Annexure 2

Audit Reports

Director
Tula's Institute, Dehradun

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AUDIT NOTES – REPORT NO.....

(ISO 50001:2018)

Name of the Organization	Tula's Institute Dehradun		
Address	Mehra ka Gaon, PO Selaqui Dhoolkot Dehradun Uttarakhand 248011		
Site Address (If any)	www.tulas.edu.in		
E mail id	Director@tulas.edu.in		
Unit Head. Name / Contact Person	Dr. Nishant Saxena Director & Dean Academics		
Telephone/Fax	01352699300		
Audit Scope	An energy audit is a study of an organisation 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.		
Audit standard	**ISO 50001:2018**		
No. of Skilled workers(Required)	4		
No. of unskilled workers(Required)	1		
No. of contract workers	Nil		
No. of part time workers	Nil		
Shift details	1		
Audit Team	Audit Team Leader:	Audit Duration: Man day(s) :	3
Date of Audit	16-05-2022- 18-05-2022		
Audit Criteria	*Organization's guidelines, and applicable legal & other requirements related to Applicable Standard.*		
Purpose of Audit	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.		

This report is based on random samples of energy usage and therefore not every aspect of the organization's activities has necessarily been assessed. Hence where no non-conformities are reported it does not follow that none exist.

Legal, Statutory & Regulatory Requirements	Applicability of Air Pollution Act, Enviornment Pollution Act, Water Pollution Act and the organization is a small organization also working on contract basis-legal requirements are fulfilled by the company employees.

For QRO Certification LLP
Authorised Signatory

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Tula's Institute, Dehradun

Summary of Audit & Observations

General Details

The Tula's Institute Dehradun entrusted the work of conducting a detailed Energy Audit of campus with the main objectives are

as bellows:

- To study the present pattern of energy consumption
- To identify potential areas for energy optimization
- To recommend energy conservation proposals with cost benefit analysis.

- Scope of Work, Methodology and Approach:

Scope of work and methodology were as per the proposal. While undertaking data collection, field trials and their analysis, due care was always taken to avoid abnormal situations so as to generate normal/representative pattern of energy consumption at the facility.

- Approach to Energy Audit:

We focused our attention on energy management and optimization of energy efficiency of the systems, sub systems and equipments. The key to such performance evaluation lies in the sound knowledge of performance of equipments and system as a whole.

- Energy Audit:

The objective of Energy Audit is to balance the total energy inputs with its use and to identify the energy conservation opportunities in the stream. Energy Audit also gives focused attention to energy cost and cost involved in achieving higher performance with technical and financial analysis. The best alternative is selected on financial analysis basis.

Energy Audit Methodology: Energy Audit Study is divided into following steps

1. Historical Data Analysis:

The historical data analysis involves establishment of energy consumption pattern to the established base line data on energy consumption and its variation with change in production volumes.

2. Actual measurement and data analysis:

This step involves actual site measurement and field trials using various portable measurement instruments. It also involves input to output analysis to establish actual operating equipment efficiency and finding out losses in the system.

3. Identification and evaluation of Energy Conservation Opportunities:

This step involves evaluation of energy conservation opportunities identified during the energy audit. It gives potential of energy saving and investment required to implement the proposed modifications with payback period.

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Energy Consumption Profile

The salient observations and recommendations are given below.

1. Tula's Institute- Engineering & Management college uses energy in the following forms:

   a. Electricity from Uttarakhand power corporation limited – Connection type- RTS-2 Other non- domestic 25kW

   b. D-G set (320 kVA+ 250kVA+125kVA)

   c. Solar water heaters in hostels- 8000 litre (Water tube type)

Major electrical energy is used for various applications, like:

- Computers
- Lighting
- Air-Conditioning
- Fans
- Other Lab Equipment
- Printers
- Xerox machines
- CCTV
- UPS
- LCD Projector
- Router system
- Flood light
- Pumping motor

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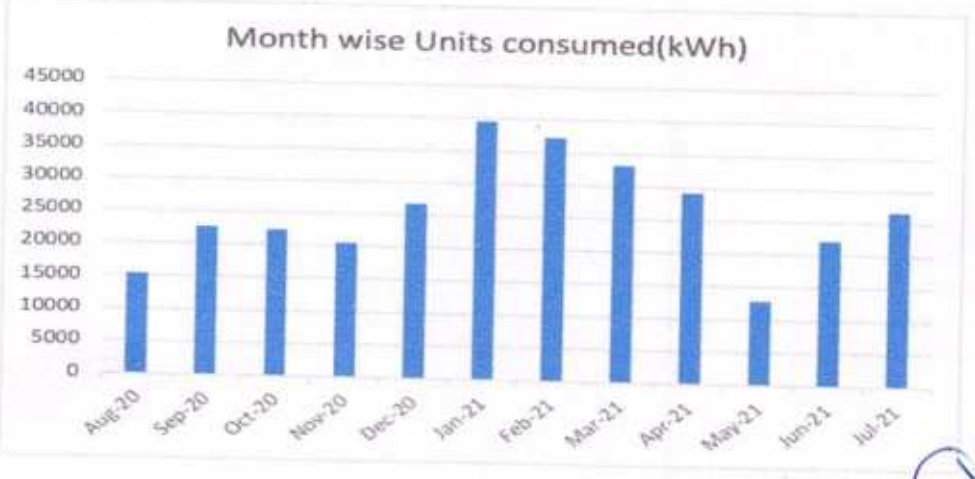
Historical Data Analysis

Study of Variation of Monthly Units consumption & Power Factor:

Variation in Units Consumption & Power Factor (PF)

S.No	Month	No. Units (kWh)	Power Factor
1	September 21	15396	0.96
2	October 21	22616	0.92
3	November 21	22302	0.99
4	December 21	20418	0.99
5	January 22	26628	0.99
6	February 22	39610	0.95
7	March 22	37284	0.94
8	April 22	33268	0.95
9	May 22	29168	0.94
10	June 22	12928	0.94
11	July 22	22128	0.95
12	August 22	26740	0.94

Month- wise Unit Consumption



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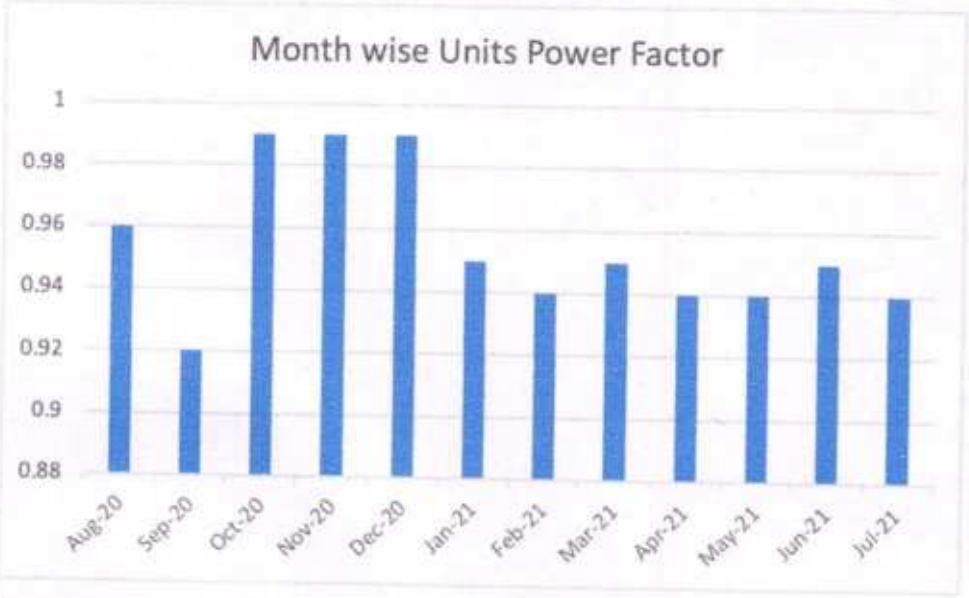
Power Factor Variation



Conclusion: Variation in units consumed and power factor- The irregular variation in the total units consumed month-wise is due to the Covid pandemic (Third wave) situation, the college premises was partially operated during most of the time

The relatively low value of the power factor is mainly due to the lightning lamps like florescent lamp etc.

Study of Month wise Electricity Bill Variation:

S.No	Month	Electricity Bill Amount (Rs.)
1	September 21	98123
2	October 21	114968
3	November 21	139866
4	December 21	121939
5	January 22	159380
6	February 22	133138
7	March 22	103129
8	April 22	178303
9	May 22	192137
10	June 22	194092

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11	July 22	126735

Conclusion:- Variation in Electricity Bill- The irregular variation in the Electricity Bill month-wise is due to the Covid pandemic(Third wave) situation, the college premises was partially operated during most of the time

Month-wise Maximum demand

Study of Month wise Load Factor Variation

Load Factor = KWh/ (KW/hours in the period/ number of days in the billing cycle)

S.No	Month	Load Factor
1	September 21	35
2	October 21	34
3	November 21	32.72
4	December 21	32
5	January 22	32.28
6	February 22	47
7	March 22	34
8	April 22	35

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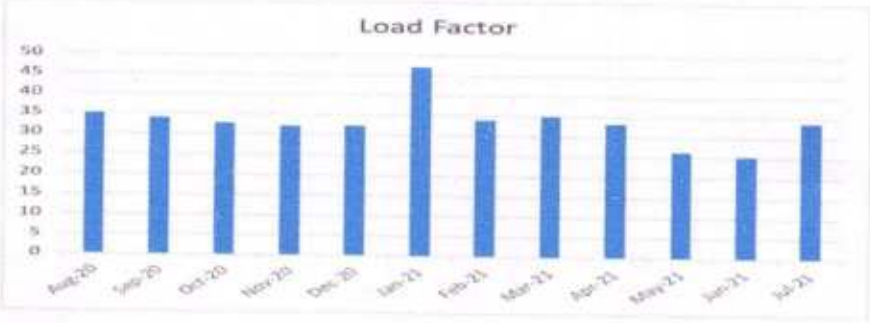
9	May 22	33.24
10	June 22	26.45
11	July 22	25.38
12	August 22	33.80

Load Factor Variation



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Actual Measurements and its Analysis

Block A

S.No	Name of Appliance	Power Rating (Watt)	Quantity	Power Consumption (Watt)	Average Usage per Day Hr.	Energy Consumption/day (Wh)
1	Florescent Lamps	41	38	1558	2	3116
2	Ceiling Fans	70	20	1400	5	7000
3	Desktop Computers	200	20	4000	4	16000
4	Air Conditioner	3500	15	52500	2.5	131250
5	Printers	30	15	450	1	450
6	Xerox Machine	200	2	400	0.5	200
7	Exhaust Fans	50	8	400	3	1200

Block B

S.No	Name of Appliance	Power Rating (Watt)	Quantity	Power Consumption (Watt)	Average Usage per Day Hr.	Energy Consumption/day (Wh)
1	LED Lights	10	830	8300	1	8300
2	Air Conditioner	5250	5	26250	1	26250
3	Ceiling Fans	70	10	700	6	4200
4	Printer	40	4	160	0.25	40
5	Centralised AC	3500	42.5	148750	0.5	74375
6	Music System with console	4000	1	4000	1	4000

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Block C

S.No	Name of Appliance	Power Rating (Watt)	Quantity	Power Consumption (Watt)	Average Usage per Day Hr.	Energy Consumption/day (Wh)
1	Florescent Lamps	41	95	3895	3	116775
2	Ceiling Fans	70	69	4830	5	24150
3	Desktop Computers	200	14	2800	2	5600
4	Air Conditioner	3500	5	17500	2	35000
5	Printers	30	3	90	1	90
6	Xerox Machine	200	1	200	1	200
7	Exhaust Fans	50	2	100	4	400
8	Water Cooler with RO	500	1	500	5	2500
9	LED lights	18	20	360	2	720

Block D

S.No	Name of Appliance	Power Rating (Watt)	Quantity	Power Consumption (Watt)	Average Usage per Day Hr.	Energy Consumption/day (Wh)
1	Florescent Lamps	41	100	4100	2.5	10250
2	Ceiling Fans	70	77	5390	4	21560
3	Desktop Computers	200	5	1000	2	2000
4	Air Conditioner	3500	5	17500	2	35000
5	Printers	30	3	90	1	90
6	Exhaust Fans	50	4	200	3	600
7	LED Lights	18	25	450	2	900

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Block E

S.No	Name of Appliance	Power Rating (Watt)	Quantity	Power Consumption (Watt)	Average Usage per Day Hr.	Energy Consumption/day (Wh)
1	Florescent Lamps	41	82	3362	2	6724
2	Ceiling Fans	70	47	3290	4	13160
3	Desktop Computers	200	10	2000	2	4000
4	Air Conditioner	3500	3	10500	1	10500
5	Printers	30	5	150	1	150
6	Exhaust Fans	50	6	300	4	1200

Block F

S.No	Name of Appliance	Power Rating (Watt)	Quantity	Power Consumption (Watt)	Average Usage per Day Hr.	Energy Consumption/day (Wh)
1	Florescent Lamps	41	99	4059	2	8118
2	Ceiling Fans	70	51	3570	4	14280
3	Desktop Computers	200	4	800	2	1600
4	Air Conditioner	3500	0	0	0	0
5	Printers	30	2	60	1	60
6	Exhaust Fans	50	2	100	4	400

Block H

S.No	Name of Appliance	Power Rating (Watt)	Quantity	Power Consumption (Watt)	Average Usage per Day Hr.	Energy Consumption/day (Wh)
1	Florescent Lamps	41	128	5248	2	10496
2	Ceiling Fans	70	81	5670	4	22680

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3	Desktop Computers	200	48	9600	2	19200
4	Air Conditioner	3500	6	21000	1	21000
5	Printers	30	8	240	1	240
6	Exhaust Fans	50	4	200	4	800
7	LED Lights	10	20	200	6	1200

Block G

S.No	Name of Appliance	Power Rating (Watt)	Quantity	Power Consumption (Watt)	Average Usage per Day Hr.	Energy Consumption/day (Wh)
1	Florescent Lamps	41	35	1435	2	2870
2	Ceiling Fans	70	43	3010	4	12040
3	Desktop Computers	200	5	1000	2	2000
4	Water Cooler with RO	500	1	500	5	2500
5	Printers	30	8	240	1	240
6	Exhaust Fans	50	4	200	4	800
7	LED Lights	10	20	200	6	1200

Block I

S.No	Name of Appliance	Power Rating (Watt)	Quantity	Power Consumption (Watt)	Average Usage per Day Hr.	Energy Consumption/day (Wh)
1	Florescent Lamps	41	75	3075	2	6150
2	Ceiling Fans	70	49	3430	4	13720
3	Desktop Computers	200	462	92400	3	277200
4	Water Cooler with RO	500	1	500	5	2500
5	Printers	30	4	120	1	120
6	Exhaust Fans	50	6	300	4	1200
7	LED Lights	10	25	250	6	1500

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Block J

S.No	Name of Appliance	Power Rating (Watt)	Quantity	Power Consumption (Watt)	Average Usage per Day Hr.	Energy Consumption/day (Wh)
1	Florescent Lamps	41	53	2173	2	4346
2	Ceiling Fans	70	58	4060	4	16240
3	Desktop Computers	200	5	1000	3	3000
4	Water Cooler with RO	500	1	500	5	2500
5	Printers	30	4	120	1	120
6	Exhaust Fans	50	4	200	4	800
7	LED Lights	10	5	50	4	200

Boys Hostel (BH1- BH4) & Girls Hostel

S.No	Name of Appliance	Power Rating (Watt)	Quantity	Power Consumption (Watt)	Average Usage per Day Hr.	Energy Consumption/day (Wh)
1	Connected Load per room	110	50	5500	5	27500* 5
2	Air Conditioner	3500	4	14000	3	42000*5
3	Load Washrooms	120	4	480	6	2880*5
4	Common Room	370	2	740	3	2220*5
5	Miscellaneous (Water cooler & lobby lights & street lights)	340	2	680	6	4080*5

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Miscellaneous Load Centres

Building names	Total Connected Load	Average Usage per Day Hr.	Energy Consumption/day (Wh)
Tula' s Guest House	52190	2	104380
Faculty Quarters	43550	2	87100
Central Mess	10600	4	42400
Cafetaria & Street Lights	7100	5	35500

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Total Energy Consumption of the college premises

S.no	Block	Energy Consumption per day(kWh)	Energy Consumption per Month	Tariff per unit	Total Cost of Electricity
1	A	159.21	4770	Rs 5.6	Rs 281904
2	B	117.165	3510		
3	C	185.435	5550		
4	D	70.4	2100		
5	E	35.734	1050		
6	F	24.458	720		
7	G	21.65	630		
8	H	75.616	2250		
9	I	302.39	9060		
10	J	27.20	810		
11	Hostels	393.40	11790		
12	Miscellaneous Load centres	269.38	8100		
Total Units per month			50340 +-(5%)		

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Energy Saving Proposals

Energy saving proposal -1- Use of Energy efficient lightings

Lighting load before replacement

S. NO	LOCATION/ LIGHTING	TOTAL NUMBERS	Power Rating (watts)	Energy Consumption per Day(kWh)
1.	Tube lights	706	41	168.44
2.	Street Light High pressure sodium lamps	8	400	16
3.	LED Street light with out sensors	20	100	18

Calculations: - Replacement of Florescent lamps with LED tube lights (18 Watts each)

Energy consumption per month before replacement = 706*41*1.95*30 kWh

= 1693.341 kWh (units)

After replacement = 706*18*1.95*30 kWh

= 743.418 kWh (units)

Saving in units per month = 1693- 743 units

= 950 units

Cost savings = 950* 5.6 = 5319 Rs

Investment made in Led tube lighting. = 706 *250= Rs 176500

Payback period of Led-tube light = 176500/5319

= 33.18 months

= 2.75 year

Average lifecycle of 18 Watt LED tube light = 4-5 Years

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Replacement of Street light -Sodium vapour/ Mercury/ Halogen with LED street light (100 Watts each)

Energy consumption per month before replacement = 8*400*5 *30 kWh

= 480 kWh (units)

After replacement = 8*100 *5*30 kWh

= 120 kWh (units)

Saving in units per month= 480- 120 units

= 360 units

Cost savings = 360* 5.6 = 2016 Rs

Investment made in Led street lighting = 8 *600= Rs 4800

Payback period of Led street light = 4800/360

= 13.33 months

= 1.11 year

Average lifecycle of 100 Watt LED street light= 2-3 Years

Replacement of Normal LED Street light with LED street light with day light sensors

Energy consumption per month before replacement = 20*100*9 *30 kWh

= 540 kWh (units)

After replacement = 8*100 *6*30 kWh

= 144 kWh (units)

Saving in units per month = 540- 144 units

= 396 units

Cost saving = 396* 5.6 = 2218 Rs

Investment made in Led light sensors = 20 *215= Rs 4300

Payback period of Led light sensors = 4300/2218

= 1.93 months

= 0.16 year

Average lifecycle of 100 watt LED day light sensors= 4.5 Years

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ENERGY SAVING PROPOSAL NO. 2- Use of Turbo Vents

Calculations

No of exhaust fans currently running= 40

Power consumption of one exhaust fan = 200 W

Energy consumption per month of 40 exhaust fans = 40 *200*4*30 = 960 kWh

Electricity bill per month = Rs. 960*5.6 = Rs 5376

Cost of one turbo vent with installation = Rs 8000

Cost of 40 turbo vents with installation = Rs. 320000

Payback period = 320000/5376= 59.52 months = 4.96 years

PARAMETER(PER Month)	BEFORE TURBO VENTS	AFTER Replacing TURBO VENTS
Energy consumption	960 (24 exhaust)	0
Electricity bill	5376	0

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General Recommendations:

1. All Class Rooms and labs to have Display Messages regarding optimum use of electrical appliances in the room like, lights, fans, computers and projectors. Save electricity. Display the stickers of save electricity, save nature everywhere in the campus. So that all stakeholders encouraged to save the electricity.
2. All projectors to be kept OFF or in idle mode if there will be no presentation slides.
3. All computers to have power saving settings to turn off monitors and hard discs, say after10 minutes/30 minutes.
4. The comfort/Default air conditioning temperature to be set between 24˚C to26˚C.
5. Lights in toilet area may be kept OFF during daytime
6. Usc AUTOMATIC POWER FACTOR CORRECTION (APFC) Panel FOR PF, need to use power saver circuits for AC.
7. Need to replace FTL by smart LED Tube
8. Need to replace ordinary refrigerator by BEE power saver refrigerator if possible.
9. Out of total electricity bill paid, 53 percentage are actual energy utilized charges and remaining expense belongs to additional taxes on energy consumption
10. Recently govt. has declared the exemption on electricity duty charges for school and colleges trying to get the benefit of the same as soon as possible.

Executive Recommendations:

1. There has to be Institute level student community that keeps track of the energy consumption parameters of the various departments, class rooms, halls, areas, meters, etc

2. Energy auditing inside the campus has to be done on a regular basis and report should be made public to generate awareness.

3. Need to Create energy efficiency/ renewable energy awareness among the college campus i.e. solar, wind, Biogas energy. College should take initiative to arrange seminars, lectures, paper presentation competition among students and staff for general awareness.

AUDIT RESULT

Date :	
Report Submitted	**Acceptance from**
Name of Auditor :	Name: Designation: Signature & Seal

For QRO Certification LLP
Authorised Signatory

Director
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AUDIT NOTES – REPORT NO.....

(ISO 14001:2015)

Name of the Organization	Tula's Institute Dehradun		
Address	Mehra ka Gaon, PO Selaqui Dhoolkot Dehradun Uttarakhand 248011		
Site Address (If any)	www.tulas.edu.in		
E mail id	Director@tulas.edu.in		
Unit Head. Name / Contact Person	Dr. Ranit Kishor Dean Agriculture & Management		
Telephone/Fax	01352699300		
Audit Scope	Green and Environment audit is the tool of management system used methodologically for protection and conservation of the environment. It is also used for the sustenance of the environment. The audit suggests different standard parameters, methods and projects for environmental protection. Green audit can be a useful tool for a college to determine and make sure whether they are performing in accordance with the relevant rule and regulations, to improve the procedures to determine a way which can be lower the cost and resource and then consider how to implement changes and make savings. It can also be used to determine the type and volume of waste, which can be used for a recycling project or to improve waste minimization plan. It can create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of Green impact on campus. If self-enquiry is a natural and necessary outgrowth of a quality education, it could also be stated that institutional self-enquiry is a natural and necessary outgrowth of a quality educational institution. Thus it is imperative that the college evaluate its own contributions toward a sustainable future. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent.		
Audit standard	**ISO 14001:2015**		
No. of Skilled workers(Required)	3		
No. of unskilled workers(Required)	1		
No. of contract workers	Nil		
No. of part time workers	Nil		
Shift details	1		
Audit Team	Audit Team Leader:	Audit Duration: Man day(s) :	2
Date of Audit	19-05-2022- 20-05-2022		
Audit Criteria	*Organization's guidelines, and applicable legal & other requirements related to Applicable Standard.*		
Purpose of Audit	Green Audit & Environment can be defined as systematic identification, quantification, recording, reporting and analysis of components of environmental diversity. The Green Audit aims to analyze environmental practices within and outside the college campus, which will have an impact on the eco-friendly ambience. It was initiated with the motive of inspecting the work conducted within the organizations whose exercises can cause risk to the health of inhabitants and the environment.		

This report is based on random samples and therefore not every aspect of the organization's activities has necessarily been assessed. Hence where no non-conformities are reported it does not follow that none exist.

Legal, Statutory & Regulatory Requirements	Applicability of Air Pollution Act, Enviornment Pollution Act, Water Pollution Act and the organization is a small organization also working on contract basis-legal requirements are fulfilled by the company employees.

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Summary of Audit & Observations

Target areas of Green Audit

Target areas included in this green auditing are water, waste, green campus and carbon footprint.

1. **Auditing for Water Management**
   This indicator addresses water consumption, water sources, irrigation, storm water, appliances and fixtures. Water is a very valuable resource which should be used judiciously. Efficient use of water with no or less wastage is the need of the hour as the availability of potable water is reducing day by day. Along with this, the possibility of rain water harvesting, purification and reuse of water are also sought. A status study on these aspects is made in the audit. Aquifer depletion and water contamination are taking place at unprecedented rates. It is therefore essential that any environmentally responsible institution should examine its water use practices.

2. **Auditing for Waste Management**
   This is an important area in educational institutions. This indicator addresses waste production and disposal, plastic waste, paper waste, food waste, and recycling. Municipal solid waste has a number of adverse environmental impacts, most of which are well known and not in need of elaboration. Solid waste can be divided into two categories: general waste and hazardous waste. General waste includes what is usually thrown away in homes and schools such as paper, plastics tins and glass bottles. Hazardous waste is waste that is likely to be a threat to one's health or the environment like cleaning chemicals and petrol.
   Unscientific landfills may contain harmful contaminants that leach into soil and water supplies, and produce greenhouse gases contributing to global climate change. Furthermore, solid waste often includes wasted material resources that could otherwise be channeled into better service through recycling, repair, and reuse. Thus the minimization of solid waste is essential for a sustainable college.

3. **Auditing for Green Campus Management**
   All plant and animal species - including humans - are linked together in a complex web of life; we depend upon biodiversity for our survival. Biodiversity is the key to healthy ecosystems and ultimately a healthy planet. It keeps the air and water clean, regulates our climate and provides us food, shelter, clothing, medicine and other useful products. Each part within this complex web diminishes a little when one part weakens or disappears.
   The trees work hard to keep the air we breathe clean and healthy. They are like sponges. Their leaves take in much of the poisonous unwanted carbon dioxide in the air, and replace it with the oxygen we need for healthy living. This system of absorbing gases on which all plants rely for their food is called photosynthesis. In this process, the plants with the help of sunlight, water, minerals and the green material called Chlorophyll within the leaves change the carbon-dioxide into food for themselves. When doing this they release oxygen into the air which is vital for all life on earth. At night when there is no sunlight the plant no longer makes food, so it does not release the same amount of oxygen. One is often told not to sleep with plants in one's room, as they will use up all the oxygen. However, at night although photosynthesis does take place the plants also rest, so that little oxygen is absorbed from the air and very little harm can be done to the sleeper.

4. **Auditing for carbon footprint**
   Carbon foot print is the total amount of Green House Gases (GHGs)emitted in terms of carbon dioxide by a person, institute, company, state or country. Carbon footprint is typically given in tons of CO_2 equivalent per

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year. For calculation of carbon foot print the basic data regarding direct and indirect sources of emission of Green House Gases is needed. How we get around and commute to and from college each day has an impact on the environment through the emission of greenhouse gases into the atmosphere by the burning of fossil fuels (such as petrol). The most common greenhouse gases are carbon dioxide, water vapour, methane, nitrous oxide and ozone. Of all the greenhouse gases, carbon dioxide is the most prominent greenhouse gas, comprising 402 ppm of the Earth's atmosphere. The release of carbon dioxide gas into the Earth' s atmosphere through human activities is commonly known as carbon emissions.

5. **Energy Audit**

Consumption of energy is an indicator towards green environment. Lesser the consumption of energy, more the contribution to environment is. Energy audit of the college is done separately by the energy audit team of this college and does not included in this report.

1. Water Management:

The college campus possesses many water outlets. There is an overhead water tank of capacity of 200000 Litre (approx.) capacity which is connected to 950 taps & 8 water- coolers There are four Rain water harvesting plants worth 20000 litres and a well. The different items monitored under this category are tabulated below.

Water Uses	General Details
Number of water treatment system in place	Nil
Water cooler with drinking water filtration is installed	10

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Number of water taps	950
Number of wells	1
Number of Bored wells	3
Quantity of water pumped	35000 Litre/Day(approx.)

2. Waste Management

Biodegradable waste = 35 kg/day; Non-biodegradable waste = 4 kg/day

Number of Garbage dumps & Storage points (Separate for Biodegradable & Non-biodegradable wastes)	12
Number of toilets	205
E-wastes- computers, electrical and electronic parts	Disposal by auction
Plastic waste	Disposal to Municipal corporation waste collection centers
Waste water -washing, urinals, bathrooms	Disposal to pits
Food wastes	Some disposed to biogas plant & some are distributed to the cattle shelter nearby college
Glass waste-Broken glass wares from the labs	Disposal to Municipal corporation waste collection centers

Quantity of waste generated:-

Bio degradable	3 kg/day (office)
Non bio degradable	1.5 kg/day (office)
Bio degradable	1 kg/day (labs)
Non-bio-degradable	0.5 kg/day (labs)

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Canteen, Mess & Hostel wastes

Bio degradable	31 kg/day
Non bio degradable	2 kg/day

Existing waste management methods in the campus

- Waste bins are placed at several points in the college to collect bio-degradable & non bio degradable wastes
- Waste segregation is done regularly
- Installation of biogas plant for the biodegradable wastes
- Vermicompost system for the manure production

3. Green Campus

S.no	Context	Details
1	Total lawn & garden area(Excluding Sports field)	12648 sq m
2	Total number of plants	127
3	Total number of shrubs	1402

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List Flora and Fauna (Existing in the campus)

List of Herbs/Shrubs/Trees

S. No.	Common Name	Botanical Name	Hindi name
1	Cuban Royal Palm	*Roystonea regia*	रॉयल पाम
2	Curry Tree	*Murrayakoenigii*	कड़ी पत्ता
3	Periwinkle	*Catharanthus roseus*	सदाबहार
4	Ficus	*Ficus benjamina*	पुकर
5	Century plant	*Agave americana*	कमल कैक्टस
6	Chir Pine	*Pinus roxburghii*	चिर
7	Junipers	*Junipers osteosperma*	हौबेरा
8	Pygmy Palm	*Phoenix roebelenii*	पिग्मी पाम
9	Lemon	*Citrus lemon*	छोटा नींबू
10	Jasmine	*Jasminum Officinal*	चमेली
11	Paper Flower	*Bougainbillea glabra*	कागज के फूल
12	Guava	*Psidium guajava*	अमरूद
13	Tulsi	*Ocimumtenuiflorum*	तुलसी
14	Monkey Puzzle Tree	*Araucaria araucana*	बंदर पहेली पेड़
15	Mango	*Mangifera Indica*	आम
16	Tala Palm	*Borassus flabellifer*	पामीरा पाम
17	Litchi	*Lichichinenesis*	लिंची
18	Sky Flower	*Durant aerecta*	नीलकांत
19	Tea Plant	*Camellia Sinensis*	चाय
20	China Rose	*Hibiscus rosa-sinensis*	गुड़हल
21	Wild Plumeria	*Plumeria Iudica*	चमेली
22	Chinese fan palm	*Livistonia chinensis*	फाउंटेन पाम
23	Indian Lamburnum	*Cassai fistula*	अमलतास
24	Cycas	*Cycas revoluta*	साइकस पाम
25	Gulmohar	*Delonix regia*	गुलमोहर
26	Black Plum	*Syzygium cumini*	जामुन
27	Orchid Tree	*Bauhinia variegata*	कूर्याल
28	Pride of India	*Lagerstroemia speciosa*	अरूल
29	Burflower Tree	*Neolamarckiacadamba*	कदंब
30	Pomegranate	*Punicagranatum*	अनार
31	Bottle Brush	*Callistemon L*	बॉटल ब्रश
32	Indian Gooseberry	*Phyllanthus emblica*	आंवला
33	Camphor Tree	*Cinnamomum camphora*	कपूर
34	Gardenia	*Gardenia Jasminoides*	जसमीन
35	North Indian Rose Wood	*Dalbergia sissoo*	शीशम
36	Oleander	*Neriun oleander*	सफेद कनेर
37	Indian Wild Date	*Phoenix sylbestris*	खजूरी
38	Papaya	*Carica papaya*	पपीता
39	Cliff date palm	*Phoenix rupicola*	ताड़
40	Rose	*Rosa rubiginosa*	गुलाब
41	Peach	*Prunus persica*	आड़ू

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42	Garden dahlia	*Dahlia pinnata*	दहेलिया
43	Aloe vera	*Aloe barbadensis*	एलो वेरा
44	White frangipani	*Plumeria obtusa*	छीर चंपा
45	Black tea tree	*Melaleuca bracteata*	काली चाय
46	Winter creeper	*Euonymus fortunei*	धुरी
47	Manaca	*Brunfelsia uniflora*	पॉल
48	Buddha's Palm	*Alocasia cucullata*	बुद्धा हाथ
49	Crane flower	*Strelitzia reginae*	क्रेन फूल
50	Foxtail Fern	*Asparagus densiflorus*	अस्पर्गस फर्न
51	Day lily	*Hemerocallis fulva*	लिली
52	Dragon tree	*Dracaena marginata*	ड्रैगन ट्री
53	The corn plant	*Dracaena fragrans*	मेडागास्कर ड्रैगन ट्र
54	Zigzag Plant	*Euphorbia tithymaloides*	एजिया
55	Cabbage tree	*Cordyline australis*	कैब्बेज ट्री
56	Fishbone fern	*Nephrolepis cordifolia*	बटन फर्न
57	Rainbow tree	*Dracaena reflexa*	इन्द्रधनुष प्लांट
58	Scarlet firespike	*Odontonema cuspidatum*	नीस
59	Broadleaf palm lily	*Cordyline fruticosa*	पाम लिली
60	Areca palm	*Dypsis lutecens*	अरेका पाम
61	Chinese croton	*Excoecaria cochinchinensis*	चीनी क्रोट
62	Dwarf lily turf	*Ophiopogon japonicus*	बच नाग
63	Ponytail palm	*Beaucarnea recurvata*	हाथी पाव
64	Weevil lily	*Molineria capitulata*	काली मूसली
65	Spanish dagger	*Yucca gloriosa*	बचनाग
66	Mistletoe fig	*Ficus deltoidea*	मिसल टोए रबर प्लांट
67	Golden ficus plant	*Ficus mirocarpa*	कामरूप
68	Zebra plant	*Calathea zebrina*	रेटल स्नेक प्लांट
69	Arrowhead plant	*Syngonium podophyllum*	सिंगोनियम
70	Dwarf umbrella tree	*Schefflera arboricola*	छाता पौधा
71	Ti plant	*Cordyline Terminalis*	पाम लिली
72	Table palm	*Livistona rotundifolia*	टेबल पाम
73	Lady palm	*Rhapis excelsa*	लेडी पाम
74	Greater tussock sedge	*Carex paniculata*	कामिनी
75	Rangpoon creeper	*Combretum indicum*	मधु मालती
76	Crown imperial	*Fritillaria imperialis*	केसर ताज
77	Mexican heather	*Cuphea hyssopifolia*	मैक्सिकन हीथ
78	Golden duranta	*Duranta erecta*	आकाश फूल
79	Yellow elder	*Tecoma stans*	घंटी फ्लॉवर
80	Mauritius hemp	*Furcraea foetida*	ग्रीन मुसब्बर
81	Mexican petunia	*Ruellia simplex*	जंगली पेटुनीस
82	mint	*Mentha spicata*	पुदीना
83	chilli	*Capsicum annum*	मिर्च

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84	Indian gooseberry	*Phyllanthus emblica*	आंवला
85	Pear	*Pyrus communis*	नाशपाती
86	Jackfruit	*Artocarpus hetrophyllus*	कटहल
87	Golden shower	*Cassia fistula*	अमलतास
88	Apple	*Malus domestica*	सेब
89	Pomegranate	*Punica granatum*	अनार
90	Hibiscus	*Hibiscus Rosa-sinensis*	गुड़हल
91	Crown of thorns	*Euphorbia milii*	कांटो का ताज
92	Jamun	*Syzygium cumini*	जामुन
93	Burflower tree	*Neolamarckia cadamba*	कदंब
94	oleander	*Nerium indicum*	कनेर
95	Orchid tree	*Bauhinia variegata*	कुरवाल
96	Blue jacaranda	*Jacaranda mimosifolia*	नीली गुलमोहर
97	Mountain cidar	*Toona ciliata*	तून
98	Indian soapberry	*Sapindus mukorossi*	रीठा
99	Chrysanth	*Chrysanthemum grandiflorum*	गुलदाउदी

List of Birds Species identified inside the campus

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S. No.	Common Name
1	Blue Rock Pigeon
2	Rose Ring Parakeet
3	Slaty Heded Parakeet
4	Plum Heded Parakeet
5	Himalayan Bulbul
6	Red Vented Bulbul
7	Great Tit
8	Orintal Magpierobin
9	Rufous Treepi
10	Common Sparrow
11	Common Mina
12	Kingfisher
13	Hooplo
14	Catle Egret
15	Babbler
16	Kite
17	Scally Brested Munia
18	Black Drongo
19	Barn Owl
20	Common Crow
21	Wag Tail
22	Lap Wing
23	Fan Tail

4. Carbon footprints

Carbon footprint analysis is done by combining data collected with respective emission factor of the each of the selected emission

S. No.	Emission factor	CO2 emitted
1	Human factor	1.14kg/person/day
2	Petrol	2.3kg/liter
	Diesel	2.7kg/liter
4	Hydro-electricity	0.68956kg/kwh
5	Solar-based electricity	0.05kg/kwh
6	Food	1.7kg/kg
7	Solid waste	0.125kg/kg
8	LPG	1.5kg/kg
9	Buildings	0.1867kg/sq.mt./year

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Burning of fossil fuels is the main source and cause of carbon dioxide release to the atmosphere. Carbon dioxide release for the stakeholders to reach the college is very high. It is contributing to the global warming and increasing the pace of climate change.

The cost of using the cars is very high and therefore discourages stakeholders from using them. If a College bus is servicing for the staff and students, carbon dioxide released for the stakeholders can be reduced. More trees may be planted in the campus to make a source of sink for the carbon dioxide and for other green-house gases.

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Recommendations & Conclusion

The green and environment auditing exercise have come up with and implemented practical ways to reduce our negative impact on the environment to create awareness around the use of the Earth's resources in your home, college, local community and beyond. There is scope for further improvement, particularly in relation to waste, and water management. The college in recent years considers the environmental impacts of most of its actions and makes a concerted effort to act in an environmentally responsible manner. Even though the college does perform fairly 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.

Suggestions

Some of the important suggestions are summarized below:-

a) Increase Awareness of Environmentally Sustainable Development- Use every opportunity to raise public, government, industry, foundation, and university awareness by openly addressing the urgent need to move toward an environmentally sustainable future.

b) Educate for Environmentally Responsible Citizenship- Establish programs to produce expertise in environmental management, sustainable economic development, population, and related fields to ensure that all university graduates are environmentally literate and have the awareness and understanding to be ecologically responsible citizens.

c) Practice Institutional Ecology- Set an example of environmental responsibility by establishing institutional ecology policies and practices of resource conservation, recycling, waste reduction, and environmentally sound operations.

d) Collaborate for Interdisciplinary Approaches- Convene university faculty and administrators with environmental practitioners to develop interdisciplinary approaches to curricula, research initiatives, operations, and outreach activities that support an environmentally sustainable future.

g) Adopt the proposed Environmentally Responsible Purchasing Policy, and work towards creating and implementing a strategy to reduce the environmental impact of its purchasing decisions.

Recommendations

1. Set up water recycling unit where the recycled water can be used for gardening in the college.
2. Grow up vegetable garden and medicinal garden and gradually develop it as a nursery.
3. Arrange training programmes on environmental management system and nature conservation.
4. Establish an e-waste collection centre in campus.
5. Ensure participation of students and teachers in local environmental issues.

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AUDIT RESULT

Date :	
Report Submitted	**Acceptance from**
Name of Auditor :	Name: Designation: Signature & Seal

For QRO Certification LLP
Authorised Signatory

Director
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