

Senergy Consultants Pvt Ltd

Ref: SCPL-PR-653-170519  
Date: May 17, 2019

Green Audit Report  
Shailendra Education Society's Arts, Commerce and Science College

## Report

On

## GREEN AUDIT

For

**Shailendra Education Society's Arts, Commerce and Science  
College, Dahisar  
Mumbai**

Prepared

By

**Senergy Consultants Pvt Ltd  
Mumbai**

May 2019



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*B. Patil*

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**Principal  
Shailendra Education Society's  
Arts, Commerce & Science College  
Dahisar (E), Mumbai - 400 068**

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## I Introduction

Green Audit was undertaken at Shailendra Degree College, Dahisar, Mumbai, during the month of May 2019.

The organization is very keen to promote green culture wherever possible, as a commitment towards better environment and conservation of energy. To further optimize consumption and identify saving opportunities, M/s Senergy Consultant Private Limited was assigned to carry out Green Audit of the premises.

This Audit Report presents the analysis of the data collected, observations made at the facility and is governed by the objectives, scope of work, methodology etc. discussed in the ensuing paragraphs.

### Team:

The team members of the audit study.

- Mr. Ravindra Datar
- Mr. Umesh Phatakare
- Mr. Chirag Patel

### Instruments:

The following instruments were utilized for measurement during the energy audit study.

1. Power Analyzer
2. Hygro-temp meter
3. Vane Type Anemometer
4. Hot Wire Anemometer
5. Lux meter
6. Environmental meter
7. Measuring Tape

### Acknowledgment:

We would like to express our gratitude towards Dr. Swati Pitale and Prof. Sony Paul for given us the opportunity for conducting the study and the support provided during the study.

We are also thankful to the entire team for extending the necessary help and co-operation from their side.



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## II Executive Summary

The premises were evaluated against the various criteria laid down by the National Assessment and Accreditation Council (NAAC). The major observations are

1. Lighting & Ventilation
  - a. Energy efficient light fittings have been installed at all of the places.
  - b. Illumination level is within the norm, but for the few places where it is marginally lower than the standard level.
  - c. The ventilation is adequate, and the carbon dioxide as well as the Volatile Organic Matter contents are within a limit for all the classrooms and other premises.
  - d. The possibility of replacing the fans with high efficiency fans may be ascertained; especially while making new purchases.
  - e. The fans & lights are switched off when not in use.
2. Water Quality & Conservation
  - a. The water supplied by the Municipal Corporation is used for drinking after purification
  - b. Water Purifier is provided at convenient locations.
  - c. The specific water consumption is higher than nominal range.
3. Waste Management
  - a. The generation of waste is minimized through use of electronic communication and effective water management system.
  - b. The wastewater is disposed of through Municipal system; this is a common practice in Mumbai city area.
  - c. The solid waste is segregated; while organic waste is converted in to manure in a composting pit, the non-organic waste is disposed of through the Municipal system.
4. Infrastructure usage
  - a. Movement on-campus is distributed with multiple entrances.
  - b. The adequate parking space is available and provisions for bike parking are made for staff and students. However, many prefer public transport due proximity to bus stops / station.
  - c. There are adequate fire extinguishers located in key areas.
  - d. The draining system for washrooms is efficient and effective.
  - e. Seepages were not observed in the building premises.
5. Green IT culture
  - a. Energy efficient computers and monitors have been procured.
  - b. In most of the cases, the computers are switched off, when not in use.
  - c. Energy efficient air conditioners with higher star rating have been procured during recent purchases.
  - d. The air conditioners are switched off, when not in use.
  - e. The performance of the air conditioners was observed to satisfactory.
  - f. Electronic communication is encouraged to minimize usage of papers.
  - g. Most of the papers are reused for doubled sided printing.



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6. Renewable Energy
  - a. Roof-top Solar Panels have been installed since 2018

**Potential Saving Area:**

At this stage there is no major saving expected, however the savings has been achieved by installing LED lights and Solar Photovoltaic.



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### III

## Electrical System & Bill

#### Electricity Bill

The electricity for the entire premises is supplied by Adani Power and Reliance Energy low tension (LT) connection. The details of energy consumption with costs are as under.

Consumer Name - Shailendra Degree College, Dahisar							
Consumer No. - 100295862							
Category - LT IX B				Contract Demand-38.75 KVA			
Meter No.-9078590				Cycle No.- 37			
Description	Unit	Jun-18	Aug-18	Dec-18	Jan-19	Feb-19	Average
Consumption	KWH	2304	2004	811	532	325	1195.20
Maximum Demand	KVA	22.68	18.06	12.92	12.1	13.7	15.89
Power Factor (PF)		0.989	0.997	0.999	0.999	0.968	0.99
PF Penalty/Incentives	Rs	1044	1262	273	184	34	559.31
Penalty Demand	Rs	0	0	0	0	0	0.00
Energy Charges	Rs	13824	12024	5231	3431	2096	7321.30
Bill Amount	Rs	24780	21040	9340	6330	4140	13126.00
Cost	Rs/KWH	10.8	10.5	11.5	11.9	12.7	11.0

Consumer Name - Shailendra Degree College, Dahisar							
Consumer No. - 100295862							
Category - LT I B				Contract Demand - NA			
Meter No.- 7764931				Cycle No.- 03			
Description	Unit	Dec-17	Feb-18	Mar-18	Jun-18	Aug-18	Average
Consumption	KWH	539	172	484	2304	2004	1100.60
Maximum Demand	KVA	NA	NA	NA	22.68	18.06	20.37
Power Factor (PF)		NA	NA	NA	0.989	0.997	0.99
PF Penalty/Incentives	Rs	NA	NA	NA	1044	1262	1153.22
Penalty Demand	Rs	NA	NA	NA	0	0	0.00
Energy Charges	Rs	2965.4	579	2521	13824	12024	6382.68
Bill Amount	Rs	5190	1300	4350	24780	21040	11332.00
Cost	Rs/KWH	9.6	7.6	9.0	10.8	10.5	10.3



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Consumer Name - Shailendra Degree College, Dahisar								
Consumer No. - 100261947								
Category - LT II A			Contract Demand-51 KVA					
Meter No.- 7665757			Cycle No.- 03					
Description	Unit	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	Mar-19	Average
Consumption	KWH	2804	2326	2656	2881	3194	107	2772.20
Maximum Demand	KVA	NA	NA	NA	NA	NA	NA	NA
Power Factor (PF)		NA	NA	NA	NA	NA	NA	NA
PF Penalty/Incentives	Rs	NA	NA	NA	NA	NA	NA	NA
Penalty Demand	Rs	NA	NA	NA	NA	NA	NA	NA
Energy Charges	Rs	19067.2		18061	19591	21820	733	19634.79
Bill Amount	Rs	33680		33000	34250	39260	630	35047.50
Cost	Rs/KWH	12.0		12.4	11.9	12.3	5.9	12.6

**Contract Demand:**

The billed demand of Meter No-9078590, meter no-7764931 and Meter No-7665757 is within the contract demand of 38.75 kVA and 51 kVA respectively. Therefore, no penalty demand has been levied.

**Power Factor:**

The power factor was observed to be around unity for meter no-9078590, meter no-7764931 and meter no-7665757 for most of the period.

The incentive is paid on the entire current bill amount including charges for energy, maximum demand, fuel adjustment charges (FAC) and reliability charges but excluding taxes and duties.



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Light fittings:

Location	Operation		LED 36W		LED 22W		LED 25W	
	Hr/D	D/M	F	W	F	W	F	W
<b>First Floor</b>								
M.Com Office	8	25	0	0	1	1	2	2
Staff Room + Gymkhana + College Office	8	25	0	0	7	7	0	0
IQAC Room (principal office)	8	25	0	0	4	4	0	0
Boys Common Room	0	25	0	0	0	0	0	0
Computer Lab-3	6	25	0	0	4	4	0	0
DG Samant Hall	4	25	0	0	29	29	0	0
Advance Lab	8	25	0	0	0	0	6	6
<b>Second Floor</b>								
Room No 201	8	25	0	0	4	4	0	0
Room No 202 Students Council	8	25	0	0	1	1	0	0
Room No 203	8	25	0	0	6	6	0	0
Room No 204	8	25	0	0	8	8	0	0
Room No 205	8	25	0	0	3	3	0	0
Room No 208	8	25	0	0	3	3	0	0
Room No 209	8	25	0	0	4	3	0	0
Room No 210	8	25	0	0	5	0	0	0
<b>Third Floor</b>								
Room No 301	8	25	0	0	4	4	0	0
Room No 302 NSS Room	8	25	0	0	2	2	0	0
Room No 303	8	25	0	0	6	6	0	0
Room No 304	8	25	0	0	7	7	0	0
Room No 305 LCR	8	25	0	0	2	2	0	0
<b>Fourth Floor</b>								
Room No 401	8	25	0	0	4	4	0	0
Room No 402	8	25	0	0	4	4	0	0
Room No 403 Co-ordinator Room	8	25	0	0	2	2	0	0
Library	8	25	13	13	0	0	18	18
Room No 408	8	25	0	0	4	4	0	0
<b>Fifth Floor</b>								
Room No 504	8	25	0	0	5	5	0	0
Room No 508	8	25	0	0	4	4	0	0
Room No 509	8	25	0	0	4	4	0	0
Room No 510	8	25	0	0	4	4	0	0
BSCIT Lab-4	8	25	0	0	7	7	0	0
<b>Total</b>			13	13	138	132	26	26

F: fitted  
W: Working



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**LED Lamps:**

All the light fittings have been replaced with LED lights.



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The power consumption of some of the gadgets is as under.

Sr No	Description	Operation		Voltage V	Current A	Power Kw	Power Factor
		Hr/Day	Day/Year				
<b>Computers</b>							
<b>Research Center 4th Floor</b>							
1	PC-01	6	280	241.5	0.11	0.01	0.53
2	PC-02	6	280	242.3	0.12	0.02	0.57
3	PC-03	6	280	242.2	0.12	0.02	0.59
<b>UGC Center 4th Floor</b>							
4	PC-02	8	280	242.2	0.43	0.08	0.73
5	PC-06	8	280	241.9	0.33	0.06	0.71
<b>BSCIT Lab 5th Floor</b>							
6	PC-05	8	280	243.2	0.22	0.04	0.69
7	PC-09	8	280	243.4	0.18	0.03	0.59
8	PC-14	8	280	244.2	0.32	0.05	0.65
9	PC-18	8	280	244.0	0.15	0.03	0.81
10	PC-22	8	280	243.4	0.23	0.04	0.70
<b>Exam Room 2nd Floor</b>							
11	PC-01	8	280	243.6	0.42	0.09	0.85
12	PC-03	8	280	244.0	0.39	0.07	0.78
<b>Computer Lab-3 1st Floor</b>							
13	PC-20	8	280	238.9	0.17	0.04	0.82
14	PC-25	8	280	238.3	0.25	0.05	0.85
15	PC-16	8	280	239.4	0.40	0.09	0.89
16	PC-10	8	280	238.1	0.42	0.09	0.90
17	PC-4	8	280	238.4	0.22	0.04	0.82
<b>Copying Machine</b>							
18	2st Floor	5	280	243.9	0.55	0.09	0.70
19	1st Floor	6	280	237.0	2.21	0.52	0.99
<b>Water Cooler</b>							
20	Canteen Water Cooler	8	280	237.8	3.92	0.87	0.94
<b>Air Conditioners</b>							
21	Research Center 4th Floor	6	280	232.0	6.33	1.43	0.97
22	Co-ordinator Room 4th Floor	8	280	238.8	5.94	1.03	0.59
23	UGC Room 4th Floor	8	280	238.8	4.31	1.10	0.99
24	BSCIT Lab-4 5th Floor	6	280	236.3	12.69	2.94	0.99
25	Exam Room 2nd Floor	6	280	238.8	7.03	1.65	0.99
26	Junior College Library	6	280	237.6	4.40	1.03	0.98

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## Fan Fittings:

Location	Rating	Quantity	Operation	
	W	No	Hr/Day	Days/Year
<b>First Floor</b>				
M.Com Office	60	1	4	280
Staff Room + Gymkhana + College Office	60	7	8	280
IQAC Room (principal office)	60	1	4	280
Boys Common Room	0	0	0	0
Computer Lab-3	0	0	0	0
DG Samant Hall	60	18	4	280
Advance Lab	0	0	0	0
<b>Second Floor</b>				
Room No 201	60	5	8	280
Room No 202 Students Council	60	1	1	280
Room No 203	60	8	8	280
Room No 204	60	9	8	280
Room No 205	60	3	8	280
Room No 208	60	4	8	280
Room No 209	60	4	8	280
Room No 210	60	5	8	280
<b>Third Floor</b>				
Room No 301	60	4	8	280
Room No 302 NSS Room	60	1	5	280
Room No 303	60	12	8	280
Room No 304	60	10	8	280
Room No 305 LCR	40	2	8	280
<b>Fourth Floor</b>				
Room No 401	60	4	8	280
Room No 402	60	4	8	280
Room No 403 Co-ordinator Room	60	2	8	280
Library	40	17	8	280
MPSC Room	0	0	0	0
Room No 408	60	5	8	280
<b>Fifth Floor</b>				
Room No 504	60	7	8	280
Room No 508	60	5	8	280
Room No 509	60	4	8	280
Room No 510	60	4	8	280
BSCIT Lab-4	0	0	0	0



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**Opportunity for Conservation of energy:**

**Energy Efficient Fans:**

The possibility of replacing the fans with energy efficient new fans may be evaluated. These fans can save 50 to 60% energy while delivering similar air flows.

The expected saving works out to about Rs 700/- per year per fan.

The investment shall be in the range of Rs 3,500/- per fan; giving a payback period of 60.0 months

The installation of energy efficient fans may be considered for new purchases.



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## IV Energy Management & Efficiency

### Illumination & Lighting

The illumination level was measured at various locations; the details are as under.

Location	Illumination Level (Lux)		
	Minimum	Maximum	Average
<b>1st Floor</b>			
DG Samant Hall	35	97	70
Principal Office	85	192	134
Room No 101 Computer Lab 3	77	141	106
Room No 102 Advance Lab	78	323	162
Room No 103 Collage Office	96	370	195
Room No 110 AV Room	40	159	93
<b>Second Floor</b>			
Room No 201	160	404	266
Room No 202	93	113	103
Room No 203	120	430	271
Room No 204	155	370	260
Room No 205	77	207	124
Room No 208	98	194	147
Room No 209	113	519	250
Room No 210	126	279	175
<b>Third Floor</b>			
Room No 301	180	290	220
Room No 302 NSS Room	113	363	196
Room No 303	77	300	182
Room No 304	85	265	170
Room No 305 Ladies Common Room	45	179	124
<b>Fourth Floor</b>			
Jr Collage Library	75	350	175
Library	226	407	347
Room No 401	95	254	156
Room No 402	101	264	176
Room No 403- Co-ordinator	85	201	148
Room No 407	75	155	115
Room No 408	77	218	175

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Location	Illumination Level (Lux)		
	Minimum	Maximum	Average
<b>Fifth Floor</b>			
Computer Lab 3	45	102	87
Room No 504	155	245	200
Room No 508	238	534	344
Room No 509	122	268	193
Room No 510	130	445	260

**Observations:**

- The illumination level is generally as per the norms; however, illumination level is low at some places.
- The lamps should be strategically located to optimize usage of day light.
- The use of daylight has been maximized through windows.
- The practice of switching off the lamps in the unoccupied areas has been followed.
- There is no major improvements/saving potential in this area.
- It is not economical to provide occupancy sensors for the class rooms due to lesser light fitting and practice of switching off the lamps during the unoccupied area.



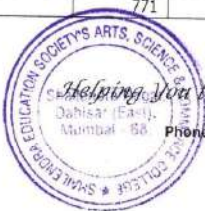
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**Ventilation & Air Quality:**

The air quality was checked by measuring carbon dioxide & VOC contents at various locations in the class rooms as well as administrative areas. The details are as under.

Location	Carbon Dioxide (PPM)			VOC		
	Minimum	Maximum	Average	Minimum	Maximum	Average
<b>1st Floor</b>						
Room No 103 Collage Office	434	450	442	119	125	122
Room No 101 Computer Lab 3	427	450	439	114	125	120
Room No 102 Advance Lab	429	450	440	119	125	122
Principal Office	412	450	431	109	125	117
Room No 110 AV Room	482	501	492	131	140	136
DG Samant Hall	456	470	463	122	131	127
<b>2nd floor</b>						
Room No 208	613	635	624	149	158	154
Room No 209	458	471	465	121	128	125
Room No 210	468	495	482	126	138	132
Room No 201	498	519	509	138	147	143
Room No 202	763	797	780	199	220	210
Room No 203	429	450	440	112	125	119
Room No 204	579	607	593	158	170	164
Room No 205	441	450	446	108	125	117
<b>3rd Floor</b>						
Room No 301	440	450	445	116	125	121
Room No 303	436	450	443	110	125	118
Room No 304	578	600	589	152	167	160
Room No 302 NSS Room	429	450	440	106	125	116
Room No 305 Ladies Common Room	845	876	861	229	242	236
<b>4th Floor</b>						
Library	845	846	846	162	178	170
Room No 402	521	535	528	118	127	123
Room No 401	522	536	529	120	129	125
Room No 408	427	450	439	131	144	138
Room No 403- Co-ordinator	419	450	435	146	156	151
Room No 407	472	500	486	153	161	157
Jr Collage Library	510	528	519	148	157	153
<b>5th Floor</b>						
Room No 504	443	450	447	116	125	121
Room No 508	538	554	546	142	154	148
Room No 509	427	450	439	108	125	117
Room No 510	569	586	578	149	165	157
Computer lab	771	789	780	532	547	540



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**Observations:**

- The carbon dioxide and VOC level is within the limit at most of the places. The standard norm is to maintain the carbon dioxide level below 1000 ppm & VOC level below 400 ppb.



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## V Water Management

**Consumption Pattern:**

The water supplied by the municipal corporation is used for drinking & other applications like toilets, washing of utensils and other requirements. The incoming water from the municipal corporation is metered.

The consumption pattern was analyzed by the water bills. The details are as under.

Connection No- RN@0004156				
Period	Days	Consumption	Bill Amount	Cost
		KL	Rs	Rs/KL
19/09/17 to 19/12/17	91	2022	17533.00	8.67
19/12/17 to 19/03/18	90	2156	17996.00	8.35
19/03/18 to 20/06/18	93	1613	13850.00	8.59
20/06/18 to 21/09/18	93	2049	18269.00	8.92
21/09/18 to 20/12/18	90	1983	17889.00	9.02

Connection No- RNE9170004				
Period	Days	Consumption	Bill Amount	Cost
		KL	Rs	Rs/KL
19/09/17 to 19/12/17	91	233	2025.00	8.69
19/12/17 to 19/03/18	90	230	1958.00	8.51
19/03/18 to 20/06/18	93	238	2224.00	9.34
20/06/18 to 21/09/18	93	238	2254.00	9.47
21/09/18 to 20/12/18	90	230	2036.00	8.85

**Specific Water Consumption:**

The specific water consumption details are as under.

Period	Days	Consumption	Total No. Of Person	Water Consumption
		KL		L/Person/Day
19/09/17 to 19/12/17	91	2255	1392	17.80
19/12/17 to 19/03/18	90	2386	1392	19.05
19/03/18 to 20/06/18	93	1851	1392	14.30
20/06/18 to 21/09/18	93	2287	1392	17.67
21/09/18 to 20/12/18	90	2213	1392	17.66

There are around 1326 students and 66 teaching & non-teaching staff and other Visitor members.

The specific water consumption is higher than nominal range against the typical values of 6 to 8 Liters per person.

The possibility of providing low flow taps/dushing system at major locations may also be evaluated.

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**Water Purifiers:**

The water purifiers are installed within the premises floor wise and bottled water is not used in the campus. As such quality of municipal water is quite satisfactory.

**Rain Water Harvesting:**

The rainwater harvesting has not implemented in the premises.



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## VI Waste Generation & Management

### Sewage & Waste Water:

The sewage is fed in to the municipal drainage. This is a common practice and the municipal corporation which charges less towards the sewage charges.

### Solid Waste:

The organic, as well as inorganic waste, is segregated in the college premises. The organic waste is used to generate manure by composting. The non-organic waste is collected in garbage bins and disposed of through Municipal system.

### E-Waste:

Electronic waste donation has not been implemented yet for E-waste Management Organization.



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## VII Infrastructure & Safety

### Movement on-campus (Distributed / non-distributed leading to crowds)

The premises are provided with multiple entrances to ensure quick and effective movement in normal as well as emergency conditions.

### Parking space:

The adequate parking space is available and provisions for bike parking are made for staff and student. However, many prefer public transport due proximity to bus stops / station.

### Fire-fighting & fire escape system:

The fire extinguishers have been installed at various places in the premises & Laboratories; which are checked/refilled as per the stipulated frequency.

The premise is provided with requisite entrances to ensure quick and effective movement in emergency conditions.

### Draining system:

The drains from the washrooms are connected to the municipal drainage; which is a common practice in the colleges in Maharashtra.

The municipal corporation charges cess for water disposal.

### Seepage in the building:

The premise was visually inspected for seepages.

Seepages were not observed in the building premises.



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## VIII Air Conditioners

Air conditioning system is basically provided to maintain comfortable ambience inside the premises by maintaining the temperature (and relative humidity, at times) at appropriate levels. The performance of human being is optimal at the temperature of  $24 \pm 2^\circ\text{C}$  and at relative humidity (RH) of  $60 \pm 5\%$ .

The warmer and humid air from the premises is drawn and fed to the Air Conditioning System by a circulating fan. This air is chilled in an evaporator by vaporizing the refrigerant and is distributed throughout the conditioned area. The refrigerant is pressurized by a compressor and subsequently cooled and condensed by an air-cooled condenser. The compressor and condenser are placed in an outdoor unit, located on the external side of the premise. While the circulating fan and evaporator are placed in an indoor unit located inside the premises.

### Performance:

The performance as well as chilling (or Air Conditioning) effect delivered by the air conditioner (represented as TR – Ton of Refrigeration) is computed by measuring

- Air Velocity along with the cross-sectional area of flow to determine the flow rate and subsequently mass flow rate.
- Temperature and relative humidity of the air at the inlet of the evaporator coil to determine the enthalpy of the air.
- Temperature and relative humidity of the air at the outlet of the evaporator coil to determine the enthalpy of the air.
- Power drawn by the air conditioning unit

The chilling effect can be computed as under,

Flow Rate of Air (kg/hr)  
= Average Air velocity (M/s) x Cross sectional area of the air flow ( $\text{M}^2$ ) x Specific Gravity of Air

Chilling or Air Conditioning Effect (TR)  
= Air flow rate (kg/hr) x Enthalpy difference between the air at inlet & outlet of the evaporator coil (kJ/kg) / ( $4.18 \times 3024$ )

Chilling or Air Conditioning Effect (kW)  
= Air flow rate (kg/hr) x Enthalpy difference between the air at inlet & outlet of the evaporator coil (kJ/kg) / 3600  
=  $3.5112 \times$  Chilling Effect (TR)

Specific Power Consumption (kWh/TR) =  
Power consumption (kW) / Air Chilling Effect (TR)

Energy Efficiency Ratio – EER (W of cooling / W of input power)  
= Power consumption (kW) / Air Chilling Effect (kW)  
=  $3.5112 /$  Specific Power consumption (kWh/TR)

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The performance of a few of the randomly selected air conditioning units (of different make, capacity and age) were carried out as described above.

Description	Unit	Research Centre AC-1	Co-Ordinator Room AC-1	UGC Room
<b>Design Data</b>				
Make		Voltas	Carrier	Carrier
Star Rating		3	5	3
Rating - AC (Capacity)	TR	1.38	1.00	1.00
Energy Efficiency Ratio		3.15	3.1	3.04
Power	kW	1.53	1.08	1.12
		1.11	1.08	1.12
<b>Operating parameters</b>				
Operating period	Hr/D	6	8	8
	D/M	25	25	25
Velocity	M/s	3	2.1	4
Area	M <sup>2</sup>	0.05	0.04	0.03
Air flow	M <sup>3</sup> /Sec	0.153	0.094	0.105
	M <sup>3</sup> /hr	552	338	378
Supply air - Temperature	°C	9.5	12.9	16.9
Supply air - RH	%	87.5	84.5	89.1
Return air - Temperature	°C	25	26.5	26.2
Return air - RH	%	51.2	71.5	75.7
Total Power Consumption	kW	1.43	1.05	1.01
Supply Enthalpy	kJ/kg	25.8	32.7	43.8
Return Enthalpy	kJ/kg	51.0	66.4	67.3
<b>Operating Status</b>				
Cooling Effect	TR	1.37	1.11	0.86
Total Cooling Effect	TR	1.37	1.11	0.86
Specific Power	kWh/TR	1.04	0.94	1.18
Energy Efficiency Ratio		3.38	3.72	2.98
<b>Hall Temperature</b>				
Maximum	°C	24.5	25	24.7
Minimum	°C	22.3	21.2	22.1
Average	°C	23.4	23.1	23.4
Variation - Room	%	9%	16%	11%
Variation - Norm	°C	0.5	0.0	0.3
	%	2%	0%	1%

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Description	Unit	BSCIT Lab-4	Exam Room 2nd Floor	Computer Lab-3	Junior College Library
<b>Design Data</b>					
Make		Blue-Star	Carrier	Carrier	Voltas
Star Rating		2	3	NA	3
Rating - AC (Capacity)	TR	NA	1.70	NA	0.91
Energy Efficiency Ratio		NA	3.14	NA	3.15
Power	kW	NA	1.9	NA	1.01
kW/TR		NA	1.12	NA	1.11
<b>Operating parameters</b>					
Operating period	Hr/D	6	8	6	6
	D/M	25	25	25	25
Velocity	M/s	2.5	2.2	3.8	2.5
Area	M <sup>2</sup>	0.08	0.08	0.08	0.05
Air flow	M <sup>3</sup> /Sec	0.200	0.176	0.304	0.127
	M <sup>3</sup> /hr	720	634	1094	457
Supply air - Temperature	°C	8.2	12.8	13	14
Supply air - RH	%	87.8	76.5	88.5	87.8
Return air - Temperature	°C	26.5	27.1	25.7	26.2
Return air - RH	%	44.5	53.2	50	55
Total Power Consumption	kW	2.94	1.65	NP	1.03
Supply Enthalpy	kJ/kg	23.1	30.6	33.9	36.2
Return Enthalpy	kJ/kg	51.1	57.7	52.1	56.2
<b>Operating Status</b>					
Cooling Effect	TR	2.00	1.68	1.95	0.89
Total Cooling Effect	TR	2.00	1.68	1.95	0.89
Specific Power	kWh/TR	1.47	0.98	NP	1.16
Energy Efficiency Ratio		2.39	3.57	NP	3.04
<b>Hall Temperature</b>					
Maximum	°C	24.4	24.9	24.6	25
Minimum	°C	22.5	22.4	22	22.4
Average	°C	23.5	23.7	23.3	23.7
Variation - Room	%	8%	11%	11%	11%
Variation - Norm	°C	0.6	0.1	0.4	0.0
	%	2%	0%	2%	0%



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Senergy Consultants Pvt Ltd

Ref: SCPL-PR-653-170519  
Date: May 17, 2019

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**Observations:**

- The performance of all the AC machines is satisfactory.
- The temperatures are maintained as per the stipulated norms and variation across the room is marginal.



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## IX Green Culture

The power consumption of some of the personal computers is as under

Sr No	Description	Operation		Voltage	Current	Power	Power Factor
		Hr/Day	Day/Year	V	A	Kw	
<b>Computers</b>							
<b>Research Center 4th Floor</b>							
1	PC-01	6	280	241.5	0.11	0.01	0.53
2	PC-02	6	280	242.3	0.12	0.02	0.57
3	PC-03	6	280	242.2	0.12	0.02	0.59
<b>UGC Center 4th Floor</b>							
4	PC-02	8	280	242.2	0.43	0.08	0.73
5	PC-06	8	280	241.9	0.33	0.06	0.71
<b>BSCIT Lab 5th Floor</b>							
6	PC-05	8	280	243.2	0.22	0.04	0.69
7	PC-09	8	280	243.4	0.18	0.03	0.59
8	PC-14	8	280	244.2	0.32	0.05	0.65
9	PC-18	8	280	244.0	0.15	0.03	0.81
10	PC-22	8	280	243.4	0.23	0.04	0.70
<b>Exam Room 2nd Floor</b>							
11	PC-01	8	280	243.6	0.42	0.09	0.85
12	PC-03	8	280	244.0	0.39	0.07	0.78
<b>Computer Lab-3 1st Floor</b>							
13	PC-20	8	280	238.9	0.17	0.04	0.82
14	PC-25	8	280	238.3	0.25	0.05	0.85
15	PC-16	8	280	239.4	0.40	0.09	0.89
16	PC-10	8	280	238.1	0.42	0.09	0.90
17	PC-4	8	280	238.4	0.22	0.04	0.82


### Observations:

1. The LED / LCD monitors have been procured, which are energy efficient.
2. These monitors are not only energy efficient but also generate minimal heat and cut down on air conditioning load.



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## X Renewable Energy

### Solar Photovoltaic:

The Solar photovoltaic system of 30 kW capacity has already been installed in the campus.

### Bio-methanation:

1. The possibility of installing biogas plant to generate biogas for canteen usage from plate and canteen waste is could be initiate.
2. Vermicompost has been extensively practiced in the premises.

For Senergy Consultants Pvt. Ltd

Authorized Signatory



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