



Energy Audit Report, 2019-20

IQAC



UNIVERSITY OF NORTH BENGAL

RAJA RAMMOHUNPUR

DIST. DARJEELING, W.B., INDIA

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Energy Audit Report

As on-06/01/2020

Preface

An energy audit is a study of a plant or facility to do determine how & where energy is used and to identify methods for energy savings. There is now a universal recognition of the fact that new technologies and much greater use of some that already exist provide the most hopeful prospects for the future. The opportunities lie in the use of existing renewable energy technologies, greater efforts at energy efficiency and the dissemination of these technologies and options.

This report is just one step, a mere mile marker towards our destination of achieving energy efficiency and we would like to emphasize that an energy audit is a continuous process. We have compiled a list of possible actions to conserve and efficiently utilize our scarce resources and identified their savings potential. The next step would be to prioritize their implementation.

We look forward with optimism that the University authorities, staffs and students shall ensure the maximum execution of the recommendations and the success of this work.

**Sd/-
Er. Anirban Goon
University Engineer
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Need for Energy Audit

In any industry, the three top operating expenses are often found to be energy (both electrical and thermal), labour & materials. If one were to relate to the manageability of the cost or potential cost savings in each of the above components, energy would invariably emerge as a top ranker, and thus energy management function constitutes a strategic area for cost reduction. Energy audit will help to understand more about the ways energy and fuel are used in any identity, and help in identifying the areas where waste occurs and where scope for improvement exists.

The energy audit would give a positive orientation to the energy cost reduction, preventive maintenance and quarterly Central Programmes which are vital for production and utility activities. Such an audit programme will help to keep focus on variations which occur in the energy costs, availability and reliability of supply of energy, decide on approximate energy mix, identify energy conservation technologies, retrofit for energy conservation equipment etc.

In general, Energy Audit is the translation of conservative ideas into realities, by lending technically feasible solutions with economic and other organizational considerations within a specified time frame.

The primary objective of Energy Audit is to determine ways to reduce energy consumption per unit of product output or to lower operating costs. Energy Audit provides a "bench-mark" for managing energy in the organization and also provides the basis for planning a more effective use of energy throughout the organization.

Introduction

This project is the vision to make NBU campus energy efficient. NBU campus energy bill keeps up around INR 1.7-2.0 Crores per year. This amount is huge and thus naturally attracts attention when we understand that quite a lot of energy is being wasted, which in turn would mean that huge amount of financial resources is being wasted.

Making the campus energy efficient will not only help the University reduce its expenses but also helps us fulfil our moral responsibility of not wasting this precious resource, which is scarcely available to rest of the people of the country.

This would act as a prototype project, the lessons learnt here can be put to practice in the future as we progress and move to our 2nd campus at Jalpaiguri. We are confident that the results that will come out of this exercise are bound to be of interest to everyone and can be the first step to make NBU campus energetically the most efficient campus in India.

Energy Audit Objective

Primary: --

- 1) The first objective is to acquire and analyze data and finding the necessary consumption pattern of these facilities.
- 2) The second objective will be to calculate the wastage pattern based on the results of the first objective.
- 3) The final objective is to find and implement solutions that are acceptable and feasible.

Secondary: -

- 1) This would be our first exposure to this field hence experience gain would be vital.
- 2) This project will precede many follow up projects and hence helps to gain technical and management exposure required for future energy projects.
- 3) It is sure to help create a repertoire of vital contacts hence will develop interaction with alumni, faculty and students.

ENERGY MANAGEMENT

Contract Demand with WBSEDCL	1000 KVA
Transformer Capacity	1065 KVA
Connected Load (present)	840 KW

Electric consumption per year	<u>2017</u>	<u>2018</u>	<u>2019</u>
	1948748 kwh	1993472 kwh	2083176 kwh

Energy cost per year	<u>2017</u>	<u>2018</u>	<u>2019</u>
	Rs 17994748	Rs 17560530	Rs 19123559

Diesel consumption per year	<u>2017</u>	<u>2018</u>	<u>2019</u>
	1837.5 ltrs	1702.5 ltrs	1680.5 ltrs

Winter load per year (October to March)	<u>2017</u>	<u>2018</u>	<u>2019</u>
	862544 kwh	859902kwh	903458kwh

Summer load per year (April to September) kwh	<u>2017</u>	<u>2018</u>	<u>2019</u>
	1086204 kwh	1133570 kwh	1179718

Connected load in residences	126 KW
Load in administrative building	69 KW
Load in guest houses	45 KW
Connected load in Library	20 KW
Connected load in Hostels	190 KW
Connected load Street light load	16 KW
Connected Loads of water pumps	87 KW
Connected Loads in science block	181 KW
Connected Loads in arts block	80 KW

Connected Loads in University Press

26 KW

Average AC use time

08 hrs daily for four months

Percentage of LED lights to incandescent lights

25.27 %

Energy from alternative source
of roof

The University has already initiated for installation

this

top Solar Power Panels in different buildings of

University of 1000 KW capacity which is under

end of

construction and likely to be completed by the

lakhs

2020. It is expected to produce electricity of 11.0

unit/year.

Details of Electrical Load Patterns

Sl. No	Department /Block	No. of Tubes + Bulbs	No. of A/C	No. of Fans	No. of Projectors	No. of Photocopiers	Computers + Printers	Water Purifiers	LED fittings	Geyser s
1	Bengali	122	-	40	1	1	10	1	08	
2	English	65	-	38	2	1	11	1	6	
3	History	120	-	40	2	1	16	2	15	
4	Economics	52	1	25	2	1	16	1		
5	Commerce	85	2	39	3	2	15	1	4	
6	HRDC	65	2	20	2	2	5	3	2	
7	DLEE& local language	107	1	55	5	3	22	2	10	
8	Faculty council for PG ,arts commerce & law	10	1	9	-	2	3	1	20	
9	Philosophy	40	-	30	3	1	26	1		
10	Education	28	-	18	-	-	-	-	10	
11	Centre for women's studies	16	1	5	-	1	5	1		
12	SC,ST coaching centre	15	-	6	2	1	6	-		
13	Seminar hall (room no 109)	10	2	8	-	-	-	-		
14	Nepali	61	-	28	1	1	8	2		
15	Hindi	72	-	30	2	2	10	1		
16	Mass communication	70	-	40	1	1	30	1		
17	Sociology	68	-	32	1	1	10	2		
18	Political science	80	2	51	4	5	34	3		
19	Centre for innovative studies	92	2	40	-	1	24	1		
20	MBA	70	-	38	1	1	10	1		
21	Guest house	563	14	209	-	-	1	11		18
22	Distance education	87	2	40	-	5	36	2		
23	PG Hostels	1421	-	635	-	-	-	31		6
24	RS Hostels	251	-	92	-	-	-	6		2
25	Administrative building	-	26	259	3	29	141	5	444	1
26	Library	326	5	210	1	4	64	3		
27	Library science	105	-	47	1	2	18	1		

28	Physics	150	9	70	1	1	40	3		
29	Chemistry	170	14	90	4	2	40	4	80	
30	Geography	100	1	60	2	1	25	2	15	
31	Estate office	-	-	10	-	1	4	1	18	
32	Zoology	153	4	70	1	1	18	2		
33	Botany	181	9	75	1	1	20	2		
34	Life science	90	9	50	-	-	15	1		
35	Microbiology	70	6	32	1	1	15	2		
36	Biotechnology	72	8	32	1	1	20	1		
37	USIC	22	-	18	-	-	2	-		
38	CMEF	50	3	32	1	1	12	1	8	
39	Bio informatics	60	1	30	-	1	18	1		
40	Tea Science	120	-	55	-	2	20	2		
41	Food Technology	-	-	8	-	1	3	-	15	
42	Pharmacy	53	-	40	-	1	17	1	50	
43	Geology	40	-	37	-	1	16	1	48	
44	Math	95	3	60	1	2	20	2		
45	Anthropology	45	-	30	1	1	22	1		
46	Himalayan studies	45	2	40	1	2	18	1	20	
47	Health centre	20	1	10	-	1	3	1		
48	Faculty club	85	-	50	-	-	-	2		
49	Museum	204	-	40	-	1	3	1		
50	Engineering Branch	-	1	12	-	2	10	1	20	
51	Watch & Ward	12	-	5	-	1	1	-		
52	Computer science and Computer centre	110	8	65	1	3	50	2	22	
53	Cosmic Ray	40	4	15	-	1	6	1		
54	Vidyasagar Mancha	-	-	70	-	-	-	-	74	
55	Rabindra Bhanu Mancha	24	-	20	-	-	-	-	-	
56	Street Lights	104 SV &Meta I	-	-	-	-	-	-	340	
57	Quarters	1225	5	780	-	-	140	110	560	42

LED Lighting at Administrative Building.



LED Lighting at Finance Branch



LED Lighting at Engineering Branch



LED Street lights



LED Lights in Residential Quarter



LED Lighting at Vidyasagar Mancha



Roof Top Solar Panels



Eastern Sector Control Room



Diesel Generator

Transformer



Weston Sector Control Room



Transformer



Salbagan Sector Control Room

Diesel Generator



Transformer



Recommendations

- (1) Installation of solar water heaters for the hostels and residential quarters.
- (2) Replacement of rheostatic regulators with electronic--- However, studies done at NBU Campus have shown that the electronic regulator is more energy efficient but experience suggests that resistive regulators are more durable. Though it is still mentioned here as a possible option.
- (3) Installation of biogas plant at NBU Campus.

- (4) Installation of Solar Power Panels which are renewable in nature, instead of using conventional power--Recently a 1000 KW grid connected Solar Power Plant at the roof top of various buildings of this University has been initiated and likely to be completed very soon, thus a huge amount of renewable power will be generated at this campus.
- (5) Installation of energy efficient LED lighting instead of using conventional lighting.
- (6) Energy auditing inside the campus has to be done on a regular basis and the reports should be made public to generate awareness. We feel that this is only the tip of the iceberg, and an enormous amount of work can be done on the Campus in terms of energy efficiency.