



Green Audit Report
Indore Institute of Law, Rau-Pithampur
Road, Indore (M.P.)



GREEN AUDIT REPORT




Indore Institute of LAW
Rau Pithampur Road, Opp. IIM,
Indore (M.P.)

PREPARED BY

EMPIRICAL EXERGY PRIVATE LIMITED

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(2021-22)


Prof. (Dr.) Manpreet Kaur Rajpa
Dean
Indore Institute of Law

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ACKNOWLEDGEMENT

Empirical Exergy Private Limited (EEPL), Indore (M.P) takes this opportunity to appreciate & thank the management of **Indore Institute of Law, Indore** for allowing us to conduct a green audit for the institute.

We are indeed touched by the helpful attitude and co-operation of all faculties and technical staff, who rendered their valuable assistance and co-operation during the course of study.

Rajesh Kumar Singadiya

(Director)

M.Tech (Energy Management), PhD (Research Scholar)
Accredited Energy Auditor [AEA-0284]
Certified Energy Auditor [CEA-7271]
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The Audit Team

The study team constituted of the following senior technical executives from **Empirical Exergy Private Limited,**

- + **Mr. Rajesh Kumar Singadiya** [Director & Accredited Energy Auditor AEA-0284]
- + **Mr. Rakesh Pathak,** [Director & Electrical Expert]
- + **Mr. Sachin Kumawat** [Sr. Project Engineer]
- + **Mr. Charchit Pathak** [Asst.Project Engineer]
- + **Mr. Aakash Kumawat** [Site Engineer]
- + **Mr. Ajay Nahra,** [Sr. Accountant & admin]

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EXECUTIVE SUMMARY

Green Initiative Taken by Institute

CAMPAIGN OF PLANTATION AND GREEN CAMPUS:

- ✦ Institute has around 2922 trees on campus. It's a good initiative taken by management for a green campus under the campaign of a plantation. **It is APPRECIABLE.**

SOLAR SYSTEM

- ✦ Institute management has installed 58 kWp roof top grid connected solar system in campus. **It is APPRECIABLE.**

BIO GAS PLANT

- ✦ Management has purchased 2 cubic metr bio gas plant for treatment of organic waste generated in campus. **It is APPRECIABLE.**

- ✦ **QR code on Trees**

Institute has installed QR code system on trres for commo details on single page . **It is APPRECIABLE.**

AUDIT RECOMMENDATION: -

5 Dust bin system :-

- ✦ Institute has used 03 dust in systems for collect all type of weaste in campus . It is recommended to installed 05 nos dustbin system .

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CHAPTER-1

INTRODUCTION

1.1 About institute

Indore Institute of Law (IIL) was founded with a vision to be one of India's most prominent Law institutes and has established itself as one of the most recognized Law Institutes in India. IIL are committed to providing the best platform for global legal education to students and courses are designed in order to give a complete exposure, both in domestic and international law practices, students. At Indore Institute of Law, students have an option to choose from a variety of law courses, where they are offered complete law programmes along with practical training and research papers to get an all-round understanding of the law in detail.



Figure 1.1: - Satellite Image of IIL, Indore from Google map

Value Based Education

“Educating the mind without educating the heart is no education at all!” At Indore Institute of Law, the objective of delivering Value Based Education is to produce responsible and committed citizens. This education acts as a multidimensional attribute to activate human values among students. On one hand, they achieve exceptional success in their legal profession and on the other; they become good human beings with a heart for society and the country. This is an institute which stands on the foundation of moral values, passion and a relentless search for excellence.

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Objective

At Indore Institute of Law, our objective is to form a community where people come together and respect the law and take an oath to use it in an honest way for the betterment of the society.

Mission

The world works with a right mix of Cultural and Spiritual Excellence and sometimes, you need the help of law to maintain the right balance in the society. For a society to function ideally, you need people to maintain a certain law and order and direct it towards an accomplishment it is trying to achieve. At Indore Institute of Law, we are nurturing young minds with equality and right law education to ensure they promote it further to the society, when they take the law as their career path. The society is always looking forward to people who are making a positive change with their morals and with a higher understanding of moral excellence. This is where Indore Institute of Law steps in and offers a platform to the students where they get a complete understanding of law, fostering their minds in the right development that is ultimately going to play a positive role in the betterment of the society and the nation, as whole.

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1.2 Green Monitoring Committee

INDORE INSTITUTE OF LAW™



(Affiliated to DAVV and Bar Council of India, New Delhi)

— RANK 1st PRIVATE LAW COLLEGE IN M.P., C.G. & RAJASTHAN BY —
 INDIA TODAY | OUTLOOK | THE WEEK | THE KNOWLEDGE REVIEW

Campus Add.: "Gendal Ram Patisar" Opp. IIM Rau, Pithampur Road, Indore (M.P.) 451331

Phone No.: +91 9977011777, 9977019777 | Web.: www.indore-instituteoflaw.org | E-mail: indoreinstituteoflaw@gmail.com

No. 116/76/0/22


Date: 1/1/22

Energy, Water, Green & Environment Audit Committee

Energy, Water, Green & Environment Audit Committee will consist of the following members.

| S. No. | Name | Designation |
|--------|---------------------------|-----------------------------|
| 1 | Dr. Manpreet Kaur Rajpal | Dean and Director Academics |
| 2 | Mr. K.S. Vyas | Executive Director |
| 3 | Mr. Nitin Jasuja | Campus Incharge |
| 4 | Mr. Arun Naik | Admin Officer |
| 5 | Mr. Shekhar Patankar | Coordinator |
| 6 | Mr. Ashish Verma | Admin. Assistant |
| 7 | Mr. Anil Choudhary | Campus Supervisor |
| 8 | Mr. Yogendra Singh Thakur | Campus Supervisor |

Time duration of this committee is 2 years, after which the committee will be reconstituted.


 Executive Director
 Indore Institute of Law
 Executive Director (Admin)
 Indore Institute of Law

ISO 9001:2008 Certified

Run By: Icon Education Society

City Office: 425-426, Orbit Mall, A.B. Road, Indore (M.P.)

Associate Institute:

INDORE NURSING COLLEGE
 (Affiliated to DAVV and Indian Nursing Council, New Delhi)
 www.indorenursingcollege.com

IdylliC Institute of Management
 (Affiliated to DAVV and approved by M.P. Higher Edu. & NCTE, New Delhi)
 www.idylliCindore.com

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1.3 About Institute Infrastructure

The institute is spread over **1,81,673 Sq.Ft** with plenty of open space and sports area interspersed within academic buildings. The details of various department and building are given below:

Table 1.1 :- Name of the various Building in the institute

| Sr.No. | Buildinding | Buildup Area(Sq.Ft.) |
|--------|-------------------------|----------------------|
| 1 | Block-A | 65,725 |
| 2 | Block-B | 10,032 |
| 3 | Block-C | 28201 |
| 4 | Boys Hostel (Block- D) | 32830 |
| 5 | Girls Hostel (Block- E) | 44885 |
| | Total | 1,81,673 |

1.4 About Green Auditing

Eco campus is a concept implemented in many educational institutions, all over the world to make them sustainable because of their mass resource utilization and waste discharge into the environment.

Green audit means to identify opportunities for sustainable development practices, enhance environmental quality, improve health, hygiene, and safety, reduce liabilities achieve values of virtue. A green audit also provides a basis for calculating the economic benefits of resource conservation projects by establishing the current rates of resource use and their associated costs.

Green auditing of “**Indore Institute of Law**” enables assessment of the lifestyle, action, and its impact on the environment. This green audit was mainly focused on greening indicators like utilization of green energy (solar energy) and optimum use of secondary energy sources (petrol and diesel) in the Institute campus, vegetation, carbon footprint of the campus, etc. Green auditing aims to help the institution to apply sustainable development practices and to set examples before the community and young learners.

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1.5 Objectives of Green Auditing

The general objective of a green audit is to prepare a baseline report on “Green campus” and alternative energy sources (solar energy), measures to mitigate resource wastage, and improve sustainable practices.

The specific objectives are

- ✦ To inculcate values of sustainable development practices through a green audit mechanism.
- ✦ Providing a database for corrective actions and plans.
- ✦ To identify the gap areas and suggest recommendations to improve the green campus status of the Institute.

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CHAPTER- 2
GREEN CAMPUS & SUSTAINABLE DEVELOPMENT

2.1 Green Audit

In the survey, the focus has been given to the assessment of the present status of plants and trees on the institute campus and efforts made by the institute authorities for nature conservation. The campus is in the vicinity of approximately more than 2922 trees/medicinal herbs/ornamental plants. The detail is given below:

| Sr. NO | Common Name | Botanical or family Name | Quantity |
|--------|--------------------------------|----------------------------|----------|
| 1 | Ashoka Tree | Saraca Asoca | 2 |
| 2 | Basil (Tulsi) | Ocimum tenuiflorum | 86 |
| 3 | Bismarkya Palm Tree | Bismarckia nobilis | 10 |
| 4 | Bottle Palm tree | Hyophorbe Lagenicaulis | 51 |
| 5 | Casuarina Topiary | Casuarina | 27 |
| 6 | Champa | Magnolia champca | 69 |
| 7 | Chandani | Tabernaemontana Divaricata | 225 |
| 8 | Christmas Tree | Araucaria heterophylla | 13 |
| 9 | Cycas Palm | Cycas revolute | 8 |
| 10 | Dates Tree | Areca palms | 12 |
| 11 | Erika Palm (Elite Green) | Chrysalidocarpus lutescens | 13 |
| 12 | Farkeriya Green | Ficus Benjamina | 27 |
| 13 | Ficus Panda | Ficus Benjamina | 121 |
| 14 | Ficus Panda Black, (Benjamina) | Ficus Benjamina | 14 |
| 15 | Golden Pandanus (Ground Cover) | Pandanus baptistii | 490 |
| 16 | Green Chili | Acer negundo | 5 |
| 17 | Guava Tree | Psidium Guajava | 2 |
| 18 | Gulmohar Tree | Delonix regia | 31 |
| 19 | Hamelia | Hamelia cuprea Griseb. | 3 |
| 20 | Jetropa | Euphorbiaceae | 700 |
| 21 | Kadam Tree | Neolamarckia cadamba | 27 |
| 22 | Kejurina tree | Prosopis cineraria | 7 |
| 23 | Latania Palm | Latania lontaroides | 4 |
| 24 | Lemon Tree | Citrus limon | 2 |
| 26 | Mango Plant | Mangifera indica | 2 |
| 27 | Money Plant | Epipremnum aureum | 120 |
| 28 | Morsali Tree | Acacia hybryda. | 25 |
| 29 | Neem Tree | Azadirachta indica | 9 |
| 30 | Palm Tree | Archontophoenix alexandrae | 104 |
| 31 | Peltophorum Tree | Peltophorum pterocarpum | 1 |
| 32 | Phoniex Palm | Phoenix canariensis | 14 |
| 33 | Rafis Palm | Rhapis excels | 47 |
| 34 | Rasulia (Bel/ latkan) | Aegle marmelos | 133 |

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| | | | |
|----|-------------------------|-----------------------|------|
| 35 | Rose Plants | Rosa rubiginosa | 416 |
| 36 | Sacred Fig Tree (Pipal) | Ficus religiosa | 2 |
| 37 | Samal Tree | Bombax malabaricum | 8 |
| 38 | Shisham Tree | Dalbergia sissoo | 2 |
| 39 | Silver Oak Tree | Grevillea robusta | 2 |
| 40 | Sonapatti Tree | Cassia angustifolia | 1 |
| 41 | Spathodea Tree | African tulip tree | 66 |
| 42 | Sugarcane | Saccharum officinarum | 17 |
| 43 | Sweetsop Tree | Ammona squamosal | 1 |
| 44 | Vidya | NA | 3 |
| | | Total | 2922 |



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2.2 Green Campus Photograph .



Institute has **2922 trees** on the campus. This is a good initiative taken by management for a green campus under the campaign of the plantation. **It is APPRECIABLE.**

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CHAPTER- 3

RENEWABLE ENERGY AND SUSTAINABLE DEVELOPMENT

3.1 Grid Connected Solar Photovoltaic System (58Kwp)

There is a 58 KWp solar photovoltaic rooftop grid-connected system on various building. The date of project installation is 04/01/2022. System details are given below:

Table: - 2.6 solar plants detailed

| Sr. No. | Description | Technical Specification |
|---------|--------------------------------|-------------------------|
| A | Details of the Solar PV Module | |
| 1 | Capacity of module | 500Wp |
| 2 | No of Modules | 116 No's |
| 3 | Total Capacity | 58 KWp |
| 4 | Latitude & Longitude | 22.77125 N & 75.90821 E |
| B | Inverter Information | |
| 2.1 | Make | Growatt |
| 2.2 | Model | GROWATT 8000TL3-S |
| 2.3 | Serial No | EGK0BHM016 |
| 2.4 | AC capacity of Inverter | 60 |
| 2.5 | No of inverter installed | 1 |
| 2.6 | Total AC Capacity of Inverter | 60 Kw |

Photographs of Solar Plant:-



Figure 2.6:- Solar Plant 58 KWp and Inverter System

Observation:-

Institute has installed 58 kWp solar roof top grid connected system at various buildings .There are still good potential to increased capacity of the solar system.

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Chapter-04 Carbon Footprint Analysis

4.1 About carbon footprint.

Climate change is one of the biggest challenges faced by the world, nations, governments, institutions, businesses, and mankind today.

Carbon footprint is a measure of the impact your activities have on the amount of carbon dioxide (CO₂) produced through the burning of fossil fuels and is expressed as a weight of CO₂ emissions produced in tonnes.

We focus on consumption in each of our five major categories: housing, travel, food, products, and services. In addition to these, we also estimate the share of national emissions over which we have little control, government purchases, and capital investment.

For simplicity and clarity, all our calculations follow one basic method. We multiply a user input by an emissions factor to calculate each footprint. All use inputs are per individual and include things like fuel use, distance, calorie consumption, and expenditure. Working out your inputs is a matter of estimating them from your home, travel, diet, and spending behaviour.

Although working out your inputs can take some investigation on your part the much more challenging aspect of carbon calculations is estimating the appropriate emissions factor to use in your calculation. Where possible you want this emissions factor to account for as much of the relevant life cycle as possible.

We all have a carbon footprint...



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4.2 Methodology and Scope

The carbon footprint gives a general overview of the Indore Institute of Law greenhouse gas emissions, converted into CO₂-equivalents and it is based on reported data from internal and external systems. The purposes of the carbon indicators are to measure the carbon intensity per unit of product, in addition to showing environmental transparency towards external stakeholders. The carbon footprint reporting approach undertaken in this study follows the guidelines and principles set out in the "Greenhouse Gas Protocol Corporate Accounting and Reporting Standard" (hereafter referred to as the GHG Protocol) developed by the Greenhouse Gas Protocol Initiative and international standard for the quantification and reporting of greenhouse gas emissions -ISO 14064. This is the most widely used and accepted methodology for conducting corporate carbon footprints. The study has assessed carbon emissions from the Indore Institute of Law Campus. This involves accounting for and reporting on, the GHG emissions from all those activities for which the company is directly responsible. The items quantified in this study are as classified under the ISO 14064 standards: The report calculates the greenhouse gas emissions from Indore Institute of Law Campus. This includes electricity, as well as emissions associated with diesel consumption in the institute vehicle. The emission associated with air travel, waste generation, administration, and marketing-related activities has been excluded from the current study. Emissions from business activities are generally classified as scope 1, 2, or 3 areas classified under the ISO 14064 standards.

4.3 Carbon emission from electricity

Direct emissions factors are widely published and show the number of emissions produced by power stations to produce an average kilowatt-hour within that grid region

Unlike other energy sources, the carbon intensity of electricity varies greatly depending on how it is produced and transmitted. For most of us, the electricity we use comes from the grid and is produced from a wide variety of sources. Although working out the carbon intensity of this mix is difficult, most of the work is generally done for us.

Electricity used in the site is a significant contributor to GHGs emissions from the unit. Electricity used onsite is the most direct, and typically the most significant, a contributor to a unit's carbon footprint. Thus, using an average fuel mix for generating electricity, the carbon dioxide intensity of electricity for the national grid is assumed to be 0.9613 KgCO₂/Kwh

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(Reference: Central Electricity Authority (CEA) Baseline Carbon Dioxide Emission database http://cea.nic.in/reports/others/thermal/tpece/cdm_co2/database_11.zip). Electricity is purchased from the grid

Table: - 4.1 Electricity Purchased from the grid and Emissions from the electricity Import

| Sr. No | Year | Total unit Consumption by AVVNL | Unit | Emission Factor kg CO ₂ e/kWh | Emission ton CO ₂ e/year |
|---|---------|---------------------------------|------|--|-------------------------------------|
| 1 | 2017-18 | 291473 | kWh | 0.9613 | 280 |
| 2 | 2018-19 | 352571 | kWh | 0.9613 | 339 |
| 3 | 2019-20 | 282567 | kWh | 0.9613 | 272 |
| 4 | 2020-21 | 130611 | kWh | 0.9613 | 126 |
| 5 | 2021-22 | 270480 | kWh | 0.9613 | 260 |
| Total Carbon emission CO₂e/year | | | | | 1276.3 |

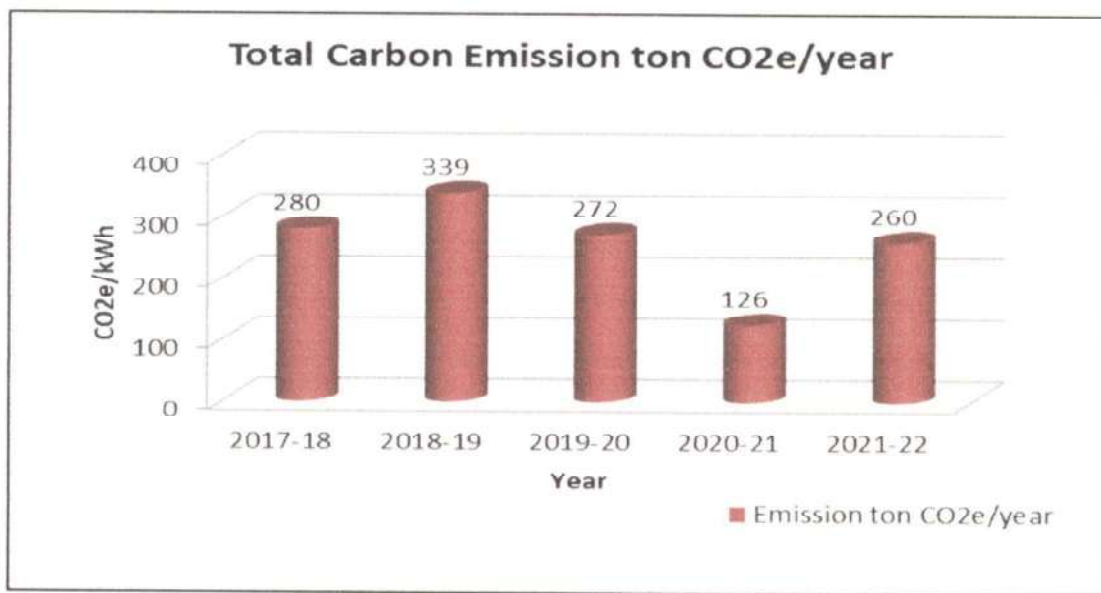


Figure 4.1:- Graphical Presentation of CO₂ emission from electricity per year

Observation:-

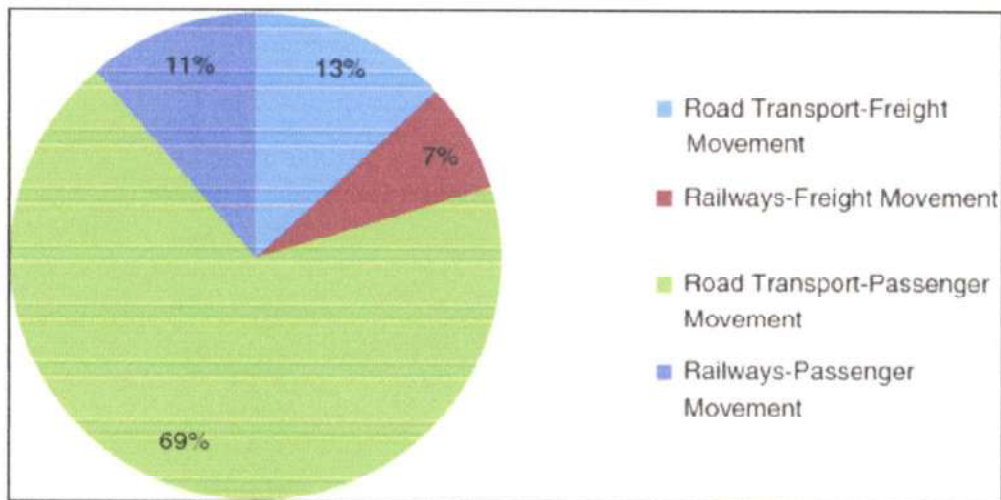
Total CO₂ Emission by indirectly from electricity is 260 Ton CO₂ e/year in 2021-22.

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4.4 Carbon emission from vehicles.

In India, it is the third most CO₂ emitting sector, and within the transport sector, road transport contributed more than 90% of total CO₂ emissions (IEA, 2020; Ministry of Environment Forest and Climate Change, 2018)



Transportation (29 percent of 2019 greenhouse gas emissions) – The transportation sector generates the largest share of greenhouse gas emissions. Greenhouse gas emissions from transportation primarily come from burning fossil fuels for our cars, trucks, ships, trains, and planes.

We have also considered the total GHGs emission done by transportation facilities available on the campus like Cars, Buses, etc. We consider the different types of vehicles which are operated on petrol and diesel fuels

The energy team has analysed the following vehicle movement for Campus.

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Calculation of Carbon footprint analysis: -

As per discussion by the concerned department in the Institute and data provided by Management.

The following details are given in the table: -

| Sr. No | Vehicle Type | Fuel type | Distance Traveling per day (KM) | Average Mileage (Per Litter) | Total Distance traveling per month (25 days) |
|--|-------------------|-----------|---------------------------------|------------------------------|--|
| 1 | Institute Bus -01 | Diescl | 65 | 15 | 1,625 |
| 2 | Institute Bus -02 | Diesel | 65 | 15 | 1,625 |
| 3 | Institute Bus -03 | Diesel | 60 | 15 | 1,500 |
| Total Distance traveling in a month | | | | | 4750 |

❖ CO₂ Emissions from a gallon of gasoline: 8,887 grams CO₂/ gallon

❖ CO₂ Emissions from a gallon of diesel: 10,180 grams CO₂/ gallon

(1 US Gallon = 3.7854 liters)

❖ CO₂ Emissions from a Litter of gasoline: 2347.95 grams CO₂/ Litter.

❖ CO₂ Emissions from a Litter of diesel: 2689.56 grams CO₂/ litter.

$$\text{Total CO}_2 \text{ Emissions} = \frac{\text{CO}_2 \text{ Per litter}}{\text{Average Mileage (Km/Litter)}} \times \text{Distance (in km)}$$

$$\text{Total CO}_2 \text{ Emissions} = \frac{2689.59}{15} \times 190 = 34068.14 \text{ gram or } 34.08 \text{ Kg/day}$$

When Vehicle traveling in 300 Days in Year =

$$190 \times 300 = 57000 \text{ Kg/year or } 57.00 \text{ ton/year}$$

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4.5 Carbon emission from DG sets: -

Institute has 01 no DG sets installed on the campus for emergency power failure.

As per reference month July-2022 total diesel consumption in DG set is 600 Litter.

Every litter of diesel fuel contains 720 grams of pure carbon. In an average liquid hydrocarbon burning engine. It can be assumed that about 99 % of the fuel is Oxidized (It is assumed that somewhat less than 01 % will fail to fully oxidize and will be emitted as a particulate of unburned hydrocarbons instead of CO₂).

Calculation of Total CO₂ =

- ❖ CO₂ Emissions from a Litter of diesel: 2689.56 grams CO₂/ litter.
- ❖ Diesel consumption Sep-2021 to July-2022 is = 7200 Litter
- ❖ 7200 x 2689 = 19360800 gram. or 19360 Kg CO₂ emission year or **19.36 Ton/year**

4.6 Biomass Calculation and CO₂ Sequestration of the Trees: -

1. Estimation of above-ground biomass (AGB)

$$K = 34.4703 - 8.0671D + 0.6589 D^2$$

Where = K is above-ground biomass.

D is Breast height diameter in (cm)

- 1 Estimation of below ground biomass (BGD)

$$BGB = AGB \times 0.15$$

- 2 Total Biomass (TB)

$$TB = AGB + BGB$$

- 3 Calculation of carbon dioxide Weight sequestered in the tree in Kg.

$$C = W \times 0.50$$

- 4 Calculate the weight of CO₂ sequestered in the tree per year in Kg.

$$CO_2 = C \times 3.666$$

Where: -

AGB = above ground biomass.

D = Diameter of tree breast height.

BGB = Below Ground Biomass.

C = Carbon

TB = Total Biomass.

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| | | | | | | | | | | | | |
|--------------|-------------------------|----|--------|-------|--------|--------|--------|-----|-------------|-------------------|-----------------|--------------|
| 22 | Kejurina tree | 57 | 1780.4 | 267.1 | 2047.5 | 1023.7 | 3753.0 | 7 | 26270.9 | 358.3 | 0.36 | |
| 23 | Latania Palm | 17 | 93.5 | 14.0 | 107.6 | 53.8 | 197.2 | 4 | 788.7 | 10.8 | 0.01 | |
| 24 | Lemon Tree | 21 | 164.5 | 24.7 | 189.1 | 94.6 | 346.7 | 2 | 693.3 | 9.5 | 0.01 | |
| 26 | Mango Plant | 17 | 93.5 | 14.0 | 107.6 | 53.8 | 197.2 | 2 | 394.3 | 5.4 | 0.01 | |
| 27 | Money Plant | 16 | 79.2 | 11.9 | 91.1 | 45.5 | 166.9 | 120 | 20033.0 | 273.2 | 0.27 | |
| 28 | Morsali Tree | 64 | 2299.0 | 344.8 | 2643.8 | 1321.9 | 4846.1 | 25 | 121152.1 | 1652.4 | 1.65 | |
| 29 | Neem Tree | 47 | 1155.0 | 173.3 | 1328.3 | 664.1 | 2434.7 | 9 | 21912.4 | 298.9 | 0.30 | |
| 30 | Palm Tree | 55 | 1644.5 | 246.7 | 1891.1 | 945.6 | 3466.4 | 104 | 360509.2 | 4916.9 | 4.92 | |
| 31 | Peltophorum Tree | 49 | 1269.2 | 190.4 | 1459.6 | 729.8 | 2675.5 | 1 | 2675.5 | 36.5 | 0.04 | |
| 32 | Phoniex Palm | 88 | 4582.0 | 687.3 | 5269.3 | 2634.6 | 9658.6 | 14 | 135220.1 | 1844.2 | 1.84 | |
| 33 | Rafis Palm | 23 | 208.1 | 31.2 | 239.3 | 119.6 | 438.6 | 47 | 20614.0 | 281.2 | 0.28 | |
| 34 | Rasulia (Bel/ latkan) | 29 | 371.5 | 55.7 | 427.2 | 213.6 | 783.1 | 133 | 104147.7 | 1420.5 | 1.42 | |
| 35 | Rose Plants | 18 | 109.2 | 16.4 | 125.6 | 62.8 | 230.2 | 416 | 95782.5 | 1306.4 | 1.31 | |
| 36 | Sacred Fig Tree (Pipal) | 38 | 708.3 | 106.2 | 814.5 | 407.2 | 1493.0 | 2 | 2985.9 | 40.7 | 0.04 | |
| 37 | Samal Tree | 44 | 993.9 | 149.1 | 1143.0 | 571.5 | 2095.0 | 8 | 16760.3 | 228.6 | 0.23 | |
| 38 | Shisham Tree | 24 | 231.9 | 34.8 | 266.7 | 133.3 | 488.9 | 2 | 977.7 | 13.3 | 0.01 | |
| 39 | Silver Oak Tree | 38 | 708.3 | 106.2 | 814.5 | 407.2 | 1493.0 | 2 | 2985.9 | 40.7 | 0.04 | |
| 40 | Sonapatti Tree | 23 | 208.1 | 31.2 | 239.3 | 119.6 | 438.5 | 1 | 438.6 | 6.0 | 0.01 | |
| 41 | Spathodea Tree | 68 | 2625.1 | 393.8 | 3018.9 | 1509.5 | 5533.7 | 66 | 365222.9 | 4981.2 | 4.98 | |
| 42 | Sugarcane | 43 | 942.9 | 141.4 | 1084.3 | 542.2 | 1987.5 | 17 | 33788.1 | 460.8 | 0.46 | |
| 43 | Sweetsof Tree | 39 | 752.5 | 112.9 | 865.3 | 432.7 | 1586.2 | 1 | 1586.2 | 21.6 | 0.02 | |
| 44 | Vidya | 10 | 21.7 | 3.3 | 24.9 | 12.5 | 45.7 | 3 | 137.2 | 1.9 | 0.00 | |
| Total | | | | | | | | | 2922 | 2906417.98 | 39640.18 | 39.64 |

Institute has **2922 trees** on campus. This is a good initiative taken by management for a green campus under the campaign of the plantation. **It's APPRECIABLE.** There are total CO₂ sequestered of **39640 Kg/year** or **39.64 Tons /Year.**

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4.6 Biomass calculation of the tree

| Sr. NO | Common Name | Average Diameter CM (25 to 100) | AGB | BGB | Total | Carbon Storage | Amount of Co ₂ Sequestered | Quantity | Total Amount of Co ₂ Sequestered | Co ₂ Sequestered amount Kg/year | Co ₂ Sequestered amount Ton/year |
|--------|--------------------------------|----------------------------------|--------|-------|--------|----------------|---------------------------------------|----------|---|--|---|
| 1 | Asoka Tree | 67 | 2541.6 | 381.2 | 2922.8 | 1461.4 | 5357.5 | 2 | 10715.0 | 146.1 | 0.15 |
| 2 | Basil (Tuisi) | 12 | 35.4 | 5.3 | 40.7 | 20.4 | 74.7 | 86 | 6422.4 | 87.6 | 0.09 |
| 3 | Bismarkya Palm Tree | 56 | 1711.7 | 256.8 | 1968.5 | 984.3 | 3608.3 | 10 | 36082.8 | 492.1 | 0.49 |
| 4 | Bottle Palm tree | 56 | 1711.7 | 256.8 | 1968.5 | 984.3 | 3608.3 | 51 | 184022.3 | 2509.9 | 2.51 |
| 5 | Casuarina Topiary | 24 | 231.9 | 34.8 | 266.7 | 133.3 | 488.9 | 27 | 13199.0 | 180.0 | 0.18 |
| 6 | Champa | 19 | 126.3 | 18.9 | 145.2 | 72.6 | 266.2 | 69 | 18367.2 | 250.5 | 0.25 |
| 7 | Chandani | 13 | 44.3 | 6.6 | 51.0 | 25.5 | 93.5 | 225 | 21026.7 | 286.8 | 0.29 |
| 8 | Christmas Tree | 32 | 471.5 | 70.7 | 542.2 | 271.1 | 993.9 | 13 | 12921.2 | 176.2 | 0.18 |
| 9 | Cycas Palm | 84 | 4147.2 | 622.1 | 4769.2 | 2384.6 | 8742.0 | 8 | 69936.1 | 953.8 | 0.95 |
| 10 | Dates Tree | 19 | 126.3 | 18.9 | 145.2 | 72.6 | 266.2 | 12 | 3194.3 | 43.6 | 0.04 |
| 11 | Erika Palm (Elite Green) | 26 | 283.7 | 42.5 | 326.2 | 163.1 | 598.0 | 13 | 7773.4 | 106.0 | 0.11 |
| 12 | Farkeriya Green | 23 | 208.1 | 31.2 | 239.3 | 119.6 | 438.5 | 27 | 11842.1 | 161.5 | 0.16 |
| 13 | Ficus Panda | 23 | 208.1 | 31.2 | 239.3 | 119.6 | 438.5 | 121 | 53070.0 | 723.8 | 0.72 |
| 14 | Ficus Panda Black, (Benjamina) | 22 | 185.6 | 27.8 | 213.4 | 106.7 | 391.2 | 14 | 5476.8 | 74.7 | 0.07 |
| 15 | Golden Pandanus (Ground Cover) | 37 | 665.4 | 99.8 | 765.2 | 382.6 | 1402.6 | 490 | 687293.9 | 9373.9 | 9.37 |
| 16 | Green Chili | 56 | 1711.7 | 256.8 | 1968.5 | 984.3 | 3608.3 | 5 | 18041.4 | 246.1 | 0.25 |
| 17 | Guava Tree | 53 | 1513.9 | 227.1 | 1741.0 | 870.5 | 3191.3 | 2 | 6382.7 | 87.1 | 0.09 |
| 18 | Gulmohar Tree | 73 | 3063.4 | 459.5 | 3523.0 | 1761.5 | 6457.6 | 31 | 200184.7 | 2730.3 | 2.73 |
| 19 | Hameliya | 9 | 16.9 | 2.5 | 19.4 | 9.7 | 35.5 | 3 | 106.6 | 1.5 | 0.00 |
| 20 | Jetropa | 11 | 27.9 | 4.2 | 32.1 | 16.0 | 58.8 | 700 | 41138.6 | 561.1 | 0.56 |
| 21 | Kadam Tree | 71 | 2884.0 | 432.6 | 3316.7 | 1638.3 | 6079.4 | 27 | 164144.6 | 2238.7 | 2.24 |



Calculation of CO₂ Emission of IIL Institute: -

Audit team has considered electricity, Institute transport, DG sets and Tress, in CO₂ Emission

$$\begin{aligned} \text{Total Carbon Footprint generated} &= \text{Carbon footprint by electricity} \\ \text{By the campus} &+ \text{Carbon footprint by vehicle} \\ &+ \text{Carbon footprint by DG Sets.} \\ &- \text{Carbon Neutralize by the tree.} \end{aligned}$$

Total Carbon Foot

$$\text{Print by campus: } 260 + 57 + 19.36 - 39.64 = \mathbf{296.72 \text{ tons/year}}$$

4.7 Other Emissions Excluded

This study did not evaluate the carbon sequestration potential of existing plantation activities and emissions from the staff commuting, food supply, official flights, paper products, water supply, and waste disposal and recycling due to limited data availability. The current study identifies areas where data monitoring, recording, and archiving need to be developed for enlarging the scope of mapping of GHGs emissions in the future years. Accordingly, a set of tools and record-keeping procedures will be developed for improving the quality of data collection for the next year's carbon footprint studies.

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CHAPTER- 5

WASTE MANAGEMENT

5.1 About Waste

Human activities create waste, and it is the way these wastes are handled, stored, collected and disposed of, which can pose risks to the environment and to public health waste management is important for an eco-friendly campus. In institute different types of wastes are generated, its collection and management are very challenging.

Solid waste can be divided into three categories: bio-degradable, non-biodegradable and hazardous waste. A bio-degradable waste includes food wastes, canteen waste, wastes from toilets etc. Non-biodegradable wastes include what is usually thrown away in homes and schools such as plastic, tins and glass bottles etc. Hazardous waste is waste that is likely to be a threat to health or the environment like cleaning chemicals, acids and petrol.

Unscientific management of these wastes such as dumping in pits or burning them may cause harmful discharge of contaminants into soil and water supplies, and produce greenhouse gases contributing to global climate change respectively. Special attention should be given to the handling and management of hazardous waste generated in the institute . Bio-degradable waste can be effectively utilized for energy generation purposes through anaerobic digestion or can be converted to fertilizer by composting technology. Non-biodegradable waste can be utilized through recycling and reuse. Thus the minimization of solid waste is essential to a sustainable institute. The auditor diagnoses the prevailing waste disposal policies and suggests the best way to combat the problems.

Table 5.1 Different types of waste generated in the institute Campus.

| Sr. No. | Types of Waste | Particulars |
|----------------|-----------------------|--|
| 1 | Solid wastes | Damaged furniture, paper waste, paper plates, food wastes etc. |
| 2 | Plastic waste | Pen, Refill, Plastic water bottles and other plastic containers, wrappers etc. |
| 3 | E-Waste | Computers, electrical and electronic parts etc. |
| 4 | Glass waste | Broken glass wares from the labs etc. |
| 5 | Chemical wastes | Laboratory waste etc. |
| 6 | Bio-medical Waste | Sanitary Napkin etc. |

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5.2 Waste collection points in institute campus

Audit team also visited various departments, canteen, hostels and find out waste generation area and waste collection points for further improvement. Details are given in the table.

Table: 5.2 Detailed of waste collection dust bin system

| Sr. No | Block | Floor | Big | Small | Steel | Total |
|--------|-------|--------------|-----|-------|-------|-------|
| 1 | A | Ground Floor | 1 | 15 | 0 | 16 |
| 2 | | First Floor | 1 | 17 | 0 | 18 |
| 3 | | Second Floor | 1 | 0 | 0 | 1 |
| 4 | | Third Floor | 1 | 0 | 0 | 1 |
| 5 | B | Ground Floor | 1 | 23 | 0 | 24 |
| 6 | | First Floor | 1 | 18 | 0 | 19 |
| 7 | C | Ground Floor | 3 | 0 | 1 | 4 |
| 8 | | First Floor | 2 | 5 | 2 | 9 |
| 9 | | Second Floor | 1 | 11 | 0 | 12 |
| 10 | | Third Floor | 1 | 3 | 0 | 4 |
| 11 | | Fourth Floor | 1 | 0 | 0 | 1 |
| 12 | | Fifth Floor | 1 | 2 | 0 | 3 |
| 13 | D | Ground Floor | 1 | 13 | 0 | 14 |
| 14 | | First Floor | 1 | 10 | 0 | 11 |
| 15 | | Second Floor | 1 | 8 | 0 | 9 |
| 16 | | Third Floor | 1 | 6 | 1 | 8 |
| 17 | | Fourth Floor | 1 | 4 | 1 | 6 |
| 18 | | Fifth Floor | 1 | 6 | 1 | 8 |
| 19 | E | Ground Floor | 1 | 4 | 0 | 5 |
| 20 | | First Floor | 1 | 2 | 0 | 3 |
| 21 | | Second Floor | 1 | 2 | 0 | 3 |
| 22 | | Third Floor | 1 | 2 | 0 | 3 |
| 23 | | Fourth Floor | 1 | 2 | 0 | 3 |
| 24 | | Fifth Floor | 1 | 2 | 0 | 3 |
| 25 | | Campus | 6 | 1 | 0 | 7 |
| | | TOTAL | | | | 195 |

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5.3 Waste management practices adopted by the institute.

Institute is adopted “Three dust bin” waste collection system in institute campus. All waste is collected Gram panchayat rangwasa from institute campus every day.



Figure: - 5.1 Three dust bin in institute campus

Recommendation:

It is recommended adopted 5 bin waste collection system for collect different type of waste generated in institute premises.

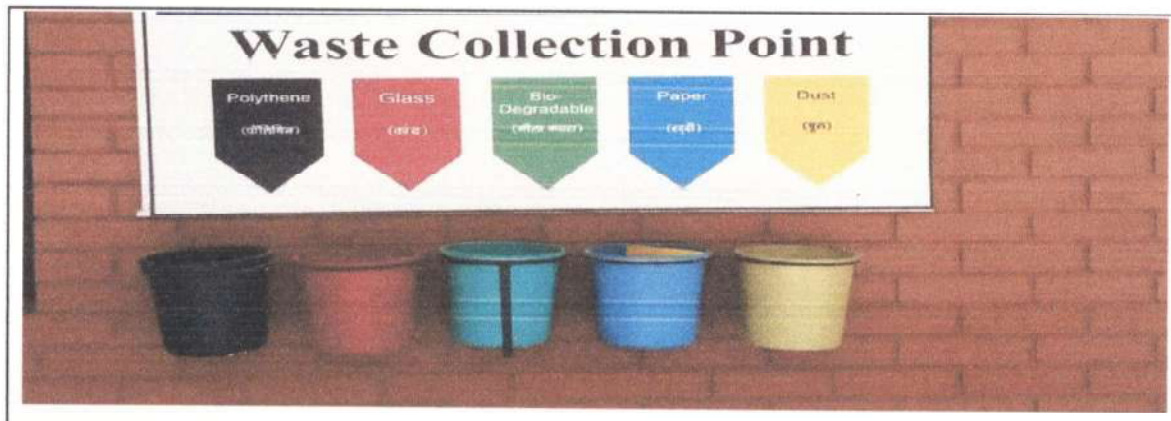


Figure 5.2: Recommended 5 Dust Bin waste collection System

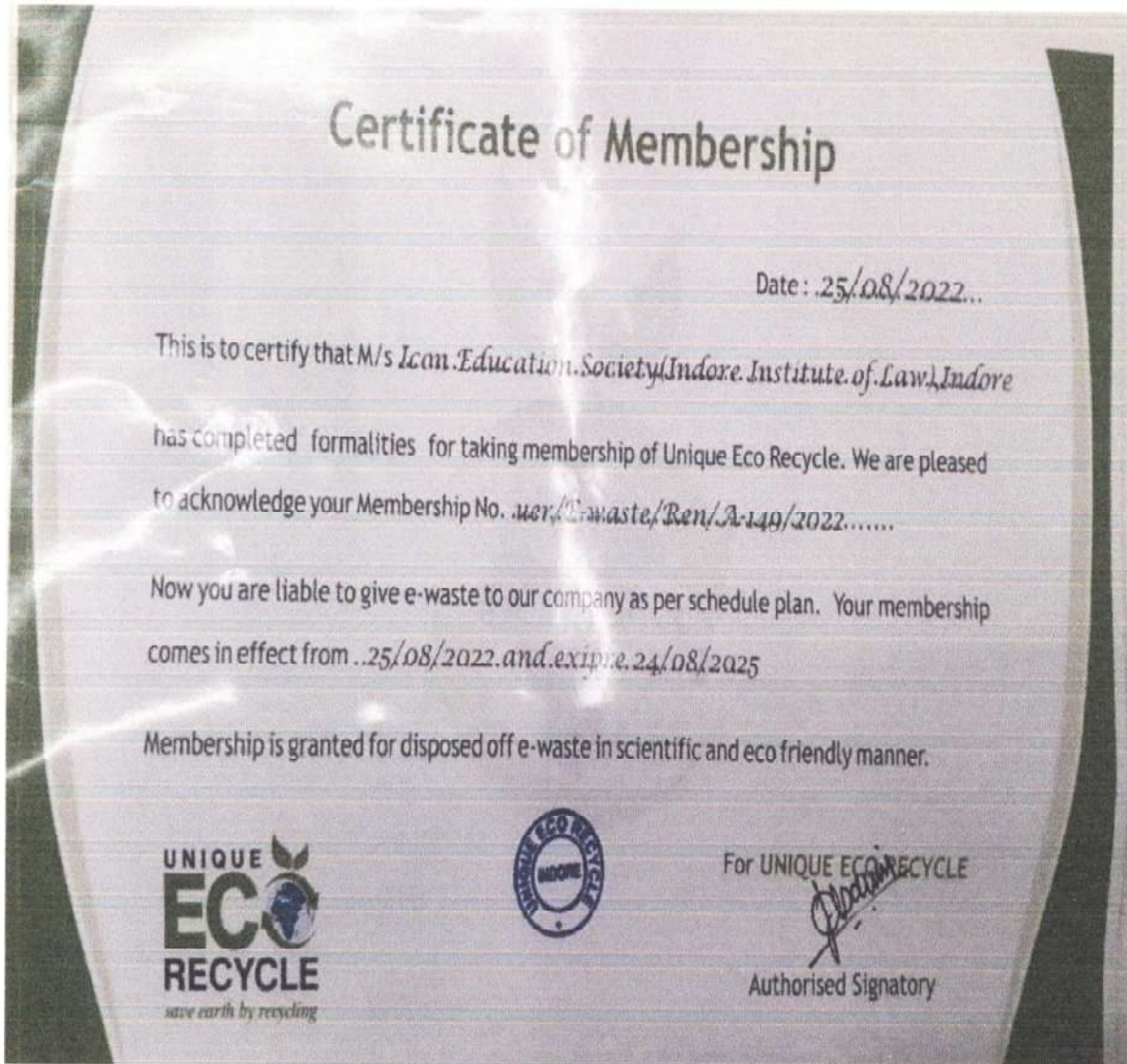
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5.4 E-Waste management

Institute has MOU sign with Unique Eco Recycle 41, Sikh Mohalla Near Kothari Market Chouraha, Indore-4520007 (M.P.) for all types of E-waste collection for treatment .Its Appriciable .

MOU of E-waste management .



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5.5:- Bio Gas Plant

Institute has given purchase order for bio gas plant of Mr. Koshish Sustainable Solution Pvt. Ltd on Dated 16-08-2022. for all type of organic waste in institute . **Its Appreciable .**

ICON EDUCATION SOCIETY

Date 18/08/2022

To,
Koshish Sustainable Solutions Pvt. Ltd.
 Lot 15 A, 6th Floor, Tradex Tower
 Sector- 125, Noida

PURCHASE ORDER

With Reference to your quotation No. KSSPL/BGP/22716 dated 16/08/2022 for the supply of Bio gas Plant for **Icon Education Society, Gendalal Bam Parisar, Rau Pithampur Road Indore.** As per the management decision, we are issuing you purchase order for the supply of same.

| S. No. | Particulars | Rate. | Value | Total |
|--------|---|-------|---------------|--------------|
| 1. | Floating Dome Biogas Plant- 2 Cum | | | |
| | • Biogas Digester | | | |
| | • Gas Holder | 1 | 65000 | 65000 |
| | • Inlet and Outlet Pipe | | | |
| | • HDPE Pipeline | | | |
| | • Bio gas Stove | | | |
| | • Biogas stop cock, moisture remover, cock cum nipple, brass nozzle | | | |
| | GST 12% | | | 7800 |
| | | | Total: | 72800 |

Terms & Conditions:-

- 1) The rates are included Freight, Shifting etc.
- 2) The materials to be deliver at "Gendalal Bam Parisar", Rau Pithampur Road Indore.
- 3) Work will be completed in all respect within 7 days.
- 4) GST will be paid as per applicable rule at the time of work completion.
- 5) The equipment's are covered under their respective warranties as mentioned.
- 6) Payment against installation.
- 7) Freight charges will be as per actual.

(Executive Director)
 Indore Institute of Law
 Mobile No. +918889733352

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5.6 QR Code System :-

Institute has installed QR code system on trees for plant details like common name , Botanical name , Family name , Flower , Fruit Etc . It is Applicable



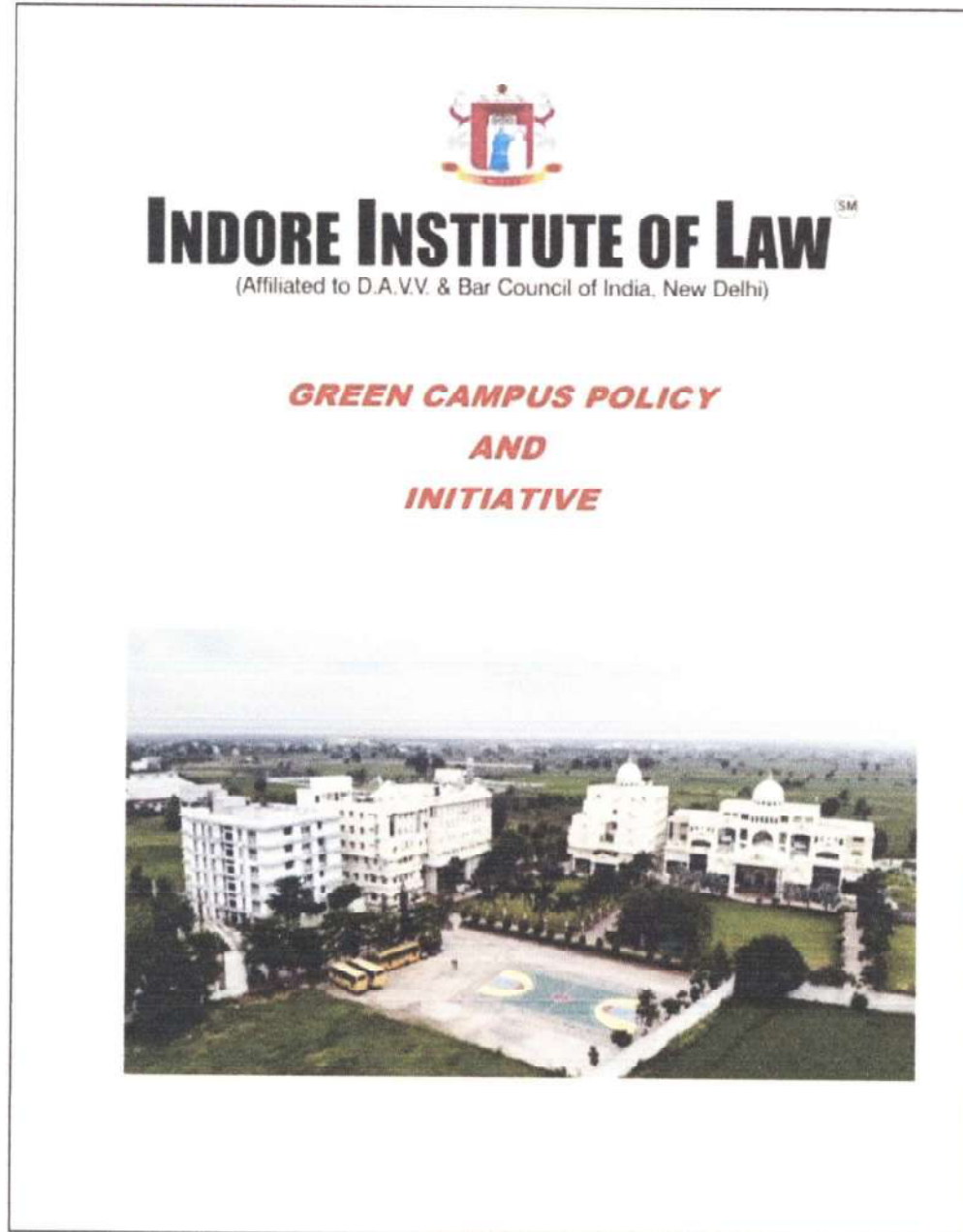
Figure :- QR code system on Trees

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Annexure-01

Green Campus Policy



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Continues :-

GREEN CAMPUS INITIATIVES INCLUDE

The institutional initiatives for greening the campus are as follows:

- Restricted entry of automobiles
- Ban on use of Plastic

RESPONSE:

Indore Institute of Law has always followed a green agenda and has shown remarkable awareness of maintaining an eco- friendly campus. On visiting the Campus, one can experience the appealing and well designed buildings, beautiful lawns, spacious sports ground and lush green environment favorable for the teaching learning process.

RESTRICTED ENTRY OF AUTOMOBILES

Indore Institute of Law operates a fleet of 3 buses covering each corner of Indore and its nearby areas to facilitate the students and staff. The institute encourages the staff and students to use the institute conveyance instead of their vehicles for safety, security, fuel conservation and to reduce environmental pollution.

The Institution buses are periodically checked for pollution by the authorized agency. Institute has a vehicle parking area available near main entrance of the campus for the guests, visitors, faculties, students and any other vehicles. The vehicles should possess pollution check stickers. Only bicycles are allowed inside the campus. Random checks are made to check the validation and periodicity of this certificate. For two wheelers or four wheelers, security measures are compulsory. Stakeholders are also encouraged to adopt carpooling to reduce the toxic emissions in the air.



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Continues :-



Green your commute

Choose the green practice



USE OF BICYCLES

The students staying on the Institute campus are using bicycles to move within the campus as well as to travel the nearby areas outside the campus. Students and staff coming from nearby villages also prefer bicycles as a mode of transport for attending the Institution. It is environmentally friendly and helps to decrease pollution.



BAN ON USE OF PLASTIC

Indore Institute of law is making an untiring effort to “Reduce Plastic Pollution” by minimizing plastic footprints and by way of refuse, reduction, reuse, and recycling. Hence the subsequent initiatives are taken by all the stakeholders to spread awareness of environmental conversation:

- 1- To refuse and reduce plastic products in daily use and pledge to a plastic free environment within the campus.
- 2- Ban Single use plastic, water bottles, takeaway cups, lunch wrapped in disposable plastic, packaging, plastic bags, disposable food service cups, plates and containers fabricated from polystyrene foam, plastic, straws etc. within the campus premises and canteen.

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- 3- Encourage the use of biodegradable and other kind of compostable utensils in situ of plastic and shall bring a fork, knife and spoon from home.
- 4- Encourage the use of durable, foldable and cheap reusable bags that may be carried around in a car, pocket or purse.
- 5- Discourage plastic bottles and instead use glass, steel or clay bottles in office.
- 6- Welcome innovative ideas to cut back plastic foot prints.
- 7- The staff and students are informed to use steel or copper water bottles rather than plastic bottles.



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**END OF THE REPORT
THANKS**

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—Rank 1st PRIVATE LAW COLLEGE IN M.P., C.J. & RAJASTHAN BY—
INDIA TODAY – OUT LOOK – THE WEEK – THE KNOWLEDGE REVIEW

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Phone no:- 9977091777, 9977019777

7.1.6

ENERGY AUDIT



Energy Audit Report
Indore Institute of Law, Rau-Pithampur
Road, Indore (M.P.)



ENERGY AUDIT REPORT



Indore Institute of LAW
Rau-Pithampur Road, Indore (M.P.)

PREPARED BY

EMPIRICAL EXERGY PRIVATE LIMITED

Flat No. 201, OM Apartment, 214 Indrapuri Colony
Bhawarkuan, Indore – 452 001 (M. P.), India
0731-4948831, 7869327256

Email ID: empirical18@gmail.com

www.eeplgroups.com

(2021-22)

Manpreet
Prof. (Dr.) Manpreet Kaur Rajpa
Dean
Indore Institute of Law

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ACKNOWLEDGEMENT

Empirical Exergy Private Limited (EEPL), Indore (M.P) takes this opportunity to appreciate & thank the management of **Indore Institute of Law, Indore** for allowing us to conduct the energy audit.

We are indeed touched by the helpful attitude and co-operation of all faculties and technical staff, who rendered their valuable assistance and co-operation during the course of study.

Rajesh Kumar Singadiya


(Director)

M.Tech (Energy Management), PhD (Research Scholar)
Accredited Energy Auditor [AEA-0284]
Certified Energy Auditor [CEA-7271]
(BEE, Ministry of Power, Govt. of India)
Empanelled Energy Auditor with MPUVN, Bhopal M.P.
Lead Auditor ISO50001:2011 [EnMS] from FICCI, Delhi
Certified Water Auditor (NPC, Govt of India)
Chartered Engineer [M-1699118], The Institution of Engineers (India)
Member of ISHRAE [58150]

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Certificate of Accreditation

 **BUREAU OF ENERGY EFFICIENCY**

Examination Registration No.: **EA-7271**

Accreditation Registration No.: **AEA-284**



Certificate of Accreditation

This is to certify that Mr./Ms. **Shri. Rajesh Kumar Singadiya** having its trade/registered office at has been given accreditation as accredited energy auditor. The certificate shall be effective from **9th** day of **May, 2018**

The certificate is subject to the provisions of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

This certificate shall be valid until it is cancelled under regulation 9 of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

On cancellation, the certificate of accreditation shall be surrendered to the Bureau within fifteen days from the date of receipt of order of cancellation.

Your name has been entered at AEA No. **284** in the register of list of accredited energy auditors. Your name shall be liable to be struck out on the grounds specified in regulation 8 of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

Given under the seal of the Bureau of Energy Efficiency, Ministry of Power, this **5th** day of **October, 2018**

Secretary,
Bureau of Energy Efficiency
New Delhi

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The Audit Team

Audit team constituted of the following senior technical executives from **Empirical Exergy Private Limited,**

- ✦ **Mr. Rajesh Kumar Singadiya** [Director & Accredited Energy Auditor AEA-0284]
- ✦ **Mr. Rakesh Pathak,** [Director & Electrical Expert]
- ✦ **Dr. Suresh Kumar Soni** [Certified Energy Auditor & Energy Expert]
- ✦ **Mrs. Laxmi Raikwar Singadiya** [Chemical Engineer]
- ✦ **Mr. Sachin Kumawat** [Sr. Project Engineer]
- ✦ **Mr. Charchit Pathak** [Asst.Project Engineer]
- ✦ **Mr. Aakash Kumawat** [Junior Engineer]
- ✦ **Mr. Ajay Nahra,** [Sr. Accountant & admin]

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EXECUTIVE SUMMARY

The executive summary of the energy audit report furnished in this section briefly gives the identified energy conservation measures and other recommendations during the project that can be implemented in a phased manner to conserve energy and increase productivity inside the institute campus.

ENERGY MANAGEMENT INITIATIVE TAKEN BY INSTITUTE

✚ SOLAR SYSTEM

Institute management has installed 58 kWp roof top grid connected solar system in the campus. **Its Appreciable.**

✚ LIGHTING SYSTEM

Institute has already replaced 657 nos. (36 Watt) tube lights with 193 nos. (15W LED) and 464 nos. (18W LED). **Its Appreciable.**

SOLAR WATER HEATER

✚ Institute management has installed 2 nos Solar water heater with 500 Litre on hostles buildings for hot water requirement. **Its Appreciable.**

ENERGY AUDIT RECOMMEDATION

LIGHTING SYSTEM

✚ There are good potential for replacement of 367 no. of conventional T-8 (36Watt) tube light by energy efficient T-5 (20Watt) LED lighting in institute, estimated energy saving potential is 20,552 kWh/Year. **Detailed Calculation in chapter-05**

CEILING FAN AND EXHAUST FAN

✚ Replacement of “conventional ceiling fan (60 Watt)” by energy efficient star rated fan or BLDC based energy efficient fan (28 Watt) in class rooms, laboratories and faculties cabin have great potential for energy saving. **Detailed Calculation in chapter-05**

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ENERGY CONSERVATION MEASURES FOR ELECTRICAL SYSTEM

| Case Study | Section | Identification | Observation | Recommendation | Annual energy saving (kWh) | Annual cost saving (Rs.) | Investment (Rs.) | Simple payback Period |
|------------|----------------------|---|--|--|----------------------------|--------------------------|------------------|-----------------------|
| 1 | Lighting System | 367 No. FTL tube light | Power consumption by FTL (36Watt) | Replaced by T-5 (20Watt) LED tube. | 20,552 | 1,73,130/- | 77,070/- | 5 month |
| 2 | Improve Power factor | Annual Average Power factor is 0.959 | There is Potential for more Power factor incentive as per tariff | Improve the system Power factor up to 0.996 | - | 86,305/- | - | - |
| 3 | Celling Fan | 447 No ceiling fan working with 60 Watt | Power consumption by existing ceiling fan (60 Watt) | Replacement by 28W BLDC energy efficient ceiling fan | 28,608 | 2,40,994/- | 8,44,830/- | 4 year |

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CHAPTER-1

INTRODUCTION

1.1 About institute

Indore Institute of Law (IIL) was founded with a vision to be one of India's most prominent Law institutes and has established itself as one of the most recognized Law Institutes in India. IIL are committed to providing the best platform for global legal education to students and courses are designed in order to give a complete exposure, both in domestic and international law practices, students. At Indore Institute of Law, students have an option to choose from a variety of law courses, where they are offered complete law programmes along with practical training and research papers to get an all-round understanding of the law in detail.



Figure 1.1: - Satellite Image of IIL, Indore from Google map

Value Based Education

“Educating the mind without educating the heart is no education at all!” At Indore Institute of Law, the objective of delivering Value Based Education is to produce responsible and committed citizens. This education acts as a multidimensional attribute to activate human values among students. On one hand, they achieve exceptional success in their legal profession and on the other, they become good human beings with a heart for society and the country. This is an institute which stands on the foundation of moral values, passion and a relentless search for excellence.

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Objective

At Indore Institute of Law, our objective is to form a community where people come together and respect the law and take an oath to use it in an honest way for the betterment of the society.

Mission

The world works with a right mix of Cultural and Spiritual Excellence and sometimes, you need the help of law to maintain the right balance in the society. For a society to function ideally, you need people to maintain a certain law and order and direct it towards an accomplishment it is trying to achieve. At Indore Institute of Law, we are nurturing young minds with equality and right law education to ensure they promote it further to the society, when they take the law as their career path. The society is always looking forward to people who are making a positive change with their morals and with a higher understanding of moral excellence. This is where Indore Institute of Law steps in and offers a platform to the students where they get a complete understanding of law, fostering their minds in the right development that is ultimately going to play a positive role in the betterment of the society and the nation, as whole.

1.2 About Institute Infrastructure:

The institute is spread over **1,81,673 Sq.Ft.** with plenty of open space and sports area interspersed within academic buildings. The details of various department and building are given below:

Table1.1 :- Name of the various Building in the institute

| Sr.No. | Building | Buildup Area (Sq.Ft.) |
|--------|-------------------------|-----------------------|
| 1 | Block-A | 65,725 |
| 2 | Block-B | 10,032 |
| 3 | Block-C | 28,201 |
| 4 | Boys Hostel (Block- D) | 32,830 |
| 5 | Girls Hostel (Block- E) | 44,885 |
| | Total | 1,81,673 |

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1.3 About Energy Audit

Energy audit helps to understand more about the ways energy is used in any institute and helps in identifying areas where waste may occur and scope for improvement exists. The overall energy efficiency from generation to the final consumer becomes 50%. Hence one unit saved in the end user is equivalent to two units generated in the power plant.

The energy audit is the most efficient way to identify the strength and weaknesses of energy management practices and to find a way to solve problems. The professional approach of the energy audit is to utilizing economic, financial, social, and natural resources responsibly. Energy audits “adds value” to management control and a way of evaluating the system.

Empirical Exergy Private Limited (EEPL), Indore M.P. carried out the “Energy Audit” at the site to find gaps in the energy consumption pattern for **Indore Institute of Law, Indore M.P.** A technical report is prepared as per the need and the requirement of the project.

1.4 Objectives of Energy Auditing

An energy audit provides a vital information base for an overall energy conservation program covering essentially energy utilization analysis and evaluation of energy conservation measures. It aims at:

- Identifying the quality and cost of various energy inputs.
- Assessing the present pattern of energy consumption in different cost centers of operations.
- Relating energy inputs and production output.
- Identifying potential areas of the thermal and electrical energy economy.
- Highlighting wastage in major areas.
- Fixing of energy-saving potential targets for individual cost centers.
- Implementation of measures for energy conservation & realization of savings.

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1.5 Green Monitoring Committee

INDORE INSTITUTE OF LAW™

(Affiliated to DAVV and Bar Council of India, New Delhi)



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INDIA TODAY | OUTLOOK | THE WEEK | THE KNOWLEDGE REVIEW

Campus Add.: "Gendral Ram Parkar" Opp. IIM Rau, Pithampur Road, Indore (M.P.) 451111

Phone No: +91 9977011777, 9977019777 | Web: www.indoreinstituteoflaw.org | E-mail: indoreinstituteoflaw@gmail.com

No. 111/76/A/22

02.07.2022
 Date: / /

Energy, Water, Green & Environment Audit Committee

Energy, Water, Green & Environment Audit Committee will consist of the following members.

| S. No. | Name | Designation |
|--------|---------------------------|-----------------------------|
| 1 | Dr. Manpreet Kaur Rajpal | Dean and Director Academics |
| 2 | Mr. K.S. Vyas | Executive Director |
| 3 | Mr. Nitin Jasuja | Campus Incharge |
| 4 | Mr. Arun Naik | Admin Officer |
| 5 | Mr. Shekhar Patankar | Coordinator |
| 6 | Mr. Ashish Verma | Admin. Assistant |
| 7 | Mr. Anil Choudhary | Campus Supervisor |
| 8 | Mr. Yogendra Singh Thakur | Campus Supervisor |

Time duration of this committee is 2 years, after which the committee will be reconstituted.


Executive Director
Indore Institute of Law
Executive Director (Admin)
Indore Institute of Law

ISO 9001:2008 Certified

Run By: Icon Education Society

City Office : 425 426, Orbit Mall, A.B. Road, Indore (M.P.)

Associate Institute :

INDORE NURSING COLLEGE
 (Affiliated to DAVV and Indian Nursing Council, New Delhi)
 www.indorenursingcollege.com

Indira Institute of Management
 (Affiliated to DAVV and approved by M.P. Higher Edu. & AICTE, New Delhi)
 www.iiimindore.com

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1.6 Methodology

The methodology adopted for achieving the desired objectives viz.: Assessment of the current operational status and energy savings includes the following:

- ✦ Discussions with the concerned officials for identification of major areas of focus and other related systems.
- ✦ A team of engineers visited the site and had discussions with the concerned officials/supervisors to collect data/information on the operations and load distribution within the plant and the same for the overall premises. The data were analyzed to arrive at a baseline energy consumption pattern.
- ✦ Measurements and monitoring with the help of appropriate instruments including continuous and/or time-lapse recording, as appropriate and visual observations were made to identify the energy usage pattern and losses in the system.
- ✦ Trend analysis of costs and consumptions.
- ✦ Capacity and efficiency test of major utility equipments, wherever applicable.
- ✦ Estimation of various losses
- ✦ Computation and **in-depth analysis** of the collected data, including utilization of computerized analysis and other techniques as appropriate, were done to draw inferences and to evolve suitable energy conservation plans for improvements/reduction in specific energy consumption.

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Road, Indore (M.P.)**



1.7 Institute Present Energy Scenario:

The annual energy consumption of **Indore Institute of Law** campus is about **2,74,201** units period from Jul - 2021 to Jun- 2022. Institute has a 58Wp solar photovoltaic rooftop grid-connected system installed on 04/01/2022

Institute uses energy in the form of electricity purchased from the grid and a 58 KWp solar grid-connected system for the institute campus. There is single feeder for institute.

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CHAPTER- 2 POWER SUPPLY SYSTEM

2.1 Transformer Details.

The power supply for Indore Institute of Law(IIL) is from MPPKVVCL with the help of 11 kV feeder. This is an education feeder under Tariff HV3.2A 11 KV Non-Industrial with contract demand of 220 KVA. There is one step-down transformer having capacity of 315 KVA. The details are given in following table 2.1

Table: 2. 1 Technical details of transformer.

| Sr. No. | Items | Technical Specification |
|---------|-------------------------|---------------------------------|
| 1 | Make | Electoforn Transpower Pvt. Ltd. |
| 2 | Year | 2018 |
| 3 | Rating (kVA) | 315 |
| 4 | Voltage (HV/ LV) | 11000/433 |
| 5 | Current Rating (HV/ LV) | 16.5 / 420 |
| 6 | Frequency (Hz) | 50 |
| 7 | Impedance at 75°C (%) | 4.5 % |
| 8 | Vector group | Dy-11 |
| 9 | Type of cooling | ONAN |
| 10 | Total no of Tap | 7 |
| 11 | No Load Loss (Watt) | 500 |
| 12 | Full Load Loss (Watt) | 4185 |

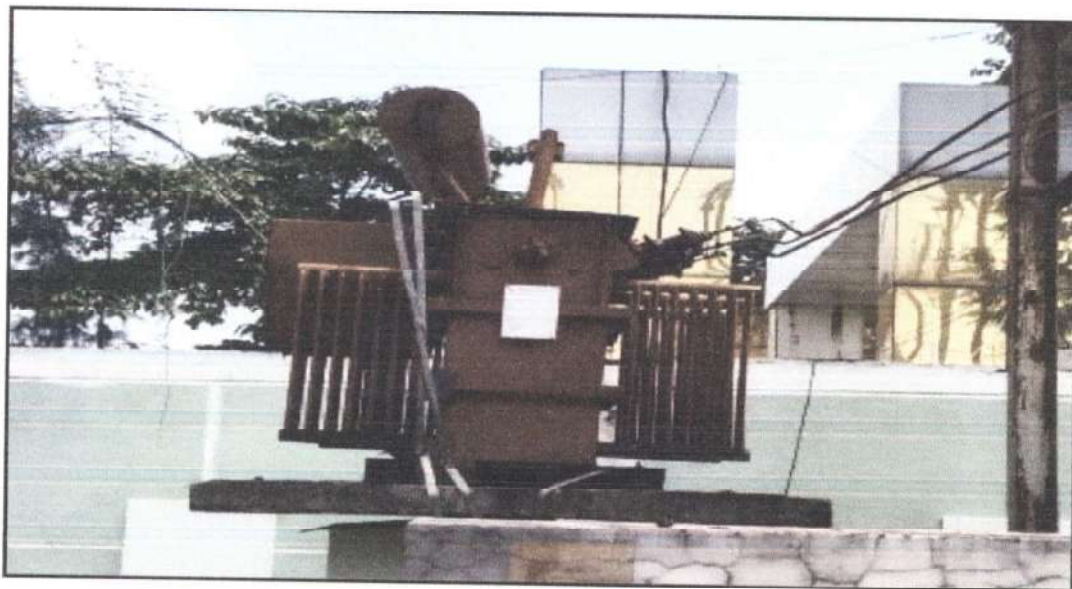


Figure 2.1:- 315 kVA Transformer

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Table 2.2: Calculated Transformer loading (%) Based on Electricity Bills Year (2021-22)

| Sr. No | Month & Year | Contract Demand (KVA) | Maximum Demand (KVA) | TR Loading (%) |
|--------|-------------------------------|-----------------------|----------------------|----------------|
| 1 | Jul-21 | 120 | 112 | 35.56 |
| 2 | Aug-21 | 120 | 57 | 18.10 |
| 3 | Sep-21 | 120 | 75 | 23.81 |
| 4 | Oct-21 | 120 | 124 | 39.37 |
| 5 | Nov-21 | 120 | 75 | 23.81 |
| 6 | Dec-21 | 120 | 73 | 23.17 |
| 7 | Jan-22 | 120 | 66 | 20.95 |
| 8 | Feb-22 | 120 | 60 | 19.05 |
| 9 | Mar-22 | 120 | 72 | 22.86 |
| 10 | Apr-22 | 120 | 170 | 53.97 |
| 11 | May-22 | 120 | 171 | 54.29 |
| 12 | Jun-22 | 220 | 167 | 53.02 |
| 13 | Average Transformer loading % | | | 32.88 |
| 14 | Maximum Loading % | | | 54.29 |

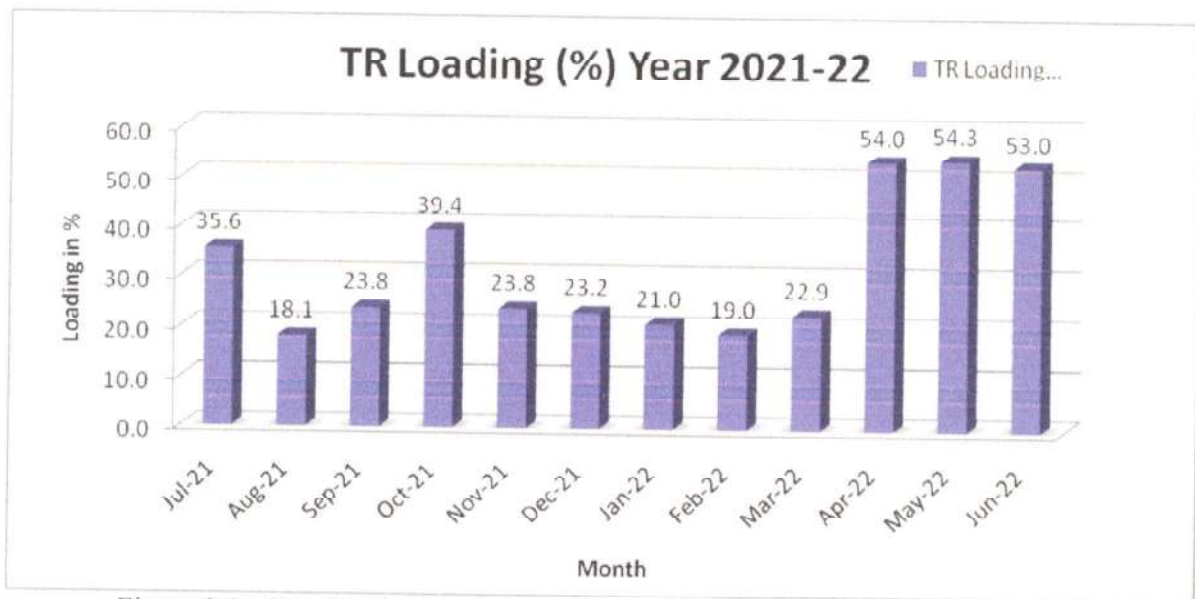


Figure 2.2:- Graphical presentation of TR loading percentage Year 2021-22

Observation: -

The average loading of the transformer is 32.88 % and goes to maximum 54.3 % in the month of May 2022. **It is Acceptable.**

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2.2 DG Set:-

There is one DG set on the institute campus. Details of the DG Set is given table. 2.4

Table 2.4 Technical specifications for DG set

| Sr. No. | Parameter | Technical Specification |
|---------|-----------------------------------|-------------------------|
| 1 | Make | KALA GENSET PVT LTD |
| 2 | Engine Sr.No | 4H.7906/1821162 |
| 3 | Capacity (KVA) | 125 |
| 4 | Rated Voltage (V) | 415 |
| 5 | Full load current (A) | 173.9 |
| 6 | Frequency (Hz) | 50 |
| 7 | Power factor | 0.8 |
| 8 | Speed (RPM) | 1500 |
| 9 | Phase | 3 |
| 10 | Specific Fuel Consumption (g/kWh) | 242 |



Figure 2.3:- DG set in power house

Observation & Suggestion:

- + DG set is used only in case of grid power failure.
- + There is no system to monitor fuel consumption w.r.t. unit generation.

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2.3 Grid Connected Solar Photovoltaic System (58KWp)

There is a 58 KWp solar photovoltaic rooftop grid-connected system on various building. The date of solar installation is 04/01/2022. System details are given below:

Table: - 2.6 solar plants details

| Sr. No. | Description | Technical Specification |
|---------|--------------------------------|-------------------------|
| A | Details of the Solar PV Module | |
| 1 | Capacity of module | 500Wp |
| 2 | No. of Modules | 116 Nos |
| 3 | Total Capacity | 58 KWp |
| 4 | Latitude & Longitude | 22.77125 N & 75.90821 E |
| B | Inverter Information | |
| 2.1 | Make | Growatt |
| 2.2 | Model | GROWATT 8000TL3-S |
| 2.3 | Serial No | EGK0BHM016 |
| 2.4 | AC capacity of Inverter | 60 |
| 2.5 | No of inverter installed | 1 |
| 2.6 | Total AC Capacity of Inverter | 60 Kw |

Photographs of Solar Plant:-

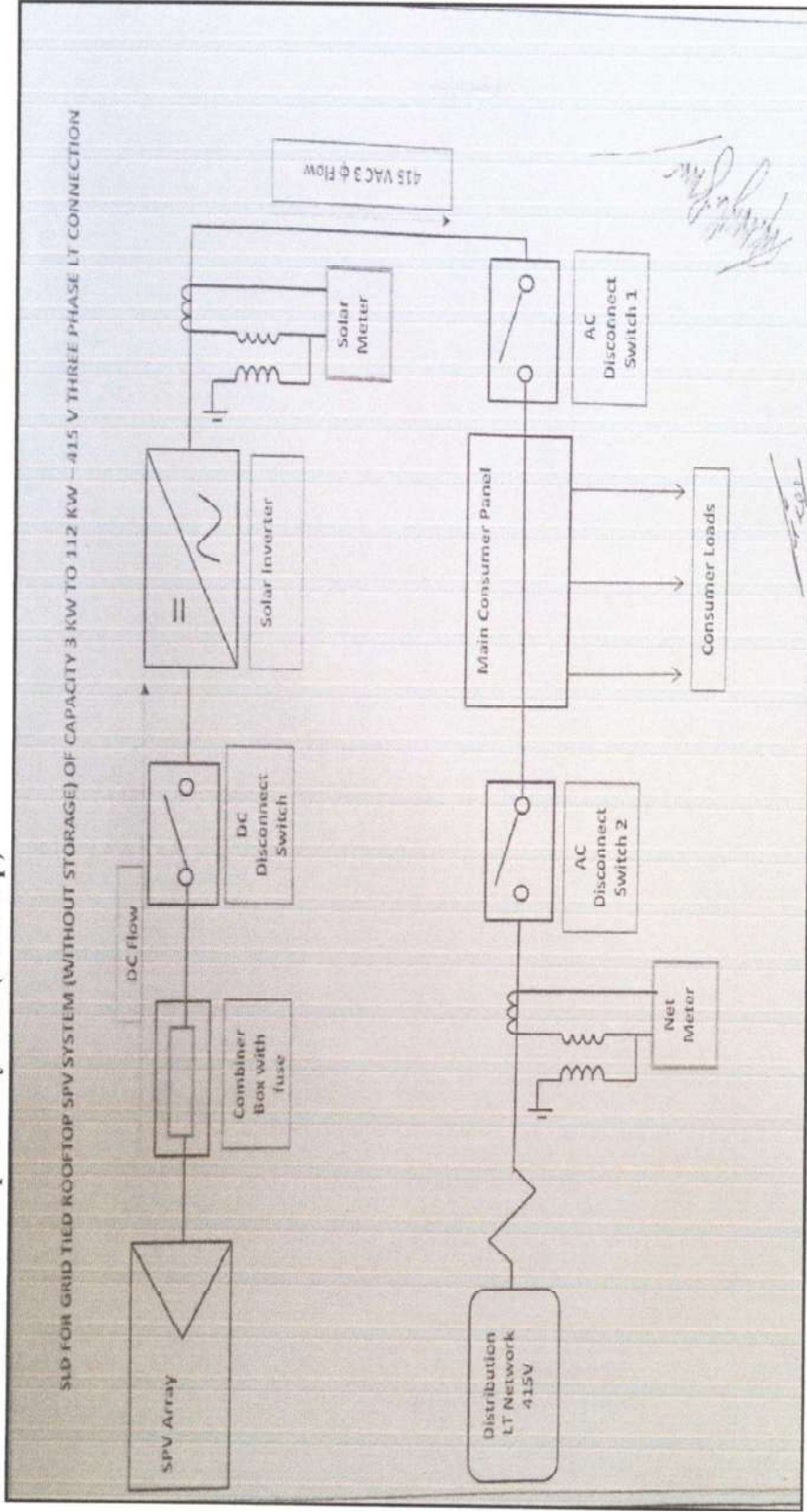


Figure 2.3:- Solar Plant 58 KWp and Inverter System

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Solar for Grid Tied Rooftop SPV System (58 KWp)



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CHAPTER- 3 ELECTRICITY BILL ANALYSIS

3.1 Electricity Bill Analysis from 2017 to 2022

Electricity bills for the last 5 years were analyzed. Detailed annual unit consumption, is given in table 3.1

Table 3.1:- Electricity bill analysis last 5 Year

| Sr. No. | Year (July to June) | Annual Unit Consumption |
|---------|------------------------|-------------------------|
| 1 | July 2017 to June 2018 | 2,91,473 |
| 2 | July 2018 to June 2019 | 3,52,571 |
| 3 | July 2019 to June 2020 | 2,82,567 |
| 4 | July 2020 to June 2021 | 1,30,611 |
| 5 | July 2021 to June 2022 | 2,70,480 |



Figure 3.1:- Graphical presentation of energy consumption in last 5 Year

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3.2 Monthly electrical energy consumption 2021-22

The monthly electrical consumption for the institute is given in the table.
 Table 3.2 Energy consumption and billing amount (the year 2021-22)

| Sr. No | Month & Year | Total Unit Consumption (kWh/Month) | Total Amount (Rs./Month) | Per Unit Charges (Rs./kWh) |
|--------|--------------|------------------------------------|--------------------------|----------------------------|
| 1 | Jul-21 | 15,788 | 1,60,670/- | 10.18 |
| 2 | Aug-21 | 10,160 | 1,16,721/- | 11.49 |
| 3 | Sep-21 | 14,931 | 1,53,578/- | 10.29 |
| 4 | Oct-21 | 20,169 | 1,98,905/- | 9.86 |
| 5 | Nov-21 | 16,986 | 1,66,529/- | 9.80 |
| 6 | Dec-21 | 21,044 | 1,98,575/- | 9.44 |
| 7 | Jan-22 | 17,397 | 1,70,820/- | 9.82 |
| 8 | Feb-22 | 17,609 | 1,71,620/- | 9.75 |
| 9 | Mar-22 | 16,941 | 1,68,767/- | 9.96 |
| 10 | Apr-22 | 37,071 | 3,38,896/- | 9.14 |
| 11 | May-22 | 43,235 | 3,98,800/- | 9.22 |
| 12 | Jun-22 | 42,870 | 3,96,686/- | 9.25 |
| | Total | 2,74,201 | 26,40,567/- | 9.63 |

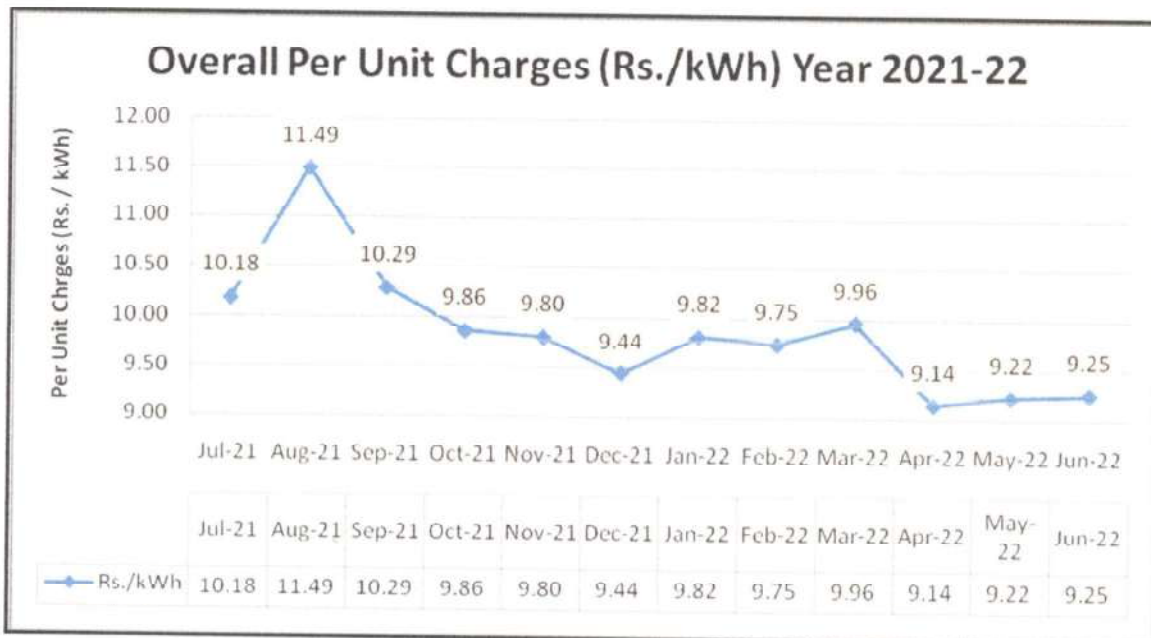


Figure 3.2:- Graphical presentation of actual per-unit charges for the year 2021-22

Observation:

It was found that total energy consumption in the last 12 months was **2, 74,201** units. The average annual unit charge is Rs 9.63 /kWh.

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3.3 Monthly demand analysis (2021-22)

The monthly demand consumption for the institute is given in the table.3.2

Table 3.3:- Monthly demand analysis (KVA) consumption pattern year 2021-22

| Sr.No. | Month & Year | Contract Demand (KVA) | Billing Demand (KVA) | Maximum Demand (KVA) |
|-------------------------------|--------------|-----------------------|----------------------|----------------------|
| 1 | Jul-21 | 120 | 112 | 112 |
| 2 | Aug-21 | 120 | 108 | 57 |
| 3 | Sep-21 | 120 | 108 | 75 |
| 4 | Oct-21 | 120 | 124 | 124 |
| 5 | Nov-21 | 120 | 108 | 75 |
| 6 | Dec-21 | 120 | 108 | 73 |
| 7 | Jan-22 | 120 | 108 | 66 |
| 8 | Feb-22 | 120 | 108 | 60 |
| 9 | Mar-22 | 120 | 108 | 72 |
| 10 | Apr-22 | 120 | 170 | 170 |
| 11 | May-22 | 120 | 171 | 171 |
| 12 | Jun-22 | 220 | 198 | 167 |
| Maximum Demand | | | | 171 |
| Average Maximum Demand | | | | 104 |

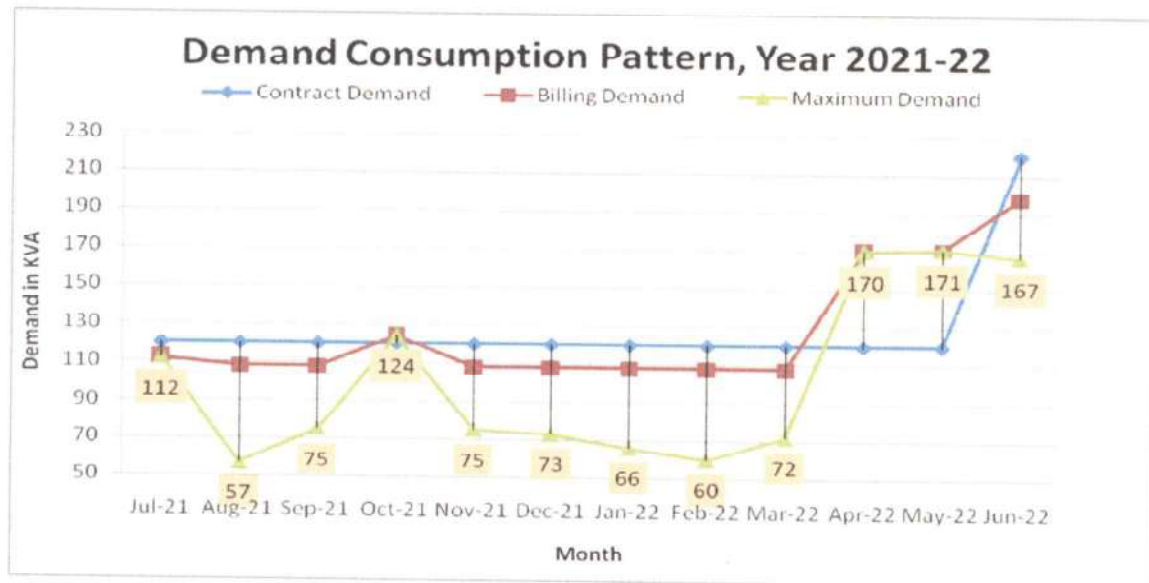


Figure 3.3:- Graphical presentation of demand consumption in the institute year 2021-22

Observation: It is observed that the contract demand of the institute is increased from 120 KVA to 220 KVA in month of June 2022. There is a large variation in maximum demand. It is maximum of 171 kVA in the Month of April-2022.

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3.4 Monthly Power factor analysis Year-2021-22

The monthly power factor for the institute is given in the following table. 3.3

Table 3.4:- Power factor of the institute year 2021-22

| Sr.No. | Month & Year | Monthly Power Factor | PF Incentive (%) | P.F. Incentive (Rs.) |
|-----------------------|--------------|----------------------|------------------|-------------------------|
| 1 | Jul-21 | 0.963 | 2 | 2,289/- |
| 2 | Aug-21 | 0.964 | 2 | 1,473/- |
| 3 | Sep-21 | 0.960 | 2 | 2,165/- |
| 4 | Oct-21 | 0.971 | 3 | 4,465/- |
| 5 | Nov-21 | 0.964 | 2 | 2,507/- |
| 6 | Dec-21 | 0.967 | 2 | 3,106/- |
| 7 | Jan-22 | 0.963 | 2 | 2,617/- |
| 8 | Feb-22 | 0.971 | 3 | 3,972/- |
| 9 | Mar-22 | 0.959 | 1 | 1,273/- |
| 10 | Apr-22 | 0.980 | 5 | 11,872/- |
| 11 | May-22 | 0.975 | 3 | 8,312/- |
| 12 | Jun-22 | 0.979 | 3 | 9,787/- |
| Average= 0.959 | | | | Total = 53,838/- |



Figure 3.4:- Graphical presentation of average power factor year 2021-22

Observation:

The average power factor was 0.959 with power factor incentive Rs.53, 838/- for the year 2021-22. **It is recommended to maintain power factor unity.**

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3.5 Monthly Load Factor analysis Year-2021-22

The monthly load factor for the institute is given in the following table. 3.3

Table 3.5:- Load Factor of the institute year 2021-22

| Sr. No | Month & Year | Avg. Load Factor (%) |
|--------|----------------------------|----------------------|
| 1 | Jul-21 | 19 |
| 2 | Aug-21 | 11 |
| 3 | Sep-21 | 17 |
| 4 | Oct-21 | 23 |
| 5 | Nov-21 | 19 |
| 6 | Dec-21 | 25 |
| 7 | Jan-22 | 20 |
| 8 | Feb-22 | 20 |
| 9 | Mar-22 | 21 |
| 10 | Apr-22 | 29 |
| 11 | May-22 | 35 |
| 12 | Jun-22 | 26 |
| 13 | Maximum Load Factor | 35 |
| 14 | Average Load Factor | 23.1 |

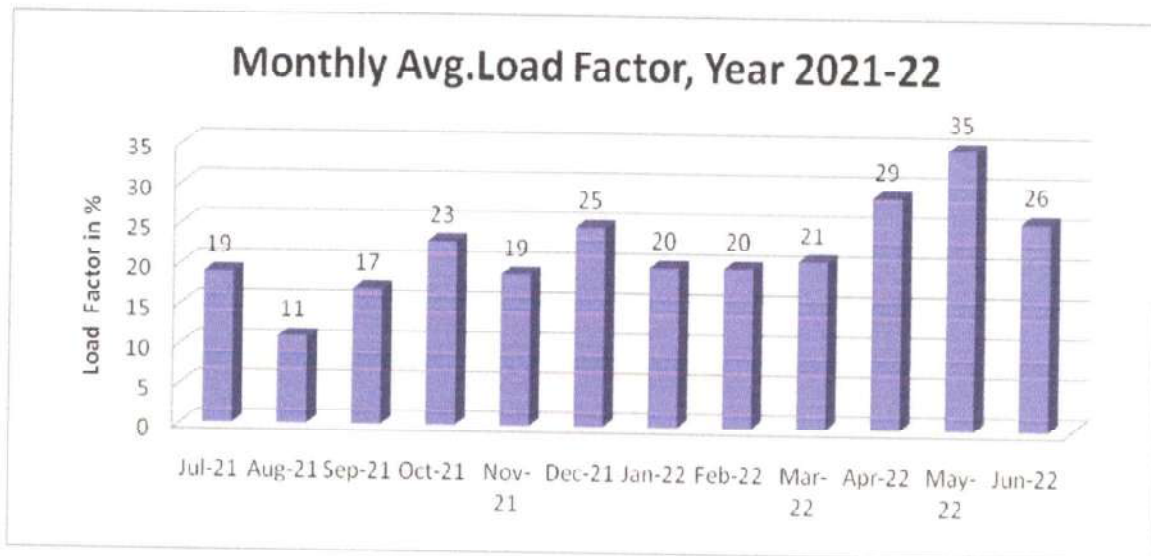


Figure 3.5:- Monthly load factor of the institute Year 2021-22

Observation:

The average load factor was 23.1 % for the year 2021-22 of the institute.

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3.6 ToD Units Consumption analysis Year-2021-22

The Time of Day units consumptions for the institute is given in the following table. 3.3

Table 3.5:- Tod Units of the institute year 2021-22

| Sr.No | Month & Year | Unit Consumption (Peak) | Unit Consumption (Off Peak) | Unit Consumption (Normal) | Total Unit Consumption |
|-------|--------------|-------------------------|-----------------------------|---------------------------|------------------------|
| 1 | Jul-21 | 1671 | 2529 | 11588 | 15788 |
| 2 | Aug-21 | 1263 | 2030 | 6867 | 10160 |
| 3 | Sep-21 | 1691 | 2460 | 10780 | 14931 |
| 4 | Oct-21 | 2379 | 3693 | 14097 | 20169 |
| 5 | Nov-21 | 2459 | 3572 | 10955 | 16986 |
| 6 | Dec-21 | 3629 | 4410 | 13005 | 21044 |
| 7 | Jan-22 | 2964 | 3837 | 10596 | 17397 |
| 8 | Feb-22 | 2774 | 3764 | 11071 | 17609 |
| 9 | Mar-22 | 2837 | 4539 | 9565 | 16941 |
| 10 | Apr-22 | 4640 | 8949 | 23482 | 37071 |
| 11 | May-22 | 6006 | 10689 | 26540 | 43235 |
| 12 | Jun-22 | 5232 | 11834 | 25804 | 42870 |
| | Total | 37545 | 62306 | 174350 | 274201 |

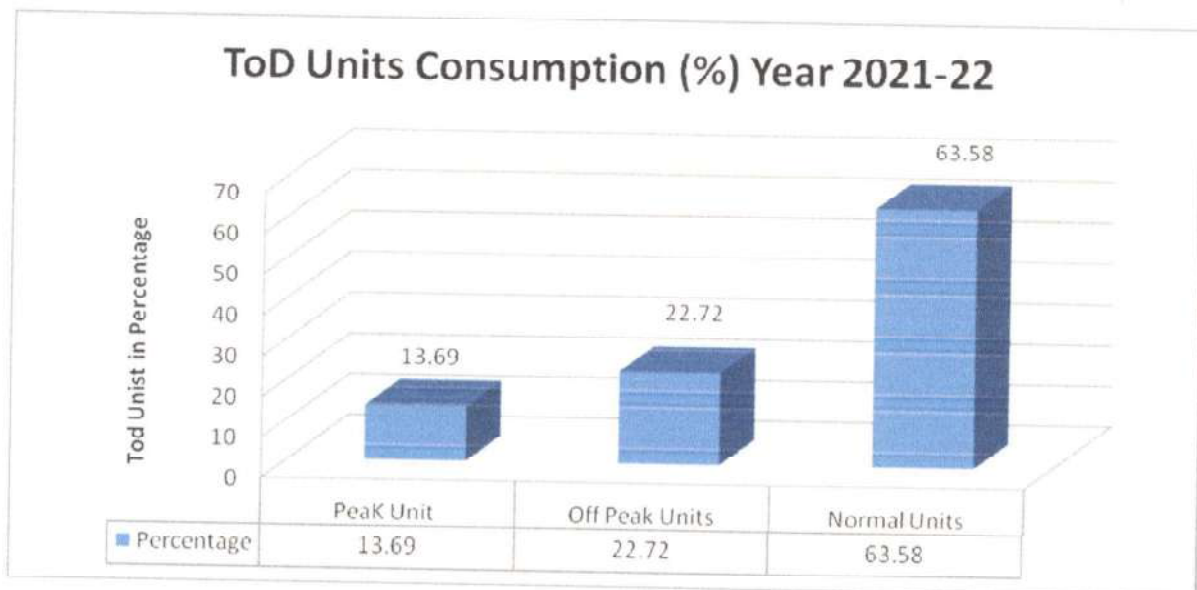


Figure 3.6:- Graphical presentation of Tod Units Consumption analysis Year 2021-22

Observation:

It was observed that 2,74,201 units is consuming at “Normal Time” with 63.58 % of the total energy consumption of the institute.

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Chapter-4
CONNECTED LOAD

4.1 Connected load details

| Sr. no | Floor | Room No. | PC | AC | Fan | Tube light | | | Projector | Printer | Induction | Fridge | Washing machine | Geyser | RO |
|--------|--------------|-------------------|----|----|-----|------------|---------|---------|-----------|---------|-----------|--------|-----------------|--------|----|
| | | | | | | 36 W | LED 15W | LED 18W | | | | | | | |
| 1 | | HR OFFICE | 1 | 1 | 1 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | | DIRECTOR OFFICE | 3 | 2 | 7 | 28 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | | ADMIN OFFICE | 6 | 4 | 5 | 0 | 22 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| 4 | Ground Floor | Class Room 1 | 1 | 3 | 4 | 0 | 0 | 8 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | | Class Room 2 | 1 | 3 | 4 | 0 | 0 | 8 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | | WASHROOM - Ground | 0 | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | | PORCH | 0 | 0 | 8 | 13 | 6 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | | STAFF ROOM | 5 | 4 | 8 | 26 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | | CONFERENCE ROOM | 0 | 1 | 1 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | | SOCIETY ROOM | 3 | 0 | 2 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 | First Floor | Class Room 3 | 1 | 4 | 6 | 0 | 0 | 18 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12 | | Class Room 4 | 1 | 4 | 7 | 0 | 12 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13 | | Class Room 5 | 1 | 4 | 8 | 0 | 13 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14 | | Class Room 6 | 1 | 4 | 8 | 0 | 13 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |



Energy Audit Report
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| | | | | | | | | | | | | | | | | |
|----|-------------------|---|---|---|----|---|---|----|---|---|---|---|---|---|---|---|
| 15 | Class Room 7 | 1 | 3 | 5 | 0 | 0 | 0 | 14 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16 | WASHROOM - First | 0 | 0 | 0 | 0 | 6 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17 | PORCH | 0 | 0 | 0 | 5 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 18 | Class Room 8 | 1 | 3 | 6 | 2 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 19 | Class Room 9 | 1 | 3 | 6 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20 | Class Room 10 | 1 | 0 | 4 | 4 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21 | Class Room 11 | 0 | 0 | 3 | 3 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 22 | Class Room 12 | 1 | 3 | 6 | 3 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 23 | Class Room 13 | 1 | 3 | 6 | 3 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 24 | Moot Court | 0 | 7 | 7 | 9 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 25 | WASHROOM - Second | 0 | 0 | 2 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 26 | PORCH | 0 | 0 | 0 | 11 | 8 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 27 | Class Room 14 | 1 | 0 | 4 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 28 | Class Room 15 | 1 | 0 | 4 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29 | Class Room 16 | 1 | 0 | 4 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 30 | Class Room 17 | 1 | 0 | 4 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

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| | | | | | | | | | | | | | | | | | |
|----|----------------------------|------------|------------|------------|------------|------------|------------|-----------|-----------|----------|----------|-----------|-----------|----------|---|---|---|
| 31 | Class Room 18 | 1 | 0 | 4 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 32 | Class Room 19 | 1 | 0 | 7 | 4 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 33 | Class Room 20 | 1 | 3 | 5 | 3 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 34 | Class Room 21 | 1 | 3 | 6 | 3 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 35 | WASHROOM - Second | 0 | 0 | 1 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 36 | PORCH | 0 | 0 | 0 | 5 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 37 | Library and Computer Class | 22 | 1 | 15 | 16 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 38 | Admission Cell | | 18 | 0 | 0 | 0 | 0 | 78 | 0 | 4 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 39 | Canteen | 0 | 4 | 0 | 0 | 0 | 0 | 68 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 1 |
| 40 | Porch+ washroom | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 41 | First Floor | 4 | 4 | 5 | 0 | 5 | 3 | 3 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 42 | Second Floor | 9 | 4 | 27 | 0 | 20 | 22 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43 | Third Floor | 7 | 5 | 37 | 0 | 0 | 51 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 44 | Fourth Floor | 4 | 0 | 36 | 0 | 0 | 28 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 45 | Library and Computer Class | 43 | 0 | 12 | 0 | 0 | 24 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 46 | Samruddhi Boys Hostel | 1 | 17 | 52 | 20 | 15 | 104 | 0 | 1 | 0 | 1 | 5 | 5 | 1 | | | |
| 47 | Samruddhi Girls Hostel | 1 | 21 | 108 | 189 | 40 | 0 | 0 | 1 | 0 | 1 | 6 | 6 | 1 | | | |
| | Total | 129 | 136 | 447 | 367 | 193 | 464 | 34 | 14 | 4 | 6 | 11 | 11 | 3 | | | |

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4.2 Load sharing equipment

Table 4.1:-Total connected load share % on equipments

| Sr. No. | Equipment's | Rated Power (Watt) | Quantity (Nos) | Total Power (Watt) | Load Share (%) |
|------------------------------------|-----------------------|--------------------|----------------|--------------------|----------------|
| 1 | LED Tube light (18 W) | 18 | 367 | 6606 | 2.15 |
| 2 | Tube light (36 W) | 36 | 193 | 6948 | 2.26 |
| 3 | LED Tube light (15 W) | 15 | 464 | 6960 | 2.27 |
| 4 | Celling Fan (60 W) | 60 | 447 | 26820 | 8.73 |
| 5 | RO | 1500 | 5 | 7500 | 2.44 |
| 6 | AC | 1500 | 136 | 204000 | 66.41 |
| 7 | PC | 85 | 129 | 10965 | 3.57 |
| 8 | Printer | 250 | 14 | 3500 | 1.14 |
| 9 | Geyser | 2000 | 11 | 22000 | 7.16 |
| 10 | Projector | 350 | 34 | 11900 | 3.87 |
| Total Connected load (Watt) | | | | 307199 | 100.00 |

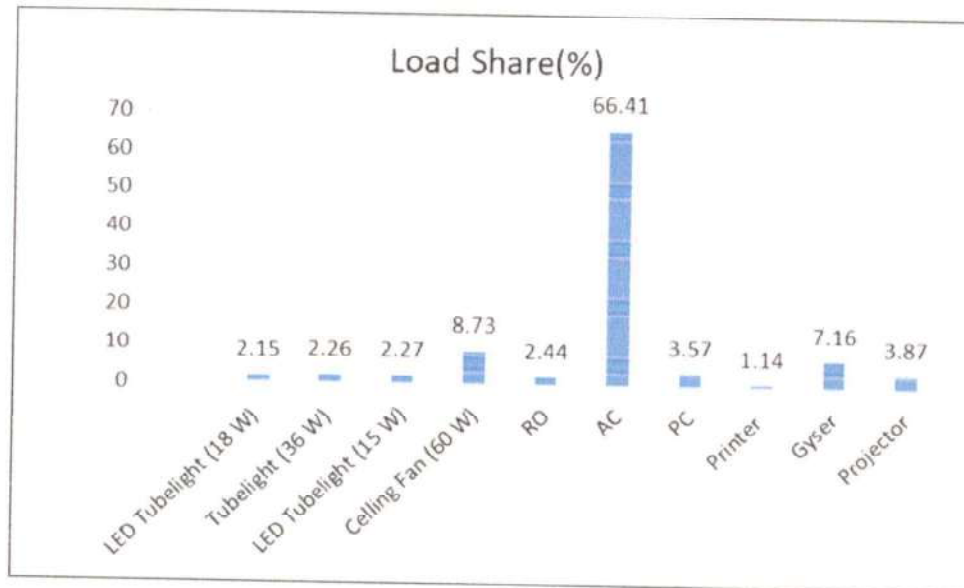


Figure 4.1:- Equipment loading Share % year-2021-22

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4.3 Some photographs of electrical equipment's

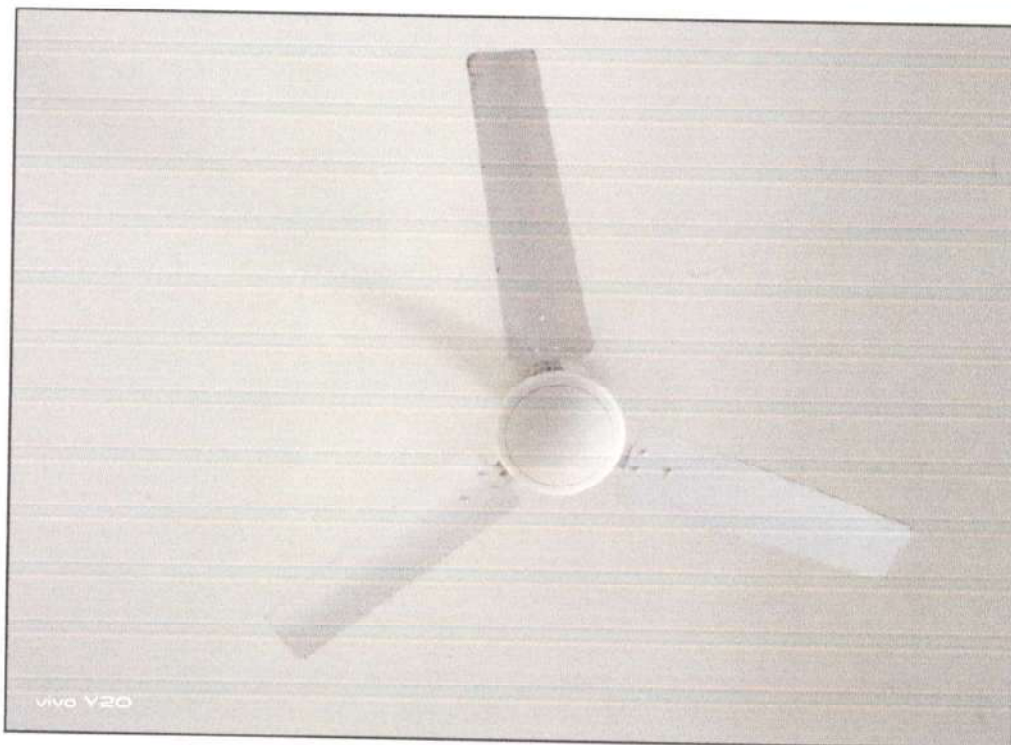
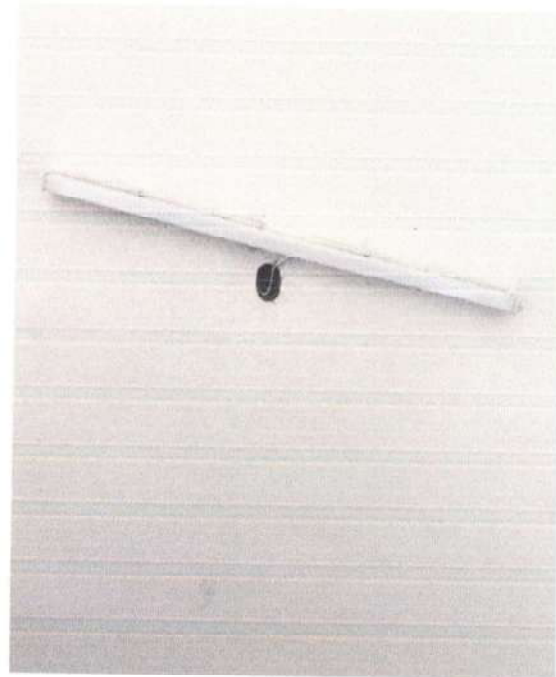


Figure 4.2:- Electrical Equipment in institute

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CHAPTER- 5
ENERGY CONSERVATION MEASURES

Case Study No. -01

Replacement of conventional (36 Watt) tubelight to energy-efficient LED tube light(20 Watt) in phase manner:-

| Sr. No. | Items | Parameters | Units |
|---------|--|------------|------------|
| 1 | Total Power Consumption by T-8 conventional tube light (12 Watt Blast Power) | 48 | W |
| 2 | No of T-8 | 367 | Nos. |
| 3 | Working Hrs/Day | 8 | Hrs/Day |
| 4 | Working Days/Year | 250 | Days/Year |
| 5 | Energy Efficient T-5 (LED) | 20 | W |
| 6 | Expected Energy Saving | 20,552 | kWh/Year |
| 7 | Load Factor@90% Assume | 0.9 | |
| 8 | Expected Annual Energy Saving | 18,497 | kWh/Year |
| 9 | Overall Per Unit Charges | 9.36 | Rs./kWh |
| 10 | Expected Money Saving | 1,73,130 | Rs./Year |
| 11 | Cost of T-5 | 200 | Rs./ Pices |
| 12 | Investment on New Light Purchasing | 73,400 | Rs. |
| 13 | Maintenance Investment | 3,670 | Rs. |
| 14 | Total Investment | 77,070 | Rs |
| 15 | Simple Pay Back Period | 5 | Month |

Total Calculated Monetary Saving Potential in lighting = **Rs 1, 73,130/-**

Note: - Energy savings depend on the operation hour per day and the load factor of the systems.

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Case Study No. -02

Improve Power Factor from 0.959 to 0.999

| Sr.No | Month & Year | Avg Power Factor | PF Incentive (%) | PF Incentive Loss (%) | Incentive Loss (RS.) |
|-------|--------------|------------------|------------------|-----------------------|----------------------|
| 1 | Jul-21 | 0.963 | 2 | 5.00 | 5881 |
| 2 | Aug-21 | 0.964 | 2 | 5.00 | 3785 |
| 3 | Sep-21 | 0.960 | 2 | 5.00 | 5562 |
| 4 | Oct-21 | 0.971 | 3 | 4.00 | 6010 |
| 5 | Nov-21 | 0.964 | 2 | 5.00 | 6327 |
| 6 | Dec-21 | 0.967 | 2 | 5.00 | 7839 |
| 7 | Jan-22 | 0.963 | 2 | 5.00 | 6480 |
| 8 | Feb-22 | 0.971 | 3 | 4.00 | 5247 |
| 9 | Mar-22 | 0.959 | 1 | 6.00 | 7573 |
| 10 | Apr-22 | 0.980 | 5 | 2.00 | 5598 |
| 11 | May-22 | 0.975 | 3 | 4.00 | 13057 |
| 12 | Jun-22 | 0.979 | 3 | 4.00 | 12947 |
| | | 0.959 | | | 86,305 |

Observation – Average Annual Power factor of last 12 month is 0.959.

Recommendation – Improve the system power factor up to 0.999. As per the applicable terrif power factor incentive can be gain Rs.86, 305/-

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Case Study No. 3

Replacement of 60W conventional ceiling fan by 28W BLDC Energy Efficient ceiling fan in Phase manner

| Sr. No. | Items | Parameters | Units |
|---------|----------------------------------|------------|------------|
| 1 | Power Consumption by 60W | 60 | W |
| 2 | No. of Fan | 447 | No's |
| 3 | Working Hrs/Day | 8 | Hrs/Day |
| 4 | Working Days/Year | 250 | Days/Year |
| 5 | Energy Efficient 28W | 28 | W |
| 6 | Energy Saving Potential | 28,608 | kWh/Year |
| 7 | Load Factor | 0.9 | NA |
| 8 | Expected Annual Energy Saving | 25747.2 | kWh/Year |
| 9 | Per Unit Charges | 9.36 | Rs./kWh |
| 10 | Expected Money Saving | 2,40,994 | Rs./Year |
| 11 | Cost of New Ceiling Fan | 1800 | Rs./ Pices |
| 12 | Investment on New Fan Purchasing | 8,04,600 | Rs. |
| 13 | Annual Maintenance Cost | 40,230 | Rs. |
| 14 | Total Investment | 8,44,830 | Rs. |
| 15 | Simple Pay Back Period | 4 | Year |

Total Calculated Monetary Saving Potential in Ceiling Fan = Rs 2, 40,994/-

Note: - Energy savings depends on the operation hour per day and the load factor of the systems.

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Annexure-01

Green Campus Policy



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***GREEN CAMPUS POLICY
AND
INITIATIVE***



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Continues :-

GREEN CAMPUS INITIATIVES INCLUDE

The institutional initiatives for greening the campus are as follows:

- Restricted entry of automobiles
- Ban on use of Plastic

RESPONSE:

Indore Institute of Law has always followed a green agenda and has shown remarkable awareness of maintaining an eco- friendly campus. On visiting the Campus, one can experience the appealing and well designed buildings, beautiful lawns, spacious sports ground and lush green environment favorable for the teaching learning process.

RESTRICTED ENTRY OF AUTOMOBILES

Indore Institute of Law operates a fleet of 3 buses covering each corner of Indore and its nearby areas to facilitate the students and staff. The institute encourages the staff and students to use the institute conveyance instead of their vehicles for safety, security, fuel conservation and to reduce environmental pollution.

The Institution buses are periodically checked for pollution by the authorized agency. Institute has a vehicle parking area available near main entrance of the campus for the guests, visitors, faculties, students and any other vehicles. The vehicles should possess pollution check stickers. Only bicycles are allowed inside the campus. Random checks are made to check the validation and periodicity of this certificate. For two wheelers or four wheelers, security measures are compulsory. Stakeholders are also encouraged to adopt carpooling to reduce the toxic emissions in the air.



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Continues :-



Green your commute

Green your commute



Walk



Bike



Carpool



Public Transit

USE OF BICYCLES

The students staying on the Institute campus are using bicycles to move within the campus as well as to travel the nearby areas outside the campus. Students and staff coming from nearby villages also prefer bicycles as a mode of transport for attending the Institution. It is environmentally friendly and helps to decrease pollution.



BAN ON USE OF PLASTIC

Indore Institute of law is making an untiring effort to "Reduce Plastic Pollution" by minimizing plastic footprints and by way of refuse, reduction, reuse, and recycling. Hence the subsequent initiatives are taken by all the stakeholders to spread awareness of environmental conversation:

- 1- To refuse and reduce plastic products in daily use and pledge to a plastic free environment within the campus.
- 2- Ban Single use plastic, water bottles, takeaway cups, lunch wrapped in disposable plastic, packaging, plastic bags, disposable food service cups, plates and containers fabricated from polystyrene foam, plastic, straws etc. within the campus premises and canteen.

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- 3- Encourage the use of biodegradable and other kind of compostable utensils in situ of plastic and shall bring a fork, knife and spoon from home.
- 4- Encourage the use of durable, foldable and cheap reusable bags that may be carried around in a car, pocket or purse.
- 5- Discourage plastic bottles and instead use glass, steel or clay bottles in office.
- 6- Welcome innovative ideas to cut back plastic foot prints.
- 7- The staff and students are informed to use steel or copper water bottles rather than plastic bottles.



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**END OF THE REPORT
THANKS**

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7.1.6

ENVIRONMENT AUDIT



Environment Audit Report
Indore Institute of Law, Rau-Pithampur
Road, Indore (M.P.)



ENVIRONMENT AUDIT REPORT



**Indore Institute of LAW
Rau-Pithampur Road,
Indore(M.P.)**

PREPARED BY

EMPIRICAL EXERGY PRIVATE LIMITED

Flat No. 201, OM Apartment, 214 Indrapuri Colony,
Bhawarkuan, Indore – 452 001 (M. P.), India
0731-4948831, 7869327256

Email ID: cempirical18@gmail.com

www.eeplgroups.com

(2021-22)

Mam
Prof. (Dr.) Mangreet Kaur Rajp
Dean

Indore Institute of Law

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ACKNOWLEDGEMENT

Empirical Exergy Private Limited (EEPL), Indore (M.P) takes this opportunity to appreciate & thank the management of **Indore Institute of Law, Indore** for allowing us to conduct an environment audit for the institute.

We are indeed touched by the helpful attitude and co-operation of all faculties and technical staff, who rendered their valuable assistance and co-operation during the course of study.


Rajesh Kumar Singadiya

(Director)


M.Tech (Energy Management), PhD (Research Scholar)
Accredited Energy Auditor [AEA-0284]
Certified Energy Auditor [CEA-7271]
(BEE, Ministry of Power, Govt. of India)
Empanelled Energy Auditor with MPUVN, Bhopal M.P.
Lead Auditor ISO50001:2011 [EnMS) from FICCI, Delhi
Certified Water Auditor (NPC, Govt of India)
Chartered Engineer [M-1699118], The Institution of Engineers (India)
Member of ISHRAE [58150]



Certificate of Accreditation

 **BUREAU OF ENERGY EFFICIENCY**

Examination Registration No.: EA-7271
Accreditation Registration No.: AEA-284



Certificate of Accreditation

This is to certify that Mr./Ms. **Shri. Rajesh Kumar Singadiya** having its trade/registered office at has been given accreditation as accredited energy auditor. The certificate shall be effective from **9th** day of **May, 2018**.

The certificate is subject to the provisions of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

This certificate shall be valid until it is cancelled under regulation 9 of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

On cancellation, the certificate of accreditation shall be surrendered to the Bureau within fifteen days from the date of receipt of order of cancellation.

Your name has been entered at AEA No. **284** in the register of list of accredited energy auditors. Your name shall be liable to be struck out on the grounds specified in regulation 8 of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

Given under the seal of the Bureau of Energy Efficiency, Ministry of Power, this **5th** day of **October, 2018**

Secretary,
Bureau of Energy Efficiency
New Delhi



The Audit Team

The study team constituted of the following senior technical executives from **Empirical Exergy Private Limited,**

- + **Mr. Rajesh Kumar Singadiya** [Director & Accredited Energy Auditor AEA-0284]
- + **Mr. Rakesh Pathak,** [Director & Electrical Expert]
- + **Mr. SachinKumawat** [Sr. Project Engineer]
- + **Mr. Charchit Pathak** [Asst.Project Engineer]
- + **Mr. AakashKumawat**[Site Engineer]
- + **Mr. Ajay Nahra** [Sr. Accountant & admin]

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EXECUTIVE SUMMARY

The executive summary of the environmental audit report furnished in this section briefly gives the identified water conservation measures that can be implemented in a phased manner to conserve water and increase the productivity of the institute.

INITIATIVE FOR ENVIRONMENT BY INSTITUTE

WATER SPRINKLER SYSTEM :-

- + Institute has installed water sprinkler system for gardening in lawan and garden area .
It is reduced water consumption **Its Appreciable.**

ENVIRONMENT AUDIT RECOMMENDATION

FRESH WATER MONITORING SYSTEM

- + Install water flow meters (Mechanical or Electronics) in distribution network, like institute building block, hostel building, for quantity per day water consumption in the institute campus.

WASTE WATER TREATMENT PLANT.

- + Waste water generated from various departments and hostel should be collect in separate waste water collection tank. The source of waste water generated from hostels activities like washroom, canteen, shower water (bath) and mess.
- + It should be treated in STP plants after that treated water reuse in activity like gardening, toilet and wash room etc

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CHAPTER-1 INTRODUCTION

1.1 About Institute

Indore Institute of Law (IIL) was founded with a vision to be one of India's most prominent Law institutes and has established itself as one of the most recognized Law Institutes in India. IIL are committed to providing the best platform for global legal education to students and courses are designed in order to give a complete exposure, both in domestic and international law practices, students. At Indore Institute of Law, students have an option to choose from a variety of law courses, where they are offered complete law programmes along with practical training and research papers to get an all-round understanding of the law in detail.



Figure 1.1: - Satellite Image of IIL, Indore from Google map

Value Based Education

“Educating the mind without educating the heart is no education at all!” At Indore Institute of Law, the objective of delivering Value Based Education is to produce responsible and committed citizens. This education acts as a multidimensional attribute to activate human values among students. On one hand, they achieve exceptional success in their legal profession and on the other, they become good human beings with a heart for society and the country. This is an institute which stands on the foundation of moral values, passion and a relentless search for excellence.



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Objective

At Indore Institute of Law, our objective is to form a community where people come together and respect the law and take an oath to use it in an honest way for the betterment of the society.

Mission

The world works with a right mix of Cultural and Spiritual Excellence and sometimes, you need the help of law to maintain the right balance in the society. For a society to function ideally, you need people to maintain a certain law and order and direct it towards an accomplishment it is trying to achieve. At Indore Institute of Law, we are nurturing young minds with equality and right law education to ensure they promote it further to the society, when they take the law as their career path. The society is always looking forward to people who are making a positive change with their morals and with a higher understanding of moral excellence. This is where Indore Institute of Law steps in and offers a platform to the students where they get a complete understanding of law, fostering their minds in the right development that is ultimately going to play a positive role in the betterment of the society and the nation, as whole.

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1.2 About Institute Infrastructure:

The institute is spread over 1,81,673 Sq.Ft. with plenty of open space and sports area interspersed within academic buildings. The details of various department and building are given below:

Table 1.1:- Name of the various Building in the institute

| Sr.No. | Building | Buildup Area(Sq.Ft.) |
|---------------|-------------------------|-----------------------------|
| 1 | Block-A | 65,725 |
| 2 | Block-B | 10,032 |
| 3 | Block-C | 28,201 |
| 4 | Boys Hostal (Block- D) | 32,830 |
| 5 | Girls Hostal (Block- E) | 44,885 |
| | Total | 1,81,673 |

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1.3 Green Monitoring Committee.

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Campus Add.: "Gendral Ram Dasra" Dop. JIM Rau, Pithampur Road, Indore (M.P.) 451111

Phone No.: +91 917201272, 917201922 | Web: www.indoreinstituteoflaw.org | E-mail: indoreinstituteoflaw@gmail.com

No. 116/76/0/22


02.07.2022
 Date: / /

Energy, Water, Green & Environment Audit Committee

Energy, Water, Green & Environment Audit Committee will consist of the following members.

| S. No. | Name | Designation |
|--------|---------------------------|-----------------------------|
| 1 | Dr. Manpreet Kaur Rajpal | Dean and Director Academics |
| 2 | Mr. K. S. Vyas | Executive Director |
| 3 | Mr. Nitin Jasuja | Campus Incharge |
| 4 | Mr. Arun Naik | Admin Officer |
| 5 | Mr. Shekhar Patankar | Coordinator |
| 6 | Mr. Ashish Verma | Admin. Assistant |
| 7 | Mr. Anil Choudhary | Campus Supervisor |
| 8 | Mr. Yogendra Singh Thakur | Campus Supervisor |

Time duration of this committee is 2 years, after which the committee will be reconstituted.


Executive Director
Indore Institute of Law
Executive Director (Admin)
Indore Institute of Law

ISO 9001:2008 Certified

Run By: Icon Education Society

City Office: 425/426, Orbit Mall, A B Road, Indore (M.P.)

Associate Institute:

INDORE NURSING COLLEGE
 (Affiliated to DAVV and Indian Nursing Council, New Delhi)
 www.indorenursingcollege.com

TDVIMC Institute of Management
 (Affiliated to DAVV and approved by M.P. Higher Edu. & AICTE, New Delhi)
 www.tdvimcindore.com

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1.4 Environment Auditing

Environment audits can be a highly valuable tool for an institute in a wide range of ways to improve their energy, environment, and economic performance, while reducing wastages and operating costs. Environment audits provide a basis for calculating the economic benefits of water conservation projects by establishing the current rates of water use and their associated cost.

1.5 Objectives of Environment audit

The general objective of the environmental audit is to conduct an environment audit and preparation of baseline report on water conservation measures to mitigate consumption and improve quality and sustainable practices.

The specific objectives are.

- + To monitor freshwater consumption in the institute and water conservation practices.
- + To assess the quantity of water usage, the quantity of wastewater generation, and their reduction within the institute.

1.6 Target Areas of Environment audit

This indicator addresses water sources, water consumption, irrigation, stormwater, appliances, and fixtures. 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.

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1.7 Methodology followed for conducting Environment audit

Step 1: Walkthrough survey

- ✦ Understanding of existing water sourcing, storage, and distribution facility.
- ✦ Assessing the water demand and water consumption areas/processes.
- ✦ Preparation of detailed water circuit diagram.

Step 2: Secondary Data Collection

- ✦ Analyse historic water use and wastewater generation
- ✦ Field measurements for estimating current water use
- ✦ Metered & unmetered supplies.
- ✦ Understanding of “base” flow and usage trends at the site
- ✦ Past water bills
- ✦ Wastewater treatment scheme & costs etc.

Step 3: Site Environment Audit Planning (based on on-site operations and practices)

- ✦ Preparation of water flow diagram to quantify water use at various locations
- ✦ Wastewater flow measurement and sampling plan

Step 4: Conduction of Detailed Environment Audit & Measurements

- ✦ Conduction of field measurements to quantify water/wastewater streams
- ✦ Power measurement of pumps/motors
- ✦ Preparation of water balance diagram
- ✦ Establishing water consumption pattern
- ✦ Detection of potential leaks & water losses in the system
- ✦ Assessment of productive and unproductive usage of water
- ✦ Determine key opportunities for water consumption reduction, reuse & recycle.

Step 5: Preparation of Environment Audit Report

- ✦ Documentation of collected & analysed water balancing and measurement details
- ✦ Projects and procedures to maximize water savings and minimize water losses.
- ✦ Opportunities for water conservation based on reducing/recycling/reuse and recharge options

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CHAPTER- 2 WATER CONSUMPTION AND WASTEWATER SOURCES

2.1 Details of source of fresh water and use areas.

The main source of freshwater is bore well for the institute. The freshwater is mainly used for drinking, housekeeping, gardening, domestic activity, and new construction project. Details of the pumps are given in the table.

Table:2.1 Details of freshwater sources.

| Sr. No. | LOCATION | POWER (H.P.) | TYPE | CONDITION | YEAR |
|---------|---|--------------|---------------|-----------|------|
| 1 | GARDEN IN FRONT OF BLOCK B BUILDING (IN TANK) | 3 | OPEN WELL | WORKING | 2013 |
| 2 | CAMPUS WELL | 5 | OPEN WELL | WORKING | 2014 |
| 3 | GARDEN NO. 4 BOARING 1 | 5 | SUB- MERSIBLE | WORKING | 2014 |
| 4 | BLOCK B BOARING | 5 | OPEN WELL | WORKING | 2015 |
| 5 | CAMPUS WELL | 7.5 | OPEN WELL | WORKING | 2017 |
| 6 | GARDEN 4 BOARING 2 | 5 | SUB- MERSIBLE | WORKING | 2018 |

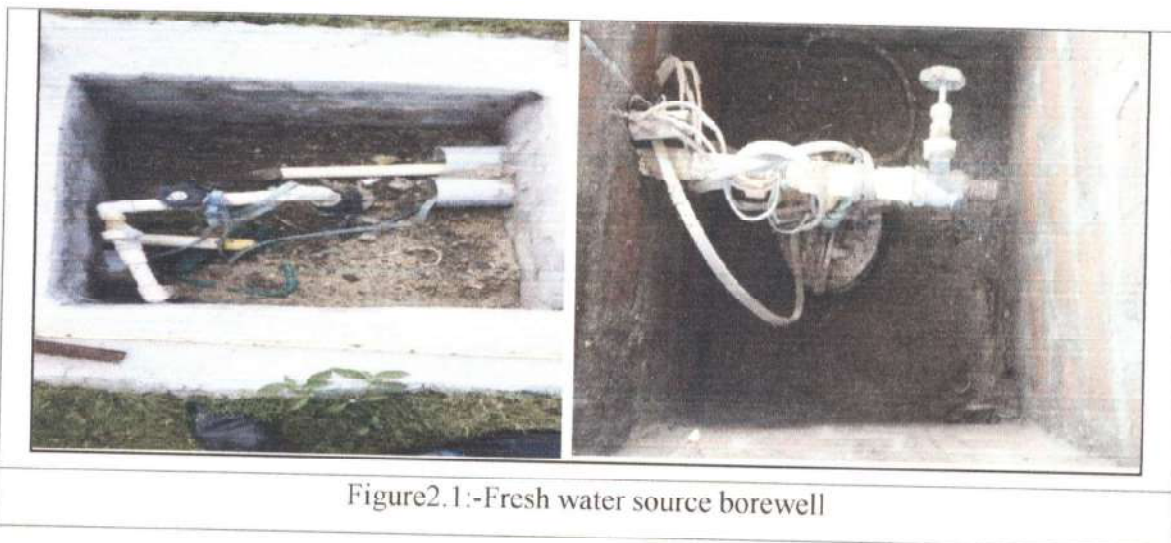


Figure 2.1:-Fresh water source borewell

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2.2 Water flow measurement and power measurement: -

Table 2.2: - Flow and power measurement of borewells.

| Sr.No. | Location | Motor Power (HP) | Voltage (V) | Current (A) | Power Factor | Power Consumption (kW) | Measured Water Flow (m ³ /hr) |
|--------|---|------------------|-------------|-------------|--------------|------------------------|--|
| 1 | GARDEN IN FORNT OF BLOCK B BUILDING (IN TANK) | 3 | 412 | 5.4 | 0.893 | 3.44 | 5.8 |
| 2 | CAMPUS OPEN WELL PUMP-01 | 5 | 423 | 8.43 | 0.902 | 5.57 | 4.6 |
| 3 | GARDEN NO. 4 BOARING 1 | 5 | 412 | 9.34 | 0.864 | 5.76 | 1.8 |
| 4 | BLOCK B BOARING | 5 | 402 | 8.91 | 0.921 | 5.71 | 2.1 |
| 5 | CAMPUS OPEN WELL PUMP-02 | 7.5 | 414 | 12.45 | 0.954 | 8.52 | 6.5 |
| 6 | GARDEN 4 BOARING 2 | 5 | 415 | 9.43 | 0.912 | 6.18 | 1.8 |

Observation: -

It was measured that the average freshwater consumption of the institute from open well and bore well is 22.6 M³/Hr. Total water extraction depend on borewelles and pump operating time.

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2.3 Water Accounting & Metering system:

It is observed that there is a requirement for water flow meters on borewells to quantify per day groundwater extraction from different sources.

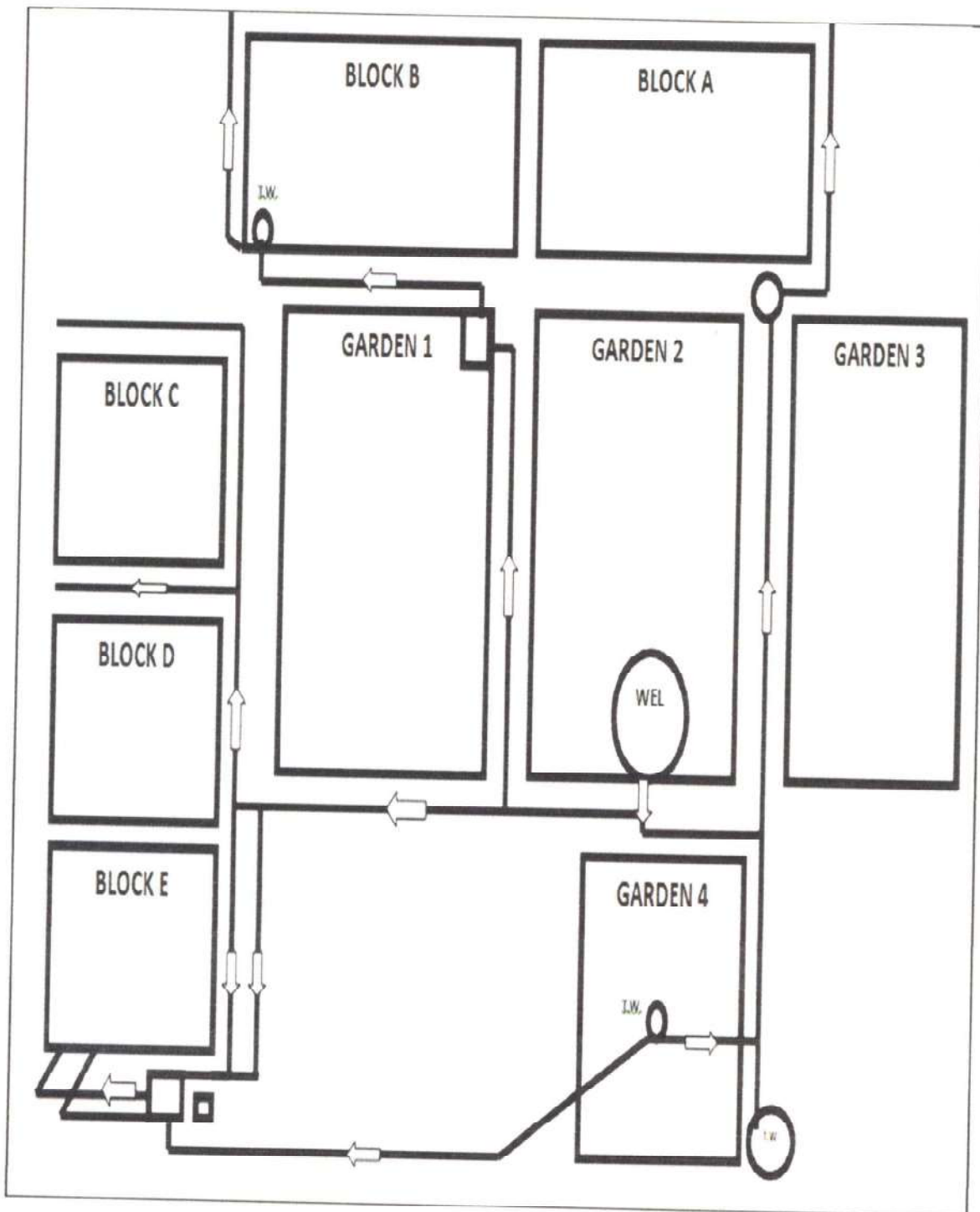


Figure 2.2: -Water flow measurement on the institute campus.

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2.4 Water Distribution Network



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2.5 Water storage capacity in institutecampus: -

There are different types of tanks available in the institute for water storage like underground RCC tanks, overhead RCC tanks, PVC tanks, etc.

| Water tanks details with capacity (In Litre) | | | | | |
|---|--------------|---------------------|--------------------------|-----------------------|---------------------------------------|
| Sr.No. | Block | Tank Details | Volume (In Litre) | Types of Tanks | Remarks |
| 1 | A | No. 1 | 42000 | Overhead | Washroom, Toilets and other activity. |
| | | No. 2 | 1000 | Overhead | For RO |
| 2 | B | No. 1 | 50000 | Overhead | Washroom, Toilets and other activity. |
| | | No. 2 | 17800 | Underground | Storage Tank |
| 3 | C | No. 1 | 55200 | Overhead | Washroom, Toilets and other activity. |
| | | No. 2 | 3800 | Overhead | For RO |
| 4 | D | No. 1 | 36300 | Overhead | Washroom, Toilets and other activity. |
| | | No. 2 | 8500 | Overhead | For RO |
| 5 | E | No. 1 | 42000 | Overhead | Washroom, Toilets and other activity. |
| | | No. 2 | 10500 | Overhead | For RO |
| | | No. 3 | 72020 | Underground | Water Storage tank |

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| | | | | |
|----------------|-------|-------|-------------|--|
| Block A | No. 4 | 29700 | Underground | For RO Waste and AC Waste water and rain water recharging Pit. |
| Block E | No. 4 | 32500 | Underground | For RO Waste and AC Waste water and rain water recharging Pit. |

2.6 Photographs of water storage tanks:-



Fresh Water Storage tank



Open Well

Figure: -2.2 Water storage tank and capacity of institute campus

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2.7 Water use areas in Institute Campus: -

Water is preliminary used for drinking, domestic, gardening, and clinical activity. The audit team visited various departments and buildings to determine appliances. The details of the washroom, toilet, and taps are given on the table

Table: 2.3 Details of washroom and uses taps in various areas

| Sr. No. | Block | Floor | Urinal | Wash Basin | Toilets | RO and Water Cooler | Total |
|--------------|-------|--------------|--------|------------|---------|---------------------|------------|
| 1 | A | Ground Floor | 0 | 12 | 8 | 0 | 20 |
| | | First Floor | 5 | 9 | 4 | 0 | 18 |
| | | Second Floor | 4 | 9 | 4 | 0 | 17 |
| | | Third Floor | 4 | 8 | 4 | 1 | 17 |
| 2 | B | Ground Floor | 0 | 6 | 2 | 0 | 8 |
| | | First Floor | 9 | 2 | 6 | 1 | 18 |
| 3 | C | Ground Floor | 0 | 20 | 12 | 1 | 33 |
| | | First Floor | 4 | 2 | 1 | 1 | 8 |
| | | Second Floor | 5 | 2 | 1 | 1 | 9 |
| | | Third Floor | 4 | 1 | 1 | 1 | 7 |
| | | Fourth Floor | 5 | 1 | 1 | 1 | 8 |
| | | Fifth Floor | 5 | 1 | 1 | 1 | 8 |
| 4 | D | Ground Floor | 0 | 4 | 2 | 2 | 8 |
| | | First Floor | 1 | 4 | 12 | 1 | 18 |
| | | Second Floor | 2 | 4 | 12 | 1 | 19 |
| | | Third Floor | 3 | 5 | 14 | 1 | 23 |
| | | Fourth Floor | 3 | 5 | 14 | 1 | 23 |
| | | Fifth Floor | 3 | 5 | 13 | 1 | 22 |
| 5 | E | Ground Floor | 0 | 10 | 18 | 1 | 29 |
| | | First Floor | 0 | 10 | 17 | 1 | 28 |
| | | Second Floor | 0 | 10 | 17 | 1 | 28 |
| | | Third Floor | 0 | 10 | 17 | 1 | 28 |
| | | Fourth Floor | 0 | 6 | 17 | 1 | 24 |
| | | Fifth Floor | 0 | 6 | 17 | 1 | 24 |
| TOTAL | | | | | | | 445 |

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2.8 Details of RO in institutecampus.

Table 2.4: - Details of RO on the campus.

| Sr.No. | Block | RO (In LPH) | Water Cooler (In LPH) |
|--------|-------|-----------------|--------------------------|
| 1 | A | 250 | 300 |
| 2 | B | Auqagurad Small | 150 |
| 3 | C | 500 | 500 |
| 4 | D | 250 | 300 |
| 5 | E | 250 | 300 |



Figure: - 2.3 Water Taps

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2.09 Waste water generation sources.

At present wastewater is generated from various departments, canteen, and mess, hostels like washrooms, handwash and RO rejected water is drain out . It is recommended to the waste water should be treated in STP plants. And after that the treated water should be reused in gardening.

Table: - 2.5 Waste water generation areas in the institute campus

| Sr. No | Key Water Usage Section | Type of water used (raw, treated, etc.) | Water Consuming activities |
|--------|-------------------------|---|------------------------------------|
| 1 | Admin Block | Fresh Water | Drinking and other uses |
| 2 | Hostels | Fresh Water | Drinking, Food cooking, other Uses |
| 3 | Institution Buildings | Fresh Water | Drinking and other uses |
| 4 | Canteens /Mess | Fresh Water | Food cooking, drinking |

✚ Some photographs of wastewater generation sources are given



Figure:-2.6 Waste water generation sources

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CHAPTER- 3 RAINWATER HARVESTING SYSTEM

3.1. Rain water harvesting systems

Rainwater harvesting is a technique to capture the rainwater when it precipitates, store that water for direct use or charge the groundwater and use it later.

There are typically four components in a rainwater harvesting system:

- ✚ Roof Catchment.
- ✚ Collection.
- ✚ Transport.
- ✚ Infiltration or storage tank and use.

If rainwater is not harvested and channelized it runoff quickly and flows out through storm-water drains. For storm-water management, the recharge pits, percolation pits, and porous trenches are constructed to allow stormwater to infiltrate inside the soil.

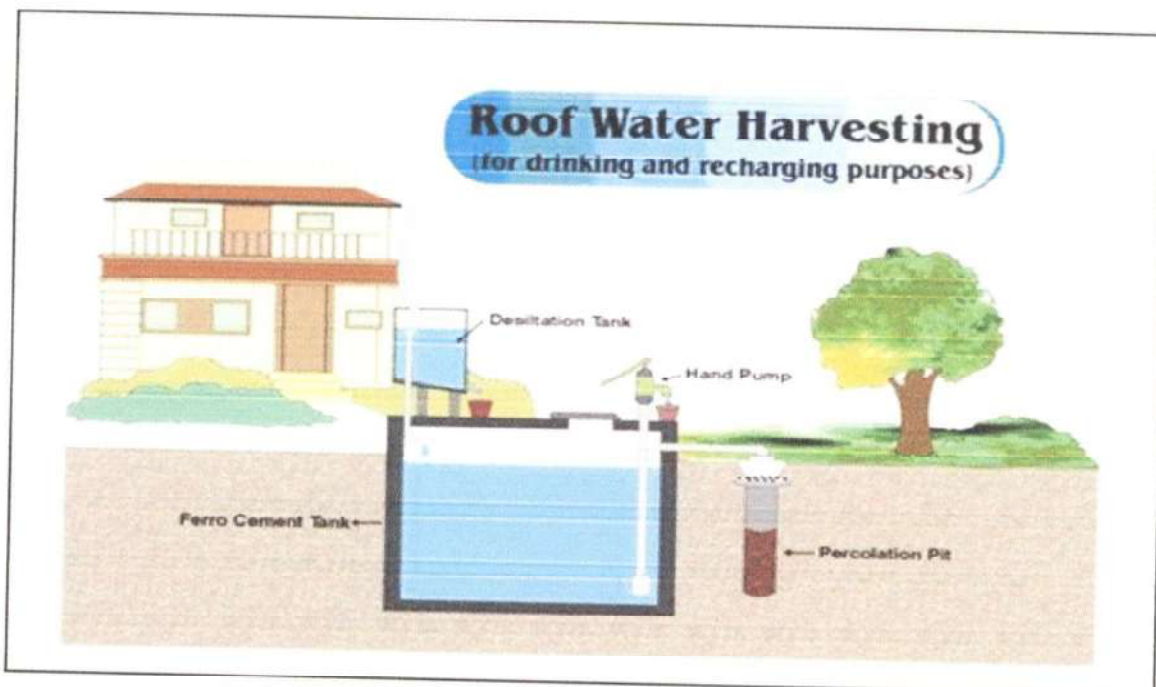


Figure: - 3.1 Components of a rooftop rainwater harvesting system



3.2 Rainwater Harvesting Potential of the Institute(Pending from institute side)

The institute has a total built-up area is approx. 16,878 m². The average annual rainfall of 0.952 m and runoff coefficient of 0.88 is considered for commercial building. According to the above figures and consideration, the estimated rainwater harvesting potential for the institute is about 14139 m³/year. The following Mathematical Equation is used for the calculation.

$$\text{RWH Potential} = \text{Rainfall (m)} \times \text{Area of catchment (m}^2\text{)} \times \text{Runoff coefficient}$$

| Rain Water Harvesting Potential Calculation | | | | | |
|---|----------------------|--------------------------------|-----------------------|--------------------|---|
| Sr. No. | Name of the building | Rooftop Area (m ²) | Average rain fall (m) | Runoff coefficient | Rainwater Harvesting potential (m ³ /year) |
| 1 | Block-A | 6106.05 | 0.952 | 0.88 | 5,115 |
| 2 | Block-B | 932 | 0.952 | 0.88 | 781 |
| 3 | Block-C | 2619.9 | 0.952 | 0.88 | 2,195 |
| 4 | Boys Hostal | 3050 | 0.952 | 0.88 | 2,555 |
| 5 | Girls Hostal | 4169 | 0.952 | 0.88 | 3,493 |

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Annexure-01

Green Campus Policy



INDORE INSTITUTE OF LAWSM
(Affiliated to D.A.V.V. & Bar Council of India, New Delhi)

***GREEN CAMPUS POLICY
AND
INITIATIVE***



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Continues :-

GREEN CAMPUS INITIATIVES INCLUDE

The institutional initiatives for greening the campus are as follows:

- Restricted entry of automobiles
- Ban on use of Plastic

RESPONSE:

Indore Institute of Law has always followed a green agenda and has shown remarkable awareness of maintaining an eco- friendly campus. On visiting the Campus, one can experience the appealing and well designed buildings, beautiful lawns, spacious sports ground and lush green environment favorable for the teaching learning process.

RESTRICTED ENTRY OF AUTOMOBILES

Indore Institute of Law operates a fleet of 3 buses covering each corner of Indore and its nearby areas to facilitate the students and staff. The institute encourages the staff and students to use the institute conveyance instead of their vehicles for safety, security, fuel conservation and to reduce environmental pollution.

The Institution buses are periodically checked for pollution by the authorized agency. Institute has a vehicle parking area available near main entrance of the campus for the guests, visitors, faculties, students and any other vehicles. The vehicles should possess pollution check stickers. Only bicycles are allowed inside the campus. Random checks are made to check the validation and periodicity of this certificate. For two wheelers or four wheelers, security measures are compulsory. Stakeholders are also encouraged to adopt carpooling to reduce the toxic emissions in the air.



Tree Car!



Continues :-



Green your commute

Choose the green mode



Walk



Bike



Carpool



Public Transit

USE OF BICYCLES

The students staying on the Institute campus are using bicycles to move within the campus as well as to travel the nearby areas outside the campus. Students and staff coming from nearby villages also prefer bicycles as a mode of transport for attending the Institution. It is environmentally friendly and helps to decrease pollution.



BAN ON USE OF PLASTIC

Indore Institute of law is making an untiring effort to "Reduce Plastic Pollution" by minimizing plastic footprints and by way of refuse, reduction, reuse, and recycling. Hence the subsequent initiatives are taken by all the stakeholders to spread awareness of environmental conversation:

- 1- To refuse and reduce plastic products in daily use and pledge to a plastic free environment within the campus.
- 2- Ban Single use plastic, water bottles, takeaway cups, lunch wrapped in disposable plastic, packaging, plastic bags, disposable food service cups, plates and containers fabricated from polystyrene foam, plastic, straws etc. within the campus premises and canteen.



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END OF THE REPORT
THANKS

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