

Hubballi Electricity Supply Company Ltd.



Resource Adequacy Plan – Hescom Perspective

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From a DISCOM perspective, "resource adequacy" refers to **ensuring that enough electricity generation capacity is available to reliably meet the projected demand of their consumers**, taking into account factors like peak demand periods, weather variability, and potential plant outages, by carefully planning and procuring power from various sources to maintain a stable supply at all times; essentially, it's about having the right mix of generation sources to reliably meet customer needs without disruptions.

Key aspects of resource adequacy for a DISCOM:

- **Demand Forecasting:** Accurately predicting future electricity demand patterns across different seasons and timeframes to plan for necessary capacity additions.
- **Generation Mix Optimization:** Selecting the optimal mix of generation sources (thermal, renewable, hydro, etc.) considering cost, availability, and environmental impact to meet demand efficiently.
- **Capacity Procurement:** Entering into long-term power purchase agreements with generators to secure sufficient capacity to meet projected demand.
- **Renewable Integration:** Managing the integration of variable renewable sources like solar and wind power, including considering energy storage solutions to mitigate fluctuations.
- **Reliability Standards:** Adhering to regulatory requirements regarding reliability metrics like Loss of Load Probability (LOLP) to ensure consistent power supply.
- **Market Mechanisms:** Utilizing electricity markets to access additional power during peak demand periods through short-term contracts or balancing mechanisms.
- **Demand Response:** Implementing strategies to manage consumer demand during peak hours, like incentivizing load shifting or curtailment.

Challenges for DISCOMs in achieving resource adequacy:

- **Uncertainty in demand:** Fluctuations in consumer demand due to economic factors or weather events can make planning difficult.
- **Renewable variability:** Integrating large amounts of intermittent renewable energy requires careful planning and storage solutions.
- **High capital costs:** Investing in new generation capacity, especially for renewables, can be financially challenging for DISCOMs.
- **Regulatory constraints:** Compliance with Renewable Purchase Obligations (RPOs) can add complexity to resource planning.

How DISCOMs can improve resource adequacy:

- **Detailed resource adequacy studies:** Regularly conducting comprehensive assessments to analyze future demand and identify potential gaps in generation capacity.
- **Collaboration with grid operators:** Coordinating with transmission system operators to ensure reliable power flow across the grid.
- **Technology advancements:** Exploring new technologies like smart grids, energy storage, and demand response to enhance grid flexibility.
- **Data analytics:** Utilizing data analysis to better understand demand patterns and optimize resource allocation.

INCORPORATION:

The Company has been entrusted with Distribution of Power in the Districts of DHARWAD, GADAG, HAVERI, UTTAR KANNADA, BELAGAVI, BAGALKOT and VIJAYPURA Districts.

BASIC PROFILE:



Sl. No	Particulars	As on 31.10.2024
1	Area (Sq Km)	54,513
2	Districts	7
3	Taluks	69
4	ULB's	109
5	VP's	1,574
6	Villages:	5,397
7	Zones	2
8	Circles	8
9	Divisions	26
10	Sub-Divisions	85
11	Sections	335
12	Population in Crs	1.66
13	No. of MLAs	56
14	No. of MPs	7
Employee Strength		
15	Sanctioned (in Nos.)	16907
16	Working (in Nos.)	10461
17	Vacant (in Nos.)	6446
18	Total Assets	Rs. 14966.33 Crs

HESCOM PROFILE

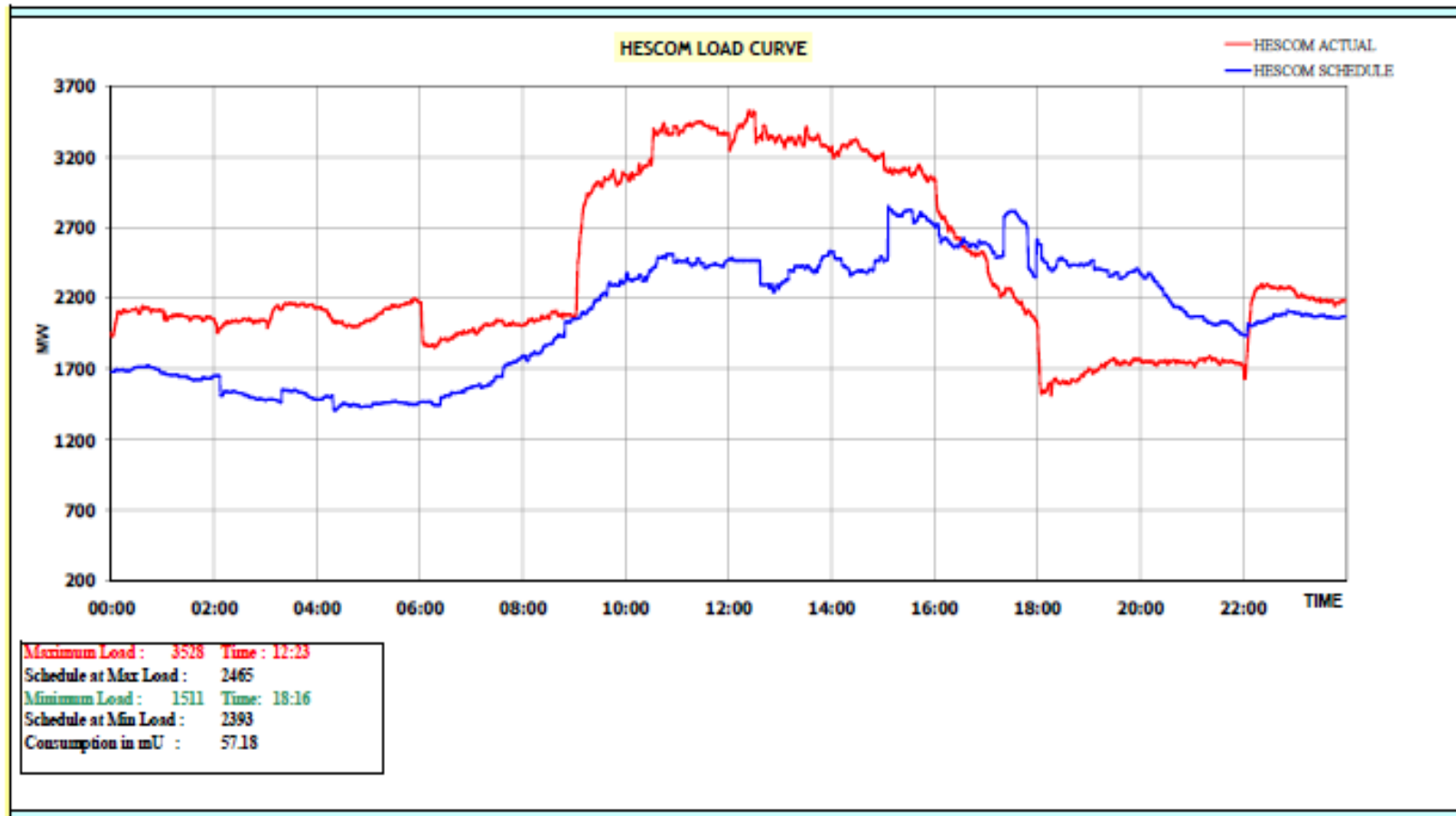
Sl. no	Particulars	As on 31.10.2024
1	400 KV Stations	02
2	220 KV Stations	27
3	110 KV Stations	260
4	66 KV Stations	1
5	33 KV Stations	177
6	33 KV Lines (Ckmtr)	3372.84
7	11 KV Feeders (Nos)	4329
8	DTC's in Nos.	318522
9	No. of Installations (in Lakhs)	62.22
10	HT Length in Rt Km.	104936.68
11	LT Length in Rt Km	153868.55

11KV Feeders existing in HESCOM jurisdiction

District wise 11 KV feeders details as on October-2024											
SI No	DISTRICT	CIRCLE	RURAL	EIP	WATER SUPPLY	NJY	URBAN DHQ	INDUSTRIAL	URBAN NDHQ	LIFT IRRIGATION	TOTAL
1	BAGALKOT	BAGALKOT		565	12	137	27	10	34	4	789
2	BELAGAVI	BELAGAVI		484	10	164	62	53	27	4	804
		CHIKKODI		524	9	103		10	18	6	670
3	GADAG	GADAG		108	9	59	14	5	13	10	218
4	HAVERI	HAVERI		294	11	135	8	7	24	5	484
5	DHARWAD	HUBBALLI		86	6	82	110	29	11		324
6	UTTAR KANNADA	SIRSI	176		7		10	4	31		228
7	VIJAYAPUR	VIJAYAPUR		578	29	140	38	8	17	2	812
TOTAL 11KV FEEDERS			176	2639	93	820	269	126	175	31	4329

Maximum Demand Recorded so far

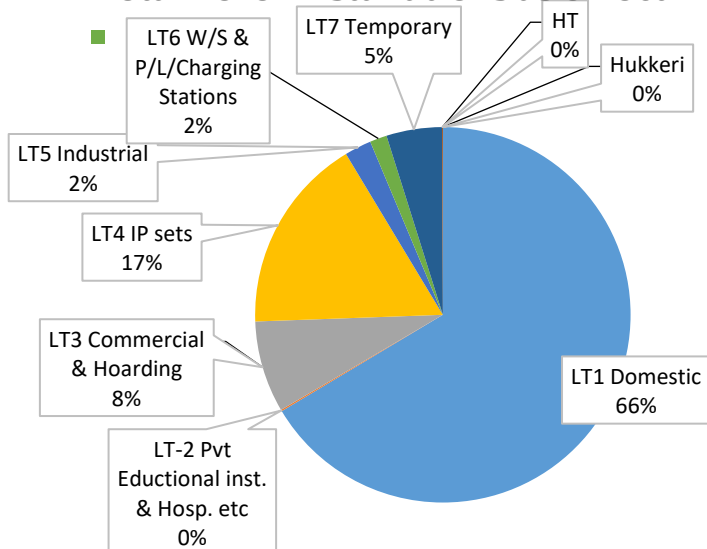
August -23



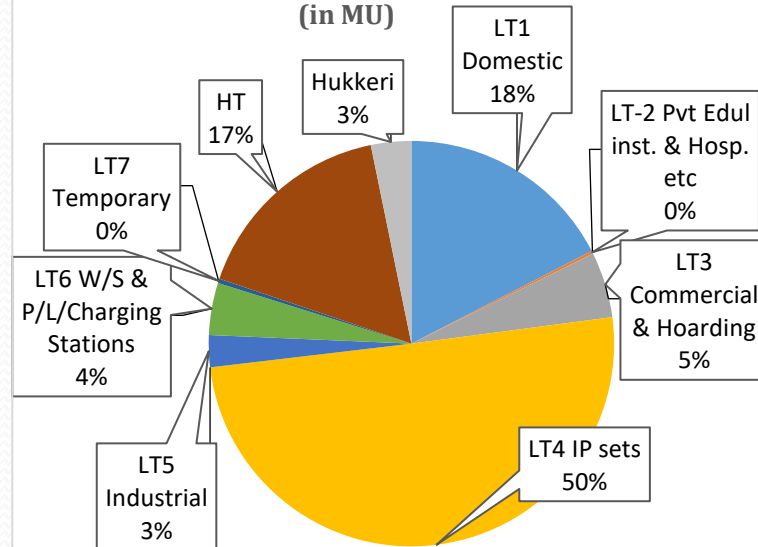
Consumer & Consumption Mix of HESCOM for FY-25

Category	Total no. of Installations as on oct-24	Consumer Mix %	Energy Consumption for FY-25 (up to Oct - 24)	Consumption Mix %
LT1 Domestic	41,18,152	66.42%	1,431.08	17.44%
LT-2 Pvt Eduational inst. & Hosp. etc	7,999	0.13%	18.12	0.22%
LT3 Commercial & Hoarding	4,88,780	7.88%	430.15	5.24%
LT4 IP sets	10,49,874	16.93%	4,120.10	50.22%
LT5 Industrial	1,43,260	2.31%	209.01	2.55%
LT6 W/S & P/L/Charging Stations	90,923	1.47%	341.23	4.16%
LT7 Temporary	2,96,319	4.78%	28.78	0.35%
HT	4,701	0.08%	1,361.42	16.60%
Hukkeri	Bulk Supply		263.67	3.21%

Total no. of Installations as on oct-24



Energy Consumption for FY-25 (up to Oct - 24) (in MU)



Load Forecasting

HESCOM Energy Sales – for Major Tariff Categories



HESCOM Historical Energy Sales (MU) for Major Categories, Open Access (OA) Sales (MU), and Distribution Loss (%)

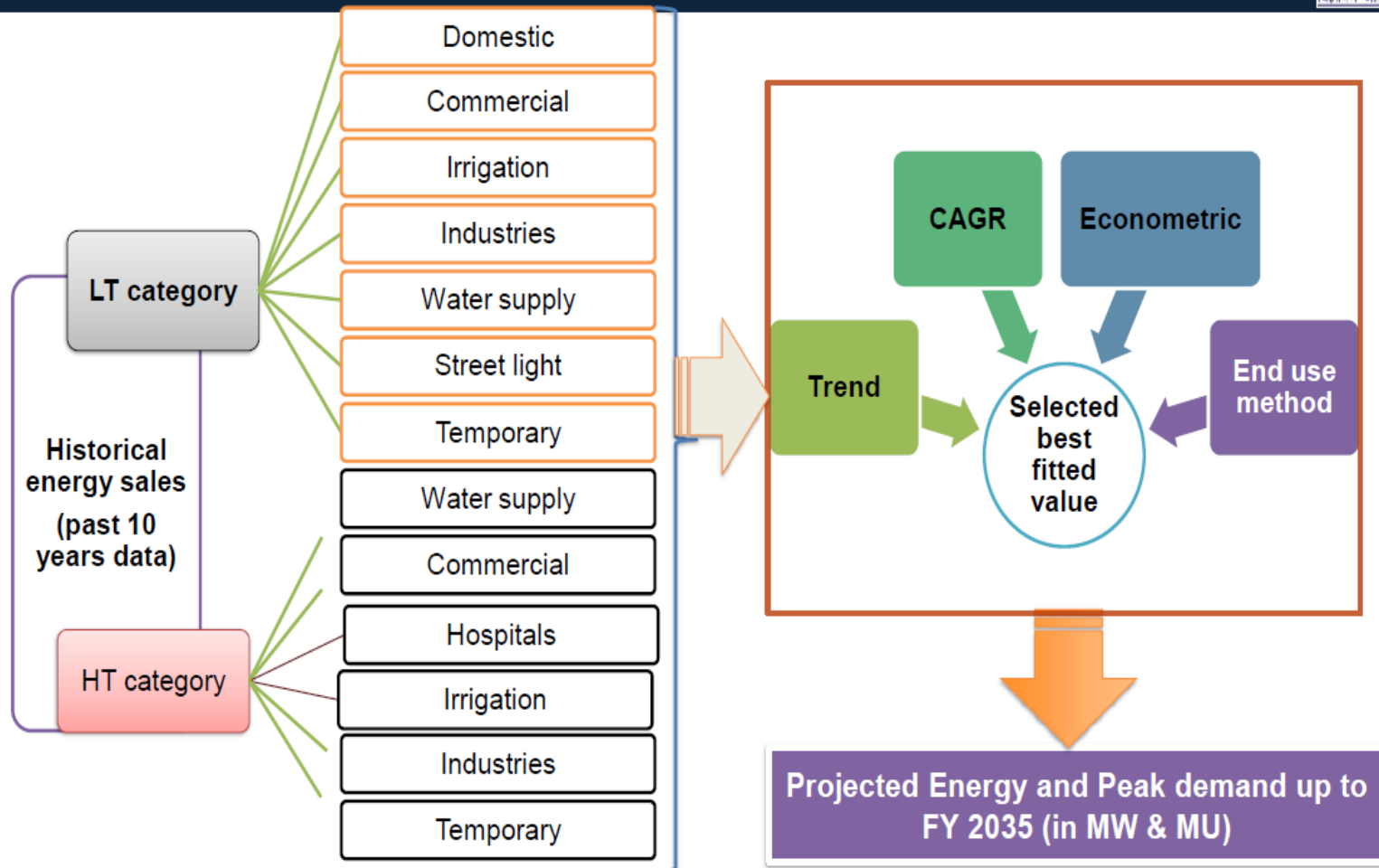
Year	Energy Sales (MU) – Major Tariff Categories							Total Sales (MU)	Growth	OA Sales (MU)	Distribution Loss
	LT1-Domestic	LT3-Commercial	LT4a-IP sets < 10HP	LT6a-Water Supply	HT2a-Industries	HT3-Irrigation	Others				
2011-12	1201	308	4297	160	881	116	712	7675			20.0%
2012-13	1273	337	4700	171	991	135	782	8389	9.3%		19.9%
2013-14	1312	340	4959	190	889	147	827	8664	3.3%		18.0%
2014-15	1407	371	5267	203	926	137	897	9208	6.3%		16.7%
2015-16	1522	414	5928	216	930	164	918	10092	9.6%		16.9%
2016-17	1557	426	5981	272	844	215	971	10266	1.7%		15.6%
2017-18	1658	448	6054	277	1005	256	1001	10699	4.2%		14.8%
2018-19	1688	465	6729	312	1160	337	1416	12107	13.2%	176	14.6%
2019-20	1757	493	5986	328	1102	282	1399	11347	-6.3%	186	14.1%
2020-21	1908	463	5939	336	945	322	1388	11301	-0.4%	214	13.2%
2021-22	1872	508	6603	348	898	423	1445	12097	7.1%	665	13.5%
2022-23	1870	586	6476	380	1048	380	1596	12336	2.0%	760	15.3%
2023-24	2090	667	8935	422	1101	575	1813	15603	26.5%	882	14.9%

HESCOM – Energy Input, Peak Demand, and Load Factor



Year	HESCOM Energy Sales (MU)	Open Access Sales (MU)	Total Energy Sales without OA and W/O loss (MU)	T&D Losses (MU)	Energy Input at Generation (MU)	Peak Demand (MW)	Load Factor (%)
2011-12	7675		7675	2308	9983	1685	67.6%
2012-13	8389		8389	2496	10885	1750	71.0%
2013-14	8664		8664	2335	10999	1804	69.6%
2014-15	9208		9208	2272	11481	1822	71.9%
2015-16	10092		10092	2496	12588	1861	77.2%
2016-17	10266		10266	2303	12569	1981	72.4%
2017-18	10699		10699	2270	12969	2365	62.6%
2018-19	12107	176	12107	2537	14644	2401	69.6%
2019-20	11347	186	11347	2289	13636	2536	61.4%
2020-21	11301	214	11301	2131	13432	2856	53.7%
2021-22	12097	665	12097	2316	14413	2872	57.3%
2022-23	12336	760	12336	2949	15285	2955	59.0%
2023-24	15603	882	15603	3644	19246	3528	62.3%

Load Forecasting Approach



Econometric Method – Independent Variables Mapping



Tariff Category Code	Tariff Category Name	Independent Variable-1	Independent Variable-2	Independent Variable-3
LT-1	Domestic	Gross Domestic Product (GDP)	Population	Per Capita Income
LT-2	Educational Institutions	Population		
LT-3	Commercial	GDP	Population	Per Capita Income
LT-4a	IP sets - Less than 10 HP - General	GDP Agriculture		
LT-4b	Irrigation Pump sets - More than 10 HP	GDP Agriculture		
LT-4c	Private Horticulture Nurseries, Coffee & Tea Plantations	GDP Agriculture		
LT-5	Industries	GDP Manufacturing	Per Capita Income	
LT-6a	Water Supply	Population		
LT-6b	Street Lights	Population		
HT-1	Water Supply	Population		
HT-2a	Industries	GDP Manufacturing	Per Capita Income	
HT-2b	Commercial	GDP	Population	Per Capita Income
HT-2c	Hospitals	Population	Per Capita Income	
HT-3	Irrigation	GDP Agriculture		
HT-6	Horticulture & Nurseries	GDP Agriculture		
HT-4	Residential Apartments	GDP	Population	Per Capita Income

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Challenging Factor

Agriculture - Scenarios



The load forecasting has been performed for different annual rainfall i.e., low rainfall, high rainfall and average rainfall for future years for LT4a and HT3 categories all the ESCOMs. For example, HESCOM – LT4a is as follows:

In Business as usual scenario, the average specific energy consumption of historical data (2012-13 to 2023-24) is considered i.e., 7779 kWh.

The average of the specific energy consumption during the low rainfall (*) years has been considered for Low Rainfall Scenario for future years. i.e., 8796 kWh.

The average of the specific energy consumption during the high rainfall (**) years has been considered for High Rainfall Scenario for future years. i.e., 6326 kWh.

HESCOM				
FY	LT4a - Actual Energy MU	Annual Rain Fall (mm)	No of Installations (Nos)	Specific Energy Consumption (kWh)
2013-14	4958.5	1242.7	568975	8715
2014-15	5266.7	1242.2	601939	8750
2015-16	5927.8	1002.9	637907	9293
2016-17	5981.1	858.9	663011	9021*
2017-18	6054.1	1118.7	696647	8690
2018-19	6729.1	1062.1	930551	7231
2019-20	5985.9	1424.9	957838	6249**
2020-21	5938.8	1448.0	974820	6092**
2021-22	6603.5	1426.0	995372	6634**
2022-23	6476.2	1564.0	1023525	6327**
2023-24	8935.2	862.3	1042516	8571*

*Low Rainfall and ** High Rainfall

HESCOM -LT4a-IP sets <10HP

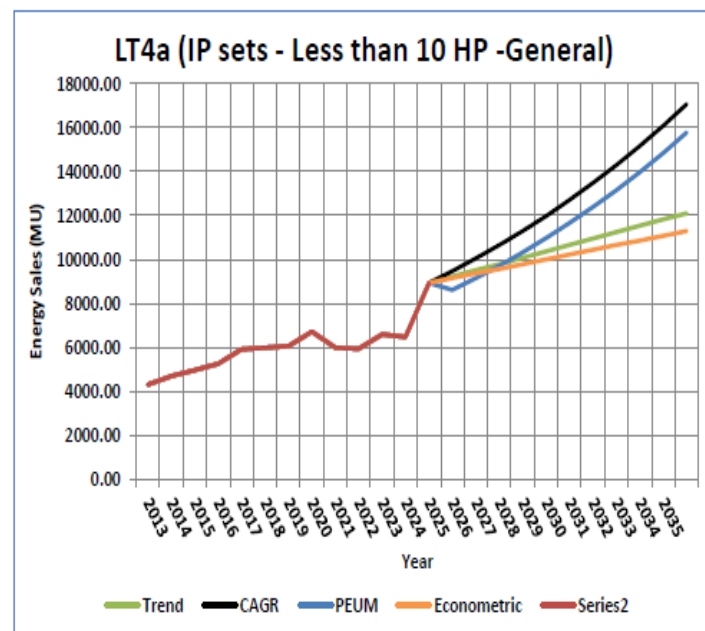


Historical Energy Sales (MU)

Year	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24
Energy Sales (MU)	4297	4700	4959	5267	5928	5981	6054	6729	5986	5939	6603	6476	8935

Forecasted Energy Sales (MU)

Year	Trend	%	CAGR	%	PEUM	%	Econometric	%
2024-25	9224	3.2%	9477	6.1%	8616	-3.6%	9151	2.4%
2025-26	9514	3.1%	10052	6.1%	9154	6.2%	9366	2.4%
2026-27	9803	3.0%	10662	6.1%	9726	6.2%	9581	2.3%
2027-28	10092	3.0%	11308	6.1%	10333	6.2%	9797	2.2%
2028-29	10381	2.9%	11994	6.1%	10978	6.2%	10012	2.2%
2029-30	10671	2.8%	12722	6.1%	11663	6.2%	10228	2.2%
2030-31	10960	2.7%	13494	6.1%	12391	6.2%	10443	2.1%
2031-32	11249	2.6%	14312	6.1%	13165	6.2%	10659	2.1%
2032-33	11538	2.6%	15180	6.1%	13987	6.2%	10874	2.0%
2033-34	11828	2.5%	16101	6.1%	14860	6.2%	11090	2.0%
2034-35	12117	2.4%	17078	6.1%	15788	6.2%	11305	1.9%



Note: PEUM based on average rainfall scenario

Agriculture - Scenarios



HESCOM - Agriculture – LT4a – Energy Sales Projections

FY	Actual Energy MU	Annual Rain Fall (mm)	No of Installations (Nos)	Scenario - 1: Average Rainfall		Scenario - 2: Low Rainfall		Scenario - 3: High Rainfall	
				Specific Energy (kWh)	Final Energy Sales (MU)	Specific Energy (kWh)	Final Energy Sales (MU)	Specific Energy (kWh)	Final Energy Sales (MU)
2018-19	6729.1	1062.1	930551	7231	6729	7231	6729	7231	6729
2019-20	5985.9	1424.9	957838	6249	5986	6249	5986	6249	5986
2020-21	5938.8	1448.0	974820	6092	5939	6092	5939	6092	5939
2021-22	6603.5	1426.0	995372	6634	6603	6634	6603	6634	6603
2022-23	6476.2	1564.0	1023525	6327	6476	6327	6476	6327	6476
2023-24	8935.2	862.3	1042516	8571	8935	8571	8935	8571	8935
2024-25			1107597	7779	8616	8796	9742	6326	7006
2025-26			1176740	7779	9154	8796	10351	6326	7444
2026-27			1250200	7779	9726	8796	10997	6326	7908
2027-28			1328246	7779	10333	8796	11683	6326	8402
2028-29			1411164	7779	10978	8796	12413	6326	8927
2029-30			1499258	7779	11663	8796	13187	6326	9484
2030-31			1592852	7779	12391	8796	14011	6326	10076
2031-32			1692288	7779	13165	8796	14885	6326	10705
2032-33			1797932	7779	13987	8796	15815	6326	11373
2033-34			1910171	7779	14860	8796	16802	6326	12083
2034-35			2029417	7779	15788	8796	17851	6326	12838

Final Projection Scenario with Low Rainfall

Year	HESCOM Energy Sales (MU)	Solar Rooftop (MU)	EV Energy (MU)	Energy Sales without OA and loss (MU)	Open Access Sales (MU)	T&D Losses (MU)	Energy Input at Generation (MU)	T&D Losses (%)
2024-25	16794	25	155	16924	926	3980	21830	18.2%
2025-26	17780	55	316	18042	973	4243	23257	18.2%
2026-27	18835	88	506	19254	1021	4527	24802	18.3%
2027-28	20621	125	771	21267	1072	4999	27338	18.3%
2028-29	21802	166	1121	22756	1126	5348	29230	18.3%
2029-30	23052	202	1559	24409	1182	5736	31328	18.3%
2030-31	24376	237	2134	26273	1242	6173	33687	18.3%
2031-32	25779	273	2636	28142	1304	6611	36057	18.3%
2032-33	27264	308	3412	30368	1369	7133	38870	18.4%
2033-34	28838	343	4329	32824	1437	7709	41970	18.4%
2034-35	30506	379	5498	35625	1509	8365	45499	18.4%

Details of the Power Purchase Agreements (PPAs) / Power Supply Agreements (PSAs) executed by HESCOM for power from Coventional & Renewable Sources

Abstract of RE PPAs executed by HESCOM as on 30.06.2024				
Sl. No.	Source	Nos.	Capacity (in MW)	Remarks
1	Mini Hydel	4	30.5	
2	Co-gen	18	254.835	Exportable capacity only
3	Solar	56	649	PPA
		14	307.36	PSA (HESCOM portion only)
4	Solar Total	70	956.36	
5	Wind	171	1001.3	
	Total RE	263	2242.995	

Details of the Power Purchase Agreements (PPAs) / Power Supply Agreements (PSAs) executed by HESCOM for power from Coventional & Renewable Sources

Abstract of Conventional PPAs executed by HESCOM as on 30.06.2024			
Sl. No.	Source	Nos.	Capacity (in MW)
1	Thermal	21	1045.16
2	Major Hydro	20	1530.9
3	Nuclear	3	146.72
	Total Conventional	44	2722.78
	Total Conventional + RE	307	Around 5000 MW

	Power Purchase Details of HESCOM							
Sl No	Source of Power purchase	Capacity in MW	Generators details		Power purchase cost for 2023-24			
			Nos	Units	Energy in MU	%ge Energy mix	Cost in Crores	Rate per unit
1	KPCL HYDEL	1,019.40	1	16	3427	17.90	677.59	1.98
2	KPCL Thermal	502	2	11	1221	6.38	1269.34	10.39
3	KPCL Solar	3	1	1	2	0.01	1	6
4	CGS Thermal	1,041.99	14	25	5547	28.97	2660.3	4.8
5	Wind Mill	1,138.35	113	169	2105	10.99	889.94	4.23
6	Mini Hydel	43.7	3	3	20	0.10	6.71	3.33
7	Co gen (old PPA- 20 years term))	254.84	17	17	593	3.10	400.21	6.75
8	Major IPP (UPCL,)	155.21	1	1	422	2.20	215.52	5.1
9	Solar (1-3 Mw) Farmers Scheme	60	29	29	96	0.50	94.47	9.82
10	Solar MW scale (Above 3 Mw)	998.89	30	32	1822	9.52	889.96	4.88
11	Section-11 (Gok order dt:16.10.2024)	-	65	65	585	3.06	323.63	5.53
12	Transmission bills (PGCIL, VVNL, KPTCL)	0	3	3	0	0.00	1501.42	0
13	Inter-Escom Energy Exchange 66KV and above and 11/33 KV	0	0	0	2501	13.06	1628.16	6.51
14	Others (Energy Exchange Purchases/sales, Wheeling & Banking etc	0	0	0	802	4.19	493.74	6.15
	Total	5,217.38	279	372	19146	100.00	11052	5.77

RA recommendation for the state

Year	PCKL/KREDL					PRDC Recommendations		
	Solar MW	Wind MW	Thermal MW	Gas MW	PSP MW/hrs	RE MW	Thermal Eq. MW	BESS MW/hrs
2024-25	753	0		370	0	3100	0	2000/2
2025-26	3063	0	0	370	0	6200	500	3000/2
2026-27	4763	1000	0	370	0	6200	1500	3000/2
2027-28	6163	2000	0	370	0	8100	1500	3000/2
2028-29	6563	2200	1600	370	0	8100	1500	3000/2
2029-30	7563	3200	1600	370	2000/6	13100	1500	3000/2
2030-31	8563	4200	1600	370	3500/6	18100	1500	3000/2
2031-32	8563	4200	1600	370	5000/6	23100	2000	3000/2
2032-33	8563	4200	1600	370	7500/6	28100	3000	3000/2
2033-34	753	0		370	0	3100	0	2000/2
2034-35	8563	4200	1600	370	7500/6	33100	4600	3000/2

Solar Planned under PM Kusum C

- HESCOM has got revised allocation of 65,000 IP sets on dated 21.06.2021
- HESCOM has got allocation of 86585 IP sets on dated 14.08.2024
- Based on KPTCL revised feasibility and field condition PM KUSUM Component-C can be implemented as following;

Particulars	KPTCL Feasibility		Can be Implemented			
	S/s (Nos)	Capacity(MW)	S/s (Nos)	Capacity(MW)	No of Agriculture Feeders	No of IP sets
Phase- I	60	273.37	58	215.63	109	65311
Phase-II	64	484.9	29	201.34	126	44052
Total	124	758.27	87	416.97	235	109363

Solar under Roof Top PM Surya Ghar Yojane

- Installed capacity of Solar Roof Top – 95 MW
- Installed Capacity under PM Surya Ghar Scheme- 2.5 MW.
- Targeted Consumers – Consumers consuming more than 200 units.
- Targeted capacity – Another 25 MW



THANK YOU