Annual Energy Audit (2022-23) for Gulbarga Electricity Supply Company Limited as per Bureau of Energy Efficiency (Manner and Intervals to Conduct Energy Audit in electricity distribution companies) as per Regulations, 2021 Notified on 07.10.2021

Gulbarga Electricity Supply Company Limited

Corporate office, Station Road, Kalaburgi-585102

Prepared For

Bureau of Energy Efficiency
[Government of India–Ministry of Power]
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1. Acknowledgment

M/S Katyani Energy Solution Pvt Ltd is thankful to Sri. Rahul Tukaram Pandve (IAS) MD GESCOM, for co-operation during annual energy audit for FY 2022-2023.

Special thanks to Er. Sri R.D. Chandrashekhar, Chief Engineer Elect. O&M Zone, Kalaburagi and I/C Director Technical GESCOM, Er. Vasudev H. H., Superintending Engineer Electrical, Er. Ameena Nishat, EE, Electrical for their valuable contribution in deliberation over network and management aspects.

The interaction and deliberation with Sri Dodda Basappa, Assistant Engineer El., Unit-7, CSD-II, Ballari Urban division GESCOM who is also the nominated Energy Manager of GESCOM, has been very much useful in completion of energy audit task assigned by GESCOM. We thank for his co-operation in providing data and details to Audit Team.

The study team also acknowledges the contribution of Ms. Geetanjali, AAO for coordinating the activities of Energy Audit.

In the last but not the least we thank to Er. Mayuri, AEE for being associated with audit team all along the audit work & providing basic inputs of Energy Audit as and when required.

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KATYANI ENERGY SOLUTION PVT. LTD. NEW DELHI

2. Team Of Energy Audit

Name of Team Members	Experts	Brief Introduction
Mr. R.K. Jain	Accredited Energy Auditor AEA - 0043	He has experience of 47 years in thermal power plants / Iron & Steel and commercial buildings etc. Under PAT scheme of BEE.
Mr. A.K. Jain	Certified Energy Auditor (9553) & DISCOM Expert	Ex-SE UPPCL, Certified Energy Auditor
Mr. Akshay Kumar	Certified Energy Auditor (34721)	He is an Ex-Executive Director (JUSNL & JUUNL of erstwhile JSEB. He has experience of 36 years in Transmission, Generation (Thermal Power station), SLDC (Power System Manager) and Energy Audit.
Mr. Raju Kumar	Energy Engineer	He has experience of 2 years working in KESPL, reputed energy firm in New Delhi.

KATYANI ENERGY SOLUTION PVT. LTD. NEW DELHI

3. Executive Summary:

Gulbarga Electricity Supply Company Limited (GESCOM), Corporate office, Station Road, Kalaburgi-585102 after unbundling of KEB, came into existence in 2010. Karnataka embarked on a major reform of the power sector. As a first step, Karnataka Electricity Board (KEB) was dissolved and in its place, the Karnataka Power Transmission Corporation Limited (KPTCL) was incorporated. This was followed by the constitution of Karnataka Electricity Regulatory Commission (KERC) in November 1999.

In the next phase of the reform process, the transmission and distribution business managed by KPTCL was unbundled in June 2002 and four new distribution companies were formed to distribute power in Karnataka one of them was Gulbarga Electricity Supply Company Limited.

GESCOM bears the responsibility of distribution of power to various categories of consumers. The coordinating agency, BEE, has framed regulation in exercise of power conferred upon under clause (g) and (n) of section 14 of the energy conservation act 2001 (Amended in 2010) for quarterly and annual energy audit of all the DISCOM's as designated consumers.

Accordingly, GESCOM has awarded the work of annual energy audit for FY 2022-23 vide work order number GESOM/SEE(Tech)/EEE(Tech)/AEE-2(Tech)/AE-2(Tech)/2022-23/13164-67 Dated12.05.2023 to M/S Katyani energy solution private limited, Delhi.

The objective of annual energy audit is to conduct energy audit is to identity and to suggest corrective action on following points:

a) Identify Losses of power in distribution network at various voltage levels
b) Identify high loss area/divisions
c) Assess the metering status of consumers, distribution transformers and feeders
d) Types of meters connected
e) Monitoring mechanism of system 0.415kV, 11kV, 33kV, 66kV, 110kV and 220kV network and consumers connected at different voltages of various categories
f) Calculation of billing efficiency, collection efficiency and AT & C losses
g) Calculation of average billing rate (ABR) and through rate
h) Study of subsidiary account and claims
i) Overloaded segments of networks
j) Study of energy saving measures being adopted by DISCOM

4. Background:

The Bureau of Energy Efficiency (BEE), through Ministry of Power, Government of India, notified the regulations. The extant regulations specify the following key aspects related to energy accounting and audit for electricity distribution companies.

i. Intervals of time for conduct of periodic energy accounting and annual energy audit and report submission thereof.
ii. Pre-requisites for annual energy audit and periodic energy accounting
iii. Reporting requirements for annual energy audit and periodic energy accounting,
iv. Manner of annual energy audit and periodic energy accounting
v. Prioritization and preparation of action planand
vi. Structure of annual energy audit report

These regulations have been issued under the ambit of Energy Conservation Act, 2001, with an overallobjectivetoreduceinefficienciesandlossesindistributionsectortherebyensuringfinancialandeconomicviabilityof DISCOMs.

Energy accounting for all energy in flows in the distribution system, including renewable energy generation, open access consumers, and energy consumption by the end consumers, shall be conducted on a periodic basis. This necessitates that energy accounting data is made available at a consumer, transformer, feeder and system level. Energy accounting will help to identify areas of high loss and pilferage, and thereafter, focused efforts can be made by DISCOMs to take corrective action.

The regulation stipulates quarterly energy accounting by DISCOMs, through a certified Energy Manager and annual energy audit by an Independent Accredited Energy Auditor.

TheregulationsalsospecifytheMannerofperiodicenergyaccountingandannualenergyauditPrioritization and preparation of action plan and Structure of the annual audit report.

The Energy Managerwillbeheldaccountableforanysubstantivediscrepancy/differencesbetweenthequarterlyenergyaccounts/annualenergyaccountandtheannualEnergyaudit.

5. DISCOM Introduction and Overview:

Karnataka embarked on a major reform of the power sector. As a first step, Karnataka Electricity Board (KEB) was dissolved and in its place, the Karnataka Power Transmission Corporation Limited (KPTCL) was incorporated. This was followed by the constitution of Karnataka Electricity Regulatory Commission (KERC) in November 1999.

In the next phase of the reform process, the transmission and distribution business managed by KPTCL was unbundled in June 2002 and four new distribution companies were formed to distribute power in Karnataka one of them was Gulbarga Electricity Supply Company Limited.

Gulbarga Electricity Supply Company Limited (GESCOM) has taken over the responsibility from KPTCL for the distribution of electricity in 7 districts of Karnataka namely Bidar, Gulbarga, Raichur, Koppal, Bellari, Yadgir and Vijaynagar District commenced its power distribution operation and maintenance from 1st June 2002.

The company is engaged in electricity sub-transmission, distribution, and retail supply in Seven District of the State of Karnataka. GESCOM's mandate is to establish and use a power system network and to buy and sell electrical energy and to implement system improvements for T&D loss reduction.

5.1.General Information

General Information				
1	**Name of the DISCOM**	Gulbarga electricity supply company limited (GESCOM)		
2	**i) Year of Establishment**	01-06-2002		
	ii) Government/Public/Private	Government		
3	**DISCOM's Contact details & Address**			
i	City/Town/Village	Gulbarga		
ii	District	Gulbarga		
iii	State	Karnataka	Pin	585102
iv	Telephone	08472-256842	Fax	256842
4	**Registered Office**			
i	Company's Chief Executive Name	Sri. Rahul T Pandve		
ii	Designation	Managing Director		
iii	Address	Station road, Gulbarga		
iv	City/Town/Village	Gulbarga	P.O.	Gulbarga
v	District	Gulbarga		
vi	State	Karnataka	Pin	585102
vii	Telephone		Fax	
5	**Nodal Officer Details***			
i	Nodal Officer Name (Designated at DISCOM's)	Sri R. D. Chandrashekhar		
ii	Designation	I/C Director Technical, GESCOM		

iii	Address	Station Road, Gulbarga		
iv	City/Town/Village	Gulbarga	P.O.	Gulbarga
v	District	Gulbarga		
vi	State	Karnataka	Pin	585102
vii	Telephone		Fax	
6	**Energy Manager Details***			
i	Name	DoddaBasappa. A		
ii	Designation	Assistant Engineer Elec.	Whether EA or EM	EM
iii	EA/EM Registration No.	EM-7976		
iv	Telephone		Fax	
v	Mobile	8328514237	E-mail ID	dodda1986@gmail.com
7	**Period of Information**			
	Year of (FY) information including Date and Month (Start & End)	1st April 2022 – 31st March 2023		

5.2.Summary Sheet

Performance Summary of Electricity Distribution Companies			
1	Period of Information Year of (FY) information including Date and Month (Start & End)	1 APRIL 2022 - 31 March 2023	
2	**Technical Details**		
(a)	**Energy Input Details**		
(i)	Input Energy Purchase (From Generation Source)	Million kwh	9896.44
(ii)	Net input energy (at DISCOM Periphery after adjusting the transmission losses and energy traded)	Million kwh	9430.59
(iii)	Total Energy billed (is the Net energy billed, adjusted for energy traded))	Million kwh	8440.51
(b)	Transmission and Distribution (T&D) loss Details	Million kwh	990.08
		%	10.50%
	Collection Efficiency	%	93.00%
(c)	Aggregate Technical & Commercial Loss	%	16.76%

Note* The collection efficiency calculated in BEE format is on the basis of assumption that all the subsidiary bill issued during the year have been received from the Government of Karnataka. However, as per Central electricity authority revised guidelines on dated 02-06-2017, AT & C losses for the FY 2022-23 are as follows details **(Annexure 01)**

FY	AT & C losses as per BEE	AT & C losses as per CEA
2022-23	16.76%	20.98%

5.3.Name and Contact Details of Energy Manager and Authorized Signatory of DISCOM

Sr. No.	Member of EAC	Name	Designation	Mobile number	Email	Address
1.	Nodal Officer	Sri R.D. Chandrashekhar	Chief Engineer Electy O&M Zone, Kalaburagi and I/C Director Technical, GESCOM	9480844377, 9448359005	dtgescom@gmail.com	Corporate Office, Station Road, GESCOM, Kalaburagi 585102
2.	Energy Manager	Sri DoddaBasappa	Assistant Engineer El., Unit-7, CSD-II, Ballari Urban division GESCOM	8328514237	dodda1986@gmail.com	Dr. No 59, M.K Nagar, Kolagal Road Ballari 583102
3.	IT Manger	Sri Shankar Adki	Executive Engineer O&M Division Humnabad and I/C EE IT, GESCOM	9449597320	eeitgescom@gmail.com	Corporate Office, Station Road, GESCOM, Kalaburagi 585102
4.	Financial Manager	Kumari Geetanjali	Asst. Accounts Officer (DCB) Corporate Office GESCOM	8660410134	dcb.gescom@gmail.com	Corporate Office, Station Road, GESCOM, Kalaburagi 585102

Order of GESCOM attached as per **Annexure 02**

5.4.Geographical Area of GESCOM

5.4.1. Key Details of GESCOM

Name of District	No. of Residential Connections	No. of BJ/KJ Residential Connection getting subsidiary
Bidar	4,01,233	91,673
Gulbarga	6,64,532	1,33,385
Raichur	3,89,408	89,921
Koppal	3,08,076	80,351
Bellari	3,43,028	51,874
Yadgir	2,36,760	68,366
Vijay Nagar	3,00,626	82,105
GESCOM	26,43,663	5,97,675

Note* From the table 5.4.1 it is clear that in every district BJ/KJ connections are approximately 20% of total residential connection in respective district. On observation of bills of few of the BJ/KJ connection, Supply Type LT-1 it is found that few bills of defective or unmetered connections are being generated by considering average consumption of 40 units per installation as per KERC Tariff Order.

5.5. Administrative Infrastructure

Zone Name	Circle Name	District covered	Division Name	No. of Sub Division
Kalaburagi	Kalaburagi	Gulbarga	Kalaburagi Urban	4
			Kalburagi Division1	5
			Kalaburagi Division2	5
			Sedam	2
		Yadgir	Yadgir	5
	Bidar	Bidar	Bidar	4
			Humnabad	3
Ballari	Ballari	Ballari	Ballari Urban	2
			Ballari Rural	3
		Vijay Nagar	Hospet Urban	3
			Hospet Rural	3
	Raichur	Raichur	Raichur Urban	2
			Raichur Rural	4
			Sindhanoor	3
	Koppal	Koppal	Koppal	3
			Gangavathi	3

5.6. Technical Infrastructure:

Details		Nos.
No. of 220/11 kV Substation		18
No. of 110/11 kV Substation		137
No. of 66/11 kV Substation		25
No. of 33/11 kV Substation		146
Installed load in MVA		9320.2
No. of 33 kV Feeders		150
Length of 33 kV Line (CKT Km)		2857.79
No. of 11 kV Feeders		2265
Length of 11 kV Line (CKT Km)		74705.16
No. of 11/0.4 kV Transformers (In kVA)	15	1898
	25	62906
	63	37797
	100	18032
	250	1842
	500	205
No. of Consumers	Residential	2643663
	Agriculture	434744
	Commercial/Industrial-LT	401489
	Commercial/Industrial-HT	2701
	Others	102102
	Total	3584699
Total Sanction Load		7218.86 MW

5.7.Energy Conservation measures:

5.7.1. Energy Conservation measures already adopted by DISCOM:

Following energy conservation measures already adopted by GESCOM

- EIP Feeders emanating from 110kV, 66kV and 33kV sub-stations are provided with Capacitor banks of adequate capacity to overcome the low power factor.
- Installations with Motive Load are serviced duly ascertaining the provision of capacitor for reactive power compensation.
- GESCOM is insisting and encouraging its prospective consumers to use high star rated electrical appliances.
- For residential consumers provision of Solar Water Heater is mandatory for availing power supply.
- In urban areas GESCOM has mandated usage of 5 Start Rated DTC's and 4 Star Rated in Rural areas.
- GESCOM has dedicated Demand Side Management DSM cell for effective implementation of energy conservation measures initiated by state and central government.
- DSM Cell regularly conducts campaigns programs and workshop to create public awareness

5.7.2. Energy Conservation measures Proposed:

- As per tariff if the Power Factor of LT Consumers is less-than 0.85, surcharge of 02 Paisa per Unit is levied and if power factor of HT consumer is less than 0.90, surcharge of 03 Paisa per unit is levied. On observation of electricity bill of LT/HT industrial consumers it is found that this small amount of surcharge does not motivate consumers to install adequate capacity capacitor bank to control their power factor. Power factor of many LT/HT consumers running very poor and they are paying penalty as per tariff. Recommended to give notice to such consumers and motivate them to keep their power factor 0.98 or 0.99 by installing capacitor of adequate capacity at their premises. This will reduce reactive load on the grid.
- Recommended to represent to KERC for kVAh based billing instead of kWh-based billing.
- Normal conventional meter should be replaced with communicable prepaid smart meters.

5.8. Distribution Transformer Damage Rate:

Sl. No	Division	Transformers Existing at the end of Month	Failed during the Month Apr-22	Failed during the Month May-22	Failed during the Month Jun-22	Failed during the Month Jul-22	Failed during the Month Aug-22	Failed during the Month Sept-22	Failed during the Month Oct-22	Failed during the Month Nov-22	Failed during the Month Dec-22	Failed during the Month Jan-23	Failed during the Month Feb-23	Failed during the Month Mar-23	Transformers Failure Rate for 2022-23
1	City Dvn, Kalaburagi	3483	23	37	11	46	41	24	31	31	20	6	9	21	8.61%
2	Dvn-1, Kalaburagi	11425	252	216	164	145	139	110	168	297	177	119	105	136	17.75%
3	Dvn-2, Kalaburagi	7212	97	76	122	90	101	71	79	98	54	43	68	51	13.17%
4	Sedam	5145	48	83	28	88	55	52	65	82	38	25	34	47	12.54%
5	Yadgir	14243	130	206	273	207	207	199	216	198	186	165	110	153	15.80%
6	Bidar	9980	152	172	204	180	178	210	149	176	177	104	76	156	19.38%
7	Humnabad	7623	95	121	100	93	100	91	105	110	94	85	77	122	15.65%
8	City Dvn, Raichur	1256	20	20	7	15	7	8	7	11	2	5	5	8	9.16%
9	Raichur Rural Dvn	12656	43	145	279	155	168	165	131	153	133	149	18	203	13.76%
1	Sindhanur	8601	47	107	137	115	125	96	131	94	73	87	54	64	13.14%
11	Koppal	9495	118	156	117	75	0	120	93	114	102	120	119	97	12.96%
12	Gangavati	6688	53	64	72	74	70	70	61	51	49	31	43	49	10.27%
13	City Dvn, Ballari	1525	13	19	21	6	14	32	19	7	6	9	0	9	10.16%
14	Ballari Rural Dvn	10860	109	120	140	125	157	117	106	82	72	78	60	77	11.45%
15	HB Halli Dvn	8540	99	149	121	113	113	100	128	146	125	144	128	125	17.46%
16	Hopset Dvn	3948	25	49	51	57	63	57	46	58	27	43	38	33	13.86%
GESCOM		122680	1324	1740	1847	1584	1538	1522	1535	1708	1335	1213	944	1351	14.38%

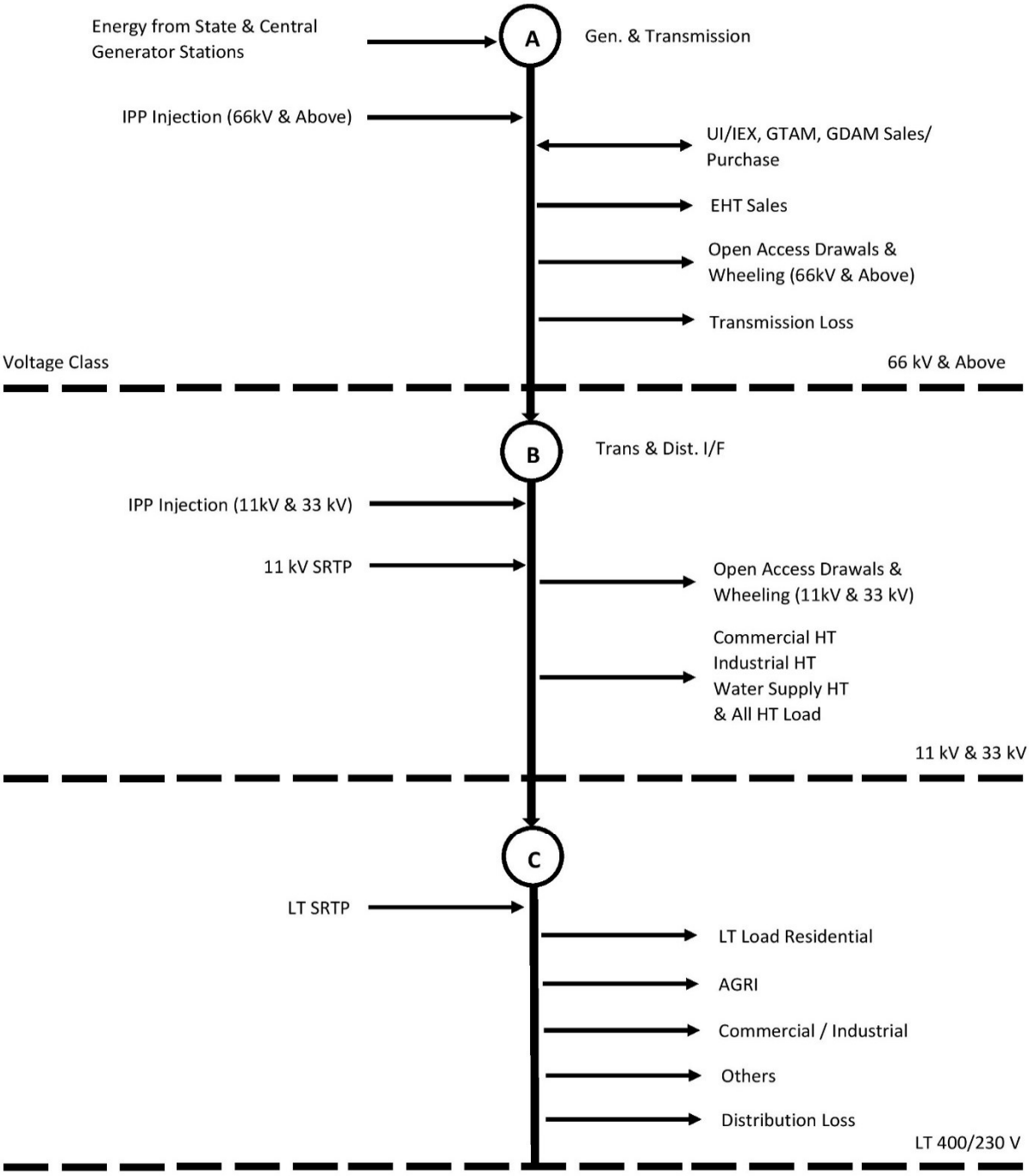
- From table no. 5.7.2.1 distribution transformer damage rate of DISCOM is very high (14.38%) and damage rate of few of the division such as Division 1 Kalaburgi, Yadgir, Bidar, Humnabad and H.B. Halli Division is even higher than the DISCOM average.
- Higher damage rate may be due to the following reasons.
  - Overloading of transformers
  - Poor earthing of body and neutral of transformers
  - Not providing protection on HT and LT side
  - Poor maintenance
  - Poor repairing of transformer in workshop
  - Unwanted trees and grass in nearby area
  - Unbalance load on the three phases
  - Oil leakage of transformers
- Recommended to analyze reason of transformer failure for every transformer and take corrective action accordingly

5.9. Action being taken by GESCOM for controlling theft of electricity:

- Regular checking/raid is being done by departmental officers and vigilance teams. Details of raid conducted, unit booked, assessment raised and assessment realised during 2022-23 as follows-

Details of Theft of Electricity (April 2022-March2023)			
Sl. No	**Particulars**	**GESCOM**	**Total**
1	No. of cases where inspection was carried out (CC+NC)	251211	**251211**
2	No. of cases detected (As a whole) (CC+NC)	17851	**17851**
3	Estimated quantity of electrical energy considered as theft in above cases for the period **(In Million Units)**	0.436	**0.436**
4	No. of cases where penalties were imposed (As a whole) (CC+NC)	17851	**17851**
4a	No. of Theft cases where penalties were imposed (included in Sl No.4)	7322	**7322**
5	Total Penalty Imposed **(in Rs. Cr)**	43.102	**43.102**
5a	Total Penalty Collected **(inRs Cr.)**	33.763	**33.763**

5.10. Power Flow Chart of GESCOM's Network



SRTP → Solar Roof Top Panels

5.11. Validation of metering data, energy flow data and losses

Audit team visited following Circles, Division, Sub-Division and Sub-Stations to sample check their record and validate the data.

- Electronic meters are installed on all the 11kV/33kV/66kV/110kV/220kV feeders at DISCOM boundary and on the basis of joint reading of these meters with KPTCL and GESCOM input energy of divisions/DISCOM is fixed.
- Frequent calibration of these meters is being done jointly by KPTCL and GESCOM.
- Monthly report of energy flow at transmission level is prepared by KPTCL and GESCOM jointly.
- On the basis of joint report input energy received by GESCOM at 11kV, 33kV, 66kV, line losses are calculated by GESCOM by taking billed energy, assessment, and realization by billing data.

Sr. No.	Particulars	Date of visit
Name of Circle		
Sr. No.	**Name of Circle**	**Date of Visit**
1	Kalburgi	28-06-2023
2	Bidar	29-06-2023
Name of Division Visit		
Sr. No.	**Name of Division**	**Date of Visit**
1	Kalaburagi Urban	28-06-2023
2	Bidar	29-06-2023
3	Humnabad	29-06-2023
4	Yadgiri	30-06-2023
5	Sedan	01-07-2023
Name of Sub-Stations Visit		
Sr. No.	**Name of Sub-Stations**	**Date of Visit**
1	110 kV Gulbarga University	28-06-2023
2	33/11kV Azadpur	28-06-2023
3	110 kV Kolhar	29-06-2023
4	220/11kV humnabad	29-06-2023
5	33kV sagar	30-06-2023
6	110/11kV Master unit Yadgiri	30-06-2023
7	220/11KV Batgeera	01-07-2023

Name of Feeder Visit			
Sr. No.	**Name of Sub-Stations**	**Name of 11 kV Feeder**	**Date of Visit**
1	110 kV Gulbarga University	UNIVEERSITY	28-06-2023
2	110 kV Gulbarga University	VEERESH NAGAR	28-06-2023
3	110 kV Gulbarga University	RAJAPUR	28-06-2023
4	110 kV Gulbarga University	ASHOK NAGAR	28-06-2023
5	33/11kV Azadpur	F4 AZADPUR NJY	28-06-2023
6	33/11kV Azadpur	F6 HAGARGA IP	28-06-2023
7	110 kV Kolhar	KHB	29-06-2023
8	110 kV Kolhar	GND	29-06-2023
9	110 kV Kolhar	ATIWAL IP FEEDER	29-06-2023
10	110 kV Kolhar	GARMA IP FEEDER	29-06-2023
11	110 kV Kolhar	KOLAR B NJY FEEDER	29-06-2023
12	110 kV Kolhar	SECUNDRAPUR IP FEEDER	29-06-2023
13	110 kV Kolhar	SRINIVAS INDUSTRY	29-06-2023
14	220/110-11kV humnabad	KIADB	29-06-2023
15	220/110-11kV humnabad	INDUSTRIAL	29-06-2023
16	220/110-11kV humnabad	MUSTAPUR	29-06-2023
17	33kV sagar	Kongandi	30-06-2023
18	33kV sagar	Shardalli	30-06-2023
19	110/33/11kV Master unit Yadgiri	Laxmi Nagar	30-06-2023
20	110/33/11kV Master unit Yadgiri	Mailapur	30-06-2023
21	220/11KV Batgeera	Sirolli+W/S	01-07-2023
22	220/11KV Batgeera	Kamlawathi	01-07-2023
23	220/11KV Batgeera	Mugnoor	01-07-2023
24	220/11KV Batgeera	Batgeera	01-07-2023
25	220/11KV Batgeera	Jakotiya	01-07-2023

6. Loss and Subsidy computation

6.1. Energy Account analysis of previous year (Details as per Annexure 4)

Year	AT & C Losses as per BEE Format	AT & C Losses as per CEA Format	ACS-ARR GAP
2021-22	13.24%	10.54%	RS. 6.82-Rs. 7.60= **-0.79 Rs. Per kWh**
2022-23	16.76%	20.98%	Rs. 7.88-Rs.7.29= **0.59Rs. Per kWh**

- AT & C losses in FY 2022-23 have been increased significantly in comparison to FY 2021-22
- Cost of purchase of supply is also increase significantly in FY 2022-23
- Average revenue realization per unit is dropped significantly in FY 2022-23
- **Needs to make efforts to reduce (Average Cost of Supply) ACS - (Average Realisable Revenue) ARR GAP**

6.2. Aggregate AT & C Losses

Year	AT & C Losses as per BEE Format	AT & C Losses as per CEA Format	ACS-ARR GAP
2022-23	16.76%	20.98%	Rs. 7.88-Rs.7.29= **0.59 Rs. Per kWh**

6.2.1. Voltage-wise Losses

Energy Accounting Summary

DISCOM		Input (in MU)	Sale (in MU)	Loss (in MU)	Loss %
i	LT	7,470	6,554	916	12.26
ii	11 Kv	430	402	28	6.42
iii	33 kv	85	82	3	3.54
iv	> 33 kv	1,445	1402.53	43	2.94

For further reduction of losses following steps may be taken:

- Need to survey and replace conductor of proper capacity
- Need to cut tree branches touching to conductors
- Need to tighten the jumpers
- At present HT/LT ratio of DISCOM is 0.79. Ideally it should be 1-2 for loss reduction.
- Need to improve HT/LT ratio by providing (High Voltage Distribution System) HVDS system

6.2.2. Division-wise and Category-wise Losses

6.2.2.1. With Irrigation Pump

With Irrigation Pump										
S.No	Name of Division	Input energy (MU)	Total energy	Billed Amount in Rs. Crore	Collected Amount in Rs. Crores	Billing efficiency= total energy/input energy	Collection Efficiency= Collection/ Billed amount	Average Billing Rate (ABR)=Assasment/billed*10	Through Rate=Realization/input*10	AT&C losses=(ABR-Through rate)/ABR
Formula						g=d/c*100 %	h=f/e*100 %	i=e/d*10	j=f/c*10	k=(i-j)/i*100%
Sub-total	Kalaburagi Urban	478.24	417.84	356.06	356.49	87.37	100.12	8.52	7.45	12.52
Sub-total	Kalburagi Division1	683.97	612.17	473.39	424.32	89.50	89.63	7.73	6.20	19.78
Sub-total	Kalaburagi Division2	373.54	332.07	282.19	266.28	88.90	94.36	8.50	7.13	16.11
Sub-total	Sedam	464.81	426.02	387.13	357.45	91.65	92.33	9.09	7.69	15.37
Sub-total	Yadgir	750.61	668.85	510.03	484.66	89.11	95.03	7.63	6.46	15.32
Sub-total	Bidar	720.12	648.83	523.57	452.06	90.10	86.34	8.07	6.28	22.21
Sub-total	Humnabad	463.58	423.71	327.56	282.10	91.40	86.12	7.73	6.09	21.29
Sub-total	Ballari Urban	292.04	247.50	211.66	207.25	84.75	97.92	8.55	7.10	17.02
Sub-total	Ballari Rural	982.52	868.56	730.34	687.54	88.40	94.14	8.41	7.00	16.78
Sub-total	Hospet Urban	379.48	343.97	305.08	285.32	90.64	93.52	8.87	7.52	15.23
Sub-total	Hospet Rural	702.76	630.73	507.6	453.85	89.75	89.41	8.05	6.46	19.75
Sub-total	Raichur Urban	243.99	212.17	195.14	180.93	86.96	92.72	9.20	7.42	19.37
Sub-total	Raichur Rural	802.13	700.42	546.73	512.79	87.32	93.79	7.81	6.39	18.10
Sub-total	Sindhanoor	568.05	508.88	396.53	364.95	89.58	92.04	7.79	6.42	17.55
Sub-total	Koppal	873.15	810.06	678.84	664.08	92.77	97.83	8.38	7.61	9.24
Sub-total	Gangavathi	651.60	575.06	448.83	436.27	88.25	97.20	7.80	6.70	14.22
Remark	7.58MU peratins to HT 2a (IPP import to GESCOM) sales accounted by Power Trading Cell of GESCOM Corporate Office., 6.09MU - KPTCL office Lighting and S/s auxilliary consuption, Misc.		13.67	280.48	244.24					
Total		9430.61	8440.51	7161.16	6660.58	89.50	93.01	8.48	7.06	16.76

- On observation of table no. 6.2.2.1. it is found that line losses in Kalburgi Urban, Kalburgi Division 1, Kalburgi Division 2, Yadgiri Division, Ballari Urban, Ballari Rural, Hospet Rural, Raichur Urban, Raichur Rural, Sindhanoor and Gangavathi Divisions is more than 10%and collection efficiency of Kalburgi Division 1, Bidar Division, Humnabad Division, Hospet Rural Division is less than 90%.
- **From table no. 6.2.2.1., it is also clear that AT & C losses of all the division except Kalburgi Urban, Koppal and Gangavathi is more than allowable limit of 15%.**
- From table no. 6.2.2.1., Average billing rate of Sedam and Raichur Urban are more than Rs. 9 per kWh but through rate (Realization/Input Unit) of Raichur Urban is poor in comparison to it is average billing rate, resulting in poor AT & C losses.

6.2.2.2. Without Irrigation Pump

Without Irrigation Pump										
S.No	Name of Division	Input energy (MU)	Total energy	Billed Amount in Rs. Crore	Collected Amount in Rs. Crores	Billing efficiency= total energy/input energy	Collection Efficiency= Collection/ Billed amount	Average Billing Rate (ABR)=Assasment/billed*10	Through Rate=Realization/input*10	AT&C losses=(ABR-Through rate)/ABR
Formula						g=d/c*100 %	h=f/e*100 %	i=e/d*10	j=f/c*10	k=(i-j)/i*100%
Sub-total	Kalaburagi Urban	478.24	417.65	356.06	356.49	87.33	100.12	8.53	7.45	12.56
Sub-total	Kalburagi Division1	309.50	269.59	237.08	187.62	87.10	79.14	8.79	6.06	31.07
Sub-total	Kalaburagi Division2	228.31	204.98	190.76	174.58	89.78	91.52	9.31	7.65	17.83
Sub-total	Sedam	375.59	340.74	327.81	298.33	90.72	91.01	9.62	7.94	17.44
Sub-total	Yadgir	329.65	253.94	229.58	204.92	77.03	89.26	9.04	6.22	31.24
Sub-total	Bidar	445.78	424.44	367.65	296.32	95.21	80.60	8.66	6.65	23.26
Sub-total	Humnabad	260.28	244.6	203.17	157.31	93.98	77.43	8.31	6.04	27.24
Sub-total	Ballari Urban	292.04	241.45	211.66	207.25	82.68	97.92	8.77	7.10	19.05
Sub-total	Ballari Rural	673.49	580.58	531.55	492.6	86.20	92.67	9.16	7.31	20.11
Sub-total	Hospet Urban	263.85	238.72	305.08	285.32	90.48	93.52	12.78	10.81	15.38
Sub-total	Hospet Rural	239.59	188.11	203	153.7	78.52	75.71	10.79	6.42	40.55
Sub-total	Raichur Urban	243.99	202.99	195.94	180.93	83.20	92.34	9.65	7.42	23.18
Sub-total	Raichur Rural	335.85	233.26	221.16	186.96	69.45	84.54	9.48	5.57	41.29
Sub-total	Sindhanoor	316.60	241.22	216.13	185.9	76.19	86.01	8.96	5.87	34.47
Sub-total	Koppal	503.31	475.38	446.67	431.87	94.45	96.69	9.40	8.58	8.68
Sub-total	Gangavathi	288.88	231.14	208.96	197.94	80.01	94.73	9.04	6.85	24.21
Remark	7.58MU peratins to HT 2a (IPP import to GESCOM) sales accounted by Power Trading Cell of GESCOM Corporate Office., 6.09MU - KPTCL office Lighting and S/s auxilliary consuption, Misc.		13.67	280.48	244.24					
Total		5584.95	4802.45	4732.74	4242.3	85.99	89.64	9.85	7.60	22.92

- On observation of table no. 6.2.2.2.which is for commercial data of divisions excluding 434744 Nos. Irrigation power consumers (Feeding through 1066 nos. separate 11kV feeders) which are getting subsidiary from Government it is found that line losses of Kalburgi Urban, Kalburgi Division 1, Kalburgi Division 2, Yadgiri, Ballari Urban, Ballari Rural, HospetRural, Raichur Urban, Raichur Rural, Shindhanoorand Gangavathiare more than 10% and collection efficiency of Kalburgi Division 1, Yadgir, Bidar, Humnabad, Hospet Rural, Raichur Rural and Sindhanoor Division is less than 90%.
- From table no. 6.2.2.2., AT & C losses (without irrigation pump consumers) of all the division except Kalburgi Urban and Koppal is more than allowable limit of 15%.
- From table no. 6.2.2.2., Average billing rate (without irrigation pump consumers) of Kalburgi Division 2, Sedam, Billari Rural, Hospet Urban, Hospet Rural, Raichur Urban, Raichur Rural and Koppalare

more than Rs. 9 per kWh but except HospetUrban and Koppal there through rate (Realization/Input Unit) is poor in comparison to it is average billing rate, resulting in poor AT & C losses.

6.2.3. Feeder-wise Losses

Abstract of 11kV Feeder Wise Losses , Collection Efficiency and AT & C Losses for FY 2022-23																
Name of the Division	Total No. Of Feeders	Type of the Feeders	No. of 11KV Feeder Existing	No. of 11KV Feeder Audited	NUMBER OF FEEDERS WITH DISTRIBUTION LOSSES %						Collection Efficiency %		AT & C Losses %			
					<5	5 to 10	10 to 15	15 to 20	20 to 30	>30	< 80	80-100	<15	15-20	20-30	>30
Kalaburagi Urban Division	69	Urban	65	64	3	34	25	2	0	0	0	64	62	1	1	0
		Industrial	2	2	0	2	0	0	0	0	0	2	2	0	0	0
		I/P Set	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		NJY	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Rural	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		WW	2	2	0	2	0	0	0	0	0	2	2	0	0	0
		Total	**69**	**68**	**3**	**38**	**25**	**2**	**0**	**0**	**0**	**68**	**66**	**1**	**1**	**0**
	214	Urban	6	6	0	2	4	0	0	0	0	6	5	1	0	0

Kalaburagi Division-1		Industrial	12	12	0	11	1	0	0	0	1	11	6	4	2	0
		I/P Set	109	107	0	91	16	0	0	0	31	76	64	10	6	27
		NJY	82	82	0	12	70	0	0	0	32	50	25	16	9	32
		Rural	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		WW	5	5	0	5	0	0	0	0	1	4	4	0	1	0
		Total	**214**	**212**	**0**	**121**	**91**	**0**	**0**	**0**	**65**	**147**	**104**	**31**	**18**	**59**
Kalaburagi Division-2	115	Urban	15	15	0	9	6	0	0	0	3	12	11	1	1	2
		Industrial	5	5	1	4	0	0	0	0	1	4	2	1	1	1
		I/P Set	47	47	0	40	7	0	0	0	14	33	24	6	2	15
		NJY	45	45	0	18	27	0	0	0	9	36	31	2	3	9
		Rural	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		WW	3	3	2	1	0	0	0	0	0	3	2	1	0	0
		Total	**115**	**115**	**3**	**72**	**40**	**0**	**0**	**0**	**27**	**88**	**70**	**11**	**7**	**27**
Sedam Division	90	Urban	5	5	0	3	2	0	0	0	0	5	0	5	0	0
		Industrial	2	2	0	2	0	0	0	0	0	2	1	1	0	0
		I/P Set	31	31	0	21	10	0	0	0	0	31	14	12	5	0
		NJY	48	48	0	3	30	11	4	0	0	48	20	25	3	0
		Rural	3	3	0	0	3	0	0	0	0	3	1	2	0	0
		WW	1	1	1	0	0	0	0	0	0	1	1	0	0	0
		Total	**90**	**90**	**1**	**29**	**45**	**11**	**4**	**0**	**0**	**90**	**37**	**45**	**8**	**0**
Yadgir Division	208	Urban	15	15	0	7	8	0	0	0	2	13	8	1	4	2
		Industrial	6	5	1	2	2	0	0	0	1	4	2	0	2	1
		I/P Set	98	98	0	48	50	0	0	0	20	78	58	7	11	22
		NJY	76	76	0	7	62	3	4	0	14	62	45	5	14	12
		Rural	4	4	0	0	4	0	0	0	1	3	2	1	0	1
		WW	9	6	2	4	0	0	0	0	0	6	5	0	1	0
		Total	**208**	**204**	**3**	**68**	**126**	**3**	**4**	**0**	**38**	**166**	**120**	**14**	**32**	**38**
Bidar Division	225	Urban	28	28	1	6	21	0	0	0	2	26	23	1	2	2
		Industrial	9	9	4	4	1	0	0	0	2	7	7	0	0	2
		I/P Set	98	98	0	97	1	0	0	0	21	77	67	2	8	21
		NJY	85	85	0	2	75	5	3	0	25	60	48	6	6	25
		Rural	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		WW	5	5	1	4	0	0	0	0	1	4	4	0	0	1
		Total	**225**	**225**	**6**	**113**	**98**	**5**	**3**	**0**	**51**	**174**	**149**	**9**	**16**	**51**
Humnabad Division	139	Urban	10	10	0	8	2	0	0	0	0	10	9	1	0	0
		Industrial	6	6	1	4	1	0	0	0	1	5	4	0	1	1
		I/P Set	73	73	0	55	18	0	0	0	26	47	33	13	2	25
		NJY	47	47	0	5	40	2	0	0	14	33	31	2	0	14
		Rural	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		WW	3	3	0	3	0	0	0	0	0	3	3	0	0	0
		Total	139	139	1	75	61	2	0	0	**41**	**98**	**80**	**16**	**3**	**40**
Kalaburagi Zone	1060	Urban	144	143	4	69	68	2	0	0	7	136	118	11	8	6
		Industrial	42	41	7	29	5	0	0	0	6	35	24	6	6	5
		I/P Set	456	454	0	352	102	0	0	0	112	342	260	50	34	110
		NJY	383	383	0	47	304	21	11	0	94	289	200	56	35	92
		Rural	7	7	0	0	7	0	0	0	1	6	3	3	0	1
		WW	28	25	6	19	0	0	0	0	2	23	21	1	2	1
		Total	1060	1053	17	516	486	23	11	0	**222**	**831**	**626**	**127**	**85**	**215**
Ballari Urban Division	30	Urban	25	25	0	9	14	2	0	0	0	25	21	3	1	0
		Industrial	3	3	1	1	1	0	0	0	0	3	3	0	0	0
		I/P Set	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		NJY	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Rural	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		WW	2	2	1	1	0	0	0	0	0	2	2	0	0	0
		Total	**30**	**30**	**2**	**11**	**15**	**2**	**0**	**0**	**0**	**30**	**26**	**3**	**1**	**0**
Ballari Rural Division	169	Urban	20	20	0	3	17	0	0	0	5	15	5	5	5	5
		Industrial	16	15	1	6	8	0	0	0	1	14	6	7	1	1
		I/P Set	84	84	0	82	2	0	0	0	3	81	72	4	5	3
		NJY	44	44	0	1	39	1	3	0	31	13	1	0	12	31
		Rural	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		WW	5	5	0	1	4	0	0	0	4	1	0	1	0	4
		Total	**169**	**168**	**1**	**93**	**70**	**1**	**3**	**0**	**44**	**124**	**84**	**17**	**23**	**44**
	78	Urban	27	27	0	20	6	1	0	0	1	26	17	5	4	1

Hospet Urban Division		Industrial	4	4	1	2	1	0	0	0	0	4	4	0	0	0
		I/P Set	31	29	0	27	2	0	0	0	1	28	28	0	0	1
		NJY	13	13	0	0	13	0	0	0	4	9	0	0	7	6
		Rural	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		WW	3	3	0	3	0	0	0	0	1	2	1	0	1	1
		Total	**78**	**76**	**1**	**52**	**22**	**1**	**0**	**0**	**7**	**69**	**50**	**5**	**12**	**9**
Hospet Rural Division	203	Urban	9	9	0	7	2	0	0	0	0	9	9	0	0	0
		Industrial	2	2	1	1	0	0	0	0	1	1	1	0	0	1
		I/P Set	129	128	0	121	7	0	0	0	5	123	117	4	3	4
		NJY	57	57	0	14	40	0	3	0	38	19	1	1	18	37
		Rural	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		WW	6	6	0	5	1	0	0	0	4	2	1	0	1	4
		Total	**203**	**202**	**1**	**148**	**50**	**0**	**3**	**0**	**48**	**154**	**129**	**5**	**22**	**46**
Raichur Urban Division	28	Urban	22	22	0	5	13	2	2	0	0	22	4	3	14	1
		Industrial	5	5	0	4	1	0	0	0	0	5	4	1	0	0
		I/P Set	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		NJY	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Rural	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		WW	1	1	0	1	0	0	0	0	0	1	1	0	0	0
		Total	**28**	**28**	**0**	**10**	**14**	**2**	**2**	**0**	**0**	**28**	**9**	**4**	**14**	**1**
Raichur Rural Division	222	Urban	15	15	1	5	9	0	0	0	3	12	5	2	5	3
		Industrial	11	11	3	7	1	0	0	0	0	11	11	0	0	0
		I/P Set	110	110	0	74	36	0	0	0	1	109	105	4	0	1
		NJY	83	83	0	36	44	0	3	0	43	40	28	4	7	44
		Rural	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		WW	3	3	2	1	0	0	0	0	0	3	3	0	0	0
		Total	**222**	**222**	**6**	**123**	**90**	**0**	**3**	**0**	**47**	**175**	**152**	**10**	**12**	**48**
Sindhanur Division	165	Urban	11	11	0	4	1	5	1	0	0	11	4	1	5	1
		Industrial	4	4	0	1	3	0	0	0	1	3	3	0	0	1
		I/P Set	78	77	0	16	61	0	0	0	3	75	24	29	20	5
		NJY	63	63	0	11	39	8	5	0	28	35	2	6	22	33
		Rural	2	2	0	0	0	2	0	0	1	1	0	0	1	1
		WW	7	7	0	5	2	0	0	0	2	5	2	1	2	2
		Total	**165**	**164**	**0**	**37**	**106**	**15**	**6**	**0**	**35**	**130**	**35**	**37**	**50**	**43**
Koppal Division	157	Urban	10	10	0	2	8	0	0	0	0	10	10	0	0	0
		Industrial	5	5	1	3	1	0	0	0	0	5	5	0	0	0
		I/P Set	97	97	0	69	28	0	0	0	0	97	92	5	0	0
		NJY	40	40	0	0	31	4	5	0	0	40	26	9	5	0
		Rural	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		WW	5	5	1	3	1	0	0	0	0	5	5	0	0	0
		Total	157	157	2	77	69	4	5	0	**0**	**157**	**138**	**14**	**5**	**0**
Gangavathi Division	153	Urban	18	18	0	2	16	0	0	0	0	18	17	1	0	0
		Industrial	4	4	1	3	0	0	0	0	0	4	4	0	0	0
		I/P Set	86	86	0	80	6	0	0	0	2	84	83	1	0	2
		NJY	33	33	0	1	32	0	0	0	0	33	27	6	0	0
		Rural	6	6	0	0	6	0	0	0	0	6	6	0	0	0
		WW	6	6	5	1	0	0	0	0	0	6	6	0	0	0
		Total	**153**	**153**	**6**	**87**	**60**	**0**	**0**	**0**	**2**	**151**	**143**	**8**	**0**	**2**
Ballari Zone	1205	Urban	157	157	1	57	86	10	3	0	9	148	92	20	34	11
		Industrial	54	53	9	28	16	0	0	0	3	50	41	8	1	3
		I/P Set	615	611	0	469	142	0	0	0	15	597	521	47	28	16
		NJY	333	333	0	63	238	13	19	0	144	189	85	26	71	151
		Rural	8	8	0	0	6	2	0	0	1	7	6	0	1	1
		WW	38	38	9	21	8	0	0	0	11	27	21	2	4	11
		Total	**1205**	**1200**	**19**	**638**	**496**	**25**	**22**	**0**	**183**	**1018**	**766**	**103**	**139**	**193**
GESCOM	2265	Urban	301	300	5	126	154	12	3	0	16	284	210	31	42	17
		Industrial	96	94	16	57	21	0	0	0	9	85	65	14	7	8
		I/P Set	1071	1065	0	821	244	0	0	0	127	939	781	97	62	126
		NJY	716	716	0	110	542	34	30	0	238	478	285	82	106	243
		Rural	15	15	0	0	13	2	0	0	2	13	9	3	1	2
		WW	66	63	15	40	8	0	0	0	13	50	42	3	6	12
Total			**2265**	**2253**	**36**	**1154**	**982**	**48**	**33**	**0**	**405**	**1849**	**1392**	**230**	**224**	**408**

- GESCOM presently has total 2265 Nos. exciting 11kV feeders out of which 2254 Nos. 11kV feeders covered for energy auditing.
- Out of 301Urban feeder distribution losses of 154 Nos. feeders are between 10 to 15% and losses of 15 Nos. feeders are more than 15%. Consumers of these 169 Nos. feeder need to be checked in phase manner.
- Collection efficiency of 16Urban feeders is less than 80%. Disconnection drive is commended of these feeders to increase the revenue realization.
- Out of 96 Industrial feeders distribution losses of 21 feeders are between 10-15%. Consumers of these 21 feeders need to be checked in phase manner.
- Collection efficiency of 9 Nos. Industrial feeders is less than 80%. Disconnection drive is commended of these feeders to increase the revenue realization.
- Approximate half of the total feeders of GESCOM are agriculture feeder which are consuming 40.67% energy of DISCOM.
- Raid/Checking should also be done on NJY/Rural feeders to reduce the losses and to improve collection efficiency**.**

6.2.4. Subsidy Computation and Analysis

Proforma for the Quarterly Consumer Category Wise Subsidy Billed/Received/Due for FY 2022-23															
Consumer Category (Separate for each Subsidized consumer category)	**Quarter**	**Billed Energy**			**Subsidized Billed Energy**			**Applicable rate of Subsidy as notified by State Govt. (CDT+FAC=8.11/6.63+0.00)**		**Subsidy Due from State Govt.**			**Subsidy Actually Billed/ Claimed from State Govt. (As against Col.12)**	**Subsidy Received from State Govt. (As against Col.13)**	**Balance Subsidy yet to be received from State Govt.**
		Metered	**Unmetered**	**Total**	**Metered (Out of Col.2)**	**Unmetered (Out of Col.3)**	**Total**	**Metered Energy**	**Unmetered Energy**	**Metered Energy**	**Unmetered Energy**	**Total**			
		(in MU)			**(in MU)**			**(in Rs./kWh)**		**(inRs. Crs.)**			**(inRs. Cr.)**	**(inRs. Cr.)**	**(inRs. Cr.)**
1		**2**	**3**	**4=2+3**	**5**	**6**	**7=5+6**	**8**	**9**	**10=5*8**	**11=6*9**	**12=10+11**	**13**	**14**	**15=13-14**
Residential	Quarter 1 (April-22 to June-22)	435.23	37.54	472.77	32.52	34.28	66.80	8.11	8.11	26.38	27.80	54.17	54.45	50.64	3.81
Agriculture		50.16	999.29	1049.45	30.00	999.29	1029.29	6.63	6.63	19.89	662.53	682.42	671.45	456.66	214.79
Commercial/Industrial LT		162.88	0.00	162.88	0.00	0.00	0.00	-							
Commercial/Industrial HT		446.13	0.00	446.13	0.00	0.00	0.00								
Others (Specify)		209.95	0.00	209.95	0.00	0.00	0.00								
Total		**1304.35**	**1036.82**	**2341.18**	**62.53**	**1033.56**	**1096.09**			**46.27**	**690.32**	**736.59**	**725.90**	**507.30**	**218.60**
Residential	Quarter 2 (July-22 to Sept-22)	380.35	37.59	417.94	33.03	33.97	67.00	8.37	8.37	27.65	28.43	56.08	56.31	81.37	-25.05
Agriculture		43.06	612.31	655.37	25.64	612.31	637.95	6.89	6.89	17.67	421.88	439.55	439.51	462.55	-23.03
Commercial/Industrial LT		144.84	0.00	144.84	0.00	0.00	0.00	-							
Commercial/Industrial HT		364.20	0.00	364.20	0.00	0.00	0.00								
Others (Specify)		233.26	0.00	233.26	0.00	0.00	0.00								
Total		**1165.71**	**649.90**	**1815.62**	**58.67**	**646.28**	**704.95**			**45.32**	**450.31**	**495.63**	**495.83**	**543.92**	**-48.09**

Consumer Category (Separate for each Subsidized consumer category)	Quarter	Billed Energy			Subsidized Billed Energy			Applicable rate of Subsidy as notified by State Govt. (CDT+FAC=8.11/6.63+0.00)		Subsidy Due from State Govt.			Subsidy Actually Billed/ Claimed from State Govt. (As against Col.12)	Subsidy Received from State Govt. (As against Col.13)	Balance Subsidy yet to be received from State Govt.
		Metered	Unmetered	Total	Metered (Out of Col.2)	Unmetered (Out of Col.3)	Total	Metered Energy	Unmetered Energy	Metered Energy	Unmetered Energy	Total			
		(in MU)			(in MU)			(in Rs./kWh)		(inRs. Crs.)			(inRs. Cr.)	(inRs. Cr.)	(inRs. Cr.)
1		2	3	4=2+3	5	6	7=5+6	8	9	10=5*8	11=6*9	12=10+11	13	14	15=13-14
Residential	Quarter 3 (Oct-22 to Dec-22)	354.52	35.61	390.13	34.14	33.02	67.16	8.72	8.72	29.77	28.80	58.57	57.28	53.11	4.17
Agriculture		62.67	660.29	722.96	23.34	660.29	683.63	7.24	7.24	16.90	478.05	494.95	494.94	424.36	70.58
Commercial/Industrial LT		141.19	0.00	141.19	0.00	0.00	0.00	-							
Commercial/Industrial HT		383.38	0.00	383.38	0.00	0.00	0.00								
Others (Specify)		243.16	0.00	243.16	0.00	0.00	0.00								
Total		1184.92	695.90	1880.82	57.48	693.31	750.79			46.67	506.84	553.51	552.22	477.47	74.75
Residential	Quarter 4 (Jan-23 to Mar-23)	333.63	38.74	372.37	32.94	34.49	67.42	8.66	8.66	28.53	29.86	58.39	56.93	53.73	3.20
Agriculture		77.50	1132.79	1210.29	35.43	1132.79	1168.22	7.18	7.18	25.44	813.34	838.78	870.97	854.05	16.92
Commercial/Industrial LT		147.96	0.00	147.96	0.00	0.00	0.00	-							
Commercial/Industrial HT		414.34	0.00	414.34	0.00	0.00	0.00								
Others (Specify)		244.26	0.00	244.26	0.00	0.00	0.00								
Total		1217.70	1171.52	2389.22	68.37	1167.27	1235.64			53.96	843.20	897.17	927.91	907.78	20.13
Consumer Category (Separate for each Subsidized consumer category)	Quarter	Billed Energy			Subsidized Billed Energy			Applicable rate of Subsidy as notified by State Govt. (CDT+FAC=8.11/6.63+0.00)		Subsidy Due from State Govt.			Subsidy Actually Billed/ Claimed from State Govt. (As against Col.12)	Subsidy Received from State Govt. (As against Col.13)	Balance Subsidy yet to be received from State Govt.
		Metered	Unmetered	Total	Metered (Out of Col.2)	Unmetered (Out of Col.3)	Total	Metered Energy	Unmetered Energy	Metered Energy	Unmetered Energy	Total			

		(in MU)			(in MU)			(in Rs./kWh)		(inRs. Crs.)			(inRs. Cr.)	(inRs. Cr.)	(inRs. Cr.)
1		2	3	4=2+3	5	6	7=5+6	8	9	10=5*8	11=6*9	12=10+11	13	14	15=13-14
Residential	FY April-22 to Mar-23	1503.73	149.48	1653.21	132.64	135.75	268.39	8.47	8.47	112.28	114.91	227.19	224.98	238.85	-13.86
Agriculture		233.39	3404.67	3638.06	114.41	3404.67	3519.08	6.99	6.99	79.92	2378.16	2458.08	2476.87	2197.62	279.25
Commercial/Industrial LT		596.88	0.00	596.88	0.00	0.00	0.00				-				
Commercial/Industrial HT		1608.06	0.00	1608.06	0.00	0.00	0.00								
Others (Specify)		930.63	0.00	930.63	0.00	0.00	0.00								
Total		4872.69	3554.15	8426.84	247.05	3540.42	3787.47			192.19	2493.07	2685.27	2701.85	2436.47	265.39

- As per BEE format total energy billed for FY 2022-23 is 8440.51 **MU** which includes 7.58MU, HT2a (IPP import to GESCOM) sales accounted by Power Trading Cell of GESCOM Corporate Office. And 6.09MU - KPTCL office Lighting and S/s Auxiliary consumption.
- Energy consumption of **Agriculture Consumers**is 100% subsided which is being assessed on the basis of input energy of dedicated agriculture feeders by deducting technical losses of feeders and subsidiary amount is calculated on the basis of rate per unit prescribed by KERC in tariff and (Fuel Adjustment Charges) FAC (Rate of which is approved by KERC on quarterly basis) for the FY 2022-23-unit rates are as follows.

Quarter	Rate as per Tariff (Rs.)	FAC (Rs.)	Total Rate (Rs.)
Q1	6.63	0	6.63
Q2	6.63	0.26	6.89
Q3	6.63	0.61	7.24
Q4	6.63	0.55	7.18

- **BJ/KJ Consumers**with less than 40 units per month consumption are 100% subsidized which is being calculated through billing software system and subsidiary amount is calculated on the basis of rate per unit prescribed by KERC in tariff and FAC (Rate of which is approved by KERC on quarterly basis) for the FY 2022-23 unit rates of this categories of consumers are as follows.

Quarter	Rate as per Tariff (Rs.)	FAC (Rs.)	Total Rate (Rs.)
Q1	8.11	0	8.11
Q2	8.11	0.26	8.37
Q3	8.11	0.61	8.72
Q4	8.11	0.55	8.66

- Out of **3584699Nos.** total consumers of DISCOM,**434744 Nos.** (12.12%) Irrigation power consumers and **597675Nos.** (16.67%) BJ/KJ consumers are getting subsidy.
- Out of 8440.51 **MU** energy billed in FY 2022-23, **3519.08 MU** (41.69%)subsidy unit booked for irrigation power consumer and **268.39 MU** (3.18%) subsidy unit booked for BJ/KJ consumers.
- Pending BJ/KJ and Irrigation Power consumers which are unmetered need to be provided meteres.
- Rs. 265.39 Cr. Subsidy amount for FY 2022-23 still not received from Government of Karnataka.

7. GESCOMMetering and Billing Network

7.1. Metering and Billing arrangement

7.1.1. Metering and Billing arrangement for Consumers

2	Parameters	66kV and above	33kV	11/22kV	LT
a. i.	Number of conventional metered consumers	185	21	3251	3352424
ii	Number of consumers with 'smart' meters	0	0	0	0
iii	Number of consumers with 'smart prepaid' meters	0	0	0	0
iv	Number of consumers with 'AMR' meters	0	0	0	0
v	Number of consumers with 'non-smart prepaid' meters	0	0	0	0
vi	Number of unmetered consumers	0	0	0	228534
vii	**Number of total consumers**	185	21	3251	3580958

- Consumer billing in Urban area (RAPDRP)is being done through Infosys software and In Rural Area (Non-RAPDRP) billing is being done through N-Soft Software.
- Billed energy, assessment, and realization on 11kV feeder is calculated through Infosys and N-Soft billing system on the basis of consumer indexing.
- Out of **228534** unmetered connection **22566** Nos. consumers are of irrigation power and **5968** Nos. consumers are residential. As per government guidelines all these unmetered connections should be provided meters on top priority.
- Recommended to install smart prepaid meters at the premises of high line losses Urban feeder consumers on top priority.

7.1.2. Metering arrangement for Transformers

2	Parameters	66kV and above	33kV	11/22kV	LT
b.i.	Number of conventionally metered Distribution Transformers	185	21	3234	29629
ii	Number of DTs with communicable meters	0	0	0	0
iii	Number of unmetered DTs	0	0	0	93051
iv	**Number of total Transformers**	185	21	3234	122680

- Out of the total 122680 Nos. of Distribution Transformers of DISCOM, 76907 Nos. are excluded from metering. Out of the remaining 45773 Nos. of Distribution Transformers, 29629 Nos. of Distribution Transformers are metered which comes to 64.73%. Still meters are to be provided on remaining 16144 Nos. Distribution Transformers.
- There is no communicable metering at distribution transformers. Every month manual reading of meters of distribution transformers are being taken by division staff and based on these input readings DT-wise losses are being calculated in GESCOM.

7.1.3. Metering arrangement for Feeders

2	Parameters	66kV and above	33kV	11/22kV	LT
c.i.	Number of metered feeders	NA	150	2265	
ii	Number of feeders with communicable meters	0	0	0	
iii	Number of unmetered feeders	0	0	0	0
iv	**Number of total feeders**	0	150	2265	0

- Reading of All the 33kV and 11kV feeders are being taken manually.
- Need to provide automatic meter reading system (AMR) to push input metering data of all the feeder meter to the billing system automatically.
- Feeder wise Sold energy, assessment and realization of consumers other than irrigation power is being calculated through Infosys and N-soft software on the basis of consumer tagged on the respective feeders.

8. Energy Audit Findings

GESCOM has independent energy audit wing consist of technical, IT and Account officers. As per BEE guidelines quarterly energy audit report is being prepared and uploaded by audit team.

On the basis of data/information submitted by DISCOM energy audit team, Annual energy audit for the FY 2022-23 was done by energy auditing team of M/s Katayani Energy Solutions Pvt. Ltd., New Delhi from 28-06-2023 to 01-07-2023. During audit period M/s Katayani Team visited various distribution and transmission substations, subdivisions, divisions and circles of GESCOM and intimated the GESCOM team about the finding which are summarized in conclusion and action plan.

9. Conclusion and Action Plan

1. The collection efficiency calculated in BEE format is on the basis of assumption that all the subsidiary bill issued during the year have been received from the Government of Karnataka. However, as per Central electricity authority revised guidelines on dated 02-06-2017, AT & C losses for the FY 2022-23 are as follows details **(Annexure 01)**

FY	AT & C losses as per BEE	AT & C losses as per CEA
2022-23	16.76%	20.98%

2. In every district BJ/KJ connections are approximately 20% of total residential connection in respective district. On observation of bills of few of the BJ/KJ connection, Supply Type LT-1 it is found that few bills of defective or unmetered connections are being generatedby considering average consumption of 40 units per installation as per KERC Tariff Order.
3. EIP Feeders emanating from 110kV, 66kV and 33kV sub-stations are provided with Capacitor banks of adequate capacity to overcome the low power factor.
4. Installations with Motive Load are serviced duly ascertaining the provision of capacitor for reactive power compensation.
5. GESCOM is insisting and encouraging its prospective consumers to use high star rated electrical appliances.
6. For residential consumers provision of Solar Water Heater is mandatory for availing power supply.
7. In urban areas GESCOM has mandated usage of 5 Start Rated DTC's and 4 Star Rated in Rural areas.
8. GESCOM has dedicated Demand Side Management DSM cell for effective implementation of energy conservation measures initiated by state and central government.
9. DSM Cell regularly conducts campaigns programs and workshop to create public awareness
10. Regular checking/raid is being done by departmental officers and vigilance teams.
11. As per tariff if the Power Factor of LT Consumers is less-than 0.85, surcharge of 02 Paisa per Unit is levied and if power factor of HT consumer is less than 0.90, surcharge of 03 Paisa per unit is levied. On observation of electricity bill of LT/HT industrial consumers it is found that this small amount of surcharge does not motivate consumers to install adequate capacity capacitor bank to control their power factor. Power factor of many LT/HT consumers running very poor and they are paying penalty as per tariff. Recommended to give notice to such consumers and motivate them to keep their power factor 0.98 or 0.99 by installing capacitor of adequate capacity at their premises. This will reduce reactive load on the grid.

12. Recommended to represent to KERC for kVAh based billing instead of kWh-based billing.
13. Normal conventional meter should be replaced with communicable prepaid smart meters.
14. Distribution transformer damage rate of DISCOM is very high (14.38%) and damage rate of few of the division such as Division 1 Kalaburgi, Yadgir, Bidar, Humnabad and H.B. Halli Division is even higher than the DISCOM average.
15. Higher damage rate may be due to the following reasons.
    a) Overloading of transformers
    b) Poor earthing of body and neutral of transformers
    c) Not providing protection on HT and LT side
    d) Poor maintenance
    e) Poor repairing of transformer in workshop
    f) Unwanted trees and grass in nearby area
    g) Unbalance load on the three phases
    h) Oil leakage of transformers
16. Recommended to analyze reason of transformer failure for every transformer and take corrective action accordingly
17. Electronic meters are installed on all the 11kV/33kV/66kV/110kV/220kV feeders at DISCOM boundary and on the basis of joint reading of these meters with KPTCL and GESCOM input energy of divisions/DISCOM is fixed.
18. Frequent calibration of these meters is being done jointly by KPTCL and GESCOM.
19. Monthly report of energy flow at transmission level is prepared by KPTCL and GESCOM jointly.
20. On the basis of joint report input energy received by GESCOM at 11kV, 33kV, 66kV, line losses are calculated by GESCOM by taking billed energy, assessment, and realization by billing data.
21. AT & C losses in FY 2022-23 have been increased significantly in comparison to FY 2021-22
22. Cost of purchase of supply is also increase significantly in FY 2022-23
23. Average revenue realization per unit is dropped significantly in FY 2022-23
24. **Needs to make efforts to reduce (Average Cost of Supply) ACS - (Average Realisable Revenue) ARR GAP**
25. For further reduction of losses following steps may be taken:
    a) Need to survey and replace conductor of proper capacity
    b) Need to cut tree branches touching to conductors
    c) Need to tighten the jumpers
    d) At present HT/LT ratio of DISCOM is 0.79. Ideally it should be 1-2 for loss reduction
    e) Need to improve HT/LT ratio by providing (High Voltage Distribution System) HVDS system
26. Line losses in Kalburgi Urban, Kalburgi Division 1, Kalburgi Division 2, Yadgiri Division, Ballari Urban, Ballari Rural, Hospet Rural, Raichur Urban, Raichur Rural, Sindhanoor and Gangavathi Divisions is more than 10% and collection efficiency of Kalburgi Division 1, Bidar Division, Humnabad Division, Hospet Rural Division is less than 90%.

27. **AT & C losses of all the division except Kalburgi Urban, Koppal and Gangavathi is more than allowable limit of 15%.**
28. Average billing rate of Sedam and Raichur Urban are more than Rs. 9 per kWh but through rate (Realization/Input Unit) of Raichur Urban is poor in comparison to it is average billing rate, resulting in poor AT & C losses.
29. On observation of commercial data of divisions excluding 434744 Nos. Irrigation power consumers (Feeding through 1066 nos. separate 11kV feeders) which are getting subsidiary from Government it is found that line losses of Kalburgi Urban, Kalburgi Division 1, Kalburgi Division 2, Yadgiri, Ballari Urban, Ballari Rural, Hospet Rural, Raichur Urban, Raichur Rural, Shindhanoor and Gangavathi are more than 10% and collection efficiency of Kalburgi Division 1, Yadgir, Bidar, Humnabad, Hospet Rural, Raichur Rural and Sindhanoor Division is less than 90%.
30. AT & C losses (without irrigation pump consumers) of all the division except Kalburgi Urban and Koppal is more than allowable limit of 15%.
31. Average billing rate(without irrigation pump consumers) of Kalburgi Division 2, Sedam, Billari Rural, Hospet Urban, Hospet Rural, Raichur Urban, Raichur Rural and Koppal are more than Rs. 9 per kWh but except Hospet Urban and Koppal there through rate (Realization/Input Unit) is poor in comparison to it is average billing rate, resulting in poor AT & C losses.
32. GESCOM presently has total 2265 Nos. exciting 11kV feeders out of which 2254 Nos. 11kV feeders covered for energy auditing.
33. Out of 301 Urban feeder distribution losses of 154 Nos. feeders are between 10 to 15% and losses of 15 Nos. feeders are more than 15%. Consumers of these 169 Nos. feeder need to be checked in phase manner.
34. Collection efficiency of 16 Urban feeders is less than 80%. Disconnection drive is commended of these feeders to increase the revenue realization.
35. Out of 96 Industrial feeders distribution losses of 21 feeders are between 10-15%. Consumers of these 21 feeders need to be checked in phase manner.
36. Collection efficiency of 9 Nos. Industrial feeders is less than 80%. Disconnection drive is commended of these feeders to increase the revenue realization.
37. Approximate half of the total feeders of GESCOM are agriculture feeder which are consuming 40.67% energy of DISCOM.
38. Raid/Checking should also be done on NJY/Rural feeders to reduce the losses and to improve collection efficiency
39. As per BEE format total energy billed for FY 2022-23 is 8440.51 MU which includes 7.58MU, HT2a (IPP import to GESCOM) sales accounted by Power Trading Cell of GESCOM Corporate Office. and 6.09MU - KPTCL office Lighting and S/s auxilliary consumption.
40. Energy consumption of **Agriculture Consumers** is 100% subsided which is being assessed on the basis of input energy of dedicated agriculture feeders by deducting technical losses of feeders and subsidiary amount is calculated on the basis of rate per unit prescribed by KERC in tariff and (Fuel Adjustment Charges) FAC (Rate of which is approved by KERC on quarterly basis) for the FY 2022-23-unit rates.

41. **BJ/KJ Consumers** with less than 40 units per month consumption are 100% subsidized which is being calculated through billing software system and subsidiary amount is calculated on the basis of rate per unit prescribed by KERC in tariff and FAC (Rate of which is approved by KERC on quarterly basis) for the FY 2022-23 unit rates of this categories of consumers..
42. Out of **3584699Nos.** total consumers of DISCOM, **434744 Nos.** (12.12%) Irrigation power consumers and **597675Nos.** (16.67%) BJ/KJ consumers are getting subsidy.
43. Out of 8440.51 MU energy billed in FY 2022-23, **3519.08 MU** (41.69%) subsidy unit booked for irrigation power consumer and **268.39 MU** (3.18%) subsidy unit booked for BJ/KJ consumers.
44. Pending BJ/KJ and Irrigation Power consumers which are unmetered need to be provided meteres.
45. Rs. 265.39 Cr. Subsidy amount for FY 2022-23 still not received from Government of Karnataka.
46. Consumer billing in Urban area (RAPDRP)is being done through Infosys software and In Rural Area (Non-RAPDRP) billing is being done through N-Soft Software.
47. Billed energy, assessment, and realization on 11kV feeder is calculated through Infosys and N-Soft billing system on the basis of consumer indexing.
48. Out of **228534** unmetered connection **22566** Nos. consumers are of irrigation power and **5968** Nos. consumers are residential. As per government guidelines all these unmetered connections should be provided meters on top priority.
49. Recommended to install smart prepaid meters at the premises of high line losses Urban feeder consumers on top priority.
50. Out of the total 122680 Nos. of Distribution Transformers of DISCOM, 76907 Nos. are excluded from metering. Out of the remaining 45773 Nos. of Distribution Transformers, 29629 Nos. of Distribution Transformers are metered which comes to 64.73%. Still meters are to be provided on remaining 16144 Nos. Distribution Transformers.
51. There is no communicable metering at distribution transformers. Every month manual reading of meters of distribution transformers are being taken by division staff and based on these input readings DT-wise losses are being calculated in GESCOM.
52. Reading of All the 33kV and 11kV feeders are being taken manually.
53. Need to provide automatic meter reading system (AMR) to push input metering data of all the feeder meter to the billing system automatically.
54. Feeder wise Sold energy, assessment and realization of consumers other than irrigation power is being calculated through Infosys and N-soft software on the basis of consumer tagged on the respective feeders.

10. Annexure

Annexure 1. AT&C Loss for FY 2022-23

AT&C Loss for FY 2022-23 - CEA Methodology (Provisional)				
S.No.	**Parameter**	**Unit**	**Description**	**GESCOM**
A	Input Energy	MU	Energy Generated - Axillary Consumption + Energy Purchased (Gross) – Energy Traded/ Inter State Sales.	9,896.44
B	Transmission Losses	MU		465.84
C	Net Input Energy	MU	A-B	9,430.60
	Distribution Loss	**%**		**10.50**
	Billing Efficiency	**%**		**89.50**
D	Energy Sold	MU	Energy Sold to all categories of consumers excluding units of Energy Traded/Inter-State Sales.	8,440.51
E	Revenue from Sale of Energy	Rs. crore	Revenue from Sale of Energy to all categories of consumers (including Subsidy Booked) but excluding Revenue from Energy Traded /Inter-State Sales.	7,161.96
F	Adjusted Revenue from Sale of Energy, on Subsidy Received basis	Rs. crore	Revenue from Sale of Energy (same as E above) minus Subsidy Booked plus Subsidy Received	6,896.59
G	Opening Debtors for Sale of Energy	Rs. crore	Opening debtors for sale of Energy as shown in Receivable Schedule (Without deducting provisions for doubtful debtors). Unbilled Revenue shall not be considered as Debtors .	2,386.26
H	Closing Debtors for Sale of Energy	Rs. crore	i) Closing debtors for Sale of Energy as shown in Receivable Schedule (Without deducting provisions for doubtful debts). Unbilled Revenue shall not be considered as Debtors.	2,959.73
			ii) Any amount written off during the year directly from(i)	0
I	Adjusted Closing Debtors for sale of Energy	Rs. crore	H(i+ii)	2,959.73
J	**Collection Efficiency**	**%**	**(F+G-I)/E*100 Collection Efficiency is capped at 100%**	**88.29**
K	Units Realised = [Energy Sold*Collection efficiency]	MU	D*J/100	7,451.92
L	Units Unrealised = [Net Input Energy-Units Realised]	MU	C-K	1,978.68
M	**AT&C Losses = [{ Units Unrealised/Net Input Energy}*100]**	**%**	**L/C *100**	**20.98**

Annexure 2. Order of GESCOM for appointment of Energy Manager

GULBARGA ELECTRICITY SUPPLY COMPANY LIMITED
(A Government of Karnataka Enterprise)

Phone No :9448359013-
mail:eeetpgescom@gmail.com

Corporate Office,
GESCOM, Kalaburagi,
Pin Code.585 102.

No. GESCOM/CEE(OP)/SEE (Tech)/EEE (Tech)/AEE-2(Tech)/AE-2/2023-24/ 15827-30 Date: - 1 JUL 2023

OFFICIAL MEMORANDUM

Sub:- Nomination of members of Energy Audit Cell(EAC) of GESCOM -reg.

Ref:- 1. F.No 18//1BEE/DISCOM/2021/3999-4101 dt :18.11.2021.
2. T.O Letter No.:GESCOM/CEE(O)/SEE(Tech)/EEE(Tech)/AEE-2(Tech)/AE-2 (Tech)/2021-22/32018-44 dated: 2.12.21 for Nomination Details of Energy Cell sent to BEE.

* * * * *

With reference to the above subject, as per the Clause 5(g) of Manner and Intervals for Conduct of Energy Audit in Electricity Distribution Companions Regulation, 2021 as cited under ref 1 of BEE letter, Energy Audit Cell(EAC) of GESCOM was created vide letter cited under ref. 2.

Further, consequent to retirement of Sri Sidram Patil, SEE(Tech.), Corporate Office, GESCOM and as per the directions of M.D., GESCOM the nomination details of EAC of GESCOM is as shown in the table below:

Sl. No	Member of EAC	Name	Designation	Mobile number	Email	Address
1	Nodal Officer	Sri R.D. Chandrashekhar	Chief Engineer Electy O&M Zone, Kalaburagi and I/C Director Technical, GESCOM	9480844377 9448359005	dtgescom@ gmail.com	Corporate Office, Station Road, GESCOM, Kalaburagi-585102
2	Energy Manager	Sri Dodda Basappa	Assistant Engineer El., Unit-7, CSD-II, Ballari Urban division GESCOM	8328514237	dodda1986@ gmail.com	Dr.No 59, M.K Nagar, Kolagal Road Ballari 583102
3	IT Manager	Sri Shankar Adki	Executive Engineer O&M Division, Humnabad and I/C EE IT, GESCOM	9449597320	eeitgescom@ gmail.com	Corporate Office, Station Road, GESCOM, Kalaburagi-585102
4	Financial Manager	Kumari. Geetanjali	Asst. Accounts Officer (DCB) Corporate Office GESCOM	8660410134	dcb.gescom@ gmail.com	Corporate Office, Station Road, GESCOM, Kalaburagi-585102

Chief Engineer (Electy).,
(Operations)
Corporate office
GESCOM, Kalaburagi.

Annexure 3. ACS & ARR Gap for FY 2021-22 & 2022-23

ACS - ARR Gap for 2021-22			
S.No.	**Parameter**	**Units**	**GESCOM**
A	Gross Input Energy	**MU**	8,755.57
B	Total Expenses	**Rscrs**	5,969.52
C	Total Revenue	**Rscrs**	6,087.49
D	Tariff Subsidy Booked for the year included in (C) above	**Rscrs**	2,397.47
E	Tariff Subsidy Received during the year including arrears	**Rscrs**	3,135.17
F	Tariff Subsidy Unrealised : (D-E)	**Rscrs**	-737.70
G	Revenue Billed to Government Departments for the year included in (C) above	**Rscrs**	592.47
H	Revenue Received from Government Departments during the year including arrears	**Rscrs**	425.40
I	Revenue Unrealized from Government Departments	**Rscrs**	167.07
J	Regulatory Income, if any, included in (C) above	**Rscrs**	0
K	Grant from State Govt. for takeover of loan, if any, included in (C) above	**Rscrs**	0
L	Revenue (adjusted for State Govt. Grants, Regulatory Income, Unrealized subsidy and Govt. Dept outstanding dues) : (C - F - I - J – K)	**Rscrs**	6,658.12
M	Average Cost of Supply (ACS) : B*10/A	**Rs/kwh**	**6.82**
N	Average Revenue (ARR) : L*10/A	**Rs/kwh**	**7.60**
O	ACS - ARR Gap : (M – N)	**Rs/kwh**	**-0.79**
ACS - ARR Gap for 2022-23 (Provisional)			
S.No.	**Parameter**	**Units**	**GESCOM**
A	Gross Input Energy	**MU**	9,896.44
B	Total Expenses	**Rscrs**	7,793.83
C	Total Revenue	**Rscrs**	7,901.43
D	Tariff Subsidy Booked for the year included in (C) above	**Rscrs**	2,701.84
E	Tariff Subsidy Received during the year including arrears	**Rscrs**	2,436.47
F	Tariff Subsidy Unrealised : (D-E)	**Rscrs**	265.37
G	Revenue Billed to Government Departments for the year included in (C) above	**Rscrs**	753.63
H	Revenue Received from Government Departments during the year including arrears	**Rscrs**	331.28
I	Revenue Unrealized from Government Departments	**Rscrs**	422.35
J	Regulatory Income, if any, included in (C) above	**Rscrs**	0
K	Grant from State Govt. for takeover of loan, if any, included in (C) above	**Rscrs**	0
L	Revenue (adjusted for State Govt. Grants, Regulatory Income, Unrealized subsidy and Govt. Dept outstanding dues) : (C - F - I - J – K)	**Rscrs**	7,213.70
M	Average Cost of Supply (ACS) : B*10/A	**Rs/kwh**	**7.88**
N	Average Revenue (ARR) : L*10/A	**Rs/kwh**	**7.29**
O	ACS - ARR Gap : (M – N)	**Rs/kwh**	**0.59**

AT&C Loss for FY 2021-22 - CEA Methodology				
S. No.	**Parameter**	**Unit**	**Description**	**GESCOM**
A	Input Energy	MU	Energy Generated - Axillary Consumption + Energy Purchased (Gross) – Energy Traded/ Inter State Sales.	8755.57
B	Transmission Losses	MU		5.91
C	Net Input Energy	MU	A-B	8749.66
	Distribution Loss	**%**		**10.54**
	Billing Efficiency	**%**		**89.46**
D	Energy Sold	MU	Energy Sold to all categories of consumers excluding units of Energy Traded/Inter-State Sales.	7827.30
E	Revenue from Sale of Energy	Rs. crore	Revenue from Sale of Energy to all categories of consumers (including Subsidy Booked) but excluding Revenue from Energy Traded /Inter-State Sales.	5851.02
F	Adjusted Revenue from Sale of Energy, on Subsidy Received basis	Rs. crore	Revenue from Sale of Energy (same as E above) minus Subsidy Booked plus Subsidy Received	6588.72
G	Opening Debtors for Sale of Energy	Rs. crore	Opening debtors for sale of Energy as shown in Receivable Schedule (Without deducting provisions for doubtful debtors). Unbilled Revenue shall not be considered as Debtors .	2170.99
H	Closing Debtors for Sale of Energy	Rs. crore	i) Closing debtors for Sale of Energy as shown in Receivable Schedule (Without deducting provisions for doubtful debts). Unbilled Revenue shall not be considered as Debtors.	2386.26
			ii) Any amount written off during the year directly from(i)	0.00
I	Adjusted Closing Debtors for sale of Energy	Rs. crore	H(i+ii)	2386.26
J	**Collection Efficiency**	**%**	**(F+G-I)/E*100 Collection Efficiency is capped at 100%**	**100.00**
K	Units Realised = [Energy Sold*Collection efficiency]	MU	D*J/100	7827.30
L	Units Unrealised = [Net Input Energy-Units Realised]	MU	C-K	922.36
M	**AT&C Losses = [{ Units Unrealised/Net Input Energy}*100]**	**%**	**L/C *100**	**10.54**

AT&C Loss for FY 2022-23 - CEA Methodology (Provisional)				
S.No.	**Parameter**	**Unit**	**Description**	**GESCOM**
A	Input Energy	MU	Energy Generated - Axillary Consumption + Energy Purchased (Gross) – Energy Traded/ Inter State Sales.	9,896.44
B	Transmission Losses	MU		465.84
C	Net Input Energy	MU	A-B	9,430.60
	Distribution Loss	**%**		**10.50**
	Billing Efficiency	**%**		**89.50**
D	Energy Sold	MU	Energy Sold to all categories of consumers excluding units of Energy Traded/Inter-State Sales.	8,440.51
E	Revenue from Sale of Energy	Rs. crore	Revenue from Sale of Energy to all categories of consumers (including Subsidy Booked) but excluding Revenue from Energy Traded /Inter-State Sales.	7,161.96
F	Adjusted Revenue from Sale of Energy, on Subsidy Received basis	Rs. crore	Revenue from Sale of Energy (same as E above) minus Subsidy Booked plus Subsidy Received	6,896.59
G	Opening Debtors for Sale of Energy	Rs. crore	Opening debtors for sale of Energy as shown in Receivable Schedule (Without deducting provisions for doubtful debtors). Unbilled Revenue shall not be considered as Debtors .	2,386.26
H	Closing Debtors for Sale of Energy	Rs. crore	i) Closing debtors for Sale of Energy as shown in Receivable Schedule (Without deducting provisions for doubtful debts). Unbilled Revenue shall not be considered as Debtors.	2,959.73
			ii) Any amount written off during the year directly from(i)	0
I	Adjusted Closing Debtors for sale of Energy	Rs. crore	H(i+ii)	2,959.73
J	**Collection Efficiency**	**%**	**(F+G-I)/E*100 Collection Efficiency is capped at 100%**	**88.29**
K	Units Realised = [Energy Sold*Collection efficiency]	MU	D*J/100	7,451.92
L	Units Unrealised = [Net Input Energy-Units Realised]	MU	C-K	1,978.68
M	**AT&C Losses = [{ Units Unrealised/Net Input Energy}*100]**	**%**	**L/C *100**	**20.98**

Annexure 4. Category of Consumers as per Tariff Order

Category of Consumers as per Tariff Order		
Sr. No.	**Schedule**	**Applicable For**
1	LT-1	BJ/KJ
2	LT-2 (a)	Lighting
3	LT-2 (b)	Private Professional and other Private Educational
4	LT-3	Commercial Lighting
5	LT-4 (a)	I.P. Sets up to and inclusive of 10HP
6	LT-4 (b)	I.P. Sets above 10HP
7	LT-4 (c)	Private Horticultural Nurseries
8	LT-5	Industrial Units
9	LT-5 (a)	Under City Municipal Corporation
10	LT-5 (b)	All areas other than those covered under LT-5 (a)
11	LT-6	Water purifying plants of Government
12	LT-6 (a)	Water Supply
13	LT-6 (b)	Public Lighting
14	LT-6 (c)	EV Charging
15	LT-7 (a)	Temporary Power supply advertising Hoarding
16	LT-7 (b)	Permanent Power supply advertising Hoarding
17	HT-1	Water Supply, Drainage/Sewerage
18	HT-2 (a)	Industries (All areas of GESCOM)
19	HT-2 (b)	Commercial Complexes
20	HT-2 (c)	Government Hospital
21	HT-3 (a)	LT Schemes under Govt. Department
22	HT-3 (b)	Irrigation and Agricultural Farms
23	HT-4	Residential Apartments
24	HT-5	Hoarding and Advertisement of 67 HP

Annexure 5. Scope of work, Methodology and Data Collection

i. Scope of work of MEA

The Scope of the study was to conduct the annual energy audit of GESCOM for AT & C losses for the FY 2022-23.

1. Energy Audit should be carried out in line with the Regulation to Conduct Energy Audit in DISCOMs 2021.
2. Preparation of checklist/action plan for Energy Audit.
3. Proforma of Energy Audit will be shared with selected agency after the issuance of LoA. GESCOM visit should be carried out by all team members of the agency as per the team declaration in technical proposal. Energy Audit regulation, 2021, proforma's (formats) will be used for this audit.
4. Collection and Review of the energy related data of last Financial Year **(FY:2022-23)** in the Proforma by visiting the GESCOM physically.
5. Verification of existing pattern of energy distribution across periphery of electricity distribution company
6. Collection and verification of energy flow data of electricity distribution company at all applicable voltage level of distribution network (please refer energy audit regulation)
7. Collection of data on energy received and distributed by GESCOM and verify the accuracy of data
8. Collection & analysis the data and prepare the same with report;

I. Input energy details:
   a) Collection of input energy from recorded system meter reading
   b) All the inputs points of transmission system
   c) Details provided by transmission unit
   d) Recorded meter reading at all export points (where energy sent outside the State (interstate as well as intrastate)is from the distribution system);
   e) System loading and Captures infrastructure details (i.e. no of circle, division, sub-division, feeders, DTs, & Consumers)

II. Parameters for computation of distribution losses:
   a) Details of open access, EHT sale, HT sale, LT sale and transmission losses
   b) Number of consumers category wise in each circle
   c) Consumers connected load category wise in each circle
   d) Details of billed and un-billed energy category wise of each circle
   e) Metered and un-metered details.
   f) Circle wise losses of all circles under DISCOM periphery

g) Boundary meter details
h) Energy Cost and Tariff data
i) Source of energy Supply (e.g. electricity from grid or self-generation), including generation from renewables;
j) Energy supplied to Open Access Consumers which is directly purchased by Open Access Consumers from any supplier other than electricity distribution company

III. Monitoring and verifications of input energy and consumption pattern at various voltage levels
IV. Identify the areas of energy leakage, wastage or inefficient use;
V. Identify high loss-making areas/networks, for initiating target based corrective action;
VI. Identify overloaded segments of the network for necessary capacity additions.
VII. Computation of agriculture consumption (approved by KERC)
VIII. Methodology for loss computation various losses.
IX. Computation of Average Billing Rate (ABR)
a) Total revenue billed category wise.
b) Category wise ABR with tariff subsidy.
c) Category wise ABR without tariff subsidy.
X. Collection Efficiency (Category wise) and computation of AT&C loss.

9. Observe and compile various Energy Conservation (ENCON) options implemented by the DISCOM.
10. Recommendations to facilitate energy audit, energy accounting and improve energy efficiency
11. Study the details of loss/gain of GESCOM, analysis of Average Cost of Supply (ACS) and Average Revenue realized (ARR) gap, details of energy charges/Power purchase cost along with the financial analysis.
12. Current System Metering Status at various voltage level of GESCOM
    - Status of Functional meters for all consumers, transformers and feeders.
    - Status of default meters (non-functional meters) for all consumers, transformers and feeders
13. Current status of pre-requisites mentioned in regulations (Please refer energy accounting regulation).
14. Copies of relevant authentic and certified documents should support the report. Each document should be sealed and signed by GESCOM authorized representative as well as by agency's AEA.

15. Prepare final report of GESCOM as per the scope of work and as per the regulation of Energy Audit, 2021, in a standard format duly indexed, covering profile of the unit and its details of energy related data w.r.t DISCOMs Sector, analytical & Statistical details and any other relevant information.

ii. Methodology for Energy Audit FY 2022-23.

M/S KESPL has been awarded the work of Annual Energy Audit for FY 2022-2023 by GESCOM vide W.O. no 002/DSM dated 09-05-2023.The objective is to conduct energy audit of GESCOM Distribution Network, energy flow, metering, billing and collection performance assessment based on data submitted for study. The approval and methodology are as mentioned below

1) Kick off Meeting

- Introduction of stakeholders with Audit Team.
- Sharing contact details of team members and identify the lead managers (Energy Manager/Nodal officer) for the audit.
- Sharing details regarding project in respect of BEE PAT Scheme.
- Discussion regarding approach of study.
- Overall project plan
- Identification of boundaries of audit.

2) Data collection for FY 2022-2023

- Details of purchase of energy
- Details of subsidy
- Details for approved energy for sale by state regulatory commission
- Energy flow details and check
  - i) Energy flow between transmission and 220kV/110kV/66 KV/33 KV/11 KV incoming distribution feeders
  - ii) Energy flow between 66 KV/33 KV outgoing and 11 KV incoming feeders
  - iii) Energy flow between 11 KV feeders and Distribution Transformers or high voltage distribution systems.
  - iv) Energy flow between DT or high voltage distribution system to end consumer including ring main system.
  - v) Energy flow between feeders to end consumers.

vi) Energy flow between 66 KV/33 KV/11 KV directly to consumers.

- Identification and mapping of network assets.
- Capacity-wise HT and LT Transformers
- HT & LT Energy meter
- Mapping of HT and LT Consumers including open access
- Mapping of type of meter and functionality status.
- System of generating energy account
- Verify the accuracy of data collected in consultation with nodal officer of the DISCOM company as per standard practices and validation of data compared to collected data and analysis with respect to
  - i) consistency
  - ii) recommendation to facilitate energy accounting
  - iii) Assessment of energy conservation measures adopted by DISCOM

3) Preparation of energy audit report covering

- Power Input source at different voltage levels
- Total Input Energy
- LT & HT Distribution Network Configuration
- Metering Details, Type, Metered & Unmetered
- Record Keeping, Accountability, Monitoring & Verification Procedure
- T& D Losses
- Measures taken by DISCOM to improve transmission efficiency including prevention of theft.
- Impact of Solar Power generation and net metering.
- Input of stakeholders including substation level management personnel.

iii. Methods of Data Collection

Sample check of meter installed in various sub-station were carried out during field visit of audit team. The problems regarding calculation of feeder-wise losses were observed. Loss assessments of bus bars along with power transformers at 66 KV/11 KV substations were noted. Type of meters and its functional status were verified. Following data have been obtained for analysis. The analysis of energy audit is based on the information contained in the report as mentioned below

1) Performa for quarterly consumer category wise subsidy bill/received/Due for the period 2022-2023.

2) Abstract of BEE formulas FY 2022 – 23
3) Detailed collection efficiency up to Q4 , 2022 – 23
4) General information sheet
5) Details of input infrastructure
6) A list of questionnaires given to GESCOM regarding activities to be performed as per BEE norms and its possibility of fulfillment.
7) List of division-wise and category-wise loss assessment.
8) Notification of government regarding subsidy.
9) Division-wise loss assessment sheets.

Note: -

1) Indirect method has been adapted for calculation of arrears for nonsubsidised part of revenue collection against current billing. The value of debtors at the end of financial year 2021-22 has been assumed arrear of previous years and adjusted in FY 2022-23.
2) Short billing and theft amount have been termed as inefficiency on the part of the company. So, the value has not been considered for the efficiency calculation of billing.

Annexure 6. Introduction of Katyani Energy Solution Pvt. Ltd.

About Us

35 Years of Glorious Industrial presence, Katyani Energy Solution Pvt. Ltd incorporated in 1987, company initially offered,its services in the IT sector and started providing engineering solutions in early 2010 onwards.

KESPL is head-quartered in Delhi and having offices in Mumbai, Noida, Ranchi, Patna, and Ahmedabad.

Team

The company has vast pool of Technocrats, Design Professional, and Marketing professionals, to handle variety of projects and related services to deliver all round solutions to clients. In any assignment, we follow an approach of rigorous research followed by an in-depth Analysis of problems/needs, by which we gain useful Insights.

We use the skills, expertise, knowledge, and Insights gained over a period to offer customized Solutions to our clients' needs.

KESPL Service Sector

Advisory Division

- Efficiency & Conservation
- Renewable Energy
- Environmental Services
- GIS Mapping
- Food Processing, Cluster Development& Agriculture

EPC Division

- Electrical installations & Maintenance
- Energy Efficiency Implementation
- Solar Projects (Roof Top, Ground Mounted& Mini Grid works)
- Rural Electrification works

Energy & Safety Audit

- ✓ Energy Audit of Designated Consumers, buildings &other industries
- ✓ Detailed Measurement & Verification
- ✓ Electrical Fire Safety Audit
- ✓ Fire Safety Audit
- ✓ Green Building Advisory
- ✓ Feasibility Study or Investment Grade Energy Audit
- ✓ Project Finance Support services
- ✓ Bid Process Management
- ✓ Drafting of Legal Documents (RFQ/RFP/ESCO Agreement)
- ✓ Project Management Consultancy
- ✓ Post Implementation Measurement & Verification
- ✓ Implementation Support Services
- ✓ REC / RPO Advisory

Renewable Energy (Solar)

- ✓ Site Suitability Analysis & resource assessment

KATYANI ENERGY SOLUTION PVT. LTD. NEW DELHI

- ✓ Feasibility Study
- ✓ Detailed Engineering & Designing
- ✓ Development of Detailed Project Report
- ✓ Consultancy support for government approvals
- ✓ Rapid Environmental Impact Assessment
- ✓ Permit Engineering
- ✓ Development of Legal Documents (Request for Proposal (RFP) and Power Purchase Agreement (PPA)
- ✓ Project Management Consultancy services

E-Mobility

- ✓ Developing scenarios for e-mobility implementation
- ✓ Development of strategies for converting vehicle fleets to e-vehicles
- ✓ Need assessment for charging infrastructure
- ✓ Demand assessment and projection for demand loads
- ✓ Techno-economic analysis of measures to peak load
- ✓ Investigation of the need to expand the grid
- ✓ Infrastructure to support the e-mobility
- ✓ Option analysis e-vehicles with solar & wind power
- ✓ Policy & Regulatory framework governing e- mobility

Environmental & GIS Mapping

- ✓ Environmental Impact Assessment
- ✓ Environmental & Social Management Framework
- ✓ Climate change mitigation
- ✓ Climate change adaptation
- ✓ Monitoring &evaluation GIS Mapping:
- ✓ GIS survey
- ✓ GIS mapping
- ✓ Topographical Survey
- ✓ GIS Mapping of Street Lights & other electrical equipment

Food Processing & Agriculture

- ✓ Site Assessment
- ✓ Market & Demand assessment
- ✓ Feasibility Study
- ✓ Detail Design & Layout
- ✓ Detailed Project Report
- ✓ Project Management Consultancy Services Modern Agriculture:
- ✓ Technology assessment
- ✓ Policy Support
- ✓ Implementation support services
- ✓ Market linkages

Annexure 7. Minutes of meeting

Proceedings of Meeting between M/s. GESCOM Kalaburagi & KESPL Regarding the work of "Preparation of Annual Energy Audit Report of GESCOM for FY 2022-23" held on 28.6.23.

1) Audit team of M/s. KESPL: **Sri RK Jain- AEA, Sri A.K Jain- Sector Expert and Sri Raju – Energy Engineer** arrived at Kalaburagi on 27.06.2023 & on 28.06.2023 met the following officers of GESCOM with reference to the Work Award No GESCOM/SEE(Tech)/AEE-2(Tech)/AE-2 (Tech) /2022-23/3164-67 Dtd:12.06.2023.
   a) **Sri. Rahul Tukaram Pandve, Managing Director, GESCOM.**
   b) **Sri. R.D Chandrashekhar – Director (Technical), GESCOM.**
   c) **Sri. R. Venkatesh Prasad – Chief Engineer (Electy)., Operation, GESCOM.**
   d) **Sri. Vasudev H.H – Superintending Engineer (Ele)., Technical, Corporate Office, GESCOM.**
   e) **Smt. Ameena Nishat, Executive Engineer (Ele)., Technical, Corporate Office, GESCOM.**
   f) **Smt. Mayuri AEE, Elec., Technical, Corporate Office, GESCOM.**
   g) **Smt. Rizwana Anjum AE, Elec., Technical, Corporate Office, GESCOM.**
   h) **Kum. Gitanjali A.A.O, DCB, Corporate Office, GESCOM.**
2) Under Pre-audit phase, M/s. KESPL handed over the list of document/data required from M/s. GESCOM by 28.06.2023 the list of documents/data received from GESCOM is attached as Annexure-I.
3) It has been agreed during the meeting regarding visit of following Divisions out of total 16 Nos. of Divisions of GESCOM, for field survey as per the Work Award ;
   a) Kalaburagi Urban Division, Kalaburagi Division 1&2 on 28.06.2023.
   b) Humnabad Division on 29.06.2023.
   c) Bidar Division on 29.06.2023.
   d) Yadgir Division on 30.06.2023.
   e) Shahapur Division on 30.06.2023.
   f) Sedam Division on 01.07.2023
4) Information to be provided by GESCOM :
   a) Copy of GESCOM's order for formation and nomination of members of Energy Cell - by 1.7.23
   b) Division wise Subsidy received/arrears details by 8.7.23
   c) Write-up on Energy accounting and Monitoring (Including SCADA) Systems and ENCon measures in GESCOM- by 8.7.23

For GESCOM
01/7/2023
Superintending Engineer Ele.,
(Projects)
Corporate Office,
GESCOM, Kalaburagi.

For KESPL 1/7/23.
(R.K. Jain)
AEA.
Associate Director
M/s KESPL


GESCOM


KATYAYANI ENERGY SOLUTION PVT. LTD.
NEW DELHI

Annexure 8. List of Abbreviations

List of Abbreviations		
1	EHV	Extra High Voltage
2	EHT	Extra High Tension
3	FY	Financial Year
4	I&C	Installation and commissioning
5	ICL	Incandescent Lamp
6	IPP	Independent Power Plant
7	KVA	Kilo Volt Ampere
8	KVAR	Kilo Volt Ampere Reactive
9	MOP	Ministry of Power
10	MVAR	Mega Volt Ampere Reactive
11	M&V	Monitoring and Verification
12	MU	Million Units (Million KWG)
13	MVA	Mega Volt Ampere
14	MVAr	Mega Volt Ampere Reactive
15	MMC	Monthly Minimum Charges
16	MTOE	Million Ton Oil Equivalent
17	NRSE	New and renewable Source of Energy
18	PF	Power Factor
19	PT	Power Transformer (Ref CT-PT Ratio)
20	POC	Point of Connection
21	HT	High Tension Line
22	kW	Kilo Watt
23	kWH	Kilo Watt Hour
24	LED	Light Emitting Diode
25	LT	Low Tension Line
26	GESCOM	Punjab state Power Corporation Limited
27	PSTCL	Punjab state Transmission Corporation Limited
28	PEDA	Punjab Electricity Development Agency
29	SLD	Single Line Diagram along with input energy
30	SLDC	State Load Dispatch Center
31	T&D	Transmission and Distribution
32	UJALA	UnnatJyoti Affordable lighting for All
33	UPS	Uninterrupted Power Supply
34	1000 M kWh	86, 000 MToe
35	AEA	Accredited Energy Auditor
36	ABR	Average Billing Rate
37	ABC	Aerial Bunched Cables
38	AP	Agricultural Pump
39	Amp	Ampere
40	AMI	Advanced Metering Infrastructure
41	AMR	Automated Meter Reading

42	AMRUT	Atal Mission for Rejuvenation and Urban Transformation
43	AT&C	Aggregate Technical and commercial
44	BBMB	Bhakra Beas Management Board
45	BEE	Bureau of Energy Efficiency
46	CEA	Certified Energy Auditor
47	CERC	Central Electricity Regulatory commission (India)
48	CFL	Compact Florescent Lamp
49	CO_2	Carbon Dioxide
50	CKT	Circuit Kilometer
51	CT	Circuit Transformer (Ref. CT-PT Ratio)
52	DC	Designated Consumer
53	DCS	Distributed Control system
54	DT	Distribution Transformer
55	EAR	Energy Audit Report
56	EmAEA	Empanelled Accredited Energy Auditor
57	EC	Energy Conservation
58	ECM	Energy Conservation Measures
59	EE	Energy Efficiency
60	EPIA	Energy Performance Improvement Action
61	ACS	Average Cost of Supply
62	ARR	Average Rate of Revenue
63	HVDS	High Voltage Distribution System
64	FAC	Fuel Adjustment Charges

Annexure 9. Check List

1. Data details in BEE format for Quarter 1,2,3,4 and Total separately.
2. Energy flow diagram.
3. Division-wise and Capacity-wise no. of installed 11/0.4 kV DT's.
4. Calculation of AT & C losses as per revise methodology for computation of AT & C losses issued by Central Electricity Authority on dated 02-06-2017.
5. Division-wise details of checking/raid conducted as per following format.

Name of Division	No. of Raid/checking	Theft Unit (kWh) booked	Theft Assessment Raised	Amount Realized

6. Damage rate of distribution transformers.
7. Order for appointing nodal officer and energy manager of DISCOM.
8. Details of subsidiary along with calculation method and rate per unit decided by Regulatory commission.
9. Average supply availability.
10. No. of substations, 11kV feeders.
11. Division-wise, Category-wise no. of consumers.
12. Tariff.
13. Details of installation of capacitors at 11 kV feeders.
14. Gap of ACS – ARR.
15. Energy conservation measures been adopted by company.
16. Division-wise, category-wise and month wise detail of defective, unbilled, not reading consumers.
17. No. of roof top solar PV installations and energy import through these consumers.
18. Progress of RDSS work.
19. Information of metered/unmetered connected load is to be filled in the division-wise loss format provided by BEE.
20. Details of raid/checking conducted in FY 2022-23 by department officers an vigilance team separately in following format.

Name of Division	No. of Raid/checking	Theft Unit (kWh) booked	Theft Assessment Raised	Amount Realised

21. GAP of ACS-ARR.
22. Energy conservation measures being adopted by DISCOM.
23. Division-wise, category-wise and month-wise details of billed/unbilled consumers.
24. Division-wise, category-wise and month-wise details of defective meters consumers.

25. Five nos. bills of each category of consumers.
26. Division-wise and Month-wise details of BJ/KJ consumers who are availing subsidiary along with their average monthly consumption.
27. Guidelines for BJ/KJ Consumers.
28. No. of net metering consumers and energy import through net metering consumers.
29. Energy flow chart
30. Division-wise no. of Transformer and install capacity, 33/11, 66/11 power transformer

Annexure 10. Form-Details of Input Infrastructure

Form-Details of Input Infrastructure					
1	**Parameters**	**Total**	**Covered during in audit**	**Verified by Auditor in Sample Check**	**Remarks (Source of data)**
i	Number of circles	5	5		
ii	Number of divisions	16	16		
iii	Number of sub-divisions	54	54		
iv	Number of feeders	2415	2415		
v	Number of DTs	122680	122680		
vi	Number of consumers	3584699	3584699		
2	**Parameters**	**66kV and above**	**33kV**	**11/22kV**	**LT**
a. i.	Number of conventional metered consumers	185	21	3251	3352708
ii	Number of consumers with 'smart' meters	0	0	0	0
iii	Number of consumers with 'smart prepaid' meters	0	0	0	0
iv	Number of consumers with 'AMR' meters	0	0	0	0
v	Number of consumers with 'non-smart prepaid' meters	0	0	0	0
vi	Number of unmetered consumers	0	0	0	228534
vii	**Number of total consumers**	185	21	3251	3581242
b.i.	Number of conventionally metered Distribution Transformers	185	21	3234	26189
ii	Number of DTs with communicable meters	0	0	0	0
iii	Number of unmetered DTs	0	0	0	93051
iv	**Number of total Transformers**	185	21	3234	119240
c.i.	Number of metered feeders	NA	150	2265	
ii	Number of feeders with communicable meters	0	0	0	

iii	Number of unmetered feeders	0	150	2265	0
iv	**Number of total feeders**				
d.	Line length (ct km)	172297.62			
e.	Length of Aerial Bunched Cables	2451.5			
f.	Length of Underground Cables	107.88			

Annexure 11. Power Purchase Details

Power Purchase Details					
3	**Voltage level**	**Particulars**	**MU**	**Reference**	**Remarks (Source of data)**
i	66kV and above	Long-Term Conventional	5,917	Includes input energy for franchisees	Includes Energy Balance Over Drawal Energy
		Medium Conventional	0		
		Short Term Conventional	0		
		Banking	0		
		Long-Term Renewable energy	4271.61		
		Medium and Short-Term RE	20.51	Includes power from bilateral/ PX/ DEEP	
		Captive, open access input	0	Any power wheeled for any purchase other than sale to DISCOM. Does not include input for franchisee.	
		Sale of surplus power	-62976.60%		
		Quantum of inter-state transmission loss	0	As confirmed by SLDC, RLDC etc	
		Power procured from inter-state sources	9,579	Based on data from Form 5	
		Power at state transmission boundary	9,579		
ii	33kV	Long-Term Conventional			
		Medium Conventional			
		Short Term Conventional			
		Banking			
		Long-Term Renewable energy			
		Medium and Short-Term RE	269.81		
		Captive, open access input			
		Sale of surplus power			
		Quantum of intra-state transmission loss	0		

		Power procured from intra-state sources	270		
iii		**Input in DISCOM wires network**	9,849		
iv	33 kV	Renewable Energy Procurement			
		Small capacity conventional/ biomass/ hydro plants Procurement			
		Captive, open access input			
v	11 kV	Renewable Energy Procurement	47.28		
		Small capacity conventional/ biomass/ hydro plants Procurement			
		Sales Migration Input			
vi	LT	Renewable Energy Procurement			
		Sales Migration Input			
vii		**Energy Embedded within DISCOM wires network**	47.28		
viii		**Total Energy Available/ Input**	9,896		
4	**Voltage level**	**Energy Sales Particulars**	**MU**	**Reference**	
i	LT Level	DISCOM' consumers	6,554	Include sales to consumers in franchisee areas, unmetered consumers	
		Demand from open access, captive		Non-DISCOM's sales	
		Embedded generation used at LT level		Demand from embedded generation at LT level	
		Sale at LT level	6,554		
		Quantum of LT level losses	916		
		Energy Input at LT level	7,470		Pro rata calculation
ii	11 kV Level	DISCOM' consumers	402	Include sales to consumers in franchisee areas,	

				unmetered consumers	
		Demand from open access, captive		Non-DISCOM's sales	
		Embedded generation at 11 kV level used		Demand from embedded generation at 11kV level	
		Sales at 11 kV level	402		
		Quantum of Losses at 11 kV	28		
		Energy input at 11 kV level	430		Pro rata calculation
ii i	33 kV Level	DISCOM' consumers	82	Include sales to consumers in franchisee areas, unmetered consumers	
		Demand from open access, captive		Non-DISCOM's sales	
		Embedded generation at 33 kV or below level		This is DISCOM and OA demand met via energy generated at same voltage level	
		Sales at 33 kV level	82		
		Quantum of Losses at 33 kV	3		
		Energy input at 33kV Level	85		Pro rata calculation
iv	> 33 kV	DISCOM' consumers	1402.532168	Include sales to consumers in franchisee areas, unmetered consumers	
		Demand from open access, captive		Non-DISCOM's sales	
		Cross border sale of energy			
		Sale to other DISCOMs			
		Banking			
		Energy input at > 33kV Level	1,445		Pro rata calculation
		Sales at 66kV and above (EHV)	1,403		
		Total Energy Requirement	**9,430**		
		Total Energy Sales	**8,441**		

A. Summary of energy input & Infrastructure			
S.No	**Parameters**	**Period From 1.4.22 to 31.3.23**	**Remarks (Source of data)**
A.1	Input Energy purchased (MU)	9,896	
A.2	Transmission loss (%)	3%	
A.3	Transmission loss (MU)	286.9968766	
A.4	Energy sold outside the periphery(MU)	629.7	IEX Sales
A.5	Open access sale (MU)	849.05	
A.6	EHT sale	1678.322	
A.7	Net input energy (received at DISCOM periphery or at distribution point)-(MU)	9430.66	
A.8	Is 100% metering available at 66/33 kV (Select yes or no from list)	Yes	
A.9	Is 100% metering available at 11 kV (Select yes or no from list)	Yes	
A.10	% of metering available at DT	65%	
A.11	% of metering available at consumer end	94%	
A.12	No of feeders at 66kV voltage level	NA	
A.13	No of feeders at 33kV voltage level	150	
A.14	No of feeders at 11kV voltage level	2265	
A.15	No of LT feeders level	NA	
A.16	Line length (ckt. km) at 66kV voltage level	NA	
A.17	Line length (ckt. km) at 33kV voltage level	2857.79	
A.18	Line length (ckt. km) at 11kV voltage level	74705.16	
A.19	Line length (km) at LT level	94734.67	
A.20	Length of Aerial Bunched Cables	2451.5	
A.21	Length of Underground Cables	107.8	

A.22	HT/LT ratio	0.79	

Annexure 12. Division-wise Sanction Load

Sanction Load details of GESCOM as on 31.03.2023			
Sl. No.	**Name of the Division**	**Nature of Load**	**Sanction Load in MW**
1	**KLB URBAN**	Resi	254.00
		Agri	0.27
		Comm/Ind LT	89.04
		Comm/Ind HT	24.22
		Others	18.32
			385.85
2	**KLB DIV 1**	Resi	84.67
		Agri	291.57
		Comm/Ind LT	73.53
		Comm/Ind HT	39.69
		Others	29.85
			519.31
3	**KLB DIV 2**	Resi	72.24
		Agri	146.97
		Comm/Ind LT	68.33
		Comm/Ind HT	27.94
		Others	16.02
			331.50
4	**SEDAM**	Resi	43.26
		Agri	56.60
		Comm/Ind LT	40.48
		Comm/Ind HT	134.71
		Others	12.15
			287.21
5	**YADGIR**	Resi	140.39
		Agri	230.55
		Comm/Ind LT	83.54
		Comm/Ind HT	29.04
		Others	20.39
			503.91
6	**BIDAR**	Resi	183.54
		Agri	233.81

		Comm/Ind LT	84.20
		Comm/Ind HT	63.80
		Others	38.95
			604.29
7	**HUMNABAD**	Resi	98.89
		Agri	217.14
		Comm/Ind LT	51.29
		Comm/Ind HT	19.26
		Others	24.30
			410.89
8	**BALLARY URBAN**	Resi	160.40
		Agri	0.75
		Comm/Ind LT	54.43
		Comm/Ind HT	26.09
		Others	10.77
			252.45
9	**BALLARY RURAL**	Resi	135.55
		Agri	302.86
		Comm/Ind LT	78.10
		Comm/Ind HT	206.96
		Others	66.05
			789.52
10	**HOSPET URBAN**	Resi	133.30
		Agri	66.54
		Comm/Ind LT	52.24
		Comm/Ind HT	87.08
		Others	15.35
			354.51
11	**HOSPET RURAL**	Resi	569.21
		Agri	254.54
		Comm/Ind LT	46.92
		Comm/Ind HT	6.21
		Others	40.54
			917.43
12	**RAICHUR URBAN**	Resi	113.47
		Agri	1.46
		Comm/Ind LT	36.91

		Comm/Ind HT	42.78
		Others	9.13
			203.75
13	**RAICHUR RURAL**	Resi	79.22
		Agri	182.23
		Comm/Ind LT	55.63
		Comm/Ind HT	44.33
		Others	24.54
			385.95
14	**SINDHANOOR**	Resi	116.59
		Agri	152.31
		Comm/Ind LT	62.04
		Comm/Ind HT	11.90
		Others	29.05
			371.90
15	**KOPPAL**	Resi	86.96
		Agri	188.02
		Comm/Ind LT	57.13
		Comm/Ind HT	110.10
		Others	36.85
			479.06
16	**GANGAVATHI**	Resi	110.22
		Agri	172.99
		Comm/Ind LT	63.56
		Comm/Ind HT	46.37
		Others	28.19
			421.34
GESCOM TOTAL		Resi	2381.94
		Agri	2498.62
		Comm/Ind LT	997.37
		Comm/Ind HT	920.49
		Others	420.46
		Total	**7218.86**

Annexure 13. Electrical Distribution System

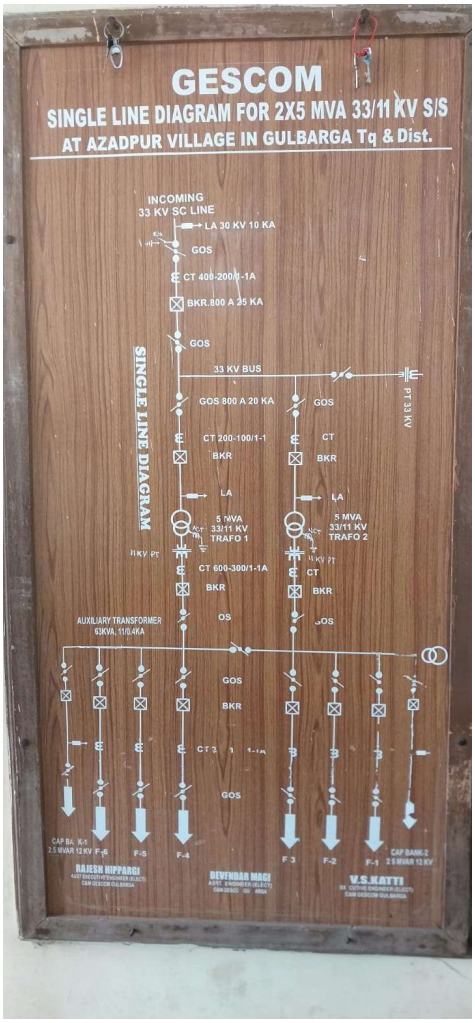
- Electricity Transmission system of Karnataka State is being taking care by KPTCL up-to 110kV. Electricity is supplied to the DISCOM at 33kV and 11kV. Operation and maintenance of 33kV and 11kV lines and equipment's are done by DISCOM. Few 33kV and 11kV consumers are directly fedwith independent feeders. Few 11kV consumers are directly fed with 11kV mixed feeders and most of the residential and other LT consumers are fed on LT side of 11/0.4kV distribution transformers.

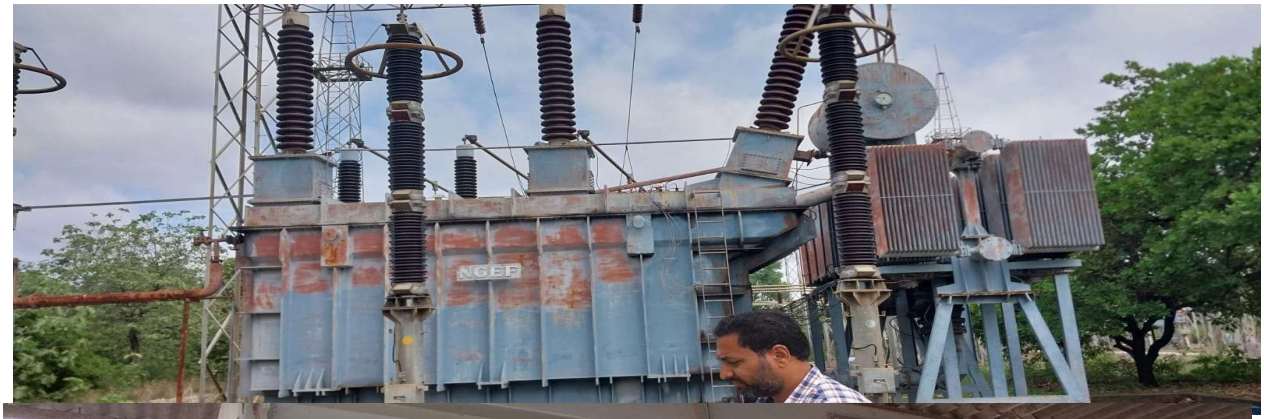
Annexure 14. Field verification data and report

Gulbarga University

AZADPUR Sub-Station

DTs Visited



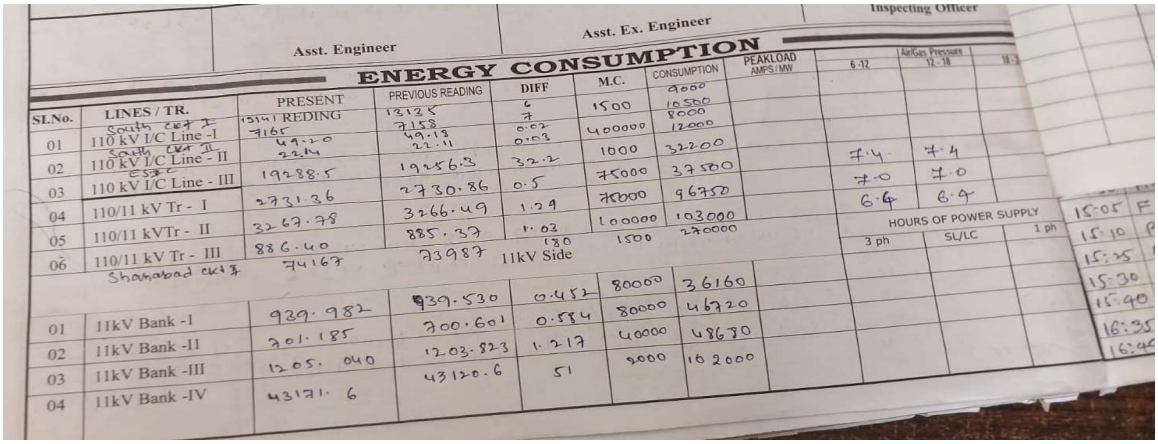



KPTCL
INCOMER
FEEDER
FEEDER
BANK-I
11KV KIADB
INDUSTRIAL

LT CONSUMER Meter verification

Annexure 15. List of documents verified with each parameter

Gulbarga University



Asst. Engineer | Asst. Ex. Engineer | Inspecting Officer

ENERGY CONSUMPTION

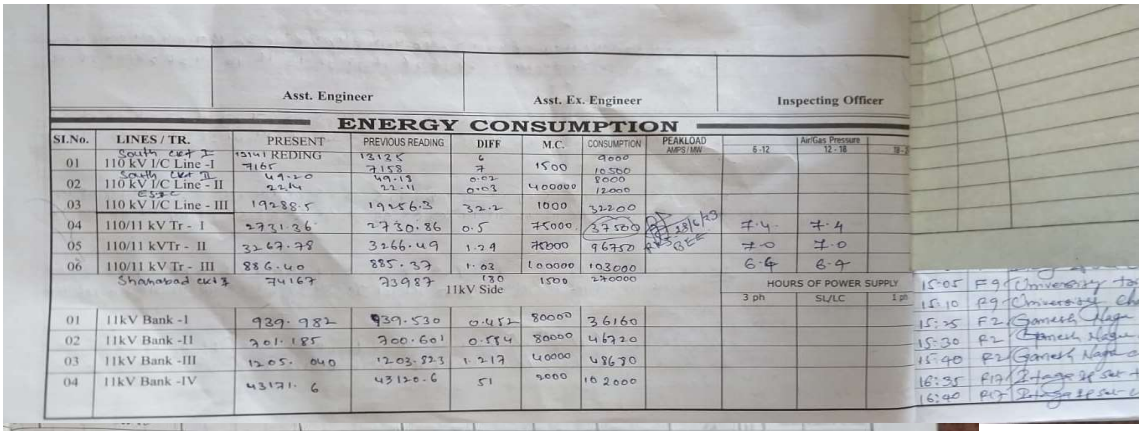
SL.No.	LINES / TR.	PRESENT READING	PREVIOUS READING	DIFF	M.C.	CONSUMPTION	PEAKLOAD AMPS / MW
01	110 kV I/C Line -I (South Cct I)	13141 / 7165	13135 / 7158	6 / 7	1500	9000 / 10500	
02	110 kV I/C Line - II (South Cct II)	49.20 / 22.14	49.18 / 22.11	0.02 / 0.03	400000	8000 / 12000	
03	110 kV I/C Line - III (ESSC)	19288.5	19256.3	32.2	1000	32200	
04	110/11 kV Tr - I	2731.36	2730.86	0.5	75000	37500	
05	110/11 kVTr - II	3267.78	3266.49	1.29	75000	96750	
06	110/11 kV Tr - III (Shanabad Cct)	886.40 / 74167	885.37 / 73987	1.03 / 180	100000 / 1500	103000 / 270000	
	11kV Side						
01	11kV Bank -I	939.982	939.530	0.452	80000	36160	
02	11kV Bank -II	701.185	700.601	0.584	80000	46720	
03	11kV Bank -III	1205.040	1203.823	1.217	40000	48680	
04	11kV Bank -IV	43171.6	43120.6	51	8000	10 2000	

HOURS OF POWER SUPPLY

6-12	Air/Gas Pressure 12-18	18-2
7.4	7.4	
7.0	7.0	
6.4	6.4	

3 ph	SL/LC	1 ph

15:05 F
15:10 F
15:35
15:30
15:40
16:35
16:40



Asst. Engineer | Asst. Ex. Engineer | Inspecting Officer

ENERGY CONSUMPTION

SL.No.	LINES / TR.	PRESENT READING	PREVIOUS READING	DIFF	M.C.	CONSUMPTION	PEAKLOAD AMPS / MW
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02	110 kV I/C Line - II (South Cct II)	49.20 / 22.14	49.18 / 22.11	0.02 / 0.03	400000	8000 / 12000	
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	11kV Side						
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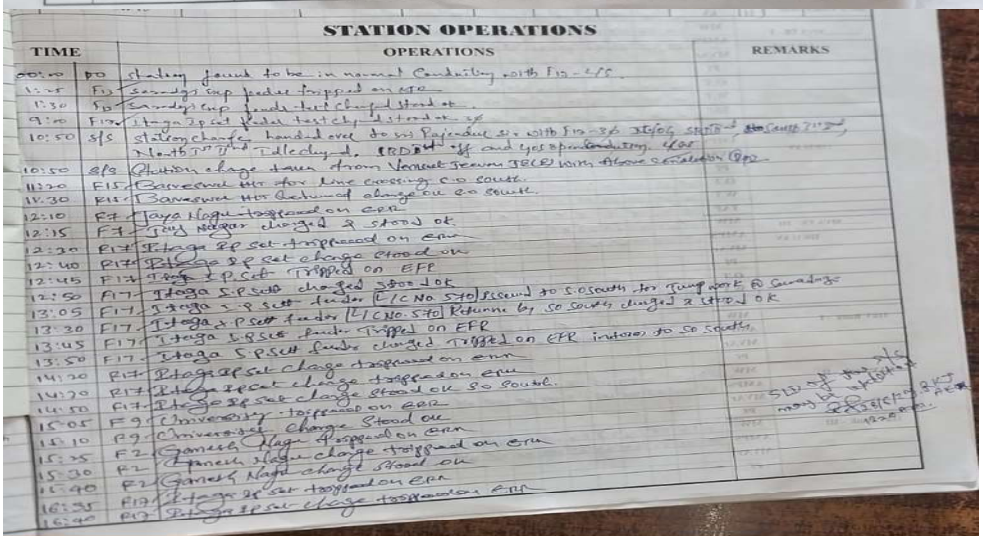
03	11kV Bank -III	1205.040	1203.823	1.217	40000	48680	
04	11kV Bank -IV	43171.6	43120.6	51	8000	10 2000	

HOURS OF POWER SUPPLY

6-12	Air/Gas Pressure 12-18	18-2
7.4	7.4	
7.0	7.0	
6.4	6.4	

3 ph	SL/LC	1 ph

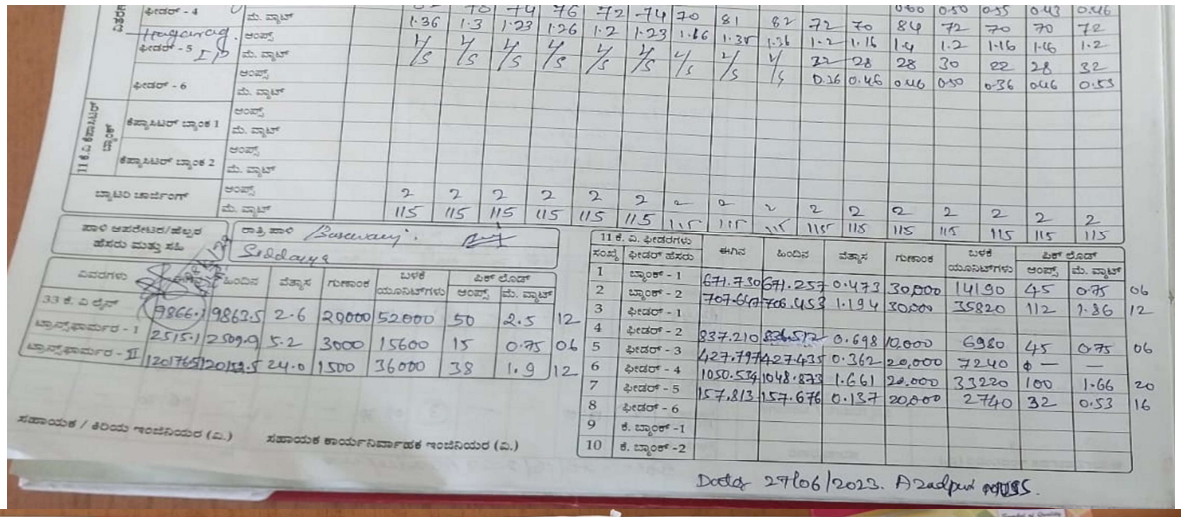
15:05 F9 University
15:10 F9 University
15:35 F2 Ganesh Nagar
15:30 F2 Ganesh Nagar
15:40 F2 Ganesh Nagar
16:35 F17 Jhaga
16:40 F17 Jhaga

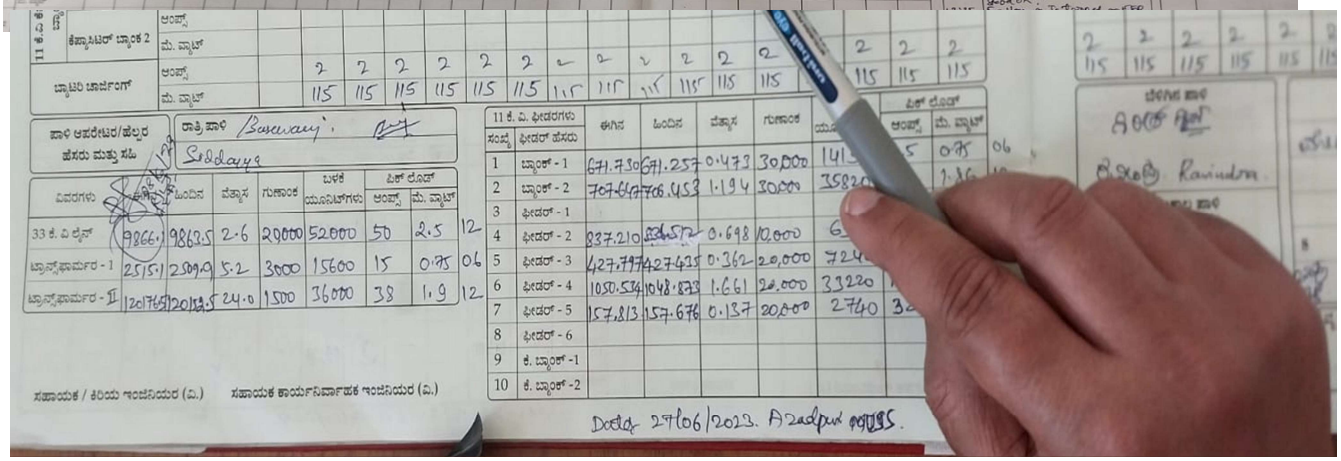


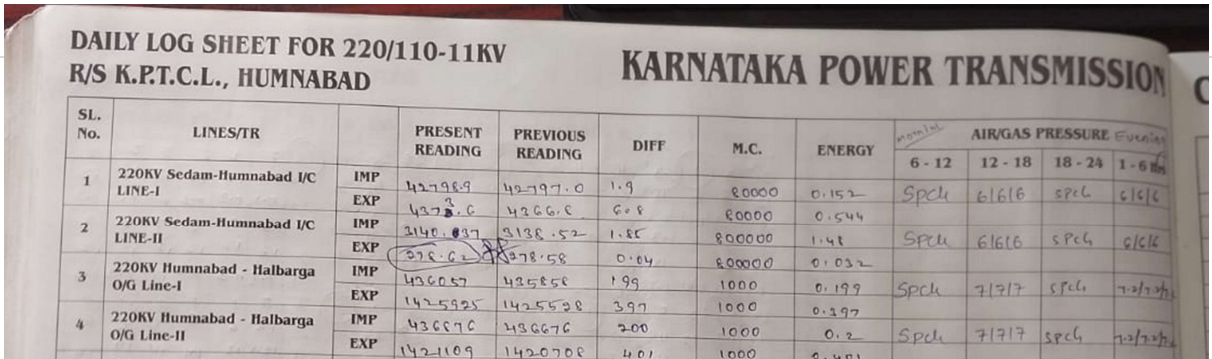
STATION OPERATIONS

TIME	OPERATIONS	REMARKS
00:00	DO	
1:25	F13	
1:30	SD	
9:10	F17	
10:50	S/S	
10:50	S/S	
11:20	F15	
11:30	F17	
12:10	F7	
12:15	F4	
12:20	F17	
12:40	F17	
12:45	F17	
12:50	F17	
13:05	F17	
13:20	F17	
13:45	F17	
13:50	F17	
14:20	F17	
14:20	F17	
14:50	F17	
15:05	F9	
15:10	F9	
15:35	F2	
15:30	F2	
15:40	F2	
16:35	F17	
16:40	F17	

AZADPUR Sub-Station







DAILY LOG SHEET FOR 220/110-11KV R/S K.P.T.C.L., HUMNABAD

KARNATAKA POWER TRANSMISSION

SL. No.	LINES/TR		PRESENT READING	PREVIOUS READING	DIFF	M.C.	ENERGY	AIR/GAS PRESSURE 6 - 12	12 - 18	18 - 24	1 - 6
1	220KV Sedam-Humnabad I/C LINE-I	IMP	427987.0	427977.0	1.9	80000	0.152	Spch	6|6|6	spch	6|6|6
		EXP	43736.6	42666.6	6.8	80000	0.544				
2	220KV Sedam-Humnabad I/C LINE-II	IMP	3140.897	3138.52	1.85	800000	1.48	Spch	6|6|6	spch	6|6|6
		EXP	378.62	378.58	0.04	800000	0.032				
3	220KV Humnabad - Halbarga O/G Line-I	IMP	436057	435858	1.99	1000	0.199	Spch	7|7|7	spch	7|7|7
		EXP	142-5925	142-5528	397	1000	0.397				
4	220KV Humnabad - Halbarga O/G Line-II	IMP	436676	436676	2.00	1000	0.2	Spch	7|7|7	spch	7|7|7
		EXP	142-1109	142-0708	401	1000	0.401				