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GREEN AUDIT REPORT

Submitted for year 2023-24

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Rev. No. :00

Submitted to

Hindi Vidya Prachar Samiti's

Ramniranjan Jhunjunwala College of Arts, Science & Commerce

(R.J. College of Arts, Science & Commerce)

Ghatkopar West, Mumbai – 400086

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Prepared by

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Green Audit Team

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Preface

A Green Audit is the first step to reducing a **building's water, waste, energy, carbon footprint, and environmental impact**. The analysis of the consumption of water and energy as well as the generation of waste is used to provide recommendations on solutions such as rainwater harvesting, water and waste management, and energy management including the addition of renewable energy. *The objective of the green audit is to transform to be self-reliant and self-sustainable in water and energy and create a zero-waste campus.*

In the long run, such a campus will have greatly reduced its operating costs, carbon footprint and impact on the city's infrastructure. Upcoming and future regulations for buildings will require to follow green norms and energy-efficient measures including the Energy Conservation Building Code (ECBC). Hence, Green Audits will help buildings to achieve the norms.

The methodology of the Green Audit involves evaluation of the **water, energy and waste** consumption in the building or premises through online surveys, walk-throughs and detailed audits (where required). The results are analysed against existing Indian and international benchmarks and standards.

The benefits of conducting a green audit are a better understanding of the building systems, along with recommendations for improvement with a goal of self-reliance on resources and reducing the load on public infrastructure.

Through the audit report, we endeavour to provide cost-effective and long-term solutions in a continuous process of conservation of resources. The data collected has been presented through appropriate visual representations for easy understanding of the technical information. Glossary, abbreviations, units of measurements and references are provided for those who are further interested. Any suggestions or edits in the report are welcome and can be sent to roshniudyavar@gmail.com

This Green Audit Report is meant for academic and research purposes only. For legal issues, a separate study is required, and hence the results of this report cannot be used as evidence for any legal case within India or abroad.

Roshni Udyavar & Associates / RUA Ecospace LLP. has been conducting green audits in and around Mumbai since 2019. The team has skilled professionals viz. having Green Accredited Professionals, and ECBC master trainers empanelled energy expert. M/s RUA Ecospaces LLP, Mumbai is a Tye 'A' Inspection Body in accordance with ISO/IEC 17020:2012 for IAF Scope Sector 28 (Green Audit) accredited by National Accreditation Board for Certification Bodies (NABCB).

Acknowledgment

We extend our sincere thanks to to Hindi Vidya Prachar Samiti, the Management of Ramniranjan Jhunjhunwala College, for taking up the initiative to conduct the Green Audit of the College Campus.

We are grateful to the foresighted individual Dr Usha Mukudan, the the Director of Hindi Vidya Prachar Samiti Trust for her robust support and enthusiasm in taking up this comprehensive enterprise. We acknowledge the initiative of the College, especially In charge Principal, Dr Himanshu Dawda, in assessing the conduct and feasibility of the green audit.

We are also grateful to Dr. Bhushan Arekar, IQAC Coordinator and In-Charge Dr Karishma Rajbhar. Teaching and Non-Teaching Staff and Students of the College for furnishing an exceptionally huge amount of data in the stipulated period of time.

Green Audit Team

RUA Ecospace LLP.

Abbreviations

- **BEE** - Bureau of Energy Efficiency
- **BLDC** - Brushless Direct Current
- **BUA** - Built-up area
- **DBT** - Dry Bulb Temperature
- **DEF** - Daylight extent factor
- **DG** - Diesel Generator
- **EER** - Energy efficiency ratio
- **ECBC** - Energy Conservation Building Code
- **ECMs** - Energy Conservation Measures
- **EPI** - Energy Performance Index
- **FTLs** - Fluorescent Tube Lights
- **LED** - Light Emitting Diodes
- **LPD** - Lighting Power Density
- **LPG** - Liquefied petroleum gas
- **MNRE** - Ministry of New and Renewable Energy
- **MRT** - Mean Radiant Temperature
- **NAAC** - The National Assessment and Accreditation Council
- **NBC** - National Building Code
- **NCEF** - National Clean Energy Fund
- **SEC** - Specific Energy Consumption
- **SECI** - Solar Energy Corporation of India
- **Solar PV** - Solar Photovoltaic
- **TOD** - Time of Day
- **WWR** - Window to Wall Ratio

Units of Measurements

- **C-** Celsius
- **cm -** Centimetre
- **Ft -** Foot
- **H -** Hour
- **kW -** Kilowatt of electricity
- **kWh -** kilowatt-hour
- **kWh/m²/year-** kilowatt per square meter per year
- **kVA -** kilovolt-ampere
- **lm -** Lumens
- **lm/W -** Lumens per Watt
- **lux -** Illuminance
- **m -** Meter
- **mm -** Millimetre
- **W -** Watt
- **W/m² -** Watts per square meter
- **Wh -** Watthour

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I. Executive Summary 2023-24

The Green audit of Hindi Vidya Prachar Samiti's Ramniranjan Jhunjhunwala College of Arts, Science & Commerce (R.J. College of Arts, Science & Commerce) was conducted on **06/05/2024.** The premises have an energy consumption of **274,364 kWh** for the academic year 2023-24 as per metered electricity bill. The college functions in ground + 6 storey single building.

The Energy Performance Index (EPI) of the building is **33.18 kWh/sq. m/ year** which is well below the Bureau of Energy Efficiency (BEE), Govt. of India's national benchmark of **150 kWh/ sq. m/ year** for institutional buildings in warm-humid climate.

80% of the habitable spaces of the college are naturally lit which comply as per ECBC norms. **55%** of spaces within the college comply with the maximum allowable Lighting Power Density (LPD) as per the **Space Function method of ECBC 2018**. Also, the lighting levels meet the NBC standard in most of the spaces.

According to municipal water bills, the average monthly consumption is around **469 KL** which comes to about **24.5 KL** per day which is around **5%** of the standards prescribed by the NBC for usage. The pH value of municipal water is **7.5** which is within the limits as per CPCB norms, this water is used for all domestic activities.

The college generates Paper, Glass, Cardboard, Cloth, Electrical and Electronic Waste which constitutes **70% of recyclable solid waste**, while **30% of organic** waste is generated in the form of vegetable and food waste from the canteen and leaf litter on site. The paper waste of the college is sold to a local waste paper contractor for recycling. The college also collects E-waste and hazardous waste separately and disposes off with the help of related agencies. The **multi-layer plastic (MLP)** recycling facility has been provided for collection and an incentive-based credit system has been generated for awareness among the students and faculty. The college practices the 'Paperless Campus' method for its different processes like admission, administration, and attendance.

The college has **named all the trees and plants on the site along with a QR Code**. Since the college is adjacent to a major suburban Railway station (Ghatkopar) and like most station areas it is congested with noise and air pollution issues but on the other hand majority of the students and faculty use this mass transportation system to commute.

1. Introduction

Hindi Vidya Prachar Samiti's Ramniranjan Jhunjhunwala College came into existence in 1963, enabling a larger section of the society to take advantage of the facilities provided for higher education. From 1999-2000 the College added several self-financing courses like BMS, B.B.I, B.Sc. in C.S., I.T., Biotechnology, and M.Sc. in Computer Science and Biotechnology which further hone the special skills of the students. In 2014 they started a skill-based program supported by the University Grants commission known as Bachelor in Vocation.

The college has been reaccredited with 'A' Grade by NAAC in 2014 with a CGPA of 3.50 and received the Best College Award (2007-2008) of the University of Mumbai. The College has been bestowed with IMC **RAMKRISHNA BAJAJ PERFORMANCE EXCELLENCE TROPHY, 2010.** The principal of the college was awarded **"Best Teacher"** by the Government of Maharashtra in 2011. Government of Maharashtra conferred the college with **"JAAGAR JAANIVANCHA"** (First in Mumbai Suburban- in 2013 and second in Mumbai Suburban- in 2014) for the safety of girls.

The College has been granted Autonomous Status by the University Grants Commission (UGC) for a period of Ten Years w.e.f. 2018-2019 to 2027-2028. However, the college will remain affiliated to University of Mumbai with an autonomous status.

The College has been awarded a **Certificate of Responsible Recycling** by E-Incarnation Recycling Private Limited (for E-waste Management) and **Safai Bank of India** by the Kulkarni Foundation (for Multi-layer plastic Management (MLP)) for proactively contributing to the waste management. They have devised a module in which students are given credits for the amount and size of MLP they collected. They also have a compost pit for leaf and canteen waste (Wet waste).

The college has also a QR code all the trees on the campus, to create awareness about the types of trees and their benefits amongst the students and the visitors.

1.1 Objectives of the Green Audit

The objective of the green audit are as follows

- Quantify energy, water and waste consumption;

- Identify energy saving opportunities resulting in lowered energy bills, less use of fossil fuel-based energy and lower carbon footprint;
- Identify wastages in use – and devise solutions such as smart/automated equipment to reduce consumption;
- Introduction of renewable energy to reduce operational energy cost (if required)
- Introducing measures to reduce water consumption and optimise rainwater harvesting potentials.

1.2 Scope of Work

Energy:

o Energy Efficiency

o Renewable Energy

o Metering and Electrical System

Water:

o Rainwater harvesting

o Water Efficient Equipment

o Landsacape Water Management

o Wastewater treatment

o Water usage

Solid Waste:

o Waste Segregation

o Organic waste treatment

o Recycling of Waste

o E-waste management

o Paperless Campus

Environmental Quality:

o Green spaces

o Flora and Fauna

o Universal Access

o Amenities

o Indoor Air Quality

o Noise Pollution

Carbon Footprint:

o Scope 1 & 2 CO2 emissions

Beyond the Campus:

o Involvement of stakeholders – students, faculty, non-teaching staff

o Environment / Green Club

o Inlcusion in curriculum

1.3 Understanding of the Audited Area

The total built-up area of **89,018 sq. ft. (8270 sq. m)**, is considered for the audit and was evaluated based on existing drawings, information as well as on-site measurements as it forms the basis of assessment of the energy, water, and waste consumption to existing benchmarks. The college campus has an area of **2800 sq. m.** The college functions mainly in 2 buildings namely the school building and the College building having Ground to sixth floors

Categorization of the spaces as administrative spaces (offices, staff rooms, etc.), common spaces (Toilets, storage, canteen, library, etc.), circulation spaces (staircase, corridors) and conditioned vs. non-conditioned spaces (Computer labs, Audio Visual room, Auditorium and classrooms) was then carried out. Other common spaces like canteen and gym were considered during the audit.

The analysis shows that **26%** of the total built-up area of the college is used as a common passage. The college building has classroom, computer labs, administrative offices, staff rooms, conference rooms, auditorium, library, common passages, staircase, lift etc.

The description of facilities and activities on each floor are given in Table 1:

S. No.	Floor	Name of the Facility
1	Ground Floor	Chemistry labs, Gymnasium, Canteen, Seminar Hall Toilets
2	First Floor	Accounts office, Principal's cabin, Conference room, Girls common room, Classrooms, Biology labs, Toilets
3	Second Floor	Classrooms, Staffroom, Physics labs, Toilets

4	Third Floor	Computer lab, Library, Classroom, Biotechnology lab, Toilets
5	Fourth Floor	Staff room, Class room, Maths lab, Toilets
6	Fifth Floor	Statistics lab, Classrooms, Staff room, Toilets, computer lab
7	Sixth Floor	Classrooms, Staff room

Table 1: Floor wise distribution of area

Some sample photographs taken during the audit showing different spaces and equipment are provided in the following pages.

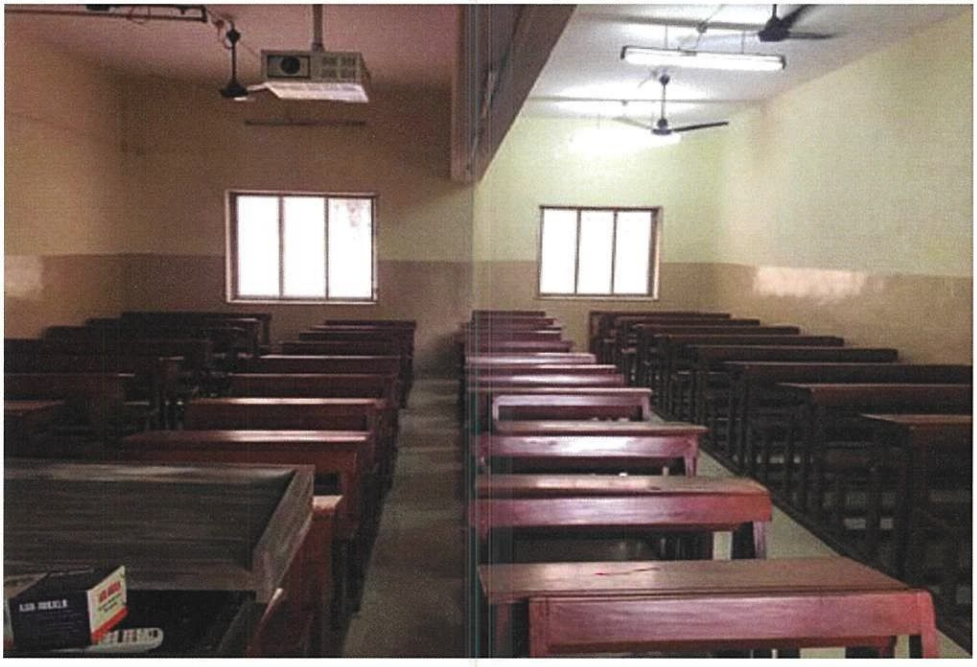
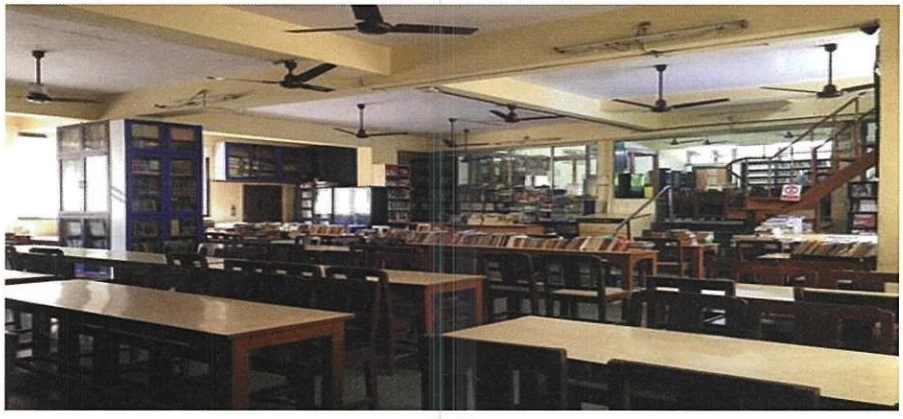


Plate 1: Fourth Floor Classroom



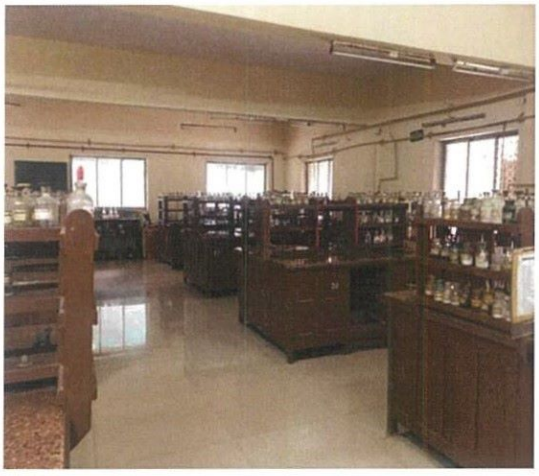


Plate 2: Chemistry Lab

Plate 3: Administration area

2. Audit Methodology

Five steps involved in the audit process are as follows:

Table 2: Steps in the Green Audit

Step	Objective	Activities
Step 1	Audit of historical data	• Online data collection • Using online data for screening survey and time estimation. • Building drawings, utility bills
Step 2	Screening survey or walk-through audit	• Inspection of the site for energy, water, waste and environmental information
Step 3	On-site investigations	• Verification of online data submitted through ground survey and observations • Conduct random lighting audit of habitable spaces and compare with National Building Code (NBC) 2016 standards. • Study of illumination system – LUX levels, Lighting Power Density (LPD) • Inspection of water, waste and environmental issues including flooding, stormwater system
Step 4	Data Analysis	• Analysis of all criteria and comparison with standards and benchmarks •
Step 5	Documentation and Report	• Preparation of detailed report with documentation, calculation and all technical information and summary

Table 3: Steps in the Green Audit

2.1 Data Collection

General Data collection such as the year of establishment of the college, number of students and staff, inclusion and exclusion of spaces and equipment for the audit were obtained through one-to-one interviews and discussions with key informants who also assisted in the collection of building drawings and electricity bills for the past 1 years (February 2023 to February 2024).

On-site inspection

A walk-through audit was conducted by the Team which was followed by a few more visits to review the accuracy of the data. Special guided visits of the campus were conducted along with **Mr. Somnath Kangralkar**.

The Green Audit Checklist was used during the walk-through audits to gather information about the location of windows, Window Wall Ratio (WWR), number and type of lights, fans, air conditioners and Equipment

Instruments Used

For the Green audit, the following instruments were used:

LUX meter	
Indoor environmental quality sensor	

pH meter	
TDS meter	

Table 4: Instruments used for the study

Measurement of Illuminance

Lux levels were measured at **37** different spaces by using a Lux Meter over a grid of 9 points measured at working plane height with artificial light between 11:00 to 17:00 hours. The average reading was then compared with the mid-point reading of the recommended levels in the National Building Code, 2016.

Schedule of Data Collection

S. No.	Audit Activity	Person	Date
1.	Visit to Jhunjhunwala College and presentation along with walk through and detailed green audit	**Ar. Aditi Mane**	**06/05/2024**
2.	Online data submission	**Mr. Kiran Raut**	**18/04/2024**

Table 5: Schedule of data collection based on actual visits

2.2 Data Analysis

They were assessed against existing benchmarks and standards such as Energy Performance Index (EPI), Lighting Power Density (LPD) as per Energy Conservation Building Code (ECBC) 2007, appropriate illuminance levels (Lux) for visual comfort, and Specific Energy Consumption (SEC) as specified by National Building Code 2016, Window Wall Ratio (WWR).

Calculation of Wattage

The wattage of lights, fans and AC were made based on data submitted online by the college and were verified through a random survey during an on-site investigation. For the purpose of calculating lighting and fan energy consumption, an average of 8 hours working day was assumed. The complete consolidated data is provided in Annexure A.

Information on Population and Area for Energy Performance Index (EPI) and Specific Energy Consumption (SEC)

Information on the number of people using a specific space was obtained from the online questionnaire and interpolated to obtain occupancy for fresh air calculations. For area calculations, the total built-up area provided in an online questionnaire and building drawings were utilized. As per online data submitted, the approximate total population of students, teachers, non-teaching and administrative staff is **11,083 persons.** This will be used for SEC calculation. The total built-up area of the college considered for EPI is **89,017.54 sq. ft. (8270 sq. m).**

Category	Number of Occupants
Students	10889
Teachers	117
Non-teaching staff	56
Administrative staff	21
Total	**11083**

Table 6: Number of occupants

3. Analysis and Benchmarking

3.1 Energy

3.1.1 Overall Energy Consumption

The overall electricity load at Jhunjhunwala College as per electricity bills as **2,74,364kWh** which comprises of all electric requirements of the college. There is a solar PV installed on site which is sent back to the grid. **88**% of the college is naturally ventilated whereas **12**% is air conditioned.

3.1.2 Lighting Energy Consumption

3.1.2.1 Artificial lighting

In Jhunjhunwala College the percentage of energy consumed by LED lights used is **82%** whereas non-LED lights is only **18%**, there is scope to change all the lights to LED fitting which can help to reduce the energy consumption. The types and wattage of lamps used are shown in figure 01 and 02 and Table 06.

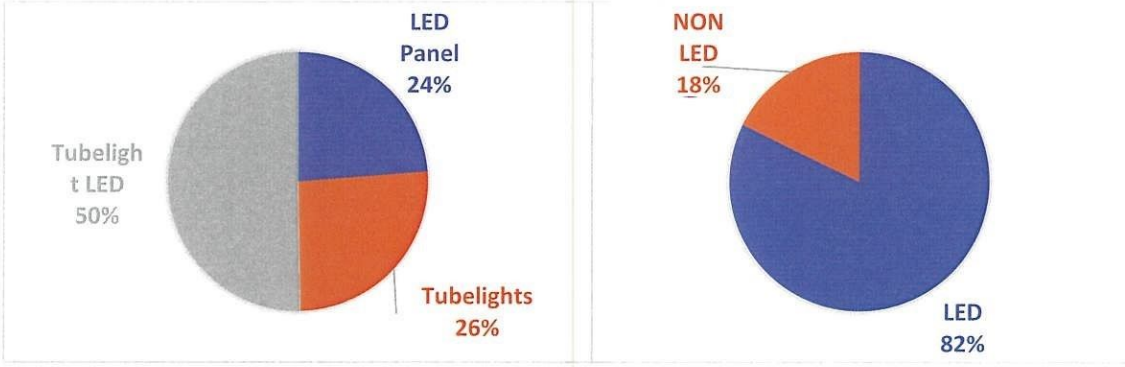


Figure 1: Type of light fixtures based on wattages & LED v/s non-LED

S. No.	Lamp Type	Approximate wattage per lamp (W)	Numbers	Total usage KWH/ year
1.	LED PANEL	24	335	15212.64
2.	Tube lights	40	228	16669.6
3.	Tube lights LED	24	700	32249.5
Grant total			227	64,131.76

Table 7: Type of lights distribution

3.1.2.2 Lighting Power Density (LPD)

The Energy Conservation Building Code 2017 defines Lighting Power Density (LPD) as the maximum lighting power per unit area of space as per its function or building as per its classification.

LPD is a benchmark for the maximum allowable light per unit area provided in the ECBC 2018 and has been used here to compare with the lighting power allowance of each area in the college. The LPD using the 'Space Function Method' for some important activity areas has been calculated and compared with ECBC 2018 in Table 07. It is observed that **96% of the spaces** in the college **comply with LPD norms** provided in ECBC.

S. No.	Space	LPD as per ECBC 2018 (W/sq. m)	Calculated LPD (W/sq. m)	Meeting with ECBC Standard
1.	Library – reading Area	10.00	7.91	Yes
2.	Classroom	13.8	5.64	Yes
3.	Administrative office	15.1	2.35	Yes
4.	Computer lab	2.01	2.82	No

Table 8: LPD for some important activity areas using the 'Space Function Method'

Figure 2: Percentage of areas complying with LPD norms as per ECBC using Space Function Method

3.1.2.3 Wall Window Ratio and lighting level

The overall **Wall to window ratio (WWR) is observed to be 25%..** During a detailed audit, lighting level was measured in some rooms randomly, to verify whether they are in accordance with NBC standards. In the random survey of lux levels at different places with artificial lights on, it was found that **55%** of **the lux level** measurements are matching with the NBC norms and **45%** were underlit (these are spaces which have obstruction near the windows opening).

The results of the survey of Lux levels with artificial lights ON are shown below:

Sr. No	Name of space	Floor	Avg Lux level	Lux level as per NBC	Limit
1	Labrary-4 Chemistry and physics	Ground	181	200 – 300 - 500	Below limit
2	Labrary-3 Chemistry	Ground	195	200 – 300 - 500	Below limit
3	Chemistry Store Room	Ground	158	200 – 300 - 500	Below limit
4	Chemistry Lab-1	Ground	334	200 – 300 - 500	Within Limit
5	Chemistry Staff Room	Ground	201	200 – 300 - 500	Below limit
6	Pantry	1st	66	200 – 300 - 500	Below limit
7	Admin Office	1st	150	200 – 300 - 500	Below limit
8	Admin Office	1st	180	200 – 300 - 500	Below limit
9	Admin Office	1st	185	200 – 300 - 500	Below limit
10	Biology Lab	1st	265	200 – 300 - 500	Within Limit
11	Biology Lab	1st	280	200 – 300 - 500	Within Limit
12	Biology Lab	1st	255		Within Limit
13	Principal Office	1st	357	200 – 300 - 500	Within Limit
14	Physics Room-3	2nd	279	200 – 300 - 500	Within Limit
15	Physics Staff Room	2nd	314	200 – 300 - 500	Within Limit
16	Biology Staff Room	2nd	224	200 – 300 - 500	Below limit
17	Biology Lab-3	2nd	223	200 – 300 - 500	Below limit
18	Class Room- 11	2nd	301	200 – 300 - 500	Within Limit
19	Class Room- 12	2nd	254	200 – 300 - 500	Within Limit
20	Computer Lab	3rd	92	200 – 300 - 500	Below limit
21	Mathematics Staff Room	3rd	166	200 – 300 - 500	Below limit
22	Library	3rd	293	200 – 300 - 500	Within Limit
23	Biotechnology	3rd	240	200 – 300 - 500	Below limit
24	BBI Staff Room	4th	554	200 – 300 - 500	Within Limit
25	BMS Staff Room	4th	111	200 – 300 - 500	Below limit

26	Statistic Staff Room	4th	213	200 – 300 - 500	Below limit
27	Teacher Staff Room	4th	164	200 – 300 - 500	Below limit
28	Computer Lab	5th	229	200 – 300 - 500	Below limit
29	Computer Lab-1	5th	240	200 – 300 - 500	Below limit
30	Computer Room near to staff Room	5th	282	200 – 300 - 500	Within Limit
31	IT staff Room	5th	280	200 – 300 - 500	Within Limit
32	IT Computer Room	5th	380	200 – 300 - 500	Within Limit
33	Class Room-52	5th	382	200 – 300 - 500	Within Limit

Table 9: Summary of lux levels with comparison with NBC

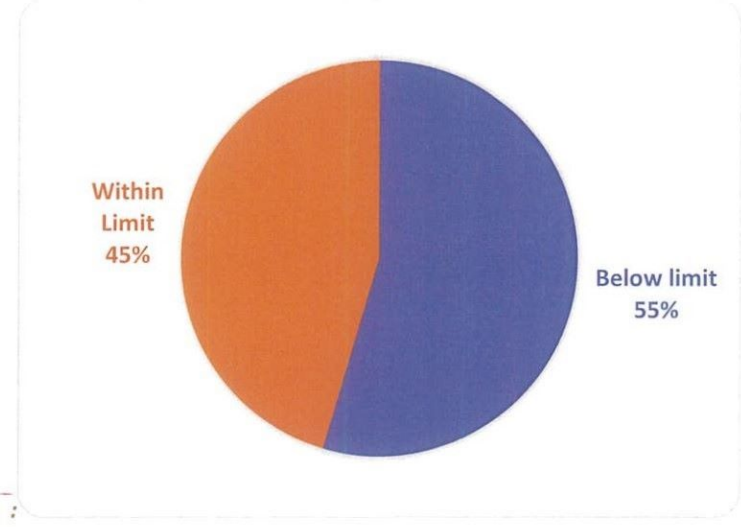


Figure 3: LUX leves as per limits

Summary of Observations:

1. There are in all 1263 lamps (artificial light sources) in the campus amounting to annual energy consumption of **64,131.8 kWh.**
2. **82% of lighting consumption is from LED lamps.**
3. As per the recommendation of previous green audit report, the college has replaced few old luminaries to LED.
4. Building envelope has **Window Wall Ratio (WWR) of 25%,** which is within ECBC's allowable norms of up to 60%.
5. **96%** of the spaces comply with the LPD norms of ECBC. By the Space Function method, most of the key activity spaces meet the ECBC norms.
6. In the random survey of lux levels at different places with artificial lights ON, it was found that 55% of the lux level measurements are matching with the NBC norms.

7. Lights in washrooms are replaced with sensor lights.

3.1.3 Energy Consumption for Thermal Comfort

The college is been ventilated using fans and air conditioning systems. As per the data **12%** of the college space is air conditioned.

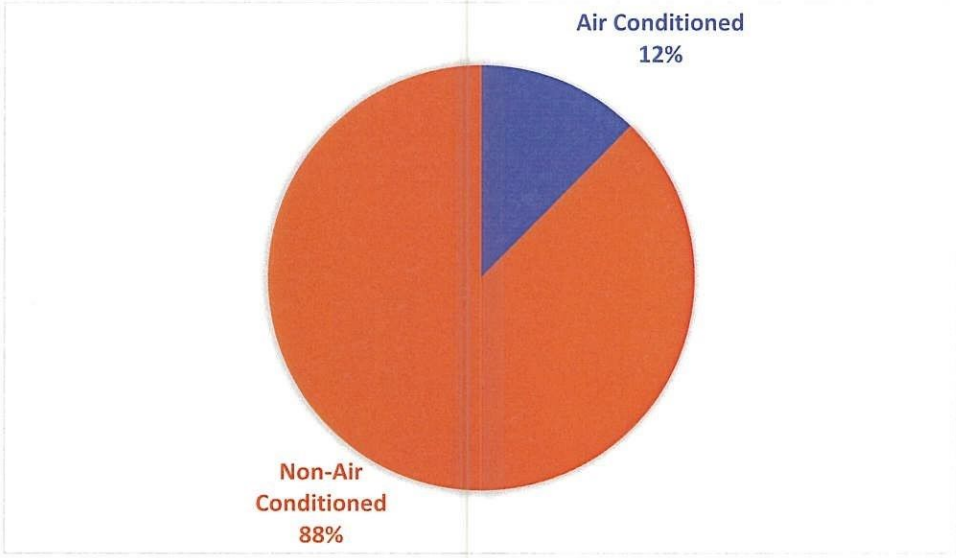


Figure 4: Conditioned and un-conditioned areas

There are in total **529** ceiling fans fitted in the audited area of the college.

The comfort air-conditioning system at college mainly comprises split and window units. All the cabins and the classroom are mechanically ventilated whereas common spaces such as passages, auditorium, library are naturally ventilated. The AC's installed in class rooms are used as and when needed and are left on throughout the day, this is a good practice by the college.

Summary of Observations:

1. The college has **121** ceiling fans out of which **100%** are regular fans and there are no BLDS fans on campus.
2. Although around **88% of the built area is Air Conditioned.**

The college has taken an initiative towards creating awareness regarding electricity conversation by installing posters of electricity efficiency in each room near switch boards.

Plate 4: Save Electricity posters

The college has also numbered the lights and fan fittings in each room and the same numbering are marked on switch boards for more efficient use of the lighting fixtures.

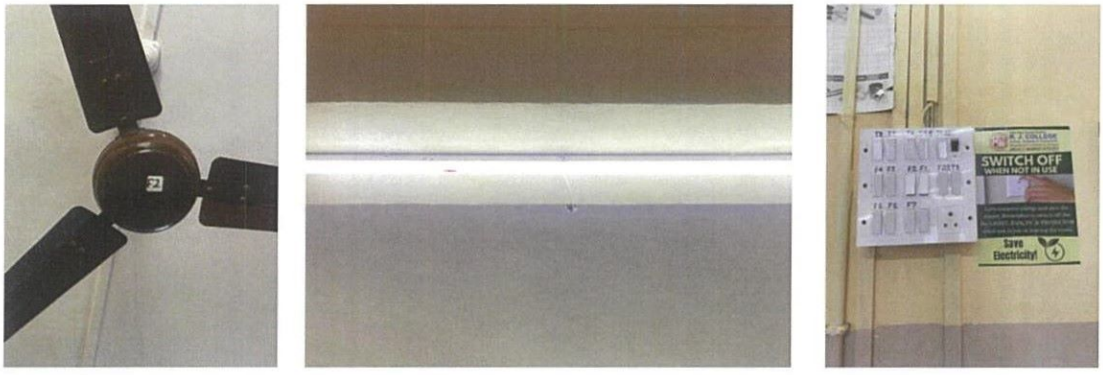


Plate 5: Fixture numbering

3.1.4 Benchmarking - Energy Performance Index (EPI)

The **Energy Performance Index (EPI)** of RJ College is **33.18kWh/sq. m/year** in 2022-2023 as the billing data. As per the **Bureau of Energy Efficiency (BEE) EPI benchmark for institutional** buildings in **warm-humid climate zone** (such as Mumbai) is **150 kWh/sq. m/year.** The energy consumption of the college is well below this benchmark, as the college was fully functional for around 3 months, due to the Covid pandemic.

Climate Zone	EPI (kWh/m²/yr)
Warm & Humid	150
Composite	117
Hot & Dry	106
Moderate	129

Table 10: EPI benchmark by BEE for Institutes

3.1.5 Benchmarking – Specific Energy Consumption (SEC)

Specific Energy Consumption (SEC) is defined as the energy consumption per unit product. The specific energy consumption considering students, faculty and staff members was calculated to form a benchmark of **24.76kWh/ person/ year.**

3.1.6 Billing Analysis and Metering system

1. The energy consumption in the college is mainly in the form of electricity which is supplied through **Adani Electricity Utility Company** and 10 KW solar PV panels on the terrace
2. The College is billed under category **LT IV (B)** for all 9 meters. This category is applicable for public services which includes Government and private hospitals and educational institutions.
3. The Monthly electricity bill for all the meters with **LT IV (B)** has the basic rate of energy as **Rs. 6.00 per unit (kWh)** in addition to fixed demand charge of **Rs. 425** per connection per month, **Wheeling charge of Rs. 1.74 per unit. Additional Fix charge of Rs 250 per 10 KW for three phase connection.**

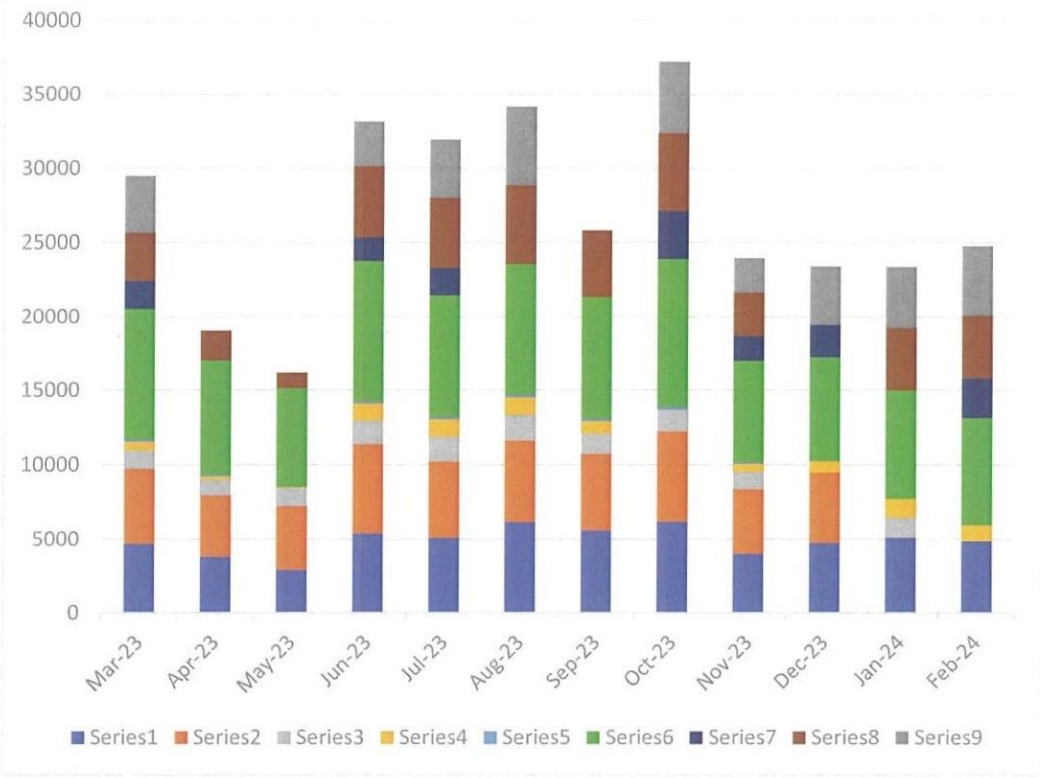


Figure 5: Monthly billed units by meter

The college has installed **9**submeters for monitor the use of electricity consumption for different areas.

3.1.7 Renewable Energy- Rooftop Solar PV

The College has 34 nos. of Solar PV panels installed on the Rooftop in 2017 which have capacity of 10 kWp. These panels were installed by Hon. MP Dr. Kirti Somaiya as per the guidelines of MPLADS Administrative Approval in 2016-17. These panels are laid on the Sloping roof, based on the slope of the roof and not as per the best orientation for higher solar gain. A separate energy meter and inverter is also attached to the system.

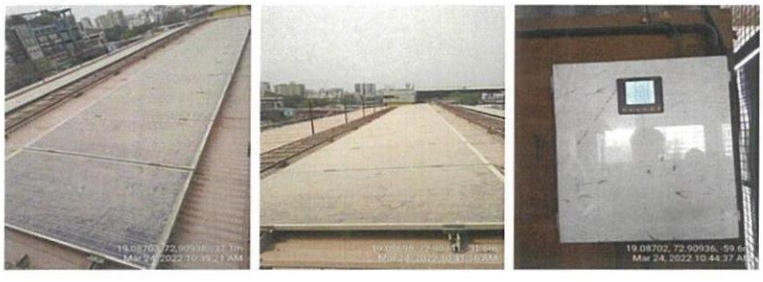


Plate 6: Solar PV Panels & meters

1. Based on meter readings from Energy meter recorded from March 2023 to Febuary 2024, it was recorded that power generated is 28.47 kWh per day. The

total electricity generated throughout the year was 10,393kWh. As per the current energy generation thumb rules, a 10kWp system should generate 40kWh/day. So, the system was generating power on lower side.

2. The solar PV manufacturing data could not be obtained and hence it is not possible to comment on the deterioration rate considered on Y-O-Y basis for ageing of the Solar Panels.
3. As being given to understand this Solar power is consumed fully on fourth floor wherein considerable power demand is present at any given point of time.
4. The college has made an AMC for solar panel and the same is been attached in Annexure **F**.

3.2 Water

The College has Over head tank (OHT) of capacity **1,000 litres** and a Underground tank (UGT) of capacity **5,000 litres.** There are **23** wash basins, and **5** WC having **single and dual** flush type flushing tanks while the rest of the toilet units have only ablution taps, and a total of **12** drinking water coolers. The water quality of the college was found to be good. Considering **11,083** people at a rate of 45 litres per person per day (as per NBC), the maximum total **daily** requirement of the college is **498.7** kilo litres Monthly requirement should be **9974.7 kilo litres** considering **20 days** of operation per month. However, as per water bills submitted by the college, the average monthly water consumption is **469 kilo litres**, which means daily consumption is around **24.5 kilo litres.** This amounts to almost **5%** of the calculated domestic daily water consumption, which indicates the good practice of college towards less water consumption. The college pays Rs. 5.94 per kilo litres of water in addition to the 70% of water charges as sewerage charges according to the tariff specified in the water bills.

Table **11** gives details of the faucets, flushing devices, and water coolers in the college.

The college has **1** source of potable water supply, which is from the Municipal Corporation. It caters to the domestic and flushing requirements. As per the water test report from Brihanmumbai Mahanagarpalika, Public Health Department, the pH value of the municipal tap water is **7.5.** This states that the water quality falls in Class A category as per CPCB standards which says drinking water without conventional treatment but after disinfection. Water test report is attached in Annexure **G.**

Sensor-based taps with aerators are installed in the washroom of the director's cabin along with a dual flush system. This helps in reducing water usage.

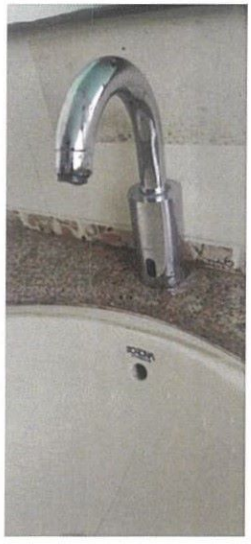


Plate 7: Faucet with sensor with aerator and dual flush

Sr. No.	Building	Floor	Total No.	Total No. of Toilet Blocks	Drinking Water/ Cooler	Wash Basin	Wash basin taps	Type of Flushing Tank (Dual Flush/ Single Flush)
1	Garden	Campus	6				Tap	
2	Chem Lab 1	Ground floor	17			Basin Tap		
3	Chem Lab 2	Ground floor	21			Basin Tap		
4	Chem Lab 3	Ground floor	9			Basin Tap		
5	Research lab	Ground floor	2			Basin Tap		
6	Chem Jr lab	Ground floor	14			Basin Tap		
7	Canteen	Ground floor	5			Basin Tap		
8	Canteen	Ground floor	2		Water cooler			
9	Ground floor	Ground floor	2		Water cooler			
10	LCR	1st Floor	5				Tap	
11	1st floor	1st Floor	2		Water cooler			
12	Office Toilet	1st Floor	3					Single Flush
13	Office toilet	1st Floor	3			Basin Tap		
14	Pantry	1st Floor	1			Basin Tap		

15	Panty	1st Floor	2		Water cooler			
16	Biology Lab	1st Floor	9			Basin tap		
17	Biology Lab	1st Floor	3		Water cooler			
18	2nd floor	2nd floor	4		Water cooler			
19	Physics	2nd floor	9			Basin tap		
20	Boys Washroom	2nd floor	3					Single Flush
21	Boys Washroom	2nd floor	4			Basin tap		
22	Boys Washroom	2nd floor	2				Tap	
23	3rd floor	3rd floor	2		Water cooler			
24	Boys Washroom	3rd floor	3	3 push			Tap	
25	Boys Washroom	3rd floor	2			Basin tap		
26	Boys Washroom	3rd floor	1				Tap	
27	Library	3rd floor	1			Basin tap		
28	Biotech Lab	3rd floor	24			Basin tap		
29	Biotech	3rd floor	3		Water cooler			
30	Stats	4th floor	1			Basin tap		
31	Research lab	4th floor	2			Basin tap		
32	Staff room	4th floor	2		Water cooler			
33	Staff room Gents washroom	4th floor	6				Tap	
34	Staff room Ladies washroom	4th floor	4				Tap	
35	Girls washroom	4th floor	2				Tap	
36	Lunch room	4th floor	1			Basin tap		
37	Lunch room	4th floor	2		Water cooler			
38	Temple	4th floor	2				Tap	
39	Research preparation room	4th floor	2			Basin tap		
40	4th floor	4th floor	2		Water cooler			

41	BMS Washroom	4th floor	1					Single Flush
42	BMS Washroom	4th floor	1			Basin tap		
43	5th floor	5th floor	3		Water cooler			
44	CS Washroom	5th floor	1					Single Flush
45	CS Washroom	5th floor	3			Basin tap		
46	BVOC Washroom	5th floor	2				Tap	
47	BVOC Washroom	5th floor	1			Basin tap		
48	61-62 room no.	5th floor	1				Tap	
49	Garden	Terrace	1				Tap	
50	Beauty parlour	Terrace	2			Basin tap		

Table 11: Toilet details in college

3.2.1 Rain Water Harvesting

The college has successfully installed a rainwater harvesting system collecting water from the rooftop catchment through down take pipes fitted with filter which is used to recharge a 20 feet deep ring well. This water is used for cleaning the campus, landscaping and watering the plants as the quality of water is not feasible for drinking.

Plate 8: Rainwater tank with down take pipe

3.2.2 Reusing water from coolers

The college has installed a water recycling unit to treat the wastewater from drinking water coolers for reuse i.e., watering plants or gardening. This is initiative to further reduce the water for landscaping is commendable, as an institution already has mist irrigation for terrace garden.

Plate 9: Water re-use age tank

3.3 Solid Waste

The college generates approximately half a kg of waste per day which amounts to 100 kg/year, which is organic / food waste from the canteen. The waste is not collected separately on floors but they have a separate centralized waste segregation system.

3.3.1 Treatment of organic waste

The college has already marked out a place on campus for a compost pit.

Plate 10: Compost pit provided on campus

The organic waste generated from the pantry and canteen is composted within the campus with the help of dry leaves and other waste. The compost is then used as a manure for trees and plants that are there on the campus.

3.3.2 Recycling of waste

The waste generated by college is seperated and paper carboard waste is send to recycling around 400 kg of paper was sold to to the paper mart who then send for recycling. The acknowledgement is attached in Annexure **H.**

The college has developed an E-waste collection system in collaboration with Eincarnation Recycling Pvt Ltd. that collects the E-waste periodically, the same is attached in Annexure **I.**

College has devised a credit based waste collection module. This not only creates the awareness amongst the student but motivates them to collect and deposit multi-layer, in the process cleaning the surrounding environmetal from a type of plastic waste, allowing systematic recycling of the same. In accordance to this, Kulkarni foundation has nominated them as branch of Safai Bank of India. Letter forms the Annexure **J**.

The College also partices partial paperless system for admission and administration process. The also have a complete paperless parctice for attendence and presenations.

3.4 Environment Quality

3.4.1 Green Spaces, Flora & Fauna

Since the college is nested in a very small campus space, they do not have enough space for gardens or lawns but the college has taken huge efforts toward created green buffer within and outside college along the compound with help of green walls and potted plants.

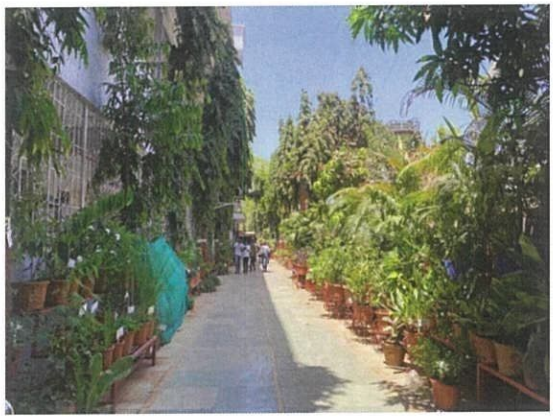


Plate 11: Plantation on campus

They have also created a green house on the roof top which has mist irrigation and hydroponic technology of growing plants. These efforts taken by the college are commendable.

Plate 12: Greenhouse created on roof

The college already has identified and listed the number of trees on campus. As they have botany department all the trees are listed by their scientific name and the information is already. All identified trees in the campus have QR code plate, scanning which the basic information of the tree can be read.

Plate 13: Naming plants with QR code

The list of vegetation observed on campus, submitted by the college is given below:

Sr. No	Common name	Scientific name	Type of plant	No. of Trees	Location
1	Sacred Fig	*Ficus religiosa*	*Tree*	2	Ground floor
2	Cluster Fig	*Ficus racemosa*	*Tree*	1	Ground floor
3	Mango tree	*Mangifera indica*	*Tree*	4	Ground floor
4	Yellow flametree	*Peltophorum pterocarpum*	*Tree*	4	Ground floor
5	Kasah	*Sterculia alata*	*Tree*	1	Ground floor
6	Indian Beech	*Ponngamia pinata*	*Tree*	1	Ground floor
7	Rain tree	*albizia saman*	*Tree*	1	Ground floor
8	Indian mast tree	*Polyalthia longifolia*	*Tree*	49	Ground floor
9	Pinwheel Flower tree	*Tabernaemontana divaricata*	*Shrub*	1	Ground floor
10	Areca palm	*Dypsis lutescens*	*Shrub*	9	Ground floor
11	Dumb cane	*Dieffenbachia seguine*	*Shrub*	5	Ground floor
12	Indian screw tree	*Helecteris isora*	*Tree*	1	Ground floor
13	Wild plantain	*Heliconia sp.*	*Shrub*	4	Ground floor
14	Crane Flower	*Sterlitzia reginae*	*Shrub*	2	Ground floor
15	Flame of woods	*Ixora coccinea*	*Tree*	3	Ground floor
16	Chinese chaste tree	*Vitex negundo*	*Tree*	2	Ground floor
17	Sandpaper vine	*Petrea volubilis (Liana)*	*Creeper*	1	Ground floor
18	Sago Palm	*Cycas sp.*	*Tree*	1	Ground floor
19	Rangoon Creeper	*Combretum indicum*	*Creeper*	1	Ground floor
20	Monkey brush vine	*Combretum rotundifolium*	*Creeper*	1	Ground floor
21	Ceylon Ironwood	*Messua ferrea*	*Tree*	1	Ground floor
22	Bitter cassava	*Manihot esculanta*	*Shrub*	1	Ground floor
23	White frangipani	*Plumeria alba*	*Tree*	1	Ground floor
24	Bridal Bouquet	*Plumeria pudica*	*Tree*	1	Ground floor

Table 12: List of Indoor and Outdoor plants

In order to ensure the well-being of the students and staff on the campus certain facilities are provided and are well maintained such as separate common rooms, gymnasium, indoor games room, playground and activity area.

Along with botanical, butterfly garden the college has also made a health garden in which they have created a garden where different elements of the body are colour coded and then list of plants are made with respect to the concern body part which might be medically beneficial for the body to recover or heal from respective decises.

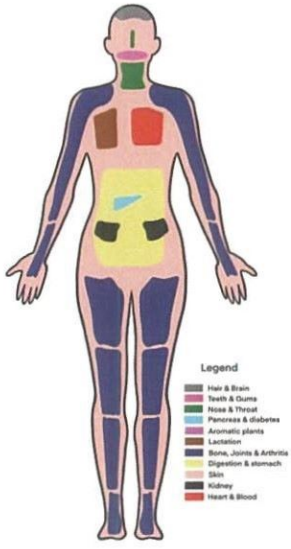


Plate 14: Body part chats with colour coded

The list of trees is attached in Annexure **K**.

It was observed that here are no indoor plants in the building in the buildings but the college has taken an initiative to plant hanging potted plants in the corridor areas.

Plate 15: Hanging plants in co-corridors

The college has also take various green campus initiative which is acknowledged in Annexure **L.**

3.4.2 Inclusivity

There is a ramp provided at the entrance of the buildings for easy accessibility. The college has separate universal toilets for male and female and also separate universal toilet for staffs. Lift is also provided for easy accessibility.

Plate 16: Ramps at entrance

Plate 17: Universal toilet on campus

3.4.3 Noise Pollution

As the college is located right next to the major railway station (Ghatkopar), there are several sources of noise and air pollution due to food stalls, railway line and associated activities.

3.4.4 Indoor Air Quality

The indoor air quality of the classroom, staff area and common area was monitored with the help of indoor air quality sensor. The IAQ report is been attached in Annexure **M.** It was observed that the VOC levels were **126, 127, 16**, for class room, staffroom and computer lab area respectively which are within the limits. The CO2 levels were **535, 748, 519**, for class room, staffroom and computer lab area respectively which are within the limits. The SPM were **31, 30, 24**, for class room, staffroom and computer lab area respectively which are beyond the limits.

3.4.5 Green Policy

The college is deeply committed to advancing environmental sustainability. As an academic institution the college tries to understand its significant impact on environment and therefore embraced a comprehensive green policy. The green policy of the college is attached in Annexure N.

3.5 Carbon Footprint

The total energy carbon footprint of the college is **225t** for one year, and total LPG carbon footprint of the college is **1.82t** for one year, this includes LPG used in canteen, pantry, and all laboratories. The college is trying to create a biogas cans which help to fulfil the LPG demand in few of the laboratories. Majority college students and faculty use public transport like BEST buses and local trains to reach the college. The nearest railway station is Ghatkopar railway station for students and faculty.

3.6 Beyond the Campus

The nature club has conducted various activities to support the environment by conducting cleanliness and understanding the environment by different nature walks.

The club held many activities in campus of the college related to environments, few of

Activity 1: Birdwatching and Mangrove Walk at Navi Mumbai

A "Birdwatching and Mangrove Walk" at Navi Mumbai on 13th May 2023 on the occasion of World Migratory Bird Day as a part of Naturalist Foundation, a nature education organisation in collaboration with United Way Mumbai, an NGO. The walk took place at the wetlands located behind the T.S.Chanakya Maritime University, Seawoods Darave, 11 people from the team - (7 members and 4 interns) were involved in conducting the event, 34 participants attended the event which were divided into 2 groups.

Objective: The nature trail was conducted to highlight the importahce of Bird Migration as well as the role of mangroves in a wetland ecosystem and the ecosystem services provided by mangroves. The participants were also introduced to the citizen science platforms 'Ebird"

Group photo of participants and members

The NaturalisT Foundation Team

Participants observing birds

Salvadora persica

Avicennia marina

Activity 2: City Nature Challenge - Deer Park

A nature walk at Deer Park, Powai was conducted by Ms. Gauri Joshi, faculty member of ESDm for the City Nature Challenge 2023 on 30th April 2023 along with my fellow colleagues Umesh Avadootha and Kasim Ansari from Naturalist Foundation. The event was a collaboration where The Naturalist School, WWF India, Naturalist Foundation and BNHS came together to host City Nature Challenge 2023 in the Mumbai Metropolitan Region. In this challenge, several cities all over the world participate to document urban wildlife and compete on which city shows the most diversity. The park sits alongside Powai lake and hosts plenty of green cover with several species of native and exotic tree species forming a woodland while the adjacent lake provides a wetland for wading birds. Total 6 participants were present for the Deer Park event.

Activity 3: Marine Walk at Juhu Beach

Ms. Gaur Joshi faculty of ESDM conducted a Marine Walk at Juhu Beach on 19th February 2023 as a part of NaturalisT Foundation, a nature education organization in collaboration with two NGOs Seed Foundation and United Way Mumbai. The event was specifically organized for underprivileged school students from different areas of Mumbai.

Octopus along with a rare sighting of Malacca sea snake made the highlight of the marine along with different types of snails such as Turbun snail, Arabian Cowry and

Button Snail followed by Hermit crab, Porcelain crab and Pistol Shrimp. Different species of bivalves were also observed such as Sunset Shell, Green Mussel and Windowpane Oyster.

5. Glossary

- **Ballast:** A device used in conjunction with an electric-discharge lamp to cause the lamp to start and operate under proper circuit conditions of voltage, current, waveform, electrode heat, etc.
- **Built up area (BUA):** Sum of the covered areas of all floors of a building, other than the roof, and areas covered by external walls and parapet on these floors.
- **Common area:** Areas within a building that are available for use by all users in a building (i.e. lobbies, corridors, restrooms, etc.).
- **Connected load:** The sum of the rated wattage of all equipment, appliances and devices to be installed in the building or part of building or building complexes, in terms of kilowatt (kW) that will be allocated to all applicants for electric power consumption in respect of the proposed building or building complexes on their completion.
- **Contract demand:** The maximum demand in kilo Volt Ampere (kVA) (within a consumer's sanctioned load) agreed to be supplied by the electricity provider or utility in the agreement executed between the user and the utility or electricity provider.
- **Colour Rendering Index (CRI):** Colour Rendering Index (CRI) — Measure of the degree to which the psychophysical colour of an object illuminated by the test illuminant conforms to that of the same object illuminated by the reference

illuminant, suitable allowance having been made for the state of chromatic adaptation.

- **Correlated Colour Temperature (CCT) (K):** The temperature of the Planckian radiator whose perceived colour most closely resembles that of a given stimulus at the same brightness and under specified viewing conditions.
- **Demand:** Maximum rate of electricity (kW) consumption recorded for a building or facility during a selected time frame.
- **Demand factor**: Is the ratio of the sum of the maximum demand of a system (or part of a system) to the total connected load on the system (or part of the system) under consideration. Demand factor is always less than one.
- **Diversity factor**: The ratio between the actual power (Pact) and the rated power (P max) of systems.
- **Dry Bulb Temperature:** The temperature of the air, read on a thermometer, taken in such a way so as to avoid errors due to radiation.
- **Efficacy:** The lumens produced by a lamp plus ballast system divided by the total watts of input power (including the ballast), expressed in lumens per watt.
- **Energy:** Power derived from renewable or non-renewable resources to provide heating, cooling and light to a building or operate any building equipment and appliances. It has various forms such as thermal (heat), mechanical (work), electrical, and chemical that may be transformed from one into another. Customary unit of measurement is watts (W).
- **Energy Conservation Building Code (ECBC):** The Energy Conservation Building Code as updated from time to time by the Bureau and displayed on its website. (www.beeindia.gov.in).
- **Energy Efficiency Ratio (EER):** the ratio of net cooling capacity in watt to total rate of electric input in watts under design operating conditions.
- **Energy Performance Index (EPI):** of a building means its annual energy consumption in kilowatt-hours per square meter of the area of the building which shall be calculated in the existing or proposed building as per the formula annual energy consumption in kWh/total built-up area (excluding storage area and the parking in the basement) in m^2
- **EPI Ratio:** of a building means the ratio of the EPI of the Proposed Building to the EPI of the Standard Building.

- **Equipment:** Mechanical, electrical or static devices for operating a building, including but not limited to those required for providing cooling, heating, ventilation, lighting, service hot water, vertical circulation.
- **Equipment, existing:** Equipment previously installed in an existing building.
- **Illuminance:** At a point on a surface, the ratio of the luminous flux incident on an infinitesimal element of the surface containing the point under consideration to the area of the element.
- **Interior Lighting Power**: LPD x Gross Lighted Floor Area.
- **Kilowatt (kW):** The basic unit of electric power, equal to 1000 W.
- **Lighting system:** A group of luminaires circuited or controlled to perform a specific function.
- **Lighting power allowance:**

  (a) Interior lighting power allowance: the maximum lighting power in watts allowed for the interior of a building

  (b) Exterior lighting power allowance: the maximum lighting power in watts allowed for the exterior of a building

- **Lighting Power Density:** Maximum lighting power per unit area of a space as per its function or building as per its classification.
- **Lumen (lm) :** SI unit of luminous flux. The luminous flux emitted within unit solid angle (one steradian) by a point source having a uniform intensity of one candela.
- **Luminaires:** A complete lighting unit consisting of a lamp or lamps together with the housing designed to distribute the light, position and protect the lamps, and connect the lamps to the power supply.
- **Lux:** The unit of illuminance (the measurement of illumination) is lux which is 1 lumen per m^2.
- **National Building Code 2016 (NBC):** model building code that provides guidelines for design and construction of buildings. In this code, National Building Code 2016 refers to the latest version by the Bureau of Indian Standards.
- **Reflectance:** The ratio of the light reflected by a surface to the light incident upon it.
- **Space:** An enclosed area within a building. The classifications of spaces are as follows for purpose of determining building envelope requirements:

(a) Conditioned space: a cooled space, heated space, or directly conditioned space.

(b) Semi-heated space: an enclosed space within a building that is heated by a heating system whose output capacity is greater or equal to 10.7 W/m2 but is not a conditioned space.

(c) Non-conditioned space: an enclosed space within a building that is not conditioned space or a semi-heated space. Crawlspaces, attics, and parking garages with natural or mechanical ventilation are not considered enclosed spaces.

- **Specific Energy Consumption:** The Specific Energy Consumption (SEC) is defined as the energy consumption per unit of product output.
- **Unconditioned buildings:** Building in which more than 90% of spaces are unconditioned spaces.
- **Unconditioned space:** Mechanically or naturally ventilated space that is not cooled or heated by mechanical equipment.
- **Uniformity Ratio:** Minimum illuminance divided by average illuminance levels.
- **Ventilation:** The process of supplying or removing air by natural or mechanical means to or from any space. Such air is not required to have been conditioned.
- **Watt:** The unit of power.
- **Wall Window Ratio:** The ratio of vertical fenestration area to gross exterior wall area. Gross exterior wall area is measured horizontally from the exterior surface; it is measured vertically from the top of the floor to the bottom of the roof.
- **Wet Bulb Temperature:** The steady temperature finally given by a thermometer having its bulb covered with gauze or muslin moistened with distilled water and placed in an air stream of not less than 4.5 m/s.
- **Working Plane:** A horizontal plane at a level at which work will normally be done.

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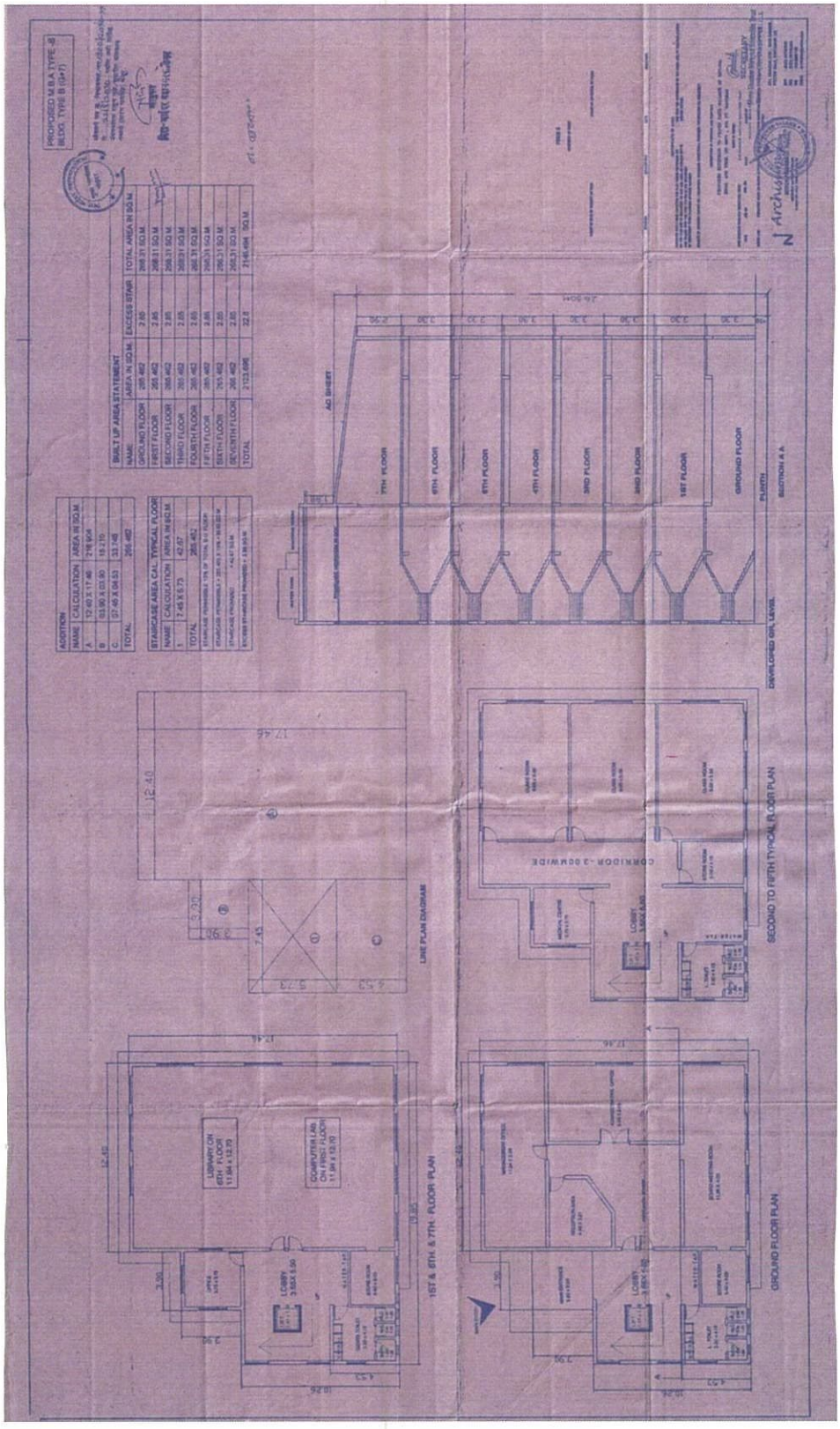
7. Annexure

A. Usage data collection template

				Information about the Indoor Lights				
Sr. No.	Name of the Space	Floor	Area (sq.m.)	Type of Light (LED/ Halogen/ Tubelight/ Twin tubelight/ Incandescent)	LED/ NON LED	Total no.	Approximate Wattage	Total no. of days used
1	Auditorium	7th Floor	160	LED Panel	LED	26	22	25
2	Library	6th Floor	151.64	Tubelight	NON LED	24	50	220
3	Research Lab	6th Floor	14.06	Tubelight	NON LED	2	50	150
4	Library Store Room	6th Floor	14.06	Tubelight	NON LED	2	50	15
5	Washroom	6th Floor	13.69	Tubelight	NON LED	1	50	220
6	Washroom	6th Floor	13.69	Bulb	LED	3	3	220
6	Passage - 6th Foor	6th Floor	32.84	Tubelight	NON LED	3	50	220
7	Passage - 5th Floor	5th Floor	57.11	Tubelight	NON LED	4	50	220
8	5A Classroom	5th Floor	79.73	Tubelight	NON LED	9	50	190
9	5B Classroom	5th Floor	79.73	Tubelight	NON LED	10	50	190
10	Counselling Room	5th Floor	14.06	Tubelight	NON LED	2	50	150
11	Admin Store Room	5th Floor	13.7	Tubelight	NON LED	1	50	15
12	Washroom	5th Floor	13.69	Tubelight	NON LED	1	50	220
13	Washroom	5th Floor	13.69	Bulb	LED	3	3	220
14	Passage - 4th Floor	4th Floor	57.11	Tubelight	NON LED	4	50	220
15	Girls Common Room	4th Floor	13.7	Tubelight	NON LED	1	50	220
16	WDC / ICC Cell	4th Floor	10.6	Tubelight	NON LED	1	50	150
17	Washroom - Girls Common Room	4th Floor	1.5	Bulb	LED	1	3	220
18	Faculty Room	4th Floor	53.15	Twin Tubelight	NON LED	6	50	220
19	Faculty Room	4th Floor	53.15	Tubelight	NON LED	1	50	220
20	Washroom	4th Floor	13.69	Tubelight	NON LED	1	50	220
21	Washroom	4th Floor	13.69	Bulb	LED	3	3	220
22	Room Adjacent to Faculty Room	4th Floor	53.15	Tubelight	NON LED	7	50	150
23	4A Classroom	4th Floor	53.15	Tubelight	NON LED	5	50	190
24	Placement Cell	4th Floor	14.06	Tubelight	NON LED	2	50	220
25	Passage - 3rd floor	3rd Floor	57.11	Tubelight	NON LED	5	50	220
26	Pantry Room	3rd Floor	10.6	Tubelight	NON LED	1	50	220
27	3A Classroom	3rd Floor	53.15	Tubelight	NON LED	6	50	190
28	3B Classroom	3rd Floor	53.15	Tubelight	NON LED	7	50	190
29	Conference Room	3rd Floor	53.15	LED Panel	LED	8	36	150
30	Examination Room	3rd Floor	14.06	Tubelight	NON LED	2	50	220
31	Washroom	3rd Floor	13.69	Tubelight	NON LED	1	50	220
32	Washroom	3rd Floor	13.69	Bulb	LED	4	3	220
33	Passage - 2nd floor	2nd Floor	57.11	Tubelight	NON LED	4	50	220

B.Sample Floor Layouts



C.Sample Electricity bill of RPIMS

adani Electricity — The power of service

BILL OF SUPPLY — RESIDENTIAL

Electric Smiles 560 Points Earned

QR code for Kiosk payment

SHREE SHANKAR NARAYAN EDUCATION TRUST
W/P M S A BUILDING; MAHAVIDYALAYA MARG NAVGHAR BHAIND AR EAST THANE 401105
Mobile: 93******28
Email :
PAN : GST :

BILL DATE	METER STATUS	CYCLE NUMBER	TYPE OF SUPPLY
14-07-2023	Active	21	THREE PHASE
TARIFF	**CONNECTION DATE**	**SANCTIONED LOAD (kW)**	**BILL NUMBER**
LT I (B)	Prior to Aug-2011	10.33	100938228037
BILL DISTRIBUTION NO.	**BILLING STATUS**	**PRESENT READING DATE**	**PREVIOUS READING DATE**
Mira Bhaindar/Bhaindar East/21/310/01A/01A/001	Regular	12-07-2023	12-06-2023

CA NO: 150594056

₹970.00

Due Date : 04-08-2023

The due date refers to only current bill amount, previous balance is payable immediately

Bill Month	Units Consumed	Current Month Bill	Previous Outstanding
June 2023	92	₹976.00	₹2.07

Bill Period: 13-06-2023 - 12-07-2023 Previous Units: 109

- Round sum payable by discount date : 21-07-2023 Amt ₹960.00 Discount ₹8.21
- Round sum payable after due date : 04-08-2023 Amt ₹990.00 DPC ₹12.20

Scan code to pay your bill via (Use any UPI app)

UPI BBPS NACH

Nearest Collection Centre (Cash/Cheque)
Adani electricity, MB Trade Center, Bhayandar East , Thane Mumbai-401105

SANGNATH SHANBHAG

CONSUMPTION TREND

Current year Previous year

MAJOR BILL COMPONENTS (Rounded off)(₹)

METER DETAILS

Meter Number	Present Reading	Previous Reading	Multiplying Factor	Consumption Units(kWh)
7803638	27806.00	27714.00	1	92

960
3620
1680
25210
11040
2240
2850
6530
830
620

Total Consumption 55.580

HELP CENTER

19122 Toll Free No. (24x7) www.adanielectricity.com

helpdesk.mumbaielectricity@adani.com

Adani electricity, MB Trade Center, Bhayander East , Thane Mumbai-401105

For power interruption complaint or restoration status
SMS POWER <9 digit account no.> to 7065313030 from mobile no.
Whatsapp POWER <9 digit account no> to 9594519122 from any mobile number

Give us missed call on 1800 532 9998 from your registered mobile no.

For Portal Related Complaint call us: 19122

For internal complaint redressal system(ICRS), visit our website: www.adanielectricity.com

Join us on:

IMPORTANT MESSAGE

- Please note that all important communication related to your account are being sent on 93******28 registered with us. In case of any change, do inform us immediately to avoid any inconvenience and enjoy our uninterrupted services
- Tentative meter reading date for your JUL-23 bill is 11/08/2023

This electricity bill neither reflects a title nor is to be used as a proof of any property or premises.

This bill is printed on recycled paper.

CONSOLIDATED STAMP DUTY PAID BY ORDER NO. LOA/CSD/473/2022/(Validity Period from Dt.01/10/2022 to Dt. 30/09/2024) /4205 DT. 27 SEP 2022

5000\J01\5053-310\01A\R4720 D71269\A71269\B245\S9\R4720

D.Sample Water bill

मिरा भाईंदर महानगरपालिका

मुख्य कार्यालय, छत्रपती शिवाजी महाराज मार्ग, भाईंदर (प.) ता. जि. ठाणे - ४०१ १०१

॥ पाण्याचे देयक ॥

Connection Number	Address	Previous Reading Details	
JNA5002626	ROHIDAS PATIL INSTITUTE OF MANAGEMENT STUDIES,MAHAVIDYALYA MARG, NAVGHAR NAKA	Bill Number	1185750
Consumer Type		Bill Amount	1876.00
Domectic Metered		Bill Date	27/05/2022
Connection Size		Meter Reading	1622000
1.0		Meter Reading Date	05/05/2022
Description		Billing cycle	Jan-Apr
Domectic Metered			
Ward Name			
J			

Zone Number	Rs Per 1000 Ltrs	Bill Number	Bill Date	Due Date
50	13.00	1213623	21/09/2022	12/10/2022

Meter Number 266758 Billing Period MAY-2022 To AUG-2022

Meter Status	Previous Reading Date	Previous Reading	Current Reading Date	Current Reading	Consumption	Rate Card	Bill Amount
Faulty	05/05/2022	1622000	06/09/2022	0	430000	13.00	5603.0

Old Connection Nbr J/50-092_

Rebate Amount	0.0	Water Charge	5590.0
		Cess Amount	13.0
		DPC	0.0
		Chq Dishonor Penalty	0.0
		Current Bill Amount	5603.0
		Balance Bill Amount	0.0
		Advance/Excess Amount	0.0
		Total	5603.0

Rupees in words : Rupees Five Thousand Six Hundred and Three Only

Arrears :

Prev Yr Arr	Prev Yr Cess Arr	Prev Yr DPC Arr	Prev Yr Cheq Pen Arr	Curr Yr Arr	Curr Yr Cess Arr	Curr Yr DPC Arr	Curr Yr Cheq Pen Arr
0.0	0.0	0.0	0.0	5590.0	13.0	0.0	0.0

Note :

Your meter is faulty please rectify as soon as possible

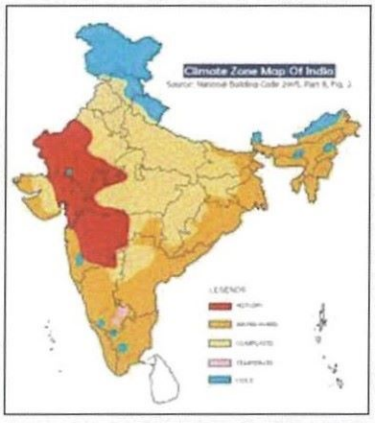
Sharad Nanegaonkar
Executive Engineer (W.S.)

"१०० टक्के मतदान ! हिच लोकशाहीची शान!"

" गर्दीच्या ठिकाणी जाणे टाळावे, साबण व पाण्याने हात धूवावेत
मास्कचा वापर करावा "

नियम पाळा, कोरोना टाळा

E. Energy benchmarks for Commercial Buildings



Based on the data collected from different categories of commercial buildings, the following tables show the indicative EPI benchmarks.

EPI benchmarks for Office Buildings

Climate Zone	Less than 50% AC	More than 50% AC
EPI (kWh/m²/yr)		
Warm & Humid	101	182
Composite	86	179
Hot & Dry	90	173
Moderate	94	179

EPI benchmarks for Shopping Malls

Climate Zone	EPI (kWh/m²/yr)
Warm & Humid	428
Composite	327
Hot & Dry	273
Moderate	257

EPI benchmarks for Hospitals

Climate Zone	EPI (kWh/m²/yr)
Warm & Humid	275
Composite	264
Hot & Dry	261
Moderate	247

EPI benchmarks for Hotels

Climate Zone	Upto 3 star	Above 3 star
EPI (kWh/m²/yr)		
Warm & Humid	215	333
Composite	201	290
Hot & Dry	167	250
Moderate	107	313

EPI benchmarks for Institutes

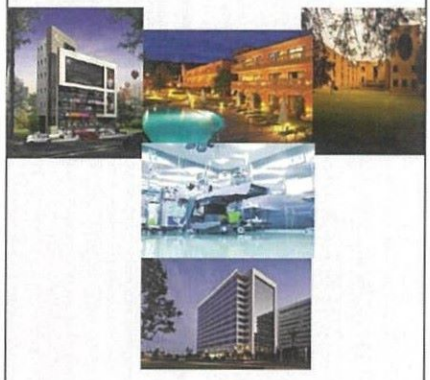
Climate Zone	EPI (kWh/m²/yr)
Warm & Humid	150
Composite	117
Hot & Dry	106
Moderate	129

EPI benchmarks for BPOs

Climate Zone	EPI (kWh/m²/yr)
Warm & Humid	452
Composite	437
Hot & Dry	-
Moderate	433

Disclaimer : The EPI benchmarks should be considered as an Indicative figure as it largely depends upon the operating hours, energy efficiency measures, sample size, climatic zone and lack of detailed information by building owners.

Energy benchmarks for Commercial Buildings



ENERGY IS LIFE
CONSERVE IT

Bureau of Energy Efficiency
4th Floor, Sewa Bhawan, R.K. Puram, New Delhi – 110066
Website : www.beenet.in

F. AMC for Solar PV Panels

Tax Invoice

PV Power Technologies Pvt Ltd Taraapur Textile Park Ltd., Plot No. 60 Village: Gundale, Post: Mahagoan Tal: Palghar, Dist: Palghar GSTIN/UIN: 27AAECP5113E1ZR State Name : Maharashtra, Code : 27	Invoice No.: PV/2223/0343 — Dated: 9-Jul-22 Delivery Note — Mode/Terms of Payment: As Agreed Reference No. & Date.: NA dt. 9-Jul-22 — Other References Buyer's Order No.: - — Dated: 9-Jul-22 Dispatch Doc No. — Delivery Note Date Dispatched through — Destination Terms of Delivery
Consignee (Ship to) **Ramniranjan Jhunjhunwala College** Station Road Opposite Ghatkopar Railway Station, Ghatkopar West, Mumbai, Maharashtra-400086 GSTIN/UIN : 27AAATH0417Q1ZI State Name : Maharashtra, Code : 27	
Buyer (Bill to) **Ramniranjan Jhunjhunwala College** Station Road Opposite Ghatkopar Railway Station, Ghatkopar West, Mumbai, Maharashtra-400086 GSTIN/UIN : 27AAATH0417Q1ZI State Name : Maharashtra, Code : 27	

Sl No.	No. & Kind of Pkgs.	Description of Services	HSN/SAC	Quantity	Rate	per	Amount
1		**Annual Maintanence Charges** *Operation & Maintenace of 20kW Rooftop Solar Power System* *for period 12months from 10/23-09/23*	998719	1.00 SET	15,000.00	SET	15,000.00
		Output CGST @ 9%			9	%	1,350.00
		Output SGST @ 9%			9	%	1,350.00
		Total		1.00 SET			17,700.00

Terms and Condition

1) Site Visit by Engineer once every 4 months for routine checkup
2) In case of any fault, we will try to resolve by providing online support first, if not solved then engineer will visit the site.
3) In case of any major fault engineer shall attend site in 2 working days in normal circumstances.
4) Checking of string voltages and panel voltages. Cleaning of inverter fans if required
5) Offline support will be provided form Monday to Friday (10 a.m to 7 p.m)
6) Follow up with OEM for repair/replacement of the faulty parts.
7) No. of Site Visits by the engineer is limited to 6 nos/day (3 Routine Visits + 3 on Call Visits). Any Visit beyond this will be charged at Rs. 3000 per Visit.

Amount Chargeable (in words) — E. & O.E

Indian Rupees Seventeen Thousand Seven Hundred Only

HSN/SAC	Taxable Value	Central Tax Rate	Central Tax Amount	State Tax Rate	State Tax Amount	Total Tax Amount
998719	15,000.00	9%	1,350.00	9%	1,350.00	2,700.00
Total	15,000.00		1,350.00		1,350.00	2,700.00

Tax Amount (in words) : **Indian Rupees Two Thousand Seven Hundred Only**

Declaration
1) Any Damaged must be intimated to PV Power Technologies Pvt Ltd. within 3 days of materials receipt beyond which no Claims be our liability.
2) All damaged Goods must be reported via e-mail to info@pvpowertech.com with serial No. & Photographs of every Modules and Pallets.
3) Goods supplied to order will not be accepted back.
4) Subject to Palghar Jurisdiction.
5) Interest @ of 24% per annum will be charged on Bills remaining unpaid one week after due date.

Company's Bank Details
Bank Name: Indusind Bank Ltd
A/c No.: 650002041466
Branch & IFS Code: Andheri East & INDB0000018

for PV Power Technologies Pvt Ltd

Authorised Signatory

This is a Computer Generated Invoice

R J COLLEGE, GHATKOPAR
331
27/07/2022

Certified as TRUE COPY

Principal
Ramniranjan Jhunjhunwala College,
Ghatkopar (W), Mumbai-400086.

G. Water Quality Test Report

BRIHANMUMBAI MAHANAGARPALIKA
PUBLIC HEALTH DEPARTMENT
MUNICIPAL ANALYST LABORATORY
Room No. 49, 2nd Floor, G/North Ward Office,
Harishchandra Yelve Marg, Dadar (W), Mumbai - 400 028.
Tel. No. : (022) 24301551, Email - municipalanalyst@gmail.com

F.No MAL/ARF/01/2023

Analysis Report

# Customer Name & Address	REPORT NO.	2023/01932
Hindi Vidya Prachar Samiti Ghatkopar (West) Mumbai -400 086	Sample Id.	MA/23/1932
	Date of Receipt	25.03.2023
	Quantity	1 Lit
# Sample Name :- Drinking Water	Discipline	Chemical Testing
# Sample Details :- --	Group	Water
# Other information :- --	Analysis Started on	27.03.2023
	Completed on	28.03.2023

SR NO.	TEST	RESULTS	ACCEPTABLE LIMITS	METHOD USED
1.	*Physical Appearance	Clear	Clear	By visual examination
2.	*Odour	Agreeable	Agreeable	IS 3025 Part 05:1983 Reaffirmed 2002
3.	*Turbidity	0.42 NTU	Not more than 1.0 NTU	IS 3025 Part 10:1984 Reaffirmed 2006
4.	*Dissolved Solids	50.4 mg/lit.	Not more than 500.00 mg/lit.	By TDS Electrode
5.	*pH	7.3	6.5 to 8.5	IS 3025 Part 11:1983 Reaffirmed 2006
6.	*Total Hardness (As $CaCO_3$)	44.0 mg/lit.	Not more than 200.0 mg/lit.	IS 3025 Part 21:1983 Reaffirmed 2009
7.	*Chloride (As Cl)	7.9 mg/lit.	Not more than 250.0 mg/lit.	IS 3025 Part 32:1988 Reaffirmed 2007
8.	*Total Alkalinity (As $CaCO_3$)	33.12 mg/lit.	Not more than 200.0 mg/lit.	IS 3025 Part 23:1986 Reaffirmed 2003
9.	*Nitrate (As NO_3)	Nil	Not more than 45.0 mg/lit.	By Nitrate electrode
10.	*Free Residual Chlorine	0.2 mg/lit.	Not less than 0.2 mg/lit.	By chlorinometer

OPINION: The sample of Drinking Water conforms to the standards prescribed in IS:10500 of 2012, hence chemically fit for drinking purpose for the parameters tested.

Date : 29 MAR 2023

AUTHORISED SIGNATORY
Shri. Samadhan S. Sanap
Assistant Analyst

Customer Copy / Office Copy Checked By/ Reviewed By: (Dy. Quality Manager)

Note : 1. Sample(s) not drawn by MAL, & the results apply to the sample(s) as received & tested at the laboratory for applicable parameters.
2. Total liability of MAL is limited to received sample quantity.
3. Analysis Report will not be reproduced partly or fully, without written approval from MAL.
4. It is distinctly understood that this report will not be used for advertisement purpose.
* indicates that the parameters are not accredited under NABL Scope.
# indicates Information supplied by the customer for which the laboratory has no control.

--End of Report--

H. Letter from Laxmi Paper Mart

LAXMI PAPER MART

Ranade Road, Dadar (West), Mumbai - 400028

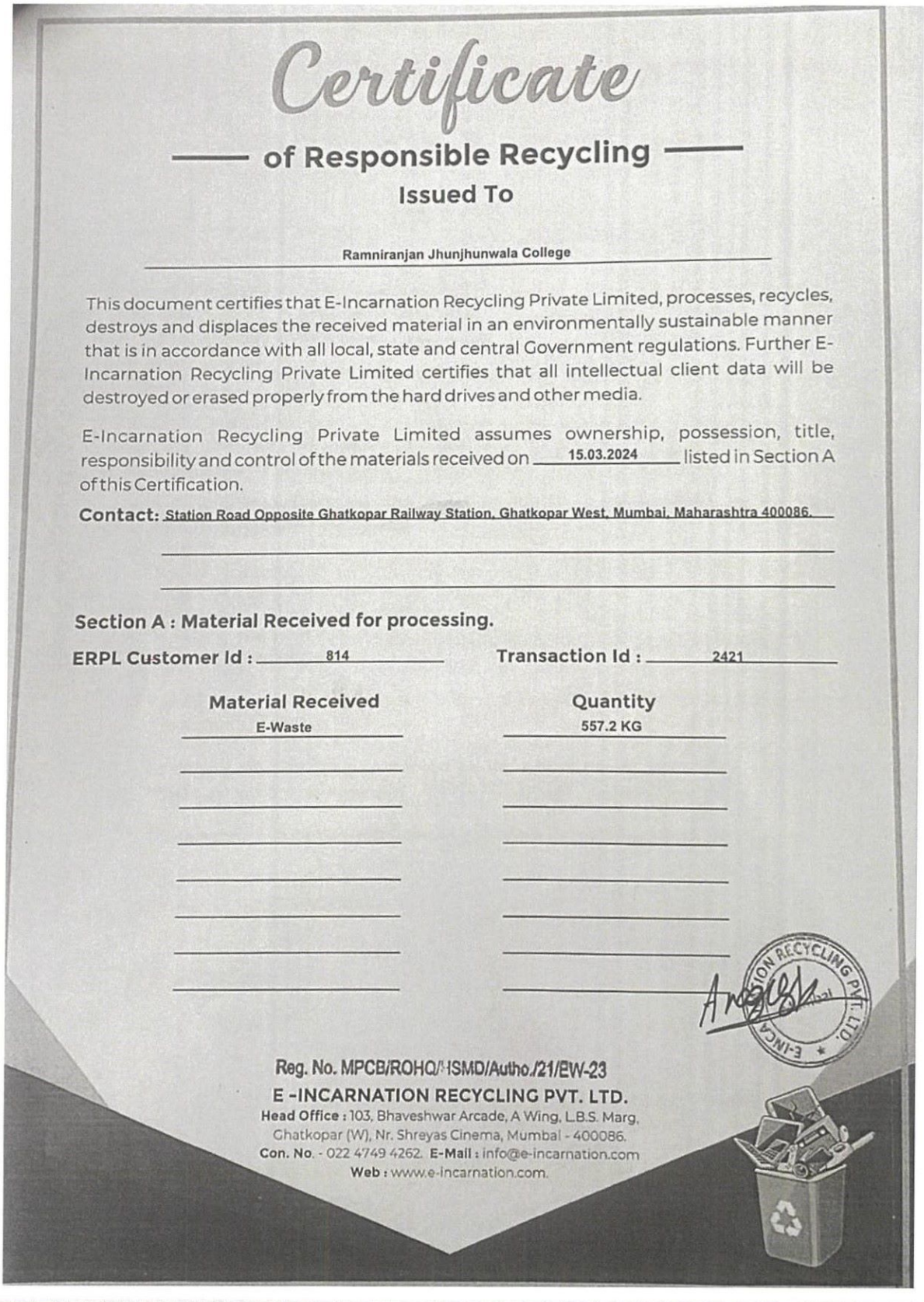
All kinds of Waste paper, Old Iron Scrap, old metals like Aluminium, Brass, Copper, Zinc etc. Buying/Selling Merchant. We also buy Wooden furniture items etc. at Resonable Rate. We also buy old Computers & other Electronic Items

TO WHOMSOEVER IT MAY CONCERN

This is to certify that we have collected 400 Kg of answer books from Hindi Vidya Prachar Samiti's Ramniranjan Jhunjhunwala College of Arts, Science and Commerce (Autonomous) on 15th March, 2024 , which will be directly sent into the mill for pulping/ recycle purpose only. The secrecy of all your items i.e. old scrap or written matter of old waste paper is also taken into consideration.

LAXMI PAPER MART
Ranade Road, Dadar (W), Mumbai - 28.

I. E-waste Collection Collabration



Certificate

of Responsible Recycling

Issued To

Ramniranjan Jhunjhunwala College

This document certifies that E-Incarnation Recycling Private Limited, processes, recycles, destroys and displaces the received material in an environmentally sustainable manner that is in accordance with all local, state and central Government regulations. Further E-Incarnation Recycling Private Limited certifies that all intellectual client data will be destroyed or erased properly from the hard drives and other media.

E-Incarnation Recycling Private Limited assumes ownership, possession, title, responsibility and control of the materials received on 15.03.2024 listed in Section A of this Certification.

Contact: Station Road Opposite Ghatkopar Railway Station, Ghatkopar West, Mumbai, Maharashtra 400086.

Section A : Material Received for processing.

ERPL Customer Id : 814 Transaction Id : 2421

Material Received	Quantity
E-Waste	557.2 KG

E-INCARNATION RECYCLING PVT. LTD.

Reg. No. MPCB/ROHQ/HSMD/Autho./21/EW-23

E -INCARNATION RECYCLING PVT. LTD.

Head Office : 103, Bhaveshwar Arcade, A Wing, L.B.S. Marg, Ghatkopar (W), Nr. Shreyas Cinema, Mumbai - 400086.

Con. No. - 022 4749 4262. E-Mail : info@e-incarnation.com

Web : www.e-incarnation.com.

J. Safai Bank of India Letter

R. J. COLLEGE of Arts, Science & Commerce (AUTONOMOUS)
(Hindi Vidya Prachar Samiti's RAMNIRANJAN JHUNJHUNWALA COLLEGE of Arts, Science & Commerce)
Opposite Ghatkopar Railway Station, Ghatkopar (West), Mumbai 400086, Maharashtra, INDIA.
Website: www.rjcollege.edu.in Email: rjcollege@rjcollege.edu.in Tel No: +91 22 25151763 Fax No: +91 22 25150957
College is recognized under Section 2(f) & 12(B) of the UGC Act, 1956
Affiliated to UNIVERSITY OF MUMBAI || NAAC Re-Accredited 'A' Grade (CGPA: 3.50)

Annual Report 2022-23
SAFAI BANK OF RJ COLLEGE (SAFAI WARRIORS)

The Safai Bank of R J College, as a part of Swacchta Ambassadors in association with Mumbai Sustainability Centre's (MSC) Safai Bank of India, formed since October 2018 has performed quite fairly good. Presently 18 Departments of our college are associated with this initiative. The college committee consists of Teachers from various Departments who have volunteered to be a part of this initiative and are involved in guiding and helping the students in the systematic collection and deposition of Plastic, especially Multi- laminated Plastic (MLPs). There are core student representatives appointed who constantly interact and keep records with the Class representatives. These class representatives are the ultimate important part of the ladder who are in direct contact with the student volunteers who collect and submit their MLPs.

From October 2018 to 26th April 2023, the Safai Bank unit of R J college has deposited a total of 2,74,841 MLPs with the central depository of Safai Bank of India and is placed within the top 05 National depositor institutions involved with Safai Bank of India.

For the Year 2022-2023, from 08th July 2022 to 26th April 2023, the Safai Bank unit of R J College has deposited with the central depository about 61,481 MLPs with depositions made on 2 occasions on 04th Jan. 2023 and 26th Apr. 2023.

Est. 1963 AUTONOMOUS NAAC Re-Accredited 'A' Grade

PRINCIPAL
RAMNIRANJAN JHUNJHUNWALA COLLEGE
OF ARTS, SCIENCE & COMMERCE (AUTONOMOUS)
Ghatkopar (W), Mumbai-400 086, Maharashtra, INDIA

K. List of trees

Sr. no		Common Name	Scientific Name	Family	Plant part used	Medicinal uses
1	Hair and brain	Mehendi	*Lawsonia inermis*	Lythraceae	Leaves	Natural hair dye, kills lice, conditions hair, promotes hair growth
2		Aloe vera	*Aloe vera*	Asphodelaceae	Leaves	Hair strengthener, cures itchy scalp, promotes hair growth
3		Awla	*Phyllanthus emblica*	Phyllanthaceae	Fresh fruit	Contains Vitamin E. Used in hair oils and shampoo for promoting hair growth
4		Onion	*Allium cepa*	Amaryllidaceae	Seeds, peel, leaves	Prevents hair loss and promotes hair growth
5		Coconut	*Cocos nucifera*	Arecaceae	flower, root, oil from fruit	Relieve dandruff, restore luster to dry and damaged hair, hair growth
6		Bhringraj	*Eclipta alba*	Asteraceae	Entire herb	Controls hair loss and premature greying, hair tonic
7		Brahmi	*Centella asiatica*	Apiaceae	Entire herb	Memory enhancer,improve cognitive function
8		Rosemary	*Salvia rosmarinus*	Lamiaceae	Essential oil	Anti-inflammatory, controls premature greying and dandruff
9		Hibiscus	*Hibiscus rosa-sinensis*	Malvaceae	Dried flower, bark, root	Controls hair loss and premature greying, hair tonic, reduces dandruff and hair damage
10		Ber	*Ziziphus mauritiana*	Rhamnaceae	Fruits	Controls hairfall and promotes hair growth
11		Swarnabhringraj	*Sphagneticola trilobata*	Asteraceae	Leaves	Promotes hair growth, hair dye, tonic
12	Teeth and gums	Khair	*Senegalia catechu*	Fabaceae	Bark	Stomatitis, coolant
13		Neem	*Azadirachta indica*	Meliaceae	Bark, leaves	Heals ulcer, antiseptic, anti-inflammatory, gum inflammation, bleeding gums
14		Clove	*Syzygium aromaticum*	Myrtaceae	Mature flower buds, essential oil	Toothache, antibacterial
15		Miswak	*Salvadora persica*	Salvadoraceae	Branches	Toothache, antibacterial, prevents tooth decay, strengthens gums
16		Dikemali	*Gardenia gummifera*	Rubiaceae	Resin exudation	Toothache (especially in children)
17	Nose & Throat	Adulsa	*Justicia adhatoda*	Acanthaceae	Leaves, root, flowers, bark	Covid, bronchodilator, expectorant, antispasmodic (especially when blood passes through lungs)
18		Turmeric	*Curcuma longa*	Zingiberaceae	Rhizome	Cough and cold, anti-inflammatory, antibacterial
19		Dam vel	*Tylophora indica*	Apocynaceae	Leaf	Anti-inflammatory, hay fever, bronchial asthma, bronchitis, congestion and cough
20		Gulvel	*Tinospora cordifolia*	Menispermaceae	Stem, roots	Covid, intermittent fever, Antibiotic
21		Mirvel	*Piper nigrum*	Piperaceae	Roots, fruits, leaves	Antiviral activity, cough and throat pain, nasal and bronchial problems
22		Ashwagandha	*Withania somnifera*	Solanaceae	Roots	Heals sore throat and improves immunity
23		Pimpali	*Piper longum*	Piperaceae	Fruits	Controls cough, releases mucus, clears congestion
24		Ginger	*Zingiber officinale*	Zingiberaceae	Fresh/ dried rhizome	Covid, Asthma disorder, removes cough congestion, improves lung capacity
25		Tulsi	*Ocimum sanctum*	Lamiaceae	Whole plant	Immunomodulatory, fever, cough & cold
26		Kapur tulas	*Ocimum tenuiflorum*	Lamiaceae	Whole plant	Immunomodulatory, fever, cough & cold
27		Tejpatta	*Cinnamomum tamala*	Lauraceae	Leaves	Chest disorders, cough
28	Pancreas & Diabetes	Insulin	*Costus igneus*	Costaceae	Leaves	Lowers blood glucose levels
29		Bitter leaf	*Vernonia amygdalina*	Asteraceae	Leaves	Lowers blood glucose levels
30		Jamun	*Syzygium cumini*	Myrtaceae	Seed	Diabetes, reduces frequency of urine
31		Methi	*Trigonella foenum-graecum*	Fabaceae	Seeds	Lowers blood glucose levels
32		Madhunashini	*Gymnema sylvestre*	Apocynaceae	Leaves	Reduces sugar cravings, lowers blood glucose levels
33		Karela	*Momordica charantia*	Cucurbitaceae	Seed, fruits	diabetes,pitta vardhak
34		Tamhan	*Lagerstroemia speciosa*	Lythraceae	Leaves	Lowers blood glucose levels, helps body to use insulin more efficiently
35		Sadafuli	*Catharanthus roseus*	Apocynaceae	Leaves	Lowers blood glucose levels
36		Stevia	*Stevia rebaudiana*	Asteraceae	Leaves	Alternative to sugar, lowers blood glucose levels
37	Aromatic plants	Galanga	*Alpinia galanga*	Zingiberaceae	Rhizome	Treating flatulence, dyspepsia, vomiting
38		Vetiver	*Chrysopogon zizanioides*	Poaceae	Roots	Stress reliever, used in aromatherapy for

L. List of Green Campus Activates

R. J. COLLEGE of Arts, Science & Commerce (AUTONOMOUS)
(Hindi Vidya Prachar Samiti's RAMNIRANJAN JHUNJHUNWALA COLLEGE of Arts, Science & Commerce)
Opposite Ghatkopar Railway Station, Ghatkopar (West), Mumbai 400086, Maharashtra, INDIA.
Website: www.rjcollege.edu.in Email: rjcollege@rjcollege.edu.in Tel No: +91 22 25151763 Fax No: +91 22 25150957
College is recognized under Section 2(f) & 12(B) of the UGC Act, 1956
Affiliated to UNIVERSITY OF MUMBAI II NAAC Re-Accredited 'A' Grade (CGPA: 3.50)

Restricted Entry of Automobile

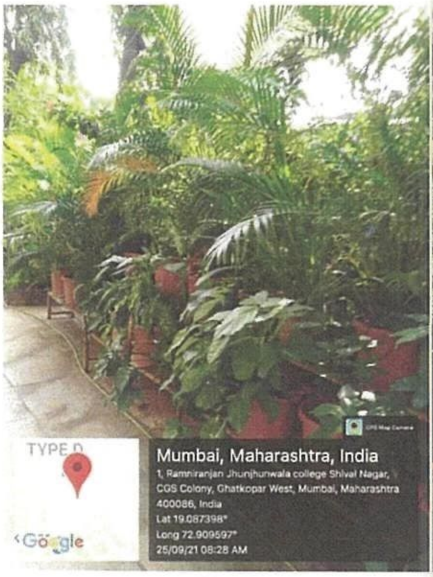
The College is situated opposite Ghatkopar railway station and it is next to metro station and bus stop. Teachers and students use this Public transport to College. In Mumbai traffic local train is fastest mode of transport. Parking space is limited in college premises entry of automobiles is restricted.

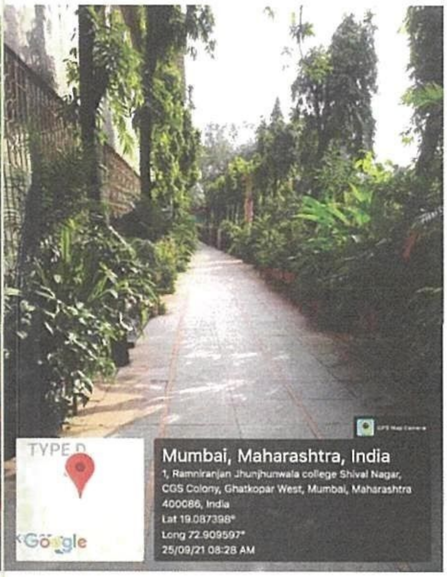
Principal
PRINCIPAL
RAMNIRANJAN JHUNJHUNWALA COLLEGE
OF ARTS, SCIENCE & COMMERCE (AUTONOMOUS)
Ghatkopar (W), Mumbai-400 086, Maharashtra, INDIA

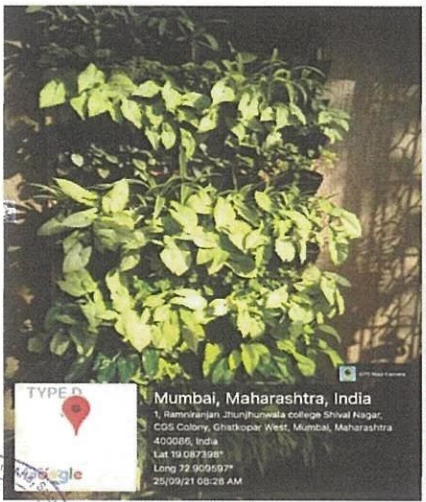
Use of Bicycle

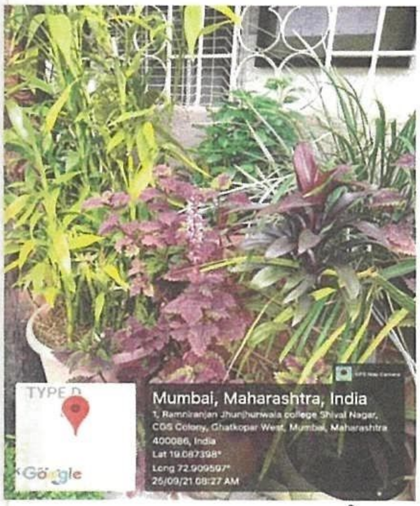
PRINCIPAL
RAMNIRANJAN JHUNJHUNWALA COLLEGE
OF ARTS, SCIENCE & COMMERCE (AUTONOMOUS)
Ghatkopar (W), Mumbai-400 086, Maharashtra, INDIA

Landscaping









PRINCIPAL
RAMNIRANJAN JHUNJHUNWALA COLLEGE
OF ARTS, SCIENCE & COMMERCE (AUTONOMOUS)
Ghatkopar (W), Mumbai-400 086, Maharashtra, INDIA

BAN ON USE OF PLASTIC

M. IAQ Test Report

ActiveBuildings ActiveBuildings

Indoor Air Quality Assessment: Brief Summary

Location: Computer Lab

Building Type :Commercial Building
Ventilation :Mechanical Ventilation
No. of Occupants :02
Monitoring Period :06/05/2024 11:51 AM to 06/05/2024 12:11 PM (20 Minutes)
Data Collection Rate :2 minutes
Total sensor data points : 60
Uptime :100%
Standard for assessment : ISHRAE Standard for Air Quality and Thermal Comfort

INDOOR AIR QUALITY: Key Observations

This brief summarizes 20 Minutes of data collected by the ActiveBuildings™ real-time indoor air quality and environment monitoring platform on 6th of May 2024. The sensor was kept on a Table top in the Computer Lab area, Located at Ramniranjan Jhunjhunwala College of Science, Arts and Commerce, Opposite Ghatkopar railway station, Ghatkopar, West Mumbai-400086, India.

The measured IEQ data was assessed against ISHRAE Standards on Air Quality, on a limited scope with no occupant survey. The sample collected was averaged and the results were benchmarked against the ISHRAE standards for the parameters measured. A tabulated form of the results in the format prescribed by the Standard is shown below. Under the remarks section, assumptions and potential solutions are highlighted which can be looked into. Detailed trends for the duration of the study are provided in the subsequent sections.

Parameter	Measured Values	Units	Classification	Remarks
Thermal Comfort				
TEMP	27.7	°C	Good	Ideal conditions are between 22°C - 26°C.
HUM	64.5	% Rh	Best	-
Indoor Air Quality				
TVOC	126	ppb	Best	-
CO2	519	ppm	Best	-
PM10	38	µg/m^3	Best	-
PM2.5	24	µg/m^3	Good	Ideal condition is less than 15 µg/m^3. Prolonged exposure may cause respiratory irritations.

Indoor Air Quality Assessment: Brief Summary

Location: Admin Room

Building Type :Commercial Building
Ventilation :Mechanical Ventilation
No. of Occupants :30
Monitoring Period :06/05/2024 12:15 PM to 06/05/2024 12:45 PM (30 Minutes)
Data Collection Rate :2 minutes
Total sensor data points : 90
Uptime :100%
Standard for assessment : ISHRAE Standard for Air Quality and Thermal Comfort

INDOOR AIR QUALITY: Key Observations

This brief summarizes 30 Minutes of data collected by the ActiveBuildings™ real-time indoor air quality and environment monitoring platform on 6th of May 2024. The sensor was kept on a Table top in the Admin Room area, Located at Ramniranjan Jhunjhunwala College of Science, Arts and Commerce, Opposite Ghatkopar railway station, Ghatkopar, West Mumbai-400086, India.

The measured IEQ data was assessed against ISHRAE Standards on Air Quality, on a limited scope with no occupant survey. The sample collected was averaged and the results were benchmarked against the ISHRAE standards for the parameters measured. A tabulated form of the results in the format prescribed by the Standard is shown below. Under the remarks section, assumptions and potential solutions are highlighted which can be looked into. Detailed trends for the duration of the study are provided in the subsequent sections.

Parameter	Measured Values	Units	Classification	Remarks
Thermal Comfort				
TEMP	29.3	°C	Good	Ideal conditions are between 22°C - 26°C.
HUM	64.7	% Rh	Best	-
Indoor Air Quality				
TVOC	127	ppb	Best	-
CO2	748	ppm	Good	Ideal conditions is less than 700 ppm. If remains unchecked, can cause lethargy, drowsiness and headaches.
PM10	58	µg/m^3	Good	Ideal condition is less than 50 µg/m^3. Prolonged exposure may cause respiratory irritations. Can have a long-term impact on immunity and lung health.
PM2.5	30	µg/m^3	Bad	Ideal condition is less than 15 µg/m^3. Prolonged exposure may cause respiratory irritations.

ActiveBuildings ActiveBuildings

Indoor Air Quality Assessment: Brief Summary

Location: Class Room

Building Type :Commercial Building
Ventilation :Mechanical Ventilation
No. of Occupants :06
Monitoring Period :06/05/2024 12:52 PM to 06/05/2024 13:11 PM (19 Minutes)
Data Collection Rate :2 minutes
Total sensor data points : 90
Uptime :100%
Standard for assessment : ISHRAE Standard for Air Quality and Thermal Comfort

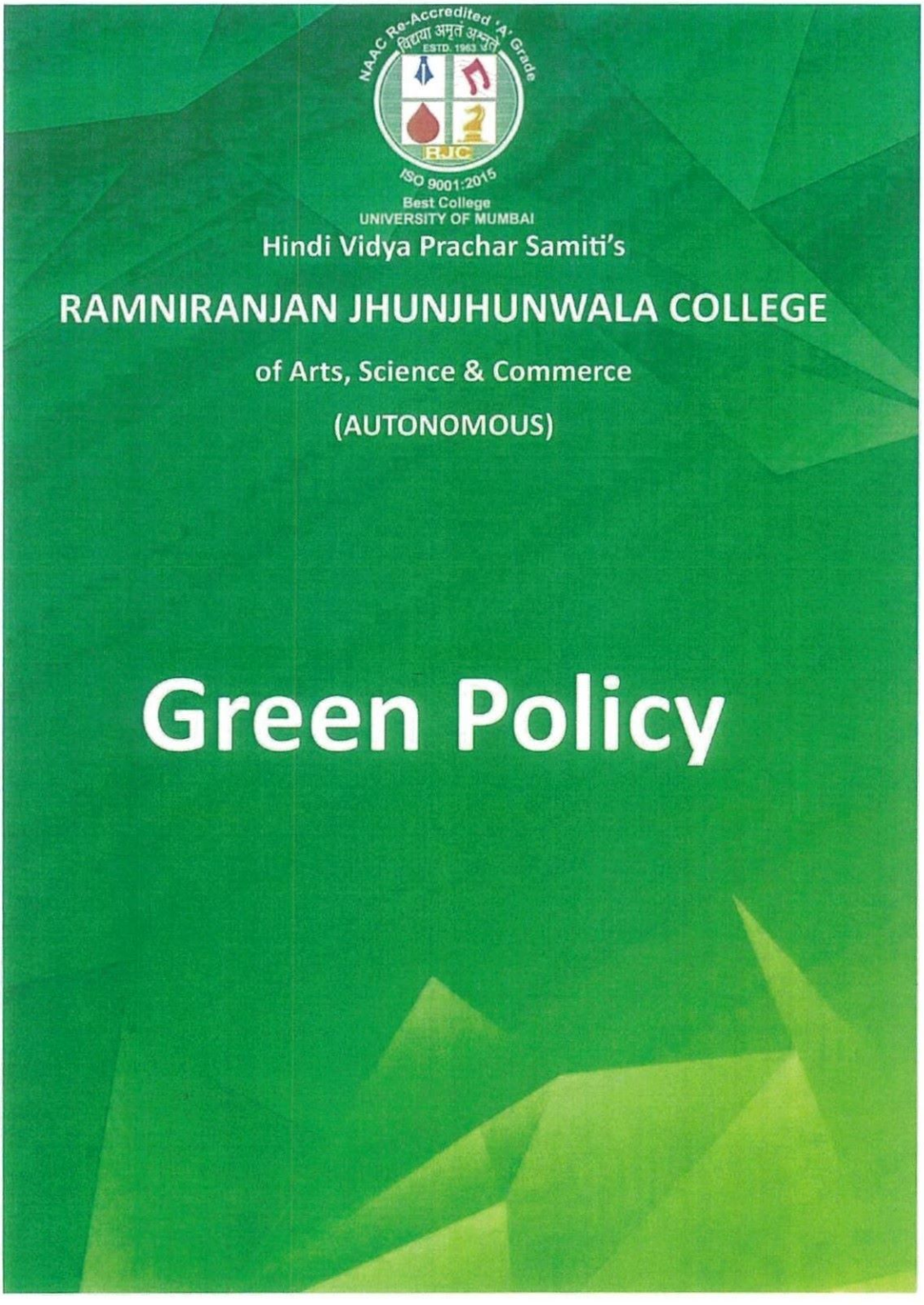
INDOOR AIR QUALITY: Key Observations

This brief summarizes 19 Minutes of data collected by the ActiveBuildings™ real-time indoor air quality and environment monitoring platform on 6th of May 2024. The sensor was kept on a Table top in the Class Room area, Located at Ramniranjan Jhunjhunwala College of Science, Arts and Commerce, Opposite Ghatkopar railway station, Ghatkopar, West Mumbai-400086, India.

The measured IEQ data was assessed against ISHRAE Standards on Air Quality, on a limited scope with no occupant survey. The sample collected was averaged and the results were benchmarked against the ISHRAE standards for the parameters measured. A tabulated form of the results in the format prescribed by the Standard is shown below. Under the remarks section, assumptions and potential solutions are highlighted which can be looked into. Detailed trends for the duration of the study are provided in the subsequent sections.

Parameter	Measured Values	Units	Classification	Remarks
Thermal Comfort				
TEMP	31.18	°C	Bad	Ideal conditions are between 22°C - 26°C.
HUM	67.5	% Rh	Good	Ideal condition is less than 65 %Rh. If not corrected may cause mold growth and musty smell.
Indoor Air Quality				
TVOC	126	ppb	Best	-
CO2	535	ppm	Best	-
PM10	59	µg/m^3	Good	Ideal condition is less than 50 µg/m^3. Prolonged exposure may cause respiratory irritations. Can have a long-term impact on immunity and lung health.
PM2.5	31	µg/m^3	Bad	Ideal condition is less than 15 µg/m^3. Prolonged exposure may cause respiratory irritations.

N.Green Policy

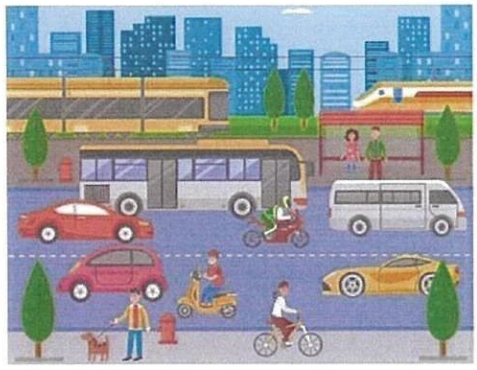


Green Policy

Ramniranjan Jhunjhunwala College (RJ College) is deeply committed to advancing environmental sustainability. As an academic institution, we understand our significant impact on the environment, and have therefore embraced a comprehensive green policy. This policy outlines our firm commitments and practices aimed at reducing our ecological footprint and promoting a sustainable future.

Campus Location and Transportation

Situated across from Ghatkopar Railway Station, a vital transit hub for millions of Mumbaikars, RJ College is uniquely positioned to influence eco-friendly commuting. The majority of our staff and students opt for the convenient, swift, and cost-effective local train service. Furthermore, the metro station's proximity allows for comfortable travel from the western suburbs. Our emphasis on green initiatives actively involves both staff and students.



Sustainable Practices

In recognizing the need for sustainability, we prioritize the reduction of wants, promoting reuse, and practicing recycling. This ethos extends to minimizing food waste and plastic use on campus. Measures include encouraging reusable lunch boxes and water bottles, along with a comprehensive ban on plastic materials.

Water Conservation

Water, essential for life, is a key focus at RJ College. Rainwater harvesting through a ring well, along with water-saving fixtures and sensor-based taps, underscores our commitment to conservation. Efforts to recycle wastewater further support this cause.

Energy Efficiency and Clean Energy Adoption

The installation of a 10KW solar panel system exemplifies our dedication to clean energy generation. Practices such as turning off fans and lights when not in use, optimizing air conditioning settings, and utilizing LED lighting contribute to our energy-saving efforts. These practices are complemented by regular energy audits.

Waste Segregation and Reduction Initiatives

RJ College actively promotes waste segregation and reduction of paper usage through digital communication channels, minimizing printing, and utilizing online evaluation methods. Initiatives like SAFAI bank for multilaminate plastics, e-waste collection, and composting further reinforce our commitment to waste reduction.

Green Policy

Landscaping and Biodiversity

Despite limited space, our campus boasts a diverse array of QR-coded trees and numerous plants that attract local wildlife. Innovative projects like green walls, vertical farming, and aquaponics demonstrate sustainable practices in action. Education in gardening, composting, and sustainability principles further empower our students.

Continuous Improvement and Auditing

RJ College conducts regular audits to assess its environmental performance, with a focus on areas of improvement. We remain dedicated to ongoing enhancement through the adoption of best practices and the incorporation of cutting-edge technologies.

Ramniranjan Jhunjhunwala College takes pride in upholding its green policy, aspiring to be a beacon of environmental stewardship within the academic community. Through these practices and a culture of sustainability, we aim to make a positive impact on the well-being of the environment and society at large.

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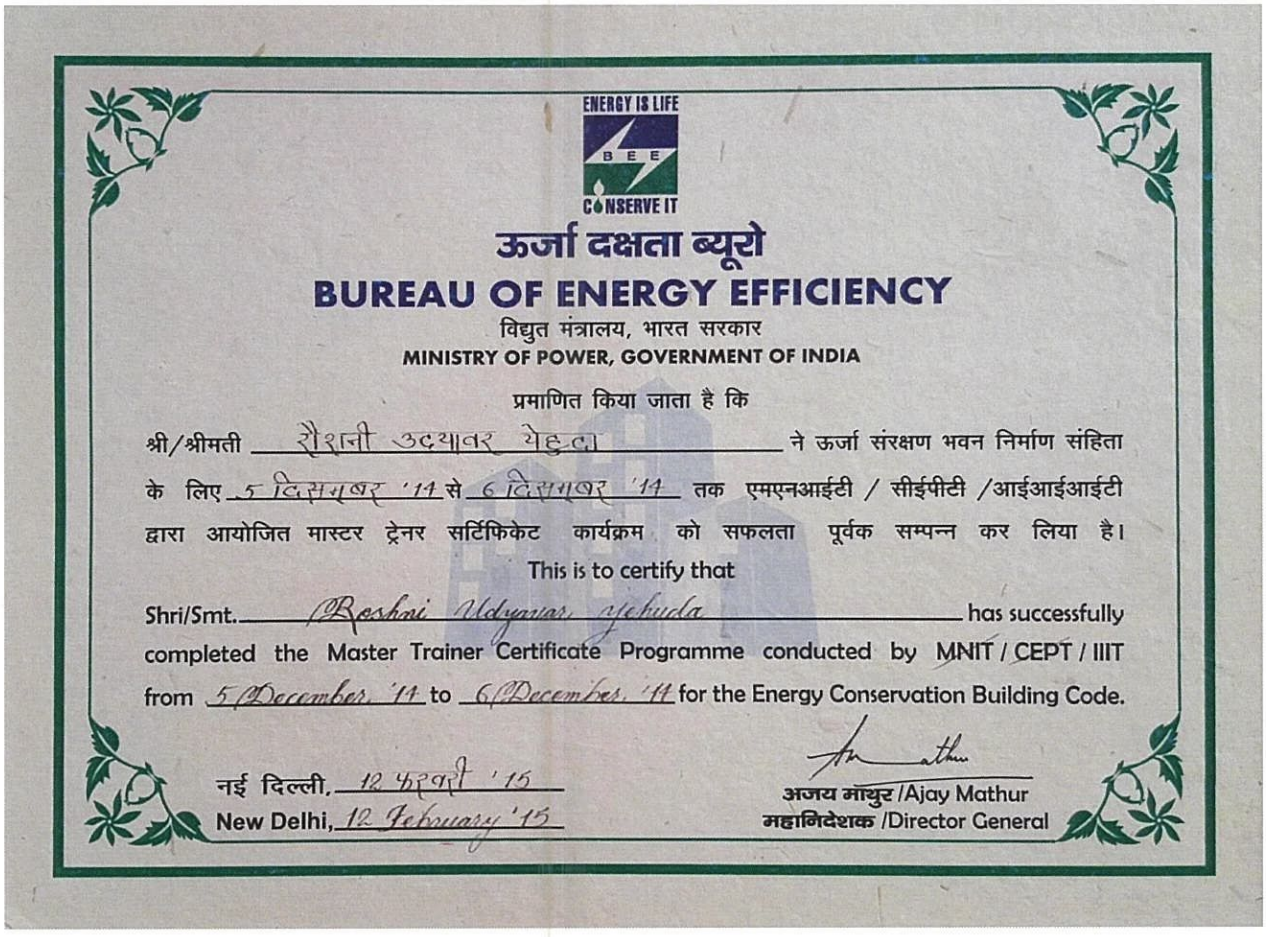
Ramniranjan Jhunjhunwala College of Arts, Science & Commerce (Autonomous)
Ghatkopar (W), Mumbai 400 086, INDIA
Est. 1963
AUTONOMOUS
NAAC Re-accredited 'A' Grade

O. BEE Master Trainer Certificate



ENERGY IS LIFE
BEE
CONSERVE IT

ऊर्जा दक्षता ब्यूरो

BUREAU OF ENERGY EFFICIENCY

विद्युत मंत्रालय, भारत सरकार

MINISTRY OF POWER, GOVERNMENT OF INDIA

प्रमाणित किया जाता है कि

श्री/श्रीमती रौशनी उदयावर येहुदा ने ऊर्जा संरक्षण भवन निर्माण संहिता के लिए 5 दिसम्बर '11 से 6 दिसम्बर '11 तक एमएनआईटी / सीईपीटी /आईआईआईटी द्वारा आयोजित मास्टर ट्रेनर सर्टिफिकेट कार्यक्रम को सफलता पूर्वक सम्पन्न कर लिया है।

This is to certify that

Shri/Smt. Roshni Udyavar Yehuda has successfully completed the Master Trainer Certificate Programme conducted by MNIT / CEPT / IIIT from 5 December '11 to 6 December '11 for the Energy Conservation Building Code.

नई दिल्ली, 12 फरवरी '15
New Delhi, 12 February '15

अजय माथुर /Ajay Mathur
महानिदेशक /Director General

P.BEE Empaneled Expert professional

ENERGY IS LIFE
CONSERVE IT

ऊर्जा दक्षता ब्यूरो
(भारत सरकार, विद्युत मंत्रालय)

SPEED POST

BUREAU OF ENERGY EFFICIENCY
(Government of India, Ministry of Power)

F.No.09/06/07/IMPL/ECBC/11745

28th March, 2016

Ms. Roshni Udyavar Yehuda
Rachana Sansad's Institute of Environmental Architecture
278, Shankar Ghanekar Marg, Prabhadevi
Mumbai – 400 025

Sub: Energy Conservation Building Code – Shortlisting of Architects/ Consultant reg.

Dear Madam,

This has reference to your application for shortlisting of Architects/Consultants for implementing the Energy Conservation Building Code (ECBC). We are pleased to inform you that you have been shortlisted to act as the resource person of the Bureau of Energy Efficiency (BEE) for helping in building technical capacity and develop compliance procedures and tools for the effective implementation of the ECBC. In addition, you would also be expected to advise design professionals in modifying the standard specifications so as to correspond with the Code requirements.

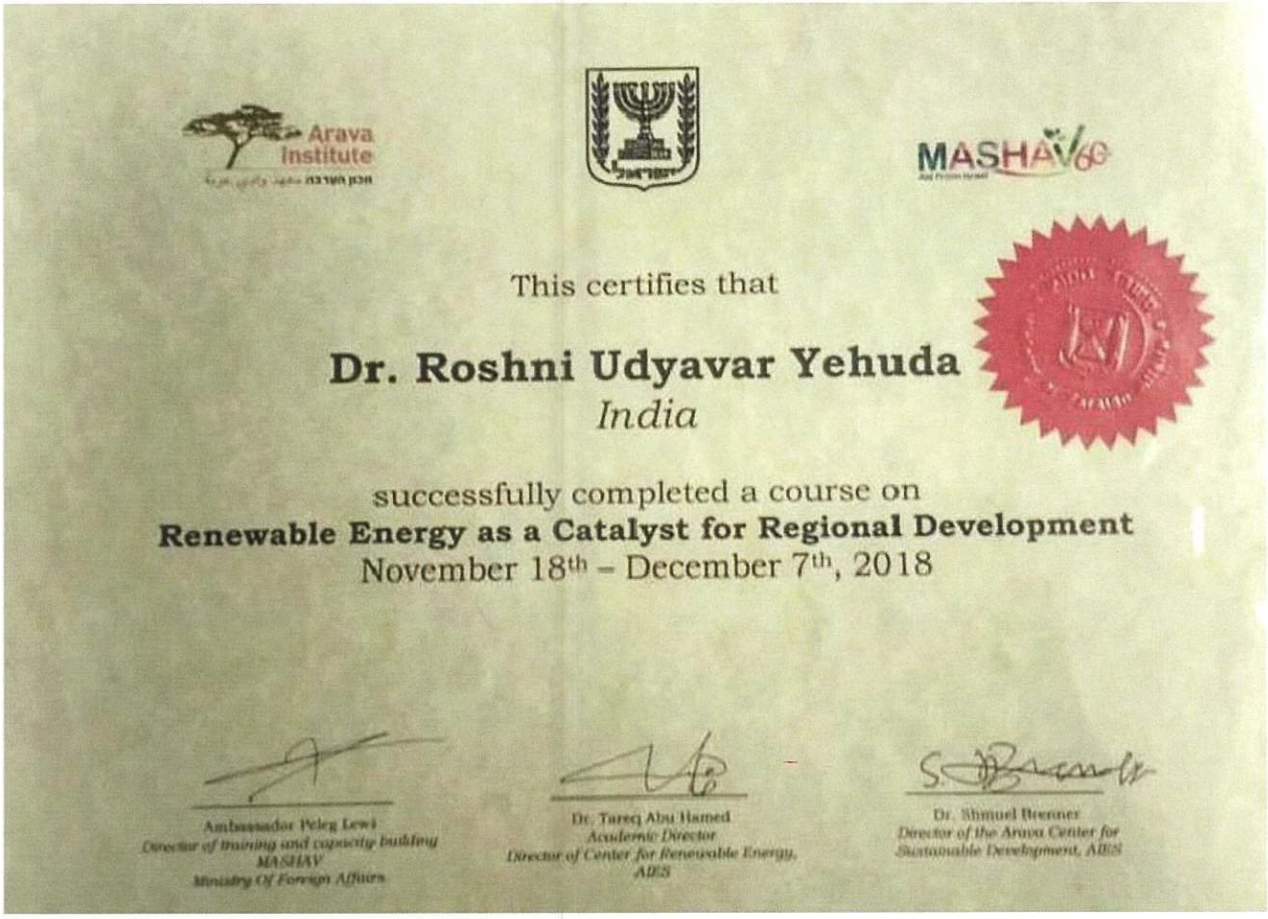
We would like you to send in your acceptance to being associated with the BEE in providing technical assistance to all those seeking to adopt Energy Conservation Building Code.

Yours faithfully,

(Sanjay Seth)
Energy Economist

स्वहित एवं राष्ट्रहित में ऊर्जा बचाएँ Save Energy for Benefit of Self and Nation
चौथा तल, सेवा भवन, आर० के० पुरम, नई दिल्ली-110 066 वेबसाईट/Website www.beeindia.in
4th Floor, Sewa Bhawan, R.K. Puram, New Delhi-110 066 टेली/Tel.: 26179699 (5 Lines) फैक्स/Fax 91 (11) 26178352

Q. Renewable Energy Mashav Course Certificate



Arava Institute

MASHAV

This certifies that

Dr. Roshni Udyavar Yehuda

India

successfully completed a course on

Renewable Energy as a Catalyst for Regional Development

November 18th – December 7th, 2018

Ambassador Peleg Lewi
Director of training and capacity building
MASHAV
Ministry Of Foreign Affairs

Dr. Tareq Abu Hamed
Academic Director
Director of Center for Renewable Energy,
AIES

Dr. Shmuel Brenner
Director of the Arava Center for
Sustainable Development, AIES

R.ISO 17020 Application Registration with NABCB