2020

WEECON
(CONSULTANTS & ENGINEERS)
1/240 SFS, MANSAROVAR JAIPUR

IIS (deemed to be UNIVERSITY) JAIPUR

ENERGY AUDIT REPORT

Registrar
IIS (deemed to be University)
Mansarovar, Jaipur-302020

Executive Summary

IIS University is one of the most prestigious academic institutes for girls and has excellent infrastructure and educational environment. A comprehensive energy audit was conducted from 10th February to 26th February 2020 at the premises to bring forth the further possibilities that exist for energy conservation. The energy performance index which is energy consumed(kwh) / year/sq mtr is in the bandwidth of 5 star rated buildings category of Bureau of energy efficiency for commercial buildings in composite climate and with more than 50% conditioned area. It is 37.07 Kwh/sq mtr/year.

The audit report has been divided in four sections covering the entire distribution and assessment of all major critical loads. The energy saving proposals has been worked out at the end of each section.

The brief overview of the projected savings is as under:

Proposal No	Title	Energy Savings (kWh)	Cost Savings (Rs)	Investment (Rs- lacs)	Payback Period (months)
1	Reducing the contract demand of Institute and hostel electricity connections	nil	1,95,000	nil	Immediate
2	maintaining power factor near to unity for incentive & demand reduction	nil	90,000	0.20	2.5 months
3	Replacement of 40W tube lights , bulbs and sodium street lights in initial phase	28,710	2,29,680	2.25	12 months
4	Replacement of existing fans with super efficient fans	49,710	4,00,000	15.78	48 months
5	To avoid keeping equipments in standby mode and switching off supply while not in use	8760	70,800	nil	Immediate

The proposals with no investment should be implemented immediately at the merits and on the discretion of the management and the proposals with investment can be prioritized accordingly.

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The energy conservation proposals are attached with respective sections.

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Power Distribution Network **Section 1**

1.0 General: The IISU Jaipur centre located at SFS Mansarovar ,Jaipur comprises of multi blocks and multi storey building complex with additional at the basement level . The building has hall of residence for girl students and a Bank Branch is also operative in the premises for convenience of students.

2.0 Utility supply : The power supply from the JVVNL at 11 KV is supplied to the transformer of 500KVA rating and is stepped down to 415V for further distribution . The Transformer is within the building premises and metering is done at HT side (before transformer) as per the utility norms. A distribution panel is provided in a separate room adjacent to the transformer and has the necessary arrangements to distribute the supply further to the buidings. A automatic power factor correction panel is also provided for pf. compensation. The maximum demand is 500KVA and the sanctioned load is 600KW. Two standby DG sets 320 kVA and 200 kVA are used as a standby power supply and kept in auto mains failure(AMF) mode. The institute has a separate utility connection for the Hostel and equipped with 82 kVA dedicated DG set. The institute has solar roof top grid connected system of capacity 65 kW installed at the institute educational block while 10kW is installed at the hostels.

3.0 Study Boundary: The **study** covers the following areas

a) The electric room onwards and further distribution of electricity.

b) The major equipments (except specialized lab equipments) which cater to the energy consumption.

4.0 Electrical Distribution: The supply from the electrical panel near transformer is first received at the electric room located at entrance of premises. It is thereafter routed to a 250 KVA servo stabaliser installed outside .The stabalised power supply is again brought back to the electric room for further distribution through electric panel. The standby DG power supply is also coming to the electrical panel room where the main DG incomer breaker and the AMF panel is housed.

The cables for the outdoor units of the AC's are taken out from the panel room to the roof . The other supplies to the respective floors are from the respective MCB boxes provided for the purpose.

5.0 Energy Consumption: The energy consumption pattern of as under for the previous year for year 2019-20 (10 months) . The details have been separately tabulated for the two electricity connections at IISU. One is for the institute while the other is for the hostels.

Table 1.0 : IISU Energy Consumption 2019-20

S.no	Month	kWH (units)	Billing demand	KVA (demand)	pf (power factor)	Penalty/ incentive	Solar generation
1	Apr 19	23505	375	236	0.839	-11972	5880
2	May-19	60807	375	339	0.984	12128	not given
3	June 19	64854	375	357	0.98	10830	9040
4	July 19	37992	375	233	0.98	7613	7960
5	Aug-19	66654	375	352	0.978	10018	6400
6	Sept-19	61422	375	320	0.981	10770	5200
7	Oct-19	68676	375	349	0.986	14909	3080
8	Nov-19	36990	375	227	0.972	3706	5920
9	Dec-19	17919	375	144	0.971	1645	4800
10	Jan-20	10191	375	84	0.663	-20167	6200
	Total	449010					54480

Table 2.0 : IISU Hostel electricity consumption (2019-20)

S.no	Month	kWH (units)	Billing demand	KVA (demand)	pf (power factor)	Penalty/ incentive	Solar generation
1	Apr-19	7476	52.5	30	0.985	1560	1352
2	May 19	8247	52.5	30.69	0.98	1377	330
3	June 19	7432	52.5	28.96	0.978	1117	137
4	July-19	2670	52.5	14.13	0.956	66	1221
5	Aug-19	7077	52.5	23.77	0.977	1004	1040
6	Sept-19	8433	52.5	26.53	0.98	1408	1002
7	Oct-19	9708	52.5	27.07	0.98	1702	452
8	Nov-19	6042	52.5	21.01	0.979	958	1014
9	Dec-19	10684	52.5	29.58	0.986	2319	835
10	Jan-20	6589	52.5	24.93	0.986	1430	913
	Total	74358					8296

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Fig 1.0 : Consumption pattern (kWH) of IISU Institutional Building Complex

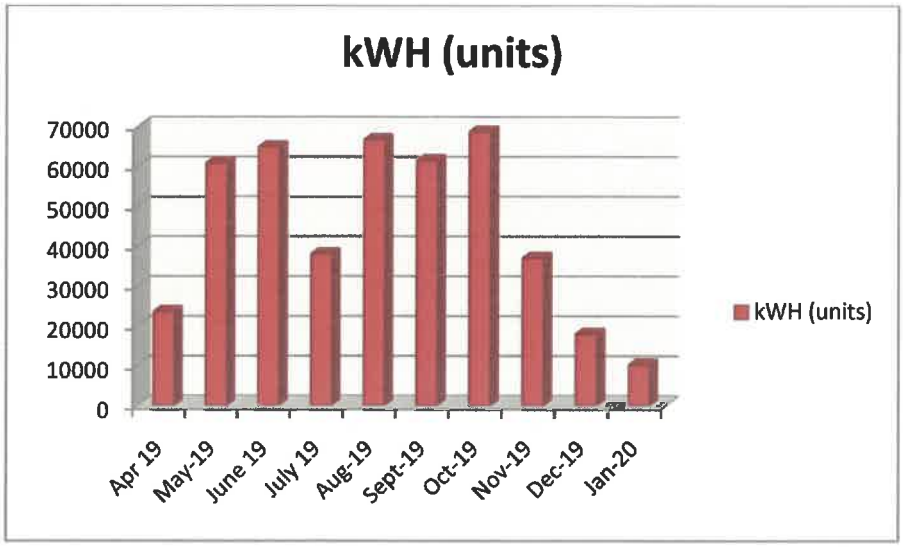
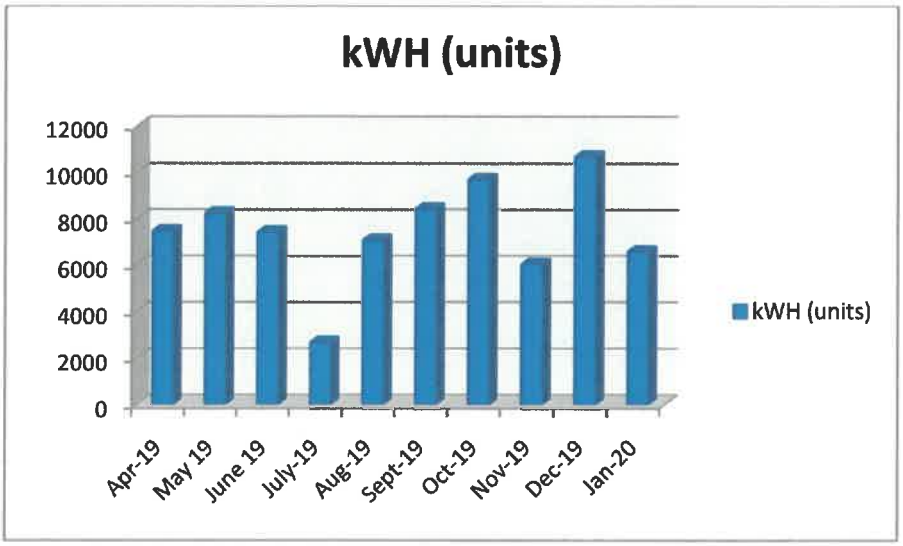


Fig 2.0 : Consumption pattern (kWH) of IISU Hostel



The energy consumption has a seasonal variation. The institution building complex has minimum consumption of 10191 units in January 20 while the maximum has been in August 2019 and the average consumption is 44900units/month. The requirement of air conditioning is the main reason for the peak in Aug 2019. The hostel on the contrary has a minimum in July2019 which is mainly a holiday's period while the peak is in Dec 2019 due to hot water requirements. The average consumption of hostel is 7435 units.

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6.0 Energy Demand

The contract demand of the institution is 500 kVA while that of hostel is 70 kVA. The pattern of maximum demand is as per Fig 3 and Fig 4 respectively. It is also to be noted that the maximum demand has never exceeded and therefore the billing demand which is 75% of the contract demand is reflected in the bills for the fixed charge calculations.

Fig 3.0: Maximum demand pattern of IISU

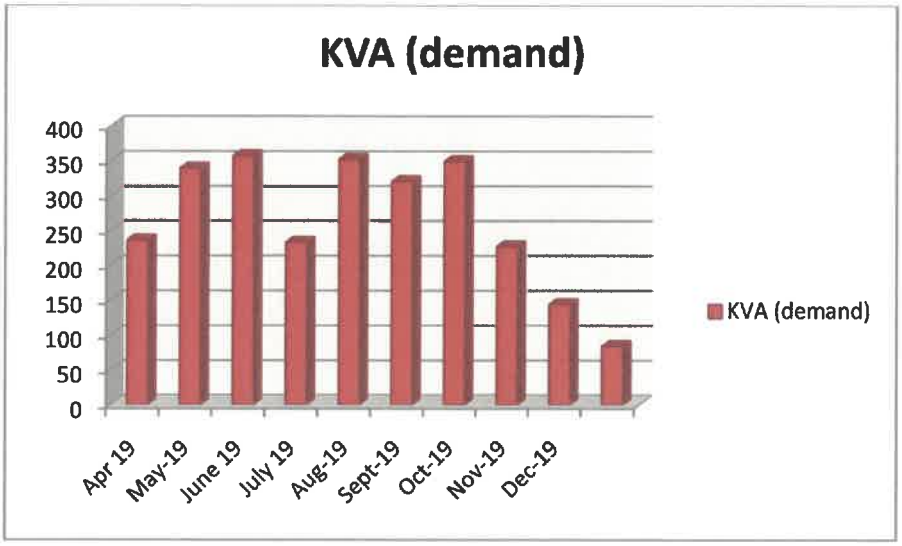
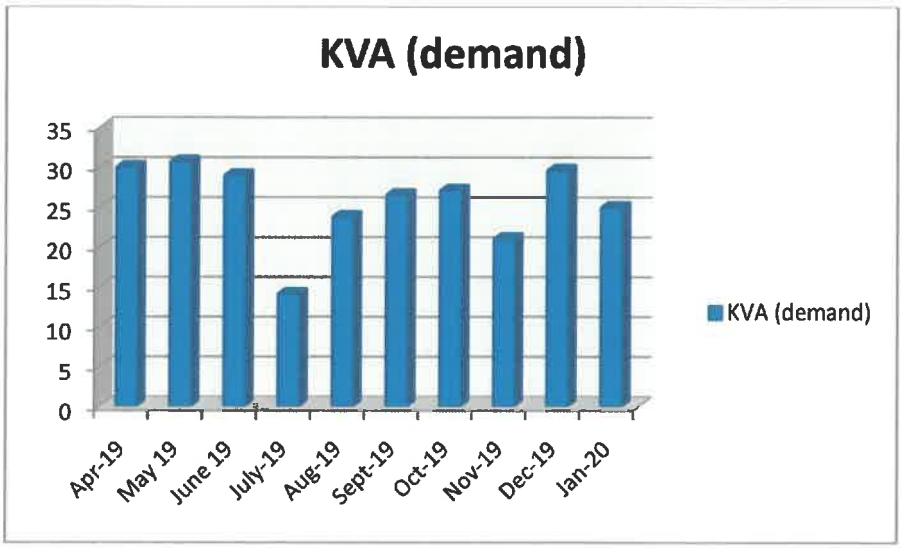


Fig 4.0: Maximum demand pattern of IISU – Hostel



7.0 Power Factor (pf)

The power factor is well managed through APFC panel. The power factor closeness to unity fetches incentives up to 4% (1% above 0.97 for every increment of 0.01 and .5% from 0.95 to 0.96). The pf trend of institution is as per Fig 5.0 while that of hostel is as per Fig 6.0 below

Fig . 5.0: Power Factor Pattern of IISU

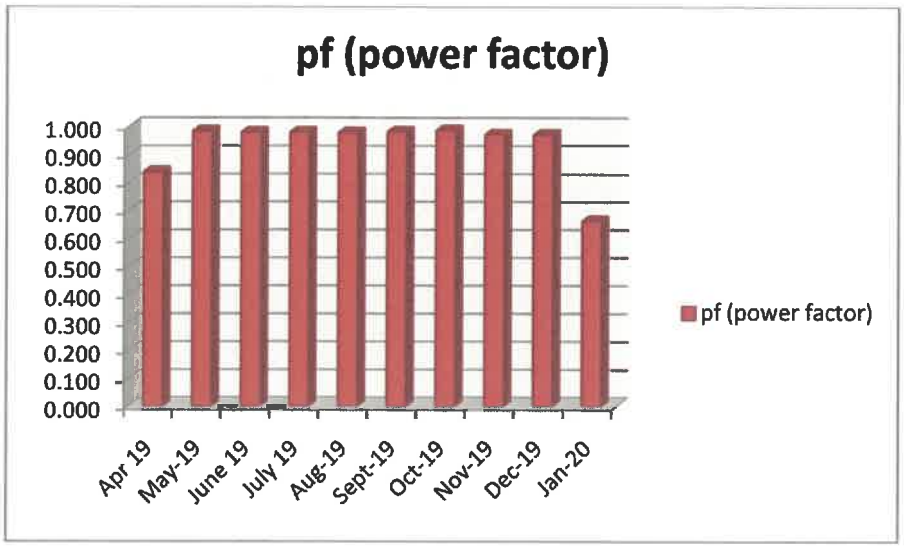
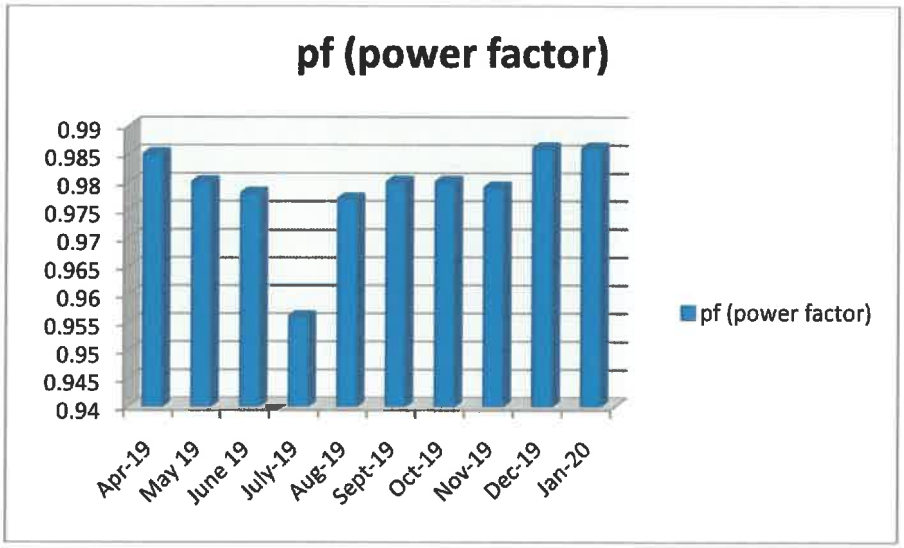


Fig . 6.0: Power Factor Pattern of IISU- Hostel



APFC Details : Capacitor ratings – 85 KVAR

Installation - LT side in APFC Panel

APFC relay - Neptune Make

The charging currents for the capacitors were measured and all the capacitors are functional.

Charging current :

15KVAR – 20.2 Amps

10 KVAR – 13.2 Amps

05 KVAR - 6.7 Amps

8.0 Connected Load : The complete load inventory was collected at premises and the details are as following and also annexed at respective sections –

Table 3.0 : Connected load profile off IISU

	% Load (approx)
Illumination load	18%
A.C. Load	70%
Computer & Printer Load	2%
Fan & Exhaust fan Load	5%
Other Load	5%

9.0 Energy Performance Index (EPI): The energy performance index is the amount of energy consumed per square meter per year

i.e EPI = Total yearly energy consumption / floor area in sq mtr.

Total energy consumption of institute : 5,93,290 kWH (449010 for 10 month + 54480 solar + 2 months average 89,800 units @44900/month avg value)

Total built up area of institute = 16002 sq mtr

Conditioned area = 6003 sq.mtr

Non conditioned area = 9969 sq.mtr

EPI = 5,93,290 ÷ 16002 = 37.07 kWH/sq.mtr

The Table (source BEE – Buildings star rating program) for Star rating program for composite climatic zone and having less than 50% conditioned area is as per Table 3 below

Table 4.0: Star Rating for Composite climatic zone

EPI(Kwh/sqm/year)	Star Label
80-70	1 Star
70-60	2 Star
60-50	3 Star
50-40	4 Star
Below 40	5 Star

Source: BEE star rating scheme for buildings

Thus the IISU falls under 5 Star Building category and certification for the same should be obtained for enhanced prestige of the institute.

Note : Exact working to be done to avoid the averaging as done (10 months data + avg of two months considered above) and also adding the units generated by standby DG sets while reconfirming on the conditioned area alterations if any at the time of applying for certification.

10.0 Transformer losses

No Load Losses of Transformer

The Transformer, a static electrical equipment has high tension (HT) and low tension windings (LT) for step down of voltage (11kV/415 V . There is thus an inherent energy loss depending on the efficiency of Transformer. The No-load loss is of importance and the same was measured (& calculated) as under.

Test Methodology –

1. Transformer secondary supply to load is interrupted.
2. The losses of Transformers were calculated.
3. No Transformer compensation during OFF period.

Calculation for no load losses:

Load in KW = 12.2 x .109 = 1.33 KW

= 1330 Watts

Hence no load losses = 1.33 units per Hrs.

= 31.92 units per day

= 958 units per month

11.0 Power Quality and Harmonics

The values of current and voltage harmonics are as under

Voltage harmonics (peak value) : 4.16 %

Current harmonics (peak value) : 3.16 %

12.0 Renewable Energy Sources

The IISU being committed to renewable energy sources have deployed the Solar water heating system at girls hostel to meet the requirements of service hot water during winters. For generating power the Solar roof top system (grid interactive) has been used of capacity 65 kW at the institute and 10 kW at the hostel. The solar generation as directly taken on a monthly basis is as per Table 5.0 (there is difference between solar generation mentioned in bill and in solar meter as monthly cycle of bill reading varies)

Table 5.0: Solar generation at the IISU

Sr.No.	Month	IIS UNIVERSITY			HOSTEL			
		Initial Reading	Final Reading	Net Production	Initial Reading	Final Reading	Net Production	Total A+B
1	Apr-19	149040	157712	8672	25123	25455	332	9004
2	May-19	157712	166784	9072	25455	25561	106	9178
3	Jun-19	166784	174856	8072	25561	26766	1205	9277
4	Jul-19	174856	181216	6360	26766	27830	1064	7424
5	Aug-19	181216	186440	5224	27830	28823	993	6217

6	Sep-19	186440	189040	2600	28823	29296	473	3073
7	Oct-19	189040	195356	6316	29296	30288	992	7308
8	Nov-19	195356	200176	4820	30288	31135	847	5667
9	Dec-19	200176	206388	6212	31135	32099	964	7176
10	Jan-20	206388	212560	6172	32099	32941	842	7014
11	Feb-20	212560	219096	6536	32941	34031	1090	7626
12	Mar-20	219096	227532	8436	34031	35208	1177	9613
							Total (A+B)	**88577**

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Energy Conservation Option in power distribution **Proposal 1**

1.0 Title: Reducing the contract demand of Institute and hostel electricity connections.

2.0 Existing practice:

a) The contract demand of Institute is 500kVA and billing for MD has been done for 375kVA which is 75% of the contract demand as per rules of JVVNL. To elaborate, the minimum charges for 75% of contract demand has to be paid by consumer while there is no penalty for using demand upto 525kVA (105% of contract demand . In case of hostel the contract demand is 70 kVA and therefore the billing demand throughout the year is 52.5 kVA(75% of 70 kVA)

b) The maximum and minimum demands observed are as under

Institute : Max value of demand - 349 kVA (Oct 19)

Min.value of demand – 84 kVA (Jan 20)

Hostel : Max value of demand - 30.6 kVA (May 19)

Min.value of demand - 14 kVA (July 19)

3.0 Recommendations:

To reduce the contract demand as under -

a) Institute : 400 kVA in place of 500kVA

b) Hostel : 45 kVA in place of 70 kVA

4.0 Savings calculations :

a) Nett Reduction in contract demand (from peak value) : Minimum 60 kVA avg

b) Charges per kVA - Rs 270/kVA

b) Monthly savings - Rs 16,200

d) Yearly savings - Rs 1,95,400

5.0 Investment : Nil

6.0 Return on investment/ Payback : Immediate

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Energy Conservation Option in power distribution **Proposal 2**

1.0 **Title**: maintaining power factor near to unity for incentive & demand reduction.

2.0 **Existing condition**: The trend of power factor variance is as per Fig. below

Further the billed kWh (energy consumption) and incentive received during the period is as under.

Table 6.0 : Power factor and incentive received

S.no	Month	kWH (units)	pf (power factor)	Penalty/ incentive
1	Apr 19	23505	0.839	-11972
2	May-19	60807	0.984	12128
3	June 19	64854	0.98	10830
4	July 19	37992	0.98	7613
5	Aug-19	66654	0.978	10018
6	Sept-19	61422	0.981	10770
7	Oct-19	68676	0.986	14909
8	Nov-19	36990	0.972	3706
9	Dec-19	17919	0.971	1645
10	Jan-20	10191	0.663	-20167

There is incremental incentive of 1% for every improvement above 0.95 with an increment of 0.1. Thus at 0.99 one can get an incentive of 4% and so forth. However it is observed that power factor has reduced from 0.986 to lower values resulting in lesser incentive and even penalty of Rs 32,000 approx. It is observed that the power factor is not maintained at lower loads due to inappropriate capacitor bank capacity.

3.0 APFC study

An Automatic Power Factor Correction Unit has been provided at IISU for 85 kVAr .

The charging current was measured for all the capacitors and the values are near to the recommended values for respective sizes of condensers. It was observed that the values were slightly less in case on one no 10kVAR unit though the existing unit can be used.

4.0 Recommendation

To add additional capacitors as per the details annexed at the end of the report.

5.0 Cost savings

The cost saving is in terms of added incentives, which are to be maximized so that the resultant net savings of nearly Rs 90,000/year minimum can be easily achieved beside the amount being received as an incentive.

6.0 Investment: Rs 20,000 approx

7.0 Payback: 2.5 months approx

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Illumination **Section 2**

1.0 General :

The University due to design superiority has abundant natural light resource. In the premises the illumination of classrooms and other facilities is by using tube lights predominately. The lux levels have been measured on sample basis to evaluate the adequacy of the same.

2.0 Inventory of luminaires

The detailed inventory of luminaires is attached at the annexure 1. The summary is as per Table 7. Below

Table 7.0: Summary of luminairs at IIS University

Sl.no	Item description	Institution (no's)	Hostel(no's)	Total(no's)	Total wattage(kW)
1	LED Tube lights (20W)	569	125	694	13.8
2	Tube lights (40 W)	581	113	694	27.76
3	CFL (5W)	193	-	193	0.96
4	Incandescent Lamps(40W)	16	50	66	2.6
5	LED street lights (50W)	12	-	12	6
6	Street Lights Sodium (250W)	06	-	06	1.5
7	Halogen (70W on stage)	09	-	09	0.63
				Total Wattage (kW)	**53.25**

3.0 **Measurement of Illumination – Lux levels**

The illumination has been measured on a sample basis on individual floors of the institute and light intensive offices to assess the adequacy. The same is as per Table 8.0 . It is noted that the most of the areas the lux levels are sufficient and in conformity to ILES standards. Further for energy efficiency purposes a recommendation has been made as ECM-03 for conversion to LED lights wherever possible.

Table 8.0: Average Lux level chart

S.No.	Location	Average Lux level
	Basement	
1	Room No. A-101	309
2	Room No. A-102	362
3	Room No. A-103	350
4	Net work centre	327
	G-Floor	
5	Room No. A-201	318
6	Room No. A-202	352
7	Room No. A-203	292
8	Room No. A-204	200
	First Floor	
9	Room No. A-301	284
10	Room No. A-302	239
11	Room No. A-303	315
12	Room No. A-304	290
	Second floor	
13	Room No. A-401	270
14	Room No. A-402	226
15	Room No. A-403	210
16	Room No. A-404	225
	Third floor	
17	Room No. A-501	285

18	Room No. A-502	259
19	Room No. A-503	234
20	Room No. A-504	227
	Fourth floor	
21	Room No. A-601	252
22	Room No. A-602	286
23	Room No. A-603	315
24	Room No. A-604	320

Energy Conservation options in illumination **Proposal 3**

1) Title: Replacement of 40W tube lights , bulbs and sodium street lights in initial phase.

2) Existing Practice:

Presently the IISU uses the following energy consuming lights in the premises

a) Tube lights 40W – 694 no's
b) Incandescent lights 40 W(bulbs) -66 no's
c) Sodium street lights ,250 W – 06 no's

3) Recommendations:

a) To use 5 watt LED Lights in place of 40W bulbs

b) To use 20W LED tube lights in place of 40W tube lights.

c) To use 50 W LED Street lights in place of 250W sodium street lights.

4) **Saving Calculations:** The saving calculations are based on existing consumption and with proposed replacement as per Table 9.0

Table 9.0: Existing and proposed energy consumption

Sl.no	Existing Lights	Numbers	Wattage	Total wattage	Operating Hrs	Units/year
1	Tube light	694	40 watts	27.76 kW	06 x 250 days=1500 Hrs	41,640 Units
2	Bulbs	66	40	2.6 kW	06 x 250 = 1500 hrs	3,900 Units
3	Sodium street lights.	06	250	1.5kW	10x365= 3650 hours	5,475 units
Total units						51,015 units

Consumption with proposed changes

Sl.no	Proposed Lights	Numbers	Wattage	Total wattage	Operating Hrs	Units/year
1	Tube light (LED)	694	20 watts	13.8kW	06 x 250 days=1500 Hrs	20,700 Units
2	Bulbs (LED)	66	05	.34 kW	06 x 250 = 1500 hrs	510 Units
3	Sodium street lights. (LED)	06	50	.30kW	10x365= 3650 hours	1095 units
Total units						22,305 units

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Energy savings: 28,710 Units

Cost Savings @ 8/unit: Rs 2, 29,680

5) Investment: The total cost would be approx Rs 2.25 lacs

6) Return on investment /Payback: *01* year

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Fans & Exhaust Fans **Section 3**

1.0 General:

At IISU the classrooms are not conditioned and fans are widely used in both conditioned and non conditioned spaces. The electronic regulator is mostly used. Further, many fans are rewound every year and reinstalled which also leads to excessive consumption of energy.

2.0 Existing scenario :

The population of fans at IISU is as under-

a) Institute : 909 no's
b) Hostel : 143 no's Total = 1052

The wattage of the fans have been measured on a sample basis and the average consumption has been taken as 65 Watts

3.0 Recommendation

a) To replace the existing fans with BLDC fans which consume nearly 30 Watts.
b) OR to go in for 5 star rated fans which consume around 45 W (rated 48 w)
c) The transition can be in phased manner covering some 400 fans/year so that the entire fan population gets converted to energy efficient fan in a span of 03 years.
d) To discard the fans where it is required to rewind the fans as the wattage consumption increases.

The proposal for energy conservation has however been worked on the entire quantity to assess the potential and the corresponding pay-back period. Management at its discretion may decide on the numbers to be replaced progressively over the years.

Energy Conservation options in Fans **Proposal 4**

1.0 Title : Replacement of existing fans with super efficient fans .

2.0 Existing scenario :

The population of fans at IISU is as under-

c) Institute : 909 no's

d) Hostel : 143 no's Total = 1052

The wattage of the fans have been measured on a sample basis and the average consumption has been taken as 65 Watts

3.0 Recommendation:

To replace the existing fans with BLDC fans which consume nearly 30 Watts

4) **Saving Calculations**: The saving calculations are based on existing consumption and with proposed replacement as under

a) Present consumption = 1052 x 225 days x 6 hrs/day x 65 watts = 92,300 units/year(kWh)

b) Proposed consumption = 1052x225 days x 6hrs/day x 30 watts = 42,600 units/year

c) Energy savings = 49,700 units say 50,000 units/year

d) Yearly savings = Rs 8/unit x 50,000 = 4, 00,000 Rs /year

e) Cost of fans estimated = 1500/unit x 1052no's = 15, 78,000 Rs

f) Payback period = approx 4 years

Air Conditioners **Section 4**

1.0 General: The IISU building if partially air conditioned and the connected load for AC's is the highest. The AC are mostly split AC with outdoor units.

2.0 Inventory of AC's:

The inventory of AC at University is as per Table 10.0. The units were evaluated on the basis of kW /TR basis on sampling basis.

Table 10.0 : Details of AC's installed at IISU

IISU- Air-conditioning Machine Details								
Sr. No.	Area	Location	Floor	Unit Make	Type of AC	TR	QTY	Total TR
CIT								
1	CIT	Computer Lab	GF	Hitachi	SAC	1.5	3	4.5
2		Computer Lab	GF	Voltas	WAC	1.5	1	1.5
3		Web Office	GF	Carrier	SAC	2.0	1	2
4		AV Hall	GF	Voltas	SAC	1.5	5	7.5
5		Computer Lab	FF	Hitachi	WAC	1.5	6	9
6		C-Block	Fourth Floor	Daikin	Tower Unit	4.0	2	8
A & B BLOCK								
7	A & B Block	Server Room	Basement	Daikin	SAC	2.0	2	4
8		IT Room		Samsung	WAC	1.5	2	3
9		E-Library		Daikin	SAC	2.0	1	2
10		Knowledge Cell	Ground Floor	Daikin	SAC	2.0	1	2
11		A-203	Ground Floor	Videocon	SAC	1.5	1	1.5
12			Ground Floor	Voltas	WAC	1.5	2	3
13		Net Working lab	Ground Floor	Voltas	WAC	1.5	2	3
14		C-506	Fourth Floor	Daikin	SAC	1.5	1	1.5
D- BLOCK								
15	D-Block	D-501	Fourth Floor	Voltas	SAC	1.5	1	1.5
16		D-502	Fourth Floor	Blue Star	SAC	1.5	2	3
17			Fourth Floor	LG	SAC	1.5		
18		D-401	Third Floor	Voltas	WAC	1.5	2	3
19			Third Floor	Voltas	SAC	1.5	1	1.5
20		D-402	Third Floor	Voltas	WAC	1.5	1	1.5

21		D-403	Third Floor	Voltas	WAC	1.5	1	1.5
22		D-303	Second Floor	Voltas	WAC	1	1	1
23		D-201	First Floor	Voltas	SAC	1.5	1	1.5
24		Audio/video				2	2	4
E- BLOCK								
25	**E-Block**	E-504	Fourth Floor	Daikin	SAC	2	1	2
26		E-301	Second Floor	Neopolian	WAC	1.5	1	1.5
F- BLOCK								
27	**F-Block**	F-201	First Floor	Voltas	SAC	1.5	1	1.5
28		F-102	Ground Floor	Panasonic	SAC	1.5	1	1.5
29		F-301	Second Floor		WAC	1.5	1	1.5
30		Staff Room		Mitsubishi Electric	SAC	2	1	2
31		OJAS	Basement	Mitsubishi Electric	SAC	2	4	8
32		Aditya	Basement	Mitsubishi Electric	SAC	2	4	8
33		Transport	Ground Floor		WAC	1.5	1	1.5
34		Gate Room (Wahini Room)	Ground Floor		SAC	2	1	2
MAIN BLOCK								
35	**Main Block**	417	THIRD	Voltas	WAC	1.5	2	3
36		406	THIRD	Voltas	SAC	1.5	2	3
37		202 (Staff room)	First Floor	Daikin	SAC	1.5	3	4.5
38		203	First Floor	Samsung	SAC	1.5	1	1.5
39			First Floor	Samsung	WAC	1.5	1	1.5
40		AV System	Ground Floor	Midea	SAC	1.0	1	1
41		Board Room	Ground Floor	O General	SAC	2	2	4
42		Boss Cabin	Ground Floor	Mitsubishi Heavy	CAC	3	1	3
43		Reception	Ground Floor	Daikin	Tower Unit	4	1	4
44		Registrar Office	Ground Floor	Mitsubishi Electric	CAC	3	1	3
45		Office Reception	Ground Floor	Daikin	SAC	1.5	2	3
46		205	FIRST	Daikin	SAC	1.5	2	3
47		206	FIRST	Voltas	WAC	1.5	2	3
48		207	FIRST	Daikin	CAC	4	2	8
49		208	FIRST	Daikin	SAC	1.5	2	3
50		Nurse Madam	FIRST	Daikin	SAC	1.5	1	1.5
51		107	Basement	O General	SAC	1.5	1	1.5
52		108	Basement	Carrier	SAC	1.5	2	3

53		Examinations (310)	Second Floor	Voltas	WAC	1.5	2	3
54		Secrey	Second Floor	Voltas	WAC	1.5	1	1.5
55			Second Floor	Voltas	SAC	1.5	1	1.5
56		Software Lab	Second Floor	Onida	SAC	1.5	1	1.5
57			Second Floor	Midea	SAC	1.5	1	1.5
OTHER								
58	Other	A. K. Gupta Ji Cabin	Ground Floor	Midea	SAC	1.5	1	1.5
59		H-101	Ground Floor	Voltas	SAC	2	1	2
	TOTAL MACHINE/TR						95	167.5

3.0 Performance Assessment:

The performance assessment in the cooling mode is satisfactory. The details of the current recorded, power drawn etc are attached.

It is however recommended that the set point of the AC's should be kept at 24 deg C. or in energy efficiency mode the provision of which is normally there in Diakin AC's. This results in significant cost savings as the cost increase by approximately 2% for every degree incremental increase in temperatures

Energy Conservation options (General) **Proposal 5**

1.0 Proposal Title: The commonly used equipments when switched off with remote or not from the mains consume energy in standby mode . This can be saved by switching them from the mains,

2.0 Existing scenario:

1) The Ac's with remote are switched ON/OFF through remote.
2) The computers are switched ON/OFF from the frontal switches.
3) The TV's are switched ON/OFF through a remote.
4) The LCD's are switched ON/OFF through a remote.
5) The mobile phone/laptop chargers are not switched off from the mains.
6) Printers are not switched OFF from the mains

3.0 Recommendations:

The electric gadgets consume a small amount of energy when they are in stand by mode; cumulatively this becomes a significant amount. For example, it is a common practice to use the remote control device to switch off television. This keeps the TV on, in stand-by mode-where it consumes 6 watts per hour. Even if you switch OFF the TV set and not in the switch at the plug point, the TV consumes 0.5 to 1 watt power. Similar is the case for computers, printers, mobile chargers etc.

4.0 Energy saving calculations: The amounts of energy spent in stand by common gadgets are as following

Fax machine	- 5.2 watts
Printer	- 4.3 watts
Compact stereo	- 4.3 watts
Tool charger	- 4.2 watts
Battery charger	- 2.6 watts
TV, CRT (26-31 inches)	- 1.3 watts
Desktop computer	- 2.4 watts
Modem	- 1.5 watts
Scanner	- 1.5 watts
Monitor	- 1.2 watts

Laptop computers	- 0.7 watts
DVD player	- 0.4 watts

The list is only indicative and one can save energy without sacrificing any comforts. What is needed is to be vigilant of the electricity usage practices and to switch off the gadgets from the mains when they are not in use. In case of multiple points power usage like computer /Printer /Fax/Scanner etc use a multiple point power strip with single ON/OFF switch.

In case of IISU a conservative estimate of the standby energy which can be saved by simple practices has been taken as 1.0 Kwh.(units)

Energy spent on standby supply	= 1 units x 24 hrs x 365 days = 8760 units
Amount @8/unit	= Rs 70,080 (say Rs 70,000)
Investment	= Nil
Payback	= immediate

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