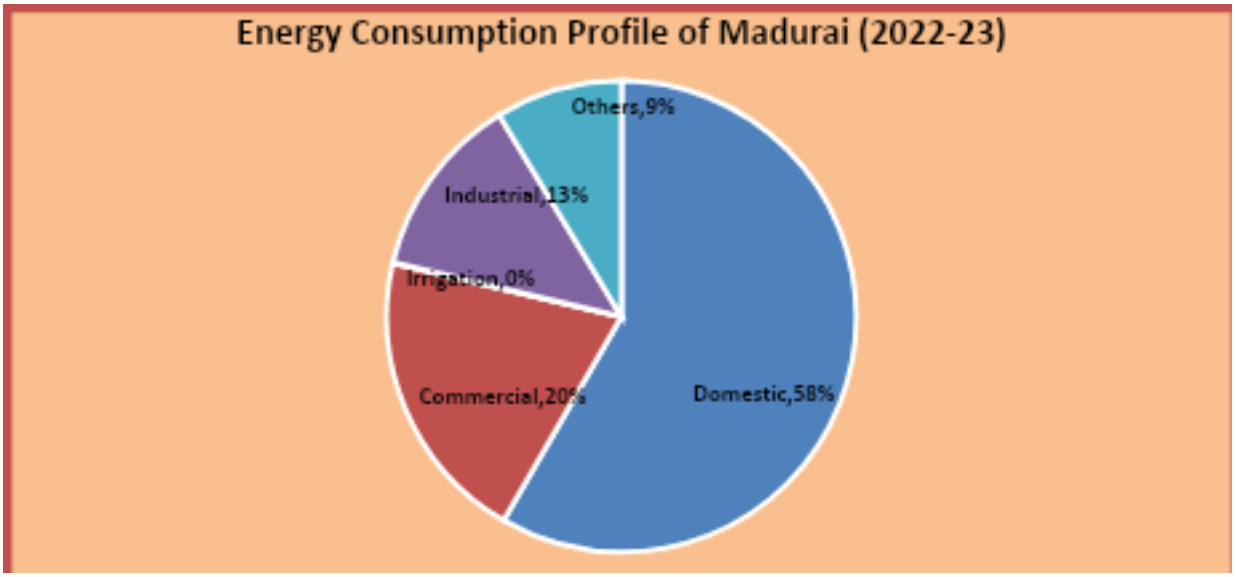

Figure 33-1 Energy Consumption Profile of Madurai (2022-23)

In a comparison of Madurai City with Tamil Nadu for the year 2022-23, it is observed that the energy requirement of Madurai was 15.06% of the total energy requirement of the state.

2022-23	Madurai City	Tamil Nadu	% Share of Coimbatore City
Energy in MU	1804	115788	1.56
Peak Demand in MW	278	17361	1.60

Table 33-1 Comparison of Madurai with Tamil Nadu in 2022-23

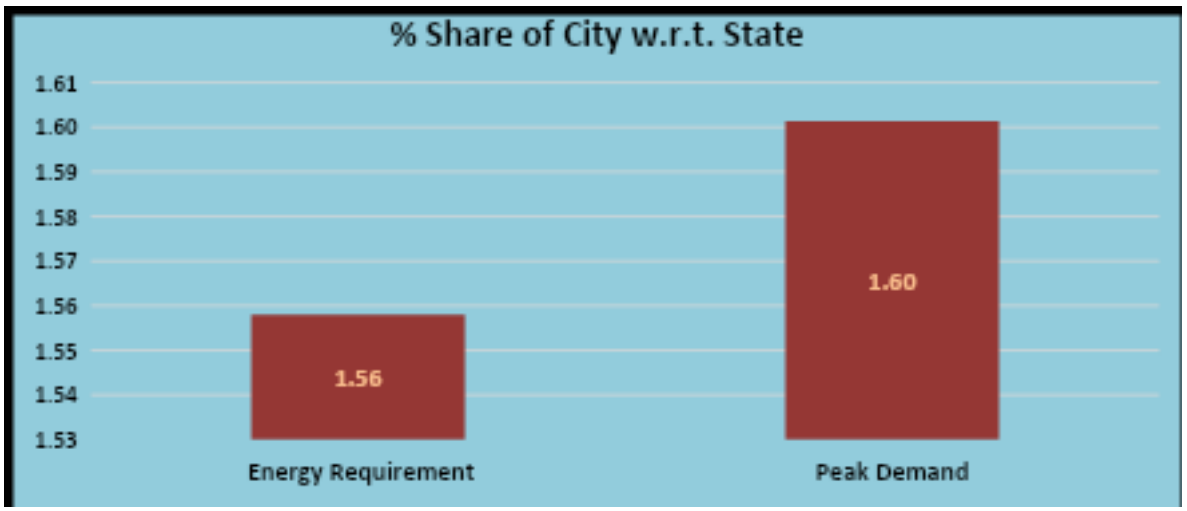

Figure 33-2 Comparison of Madurai City and Tamil Nadu in the year 2022-23

32.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Madurai was 1804 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 2337 MU by the year 2027-28 with a 5.31% CAGR for the period 2022-23 to 2027-28. With a CAGR of 5.52% for the period 2027-28 to 2032-33, its energy requirement is estimated as 3057 MU by the year 2032-33.

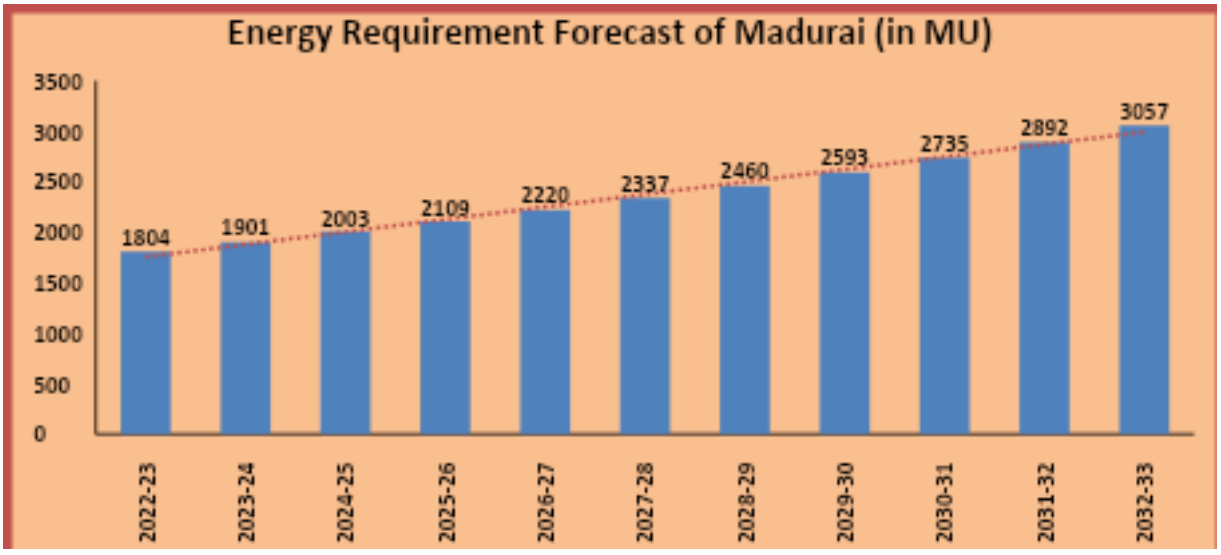

Figure 33-3 Energy Requirement Forecast of Madurai (in MU)

Peak Demand of the Madurai is expected to see 6.37% CAGR upto 2027-28 and will reach 378 MW in comparison to 278 MW in the year 2022-23. It is expected to reach 520 MW in the year 2032-33 with a CAGR of 6.57% after 2027-28.

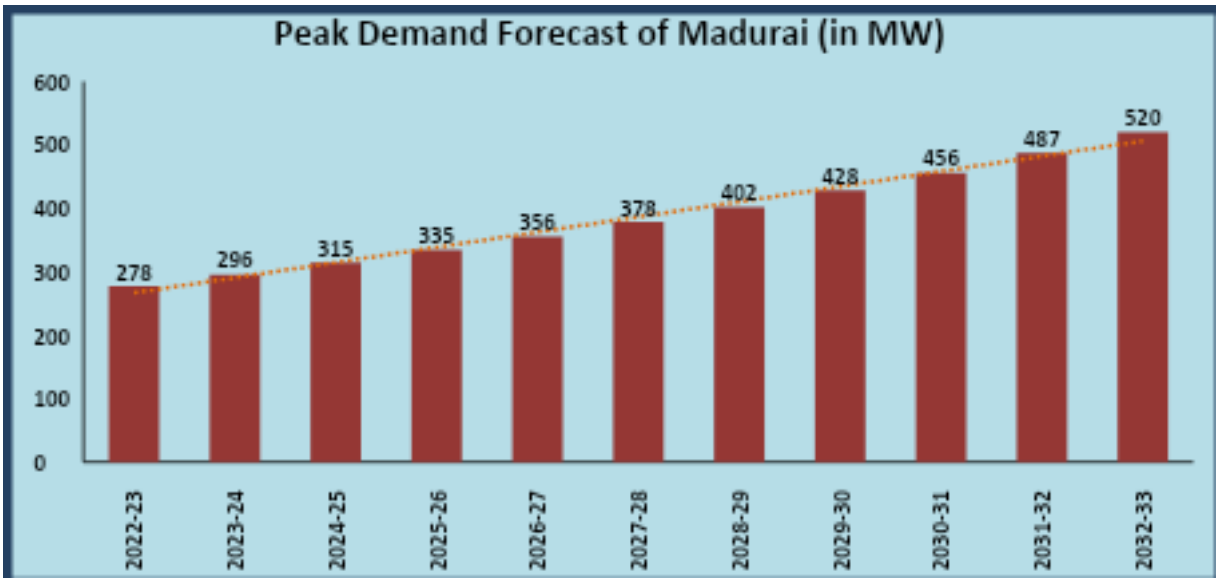

Figure 33-4 Peak Demand Forecast of Madurai (in MW)

The category-wise energy consumption forecast of Madurai are as follows:

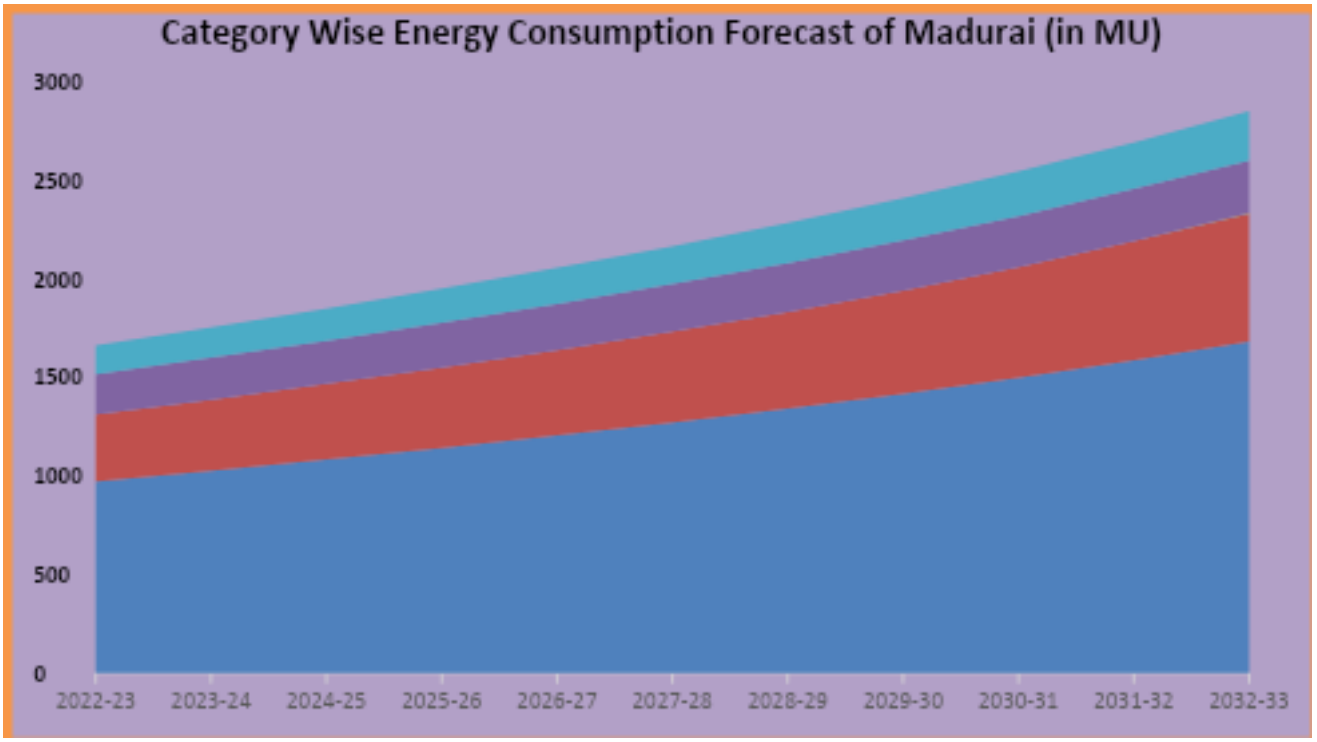

Figure 33-5 Category-wise Energy Consumption Forecast of Madurai (in MU)

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)	CAGR (In %)

		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	**Domestic**	969	1269	1680	5.53	5.77	5.65
2	**Commercial**	339	460	648	6.32	7.09	6.71
3	**Irrigation**	0.66	0.73	1.00	1.86	6.63	4.22
4	**Industrial**	204	240	267	3.28	2.19	2.73
5	**Others**	146	191	248	5.64	5.28	5.46
6	**Total**	**1658**	**2161**	**2843**	**5.44**	**5.65**	**5.54**

Table 33-2 Expected CAGR of Madurai - Category-wise Consumption

32.5 Transmission & Distribution Losses:

T&D losses of Madurai were 8.08% in year 2022-23. The target level is to bring it down to about 7.53% and 6.98% by the end of 2027-28 & 2032-33 respectively.

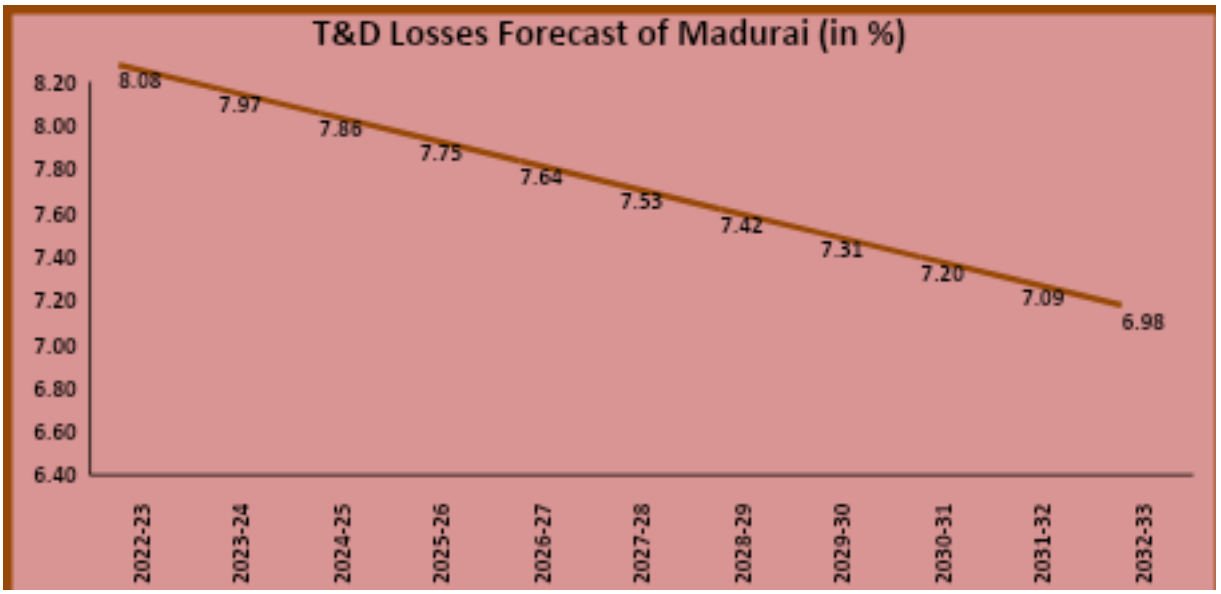

Figure 33-6 T&D Losses Forecast of Madurai (in %)

32.6 Summary of power forecast of Madurai city:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	1804	2337	3057	5.31	5.52
2	**Peak Demand (in MW)**	278	378	520	6.37	6.57
3	**T&D Losses (in %)**	8.08	7.53	6.98		

Table 33-3 Power forecast summary of Madurai

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Madurai											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	969	1024	1081	1140	1203	1269	1339	1414	1495	1585	1680
Commercial	339	360	383	407	432	460	490	523	560	602	648
Public lighting	21	21	21	22	22	22	23	23	23	24	24
Public Water Works	0	0	0	0	0	0	0	0	0	0	0
Irrigation	1	1	1	1	1	1	1	1	1	1	1
LT Industries	119	123	128	132	136	141	145	149	153	157	161
HT Industries	85	88	91	94	97	99	102	104	106	107	107
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	41	44	47	51	55	59	63	67	72	77	82
Others (if Any)	84	89	94	99	105	110	116	122	129	135	142
Total (Energy Consumption)	**1658**	**1750**	**1845**	**1946**	**2050**	**2161**	**2278**	**2403**	**2538**	**2687**	**2843**
T&D losses -MU	146	152	157	163	170	176	183	190	197	205	213
T&D losses -in %	8.08	7.97	7.86	7.75	7.64	7.53	7.42	7.31	7.20	7.09	6.98
Energy Requirement - MU	**1804**	**1901**	**2003**	**2109**	**2220**	**2337**	**2460**	**2593**	**2735**	**2892**	**3057**
Annual Load Factor - %	74.12	73.38	72.66	71.94	71.23	70.52	69.82	69.13	68.45	67.77	67.10
Peak Load - MW	**278**	**296**	**315**	**335**	**356**	**378**	**402**	**428**	**456**	**487**	**520**

Table 33-4 Category-wise and Year-wise Summary of Madurai.

Mumbai

Chapter 33: **Mumbai**

33.1 Introduction

Mumbai is the capital city of the Indian state of Maharashtra. It is the financial capital of India.

Economy:

Mumbai is the financial, commercial and entertainment capital of India. Mumbai is often compared to New York and the city is home to the Bombay Stock Exchange, situated on Dalal Street. Many of India's numerous conglomerates (including L&T, SBI, LIC, Tata Group, Godrej and Reliance) and five of the Fortune Global 500 companies are based in Mumbai.

Climate:

The period from June to about the end of September constitutes the South West Monson season and October and November form the post-monsoon season. The average annual temperature is 27 °C and the average annual precipitation is 2,213 mm.

33.2 Brief description of Power Utilities:

Electricity distribution is being supplied to Mumbai city by four distribution companies i.e. MSEDCL, BEST, Tata Power Ltd. & Adani Electricity Mumbai Ltd.

33.3 Existing Power Scenario: BEST – Mumbai

The total electricity consumption of BEST – Mumbai in the year 2022-23 was 4483 MU and with 7.40% T&D losses, the requirement was 4842 MU. The peak demand was 890 MW. The Domestic sector was the biggest consumer of electricity (49%) followed by commercial (41%) & Industrial (8%).

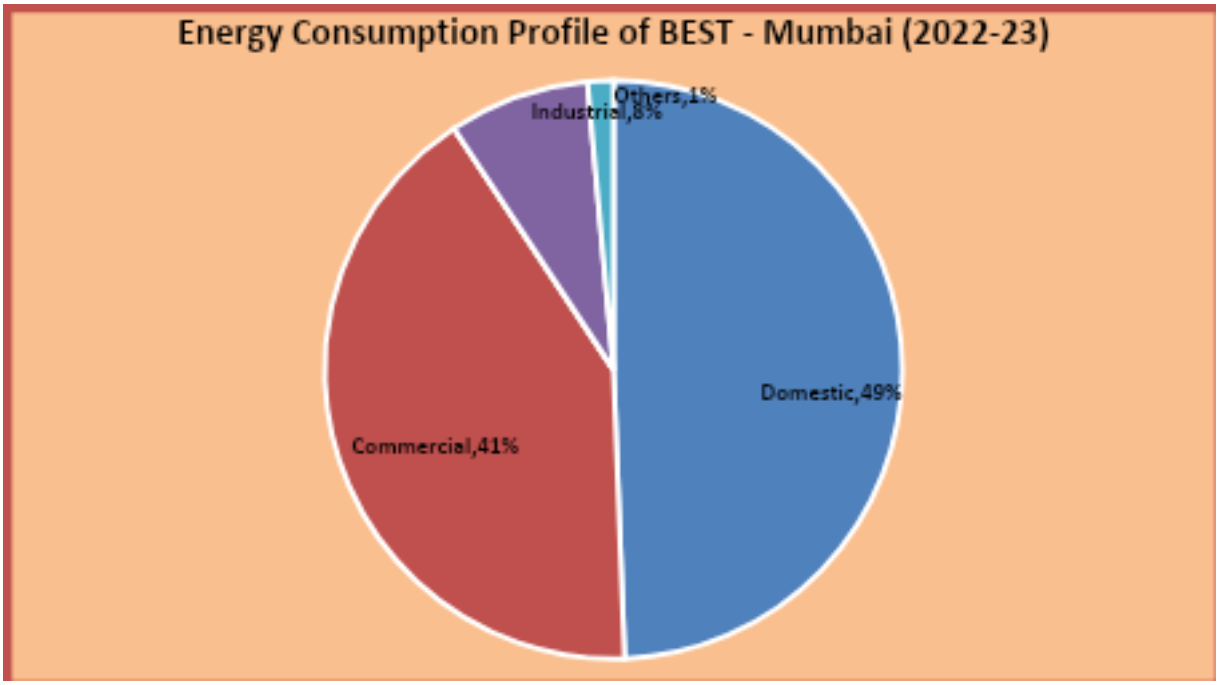

Figure 34-1 Energy Consumption Profile of BEST - Mumbai (2022-23)

33.4 Existing Power Scenario: MSEDCL – Mumbai

The total electricity consumption of MSEDCL – Mumbai in the year 2022-23 was 1098 MU and with 9.75% T&D losses, the requirement was 1216 MU. The peak demand was 274 MW. The Domestic sector was the biggest consumer of electricity (53%) followed by commercial (19%) & Industrial (17%).

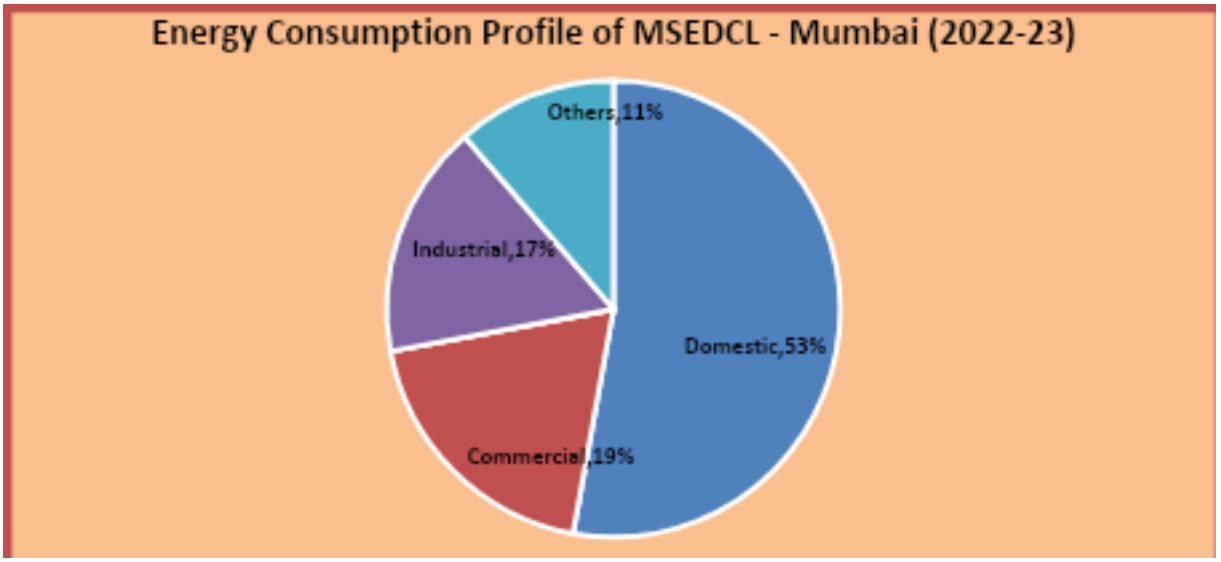

Figure 34-2 Energy Consumption Profile of MSEDCL - Mumbai (2022-23)

33.5 Existing Power Scenario: Tata Power – Mumbai

The total electricity consumption of Tata Power – Mumbai in the year 2022-23 was 5664 MU and with 4.20% T&D losses, the requirement was 5796 MU. The peak demand was 948 MW. The Domestic sector was the biggest consumer of electricity (40%) followed by Industrial (32%) & commercial (18%).

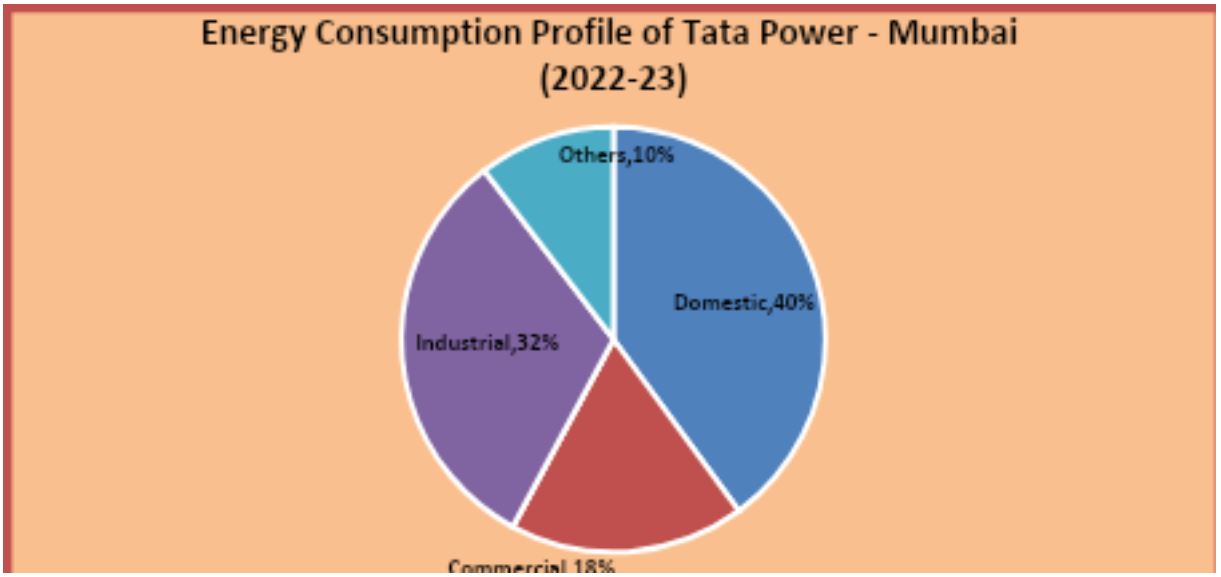

Figure 34-3 Energy Consumption Profile of Tata Power - Mumbai (2022-23)

33.6 Existing Power Scenario: AEML – Mumbai

The total electricity consumption of AEML – Mumbai in the year 2022-23 was 10869 MU and with 10.38% T&D losses, the requirement was 12128 MU. The peak demand of the city was 2132 MW. The Domestic sector was the biggest consumer of electricity (56%) followed by commercial (33%) & Industrial (8%).

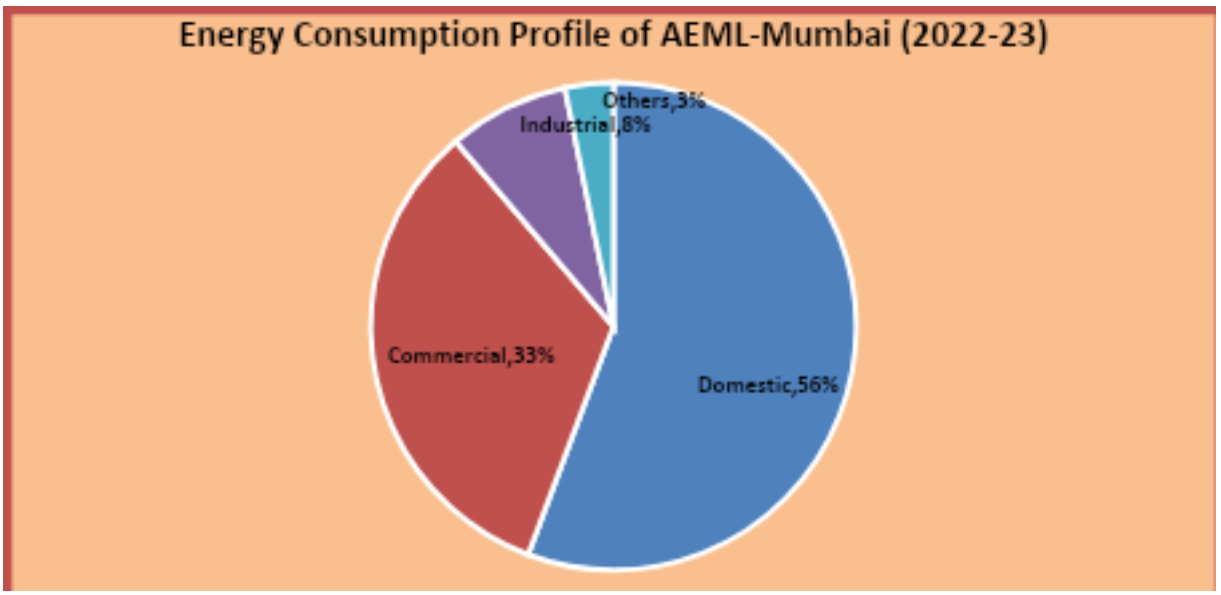

Figure 34-4 Energy Consumption Profile of AEML-Mumbai (2022-23)

In a comparison of Mumbai City with Maharashtra for the year 2022-23, it is observed that the energy requirement of Mumbai was 13.18% of the total energy requirement of the state.

2022-23	Mumbai City	Maharashtra	% Share of Pune City
Energy in MU	23982	183777	13.05
Peak Demand in MW	4244	30203	14.05

Table 34-1 Comparison of Mumbai City with Maharashtra in 2022-23

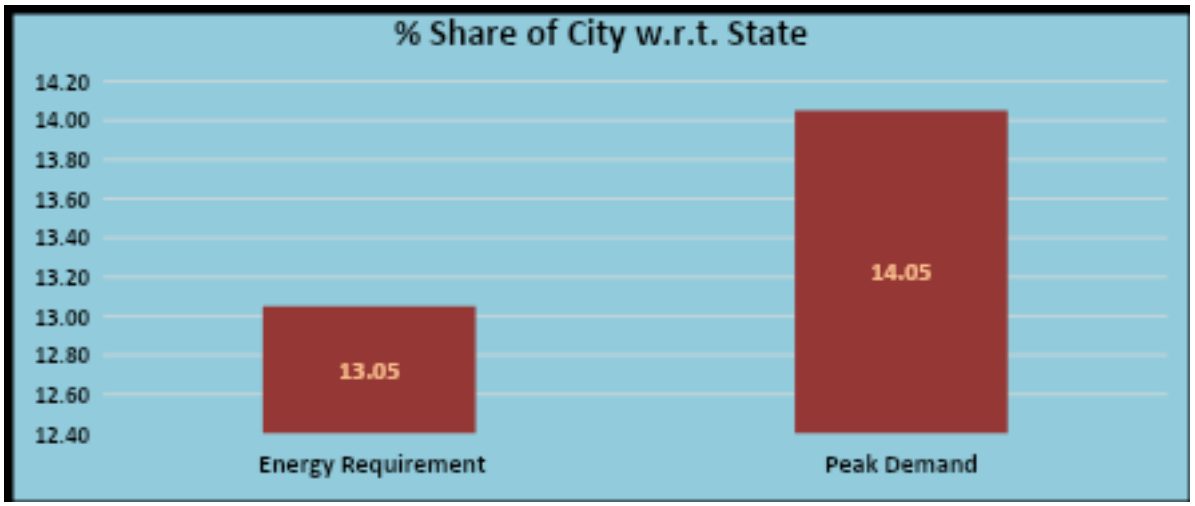

Figure 34-5 Comparison of Mumbai City and Maharashtra in the year 2022-23.

33.7 Power Forecast: BEST - Mumbai

Based on total electricity consumption and T&D Losses, the total energy requirement of BEST - Mumbai was 4842 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 5531 MU by the year 2027-28 with a 2.70% CAGR for the period 2022-23 to 2027-28. With a CAGR of 2.37% for the period 2027-28 to 2032-33, its energy requirement is estimated as 6219 MU by the year 2032-33.

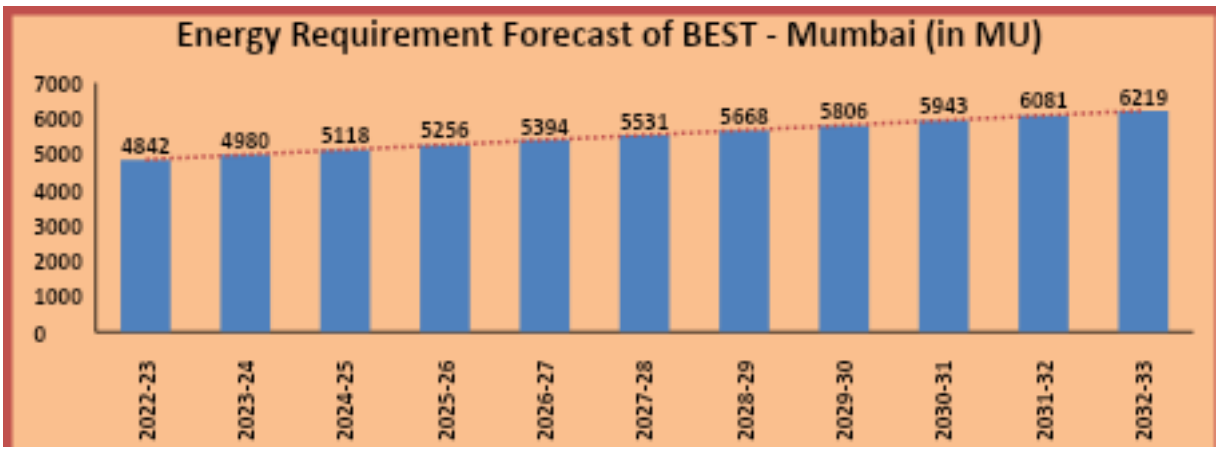

Figure 34-6 Energy Requirement Forecast of BEST - Mumbai (in MU)

Peak Demand of the BEST – Mumbai is expected to see 2.79% CAGR upto 2027-28 and will reach 1021 MW in comparison to 890 MW in the year 2022-23. It is expected to reach 1153 MW in the year 2032-33 with a CAGR of 2.47% after 2027-28.

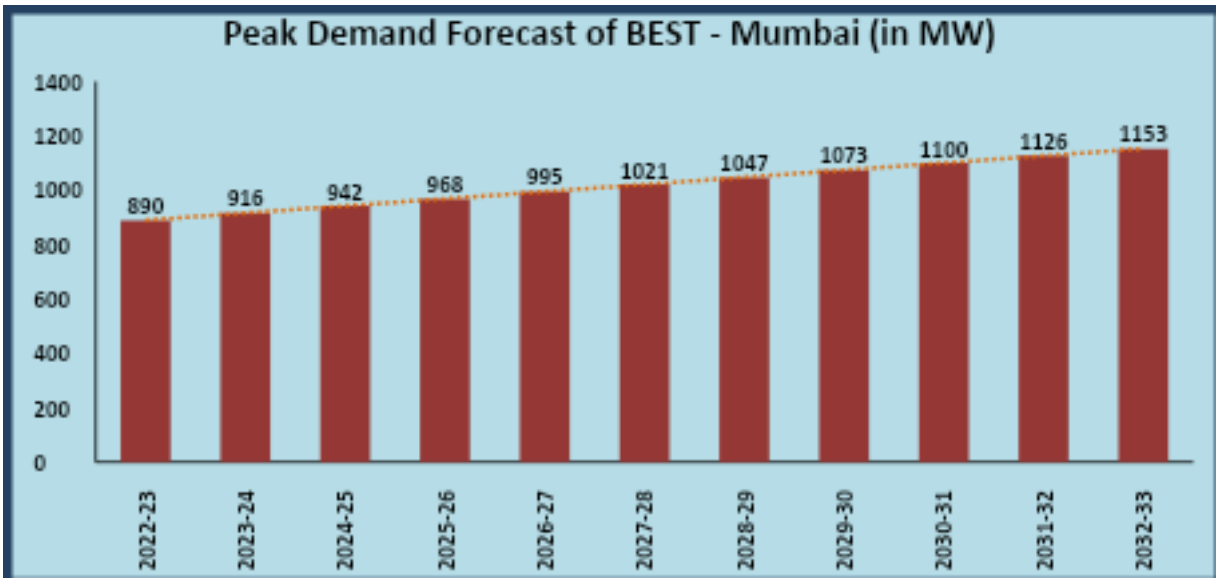

Figure 34-7 Peak Demand Forecast of BEST - Mumbai (in MW)

The category-wise energy consumption forecast of BEST - Mumbai are as follows:

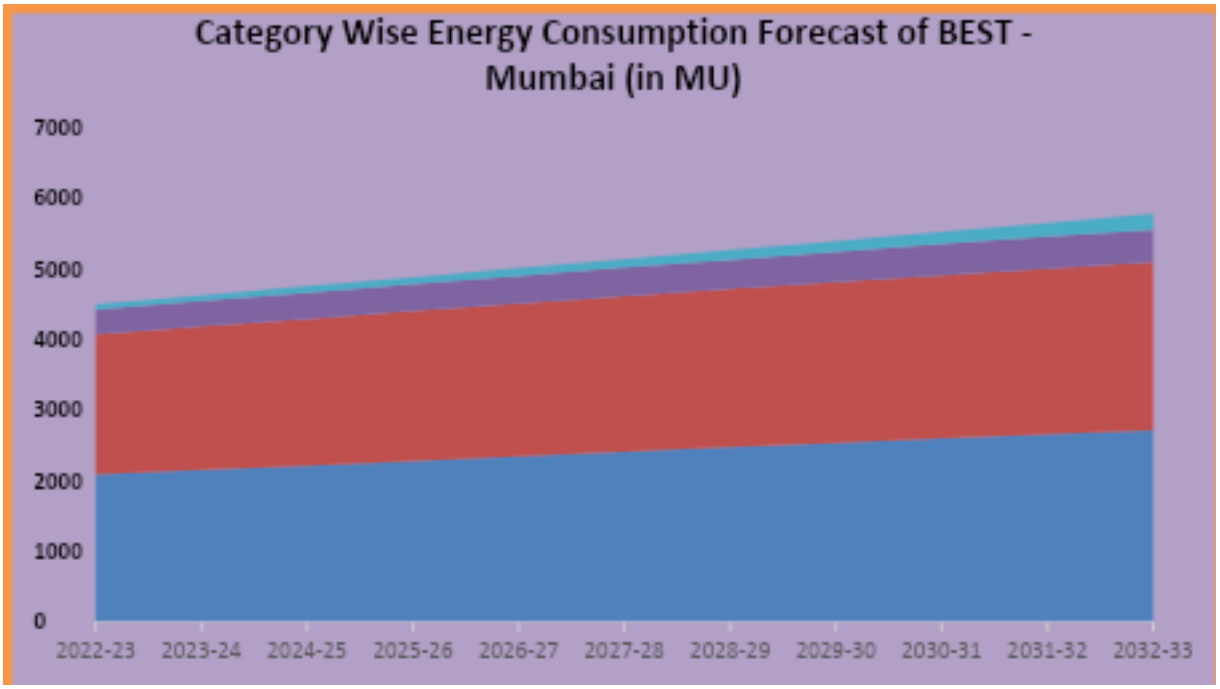

Figure 34-8 Category-wise Energy Consumption Forecast of BEST - Mumbai (in MU)

The category-wise CAGR is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	Domestic	2074	2397	2704	2.94	2.44	2.69
2	Commercial	1983	2198	2377	2.08	1.58	1.83
3	Irrigation	0	0	0	0	0	0
4	Industrial	350	405	458	2.96	2.46	2.71
5	Others	76	121	220	9.79	12.63	11.20
6	**Total**	**4483**	**5122**	**5759**	**2.70**	**2.37**	**2.54**

Table 34-2 Expected CAGR of BEST - Mumbai Category-wise Consumption

33.8 Power Forecast: MSEDCL

Based on total electricity consumption and T&D Losses, the total energy requirement of MSEDCL - Mumbai was 1216 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 1372 MU by the year 2027-28 with a 2.43% CAGR for the period 2022-23 to 2027-28. With a CAGR of 2.83% for the period 2027-28 to 2032-33, its energy requirement is estimated as 1577 MU by the year 2032-33.

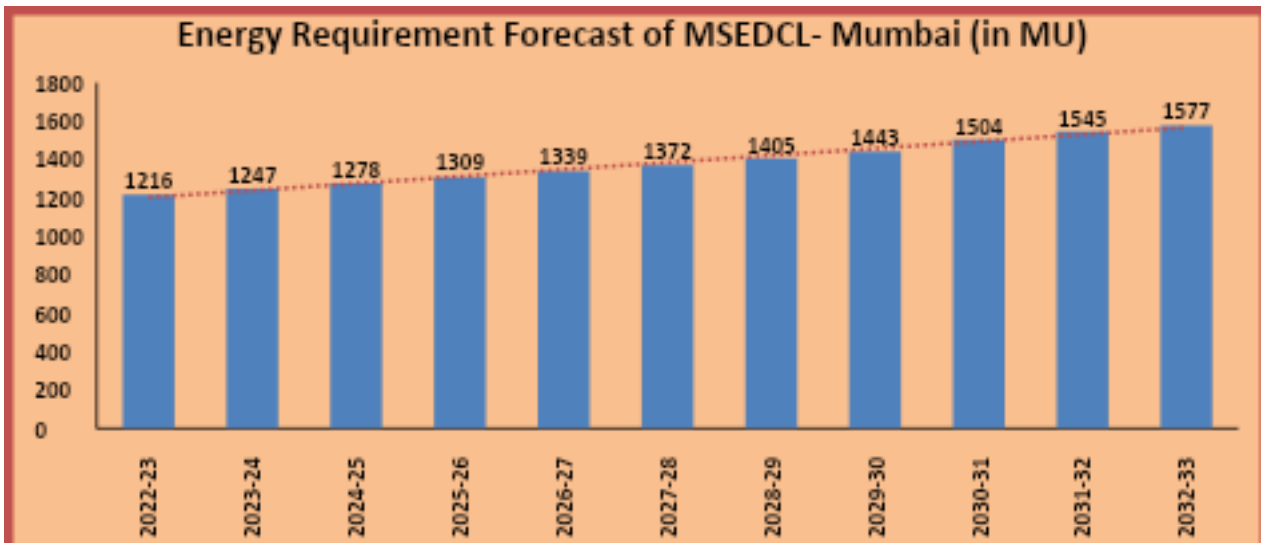

Figure 34-9 Energy Requirement Forecast of MSEDCL- Mumbai (in MU)

Peak Demand of the MSEDCL – Mumbai is expected to see 2.95% CAGR upto 2027-28 and will reach 317 MW in comparison to 274 MW in the year 2022-23. It is expected to reach 374 MW in the year 2032-33 with a CAGR of 3.35% after 2027-28.

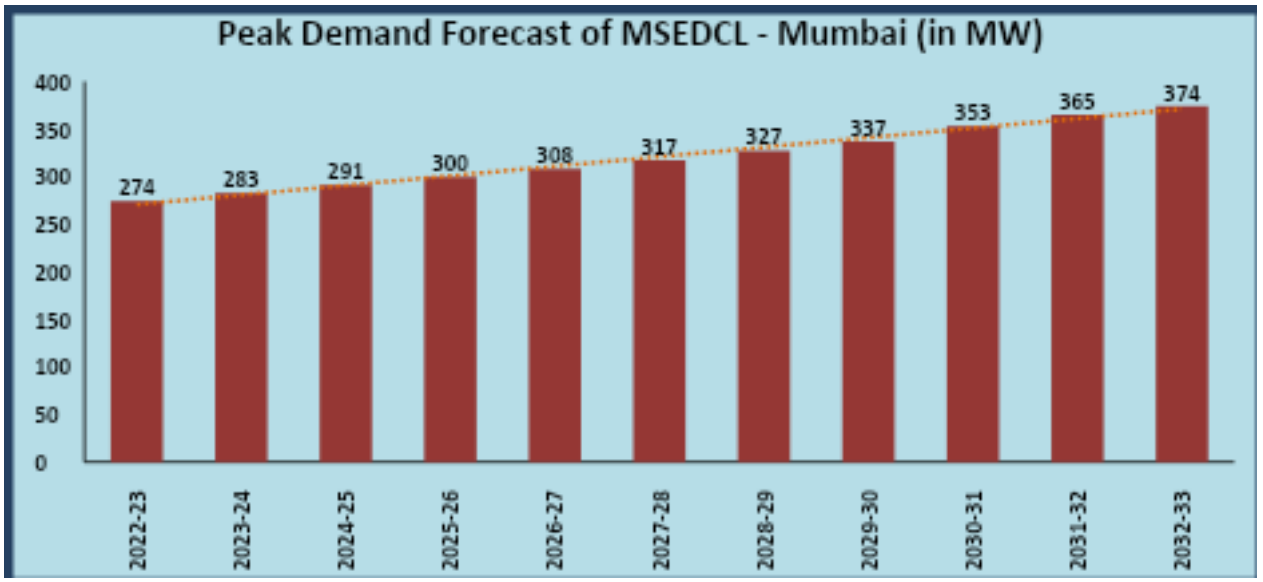

Figure 34-10 Peak Demand Forecast of MSEDCL - Mumbai (in MW)

The category-wise energy consumption forecast of MSEDCL - Mumbai are as follows:

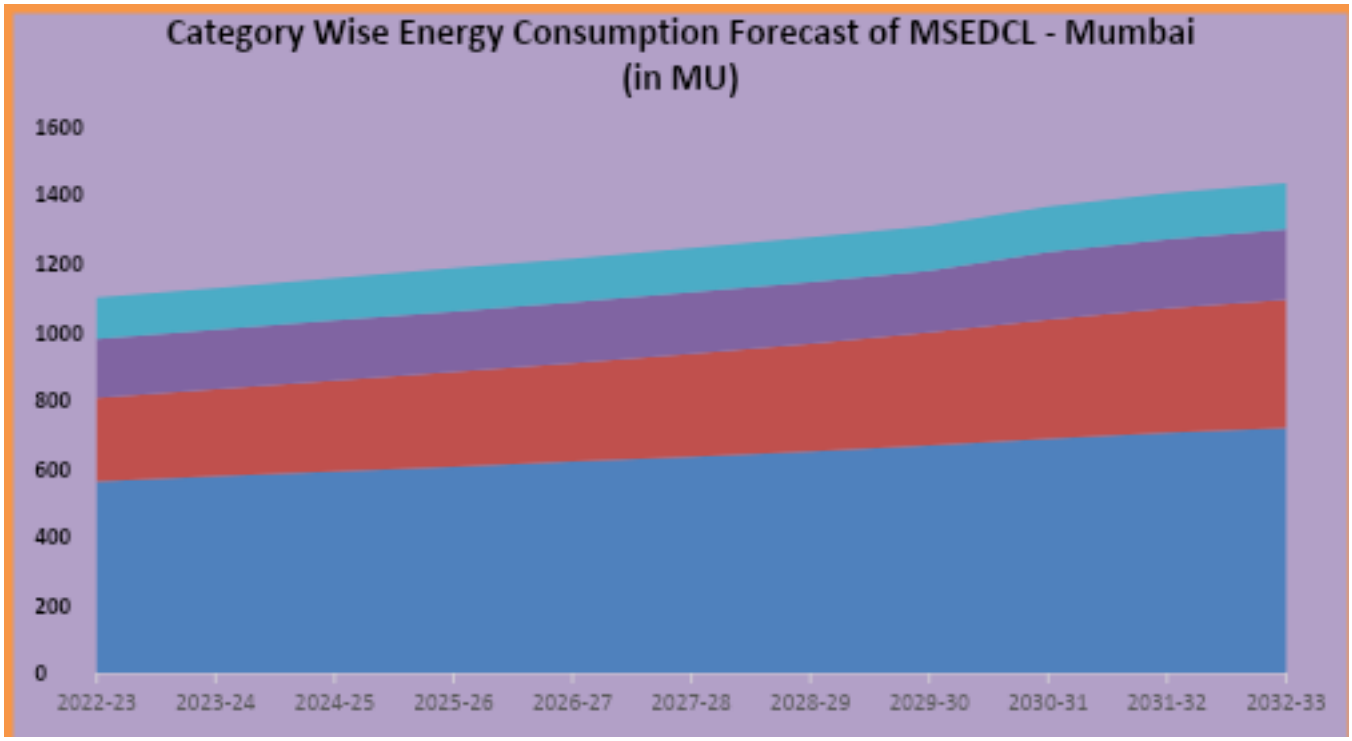

Figure 34-11 Category-wise Energy Consumption Forecast of MSEDCL - Mumbai (in MU).

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	Domestic	560	633	716	2.46	2.51	2.48
2	Commercial	244	302	376	4.34	4.51	4.42
3	Irrigation	0	0	0	0	0	0
4	Industrial	173	179	206	0.69	2.88	1.78
5	Others	121	129	135	1.37	0.89	1.13
6	**Total**	**1098**	**1242**	**1433**	**2.51**	**2.90**	**2.70**

Table 34-3 Expected CAGR of MSEDCL - Mumbai Category-wise Consumption

33.9 Power Forecast: Tata Power

Based on total electricity consumption and T&D Losses, the total energy requirement of Tata Power – Mumbai was 5796 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 8652 MU by the year 2027-28 with 7.93% CAGR for the period 2022-23 to 2027-28. With a CAGR of 7.86% for the period 2027-28 to 2032-33, its energy requirement is estimated as 12632 MU by the year 2032-33.

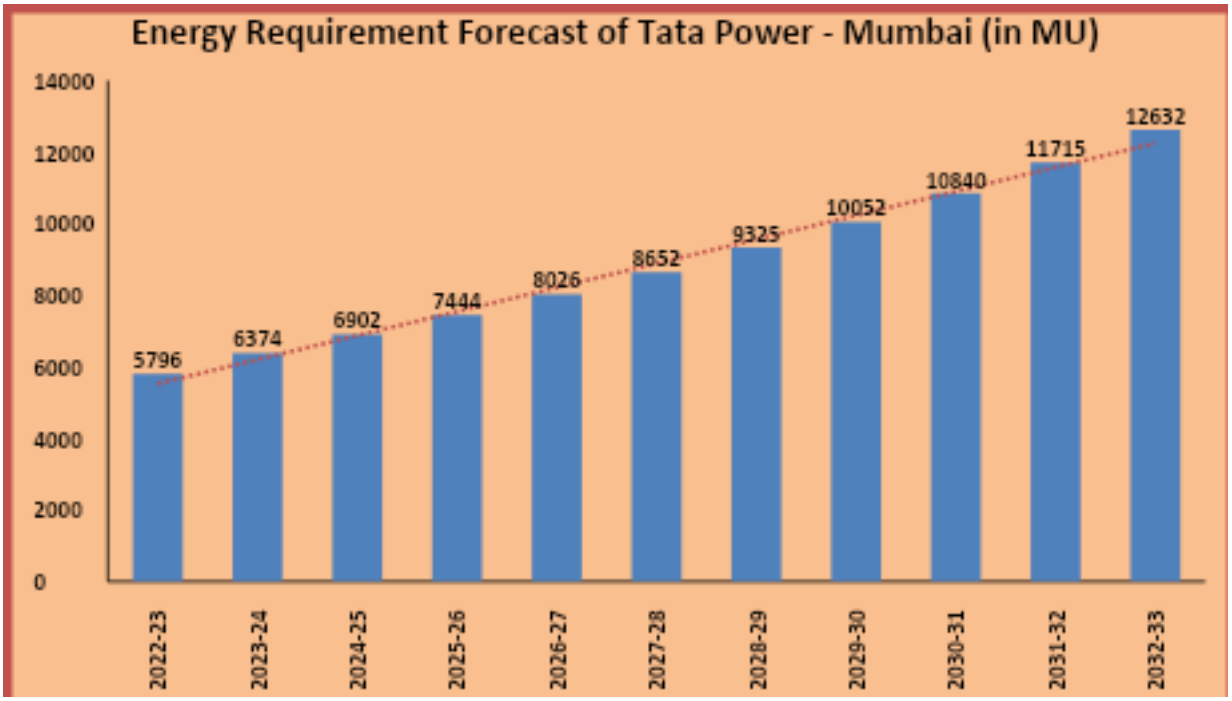

Figure 34-12 Energy Requirement Forecast of Tata Power - Mumbai (in MU)

Peak Demand of the Tata Power – Mumbai is expected to see 7.73% CAGR upto 2027-28 and will reach 1376 MW in comparison to 948 MW in the year 2022-23. It is expected to reach 1954 MW in the year 2032-33 with a CAGR 7.27% after 2027-28.

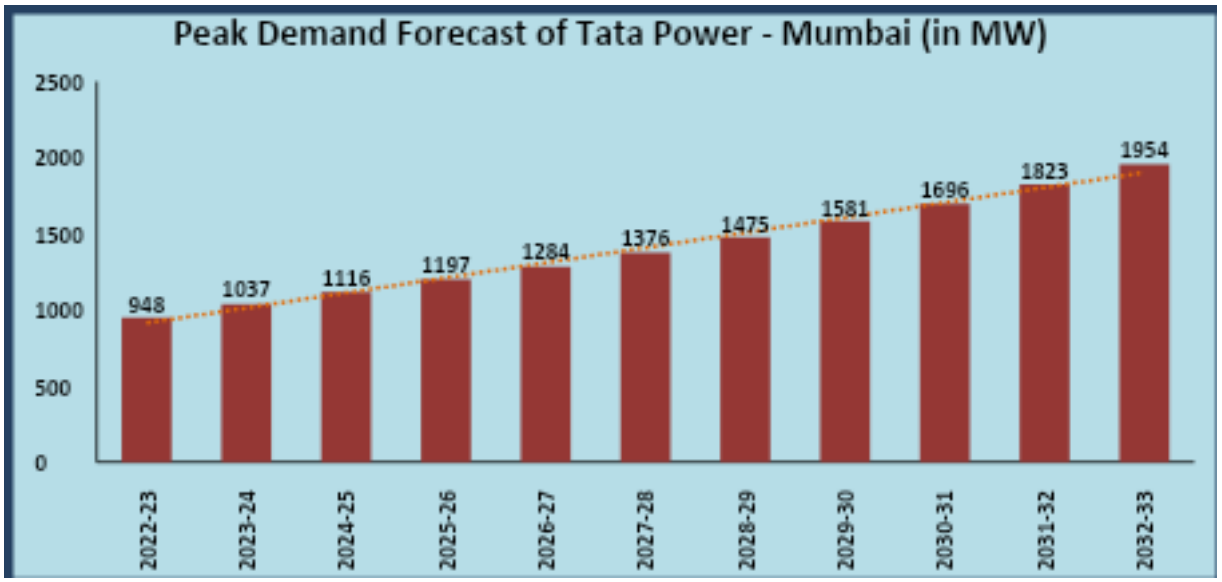

Figure 34-13 Peak Demand Forecast of Tata Power - Mumbai (in MW)

The category-wise energy consumption forecast of TATA Power – Mumbai are as follows:

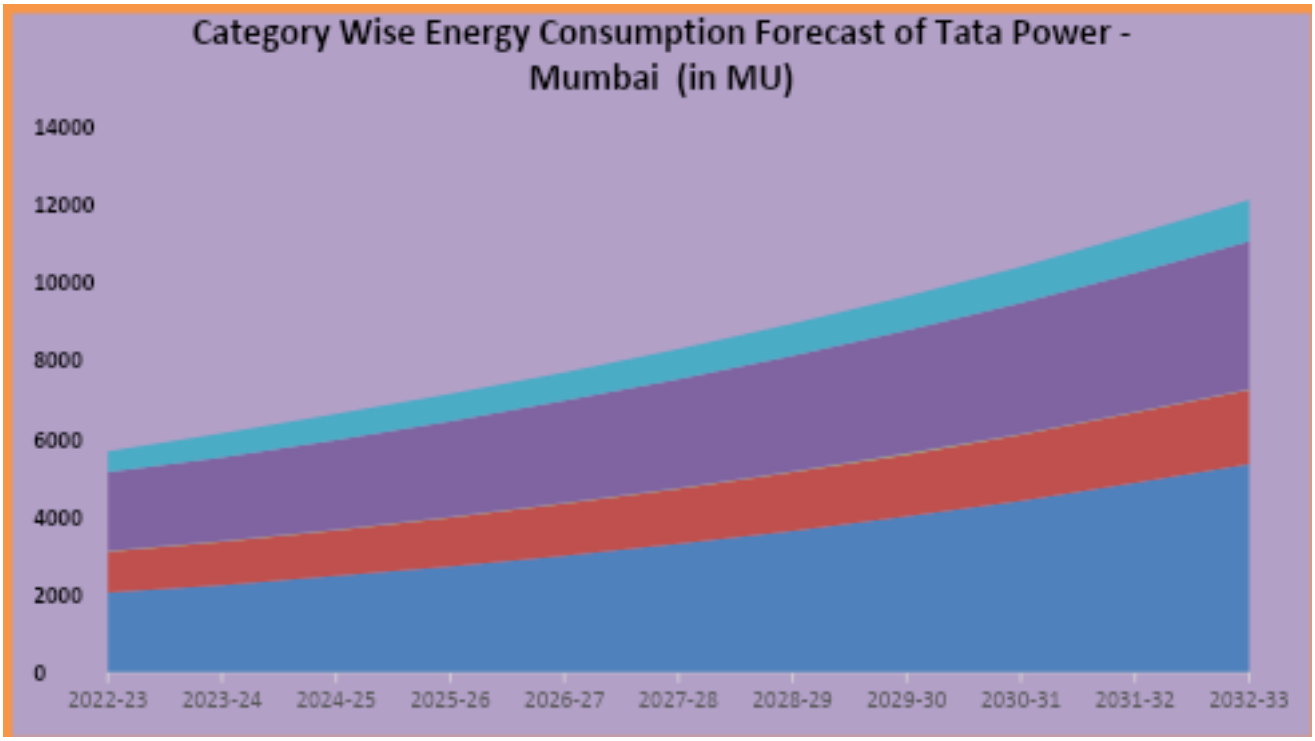

Figure 34-14 Category-wise Energy Consumption Forecast of Tata Power - Mumbai (in MU)

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	Domestic	2040	3291	5327	10.04	10.11	10.08
2	Commercial	1047	1410	1906	6.15	6.21	6.18
3	Irrigation	22	22	22	0.00	0.00	0.00
4	Industrial	2012	2789	3792	6.75	6.34	6.54
5	Others	544	776	1054	7.36	6.32	6.84
6	**Total**	**5664**	**8288**	**12102**	**7.91**	**7.86**	**7.89**

Table 34-4 Expected CAGR of Tata Power - Mumbai Category-wise Consumption

33.10 Power Forecast: AEML

Based on total electricity consumption and T&D Losses, the total energy requirement of AEML - Mumbai was 12128 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 14647 MU by the year 2027-28 with a 3.85% CAGR for the period 2022-23 to 2027-28. With a CAGR of 3.73% for the period 2027-28 to 2032-33, its energy requirement is estimated as 17590 MU by the year 2032-33.

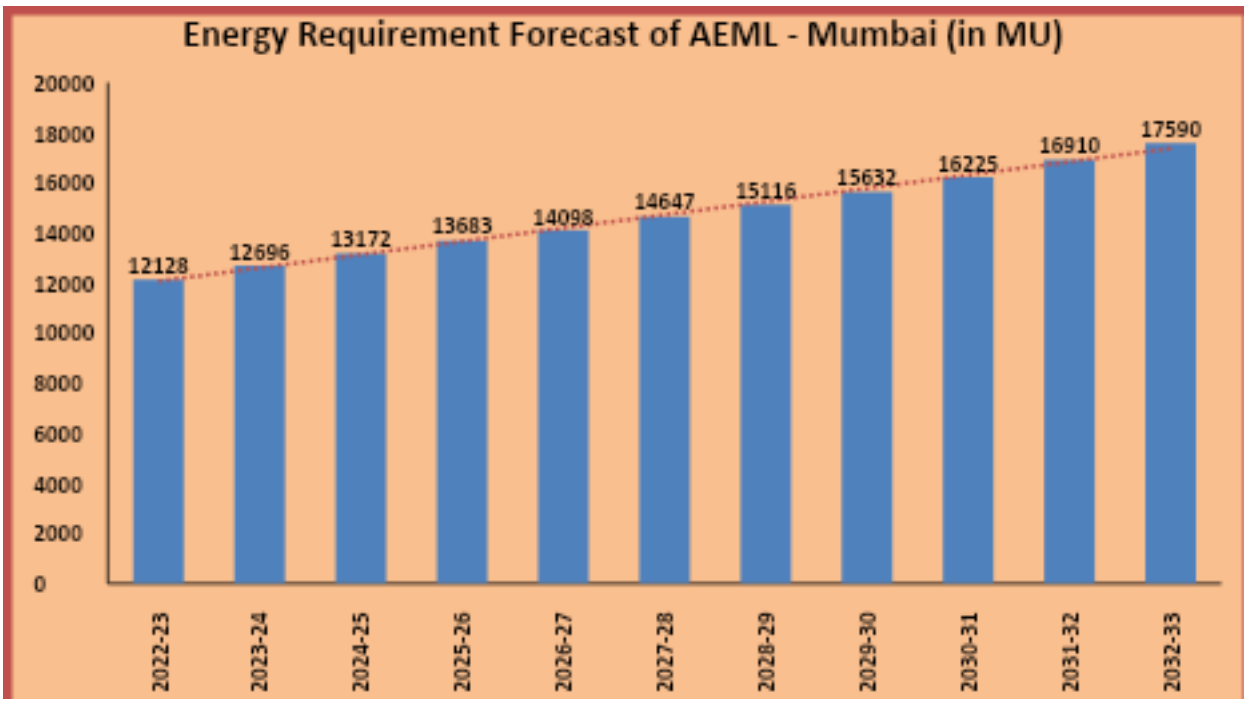

Figure 34-15 Energy Requirement Forecast of AEML - Mumbai (in MU)

Peak Demand of the AEML – Mumbai is expected to see 4.69% CAGR upto 2027-28 and will reach 2682 MW in comparison to 2132 MW in the year 2022-23. It is expected to reach 3263 MW in the year 2032-33 with a CAGR of 4.00% after 2027-28.

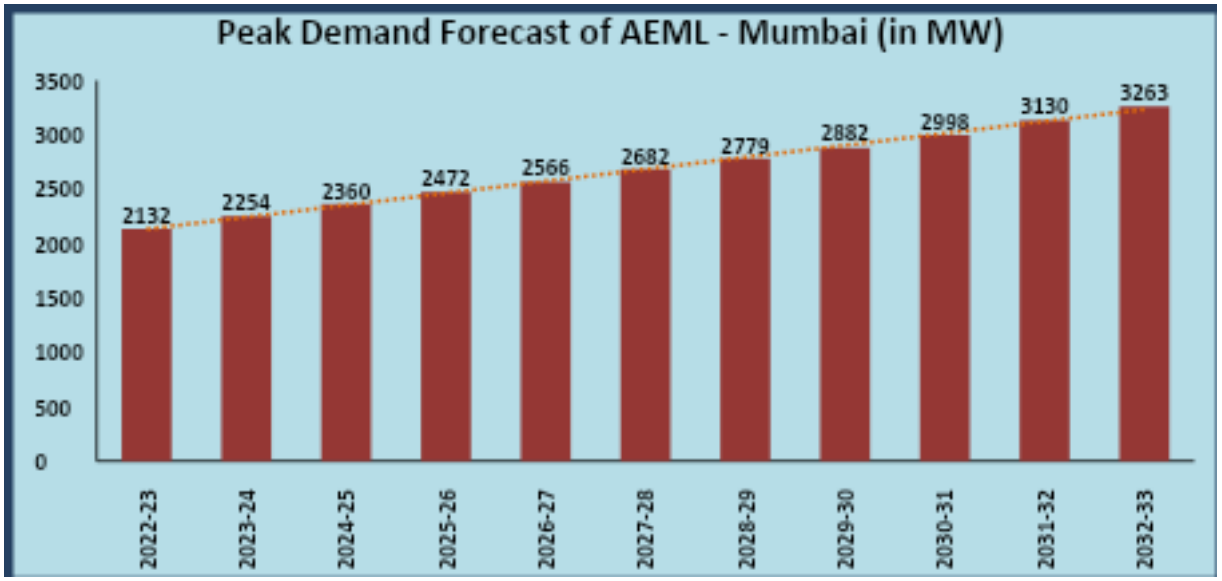

Figure 34-16 Peak Demand Forecast of AEML - Mumbai (in MW)

The category-wise energy consumption forecast of AEML - Mumbai are as follows:

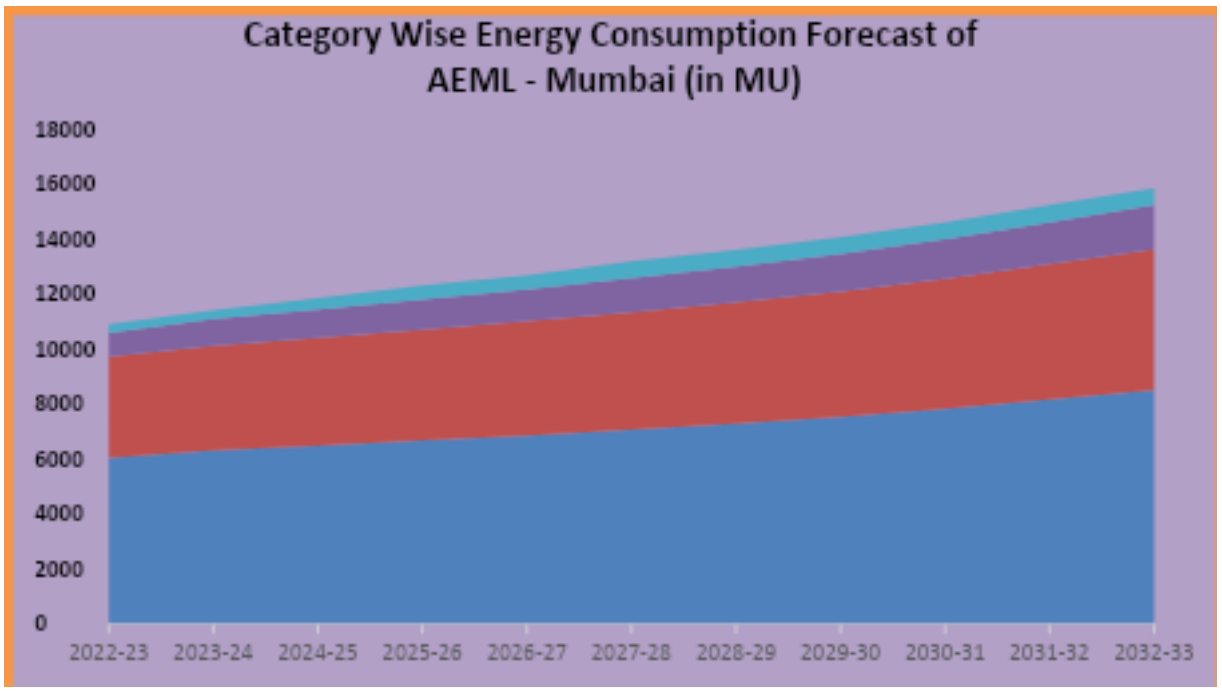

Figure 34-17 Category-wise Energy Consumption Forecast of AEML - Mumbai (in MU)

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	Domestic	6010	7039	8485	3.21	3.81	3.51
2	Commercial	3680	4282	5111	3.08	3.60	3.34
3	Irrigation	0	0	0	0	0	0
4	Industrial	869	1221	1605	7.05	5.63	6.33
5	Others	310	609	621	14.43	0.40	7.19
6	**Total**	**10869**	**13151**	**15823**	**3.89**	**3.77**	**3.83**

Table 34-5 Expected CAGR of AEML - Mumbai Category-wise Consumption

33.11 Transmission & Distribution Losses: BEST- Mumbai

T&D losses of BEST - Mumbai were 7.40% in year 2022-23. The target is maintain T&D losses around this level.

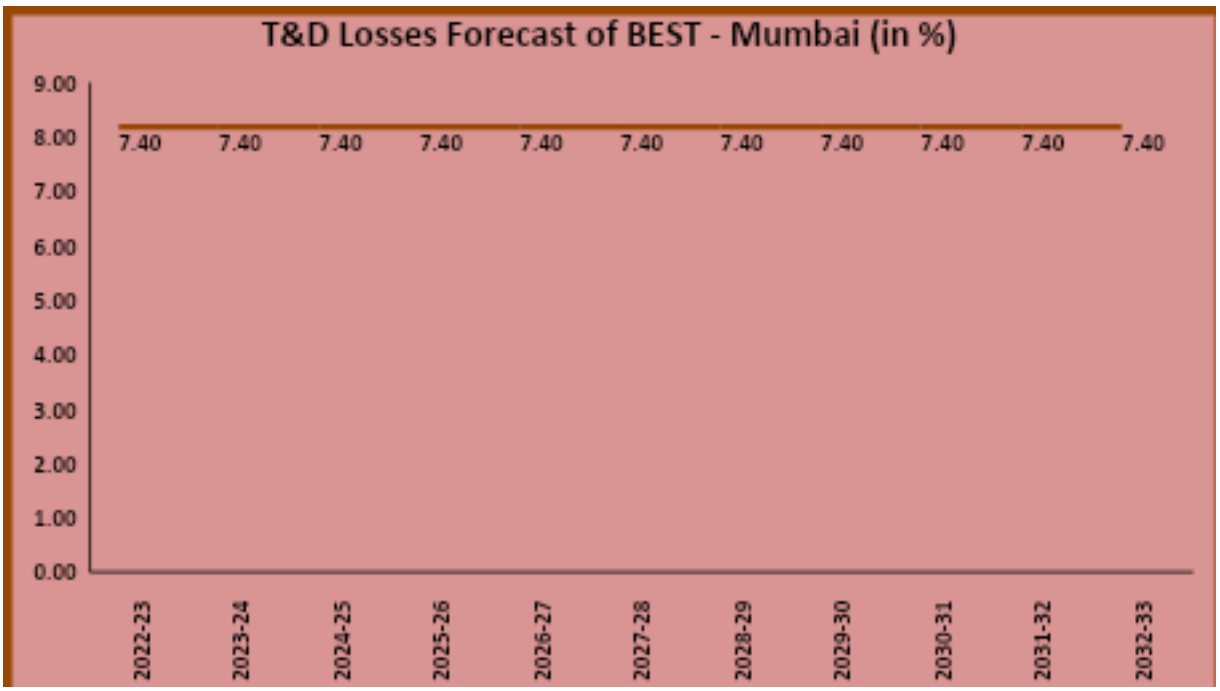

Figure 34-18 T&D Losses Forecast of BEST - Mumbai (in %)

33.12 Transmission & Distribution Losses: MSEDCL - Mumbai

T&D losses of MSEDCL - Mumbai were 9.75% in year 2022-23. The target level is to bring it down to about 9.43% and 9.11% by the end of 2027-28 & 2032-33 respectively.

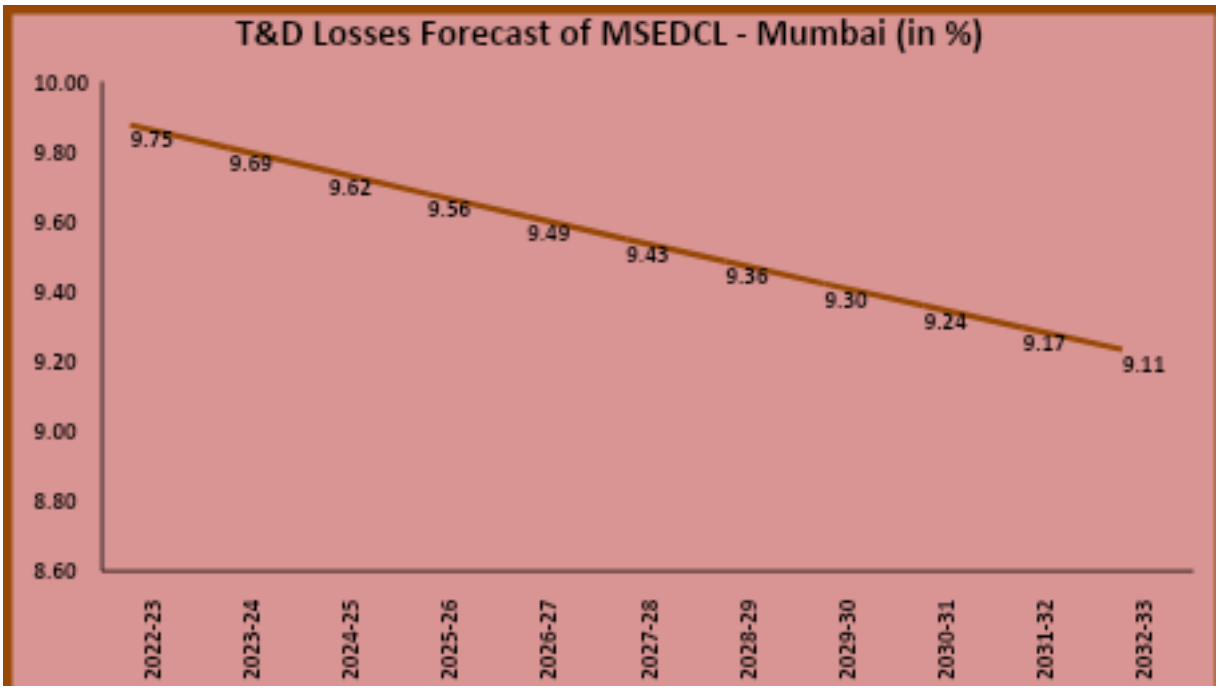

Figure 34-19 T&D Losses Forecast of MSEDCL - Mumbai (in %)

33.13 Transmission & Distribution Losses: Tata Power – Mumbai

T&D losses of Tata Power – Mumbai were 4.2% in year 2022-23. The target is to maintain T&D losses

around this level.

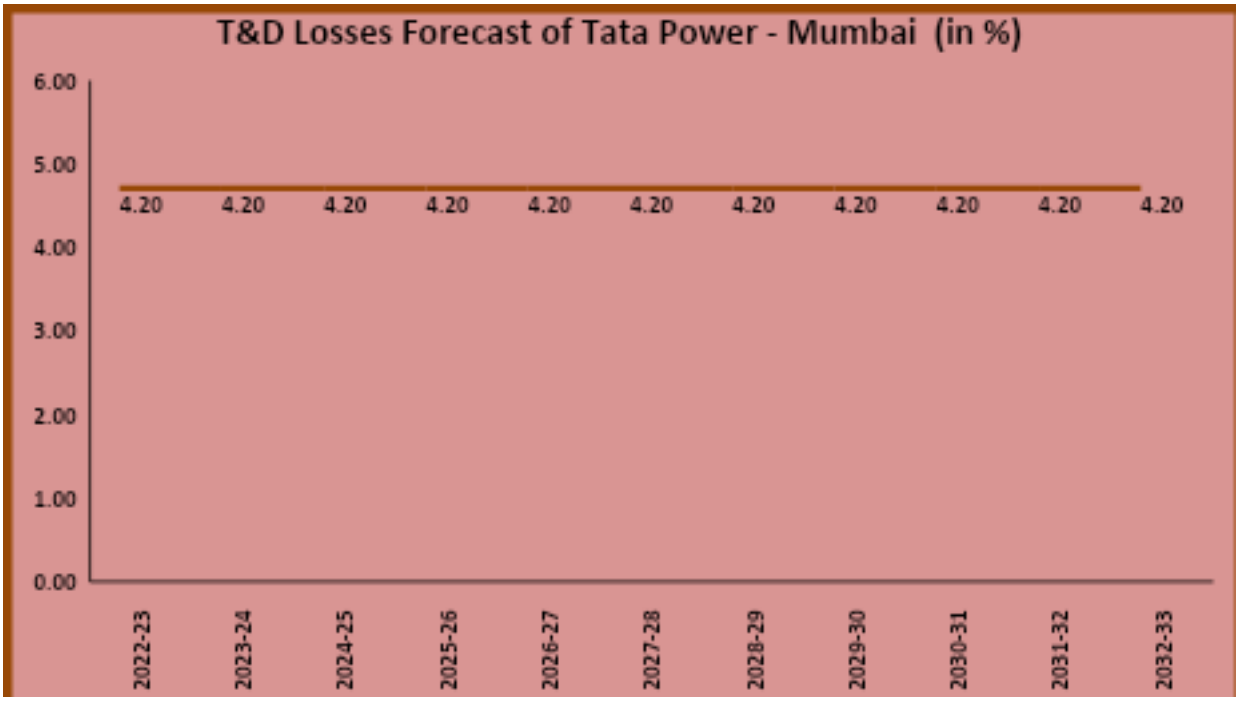

Figure 34-20 T&D Losses Forecast of Tata Power - Mumbai (in %)

33.14 Transmission & Distribution Losses: AEML - Mumbai

T&D losses of AEML - Mumbai were 10.38% in year 2022-23. The target level is to bring it down to about 10.21% and 10.05% by the end of 2027-28 & 2032-33 respectively.

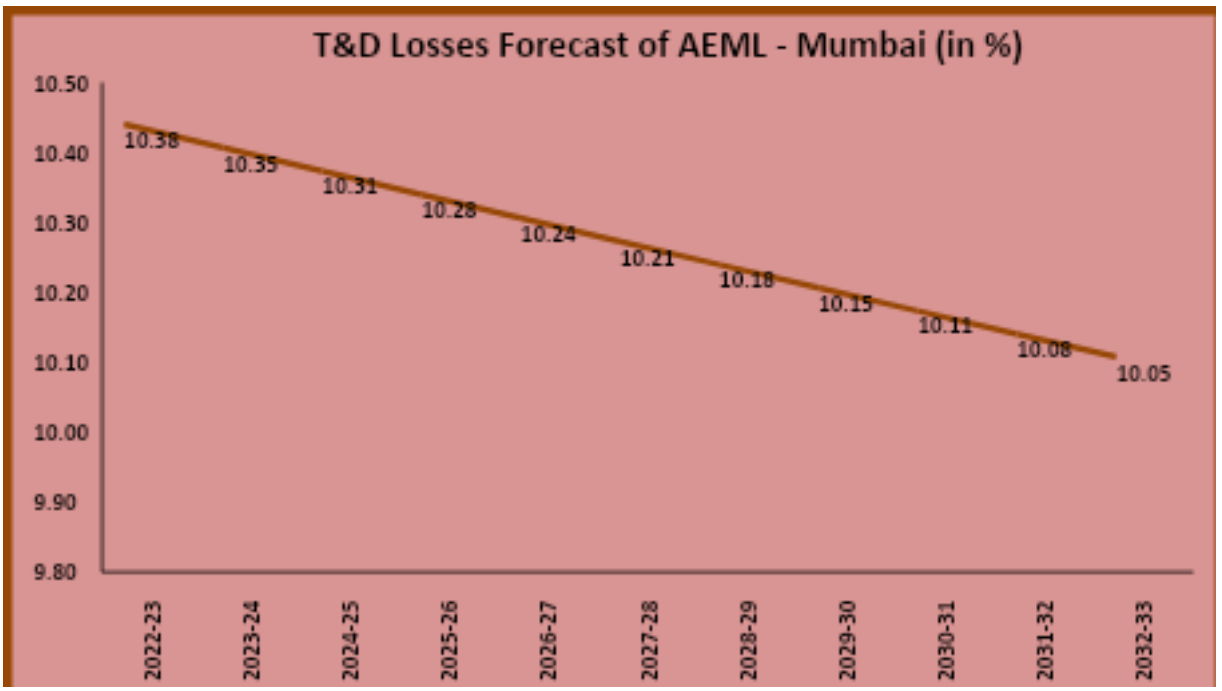

Figure 34-21 T&D Losses Forecast of AEML - Mumbai (in %)

33.15 Summary of power forecast of BEST - Mumbai:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	Energy Requirement (in MU)	4842	5531	6219	2.70	2.37
2	Peak Demand (in MW)	890	1021	1153	2.79	2.47
3	T&D Losses (in %)	7.40	7.40	7.40		

Table 34-6 Power forecast summary of BEST - Mumbai

33.16 Summary of power forecast of MSEDCL - Mumbai:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	Energy Requirement (in MU)	1216	1372	1577	2.43	2.83
2	Peak Demand (in MW)	274	317	374	2.95	3.35
3	T&D Losses (in %)	9.75	9.43	9.11		

Table 34-7 Power forecast summary of MSEDCL - Mumbai

33.17 Summary of power forecast of Tata Power – Mumbai:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	Energy Requirement (in MU)	5796	8652	12632	8.34	7.86
2	Peak Demand (in MW)	948	1376	1954	7.73	7.27
3	T&D Losses (in %)	4.20	4.20	4.20		

Table 34-8 Power forecast summary of Tata Power – Mumbai

33.18 Summary of power forecast of AEML - Mumbai:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	Energy Requirement (in MU)	12128	14647	17590	3.85	3.73
2	Peak Demand (in MW)	2132	2682	3263	4.69	4.00
3	T&D Losses (in %)	10.38	10.21	10.05		

Table 34-9 Power forecast summary of AEML - Mumbai

33.19 Summary of power forecast of Mumbai:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	23982	30200	38019	4.72	4.71
2	**Peak Demand (in MW)**	4244	5396	6744	4.92	4.56
3	**T&D Losses (in %)**	7.79	7.93	7.63		

Table 34-10 Power forecast summary of Mumbai

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BEST - Mumbai											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	2074	2139	2204	2269	2333	2397	2461	2523	2585	2645	2704
Commercial	1983	2028	2072	2116	2157	2198	2237	2275	2311	2345	2377
Public lighting	15	16	17	17	18	19	19	20	20	21	22
Public Water Works	42	44	46	48	50	52	54	57	59	61	63
Irrigation	0	0	0	0	0	0	0	0	0	0	0
LT Industries	183	189	195	201	208	214	220	226	232	238	244
HT Industries	168	173	177	182	187	192	196	201	205	209	214
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	0	0	0	0	0	0	0	0	0	0	0
Others (if Any)	18	23	28	34	41	50	61	75	91	111	134
Total (Energy Consumption)	**4483**	**4611**	**4739**	**4867**	**4995**	**5122**	**5249**	**5376**	**5503**	**5631**	**5759**
T&D losses -MU	358	369	379	389	399	409	419	430	440	450	460
T&D losses -in %	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40
Energy Requirement - MU	**4842**	**4980**	**5118**	**5256**	**5394**	**5531**	**5668**	**5806**	**5943**	**6081**	**6219**
Annual Load Factor - %	62.13	62.08	62.02	61.96	61.91	61.85	61.80	61.74	61.69	61.63	61.57
Peak Load - MW	**890**	**916**	**942**	**968**	**995**	**1021**	**1047**	**1073**	**1100**	**1126**	**1153**

Table 34-11 Category-wise and Year-wise Summary BEST- Mumbai

MSEDCL - Mumbai											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	560	575	589	603	618	633	648	666	686	703	716
Commercial	244	255	266	277	289	302	316	331	348	364	376
Public lighting	7	7	7	7	7	7	7	7	7	7	7
Public Water Works	10	10	10	10	10	10	10	10	10	10	10
Irrigation	0	0	0	0	0	0	0	0	0	0	0
LT Industries	122	123	124	125	126	127	128	129	130	131	132
HT Industries	51	51	52	52	52	52	52	51	68	71	74
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	79	81	83	84	86	87	89	90	91	92	93
Others (if Any)	25	25	25	25	25	25	25	25	25	25	25
Total (Energy Consumption)	**1098**	**1127**	**1155**	**1184**	**1212**	**1242**	**1274**	**1309**	**1365**	**1404**	**1433**
T&D losses -MU	119	121	123	125	127	129	132	134	139	142	144
T&D losses -in %	9.75	9.69	9.62	9.56	9.49	9.43	9.36	9.30	9.24	9.17	9.11
Energy Requirement - MU	**1216**	**1247**	**1278**	**1309**	**1339**	**1372**	**1405**	**1443**	**1504**	**1545**	**1577**
Annual Load Factor - %	50.61	50.35	50.10	49.85	49.60	49.35	49.11	48.86	48.62	48.37	48.13
Peak Load - MW	**274**	**283**	**291**	**300**	**308**	**317**	**327**	**337**	**353**	**365**	**374**

Table 34-12 Category-wise and Year-wise Summary MSEDCL - Mumbai

Tata Power - Mumbai											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024 -25**	**2025 -26**	**2026 -27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	2040	2231	2461	2713	2989	3291	3624	3990	4396	4849	5327
Commercial	1047	1105	1176	1250	1328	1410	1497	1590	1690	1799	1906
Public lighting	0	0	0	0	0	0	0	0	0	0	0
Public Water Works	192	199	206	212	219	225	232	238	245	251	257
Irrigation	22	22	22	22	22	22	22	22	22	22	22
LT Industries	256	269	286	303	320	338	357	375	394	414	434
HT Industries	1756	1872	2006	2147	2295	2451	2613	2781	2956	3153	3358
Railway Traction	102	129	141	156	171	188	207	228	251	276	303
Bulk Supply	17	22	26	32	39	48	58	71	86	106	129
Others (if Any)	232	278	288	297	306	315	324	334	344	354	365
Total (Energy Consumption)	**5664**	**6127**	**6612**	**7132**	**7689**	**8288**	**8934**	**9630**	**10384**	**11223**	**12102**
T&D losses -MU	132	247	290	313	337	363	392	422	455	492	531
T&D losses -in %	2.28	3.87	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20
Energy Requirement - MU	**5796**	**6374**	**6902**	**7444**	**8026**	**8652**	**9325**	**10052**	**10840**	**11715**	**12632**
Annual Load Factor - %	69.78	70.18	70.58	70.98	71.38	71.78	72.18	72.58	72.98	73.38	73.78
Peak Load - MW	**948**	**1037**	**1116**	**1197**	**1284**	**1376**	**1475**	**1581**	**1696**	**1823**	**1954**

Table 34-13 Category-wise and Year-wise Summary Tata Power - Mumbai

AEML - Mumbai											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	6010	6284	6464	6647	6837	7039	7257	7503	7790	8141	8485
Commercial	3680	3796	3913	4032	4155	4282	4417	4564	4729	4921	5111
Public lighting	0	0	0	0	0	0	0	0	0	0	0
Public Water Works	0	0	0	0	0	0	0	0	0	0	0
Irrigation	0	0	0	0	0	0	0	0	0	0	0
LT Industries	569	596	604	610	616	621	625	629	631	634	637
HT Industries	300	391	434	484	540	600	665	736	818	890	968
Railway Traction	31	31	111	211	212	312	312	313	313	313	314
Bulk Supply	0	0	0	0	0	0	0	0	0	0	0
Others (if Any)	280	284	288	291	294	297	300	302	304	306	308
Total (Energy Consumption)	**10869**	**11383**	**11814**	**12277**	**12654**	**13151**	**13577**	**14046**	**14584**	**15205**	**15823**
T&D losses -MU	1259	1313	1358	1406	1444	1496	1539	1586	1641	1704	1767
T&D losses -in %	10.38	10.35	10.31	10.28	10.24	10.21	10.18	10.15	10.11	10.08	10.05
Energy Requirement - MU	**12128**	**12696**	**13172**	**13683**	**14098**	**14647**	**15116**	**15632**	**16225**	**16910**	**17590**
Annual Load Factor - %	64.93	64.30	63.72	63.19	62.73	62.35	62.10	61.91	61.79	61.68	61.54
Peak Load - MW	**2132**	**2254**	**2360**	**2472**	**2566**	**2682**	**2779**	**2882**	**2998**	**3130**	**3263**

Table 34-14 Category-wise and Year-wise Summary AEML Mumbai

Mumbai											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	10684	11229	11718	122port blair 32	12777	13360	13990	14682	15457	16338	17232
Commercial	6954	7184	7427	7675	7929	8192	8467	8760	9078	9429	9770
Public lighting	22	23	24	24	25	26	26	27	27	28	29
Public Water Works	244	253	262	270	279	287	296	305	314	322	330
Irrigation	22	22	22	22	22	22	22	22	22	22	22
LT Industries	1130	1177	1209	1239	1270	1300	1330	1359	1387	1417	1447
HT Industries	2275	2487	2669	2865	3074	3295	3526	3769	4047	4323	4614
Railway Traction	133	160	252	367	383	500	519	541	564	589	617
Bulk Supply	96	103	109	116	125	135	147	161	177	198	222
Others (if Any)	555	610	629	647	666	687	710	736	764	796	832
Total (Energy Consumption)	**22114**	**23248**	**24320**	**25460**	**26550**	**27803**	**29034**	**30361**	**31836**	**33463**	**35117**
T&D losses -MU	1868	2050	2150	2233	2307	2397	2482	2572	2675	2788	2902
T&D losses -in %	7.79	8.10	8.12	8.06	7.99	7.93	7.87	7.80	7.75	7.69	7.63
Energy Requirement - MU	**23982**	**25298**	**26470**	**27693**	**28857**	**30200**	**31516**	**32933**	**34511**	**36251**	**38019**

Annual Load Factor - %	64.8	64.4	64.2	64.0	63.9	63.9	63.9	64.0	64.1	64.2	64.4
Peak Load - MW	**4244**	**4490**	**4709**	**4937**	**5153**	**5396**	**5628**	**5873**	**6147**	**6444**	**6744**

Table 34-15 Category-wise and Year-wise Summary Mumbai

Nagpur

Chapter 34: **Nagpur**

34.1 Introduction:

Nagpur is the third-largest city of the Indian state of Maharashtra after Mumbai and Pune. Nagpur city is famous for Nagpur oranges.

Economy:

Nagpur is an emerging metropolis and the largest economic center in entire central India. Prominent Information Technology companies such as TCS, Tech Mahindra, HCL, Global Logic, Persistent Systems, Infosys, T-Systems, Ebix, LTI Mindtree, Accenture, Zoho, Hexaware etc. are located at various IT Parks in Nagpur. Tata Advanced Systems, erstwhile TAL Manufacturing Solutions, has its facility in the SEZ for manufacturing structural components for Boeing and Airbus. Air India Engineering Services Limited and AAR-Indamer have their MRO Facility in the SEZ Dassault Reliance Aerospace Limited (DRAL) and Thales Reliance Defence System also have their manufacturing facilities in MIHAN.

Climate:

Nagpur has tropical wet and dry climate with dry conditions prevailing for most of the year. Summers are extremely hot, lasting from March to June. Winter lasts from November to February, during which temperatures occasionally drop to 10 °C. The average number of heat waves days occurring in Nagpur in the summer months of March, April and May.

34.2 Brief description of Power Utilities:

Maharashtra State Electricity Distribution Company limited, a wholly owned corporate entity under the Maharashtra Government, was incorporated under the Companies Act, in June, 2005 after restructuring the erstwhile Maharashtra State Electricity Board. It is responsible for distribution of electricity in Nagpur.

34.3 Existing Power Scenario:

The total electricity consumption of Nagpur in the year 2022-23 was 2242 MU and with 13.87% T&D losses, the requirement was 2603 MU. The peak demand of the city was 684 MW. The Domestic sector was the biggest consumer of electricity (54%) followed by Industrial (24%) & commercial (13%).

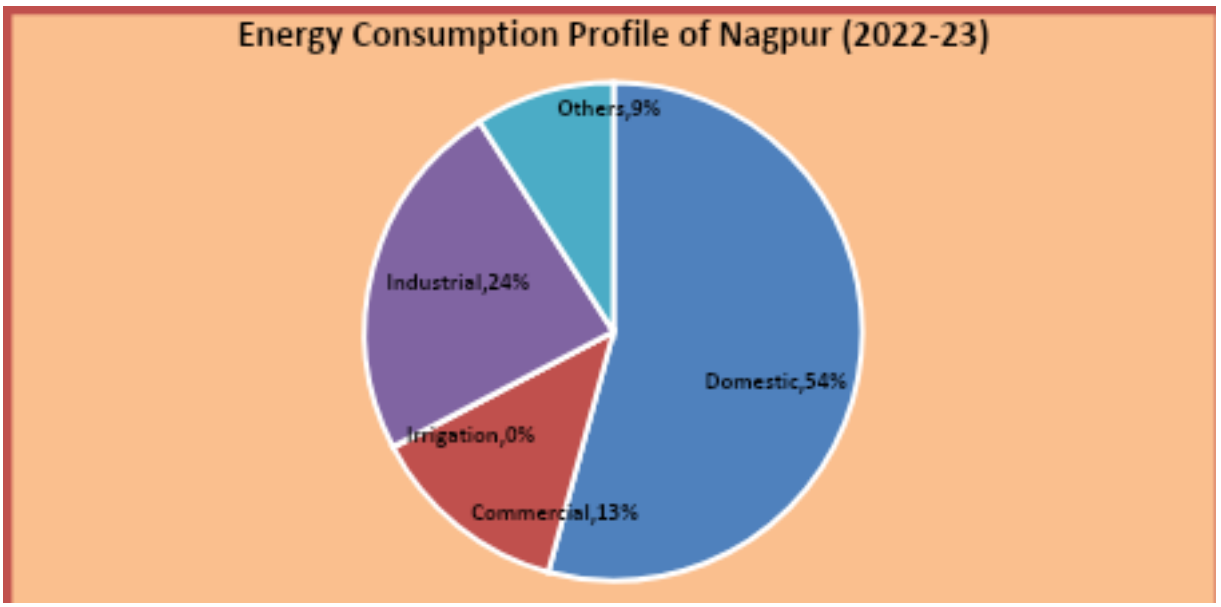

Figure 35-1 Energy Consumption Profile of Nagpur (2022-23)

In a comparison of Nagpur City with Maharashtra for the year 2022-23, it is observed that the energy requirement of Nagpur was 1.43% of the total energy requirement of the state.

2022-23	Nagpur City	Maharashtra	% Share of Nagpur City
Energy in MU	2603	183777	1.42
Peak Demand in MW	684	30203	1.97

Table 35-1 Comparison of Nagpur City with Maharashtra in 2022-23

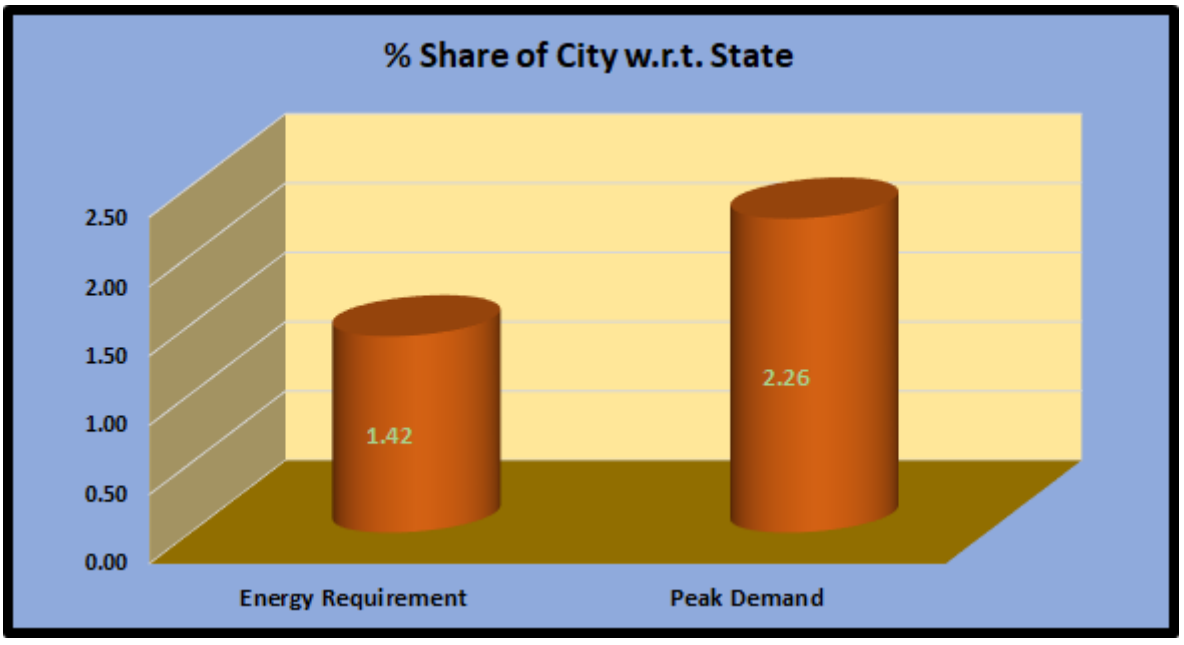

Figure 35-2 Comparison of Nagpur City and Maharashtra in the year 2022-23.

34.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Nagpur was 2603 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 3076 MU by the year 2027-28 with a 3.40% CAGR for the period 2022-23 to

2027-28. With a CAGR of 3.26% for the period 2027-28 to 2032-33, its energy requirement is estimated as 3612 MU by the year 2032-33.

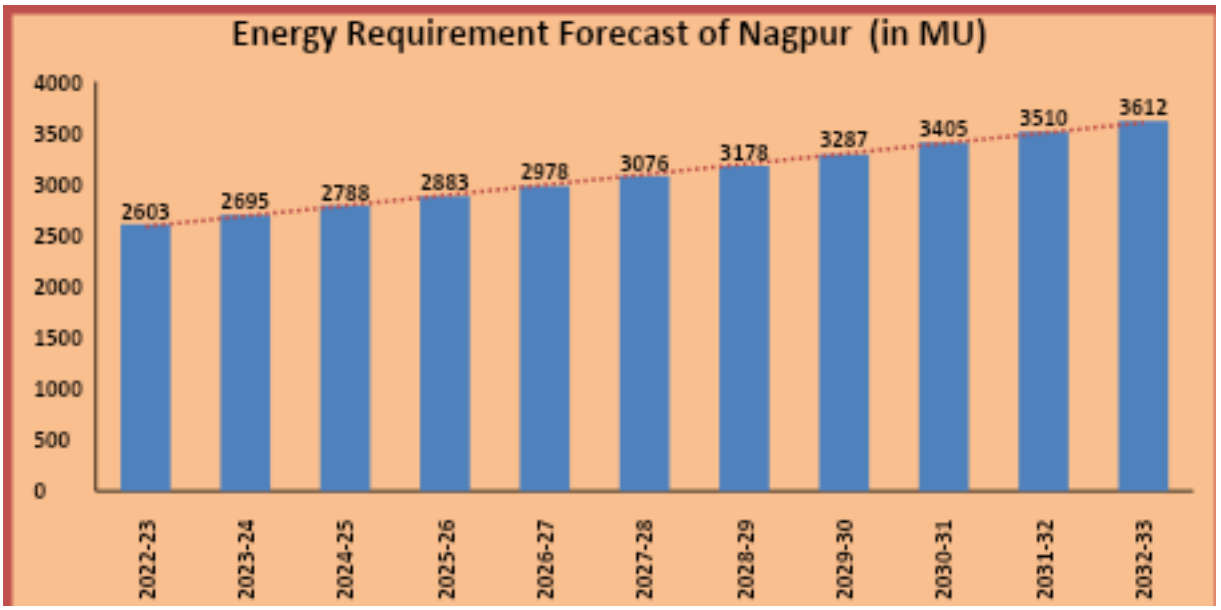

Figure 35-3 Energy Requirement Forecast of Nagpur (in MU)

Peak Demand of the Nagpur is expected to see 4.76% CAGR upto 2027-28 and will reach 863 MW in comparison to 684 MW in the year 2022-23. It is expected to reach 1082 MW in the year 2032-33 with a CAGR of 4.62% after 2027-28.

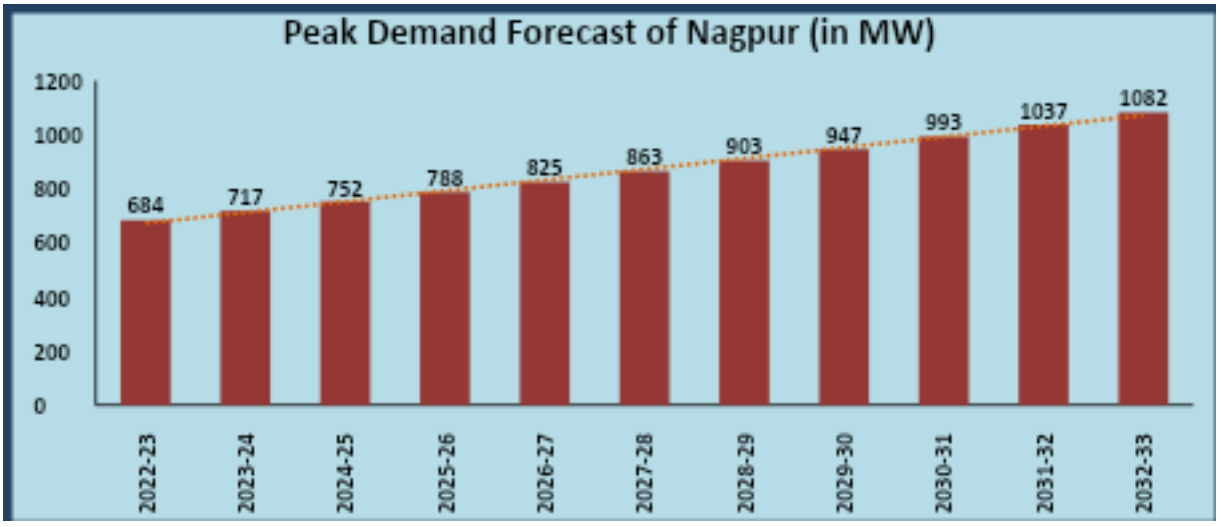

Figure 35-4 Peak Demand Forecast of Nagpur (in MW)

The category-wise energy consumption forecast of Nagpur are as follows:

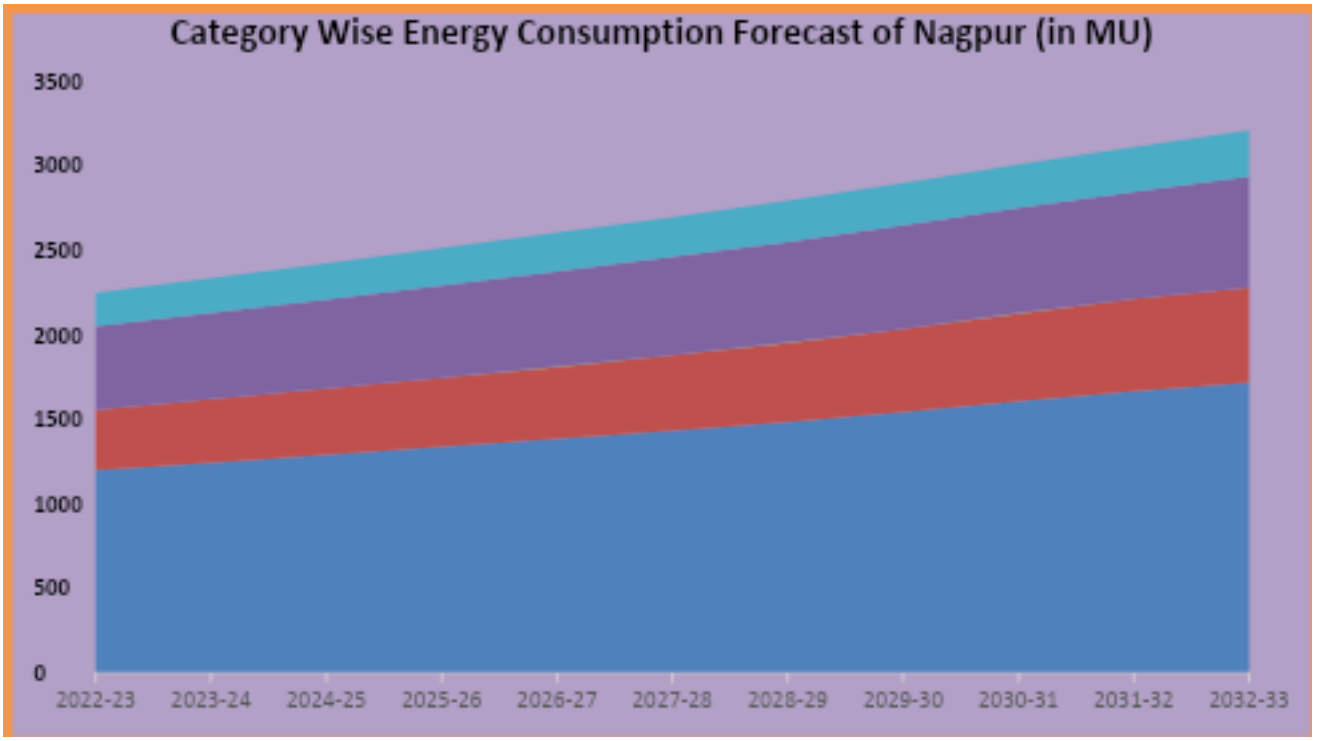

Figure 35-5 Category-wise Energy Consumption Forecast of Nagpur (in MU)

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	Domestic	1194	1428	1712	3.64	3.69	3.67
2	Commercial	358	447	564	4.54	4.78	4.66
3	Irrigation	0	0	0	0	0	0
4	Industrial	491	580	653	3.39	2.40	2.89
5	Others	198	235	273	3.49	3.03	3.26
6	**Total**	**2242**	**2691**	**3202**	**3.72**	**3.54**	**3.63**

Table 35-2 Expected CAGR of Nagpur Category-wise Consumption

34.5 Transmission & Distribution Losses:

T&D losses of Nagpur were 13.87% in year 2022-23. The target level is to bring it down to about 12.54% and 11.33% by the end of 2027-28 & 2032-33 respectively.

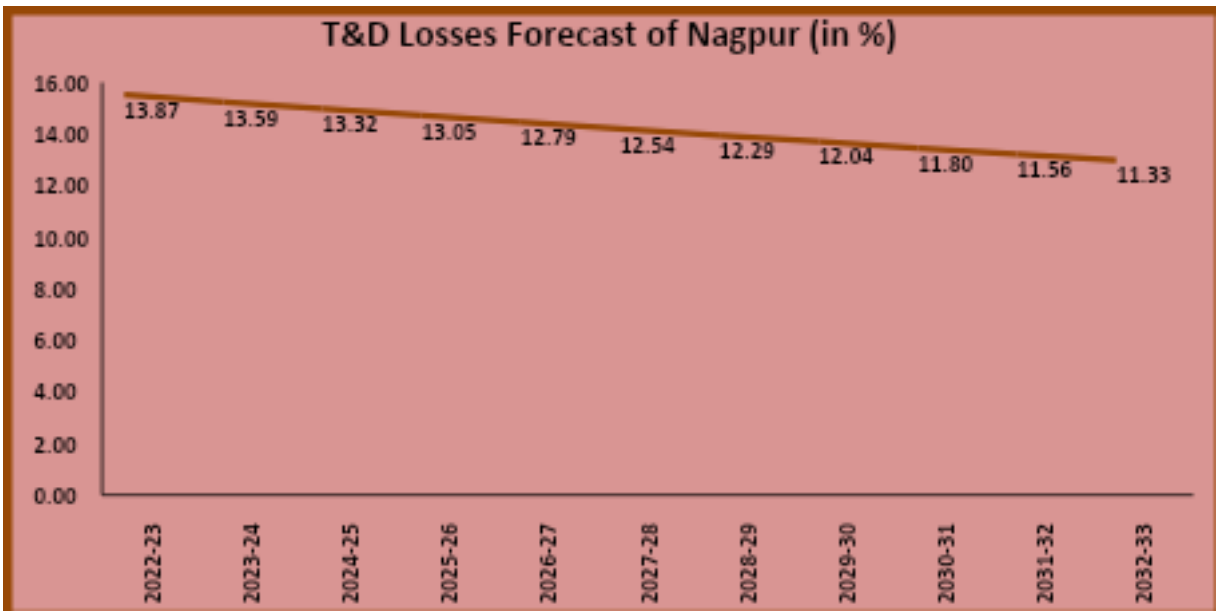

Figure 35-6 T&D Losses Forecast of Nagpur (in %)

34.6 Summary of power forecast of Nagpur city:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	2603	3076	3612	3.40	3.26
2	**Peak Demand (in MW)**	684	863	1082	4.76	4.62
3	**T&D Losses (in %)**	13.87	12.54	11.33		

Table 35-3 Power forecast summary of Nagpur

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Nagpur											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	1194	1240	1285	1331	1379	1428	1481	1538	1604	1663	1712
Commercial	358	374	391	409	427	447	468	491	519	545	564
Public lighting	27	27	28	28	29	29	30	30	30	31	31
Public Water Works	62	64	66	68	70	72	74	76	78	80	82
Irrigation	0	0	0	0	0	0	0	0	0	0	0
LT Industries	156	164	172	181	189	197	205	212	219	225	236
HT Industries	335	345	355	365	375	383	392	399	404	406	417
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	105	109	114	119	124	129	134	139	144	149	154
Others (if Any)	5	5	5	5	5	5	5	5	5	5	5
Total (Energy Consumption)	**2242**	**2329**	**2417**	**2506**	**2597**	**2691**	**2788**	**2892**	**3004**	**3104**	**3203**
T&D losses -MU	361	366	371	376	381	386	391	396	402	406	409
T&D losses -in %	13.87	13.59	13.32	13.05	12.79	12.54	12.29	12.04	11.80	11.56	11.33
Energy Requirement - MU	**2603**	**2695**	**2788**	**2883**	**2978**	**3076**	**3178**	**3287**	**3405**	**3510**	**3612**
Annual Load Factor - %	43.45	42.89	42.33	41.78	41.23	40.70	40.17	39.65	39.13	38.62	38.12

Peak Load - MW	**684**	**717**	**752**	**788**	**825**	**863**	**903**	**947**	**993**	**1037**	**1082**

Table 35-4 Category-wise and Year-wise Summary of Nagpur.

Panaji

Chapter 35: **Panaji**

35.1 Introduction:

Panaji (also known as Panjim) is the capital of the Indian state of Goa. It became a state-capital on Goa's elevation to statehood in 1987.

Economy:

Tourism is Goa's primary industry: it gets 12% of foreign tourist Panaji arrivals in India. The land away from the coast is rich in minerals and ores, and mining forms the second largest industry. Iron, bauxite, manganese, clays, limestone, and silica are mined. The Mormugao port handled 31.69 a million tonnes of cargo in 2007, which was 39% of India's total iron ore exports.

Climate:

Panaji features a tropical monsoon climate. The climate in Panaji is hot in summer and equable in winter. During summers (from March to May) the temperature reaches up to 32 °C and in winters (from November to February) it is usually between 31 °C and 23 °C. The monsoon period is from June to October with heavy rainfall and gusty winds. The annual average rainfall is 2,932 mm.

35.2 Brief description of Power Utilities:

The Electricity Department was created as a Govt. Department in the year 1963. The Electricity Department is the only licensee in the state of Goa for transmission and distribution of Electrical Energy.

35.3 Existing Power Scenario:

The total electricity consumption of Panaji City in the year 2022-23 was 135 MU and with 12.96% T&D losses, the requirement was 155 MU. The peak demand of the city was 38 MW. The Commercial sector was the biggest consumer of electricity (44%) and followed by domestic (39%) & Industrial (17%).

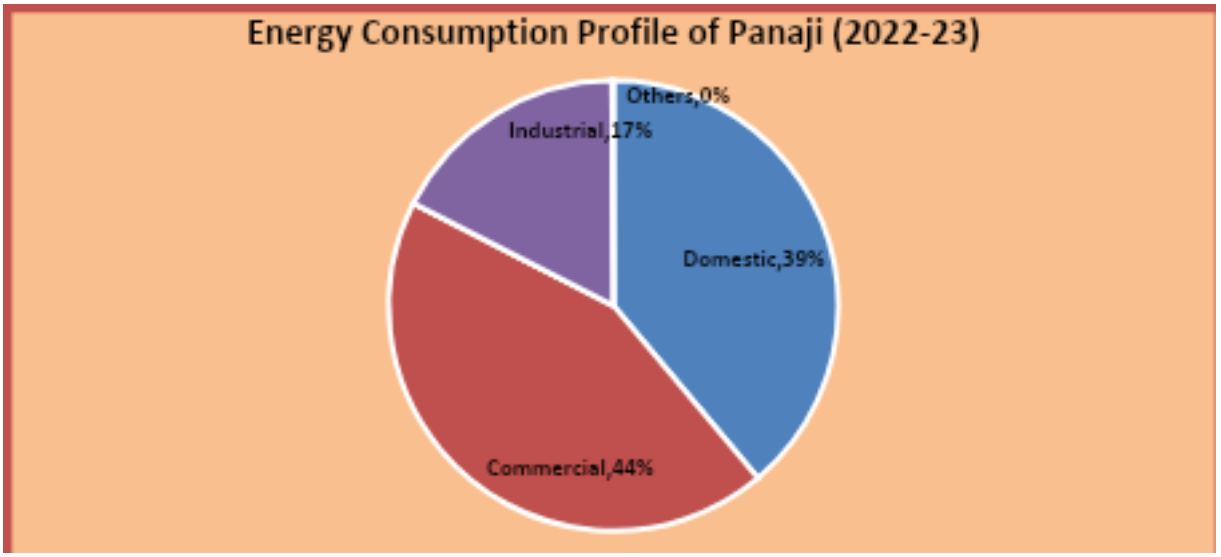

Figure 36-1 Energy Consumption Profile of Panaji (2022-23).

In a comparison of Panaji City with Goa for the year 2022-23, it is observed that the energy requirement of Panaji was 3.45% of the total energy requirement of the state.

2022-23	Panaji City	Goa	% Share of Panaji City
Energy in MU	155	4630	3.35
Peak Demand in MW	38	740	5.14

Table 36-1 Comparison of Panaji with Goa in 2022-23

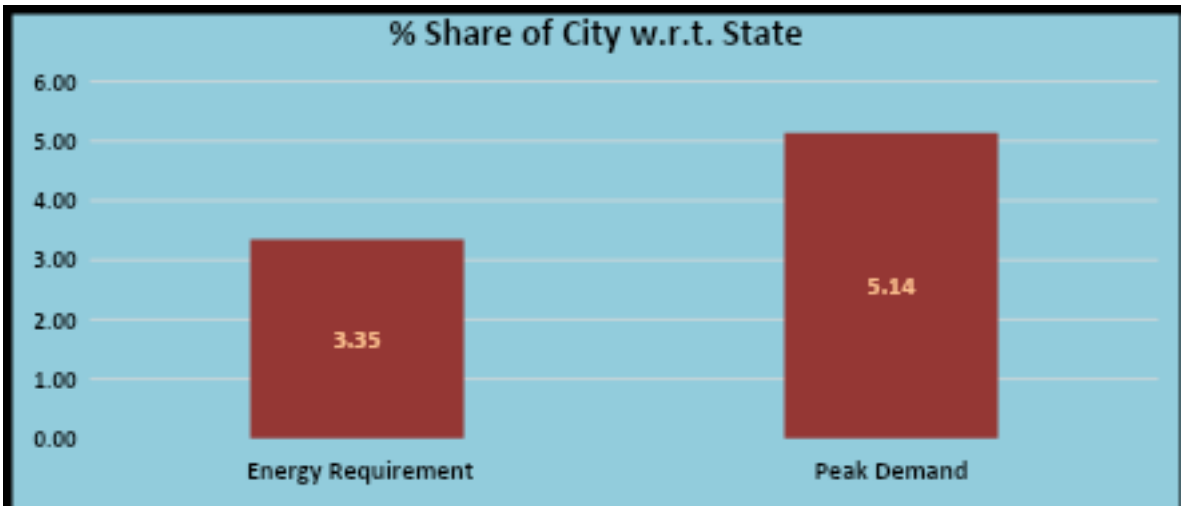

Figure 36-2 Comparison of Panaji City and Goa in the year 2022-23.

35.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Panaji City was 155 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 196 MU by the year 2027-28 with a 4.75% CAGR for the period 2022-23 to 2027-28. With a CAGR of 6.31% for the period 2027-28 to 2032-33, its energy requirement is estimated as 266 MU by the year 2032-33.

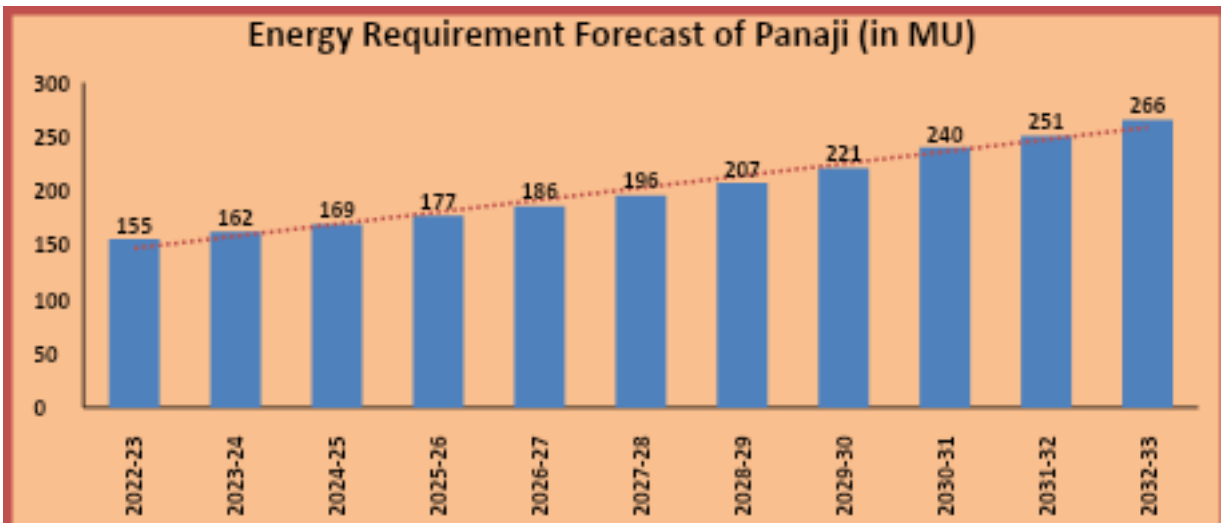

Figure 36-3 Energy Requirement Forecast of Panaji (in MU).

Peak Demand of the Panaji City is expected to see 3.71% CAGR upto 2027-28 and will reach 46 MW in comparison to 38 MW in the year 2022-23. It is expected to reach 59 MW in the year 2032-33 with a CAGR of 5.25% after 2027-28.

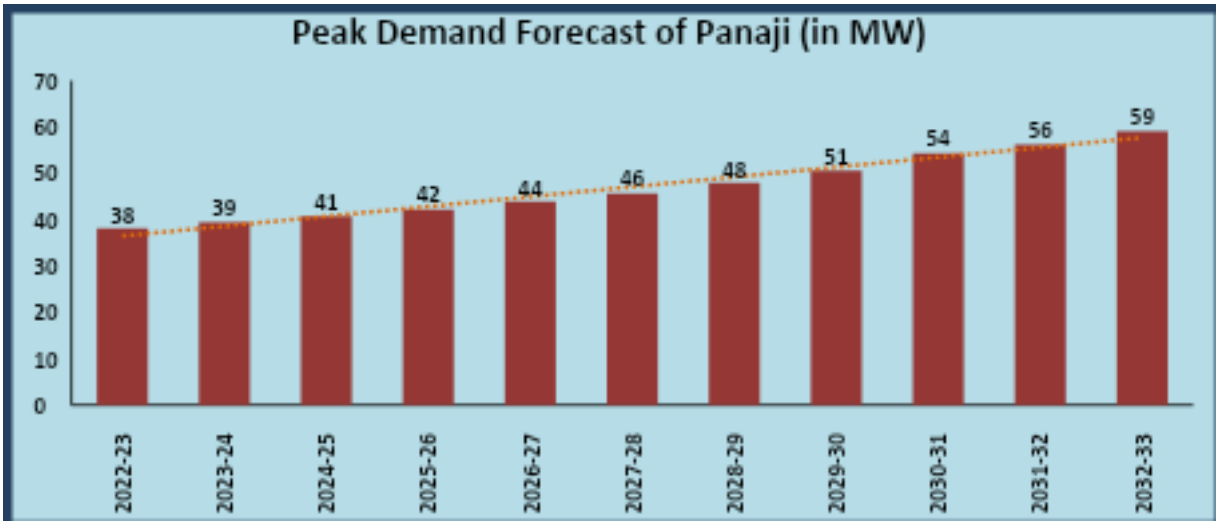

Figure 36-4 Peak Demand Forecast of Panaji (in MW)

The category-wise energy consumption forecast of Panaji City are as follows:

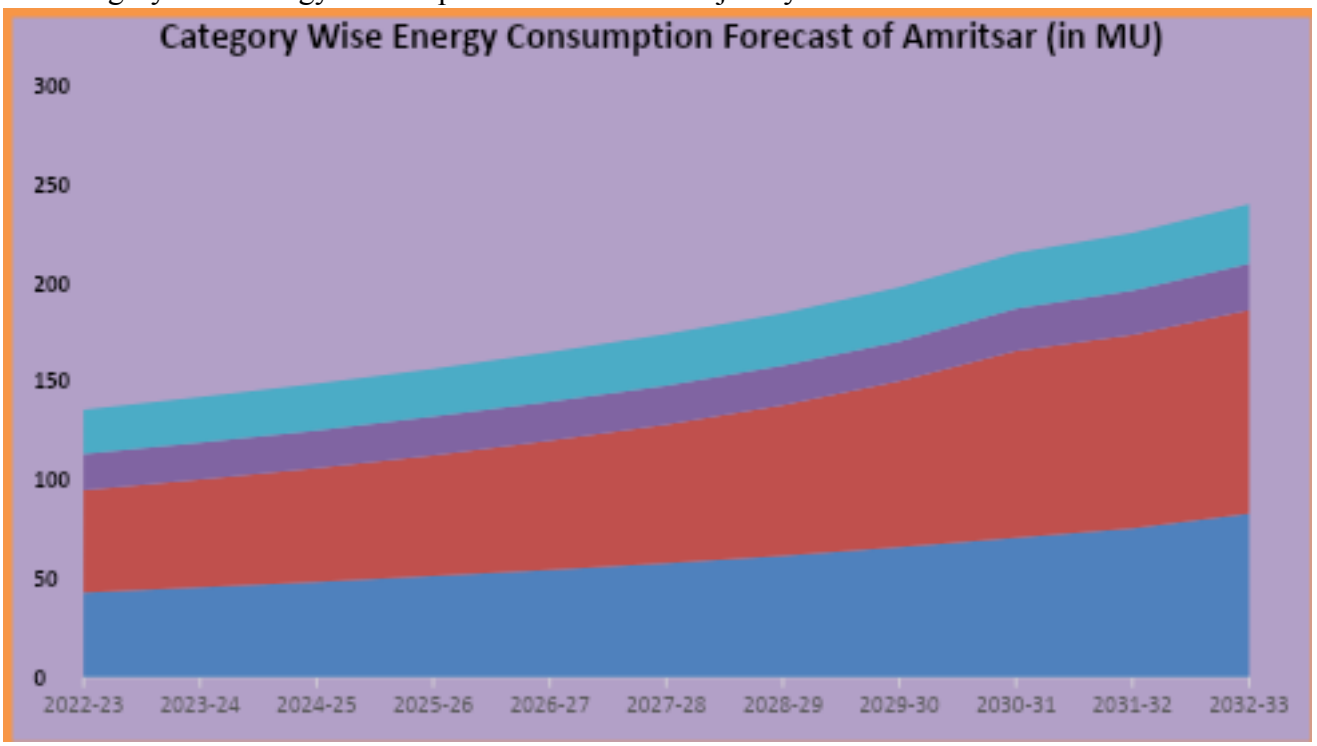

Figure 36-5 Category-wise Energy Consumption Forecast of Amritsar (in MU)

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33

1	Domestic	43	58	83	6.14	7.51	6.82
2	Commercial	52	70	103	6.30	8.00	7.15
3	Irrigation	0	0	0	0	0	0
4	Industrial	19	20	23	1.31	3.34	2.32
5	Others	22	26	30	3.19	2.99	3.09
6	**Total**	**135**	**174**	**239**	**5.12**	**6.63**	**5.88**

Table 36-2 Expected CAGR of Panaji City Category-wise Consumption

35.5 Transmission & Distribution Losses:

T&D losses of Panaji City were 12.96% in year 2022-23. The target level is to bring it down to about 11.39% and 10.01% by the end of 2027-28 & 2032-33 respectively.

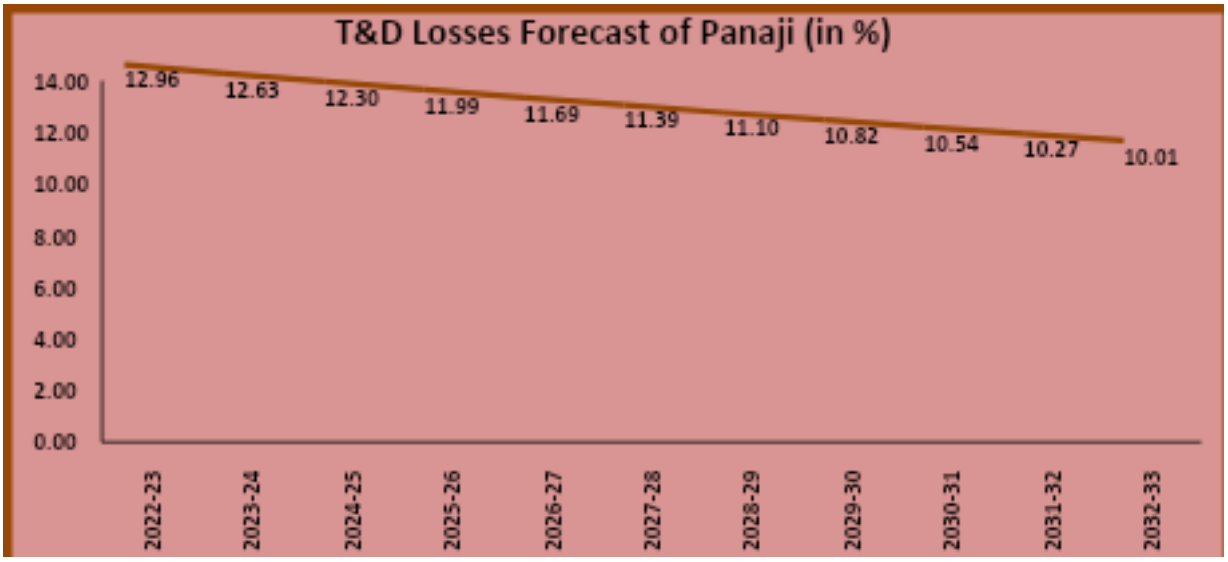

Figure 36-6 T&D Losses Forecast of Panaji (in %)

35.6 Summary of power forecast of Panaji city:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	155	196	266	4.75	6.31
2	**Peak Demand (in MW)**	38	46	59	3.71	5.25
3	**T&D Losses (in %)**	12.96	11.39	10.01		

Table 36-3 Power forecast summary of Panaji

****

Panaji City											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	43	45	48	51	54	58	62	66	71	75	83
Commercial	52	54	58	61	65	70	76	84	94	98	103
Public lighting	0	0	0	0	0	0	0	0	0	0	0
Public Water Works	0	0	0	0	0	0	0	0	0	0	0
Irrigation	0	0	0	0	0	0	0	0	0	0	0
LT Industries	0	0	0	0	0	0	0	0	0	0	0
HT Industries	18	19	19	19	19	20	20	20	21	22	23
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	0	0	0	0	0	0	0	0	0	0	0
Others (if Any)	22	23	23	24	25	26	27	27	28	29	30
Total (Energy Consumption)	**135**	**142**	**149**	**156**	**164**	**174**	**184**	**197**	**215**	**225**	**239**
T&D losses -MU	20	20	21	21	22	22	23	24	25	26	27
T&D losses -in %	12.96	12.63	12.30	11.99	11.69	11.39	11.10	10.82	10.54	10.27	10.01
Energy Requirement - MU	**155**	**162**	**169**	**177**	**186**	**196**	**207**	**221**	**240**	**251**	**266**
Annual Load Factor - %	46.57	47.03	47.50	47.98	48.46	48.94	49.43	49.93	50.43	50.93	51.44
Peak Load - MW	**38**	**39**	**41**	**42**	**44**	**46**	**48**	**51**	**54**	**56**	**59**

Table 36-4 Category-wise and Year-wise Summary of Panaji.

Patna

Chapter 36: **Patna**

36.1 Introduction:

Patna is the capital of Bihar. Patna is located on the southern bank of river Ganges. The city is known for its rich cultural and historical heritage.

Economy:

The main economy of the city is based on trade, retail, and services. The surrounding region is primarily agricultural, and Patna benefits from agro-based industries and trade related to agriculture.

Climate:

The climate of Patna is the tropical climate. The summer begins in April and peaks in June/July with the temperature soaring up to 46° C. The rains last through August & September and continue into early October. The winters are cold and dry.

36.2 Brief description of Power Utilities:

In Patna, Southern Bihar Power Distribution Company Limited (SBDCL), deals with the distribution of electricity.

36.3 Existing Power Scenario:

The total electricity consumption of Patna in the year 2022-23 was 2453MU and with 18% T&D losses, the requirement was 3009 MU. The peak demand of the city was 658 MW. The Domestic sector was the biggest consumer of electricity (52%) followed by Industrial (25%) & Commercial (20%).

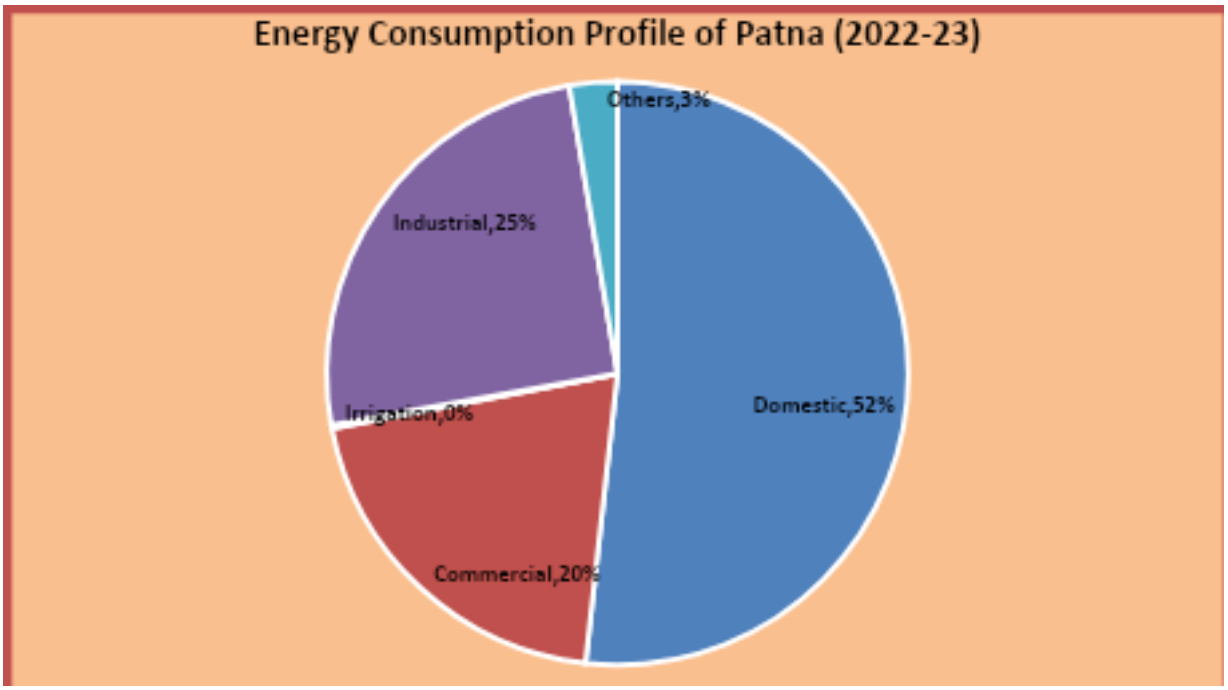

Figure 37-1 Energy Consumption Profile of Patna (2022-23)

On comparison of Patna with Bihar for the year 2022-23, it is observed that the energy requirement of Patna was 1.99% of the total energy requirement of the state.

2022-23	Patna City	Bihar	% Share of Patna City
Energy in MU	3009	41814	7.20
Peak Demand in MW	658	7495	8.78

Table 37-1 Comparison of Patna with Bihar in 2022-23

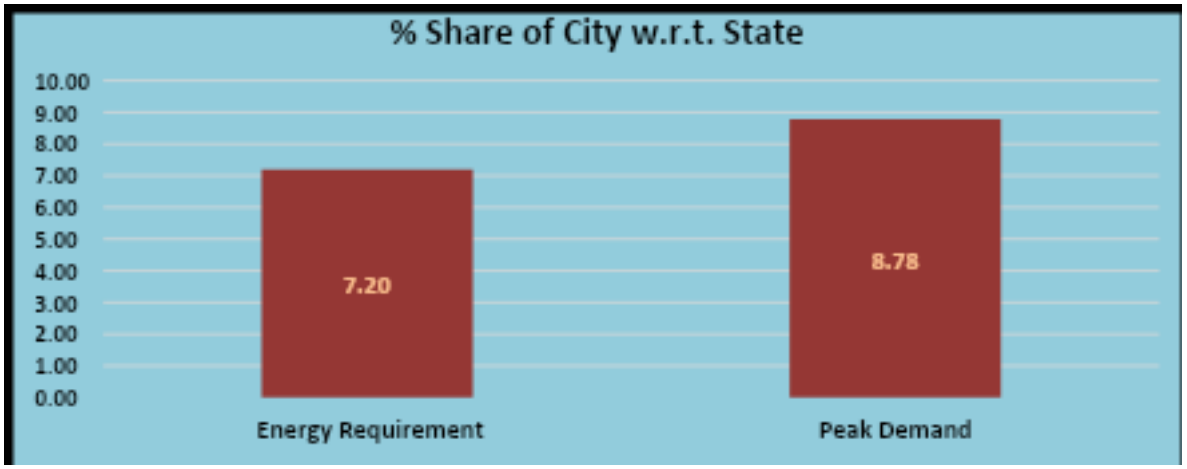

Figure 37-2 Comparison of Patna and Bihar in the year 2022-23.

36.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Patna was 3009 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 3671 MU by the year 2027-28 with a 4.06 % CAGR for the period 2022-23 to 2027-28. With a CAGR of 3.25 % for the period 2027-28 to 2032-33, its energy requirement is estimated as 4307MU by the year 2032-33.

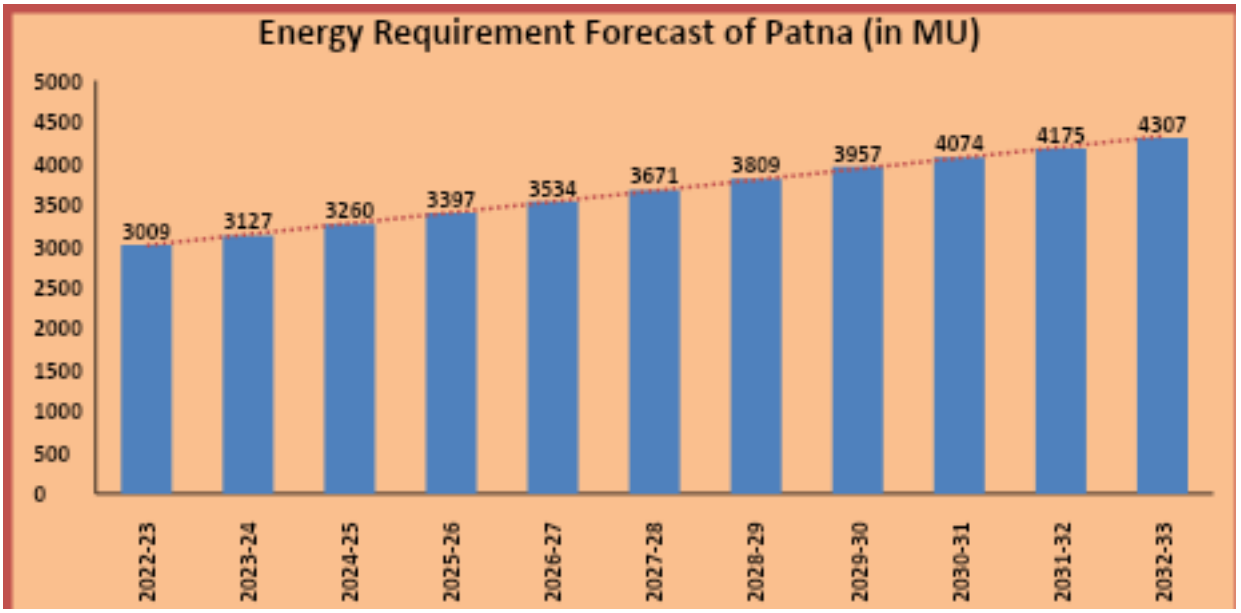

Figure 37-3 Energy Requirement Forecast of Patna (in MU)

Peak Demand of Patna is expected to see 4.56 % CAGR upto 2027-28 and will reach 823MW in comparison to 658 MW in year 2022-23. It is expected to reach 1014 MW in year 2032-33 with a CAGR of 4.27 % after 2027- 28.

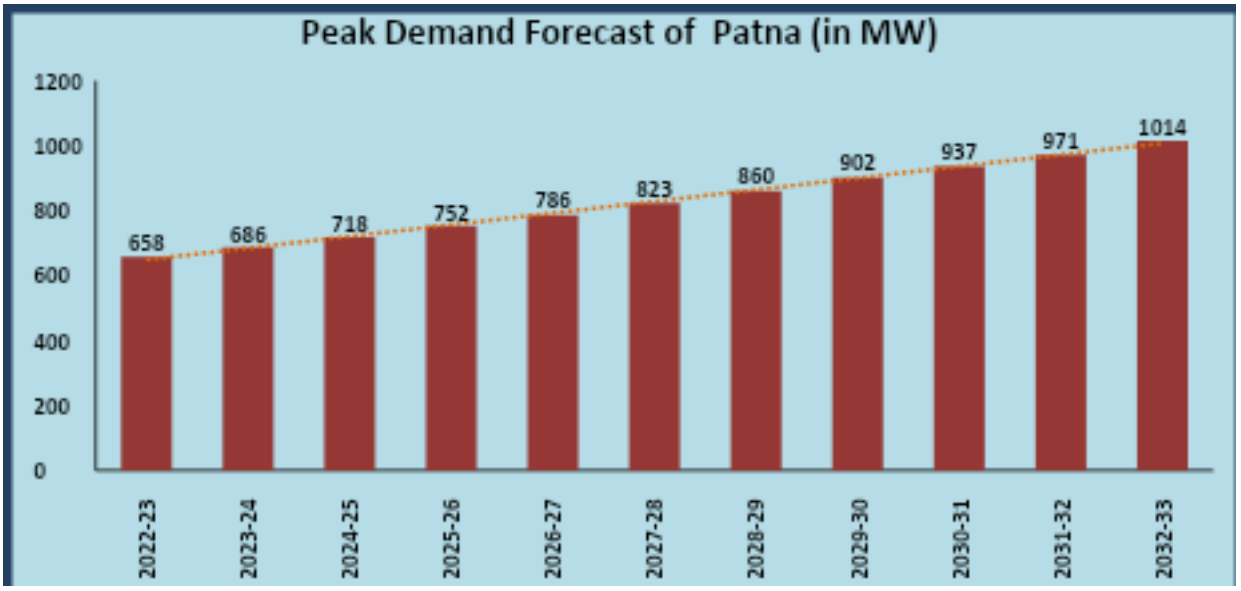

Figure 37-4 Peak Demand Forecast of Patna (in MW)

The category-wise energy consumption forecast of Patna are as follows:

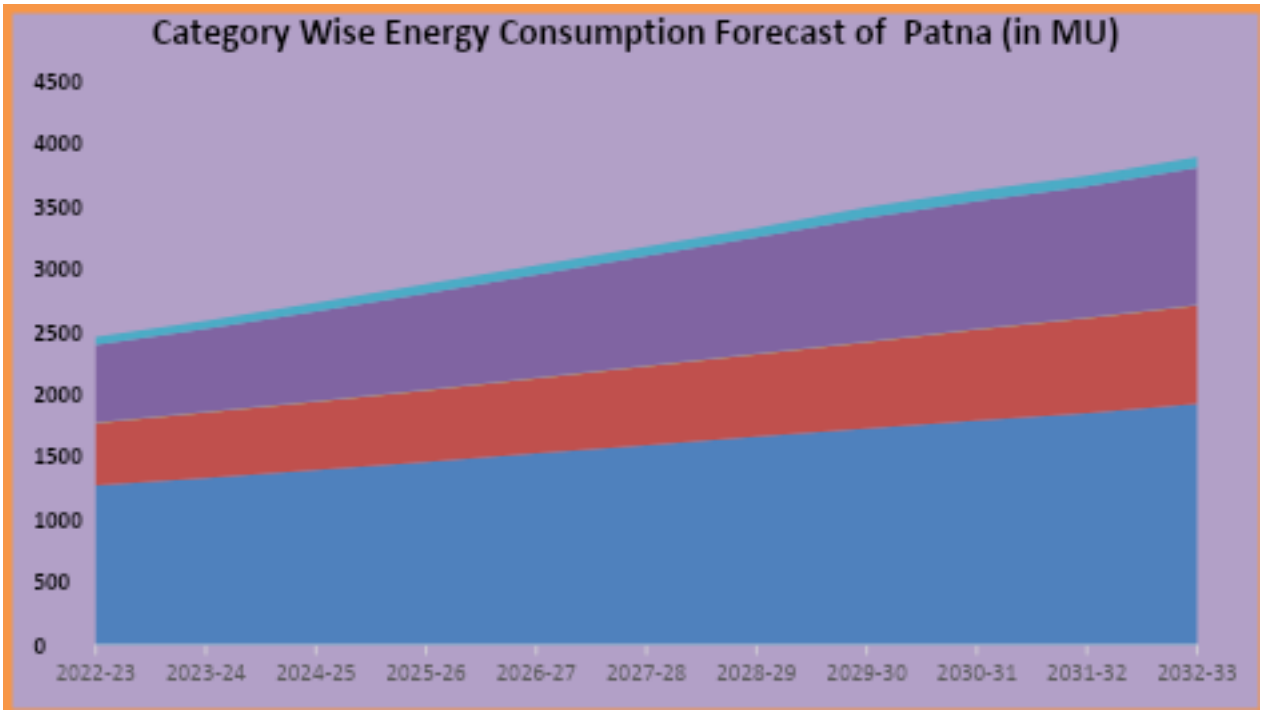

Figure 37-5 Category-wise Energy Consumption Forecast of Patna (in MU)

The category-wise CAGR expected in energy consumption for the next ten years (2022-23 to 2032-33) along with its break up in five years (2022-23 to 2027-28 & 2028-29 to 2032-33) is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	**Domestic**	1269	1591	1920	4.62	3.84	4.23
2	**Commercial**	496	626	784	4.78	4.60	4.69
3	**Irrigation**	4	5	5	3.05	0.86	1.95
4	**Industrial**	620	875	1091	7.15	4.51	5.82
5	**Others**	64	76	88	3.41	3.02	3.21
6	**Total**	2453	3173	3889	5.28	4.15	4.72

Table 37-2 Expected CAGR of Patna - Category-wise Consumption

36.5 Transmission & Distribution Losses:

T&D losses of Patna were 18.49 % in 2022-23. The target level is to bring it down to about 13.57 % and 9.7% by the end of 2027-28 & 2032-33 respectively.

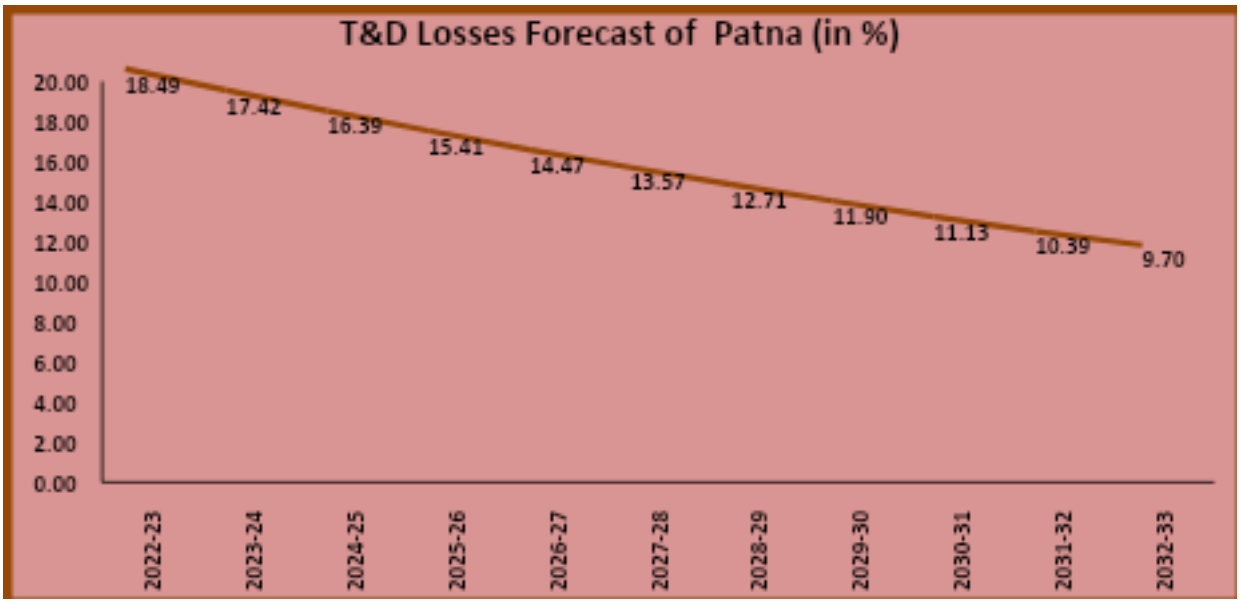

Figure 37-6 T&D Losses Forecast of Patna (in %)

36.6 Summary of power forecast of Patna city:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	3009	3671	4307	4.06	3.25
2	**Peak Demand (in MW)**	658	823	1014	4.56	4.27

3	**T&D Losses (in %)**	18	14	9.70		

Table 37-3 Power forecast summary of Patna

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Patna											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	1269	1331	1394	1458	1524	1591	1657	1724	1788	1844	1920
Commercial	496	520	545	571	598	626	657	690	725	758	784
Public lighting	38	40	41	43	45	47	49	51	54	56	58
Public Water Works	27	27	28	28	28	29	29	29	30	30	30
Irrigation	4	4	4	5	5	5	5	5	5	5	5
LT Industries	76	77	77	78	79	79	80	80	80	79	79
HT Industries	544	585	637	690	743	796	848	907	939	970	1012
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	0	0	0	0	0	0	0	0	0	0	0
Others (if Any)	0	0	0	0	0	0	0	0	0	0	0
Total (Energy Consumption)	2453	2582	2726	2873	3022	3173	3325	3486	3620	3741	3890
T&D losses -MU	556	545	534	523	511	498	484	471	453	434	418
T&D losses -in %	18.49	17.42	16.39	15.41	14.47	13.57	12.71	11.90	11.13	10.39	9.70
Energy Requirement - MU	3009	3127	3260	3397	3534	3671	3809	3957	4074	4175	4307
Annual Load Factor - %	52.18	52.03	51.83	51.59	51.29	50.94	50.54	50.10	49.61	49.08	48.50
Peak Load - MW	658	686	718	752	786	823	860	902	937	971	1014

Table 37-4 Category-wise and Year-wise Summary

Port Blair

Chapter 37: **Port Blair**

37.1 Introduction:

Port Blair, the capital of the Andaman and Nicobar Islands, is a vibrant destination known for its stunning natural beauty and rich history.

Economy

The economy of Port Blair is primarily driven by tourism, agriculture, and fisheries. As the gateway to the Andaman and Nicobar Islands, the city attracts visitors drawn to its natural beauty and historical significance. Agriculture plays a role, with local farmers cultivating crops like rice, fruits, and spices, while fishing is vital for both sustenance and commerce.

Climate:

Port Blair has a tropical climate with warm temperatures and high humidity year-round. Summer (March to May) sees temperatures between 25°C and 35°C. The monsoon season (June to September) brings heavy rainfall and temperatures around 24°C to 30°C. Winter (October to February) offers pleasant weather, with temperatures ranging from 20°C to 30°C

37.2 Brief description of Power Utilities:

Power distribution in Port Blair, is managed by the Andaman and Nicobar Islands Power Distribution Corporation Limited.

37.3 Existing Power Scenario:

The total electricity consumption of Port Blair in the year 2022-23 was 160 MU and with 10% T&D losses, the requirement was 178 MU. The peak demand of the city was 35 MW. The Domestic sector was the biggest consumer of electricity (54%) followed by Commercial (23%).

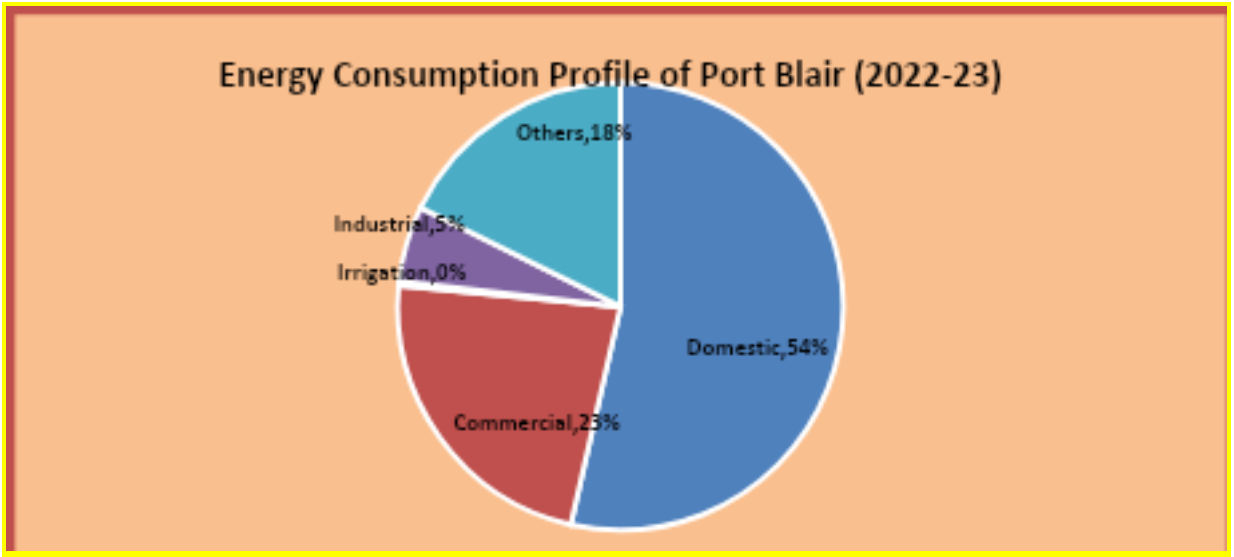

Figure 38-1 Energy Consumption Profile of Port Blair (2022-23)

On comparison of Port Blair with A&N for the year 2022-23, it is observed that the energy

requirement of Port Blair was 51.59% of the total energy requirement of the state.

2022-23	Port Blair	Andaman & Nicobar	% Share of Port Blair City
Energy in MU	178	345	51.59
Peak Demand in MW	35	61	57.38

Table 38-1 Comparison of Port Blair with A&N in 2022-23

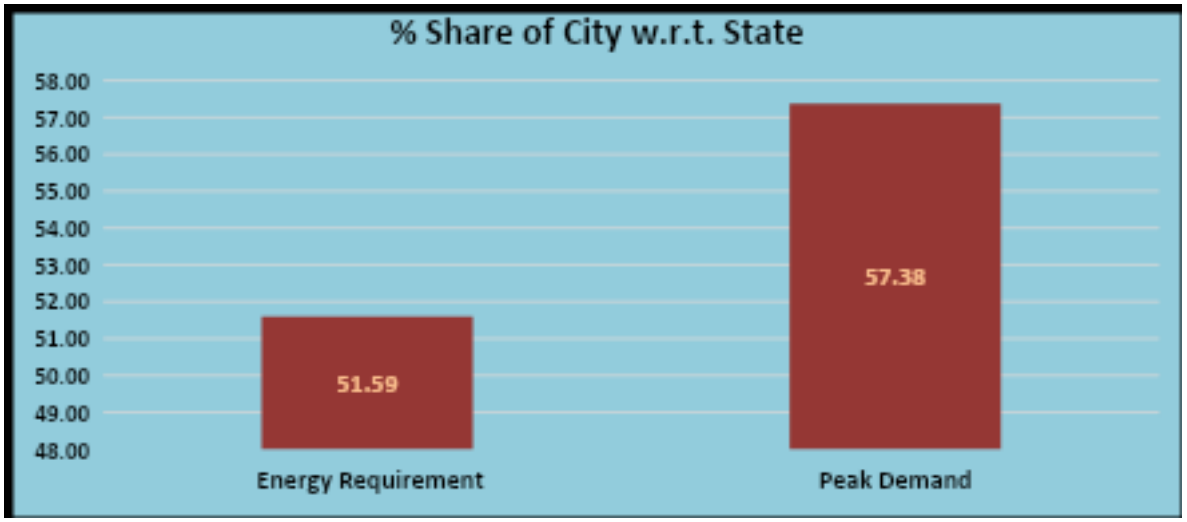

Figure 38-2 Comparison of Port Blair and A&N in the year 2022-23

37.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Port Blair was 178 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 202 MU by the year 2027-28 with a 2.52% CAGR for the period 2022-23 to 2027-28. With a CAGR of 2.14% for the period 2027-28 to 2032-33, its energy requirement is estimated as 224 MU by the year 2032-33.

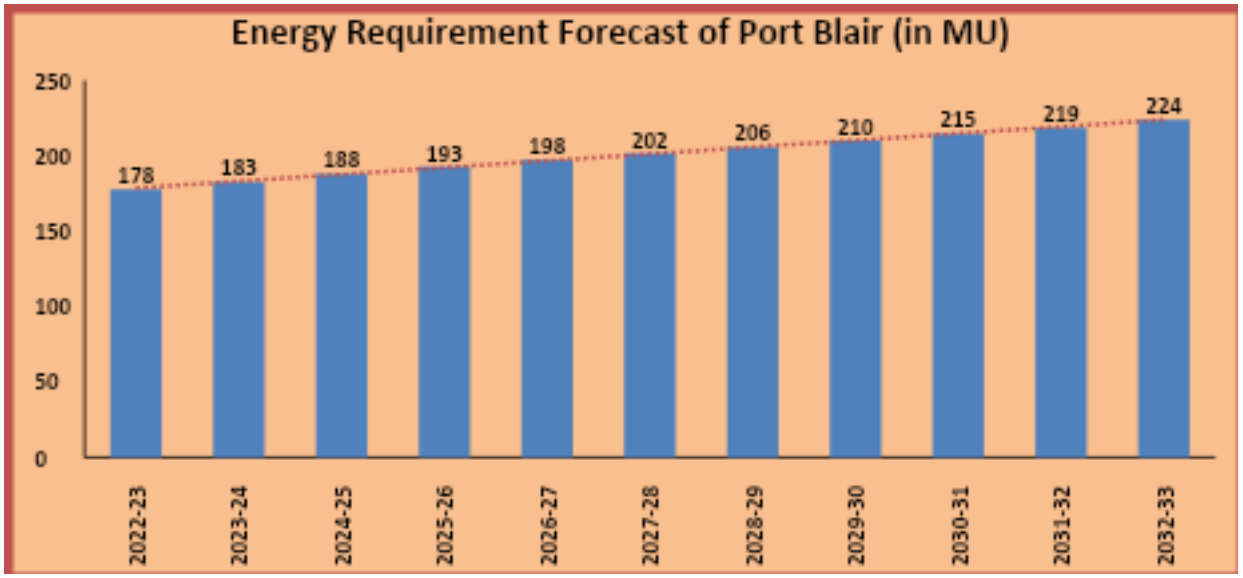

Figure 38-3 Energy Requirement Forecast of Port Blair (in MU)

Peak Demand of Port Blair is expected to see 2.0% CAGR upto 2027-28 and will reach 39 MW in

comparison to 35 MW in year 2022-23. It is expected to reach 43 MW in year 2032-33 with a CAGR of 2.13 % after 2027- 28.

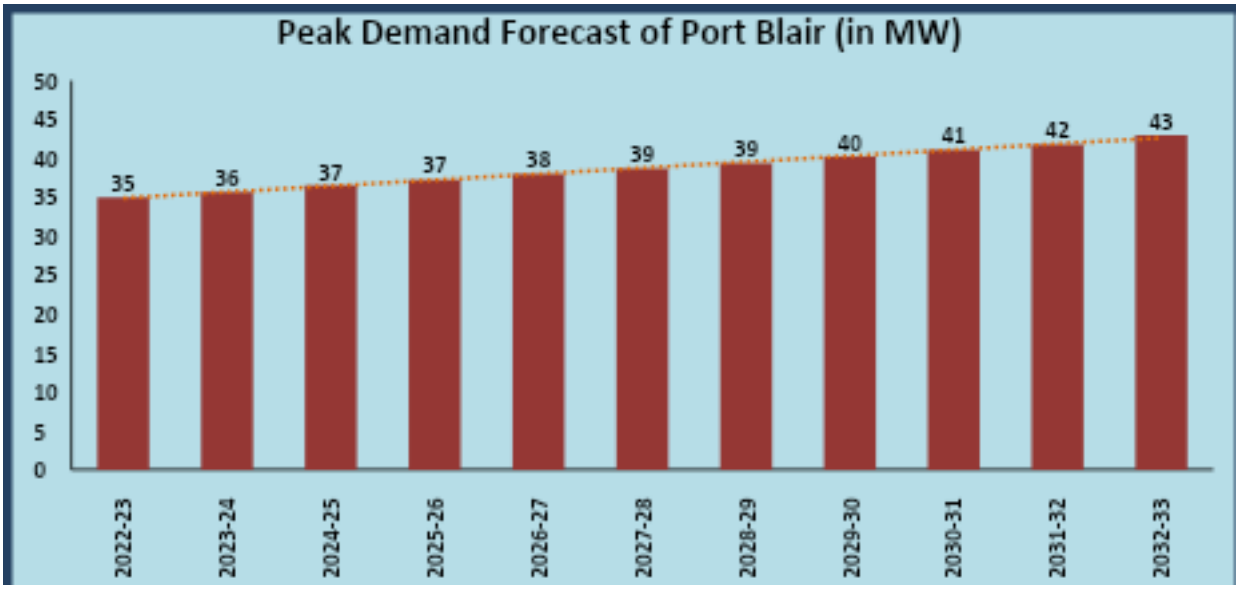

Figure 38-4 Peak Demand Forecast of Port Blair (in MW)

The category-wise energy consumption forecast of Port Blair are as follows:

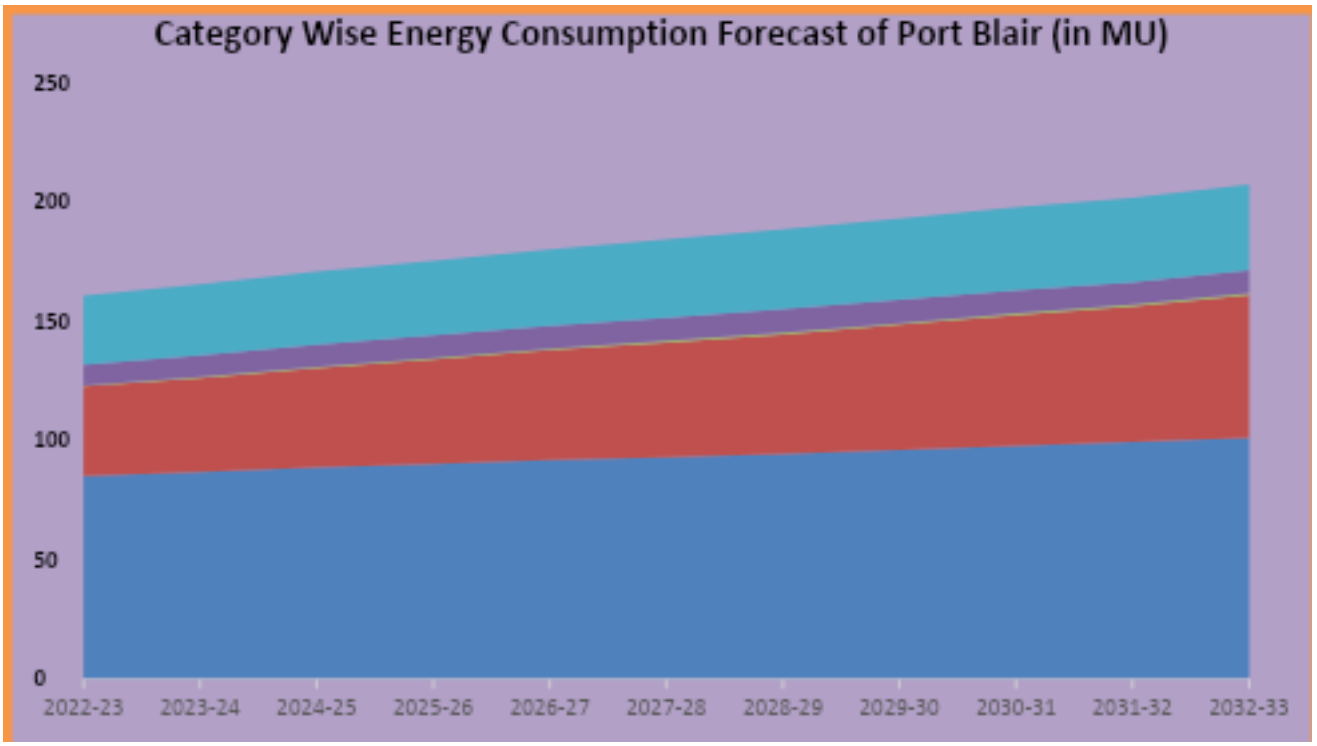

Figure 38-5 Category-wise Energy Consumption Forecast of Port Blair (in MU)

The category-wise CAGR expected in energy is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	**Domestic**	85	93	101	1.79	1.69	1.74
2	**Commercial**	37	48	60	5.10	4.44	4.77
3	**Irrigation**	0	0	0	0	0	0
4	**Industrial**	9	10	10	2.27	-0.49	0.88
5	**Others**	29	33	36	2.48	1.99	2.24
6	**Total**	160	184	206	2.76	2.32	2.54

Table 38-2 Expected CAGR of Port Blair - Category-wise Consumption

37.5 Transmission & Distribution Losses:

T&D losses of Port Blair were 9.87% in 2022-23. The target level is to bring it down to about 8.81% and 7.66% by the end of 2027-28 & 2032-33 respectively.

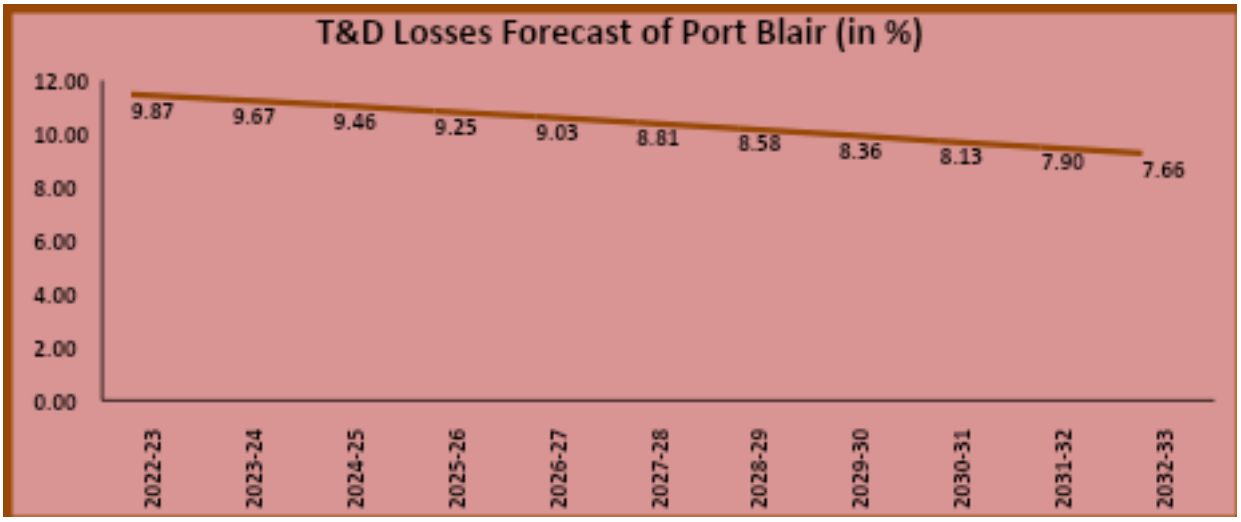

Figure 38-6 T&D Losses Forecast of Port Blair (in %)

37.6 Summary of forecast of Port Blair city:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in%)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	178	202	224	2.52	2.14
2	**Peak Demand (in MW)**	35	39	43	2.00	2.13
3	**T&D Losses (in %)**	10	9	7.66		

Table 38-3 Power forecast summary of Port Blair

****

Port Blair							
Electrical Energy Consumption, Energy Requirement and Peak Electr							
(Category-wise and Year-wise Summary)							
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028**
Domestic	85	86	88	90	91	93	94
Commercial	37	39	42	44	46	48	50
Public lighting	3	3	3	3	3	3	3
Public Water Works	0	0	0	0	0	0	0
Irrigation	0	1	1	1	1	1	1
LT Industries	9	9	9	9	10	10	10
HT Industries	0	0	0	0	0	0	0
Railway Traction	0	0	0	0	0	0	0
Bulk Supply	26	27	27	28	29	29	30
Others (if Any)	0	0	0	0	0	0	0
Total (Energy Consumption)	160	165	170	175	180	184	188
T&D losses -MU	18	18	18	18	18	18	18
T&D losses -in %	9.87	9.67	9.46	9.25	9.03	8.81	8.58
Energy Requirement - MU	178	183	188	193	198	202	206
Annual Load Factor - %	58.04	58.46	58.81	59.11	59.35	59.54	59.66
Peak Load - MW	35	36	37	37	38	39	39

Table 38-4 Category-wise and Year-wise Summary

Chapter 38: **Prayagraj**

38.1 Introduction:

Prayagraj is one of the oldest cities in India. It is crowned in ancient scriptures as ‘Prayag’ or ‘Teertharaj’ and is considered the holiest of pilgrimage centres of India. It is situated at the confluence of three rivers- Ganga, Yamuna and the invisible Saraswati.

Economy:

Prayagraj's economy is driven by agriculture, education, tourism, retail, and government services. Key sectors include religious tourism (Kumbh Mela), educational institutions, small-scale industries, and infrastructure development. The city is evolving with growth in retail, real estate, and IT services.

Climate:

Prayagraj has a tropical climate with hot summers, mild winters, and a monsoon season. Summer temperatures can exceed 45°C, while winters are cooler, averaging 7-15°C. The monsoon season brings heavy rainfall from June to September, sustaining agriculture.

38.2 Brief description of Power Utilities:

Purvanchal Vidyut Vitaran Nigam Limited is responsible for electricity distribution in Prayagraj.

38.3 Existing Power Scenario:

The total electricity consumption of Prayagraj in the year 2022-23 was 1938 MU and with 14 % T&D losses, the requirement was 2254 MU. The peak demand of the city was 548 MW. The Domestic sector was the biggest consumer of electricity (62%) followed by Industrial sector (15%).

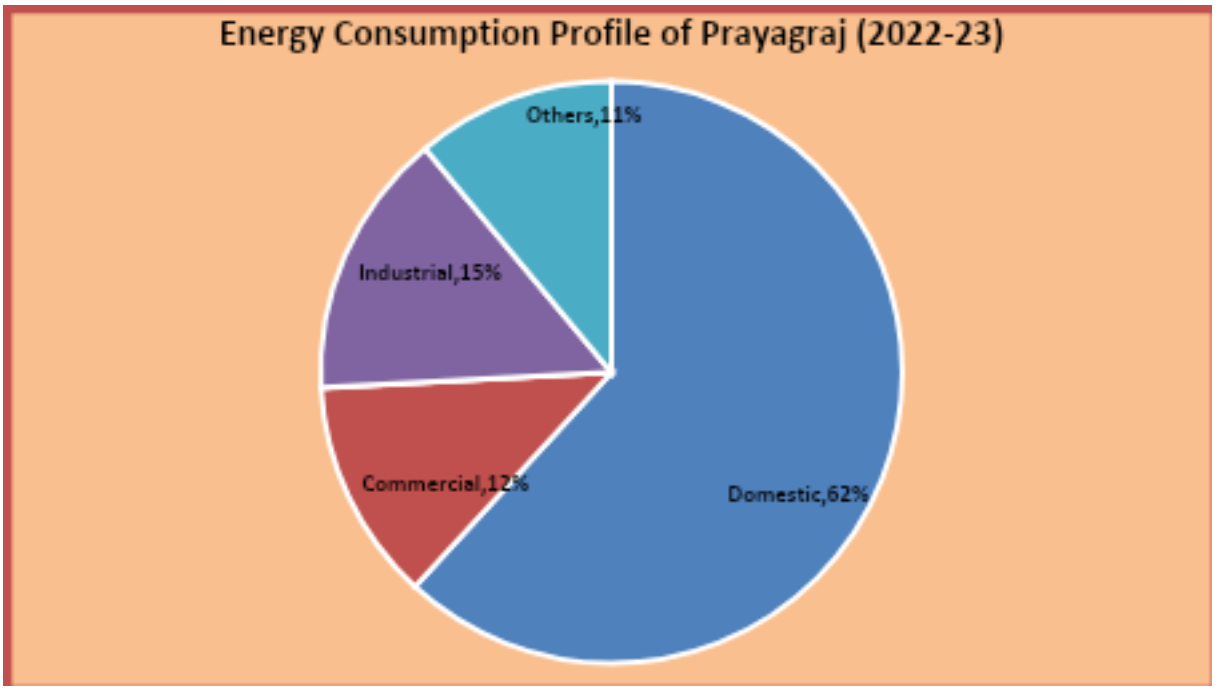

Figure 39-1 Energy Consumption Profile of Prayagraj in 2022-23.

On comparison of Prayagraj with Uttar Pradesh for the year 2022-23, it is observed that the energy requirement of Prayagraj was 5.46% of the total energy requirement of the state.

S. No	Particulars	Prayagraj	Uttar Pradesh	Prayagraj as % of Uttar Pradesh
1.	Energy Requirement (in MU)	2254	151152	1.49
2.	Peak Demand (in MW)	548	26028	2.11

Table 39-1 Comparison of Prayagraj with Uttar Pradesh in 2022-23.

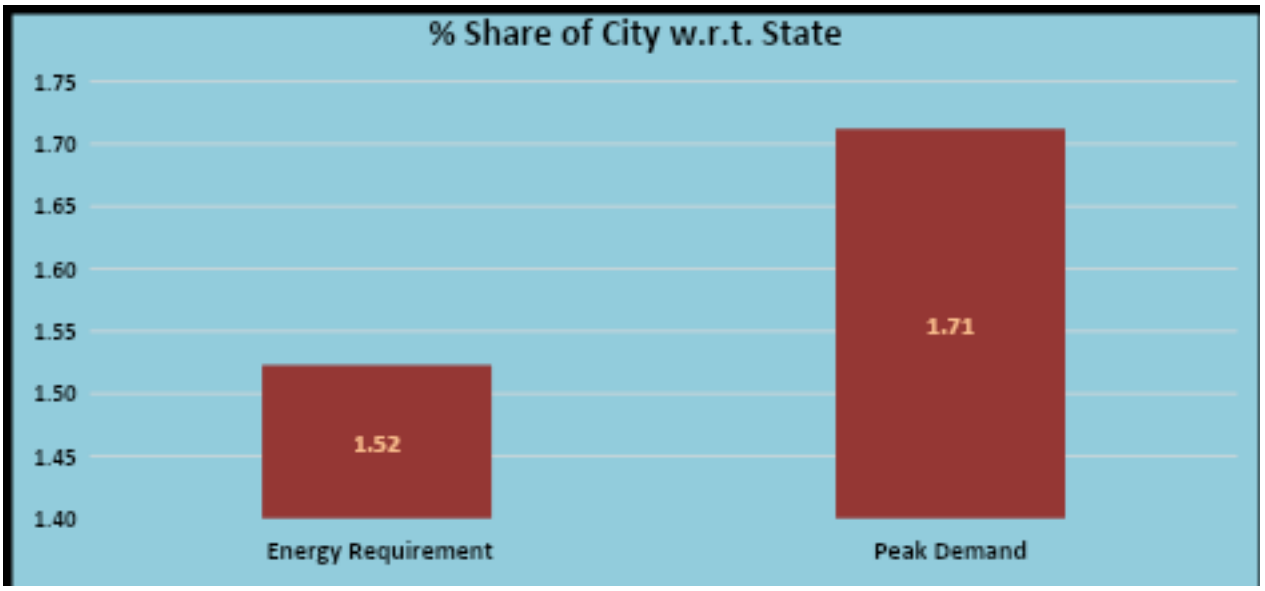

Figure 39-2 Comparison between Prayagraj and Uttar Pradesh in 2022-23.

38.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Prayagraj is estimated as 6005 MU in year 2022-23. It is expected that the energy requirement of the city will reach to 8180 MU by the year 2027-28 with 6.38% CAGR for the period 2022-23 to 2027-28. With CAGR of 5.83% for the period 2027-28 to 2032-33, its energy requirement is estimated as 10858 MU by the year 2032-33.

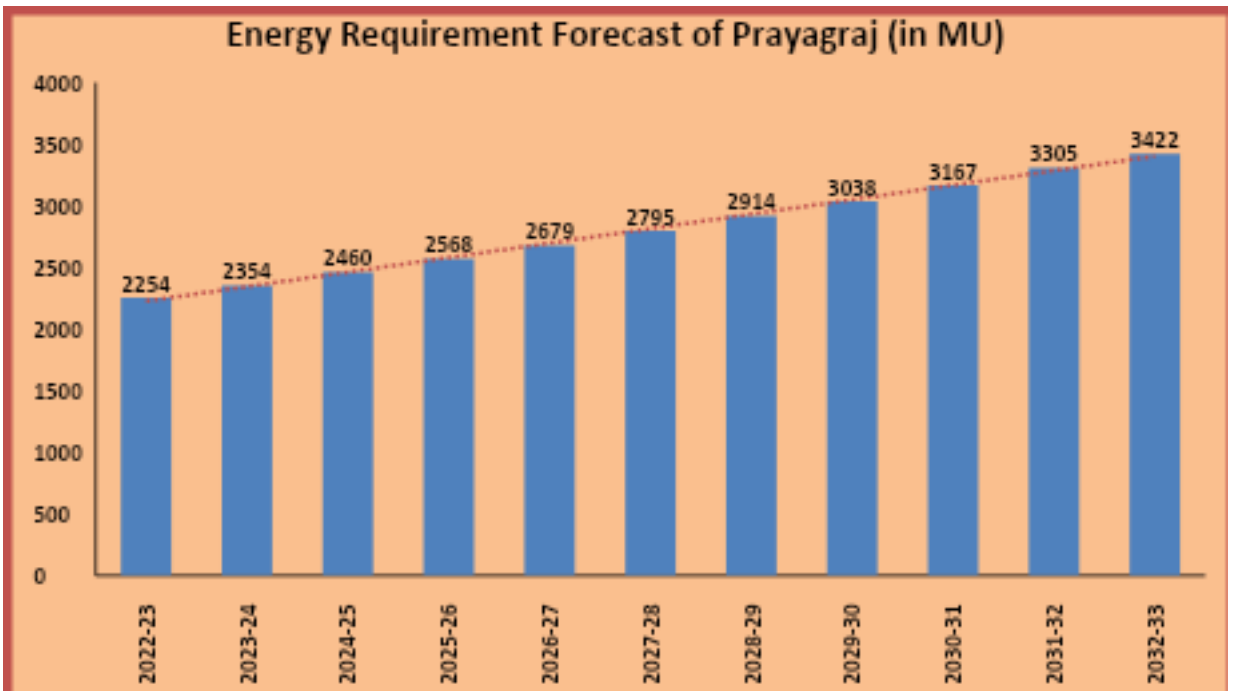

Figure 39-3 Energy Requirement Forecast of Prayagraj in MU.

Peak Demand of Prayagraj is expected to see 6.15% CAGR up to 2027-28 and will reach 1955 MW in comparison to 1450 MW in year 2022-23. It is expected to reach 2579 MW in year 2032-33 with a CAGR of 5.70% after 2024- 25.

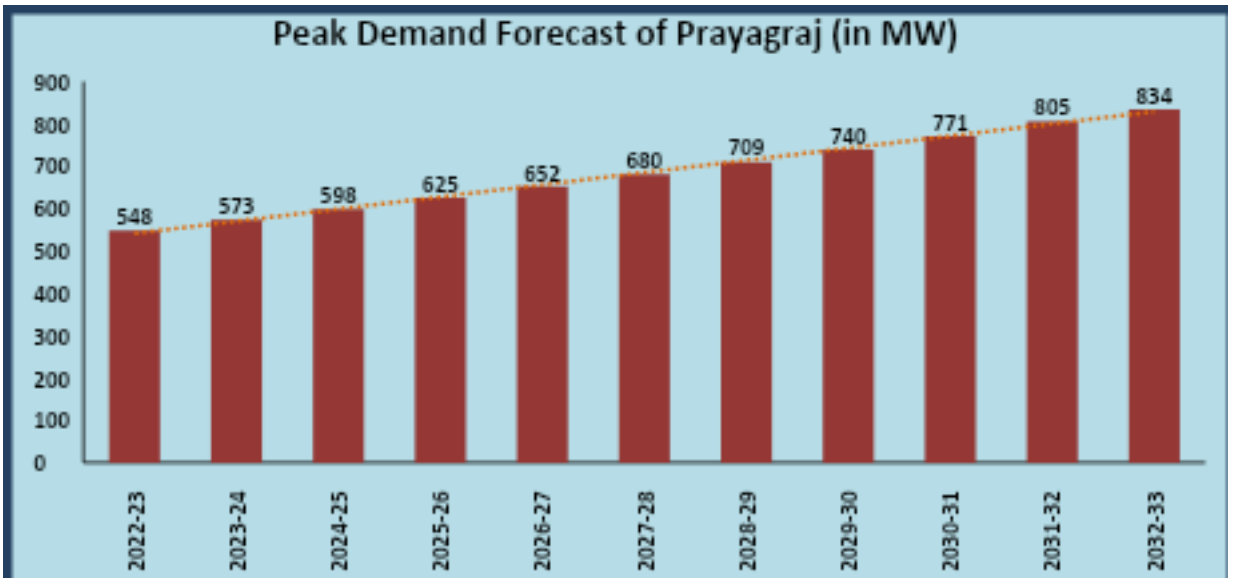

Figure 39-4 Peak Demand Forecast of Prayagraj in MW

The category-wise energy consumption forecast of Prayagraj are as follows:

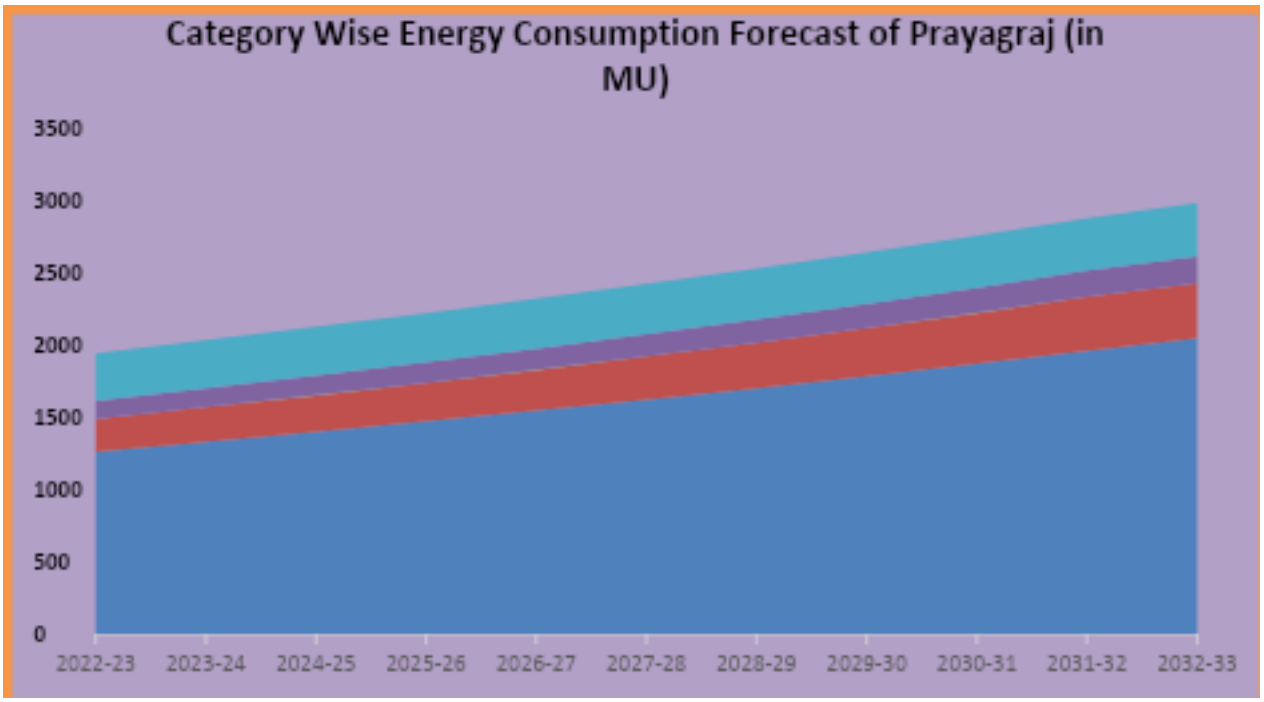

Figure 39-5 Category-wise Energy Consumption forecast of Prayagraj.

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR in %		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1.	Domestic	1258	1619	2042	5.17	4.75	4.96
2.	Commercial	226	297	379	5.60	5.01	5.30
3.	Irrigation	1	1	0	0.00	-100.00	-100.00
4.	Industrial	125	153	187	4.19	4.03	4.11
5.	Others	328	348	368	1.18	1.12	1.15
6.	Total	1938	2418	2976	4.52	4.24	4.38

Table 39-2 Expected CAGR of Prayagraj - Category-wise Consumption

38.5 Transmission & Distribution Losses:

T&D losses of Prayagraj were 14% in the year 2022-23. The target level is to bring it down to about 13.5% and 13% by the end of 2027-28 & 2032-33 respectively.

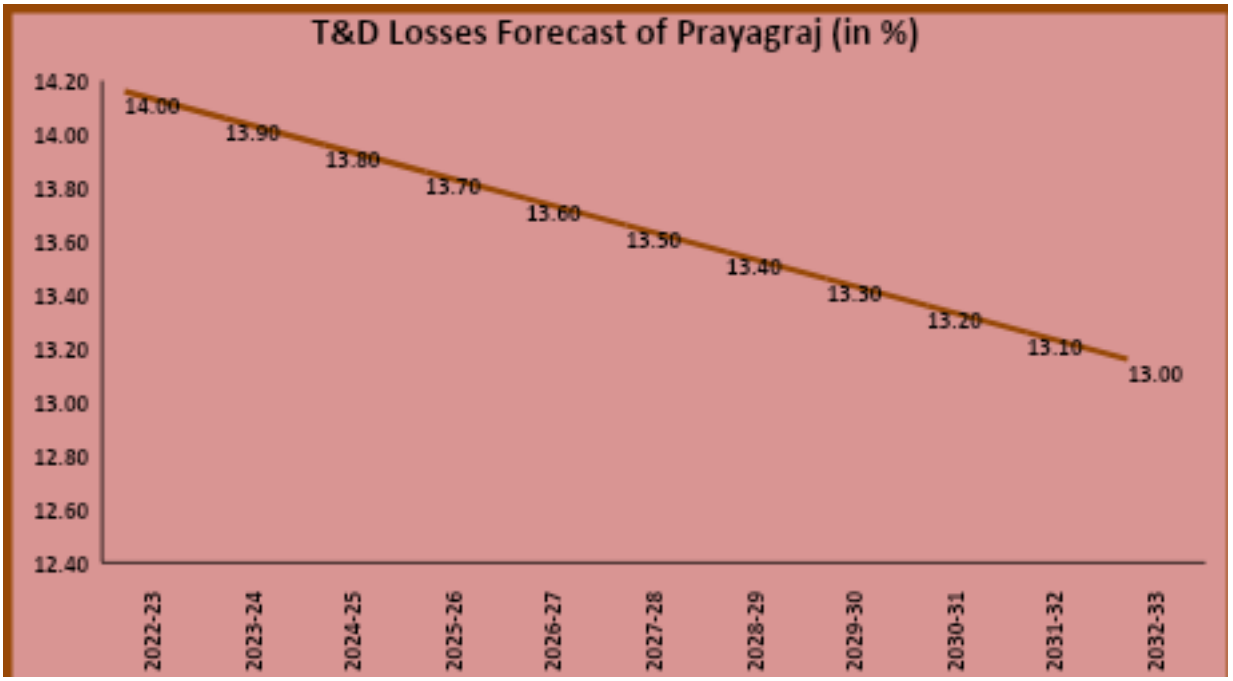

Figure 39-6 T&D Loss Forecast of Prayagraj

38.6 Summary of forecast of Lucknow city

Sl. No.	Particulars	2022-23	2027-28	2032-33	CAGR in %	
					2022-23 to 2027-28	2027-28 to 2032-33
1.	Energy Requirement in MU	2254	2795	3422	0.57%	4.40%
2.	Peak Demand in MW	548	680	834	2.07%	4.42%
3.	T&D Losses in %	14	14	13.00		

Table 39-3 Power forecast summary of Prayagraj

****

Prayagraj											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	1258	1326	1396	1468	1542	1619	1698	1780	1866	1955	2042
Commercial	226	239	252	266	281	297	314	331	350	373	379
Public lighting	53	55	57	59	61	63	65	67	69	71	73
Public Water Works	174	176	178	180	182	184	186	188	190	192	194
Irrigation	1	1	1	1	1	1	1	1	1	1	1
LT Industries	20	21	22	23	24	25	26	27	28	29	30
HT Industries	105	110	114	119	124	128	133	139	145	151	157
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	0	0	0	0	0	0	0	0	0	0	0
Others (if Any)	101	101	101	101	101	101	101	101	101	101	101
Total (Energy Consumption)	1938	2027	2120	2216	2315	2418	2524	2634	2749	2872	2977
T&D losses -MU	316	327	339	352	364	377	390	404	418	433	445
T&D losses -in %	14.00	13.90	13.80	13.70	13.60	13.50	13.40	13.30	13.20	13.10	13.00
Energy Requirement - MU	2254	2354	2460	2568	2679	2795	2914	3038	3167	3305	3422
Annual Load Factor - %	46.95	46.94	46.93	46.92	46.91	46.90	46.89	46.88	46.87	46.86	46.85
Peak Load - MW	548	573	598	625	652	680	709	740	771	805	834

Table 39-4 Category-wise and Year-wise Summary of Prayagraj

Pune

Chapter 39: **Pune**

39.1 Introduction:

Pune is a city in Maharashtra State in the Deccan Plateau in Western India.

Economy:

Pune is a well-known manufacturing and industrial center of India. The city serves as headquarters to many companies. Major industrial areas around Pune are Chakan, Chinchwad, Bhosari, Pirangut, Hinjawadi, Telegaon, Talawade. The city is known for its automotive industry. A large number of automobile companies such as Bajaj Auto, tata Motors, Mahindra & Mahindra, Land Rover and Fiat etc. have their manufacturing plants in Chakan. Serum Institute of India, the world's fifth largest vaccine producer by volume, is based in Pune. The Rajiv Gandhi Infotech Park in Hinjawadi encompasses an area of about 2,800 acres (11 km2) and is home to over 800 IT companies and the IT sector employed more than 300,000 people.

Climate:

Pune has a tropical wet dry climate, closely bordering upon a hot semi-arid climate with average temperatures ranging between 20 and 28 °C. Typical summer months are from mid-March to mid-June, with maximum temperatures sometimes reaching 42 °C. The warmest month in Pune is May. The monsoon lasts from June to October, with moderate rainfall and temperatures ranging from 22 to 28 °C. For most of December and January the daytime temperature hovers around 29 °C, while overnight temperatures are below 12 °C.

39.2 Brief description of Power Utilities:

MSEDCL (Maharashtra State Electricity Distribution Company Limited) is responsible for electricity distribution in Pune.

39.3 Existing Power Scenario:

The total electricity consumption of Pune in the year 2022-23 was 9260 MU and with 11.93% T&D losses, the requirement was 10515 MU. The peak demand of the city was 2099 MW. The Domestic sector was the biggest consumer of electricity (36%) followed by Industrial (35%) & commercial (15%).

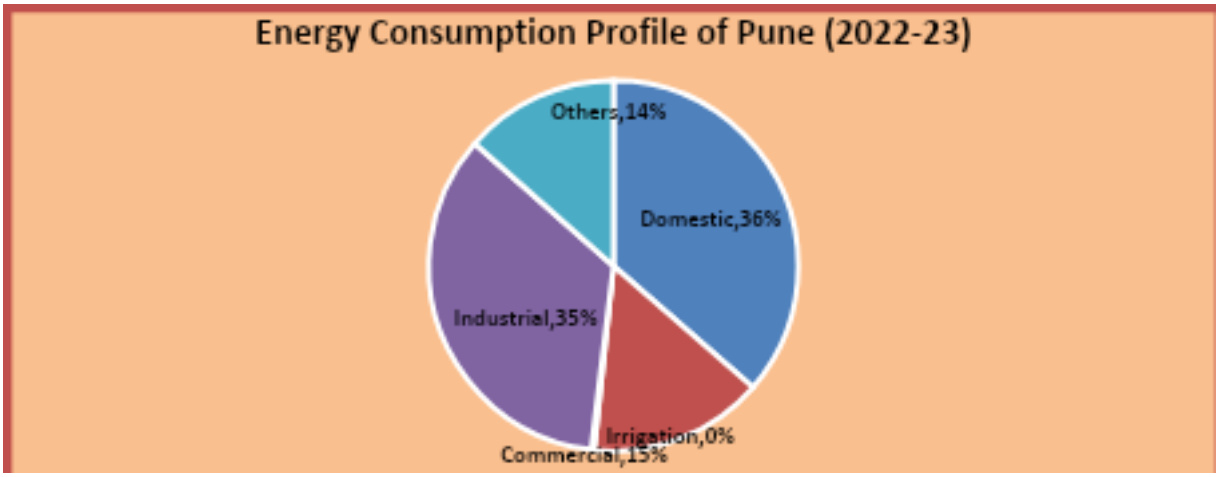

Figure 40-1 Energy Consumption Profile of Pune (2022-23)

In a comparison of Pune City with Maharashtra for the year 2022-23, it is observed that the energy requirement of Pune was 5.78% of the total energy requirement of the state.

2022-23	Pune City	Maharashtra	% Share of Pune City
Energy in MU	10515	183777	5.72
Peak Demand in MW	2099	30203	6.95

Table 40-1 Comparison of Pune with Maharashtra in 2022-23

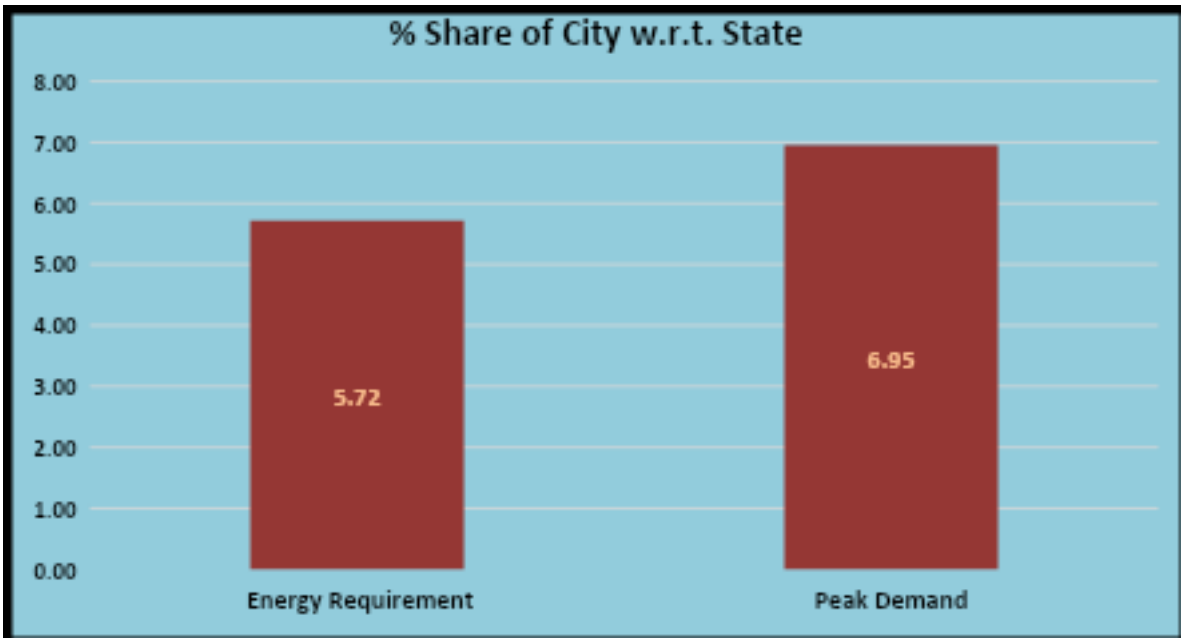

Figure 40-2 Comparison of Pune with Maharashtra in 2022-23.

39.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Pune was 10515 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 12536 MU by the year 2027-28 with a 3.58% CAGR for the period 2022-23 to 2027-28. With a CAGR of 3.34% for the period 2027-28 to 2032-33, its energy requirement is estimated as 14774 MU by the year 2032-33.

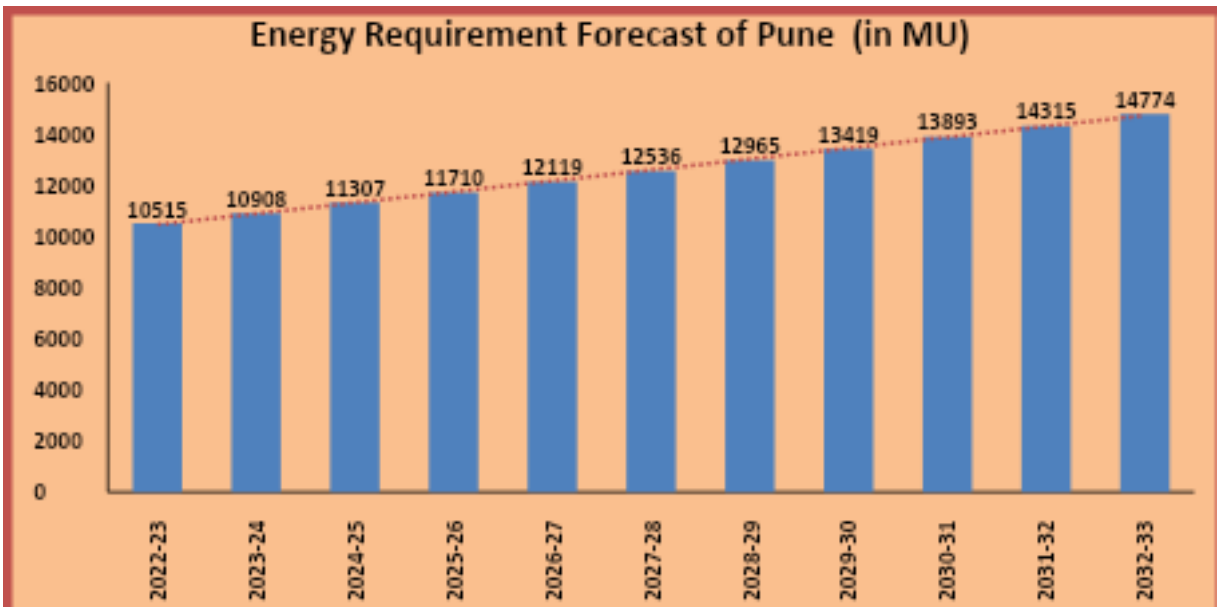

Figure 40-3 Energy Requirement Forecast of Pune (in MU)

Peak Demand of the Pune is expected to see 5.10% CAGR upto 2027-28 and will reach 2692 MW in comparison to 2099 MW in the year 2022-23. It is expected to reach 3414 MW in the year 2032-33 with a CAGR of 4.86% after 2027-28.

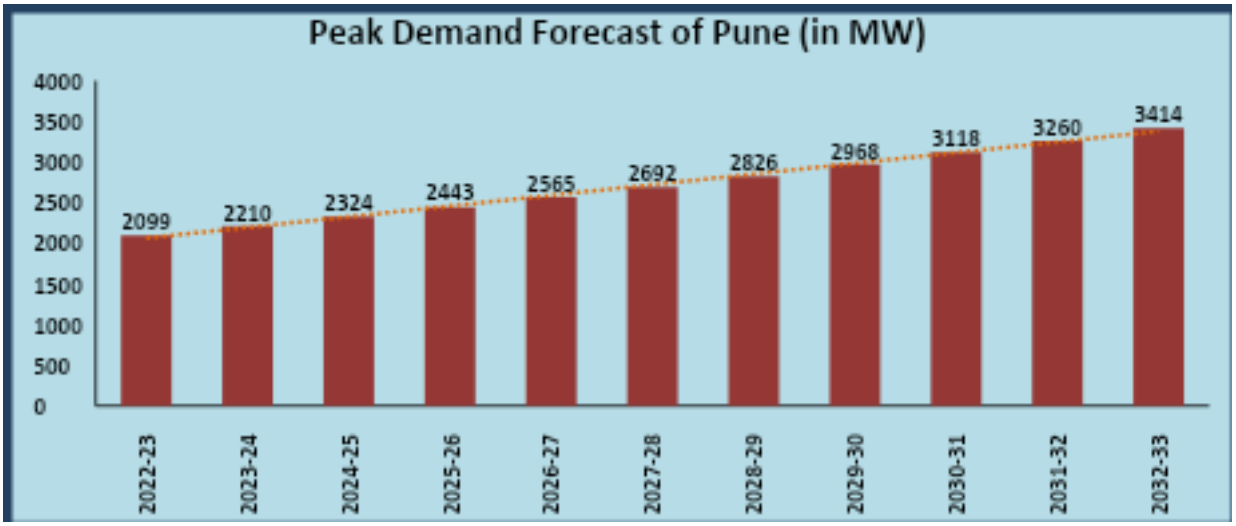

Figure 40-4: Peak Demand Forecast of Pune (in MW)

The category-wise energy consumption forecast of Pune are as follows:

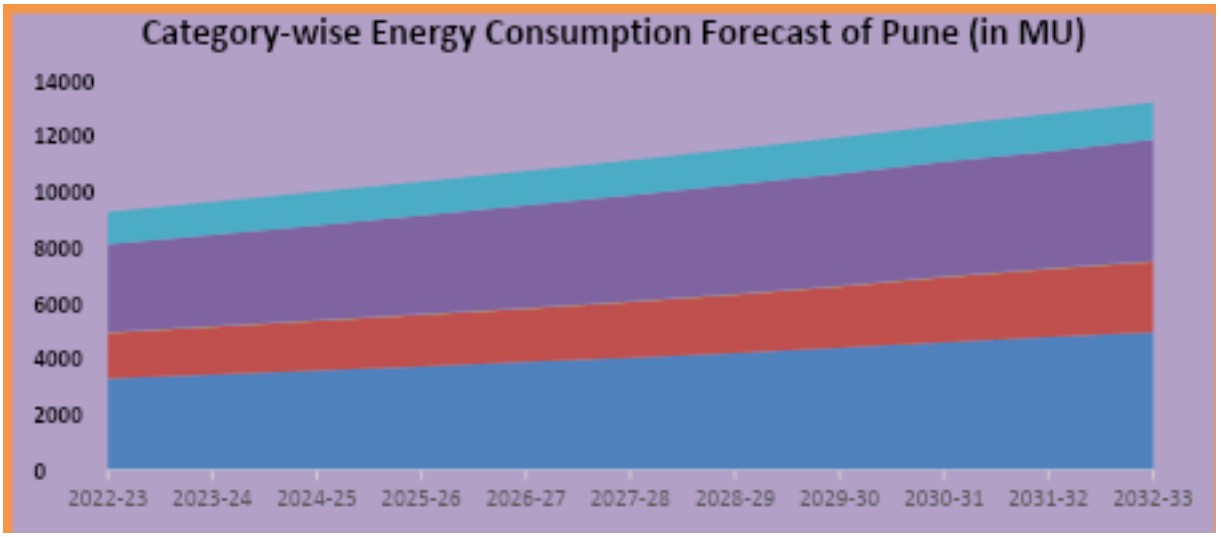

Figure 40-5: Category-wise Energy Consumption Forecast of Pune (in MU)

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	**Domestic**	3285	4023	4940	4.14	4.19	4.17
2	**Commercial**	1631	2017	2532	4.34	4.65	4.49
3	**Irrigation**	23	23	23	0.00	0.00	0.00
4	**Industrial**	3170	3805	4373	3.72	2.82	3.27
5	**Others**	1152	1263	1352	1.86	1.37	1.61
6	**Total**	**9260**	**11131**	**13219**	**3.75**	**3.50**	**3.62**

Table 40-2 Expected CAGR of Pune Category-wise Consumption

39.5 Transmission & Distribution Losses:

T&D losses of Pune were 11.93% in year 2022-23. The target level is to bring it down to about 11.20% and 10.52% by the end of 2027-28 & 2032-33 respectively.

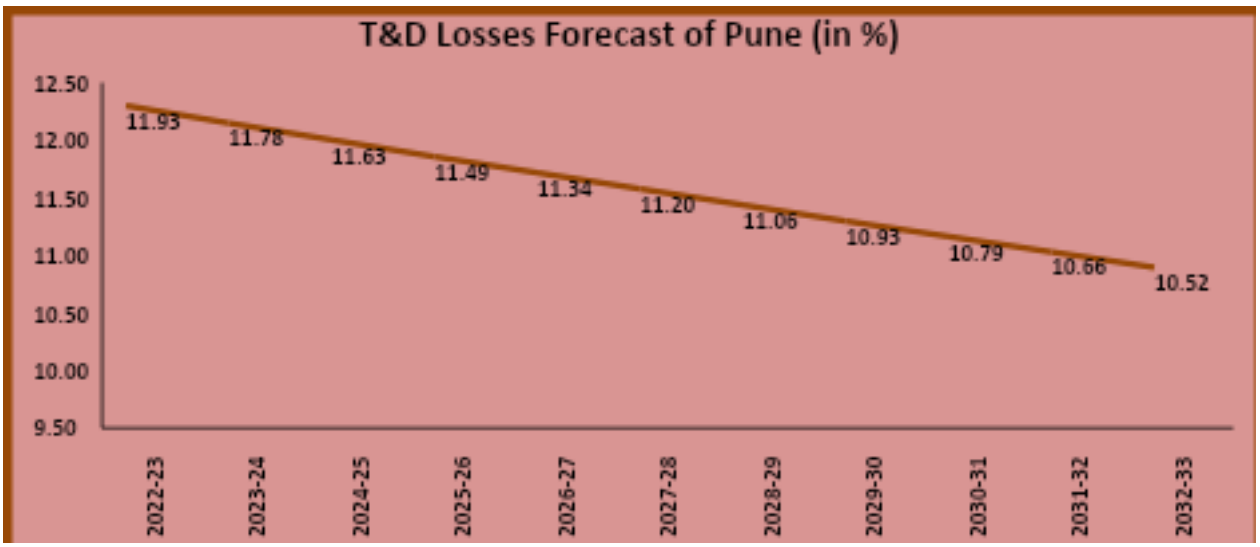

Figure 40-6: T&D Losses Forecast of Pune (in %)

39.6 Summary of power forecast of Pune city:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in%)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	10515	12536	14774	3.58	3.34
2	**Peak Demand (in MW)**	2099	2692	3414	5.10	4.86
3	**T&D Losses (in %)**	12	11	10.52		

Table 40-3 Power forecast summary of Pune

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Pune											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	3285	3425	3568	3715	3866	4023	4191	4374	4583	4775	4940
Commercial	1631	1703	1776	1852	1932	2017	2110	2214	2335	2450	2532
Public lighting	92	93	94	95	96	97	98	99	100	100	101
Public Water Works	374	383	391	400	409	417	425	432	440	447	453
Irrigation	23	23	23	23	23	23	23	23	23	23	23
LT Industries	841	897	955	1015	1076	1139	1202	1265	1326	1384	1474
HT Industries	2329	2400	2471	2539	2605	2666	2722	2775	2807	2822	2899
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	381	390	399	407	416	424	432	440	448	455	462
Others (if Any)	306	310	314	318	321	324	327	330	332	334	336
Total (Energy Consumption)	**9260**	**9623**	**9992**	**10365**	**10744**	**11131**	**11531**	**11953**	**12394**	**12790**	**13219**
T&D losses -MU	1254	1285	1315	1345	1375	1404	1434	1466	1499	1525	1555
T&D losses -in %	11.93	11.78	11.63	11.49	11.34	11.20	11.06	10.93	10.79	10.66	10.52
Energy Requirement - MU	**10515**	**10908**	**11307**	**11710**	**12119**	**12536**	**12965**	**13419**	**13893**	**14315**	**14774**
Annual Load Factor - %	57.18	56.35	55.53	54.73	53.93	53.15	52.38	51.62	50.87	50.13	49.41
Peak Load - MW	**2099**	**2210**	**2324**	**2443**	**2565**	**2692**	**2826**	**2968**	**3118**	**3260**	**3414**

Table 40-4 Category-wise and Year-wise Summary of Pune.

Raipur

Chapter 40: **Raipur**

40.1 Introduction:

Raipur is the capital city of Chhattisgarh. It was a part of Madhya Pradesh before the state of Chhattisgarh was formed on 1 November 2000.

Economy:

Being the capital city of Chhattisgarh Raipur has attracted large amounts of industrial development. It is abundantly rich in mineral resources, and is among the biggest producers of steel and iron in the country. In addition, Raipur also has over 800 rice milling plants. JSW Steel has a steel plant in Raipur. Grasim Industries operates a cement plant at Rewan in Raipur. Ambuja Cement has a plant in Bhatapara. In addition, Raipur has a large chemical plant which produces and supplies formalin all throughout the country.

Climate:

Raipur has a tropical wet and dry climate. Temperatures remain moderate throughout the year, except from March to June, which can be extremely hot. The temperature in April–May sometimes rises above 48 °C. These summer months also have dry and hot winds. The city receives about 1,300 mm of rain, mostly in the monsoon season from late June to early October. Winters last from November to January and are mild, although lows can fall to 5 °C making it reasonably cold.

40.2 Brief description of Power Utilities:

Chhattisgarh State Power Distribution Company Limited (CSPDCL) is responsible for distribution of electricity in Raipur.

40.3 Existing Power Scenario:

The total electricity consumption of Raipur in the year 2022-23 was 7466 MU and with 5.59% T&D losses, the requirement was 7909 MU. The peak demand of the city was 1376 MW. The Industrial sector was the biggest consumer of electricity (79%) followed by Domestic (15%) & Commercial (4%).

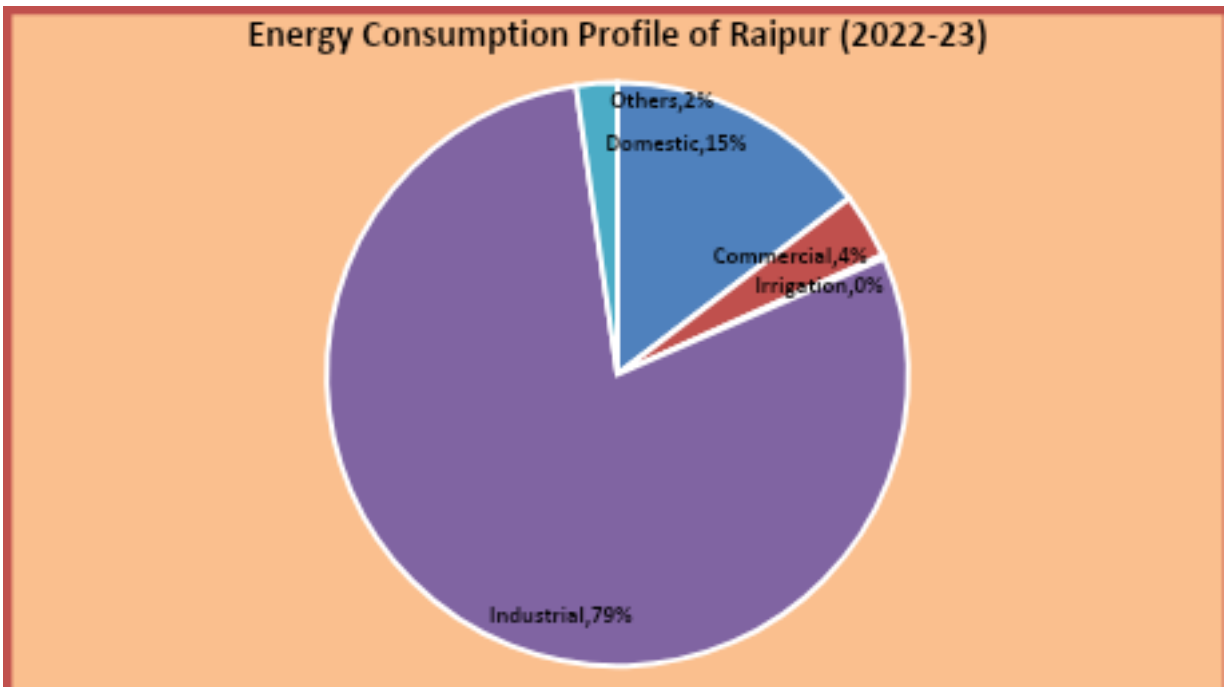

Figure 41-1: Energy Consumption Profile of Raipur (2022-23)

In a comparison of Raipur City with Chhattisgarh for the year 2022-23, it is observed that the energy requirement of Raipur was 22.02% of the total energy requirement of the state.

2022-23	Raipur City	Chhattisgarh	% Share of Raipur City
Energy in MU	7909	36260	21.81
Peak Demand in MW	1376	5358	25.68

Table 41-1 Comparison of Raipur with Chhattisgarh in 2022-23

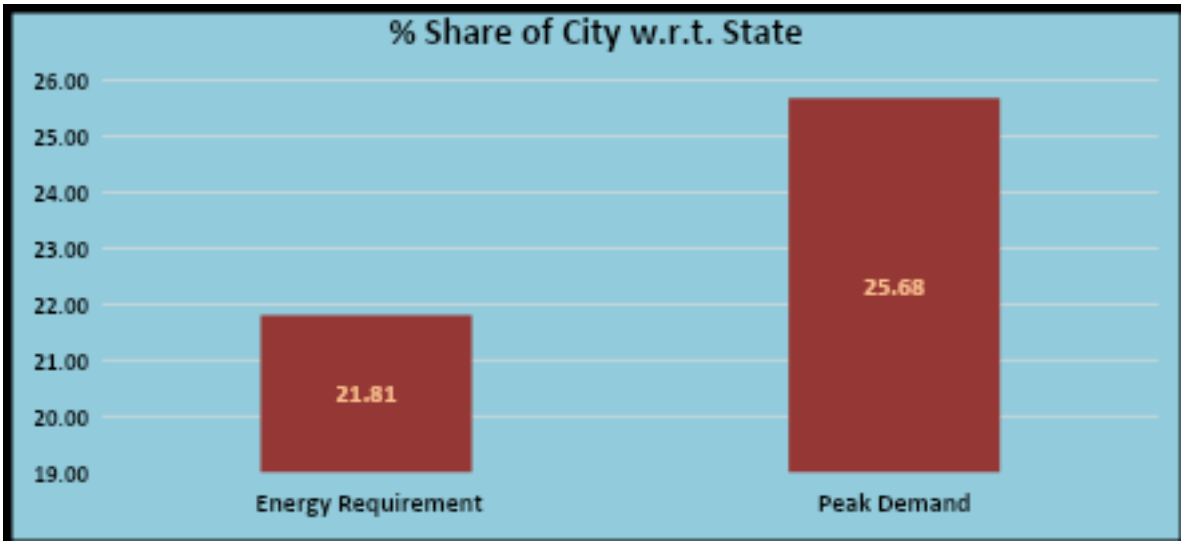

Figure 41-2: Comparison of Raipur with Chhattisgarh in 2022-23

40.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Raipur was 7909 MU in the year 2022-23. It is expected that the energy requirement of the city will

reach to 12782 MU by the year 2027-28 with a 10.08% CAGR for the period 2022-23 to 2027-28. With a CAGR of 9.80% for the period 2027-28 to 2032-33, its energy requirement is estimated as 20400 MU by the year 2032-33.

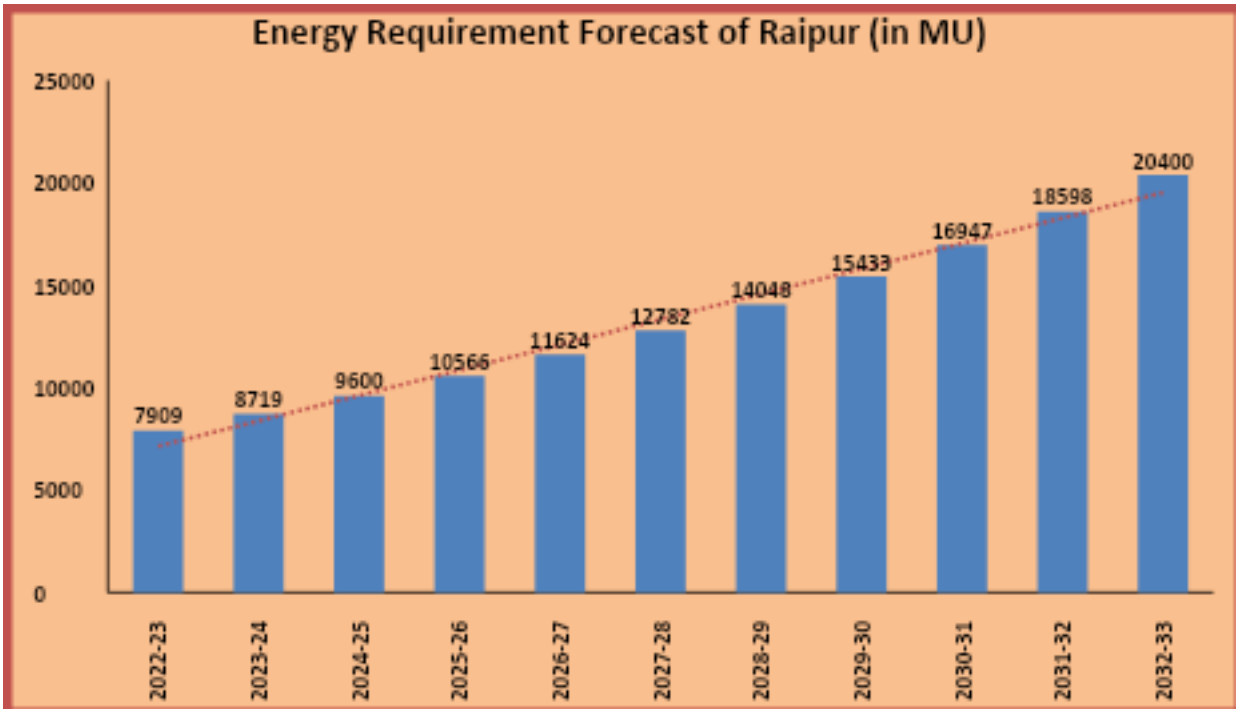

Figure 41-3 Energy Requirement Forecast of Raipur (in MU)

Peak Demand of the Raipur is expected to see 8.66% CAGR upto 2027-28 and will reach 2085 MW in comparison to 1376 MW in the year 2022-23. It is expected to reach 3120 MW in the year 2032-33 with a CAGR of 8.39% after 2027-28.

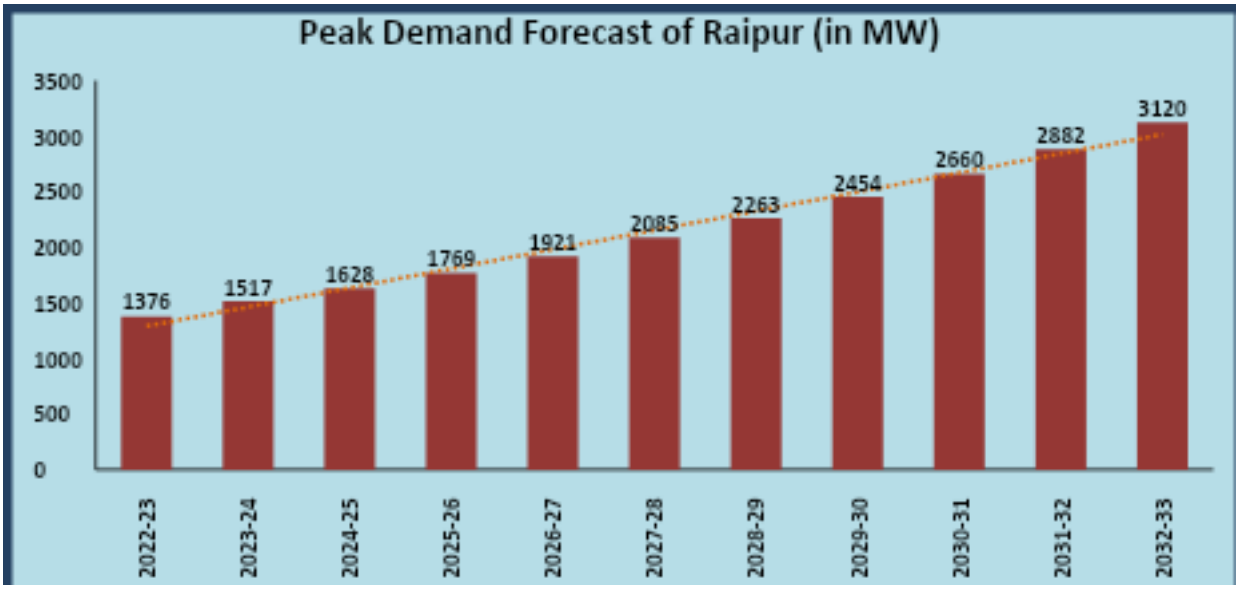

Figure 41-4: Peak Demand Forecast of Raipur (in MW)

The category-wise energy consumption forecast of Raipur are as follows:

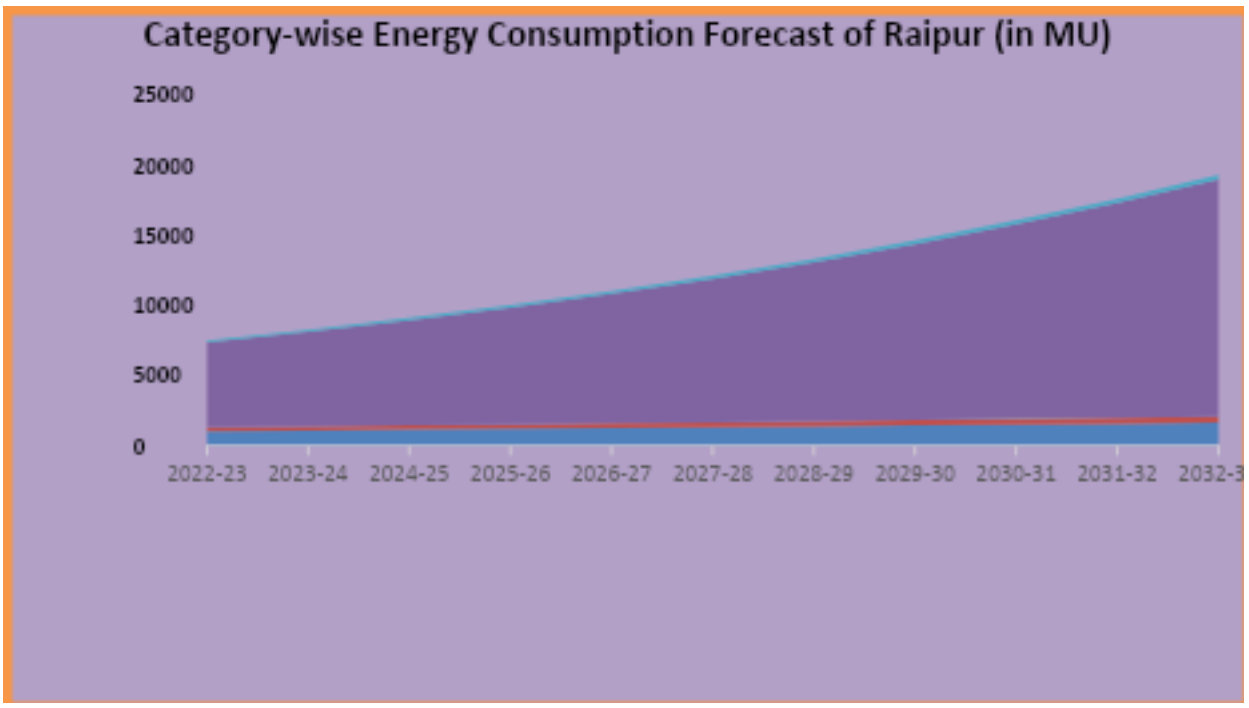

Figure 41-5: Category-wise Energy Consumption Forecast of Raipur (in MU)

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	**Domestic**	993	1265	1572	4.96	4.44	4.70
2	**Commercial**	249	337	444	6.22	5.70	5.96
3	**Irrigation**	12	13	15	2.20	2.14	2.17
4	**Industrial**	6045	10223	16910	11.08	10.59	10.83
5	**Others**	166	228	318	6.50	6.87	6.68
6	**Total**	**7466**	**12067**	**19260**	**10.08**	**9.80**	**9.94**

(Table 41-2 Expected CAGR of Raipur - Category-wise Consumption)

40.5 Transmission & Distribution Losses:

T&D losses of Raipur were 5.59% in year 2022-23. The target is to maintain T&D losses around this level.

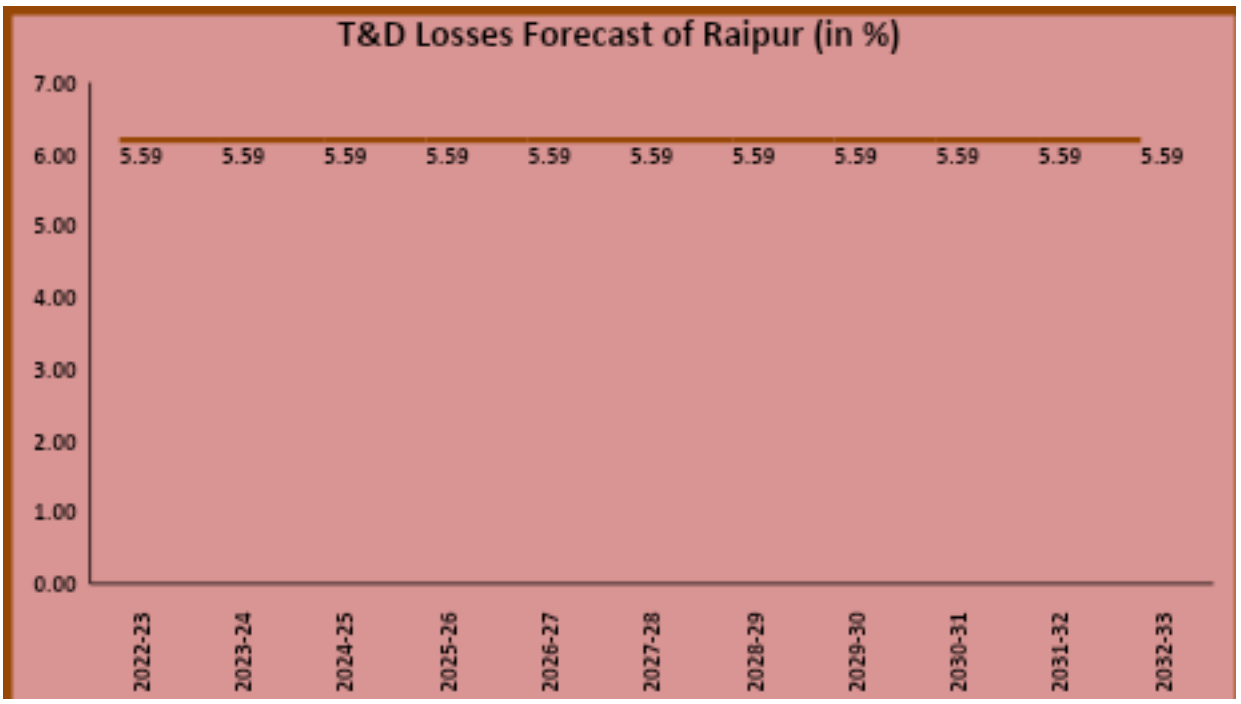

Figure 41-6 T&D Losses Forecast of Raipur (in %)

40.6 Summary of power forecast of Raipur city:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	Energy Requirement (in MU)	7909	12782	20400	10.08	9.80
2	Peak Demand (in MW)	1376	2085	3120	8.66	8.39
3	T&D Losses (in %)	5.59	5.59	5.59		

Table 41-3 Power forecast summary of Raipur

****

Raipur											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	993	1045	1098	1152	1208	1265	1324	1384	1446	1508	1572
Commercial	249	265	282	299	318	337	357	377	399	421	444
Public lighting	31	35	40	46	52	59	68	77	88	100	113
Public Water Works	8	9	9	10	11	11	12	13	14	14	15
Irrigation	12	12	13	13	13	13	14	14	14	14	15
LT Industries	109	114	118	123	129	134	139	144	149	155	160
HT Industries	5937	6618	7363	8186	9092	10089	11186	12391	13713	15163	16750
Railway Traction	114	120	125	131	137	143	150	156	163	169	176
Bulk Supply	0	0	0	0	0	0	0	0	0	0	0
Others (if Any)	14	14	14	14	14	14	14	14	14	14	14
Total (Energy Consumption)	7466	8231	9063	9975	10973	12067	13263	14570	15999	17558	19259
T&D losses -MU	442	488	537	591	650	715	786	863	948	1040	1141
T&D losses -in %	5.59	5.59	5.59	5.59	5.59	5.59	5.59	5.59	5.59	5.59	5.59
Energy Requirement - MU	7909	8719	9600	10566	11624	12782	14048	15433	16947	18598	20400
Annual Load Factor - %	65.59	65.59	67.31	68.18	69.07	69.97	70.88	71.80	72.73	73.68	74.64
Peak Load - MW	1376	1517	1628	1769	1921	2085	2263	2454	2660	2882	3120

Table 41-4 Category-wise and Year-wise Summary of Raipur.

Ranchi

Chapter 41: **Ranchi**

41.1 Introduction:

Ranchi is the capital of the Indian state of Jharkhand, and now it is the most populous city of the state.

Economy:

Ranchi is an important center of trade & commerce and also an important industrial center in Jharkhand. Due to the presence of good reserves of forest and mineral resources is considered to be a good place for setting up medium and large scale industries. A large number of engineering & mining industries present in the city provide employment opportunities to a major portion of its population.

Climate:

The average annual maximum temp. is 29.6^0 C. The average annual minimum temp. is 18^0 C. The average annual rainfall of the city is 143.3 cm.

41.2 Brief description of Power Utilities:

Jharkhand Bijli Vitran Nigam Limited (JBVNL) - A subsidiary of JUVNL, JBVNL specifically focuses on the distribution of electricity in Ranchi.

Damodar Valley Corporation (DVC): A central public sector enterprise that generates and transmits electricity in parts of Jharkhand, including some areas around Ranchi.

41.3 Existing Power Scenario:

The total electricity consumption of Ranchi in the year 2022-23 was 1399MU and with 19% T&D losses, the requirement was 1720 MU. The peak demand of the city was 407MW. The Domestic sector was the biggest consumer of electricity (78%) followed by Industrial (9%) & Commercial (8%).

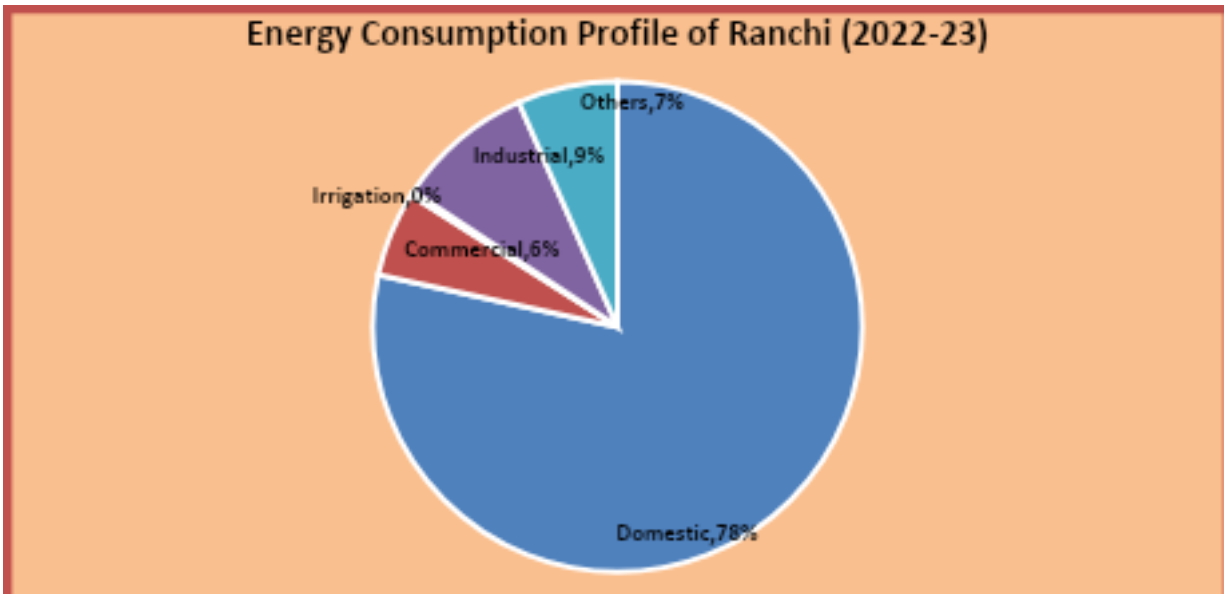

Figure 42-1 Energy Consumption Profile of Ranchi (2022-23)

On comparison of Ranchi with Jharkhand for the year 2022-23, it is observed that the energy requirement of Ranchi was 8.94 % of the total energy requirement of the state.

2022-23	Ranchi City	Jharkhand	% Share of Ranchi City
Energy in MU	1720	19242	8.94
Peak Demand in MW	407	2994	13.59

Table 42-1 Comparison of Ranchi and Jharkhand in the year 2022-23

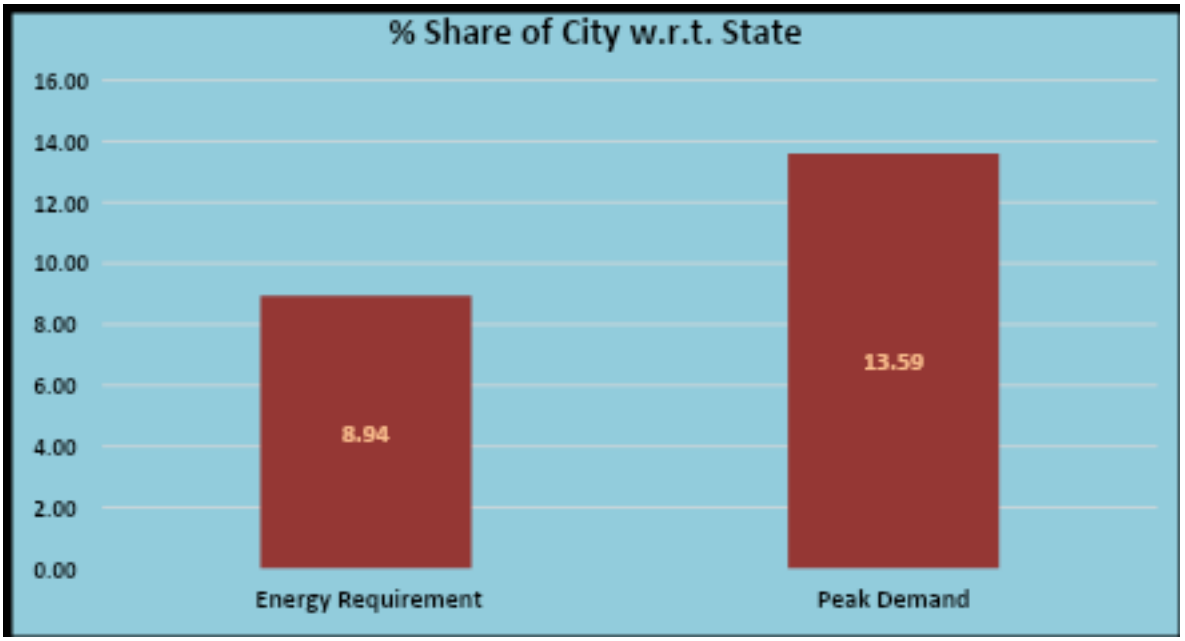

Figure 42-2 Comparison of Ranchi and Jharkhand in the year 2022-23.

41.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Raipur was 1720MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 2143MU by the year 2027-28 with a 4.49% CAGR for the period 2022-23 to 2027-28. With a CAGR of 3.84 % for the period 2027-28 to 2032-33, its energy requirement is estimated as 2587MU by the year 2032-33.

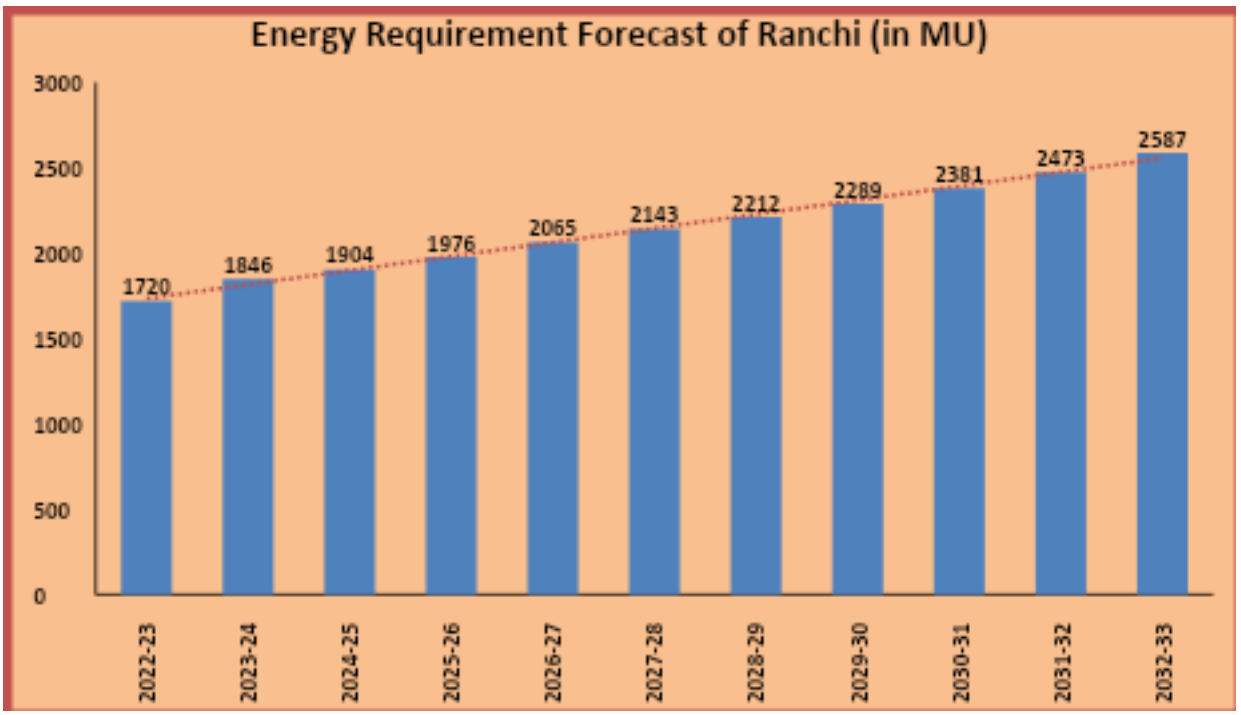

Figure 42-3 Energy Requirement Forecast of Ranchi (in MU)

Peak Demand of Ranchi is expected to see 3.66 % CAGR upto 2027-28 and will reach 488MW in comparison to 407 MW in year 2022-23. It is expected to reach 566 MW in year 2032-33 with a CAGR of 3.02 % after 2027- 28.

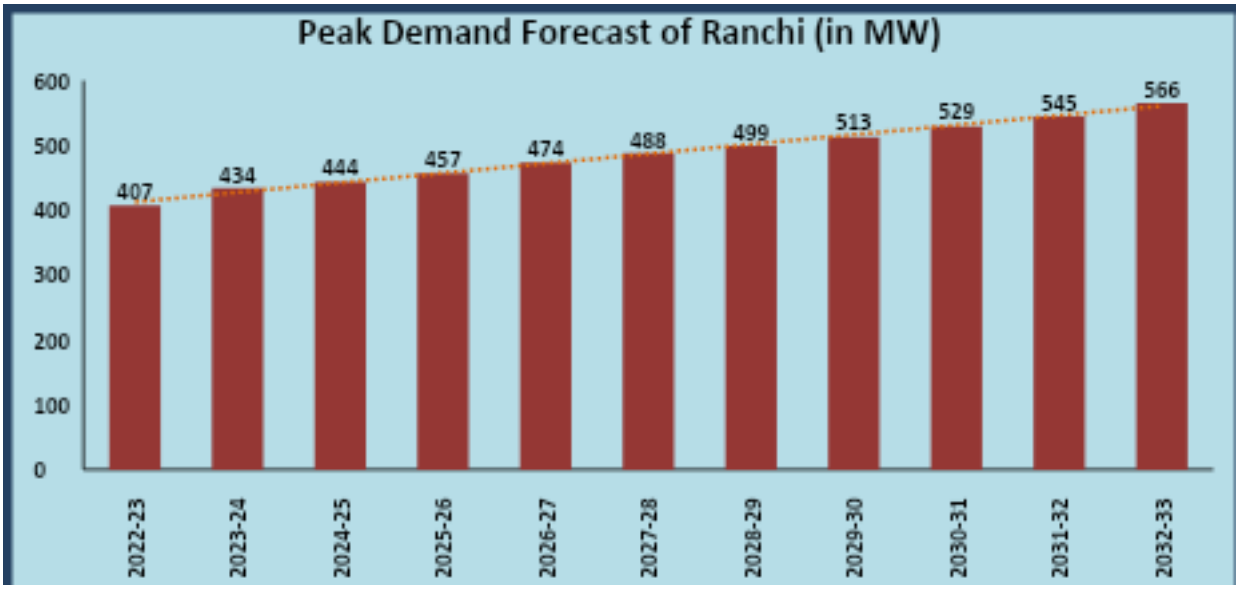

Figure 42-4 Peak Demand Forecast of Ranchi (in MW)

The category-wise energy consumption forecast of Ranchi are as follows:

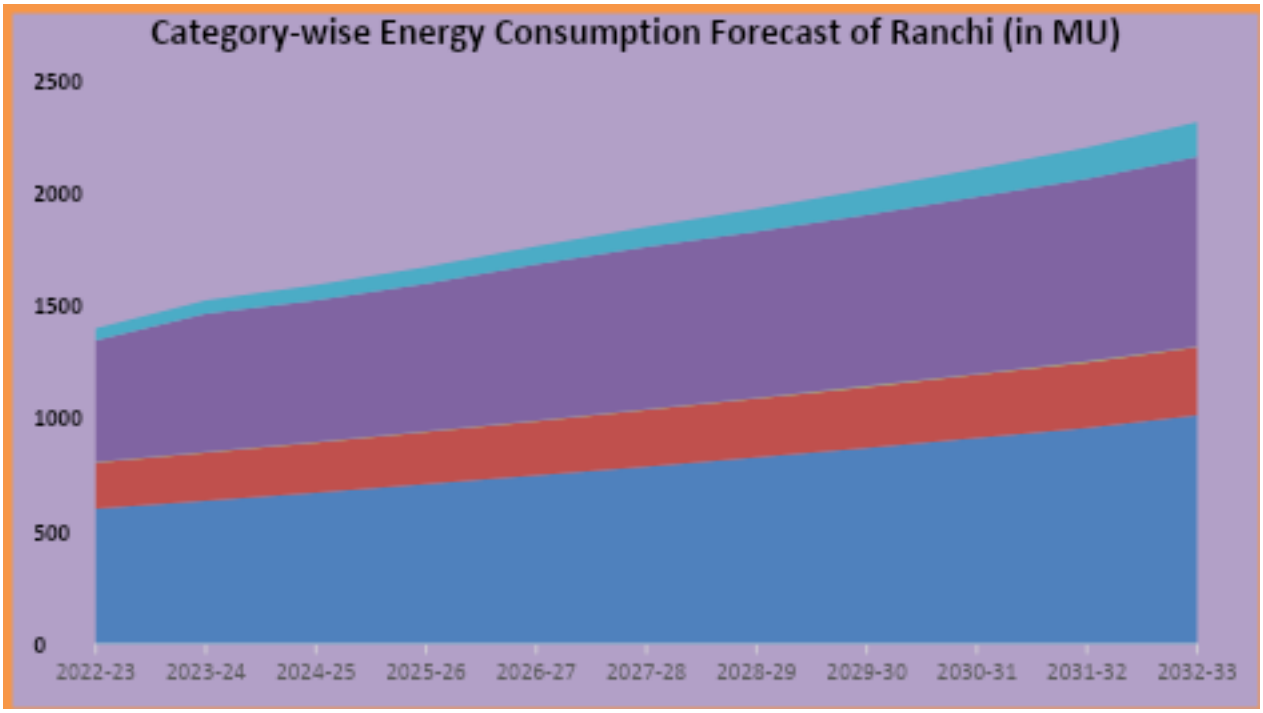

Figure 42-5 Category-wise Energy Consumption Forecast of Ranchi (in MU)

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	**Domestic**	600	786	1015	5.55	5.25	5.40
2	**Commercial**	204	250	300	4.20	3.70	3.95
3	**Irrigation**	2	3	4	6.31	5.81	6.06
4	**Industrial**	540	721	842	5.93	3.17	4.54
5	**Others**	53	91	154	11.60	11.10	11.35
6	**Total**	1399	1851	2315	5.76	4.58	5.17

Table 42-2 Expected CAGR of Ranchi - Category-wise Consumption

41.5 Transmission & Distribution Losses:

T&D losses of Ranchi were 18.70% in 2022-23. The target level is to bring it down to about 13.64% and 10.50% by the end of 2027-28 & 2032-33 respectively.

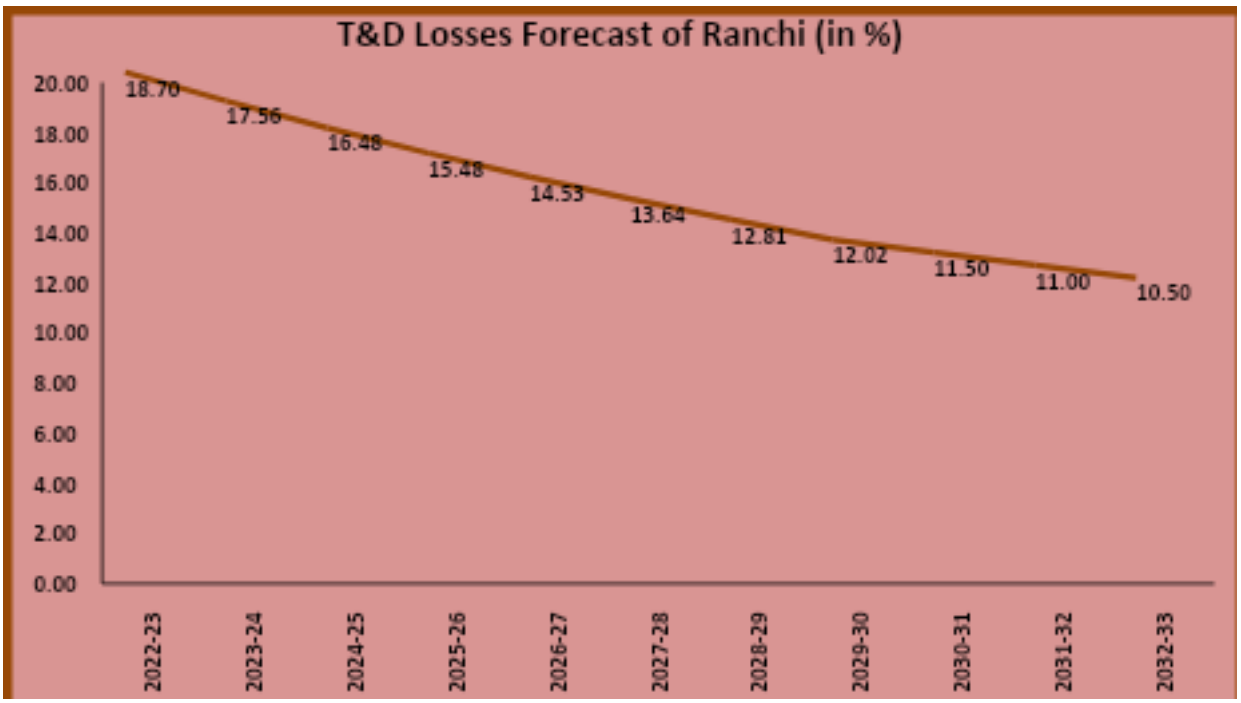

Figure 42-6 T&D Losses Forecast of Ranchi (in %)

41.6 Summary of power forecast of Ranchi city:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	1720	2143	2587	4.49	3.84
2	**Peak Demand (in MW)**	407	488	566	3.66	3.02
3	**T&D Losses (in %)**	19	14	10.50		

Table 42-3 Power forecast summary of Ranchi

****

Ranchi											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	600	634	670	707	746	786	827	870	914	959	1015
Commercial	204	213	222	231	241	250	260	270	280	290	300
Public lighting	18	20	22	25	27	30	34	37	41	45	50
Public Water Works	35	39	44	49	54	61	68	76	84	94	104
Irrigation	2	2	2	3	3	3	3	3	3	4	4
LT Industries	48	50	52	54	56	58	60	61	63	65	67
HT Industries	492	564	578	602	638	663	678	697	722	744	775
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	0	0	0	0	0	0	0	0	0	0	0
Others (if Any)	0	0	0	0	0	0	0	0	0	0	0
Total (Energy Consumption)	1399	1522	1590	1670	1765	1851	1929	2014	2107	2201	2315
T&D losses -MU	322	324	314	306	300	292	283	275	274	272	272
T&D losses -in %	18.70	17.56	16.48	15.48	14.53	13.64	12.81	12.02	11.50	11.00	10.50
Energy Requirement - MU	1720	1846	1904	1976	2065	2143	2212	2289	2381	2473	2587
Annual Load Factor - %	48.20	48.59	48.97	49.37	49.76	50.16	50.56	50.96	51.37	51.78	52.20
Peak Load - MW	407	434	444	457	474	488	499	513	529	545	566

Table 42-4 Category-wise and Year-wise Summary of Ranchi.

Shillong

Chapter 42: **Shillong**

42.1 Introduction:

Shillong is the capital and hill Station of Meghalaya and also known as "The Abode of Clouds". It is the headquarters of the East Khasi Hills and is situated at an average altitude of 4,908 feet (1,496 m) above sea level.

Economy:

The economy of Shillong is agrarian in nature as a large section of the people in Shillong are dependent on agriculture. Other than agriculture, the economy of Shillong is also dependent on small scale industries like handicraft and handloom items. The tourism industry of Shillong also reaps huge profits for the city and the state as a whole.

Climate:

Shillong has a cool climate all through the year. Winters (November to February) are freezing and minimum temperature reaches 2°C. Fog formations are common during winter. Summers (March to June) experience a maximum temperature of 24°C and a minimum temperature of 15°C. Monsoons (June to September) offers average to heavy rainfalls sometimes accompanied by heavy winds.

42.2 Brief description of Power Utilities:

Meghalaya Power Distribution Corporation Limited (MPDCL): is responsible for distribution of electricity to consumers within the state.

42.3 Existing Power Scenario:

The total electricity consumption of Shillong in the year 2022-23 was 418 MU and with 12.72% T&D losses, the requirement was 479 MU. The peak demand of the city was 133 MW. The Domestic sector was the biggest consumer of electricity (57%) followed by Commercial (15%) & Industrial (8%).

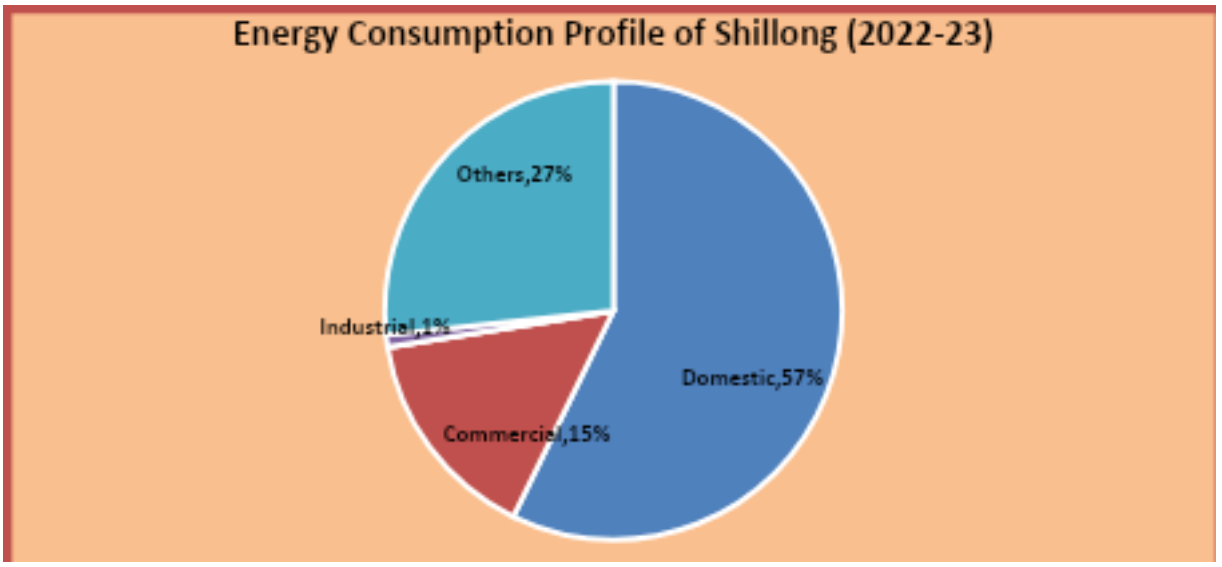

Figure 43-1 Energy Consumption Profile of Shillong (2022-23)

*Others category in Fig 43.1 includes load of public lighting, public water works, bulk supply and any other load

In a comparison of Shillong with Meghalaya for the year 2022-23, it is observed that the energy requirement of Shillong was 31.37 % of the total energy requirement of the state.

2022-23	Shillong City	Meghalaya	% Share of Meghalaya City
Energy in MU	479	2350	20.38
Peak Demand in MW	133	424	31.37

Table 43-1 Comparison of Shillong City with Meghalaya in 2022-23

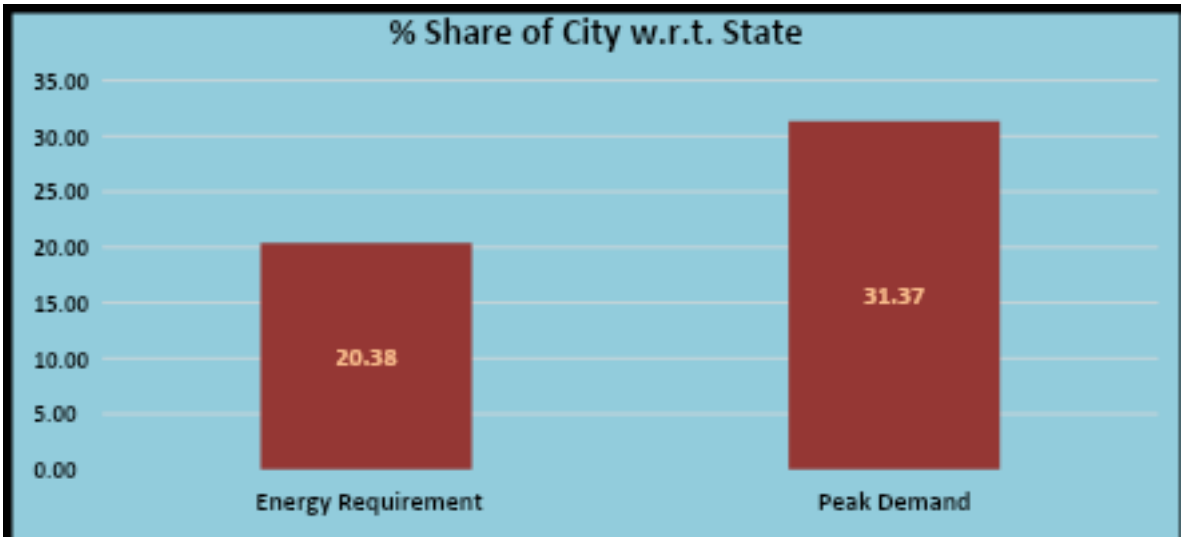

Figure 43-2 Comparison of Shillong with Meghalaya for the year 2022-23

42.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Shillong was 479 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 671 MU by the year 2027-28 with a 6.98 % CAGR for the period 2022-23 to 2027-28. With a CAGR of 7.03 % for the period 2027-28 to 2032-33, its energy requirement is estimated as 942 MU by the year 2032-33.

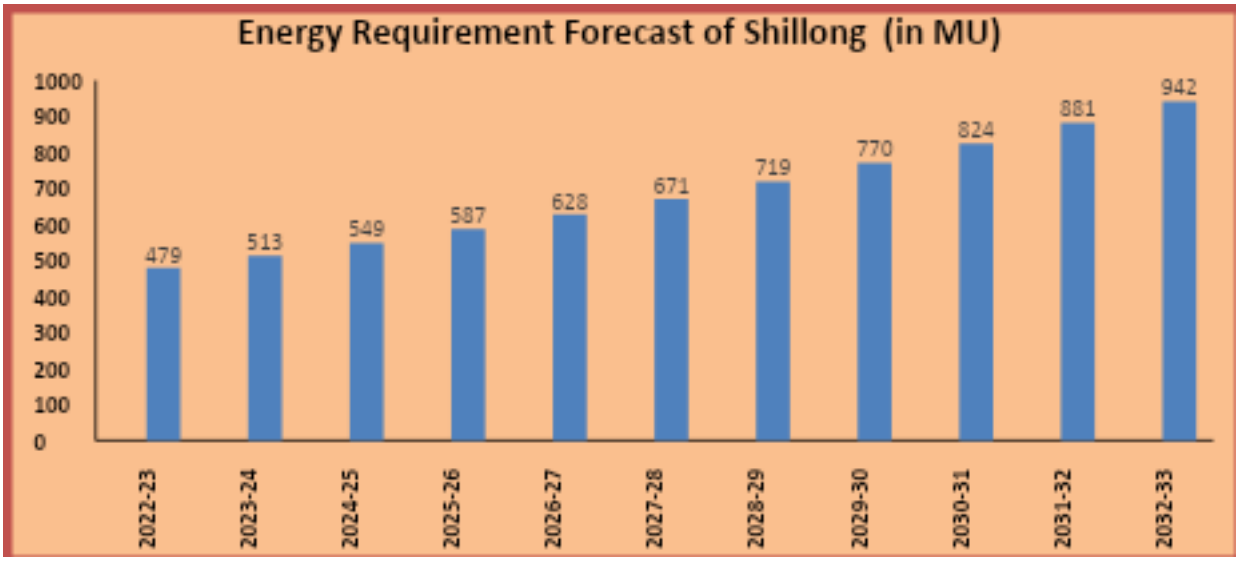

Figure 43-3 Energy Requirement Forecast of Shillong (in MU)

Peak Demand of the Shillong is expected to see 7.08% CAGR upto 2027-28 and will reach 188 MW in comparison to 133 MW in the year 2022-23. It is expected to reach 265 MW in the year 2032-33 with a CAGR of 7.14% after 2027-28.

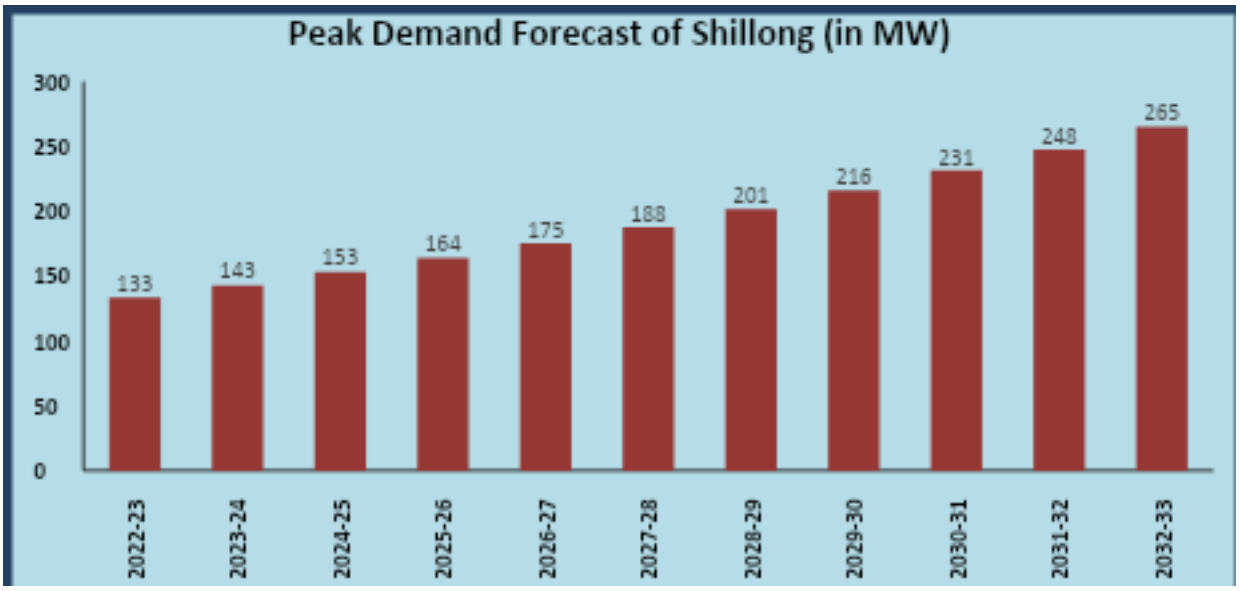

Figure 43-4 Peak Demand Forecast of Shillong (in MW)

The category-wise energy consumption forecast of Shillong are as follows:

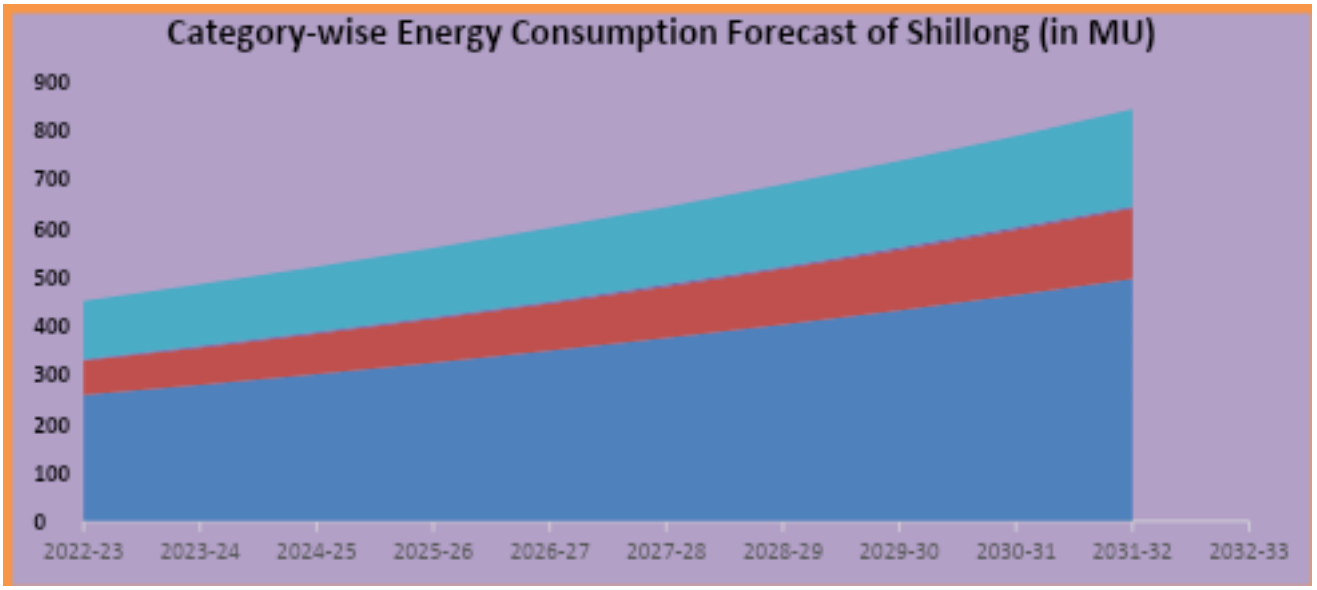

Figure 43-5 Category-wise Energy Consumption Forecast of Shillong (in MU)

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	**Domestic**	239	348	495	7.80	7.30	7.55

2	**Commercial**	64	97	143	8.70	8.20	8.45
3	**Irrigation**	0	0	0	0	0	0
4	**Industrial**	4	4	5	3.75	3.27	3.51
5	**Others**	111	150	198	6.12	5.70	5.91
6	**Total**	418	599	841	7.47	7.03	7.25

Table 43-2 Expected CAGR of Shillong - Category-wise Consumption

42.5 Transmission & Distribution Losses:

T&D losses of Shillong were 12.72% in year 2022-23. The target level is to bring it down to about 10.69%by the end of 2027-28 and then maintain it around this level.

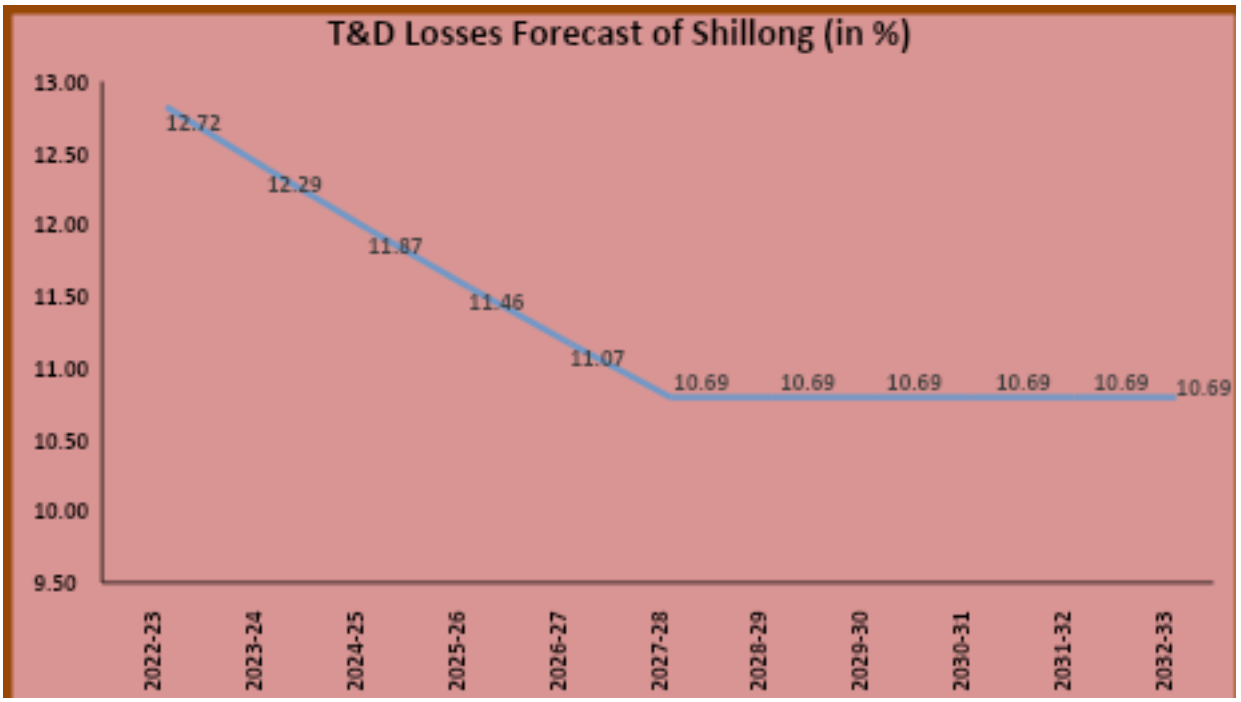

Figure 43-6 T&D Losses Forecast of Shillong (in %)

42.6 Summary of power forecast of Shillong:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	479	671	942	6.98	7.03
2	**Peak Demand (in MW)**	133	188	265	7.08	7.14
3	**T&D Losses (in %)**	12.7	10.7	10.7		

Table 43-3 Power forecast summary of Shillong

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Shillong											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	239	258	279	300	323	348	374	402	431	462	495
Commercial	64	69	75	82	89	97	105	113	123	133	143
Public lighting	0	0	0	0	0	0	0	0	0	0	0
Public Water Works	30	31	32	34	35	36	38	39	40	42	43
Irrigation	0	0	0	0	0	0	0	0	0	0	0
LT Industries	2	2	2	2	2	2	2	2	2	2	2
HT Industries	2	2	2	2	2	2	2	3	3	3	3
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	81	87	93	100	106	114	121	129	137	146	155
Others (if Any)	0	0	0	0	0	0	0	0	0	0	0
Total (Energy Consumption)	**418**	**450**	**484**	**520**	**558**	**599**	**642**	**688**	**736**	**787**	**841**
T&D losses -MU	**61**	**63**	**65**	**67**	**69**	**72**	**77**	**82**	**88**	**94**	**101**
T&D losses -in %	**12.72**	**12.29**	**11.87**	**11.46**	**11.07**	**10.69**	**10.69**	**10.69**	**10.69**	**10.69**	**10.69**
Energy Requirement - MU	**479**	**513**	**549**	**587**	**628**	**671**	**719**	**770**	**824**	**881**	**942**
Annual Load Factor - %	**40.99**	**40.95**	**40.91**	**40.87**	**40.83**	**40.79**	**40.75**	**40.71**	**40.67**	**40.63**	**40.59**
Peak Load - MW	**133**	**143**	**153**	**164**	**175**	**188**	**201**	**216**	**231**	**248**	**265**

Table 43-4 Category-wise and Year-wise Summary of Shillong.

Srinagar

Chapter 43: **Srinagar**

43.1 Introduction:

Srinagar, the capital of Jammu and Kashmir Union Territory, is situated on the banks of River Jhelum and is geographically located in the centre of the valley of Kashmir. It is one of the prime tourist centres of the country and is famous for its picturesque sites, sweet water lakes, pleasant gardens, mountain views and tourist places.

Economy:

Tourism is thus the major industry in the district and its promotion and development has direct bearing on livelihood and prosperity.

Climate:

The climate of the city is mild and generally warm and temperate. The rainfall is significant, with precipitation even during the driest month. The average annual maximum temp. is 20.0 0C with mean maximum temp. of the hottest months (July & August) and the coldest month (Jan) are about 29.6 0C and 6.7 0C respectively. The average annual minimum temp. is 7.5 0C with mean minimum temp. of the hottest and the coldest months are about 18.0 0C and -1.9 0C respectively.

43.2 Brief description of Power Utilities:

The Power Development Department (PDD) of J&K was earlier responsible for generation, transmission & distribution of electricity in the UT of J&K. Subsequently, the Power Development Corporation (JKPDC), a fully owned Government Company, was established in the year 1995, when the operation and maintenance of existing generating stations and setting up of future generating stations were entrusted to this corporation.

43.3 Existing Power Scenario:

The total electricity consumption of Srinagar in the year 2022-23 was 1069 MU and with 51.15 % T&D losses, the requirement was 2189 MU. The peak demand of the city was 356 MW. The Domestic sector was the biggest consumer of electricity (61%).

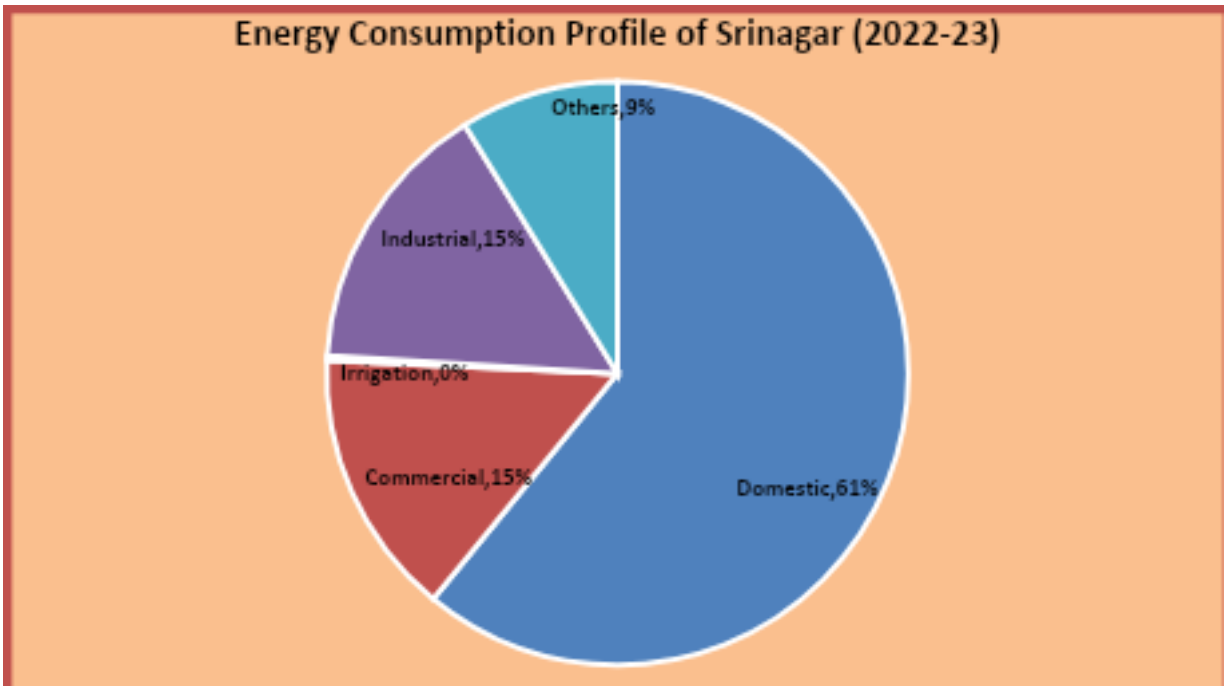


Figure 44-1 Energy Consumption Profile of Srinagar in 2022-23)

On comparison of Srinagar with J&K for the year 2021-22, it is observed that the energy requirement of Srinagar was 45.5% of the total energy requirement of the state.

Sl No	Particulars	Srinagar	J&K	Srinagar as % of J&K
1.	Energy Requirement (in MU)	2189	19568	11.19
2.	Peak Demand (in MW)	356	3075	11.58

Table 44-1 Comparison of Srinagar with J&K in 2022-23

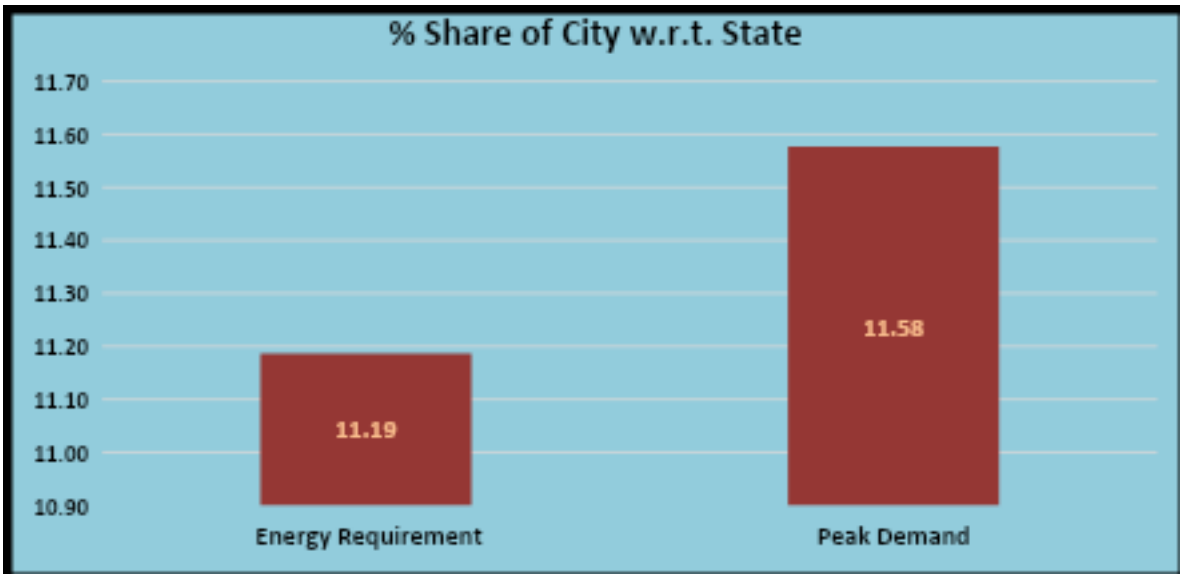


Figure 44-2 Comparison between Srinagar and J&K in 2022-23

43.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Srinagar is estimated as 2189 MU in year 2022-23. It is expected that the energy requirement of the city will be 1938 MU by the year 2027-28 with -2.41 % CAGR for the period 2022-23 to 2027-28. With a CAGR of 2.84 % for the period 2027-28 to 2032-33, its energy requirement is estimated as 2229 MU by the year 2032-33.

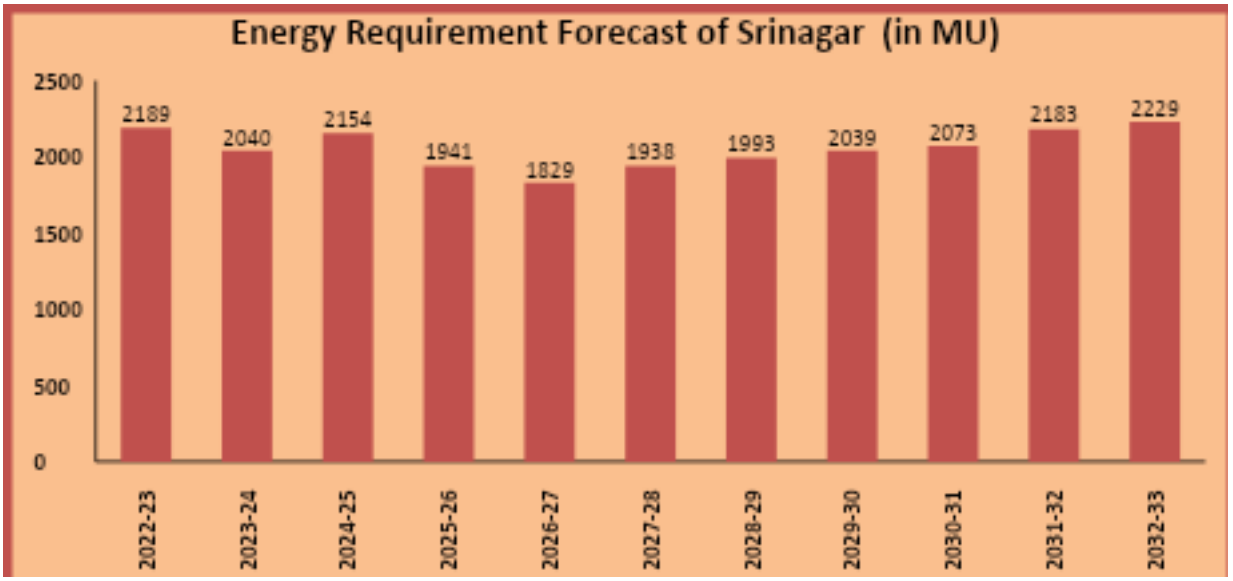


Figure 44-3 Energy Requirement Forecast of Srinagar in MU

Peak Demand of the Srinagar is expected to see 4.45 % CAGR up to 2027-28 and will reach 442 MW in comparison to 356 MW in year 2022-23. It is expected to reach 587 MW in year 2032-33 with a CAGR of 5.82 % after 2027- 28.

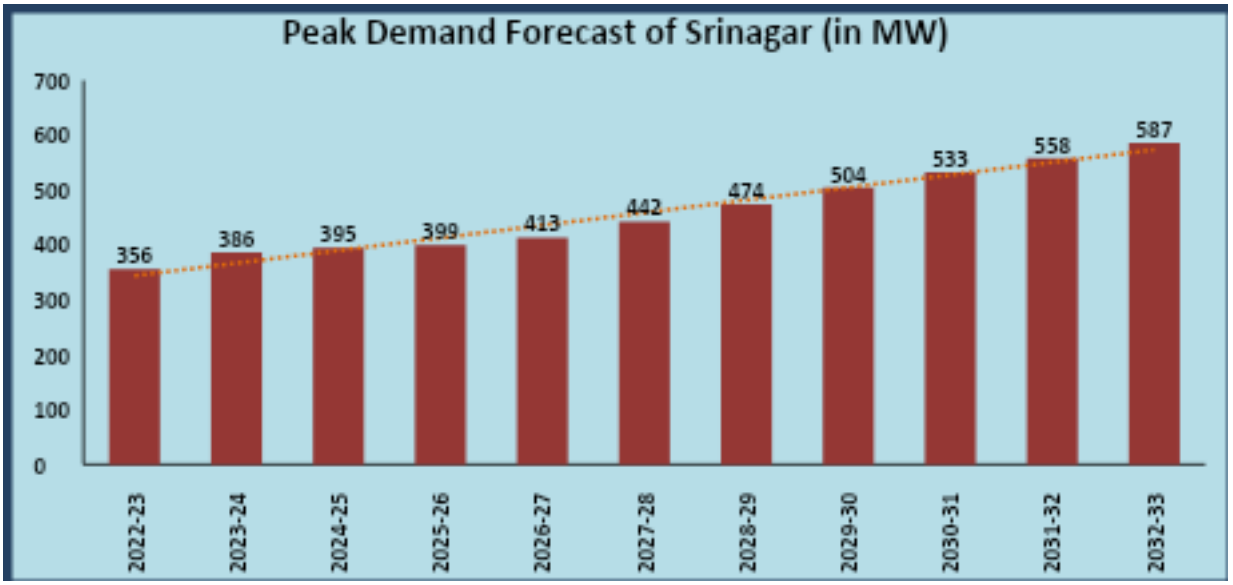


Figure 44-4 Peak Demand Forecast of Srinagar in MW)

The category-wise energy consumption forecast of Srinagar is as follows:

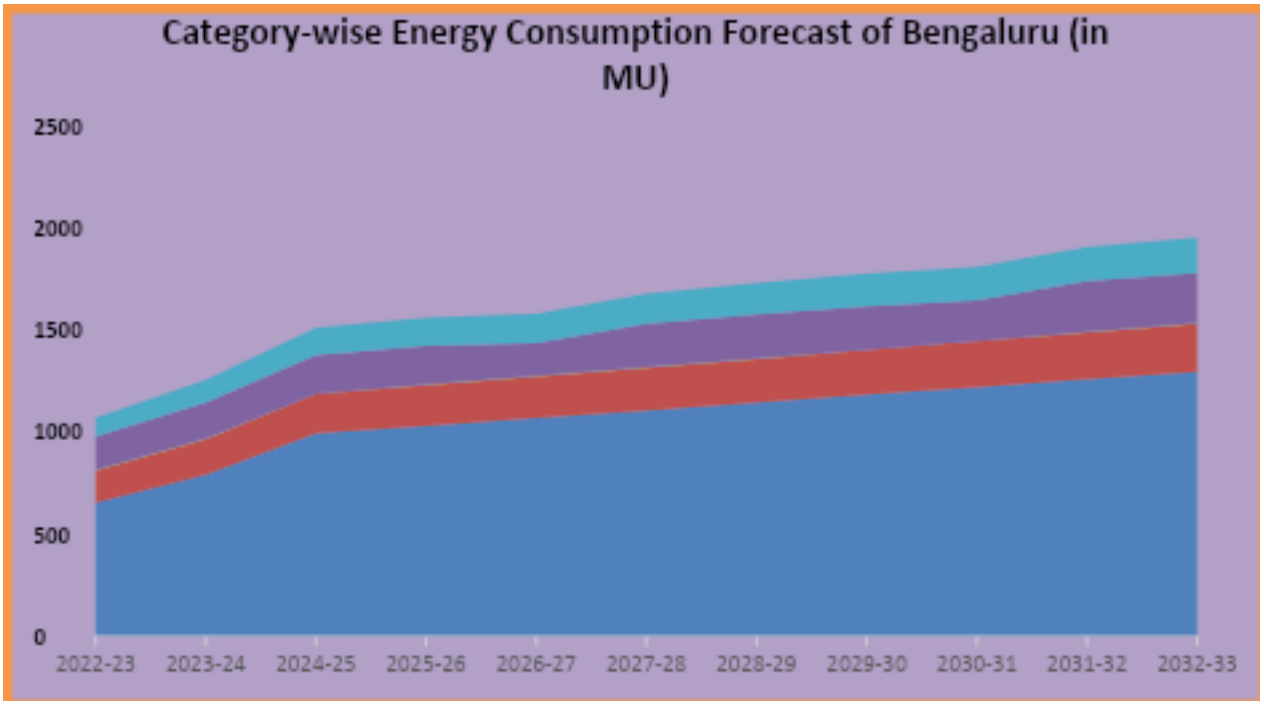


Figure 44-5 Category-wise Energy Consumption forecast of Srinagar.

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No	Category	Energy Consumption (in MU)			CAGR in %		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	**Domestic**	652	1105	1294	11.15	3.20	7.10
2	**Commercial**	158	209	236	5.72	2.48	4.09
3	**Irrigation**	3	2	2	0.00	0.00	0.00
4	**Industrial**	163	212	245	5.40	2.96	4.17
5	**Others**	94	149	173	9.66	3.06	6.31
6	**Total**	1069	1677	1951	9.42	3.07	6.20

Table 44-2 Expected CAGR of Srinagar - Category-wise Consumption

43.5 Transmission & Distribution Losses:

T&D losses of Srinagar were 51.15% in the year 2022-23. The target level is to bring it down to about 13.46% in 2027-28 and 12.50% by the end of 2032-33.

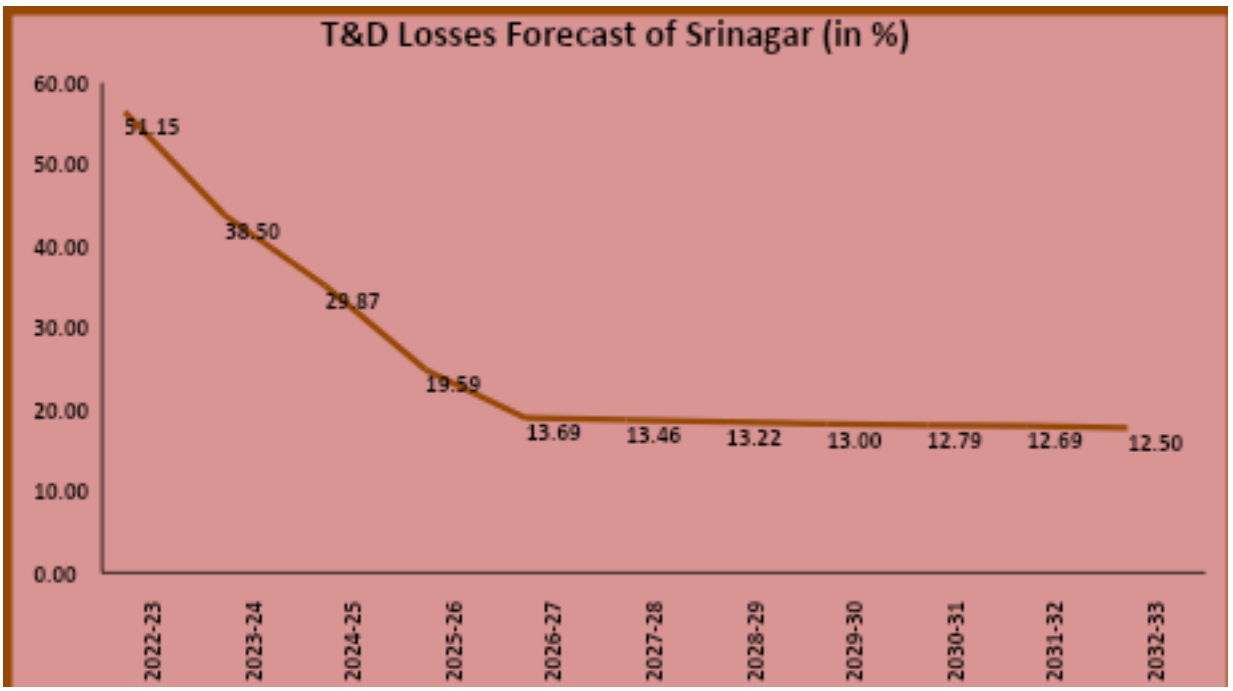


Figure 44-6 T&D Loss Forecast of Srinagar.

The power forecast of Srinagar city is summarized below:

Sl No	**Particulars**	**2022-23**	**2027-28**	**2032-33**	**CAGR in %**	
					2022-23 to 2027-28	2027-28 to 2032-33
1	Energy Requirement in MU	2189	1938	2229	-2.40	2.83
2	Peak Demand in MW	356	442	587	4.45	5.82
3	T&D Losses in %	51	13	12.50		

Table 44-3 Power forecast summary of Srinagar

****

Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	652	788	992	1030	1068	1105	1143	1181	1219	1256	1294
Commercial	158	176	193	198	204	209	214	220	225	231	236
Public lighting	13	13	15	16	17	17	18	19	20	21	22
Public Water Works	44	53	62	64	66	69	71	73	75	77	79
Irrigation	3	2	2	2	2	2	2	2	2	2	2
LT Industries	30	39	41	43	46	48	50	52	54	56	59
HT Industries	133	140	148	147	116	164	166	160	145	192	187
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	37	46	57	59	61	63	65	67	69	71	73
Others (if Any)	0	0	0	0	0	0	0	0	0	0	0
Total (Energy Consumption)	1069	1255	1510	1560	1579	1677	1730	1773	1808	1906	1950
T&D losses -MU	0	0	0	0	0	0	0	0	0	0	0
T&D losses -in %	51.15	38.50	29.87	19.59	13.69	13.46	13.22	13.00	12.79	12.69	12.50
Energy Requirement - MU	2189	2040	2154	1941	1829	1938	1993	2039	2073	2183	2229
Annual Load Factor - %	70.26	60.34	62.18	55.47	50.59	50.04	48.00	46.17	44.43	44.66	43.37
Peak Load - MW	356	386	395	399	413	442	474	504	533	558	587

Table 44-4 Category-wise and Year-wise Summary of Srinagar

Surat

Chapter 44: **Surat**

44.1 Introduction:

Surat is a city in the western Indian State of Gujarat.

Economy:

Surat will be the world's fastest-growing city from 2019 to 2035, according to a study conducted by the Economic Times. It is a major hub of diamond cutting and polishing. This industry earns India about US$10 billion in annual exports. Since it is known for producing textiles, including silk, Surat is known as the textile hub of the nation or the Silk City of India. Surat is the biggest centre of MMF (man-made fibre) in India. It has a total of 381 dyeing and printing mills and 41,100 power loom units.

Climate:

Surat has a tropical climate, moderated strongly by the Sea to the Gulf of Cambay. The summer begins in early March and lasts until June, the average maximum temperature being 37 °C. Monsoon begins in late June and the city receives about 1,200 mm of rain by the end of September. Winter starts in December and ends in late February, with average mean temperatures of around 23 °C and negligible rain.

44.2 Brief description of Power Utilities:

Torrent power covers central part of Surat city have distribution area of 52 Sq. km while DGVCL caters of the remaining area.

44.3 Existing Power Scenario: Surat -Torrent

The total electricity consumption of Surat -Torrent in the year 2022-23 was 3692 MU and with 4.03% T&D losses, the requirement was 3847 MU. The peak demand of the Surat -Torrent city was 742 MW. The Industrial sector was the biggest consumer of electricity (58%) followed by Domestic (24%) and Commercial (16%).

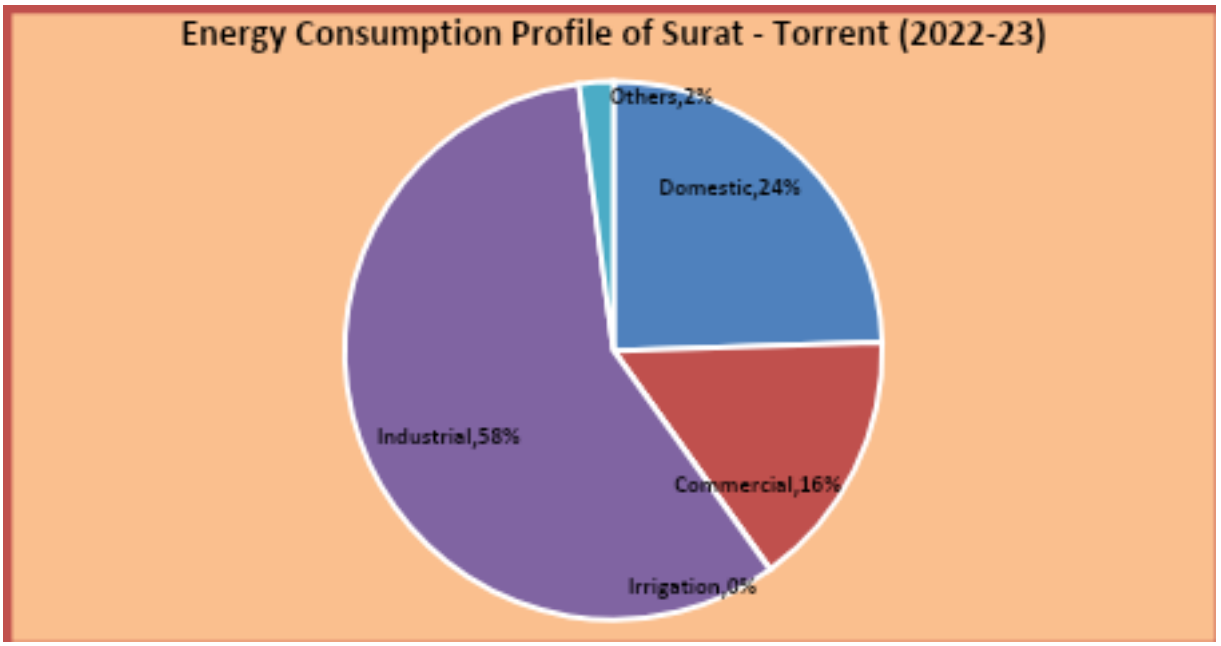


Figure 45-1 Energy Consumption Profile of Surat - Torrent (2022-23)

44.4 Existing Power Scenario: Surat - DGVCL

The total electricity consumption of Surat -DGVCL in the year 2022-23 was 11409 MU and with 6.94% T&D losses, the requirement was 12260 MU. The peak demand of the city Surat -DGVCL was 2165 MW. The Industrial sector was the biggest consumer of electricity (75%) followed by Domestic (17%) and Commercial (5%).

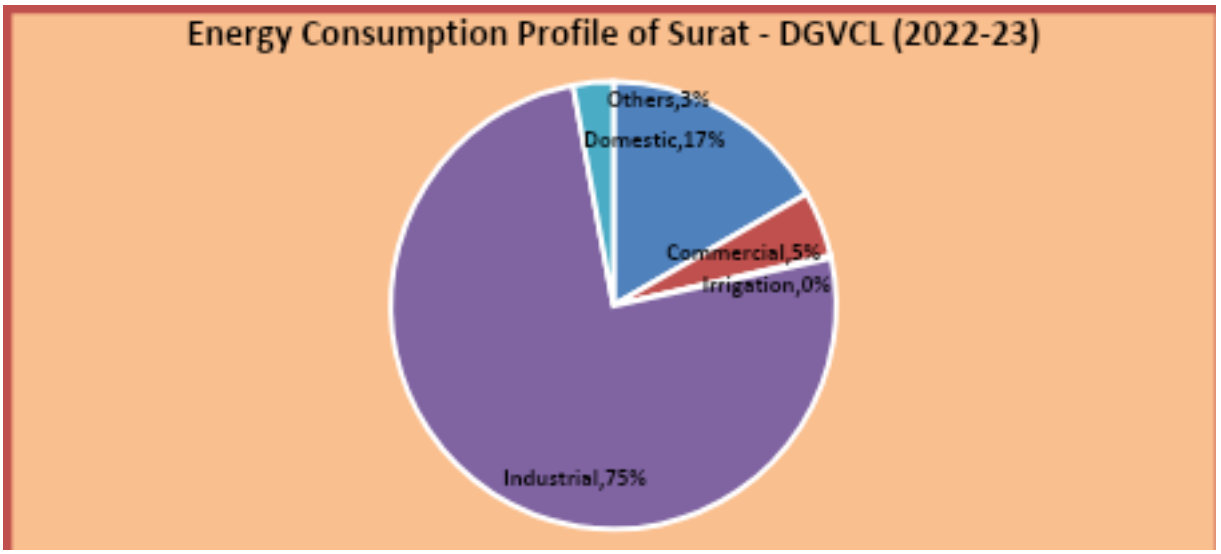


Figure 45-2 Energy Consumption Profile of Surat - DGVCL (2022-23)

In a comparison of Surat City with Gujarat for the year 2022-23, it is observed that the energy requirement of Surat was 11.64% of the total energy requirement of the state.

2022-23	Surat City	Gujarat	% Share of Surat City
Energy in MU	16107	139566	11.54
Peak Demand in MW	2907	21550	13.49

Table 45-1 Comparison of Surat City with Gujarat in 2022-23

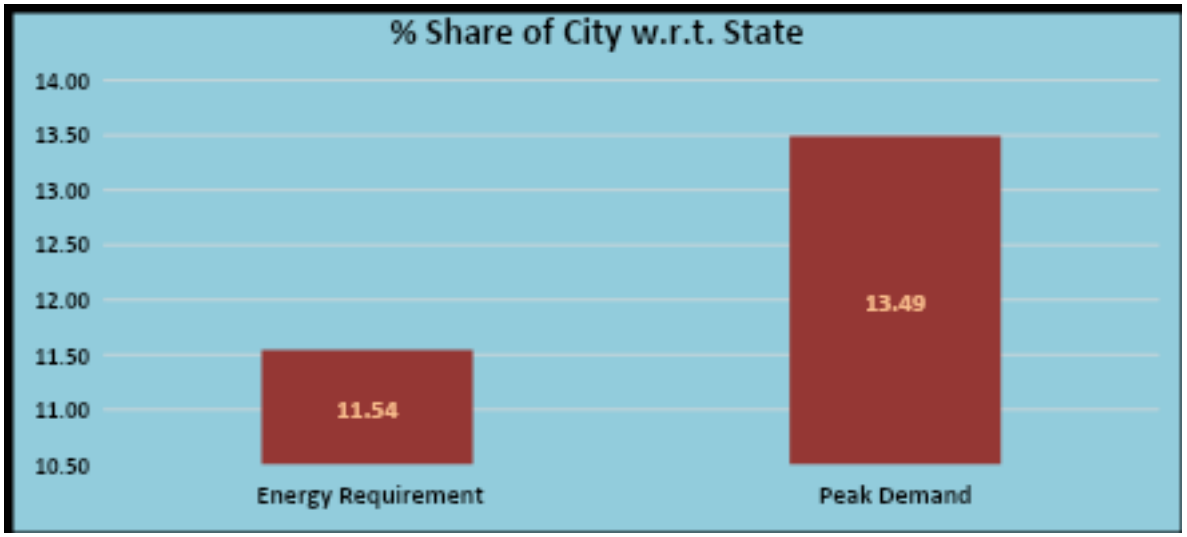


Figure 45-3 Comparison of Surat City and Gujarat in the year 2022-23.

44.5 Power Forecast: Surat - Torrent

Based on total electricity consumption and T&D Losses, the total energy requirement of Surat - Torrent is estimated as 3847 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 4462 MU by the year 2027-28 with a 3.01% CAGR for

the period 2022-23 to 2027-28. With a CAGR of 3.06% for the period 2027-28 to 2032-33, its energy requirement is estimated as 5187 MU by the year 2032-33.

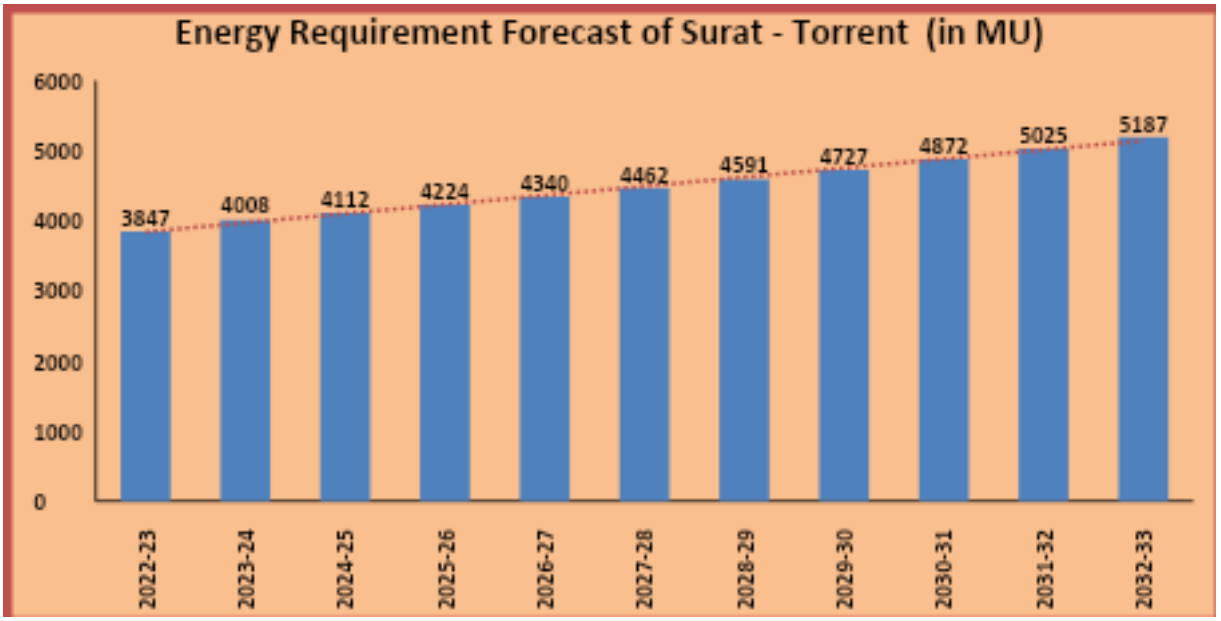


Figure 45-4 Energy Requirement Forecast of Surat - Torrent (in MU)

Peak Demand of the Surat - Torrent is expected to see 2.04% CAGR upto 2027-28 and will reach 820 MW in comparison to 742 MW in the year 2022-23. It is expected to reach 910 MW in the year 2032-33 with a CAGR of 2.09% after 2027-28.

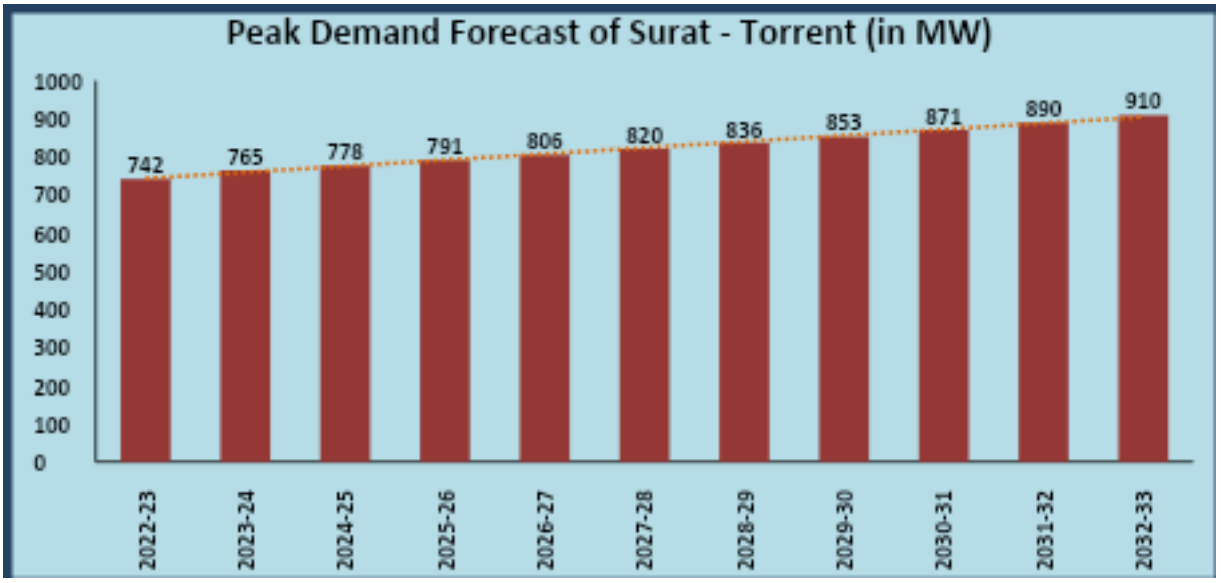


Figure 45-5 Peak Demand Forecast of Surat - Torrent (in MW)

The category-wise energy consumption forecast of Surat - Torrent are as follows:

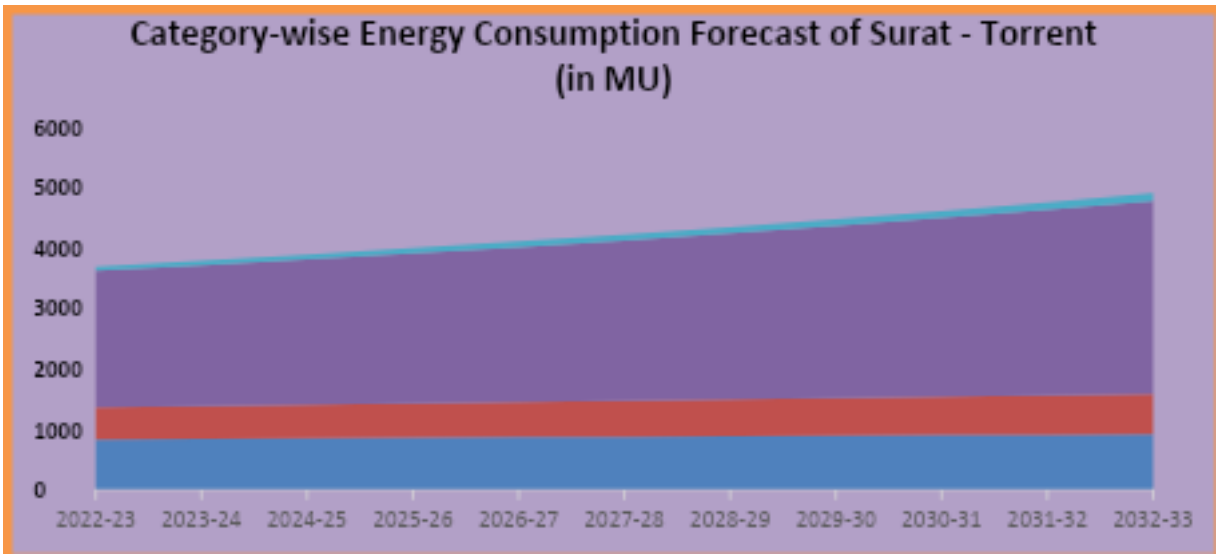


Figure 45-6 Category-wise Energy Consumption Forecast of Surat - Torrent (in MU)

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	Domestic	822	873	917	1.20	1.00	1.10
2	Commercial	535	597	659	2.20	2.00	2.10
3	Irrigation	1	1	1	0.20	5.62	2.87
4	Industrial	2257	2651	3201	3.27	3.84	3.56
5	Others	77	101	131	5.59	5.32	5.45
6	**Total**	**3692**	**4223**	**4909**	**2.72**	**3.06**	**2.89**

Table 45-2 Expected CAGR of Surat - Torrent Category-wise Consumption

44.6 Power Forecast: Surat - DGVCL

Based on total electricity consumption and T&D Losses, the total energy requirement of Surat - DGVCL is estimated as 12260 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 16289 MU by the year 2027-28 with a 5.85% CAGR for the period 2022-23 to 2027-28. With a CAGR of 6.03% for the period 2027-28 to 2032-33, its energy requirement is estimated as 21829 MU by the year 2032-33.

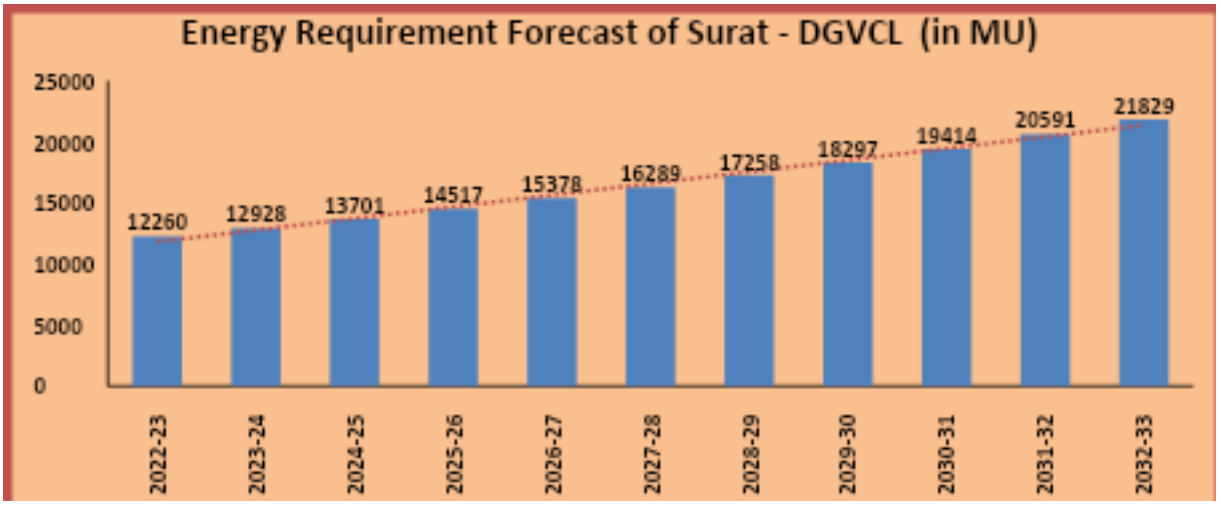


Figure 45-7 Energy Requirement Forecast of Surat - DGVCL (in MU)

Peak Demand of the Surat - DGVCL is expected to see 6.01% CAGR upto 2027-28 and will reach 2897 MW in comparison to 2165 MW in the year 2022-23. It is expected to reach 3872 MW in the year 2032-33 with a CAGR of 5.97% after 2027-28.

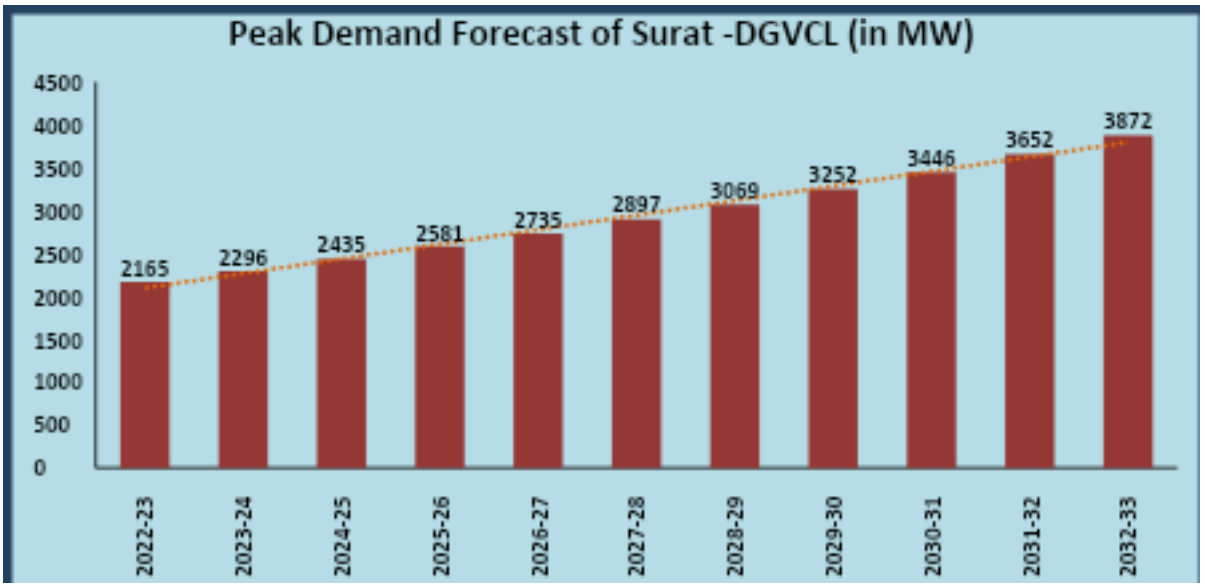


Figure 45-8 Peak Demand Forecast of Surat - DGVCL (in MW)

The category-wise energy consumption forecast of Surat - DGVCL are as follows:

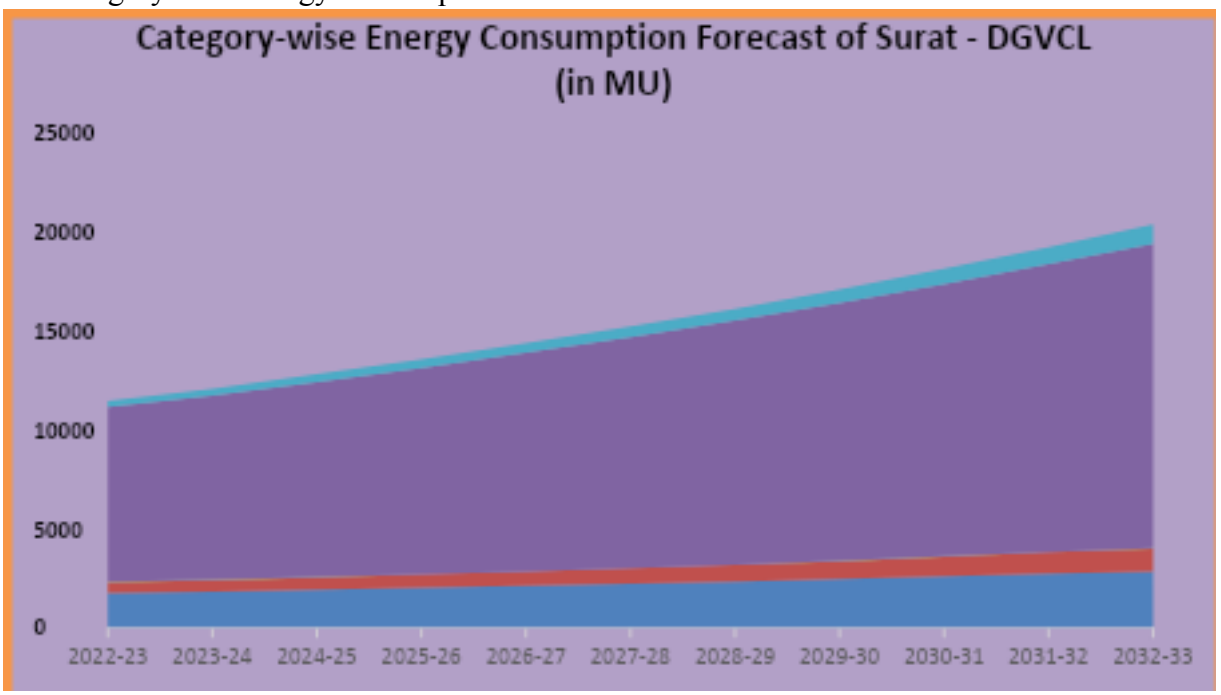


Figure 45-9 Category-wise Energy Consumption Forecast of Surat - DGVCL (in MU)

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	**Domestic**	1736	2189	2820	4.74	5.20	4.97

2	**Commercial**	547	776	1151	7.27	8.20	7.73
3	**Irrigation**	18	20	21	1.79	1.17	1.48
4	**Industrial**	8802	11636	15352	5.74	5.70	5.72
5	**Others**	306	538	970	11.96	12.49	12.22
6	**Total**	**11409**	**15159**	**20313**	5.85	6.03	5.94

Table 45-3 Expected CAGR of Surat - DGVCL Category-wise Consumption

44.7 Transmission & Distribution Losses: Surat - Torrent

T&D losses of Surat - Torrent were estimated at 5.46% in year 2023-24. The target level is to bring it down to about 5.37% and maintain the losses around this level.

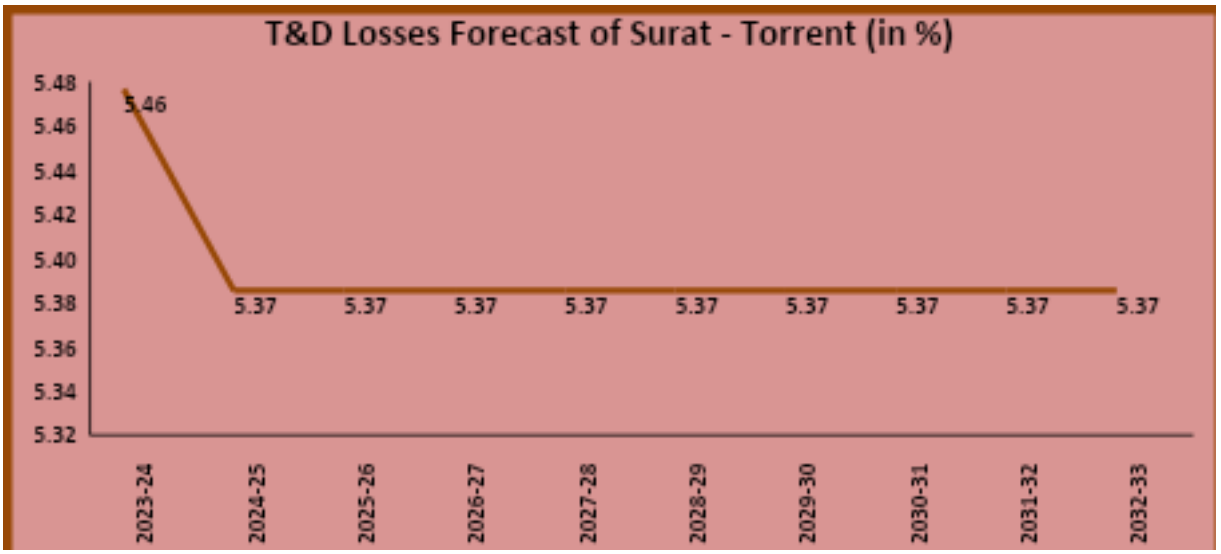


Figure 45-10 T&D Losses Forecast of Surat (in %)

44.8 Summary of power forecast of Surat - Torrent:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in%)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	3847	4462	5187	3.01	3.06
2	**Peak Demand (in MW)**	742	820	910	2.04	2.09
3	**T&D Losses (in %)**	5.46	5.37	5.37		

Table 45-4 Power forecast summary of Surat - Torrent

44.9 Transmission & Distribution Losses: Surat - DGVCL

T&D losses of Surat - DGVCL were estimated as 6.94% in year 2022-23. The target level is to bring it down to about 6.94% and 6.94% by the end of 2027-28 & 2032-33 respectively.

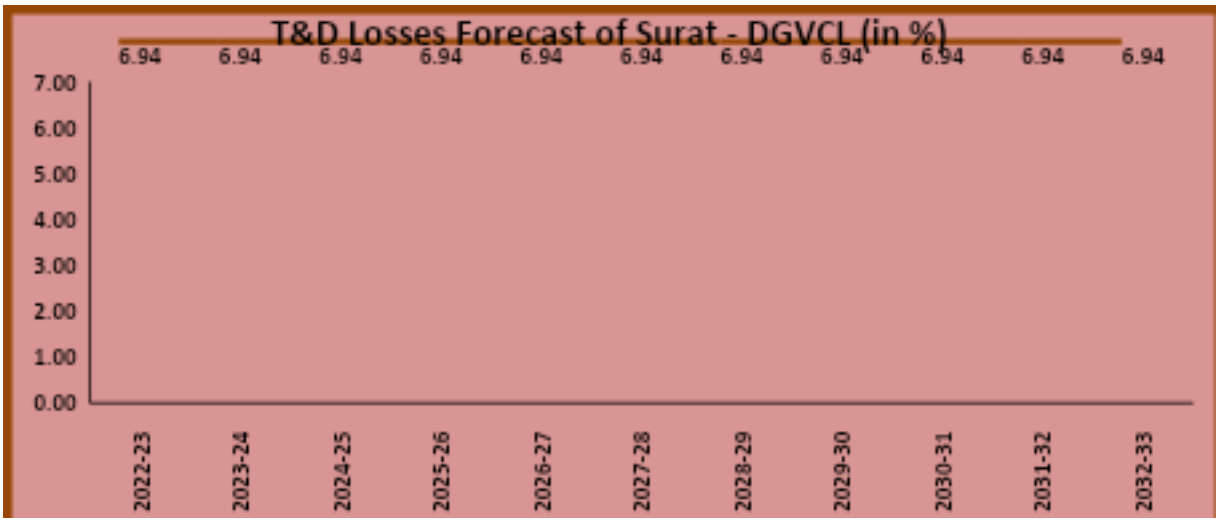


Figure 45-11 T&D Losses Forecast of Surat - DGVCL (in %)

44.10 The power forecast of Surat - DGVCL is summarized below:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in%)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	Energy Requirement (in MU)	12260	16289	21829	5.85	6.03
2	Peak Demand (in MW)	2165	2897	3872	6.01	5.97
3	T&D Losses (in %)	6.94	6.94	6.94		

Table 45-5 Power forecast summary of Surat – DGVCL

44.11 The power forecast of Surat is summarized below:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in%)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	Energy Requirement (in MU)	16107	20751	27016	5.20	5.42
2	Peak Demand (in MW)	2907	3717	4782	5.04	5.17
3	T&D Losses (in %)	6.25	6.60	6.64		

Table 45-6 Power forecast summary of Surat.

Surat - Torrent											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	822	834	845	855	864	873	882	890	899	908	917
Commercial	535	548	561	573	585	597	609	621	634	646	659
Public lighting	12	12	12	12	12	12	12	12	12	12	12
Public Water Works	65	69	74	79	84	89	94	100	106	112	119
Irrigation	1	1	1	1	1	1	1	1	1	1	1
LT Industries	1737	1754	1772	1790	1807	1826	1844	1862	1881	1900	1919
HT Industries	520	571	627	688	754	826	903	987	1078	1176	1282
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	0	0	0	0	0	0	0	0	0	0	0
Others (if Any)	0	0	0	0	0	0	0	0	0	0	0
Total (Energy Consumption)	**3692**	**3790**	**3891**	**3997**	**4107**	**4223**	**4345**	**4474**	**4610**	**4755**	**4909**
T&D losses -MU	155	219	221	227	233	239	246	254	261	270	278
T&D losses -in %	5.46	5.46	5.37	5.37	5.37	5.37	5.37	5.37	5.37	5.37	5.37
Energy Requirement - MU	**3847**	**4008**	**4112**	**4224**	**4340**	**4462**	**4591**	**4727**	**4872**	**5025**	**5187**
Annual Load Factor - %	59.22	59.79	60.35	60.93	61.51	62.09	62.68	63.28	63.88	64.48	65.10
Peak Load - MW	**742**	**765**	**778**	**791**	**806**	**820**	**836**	**853**	**871**	**890**	**910**

Table 45-7 Category-wise and Year-wise Summary: Surat - Torrent

Surat - DGVCL											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	1736	1809	1897	1990	2086	2189	2300	2423	2560	2700	2820
Commercial	547	579	623	670	721	776	839	911	994	1080	1151
Public lighting	33	34	35	36	37	37	38	39	40	41	42
Public Water Works	52	54	55	57	59	60	62	64	65	67	68
Irrigation	18	18	19	19	20	20	20	20	21	21	21
LT Industries	5105	5346	5634	5937	6255	6589	6939	7307	7692	8095	8550
HT Industries	3697	3937	4195	4466	4750	5047	5357	5687	6035	6405	6802
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	0	0	0	0	0	0	0	0	0	0	0
Others (if Any)	221	254	292	335	384	441	504	577	660	753	859
Total (Energy Consumption)	**11409**	**12031**	**12750**	**13509**	**14311**	**15159**	**16060**	**17027**	**18067**	**19162**	**20314**
T&D losses -MU	851	897	951	1007	1067	1130	1198	1270	1347	1429	1515
T&D losses -in %	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94	6.94
Energy Requirement - MU	**12260**	**12928**	**13701**	**14517**	**15378**	**16289**	**17258**	**18297**	**19414**	**20591**	**21829**
Annual Load Factor - %	64.66	64.28	64.24	64.21	64.19	64.18	64.19	64.24	64.32	64.36	64.36
Peak Load - MW	**2165**	**2296**	**2435**	**2581**	**2735**	**2897**	**3069**	**3252**	**3446**	**3652**	**3872**

Table 45-8 Category-wise and Year-wise Summary: Surat - Torrent

Surat											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	2558	2643	2742	2845	2950	3062	3182	3313	3459	3608	3737
Commercial	1082	1127	1184	1243	1306	1373	1448	1532	1628	1726	1810
Public lighting	45	46	47	48	49	49	50	51	52	53	54
Public Water Works	117	123	129	136	143	149	156	164	171	179	187
Irrigation	19	19	20	20	21	21	21	21	22	22	22
LT Industries	6842	7100	7406	7727	8062	8415	8783	9169	9573	9995	10469
HT Industries	4217	4508	4822	5154	5504	5873	6260	6674	7113	7581	8084
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	0	0	0	0	0	0	0	0	0	0	0
Others (if Any)	221	254	292	335	384	441	504	577	660	753	859
Total (Energy Consumption)	**15101**	**15821**	**16641**	**17506**	**18418**	**19382**	**20405**	**21501**	**22677**	**23917**	**25223**
T&D losses -MU	1006	1116	1172	1234	1300	1369	1444	1524	1608	1699	1793
T&D losses -in %	6.25	6.59	6.58	6.58	6.59	6.60	6.61	6.62	6.62	6.63	6.64
Energy Requirement - MU	**16107**	**16936**	**17813**	**18741**	**19718**	**20751**	**21849**	**23024**	**24286**	**25616**	**27016**
Annual Load Factor - %	63.25	63.16	63.29	63.45	63.57	63.73	63.87	64.03	64.22	64.38	64.49
Peak Load - MW	**2907**	**3061**	**3213**	**3372**	**3541**	**3717**	**3905**	**4105**	**4317**	**4542**	**4782**

Table 45-9 Category-wise and Year-wise Summary: Surat

Thiruvananthapuram

Chapter 45: **Thiruvananthapuram**

45.1 Introduction:

Thiruvananthapuram formerly known as Trivandrum is the capital of the Indian state of Kerala. Being India's largest city in the deep south, it is strategically prominent and hosts the Southern Air Command headquarters of the Indian Air Force.

Climate:

The city has a climate that lies on the border between a tropical savanna climate and a tropical monsoon climate. The mean maximum temperature is 34 °C (93 °F) and the mean minimum temperature is 21 °C (70 °F). Thiruvananthapuram is the first city along the path of the south-west monsoons and gets its first showers in early June. The city receives heavy rainfall of around 1,835 mm.

Economy and Industry:

Thiruvananthapuram's economy comprises Information Technology, education, plantations, aerospace, commerce and tourism. With the establishment of Thumba Equatorial Rocket Launching Station (TERLS) in 1962, Thiruvananthapuram became the cradle of India's ambitious space programme. The first Indian space rocket was developed and launched from the Vikram Sarabhai Space Centre (VSSC) in the outskirts of the city in 1963. Several establishments of the Indian Space Research Organisation (ISRO) were later established in Thiruvananthapuram.

45.2 Brief description of Power Utilities:

Kerala State Electricity Board (KSEB), provide electricity distribution and management services in the region. KSEB is responsible for generating, transmitting, and distributing electric power across Kerala.

45.3 Existing Power Scenario:

The total electricity consumption of Thiruvananthapuram in the year 2022-23 was 1337 MU and with 9.99% T&D losses, the requirement was 1485 MU. The peak demand of the city was 279 MW. The Domestic sector was the biggest consumer of electricity (52%) followed by Commercial (34%) & Industrial (7%).

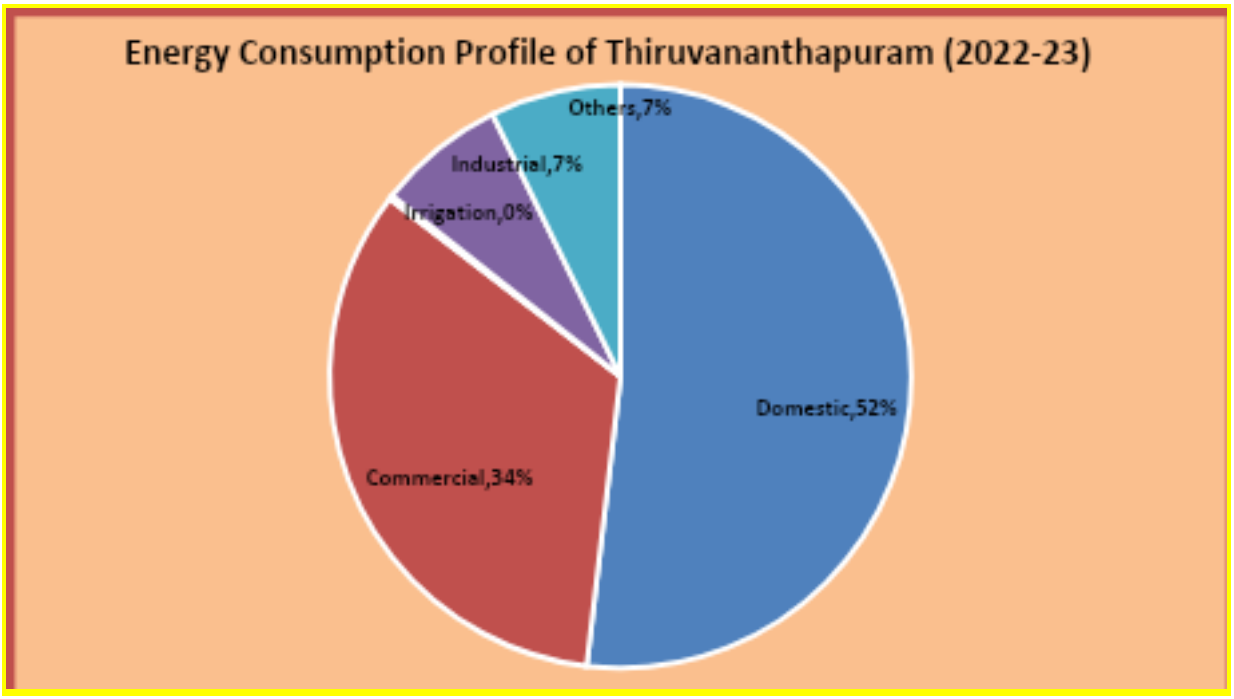


Figure 46-1 Energy Consumption Profile of Thiruvananthapuram (2022-23)

45.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Thiruvananthapuram was 1485 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 1799 MU by the year 2027-28 with a 3.92% CAGR for the period 2022-23 to 2027-28. With a CAGR of 4.04% for the period 2027-28 to 2032-33, its energy requirement is estimated as 2193 MU by the year 2032-33.

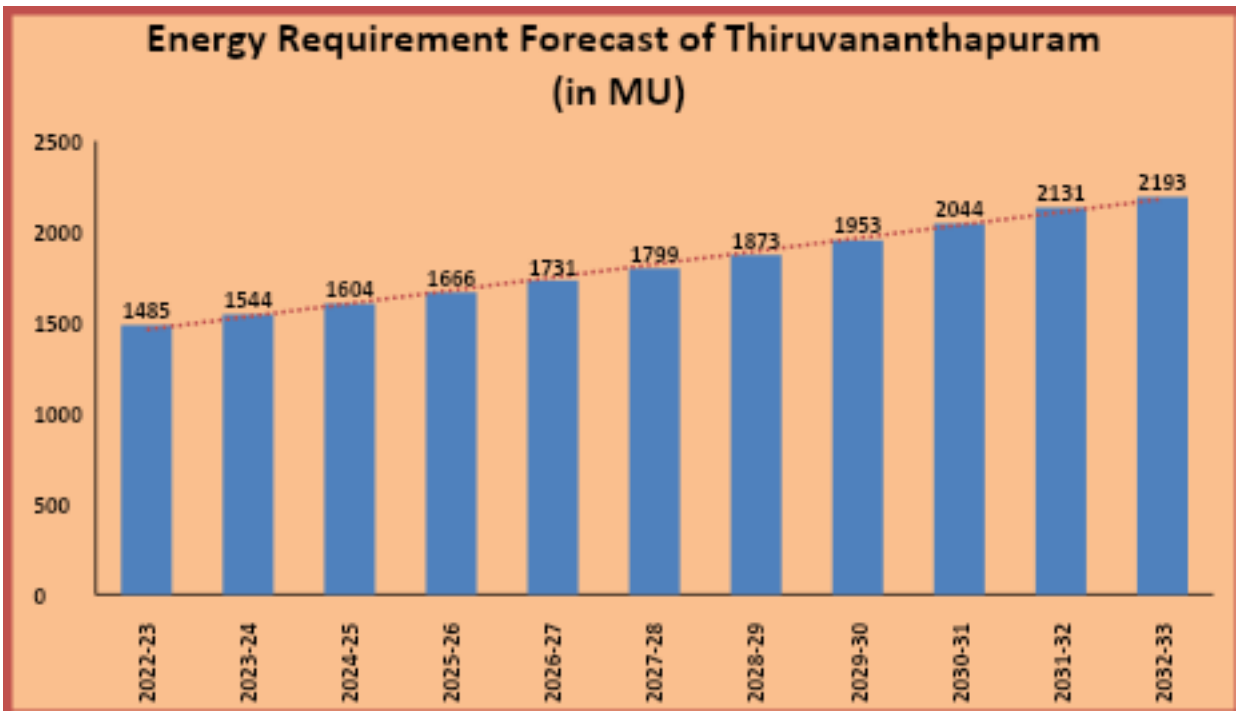


Figure 46-2 Energy Requirement Forecast of Thiruvananthapuram (in MU)

Peak Demand of Thiruvananthapuram is expected to see 4.8% CAGR upto 2027-28 and will reach 353 MW in comparison to 279 MW in year 2022-23. It is expected to reach 450 MW in year 2032-33 with a CAGR of 4.96% after 2027- 28.

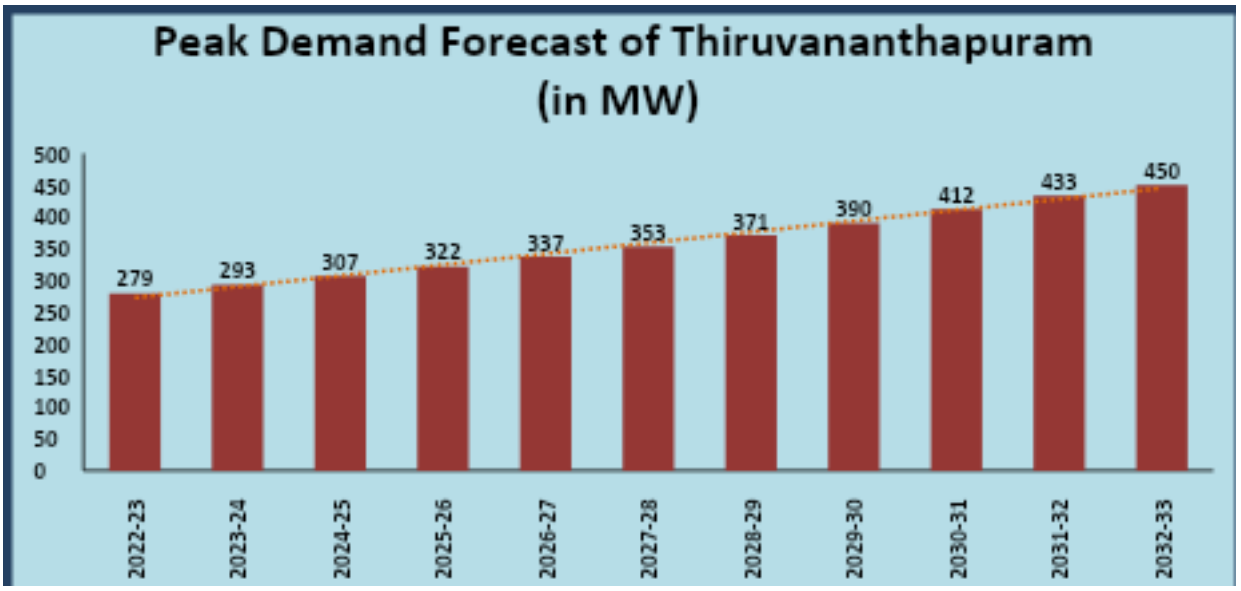
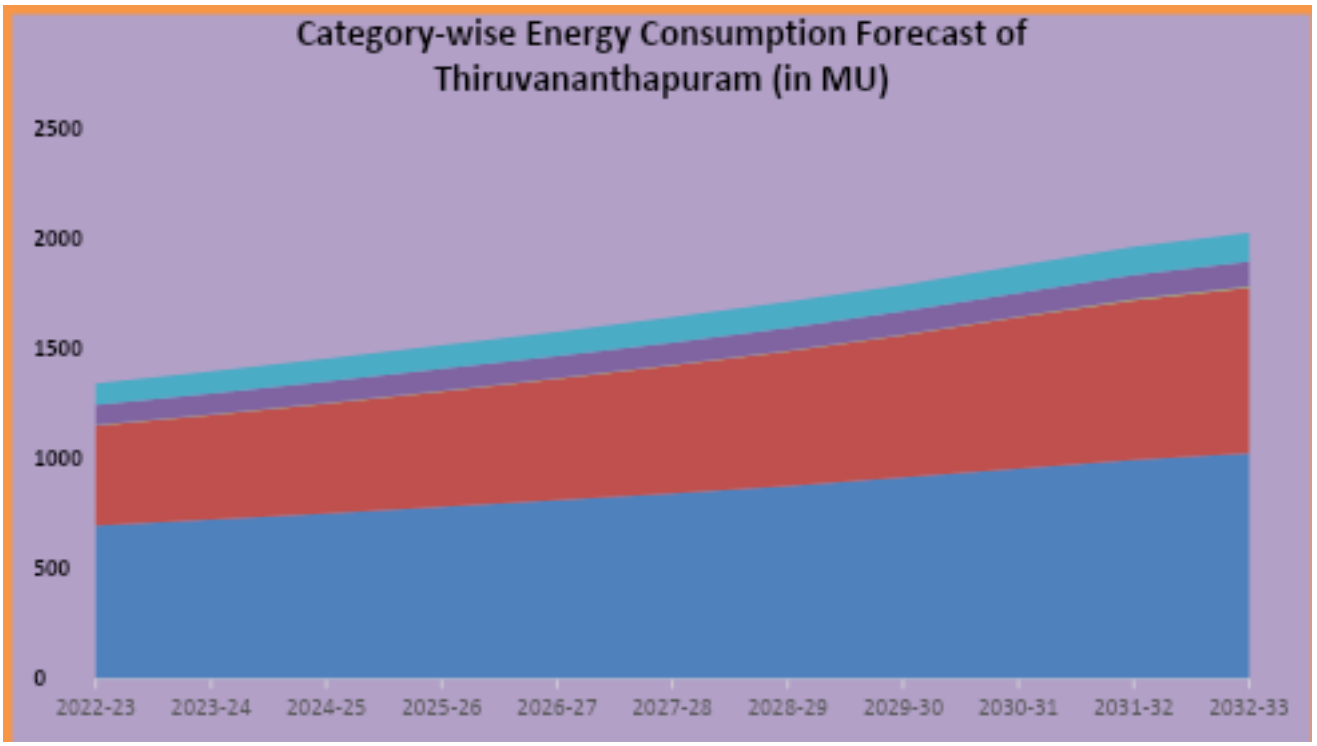


Figure 46-3 Peak Demand Forecast of Thiruvananthapuram (in MW)

The category-wise energy consumption forecast of Agra are as follows:



The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	**Domestic**	692	839	1022	3.93	4.02	3.97
2	**Commercial**	452	579	752	5.07	5.34	5.21
3	**Irrigation**	3	4	4	4.17	2.03	3.09
4	**Industrial**	92	102	112	2.04	1.89	1.96
5	**Others**	97	113	130	3.22	2.81	3.01
6	**Total**	1337	1638	2020	4.15	4.28	4.22

Table 46-1 Expected CAGR of Thiruvananthapuram - Category-wise Consumption

45.5 Transmission & Distribution Losses:

T&D losses of Thiruvananthapuram were 9.99 % in 2022-23. The target level is to bring it down to about 8.99 % and 7.89% by the end of 2027-28 & 2032-33 respectively.

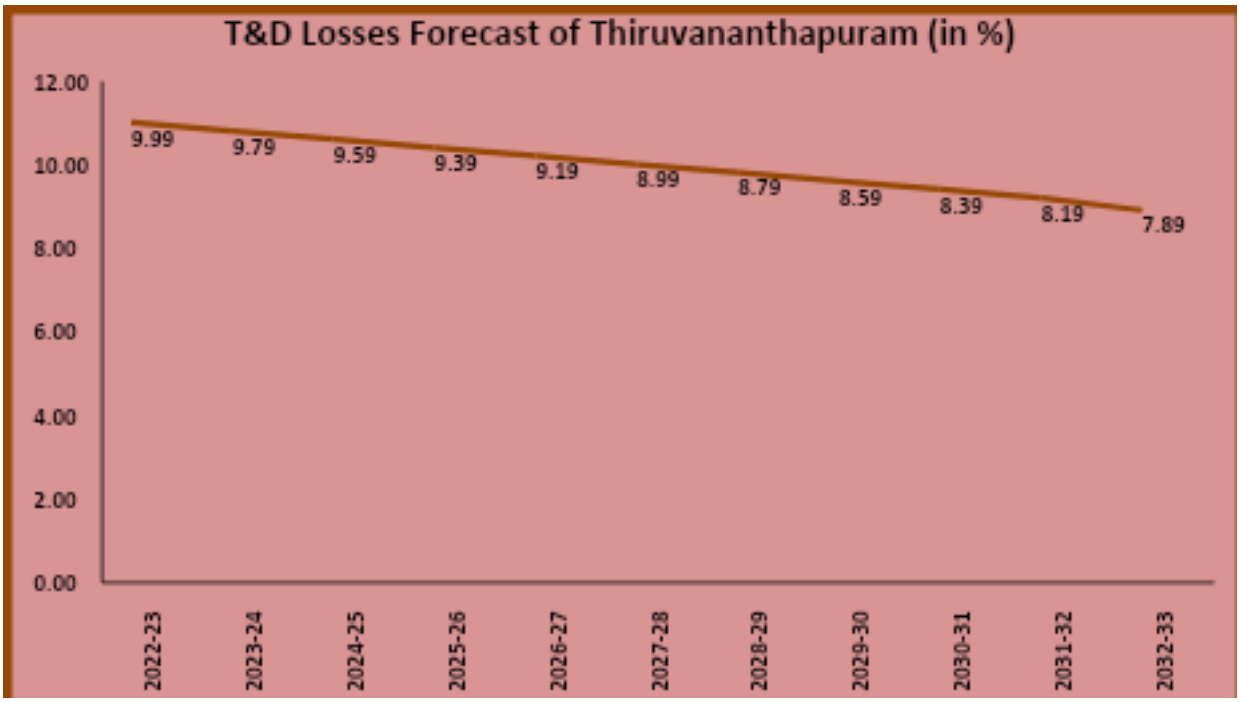


Figure 46-4 T&D Losses Forecast of Thiruvananthapuram (in %)

45.6 Summary of power forecast of Thiruvananthapuram city is summarized below:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)

					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	1485	1799	2193	3.92	4.04
2	**Peak Demand (in MW)**	279	353	450	4.80	4.96
3	**T&D Losses (in %)**	9.99	8.99	7.89		

Table 46-2 Power forecast summary of Thiruvananthapuram

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Thiruvananthapuram											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	692	720	748	777	808	839	873	910	953	992	1022
Commercial	452	475	499	524	551	579	610	645	684	723	752
Public lighting	20	21	21	22	22	23	23	24	24	24	25
Public Water Works	4	4	4	4	4	4	5	5	5	5	5
Irrigation	3	3	3	3	3	4	4	4	4	4	4
LT Industries	20	21	22	23	24	25	26	27	28	29	30
HT Industries	73	74	74	75	76	77	78	79	80	81	82
Railway Traction	21	22	23	24	25	26	27	28	29	30	32
Bulk Supply	50	51	53	55	57	58	60	62	63	65	67
Others (if Any)	2	2	2	2	2	2	2	2	2	2	2
Total (Energy Consumption)	1336.6	1393	1451	1510	1572	1638	1708	1785	1873	1957	2020
T&D losses -MU	148	151	154	156	159	162	165	168	172	175	173
T&D losses -in %	9.99	9.79	9.59	9.39	9.19	8.99	8.79	8.59	8.39	8.19	7.89
Energy Requirement - MU	1485	1544	1604	1666	1731	1799	1873	1953	2044	2131	2193
Annual Load Factor - %	60.65	60.15	59.65	59.15	58.65	58.15	57.65	57.15	56.65	56.15	55.65
Peak Load - MW	279	293	307	322	337	353	371	390	412	433	450

Table 46-3 Category-wise and Year-wise Summary of Thiruvananthapuram

Tiruchirappalli

Chapter 46: **Tiruchirappalli**

46.1 Introduction:

Tiruchirappalli is a major tier-II city in the South Indian State of Tamil Nadu.

Economy:
Tiruchirappalli is a major engineering equipment manufacturing and fabrication hub in India. A high-pressure boiler manufacturing plant was set up by India's largest public sector engineering company Bharat Heavy Electronics Limited BHEL in May 1965.

Climate:
Tiruchirappalli experiences a dry-summer tropical climate with no major change in temperature between summer and winter. The climate is generally characterized by high temperature and low humidity. With an annual mean temperature of 28.9 °C and monthly average temperatures ranging between 25 °C and 32 °C, the city is the hottest in the state. From June to September, the city experiences a moderate climate tempered by heavy rain and thundershowers. The average annual rainfall is 841.9 mm, slightly lower than the state's average of 945 mm.

46.2 Brief description of Power Utilities:

Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) is Responsible for electricity generation and distribution within the state.

46.3 Existing Power Scenario:

The total electricity consumption of Tiruchirappalli in the year 2022-23 was 1144 MU and with 8.89% T&D losses, the requirement was 1256 MU. The peak demand of the city was 425 MW. The Domestic sector was the biggest consumer of electricity (62%) followed by Commercial (21%) & others (11%).

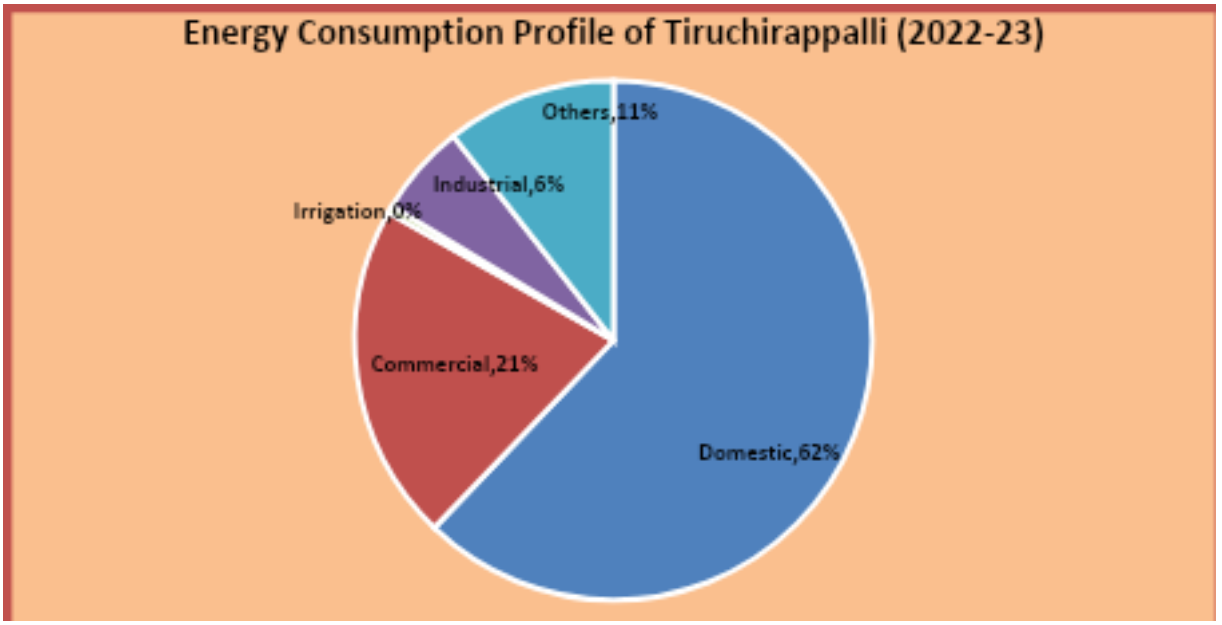


Figure 47-1 Energy Consumption Profile of Tiruchirappalli (2022-23)

In a comparison of Tiruchirappalli City with Tamil Nadu for the year 2022-23, it is observed that

the energy requirement of Trichy was 1.08% of the total energy requirement of the state.

2022-23	Tiruchirappalli	Tamil Nadu	% Share of Tiruchirappalli City
Energy in MU	1256	115788	1.08
Peak Demand in MW	425	17361	2.45

Table 47-1 Comparison of Tiruchirappalli with Tamil Nadu in 2022-23

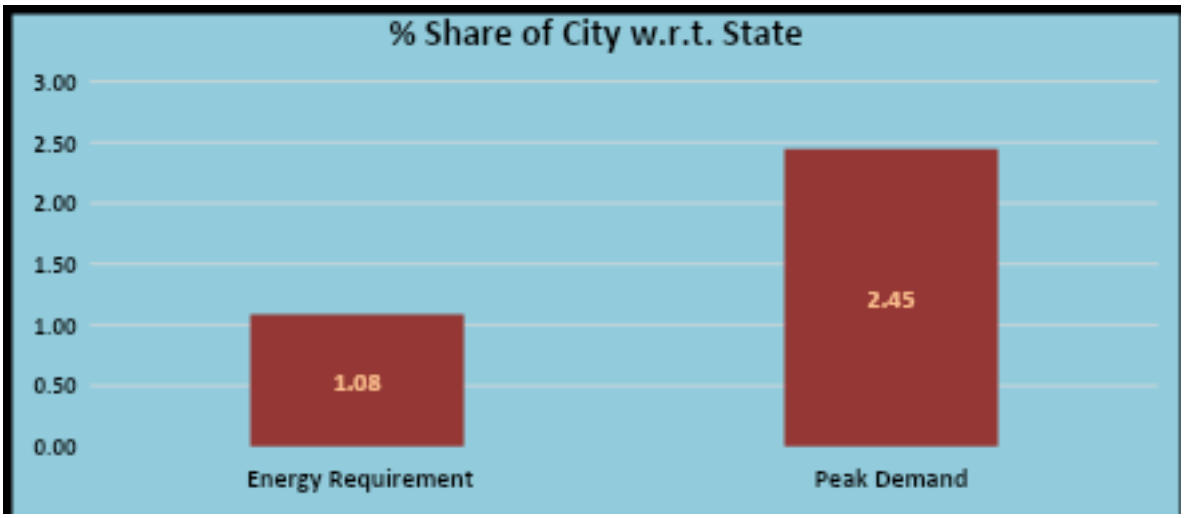


Figure 47-2 Comparison of Tiruchirappalli City and Tamil Nadu in the year 2022-23.

46.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Tiruchirappalli was 1256 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 1512 MU by the year 2027-28 with a 3.78% CAGR for the period 2022-23 to 2027-28. With a CAGR of 4.28% for the period 2027-28 to 2032-33, its energy requirement is estimated as 1864 MU by the year 2032-33.

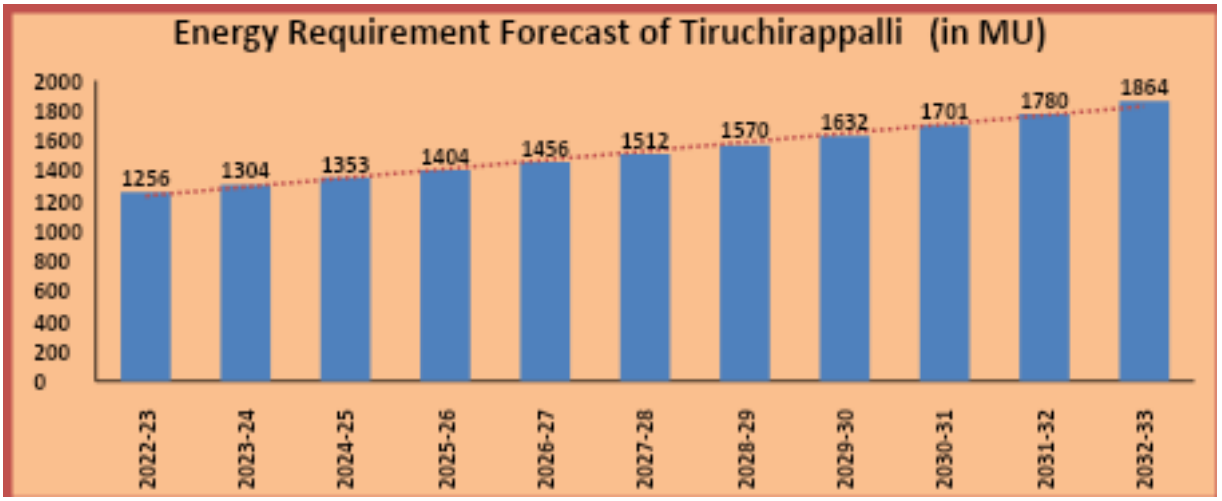


Figure 47-3 Energy Requirement Forecast of Tiruchirappalli (in MU)

Peak Demand of the Tiruchirappalli is expected to see 2.24% CAGR upto 2027-28 and will reach

474 MW in comparison to 425 MW in the year 2022-23. It is expected to reach 543 MW in the year 2032-33 with a CAGR of 2.74% after 2027-28.

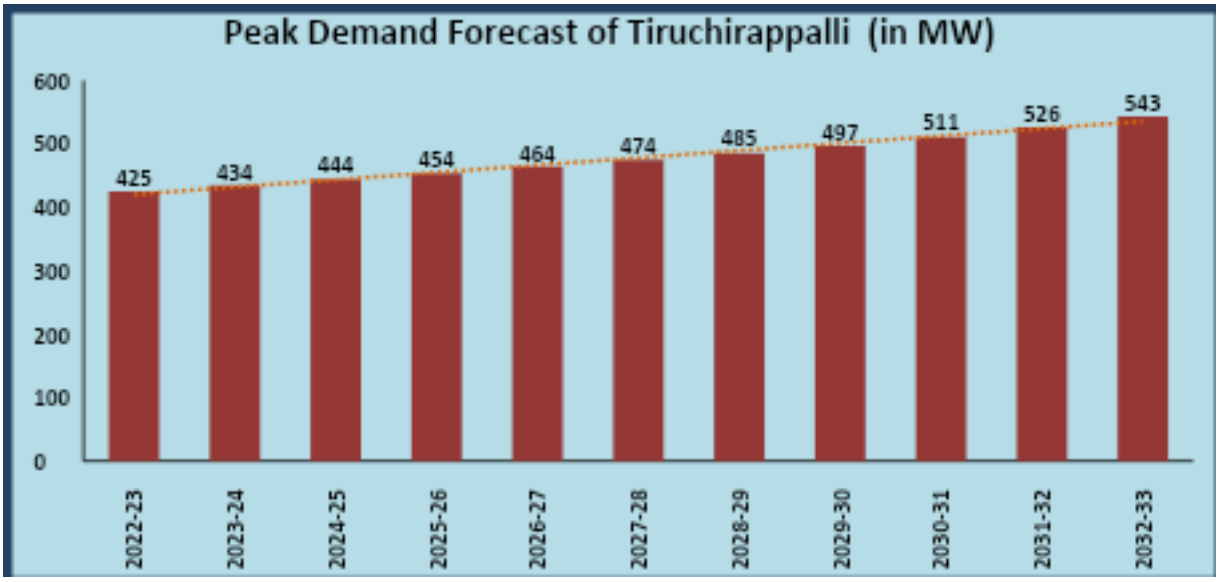


Figure 47-4 Peak Demand Forecast of Tiruchirappalli (in MW)

The category-wise energy consumption forecast of Tiruchirappalli are as follows:

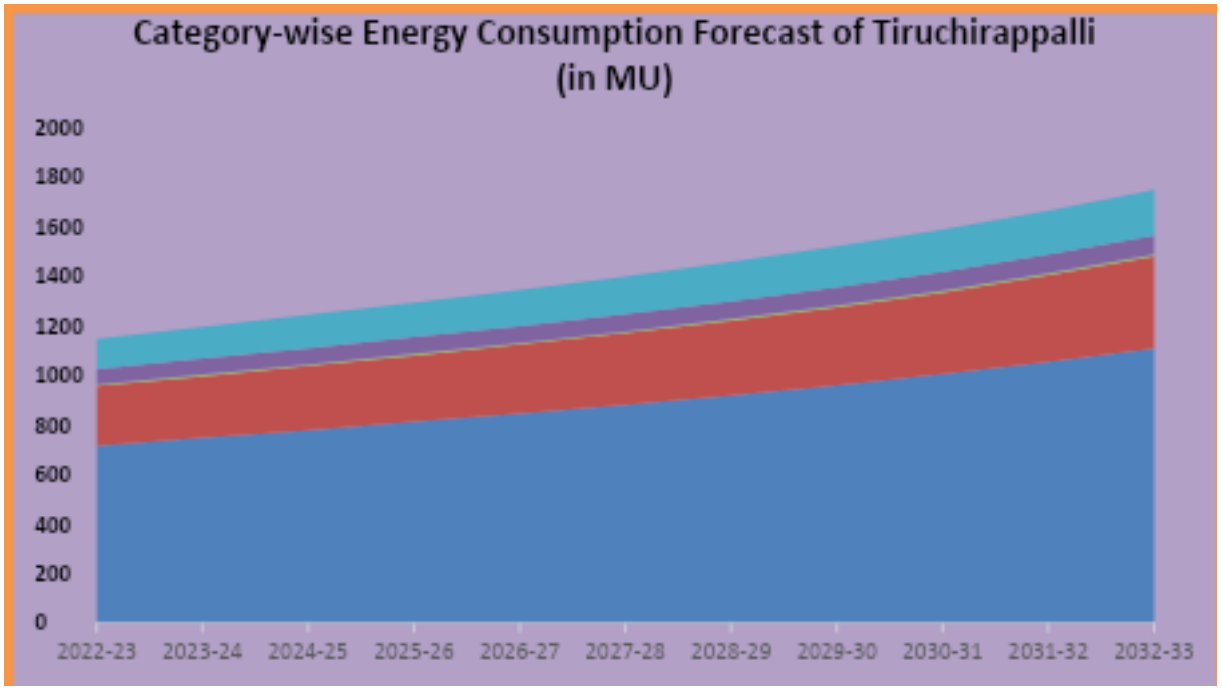


Figure 47-5 Category-wise Energy Consumption Forecast of Tiruchirappalli (in MU)

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33

1	**Domestic**	713	878	1106	4.26	4.71	4.49
2	**Commercial**	240	288	370	3.78	5.09	4.43
3	**Irrigation**	5	7	9	5.34	5.38	5.36
4	**Industrial**	64	70	76	1.89	1.56	1.72
5	**Others**	122	152	184	4.40	3.95	4.17
6	**Total**	**1144**	**1396**	**1745**	**4.05**	**4.56**	**4.31**

Table 47-2 Expected CAGR of Tiruchirappalli - Category-wise Consumption

46.5 Transmission & Distribution Losses:

T&D losses of Tiruchirappalli were 8.89% in year 2022-23. The target level is to bring it down to about 7.66% and 6.41% by the end of 2027-28 & 2032-33 respectively.

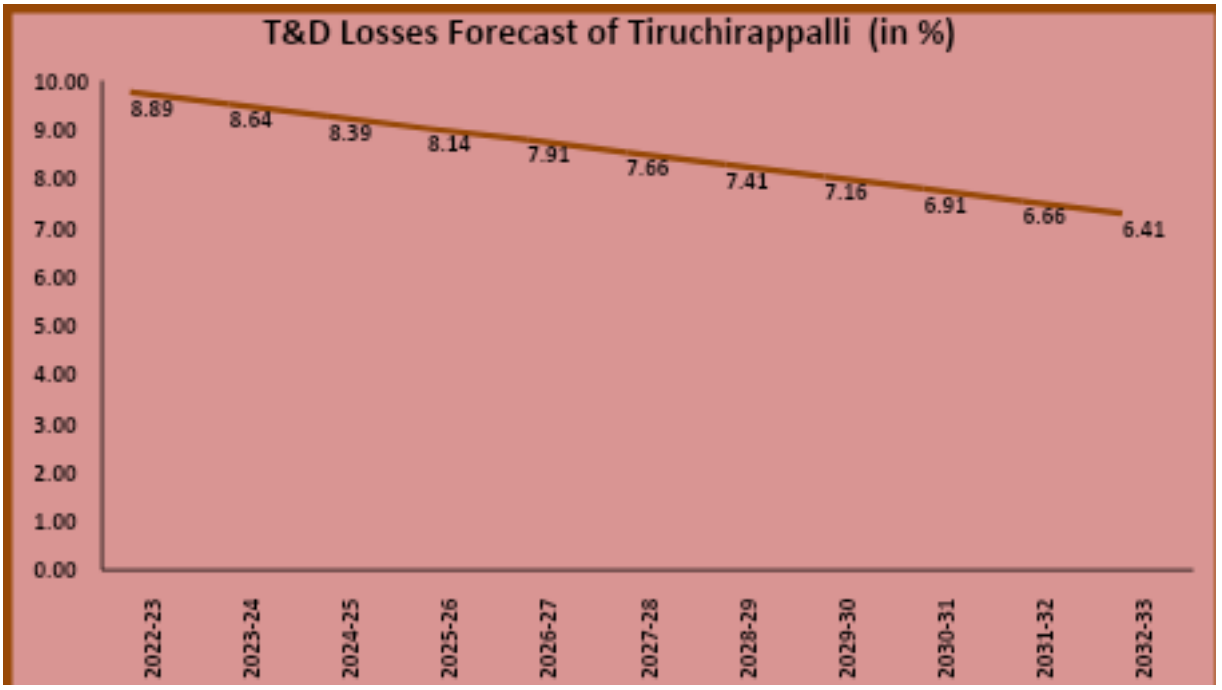


Figure 47-6 T&D Losses Forecast of Tiruchirappalli (in %)

46.6 The power forecast of Tiruchirappalli city is summarized below:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in%)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	Energy Requirement (in MU)	1256	1512	1864	3.78	4.28
2	Peak Demand (in MW)	425	474	543	2.24	2.74
3	T&D Losses (in %)	8.89	7.66	6.41		

Table 47-3 Power forecast summary of Tiruchirappalli

****

Tiruchirappalli											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	713	744	776	809	843	878	916	957	1001	1052	1106
Commercial	240	249	258	267	277	288	300	314	329	348	370
Public lighting	22	23	23	24	25	26	26	27	28	28	29
Public Water Works	0	0	0	0	0	0	0	0	0	0	0
Irrigation	5	6	6	6	7	7	7	8	8	8	9
LT Industries	36	37	37	38	38	38	39	39	39	39	39
HT Industries	28	28	29	30	31	32	33	34	35	36	37
Railway Traction	30	31	32	33	34	35	36	37	38	39	40
Bulk Supply	40	42	44	47	49	51	54	56	59	61	64
Others (if Any)	31	32	34	36	38	40	42	45	47	49	52
Total (Energy Consumption)	**1144**	**1191**	**1240**	**1290**	**1341**	**1396**	**1453**	**1515**	**1584**	**1661**	**1744**
T&D losses -MU	112	113	114	114	115	116	116	117	118	119	120
T&D losses -in %	8.89	8.64	8.39	8.14	7.91	7.66	7.41	7.16	6.91	6.66	6.41
Energy Requirement - MU	**1256**	**1304**	**1353**	**1404**	**1456**	**1512**	**1570**	**1632**	**1701**	**1780**	**1864**
Annual Load Factor - %	33.76	34.27	34.78	35.31	35.84	36.37	36.92	37.47	38.03	38.60	39.18
Peak Load - MW	**425**	**434**	**444**	**454**	**464**	**474**	**485**	**497**	**511**	**526**	**543**

Table 47-4 Category-wise and Year-wise Summary Tiruchirappalli

Varanasi

Chapter 47: **Varanasi**

47.1 Introduction:

Varanasi City is located in the middle Ganga valley of North India, in the Eastern part of Uttar Pradesh. Varanasi is known as Spiritual Capital of India and now it remains the hub of cultural and holy activities.

Economy:

The overall economy of the city is dependent on tourism and tourist related activities. Apart from religious activities, Varanasi has been a centre of spiritual and educational activities since time immemorial. Apart from this, primary economic activities such as horticulture (for betel leaves and mangoes) and household industry (silk weaving) are major occupations.

Climate:

The climate of the city is characterized by moist and relaxing except in cold & summer season. Dry summer starts in April & lasts until June followed by the monsoon season from July to October. Winters in Varanasi see very large diurnal variations with warm days and downright cold nights. Cold waves from the Himalayan region cause temperature to dip across the city in the winter from December to February and temperature below 5^0 C are not uncommon. The average annual rainfall is 1,110 mm.

47.2 Brief description of Power Utilities:

Purvanchal Vidyut Vitran Nigam Limited (PUVVNL), Varanasi is responsible for distribution of electricity in Varanasi.

47.3 Existing Power Scenario:

The total electricity consumption of Varanasi in the year 2022-23 was 1668 MU and with 13.52% T&D losses, the requirement was 1929 MU. The peak demand of the city was 604 MW. The Domestic sector was the biggest consumer of electricity (55%) followed by Commercial (24%) & Industrial (15%).

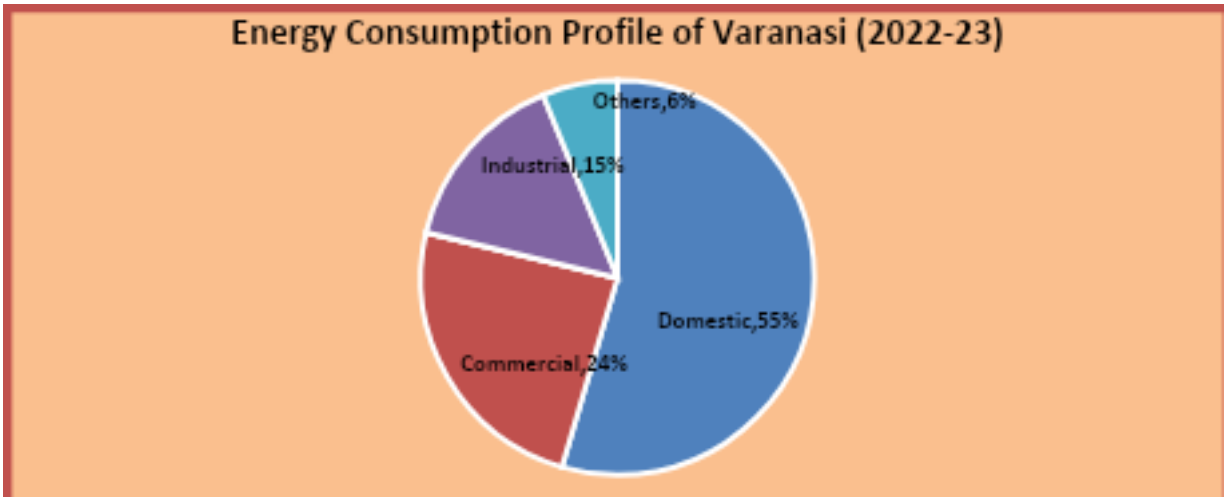


Figure 48-1 Energy Consumption Profile of Varanasi (2022-23)

In a comparison of Varanasi with Uttar Pradesh for the year 2022-23, it is observed that the energy requirement of Varanasi was 1.42% of the total energy requirement of the state.

2022-23	Varanasi	Uttar Pradesh	% Share of Varanasi City
Energy in MU	1929	151152	1.28
Peak Demand in MW	604	26028	2.32

Table 48-1 Comparison of Varanasi with Uttar Pradesh in 2022-23

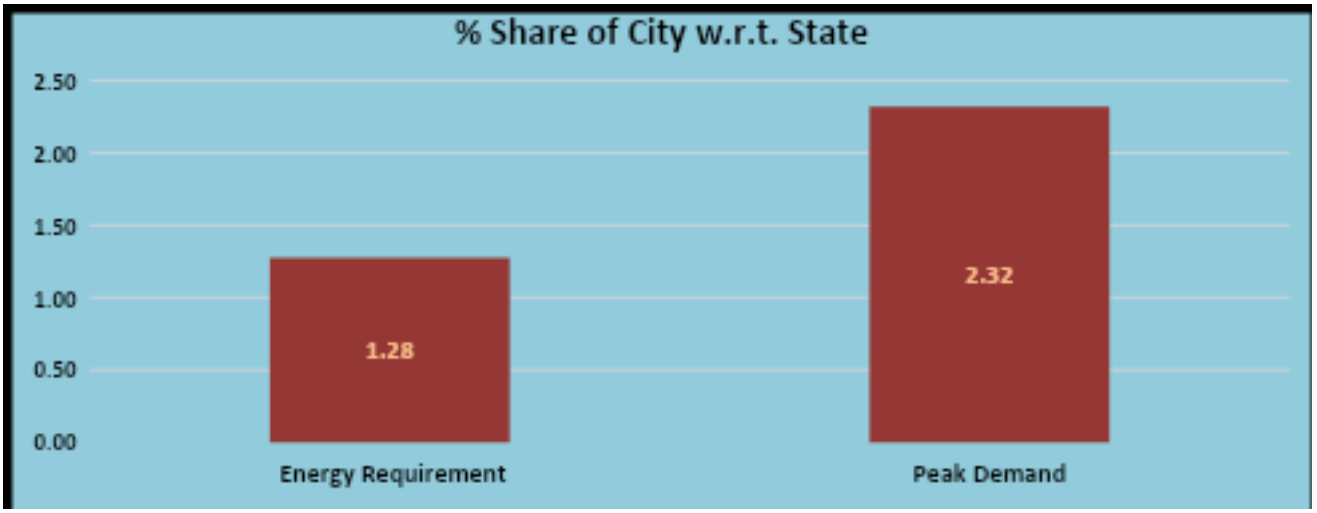


Figure 48-2 Comparison of Varanasi and Uttar Pradesh in the year 2022-23.

47.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Varanasi was 1929 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 2520 MU by the year 2027-28 with a 5.50% CAGR for the period 2022-23 to 2027-28. With CAGR of 5.27 % for the period 2027-28 to 2032-33, its energy requirement is estimated as 3259 MU by the year 2032-33.

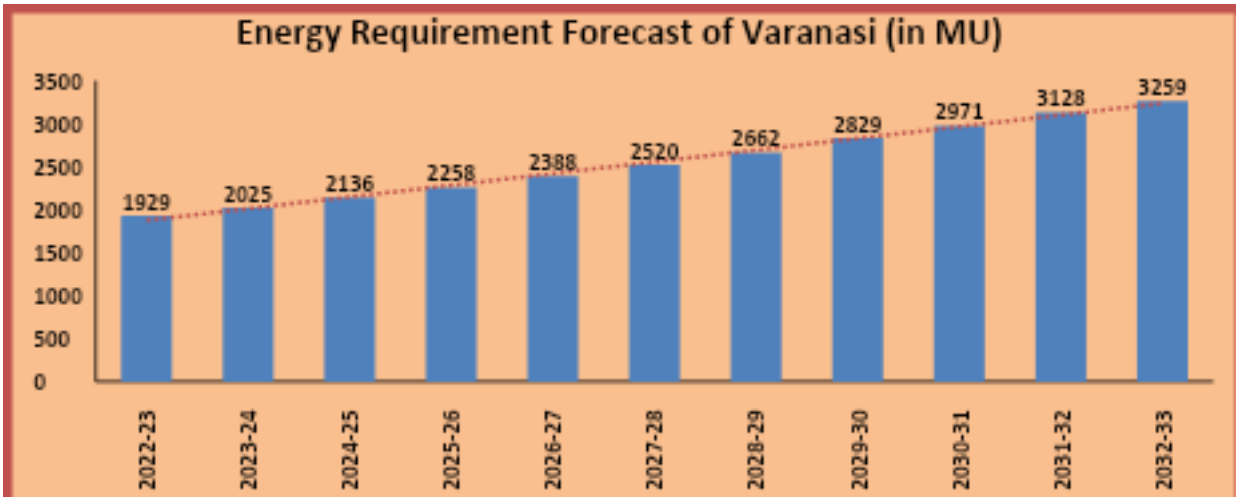


Figure 48-3 Energy Requirement Forecast of Varanasi (in MU)

Peak Demand of the Varanasi is expected to see 5.65% CAGR up to 2027-28 and will reach

795 MW in comparison to 604 MW in the year 2022-23. It is expected to reach 1041 MW in the year 2032-33 with a CAGR of 5.53% after 2027- 28.

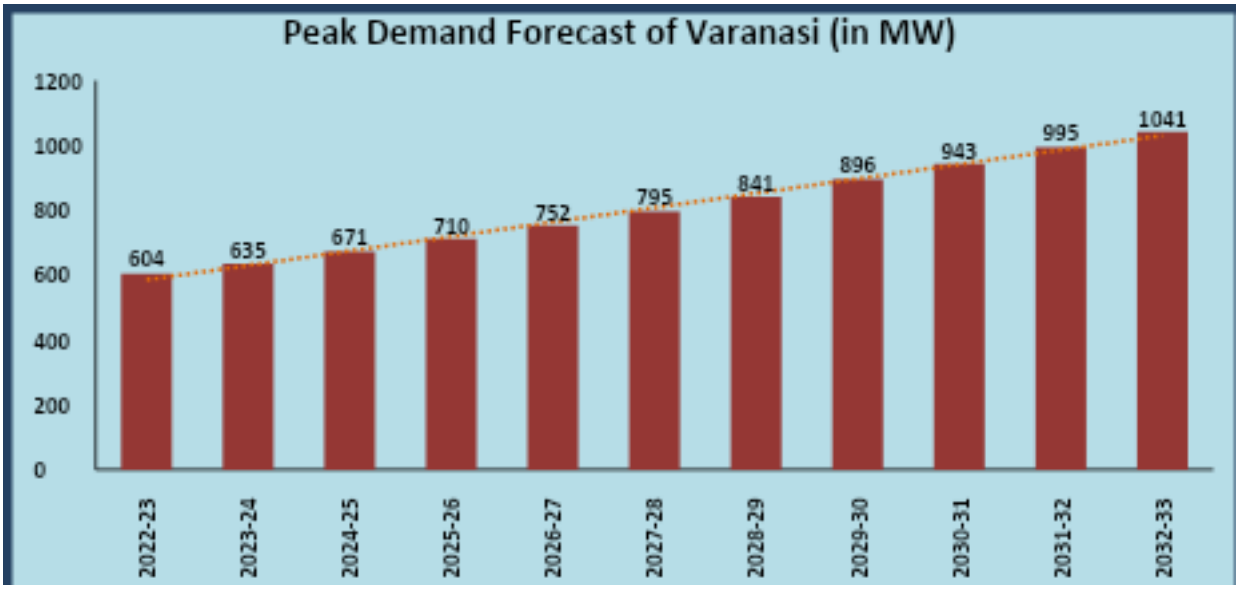


Figure 48-4 Peak Demand Forecast of Varanasi (in MW)

The category-wise energy consumption forecast of Varanasi are as follows:

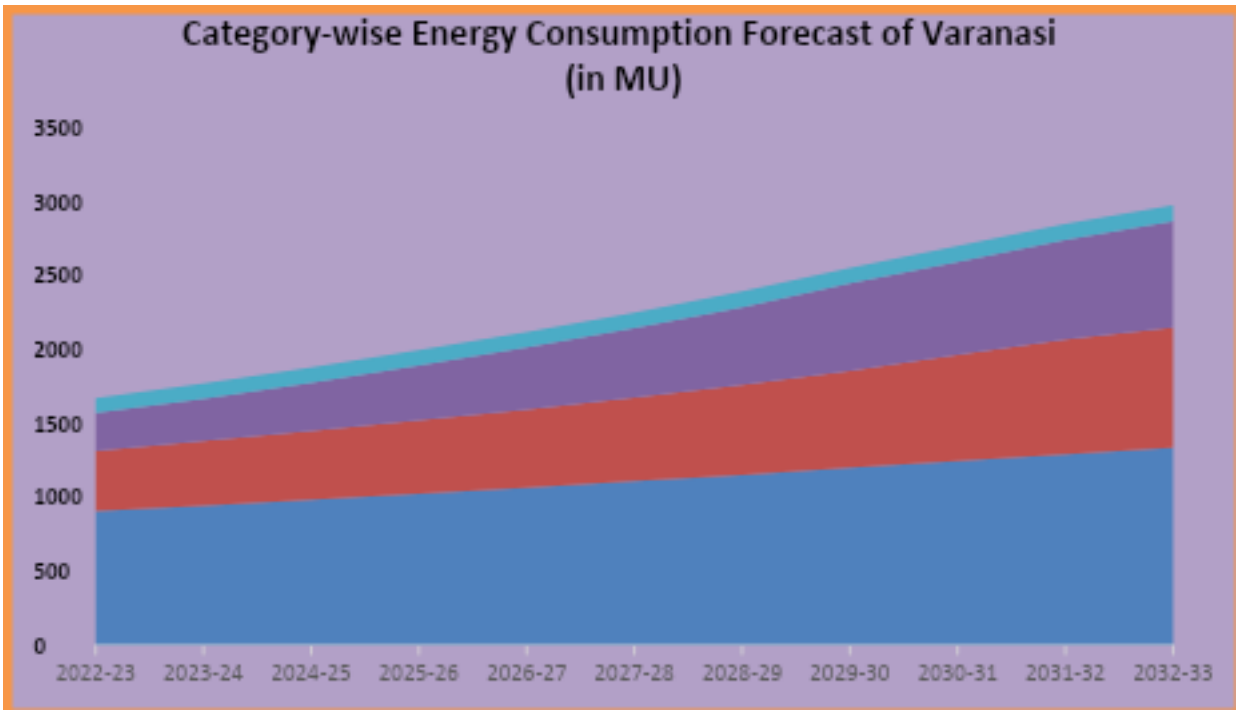


Figure 48-5 Category-wise Energy Consumption Forecast of Varanasi (in MU)

The category-wise CAGR expected in energy consumption is tabulated below:

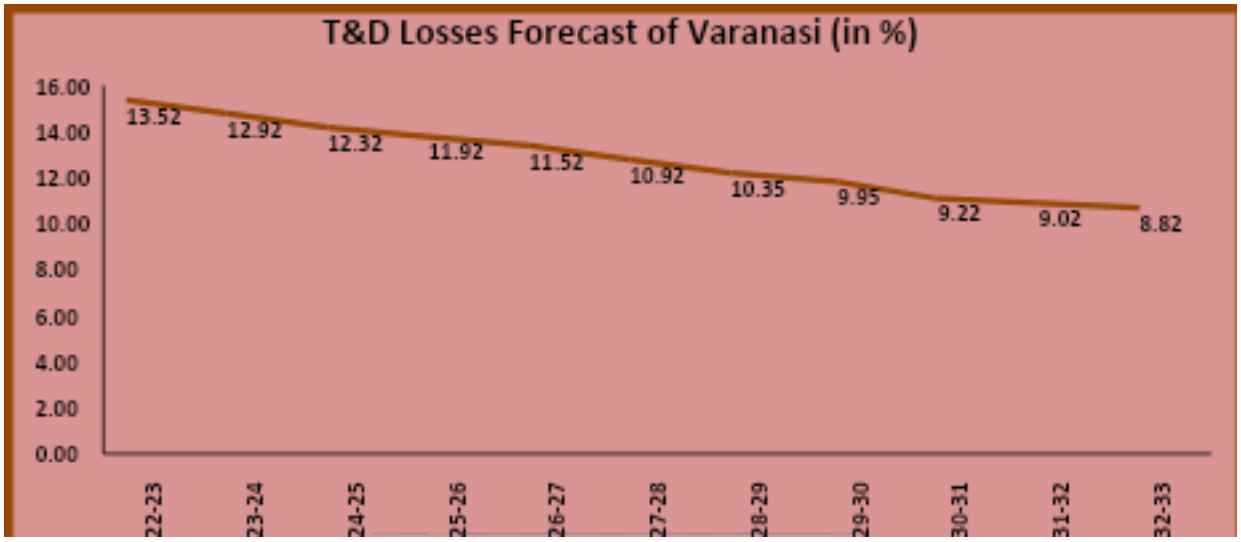
Sl. No.	Category	Energy Consumption (in MU)	CAGR (In %)

		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	**Domestic**	901	1105	1333	4.16	3.81	3.99
2	**Commercial**	408	566	812	6.80	7.46	7.13
3	**Irrigation**	0	0	0	0	0	0
4	**Industrial**	260	468	718	12.51	8.93	10.70
5	**Others**	99	106	109	1.20	0.70	0.95
6	**Total**	1668	2245	2971	6.12	5.76	5.94

Table 48-2 Expected CAGR of Varanasi - Category-wise Consumption

47.5 Transmission & Distribution Losses:

T&D losses of Varanasi were 13.52 % in the year 2022-23. The target level is to bring it down to about 10.92% and 8.82% by the end of 2027-28 & 2032-33 respectively.



47.6 Summary of power forecast of Varanasi city:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in%)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	1929	2520	3259	5.50	5.27
2	**Peak Demand (in MW)**	604	795	1041	5.65	5.53
3	**T&D Losses (in %)**	13.52	10.92	8.82		

Table 48-3 Power forecast summary of Varanasi

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Varanasi											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**2031-32**	**2032-33**
Domestic	901	941	981	1021	1063	1105	1149	1195	1243	1287	1333
Commercial	408	435	464	495	529	566	609	658	715	774	812
Public lighting	10	11	11	11	11	11	11	11	11	11	11
Public Water Works	89	90	91	93	94	94	95	96	97	97	98
Irrigation	0	0	0	0	0	0	0	0	0	0	0
LT Industries	73	77	82	87	92	97	102	107	112	117	124
HT Industries	187	210	244	283	325	371	420	481	519	559	594
Railway Traction	0	0	0	0	0	0	0	0	0	0	0
Bulk Supply	0	0	0	0	0	0	0	0	0	0	0
Others (if Any)	0	0	0	0	0	0	0	0	0	0	0
Total (Energy Consumption)	**1668**	**1763**	**1872**	**1989**	**2113**	**2245**	**2387**	**2548**	**2697**	**2846**	**2971**
T&D losses -MU	261	262	263	269	275	275	276	282	274	282	287
T&D losses -in %	13.52	12.92	12.32	11.92	11.52	10.92	10.35	9.95	9.22	9.02	8.82
Energy Requirement - MU	**1929**	**2025**	**2136**	**2258**	**2388**	**2520**	**2662**	**2829**	**2971**	**3128**	**3259**
Annual Load Factor - %	36.43	36.41	36.32	36.29	36.24	36.17	36.12	36.06	35.98	35.88	35.73
Peak Load - MW	**604**	**635**	**671**	**710**	**752**	**795**	**841**	**896**	**943**	**995**	**1041**

Table 48-4 Category-wise and Year-wise Summary of Varanasi.

Visakhapatnam

Chapter 48: **Visakhapatnam**

48.1 Introduction:

Visakhapatnam, also known as the City of Destiny and Jewel of the East Coast, is the largest city of the Sunrise State Andhra Pradesh. The city is also the financial capital as well as the executive capital of the State of Andhra Pradesh

Climate:

The annual mean temperatures range between 24.7–30.6 °C with the maximum in the month of May and the minimum in January. It receives rainfall from the South-west and North-east monsoons and the average annual rainfall is 1016 mm.

Economy & Industry:

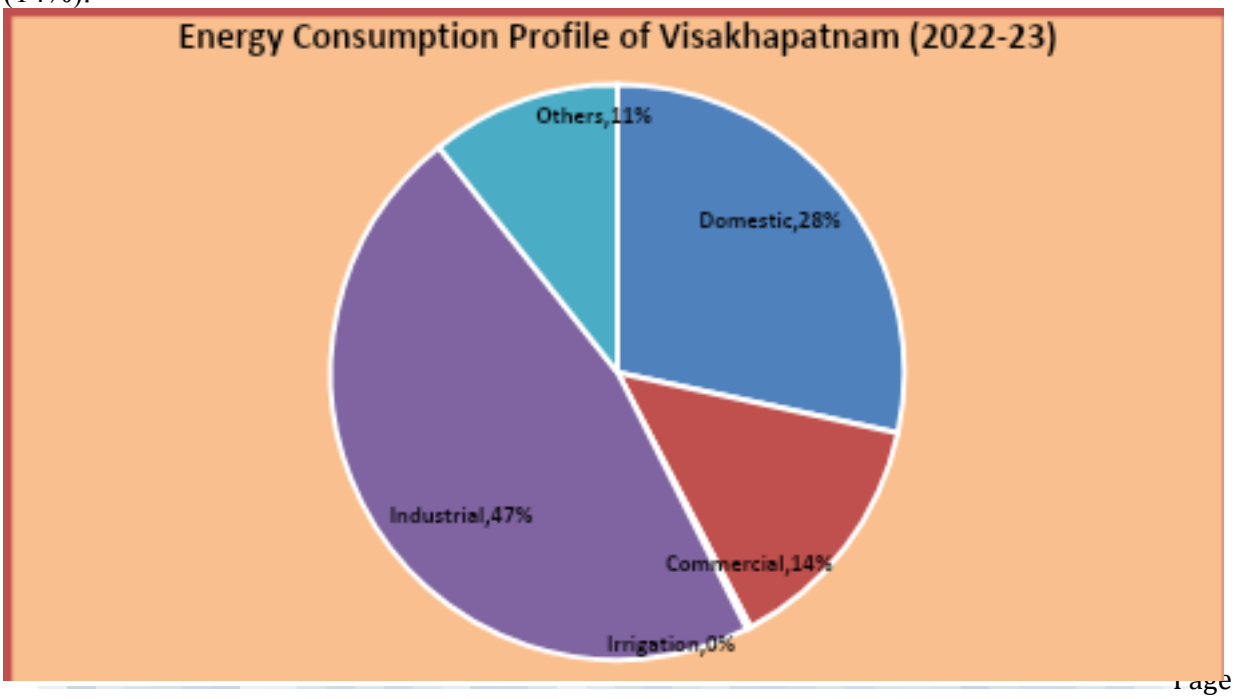
Fishing industry, road, rail, air & sea connectivity, many heavy industries like Hindustan Petroleum, Visakhapatnam Steel Plant, Hindustan Shipyard, Visakhapatnam Port Trust, National Thermal Power Corporation, Bharat Heavy Electricals, etc. and Private sector like Coromandel International, Ferro Alloys Corporation, etc., and SEZs like Jawaharlal Nehru Pharma City etc., made the city into an industrial hub. Blessed with a natural harbour and one of the largest ports of India, sea trade was made possible with other countries which plays important role in boosting up the city's economy.

48.2 Brief description of Power Utilities:

Visakhapatnam's power distribution is managed by the Andhra Pradesh Eastern Power Distribution Company Limited (APEPDCL). The utility provides electricity to urban and rural areas in and around Visakhapatnam, ensuring reliable service to a growing population.

48.3 Existing Power Scenario:

The total electricity consumption of Visakhapatnam in the year 2022-23 was 5143 MU and with 4.65% T&D losses, the requirement was 5394 MU. The peak demand of the city was 878 MW. The Industrial sector was the biggest consumer of electricity (47%) followed by Domestic (28 %) & Commercial & (14%).



In a Comparison of Visakhapatnam with Andhra Pradesh for the year 2022-23, it is observed that the energy requirement of Visakhapatnam was 7.39 % of the total energy requirement of the state.

2022-23	Visakhapatnam	Andhra Pradesh	% Share of Visakhapatnam City
Energy in MU	5391	72961	7.39
Peak Demand in MW	879	13363	6.58

Table 49-1 Comparison of Visakhapatnam with Andhra Pradesh in 2022-23.

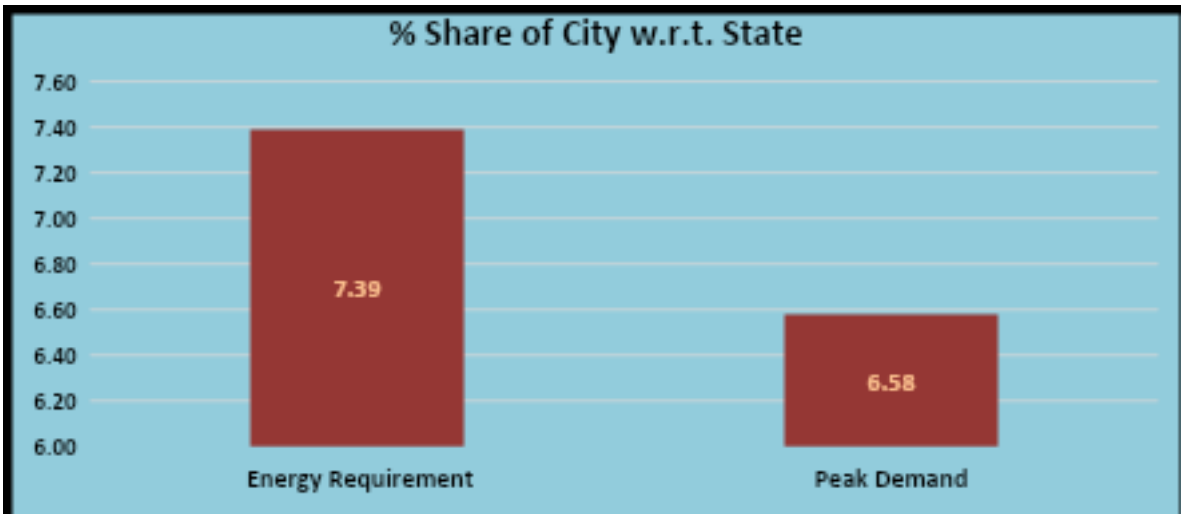


Figure 49-2 Comparison of Visakhapatnam and Andhra Pradesh in the year 2022-23.

48.4 Power Forecast:

Based on total electricity consumption and T&D Losses, the total energy requirement of Visakhapatnam was 5394 MU in the year 2022-23. It is expected that the energy requirement of the city will reach to 6803 MU by the year 2027-28 with a 4.75% CAGR for the period 2022-23 to 2027-28. With a CAGR of 4.48% for the period 2027-28 to 2032-33, its energy requirement is estimated as 8470 MU by the year 2032-33.

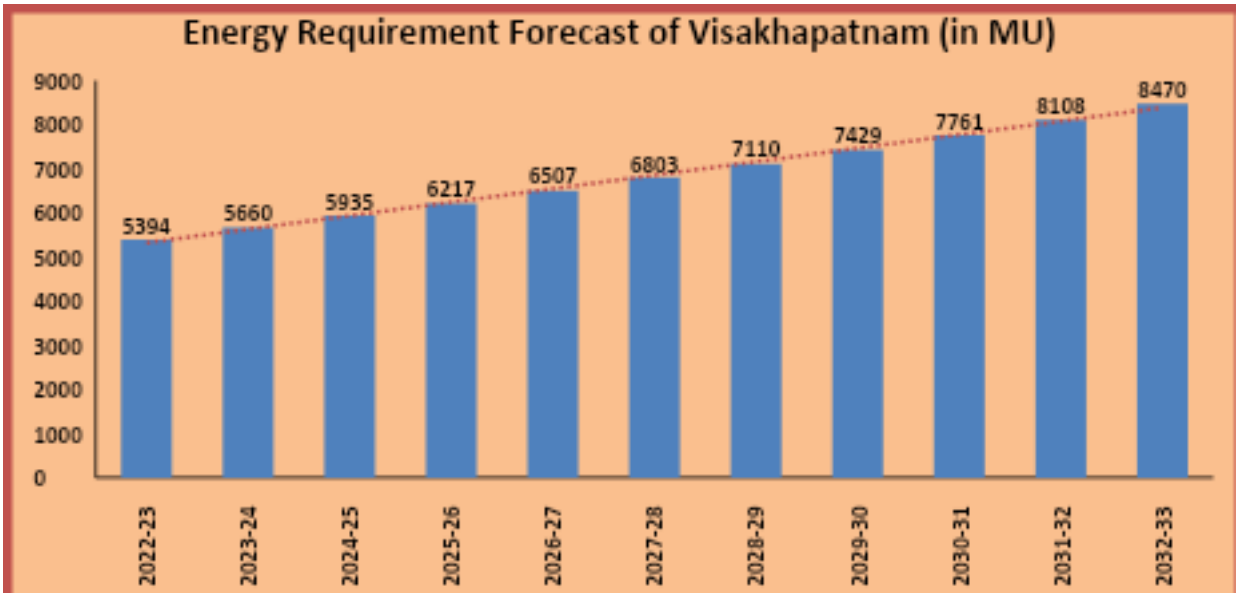


Figure 49-3 Energy Requirement Forecast of Visakhapatnam (in MU)

Peak Demand of Visakhapatnam is expected to see 4.76% CAGR upto 2027-28 and will reach 1108 MW in comparison to 878 MW in year 2022-23. It is expected to reach 1380 MW in year 2032-33 with a CAGR of 4.49% after 2027- 28.

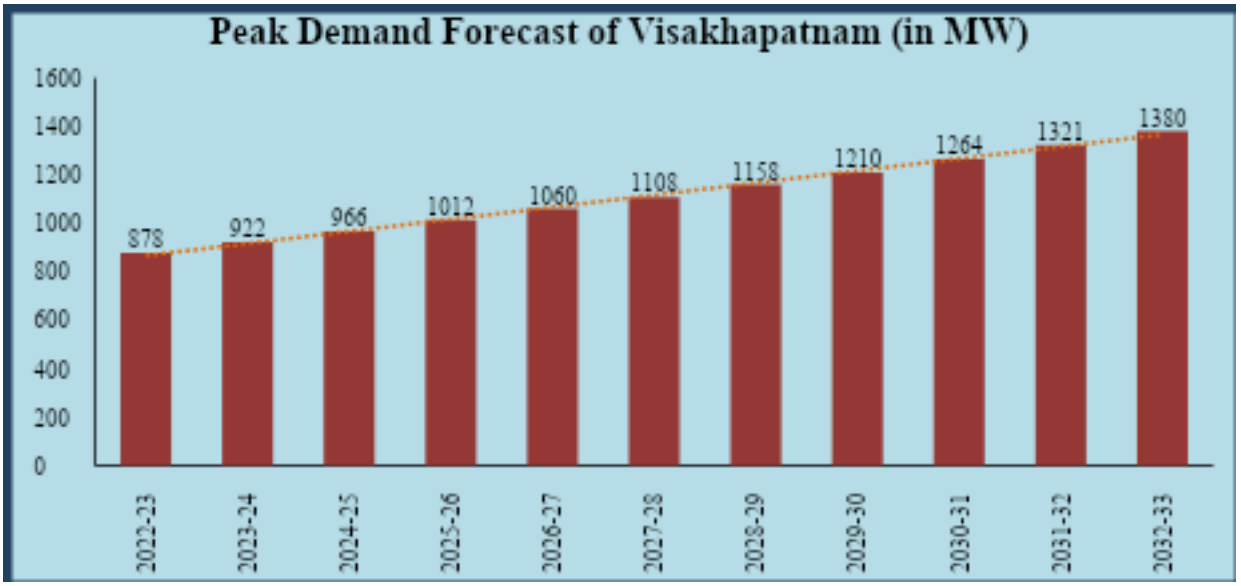


Figure 49-4 Peak Demand Forecast of Visakhapatnam (in MW)

The category-wise energy consumption forecast of Visakhapatnam are as follows:

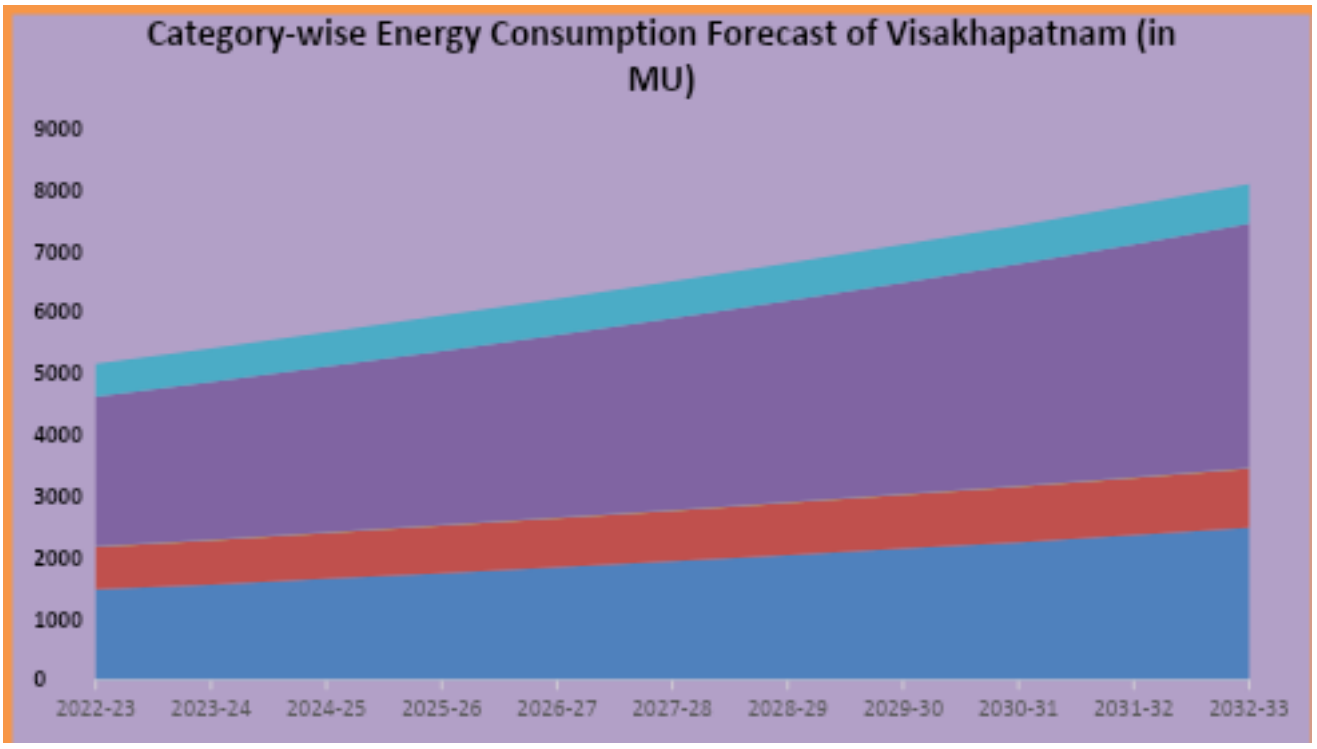


Figure 49-5 Category-wise Energy Consumption Forecast of Visakhapatnam (in MU)

The category-wise CAGR expected in energy consumption is tabulated below:

Sl. No.	Category	Energy Consumption (in MU)			CAGR (In %)		
		2022-23	2027-28	2032-33	2022-23 to 2027-28	2027-28 to 2032-33	2022-23 to 2032-33
1	**Domestic**	1464	1922	2472	5.60	5.16	5.38
2	**Commercial**	695	830	961	3.62	2.98	3.30
3	**Irrigation**	11	11	11	0	0	0
4	**Industrial**	2433	3127	3982	5.15	4.95	5.05
5	**Others**	541	597	653	2.00	1.82	1.91
6	**Total**	5143	6487	8079	4.75	4.49	4.62

Table 49-2 Expected CAGR of Visakhapatnam - Category-wise Consumption

48.5 Transmission & Distribution Losses:

T&D losses of Visakhapatnam were 4.65% in 2022-23. The target level is to bring it down to about 4.64% and 4.63% by the end of 2027-28 & 2032-33 respectively.

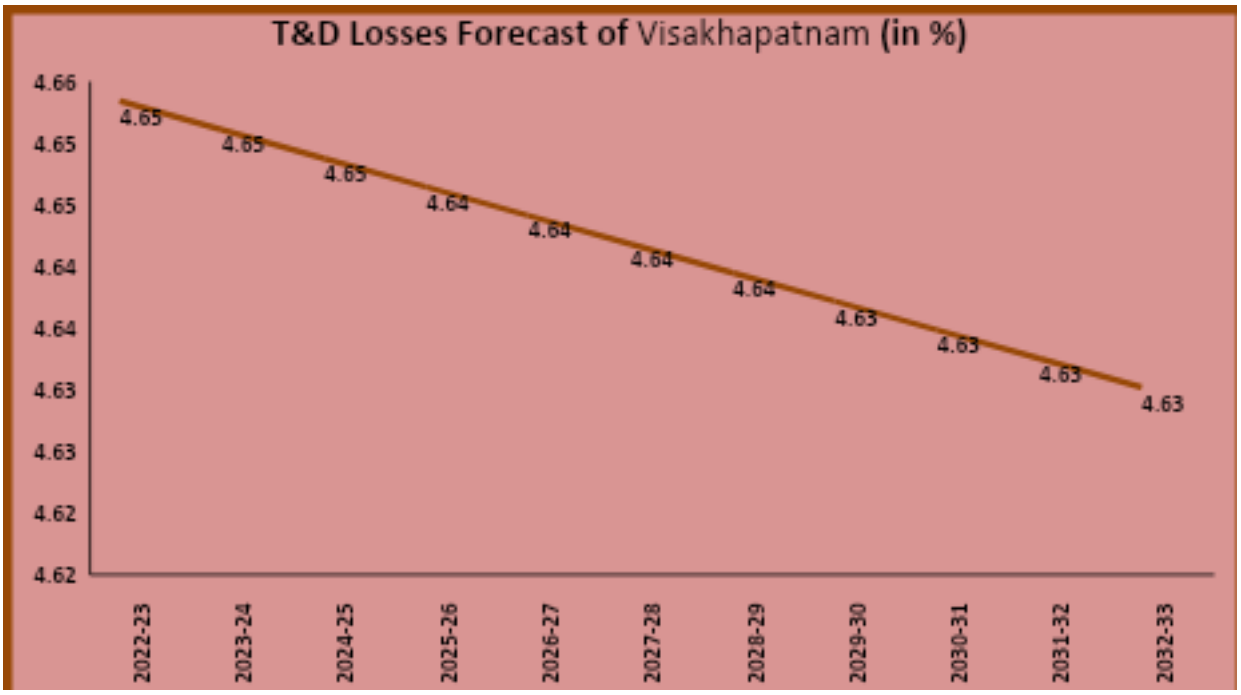


Figure 49-6 T&D Losses Forecast of Visakhapatnam (in %)

48.6 Summary of power forecast of Visakhapatnam city is summarized below:

S. N.	Particulars	2022-23	2027-28	2032-33	CAGR (in %)	
					2022-23 to 2027-28	2027-28 to 2032-33
1	**Energy Requirement (in MU)**	5394	6803	8470	4.75	4.48
2	**Peak Demand (in MW)**	878	1108	1380	4.76	4.49

3	**T&D Losses (in %)**	4.65	4.64	4.63		

Table 49-3 Power forecast summary of Visakhapatnam

As intimated by APEPDCL, GoAP have made futuristic plans to develop a sophisticated, swanky and most Modern Metro Rail System in the city of Visakhapatnam. Further, Vizag is undergoing through massive economic development as three multiplexes are under construction/ proposals- 1) Inorbit Mall (Biggest Mall in AP) 2) Karlan vizag Mall 3) ASN Mega Mall are being developed. Along with this, all the leading hotels and resort chains in India such as Oberoi, Taj Group, Mayfair Group have come forward with proposals to set up new properties across Visakhapatnam. The Adani Group is developing an 'Integrated Data Center and Technology Business Park' in Visakhapatnam.

Various initiatives such as fixing of Smart Meters, conversion of overhead lines to Under Ground Network and installation of energy efficient High Voltage Distribution system are being carried out by APEPDCL to reduce AT&C losses.

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Vishakhapatnam											
Electrical Energy Consumption, Energy Requirement and Peak Electricity Demand											
(Category-wise and Year-wise Summary)											
Year	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**20231-32**	**2032-33**
Domestic	1464	1548	1637	1728	1823	1922	2024	2129	2238	2352	2472
Commercial	695	722	750	777	804	830	856	882	908	935	961
Public lighting	24	25	27	28	29	30	31	32	33	34	35
Public Water Works	49	50	52	53	54	55	56	57	58	59	60
Irrigation	11	11	11	11	11	11	11	11	11	11	11
LT Industries	33	35	37	39	41	43	45	47	50	52	55
HT Industries	2400	2528	2661	2798	2939	3084	3237	3397	3566	3742	3927
Railway Traction	214	220	226	232	238	244	250	257	263	270	276
Bulk Supply	0	0	0	0	0	0	0	0	0	0	0
Others (if Any)	253	257	260	263	266	268	271	274	276	279	282
Total (Energy Consumption)	5143	5397	5660	5929	6205	6487	6781	7085	7401	7733	8078
T&D losses -MU	251	263	276	289	302	316	330	344	359	375	392
T&D losses -in %	4.65	4.65	4.65	4.64	4.64	4.64	4.64	4.63	4.63	4.63	4.63
Energy Requirement - MU	5394	5660	5935	6217	6507	6803	7110	7429	7761	8108	8470
Annual Load Factor - %	70.13	70.12	70.11	70.11	70.10	70.09	70.09	70.08	70.07	70.06	70.06
Peak Load - MW	878	922	966	1012	1060	1108	1158	1210	1264	1321	1380

Table 49-4 Category-wise and Year-wise Summary of Visakhapatnam.

48.7 Annex-I

Population & Area of the States as per Census-2011

S. No.	State	Population	Area
1	Uttar Pradesh	199,812,341	240,928
2	Maharashtra	112,374,333	307,713
3	Bihar	104,099,452	94,163
4	West Bengal	91,276,115	88,752
5	Andhra Pradesh	84,580,777	275,045
6	Madhya Pradesh	72,626,809	308,252
7	Tamil Nadu	72,147,030	130,060
8	Rajasthan	68,548,437	342,239
9	Karnataka	61,095,297	191,791
10	Gujarat	60,439,692	196,244
11	Orissa	41,974,218	155,707
12	Kerala	33,406,061	38,852
13	Jharkhand	32,988,134	79,716
14	Assam	31,205,576	78,438
15	Punjab	27,743,338	50,362
16	Chhattisgarh	25,545,198	135,192
17	Haryana	25,351,462	44,212
18	Delhi	16,787,941	1,483
19	Jammu and Kashmir	12,541,302	222,236
20	Uttarakhand	10,086,292	53,483
21	Himachal Pradesh	6,864,602	55,673
22	Tripura	3,673,917	10,486
23	Meghalaya	2,966,889	22,429
24	Manipur	2,855,794	22,327
25	Nagaland	1,978,502	16,579
26	Goa	1,458,545	3,702
27	Arunachal Pradesh	1,383,727	83,743
28	Puducherry	1,247,953	490
29	Mizoram	1,097,206	21,081
30	Chandigarh	1,055,450	114
31	Sikkim	610,577	7,096
32	Andaman and Nicobar Islands	380,581	8,249
33	Dadra and Nagar Haveli	343,709	491
34	Daman and Diu	243,247	111
35	Lakshadweep	64,473	30

48.8 Annex-II

Population & Area of the Cities as per Census-2011

S. No.	City	Population	Area
1.	Agartala	400004	58.84
2.	Agra	15,85,704	120.57
3.	Ahmedabad	6,357,693	1,060.95
4.	Aizawl	404054	3576.31
5.	Amirtsar	1,183,549	136
6.	Aurangabad	12,43,744	180.12
7.	Bengaluru	85,20,435	748.42
8.	Bhopal	1,886,100	336.06
9.	Bhubaneshwar	885,363	135
10.	Chennai	8,653,521	932.47
11.	Coimbatore	2,136,916	696.25
12.	Dehradun	1,696,694	3,088
13.	Gangtok	1,00,286	19.28
14.	Guwahati	962,334	219.06
15.	Gwalior	1,102,884	183.71
16.	Hyderabad	69,71,622	962.3
17.	Imphal	517992	121
18.	Indore	2,170,295	233.6
19.	Itanagar	59490	51.69
20.	Jabalpur	1,268,848	237.16
21.	Jaipur	3,046,163	484.64
22.	Jammu	5,76,198	159.36
23.	Jodhpur	10,33,756	75.5
24.	Kanpur	29,20,496	301.16
25.	Kohima	267988	1463
26.	Kolkata	1,41,12,536	1886.67
27.	Kota	10,01,694	221.36
28.	Lucknow	28,17,105	348.8
29.	Madurai	3,038,252	3,710
30.	Mumbai	1,24,42,373	603
31.	Nagpur	24,97,870	229.2
32.	Panaji	70991	53.7
33.	Patna	2,049,156	142.46
34.	Port Blair	1,08,058	17.91
35.	Prayagraj	1,212,395	115.46
36.	Pune	50,57,709	502.78
37.	Raipur	1,123,558	192.55

38.	Ranchi	11,26,720	197
39.	Shillong	143229	64.36
40.	Srinagar	1,236,829	1,979
41.	Surat	44,67,797	335.82
42.	Thiruvananthapuram	1,679,754	542.57
43.	Tiruchirappalli	1,022,518	211.51
44.	Varanasi	14,32,280	118.68
45.	Vishakhapatnam	17,28,128	513.61