

PADMASHREE DR. D Y PATIL COLLEGE OF ARCHITECTURE

Sector No. 29, B/h. Akurdi Railway Station, Nigdi Pradhikaran, Akurdi, Pune - 411044

CRITERIA 7

Institutional Values and Best Practices

7.1 Institutional Values and Social Responsibilities

7.1.3



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Sector No. 29, B/h. Akurdi Railway Station, Nigdi Pradhikaran, Akurdi, Pune - 411044

Criterion 7 Institutional Values and Best Practices

Key Indicator 7.1.3

Quality Audits and environment and energy regularly undertaken by the institution
The Institutional environment and energy initiative are confirmed through the following
1. Green Audit / Environment Audit
2. Energy Audit
3.Clean and Green Campus Initiative 4. Beyond the Campus Environmental Promotion Activities

Sr. No	Contents (Documents)		
1	Supporting Documents	Date	Year
1	Green Audit Reports	23/11/22	(2021-22)
2	Energy Audit Reports	23/11/22	(2021-22)
3	Environment Audit Report	23/11/22	(2021-22)
1	Green Audit Reports	15/10/21	(2020-21)
2	Energy Audit Reports	15/10/21	(2020-21)
3	Environment Audit Report	15/10/21	(2020-21)
1	Green Audit Reports	28/09/20	(2019-20)
2	Energy Audit Reports	28/09/20	(2019-20)
3	Environment Audit Report	28/09/20	(2019-20)
1	Green Audit Reports	22/06/2019	(2018-19)
2	Energy Audit Reports	22/06/2019	(2018-19)
1	Green Audit Reports	15/06/2018	(2017-18)
2	Energy Audit Reports	15/06/2018	(2017-18)
Sr. No	Contents (Documents)		



PADMASHREE DR. D Y PATIL COLLEGE OF ARCHITECTURE

Sector No. 29, B/h. Akurdi Railway Station, Nigdi Pradhikaran, Akurdi, Pune - 411044

3	Supporting Documents	Date	Year
1	Clean and Green Campus Initiativ	e	
2	Tree Plantation	17/12/21	2021-2022
3	Tree Plantation	12/12/19	2019-2020
4	Tree Plantation	25/10/2018	2018-2019
5	Tree Plantation	25/10/2017	2017-2018
6	Tree Plantation	15/12/2017	2017-2018
7.	Certificates of Awards received fro Campus	m recognizea age	
7.		Date	Year
4	Campus Supporting Documents	Date	
4	Campus	Date	
4	Supporting Documents The Campus Environmental Promotion A	Date Activities	Year



PADMASHREE DR. D Y PATIL COLLEGE OF ARCHITECTURE

Sector No. 29, B/h. Akurdi Railway Station, Nigdi Pradhikaran, Akurdi, Pune - 411044

ACADEMIC YEAR (2021-22)



PADMASHREE DR. D Y PATIL COLLEGE OF ARCHITECTURE

Sector No. 29, B/h. Akurdi Railway Station, Nigdi Pradhikaran, Akurdi, Pune - 411044

Criterion 7 Institutional Values and Best Practices

Key Indicator 7.1.3

Metric No.	Quality Audits and environment and energy regularly undertaken by the institution
7.1.3	The Institutional environment and energy initiative are confirmed through the following
	1. Green Audit / Environment Audit 2. Energy Audit
	3.Clean and Green Campus Initiative
	4. Beyond the Campus Environmental Promotion Activities

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3	Environment Audit Report	23/11/22	(2021-22)	

Report

On

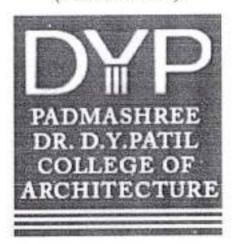
Green Audit

At

Padmashree Dr. D Y Patil College of Architecture

Akurdi,Pune

(Year 2021-22)



Prepared by

Nutan Urja Solutions

A 703, Balaji Witefield, Near Sunni's World,

Sus Road, Sus, Pune 411 021

Phone: 83568 18381. Email: nutanurja.solutions@gmail.com



Dr. D.Y. Park Pratishthan's

Padmashree Dr. D.Y. Palli College of Architecture.

Akurdi Pune

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Dr. D. Y. Patil College of Architecture Akurdi, Pune - 411114

Nutan Urja Solutions

(ISO 9001:2015, ISO 50001:2018, ISO 14001:2015)

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Sus Road, Sus, Pune 411 021

Phone: 83568 18381. Email: nutanurja.solutions/agmail.com

Date: 23/11/2022

CERTIFICATE

This is to certify that we have conducted Green Audit at Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune for the year 2021-22.

The College has already adopted Green practices like:

- Installation of Rain Water Harvesting system
- Installation of Sewage Treatment Plant.
- Installation of 350 kW Roof Top Solar PV Power Plant.
- Usage of Energy Efficient LED
- Usage of Energy Efficient BEE STAR Rated equipment

We appreciate the support of Management, involvement of faculty members and students in the process of making the campus Green.

Nutan Urja Solutions,

Hophalmdekar

K G Bhatwadekar,

Certified Energy Auditor,

EA - 22428

PRINCIPAL

Dr. D. Y. Patil College of Architecture Akurdi, Pune - 411044

Dr. D Y Patil Pratishthan's Padmashree Dr. D.Y.Path Corege of Architecture,

Akurdi Pune

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Padmashras Dr D + Fau College of Architecture, College of Architecture
Akurdi, Pune - 411044

Acknowledgement

We at Nutan Urja Solutions, Pune, express our sincere gratitude to the management of Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune for awarding us the assignment of Green Audit of their college premises.

We hope that the recommendations stated in this report will be useful and worthy of discussions to take things forward to help implementation of energy conservation measures and green practices. While we have made every attempt to adhere to high quality standards, in both data collection and analysis through the report, we would welcome your suggestions so as to improve upon this report further.

Dr. D.V.Pmil Protoivilhan's

Padmoshree Dr. D.Y. Patri College

College of Architecture Akurdi, Pune - 411044

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Executive Summary

Green Audit of Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune is conducted by Nutan Urja Solutions, Pune. Based On the audit field study, following important points can be presented.

1. Present Energy Consumption

Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune uses Electrical Energy as the source of Energy for various equipment in the college campus. In the following Table, we present the details of Energy Consumption.

Table no 1: Details of energy consumption

Srno	Parameter	Energy consumed, (Units)	CO2 Emission (MT)
1	Maximum	61,090	48.9
2	Minimum	5,778	4.6
3	Average	26,749	21.4
4	Total	320,982	256.8

2. Various Measures Adopted for Energy Conservation

- Usage of STAR Rated ACs at new installations
- 2. Usage of LED lights at some indoor locations
- 3. Usage of LED Lights for outdoor lighting.

3. Usage of Renewable Energy

The institute has installed 350 kW Solar PV Power Plant.

4. Rain Water Harvesting

The College has installed the Rainwater harvesting project, to reduce dependency on municipal corporation water supply.

5. Waste Management

The internal communication is through emails and there is hardly any generation of e-Waste in the premises.

6. Notes and Assumptions

1. Daily working hours-10 Nos

Dr. D.Y. Patik Pratishthan's

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Report on Green Audit: Padmashree DR. D Y Paril College Of Architecture Akardi, Punc

- 2. Annual working Days-250 Nos
- 3. Average Rate of Electrical Energy: Rs 11/- per kWh

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Dr. D. Y. Patil College of Architecture Akurdi, Pune - 411044 Report on Green Audit: Padmostree DR, D Y Paul College Of Architecture Akurdi, Punc

Abbreviations

CFL : Compact Fluorescent Lamp

FTL : Fluorescent Tube Light

LED : Light Emitting Diode

: Current

V : Voltage

kW : Kilo- Watt

kWh : kilo-Watt Hour

kVA : Active Power

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Padmashvee Dr. D.Y Palii College of Architecture,

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Dr. D. Y. Patil College of Architecture Aburdi, Pune - 411061

1. Introduction

Padmashree Dr. D. Y. Patil college of Architecture has been established in the year 2000. The college is run by Padmashree Dr. D. Y. Patil Pratishthan, which has set up multiple centers of educational excellence at Pune, Mumbai and Kolhapur. The Institute strongly believes that world-class education is the stepping-stone to progress. With a long-standing commitment towards quality teaching and learning, the Institute has nurtured values that go into the making of successful careers. Reiterating excellence with every incoming batch, the Institute stands tall with its undeterred commitment to deliver better. Equipped with state-of-the-art infrastructure, the Institute always encourages individuals to think, question, explore and apply their well-honed minds to scale newer heights of success. The Institute believes in imparting education that'll build world class citizens of tomorrow.

Padmashree Dr. D. Y. Patil college of Architecture fosters a positive environment for Teaching. Non-Teaching staff and Students to meet the emerging challenges which stimulates the desire to collaborate and change the world. Padmashree Dr. D. Y. Patil College of Architecture, a gem of an Institution has successfully completed a decade & is budding with young & energetic talent creating a mark in this grand galaxy of homes of higher learning. Here architecture means not merely a science & construction of building but it will be open vistas of ideas & ideals. It is indeed a center of fusion between creativity &utility. It has been bringing out the best talents in the field of housing, modern living & other aspects essential for better community life & will continue to do so in the future.

1.1 Objectives

- 1. To study present level of Energy Consumption
- 2. To Study the present CO: emissions
- 3. To assess the various equipment/facilities from Energy efficiency aspect
- 4. To measure various Electrical parameters
- To study Scope for usage of Renewable Energy
- 6. To study various measures to reduce the Energy Consumption

1.2 Audit methodology

- Study of connected load
- 2. Study of various Electrical parameters
- 3. To prepare the Report with various Encon measures with payback analysis

Padmashree Dr. D. F. and Longe of Architecture,

Akurdi Pune

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Dr. D. Y. Patil College of Architecture Akurdi, Pune - 411044

2. Study of Electrical Energy Consumption

In this chapter, electricity bills are studied for the analysis of electrical energy consumption. The Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune is situated in Padmashree D. Y. Patil Educational Complex. Entire Padmashree D. Y. Patil Educational Complex is having single energy meter for all institutes situated in complex. The bill analysis is carried for electricity bills of entire campus.

Table no 2.1: Summary of electricity bills

No	Month	Energy (kWh)	Bill Amount (Rs)
1	Jun-22	60,107	1,003,847
2	May-22	58,729	971,594
3	Apr-22	61,090	950,973
4	Mar-22	19,896	939,385
5	Feb-22	19,896	353,758
6	Jan-22	18,439	337,486
7	Dec-21	31,210	491,033
8	Nov-21	19,909	368,776
9	Oct-21	8,754	491,033
10	Sep-21	11,203	368,776
11	Aug-21	5,778	203,048
12	Jul-21	5,971	184,510
	Total	320,982	6,664,219

Variation in energy consumption is as follows,

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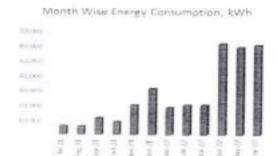


Figure 2.1: Month wise energy consumption

Monthly variation in electricity bill is as follows,



Figure 2.2: Month wise electricity bill

Key observations of electricity bill are as follows,

Table no 2.2: Key observations

Sr no	Parameter	Energy consumed, (Units)	CO2 Emission (MT)
1	Maximum	61,090	48.9
2	Minimum	5,778	4.6
3	Average	26,749	21.4
4	Total	320,982	256.8

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3. Carbon Foot printing

1. A Carbon Foot print is defined as the Total Greenhouse Gas emissions (CO₂ emissions), emitted due to various activities. In this we compute the emissions of Carbon-Di-Oxide, by usage of the various form of Electrical Energy used by the College for performing its day to day activities

2. Basis for computation of CO2 Emissions:

The basis of Calculation for CO2 emissions due to Electrical Energy is as under

Unit (kWh) of Electrical Energy releases 0.8 Kg of CO2 into atmosphere.

Based on the above Data we compute the CO₂ emissions which are being released in to the atmosphere by the College due to its Day to Day operations.

The Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune is situated in Padmashree D. Y. Patil Educational Complex. Entire Educational Complex is having single energy meter for all institutes situated in complex. Calculation for CO₂ emissions due to Electrical Energy is carried for entire campus.

We herewith furnish the details of various forms of Energy consumption as under

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Table 3.1: Month wise Consumption of Electrical Energy & CO2 Emissions

No	Month	Energy Consumed, kWh	CO2 Emissions, MT
1	Jun-22	60,107	48.1
2	May-22	58,729	47.0
3	Apr-22	61,090	48.9
4	Mar-22	19,896	15.9
- 35	Feb-22	19,896	15.9
6	Jan-22	18,439	14.8
7	Dec-21	31,210	25.0
8	Nov-21	19,909	15.9
9	Oct-21	8,754	7.0
10	Sep-21	11,203	9.0
11	Aug-21	5,778	4.6
12	Jul-21	5,971	4.8
	Total	320,982	256.8

In the following Chart we present the CO2 emissions due to usage of Electrical Energy.

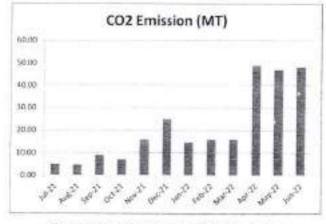


Figure 3.1: Month wise CO2 Emission

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4. Study of Usage of Alternate Energy

In this Chapter, we compute the percentage of Usage of Alternate/Renewable Energy to Annual Energy Requirement of the College.

The Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune is situated in Padmashree D. Y. Patil Educational Complex. Entire Educational Complex is having single energy meter for all institutes situated in complex. The institute have installed Roof Top Solar PV System to cater energy requirement of all institutes of entire campus. The Installed Capacity of Solar PV Plant is 350 kWp.

Table 4.1: Computation of % Usage of Alternate Energy to Annual Energy Requirement

No	Particulars	Value	Unit
1	Annual Energy Purchased from MSEDCL	320,982	kWh/Annum
2	Energy Generated by Roof Top Solar PV System	400,572	kWh/Annum
3	Total Energy Requirement of College	721,554	kWh/Annum
4	% of Usage of Alternate Energy to Annual Energy Requirement	56	%

Photograph of Solar PV plant



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5. Study of Water System

5.1 Source of Water

College gets water from Pimpiri- Chinchwad Municipal Corporation. The RO treated water is provided for drinking.

5.2 Rain Water Harvesting

The College has already installed Rain Water Harvesting project, wherein the rain water falling on the terrace is collected and through pipes it is fed to underground Water Storage tank. This stored water is then reused for domestic purpose.

5.3 Sewage Treatment Plant

The waste water generated in college campus is treated in Sewage Water Treatment Plant. This plant aims to remove contaminants from sewage to produce an effluent that is suitable for reuse application. The sewage water treatment plant is operating with 100 KLD water capacity.

Photograph of Sewage Treatment Plant



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6. Study of Waste Management

6.1 Solid Waste Management

The garbage collected in college is segregated into wet and dry centrally in campus. Waste bins are placed in college campus for collection of waste.

6.2 e-Waste Management

The internal communication is through emails and hence there is hardly any generation of e-Waste in the premises.

6.3 Waste Water Management

The waste water generated in college campus is treated in Sewage Water Treatment.

Plant. The sewage water treatment plant is operating with 100 KLD water capacity.

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7. Study of Green Practices

7.1 No of students who don't use own Vehicle for coming to Institute

Student hostels are located near college campus only. Many students live in hostel campus. Many of the Out of total students coming to Institute, about 60% students use own Automobile. During the lockdown of Covid 19 negligible vehicles are reported on the campus during the year 2019-20 and 2020-21. Online teaching mode used for the teaching learning processes.

7.2 Usage of Public Transport

Padmashree D. Y. Patil Educational Complex campus can be conveniently reachable by public transport. Most of the staff is using own vehicles i.e cars and two wheelers. The capacity of parking is enough to accommodate all vehicles. During the Students transport study, it was revealed that the local students who are residing near areas make use of Public Transport like Municipal Transport local buses, local sharing type auto rickshaws. Institute encourages students to not to use automobiles.

7.3 Pedestrian Friendly Roads

The Institute has well defined pedestrian foot paths as to facilitate the easy movement of the students within the campus.

Photograph of Road within campus



7.4 Plastic Free Campus

The Institute is an active participant in the Government of India's most prestigious project of SWATCHH BHART ABHIYAN. The Institute has displayed boards in the Campus, to make the campus plastic free. Various measures adopted for this purpose are as follows

Installation of Separate waste bins for Dry waste & wet waste

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- Usage of paper tea cups in the Institute canteen
- > Display of boards in the campus for Plastic Free campus

7.5 Paperless Office

The internal communication of the Institute is through the Internet. There are hardly any day to day operations, where printing is required.

7.6 Food Service in college campus

There are canteens and cafeterias within college campus. Students need not to travel outside the college for food. Canteen contractor have Food license and shop act certificate. Hygiene in canteen is well maintained.

7.7 Green Landscaping with Trees and Plants

The Institute has beautiful maintained Garden.



Figure 7.1: Beautiful maintained Garden of college

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Dr. D. V. Patil Collège of Architecture Akurdi, Pune - 411044 Report

On

Energy Audit

At

Padmashree Dr. D Y Patil College of Architecture

Akurdi, Pune

(Year 2021-22)



Prepared by

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Phone: 83568 18381. Email: nutanurja.solutions@gmail.com

Date: 23/11/2022

CERTIFICATE

This is to certify that we have conducted Energy Audit at Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune as per the guidelines of Maharashtra Energy Development Agency (www.mahaurja.com) in the year 2021-22.

The College has already adopted Energy Efficient practices like:

- Usage of Energy Efficient LED Fittings
- Usage of Energy Efficient BEE STAR Rated equipment
- Installation of 350 kW Roof Top Solar PV Power Plant.

We appreciate the support of Management, involvement of faculty members and students in the process of Energy Conservation & making the campus Green.

Nutan Urja Solutions,

K G Bhatwadekar.

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Certified Energy Auditor,

EA - 22428

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> PRINCIPA College of Architecture Akurdi, Pune - 4110an

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Acknowledgement

We at Nutan Urja Solutions, Pune, express our sincere gratitude to the management of Padmashree DR, D Y Patil College Of Architecture Akurdi, Pune for awarding us the assignment of Energy Audit of their college premises.

We hope that the recommendations stated in this report will be useful and worthy of discussions to take things forward to help implementation of energy conservation measures through energy savings. While we have made every attempt to adhere to high quality standards, in both data collection and analysis through the report, we would welcome your suggestions so as to improve upon this report further.

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Executive Summary

After the Field measurements & analysis, we present herewith important observations made and various measures to reduce the Energy Consumption & mitigate the CO₂ emissions. College consumes Energy in the form of Electrical Energy used for various gadgets, Office & other facilities.

1. Present Energy Consumption

In the following Table, we present the details of Energy Consumption.

Table no 2.1: Details of energy consumption

Sr no	Parameter	Energy consumed, (Units)	CO2 Emission (MT)
1	Maximum	61,090	48.87
2	Minimum	5,778	4.62
3	Average	26,749	21.40
4	Total	320,982	256.79

2. Energy Conservation Projects already installed

- Usage of STAR Rated ACs at new installations
- 2. Usage of LED lights at some indoor locations
- 3. Usage of LED Lights for outdoor lighting.

3. Key Observations

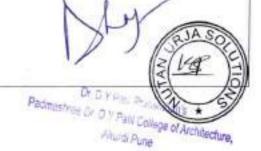
- 1. Usage of LED lights.
- 2. Usage of star rated equipment.
- Maintained a good power factor.

4. Percentage of Usage of Alternate Energy

The College has installed a Roof Top Solar PV Plant. The percentage of usage of Alternate Energy to Annual Energy Requirement is 56 %.

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5. Percentage of Usage of LED Lighting

The College has various Types of Light fittings. The percentage of Annual LED Lighting Usage to Annual Lighting requirement works out to be 33 %.

6. Recommendations

Table no 1: Recommendations for energy savings

No	Recommendation	Annual Saving potential, kWh/Annum	Annual Monetary Gain, Rs.	Investment Required, Rs.	Payback period, Months
1	Replacement of 122 Nos T-8 fittings with 20W LED fittings	2,440	26,840	78,202	35
2	Replacement of 96 Nos Old Ceiling Fans with STAR rating fans	1,248	13,728	208,704	182
3	Installation of 200kW grid connected PV panel	300,000	3,300,000	10,000,000	36
	Total	3,688	40,568	286,906	85

7 Notes & Assumptions

- 1. Daily working hours-10 Nos
- 2. Annual working Days-300 Nos
- 3. Average Rate of Electrical Energy: Rs 11/- per kWh

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Abbreviations

CFL : Compact Fluorescent Lamp

Kilo- Watt

FTL : Fluorescent Tube Light

LED : Light Emitting Diode

V : Voltage

Current :

kW

kWh : kilo-Watt Hour

kVA : Active Power

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1. Introduction

Padmashree Dr. D. Y. Patil college of Architecture has been established in the year 2000. The college is run by Padmashree Dr. D. Y. Patil Pratishthan, which has set up multiple centers of educational excellence at Pune, Mumbai and Kolhapur. The Institute strongly believes that world-class education is the stepping-stone to progress. With a long-standing commitment towards quality teaching and learning, the Institute has nurtured values that go into the making of successful careers. Reiterating excellence with every incoming batch, the Institute stands tall with its undeterred commitment to deliver better. Equipped with state-of-the-art infrastructure, the Institute always encourages individuals to think, question, explore and apply their well-honed minds to scale newer heights of success. The Institute believes in imparting education that'll build world class citizens of tomorrow.

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1.1 Objectives

- 1. To study present level of Energy Consumption
- 2. To Study Electrical Consumption
- 3. To assess the various equipment/facilities from Energy efficiency aspect
- 4. To study various measures to reduce the Energy Consumption

1.2 Audit Methodology:

- Study of connected load
- 2. Study of various Electrical parameters
- 3. To prepare the Report with various Encon measures with payback analysis

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1.3 General Details of College

Table No-1.1: Details of college

No	Head	Particulars
1	Name of Institution	Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune
2	Address	Padmashree D. Y. Patil Educational Complex, Sector 29, Nigdi, Akurdi, Maharashtra 411044
3	Affiliation	Savitribai Phule Pune University



2. Study of connected load

In this chapter, we present details of various connected electrical equipment and electrical load,

Table No-2.1: Location wise study of Electrical fittings in various buildings

No	Location	FTL (40W)	tube (20W)	LED bulb (12W)	Computers (65W)	Ceiling Fans	Wall	L5 Tr Star rated AC
	Ground Floor							
1	Cafeteria		4			8		
2	Studio	17				12		
3	Kitchen		6					
4	Passage		14					
5	Vice Principal			10	1	1		
6	Admin Office			15	5			
7	Principal Office		2	12	1	2		1
8	First Year Studio	18		4		12		
9	Exam Central room		4		2		2	
10	CAP center	12				12		
1.1	Studio Third Year A	12			2	9		
12	Studio First Year B	10			2	6		
13	Staff Room	1		24			12	
14	Faculty Room		32		20		9	
15	Studio 403	15				9		
16	Studio 303	6				6		
17	Toillet (GF)	10		8		9		
-	First Floor							
18	Toilet (First Floor)			8				
19	Passage	8				/		

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20	Computer Lab	14	1		53	10		1.
	Total	122	63	81	86	96	23	2

Apart from above load, the college has pumps, street lights. Individual fitting wise load is as under.

Table No 2.2: Equipment wise Connected Load

No	Equipment	Qty	Load, W/Unit	Load,
1	F T L-40 W	122	40	4.9
2	LED Tube-20W	63	20	1.3
3	LED bulb	81	12	1.0
4	Computers	86	65	5.6
5	Ceiling Fans	96	65	6.2
6	Wall Fans	23	50	1.2
7	AC (1.5Tr Star Rated)	2	1838	3.7
8	LED focus Street light	5	35	0.2
9	Pumps (2 nos 5HP)			7.5
	Total			18.7

Data can be represented in terms of PIE chart as under,

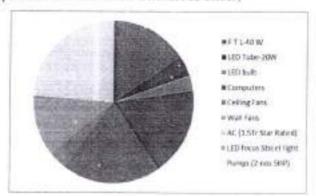


Figure 2.1: Distribution of connected load.

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3. Study of Electrical Energy Consumption

In this chapter, electricity bills are studied for the analysis of electrical energy consumption. The Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune is situated in Padmashree D. Y. Patil Educational Complex. Entire Complex is having single energy meter for all institutes situated in complex. The bill analysis is carried for electricity bills of entire campus.

Table no 3.1: Summary of electricity bills

			Bill
No.	Month	Energy (kWh)	Amount (Rs)
1	Jun-22	60,107	1,003,847
2	May-22	58,729	971,594
3	Apr-22	61,090	950,973
4	Mar-22	19,896	939,385
5	Feb-22	19,896	353,758
6	Jan-22	18,439	337,486
7	Dec-21	31,210	491,033
8	Nov-21	19,909	368,776
9	Oct-21	8,754	491,033
10	Sep-21	11,203	368,776
11	Aug-21	5,778	203,048
12	Jul-21	5,971	184,510
	Total	320,982	6,664,219

Variation in energy consumption is as follows,

10

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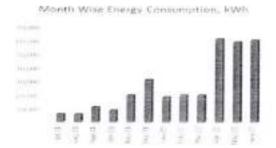


Figure 3.1: Month wise energy consumption

Monthly variation in electricity bill is as follows,

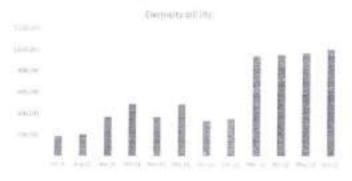


Figure 3.2: Month wise electricity bill

Key observations of electricity bill are as follows,

Table no 3.2: Key observations

Sr no	Parameter	Energy consumed, (Units)	CO2 Emission (MT)
1	Maximum	61,090	48.87
2	Minimum	5,778	4.62
3	Average	26,749	21.40
4	Total	320,982	256.79

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4. Carbon Foot printing

1. A Carbon Foot print is defined as the Total Greenhouse Gas emissions (CO₂ emissions), emitted due to various activities. In this we compute the emissions of Carbon-Di-Oxide, by usage of the various form of Electrical Energy used by the College for performing its day to day activities

2. Basis for computation of CO2 Emissions:

The basis of Calculation for CO2 emissions due to Electrical Energy is as under

1 Unit (kWh) of Electrical Energy releases 0.8 Kg of CO2 into atmosphere.

Based on the above Data we compute the CO₂ emissions which are being released in to the atmosphere by the College due to its Day to Day operations.

The Padmashree DR, D Y Patil College Of Architecture Akurdi, Pune is situated in Padmashree Dr D. Y. Patil Educational Complex. Entire Educational Complex is having single energy meter for all institutes situated in complex. Calculation for CO₂ emissions due to Electrical Energy is carried for entire campus.

We herewith furnish the details of various forms of Energy consumption as under

Show

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Table 4.1: Month wise Consumption of Electrical Energy & CO2 Emissions

No	Month	Energy Consumed, kWh	CO2 Emissions, MT
1	Jun-22	60,107	48.09
2	May-22	58,729	46.98
3	Apr-22	61.090	48.87
4	Mar-22	19,896	15.92
5	Feb-22	19,896	15.92
6	Jan-22	18,439	14.75
7	Dec-21	31,210	24.97
8	Nov-21	19,909	15.93
9	Oct-21	8,754	7.00
10	Sep-21	11,203	8.96
1.1	Aug-21	5,778	4.62
12	Jul-21	5,971	4.78
	Total	320,982	256.79

In the following Chart we present the CO2 emissions due to usage of Electrical Energy.

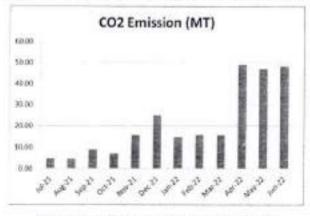


Figure 4.1: Month wise CO2 Emission

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5. Study of utilities

5.1 APFC Panel

The Office has already installed the APFC Panel. Capacitors of 110kVAR capacity is installed with panel.

5.2 Study of Lighting

In the facility, the lighting system can be divided mainly in to parts, indoor lighting and outdoor lighting. There are 122 FTL fittings with Electronic/ magnetic chokes , 63 nos of LED tubes, 81 nos of LED bulbs. It is recommended to install the 20 W LED Tube light fittings in place of these old T-8 fittings. There are 5 No of LED street lights.

5.3 Air-conditioners

There is 2 nos of star rated new AC of 1.5Tr capacity.

5.4 Fans

At building facility, there are about 96 Nos Old Ceiling Fans, which consumed about 65 W of Electrical Energy. It is recommended to replace these old Fans with BEE STAR Rated Ceiling Fans. There are 23 nos of wall fans in the facility.

5.5 Water Pumps

There are in total 2 nos of Water pumps with 5HP capacities respectively.



6. Study of usage of alternate energy

In this Chapter, we compute the percentage of Usage of Alternate/Renewable Energy to Annual Energy Requirement of the College.

The Padmashree DR, D Y Patil College Of Architecture Akurdi, Pune is situated in Padmashree D, Y. Patil Educational Complex, Entire Complex is having single energy meter for all institutes situated in complex. The institute have installed Roof Top Solar PV System to cater energy requirement of all institutes of entire campus. The Installed Capacity of Solar PV Plant is 350 kWp.

Table 6.1: Computation of % Usage of Alternate Energy to Annual Energy Requirement

No	Particulars	Value	Unit
1	Annual Energy Purchased from MSEDCL	320,982	kWh/Annum
2	Energy Generated by Roof Top Solar PV System	400,572	kWh/Annum
3	Total Energy Requirement of College	721,554	kWh/Annum
4	% of Usage of Alternate Energy to Annual Energy Requirement	56	11/4

Photograph of Solar PV plant



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7. Study of usage of LED lighting

In this chapter we study the lighting system of college and compute the percentage of total load catered by LED lighting.

Table 7.1: Total lighting load

No	Particulars	Qty	Load, W/Unit	Load.
I	F T L-40 W	122	40	4.9
	LED lighting load			
1	LED tube	63	20	1.3
2	LED bulbs	81	12	1.0
3	LED street lights	- 5	35	0.2
	Total LED lighting load			2.4
	Total Lighting load			7.3

It can be seen that out of total lighting load 33% load is LED lighting load.

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8. Energy conservation proposals

8.1 Replacement of Old T-8 FTLs with 20 W LED fittings

In the facility, there are about 122 Nos, T-8, FTL fittings with Electronic/magnetic chokes. It is recommended to install the 20 W LED Tube light fittings in place of these old T-8 fittings. In the following Table, we present the savings, investment required & payback analysis.

No	Particulars	Value	Unit
1	Present Qty of T-8 fittings	122	Nos
2	Energy Demand of T-8 fitting	40	W/Unit
3	Energy Demand of 20 W LED fittin	20	W/Unit
4	Reduction in demad	20	W/Unit
5	Average Daily Usage period	4	Hrs/Day
6	Daily saving in Energy	9.76	kWh/Day
7	Annual Working Days	250	Nos
8	Annual Energy Saving possible	2440	kWh/Annun
9	Rate of Electrical Energy	11	Rs/kWh
10	Annual Monetary saving	26840	Rs/Annum
11	Cost of 20 W LED Tube	641	Rs/Unit
12	Investment required	78202	Rs lump sum
13.	Simple Payback period	35	Months

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Dr. Dr.

8.2 Replacement of old fans with STAR Rated fans

During the Audit, it was observed that there are 96 no of fans. It is recommended to replace these old fans with STAR Rated fans.

In the following Table, we present the savings, investment required & payback analysis.

No	Particulars	Value	Unit
1	Present Qty of Old Ceiling Fan fittings	96	Nos
2	Energy Demand of Old Ceiling Fan fitting	65	W/Unit
3	Energy Demand of STAR Rated Fan	52	W/Unit
4	Reduction in demad	13	W/Unit
5	Average Daily Usage period	4	Hrs/Day
6	Daily saving in Energy	4.992	kWh/Day
7	Annual Working Days	250	Nos
8	Annual Energy Saving possible	1248	kWh/Annun
9	Rate of Electrical Energy	11	Rs/kWh
10	Annual Monetary saving	13728	Rs/Annum
11	Cost of STAR Rated Ceiling Fan	2174	Rs/unit
12	Investment required	208704	Rs lump
13	Simple Payback period	182	Months

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8.3 Installation of Solar PV panel

It is recommended to install 200 kW solar PV panel. In the following Table, we present the savings, investment required & payback analysis.

No	Particulars	Value	Unit
1	Installation of PV unit	200	kW
2	Energy saving	300000	kWh/Annum
3	Rate of electrical energy	11	Rs
4	Annual monetory savings	3300000	Rs/ Annum
5	Investment required	10000000	Rs lump sum
6	Simple payback period	36	Months

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8.4 Summary of Savings

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No	Recommendation	Annual Saving potential, kWh/Annum	Annual Monetary Gain, Rs.	Investment Required, Rs.	Payback period, Months
ą	Replacement of 122 Nos T-8 fittings with 20W LED fittings	2,440	26,840	78,202	35
2	Replacement of 96 Nos Old Ceiling Fans with STAR rating fans	1,248	13,728	208,704	182
3	Installation of 200kW grid connected PV panel	300,000	3,300,000	10,000,000	36
	Total	3,688	40,568	286,906	85

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Report

On

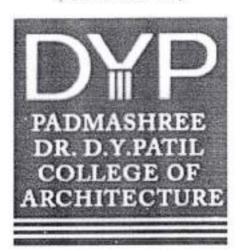
Environmental Audit

At

Padmashree Dr. D Y Patil College of Architecture

Akurdi, Pune

(Year 2021-22)



Prepared by

Nutan Urja Solutions

Dr. D Y Patil Pratishthan's Padmashree Dr. D Y Patil College of Architecture, Akurdi Pune

A 703, Balaji Witefield, Near Sunni's World,

Sus Road, Sus, Pune 411 021

Phone: 83568 18381. Email: nutanurja.solutions@gmail.com





PRINCIPAL

Dr. D. Y. Patil College of Architecture Akurdi, Pune - 411044

Nutan Urja Solutions

(ISO 9001:2015, ISO 50001:2018, ISO 14001:2015)



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Sus Road, Sus, Pune 411 021

Phone: 83568 18381. Email: nutanurja.solutions@gmail.com

Date: 23/11/2022

CERTIFICATE

This is to certify that we have conducted Environmental Audit at Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune in the year 2021-22.

The College has already adopted following projects for making the campus Energy Efficient.

- > Installation of Sewage Treatment Plant
- Installation of Rain Water Harvesting System
- Installation of 350 kW Solar PV Power Plant.

We appreciate the support of Management, involvement of faculty members and students in the process of Energy Conservation & making the campus Green.

Nutan Urja Solutions,

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K G Bhatwadekar, Certified Energy Auditor, EA - 22428



Dr. D Y Path Pratishthan's

Padmastree Dr. D Y Paul College of Architecture, Akurdi Pune

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Dr. D. Y. Patil College of Architecture Akurdi, Pune - 411044



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Acknowledgement

We at Nutan Urja Solutions, Pune wish to express our sincere gratitude to the management of Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune for assigning the work of Environmental Audit of college campus.

We appreciate the co-operation and support extended to our team members during the entire tenure of field study. We are also thankful to all other staff members who helped us during the Measurements at the field and for giving us the necessary inputs to carry out this vital exercise.

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Executive Summary

After the Field measurements & analysis, we present herewith important observations made and various measures to reduce the dependency on Natural resources & reduce the pollution.

Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune consumes various resources for day to day operations, namely: Air, Water, Electrical Energy & LPG.

1. Various Pollution due to College Activities:

- > Air pollution: Mainly CO2 on account of Electricity & LPG Consumption
- > Solid Waste: Bio degradable Kitchen Waste, Garden Waste
- > Liquid Waste: Human liquid waste

2. Present Level of CO2 Emissions:

Sr no	Parameter	Energy consumed, (Units)	CO2 Emission (MT)
1	Maximum	61,090	48.9
2	Minimum	5,778	4.6
3	Average	26,749	21.4
4	Total	320,982	256.8

3. The various projects already implemented for Environmental Conservation:

- Usage of Energy Efficient BEE STAR Rated ACs
- Usage of Natural Day light in corridors
- > Implementation of Rain Water Harvesting
- Installation of 350 kW Solar PV Power Plant.
- Installation of Sewage Treatment Plant

4. Recommendations:

- Installation of Bio Gas Generator Plant instead of Bio composting Plant.

 Dr. D.Y.Patil Pratishthan's
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 Padritishing Plant.
- 2. Installation of Bio Composting Plant to generate fertilizer from garden wasterd Pune

5. Notes & Assumptions:

1. 1 kWh of Electrical Energy releases 0.8 Kg of CO2 into atmosphere





2. 1 kWp Solar PV plant generates 5 kWh/day Electrical Energy for 300 days in an year.

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Padmashree Dr. D.Y.Pali. College of Architecture,

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Abbreviations

AC : Air conditioner

PES : Progressive Education Society

CFL : Compact Fluorescent Lamp

FTL : Fluorescent Tube Light

LED : Light Emitting Diode

kWh : kilo-Watt Hour

Qty : Quantity

W : Watt

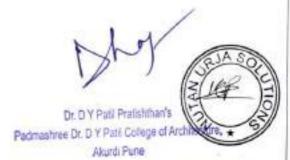
kW : Kilo Watt

PF : Power Factor

M D : Maximum Demand

PC : Personal Computer

MSEDCL : Maharashtra State Electricity Distribution Company Ltd



1. Introduction

1.1 Important Definitions:

1.1.1 Environment: Definition as per environment Protection Act: 1986

Environment includes water, air and land and the inter-relationship which exists among and between Water, Air, Land and Human beings, other living creatures, plants microorganism and property

1.1.2. Environmental Audit: Definition:

An audit which aims at verification and validation to ensure that various environmental laws are compiled with and adequate care has been taken towards environmental protection and preservation

According to UNEP, 1990, "Environmental audit can be defined as a management tool comprising systematic, documented and periodic evaluation of how well environmental organization management and equipment are performing with an aim of helping to regularize the environment

1.1.3. Environmental Pollutant: means any solid, liquid and gaseous substance present in the concentration as may be, or tend to be, injurious to Environment.

1.1.4. Relevant Environmental Laws in India: Table No-1:

1927	The Indian Forest Act
1972	The Wildlife Protection Act
1974	The Water (Prevention and Control of Pollution) Act
1977	The Water (Prevention & Control of Pollution) Cess Act
1980	The Forest (Conservation) Act
1981	The Air (Prevention and Control of Pollution) Act
1986	The Environment Protection Act
1991	The Public Liability Insurance Act
2002	The Biological Diversity Act
2010	The National Green Tribunal Act

1.1.5. Some Important Environmental Rules in India: Table No-2:

Hazardous Waste (Management and Handling) Rules
Manufacture, Storage and Import of Hazardous Chemical Rules, Part Praisinger's
Municipal Solid Waste (Management and Handlings, Rules, D. D. Pall Colege of Architecture,
The Biomedical Waste (Management and Handling) Rules Akurd Pune
The Environment (Siting for Industrial Projects) Rules
Noise Pollution (Regulation and Control) Rules
Ozone Depleting Substances (Regulation and Control) Rules

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2011	E-waste (Management and Handling) Rules
2011	National Green Tribunal (Practices and Procedure) Rules
2011	Plastic Waste (Management and Handling) Rules

1.1.6 National Environmental Plans & Policy Documents: Table No-3:

1.	National Forest Policy, 1988
2.	National Water Policy, 2002
3.	National Environment Policy or NEP (2006)
4.	National Conservation Strategy and Policy Statement on Environment and Development, 1992
5.	Policy Statement for Abatement of Pollution (1992)
6.	National Action Plan on Climate Change
7.	Vision Statement on Environment and Human Health
8.	Technology Vision 2030 (The Energy Research Institute)
9.	Addressing Energy Security and Climate Change (MoEF and Bureau of Energy Efficiency
10	The Road to Copenhagen; India's Position on Climate Change Issues (MoEF)

1.2 Objectives

- 1. To study present usage of Natural resources the College is consuming
- 2. To Study the present pollution sources
- To study various measures to make the campus Self sustainable in respect of Natural resources
- 4. To suggest the various measures to reduce the pollution: Air, Water, Noise

1.3 Audit Methodology:

- 1. Study of College as System
- 2. Study of Electrical Energy Consumption
- 3. Study of CO2 emissions
- 4. Suggestions on usage of Renewable Energy

1.4 General Details of College

No	Head	Particulars	
1	Name of Institution	Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune	
2	Address	Padmashree D. Y. Patil Educational Complex, Sector 29 Nigdi, Akurdi. Maharashtra 411044	
3	Affiliation	Savitribai Phule Pune University	

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College of Architecture

2. Study of Consumption of Various Resources

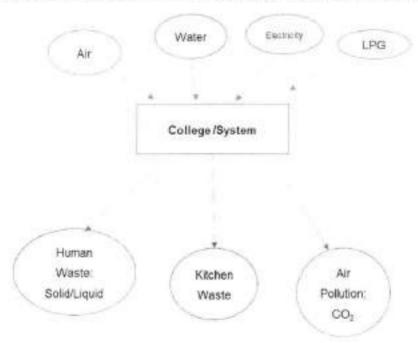
The Institute consumes following basic/derived Resources:

- L. Air
- 2. Water
- 3. Electrical Energy
- 4. Liquefied Petroleum Gas

Also, college emits following pollutants to environment

- 1. Human Waste: Solid/ Liquid
- 2. Kitchen waste
- 3. Air pollution

We try to draw a schematic diagram for the College System & Environment as under.



Now we compute the Generation of CO2 on account of consumption of Electrical Energy & LPG as under.

The Padmashree DR. D Y Patil College Of Architecture Akurdi. Pune is situated in Padmashree D. Y. Patil Educational Complex. Entire Educational Complex is having single energy meter for all institutes situated in complex. The bill analysis is carried for electricity bills of entire campus.

The calculation of electrical energy consumption by college can be given as,

Dr. D Y Patil Pravishtha something Dr. D. Y. P. Will College of Architecture,

Akurdi Pune

Table 2.1: Electrical Energy Consumption

No	Month	Energy (kWh)	
1	Jun-22	60,107	
2	May-22	58,729	
3	Apr-22	61,090	
4	Mar-22	19,896	
5	Feb-22	19,896	
6	Jan-22	18,439	
7	Dec-21	31,210	
8	Nov-21	19,909	
9	Oct-21	8,754	
10	Sep-21	11,203	
11	Aug-21	5,778	
12	Jul-21	5,971	
	Total	320,982	
	Maximum	61,090	
	Minimum	5,778	
	Average	26,749	

2.1 Variation of Monthly Electrical Energy Consumption

Month Wise Energy Consumption, kWh

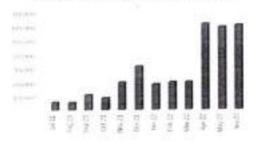


Figure 2.1: Monthly Electrical Energy Consumption

2.2 Key Inference drawn

From the above analysis, we present following important parameters:

Y Path Pretishthan's Padmashree Dr. D Y Park College of Architecture

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Table 2.2: Variation in Important Parameters

No	Parameter/ Value	Energy Consumed, kWh	
1	Maximum	61,090	
2	Minimum	5,778	
3	Average	26,749	
4	Total	320,982	



Dr. D.Y Paril Pratishthan's

Padmashree Dr. D Y Patri College of Andistacture Akurdi Pune

3. Study of Environmental Pollution

In this Chapter, we present the various types of Pollution as under:

3.1 Air Pollution

The College is using two forms of Energies, namely: Thermal in the form of LPG and Electrical Energy used for day to day operations of the College. The major pollutant on account of above Energy forms is the Carbon Di Oxide.

- 1 unit (kWh) of Electrical Energy emits 0.8 Kg of CO2 in the atmosphere
- 1 Kg of LPG emits 3 Kg of CO₂ in the atmosphere

In the following Table, we present the CO2 emissions.

Table 3.1: Month wise Consumption of Electrical Energy & CO2 Emissions:

		Energy Consumed,	CO2
No	Month	kWh	Emissions, MT
1	Jun-22	60,107	48,1
2	May-22	58,729	47,0
3	Apr-22	61,090	48.9
4	Mar-22	19,896	15.9
5	Feb-22	19,896	15.9
6	Jan-22	18,439	14.8
7	Dec-21	31,210	25.0
8	Nov-21	19,909	15.9
9	Oct-21	8,754	7.0
10	Sep-21	11,203	9.0
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12	Jul-21	5,971	4.8
	Total	320,982	256.8
	Maximum	61,090	48.9
	Minimum	5,778	4.6
	Average	26,749	21.4

Patriastree Cr. D.Y. Patri College of Architecture, Akurdi Pune

In the following Chart we present the CO2 emissions due to usage of Electrical Energy.

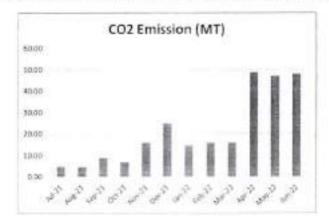


Figure 2.1: CO2 emission due to usage of electrical energy.

3.2 Study of Solid Waste Generation

The garbage collected in college is segregated into wet and dry centrally in campus.

Waste bins are placed in college campus for collection of waste.

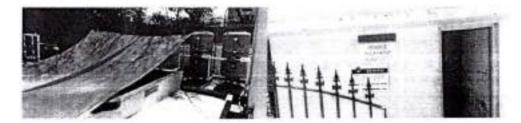
3.3 Canteen food wastage

The students and canteen staff are encouraged to have minimal food wastage. Canteen contractor have food license and shop act certificate. The canteen is encouraged for usage of paper tea cups.

3.4 Study of Liquid Waste Generation

The waste water generated in college campus is treated in Sewage Water Treatment Plant. This plant aims to remove contaminants from sewage to produce an effluent that is suitable for reuse application. The sewage water treatment plant is operating with 100 KLD water capacity.

Photograph of Sewage Treatment Plant



3.5 Study of e-Waste Management:

The internal communication is through emails and there is hardly any generation of e-Waste in the premises.

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4. Study of Rain Water Harvesting

The College has already installed Rain Water Harvesting project, wherein the rain water falling on the terrace is collected and through pipes it is fed to underground Water Storage tank. This stored water is then reused for domestic purpose.

Padmashree Dr. D Y Patil College of Architecture, College of Architecture Akurdi, Pune - 411044

Or. D.Y Path Pratishthan's -

Akurdi Pune

5. Recommendations

In order to reduce the dependency on Natural resources and also in order to reduce the various pollutions arising due to the day to day operations of the College we herewith recommend following recommendations.

- Installation of Bio Gas Generator Plant instead of Bio composting Plant.
- Installation of Bio Composting Plant to generate fertilizer from garden waste.

Thy

Dr. D. Y. Patil

College of Architecture Akurdi, Pune - 411044



Dr D Y Patil Prathisthan's

PADMASHREE DR. D Y PATIL COLLEGE OF ARCHITECTURE

Sector No. 29, B/h. Akurdi Railway Station, Nigdi Pradhikaran, Akurdi, Pune - 411044

ACADEMIC YEAR (2020-21)



Dr D Y Patil Prathisthan's

PADMASHREE DR. D Y PATIL COLLEGE OF ARCHITECTURE

Sector No. 29, B/h. Akurdi Railway Station, Nigdi Pradhikaran, Akurdi, Pune - 411044

Criterion 7 Institutional Values and Best Practices

Key Indicator 7.1.3

Metric No.	Quality Audits and environment and energy regularly undertaken by the institution
7.1.3	The Institutional environment and energy initiative are confirmed through the following 1. Green Audit / Environment Audit 2. Energy Audit 3.Clean and Green Campus Initiative 4. Beyond the Campus Environmental Promotion Activities

Sr. No	Contents (Documents)		
A	Supporting Documents	Date	Year
1	Green Audit Reports	15/10/21	(2020-21)
2	Energy Audit Reports	15/10/21	(2020-21)
3	Environment Audit Report	15/10/21	(2020-21)

Report

On

Green Audit

At

Padmashree Dr. D Y Patil College of Architecture

Akurdi, Pune

(Year 2020-21)



Prepared by

Nutan Urja Solutions

A 703, Balaji Witefield, Near Sunni's World,

Sus Road, Sus, Pune 411 021

Phone: 83568 18381. Email: nutanurja.solutions@gmail.com



by D Y Pall Pratishthan's

Padmashree Dr. D Y Patil College of Architecture, Akurdi Pune

Nutan Urja Solutions

A 703, Balaji Witefield, Near Sunni's World, Sus Road, Sus, Pune 411 021

Phone: 83568 18381. Email: nutanurja.solutions@gmail.com

Date: 15/10/2021

CERTIFICATE

This is to certify that we have conducted Green Audit at Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune for the year 2020-21.

The College has already adopted Green practices like:

- Installation of Rain Water Harvesting system
- Installation of Sewage Treatment Plant.
- Installation of 350 kW Roof Top Solar PV Power Plant.
- Usage of Energy Efficient LED
- Usage of Energy Efficient BEE STAR Rated equipment

We appreciate the support of Management, involvement of faculty members and students in the process of making the campus Green.

Nutan Urja Solutions,

KeBhidudekar

K G Bhatwadekar,

Certified Energy Auditor.

EA - 22428

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Dr. D.Y. Path Pretighthan's
Padmastiree Dr. D.Y. Path College of Architecture.

Akurdi Pune

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7.5 Paperless Office	

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Dr. D Y Patt Pratishthan's

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Nutan Urja Solutions, Pune.

Acknowledgement

We at Nutan Urja Solutions, Pune, express our sincere gratitude to the management of Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune for awarding us the assignment of Green Audit of their college premises.

We hope that the recommendations stated in this report will be useful and worthy of discussions to take things forward to help implementation of energy conservation measures and green practices. While we have made every attempt to adhere to high quality standards, in both data collection and analysis through the report, we would welcome your suggestions so as to improve upon this report further.

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Executive Summary

Green Audit of Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune is conducted by Nutan Urja Solutions, Pune. Based On the audit field study, following important points can be presented.

1. Present Energy Consumption

Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune uses Electrical Energy as the source of Energy for various equipment in the college campus. In the following Table, we present the details of Energy Consumption.

Sr no	Parameter	Energy consumed, (Units)	CO2 Emission (MT)
1	Maximum	10,974	8.8
2	Minimum	2,942	2.4
3	Average	5,124	4.1
4	Total	61,482	49.2

Table no 1: Details of energy consumption

2. Various Measures Adopted for Energy Conservation

- 1. Usage of STAR Rated ACs at new installations
- 2. Usage of LED lights at some indoor locations
- 3. Usage of LED Lights for outdoor lighting.

3. Usage of Renewable Energy

The institute has installed 350 kW Solar PV Power Plant.

4. Rain Water Harvesting

The College has installed the Rainwater harvesting project, to reduce dependency on municipal corporation water supply.

5. Waste Management

The internal communication is through emails and there is hardly any generation of e-Waste in the premises.

6. Notes and Assumptions

1. Daily working hours-10 Nos

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Padmashree Dr. D Y Patit College of Akurdi Pune

Report on Green Audit: Padmashree DR. D Y Patil College Of Architecture Alcardi, Pune

- 2. Annual working Days-250 Nos
- 3. Average Rate of Electrical Energy; Rs 11/- per kWh

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Padmastree Dr. D.Y Patil College of Arch Akurdi Pune

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Report on Green Audit: Padmashree DR. D Y Patil College Of Architecture Akurdi, Punc

Abbreviations

CFL

: Compact Fluorescent Lamp

FTL

: Fluorescent Tube Light

LED

: Light Emitting Diode.

V

Voltage

1

Current

kW

: Kilo- Watt

kWh

: kilo-Watt Hour

kVA

Active Power

Dry

Dr. D Y Patt Prats

Akurai Pune

1. Introduction

Padmashree Dr. D. Y. Patil college of Architecture has been established in the year 2000. The college is run by Padmashree Dr. D. Y. Patil Pratishthan, which has set up multiple centers of educational excellence at Pune, Mumbai and Kolhapur. The Institute strongly believes that world-class education is the stepping-stone to progress. With a long-standing commitment towards quality teaching and learning, the Institute has nurtured values that go into the making of successful careers. Reiterating excellence with every incoming batch, the Institute stands tall with its undeterred commitment to deliver better. Equipped with state-of-the-art infrastructure, the Institute always encourages individuals to think, question, explore and apply their well-honed minds to scale newer heights of success. The Institute believes in imparting education that'll build world class citizens of tomorrow.

Padmashree Dr. D. Y. Patil college of Architecture fosters a positive environment for Teaching, Non-Teaching staff and Students to meet the emerging challenges which stimulates the desire to collaborate and change the world. Padmashree Dr. D. Y. Patil College of Architecture, a gem of an Institution has successfully completed a decade & is budding with young & energetic talent creating a mark in this grand galaxy of homes of higher learning. Here architecture means not merely a science & construction of building but it will be open vistas of ideas & ideals. It is indeed a center of fusion between creativity &utility. It has been bringing out the best talents in the field of housing, modern living & other aspects essential for better community life & will continue to do so in the future.

1.1 Objectives

- 1. To study present level of Energy Consumption
- 2. To Study the present CO2 emissions
- 3. To assess the various equipment/facilities from Energy efficiency aspect
- 4. To measure various Electrical parameters
- 5. To study Scope for usage of Renewable Energy
- 6. To study various measures to reduce the Energy Consumption

1.2 Audit methodology

- 1. Study of connected load
- 2. Study of various Electrical parameters
- 3. To prepare the Report with various Encon measures with payback analysis

7

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Alcurd Pune

2. Study of Electrical Energy Consumption

In this chapter, electricity bills are studied for the analysis of electrical energy consumption. The Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune is situated in Padmashree D. Y. Patil Educational Complex. Entire Padmashree D. Y. Patil Educational Complex is having single energy meter for all institutes situated in complex. The bill analysis is carried for electricity bills of entire campus.

Table no 2.1: Summary of electricity bills

No	Month	Energy (kWh)	Bill Amount (Rs)
1	Jun-21	4,079	184,510
2	May-21	3,208	169,765
3	Apr-21	3,998	180,330
4	Mar-21	5,548	186,769
5	Feb-21	7,276	207,752
6	Jan-21	7,558	211,170
7	Dec-20	4,592	173,160
8	Nov-20	4,045	166,226
9	Oct-20	3,850	174,876
10	Sep-20	3,412	184,124
11	Aug-20	10,974	344,070
12	Jul-20	2,942	166,065
	Total	61,482	2,348,817

Variation in energy consumption is as follows,

Dr. D Y Pall Praison



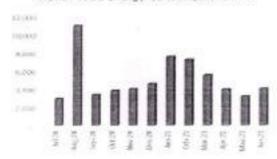


Figure 2.1: Month wise energy consumption

Monthly variation in electricity bill is as follows,

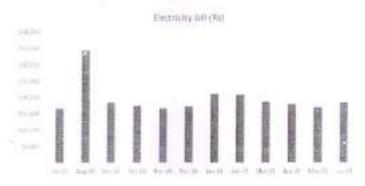


Figure 2.2: Month wise electricity bill

Key observations of electricity bill are as follows,

Table no 2.2: Key observations

Sr no	Parameter	Energy consumed, (Units)	CO2 Emission (MT)
1	Maximum	10,974	8.8
2	Minimum	2,942	2.4
3	Average	5,124	4.1
4	Total	61,482	49.2

9

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3. Carbon Foot printing

1. A Carbon Foot print is defined as the Total Greenhouse Gas emissions (CO₂ emissions), emitted due to various activities. In this we compute the emissions of Carbon-Di-Oxide, by usage of the various form of Electrical Energy used by the College for performing its day to day activities

2. Basis for computation of CO2 Emissions:

The basis of Calculation for CO2 emissions due to Electrical Energy is as under

1 Unit (kWh) of Electrical Energy releases 0.8 Kg of CO2 into atmosphere.

Based on the above Data we compute the CO₂ emissions which are being released in to the atmosphere by the College due to its Day to Day operations.

The Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune is situated in Padmashree D. Y. Patil Educational Complex. Entire Educational Complex is having single energy meter for all institutes situated in complex. Calculation for CO₂ emissions due to Electrical Energy is carried for entire campus.

We herewith furnish the details of various forms of Energy consumption as under



Report on Green Audir: Padmasheee DR. D Y Paril College Of Architecture Akurdi, Pene

Table 3.1: Month wise Consumption of Electrical Energy & CO2 Emissions

No	Month	Energy Consumed, kWh	CO2 Emissions, MT
1	Jun-21	4,079	3.3
2	May-21	3,208	2.6
3	Apr-21	3,998	3.2
4	Mar-21	5,548	4.4
5	Feb-21	7,276	5.8
6	Jan-21	7,558	6.0
7	Dec-20	4,592	3.7
8	Nov-20	4,045	3.2
9	Oct-20	3,850	3.1
10	Sep-20	3,412	2.7
11	Aug-20	10,974	8.8
12	Jul-20	2,942	2.4
	Total	61,482	49.2

In the following Chart we present the CO2 emissions due to usage of Electrical Energy.

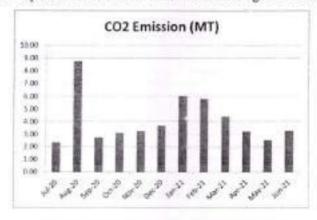


Figure 3.1: Month wise CO2 Emission

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4. Study of Usage of Alternate Energy

In this Chapter, we compute the percentage of Usage of Alternate/Renewable Energy to Annual Energy Requirement of the College.

The Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune is situated in Padmashree D. Y. Patil Educational Complex. Entire Educational Complex is having single energy meter for all institutes situated in complex. The institute have installed Roof Top Solar PV System to cater energy requirement of all institutes of entire campus. The Installed Capacity of Solar PV Plant is 350 kWp.

Table 4.1: Computation of % Usage of Alternate Energy to Annual Energy Requirement

No	Particulars	Value	Unit
1	Annual Energy Purchased from MSEDCL	61,482	kWh/Annum
2	Energy Generated by Roof Top Solar PV System	380,614	kWh/Annum
3	Total Energy Requirement of College	442,096	kWh/Annum
4	% of Usage of Alternate Energy to Annual Energy Requirement	86	%

Photograph of Solar PV plant



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5. Study of Water System

5.1 Source of Water

College gets water from Pimpiri- Chinchwad Municipal Corporation. The RO treated water is provided for drinking.

5.2 Rain Water Harvesting

The College has already installed Rain Water Harvesting project, wherein the rain water falling on the terrace is collected and through pipes it is fed to underground Water Storage tank. This stored water is then reused for domestic purpose.

5.3 Sewage Treatment Plant

The waste water generated in college campus is treated in Sewage Water Treatment Plant. This plant aims to remove contaminants from sewage to produce an effluent that is suitable for reuse application. The sewage water treatment plant is operating with 100 KLD water capacity.

Photograph of Sewage Treatment Plant



Dr. D.Y.Pail P.

6. Study of Waste Management

6.1 Solid Waste Management

The garbage collected in college is segregated into wet and dry centrally in campus.

Waste bins are placed in college campus for collection of waste.

6.2 e-Waste Management

The internal communication is through emails and hence there is hardly any generation of e-Waste in the premises.

6.3 Waste Water Management

The waste water generated in college campus is treated in Sewage Water Treatment Plant. The sewage water treatment plant is operating with 100 KLD water capacity.

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Dr. D. V. Patil Pratishmen's

7. Study of Green Practices

7.1 No of students who don't use own Vehicle for coming to Institute

Student hostels are located near college campus only. Many students live in hostel campus. Many of the Out of total students coming to Institute, about 60% students use own Automobile. During the lockdown of Covid 19 negligible vehicles are reported on the campus during the year 2019-20 and 2020-21. Online teaching mode used for the teaching learning processes.

7.2 Usage of Public Transport

Padmashree D. Y. Patil Educational Complex campus can be conveniently reachable by public transport. Most of the staff is using own vehicles i.e cars and two wheelers. The capacity of parking is enough to accommodate all vehicles. During the Students transport study, it was revealed that the local students who are residing near areas make use of Public Transport like Municipal Transport local buses, local sharing type auto rickshaws. Institute encourages students to not to use automobiles.

7.3 Pedestrian Friendly Roads

The Institute has well defined pedestrian foot paths as to facilitate the easy movement of the students within the campus.

Photograph of Road within campus



7.4 Plastic Free Campus

The Institute is an active participant in the Government of India's most prestigious project of SWATCHH BHART ABHIYAN. The Institute has displayed boards in the Campus, to make the campus plastic free. Various measures adopted for this purpose are as follows

15

Installation of Separate waste bins for Dry waste & wet waste

Padmashree Dr. D Y Patil College of Architecture,

Akurdi Pune

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- > Usage of paper tea cups in the Institute canteen
- > Display of boards in the campus for Plastic Free campus

7.5 Paperless Office

The internal communication of the Institute is through the Internet. There are hardly any day to day operations, where printing is required.

7.6 Food Service in college campus

There are canteens and cafeterias within college campus. Students need not to travel outside the college for food. Canteen contractor have Food license and shop act certificate. Hygiene in canteen is well maintained.

7.7 Green Landscaping with Trees and Plants

The Institute has beautiful maintained Garden.



Figure 7.1: Beautiful maintained Garden of college

Dr. D.Y.Patil Press

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Padmashree Dr. D Y Patil College of Alund Pune Report

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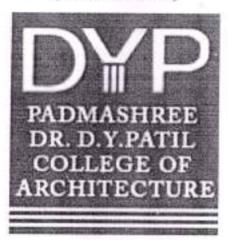
Energy Audit

At

Padmashree Dr. D Y Patil College of Architecture

Akurdi, Pune

(Year 2020-21)



Prepared by

Nutan Urja Solutions

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Phone: 83568 18381. Email: nutanurja.solutions@gmail.com

Date: 15/10/2021

CERTIFICATE

This is to certify that we have conducted Energy Audit at Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune as per the guidelines of Maharashtra Energy Development Agency (www.mahaurja.com) in the year 2020-21.

The College has already adopted Energy Efficient practices like:

- Usage of Energy Efficient LED Fittings
- > Usage of Energy Efficient BEE STAR Rated equipment
- Installation of 350 kW Roof Top Solar PV Power Plant.

We appreciate the support of Management, involvement of faculty members and students in the process of Energy Conservation & making the campus Green.

Nutan Urja Solutions,

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K G Bhatwadekar,

Certified Energy Auditor,

EA - 22428

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Padmashree Dr. D Y Patri Gollege of Architecture

Akurdi Pune

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Padmashree Dr. D Y Parli College of Architecture,

Alcurdi Pune

Acknowledgement

We at Nutan Urja Solutions, Pune, express our sincere gratitude to the management of Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune for awarding us the assignment of Energy Audit of their college premises.

We hope that the recommendations stated in this report will be useful and worthy of discussions to take things forward to help implementation of energy conservation measures through energy savings. While we have made every attempt to adhere to high quality standards, in both data collection and analysis through the report, we would welcome your suggestions so as to improve upon this report further.

Nutan Urja Solutions, Pune

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Padmashree Dr. D Y Patil College of Architecture, Akurdi Pune

Executive Summary

After the Field measurements & analysis, we present herewith important observations made and various measures to reduce the Energy Consumption & mitigate the CO₂ emissions. College consumes Energy in the form of Electrical Energy used for various gadgets, Office & other facilities.

1. Present Energy Consumption

In the following Table, we present the details of Energy Consumption.

Table no 2.1: Details of energy consumption

Sr no	Parameter	Energy consumed, (Units)	CO2 Emission (MT)
1	Maximum	10,974	8.8
2	Minimum	2,942	2.4
3	Average	5,124	4.1
4	Total	61,482	49.2

2. Energy Conservation Projects already installed

- 1. Usage of STAR Rated ACs at new installations
- 2. Usage of LED lights at some indoor locations
- 3. Usage of LED Lights for outdoor lighting.

3. Key Observations

- 1. Usage of LED lights.
- 2. Usage of star rated equipment.
- Maintained a good power factor.

4. Percentage of Usage of Alternate Energy

The College has installed a Roof Top Solar PV Plant. The percentage of usage of Alternate Energy to Annual Energy Requirement is 86 %.

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Dr. A. a. and Protehthan's

Padmashree Dr. D Y Patil College of Archited

Akunti Pune

5. Percentage of Usage of LED Lighting

The College has various Types of Light fittings. The percentage of Annual LED Lighting Usage to Annual Lighting requirement works out to be 33 %.

6. Recommendations

Table no 1: Recommendations for energy savings

No	Recommendation	Annual Saving potential, kWh/Annum	Annual Monetary Gain, Rs.	Investment Required, Rs.	Payback period, Months
1	Replacement of 122 Nos T-8 fittings with 20W LED fittings	2,440	26,840	78,202	35
2	Replacement of 96 Nos Old Ceiling Fans with STAR rating fans	1,248	13,728	208,704	182
3	Installation of 200kW grid connected PV panel	300,000	3,300,000	10,000,000	36
	Total	3,688	40,568	286,906	85

7 Notes & Assumptions

- 1. Daily working hours-10 Nos
- 2. Annual working Days-300 Nos
- 3. Average Rate of Electrical Energy: Rs 11/- per kWh

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Padmashree Dr. D Y Patil College of Architecture, Akurdi Pune

Abbreviations

CFL : Compact Fluorescent Lamp

FTL Fluorescent Tube Light

LED Light Emitting Diode

Voltage Current

: Kilo- Watt kW

kWh kilo-Watt Hour

Active Power kVA

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Padmashree Cr. D Y Path College of Architects Akurdi Pune

1. Introduction

Padmashree Dr. D. Y. Patil college of Architecture has been established in the year 2000. The college is run by Padmashree Dr. D. Y. Patil Pratishthan, which has set up multiple centers of educational excellence at Pune, Mumbai and Kolhapur. The Institute strongly believes that world-class education is the stepping-stone to progress. With a long-standing commitment towards quality teaching and learning, the Institute has nurtured values that go into the making of successful careers. Reiterating excellence with every incoming batch, the Institute stands tall with its undeterred commitment to deliver better. Equipped with state-of-the-art infrastructure, the Institute always encourages individuals to think, question, explore and apply their well-honed minds to scale newer heights of success. The Institute believes in imparting education that'll build world class citizens of tomorrow.

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1.1 Objectives

- To study present level of Energy Consumption
- 2. To Study Electrical Consumption
- 3. To assess the various equipment/facilities from Energy efficiency aspect
- To study various measures to reduce the Energy Consumption

1.2 Audit Methodology:

- 1. Study of connected load
- 2. Study of various Electrical parameters
- 3. To prepare the Report with various Encon measures with payback analysis

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6

Dr. D Y Patil Pratishthan's
Padmastree Dr. D Y Patil College of Architecture
Akurdi Pune

1.3 General Details of College

Table No-1.1: Details of college

No	Head	Particulars
1	Name of Institution	Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune
2	Address	Padmashree D. Y. Patil Educational Complex, Sector 29, Nigdi, Akurdi, Maharashtra 411044
3	Affiliation	Savitribai Phule Pune University

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Dr. D Y Patil Pratishthan's Padmashree Dr. D Y Patil College of Architect

Akurdi Pune

2. Study of connected load

In this chapter, we present details of various connected electrical equipment and electrical load.

Table No-2.1: Location wise study of Electrical fittings in various buildings

No	Location	FTL (40W)	tube (20W)	LED bulb (12W)	Computers (65W)	Ceiling Fans	Wall Fans	1.5 Tr Star rated
	Ground Floor							
1	Cafeteria		4			8		
2	Studio	17				12		
3	Kitchen		6					
4	Passage		14					
5	Vice Principal			10	1	1		
6	Admin Office			15	5			
7	Principal Office		2	12	1	2		1
8	First Year Studio	18		4		12		-
9	Exam Central room		4		2		2	
10	CAP center	12				12		
11	Studio Third Year A	12			2	9		
12	Studio First Year B	10			2	6		
13	Staff Room			24			12	
14	Faculty Room		32		20		9	
15	Studio 403	15				9		
16	Studio 303	6				6		
17	Toillet (GF)	10		8		9		
	First Floor							
18	Toilet (First Floor)			8				
19	Passage	8						

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Akurdi Pune

20	Computer Lab	14	1		53	10		1
	Total	122	63	81	86	96	23	2

Apart from above load, the college has pumps, street lights. Individual fitting wise load is as under.

Table No 2.2: Equipment wise Connected Load

No	Equipment	Qty	Load, W/Unit	Load, kW
1	F T L-40 W	122	40	4.9
2	LED Tube-20W	63	20.	1.3
3	LED bulb	81	12	1.0
4	Computers	86	65	5.6
5	Ceiling Fans	96	65	6.2
6	Wall Fans	23	50	1.2
7	AC (1.5Tr Star Rated)	2	1838	3.7
8	LED focus Street light	5	35"	0.2
9	Pumps (2 nos 5HP)			7.5
	Total			18.7

Data can be represented in terms of PIE chart as under,

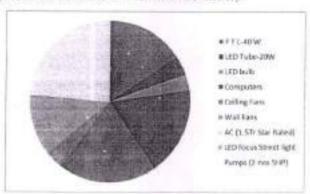


Figure 2.1: Distribution of connected load.

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3. Study of Electrical Energy Consumption

In this chapter, electricity bills are studied for the analysis of electrical energy consumption. The Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune is situated in Padmashree D. Y. Patil Educational Complex. Entire Complex is having single energy meter for all institutes situated in complex. The bill analysis is carried for electricity bills of entire campus,

Table no 3.1: Summary of electricity bills

No	Month	Energy (kWh)	Bill Amount (Rs)
1	Jun-21	4,079	184,510
2	May-21	3,208	169,765
3	Apr-21	3,998	180,330
4	Mar-21	5,548	186,769
5	Feb-21	7,276	207,752
6	Jan-21	7,558	211,170
7	Dec-20	4,592	173,160
8	Nov-20	4,045	166,226
9	Oct-20	3,850	174,876
10	Sep-20	3,412	184,124
11	Aug-20	10,974	344,070
12	Jul-20	2,942	166,065
	Total	61,482	2,348,817

Variation in energy consumption is as follows,

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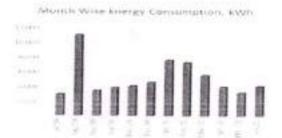


Figure 3.1: Month wise energy consumption

Monthly variation in electricity bill is as follows,

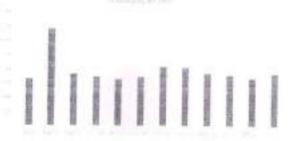


Figure 3.2: Month wise electricity bill

Key observations of electricity bill are as follows.

Table no 3.2: Key observations

Sr no	Parameter	Energy consumed, (Units)	CO2 Emission (MT)
1	Maximum	10,974	8.8
2	Minimum	2,942	2.4
3	Average	5,124	4.1
4	Total	61,482	49.2

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4. Carbon Foot printing

1. A Carbon Foot print is defined as the Total Greenhouse Gas emissions (CO₂ emissions), emitted due to various activities. In this we compute the emissions of Carbon-Di-Oxide, by usage of the various form of Electrical Energy used by the College for performing its day to day activities

2. Basis for computation of CO2 Emissions:

The basis of Calculation for CO2 emissions due to Electrical Energy is as under

Unit (kWh) of Electrical Energy releases 0.8 Kg of CO2 into atmosphere.

Based on the above Data we compute the CO₂ emissions which are being released in to the atmosphere by the College due to its Day to Day operations.

The Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune is situated in Padmashree Dr D. Y. Patil Educational Complex. Entire Educational Complex is having single energy meter for all institutes situated in complex. Calculation for CO₂ emissions due to Electrical Energy is carried for entire campus.

We herewith furnish the details of various forms of Energy consumption as under

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Table 4.1: Month wise Consumption of Electrical Energy & CO2 Emissions

No	Month	Energy Consumed, kWh	CO2 Emissions, MT
1	Jun-21	4,079	3.3
2	May-21	3,208	2.6
3	Apr-21	3,998	3.2
4	Mar-21	5,548	4.4
5	Feb-21	7,276	5.8
6	Jan-21	7,558	6.0
7	Dec-20	4,592	3.7
8	Nov-20	4,045	3.2
9	Oct-20	3,850	3.1
10	Sep-20	3,412	2.7
11	Aug-20	10,974	8.8
12	Jul-20	2,942	2.4
	Total	61,482	49.2

In the following Chart we present the CO2 emissions due to usage of Electrical Energy.

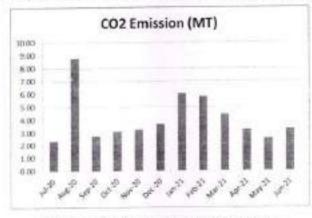


Figure 4.1: Month wise CO2 Emission

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Padmashree Dr. D Y Patil College

Akurdi Pune

5. Study of utilities

5.1 APFC Panel

The Office has already installed the APFC Panel. Capacitors of 110kVAR capacity is installed with panel.

5.2 Study of Lighting

In the facility, the lighting system can be divided mainly in to parts, indoor lighting and outdoor lighting. There are 122 FTL fittings with Electronic/ magnetic chokes, 63 nos of LED tubes, 81 nos of LED bulbs. It is recommended to install the 20 W LED Tube light fittings in place of these old T-8 fittings. There are 5 No of LED street lights.

5.3 Air-conditioners

There is 2 nos of star rated new AC of 1.5Tr capacity.

5.4 Fans

At building facility, there are about 96 Nos Old Ceiling Fans, which consumed about 65 W of Electrical Energy. It is recommended to replace these old Fans with BEE STAR Rated Ceiling Fans. There are 23 nos of wall fans in the facility.

5.5 Water Pumps

There are in total 2 nos of Water pumps with 5HP capacities respectively.

Padmashree Dr. D Y Pati Cole Colercting Akurdi Pune

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6. Study of usage of alternate energy

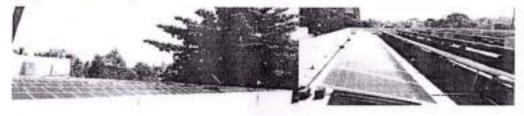
In this Chapter, we compute the percentage of Usage of Alternate/Renewable Energy to Annual Energy Requirement of the College.

The Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune is situated in Padmashree D. Y. Patil Educational Complex. Entire Complex is having single energy meter for all institutes situated in complex. The institute have installed Roof Top Solar PV System to cater energy requirement of all institutes of entire campus. The Installed Capacity of Solar PV Plant is 350 kWp.

Table 6.1: Computation of % Usage of Alternate Energy to Annual Energy Requirement

No	Particulars	Value	Unit
1	Annual Energy Purchased from MSEDCL	61,482	kWh/Annum
2	Energy Generated by Roof Top Solar PV System	380,614	kWh/Annum
3	Total Energy Requirement of College	442,096	kWh/Annum
4	% of Usage of Alternate Energy to Annual Energy Requirement	86	%

Photograph of Solar PV plant



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7. Study of usage of LED lighting

In this chapter we study the lighting system of college and compute the percentage of total load catered by LED lighting.

Table 7.1: Total lighting load

No	Particulars	Qty	Load, W/Unit	Load kW
1	F T L-40 W	122	40	4.9
	LED lighting load			
1	LED tube	63	20	1.3
2	LED bulbs	81	12	1.0
3.	LED street lights	5	35	0.2
	Total LED lighting load			2.4
	Total Lighting load			7.3

It can be seen that out of total lighting load 33% load is LED lighting load.

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8. Energy conservation proposals

8.1 Replacement of Old T-8 FTLs with 20 W LED fittings

In the facility, there are about 122 Nos, T-8, FTL fittings with Electronic/magnetic chokes. It is recommended to install the 20 W LED Tube light fittings in place of these old T-8 fittings. In the following Table, we present the savings, investment required & payback analysis.

No	Particulars	Value	Unit
t	Present Qty of T-8 fittings	122	Nos
2	Energy Demand of T-8 fitting	40	W/Unit
3	Energy Demand of 20 W LED fittin	20	W/Unit
4	Reduction in demad	20	W/Unit
5	Average Daily Usage period	4	Hrs/Day
6	Daily saving in Energy	9.76	kWh/Day
7	Annual Working Days	250	Nos
8	Annual Energy Saving possible	2440	kWh/Annun
9	Rate of Electrical Energy	.11	Rs/kWh
10	Annual Monetary saving	26840	Rs/Annum
11	Cost of 20 W LED Tube	641	Rs/Unit
12	Investment required	78202	Rs lump sum
13	Simple Payback period	35	Months

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8.2 Replacement of old fans with STAR Rated fans

During the Audit, it was observed that there are 96 no of fans. It is recommended to replace these old fans with STAR Rated fans.

In the following Table, we present the savings, investment required & payback analysis.

No	Particulars	Value	Unit
1	Present Qty of Old Ceiling Fan fittings	96	Nos
2	Energy Demand of Old Ceiling Fan fitting	65	W/Unit
3	Energy Demand of STAR Rated Fan	52	W/Unit
4	Reduction in demad	13	W/Unit
5	Average Daily Usage period	4	Hrs/Day
6	Daily saving in Energy	4.992	kWh/Day
7	Annual Working Days	250	Nos
8	Annual Energy Saving possible	1248	kWh/Annum
9	Rate of Electrical Energy	11	Rs/kWh
10	Annual Monetary saving	13728	Rs/Annum
11	Cost of STAR Rated Ceiling Fan	2174	Rs/unit
12	Investment required	208704	Rs lump sum
13	Simple Payback period	182	Months

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Report on Energy Audit: Padmashree DR. D Y Patil College Of Architecture Akurdi, Pone

8.3 Installation of Solar PV panel

It is recommended to install 200 kW solar PV panel. In the following Table, we present the savings, investment required & payback analysis.

No	Particulars	Value	Unit
1	Installation of PV unit	200	kW
2	Energy saving	300000	kWh/Annum
3	Rate of electrical energy	11	Rs
4	Annual monetory savings	3300000	Rs/ Annum
5	Investment required	10000000	Rs lump sum
6	Simple payback period	36	Months

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Akurd Pune

8.4 Summary of Savings

No	Recommendation	Annual Saving potential, kWh/Annum	Annual Monetary Gain, Rs.	Investment Required, Rs.	Payback period, Months
1	Replacement of 122 Nos T-8 fittings with 20W LED fittings	2,440	26,840	78,202	35
2	Replacement of 96 Nos Old Ceiling Fans with STAR rating fans	1,248	13,728	208,704	182
3	Installation of 200kW grid connected PV panel	300,000	3,300,000	10,000,000	36
	Total	3,688	40,568	286,906	85

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Report

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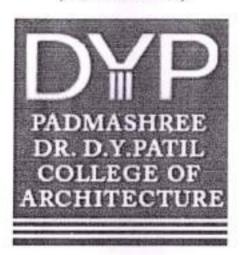
Environmental Audit

At

Padmashree Dr. D Y Patil College of Architecture

Akurdi,Pune

(Year 2020-21)



Prepared by

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Phone: 83568 18381. Email: nutanurja solutions@gmail.com

Date: 15/10/2021

CERTIFICATE

This is to certify that we have conducted Environmental Audit at Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune in the year 2020-21.

The College has already adopted following projects for making the campus Energy Efficient.

- Installation of Sewage Treatment Plant
- Installation of Rain Water Harvesting System
- Installation of 350 kW Solar PV Power Plant.

We appreciate the support of Management, involvement of faculty members and students in the process of Energy Conservation & making the campus Green.

Nutan Urja Solutions,

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K G Bhatwadekar, Certified Energy Auditor, EA – 22428 AND THE PROPERTY OF THE PROPER

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Padmashree Dr. D.Y. Paris Codegs of Architecture.
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Acknowledgement

We at Nutan Urja Solutions, Pune wish to express our sincere gratitude to the management of Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune for assigning the work of Environmental Audit of college campus.

We appreciate the co-operation and support extended to our team members during the entire tenure of field study. We are also thankful to all other staff members who helped us during the Measurements at the field and for giving us the necessary inputs to carry out this vital exercise.

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Dr. D Y Patil Pratishthan's Padmashree Dr. D Y Patil College of

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Executive Summary

After the Field measurements & analysis, we present herewith important observations made and various measures to reduce the dependency on Natural resources & reduce the pollution.

Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune consumes various resources for day to day operations, namely: Air, Water, Electrical Energy & LPG.

1. Various Pollution due to College Activities:

- Air pollution: Mainly CO₂ on account of Electricity & LPG Consumption
- Solid Waste: Bio degradable Kitchen Waste, Garden Waste
- Liquid Waste: Human liquid waste

2. Present Level of CO2 Emissions:

Sr no	Parameter	Energy consumed, (Units)	CO2 Emission
1	Maximum	10,974	8.8
2	Minimum	2,942	2.4
3	Average	5,124	4.1
4	Total	61,482	49.2

3. The various projects already implemented for Environmental Conservation:

- Usage of Energy Efficient BEE STAR Rated ACs
- Usage of Natural Day light in corridors
- Implementation of Rain Water Harvesting
- Installation of 350 kW Solar PV Power Plant.
- Installation of Sewage Treatment Plant

4. Recommendations:

- Installation of Bio Gas Generator Plant instead of Bio composting Plant.
- Installation of Bio Composting Plant to generate fertilizer from garden waste.

5. Notes & Assumptions:

1 kWh of Electrical Energy releases 0.8 Kg of CO₂ into atmosphere

Dr. D Y Paul Pratish Padmashree Dr. D.Y. Patil College of Archite

Akurdi Pune

Environmental Audit Report: Padmashree DR. D Y Patril College Of Architecture Akurdi, Pune

2. 1 kWp Solar PV plant generates 5 kWh/day Electrical Energy for 300 days in an year.

Padmashree Dr. D Y Pail College of Archite

Abbreviations

AC : Air conditioner

PES : Progressive Education Society

CFL : Compact Fluorescent Lamp

FTL : Fluorescent Tube Light

LED : Light Emitting Diode

kWh : kilo-Watt Hour

Qty : Quantity

W : Watt

kW : Kilo Watt

PF : Power Factor

M D : Maximum Demand

PC : Personal Computer

MSEDCL : Maharashtra State Electricity Distribution Company Ltd

Short Deris Protishthan's

Padmaahree Dr. D.Y.Path College of Arts

Akurdi Pune

1. Introduction

1.1 Important Definitions:

1.1.1 Environment: Definition as per environment Protection Act: 1986

Environment includes water, air and land and the inter-relationship which exists among and between Water, Air, Land and Human beings, other living creatures, plants microorganism and property

1.1.2. Environmental Audit: Definition:

An audit which aims at verification and validation to ensure that various environmental laws are compiled with and adequate care has been taken towards environmental protection and preservation

According to UNEP, 1990, "Environmental audit can be defined as a management tool comprising systematic, documented and periodic evaluation of how well environmental organization management and equipment are performing with an aim of helping to regularize the environment

1.1.3. Environmental Pollutant: means any solid, liquid and gaseous substance present in the concentration as may be, or tend to be, injurious to Environment.

1.1.4. Relevant Environmental Laws in India: Table No-1:

1927	The Indian Forest Act
1972	The Wildlife Protection Act
1974	The Water (Prevention and Control of Pollution) Act
1977	The Water (Prevention & Control of Pollution) Cess Act
1980	The Forest (Conservation) Act
1981	The Air (Prevention and Control of Pollution) Act
1986	The Environment Protection Act
1991	The Public Liability Insurance Act
2002	The Biological Diversity Act
2010	The National Green Tribunal Act

1.1.5. Some Important Environmental Rules in India: Table No-2:

1989	Hazardous Waste (Management and Handling) Rules
1989	Manufacture, Storage and Import of Hazardous Chemical Rules
2000	Municipal Solid Waste (Management and Handling) Rules
1998	The Biomedical Waste (Management and Handling) Rules
1999	The Environment (Siting for Industrial Projects) Rules
2000	Noise Pollution (Regulation and Control) Rules
2000	Ozone Depleting Substances (Regulation and Control) Rules

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2011	011 E-waste (Management and Handling) Rules	
2011	National Green Tribunal (Practices and Procedure) Rules	
2011	Plastic Waste (Management and Handling) Rules	

1.1.6 National Environmental Plans & Policy Documents: Table No-3:

1.	National Forest Policy, 1988
2.	National Water Policy, 2002
3.	National Environment Policy or NEP (2006)
4.	National Conservation Strategy and Policy Statement on Environment and Development, 1992
5.	Policy Statement for Abatement of Pollution (1992)
6.	National Action Plan on Climate Change
7.	Vision Statement on Environment and Human Health
8.	Technology Vision 2030 (The Energy Research Institute)
9.	Addressing Energy Security and Climate Change (MoEF and Bureau of Energy Efficiency
10	The Road to Copenhagen; India's Position on Climate Change Issues (MoEF)

1.2 Objectives

- 1. To study present usage of Natural resources the College is consuming
- 2. To Study the present pollution sources
- To study various measures to make the campus Self sustainable in respect of Natural resources
- 4. To suggest the various measures to reduce the pollution: Air, Water, Noise

1.3 Audit Methodology:

- 1. Study of College as System
- 2. Study of Electrical Energy Consumption
- 3. Study of CO2 emissions
- 4. Suggestions on usage of Renewable Energy

1.4 General Details of College

No	Head	Particulars
1	Name of Institution	Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune
2	Address	Padmashree D. Y. Patil Educational Complex, Sector 29, Nigdi, Akurdi, Maharashtra 411044
3	Affiliation	Savitribai Phule Pune University

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Dr. D Y Pall Pratishthan's Padmashree Sc. D.Y. Patil College of Architecture

2. Study of Consumption of Various Resources

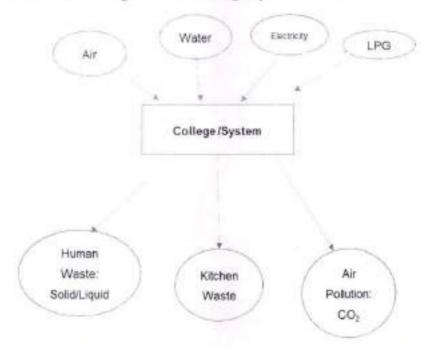
The Institute consumes following basic/derived Resources:

- 1. Air
- 2. Water
- 3. Electrical Energy
- 4. Liquefied Petroleum Gas

Also, college emits following pollutants to environment

- 1. Human Waste: Solid/ Liquid
- 2. Kitchen waste
- Air pollution

We try to draw a schematic diagram for the College System & Environment as under.



Now we compute the Generation of CO2 on account of consumption of Electrical Energy & LPG as under.

The Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune is situated in Padmashree D. Y. Patil Educational Complex. Entire Educational Complex is having single energy meter for all institutes situated in complex. The bill analysis is carried for electricity bills of entire campus.

The calculation of electrical energy consumption by college can be given as,

Table 2.1: Electrical Energy Consumption

No	Month	Energy (kWh)	
1	Jun-21	4,079	
2	May-21	3,208	
3	Apr-21	3,998	
4	Mar-21	5,548	
5	Feb-21	7,276	
6	Jan-21	7,558	
7	Dec-20	4,592	
8	Nov-20	4,045	
9	Oct-20	3,850	
10	Sep-20	3,412	
11	Aug-20	10,974	
12	Jul-20	2,942	
	Total	61,482	
	Maximum	10,974	
	Minimum	2,942	
	Average	5,124	

2.1 Variation of Monthly Electrical Energy Consumption

Month Wise Energy Consumption, kWh



Figure 2.1: Monthly Electrical Energy Consumption

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Padmashree Dr. D.Y Patil College of A

Akurdi Pune

2.2 Key Inference drawn

From the above analysis, we present following important parameters:

Table 2.2: Variation in Important Parameters

No	Parameter/ Value	Energy Consumed, kWh
1	Maximum	10,974
2	Minimum	2,942
3	Average	5,124
4	Total	61,482

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3. Study of Environmental Pollution

In this Chapter, we present the various types of Pollution as under:

3.1 Air Pollution

The College is using two forms of Energies, namely: Thermal in the form of LPG and Electrical Energy used for day to day operations of the College. The major pollutant on account of above Energy forms is the Carbon Di Oxide.

- 1 unit (kWh) of Electrical Energy emits 0.8 Kg of CO₂ in the atmosphere
- 1 Kg of LPG emits 3 Kg of CO₂ in the atmosphere

In the following Table, we present the CO2 emissions.

Table 3.1: Month wise Consumption of Electrical Energy & CO2 Emissions:

No	Month	Energy Consumed, kWh	CO2 Emissions, MT
1	Jun-21	4,079	3.3
2	May-21	3,208	2.6
3	Apr-21	3,998	3.2
4	Mar-21	5,548	4.4
5	Feb-21	7,276	5.8
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	Total	61,482	49.2
	Maximum	10,974	8.8
	Minimum	2,942	2.4
	Average	5,124	4.1

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In the following Chart we present the CO2 emissions due to usage of Electrical Energy.

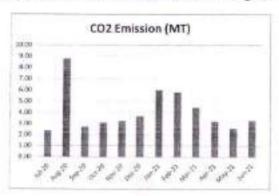


Figure 2.1: CO2 emission due to usage of electrical energy.

3.2 Study of Solid Waste Generation

The garbage collected in college is segregated into wet and dry centrally in campus.

Waste bins are placed in college campus for collection of waste.

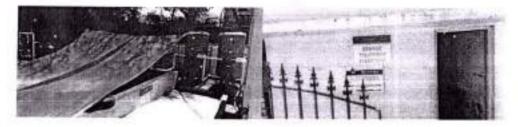
3.3 Canteen food wastage

The students and canteen staff are encouraged to have minimal food wastage. Canteen contractor have food license and shop act certificate. The canteen is encouraged for usage of paper tea cups.

3.4 Study of Liquid Waste Generation

The waste water generated in college campus is treated in Sewage Water Treatment Plant. This plant aims to remove contaminants from sewage to produce an effluent that is suitable for reuse application. The sewage water treatment plant is operating with 100 KLD water capacity.

Photograph of Sewage Treatment Plant



3.5 Study of e-Waste Management:

The internal communication is through emails and there is hardly any generation of e-Waste in the premises.

Dr. D Y Patil Praterior

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4. Study of Rain Water Harvesting

The College has already installed Rain Water Harvesting project, wherein the rain water falling on the terrace is collected and through pipes it is fed to underground Water Storage tank. This stored water is then reused for domestic purpose.

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5. Recommendations

In order to reduce the dependency on Natural resources and also in order to reduce the various pollutions arising due to the day to day operations of the College we herewith recommend following recommendations.

- Installation of Bio Gas Generator Plant instead of Bio composting Plant.
- Installation of Bio Composting Plant to generate fertilizer from garden waste.

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Padmashree Dr. D Y Patil College of Architecture,



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PADMASHREE DR. D Y PATIL COLLEGE OF ARCHITECTURE

Sector No. 29, B/h. Akurdi Railway Station, Nigdi Pradhikaran, Akurdi, Pune - 411044

ACADEMIC YEAR (2019-20)



Dr D Y Patil Prathisthan's

PADMASHREE DR. D Y PATIL COLLEGE OF ARCHITECTURE

Sector No. 29, B/h. Akurdi Railway Station, Nigdi Pradhikaran, Akurdi, Pune - 411044

Criterion 7 Institutional Values and Best Practices

Key Indicator 7.1.3

Metric No.	Quality Audits and environment and energy regularly undertaken by the institution
7.1.3	The Institutional environment and energy initiative are confirmed through the following 1. Green Audit / Environment Audit
	2. Energy Audit 3.Clean and Green Campus Initiative
	4. Beyond the Campus Environmental Promotion Activities

Sr. No	Contents (Documents)		
A	Supporting Documents	Date	Year
1	Green Audit Reports	28/09/20	(2019-20)
2	Energy Audit Reports	28/09/20	(2019-20)
3	Environment Audit Report	28/09/20	(2019-20)

Report

On

Green Audit

At

Padmashree Dr. D Y Patil College of Architecture

Akurdi, Pune

(Year 2019-20)



Prepared by

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Date: 28/09/2020

CERTIFICATE

This is to certify that we have conducted Green Audit at Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune for the year 2019-20.

The College has already adopted Green practices like:

- Installation of Rain Water Harvesting system
- > Installation of Sewage Treatment Plant.
- Installation of 350 kW Roof Top Solar PV Power Plant.
- Usage of Energy Efficient LED
- Usage of Energy Efficient BEE STAR Rated equipment

We appreciate the support of Management, involvement of faculty members and students in the process of making the campus Green.

Nutan Urja Solutions,

K G Bhatwadekar.

Certified Energy Auditor,

EA - 22428

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Dr. D.Y Patil Pratishthan's Padmashree Dr. D.Y Patil College of Architecture, Akurdi Pune

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Dr. D Y Patil Praishthan's

Padmashkee Dr. D Y Patil College of Architecture, Alturdi Pune Report on Green Audit: Padmashree DR. D Y Patil College Of Architecture Aliandi, Pune

Acknowledgement

We at Nutan Urja Solutions, Pune, express our sincere gratitude to the management of Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune for awarding us the assignment of Green Audit of their college premises.

We hope that the recommendations stated in this report will be useful and worthy of discussions to take things forward to help implementation of energy conservation measures and green practices. While we have made every attempt to adhere to high quality standards, in both data collection and analysis through the report, we would welcome your suggestions so as to improve upon this report further.

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Dr. D.Y. Patili Pratishthan

Padmashree Dr. D Y Pakil College of Architecture, Akundi Pune

Executive Summary

Green Audit of Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune is conducted by Nutan Urja Solutions, Pune. Based On the audit field study, following important points can be presented.

1. Present Energy Consumption

Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune uses Electrical Energy as the source of Energy for various equipment in the college campus. In the following Table, we present the details of Energy Consumption.

Sr no	Parameter	Energy consumed, (Units)	CO2 Emission (MT)
1	Maximum	39,074	31.3
2	Minimum	265	0.2
3	Average	22,456	18.0
4	Total	269 471	215.6

Table no 1: Details of energy consumption

2. Various Measures Adopted for Energy Conservation

- 1. Usage of STAR Rated ACs at new installations
- Usage of LED lights at some indoor locations
- 3. Usage of LED Lights for outdoor lighting.

3. Usage of Renewable Energy

The institute has installed 350 kW Solar PV Power Plant.

4. Rain Water Harvesting

The College has installed the Rainwater harvesting project, to reduce dependency on municipal corporation water supply.

5. Waste Management

The internal communication is through emails and there is hardly any generation of e-Waste in the premises.

6. Notes and Assumptions

1. Daily working hours-10 Nos

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Akurdi Pune

Report on Green Audit: Padmoshree DR. D.Y. Patil College Of Architecture Akurdi, Pune

- 2. Annual working Days-250 Nos
- 3. Average Rate of Electrical Energy; Rs 11/- per kWh

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Report on Green Audit. Padmashroe DR. D.Y. Paril College Of Architecture Akurdi, Pune

Abbreviations

CFL : Compact Fluorescent Lamp

FTL : Fluorescent Tube Light LED : Light Emitting Diode

V : Voltage

I : Current

kW : Kilo-Watt kWh : kilo-Watt Hour

kVA : Active Power

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1. Introduction

Padmashree Dr. D. Y. Patil college of Architecture has been established in the year 2000. The college is run by Padmashree Dr. D. Y. Patil Pratishthan, which has set up multiple centers of educational excellence at Pune, Mumbai and Kolhapur. The Institute strongly believes that world-class education is the stepping-stone to progress. With a long-standing commitment towards quality teaching and learning, the Institute has nurtured values that go into the making of successful careers. Reiterating excellence with every incoming batch, the Institute stands tall with its undeterred commitment to deliver better. Equipped with state-of-the-art infrastructure, the Institute always encourages individuals to think, question, explore and apply their well-honed minds to scale newer heights of success. The Institute believes in imparting education that'll build world class citizens of tomorrow.

Padmashree Dr. D. Y. Patil college of Architecture fosters a positive environment for Teaching. Non-Teaching staff and Students to meet the emerging challenges which stimulates the desire to collaborate and change the world. Padmashree Dr. D. Y. Patil College of Architecture, a gem of an Institution has successfully completed a decade & is budding with young & energetic talent creating a mark in this grand galaxy of homes of higher learning. Here architecture means not merely a science & construction of building but it will be open vistas of ideas & ideals. It is indeed a center of fusion between creativity &utility. It has been bringing out the best talents in the field of housing, modern living & other aspects essential for better community life & will continue to do so in the future.

1.1 Objectives

- 1. To study present level of Energy Consumption
- To Study the present CO₂ emissions
- 3. To assess the various equipment/facilities from Energy efficiency aspect
- 4. To measure various Electrical parameters
- 5. To study Scope for usage of Renewable Energy
- 6. To study various measures to reduce the Energy Consumption

1.2 Audit methodology

- 1. Study of connected load
- 2. Study of various Electrical parameters
- 3. To prepare the Report with various Encon measures with payback analysis

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2. Study of Electrical Energy Consumption

In this chapter, electricity bills are studied for the analysis of electrical energy consumption. The Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune is situated in Padmashree D. Y. Patil Educational Complex. Entire Padmashree D. Y. Patil Educational Complex is having single energy meter for all institutes situated in complex. The bill analysis is carried for electricity bills of entire campus.

Table no 2.1: Summary of electricity bills

No	Month	Energy (kWh)	Bill Amount (Rs)
1	Jun-20	3,240	170,142
2	May-20	265	162,544
.3	Apr-20	3,214	169,792
4	Mar-20	6,674	211,400
5	Feb-20	36,554	616,859
6	Jan-20	34,248	579,602
7	Dec-19	31,500	532,538
8	Nov-19	23,942	430,041
9	Oct-19	24,164	455,439
10	Sep-19	35,724	712,655
11	Aug-19	30,872	522,504
12	Jul-19	39,074	507,043
	Total	269,471	5,070,559

Variation in energy consumption is as follows,



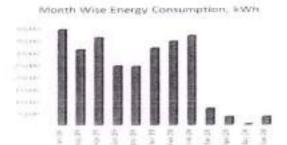


Figure 2.1: Month wise energy consumption

Monthly variation in electricity bill is as follows,

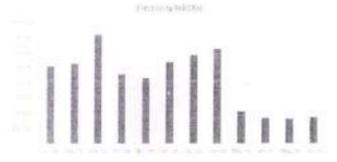


Figure 2.2: Month wise electricity bill

Key observations of electricity bill are as follows,

Table no 2.2: Key observations

Sr no	Parameter	Energy consumed, (Units)	CO2 Emission (MT)
1	Maximum	39,074	31.3
2	Minimum	265	0.2
3	Average	22,456	18.0
4	Total	269,471	215.6

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3. Carbon Foot printing

1. A Carbon Foot print is defined as the Total Greenhouse Gas emissions (CO₂ emissions), emitted due to various activities. In this we compute the emissions of Carbon-Di-Oxide, by usage of the various form of Electrical Energy used by the College for performing its day to day activities.

2. Basis for computation of CO2 Emissions:

The basis of Calculation for CO2 emissions due to Electrical Energy is as under

1 Unit (kWh) of Electrical Energy releases 0.8 Kg of CO2 into atmosphere.

Based on the above Data we compute the CO₂ emissions which are being released in to the atmosphere by the College due to its Day to Day operations.

The Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune is situated in Padmashree D. Y. Patil Educational Complex. Entire Educational Complex is having single energy meter for all institutes situated in complex. Calculation for CO₂ emissions due to Electrical Energy is carried for entire campus.

We herewith furnish the details of various forms of Energy consumption as under

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Table 3.1: Month wise Consumption of Electrical Energy & CO2 Emissions

No	Month	Energy Consumed, kWh	CO2 Emissions, MT
1	Jun-20	3,240	2.6
2	May-20	265	0.2
3	Apr-20	3,214	2.6
4	Mar-20	6,674	5.3
5	Feb-20	36,554	29,2
6	Jan-20	34,248	27.4
7	Dec-19	31,500	25.2
8	Nov-19	23,942	19.2
9	Oct-19	24,164	19.3
10	Sep-19	35,724	28.6
1.1	Aug-19	30,872	24.7
12	Jul-19	39,074	31.3
	Total	269,471	215.6

In the following Chart we present the CO2 emissions due to usage of Electrical Energy.

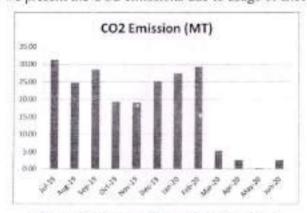


Figure 3.1: Month wise CO2 Emission

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4. Study of Usage of Alternate Energy

In this Chapter, we compute the percentage of Usage of Alternate/Renewable Energy to Annual Energy Requirement of the College.

The Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune is situated in Padmashree D. Y. Patil Educational Complex. Entire Educational Complex is having single energy meter for all institutes situated in complex. The institute have installed Roof Top Solar PV System to cater energy requirement of all institutes of entire campus. The Installed Capacity of Solar PV Plant is 350 kWp.

Table 4.1: Computation of % Usage of Alternate Energy to Annual Energy Requirement

No	Particulars	Value	Unit
1	Annual Energy Purchased from MSEDCL	269,471	kWh/Annum
2	Energy Generated by Roof Top Solar PV System	343,271	kWh/Annum
3	Total Energy Requirement of College	612,742	kWh/Annum
4	% of Usage of Alternate Energy to Annual Energy Requirement	56	%

Photograph of Solar PV plant



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5. Study of Water System

5.1 Source of Water

College gets water from Pimpiri- Chinchwad Municipal Corporation. The RO treated water is provided for drinking.

5.2 Rain Water Harvesting

The College has already installed Rain Water Harvesting project, wherein the rain water falling on the terrace is collected and through pipes it is fed to underground Water Storage tank. This stored water is then reused for domestic purpose.

5.3 Sewage Treatment Plant

The waste water generated in college campus is treated in Sewage Water Treatment Plant. This plant aims to remove contaminants from sewage to produce an effluent that is suitable for reuse application. The sewage water treatment plant is operating with 100 KLD water capacity.

Photograph of Sewage Treatment Plant



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Hay



6. Study of Waste Management

6.1 Solid Waste Management

The garbage collected in college is segregated into wet and dry centrally in campus. Waste bins are placed in college campus for collection of waste.

6.2 e-Waste Management

The internal communication is through emails and hence there is hardly any generation of e-Waste in the premises.

6.3 Waste Water Management

The waste water generated in college campus is treated in Sewage Water Treatment Plant. The sewage water treatment plant is operating with 100 KLD water capacity.



7. Study of Green Practices

7.1 No of students who don't use own Vehicle for coming to Institute

Student hostels are located near college campus only. Many students live in hostel campus. Many of the Out of total students coming to Institute, about 60% students use own Automobile. During the lockdown of Covid 19 negligible vehicles are reported on the campus during the year 2019-20. Online teaching mode used for the teaching learning processes.

7.2 Usage of Public Transport

Padmashree D. Y. Patil Educational Complex campus can be conveniently reachable by public transport. Most of the staff is using own vehicles i.e cars and two wheelers. The capacity of parking is enough to accommodate all vehicles. During the Students transport study, it was revealed that the local students who are residing near areas make use of Public Transport like Municipal Transport local buses, local sharing type auto rickshaws. Institute encourages students to not to use automobiles.

7.3 Pedestrian Friendly Roads

The Institute has well defined pedestrian foot paths as to facilitate the easy movement of the students within the campus.

Photograph of Road within campus



7.4 Plastic Free Campus

The Institute is an active participant in the Government of India's most prestigious project of SWATCHH BHART ABHIYAN. The Institute has displayed boards in the Campus, to make the campus plastic free. Various measures adopted for this purpose are as follows

- Installation of Separate waste bins for Dry waste & wet waste
- Usage of paper tea cups in the Institute canteen

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Padmashree Cr. D Y Publ College of Architecture,
Alkurdi Pune

> Display of boards in the campus for Plastic Free campus

7.5 Paperless Office

The internal communication of the Institute is through the Internet. There are hardly any day to day operations, where printing is required.

7.6 Food Service in college campus

There are canteens and cafeterias within college campus. Students need not to travel outside the college for food. Canteen contractor have Food license and shop act certificate. Hygiene in canteen is well maintained.

7.7 Green Landscaping with Trees and Plants

The Institute has beautiful maintained Garden.



Figure 7.1: Beautiful maintained Garden of college

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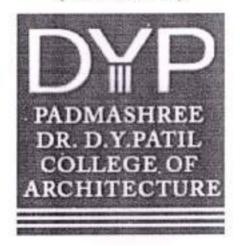
Energy Audit

At

Padmashree Dr. D Y Patil College of Architecture

Akurdi,Pune

(Year 2019-20)



Prepared by

Nutan Urja Solutions

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Sus Road, Sus, Pune 411 021

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Sus Road, Sus, Pune 411 021

Phone: 83568 18381. Email: nutanurja.solutions@gmail.com

Date: 28/09/2020

CERTIFICATE

This is to certify that we have conducted Energy Audit at Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune as per the guidelines of Maharashtra Energy Development Agency (www.mahaurja.com) in the year 2019-20.

The College has already adopted Energy Efficient practices like:

- Usage of Energy Efficient LED Fittings
- Usage of Energy Efficient BEE STAR Rated equipment
- Installation of 350 kW Roof Top Solar PV Power Plant.

We appreciate the support of Management, involvement of faculty members and students in the process of Energy Conservation & making the campus Green.

Nutan Urja Solutions,

Kethatudekar

K G Bhatwadekar.

Certified Energy Auditor.

EA - 22428



Padmashree Dr. D Y Patil College of Architecture,

Akurdi Puna

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Padmastrae Dr. D Y Patil

Acknowledgement

We at Nutan Urja Solutions, Pune, express our sincere gratitude to the management of Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune for awarding us the assignment of Energy Audit of their college premises.

We hope that the recommendations stated in this report will be useful and worthy of discussions to take things forward to help implementation of energy conservation measures through energy savings. While we have made every attempt to adhere to high quality standards, in both data collection and analysis through the report, we would welcome your suggestions so as to improve upon this report further.

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Dr. D. Y. Patil Pratish

Akurdi Pune

Executive Summary

After the Field measurements & analysis, we present herewith important observations made and various measures to reduce the Energy Consumption & mitigate the CO₂ emissions. College consumes Energy in the form of Electrical Energy used for various gadgets, Office & other facilities.

1. Present Energy Consumption

In the following Table, we present the details of Energy Consumption.

Table no 2.1: Details of energy consumption

Sr no	Parameter	Energy consumed, (Units)	CO2 Emission (MT)
1	Maximum	39,074	31.3
2	Minimum	265	0.2
3	Average	22,456	18.0
4	Total	269,471	215.6

2. Energy Conservation Projects already installed

- 1. Usage of STAR Rated ACs at new installations
- 2. Usage of LED lights at some indoor locations
- 3. Usage of LED Lights for outdoor lighting.

3. Key Observations

- 1. Usage of LED lights.
- 2. Usage of star rated equipment.
- 3. Maintained a good power factor.

4. Percentage of Usage of Alternate Energy

The College has installed a Roof Top Solar PV Plant. The percentage of usage of Alternate Energy to Annual Energy Requirement is 56 %.

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Dr. D Y Pati Pratisher

Padmashree Dr. D Y Patil College of Architecture

Akurdi Pune

5. Percentage of Usage of LED Lighting

The College has various Types of Light fittings. The percentage of Annual LED Lighting Usage to Annual Lighting requirement works out to be 33 %.

6. Recommendations

Table no 1: Recommendations for energy savings

No	Recommendation	Annual Saving potential, kWh/Annum	Annual Monetary Gain, Rs.	Investment Required, Rs,	Payback period, Months
1	Replacement of 122 Nos T-8 fittings with 20W LED fittings	2,440	26,840	78,202	35
2	Replacement of 96 Nos Old Ceiling Fans with STAR rating fans	1,248	13,728	208,704	182
3	Installation of 200kW grid connected PV panel	300,000	3,300,000	10,000,000	36
	Total	3,688	40,568	286,906	85

7 Notes & Assumptions

- 1. Daily working hours-10 Nos
- 2. Annual working Days-300 Nos
- 3. Average Rate of Electrical Energy: Rs 11/- per kWh

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Dr. D Y Patil Pratish/han's
Padmashvae Dr. D Y Patil College of Architecture,
Akurdi Pune

Abbreviations

CFL : Compact Fluorescent Lamp

Kilo- Watt

FTL : Fluorescent Tube Light

LED : Light Emitting Diode

V ; Voltage

Current

kW

kWh : kilo-Watt Hour

kVA : Active Power

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Dr. D Y Patil Protection Attended to Avenue To

1. Introduction

Padmashree Dr. D. Y. Patil college of Architecture has been established in the year 2000. The college is run by Padmashree Dr. D. Y. Patil Pratishthan, which has set up multiple centers of educational excellence at Pune, Mumbai and Kolhapur. The Institute strongly believes that world-class education is the stepping-stone to progress. With a long-standing commitment towards quality teaching and learning, the Institute has nurtured values that go into the making of successful careers. Reiterating excellence with every incoming batch, the Institute stands tall with its undeterred commitment to deliver better. Equipped with state-of-the-art infrastructure, the Institute always encourages individuals to think, question, explore and apply their well-honed minds to scale newer heights of success. The Institute believes in imparting education that'll build world class citizens of tomorrow.

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1.1 Objectives

- To study present level of Energy Consumption
- 2. To Study Electrical Consumption
- 3. To assess the various equipment/facilities from Energy efficiency aspect
- 4. To study various measures to reduce the Energy Consumption

1.2 Audit Methodology:

- 1. Study of connected load
- 2. Study of various Electrical parameters
- 3. To prepare the Report with various Encon measures with payback analysis

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Report on Energy Audit: Padmoshice DR. D.Y.Patil College Of Architecture Akurdi, Pune

1.3 General Details of College

Table No-1.1: Details of college

No.	Head	Particulars
1	Name of Institution	Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune
2	Address	Padmashree D. Y. Patil Educational Complex, Sector 29, Nigdi, Akurdi, Maharashtra 411044
3	Affiliation	Savitribai Phule Pune University

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2. Study of connected load

In this chapter, we present details of various connected electrical equipment and electrical load.

Table No-2.1: Location wise study of Electrical fittings in various buildings

No	Location	FTL (40W)	tube (20W)	LED builb (12W)	Computers - (65W)	Ceiling Fans	Wall Fans	1.5 Tr Star rated
	Ground Floor							
1	Cafeteria		4			8		
2	Studio	17				12		
3	Kitchen		6					
4	Passage		14					
5	Vice Principal			10	1	1		
6	Admin Office			15	5			
7	Principal Office		2	12	1	2		1
8	First Year Studio	18		4		12		
9	Exam Central room		4		2		2	
10	CAP center	12				12		
11	Studio Third Year A	12			2	9		
12	Studio First Year B	10			2	-6		
13	Staff Room			24			12	
14	Faculty Room		32		20		9	
15	Studio 403	15				9		
16	Studio 303	6				6		
17	Toillet (GF)	10		8		9		
	First Floor							
18	Toilet (First Floor)			8				
19	Passage	8						

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Report on Energy Audit: Padmashnee DR. D Y Patil College Of Architecture Akardi Pune

20	Computer Lab	14	1		53	10		- 1
	Total	122	63	81	86	96	23	2

Apart from above load, the college has pumps, street lights. Individual fitting wise load is as under.

Table No 2.2: Equipment wise Connected Load

No	Equipment	Qty	Load, W/Unit	Load,
1	F T L-40 W	122	40	4.9
2	LED Tube-20W	63	20	1.3
3	LED bulb	81	12	1.0
4	Computers	86	65	5.6
5	Ceiling Fans	96	65	6.2
6	Wall Fans	23	50	1.2
7	AC (1.5Tr Star Rated)	2	1838	3.7
8	LED focus Street light	5	35	0.2
9	Pumps (2 nos 5HP)			7.5
	Total			18.7

Data can be represented in terms of PIE chart as under,

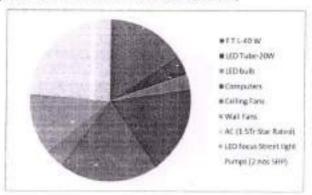


Figure 2.1: Distribution of connected load.

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3. Study of Electrical Energy Consumption

In this chapter, electricity bills are studied for the analysis of electrical energy consumption. The Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune is situated in Padmashree D. Y. Patil Educational Complex. Entire Complex is having single energy meter for all institutes situated in complex. The bill analysis is carried for electricity bills of entire campus.

Table no 3.1: Summary of electricity bills

			Bill
No	Month	Energy (kWh)	Amount (Rs)
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11	Aug-19	30,872	522,504
12	Jul-19	39,074	507,043
	Total	269,471	5,070,559

Variation in energy consumption is as follows,

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Akurdi Pune

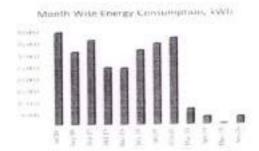


Figure 3.1: Month wise energy consumption

Monthly variation in electricity bill is as follows,

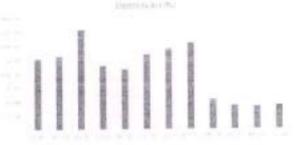


Figure 3.2: Month wise electricity bill

Key observations of electricity bill are as follows,

Table no 3.2: Key observations

Sr no	Parameter	Energy consumed, (Units)	CO2 Emission (MT)
1	Maximum	39,074	31.3
2	Minimum	265	0.2
3	Average	22,456	18.0
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Dr. D Y Parli Pratishthan's Padmashree Dr. D Y Parli College of Architecture, Akurdi Pune

4. Carbon Foot printing

1. A Carbon Foot print is defined as the Total Greenhouse Gas emissions (CO₂ emissions), emitted due to various activities. In this we compute the emissions of Carbon-Di-Oxide, by usage of the various form of Electrical Energy used by the College for performing its day to day activities

2. Basis for computation of CO2 Emissions:

The basis of Calculation for CO2 emissions due to Electrical Energy is as under

1 Unit (kWh) of Electrical Energy releases 0.8 Kg of CO2 into atmosphere.

Based on the above Data we compute the CO₂ emissions which are being released in to the atmosphere by the College due to its Day to Day operations.

The Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune is situated in Padmashree Dr D. Y. Patil Educational Complex. Entire Educational Complex is having single energy meter for all institutes situated in complex. Calculation for CO₂ emissions due to Electrical Energy is carried for entire campus.

We herewith furnish the details of various forms of Energy consumption as under

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Dr. D Y Patil Pratish and
Padmashree Dr. D Y Patil College of Architecture,
Alund Pune

Report on Energy Audit: Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune

Table 4.1: Month wise Consumption of Electrical Energy & CO2 Emissions

No	Month	Energy Consumed, kWh	CO2 Emissions, MT
1	Jun-20	3,240	2.6
2	May-20	265	0.2
3	Apr-20	3,214	2.6
4	Mar-20	6,674	5.3
5	Feb-20	36,554	29.2
6	Jan-20	34,248	27.4
7	Dec-19	31,500	25.2
8	Nov-19	23,942	19.2
9	Oct-19	24,164	19.3
10	Sep-19	35,724	28.6
11	Aug-19	30,872	24.7
12	Jul-19	39,074	31.3
	Total	269,471	215.6

In the following Chart we present the CO2 emissions due to usage of Electrical Energy.

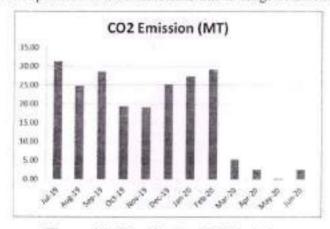


Figure 4.1: Month wise CO2 Emission

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Dr. D V Patil Profession

Pagmashree Dr. D Y Pall College of Architecture, Akurdi Pune Report on Energy Audit: Padmastiree DR. D Y Patil College Of Architecture Akurdi, Pune

5. Study of utilities

5.1 APFC Panel

The Office has already installed the APFC Panel. Capacitors of 110kVAR capacity is installed with panel.

5.2 Study of Lighting

In the facility, the lighting system can be divided mainly in to parts, indoor lighting and outdoor lighting. There are 122 FTL fittings with Electronic/ magnetic chokes, 63 nos of LED tubes, 81 nos of LED bulbs. It is recommended to install the 20 W LED Tube light fittings in place of these old T-8 fittings. There are 5 No of LED street lights.

5.3 Air-conditioners

There is 2 nos of star rated new AC of 1.5Tr capacity.

5.4 Fans

At building facility, there are about 96 Nos Old Ceiling Fans, which consumed about 65 W of Electrical Energy. It is recommended to replace these old Fans with BEE STAR Rated Ceiling Fans. There are 23 nos of wall fans in the facility.

5.5 Water Pumps

There are in total 2 nos of Water pumps with 5HP capacities respectively.

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Dr. D Y Patil Pratishthan's
Padmashree Dr. D Y Patil College of Architecture,
Akurdi Pune

6. Study of usage of alternate energy

In this Chapter, we compute the percentage of Usage of Alternate/Renewable Energy to Annual Energy Requirement of the College.

The Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune is situated in Padmashree D. Y. Patil Educational Complex. Entire Complex is having single energy meter for all institutes situated in complex. The institute have installed Roof Top Solar PV System to eater energy requirement of all institutes of entire campus. The Installed Capacity of Solar PV Plant is 350 kWp.

Table 6.1: Computation of % Usage of Alternate Energy to Annual Energy Requirement

No	Particulars	Value	Unit
1	Annual Energy Purchased from MSEDCL	269,471	kWh/Annum
2	Energy Generated by Roof Top Solar PV System	343,271	kWh/Annum
3	Total Energy Requirement of College	612,742	kWh/Annum
4	% of Usage of Alternate Energy to Annual Energy Requirement	56	%

Photograph of Solar PV plant



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7. Study of usage of LED lighting

In this chapter we study the lighting system of college and compute the percentage of total load catered by LED lighting.

Table 7.1: Total lighting load

No	Particulars	Qty	Load, W/Unit	Load.
1	F T L-40 W	122	40	4.9
	LED lighting load			
1	LED tube	63	20	1.3
2	LED bulbs	81	12	1.0
3	LED street lights	5	35	0.2
	Total LED lighting load			2.4
	Total Lighting load			7.3

It can be seen that out of total lighting load 33% load is LED lighting load.

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Padmasives Dr. D Akurdi Pune

8. Energy conservation proposals

8.1 Replacement of Old T-8 FTLs with 20 W LED fittings

In the facility, there are about 122 Nos, T-8, FTL fittings with Electronic/magnetic chokes. It is recommended to install the 20 W LED Tube light fittings in place of these old T-8 fittings. In the following Table, we present the savings, investment required & payback analysis.

No	Particulars	Value	Unit
1	Present Qty of T-8 fittings	122	Nos
2	2 Energy Demand of T-8 fitting		W/Unit
3	Energy Demand of 20 W LED fittin	20	W/Unit
4	Reduction in demad	20	W/Unit
5	Average Daily Usage period	4	Hrs/Day
6	Daily saving in Energy	9.76	kWh/Day
7	Annual Working Days	250	Nos
8	Annual Energy Saving possible	2440	kWh/Annum
9	Rate of Electrical Energy	11	Rs/kWh
10	Annual Monetary saving	26840	Rs/Annum
11	Cost of 20 W LED Tube	641	Rs/Unit
12	Investment required	78202	Rs lump sum
13	Simple Payback period	35	Months

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8.2 Replacement of old fans with STAR Rated fans

During the Audit, it was observed that there are 96 no of fans. It is recommended to replace these old fans with STAR Rated fans.

In the following Table, we present the savings, investment required & payback analysis.

No	Particulars	Value	Unit
1	Present Qty of Old Ceiling Fan fittings	96	Nos
2	Energy Demand of Old Ceiling Fan fitting	65	W/Unit
3	Energy Demand of STAR Rated Fan	52	W/Unit
4	Reduction in demad	13	W/Unit
5	Average Daily Usage period	4	Hrs/Day
6	Daily saving in Energy	4.992	kWh/Day
7	Annual Working Days	250	Nos
8	Annual Energy Saving possible	1248	kWh/Annun
9	Rate of Electrical Energy	11	Rs/kWh
10	Annual Monetary saving	13728	Rs/Annum
11	Cost of STAR Rated Ceiling Fan	2174	Rs/unit
12	Investment required	208704	Rs lump sum
13	Simple Payback period	182	Months

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Nutan Urja Solutions, Pune

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8.3 Installation of Solar PV panel

It is recommended to install 200 kW solar PV panel. In the following Table, we present the savings, investment required & payback analysis.

No	Particulars	Value	Unit
1	Installation of PV unit	200	kW
2	Energy saving	300000	kWh/Annum
3	Rate of electrical energy	11	Rs
4	Annual monetory savings	3300000	Rs/ Annum
5	Investment required	10000000	Rs lump sum
6	Simple payback period	36	Months

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8.4 Summary of Savings

No	Recommendation	Annual Saving potential, kWh/Annum	Annual Monetary Gain, Rs.	Investment Required, Rs.	Payback period, Months
1	Replacement of 122 Nos T-8 fittings with 20W LED fittings	2,440	26,840	78,202	35
2	Replacement of 96 Nos Old Ceiling Fans with STAR rating fans	1,248	13,728	208,704	182
3	Installation of 200kW grid connected PV panel	300,000	3,300,000	10,000,000	36
	Total	3,688	40,568	286,906	85

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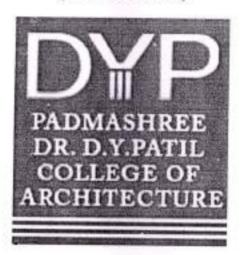
Environmental Audit

At

Padmashree Dr. D Y Patil College of Architecture

Akurdi, Pune

(Year 2019-20)



Prepared by

Nutan Urja Solutions

A 703, Balaji Witefield, Near Sunni's World,

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Phone: 83568 18381. Email: nutanurja.solutions@gmail.com



Dr. D.Y Potil Pratishthan's Padmasivee Dr. D Y Path College of Architecture

Nutan Urja Solutions

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Sus Road, Sus, Pune 411 021

Phone: 83568 18381. Email: nutanurja.solutions@gmail.com

Date: 28/09/2020

CERTIFICATE

This is to certify that we have conducted Environmental Audit at Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune in the year 2019-20.

The College has already adopted following projects for making the campus Energy

Efficient.

- Installation of Sewage Treatment Plant
- Installation of Rain Water Harvesting System
- Installation of 350 kW Solar PV Power Plant.

We appreciate the support of Management, involvement of faculty members and students in the process of Energy Conservation & making the campus Green.

Nutan Urja Solutions,

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K G Bhatwadekar, Certified Energy Auditor, EA – 22428 A SOLD

Dr. D Y Patil Pratishthan's

Padmastiree Dr. D Y Patil College of Architecture.

Akurdi Pune

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Acknowledgement

We at Nutan Urja Solutions, Pune wish to express our sincere gratitude to the management of Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune for assigning the work of Environmental Audit of college campus.

We appreciate the co-operation and support extended to our team members during the entire tenure of field study. We are also thankful to all other staff members who helped us during the Measurements at the field and for giving us the necessary inputs to carry out this vital exercise.

Padmashree Dr. D Y Patil College

Executive Summary

After the Field measurements & analysis, we present herewith important observations made and various measures to reduce the dependency on Natural resources & reduce the pollution.

Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune consumes various resources for day to day operations, namely: Air, Water, Electrical Energy & LPG.

1. Various Pollution due to College Activities:

- Air pollution: Mainly CO2 on account of Electricity & LPG Consumption
- > Solid Waste: Bio degradable Kitchen Waste, Garden Waste
- Liquid Waste: Human liquid waste

2. Present Level of CO2 Emissions:

Sr no	Parameter	Energy consumed, (Units)	CO2 Emission (MT)
1	Maximum	39,074	31.3
2	Minimum	265	0.2
3	Average	22,456	18.0
4	Total	269,471	215.6

3. The various projects already implemented for Environmental Conservation:

- Usage of Energy Efficient BEE STAR Rated ACs
- Usage of Natural Day light in corridors
- Implementation of Rain Water Harvesting
- Installation of 350 kW Solar PV Power Plant.
- Installation of Sewage Treatment Plant

4. Recommendations:

- 1. Installation of Bio Gas Generator Plant instead of Bio composting Plant,
- 2. Installation of Bio Composting Plant to generate fertilizer from garden waste.

5. Notes & Assumptions:

1 kWh of Electrical Energy releases 0.8 Kg of CO₂ into atmosphere

Dr. D Y Pari Phononia 5

Padmashree Dr. D Y Patti College of Architectur

Akurdi Pune

Environmental Audit Report: Padmashree DR. D. V. Patil College Of Architecture Akurdi, Pune

2. 1 kWp Solar PV plant generates 5 kWh/day Electrical Energy for 300 days in an year.

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or, D Y Paul Pratis No.

Partmastere Cr. D.Y. Patil College of Architecture.

Abbreviations

AC : Air conditioner

PES : Progressive Education Society

CFL : Compact Fluorescent Lamp

FTL : Fluorescent Tube Light

LED : Light Emitting Diode

kWh ; kilo-Watt Hour

Qty : Quantity

W : Watt

kW : Kilo Watt

PF : Power Factor

M D : Maximum Demand

PC : Personal Computer

MSEDCL : Maharashtra State Electricity Distribution Company Ltd

Padmashiree Dr. D Y Patil College Dischillactura

Aloudi Pune

1. Introduction

1.1 Important Definitions:

1.1.1 Environment: Definition as per environment Protection Act: 1986

Environment includes water, air and land and the inter-relationship which exists among and between Water, Air, Land and Human beings, other living creatures, plants microorganism and property

1.1.2. Environmental Audit: Definition:

An audit which aims at verification and validation to ensure that various environmental laws are compiled with and adequate care has been taken towards environmental protection and preservation

According to UNEP, 1990, "Environmental audit can be defined as a management tool comprising systematic, documented and periodic evaluation of how well environmental organization management and equipment are performing with an aim of helping to regularize the environment

1.1.3. Environmental Pollutant: means any solid, liquid and gaseous substance present in the concentration as may be, or tend to be, injurious to Environment.

1.1.4. Relevant Environmental Laws in India: Table No-1:

1927	The Indian Forest Act	
1972	The Wildlife Protection Act	
1974	The Water (Prevention and Control of Pollution) Act	
1977	The Water (Prevention & Control of Pollution) Cess Act	
1980	The Forest (Conservation) Act	
1981	The Air (Prevention and Control of Pollution) Act	
1986	The Environment Protection Act	
1991	The Public Liability Insurance Act	
2002	The Biological Diversity Act	
2010	The National Green Tribunal Act	

1.1.5. Some Important Environmental Rules in India: Table No-2:

1989	Hazardous Waste (Management and Handling) Rules	
1989	Manufacture, Storage and Import of Hazardous Chemical Rules	
2000	Municipal Solid Waste (Management and Handling) Rules	
1998	The Biomedical Waste (Management and Handling) Rules	
1999	The Environment (Siting for Industrial Projects) Rules	
2000	Noise Pollution (Regulation and Control) Rules	
2000	Ozone Depleting Substances (Regulation and Control) Rules	

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2011 E-waste (Management and Handling) Rules	
2011	National Green Tribunal (Practices and Procedure) Rules
2011	Plastic Waste (Management and Handling) Rules

1.1.6 National Environmental Plans & Policy Documents: Table No-3:

1.	National Forest Policy, 1988
2.	National Water Policy, 2002
3.	National Environment Policy or NEP (2006)
4.	National Environment Policy of NEF (2000) National Conservation Strategy and Policy Statement on Environment and Development, 1992
5.	Policy Statement for Abatement of Pollution (1992)
6.	National Action Plan on Climate Change
7.	Vision Statement on Environment and Human Health
8.	Technology Vision 2030 (The Energy Research Institute)
9.	Addressing Energy Security and Climate Change (MoEF and Bureau of Energy Efficiency
10	The Road to Copenhagen: India's Position on Climate Change Issues (MoEF)

1.2 Objectives

- 1. To study present usage of Natural resources the College is consuming
- 2. To Study the present pollution sources
- To study various measures to make the campus Self sustainable in respect of Natural resources
- 4. To suggest the various measures to reduce the pollution: Air, Water, Noise

1.3 Audit Methodology:

- 1. Study of College as System
- 2. Study of Electrical Energy Consumption
- 3. Study of CO2 emissions
- 4. Suggestions on usage of Renewable Energy

1.4 General Details of College

No	Head	Particulars	
1	Name of Institution	Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune	
2	Address	Padmashree D. Y. Patil Educational Complex, Sector 29 Nigdi, Akurdi, Maharashtra 411044	
3	Affiliation	Savitribai Phule Pune University	

Pad:nashree Dr. D Y Patil College Suchhaute,

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2. Study of Consumption of Various Resources

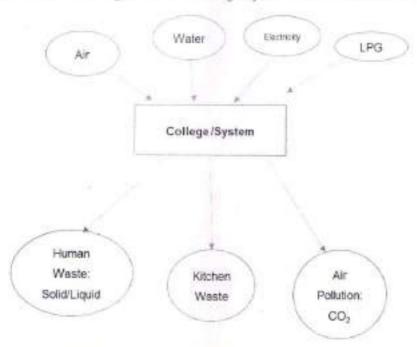
The Institute consumes following basic/derived Resources:

- 1. Air
- 2. Water
- 3. Electrical Energy
- 4. Liquefied Petroleum Gas

Also, college emits following pollutants to environment

- 1. Human Waste: Solid/ Liquid
- 2. Kitchen waste
- 3. Air pollution

We try to draw a schematic diagram for the College System & Environment as under.



Now we compute the Generation of CO2 on account of consumption of Electrical Energy & LPG as under.

The Padmashree DR. D Y Patil College Of Architecture Akurdi, Pune is situated in Padmashree D. Y. Patil Educational Complex. Entire Educational Complex is having single energy meter for all institutes situated in complex. The bill analysis is carried for electricity bills of entire campus.

The calculation of electrical energy consumption by college can be given as,

Padmashree Dr. D Y Patil

Table 2.1: Electrical Energy Consumption

No	Month	Energy (kWh)
1	Jun-20	3,240
2	May-20	265
3	Apr-20	3,214
4	Mar-20	6,674
5	Feb-20	36,554
6	Jan-20	34,248
7	Dec-19	31,500
8	Nov-19	23,942
9	Oct-19	24,164
10	Sep-19	35,724
11	Aug-19	30,872
12	Jul-19	39,074
	Total	269,471
	Maximum	39,074
	Minimum	265
	Average	22,456

2.1 Variation of Monthly Electrical Energy Consumption

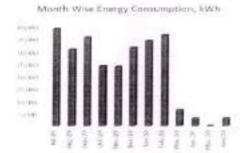


Figure 2.1: Monthly Electrical Energy Consumption

2.2 Key Inference drawn

From the above analysis, we present following important parameters

Padmashree Dr. D Y Patil College

Table 2.2: Variation in Important Parameters

No	Parameter/ Value	Energy Consumed, kWh
1	Maximum	39,074
2	Minimum	265
3	Average	22,456
4	Total	269,471

Padmashree Dr. D Y Putil College Of

3. Study of Environmental Pollution

In this Chapter, we present the various types of Pollution as under:

3.1 Air Pollution

The College is using two forms of Energies, namely: Thermal in the form of LPG and Electrical Energy used for day to day operations of the College. The major pollutant on account of above Energy forms is the Carbon Di Oxide.

- 1 unit (kWh) of Electrical Energy emits 0.8 Kg of CO₂ in the atmosphere
- 1 Kg of LPG emits 3 Kg of CO₂ in the atmosphere

In the following Table, we present the CO2 emissions.

Table 3.1: Month wise Consumption of Electrical Energy & CO2 Emissions:

No	Month	Energy Consumed, kWh	CO2 Emissions, MT
1	Jun-20	3,240	2.6
2	May-20	265	0.2
3	Apr-20	3,214	2.6
4	Mar-20	6,674	5.3
5	Feb-20	36,554	29.2
6	Jan-20	34,248	27.4
7	Dec-19	31,500	25.2
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12	Jul-19	39,074	31.3
	Total	269,471	215.6
	Maximum	39,074	31.3
	Minimum	265	0.2
	Average	22,456	18.0

11

Padmashree Dr. D Y Palji College of a Alordi Pune In the following Chart we present the CO2 emissions due to usage of Electrical Energy.

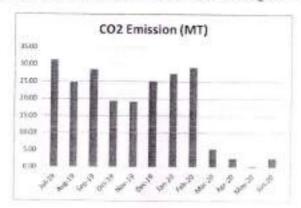


Figure 2.1: CO2 emission due to usage of electrical energy.

3.2 Study of Solid Waste Generation

The garbage collected in college is segregated into wet and dry centrally in campus.

Waste bins are placed in college campus for collection of waste.

3.3 Canteen food wastage

ALCOHOLD CONTRACTOR STANDARD CONTRACTOR STANDA

The students and canteen staff are encouraged to have minimal food wastage. Canteen contractor have food license and shop act certificate. The canteen is encouraged for usage of paper tea cups.

3.4 Study of Liquid Waste Generation

The waste water generated in college campus is treated in Sewage Water Treatment Plant. This plant aims to remove contaminants from sewage to produce an effluent that is suitable for reuse application. The sewage water treatment plant is operating with 100 KLD water capacity.

Photograph of Sewage Treatment Plant



3.5 Study of e-Waste Management:

The internal communication is through emails and there is hardly any generation of e-Waste in the premises.

Padmashree Dr. D Y Patil Company Sture,

12

4. Study of Rain Water Harvesting

The College has already installed Rain Water Harvesting project, wherein the rain water falling on the terrace is collected and through pipes it is fed to underground Water Storage tank. This stored water is then reused for domestic purpose.

Padmestree Dr. D.Y Patil College of Arch

5. Recommendations

In order to reduce the dependency on Natural resources and also in order to reduce the various pollutions arising due to the day to day operations of the College we herewith recommend following recommendations.

- Installation of Bio Gas Generator Plant instead of Bio composting Plant.
- Installation of Bio Composting Plant to generate fertilizer from garden waste.

Padmashree Dr. D Y Patil College of An



Dr D Y Patil Prathisthan's

PADMASHREE DR. D Y PATIL COLLEGE OF ARCHITECTURE

Sector No. 29, B/h. Akurdi Railway Station, Nigdi Pradhikaran, Akurdi, Pune - 411044

ACADEMIC YEAR (2018-19)



Dr D Y Patil Prathisthan's

PADMASHREE DR. D Y PATIL COLLEGE OF ARCHITECTURE

Sector No. 29, B/h. Akurdi Railway Station, Nigdi Pradhikaran, Akurdi, Punc - 411044

Criterion 7 Institutional Values and Best Practices

Key Indicator 7.1.3

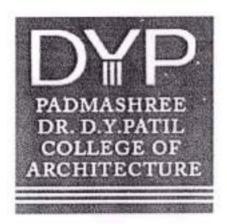
Quality Audits and environment and energy regularly undertaken by the institution
The Institutional environment and energy initiative are confirmed through the following
1. Green Audit / Environment Audit
2. Energy Audit
3.Clean and Green Campus Initiative 4. Beyond the Campus Environmental Promotion Activities

Sr. No	Contents (Documents)		
A	Supporting Documents	Date	Year
1	Green Audit Reports	22/06/2019	(2018-19)
2	Energy Audit Reports	22/06/2019	(2018-19)

GREEN AUDIT REPORT

OF

Dr. D. Y. Patil Pratishthan's, Padmashree Dr. D. Y. Patil College of Architecture, Akurdi, Pune 411 044



Year: 2018-19

Prepared by:

Enrich Consultants

Yashashree, 26, Nirmal Bag Society Near Muktangan English School, Parvati, Pune 411009

Phone: 09890444795Email: enrichcons@gmail.com
Padmashree Er D Y Pail College of Architecture,

Akurdi Pune

MAHARASHTRA ENERGY DEVELOPMENT AGENCY



Maharashtra Energy Development Agency

(A Government of Maharashtra undertaking)

2nd Floor, MHADA Commercial Complex, Opp. Tridal Nagar, Verwads, Pane 441 006

Ph No. 020-20014393/200144403

Finall: cee (mahara) com. Web: www.maharja.com.

TUN-2018-19 UR-05-4174

19th September 2018

FOR CLASS 'A'

We bereby certify that, the firm baving following particulars is registered with MAHARASHTRA ENERGY DEVELOPMENT AGENCY (MEDA) under given category as "Unergy Planner & Lucrgy Auditor" in Mahamshtra for Unergy Conservation Programme of MEDA.

Name and Address of the firm

Enrich Consultants

Vanhashree, Plot No. 26, Normal Bog Society,

Sear Multangan English School.

Parvati, Punc -411009;

Registration Category

Empanelled Consultant for Energy Conservation

Programme

Registration Number

MEDA/ECN/CR-05/2018-19/EA-03

- Energy Conservation Programme intends to alentify areas where wasteful use of energy occurs and to evaluate the scope for Energy Conservation and take concrete steps to achieve the evaluated energy savings.
- MEDA reserves the right to visit the firm at any time without giving any prior information and canceling the registration, if the information is found incorrect.
- This empanelment is valid till 31stMarch 2021 from the date of registration, to carry out energy audits under the Energy Conservation Programme
- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.

(Smith Kudarikar) General Manager (FC)

Dr. D Y Patil Pratishthan's

Padmashree Dr. D.Y.Patti College of Architecture,



Enrich Consultants

Yashashree, 26, Nirmal Bag Society, Near Muktangan English School, Parvati, Pune 411 009 Tel: 09890444795 Email: enrichcons@gmail.com

Ref: EC/DYPCOA/18-19/02

Date: 22/6/2022

CERTIFICATE

This is to certify that we have conducted Green Audit at Dr. D. Y. Patil Pratishthan's Padmashree Dr. D. Y. Patil College of Architecture, Akurdi, Pune in the Year 2018-19.

The College has adopted following Energy Efficient and Green Practices:

- Usage of Energy Efficient LED Fittings
- Segregation of Waste at Source
- Installation of 180 KLPD Sewage Treatment Plant of Capacity
- Maintenance of Good Internal Road
- Internal Tree Plantation

We appreciate the support of Management, involvement of faculty members and students in the process of Energy Conservation & making the campus Green.

For Enrich Consultants.

A Y Mehendale,

Certified Energy Auditor, EA-8192

NAICAY CONSULTANT

Dr. D Y Patil Pratishman's Padmashree Dr. D Y Patil College of Architecture, Akurdi Pune

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3	Study of CO ₂ Emission	11
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6	Study of Rain Water Management	15
7	Study of Green Practices	16

Dr. D Y Patil Profishthen's Padmashree Dr. D Y Patil College of Architecture, Akurdi Pune

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Enrich Consultants, Pune

ACKNOWLEDGEMENT

We at Enrich Consultants, Pune, express our sincere gratitude to the management of Dr. D. Y. Patil Pratishthan's Padmashree Dr. D. Y. Patil College of Architecture, Akurdi, Pune for awarding us the assignment of Green Audit of their Akurdi Campus, for the Academic Year: 2018-19.

We are thankful to the Staff members for helping us during the field study.

Ör, Ö Y Pati Profishthan's Padmashree Ör, Ö Y Patil College of Architecture,

Mura Pune

Enrich Consultants, Pune

EXECUTIVE SUMMARY

- Dr. D. Y. Patil Pratishthan's Padmashree Dr. D. Y. Patil College of Architecture, Akurdi , Pune consumes Energy in the form of Electrical Energy; used for various gadgets, office & other facilities.
- 2. Present Energy Consumption & CO2 Emission:

No	Parameter/ Value	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Total	37139	29.71
2	Maximum	3458	2.77
3	Minimum	2798	2.24
4	Average	3094.92	2.48

- 3. Energy Conservation projects already installed:
 - · Usage of Energy Efficient LED fittings
 - · Usage of BEE STAR Rated Equipment
- 4. Usage of Renewable Energy:
 - The College has yet to install Roof Top Solar PV Plant
- 5. Waste Management:
- 5.1 Segregation of Waste at Source:

The solid waste is segregated at source. There are separate bins for collection at various points and is disposed of for further action.

5.2 Liquid Waste Management:

The College has installed Sewage Treatment Plant of capacity 180 KLPD. The treated water is used for gardening purpose.

6. Rain Water Management:

The College has yet to install Rain Water Management Project.

- 7. Green Practices:
 - Maintenance of good Internal Road
 - Maintenance of Internal Garden
- 8. Assumption:
 - 1 kWh of Electrical Energy releases 0.8 Kg of CO₂into atmosphere

Dr. D Y Pati Pratishthan's Padmashree Dr. D Y Pati College of Architecture.

Page 6

Enrich Consultants, Pune

ABBREVIATIONS

BEE Bureau of Energy Efficiency

kWh Kilo Watt Hour

kWp Kilo Watt Peak

Kg Kilo Gram MT Metric Ton

CO₂ Carbon Di Oxide

LPD Liters per Day

DAD

Dr. D Y Patil Pratishthan's Padmashree Dr. D Y Patil College of Architecture,

CHAPTER-I INTRODUCTION

1.1 Objectives:

- 1. To study present Energy Consumption
- To Study CO₂ emissions
- 3. To study usage of Renewable Energy
- 4. Study of Waste Management
- 5. Study of Rain Water Management
- 6. Study of Green & Sustainable Practices

1.2 Table No 1: General Details of the College:

No	Head	Particulars
1	Name of the Institution	Dr. D. Y. Patil Pratishthan's Padmashree Dr. D. Y. Patil College of Architecture
2	Address	D Y Patil Educational Complex, Sector 29, Nigdi, Pradhikaran, Akurdi, Pune
3	Year of Establishment	2000
4	Affiliation	Savitribal Phule Pune University

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Dr. D.Y Patil Pretishthan's

Padma Fria Bill D College of Architecture,

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Page 8

Enrich Consultants, Pune

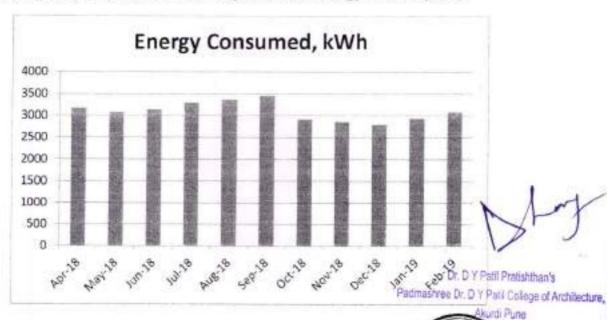
CHAPTER-II STUDY OF PRESENT ENERGY CONSUMPTION

In this chapter, we present the analysis of Energy Consumption.

Table No 2: Study of Electrical Energy Consumption: 18-19:

No	Month	Energy Consumed, kWh
1	Apr-18	3175
2	May-18	3085
3	Jun-18	3139
4	Jul-18	3296
5	Aug-18	3375
6	Sep-18	3458
7	Oct-18	2917
8	Nov-18	2857
. 9	Dec-18	2798
10	Jan-19	2936
11	Feb-19	3086
12	Mar-19	3017
13	Total	37139
14	Maximum	3458
15	Minimum	2798
16	Average	3094.92

Chart No: 1: Study of variation of Monthly Electrical Energy Consumption:



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Green Audit Report- Padmashree Dr. D. Y. Patil College of Architecture, Pimpri: 18-19

Table No 3: Important Parameters:

No	Parameter/ Variation	Energy Consumed, kWh
1	Total	37139
2	Maximum	3458
3	Minimum	2798
4	Average	3094.92

Dr. D Y Patil Pratishthan's
Padmashree Or. D Y Patil College of Architecture
Akuroi Pune

CHAPTER-III STUDY OF CO₂ EMISSION

A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities.

In this we compute the emissions of Carbon-Di-Oxide, by usage of the various forms of Energy used by the College for performing its day to day activities

The College uses Electrical Energy for various Electrical gadgets

Basis for computation of CO2 Emissions:

The basis of Calculation for CO2 emissions due to Electrical Energy are as under

1 kWh of Electrical Energy releases 0.8 Kg of CO₂ into atmosphere

Based on the above Data we compute the CO₂ emissions which are being released in to the atmosphere by the College due to its Day to Day operations

Table No 4: Month wise CO2 Emissions:

No	Month	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Apr-18	3175	2,54
2	May-18	3085	2.47
3	Jun-18	3139	2.51
4	Jul-18	3296	2.64
5	Aug-18	3375	2.70
6	Sep-18	3458	2.77
7	Oct-18	2917	2.33
8	Nov-18	2857	2.29
9	Dec-18	2798	2.24
10	Jan-19	2936	2.35
11	Feb-19	3086	2.47
12	Mar-19	3017	2.41
13	Total	37139	29.71
14	Maximum	3458	2.77
15	Minimum	2798	2.24
16	Average	3094.92	2.48

Dr. D Y Pati Pretichthan's Padmashree Dr. D Y Pati College of Architecture, Alaum Pune



Green Audit Kurart- Padmashree Dr. D. Y. Patil College of Architecture, Pimpri: 18-19

Chart No: 2: Representation of Month wise CO2 Emissions:

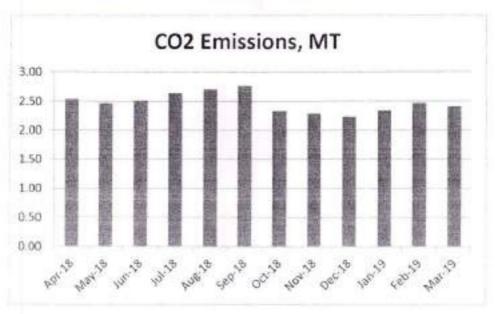


Table No 5: Variation in Important Parameters:

No	Parameter/ Value	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Total	37139	29.71
2	Maximum	3458	2.77
3	Minimum	2798	2.24
4	Average	3094.92	2.48

Dr. D Y Patil Pratishthan's
Padmashree Dr. D Y Patil College of Architecture,

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Green Audit Report- Pudmashree Dr. D. Y. Patil College of Architecture, Pimpri: 18-19

CHAPTER-IV STUDY OF USAGE OF RENEWABLE ENERGY

The College has yet to install Roof Top Solar PV Plant

Dr. D Y Patt Pratishthan's
Padmashree Dr. D Y Patt College of Architecture,

2000 Page

Enrich Consultants, Pune

CHAPTER V STUDY OF WASTE MANAGEMENT

5.1 Segregation of Waste at Source:

The solid waste is segregated at source. There are separate bins for collection at various points and is disposed of for further for action.

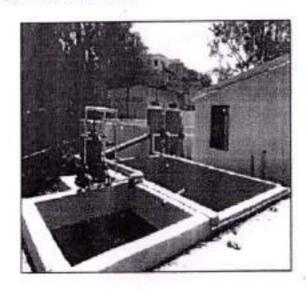
Photograph of Waste Collection Bins:



5.2 Liquid Waste Management:

The College has installed Sewage Treatment Plant of capacity 180 KLPD. The treated water is used for gardening purpose.

Photograph of Sewage Treatment Plant:



Dr. D Y Patil Pratishihan's
Padmashree Dr. D Y Patil College of Architecture,



Green Audit Report- Padmashree Dr. D. ** Patil College of Architecture, Pimpri: 18-19

CHAPTER-VI STUDY OF RAIN WATER MANAGEMENT

The College has yet to install Rain Water Management Project.

Day.

Dr. D.Y Paul Pretishthen's

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CHAPTER-VII STUDY OF GREEN PRACTICES

7.1 Pedestrian Friendly Road

The College has well maintained internal road to facilitate the easy movement of the students within the campus.

Photograph of internal road in the campus:



7.2 Internal Tree Plantation:

The College has well maintained lawn and internal Tree Plantation.

Photograph of Tree Plantation in the campus:



Dr. D Y Pati Pratishthen's

Padmisshree Dr. D.Y. Fan, College of Architecture, Gord Pune

Enrich Consultants, Pune

ENERGY AUDIT REPORT

OF

Dr. D. Y. Patil Pratishthan's, Padmashree Dr. D. Y. Patil College of Architecture, Akurdi, Pune-411 044



Year: 2018-19

Prepared by:

Enrich Consultants

Yashashree, 26, Nirmal Bag Society
Near Muktangan English School, Parvati, Pune 411009
Phone: 09890444795Email: enrichcons@gmail.com

Dr. D Y Palii Praishthan's
Padmashree Dr. D Y Patii College of Architecture,
Akurdi Pune

MAHARASHTRA ENERGY DEVELOPMENT AGENCY



Maharashtra Energy Development Agency

(A Government of Muharashtru undertaking)

2nd Floor, MHADA Commercial Complex, Opp. Fraial Nagar, Yerwada, Pune 4,1 998
Ph Suc ((2n)-2m) 4393: 206144403
Fmail: ecc o mahaurja.com, Web; www.mahaurja.com.

FUN 2018-19/CR-05 4174

19th September , 2018

FOR CLASS 'A'

We bereby certify that, the firm having following particulars in registered with MAHARASHTRA ENERGY DEVELOPMENT AGENCY (MEDA) under given category as "Forgs Planner & Energy Auditor" in Maharashtra for Energy Conservation Programme of MEDA.

Name and Address of the firm

Enrich Consultants

Yashashree, Plot No. 20, Normal Bag Society-

Near Multangur English School.

Parvati, Poor - 411009.

Registration Category

Empanelled Considerat for Energy Conservation

Programma

Registration Number

MEDA/ECN/CR-05/2018-19/E-1-03

- Energy Conservation Programmic intends to identify areas where wasteful use of energy occurs and to evaluate the scope for Unergy Conservation and take concrete steps to achieve the evaluated energy savings.
- MLDA reserves the right to visit the firm at any time without giving any prior information and canceling the registration, if the information is found incorrect.
- This empanelment is valid till 31"March 2021 from the date of registration, to corry out energy audits under the Unergy Conservation Programme
- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.

(Smith Kudarikar) General Manager (FC)

Dr. D Y Patil Pratishthan's Padmachree Dr. D Y Patil College of Architecture,

Alord Pune

THE COLUMN

Enrich Consultants, Pune

Enrich Consultants

Yashashree, 26, Nirmal Bag Society, Near Muktangan English School, Parvati, Pune 411 009 Tel: 09890444795 Email: enrichcons@gmail.com

Ref: EC/DYPCOA/18-19/01

Date: 22/6/2019

CERTIFICATE

This is to certify that we have conducted Energy Audit at Dr. D. Y. Patil Pratishthan's Padmashree Dr. D. Y. Patil College of Architecture, Akurdi, Pune in the Year 2018-19.

The College has adopted Energy Efficient Practices:

- Usage of Energy Efficient LED Fittings
- Usage of Energy Efficient BEE STAR Rated equipment
- Maximum usage of Day Lighting

We appreciate the support of Management, involvement of faculty members and students in the process of Energy Conservation & making the campus Green.

For Enrich Consultants,

A Y Mehendale,

Certified Energy Auditor

EA-8192

PALICH CORPORTING

Dr. D Y Patil Pratishthan's Padmashree Dr. D Y Patil College of Architecture, Alcurdi Plune

Enrich Consultants, Pune

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1	Introduction	8
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3	Study of Present Energy Consumption	10
4	Study of CO ₂ Emission	12
5	Study of Usage of Alternate Energy	14
6	Study of Usage of LED Lighting	15

Dr. D Y Pali Pratishthan's
Padmashree Dr. D Y Pali College of Architecture,
Akurdi Pune



Energy Audit Report: Padmashree Dr. D. Y. Patil College of Architecture, Akurdi: 18-19

ACKNOWLEDGEMENT

We at Enrich Consultants, Pune, express our sincere gratitude to the management of Dr. D. Y. Patil Pratishthan's Padmashree Dr. D. Y. Patil College of Architecture, Akurdi, Pune for awarding us the assignment of Energy Audit of their Akurdi Campus, for the Academic Year. 2018-19.

We are thankful to the Staff members for helping us during the field study.

Dr. D Y Para Pratishthan's

Padmashree Dr. D Y Patil College of Architecture,

Akurdi Pune



EXECUTIVE SUMMARY

- Dr. D. Y. Patil Pratishthan's Padmashree Dr. D. Y. Patil College of Architecture, Akurdi , Pune consumes Energy in the form of Electrical Energy; used for various gadgets, office & other facilities.
- 2. Present Energy Consumption & CO2 Emission:

No	Parameter/ Value	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Total	37139	29,71
2	Maximum	3458	2.77
3	Minimum	2798	2.24
4	Average	3094.92	2.48

- 3. Energy Conservation projects installed:
 - Usage of Energy Efficient LED fittings
 - Usage of BEE STAR Rated Equipment
- 4. Usage of Alternate Energy:
 - · The College has yet to install Roof Top Solar PV Plant
 - The percentage of usage of Alternate Energy to Annual Energy Demand is Nil
- 5. Usage of LED Lighting:
 - The Total LED Lighting load of College is 1.36 kW.
 - . The Lighting Load is 8.36 kW.
 - The % of LED Lighting to Total Lighting Load is 16.27 %.
- 6. Assumption:
 - 1 kWh of Electrical Energy releases 0.8 Kg of CO₂ into atmosphere

Dr. D Y Patil Pratishthan's
Padmashree Dr. D Y Patil College of Architecture,
Akurdi Pune



ABBREVIATIONS

BEE Bureau of Energy Efficiency

MSEDCL Maharashtra Electricity Distribution Company Limited

kWh Kilo Watt Hour

kWp Kilo Watt Peak

Kg Kilo Gram MT Metric Ton

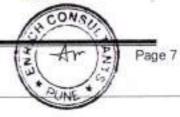
LED

CO₂ Carbon Di Oxide

FTL Fluorescent Tube Light

Light Emitting Diode

Dr. D Y Patil Pratishthan's
Padmashree Dr. D Y Patil College of Architecture,
Akurdi Pune



CHAPTER-I INTRODUCTION

1.1 Objectives:

- 1. To study Connected Load and Present Energy Consumption
- 2. To Study the CO2 emissions
- 3. To study usage of Alternate Energy
- 4. To study usage of LED Lighting

1.2 Table No 1: General Details of the College:

No	Head	Particulars
1	Name of the Institution	Dr. D. Y. Patil Pratishthan's Padmashree Dr. D. Y. Patil College of Architecture
2	Address	D Y Patil Educational Complex, Sector 29, Nigdi, Pradhikaran, Akurdi, Pune
3	Year of Establishment	2000
4	Affiliation	Savitribal Phule Pune University

Dr. D Y Patil Pratishthan's
Padmastree Dr. D Y Patil College of Architecture,
Akurdi Pune



CHAPTER-II STUDY OF CONNECTED LOAD

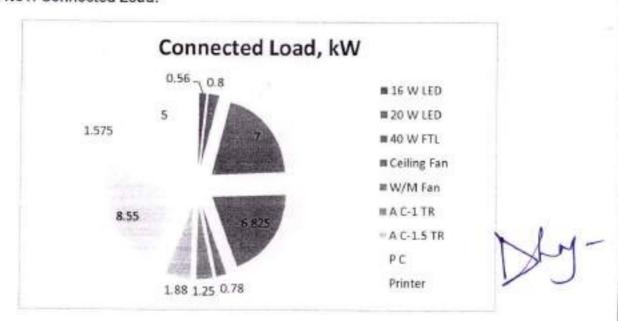
The major contributors to the connected load of the College are as under.

Table No 2: Equipment wise Connected Load:

No	Equipment	Qty	Load, W/Unit	Load, kW
1	16 W LED	35	16	0.56
2	20 W LED	40	20	0.8
3	40 W FTL	175	40	7
4	Ceiling Fan	105	65	6.825
5	W/M Fan	15	52	0.78
6	A C-1 TR	1	1250	1.25
7	A C-1.5 TR	1	1875	1.88
8	PC	57	150	8.55
9	Printer	9	175	1.575
10	Other Equipment	20	250	5
11	Total			34

We present the above Data in a PIE Chart as under,

Chart No1: Connected Load:

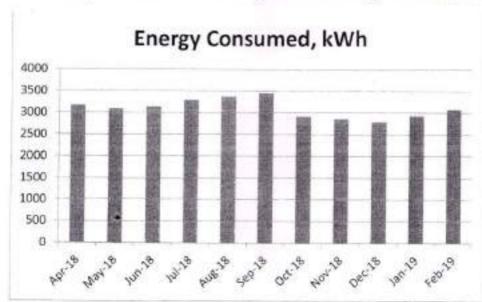


CHAPTER-III STUDY OF PRESENT ENERGY CONSUMPTION

In this chapter, we present the analysis of Energy Consumption Table No. 3: Study of Electrical Energy Consumption: 18-19:

No	Month	Energy Consumed, kWh
1	Apr-18	3175
2	May-18	3085
3	Jun-18	3139
4	Jul-18	3296
5	Aug-18	3375
6	Sep-18	3458
7	Oct-18	2917
8	Nov-18	2857
9	Dec-18	2798
10	Jan-19	2936
11	Feb-19	3086
12	Mar-19	3017
13	Total	37139
14	Maximum	3458
15	Minimum	2798
16	Average	3094.92

Chart No 2: To study the variation of Monthly Electrical Energy Consumption:



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Padmashne D Dy Pin Col Gold Architecture,

Energy Audit Report: Padmashree Dr. D. Y. Patil College of Architecture, Akurdi: 18-19

Table No 4: Important Parameters:

No	Parameter/ Variation	Energy Consumed, kWh
1	Total	37139
2	Maximum	3458
3	Minimum	2798
4	Average	3094.92

Dr. D Y Patil Pratistithan's

Padmashree Dr. D Y Patil College of Architecture,

Akurdi Pune

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CHAPTER-IV STUDY OF CO₂ EMISSION

A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities.

In this we compute the emissions of Carbon-Di-Oxide, by usage of the various forms of Energy used by the College for performing its day to day activities

The College uses two forms of Energy namely: Electrical Energy for various Electrical gadgets.

Basis for computation of CO2 Emissions:

The basis of Calculation for CO2 emissions due to Electrical Energy is as under.

1 kWh of Electrical Energy releases 0.9 Kg of CO₂ into atmosphere.

Based on the above Data we compute the CO₂ emissions which are being released in to the atmosphere by the College due to its Day to Day operations

Table No 5: Month wise CO₂ Emissions:

No	Month	Energy Consumed, kWh	CO ₂ Emissions MT
1	Apr-18	3175	2.54
2	May-18	3085	2.47
3	Jun-18	3139	2.51
4	Jul-18	3296	2.64
5	Aug-18	3375	2.70
6	Sep-18	3458	2.77
7	Oct-18	2917	2.33
8	Nov-18	2857	2.29
9	Dec-18	2798	2.24
10	Jan-19	2936	2.35
11	Feb-19	3086	2.47
12	Mar-19	3017	2.41
13	Total	37139	29.71
14	Maximum	3458	2.77
15	Minimum	2798	2.24
16	Average	3094.92	2.48

Dr. D Y Pati Presenthan's

Padmashree Dr. D Y Patil College of Architecture, Akurdi Pune W Am

Chart No 3: Representation of Month wise CO₂ Emissions:

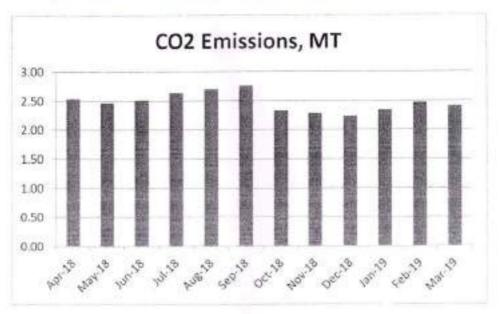


Table No 6: Important Parameters:

No	Parameter/ Value	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Total	37139	29.71
2	Maximum	3458	2.77
3	Minimum	2798	2.24
4	Average	3094.92	2.48

Dr. D.Y.Patt Pretistoner's Padmashree Dr. D.Y.Patti College of Architecture,

Akurdi Pune

GULTANA O Arr U

CHAPTER-V STUDY OF USAGE OF ALTERNATE ENERGY

The College has yet to install Roof Top Solar PV Plant

The percentage of usage of Alternate Energy to Annual Energy Demand is Nil

Dr. D Y Patil Pratishthan's

Padmashree Dr. D Y Patil College of Architecture,

Akurdi Pune

Enrich Consultants, Pune



CHAPTER VI STUDY OF USAGE OF LED LIGHTING

In this chapter, we compute the percentage of usage of LED Lighting to Total Lighting Load, as under.

Table No 7: Percentage of Usage of LED Lighting to Total Lighting Load:

No	Particulars	Value	Unit
1	Qty of 16 W LED Fitting	35	Nos
2	Load of 16 W LED Fitting	16	W/Unit
3	Total Load of 16 W LED Fittings	0.56	kW
4	Qty of 20 W LED Fitting	40	Nos
5	Load of 20 W LED Fitting	20	W/Unit
6	Total Load of 20 W LED Fittings	0.8	kW
7	Qty of 40 W FTL Fitting	175	Nos
8	Load of 40 W FTL Fitting	40	W/Unit
9	Total Load of 40 W FTL Fittings	7	kW
10	Total LED Lighting Load= 3+6	1.36	kW
11	Total Lighting Load= 3+6+9	8.36	kW
12	Percentage of LED to Total Lighting Load=(10)*100/(11)	16.27	%

Dr. D Y Patil Pratishthan's

Padmishree Dr. D Y Patil College of Architecture,

Akurdi Pune



Dr D Y Patil Prathisthan's

PADMASHREE DR. D Y PATIL COLLEGE OF ARCHITECTURE

Sector No. 29, B/h. Akurdi Railway Station, Nigdi Pradhikaran, Akurdi, Pune - 411044

ACADEMIC YEAR (2017-18)



Dr D Y Patil Prathisthan's

PADMASHREE DR. D Y PATIL COLLEGE OF ARCHITECTURE

Sector No. 29, B/h. Akurdi Railway Station, Nigdi Pradhikaran, Akurdi, Pune - 411044

Criterion 7 Institutional Values and Best Practices

Key Indicator 7.1.3

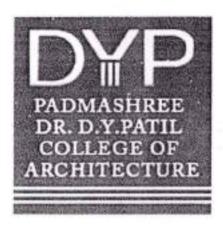
Metric No.	Quality Audits and environment and energy regularly undertaken by the institution
7.1.3	The Institutional environment and energy initiative are confirmed through the following
	1. Green Audit / Environment Audit 2. Energy Audit
	3.Clean and Green Campus Initiative 4. Beyond the Campus Environmental Promotion Activities

Sr. No	Contents (Documents)		
A	Supporting Documents	Date	Year
1	Green Audit Reports	15/06/2018	(2017-18)
2	Energy Audit Reports	15/06/2018	(2017-18)

GREEN AUDIT REPORT

OF

Dr. D. Y. Patil Pratishthan's, Padmashree Dr. D. Y. Patil College of Architecture, Akurdi, Pune 411 044



Year: 2017-18

Prepared by:

Enrich Consultants

Yashashree, 26, Nirmal Bag Society
Near Muktangan English School, Parvati, Pune 411009
Phone: 09890444795Email: enrichcons@gmail.com

Dr. D.Y. Payli Pratichthan's
Padmashree Dr. D.Y. Payli College of Architecture,
Akurdi Pune

MAHARASHTRA ENERGY DEVELOPMENT AGENCY

Maharashtra Energy Development Agency

1A Government of Mallerashtra undertaking)
2rd Floor MHADA Commercial Complex Clop. Tridal Nagar. Yerwada. Pune 411 005
Ph No. 020-26614393/266141403. Pax No. 020-26615031
Email. econ@mahaurja.com; Web www.mahaurja.com

ECN/2017-18/CR-01/5728

30" November 2017

FOR CLASS 'A'

We hereby certify that, the firm having following particulars is registered with MAHARASHTRA ENERGY DEVELOPMENT AGENCY (MEDA) under given category as Energy Planner & Energy Auditor in Manarashtra under Save Energy Programme of MEDA.

Name and Address of the firm :

Envice Consultants

Yashashree, Plot No. 26 Nirmal Baug Society, Parvati, Pune - 411009.

Registration Category

Empanelled Consultant for Save Energy

Programme

Registration Number

MEDA/ECN/CR-01/2017-18/EA-37

- The Save Energy Programme intends to identify areas where wasteful use of energy occurs and to evaluate the scope for Energy Conservation and take concrete steps to achieve the evaluated energy savings.
- MEDA reserves the right to visit the firm at any time without giving any prior information and canceling the registration, if the information is found incorrect.
- This empanelment is valid upto 3 year from the date of registration, to carry out energy audits under the Save Energy Programme of MEDA.
- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.

(Smita Kudarikar) Manager (EC)

Dr. D.Y Part Profishthan's

Padmashree Dr. O.Y. Patil College of Architecture.

Enrich Consultants, Pune

Enrich Consultants

Yashashree, 26, Nirmal Bag Society, Near Muktangan English School, Parvati, Pune 411 009 Tel: 09890444795 Email: enrichcons@gmail.com

Ref: EC/DYPCOA/17-18/02

Date: 15/6/2018

CERTIFICATE

This is to certify that we have conducted Green Audit at Dr. D. Y. Patil Pratishthan's Padmashree Dr. D. Y. Patil College of Architecture, Akurdi, Pune in the Year 2017-18.

The College has adopted following Energy Efficient and Green Practices:

- Usage of Energy Efficient LED Fittings
- Segregation of Waste at Source
- Provision of Sanitary Waste Incinerator
- Installation of 180 KLPD Sewage Treatment Plant of Capacity
- Maintenance of Good Internal Road
- Landscaped Lawn & Internal Tree Plantation

We appreciate the support of Management, involvement of faculty members and students in the process of Energy Conservation & making the campus Green.

For Enrich Consultants,

A Y Mehendale,

Certified Energy Auditor, EA-8192

STING POPULATION OF THE POPULA

Or. D.Y. Patil Prefishthan's Padmashree Dr. D.Y. Patil College of Architecture,

Akurdi Pune

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6	Study of Rain Water Management	15
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Dr. D Y Parli Pretishihan's

Padmoshree Dr. D Y Pasi College of Architectury

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ACKNOWLEDGEMENT

We at Enrich Consultants, Pune, express our sincere gratitude to the management of Dr. D. Y. Patil Pratishthan's Padmashree Dr. D. Y. Patil College of Architecture, Akurdi, Pune for awarding us the assignment of Green Audit of their Akurdi Campus, for the Academic Year: 2017-18.

We are thankful to the Staff members for helping us during the field study.

My

Dr. D.Y. Rett Pretishthan's Padmesty exist DV Set Niege of Architecture,

Enrich Consultants, Pune

EXECUTIVE SUMMARY

- Dr. D. Y. Patil Pratishthan's Padmashree Dr. D. Y. Patil College of Architecture, Akurdi , Pune consumes Energy in the form of Electrical Energy; used for various gadgets, office & other facilities.
- Present Energy Consumption & CO₂ Emission:

No	Parameter/ Value	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Total	36750	29.4
2	Maximum	3650	2.92
3	Minimum	2796	2.24
4	Average	3062.5	2.45

- 3. Energy Conservation projects already installed:
 - · Usage of Energy Efficient LED fittings
 - · Usage of BEE STAR Rated Equipment
- 4. Usage of Renewable Energy:

The College has yet to install Roof Top Solar PV Plant

- Waste Management:
- 5.1 Segregation of Waste at Source:

The solid waste is segregated at source. There are separate bins for collection at various points and is disposed of for further action.

5.2 Liquid Waste Management:

The College has installed Sewage Treatment Plant of capacity 180 KLPD. The treated water is used for gardening purpose.

6. Rain Water Management:

The College has yet to install Rain Water Management Project.

- 7. Green Practices:
 - Maintenance of good Internal Road
 - Maintenance of Internal Garden
- 8. Assumption:
 - 1 kWh of Electrical Energy releases 0.8 Kg of CO₂into atmosphere

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ABBREVIATIONS

and the same of th				
BEE	Bureau	of	Energy	Efficiency
The Park Store	Builtied I for todays	~r	LITTLE SAY	LING OF ILV

kWh Kilo Watt Hour kWp Kilo Watt Peak

Kg Kilo Gram MT Metric Ton

CO₂ Carbon Di Oxide LPD Liters per Day

LPG Liquefied Petroleum Gas
COA College of Architecture

Dr. D Y Path Profishthan's

admarked Dr. D.Y. Patri College of Architecture

RICH CO Visurdi Pune

CHAPTER-I INTRODUCTION

1.1 Objectives:

- 1. To study present Energy Consumption
- 2. To Study CO2 emissions
- 3. To study usage of Renewable Energy
- 4. Study of Waste Management
- 5. Study of Rain Water Management
- 6. Study of Green & Sustainable Practices

1.2 Table No 1: General Details of the College:

No	Head	Particulars
1	Name of the Institution	Dr. D. Y. Patil Pratishthan's Padmashree Dr. D. Y. Patil College of Architecture
2	Address	D Y Patil Educational Complex, Sector 29, Nigdi, Pradhikaran Akurdi, Pune
3	Year of Establishment	2000
4	Affiliation Savitribai Phule Pune University	

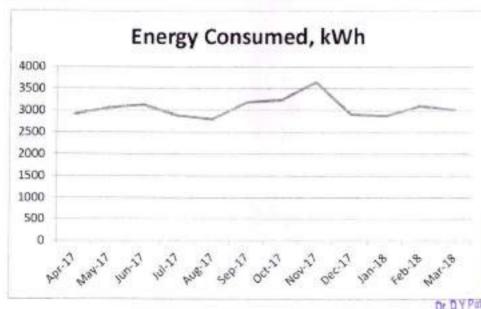
Padmash Rate H-Qo ege of Architecture

CHAPTER-II STUDY OF PRESENT ENERGY CONSUMPTION

In this chapter, we present the analysis of Energy Consumption. Table No 2: Study of Electrical Energy Consumption: 17-18:

No	Month	Energy Consumed, kWh
1	Apr-17	2917
2	May-17	3057
3	Jun-17	3125
4	Jul-17	2875
5	Aug-17	2796
6	Sep-17	3185
7	Oct-17	3236
8	Nov-17	3650
9	Dec-17	2915
10	Jan-18	2875
11	Feb-18	3102
12	Mar-18	3017
13	Total	36750
14	Maximum	3650
15	Minimum	2796
16	Average	3062.5

Chart No: 1: Study of variation of Monthly Electrical Energy Consumption:



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Dr. D Y Parti Pratishthan's
College of Architectury

Page 9

Green Audit Report- Padmashree Dr. D. Y. Patil College of Architecture, Pimpri: 17-18

Table No 3: Important Parameters:

No	Parameter/ Variation	Energy Consumed, kWh
1	Total	36750
2	Maximum	3650
3	Minimum	2796
4	Average	3062.5

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Page 10

CHAPTER-III STUDY OF CO₂ EMISSION

A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities.

In this we compute the emissions of Carbon-Di-Oxide, by usage of the various forms of Energy used by the College for performing its day to day activities

The College uses: Electrical Energy for various Electrical gadgets.

Basis for computation of CO2 Emissions:

The basis of Calculation for CO2 emissions due to Electrical Energy is as under

1 kWh of Electrical Energy releases 0.8 Kg of CO₂ into atmosphere
 Based on the above Data we compute the CO₂ emissions which are being released in to the atmosphere by the College due to its Day to Day operations

Table No 4: Month wise CO2 Emissions:

No	Month	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Apr-17	2917	2.334
2	May-17	3057	2.446
3	Jun-17	3125	2.5
4	Jul-17	2875	2.3
5	Aug-17	2796	2.24
6	Sep-17	3185	2.55
7	Oct-17	3236	2.59
8	Nov-17	3650	2.92
9	Dec-17	2915	2.33
10	Jan-18	2875	2.3
11	Feb-18	3102	2.48
12	Mar-18	3017	2.41
13	Total	36750	29.4
14	Maximum	3650	2.92
15	Minimum	2796	2.24
16	Average	3062.5	2.45



Chart No: 2: Representation of Month wise CO2 Emissions:

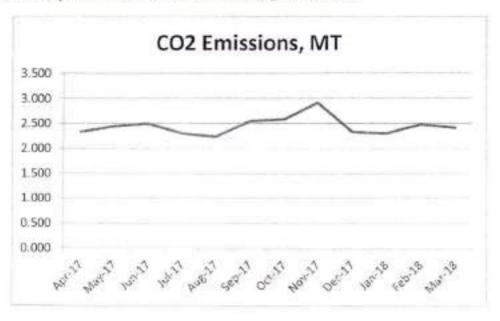


Table No 5: Variation in Important Parameters:

No	Parameter/ Value	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Total	36750	29.4
2	Maximum	3650	2.92
3	Minimum	2796	2.24
4	Average	3062.5	2.45

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Padra O. D. D. Page 12

Green Audit Report- Padmashree Dr. D. Y. Patil College of Architecture, Pimpri: 17-18

CHAPTER-IV STUDY OF USAGE OF RENEWABLE ENERGY

The College has yet to install Roof top Solar PV Plant.

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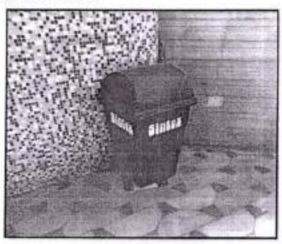


CHAPTER V STUDY OF WASTE MANAGEMENT

5.1 Segregation of Waste at Source:

The solid waste is segregated at source. There are separate bins for collection at various points and is disposed of for further for action.

Photograph of Waste Collection Bin:



5.2 Liquid Waste Management:

The College has installed Sewage Treatment Plant of capacity 180 KLPD. The treated water is used for gardening purpose.

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CHAPTER-VI STUDY OF RAIN WATER MANAGEMENT

The College has yet to install Rain Water Management Project.

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CHAPTER-VII STUDY OF GREEN PRACTICES

7.1 Pedestrian Friendly Road & Internal Tree Plantation:

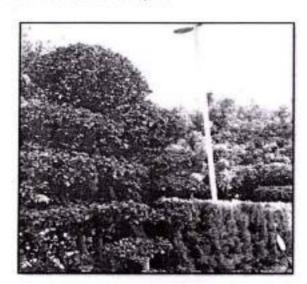
The College has well maintained internal road to facilitate the easy movement of the students within the campus.

Photograph of internal road in the campus:



7.2 Internal Tree Plantation:

The College has well maintained Landscaped Lawn and Internal Tree Plantation. Photograph of Trees & Plants in the campus:



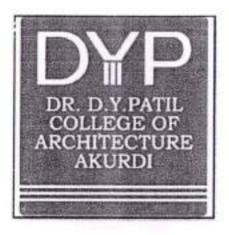
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ENERGY AUDIT REPORT

of

Dr D Y Patil Pratishthan's, Padmashree Dr. D. Y. Patil College of Architecture, Akurdi, Pune-411 044



Year: 2017-18

Prepared by:

Enrich Consultants

Yashashree, 26, Nirmal Bag Society
Near Muktangan English School, Parvati, Pune 411009
Phone: 09890444795Email: enrichcons@gmail.com

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Dr. D Y Patil Pretish Charl's

Padmeshree Dr. D. V. Palil College of Architecture,



MAHARAS ITRA ENERGY DEVELOPMENT AGENCY

Maharashtra Energy Development Agency

(A Government of Mallacastera undertaking)

211 Filoor MHADA Commercial Complex: (Icp: Tridal Nagar, Yerwada: Pune 411 008: Ph No. 020-26614393/266141403; Fax No. 020-26615031

Email: econ@mahaurja.com; Web: www.mahaurja.com

ECN/2017-18/CR-01/5728

30" November 2017

FOR CLASS 'A'

We hereby certify that, the firm having following particulars is registered with MAHARASHTRA ENERGY DEVELOPMENT AGENCY (MEDA) under given category as "Energy Planner & Energy Auditor in Maharashtra under Save Energy Programme of MEDA.

Name and Address of the firm :

Enrich Consultants

Yashirshree, Plot No. 26 Nirmal Baug Society, Parvati, Pune - 411009

Registration Category

Empinetled Consultant for Save Energy

Programme

Registration Number.

MEDA/ECN/CR-01/2017-18/EA-37

- The Save Energy Programme intends to identify areas where wasteful use of energy occurs and to evaluate the scope for Energy Conservation and take concrete steps to achieve the evaluated energy savings.
- MEDA reserves the right to visit the firm at any time without giving any prior information and canceling the registration if the information is found incorrect.
- This empanelment is valid upto 3 year from the date of registration, to carry out energy audits under the Save Energy Programme of MEDA.
- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof

(Smita Kudarikar) Manager (EC)

Dr. D Y Patil Pratishthan's

Padmashree Dr. D.Y. Pani College of Architecture,

Page 2

Enrich Consultants

Yashashree, 26, Nirmal Bag Society, Near Muktangan English School, Parvati, Pune 411 009 Tel: 09890444795 Email: enrichcons@gmail.com

Ref. EC/DYPCOA/17-18/01

Date: 15/6/2018

CERTIFICATE

This is to certify that we have conducted Energy Audit at Dr. D. Y. Patil Pratishthan's Padmashree Dr. D. Y. Patil College of Architecture, Akurdi, Pune in the Year 2017-18.

The College has adopted Energy Efficient Practices:

- Usage of Energy Efficient LED Fittings
- Maximum usage of Day Lighting

We appreciate the support of Management, involvement of faculty members and students in the process of Energy Conservation & making the campus Green.

For Enrich Consultants,

A Y Mehendale,

Certified Energy Auditor

EA-8192

STATUTE HOUSE

Dr. D. Y. F. att. Pratishthan's
Padmashree Dr. D. Y. Patt College of Architecture,

INDEX

Sr. No	Particulars	Page No
1	Acknowledgement	5
H	Executive Summary	6
H	Abbreviations	7
1	Introduction	8
2	Study of Connected Load	9
3	Study of Present Energy Consumption	10
4	Study of CO ₂ Emission	12
5	Study of Usage of Alternate Energy	14
6	Study of Usage of LED Lighting	15

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Dr. D.Y. Pauli Pratishman's
Padmashren Dt. D.Y. Pani College of Architecture,

Akurdi Rune

Enrich Consultants, Pune

ACKNOWLEDGEMENT

We at Enrich Consultants, Pune, express our sincere gratitude to the management of Dr. D. Y. Patil Pratishthan's Padmashree Dr. D. Y. Patil College of Architecture, Akurdi, Pune for awarding us the assignment of Energy Audit of their Akurdi Campus, for the Academic Year. 2017-18.

We are thankful to the Staff members for helping us during the field study.

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Dr. D.Y. Patil Profeshinan's

Padmashree Dr. D. / Fatir College of Architecture

EXECUTIVE SUMMARY

 Dr. D. Y. Patil Pratishthan's Padmashree Dr. D. Y. Patil College of Architecture, Akurdi , Pune consumes Energy in the form of Electrical Energy; used for various gadgets, office & other facilities.

2. Present Energy Consumption:

No	Parameter/ Value	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Total	36750	29.4
2	Maximum	3650	2.92
3	Minimum	2796	2.24
4	Average	3062.5	2.45

3. Energy Conservation projects already installed:

- · Usage of Energy Efficient LED fittings
- Usage of BEE STAR Rated Equipment

4. Usage of Alternate Energy:

- The College has yet to install the Roof Top Solar PV Plant.
- The percentage of usage of Alternate Energy to Annual Energy Demand is Nil

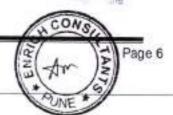
5. Usage of LED Lighting:

- The Total LED Lighting load of College is 1.10 kW.
- The Total Lighting Load is 8.70 kW.
- The % of LED Lighting to Total Lighting Load is 12.64 %.

6. Assumption:

1. 1 kWh of Electrical Energy releases 0.8 Kg of CO2 into atmosphere

Dr. D Y Puril Pratishthan's Padmashree Dr. D Y Puril College of Architecture,



ABBREVIATIONS

BEE Bureau of Energy Efficiency

MSEDCL Maharashtra Electricity Distribution Company Limited

kWh Kilo Watt Hour kWp Kilo Watt Peak

Kg Kilo Gram MT Metric Ton

CO₂ Carbon Di Oxide

FTL Fluorescent Tube Light
LED Light Emitting Diode
COA College of Architecture

Dr. D Y Parti Profishthan's Padmantree Dr. D Y Parti College of Architecture.



CHAPTER-I INTRODUCTION

1.1 Objectives:

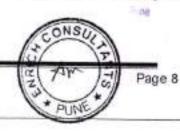
- 1. To study Connected Load
- 2. To study Present Energy Consumption
- 3. To study the CO2 emissions
- 4. To study usage of Alternate Energy
- 5. To study usage of LED Lighting

1.2 Table No 1: General Details of the College:

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Name of the Institution		Dr. D. Y. Patil Pratishthan's Padmashree Dr. D. Y. Patil College of Architecture
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3	Year of Establishment	2000
4	Affiliation Savitribai Phule Pune University	

Dr. D Y Patil Pratishthan's

Padmashrar Dr. D. Y.Patil College of Architecture,



CHAPTER-II STUDY OF CONNECTED LOAD

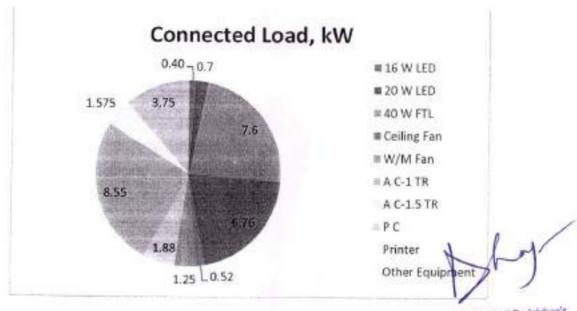
The major contributors to the connected load of the College are as under.

Table No 2: Equipment wise Connected Load:

No	Equipment	Qty	Load, W/Unit	Load kW
1	16 W LED	25	16	0.40
2	20 W LED	35	20	0.7
3	40 W FTL	190	40	7.6
4	Ceiling Fan	104	65	6.76
5	W/M Fan	10	52	0.52
6	A C-1 TR	1	1250	1.25
7	A C-1.5 TR	1	1875	1.88
8	PC	57	150	8.55
9	Printer	9	175	1.575
10	Other Equipment	15	250	3.75
11	Total			33

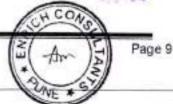
We present the above Data in a PIE Chart as under.

Chart No1: Connected Load:



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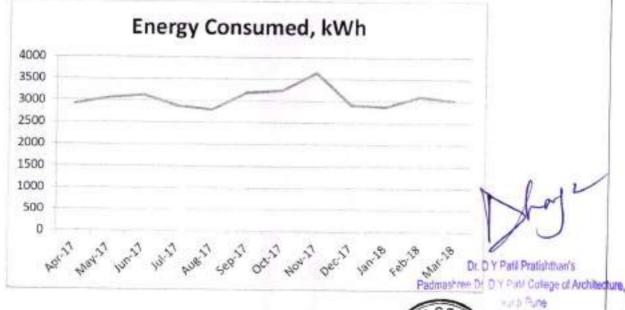


CHAPTER-III STUDY OF PRESENT ENERGY CONSUMPTION

in this chapter, we present the analysis of Energy Consumption Table No. 3: Study of Electrical Energy Consumption: 17-18:

No	Month	Energy Consumed, kWh
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12	Mar-18	3017
13	Total	36750
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16	Average	3062.5

Chart No 2: To study the variation of Monthly Electrical Energy Consumption:



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Table No 4: Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh
1	Total	36750
2	Maximum	3650
3	Minimum	2796
4	Average	3062.5

Dr. D.Y. Paul Pratishthan's Padmashren Dr. D.Y.P.NI College of Architecture

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Page 11

CHAPTER-IV STUDY OF CO₂ EMISSION

A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities

In this we compute the emissions of Carbon-Di-Oxide, by usage of the various forms of Energy used by the College for performing its day to day activities

The College uses Electrical Energy for various Electrical gadgets

Basis for computation of CO₂ Emissions:

The basis of Calculation for CO₂ emissions due to Electrical Energy is as under.

1 kWh of Electrical Energy releases 0.8 Kg of CO₂ into atmosphere.

Based on the above Data we compute the CO2 emissions which are being released in to the atmosphere by the College due to its Day to Day operations

Table No 5: Month wise CO₂ Emissions:

No	Month	Energy Consumed, kWh	CO ₂ Emissions, MT	
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Dr. D Y Patil Pratishthan's

Padmastree D. 5 * Path College of Architecture.

wind Pune

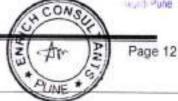


Chart No 3: Representation of Month wise CO2 Emissions:

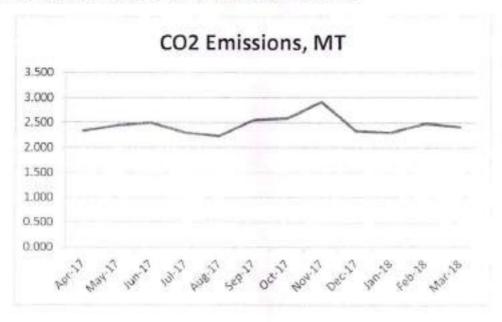


Table No 6: Important Parameters:

No	Parameter/ Value	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Total	36750	29.4
2	Maximum	3650	2.92
3	Minimum	2796	2.24
4	Average	3062.5	2.45

Dr. D Y Pail Pratishthan's

Padmastines On D.Y.P. an College of Architecture,

Page 13

CHAPTER-V STUDY OF USAGE OF ALTERNATE ENERGY

The College has yet to install Roof top Solar PV Plant.

Dr DY Path Pesichman's

or DY Path College of Architecture,

undiar and

CHAPTER VI STUDY OF USAGE OF LED LIGHTING

In this chapter, we compute the percentage of usage of LED Lighting to Total Lighting Load, as under.

Table No 7: Percentage of Usage of LED Lighting to Total Lighting Load:

No	Particulars	Value	Unit
1	Qty of 16 W LED Fitting	25	Nos
2	Load of 16 W LED Fitting	16	W/Unit
3	Total Load of 16 W LED Fittings	0.4	kW
4	Qty of 20 W LED Fitting	35	Nos
5	Load of 20 W LED Fitting	20	W/Unit
6	Total Load of 20 W LED Fittings	0.7	kW
7	Qty of 40 W FTL Fitting	190	Nos
8	Load of 40 W FTL Fitting	40	W/Unit
9	Total Load of 40 W FTL Fittings	7.6	kW
10	Total LED Lighting Load= 3+6	1.10	kW
11	Total Lighting Load= 3+6+9	8.70	kW
12	Percentage of LED to Total Lighting Load = (10)*100/(11)	12.64	%

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Padmashree Gr. D Y Pall College of Architecture,