



ENERGY AUDIT

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UKAI-GEHV-25-169178



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ENERGY AUDIT REPORT

This is to certify that, *Our Audit Team* has visited Karnataka State Law University, Hubballi : 580 025 on 28th Dec 2023 and undertook the "*Energy Audit*" of University campus.

The University is located in HUBBALLI-DHARWAD city Corporation limits. The twin cities together make the second largest city in Karnataka by population of 9,43,788 in 2011 census with 86.79 literacy rate. *The twin cities are selected for solar cities / green cities in the year 2017 by Govt of India.* Hubballi-Dharwad cities emerged as an educational hub in north Karnataka.

AIRVEDA Camera Techniques Beta Attenuation Method (BAM) has been employed to check the air quality parameters in terms of Air Quality Index (AQI) and audible intensity measured by standard sensors of sound, in decibel Bell (dB).

Both cities are semi organized Industrial cities. It seems to be free from industrial harmful gas effluents.

All Environmental related charts and their importance are submitted to the college.

The University campus is fit in all respects for academic developments.

Technical staff


Convener

Environment Audit Team

Date : 28th Dec 2023

Place : Hubballi




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ENERGY AUDIT

Energy Audit is defined as "The verification, monitoring and analysis of use of energy, recommendations for improving energy efficiency based on technical report with cost benefit analysis and an action plan to reduce energy consumption judiciously".

University needs electrical energy to run for any electric or electronic appliance for the academic developments. This energy is supplied through HESCOM connections.

The Karnataka State Law University, Hubballi is spread over 52 acres of area with various building blocks, Vice chancellor office, Administrative Building block, Registrar (Admn), Registrar evaluation (Exam), Guest house, Class rooms, Library, Auditorium, Boys el, Ladies hostel, Staff quarters, Pump house,. All building in University are well equipped with electric and electronic appliances, to facilitate higher education.

In addition to this diesel generator back up (DG) is also provided for interruptions of power supply in emergency if any.

Roof top harvesting of solar energy is also made to get green energy. Generation of solar energy minimizes HECOM bills and in turn provides clean and green campus.

There are ten HESCOM meter connection to various building in the campus and 10th meter connection sub metered with 12 sub meters. The care and maintenance of all connections is made by **Resident Engineer** of the University.

HESCOM consumer bills are obtained from 2018 to 2022 (previous five years). Analysis of energy consumption is done by following inventory methods.

- i. Month-wise/ year wise
- ii. Individual meter wise

Excel spread sheet are drawn in both the methods.

Energy audit begin with whole University as one power unit and later with identifying other sub units (consumer connections) which fall in class of higher consumption above the average of five year consumptions. Selecting higher consumption meter bills for further analysis.

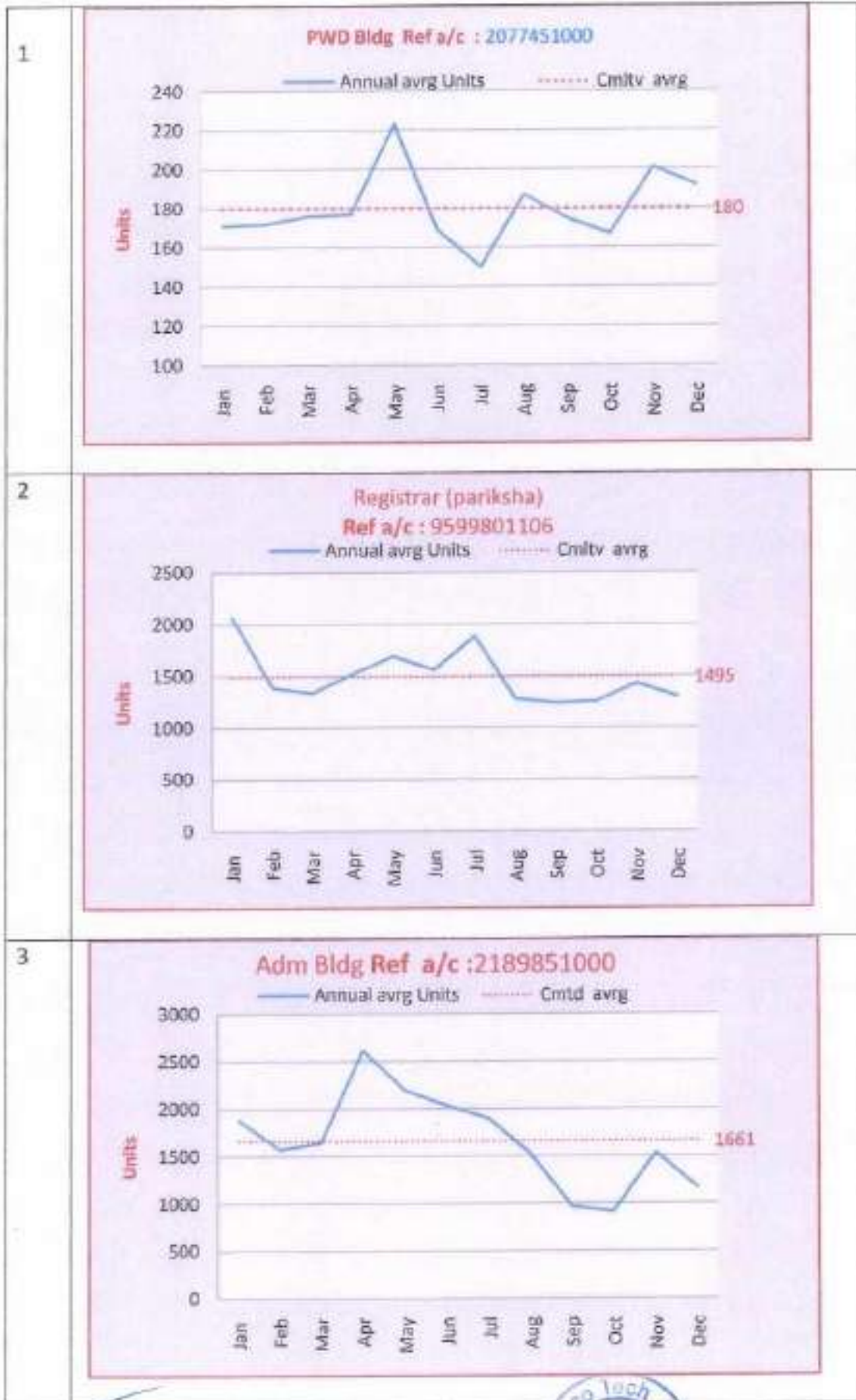

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X-Y read sheet gives the inference about the energy consumption of University.



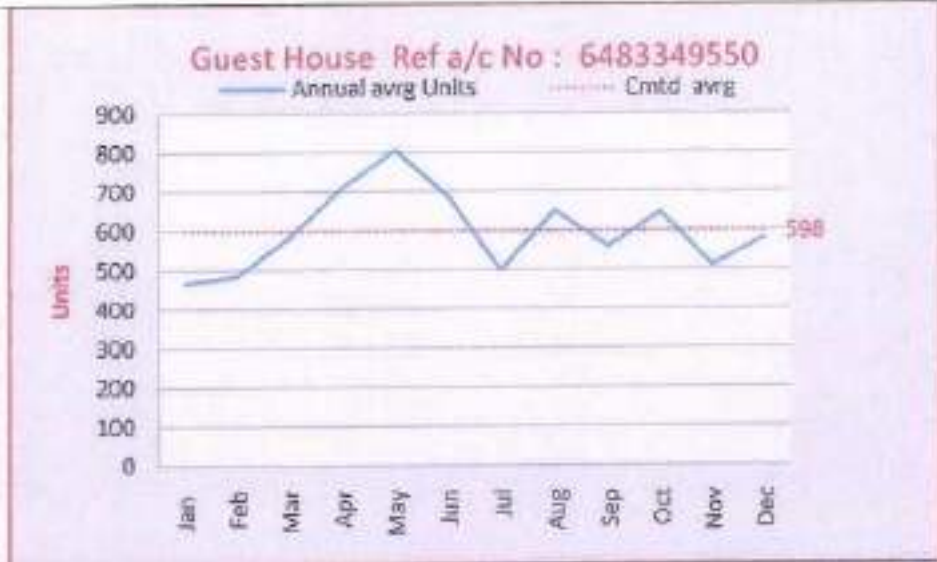
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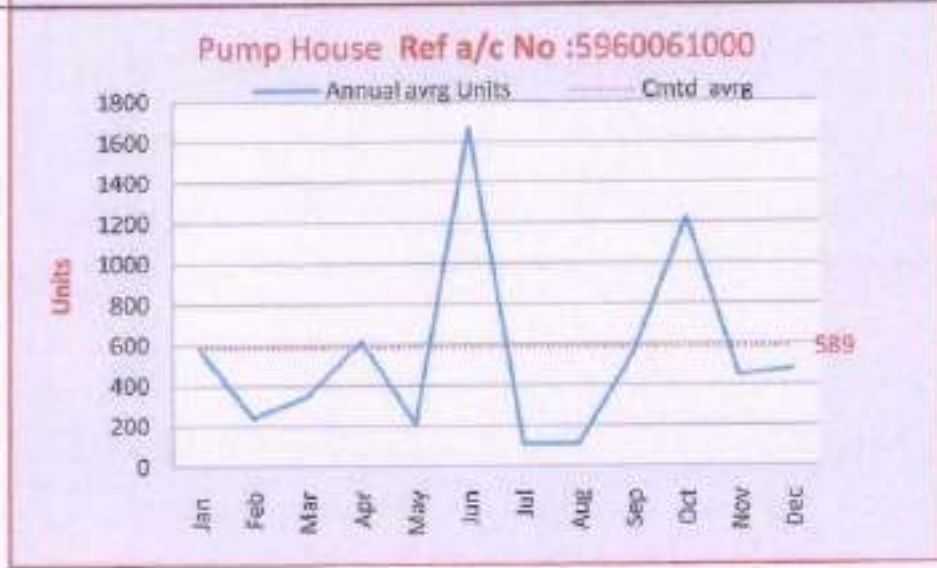


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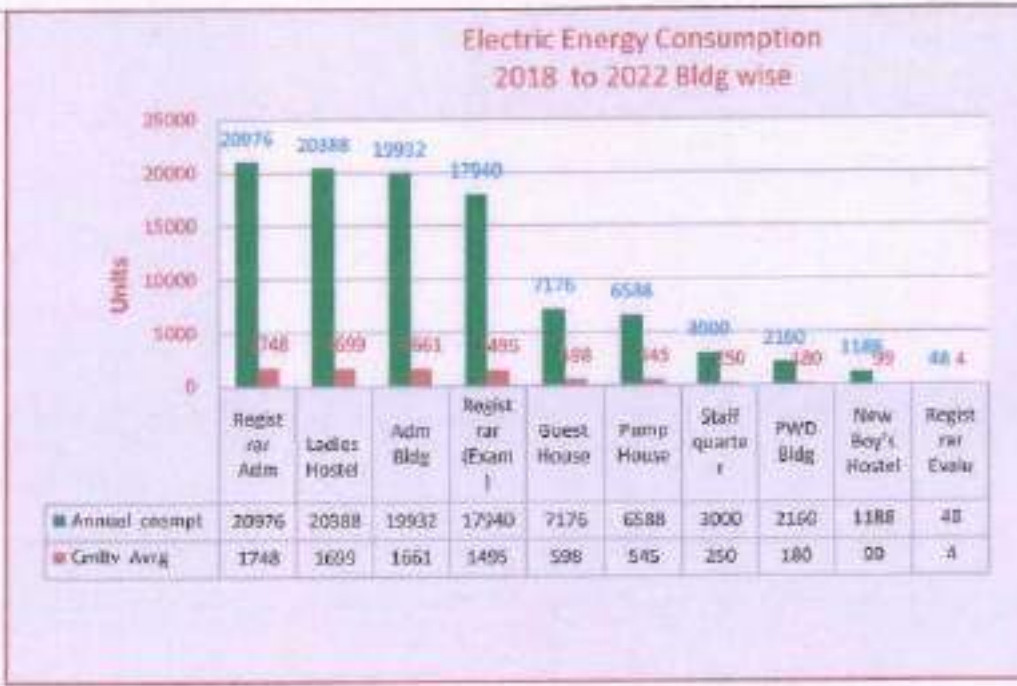
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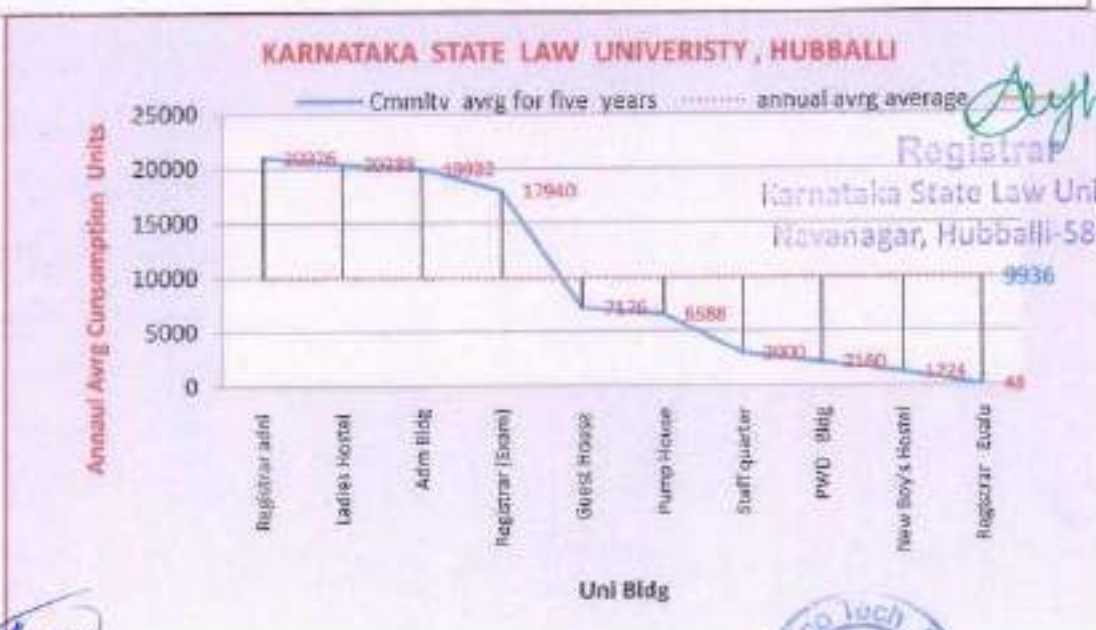
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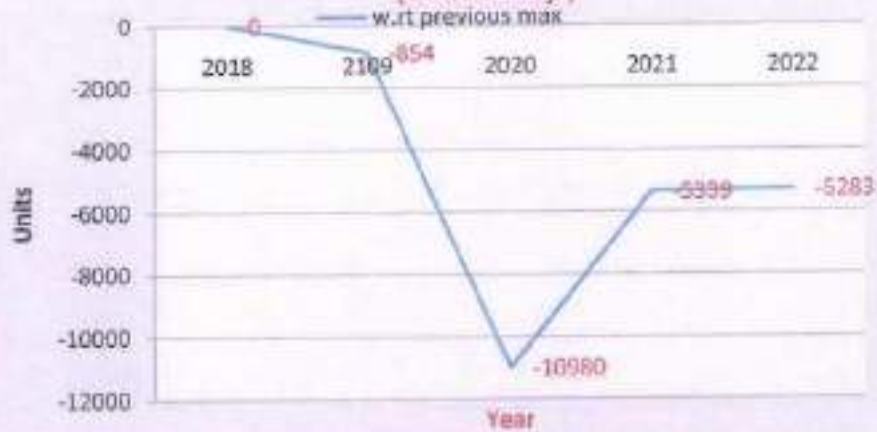
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**KARNARATKA STATE LAW UNIVERSITY , HUBBALLI
(University)**



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KARNATAKA STATE LAW UNIVERISTY, HUBBALLI



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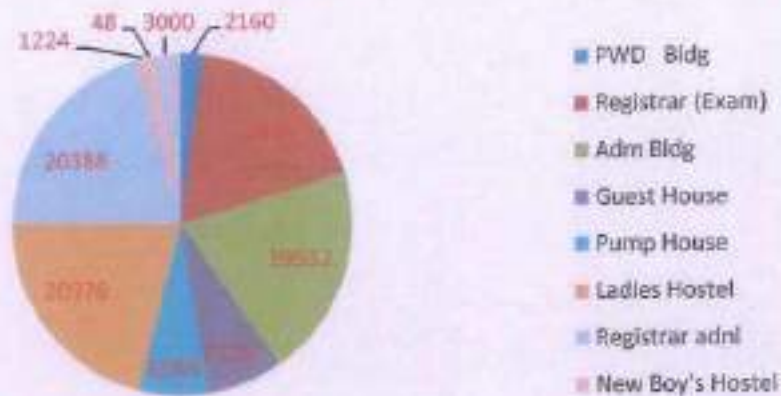


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Annual Consumption of Electric Energy Bldg wise



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% share of Electric Energy Consumption Bldg wise



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Higher power consumption of energy connection

- Registrar adm : 20974 Unit -1748/month)
- Ladies Hostel :(20388 Unit 1699/month)
- Adm Bldg : (19942 Unit-1661 /month)
- Registrar Exam :(17947 Unit-1495)
- $y = 1256.x^2 - 9042.x + 13309$ Polynomial of order 2
- Slope of the curve $m = -0.1389$ (Negative slope)
- $R^2 = 0.582$ R squared value is more than 0.5 consumption curve fits
- The electric energy is used judiciously

These energy consumption bills are fit for further analysis.

Exemplary analysis of any one such consumer bills .

It presumed for other higher energy consumer connection are almost similar

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Analysis of Individual power connection

1



2



4

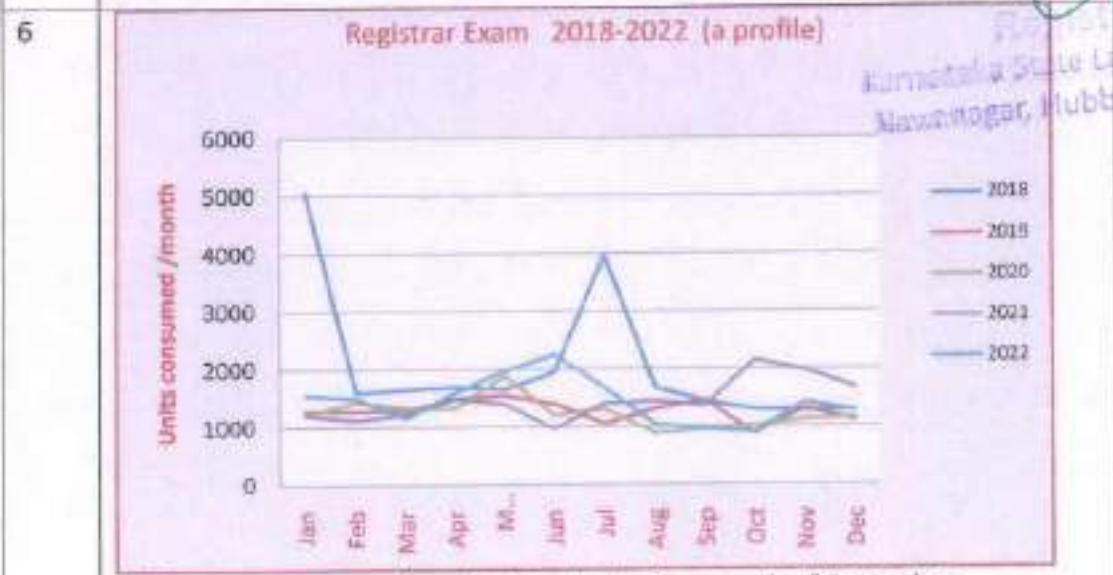


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All the energy curves show decline during the month of December.
Some spike points during which infrastructure develops were on

Keyhigh

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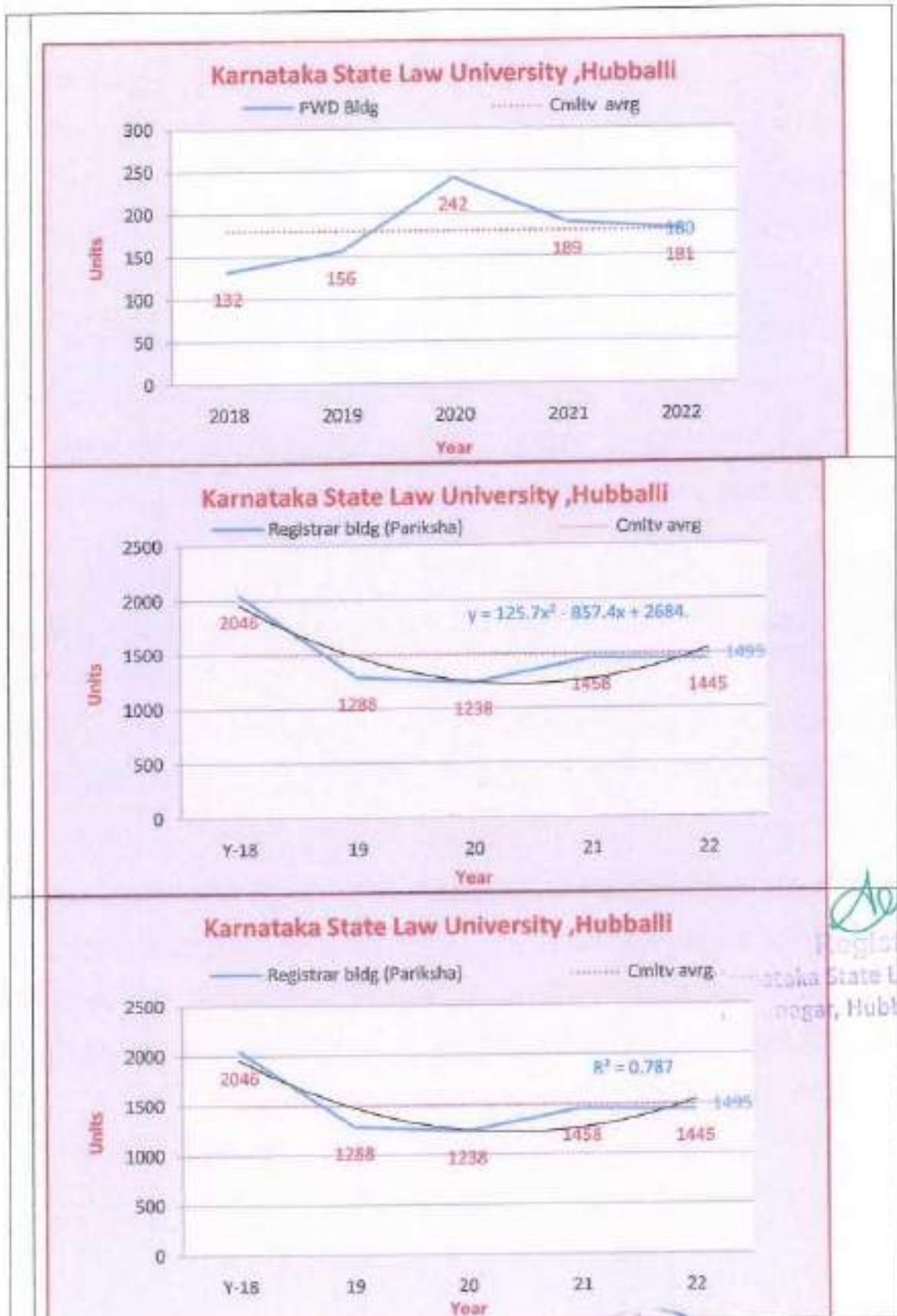
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YEAR WISE ANALYSIS OF HIGHER CONSUMER CONNECTIONS

Example : PWD Bldg



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KARNATAKA STATE LAW UNIVERSITY, HUBBALLI
Registrar Adm



KARNATAKA STATE LAW UNIVERSITY, HUBBALLI
* Shifted to Staff Quarter



KARNATAKA STATE LAW UNIVERSITY, HUBBALLI



After shifting to Staff quarter Block

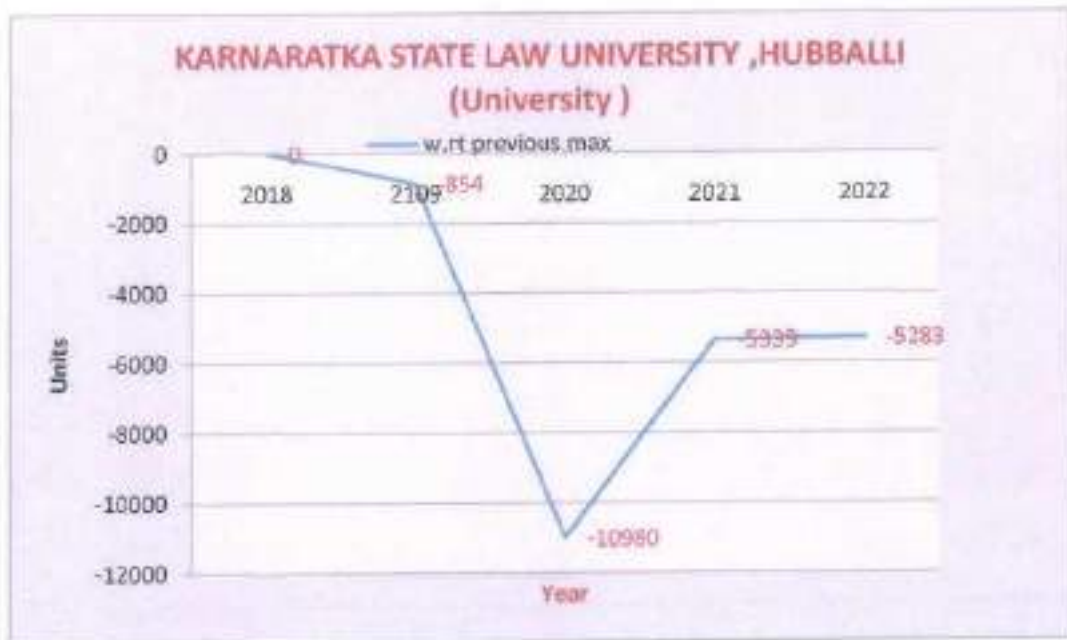
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R. S.



CONCLUSION

- i. Fitting curve $y = 125.7x^2 - 857.4x + 2684$. Polynomial of order 2
- ii. $R^2 = 0.787$
- iii. R squared value is more than 0.5 the polynomial curve fits suitably
- iv. Slope = -1466 negative slope
- v. It is presumed for other energy consumer connection are almost similar
- vi. **THE ELECTRIC ENERGY IS USED JUDICIOUSLY**

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HESCOM POWER METERS CONNECTION

S.No	Building	Ref a/c No
1	New Boy's Hostel	2371922257
2	Ladies Hostel No1	9381396129
3	Administrative Building	2189851000
4	Registrar (Exam)	9599801106
5	Guest House	6483349550
6	Pump House	5960061000
7	PWD Building	2077451000
8	Registrar additional	0838688869
9	Registrar Evaluation	7682720156
10.1**	SQ-1 (Ladies Hostel No 2)	9067326319
10.2	SQ-2	5497012416
10.3	SQ-3	1061494504
10.4	SQ-4	301231027
10.5	SQ-5	215308281
10.6	SQ-6	8334353332
10.7	SQ-7	8907530044
10.8	SQ-8	813482767
10.9	SQ-9	1590655375
10.10	SQ-10	2163832087
10.11	SQ-11	9881086905
10.12	SQ-12	3964071192


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Electric and Electronic appliances used in various buildings Campus

S.No	Electric Appliances	No	Consumption Range in Wattage
1.	Fans	598	40-75
2.	Bulb	61	40-60
3.	LED	1356	8-10
4.	CFL	26	20-40
5.	Fridge	02	300 -400
6.	Computer	108	200 -250
7.	Printers	27	250 -280
8.	Scanner	07	12-25
9.	Xerox	04	20-75
10.	Generator -125 kVA	01	125+ kVA
11.	Bore wells	06	3.73 - 8.35
12.	T V	5	150 -180
13.	Projector	02	50-400
14.	UPS -2 kVA	03	2-3
15.	UPS-5 kVA	05	6-7
16.	AC	65	1500 +

There are three sources of electric power supply.

- 1) HESCOM
- 2) Roof top solar power generation.
- 3) DG power set -125 kV is utilized in emergency load shedding.


The DG will under supervision of a trained technician.

Over all there 10 independent power connections to various buildings.

Sub metering system (12 units) is provided for the staff quarter .

Note : All appliances are under supervision of Resident Engineer of University


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