

## Certificate

This is to certify that Green Audit was carried out at Malad Kandivli Education Society's Nagindas Khandwala College of Commerce, Arts & Management Studies And Shantaben Nagindas Khandwala College of Science, Bhavishya Bharat Campus, Road No. 1, Govindji Shroff Marg, Malad West, Mumbai - 400064 during the month of April 2023.

The scope, coverage, findings and recommendations are submitted vide our report SCPL-PR-896-100423 dated April 10, 2023.

For **SENERGY CONSULTANTS PVT LTD**



**Tushar Kamble**  
**(Project coordinator)**

## Certificate

This is to certify that Energy Audit was carried out at Malad Kandivli Education Society's Nagindas Khandwala College of Commerce, Arts & Management Studies And Shantaben Nagindas Khandwala College of Science, Bhavishya Bharat Campus, Road No. 1, Govindji Shroff Marg, Malad West, Mumbai - 400064 during the month of April 2023.

The scope, coverage, findings and recommendations are submitted vide our report SCPL-PR-896-100423 dated April 10, 2023.

For **SENERGY CONSULTANTS PVT LTD**



**Tushar Kamble**  
(Project coordinator)

## Certificate

This is to certify that Environment Audit was carried out at Malad Kandivli Education Society's Nagindas Khandwala College of Commerce, Arts & Management Studies And Shantaben Nagindas Khandwala College of Science, Bhavishya Bharat Campus, Road No. 1, Govindji Shroff Marg, Malad West, Mumbai - 400064 during the month of April 2023.

The scope, coverage, findings and recommendations are submitted vide our report SCPL-PR-896-100423 dated April 10, 2023.

For **SENERGY CONSULTANTS PVT LTD**



**Tushar Kamble**  
(Project coordinator)

# Report

On

## GREEN, ENERGY & ENVIRONMENT AUDIT

For

Malad Kandivli Education Society's  
**NAGINDAS KHANDWALA COLLEGE**  
**OF COMMERCE, ARTS & MANAGEMENT STUDIES**  
**AND SHANTABEN NAGINDAS KHANDWALA COLLEGE OF SCIENCE**  
Malad West, Mumbai

Prepared

By

**Senergy Consultants Pvt Ltd**  
Mumbai

April – 2023

*Helping You to Conserve Energy*

Green, Energy & Environment Audit Report  
MKES's Nagindas Khandwala College

# Contents

<b>Sr. No</b>	<b>Description</b>	<b>Page</b>
I	Introduction	3
II	Executive Summary	4
III	Electrical Gadgets	6
IV	Environmental System	9
V	Water Management	11
VI	Waste Generation & Management	13
VII	Infrastructure & Safety	15
VIII	Green Culture	18
IX	Renewable Energy	19

*Helping You to Conserve Energy*

**Green, Energy & Environment Audit Report  
MKES's Nagindas Khandwala College**

# I Introduction

Green & Energy Audit was undertaken at MKES's Nagindas Khandwala College of Commerce, Arts & Management Studies And Shantaben Nagindas Khandwala College of Science, Bhavishya Bharat Campus, Road No. 1, Govindji Shroff Marg, Malad West, Mumbai - 400064, during the month of April 2023.

The organization is very keen to promote green culture wherever possible, as a commitment towards better environment and conservation of energy. A lot of efforts have already been put up to bring down the carbon footprint. To further optimize consumption and identify saving opportunities, M/s Senergy Consultants was assigned to carry out Green & Energy Audit of the premises.

This Audit Report presents the analysis of the data collected, observations made at the facility and is governed by the objectives, scope of work, methodology etc. discussed in the ensuing paragraphs.

## **Team:**

The team members of the audit study.

- Mr Ravindra Datar
- Mr Nitesh Kharche
- Mr Pranav Shinde

## **Acknowledgment:**

We wish to express our gratitude towards Dr. Moushumi Datta for having given us the opportunity for conducting the study and the support provided during the study.

We are also thankful to Prof. Ashish Modi for extending necessary help and co-operation from their side.

*Helping You to Conserve Energy*

**Green, Energy & Environment Audit Report  
MKES's Nagindas Khandwala College**

## **II**

# **Executive Summary**

The premises were evaluated against the various criterions laid down by the National Assessment and Accreditation Council (NAAC). The major observations are.

### **Air Quality & Ventilation:**

- The classrooms and other area are well ventilated to ensure proper air quality.
- The fans are appropriately installed to ensure proper air circulation.
- The outdoor and few indoor plants have also been provided to improve the environment.
- The air conditioned rooms are provided with proper ventilation and fresh air.

### **Lighting System:**

- The usage of natural light is optimized through well designed structure and windows.
- Almost all the light fitting are provided with high efficiency LED lamps.
- It is suggested to automate switching of lamps in the common areas and washrooms with sensor based control.

### **Green Campus Initiative:**

- The movement of vehicle inside the campus is restricted with vehicles of Staff and Special Dignitaries are allowed to enter the campus with designated parking area.
- There is a ban on plastic usage inside the campus.
- The campus is surrounded with a lot of greenery, trees, and proper landscaping.
- The college has internal committee for conservation of resources like energy, water.
- The student participation may be encouraged in such activities through student clubs and groups.

### **Environment & Energy Initiative:**

- Tree Plantation drive was undertaken by students and staff members.
- Green Consumerism and Green Entrepreneurship workshop are conducted to create awareness related to the environment.

### **Water Quality & Conservation:**

- The water is supplied by the Municipal Corporation, which is a common practice in Mumbai, Thane & Navi Mumbai.
- Water purifiers & coolers are provided at individual floors and convenient locations.
- Rainwater harvesting may be incorporated for ground water recharge.
- The distribution network and piping are more or less satisfactory and adequate.
- The toilets are provided with water efficient (low usage) fittings.

### **Waste Management:**

- The effluent water is discharged in the municipal drain, which is a common practice in and around Mumbai, Thane & Navi Mumbai.
- The organic waste may be segregated and converted into manure in the composting pits.
- There is no hazardous or medical waste generated in the college.
- The electronic gadgets / waste is either donated if useful or handed over to appropriate waste collectors.
- The general solid waste is disposed through municipal corporation.

*Helping You to Conserve Energy*

**Green, Energy & Environment Audit Report  
MKES's Nagindas Khandwala College**

**Air Conditioning System:**

- The Air Conditioners are operated as required with manual control. The operation is minimal consequently automation may not be economical.
- The room temperature is maintained at 24 to 25 °C, which is well within the recommended values.
- The Air Conditioners are serviced regularly and properly maintained.
- Most of the Air Conditioners units are energy efficient with 3 star rating.

**Infrastructure usage:**

- Ramps are provided on the ground floor to address the needs of differently abled persons.
- The special toilets may be made available to address the needs of differently abled persons.
- The on-campus movement is distributed with multiple entrances as well as staircases.
- The fire extinguishers are provided at key areas.
- The draining system for washrooms is efficient and effective.
- There were no seepages observed in the building premises.

**Green IT culture:**

- The Energy efficient computers and laptops have been procured.
- The electronic communication is encouraged to minimize usage of papers.
- Most of the papers are reused for doubled sided printing to further minimize usage of paper.

**Renewable Energy:**

- The possibility of installing Solar Photovoltaic System with NET metering may be assessed to meet part of the electricity consumption.
- The quantity of plate waste (organic waste with higher starch contents) is negligible, consequently, there is no potential for biogas generation.

*Helping You to Conserve Energy*

Green, Energy & Environment Audit Report  
MKES's Nagindas Khandwala College

## III Electrical Gadget

**Lamps:**

Sr. No.	Location	Quantity
		nos.
D - Aided Building		
1	Gr. Floor	11
2	1 <sup>st</sup> Floor	68
3	2 <sup>nd</sup> Floor	82
4	3 <sup>rd</sup> Floor	48
5	4 <sup>th</sup> Floor	17
6	5 <sup>th</sup> Floor	16
7	6 <sup>th</sup> Floor	16
8	7 <sup>th</sup> Floor	12
E - Self Finance Building		
1	4 <sup>th</sup> Floor	33
2	5 <sup>th</sup> Floor	37

**Observations and Recommendations:**

- The illumination level is generally as per the norms; the illumination level is higher mainly due to usage of day light.
- The use of daylight has been maximized through windows.
- The lamps are strategically located to optimize usage of day light.
- The practice of switching off the lamps in the unoccupied areas has been followed.
- The lamps operating for longer period have been replaced with energy efficient LED lamps. The other conventional tube lights may be replaced with energy efficient LED lamps; which can save 30 to 60% energy of individual lamp.

**Ceiling Fans:**

Sr. No.	Location	Quantity
		nos.
D - Aided Building		
1	Gr. Floor	5
2	1 <sup>st</sup> Floor	52
3	2 <sup>nd</sup> Floor	32
4	3 <sup>rd</sup> Floor	30
5	4 <sup>th</sup> Floor	16
6	5 <sup>th</sup> Floor	12

*Helping You to Conserve Energy*

Green, Energy & Environment Audit Report  
MKES's Nagindas Khandwala College

Sr. No.	Location	Quantity
		nos.
7	6 <sup>th</sup> Floor	12
8	7 <sup>th</sup> Floor	--
E - Self Finance Building		
1	4 <sup>th</sup> Floor	21
2	5 <sup>th</sup> Floor	22

**Observations:**

- The fans are switched off, when not in use.
- It is suggested to procure energy efficient fans with High Efficiency Fans with BLDS Motors / or fans with 5 star rating while making new purchases.

**Air Conditioners:**

Sr. No.	Location	Type	Quantity
			nos.
D - Aided Building			
1	Gr. Floor	Split	17
2	1 <sup>st</sup> Floor	Ductable	1
3	2 <sup>nd</sup> Floor	Ductable	1
4	3 <sup>rd</sup> Floor	Ductable	1
5	4 <sup>th</sup> Floor	Ductable	1
6	5 <sup>th</sup> Floor	Ductable	1
7	6 <sup>th</sup> Floor	Ductable	1
8	7 <sup>th</sup> Floor	Ductable	1
E - Self Finance Building			
1	4 <sup>th</sup> Floor	Ductable	1
2	5 <sup>th</sup> Floor	Ductable	1

**Observations:**

- The air conditioners are switched off, when not in use.
- The hall temperature was observed to be 24 to 25 °C; which are standard values.
- The overall condition of indoor as well as outdoor units is satisfactory.
- It is suggested to procure energy efficient machines of 5 star rating while making new purchases.

*Helping You to Conserve Energy*

Green, Energy & Environment Audit Report  
MKES's Nagindas Khandwala College

**Electricity Bill:**

<b>Consumer Name: Malad Kandivli Education Society</b>		<b>Consumer No. 102002567</b>				
Tariff Category: L T II A		<b>Service Provider -Adani Electricity</b>				
Meter No : 7954908						
Description	Unit	Nov-22	Dec-22	Jan-23	Feb-23	Average
Energy Consumption	KWH	689	440	450	323	476
Bill	Rs	7340	4910	5030	3750	5258
Cost	Rs/KWH	10.65	11.16	11.18	11.61	11.06

<b>Consumer Name: Malad Kandivli Education Society</b>		<b>Consumer No. 152374080</b>				
Tariff Category: HT II		<b>Service Provider -Adani Electricity</b>				
Meter No : H954323						
Description	Unit	Nov-22	Dec-22	Jan-23	Feb-23	Average
Energy Consumption	KWH	45360	43460	40080	40760	42415
Bill	Rs	587750	563710	503750	531440	546663
Cost	Rs/KWH	12.96	12.97	12.57	13.04	12.89

<b>Consumer Name: N K College OF Arts Commerce</b>		<b>Consumer No. 102002582</b>				
Tariff Category: L T II(A)		<b>Service Provider -Adani Electricity</b>				
Meter No : 7977321						
Description	Unit	Nov-22	Dec-22	Jan-23	Feb-23	Average
Energy Consumption	KWH	1763	1500	1657	1639	1640
Bill	Rs	17990	15560	17140	17000	16923
Cost	Rs/KWH	10.20	10.37	10.34	10.37	10.32

<b>Consumer Name: Malad Kandivli Education Society</b>		<b>Consumer No. 102002538</b>				
Tariff Category: L T I(B)		<b>Service Provider -Adani Electricity</b>				
Meter No : 7977322						
Description	Unit	Nov-22	Dec-22	Jan-23	Feb-23	Average
Energy Consumption	KWH	984	786	815	845	858
Bill	Rs	10740	8530	8850	9170	9323
Cost	Rs/KWH	10.91	10.85	10.86	10.85	10.87

<b>Consumer Name: N K College OF Arts Commerce</b>		<b>Consumer No. 102693892</b>				
Tariff Category: L T II ( C )		<b>Service Provider -Adani Electricity</b>				
Meter No : L1011024						
Description	Unit	Nov-22	Dec-22	Jan-23	Feb-23	Average
Energy Consumption	KWH	13452	14376	12751	15181	13940
Bill	Rs	171850	187470	163960	195300	179645
Cost	Rs/KWH	12.78	13.04	12.86	12.86	12.89

**Observations:**

- The average cost of the power is around Rs 11.6/- per kWh.

*Helping You to Conserve Energy*

Green, Energy & Environment Audit Report  
MKES's Nagindas Khandwala College

## IV Environmental System

### Ventilation & Air Quality:

- The air ventilation is adequate.
- Several indoor & outdoor plants have been installed to improve air quality.



*Helping You to Conserve Energy*

**Green, Energy & Environment Audit Report  
MKES's Nagindas Khandwala College**

- Many of the lamps are replaced with LED, especially those working for longer period.
- Natural light is been used for maximum illumination during daytime.
- It has been a general practice to switch off the fans & lights in an occupied area.



*Helping You to Conserve Energy*

## V Water Management

### Water Source:

The water supplied by the municipal corporation is used for drinking & other applications like washing of utensils and other requirements. The incoming water from the municipal corporation is metered.



### Rainwater Harvesting:



The rainwater is harvested in a pit & harvested rainwater is used for gardening, flushing & cleaning purposes.

*Helping You to Conserve Energy*

**Green, Energy & Environment Audit Report  
MKES's Nagindas Khandwala College**

**Water Coolers & Purifiers:**



Sr. No.	Location	Quantity nos.
D - Aided Building		
1	1 <sup>st</sup> Floor	1
2	2 <sup>nd</sup> Floor	1
3	4 <sup>th</sup> Floor	1
4	5 <sup>th</sup> Floor	1
E - Self Finance Building		
1	4 <sup>th</sup> Floor	1
2	5 <sup>th</sup> Floor	1

Water purifiers & coolers are provided at convenient locations.

*Helping You to Conserve Energy*

## VI Waste Generation & Management

### Sewage & Wastewater:

The sewage is fed into the municipal drainage. This is a common practice and the municipal corporation which charges cess towards the sewage charges.

### Solid Waste:

- The waste is segregated and disposed through municipal disposal system.
- The dustbins for Recyclable waste and Non-Recyclable Waste have been provided at appropriate locations.
- The organic waste may be converted in to manure by installing composting pit.
- The electronic gadgets with residual life may be donated while the electronic waste is properly segregated and handed over to appropriate scrap collector.



*Helping You to Conserve Energy*

**Green, Energy & Environment Audit Report  
MKES's Nagindas Khandwala College**



The organic as well as inorganic waste is segregated in the college premises. The organic waste is used to generate manure by composting.

The non-organic waste is collected in garbage bins and disposed of through Municipal system.

*Helping You to Conserve Energy*

## VII Infrastructure & Safety

### Movement on-campus (Distributed / non-distributed leading to crowds)

- The premises are provided with multiple staircases with necessary entrances to ensure quick and effective movement in normal as well as emergency conditions.
- The movement of vehicle inside the campus is restricted with vehicles of Staff and Special Dignitaries are allowed to enter the campus with designated parking area.



- There is complete ban plastic usage inside the campus.

*Helping You to Conserve Energy*

**Green, Energy & Environment Audit Report  
MKES's Nagindas Khandwala College**

- Ramp is available for differently abled student along with special toilet dedicated for them.



**Parking space:**



*Helping You to Conserve Energy*

**Green, Energy & Environment Audit Report  
MKES's Nagindas Khandwala College**

There is adequate parking space for vehicles/four wheelers. However, almost all the students and many of the faculty members avail public transport system which is very convenient due to proximity to railway station and bus services.

**Firefighting & fire escape system:**



There are efficient fire extinguishers in the premises; which are checked / refilled as per the stipulated frequency.

The premise is provided with multiple staircases with requisite entrances to ensure quick and effective movement in emergency conditions.

**Draining system:**

The drains from the washrooms are connected to the municipal drainage, which is a common practice in the colleges in and around Mumbai.

The municipal corporation charges cess for water disposal.

**Seepage in the building:**

The premise was visually inspected for seepages.

No seepages were observed in any of the places.

*Helping You to Conserve Energy*

Green, Energy & Environment Audit Report  
MKES's Nagindas Khandwala College

## VIII Green Culture

### Computers/Laptops:

1. The LED / LCD monitors & Laptops has been procured, which are energy efficient.
2. These monitors are not only energy efficient but also generate minimal heat and cut down on air conditioning load.



The following steps may be initiated to further enhance efficiency of the systems.

1. An efficient power management system may be incorporated to
  - a. Switch off the display if not in use.
  - b. Put the computer in Sleep mode / switching off the machines, if not used for prolonged period.
2. Optimize brightness of the screen.
3. Discourage use of screen savers, which has similar power consumption.

### Paper-less communication:

The major internal as well as external communication is through electronic medium.

### Re-using one sided paper for printing:

It was observed that two side printing / printing on the back side of used paper in more than 80% of the cases.

*Helping You to Conserve Energy*

Green, Energy & Environment Audit Report  
MKES's Nagindas Khandwala College

## IX Renewable Energy

### **Solar Photovoltaic:**

It is suggested to install rooftop solar panels with net metering for captive usage.

### **Solar Thermal:**

There is no application of solar thermal system and does not find attractive in this case.

### **Biogas Plant:**

There is no possibility of installing biogas plant for cooking as the quantity of plate waste is negligible.

*Helping You to Conserve Energy*