



# **P. N. Das College**



## **Energy Audit 2021-22**

**Prepared by**

**West Bengal Renewable Energy Development Agency, Kolkata**

# West Bengal Renewable Energy Development Agency (WBREDA)

Department of Non-Conventional & Renewable Energy Sources, Govt. of West Bengal  
Bikalpa Shakti Bhawan, J-1/10, EP & GP Block, Sector-V, Salt Lake Electronics Complex,  
Kolkata - 700091.

Memo no: WBREDA//109/MISC / 1006

Date: 30 / 01 / 2023

To  
The Principal,  
P.N. Das College,  
Palta, District-24 Parganas (N)

Subject: Optimal utilization of energy through utility grid, obtained through energy audit exercises

Sir,

Apropos above subject and communications from your end, following observations may please be noted for your kind appraisal and compliance.

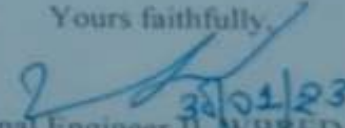
#### Observations:

Through energy audit, it is observed that from energy consumption point of view, maximum energy consumption takes place from 200 nos of ceiling fans, which are in operation for 140 days in a year. The capacity of existing ceiling fan is 80 Watt each.

#### Recommendations:

1. Presently, Brushless Direct Current (BLDC) ceiling fans are available in the market with 25 to 30 Watt capacity each. So, replacement of existing ceiling fans in phase manner (as per availability of relevant fund with the college authority) can save substantial amount of electricity.
2. For lighting fixtures, among all available fixtures Tubular Fluorescent Lamp (TFL) is the best in respect of balancing energy consumption, visibility and health issues. So, all lighting fixtures may be replaced by TFL [T5/T8 etc.] in phase manner (as per availability of relevant fund with the college authority), which can save substantial amount of electricity.
3. For replacement/procurement of air conditioner, the size of the room, its average occupancy should be considered to decide the capacity of the air conditioner. Regular cleaning of filter of air conditioner must be ensured. As it is observed that daily operation hours for air conditioner is four hours, it is preferred to have 3 star/4star air conditioner (not five star; because of low use hours).
4. To reduce electricity bill further, a 20 kWp (shadow free roof space requirement will be 2400 sq. ft.) roof top grid-connected solar power plant may be installed.

Yours faithfully,

  
30/01/23  
Divisional Engineer-II, WBREDA

Divisional Engineer  
WBREDA

## ● **Energy Observation & Management**

The college uses 1,47,648 KWH electricity per year. Therefore, the college has inculcated some conventional sources into renewable assets by installing 2 CFL bulbs in library, 18 LED bulbs, 4 fluorescent tube-lights, 7 incandescent bulb, 292 LED lights, 34 LED panel lights, 1 LED street light, 1 tungsten bulb of 100 watt in the corridor and 4 solar street lights (50 watt/6 hr) for illumination thereby saving electricity to some extent. The college has installed sanitary napkin vending machine which is a great initiative which consumes 12 watt per 6 hour. Domestic cylinder is being used in the canteen as energy source. The computers are kept in power-saving mode when not in use. 2 DGs of 35 KVA and 25 KVA power is used only at the time of load-shedding. Earth pit has been come out of soil. No fossil fuel and kerosene is being used by the college.

## **Recommendations**

Yearly once energy audit can be conducted to plan actions for energy conservation. Earth pit test is highly recommended. DG fuel be reduced by introduction of rooftop solar plant [1MW (500+500 KW)] is operational. Maximum awareness by displaying messages about energy savings and use of natural lights and natural ventilation are promoted.



## Photographs on Environment Consciousness



Street Solar Lamp



Green generator





Single Switch for each Class



Pump Power Auto Cut and Auto On

## ENERGY AUDIT

BUILDING NAME	ROOM NO/ NAME	ELECTRICAL DEVICE/ ITEMS	NUMBER	POWER	USAGE TIME(HR/DAY)
1ST FLOOR, MAIN BUILDING	A-201	LIGHT (LED)	12	20 WATT	5HR
		FAN	10	80 WATT	5HR
		PROJECTOR	1	150 WATT	2HR
		AMPLIFIER	1	125 WATT	2HR
		SOUND BOX	4	100 WATT	2HR
	A-202	LIGHT (LED)	4	20 WATT	5HR
		FAN	2	80 WATT	5HR
		WALL FAN SMALL	2	50 WATT	5HR
		PROJECTOR	1	150 WATT	2HR
	A-203	LIGHT (LED)	6	20 WATT	5HR
		FAN	6	80 WATT	5HR
	A-204	LIGHT (LED)	4	20 WATT	5HR
		FAN	4	80 WATT	5HR
		PROJECTOR	1	150 WATT	2HR
	STOCK ROOM	LIGHT (LED)	1	20 WATT	2HR
		FAN	1	80 WATT	2HR
	OFFICE	LIGHT (LED)	6	20 WATT	6HR
		LED BULB	3	9 WATT	2HR
		FAN	4	80 WATT	6HR
		WALL FAN SMALL	3	50 WATT	6HR
		WALL FAN BIG	2	1000 WATT	4HR
		COMPUTER	6	200 WATT	6HR
		PRINTER	5	40 WATT	6HR
		A.C.- 2 TON	2	2100 WATT	4HR
		WATER COOLER	1	300 WATT	4HR
		AQUAGUARD	1	45 WATT	6HR
		CCTV CAMERA UNIT	2	15 WATT	6HR
		XEROX MACHINE	1	930 WATT	6HR
		SANITIZATION MACHINE	1	10 WATT	6HR
		ACCOUNTANT'S ROOM	LIGHT (LED)	1	20 WATT
	FAN		1	80 WATT	6HR
	WALL FAN SMALL		1	50 WATT	6HR
	COMPUTER		2	150 WATT	6HR
	PRINTER		1	40 WATT	6HR
	PRINCIPAL'S OFFICE	ROUTER	1	6 WATT	6HR
		PROJECTOR	1	150 WATT	2HR
		LIGHT (LED)	4	20 WATT	5HR
		LED BULB	1	9 WATT	5HR
		CFL BULB	1	50 WATT	1HR
		WALL FAN SMALL	1	50 WATT	5HR
		COMPUTER	3	200 WATT	5HR
		PRINTER	2	40 WATT	5HR
A.C.- 2 TON		1	2100 WATT	4HR	
CCTV CAMERA UNIT		1	15 WATT	5HR	
MONITOR OF CCTV		1	100 WATT	6HR	
CPU OF CCTV	1	100 WATT	6HR		
CORRIDOR	ROUTER	3	6 WATT	6HR	
	LIGHT (LED)	7	20 WATT	4HR	
	FAN	1	80 WATT	4HR	
	ROUTER	1	6 WATT	6HR	
	DOOR BELL	1	2 WATT	1HR	
	BELL	1	35 WATT	1HR	
	CCTV CAMERA UNIT	2	15 WATT	6HR	
		TUNGSTEN BULB	1	100 WATT	1HR

BUILDING NAME	ROOM NO/ NAME	ELECTRICAL DEVICE/ ITEMS	NUMBER	POWER	USAGE TIME(HR/DAY)
<b>GROUND FLOOR, MAIN BUILDING</b>	A-115	LIGHT (LED)	5	20 WATT	5HR
		FAN	6	80 WATT	5HR
	A-114	LIGHT (LED)	6	20 WATT	5HR
		FAN	6	80 WATT	5HR
	A-113	LIGHT (LED)	6	20 WATT	5HR
		FAN	6	80 WATT	5HR
	A-112	LIGHT (LED)	7	20 WATT	5HR
		FAN	6	80 WATT	5HR
	MEDICAL UNIT	LIGHT (LED)	1	20 WATT	3HR
		WALL FAN SMALL	2	50 WATT	3HR
	CUBICLE	LIGHT (LED)	7	20 WATT	5HR
		EXHAUST FAN	2	40 WATT	2HR
		WALL FAN SMALL	11	50 WATT	5HR
		COMPUTER	2	150 WATT	5HR
		ROUTER	1	6 WATT	5HR
		BIOMETRIC	1	3.5 WATT	6HR
	TEACHER'S ROOM	LIGHT (LED)	6	20 WATT	5HR
		BULB (LED)	3	9 WATT	5HR
		FAN	6	80 WATT	5HR
		WALL FAN BIG	3	1000 WATT	5HR
		A.C.- 2 TON	2	2100 WATT	4HR
		WATER COOLER	1	300 WATT	5HR
		REFRIGERATOR	1	1000 WATT	5HR
		AQUAGUARD	2	45 WATT	5HR
	COMPUTER LAB	LIGHT (LED)	6	20 WATT	5HR
		FAN	6	80 WATT	5HR
		COMPUTER	8	200 WATT	4HR
		SYNTHESIZER	1	1000 WATT	1HR
	TOILET	BULB (LED)	4	9 WATT	5HR
	CORRIDOR	LIGHT (LED)	5	20 WATT	6HR
		WATER COOLER	1	300 WATT	6HR
		AQUAGUARD	1	45 WATT	6HR
		ROUTER	1	6 WATT	6HR
CCTV CAMERA UNIT		2	15 WATT	6HR	

BUILDING NAME	ROOM NO/ NAME	ELECTRICAL DEVICE/ ITEMS	NUMBER	POWER	USAGE TIME(HR/DAY)
OLD BUILDING	A-101	LIGHT (LED)	3	20 WATT	5 HR
		FAN	3	80 WATT	5 HR
	A-101/A	LIGHT (LED)	1	20 WATT	5 HR
		FAN	1	80 WATT	5 HR
	A-102 (Girl's Common Room)	LIGHT (LED)	4	20 WATT	5 HR
		FAN	2	80 WATT	5 HR
		SANITARY NAPKIN VENDING MACHINE	1	12 WATT	6 HR
	NSS	LIGHT (LED)	1	20 WATT	5 HR
		FAN	1	80 WATT	5 HR
	CORRIDOR	LIGHT (LED)	9	20 WATT	5 HR
		FAN	3	80 WATT	5 HR
		CCTV CAMERA UNIT	2	15 WATT	6 HR
	A-104 (SANSKRIT)	LIGHT (LED)	4	20 WATT	5 HR
		FAN	1	80 WATT	5 HR
		WALL FAN SMALL	2	50 WATT	5 HR
	A-105 (HINDI)	LIGHT (LED)	4	20 WATT	5 HR
		FAN	5	80 WATT	5 HR
	A-106	LIGHT (LED)	6	20 WATT	5 HR
		FAN	7	80 WATT	5 HR
	OLD CANTEEN	LIGHT (LED)	2	20 WATT	5 HR
		FAN	2	80 WATT	5 HR
		WALL FAN SMALL	2	50 WATT	5 HR
		MICRO OVEN	1	1000 WATT	1HR
	NCC	LIGHT (LED)	2	20 WATT	5 HR
		FAN	1	80 WATT	5 HR
	GUARD'S ROOM	LIGHT (LED)	1	20 WATT	10HR
		FAN	1	80 WATT	10HR
		WALL FAN SMALL	1	50 WATT	10 HR
		BULB (LED)	2	9 WATT	5 HR
		TELEVISION	1	60 WATT	3 HR
REFRIGERATOR		1	1000 WATT	10 HR	



BUILDING NAME	ROOM NO/ NAME	ELECTRICAL DEVICE/ ITEMS	NUMBER	POWER	USAGE TIME(HR/DAY)
LIBRARY BUILDING	IQAC	LIGHT (LED)	5	20 WATT	5 HR
		FLUORESCENT TUBE LIGHT	1	40 WATT	5 HR
		FAN	4	80 WATT	5 HR
		PROJECTOR	1	150 WATT	5 HR
		AMPLIFIER	1	125 WATT	5 HR
		A.C. - 2 TON	2	2100 WATT	5 HR
		ROUTER	1	6 WATT	5 HR
	L-204	SOUND BOX	2	100 WATT	5 HR
		LIGHT (LED)	4	20 WATT	5 HR
		FAN	4	80 WATT	5 HR
		PROJECTOR	1	150 WATT	2 HR
		AMPLIFIER	1	125 WATT	2 HR
	L-203	SOUND BOX	2	100 WATT	2 HR
		LIGHT (LED)	4	20 WATT	5 HR
		FAN	4	80 WATT	5 HR
		PROJECTOR	1	150 WATT	2 HR
		COMPUTER	1	200 WATT	2 HR
	L-202	LIGHT (LED)	4	20 WATT	5 HR
		FAN	4	80 WATT	5 HR
		PROJECTOR	1	150 WATT	2 HR
	L-201	LIGHT (LED)	4	20 WATT	5 HR
		FAN	4	80 WATT	5 HR
		PROJECTOR	1	150 WATT	2 HR
		SOUND BOX	2	100 WATT	2 HR
	CHEAP STORE	LIGHT (LED)	2	20 WATT	2 HR
		FAN	1	80 WATT	2 HR
		XEROX	1	930 WATT	2 HR
	STACK ROOM	LIGHT (LED)	12	20 WATT	6 HR
		BULB (CFL)	1	50 WATT	6 HR
		BULB (LED)	1	9 WATT	6 HR
		FAN	4	80 WATT	6 HR
		CCTV CAMERA UNIT	1	15 WATT	6 HR
	LIBRARIAN'S ROOM	LIGHT (LED)	2	20 WATT	6 HR
		FLUORESCENT TUBE LIGHT	1	40 WATT	6 HR
		FAN	2	80 WATT	6 HR
		COMPUTER	1	200 WATT	6 HR
		PRINTER	1	40 WATT	6 HR
		SWITCH	1	15 WATT	6 HR
	TOILET	BULB (LED)	2	9 WATT	6 HR
	CORRIDOR	LIGHT (LED)	11	20 WATT	6 HR
		STREET LIGHT (LED)	1	50 WATT	6 HR
		EXHAUST FAN	1	40 WATT	2 HR
		AQUAGUARD	1	45 WATT	6 HR
		ROUTER	1	6 WATT	6 HR
		MOTOR	1	2 H.P.	1 HR
		CCTV CAMERA UNIT	1	15 WATT	6 HR
	READING ROOM	LIGHT (LED)	19	20 WATT	6 HR
FAN		14	80 WATT	6 HR	
COMPUTER		7	150 WATT	6 HR	
PRINTER		1	40 WATT	6 HR	
ROUTER		1	6 WATT	6 HR	
CCTV CAMERA UNIT		1	15 WATT	6 HR	
BOY'S COMMON ROOM	LIGHT (LED)	4	20 WATT	4 HR	
	INCANDESCENT BULB	2	200 WATT	4 HR	
	WALL FAN SMALL	4	50 WATT	4 HR	

BUILDING NAME	ROOM NO/ NAME	ELECTRICAL DEVICE/ITEMS	NUMBER	POWER	USAGE TIME(HR/DAY)
<b>LADIES HOSTEL BUILDING</b>	LADIES HOSTEL ROOM 1	LIGHT (LED)	2	20 WATT	5 HR
		FAN	2	80 WATT	5 HR
	LADIES HOSTEL ROOM 2	LIGHT (LED)	2	20 WATT	5 HR
		FAN	2	80 WATT	5 HR
	LADIES HOSTEL ROOM 3	LIGHT (LED)	2	20 WATT	5 HR
		FAN	2	80 WATT	5 HR
	LADIES HOSTEL ROOM 4	LIGHT (LED)	2	20 WATT	5 HR
		FAN	2	80 WATT	5 HR
CORRIDOR	LIGHT (LED)	2	20 WATT	5 HR	
TOILET	LIGHT (LED)	2	20 WATT	5 HR	

BUILDING NAME	ROOM NO/ NAME	ELECTRICAL DEVICE/ITEMS	NUMBER	POWER	USAGE TIME(HR/DAY)
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<b>AUDITORIUM BUILDING</b>	AUDITORIUM HALL	LIGHT (LED)	1	20 WATT	4 HR/ WEEK
		FLUORESCENT TUBE LIGHT	2	40 WATT	4 HR/ WEEK
		LED METAL	2	50 WATT	1 HR/ MONTH
		PANEL LIGHT (LED)	10	15 WATT	4 HR/ WEEK
		PANEL LIGHT (LED)	24	9 WATT	4 HR/ WEEK
		FAN	1	80 WATT	4 HR/ WEEK
		WALL FAN SMALL	8	50 WATT	4 HR/ WEEK
		PROJECTOR	1	150 WATT	4 HR/ WEEK
		AMPLIFIER	1	125 WATT	4 HR/ WEEK
		A.C. - 2 TON	4	2100 WATT	4 HR/ WEEK
		ROUTER	1	6 WATT	4 HR/ WEEK
		MICROPHONE	4	15 WATT	4 HR/ WEEK
		SOUND BOX	4	100 WATT	4 HR/ WEEK
		CORRIDOR & STAIRCASE	LIGHT (LED)	4	20 WATT
	FAN		1	80 WATT	4 HR
	GEOGRAPHY DEPARTMENT	LIGHT (LED)	11	20 WATT	5 HR
		FAN	10	80 WATT	5 HR
		PROJECTOR	1	150 WATT	5 HR
		CCTV CAMERA UNIT	1	15 WATT	5 HR
		COMPUTER	4	200 WATT	5 HR
	GYM	LIGHT (LED)	4	20 WATT	5 HR
		FAN	4	80 WATT	5 HR
		CCTV CAMERA UNIT	1	15 WATT	5 HR
	RECEPTION	LIGHT (LED)	1	20 WATT	6 HR
WALL FAN SMALL		2	50 WATT	6 HR	

	UNION ROOM	LIGHT (LED)	2	20 WATT	2 HR
		FAN	1	80 WATT	2 HR
		BULB (LED)	1	9 WATT	6 HR

BUILDING NAME	ROOM NO/ NAME	ELECTRICAL DEVICE/ITEMS	NUMBER	POWER	USAGE TIME(HR/DAY)
<b>SCIENCE BUILDING</b>	C-101	LIGHT (LED)	4	20 WATT	5 HR
		INCANDESCENT BULB	1	100 WATT	1 HR
		FAN	4	80 WATT	5 HR
		PROJECTOR	1	150 WATT	1 HR
		LAB EQUIPMENTS	10	50 WATT	5 HR
	C-102	LIGHT (LED)	6	20 WATT	5 HR
		FAN	6	80 WATT	5 HR
	C-103	LIGHT (LED)	4	20 WATT	5 HR
		FAN	4	80 WATT	5 HR
		PROJECTOR	1	150 WATT	5 HR
		COMPUTER	1	200 WATT	5 HR
	C-104	LIGHT (LED)	2	20 WATT	5 HR
		FAN	2	80 WATT	5 HR
	TABLE TENNIS ROOM	LIGHT (LED)	4	20 WATT	5 HR
		FAN	2	80 WATT	5 HR
	C-105	LIGHT (LED)	4	20 WATT	5 HR
		FAN	4	80 WATT	5 HR
	C-106	LIGHT (LED)	4	20 WATT	5 HR
		FAN	4	80 WATT	5 HR
	C-107	LIGHT (LED)	4	20 WATT	5 HR
		FAN	4	80 WATT	5 HR
	TOILET	INCANDESCENT BULB	3	100 WATT	5 HR
	CORRIDOR	LIGHT (LED)	7	20 WATT	5 HR
		INCANDESCENT BULB	1	100 WATT	5 HR
		WALL FAN SMALL	1	50 WATT	1 HR
		BELL	1	30 WATT	1 HR
		ROUTER	2	6 WATT	6 HR
		CCTV CAMERA UNIT	2	15 WATT	6 HR
	C-108	LIGHT (LED)	4	20 WATT	5 HR
		FAN	4	80 WATT	5 HR
	C-109	LIGHT (LED)	3	20 WATT	5 HR
		FAN	2	80 WATT	5 HR
C-110	LIGHT (LED)	3	20 WATT	5 HR	
	FAN	2	80 WATT	5 HR	
	PROJECTOR	1	150 WATT	5 HR	
CUBICLE	LIGHT (LED)	3	20 WATT	5 HR	
	FAN	2	80 WATT	5 HR	
BUILDING NAME	ROOM NO/ NAME	ELECTRICAL DEVICE/ITEMS	NUMBER	POWER	USAGE TIME(HR/DAY)
<b>COLLEGE PREMISES</b>	COLLEGE PREMISES	BULB (LED)	1	9 WATT	1 HR
		SOLAR STREET LIGHT	4	50 WATT	6 HR

## **Conclusion**

This audit involved extensive consultation with all the members of the campus, interactions with key personnel on wide range of issues related to Environmental aspects. The P N Das College has Environmental Committee for sustainable use of resources. The college is considering the environmental impacts of most of its actions and makes an intensive effort to act in an environmentally responsible manner. Even though the college does perform quite well, the recommendations in this report highlight many ways in which the college can work to improve its actions and become a more sustainable institution. The audit team opines that the overall site is maintained well from environmental perspective. There is no major observations but few things are important to initiate urgently are waste management plan, water balance cycle, periodic inspection of buildings and introduction of solar power panels to increase the energy efficiency.

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