GREEN, ENERGY, AND ENVIRONMENT AUDIT REPORT

SIR M VISVESVARAYA INSTITUTE OF TECHNOLOGY, BENGALURU

PREPARED BY
NISARGA CONSULTANTS,
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Green, Energy, and Environment Audit Report

Sir M Visvesvaraya Institute of Technology, Bengaluru

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GREEN AUDIT CERTIFICATE

This Certificate is Presented To

Sir M Visvesvaraya Institute of Technology, Bengaluru

Our team of Environmental Engineers have analyzed Green, Energy, and Environment practices followed by the Institution.

PRADEEP NAGAMALLI
B.E., M.TECH. (ENV. ENGG.)
NISARGA CONSULTANTS
DATE: 23.01.2023

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Energy Management Details

Energy Management:

Energy management is an important aspect in institutions. Saving of electric power is a major part to minimize the greenhouse gas emissions to the environment. This can be achieved by using 5 - star electrical appliances. Renewable energy can be harvested and be used in the campus.

Observations:

- Solar rooftop harvesting is being implemented in the campus. This is greater step towards clean and green energy for the campus.
- Solar panels have been installed on roof top. Energy generated from solar panels is used in college campus. Excess energy from solar panels is stored in the batteries and used. Details of the same are mentioned in the below table.
- LED bulbs have been used extensively in the campus. Migration to LED tube lights and bulbs has been done in order to save electrical energy.
- Labels, poster regarding energy saving have been put in the campus.
- Day light (Natural light) is the main source in the classrooms, staffrooms, library and so on. Infrastructure is very well planned to harness maximum natural light in all the places.

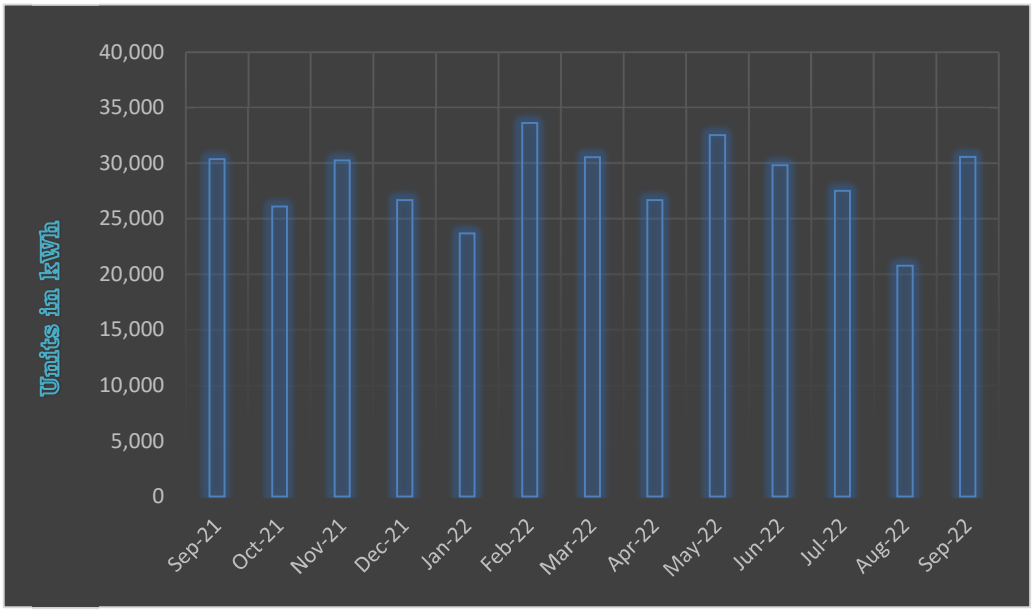
Recommendations:

- Best practices have already been implemented in the institution for optimum use of energy. More solar panels can be added to the roof for generation of renewable solar energy.

Electricity bill and Units consumed from Sept. 2021 to Sept. 2022.

Month	Sir MVIT College Buildings	
	Units in kWh	Amount in Rs.
Sept. 2021	30340	324334.00
Oct. 2021	26096	271597.00
Nov. 2021	30250	340315.00
Dec. 2021	26680	281741.00
Jan. 2022	23670	251848.00
Feb. 2022	33600	359184.00
Mar. 2022	30540	324640.00
Apr. 2022	26676	263025.00
May 2022	32510	345906.00
Jun. 2022	29810	327611.00
Jul. 2022	27525	302226.00
Aug. 2022	20770	229509.00
Sept. 2022	30570	349720.00

Energy usage patterns is the same throughout the year. Consumption is in the range of 26,000 units to 33,600 units a month.



Month wise electricity consumption in kWh

Details of Electrical and Electronic appliances

Sl. No.	Appliance	Numbers	Year of Purchase	5-star rating
1.	Computers (Desktops)	953	2006 to till date	80% of the appliances have 5-star energy savings rating
2.	Laptops	10	2010	
3.	Printers	84	2006 to till date	
4.	Copying machines	NA		
5.	Scanners	NA		
6.	Projectors	60		
7.	Refrigerators	06		
8.	Hot air ovens	02		
9.	Weighing balance	06		

New Computer Science Block

Ground floor

Room	LED/Tube lights	Ceiling Fans	Remarks
101	3	0	
102	4	0	
103	3	2	
104	12	8	
105	9	6	
106	9	6	
107	21	14	
108	6	4	
109	2	0	
110	9	6	
111	9	6	
112	15X2	7	
113	9	6	
114	3	2	
115	9	2	
116	20	15	
117			
118	9	6	

New Computer Science Block

Basement Floor

Room	LED/Tube lights	Ceiling Fans	Remarks
1	3		20 KVA UPS
2	3		
3	10	6	
4	3	2	
5	9	6	
6	9	6	
7	21	14	
8	6	4	
9	2	0	
10	6	4	20 KVA UPS
11	9	6	
12	10	9	
13	8	6	
14	3	1	
15	14	9	
16	5	4	
17	9	6	

New Computer Science Block

First Floor

Room	LED/Tube lights	Ceiling Fans	Remarks
201	3		10 KVA UPS
202	3		
203	12	7	
204	15	10	
205			
206	26	18	
207			
208	6	4	
209	3		
210	22	14	15 KVA UPS
211			
212	17	11	
213	15	10	
214	1		
215	12	8	
216	8	8	
217	9	6	
218	9	6	

New Computer Science Block

Second Floor

Room	LED/Tube lights	Ceiling Fans	Remarks
301	3	3	
302	4		
303	11	7	
304	15	10	
305	12	8	
306	14	10	
307	6	4	
308	3		
309	12	8	
310	12	7	
311	3	2	
312	3	2	
313	18	10	
314	9	6	
315	9	6	
316	3	2	
317	9	7	
318	9	6	
319	9	6	
320			

New Computer Science Block

Third Floor

Room	LED/Tube lights	Ceiling Fans	Remarks
401	2		
402	4		
403	3	2	
404	12	8	
405	9	6	
406	9	6	
407	9	6	
408	18	12	
409	3	1	
410	9	6	
411	9	6	
412			
413	9	5	
414			
415	9	6	
416	9	6	
417	3	2	
418	9	7	
419	9	6	
420	9	6	

First Block (Science Block)

Ground Floor

Room	LED/Tube lights	Ceiling Fans	Remarks
1	4	2	5 KVA UPS
2	6	3	Oven, Motos, Distill water equipment
3	4	2	Oven, motors
4	7	4	
5	7	2	
6	13	4	
7	1	1	
8	1		
9	2	2	
10	2	1	
11	3	1	
12	5	5	
13	2	1	Oven, Distill water equipment
14	8	4	

First Block (Science Block)

First floor

Room	LED/Tube lights	Ceiling Fans	Remarks
101			
102	6	3	
103	3	2	
104	4	2	
105	4	2	
106	4	2	
107	6	3	
108	2	1	
109	2	1	
110	6	3	
111	3	2	
112	9	4	
113	10	6	
114			
115	9	3	

First Block (Science Block)

Second Floor

Room	LED/Tube lights	Ceiling Fans	Remarks
201	2	1	10 KVA UPS
202	4	5	
203	8	7	
204	8	7	
205	4	5	
206	1		
207	4	4	
208	6	7	
209	4	4	
210	8	10	
211	6	2	

Second Block (Mechanical Dept.)

Ground Floor

Room	LED/Tube lights	Ceiling Fans	Remarks
1	2	2	
2	8	4	
3	6	3	
4	8	4	
5	9	6	15 KVA UPS
6	1		
7	1		
8	6	3	
9	4	2	
10	4	2	
11	4	2	
12	4	2	
13	3	2	
14	3	1	

Second Block (Mechanical Dept.)

First floor

Room	LED/Tube lights	Ceiling Fans	Remarks
101	15	6	
102	4	2	
103	4	2	
104	6	2	
105			
106	2	1	
107			
108	2	1	
109			
110	8	2	
111	16	3	
112	10	8	
113	4	2	

Second Block (Mechanical Dept.)

Second Floor

Room	LED/Tube lights	Ceiling Fans	Remarks
201	4	2	
202	8	9	
203	4	5	
204	4	5	
205	11	3	
206	1		
207	2	1	
208	4	2	
209	3	5	
210	11	12	
211	4	2	

Mechanical Workshop

Room	LED/Tube lights	Ceiling Fans	Remarks
Workshop	28		3 KW Lathes, 3HP motor, grinding, plaining, drilling, hacksaw, grinder
Carpenter	22		
Thermal lab	30		
Transport office		1	
Auditorium	27	23	
DG Room	5		
Pannel room	4	1	

MBA, MCA, Biotechnology Block

Ground Floor (MBA)

Room	LED/Tube lights	Ceiling Fans	Remarks
1	1	1	
2	2	1	
3	4	3	
4	6	5	
5	6	5	
6	6	5	
7	1	1	
8	2	2	
9	1	0	
10	18	11	
11	1	1	
12	3	5	
13	2	1	
13 (A)	1	1	
14	5	5	
15	2	1	
16	2	1	

MBA, MCA, Biotechnology Block

First Floor (MCA)

Room	LED/Tube lights	Ceiling Fans	Remarks
101	6	5	
102	6	5	
103	1	1	
104	2	1	
105	25	13	15 KVA UPS
106			
107	1	1	
108	6	8	
109	1	1	
110	6	4	
111	1	3	
112	1	1	
113	4	2	
114	2	1	
115	3	1	
116	5	3	
117	6	5	

MBA, MCA, Biotechnology Block

Second Floor (Biotechnology)

Room	LED/Tube lights	Ceiling Fans	Remarks
201	6	5	
202	6	5	
203	6	5	10 KVA UPS
204	14	3	
205	48	4	
206	3	2	
207	1	1	
208	8	8	
209	2	2	
210	8	5	
211	4	2	
212	4	2	
213	3	2	
214	3	3	
215	8	6	

Library

Room	LED/Tube lights	Ceiling Fans	Remarks
Internet Lab	8		5 KVA UPS
TV room	4	4	
Reference section	23	7	
Book issue	32	7	2.5 KVA, 5KVA UPS
Extended ref. unit	60	32	

Hydraulics

Room	LED/Tube lights	Ceiling Fans	Remarks
Lab 1	16	4	0.5 HP, 5 HP, 2 HP, 15 Hp, 20 HP motors
Lab 2	8		1 HP, 0.25 HP motors, oven

Third Block (Electrical and Civil Engineering)

Ground Floor (Dept. of Electrical Engineering)

Room	LED/Tube lights	Ceiling Fans	Remarks
1	6	3	
2	20	9	
3	2		
4			
5	1	1	15 KVA UPS
6	10	4	
7	6	3	
8	4	3	
9	9	3	

First Floor (Dept. of Electrical Engineering)

Room	LED/Tube lights	Ceiling Fans	Remarks
101	5	3	
102	6	5	
103			
104	12	6	
105	4	2	
106	4	2	
107	1	1	
108	8	6	
109	3	2	
110	4	2	
111	5	5	
112	2	2	

Third Block (Electrical and Civil Engineering)

Second Floor (Dept. of Civil Engineering)

Room	LED/Tube lights	Ceiling Fans	Remarks
201	4	2	
202	10	7	
203	4	4	
204	6	5	
205	2	1	
206	2	1	
207	2	2	
208	4	4	
209	4	2	
210	4	2	
211	4	2	
212	12	6	10 KVA UPS
213	5	4	
214	2	1	

Third Block (Electrical and Civil Engineering)

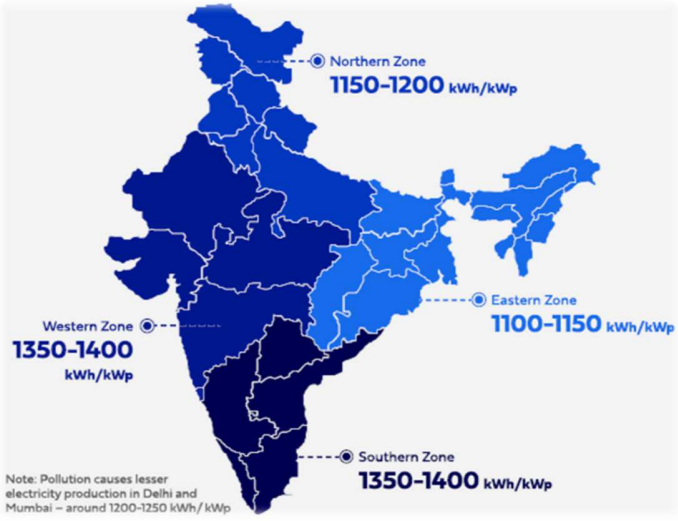
Third Floor (Dept. of Civil Engineering)

Room	LED/Tube lights	Ceiling Fans	Remarks
301	2	1	
302		1	
303	6	3	
304	6	3	
305		1	

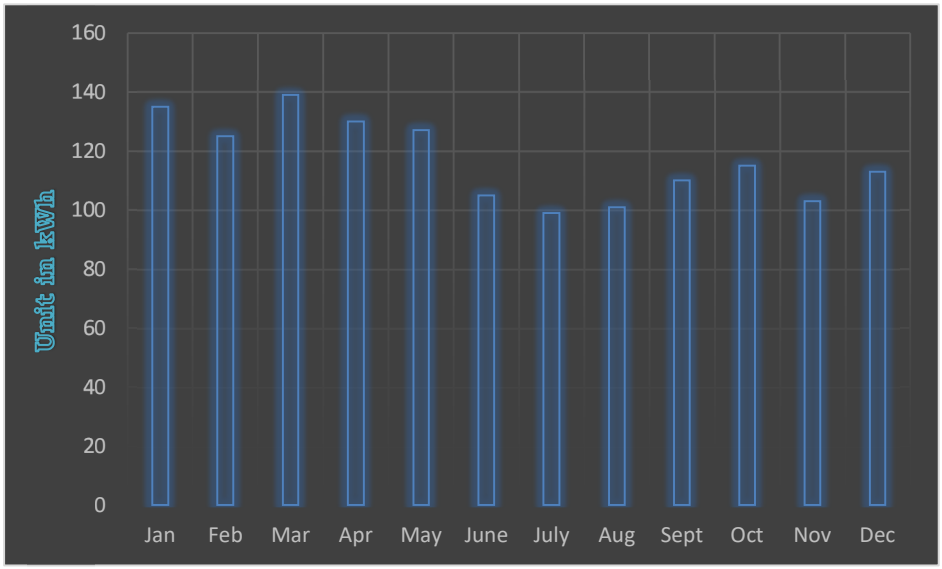
Clean energy generation using solar panels:

A solar panel is a device that converts sunlight into electricity by using photovoltaic (PV) cells. PV cells are made of materials that generate electrons when exposed to light. The electrons flow through a circuit and produce direct current (DC) electricity, which can be used to power various devices or be stored in batteries. Solar panels are also known as solar cell panels, solar electric panels, or PV modules.

India has enormous potential for solar energy. The country receives an average of 300 sunny days per year, making it an ideal location for solar energy production. According to the National Institute of Solar Energy, India has the potential to generate up to 750 GW of solar energy, which is more than enough to meet the country's energy needs. Additionally, India has a large area of land that is suitable for solar power plants, with the states of Rajasthan, Gujarat, and Tamil Nadu being particularly well-suited for solar energy production.

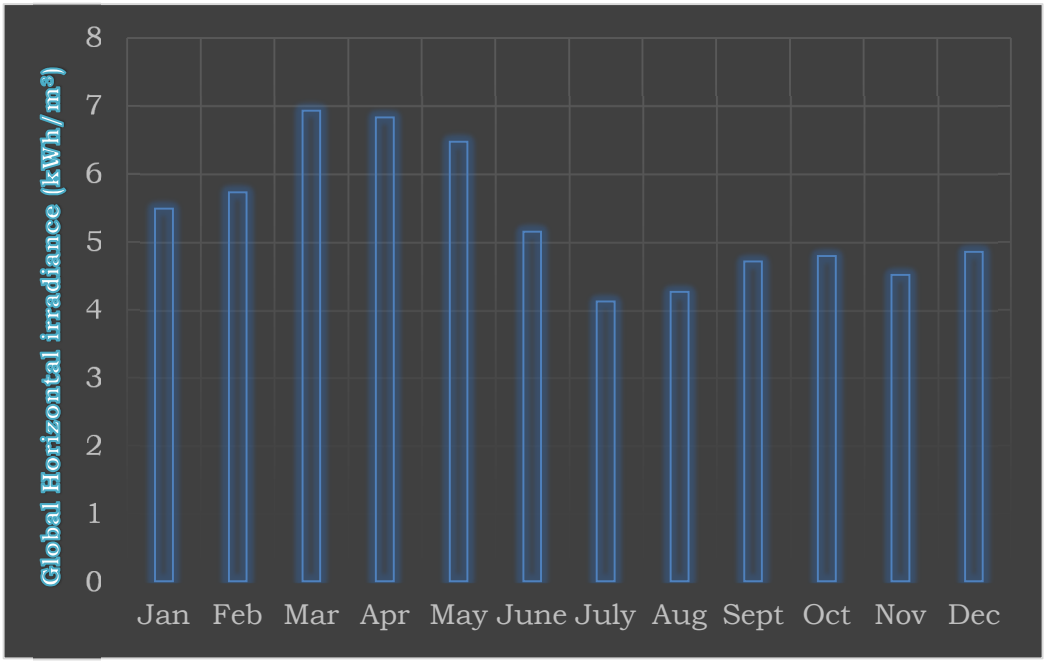


Average solar energy generation per year in different parts of India



Month wise solar power generation per kW in India (Approx.)

(Ref.: www.solarsquare.in)



Monthly average daily solar radiation over Bengaluru, Karnataka

(Ref.: Solar Radiation Resource Assessment, Solar Radiation DPR, Karnataka Renewable Energy Devolvement Ltd.)

Details of Solar power panels at Sir M Visvesvaraya Institute of Technology

Solar power panels installed on Sir M Visvesvaraya Institute of Technology new computer science block roof top are of 10 kW capacity. These panels produce 10 units of electricity during its peak production i.e., during afternoons (12:00 noon to 1:30 pm). At Bengaluru these panels produce 1400 units (Approx.) per 1 kW capacity in one year (considering seasonal variations). So 10kW produces 10 X 1400 units = 14000 units of electricity every year.

Basic information regarding power supply and its management at Sir M Visvesvaraya Institute of Technology, Bengaluru.

Sl. No.	Parameters	Response
1.	Source of electricity. BESCOM/Solar panels	BESCOM and Solar panels
2.	If Solar, Type of Solar system (On Grid/Off Grid/Hybrid)	Off grid
3.	No. of Solar Panels	44
4.	Power generation capacity of Solar Panels	10 KW
5.	Energy utilization	In the campus

Details of 10KW solar power plant installed at Sir M Visvesvaraya Institute of Technology, Bengaluru.

Sl. No.	Particulars	Description
1	Date of supply of system	06.07.2015
2	Details of PV Module installed Make Model Wattage of PV module under STC Warranty up to	 DSSPL 20 V/230W 20V/230 WP X 44 nos. 10 years
3	Details of Batteries installed Make Model Rated V & Capacity Warranty up to	 Quanta 120V / 400Ah 2V/400Ah X 60 nos. 5 years
4	Details of Electronics Make Model Serial No Warranty up to	 DSSPL AJB Box string inverter 10 KW/ 3 Phase 20151600033790 5 years

Solar panels have been placed on the rooftop to convert solar energy into electrical energy

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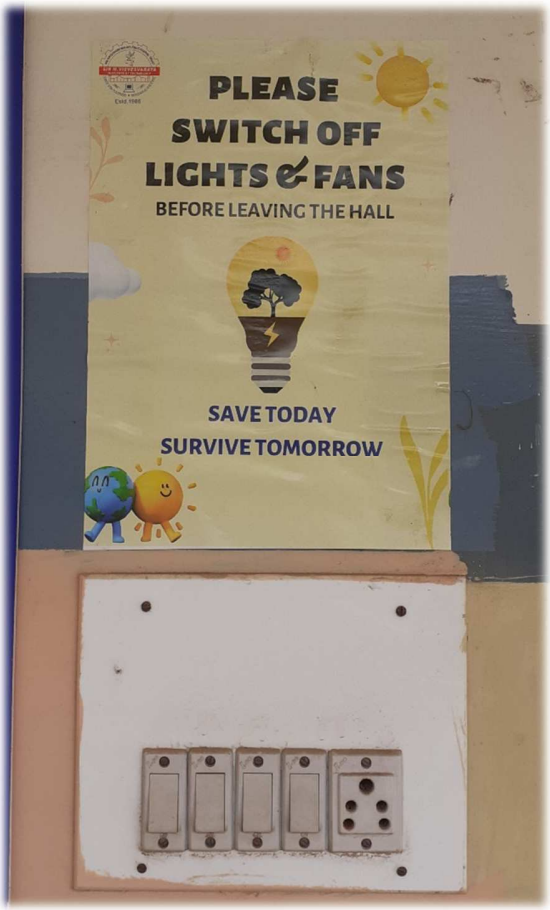
Diesel Generator (alternate source) during power cut



Posters about 'Save Energy' have been placed in classrooms

EV (Electric Vehicles) Charging Stations

A step towards sustainability and Green Initiative, Sir MVIT promotes use of EV's in the campus. The institute has made charging points for Electric Vehicles.