

**Karnataka Law Society's
Institute of Management Education and Research,
Belgaum
(Autonomous)**



Environment Assessment & Green Audit Report

2020-2021

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Environment Assessment & Green Audit Report 2020-2021

We hereby declare that the attached Environment & Green audit report for the KLS's IMER is based on data submitted by the representatives of **the institute** and rapid field assessment conducted by the subject experts.

Audit team has undertaken detailed scientific assessment of overall environmental management, Energy management - efficiency & alternatives, water quality assessment and management, wastewater management, solid Waste management, noise monitoring, health hazards - Fire- Safety assessment, Biodiversity and ecology, carbon sequestration, resource conservation initiatives, Staff awareness assessment, environment policy etc. for preparation of this report.

AUDIT TEAM

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Unique innovative approach of integrating current students, alumni students, teaching - non teaching staff members, was followed to complete this Environment – Green assessment process. Relevant ISO **14001** Guidelines for Environment compliance were followed to undertake this audit.

Sincere regards

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Environment - Green Audit report 2020 – 2021

Context –

The National Assessment and Accreditation Council, New Delhi (NAAC) has made it mandatory from the academic year 2016–17 onwards that all Higher Educational Institutions should submit a Green Audit Report. Moreover, it is part of Corporate Social Responsibility of the Higher Educational Institutions to ensure that they contribute towards the reduction of global warming through Carbon Footprint reduction measures.

In this regard the IMER's Management decided to conduct an Environment - Green Audit of the campus. Green Audit or Environment Audit focuses on the Green Campus, Waste Management, Water Management, Ambient air, Energy Management & Carbon Footprint etc. being implemented by the institute.

This is the Second Consecutive Green audit of the IMER Campus. The previous audit was undertaken in the year 2015 -2016.

Concept

Although there is no universal definition of Green Audit, many leading companies/institutions follow the basic philosophy and approach summarized by the broad definition adopted by the International Chambers of Commerce (ICC) in its publication of Environmental Auditing (1989). The ICC defines Environmental Auditing as: *“A management tool comprising a systematic, documented, periodic and objective evaluation of how well environmental organization, management and equipment are performing with the aim of safeguarding the environment and natural resources in its operations/projects.”*

An environmental audit is a snapshot in time, in which one assesses campus performance in complying with applicable environmental guidelines. Though a helpful benchmark, the audit almost immediately becomes outdated unless there is some mechanism in place to continue the effort of monitoring environmental compliance.

This is the second environmental audit of institute for NACC affiliation. This audit report contains observations and recommendations for improvement of environmental consciousness.

Over all Audit Process:

Unique innovative approach of integrating current students, alumni students, teaching - non teaching staff members, is followed to complete this Environment – Green assessment process.

Few modified guidelines from **ISO 14001** for Environment compliance are also used in this process.

Actual methods for data collection and documenting observations are decided by the audit team, who assessed diverse parameters, including Overall environmental management , Energy management, Water and waste water management , Solid Waste management, Noise monitoring and control, Health hazards - Fire- Safety assessment, Emergency response, Biodiversity and ecology, Resource conservation initiatives, Staff awareness assessment , display of environment related information, Process sustainability etc.

Factual data and observations on above parameters will provide inputs to reduce our carbon footprint and minimize the negative impact on the environment. An effective environment management system needs to be formulated to implement environmentally sound practices to achieve sustainability.

All the data, facts and observations provided in this report are true, verifiable and are documented between 20th January 2021 to 6th March 2021. Maximum efforts have been made to collect information on diverse factors.

This assessment report also provides a baseline from which improvements can be measured in the future years.

A heterogeneous group of 27 diverse individuals in campus and outside have contributed their time and energy to complete this baseline assessment report.

The audit team 2020 - 21 consisted of the following members.

Categories	M	F
Existing students	7	7
Alumni students	1	1
Non-teaching staff members	2	3
Teaching staff members	3	0
Audit team	2	1
Sub Total	15	12
Total	27	

All members have voluntarily contributed their time to give critical inputs for improvement and wellbeing of the people who are part of this institutional campus.

Green Audit

Carbon sequestration in IMER Campus.

Carbon is found in all living organisms and is the major building block for life on Earth. Carbon exists in many forms, predominately as plant biomass, soil organic matter, and as the gas carbon dioxide (CO₂) in the atmosphere and dissolved in seawater.

The term “carbon sequestration” is used to describe both natural and manmade processes by which CO₂ is either removed from the atmosphere or diverted from emission sources and stored in the ocean, terrestrial environments (vegetation, soils, and sediments), and geologic formations.

Methodology.

A tree with girth (circumference of tree) GBH more than 10 cm at chest level and height more than 4 feet were considered as a tree and taken for enumeration. The girth of each tree was measured with the help of measuring tape and approximate height by the visual method. Identification of tree species was done with the help of field guides and with the help of the experts.

All the tabulated data is analyzed by the following standard formulae:

- A. Measurement of the circumference of the tree:** To calculate the circumference Diameter at Breast Height (DBH), tree Girth at Breast Height (GBH), approximately 1.3 meters from the ground is recorded. The Girth at Breast Height of trees having a diameter greater than 10 centimeters were measured directly by measuring tape.
- B. Height measurement:** the height of the individual tree is measured by human height approximation method.
- C. Weight Above Ground (WAB) of the tree:** The Weight Above Ground is the most abundant and visible pool of carbon in all its forms, which includes branches, stem, fruit, whole shoots, and flowers. The total above-ground biomass is calculated by using the formulae given by Brown et al., 1989; Negi et al. 1988.

Formulae: Weight above-ground= $0.15 D^2 H$ (for trees with $D > 11$)

D- Diameter of the tree. H- Height of tree.

- D. Estimation of carbon:** Generally, in any plant species 50 % of its biomass is considered to consist of carbon. **Formula:** Weight of carbon= $0.5 \times$ Dry weight of the tree.

E. Determination of the weight of carbon dioxide (CO₂) sequestrated in the tree: Trees consume CO₂ and release O₂. The sequestrated CO₂ is calculated by using the Carbon Sequestration Factor given by the standard guidelines by IPCC.

Formula: Weight of carbon-dioxide = 3.67 * Weight of carbon.

Findings

Total biomass:

In total 72 individuals belonging to 22 tree species were measured for determination of carbon sequestration in the IMER campus. 101034 Kg (101 tons) of the total biomass of woody vegetation has been recorded on the IMER campus area.

Table showing tree species with the highest biomass (Kg) in campus

Sr. No	Botanical Name	Common Name	Total Biomass (Kg)
1	<i>Ficus racemosa</i>	Umber	20863
2	<i>Terminalia catappa</i>	Indian Almond	19141
3	<i>Tectona grandis</i>	Teak	14486
4	<i>Spathodea sp</i>	African Tulip	6841
5	<i>Grevellia robusta</i>	Bottle brush	6706
6	<i>Polyalthia longifolia</i>	False ashoka	4143
7	<i>Cocos Nucifera</i>	Coconut	4072
8	<i>Michelia Champaca</i>	Chafa	3638
9	<i>Delonix regia</i>	Gulmohor	3321
10	<i>Muntingia calabura</i>	singapore cherry	2120

Carbon Sequestration:

Carbon sequestration is the process of capturing and storing atmospheric carbon dioxide. It is one method of reducing the amount of carbon dioxide in the atmosphere to reduce global climate change. In the current study, the focus is given on the assessment of existing carbon stock stored in the campus in the form of woody vegetation by enumerating every tree species. Overall, so far a total of 185398 Kg (185.3 Tons) of CO₂ has been captured and stored by the woody plants present in the College campus. A total of 5392 Kg (5.3 Tons) of CO₂ is consumed yearly by >72 woody plants in the campus.

Oxygen released:

The Released oxygen is directly proportional to CO₂ sequestrate in the ratio of 32/12. Thus, every year it releases approximately 2022 Kg (>2 Tons) of oxygen annually.

Conclusion:

The trees present in the IMER campus are sequestering about 5392 kg of CO₂ /year and release 2022 Kg of oxygen annually. Thus, the campus is working as a good carbon sink and also producing good amount of oxygen.

Biodiversity in the Campus:

A rapid assessment of biological diversity inside the IMER campus was successfully undertaken in the month of February 2021. Different parts and habitats in the entire campus were surveyed to document the species richness covering maximum taxonomical groups. This documentation survey included dedicated attempts as well as opportunistic sightings.

We could not record all the species documented in previous audit, due to seasonal variations. (2015 audit was conducted in rainy season)

The entire college campus supports a good ecological diversity.

This assessment was done in a very limited time period, hence the actual values for species richness are definitely more than the numbers given in the table.

Species richness in the IMER Campus

Biological Diversity – Species richness			
Kingdom - Plantae	No of species	No of species	Kingdom - Animalia
Bryophytes (Moss)	2	1	Annelid (Earthworm)
Pteridophytes (Fern)	3	> 18	Butterflies
Angiosperms & Trees	23	> 3	Spiders
		> 12	Other Arthropods
		> 3	Amphibians
Ornamental plants	> 23	> 4	Reptiles
		> 28	Birds
		> 7	Mammals
Total Plant species	> 51 species	> 76 species	Total Animal species

The green cover in the campus created by planting native flora is providing suitable habitats for many diverse organisms.

List of Important Tree species and other Plants in Campus

- 1) Neem – *Azadiracta indica*
- 2) Mango - *Mangifera indica*
- 3) Guava - *Psidium guajava*
- 4) Indian almond – *Terminalis catappa*
- 5) False ashoka - *Polyalthia longifolia*
- 6) Bottle brush Silver oak – *Grevellia robusta*
- 7) Castor - *Ricinus communis*
- 8) Orchid tree - *Bauhinia variegata*
- 9) Banana - *Musa species*
- 10) Jamun- Indian Black berry – *Eugenia jambolano*
- 11) Rain tree – *Albizia saman*
- 12) Plumeria alba –
- 13) Gulmohor – *Delonix regia*
- 14) Jack fruit - *Artocarpus heterophyllus* -
- 15) Sisam Redwood - *Dalbergia sisso*
- 16) Coconut - *Cocos Nucifera*
- 17) *Umbar* - *Ficus racimosa*
- 18) *Ficus benamina*
- 19) Chafa - *Michelia Champaca*
- 20) Teak - *Tectona grandis*
- 21) Singapore cherry – *Muntingia calabura*
- 22) *Alstonia sp*
- 23) *Spathodea*

List of Amphibians

- 1) Indian tree frog, *Polypedates maculatus*
- 2) Common Indian toad, *Duttaphrynus melanostictus*
- 3) Common Bush frog, *Pseudophilautus sps.*

(above Three species were not recorded during this audit period due to seasonal variation, but are commonly seen during monsoon season)

Reptile diversity in campus

- 1) Common calotis
- 2) Skink
- 3) House Gecko
- 4) Brook's Gecko
- 5) Indian Rat snake (*not recorded during this audit period due to seasonal variation, but*)
- 6) Striped keel back (*not recorded during this audit period due to seasonal variation*)

Mammal diversity in campus

- 1) Hanuman langoor
- 2) Mongoose
- 3) House shrew
- 4) House Rat
- 5) Three striped squirrel
- 6) Common bandicoot
- 7) Short nosed fruit bat
- 8) Indian pipistrellus bat - (*not recorded during this audit period due to seasonal variation*)

List of Butterfly species

Family: Papilionidae (Swallowtails)

1. Common Mormon, *Papilio polytes*
2. Blue Mormon, *Papilio polymnestor*
3. Common jay, *Graphium doson* - (*not recorded during this audit period due to seasonal variation*)

Family: Lycaenidae (Blues)

4. Common Pierrot, *Caleta rosimon*
5. Tiny Grass Blue, *Zizula hylax* - (*not recorded during this audit period due to seasonal variation*)
6. Common Cerulean, *Jamides celeno* - (*not recorded during this audit period due to seasonal variation*)

Family: Pieridae (Whites & Yellows)

7. Common Emigrant, *Catopsilia pomona*
8. Common Grass Yellow, *Eurema hecabe*
9. Common jezebel, *Delias eucharis*

Family: Nymphalidae (Brush-footed Butterflies)

10. Common Evening Brown, *Melanitis leda*
11. Common Bushbrown, *Mycalesis perseus*
12. *Common four ring, Ypthima huebneri*
13. Common Castor, *Ariadne merione*
14. Chocolate Pansy, *Precis iphita* - (not recorded during this audit period due to seasonal variation)
15. Danaid Eggfly, *Hypolimnas misippus* - (not recorded during this audit period due to seasonal variation)
16. Blue Tiger, *Tirumala limniace*
17. *Striped tiger, Danaus chrysippus*
18. Common Indian Crow, *Euploea core*

Listing of Bird diversity

1. Red whiskered bulbul
2. Red-vented bulbul
3. Magpie robin
4. Tailor bird
5. Purple rumped sunbird
6. Red wattle lapwing - (not recorded during this audit period due to seasonal variation)
7. Black drongo
8. Cattle egret
9. house sparrow - (not recorded during this audit period due to seasonal variation)
10. Green bee-eater
11. Greater coucal
12. Eurasian golden oriole
13. Barn owl
14. Spotted owlet
15. White cheeked barbet
16. Ashy prinia
17. House crow
18. Crow pheasant
19. Indian Grey hornbill

- 20. Blue rock pigeon
- 21. Oriental turtle dove - *(not recorded during this audit period due to seasonal variation)*
- 22. Common myna
- 23. Brahmany myna- *(not recorded during this audit period due to seasonal variation)*
- 24. common grey babbler
- 25. Long tailed shrike - *(not recorded during this audit period due to seasonal variation)*
- 26. Rose ringed parakeet
- 27. Common kite
- 28. Fan tail flycatcher

Energy Audit

Energy management - efficiency & alternatives:

There are no issues in the demand and supply chain of the energy-electricity management. Campus gets its electricity supply from the urban feeder of HESCOM, Karnataka. Due to urban feeding the energy shut downs are very seldom.

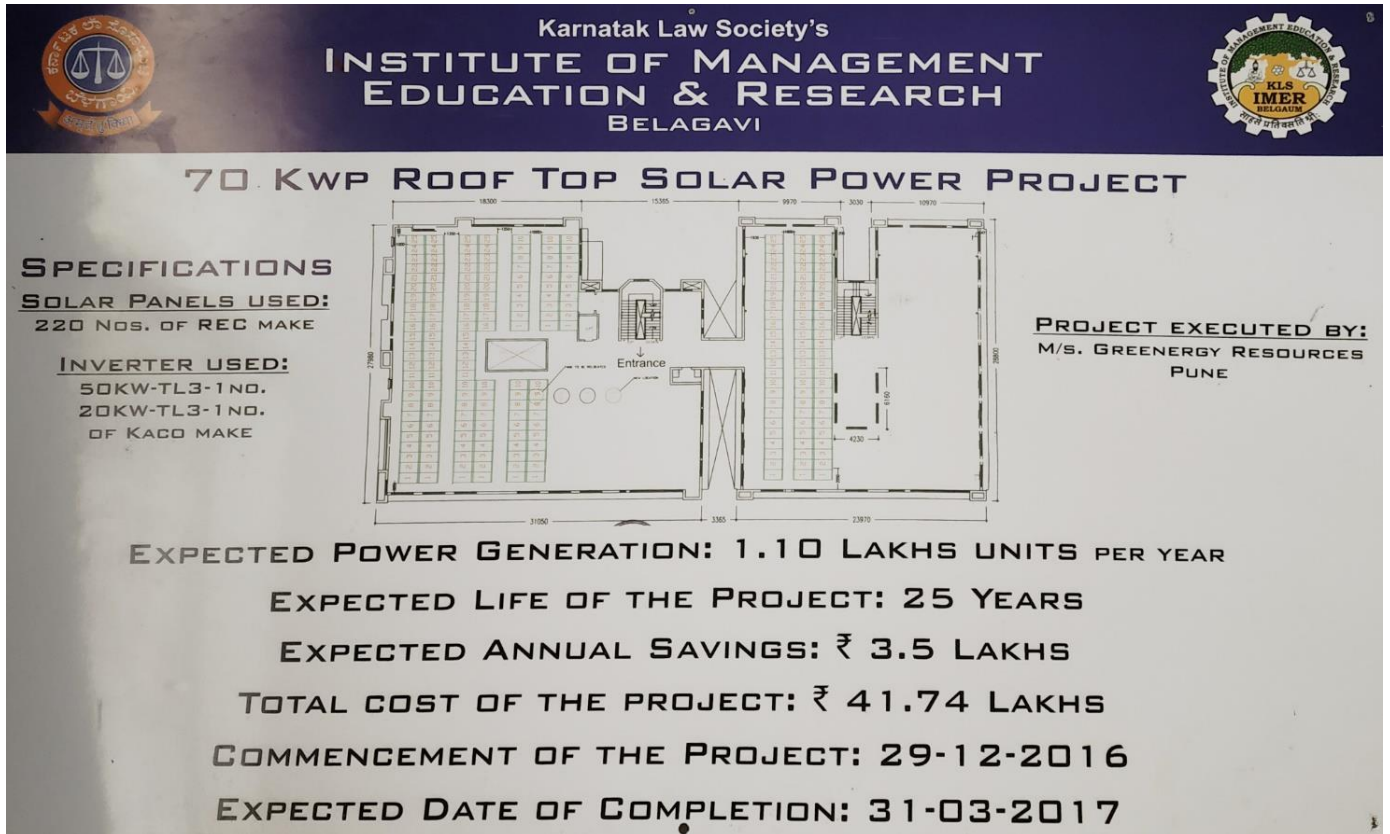
Institution also has Two decentralized efficient power generators of 62.5 KVA along with a Four UPS of 20 KVA capacity to satisfy the energy demand. And together can generate up to 165 KVA of electricity whenever necessary.

Following chart shows yearly expenditure on the electricity. (Figures in INR)

Electricity Expenses	2016	2017	2018	2019	2020
January		79260	12014	18604	21010
February	58320	72412	9389	17588	26720
March	51270	71315	493	6259	0
April	65122	43832	26589	9260	19071
May	80141	25341	23998	32469	20443
June	81175	44793	41668	55196	2261
July	85908	36300	46324	41062	21643
August	57179	16619	42664	37526	23685
September	55230	16434	9348	34126	0
October	73630	19615	10361	28376	23850
November	67053	158438	12387	20867	4600
December	70350	13625	15887	28433	18035
Total	745,378	597,984	251,122	329,766	181,318

As suggested in Green Audit - 2015, IMER has already installed 70 KWP Roof top solar power plant to satisfy energy demand from renewable energy sources. Electricity is efficiently generated through solar PV cells and is clearly evident from the HESCOM electricity bills.

Solar PV module of 70 KVA installed on building roof top. April 2017



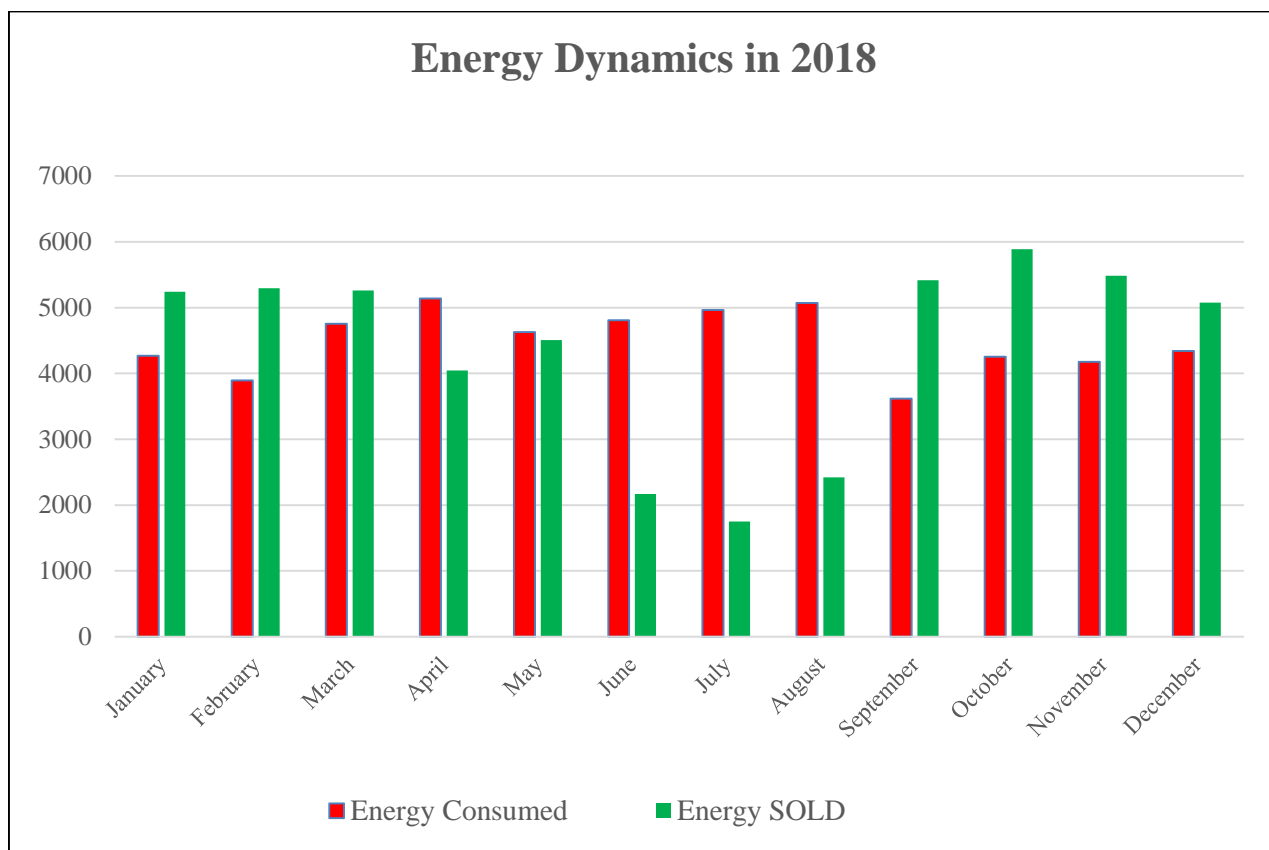
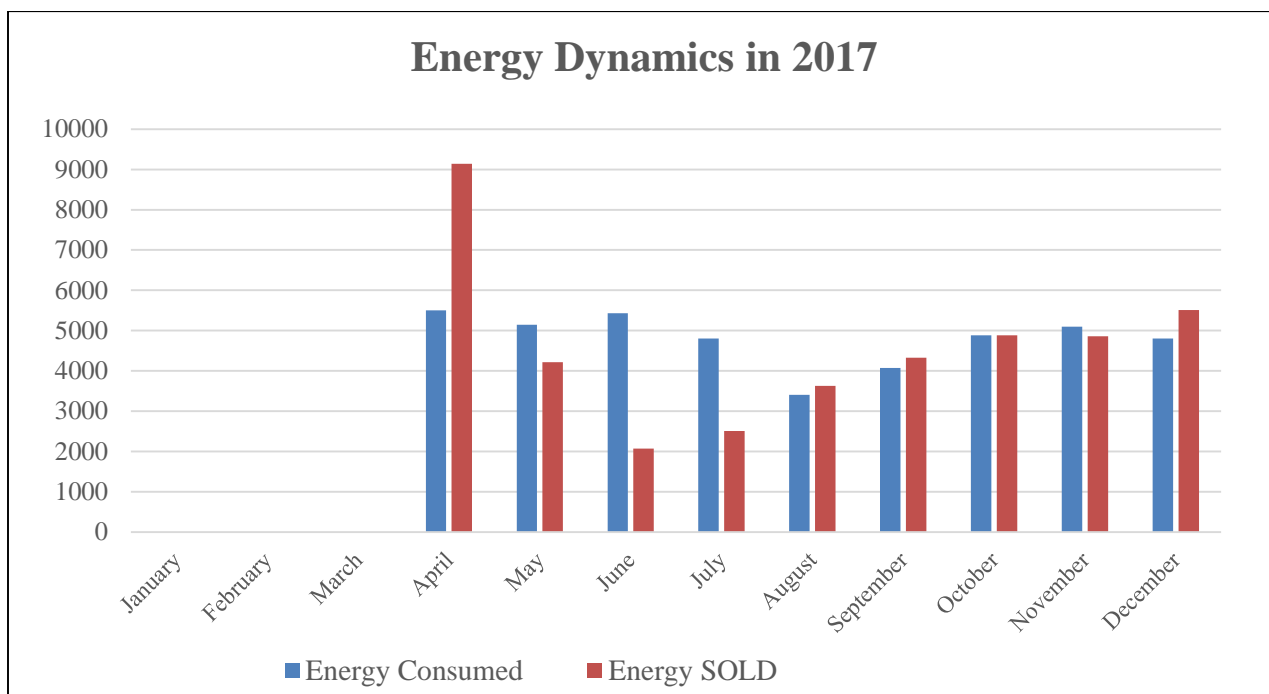
Energy Consumed by IMER in Kwh units, since 2017 to 2020

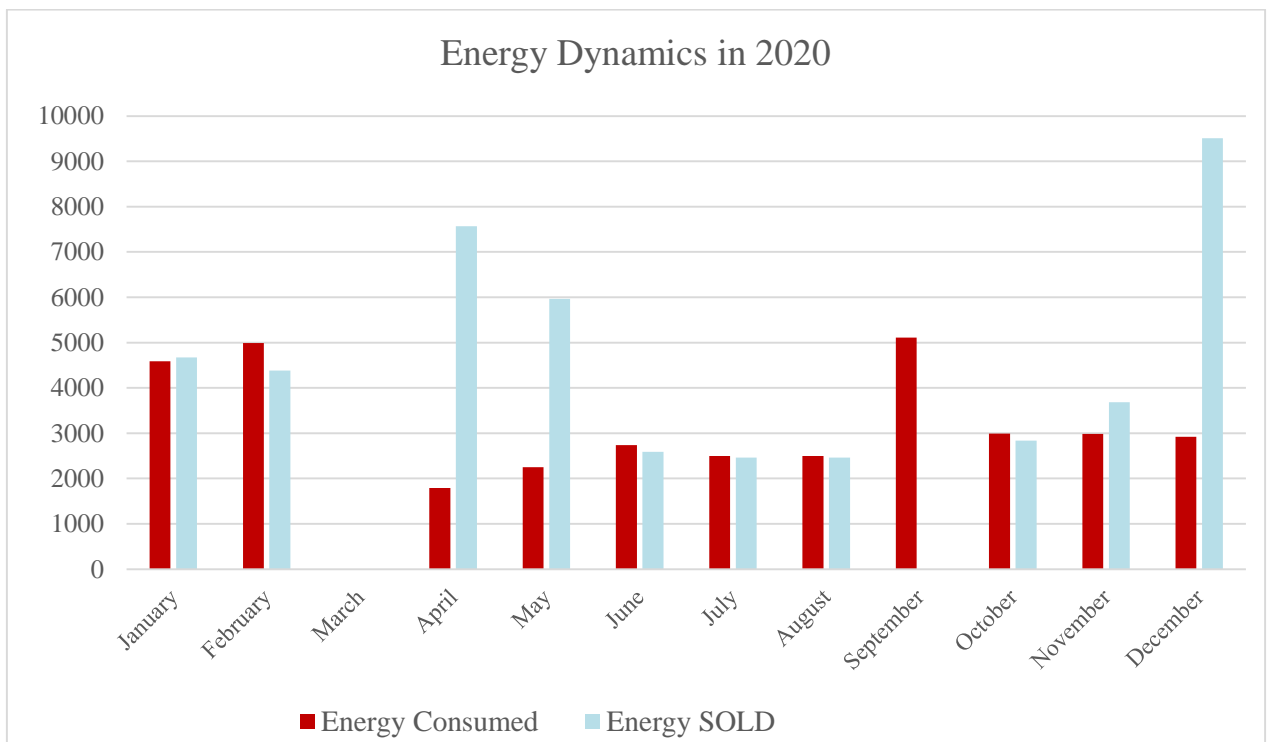
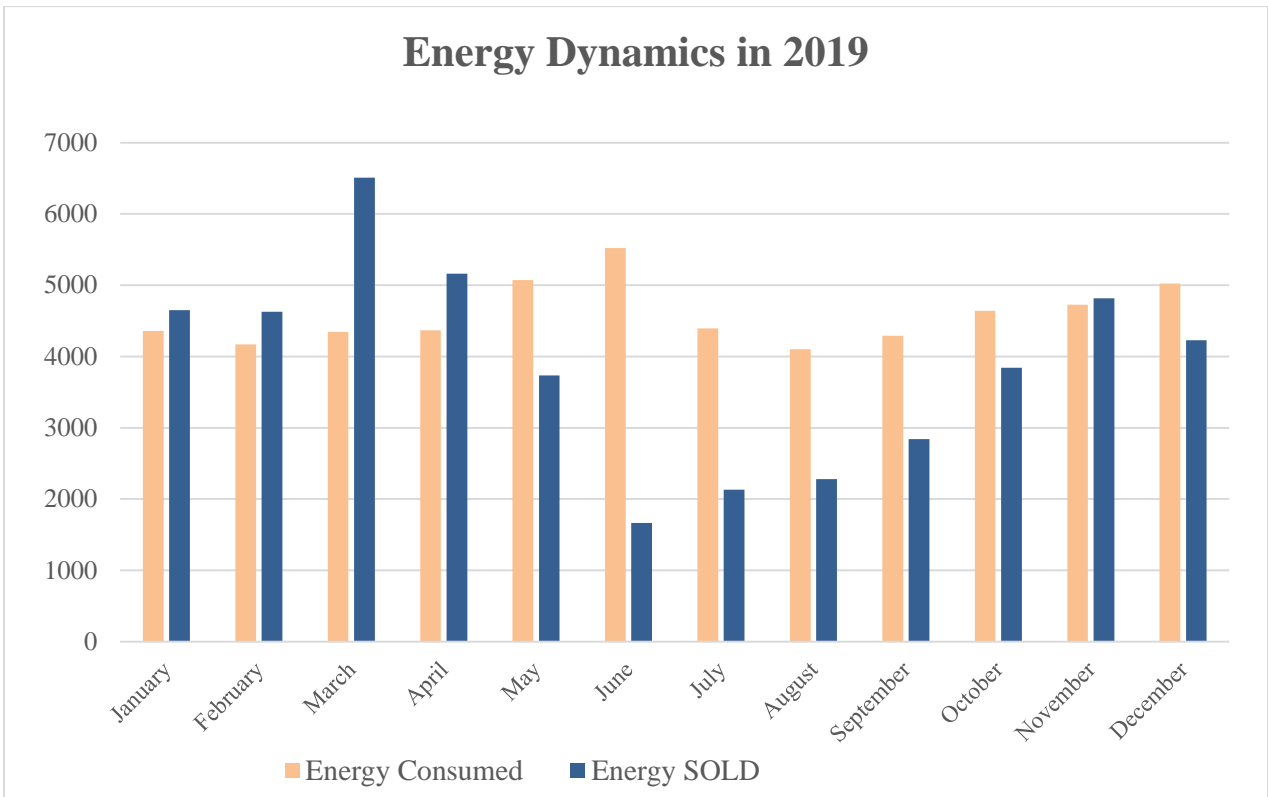
Electricity consumption	2017	2018	2019	2020
January		4268	4358	4590
February		3893	4170	4988
March		4755	4343	3214
April	5505	5138	4365	1793
May	5145	4628	5070	2250
June	5430	4808	5520	2737
July	4800	4965	4395	2498
August	3405	5070	4103	2498
September	4073	3615	4290	5108
October	4883	4253	4643	2993
November	5100	4178	4725	2985
December	4800	4343	5025	2918
Total	43141	53914	55007	38572

There is more than 70 % reduction in the electricity billing expenses. In fact, IMER is supplying surplus energy to the HESCOM supply grid. (Values can be seen in the following charts.)

Energy SOLD to HESCOM grid by IMER in Kwh units from 2017 to 2020

Electricity generated	2017	2018	2019	2020
January		5243	4650	4673
February		5295	4628	4380
March		5258	6510	0
April	9143	4043	5160	7568
May	4215	4507	3735	5962
June	2070	2168	1665	2587
July	2505	1748	2130	2460
August	3630	2423	2280	2460
September	4328	5415	2842	0
October	4883	5888	3840	2835
November	4860	5483	4815	3683
December	5513	5078	4230	9510
Total	41147	52549	46485	46118





The institute is 80% self-sufficient in satisfying its energy demand, from solar PV module. Only during the rainy season (low intensity sun light), is consuming more energy from the public grid.

Existing energy requirement:

Looking at the electricity consumption bills from year 2017 - 2020 till date, on average the entire campus requires approximately about 320 kwh of electrical energy every month. Lowest consumption being about 270 kwh and highest up to 370 kwh.

This variation is due to the weather season, full fledge practical laboratory sessions, examination schedule in the academic year.

Per capita electricity consumption (Approximate Campus population = 256)

*Whole number values are taken to ease the calculations

Monthly Minimum consumption = 270 kwh
= 270000 wh / 256
= 1054 wh / individual/month
= 35.13-watt hour /person/day

Monthly Maximum consumption = 370 kwh
= 370000 wh / 256
= **1445** wh/individual
= 48.1-watt hour/person/day

Compared to previous audit per capita consumption has increased by about 15 - 20 %.

Energy consumption per square meter

Average approximation has been considered for the following calculation based on our factual onsite observations in the campus. (These values can vary by 10%).

Total Area in square meter of the built infrastructure = 5473 sq. m (58,910.88 sq. ft)

Calculation for consumption per square meter

S. No.	Appliances	Avg. Power consumed per appliance in Watts	Number of appliances	No. of Hours it is used per day	Electrical energy consumed per day in Kwh	Total Electrical energy consumed annually in Kwh	Total electrical energy consumed per meter square annually
1	Tubes (T12)	40	263	3	31.56	9468	18.34
2	CFL (small)	12	35	5	2.1	630	
3	Fans	100	170	3	51	15300	
4	LCD Projector	200	17	2	6.8	2040	
5	Laptops	60	12	2	1.44	432	
6	Computers with LCD monitor	120	218	3	78.48	23544	
7	Air conditioner (AC)	1500	17	2	51	15300	
8	Water cooler	500	3	3	4.5	1350	
9	Pumps	1500	3	2.5	11.25	3375	
10	Fire safety pump	4000	1	1	4	1200	
11	Xerox machine(big)	500	1	4	2	600	
12	Printer	120	29	2	6.96	2088	
13	Led ceiling lights	15	5	8	0.6	180	
14	TV	120	1	14	1.68	504	
15	Led tube	40	9	8	2.88	864	
16	Server room	600	1	24	14.4	4320	
17	Lift	2000	1	24	48	14400	
18	200 w Lights	200	1	4	0.8	240	
19	Water heater	1500	3	3	13.5	4050	
20	Sound amplifier	400	4	1	1.6	480	
						100365	

The average annual energy consumption per square meter in the campus is 18.33 kWh, which is well under limit of the standard educational / commercial building infrastructure.

This value is little higher compared to 17.14 kWh consumption recorded during previous audit.

Energy Efficiency –

To check the efficiency, all the buildings in the campus were assessed for the electrical conduit and use of electrical equipment. All the classrooms, halls, labs, and other facilities were assessed by the audit team, checking working conditions of lighting, fans, wastage of energy, flaws or risk and requirements etc.

- **Wastage of electricity was not seen observed at any location.**

Energy conservation & Renewable Energy Initiative:

- To prevent wastage of energy and to increase energy conservation awareness, messages have been displayed at key locations.
- Solar street lamps are installed in campus as an alternative renewable energy source.
- A Biogas plant has been provided to the Canteen contractor for disposal of the kitchen waste.
- As suggested in the previous audit, more than 50 % roof area is now utilized to install 70 KVA solar PV module to generate electricity. On average more than 75% of energy requirement is satisfied by self-production. Solar PV module is working since April 2017.
- In summer and winter seasons, surplus energy is sold to HESCOM grid.

Environment Audit

The existing campus of the KLS's IMER provides one of the most student friendly work environment in the North Karnataka region.

Out of 2 acres of institutional campus area approximately 58 % area (about 4760 sq m. ground area out of 8092 sq. m) has constructions and built environment, whereas the remaining 42 % area comprising approximately about 3330 sq. m is under Green cover and open spaces.

Google Satellite images are used to calculate the approximate Green cover and area under vegetation.

There is no additional built infrastructure added in the campus area.

While doing a comparative observation on the campus area of last 15 years, there has not been any recognizable change in the built and natural environment. The open spaces are protected, conserved and not destroyed for expansion of the building infrastructure. Elevated construction is being undertaken by adding more classrooms on the vertical floors of the main building.

Efforts have been taken to plant native Indian trees in the open space for greening the.

IMER Campus has residential areas in the surrounding vicinity and hence, has very quiet and undisturbed work environment.

No	Public service areas	Remarks
1	Municipal dump yard	Not in vicinity of institute
2	Garbage heap	No Garbage heap nearby
3	Sewer line	No
4	Stagnant water	Not in the vicinity
5	Open drainage	No
6	Industrial Estate	Not in the vicinity
7	Bus / Railway station	Not in the vicinity

Google Earth image 2004, showing Built environment and open space in the campus .



Google Earth image 2014, showing Built environment and Green cover in the campus.





Entire campus map is displayed at the Entrance gate for ease of movement for new visitors.



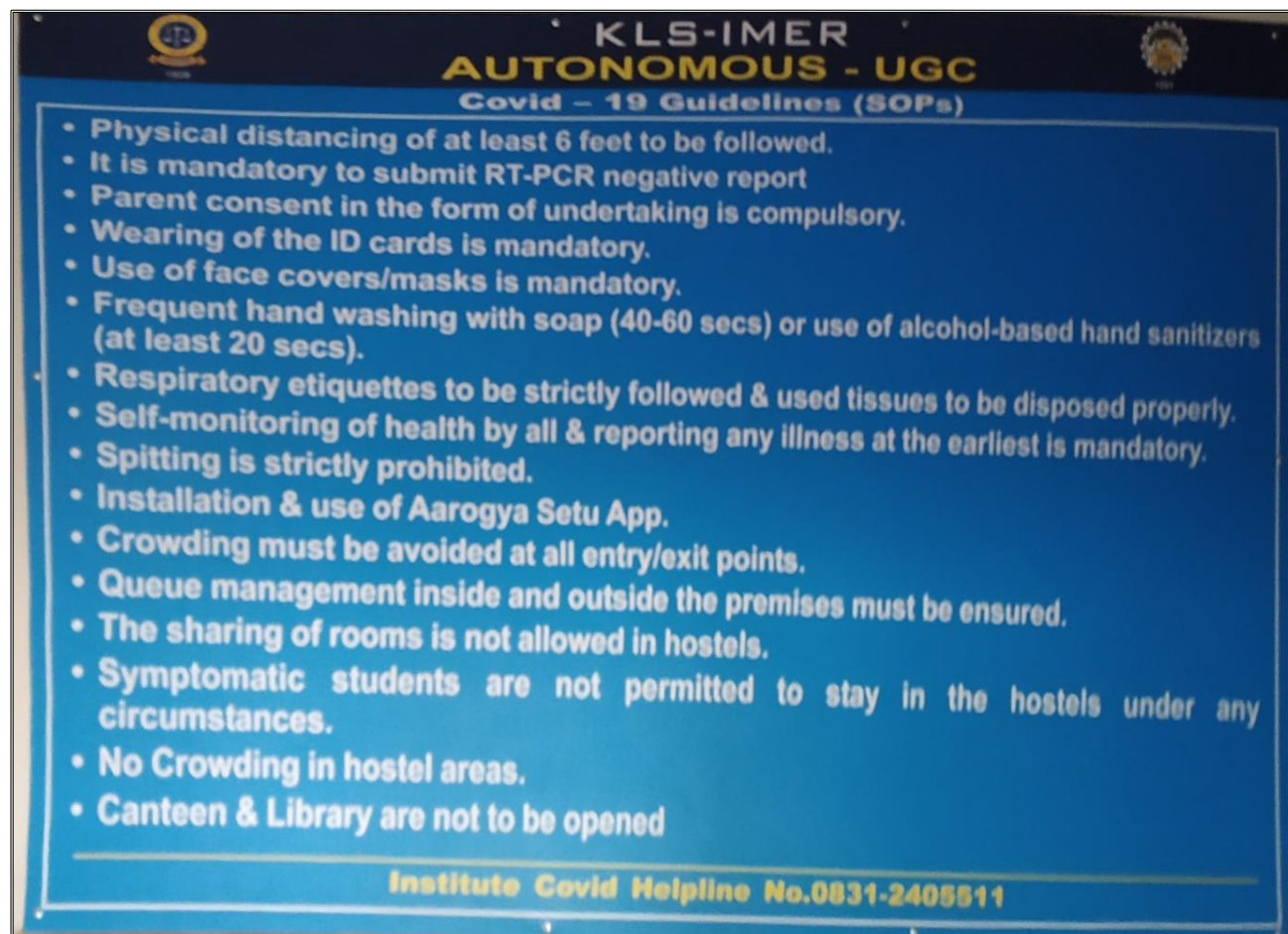
Population Dynamics in the Campus -

Entire campus is used every day by almost 257 people that includes students, Teaching and non-teaching staff members and service providers of the KLS's IMER campus.

There is no congestion of people at any facility provided in the campus. The infrastructure is properly designed and spacious enough.

Category	IMER	
Year 2020- 21	M	F
MBA 1 st year	54	47
MBA 2 nd year	70	35
Teaching Staff	13	3
Non-Teaching staff	15	8
Service providers	4	8
Total	156	101
Grand Total	257	

COVID -19 Guidelines are displayed at the entrance for the safety purpose.



Assessment of Built Infrastructure

The quality of the built constructions and infrastructure is very good. All building in the campus were assessed with respect to spaciousness, cleanliness, safety, dust levels, water facilities, toilets and sanitation blocks. Entire campus was inspected to document the lighting conditions, heating, cleanliness, garbage, dust bins, energy wastage etc.

Particular	Space	Cleanliness	Remarks
Open spaces	Specious	Bad	<u>Initial phase of audit</u> – dumping of campus waste <u>End of Audit</u> – waste material burnt in campus
Main building	Specious	Good	Leakage issues resolved (suggested in previous audit)
Toilet blocks	Specious	Good	In good condition
Parking area	Specious	Good	Parking space needs to be well defined
Canteen facility	Specious	Good	Non-operational. Scrap material stored on Roof area.
Ladies Hostel	Specious	Good	Good
Basement area	Specious	Good	Designate small area for scrap material storage & management
Roof area	Specious	Good	Roof door must be locked. Many times has open access.
Drinking water facility	Specious	Good	Adequately maintained

Observations:

- Cleanliness inside entire campus is maintained properly. Dust and dirt levels in built infrastructure are very low. Routine schedule exists for every day cleaning activities.
- Dustbins are provided at all key location and are regularly disposed by the assigned workers.
- Door mats have been provided at key locations to reduce the dirt and dust levels.
- Proper seating arrangement is provided in all the class rooms, common areas and staff areas.
- Well-equipped auditorium is maintained properly with all facilities.
- Water leakage problem existing during the previous audit have been completely resolved.
- Lot of old, scrap material is lying at the basement and canteen roof area. Immediate decision must be taken to resolve the scrap management/ storage problems.
- It is advisable to create a designated area in the basement for scarp material management.
- Adequate drinking water facility is provided on each floor of the building and is supported with water cooler. All units are working efficiently.
- Regular maintenance of these water purifiers and coolers is undertaken with AMC, and the same is evident based on the service stickers displayed on these machines. (photo attached)



All key areas (including lobbies, classrooms, library, open areas, computer laboratories, staff rooms) with respect to people's movement, have display of message about the saving energy, keeping campus clean, use of dust bins, do not litter etc. (photos attached)

- **Displaying such messages related to environment awareness was suggested in previous audit and is being implemented.**



Display of messages related to energy conservation



All the classrooms and library spaces are well ventilated and have good natural lighting, and can be seen in the photographs.





Library space is well aerated and lighted with natural as well as artificial lights.





Classrooms are well aerated and lighted with natural as well as artificial lights.



Sanitation facilities

- Adequate sanitation facility on each building floor has been provided in the entire campus to avoid congestions and to keep hygienic conditions.
- Regular contract workers have been appointed for the cleanliness and maintenance of the toilet facilities and to maintain hygienic conditions. Industry standard chemicals are provided to maintain hygienic conditions in the sanitation blocks.
- Few students (>13) were interviewed to know if there are any problems related to cleanliness, availability of water, light in the toilet facility. Both male and female students are satisfied with the facility.
- Toilets must be provided with liquid hand sanitizers.
- Few wash basins and taps in the toilet need to be repaired.

Regular monitoring and repair works are needed



Information about the maintenance contractors was also gathered to document and observe compliance with labour laws.

No	Category	M	F	Contractor Name	Mobile	Contract period from	Labour law implementation	Official Supervision	Safety measures	Remarks
1	Security Guards	2	0	One roof solutions	9986018184	2020	Yes	Yes	Yes	Average
2	Gardening	1	1	Yallappa Havannavar	9611756948	2020	Yes	Yes	Yes	Good
3	Campus Cleaning	0	7	Preetamkumar Karnataki	9986513427	2010	Yes	Yes	Yes	No safety measures not used
4	Toilet cleaning	1	0	Preetamkumar Karnataki	9986513427	2010	Yes	Yes	Yes	
5	Construction work	1	0	Muralidhar Ashtekar	9535641498	2015	Yes	Yes	Yes	Good
6	Electrical conduit	1	0	Avinash	9945011351	2016	Yes	Yes	Yes	Good
7	Plumbing	1	0	Vasant Muchandikar	9480537403	2015	Yes	Yes	Yes	Good

As suggested in previous audit all service providers are following labour laws and are providing basic ESI (Employees state insurance), accidental insurance facility to all workers.

Currently any kind of Safety equipment including hand gloves, basic foot ware, mask etc. is not used by any workers in the campus. Coordination between supervisor and workers is needed to make sure the utilization of safety equipment.

Temperature, Humidity and Noise monitoring (Indoor and Outdoor)

It is very important to monitor the temperature and humidity levels in the work environment, which can affect our well-being and work performance. Scientific Kestrel Weather meters were used to monitor the temperature and humidity levels at 13 different point locations, spread all over the area.

Entire IMER campus is designed efficiently with planned ventilation and natural lighting. We have documented temperature and humidity at key locations. There is no major difference between inside and outside temperature. **Comparatively inside temperatures are higher, as most of the windows are kept closed.**

This condition of closed atmosphere is true for many classrooms, library office, some times of office and other facilities. If windows are kept open whenever convenient, then consumption of electricity can be further reduced by avoiding use of artificial lighting and fans.

During interim phase of the audit, it was suggested to install exhaust fans in the battery rooms, along with adding steel net to the doors, for additional ventilation. Institution has taken immediate action to improve the ventilation and are in final stage of incorporating the suggestions.

No	Location		Humidity %	Temp in °C	Wind speed mph
			Feb 2021	Feb 2021	Feb 2021
1	Basement		55 %	25 °C	1.0
2	Entrance Gate		53 %	28 °C	1.1
3	Ground Floor	Main building Entrance	60 %	28.6°C	0
4		Main lobby	62 %	28.8°C	0
5		Inside Classroom 3A	58 %	27°C	0
6		Auditorium	56 %	27.2°C	0
7	First Floor	Open area 1 st floor	53 %	27 °C	0
8		Inverter room 1 st floor	58 %	33°C	0
9		Classroom	55 %	27°C	0
10	Second Floor	Open area 2 nd floor	54 %	31.1°C	0
11		2 nd floor Reading room (inside-window closed)	51 %	33.2°C	0
12		Classroom	55 %	28.3°C	0
13	Terrace area		42 %	32°C	2.3

*Temperature inside the Inverter and battery rooms is about 4 -5 °C higher.

To record the noise levels “SOUND METER’ application was utilized on Android phones with Pie 9 version. Two android handsets were used to document the sound levels at 10 point locations spread all across the campus. (the sound level accuracy was checked with the actual advanced Sound meters from engineering institution, and accuracy difference is of max 1.5 db.)

Noise level monitoring in the campus

No	Location		Time	
			10am	4pm
			Noise levels dB	
1	Basement		55	62
2	Entrance Gate		72	78
3	Ground Floor	Main building Entrance	70	75
4		Main lobby	50	52
5		Inside Classroom 3A	40	37
6		Auditorium	35	36
7	First Floor	Open area 1 st floor	48	55
8		Inverter room 1 st floor	25	28
9		Classroom	38	40
10	Second Floor	Open area 2 nd floor	48	52
11		2 nd floor Reading room (inside-window closed)	52	54
12		Classroom	38	42
13	Terrace area		55	60

All the sounds recorded in the campus are under permissible limits. Quiet work environment is available during all working hours.

Water management:

The major source of water for the KLS's IMER campus is the water supply by the Belgaum city municipal corporation and open well in the campus.

Supplied purified water is stored in two underground tanks, from where water is pumped into the overhead tanks for utilization purpose.

No	Parameter	Condition / Remarks
1	All Buildings assessed	Uninterrupted water supply
2	All water taps inspected	Leakage in <1 % taps (2/25)
3	All Toilets Blocks	In good condition
4	Drinking water facility assessed	Adequate
5	Water storage tanks	All tanks cleaned scientifically by professionals

Automatic water pumping system has been installed in all overhead tanks to maintain the uninterrupted supply. This system also helps in reducing the wastage of water due to tank overflows.

Aqua guard water purifiers and storage coolers are installed and well managed at each building floor for adequate supply.

- Water samples from all these facilities were checked for the bacterial traits and drinking quality at the district health department laboratory.
- **All sample were found clean and safe to drink.** (see attached report)

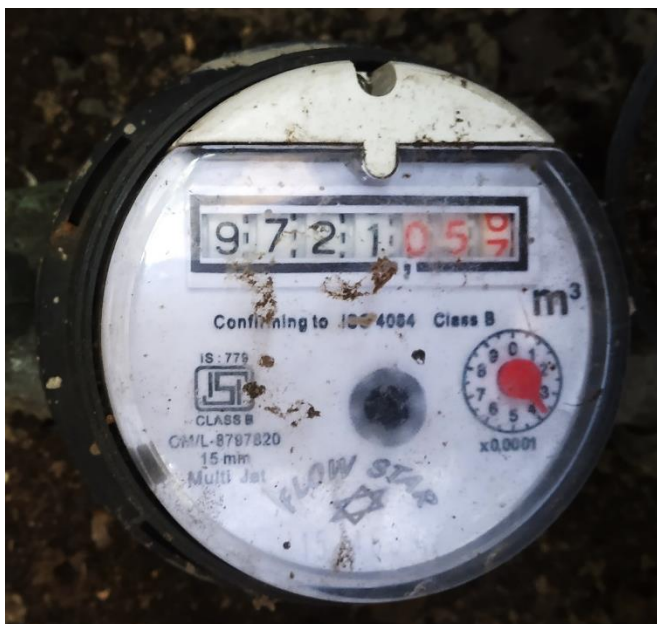
There are no issues in the demand and supply process, but there are few problems in storage facility. Most of the storage tanks do not have proper lid on the top, which increases the probability of the water contamination. This needs to be addressed immediately.

Management has taken immediate steps and is in process of covering these tanks.

Some times during summer season Water is supplied by tankers with an average frequency of 5000 lit / week, for 3 Months.

Table showing water consumption expenses, towards supply from city corporation. The billing is done on yearly basis; hence monthly consumption data is not available.

Water consumption	2016	2017	2018	2019	2020
Expenses	16236/-	-	15900/-	-	-



The current meter reading is 9721 cubic meter, for Four years.

Hence the average yearly consumption is $9721 / 4 = 2430$ cubic meter = 24,30,000 liters/ year

Average daily consumption is $2430 / 365 = 6658$ lit/ day.

This consumption is well within standard limits, for the present number of people in the campus.

Students were asked if they face any problems due to water scarcity or supply system, but no problems about water availability have been reported either by students as well as the serving workers.

Water analysis report – Chemical Parameters - February 2021.

Estd : 1979



KLE DR M S Sheshgiri
College of Engineering and Technology

Udyambag, Belagavi - 590 008.

(Approved by AICTE New Delhi & Affiliated to VTU, Belagavi)

Department of Civil Engineering

Accredited by NBA, New Delhi

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Ref: KLE/CED/ENV/TR-65/2021

Date: 10.02.2021

ANALYSIS REPORT OF FRESH WATER QUALITY

Name of the sample : Purifier passed water sample
Sample collected by : Client.
Date of collection : 04.02.2021
Particulars of sample collected : Grab
Date of receipt of sample : 04.02.2021
Report to be sent : Institute of Management Education & Research, Belagavi.

Sl. No.	Parameter	Protocol	Unit	Results	Standard Desirable	Standard Permissible limits in absence of alternate source
1	PH	pH meter	--	7.29	6.5-8.5	No relaxation
2	Conductivity (μS/cm)	Cond/TDS meter	μS/cm	136	--	--
3	Total Dissolved Solids	Cond/TDS meter	mg/L	77	500	2000
4	Turbidity (NTU)	Nephelometer	NTU	0.00	1.0	5.00
5	Chlorides (Cl)	Titrimetric	mg/L	23	250.00	1000.00
6	Sulfates (SO ₄)	Spectrophotometer	mg/L	17	200.00	400.00
7	Total Hardness as CaCO ₃	Titrimetric	mg/L	62	200.00	600.00
8	Calcium as Ca	By Calculation	mg/L	15	75.00	200.00
9	Magnesium as Mg	By Calculation	mg/L	06	30.00	100.00
10	Total Alkalinity as CaCO ₃	Titrimetric	mg/L	56	200.00	600.00
Inference		As per IS:10500-2012 Report Status: The results are within limits as per the above parameters.				

Tested By:

Shri. Joycet H
Shri. Joycet H

Dr. C.M. Patil
Dr. C.M. Patil

HOD CIVIL ENGG
HOD CIVIL ENGG

PRINCIPAL
PRINCIPAL

Water analysis report – Microbial Contamination - February 2021.

Estd : 1979



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ANALYSIS REPORT OF FRESH WATER QUALITY

Sample collected by : Client.
Date of collection : 04.02.2021
Particulars of sample collected : Grab
Date of receipt of sample : 04.02.2021
Report to be sent : Institute of Management Education & Research, Belagavi.

Sl. No.	Parameter	Protocol	Unit	Results (Purifier passed water)	Results (Well water sample)	Standard Desirable	Standard Permissible limits in absence of alternate source
1	Total Coliform Bacteria/100 ml (E- Coli)	Multiple tube fermentation	ml	nil	nil	--	--
Inference		As per IS:10500-2012 Report Status: The results are within limits as per the above parameters.					

Tested By:


Shri. Joyceton.H


Dr. C. M. Patil

for 
HOD CIVIL ENGG


PRINCIPAL

Wastage of water was observed at two locations during the survey period.

Wastage of water from the valve at roof tank & water cooler



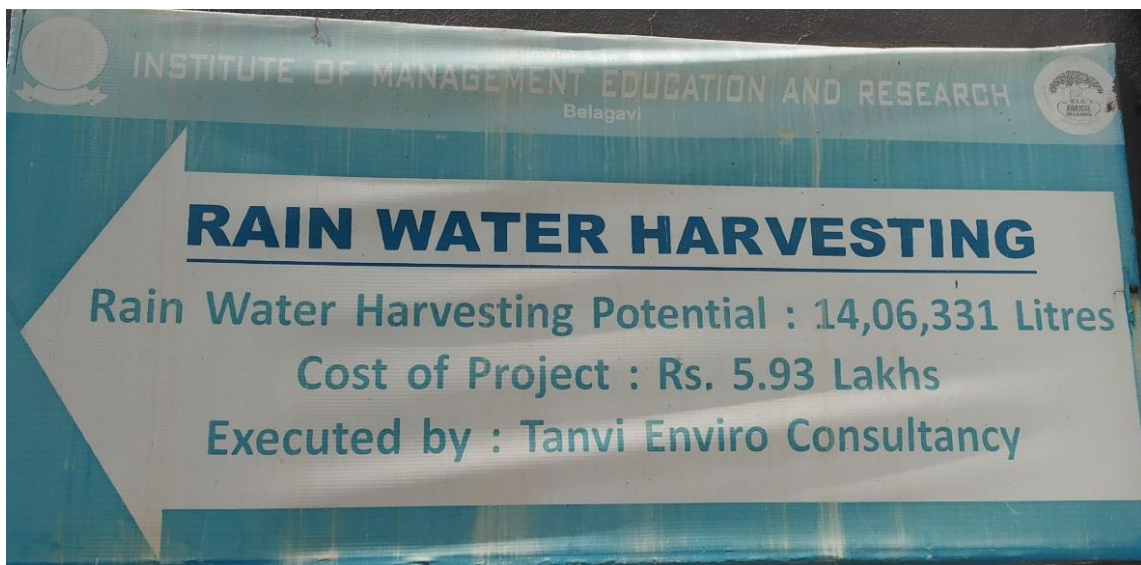
Suggestions

- 1) Adequate drinking water facility is provided which needs to be maintained.

Dust – dirt layers on the cooler tops need to be cleaned regularly.

- 2) All over head water storage tanks must have proper covers on the openings.

As suggested during previous audit Rain Water harvesting system is installed in the campus.



The rain water recharge pit is not visible now on ground surface, due to grass layer on top. The rain water from roof top is released below the ground level.



Rain water from more than 600 sq.ft roof top area is diverted towards rain water harvesting pit.
Following table shows rain water recharged in ground since year 2017

Year	Roof top area	Average rain fall in mm	Rain water harvested at 50% efficiency
2017	600 sq. ft	1230 mm	14,76,000
2018	600 sq. ft	1420 mm	17, 04,000
2019	600 sq. ft	1700 mm	20,40,000
2020	600 sq. ft	1650 mm	19,80,000
Total			72,00,000 liters

Wastewater management:

Currently the generated Waste water is released into the centralized city drainage system.

Leakage of sewage or drainage was not observed at any point during the audit process in 2021.

As suggested in Green audit 2015, of a separate Collection / disposal unit for used sanitary napkins is installed in ladies room with messages, for proper disposal of used napkins.



Waterless urinals have been installed in one entire toilet block to reduce water consumption. The facility is working properly and hygiene is maintained.



IMER has planned to install Waterless urinals in one more toilet block, to further reduce the water consumption.

Solid Waste management:

In the existing system all the solid waste is properly collected from various places in the plastic garbage drums. The appointed staff regularly check and manage the waste collection.

Waste bins have been provided in each classroom, staff rooms, office, administration facility and computer labs. All dust bins are well managed by the appointed staff and no waste material was seen lying inside the work space.

Total waste generated in the campus is less than 2 kg/day. (includes paper waste, paper cups, plastic, packaging material, plastic bottles etc.)

Earlier the collected waste was collected by the city corporation, but now that system is not working. Due to this, the collected solid waste is disposed at a corner in the campus or burnt.

Waste burning is not an acceptable practice, and the previous system needs to be reinitiated for proper disposal of waste material.

Photos showing dumps of waste material in the campus



Burning of waste material



The material which needs to be scrapped are kept at few locations in basement area, canteen roof area etc. These areas should have designated as “waste / scrap management areas” and should be covered properly.

Garbage and scrap material dumped on the canteen roof top in the campus



There needs to be a planned system for regular disposal of the scrapped materials on yearly basis. Time limit needs to be set to discard all the unnecessary materials. Lying debris, pipes, create unhygienic conditions and also support rodent population to grow in the campus.

A biomass digester of Capacity 10 Kg (1 Cubic meter), with gas output of 150- 250 gm/day, has been provided to the canteen manager, to convert the biodegradable food waste into biogas. This is a very good initiative taken by the management.



As suggested in previous audit, a Vermicomposting unit is installed in the campus in 2018, to take care of the biodegradable waste / biomass in the campus. Proper care and regular maintenance is done as per schedule.



Scheduled maintenance of vermicomposting unit.





Suggestions and recommendations –

- Material to be discarded must be stored in proper manner and must not cause visual pollution.
- A separate person needs to be assigned to take responsibility of discarding the waste – recyclable materials at regular intervals.
- There is potential to install one more compost unit, based on the observations made on availability of biomass in the campus

Health hazards/ Risk/ Safety Assessment and Emergency response:

To assess the safety factor few of the students, security staff, laboratory in charge were interviewed collecting information about accidents, fire incidents, short circuit, fire extinguishers, first aid kit, firefighting awareness and training etc.

All the departments are equipped with fire extinguishers and the attendee staff knows the use of fire extinguishers.

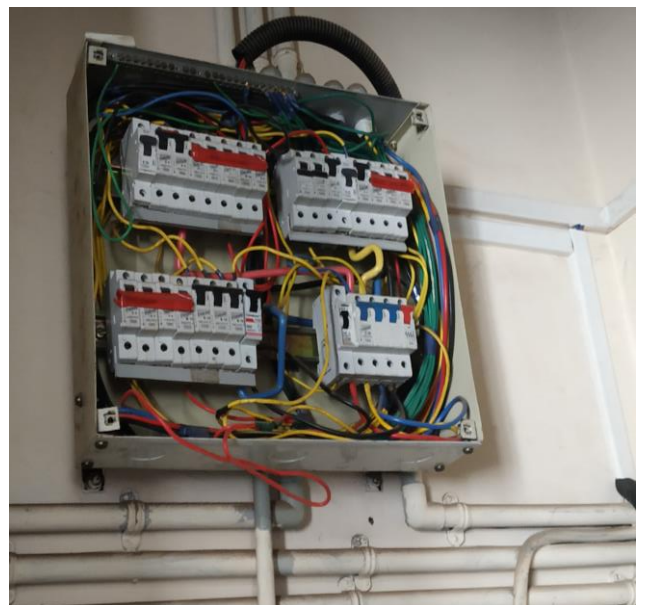
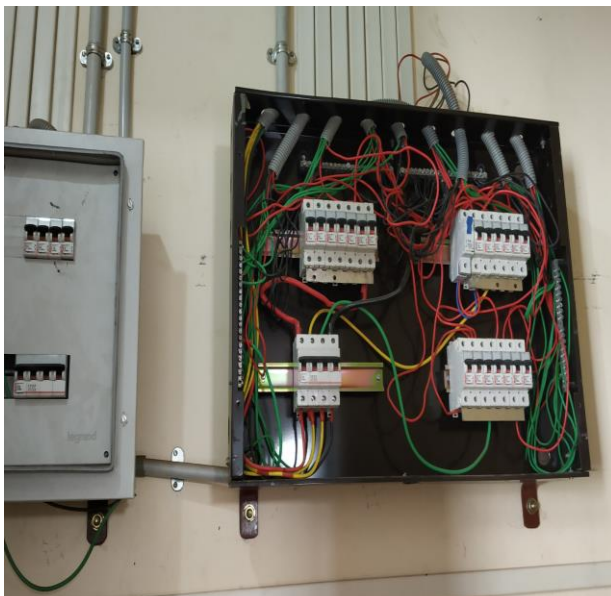
Till date there is no single fire accident recorded in the campus.

- **The First aid kit is available at Admin office, Library, Gym. And are regularly updated.**
- **Hand gloves or face masks are not used** by the cleaning and maintenance staff in the campus, which increases the probability of occupational health hazards, especially breathing issues and skin infections. This needs to be implemented immediately as the workers are involved in direct handling of the waste materials and cleanliness.
- **Workers are registered for ESI and health/accidental insurance facility.**
- Immediately closing openings of the overhead water tanks.
- Looking at the external appearance of the security staff, there physical fitness and ability to keep the campus secured is low.
- Security staff must undergo training related to safety, emergency protocol and should be able to protect the students and institutional property.
- Mock safety drills of securing – closing down entire or part of campus should be worked out every year to check process efficiency.
- Lightening arrester is installed on the roof top and is working properly

CCTV camera –

There are 16 CCTV cameras installed in the campus covering maximum area under use. The CCTV surveillance system is well equipped and stores the recorded footage. Two monitoring systems are installed, each in the Directors cabin and in the IT department.

Risk due to open electrical wiring – open wiring is observed only inside the battery / invertor rooms. which are to be considered as **high risk**, and must be enclosed immediately to avoid any incidents.



Fire extinguishers are installed at all key locations. A training session has been conducted for all staff members on the use of fire extinguishers installed in the campus.



**Fire extinguishers at key locations.
rooms in final stage**



Exhaust fans installation inside Inverter



Fire safety training using pressure water



An emergency **response system**/ protocol needs to be established, and this procedure needs to be practiced at least ones a year.

False alarms or incidents like fire, short circuits, in the campus building etc. need to be thought about and the process efficiency must be assessed.

Detailed design maps of the existing buildings must be available in office for supporting emergency services. Fortunately, such incidents have not occurred in past times, but the system must be prepared to handle any situation.

- Emergency response need to be practiced every year, by visualizing an emergency situation on different building floors, and the process of safe evacuation for all.
- Students must be an integral part of this process, as they need to be well aware of this system, which would help them in future at their work locations.
- Mock Safety drills shall be conducted ones a year.
- Basic Life support training session should be conducted for staff and students.

Paper and stationary consumption

Stationary/ Paper/Printing Expenses					
	2016	2017	2018	2019	2020
January	4632	45072	35528	28664	7120
February	14965	7359	4699	4258	30761
March	34135	9522	11549	28023	11898
April	25379	20200	3348	2275	11564
May	14334	21914	63146	12755	6044
June	74876	59404	5608	23501	48751
July	43522	34982	16622	35641	3983
August	10611	2606	3338	3954	3940
September	5802	8429	3555	7315	2596
October	5155	8541	8752	23092	4330
November	89356	21128	10139	9206	2600
December	53238	13457	13989	8471	8856
Total	376,005	252,614	180,273	187,155	142,443

IMER's efforts in reducing Paper and stationary consumption is evident from their recorded expenses for paper, stationary and printing, for last 5 years. Wherever possible online processes are followed to minimize consumption of paper. All payments are made online.

Resource conservation initiatives

Good initiatives have been implemented by the institute and staff members to reduce use of consumable items – paper, plastic etc. in the institution campus.

More strategic and planned efforts need to be taken to sensitize the students as well as staff members to conserve various resources, ultimately contributing to reduce the carbon emissions and our ecological footprint.

Steel coffee cups - small Steel cups have been provided at the coffee machine near the library on second floor, instead of the plastic use & through.

Internal Email system – internal email system is being created for discussions and dissemination of messages and notices to all staff members, so as to reduce the paper consumption.

Water tank sensors – Automatic sensor system has been installed at all major water storage tanks on the roof top, to avoid wastage of water due to overflow, and also to auto startup – stop the water pumps. This also helps in conserving energy.

Solar street lights – Solar street light are installed on the main entrance road and do not take energy from the power grid.

Solar PV Module – 70 KVA solar PV module is installed to generate electricity and become self-sufficient. Currently IMER is 75% self-reliant with respect to electricity needs.

Biogas plant - Recently the Institute has provided a biomass digester to the canteen manager, to convert the biodegradable food waste into biogas.

Staff awareness assessment:

A small self-designed exercise was undertaken for all staff members, to assess the environmental awareness, level of understanding, involvement in social- environmental cause, and sensitivities etc.

In total 12 members participated in the online assessment.

Male	9	75 %
Female	3	25 %

Staff members also assigned grades to the College campus based on the Cleanliness / hygiene, work environment, sanitation infrastructure, Drinking water facility.

Parameter	Bad	Good	Very good	Exceptional
Cleanliness and hygiene	0%	17%	63 %	20%
Safe work environment	0 %	0 %	50 %	50 %
sanitation infrastructure	0%	40 %	50 %	10 %
Drinking water facility	17 %	66 %	17 %	0%

Questions were asked to observe if staff members have tried or taking any social/ environmental / educational / conservation etc. initiatives inside or outside college campus.

- More than **50% of our staff members are involved** or related to at least one social or environmental conservation related. They spent dedicated time for well-being and development of the society.

Following are few programmes in which staff members are actively involved

- Swachata Hi Sewa Campaign, Swachta Pakhwada, Vidhya Adhar Project, Vermi Composting Processing Unit, IT literacy Camps in rural areas, Involved in Tree Plantation Camp etc.
- 90 % of staff members are also practicing waste garbage segregation at their homes.
- 75 % staff members have estimated their Individual / family carbon foot print values.

It is observed their annual carbon foot print in in the range of 0.51 tons of CO₂ equivalent to 1.9 tons of CO₂ equivalent. 80% staff have carbon foot print below Indian average, where as 20 % staff have more carbon foot print.

Following are the suggestions given by staff members to improve the work environment.

- Improving drinking water facility.
- Add more greenery at the corridors on every floor on the campus.
- Policy for Solid waste management.
- Making Campus a plastic free zone.
- Plantation of more trees
- Paperless documentation

Process sustainability - Green Policy

The institution needs to form a Green Committee to ensure the regular monitoring, sustainability and reduce the ecological footprint. The Green committee shall consist of 8- 10 members, headed by the Chairman, Director of the Institute, two male teaching staff members, two female teaching staff members, and two students (Boy & Girl), to implement environmentally and ecologically sensitive practices as a step towards reducing carbon footprint.

The fundamental outline of the Green Policy

As a public institution of higher education, KLS's IMER is committed to being a model of environmentally healthy and safe in our teaching, research, our partnerships with the community, and is currently in process of formulating its Environment Policy based on following 5 principles.

Continuous improvement - To enhance the environmental management system through checking, corrective action and annual top management review to achieve improvements in overall environmental performance.

Reduce, reuse, recycle - To use processes, practices, materials or products that avoid or reduce pollution, which may include process changes, efficient use of resources, material substitution and recycling.

Environmental compliance - To meet and where practical exceed all relevant current environmental laws and regulations.

Stewardship -To empower employees and students to identify significant environmental aspects of our activities, products, and services, and to implement programs with targets and objectives that protect the wellbeing of people and the ecosystem.

Training and education - To provide appropriate training to all employees and students to ensure competence and awareness of our environmental policies and procedures, the significant environmental impacts of their work or activities, their roles and responsibilities in support of our environmental management system.

Lists of some of the operational practices for moving toward sustainability.

- A green – environment policy need to be formulated and implemented for the IMER campus.
- Scrap material area need to be designated and discard plan to be created.
- There is potential to install additional compost pit in the campus for garden waste.
- A Policy decision need to be taken about utilization of the Aqua guard filtered water and completely discarding use of bottled water for any programmes.
- Environmental Coordinator- student or staff member should be appointed.
- Institutional Declaration of Commitment to Sustainability/Environmental Responsibility
- Orientation programs on environmental sustainability for faculty and students

Structured programmes are needed to increase environmental sensitivity, awareness and consciousness of all staff members and students resulting towards reducing our carbon emission and ecological footprint.

Clean and Green campus recognitions / awards

KLS IMER was felicitated at eduINDIA 2016 recently at India International Centre, New Delhi. Felicitations were owing to swachh campus initiatives undertaken on the campus. The Institute was one amongst very few Institutes to be honored pan India basis and second only in South India.

About 330 colleges participated in Campus Swachhata Challenge 2016. Various factors like Dry & Wet waste management measures, Water treatment, Rain water harvesting tapping renewable energy sources, creating paperless environment were taken into consideration.



IMER also received national level CLEAN & SMART CAMPUS AWARDS –2019, given by AICTE and TERRE Policy Center, for the best practices followed by the institution towards sustainability.



Beyond the campus environmental promotional activities

Swachata Pakhwada 2017 – KLS IMER organized 'Clean Campus Day', 'Green Campus Day' and 'Clean surrounding Day' under the banner, Centre for Ethics and Social Responsibility of our Institute as a part of “Swachhata Pakhwada” in the first week of September 2017



Centre for Ethics and Social Responsibility, KLS IMER Belagavi successfully organized awareness campaign on “Single use plastic and its impact on environment” on in October 2019. Students planned and executed the campaign covering various busy localities of Belagavi city namely, Shahapur, Khasbag, Bogarvaes, and other market places. The students prepared paper bags using old newspapers and distributed to shopkeepers, vegetable and fruit venders to encourage them not to use plastic bags. The students educated common citizens in that locality about how to make paper bags for their routine shopping.





Swachata Hi Sewa Campaign was successfully organized in October 2019



KLS IMER is the first management institute in Belgavi to implement CollPoll campus engagement mobile application. It is a new-age platform to allow real-time collaboration amongst different stakeholders like faculty, students and administrators. KLS IMER's CollPoll was launched on 20th February 2019.

This has also helped in reducing paper consumption.



Donating old newspapers - Students of IMER as part of the Extension Activity, collect old newspapers books, etc and regularly donate them to “Shantai Vridhasharm” to their Vidya Adhar Project every year. “Shantai Vridhasharm” Vidya Adhar Project appeals the students and parents to donate old newspapers, magazines, etc. The fund generated by selling the collected material is used to help the needy and poor students to continue with their education. Even the IMER’s library staff separately keeps stock of this old paper material for donation and up cycling.

Quantity of old Newspapers collected and donated

Year	Newspapers in KG
2017	300 kg
2018	>500 kg
2019	500 kg
2020	1000 kg

2017 Shantai Vidyadhar activity



2018 Shantai Vidyadhar activity



2019 Shantai Vidyadhar activity



2020 Shantai Vidyadhar activity



Annexure. Google Form

**IMER Campus Environment - Green Audit 2021.
Staff Awareness Assessment**

***Required**

Name : (Optional)-

Gender * Male Female Other

Age

Years of engagement with IMER Your answer

Work / Personal Environment

1)How would you grade your college campus with respect to Cleanliness / hygiene?

Bad / Good/ Very good / Exceptional

2) How safe is your college building / campus/ work environment?

Bad / Good/ Very good / Exceptional

3) How would rate the sanitation infrastructure in college campus?

Bad / Good/ Very good / Exceptional

4) What grade will you assign to the Drinking water facility provide?

Bad / Good/ Very good / Exceptional

5) Have you personally tried or taken any social/ environmental / sustainability / conservation etc. initiatives inside or outside college campus? If yes, please give details

6) Are you involved/helping /working/volunteering for any social/environmental /educational / developmental cause outside your work environment? if yes, please give details

7) How do you dispose waste generated at your home?

8) Have you ever estimated your personal / family Carbon Footprint? * YES / NO

9) Follow the link to calculate your Carbon Footprint and submit your answer below (open link in new tab) (only mention the Carbon footprint

value) www.climatecollectivepune.org/CPC/pgIndex.php

10) Would you like to give any suggestions to improve indoor & outdoor environment in IMER Campus (with respect to work environment/safety/cleanliness/ resource wastage etc)

Submit