7.1.6	Quality audits on environment and energy are regularly undertaken by the institution

Abstract

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3		Energy Audit Report-2021-22	21
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7.1.6.1	The institutional environment and energy initiatives are confirmed through the following

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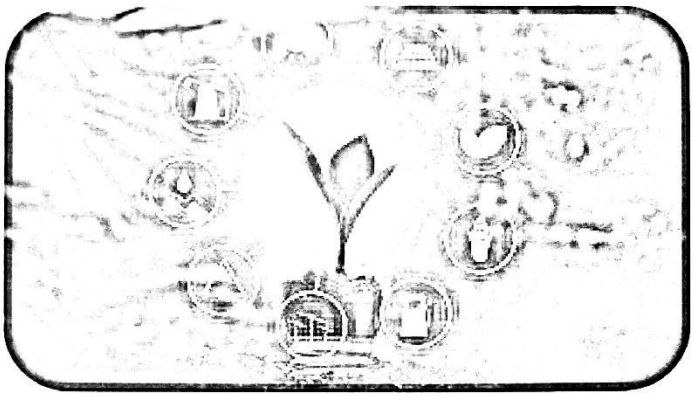
Atmiya University Rajkot

1 ENERGY AUDIT

1.1 ENERGY AUDIT REPORT-2019-20

ENERGY AUDIT REPORT



Atmiya University
Yogidham Gurukul, Kalawad Road,
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Date: 20/05/2020

Registrar
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Atmiya University Rajkot

Acknowledgement

We feel quite fortunate that Hon. P P Shri Tyagvallabh Swamiji has given us the opportunity to conduct Energy audit at Atmiya University, Yogidham Gurukul, Rajkot.

Several energy conservation measures have been identified and proposed in course of study and these options when implemented are expected to bring in lasting benefits in term of energy saving as well as cost saving to the management.

.

Mrs. Seema V. Vachhani
Energy Auditor
EA-25555

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1. Introduction

Energy audit is to reduce the amount of energy used in the organization without compromising the output. Energy auditing and management of energy consumption is to offer goods or services at the lowest possible cost and with the least amount of environmental effects. The audit team provides suggestions for better energy utilization.

2. Need for an Energy Audit

The need for energy audit arises from the importance of energy efficiency and sustainability in today's world. Energy audit serves several purposes and provides numerous benefits, including:

a. Identifying energy conservation opportunities by analyzing energy use and identifying areas where energy is being wasted or inefficiently used.
b. Cost reduction: Energy cost represents a significant part of total cost for any organization. An energy audit helps to identify energy-saving measures that can lead to cost reductions by reducing energy waste, optimizing equipment performance, and improving operational efficiency.
c. Environmental sustainability: Energy consumption is closely linked to environmental impact, particularly in terms of greenhouse gas emissions and climate change. By conducting an energy audit, organizations can identify ways to reduce their carbon footprint and contribute to environmental sustainability goals.
d. Compliance with regulations and standards: By proactively addressing compliance issues, organizations can avoid penalties and maintain a positive reputation.
e. Energy management and planning: An energy audit provides valuable data and insights that enable organizations to develop comprehensive energy management plans.

3. Systems studied during Energy Audit

a. Status of lighting fixtures have been checked, verified and recorded, physically.
b. Reviewed implemented non-conventional energy installation and applications in the institute for use.
c. Electricity bills served by PGVCL are verified and worked out for cost of power.
d. Energy conservation measures are reviewed.

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4. Statistical Data& Observations

Atmiya Campus is educational organization and it uses majorly electricity as input energy source for application of various university activities. The electricity is procured from PGVCL by HT connection of 900 kVA. PGVCL serves monthly electricity bill for payment & on receipt of monthly electricity bill it is paid. Standby power source DG set of (625+320) kVA is available to use during power failure from PGVCL.

A) Average Cost of Power

Monthly electricity bill is served by PGVCL against electricity used & is paid by university. A cost of power is worked out from total kWh used & associated cost.

Table 1: Average cost of power

Sr. No.	Month of billing	Grid electricity consumed (kWh)	Grid electricity cost (INR)	Effective Unit energy cost (INR)
1	Apr-19	1,52,740	12,51,367	8.19
2	May-19	1,35,860	11,30,746	8.32
3	Jun-19	1,14,280	9,75,495	8.54
4	Jul-19	1,62,640	13,34,526	8.21
5	Aug-19	1,83,450	15,26,749	8.32
6	Sep-19	1,57,610	13,32,741	8.46
7	Oct-19	1,62,830	13,73,117	8.43
8	Nov-19	99,080	8,96,474	9.05
9	Dec-19	1,00,325	9,00,326	8.97
10	Jan-20	75,770	7,24,769	9.57
11	Feb-20	88,705	8,15,857	9.20
12	Mar-20	1,10,170	9,71,342	8.82

Effective Average cost of energy is Rs. 8.67 per unit. In the month of November, December 19 and January, February, March 20, unit energy cost is more than average value as maximum actual demand is quite lesser than 85% of contract demand.

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B) % of Annual power met by RE resources:

Table 2: Annual power met by RE resources

Source of renewable energy	Solar roof top generation (kWh)	Grid electricity consumption (kWh)	Total electricity consumption (kWh)	% of renewable energy
Solar Rooftop	2,69,955	15,43,460	18,13,415	**14.88**

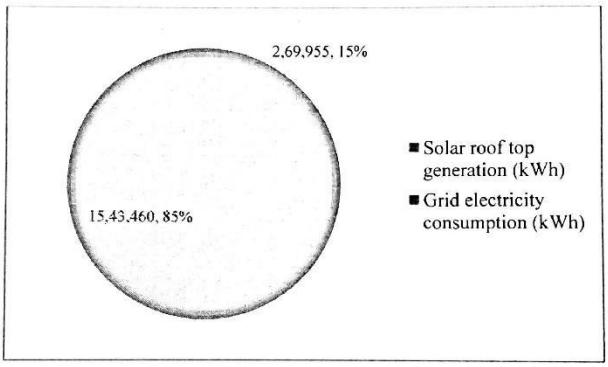

Fig. 1: % of Annual power met by RE resources

C) Green energy application per year and CO_2 Emission reduction

Table 3: CO_2 Emission reduction

Total annual energy requirement (kWh)	18,13,415
Total application of the green energy (kWh)	2,69,955
Estimated CO_2 green house gas emission reduction per year (Ton)	213.264

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D) Solar PV Power generation and cost saving

Table 4: Solar PV generation and associated cost saving

Sr. No.	Billing Month	RE generation (kWh)	Effective unit electricity cost (INR)	Cost saving (INR)
1	Apr-19	28,673	8.19	2,34,832
2	May-19	30,920	8.32	2,57,254
3	Jun-19	23,711	8.54	2,02,492
4	Jul-19	21,180	8.21	1,73,888
5	Aug-19	15,144	8.32	1,25,998
6	Sep-19	16,634	8.46	1,40,724
7	Oct-19	17,936	8.43	1,51,200
8	Nov-19	24,740	9.05	2,23,897
9	Dec-19	22,309	8.97	2,00,112
10	Jan-20	23,540	9.57	2,25,278
11	Feb-20	26,538	9.20	2,44,150
12	Mar-20	18,630	8.82	1,64,317
Total for Year 2019-20		2,51,325		23,44,141

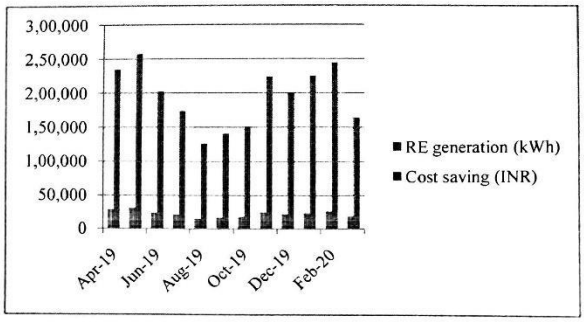

Fig. 2: Solar PV Power generation and associated cost saving

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5. Steps taken for Energy Conservation

Energy efficiency and conservation plays a pivotal role in addressing environmental and economic challenges, making it a critical component of sustainable development efforts worldwide. Atmiya University has grabbed the opportunity for energy saving using following methodologies and contributing to reduce carbon footprints.

a. Rooftop system: 450 kW of solar PV rooftop system is installed. Total 2,69,955 units of electricity have been generated by it in A.Y. 2019-20. Due to this RE generation, carbon footprint of institute has been reduced by 2,13,264 kg.
b. LED light: Much of the lighting requirement is met through LED lights. LED lights are much Energy efficient than fluorescent lights.
c. Natural ventilation: Good ventilation is observed in the institute.
d. Average power factor of 0.996 is maintained, which is appreciable.

6. Recommendations for Improving Energy Efficiency and Energy Conservation

a. Major of fans are of conventional type (50 W). Conventional exhaust fans must be replaced by energy efficient star rated exhaust fans.
b. Partial lighting requirement of the institute is met with florescent tube lights. LED lights of the same rating provide much more luminance than florescent tubes. Hence florescent tubes must be replaced immediately by LEDs.
c. As electricity charges are minimum during 10 pm to 6 am, works like all water tank filling must be encouraged during this time interval.
d. Energy conservation awareness programs may be conducted in the campus for creating better usage of electricity.
e. Conventional fans take more power than BLDC fans for same amount of output. With time, BLDC fans must be installed whenever replacement of fans is needful.

Prepared By:

20.06.20

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Bureau of Energy Efficiency, India.

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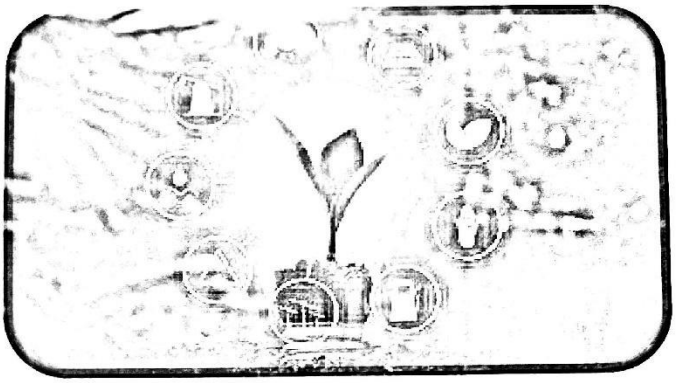
1.2 ENERGY AUDIT REPORT-2020-21

ENERGY AUDIT REPORT



Atmiya University
Yogidham Gurukul, Kalawad Road,
Rajkot – 360005

Date: 05/05/2021

Registrar
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Atmiya University Rajkot

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Mrs. Seema V. Vachhani
Energy Auditor
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A) Average Cost of Power

Monthly electricity bill is served by PGVCL against electricity used & is paid by university. A cost of power is worked out from total kWh used & associated cost.

Table 1: Average cost of power

Sr. No.	Month of billing	Grid electricity consumed (kWh)	Grid electricity cost (INR)	Effective Unit energy cost (INR)
1	Apr-20	58,990	4,27,523	7.25
2	May-20	72,155	6,65,801	9.23
3	Jun-20	1,15,035	9,82,641	8.54
4	Jul-20	1,15,245	9,85,852	8.55
5	Aug-20	97,880	8,70,942	8.90
6	Sep-20	86,720	7,87,712	9.08
7	Oct-20	73,295	6,89,906	9.41
8	Nov-20	68,060	6,38,574	9.38
9	Dec-20	49,560	5,10,274	10.30
10	Jan-21	50,600	5,17,850	10.23
11	Feb-21	61,020	5,90,514	9.68
12	Mar-21	89,320	7,92,529	8.87

Effective Average cost of energy is INR 9.12 per unit. In the month of May, October, November, December 20 and January, February 21, unit energy cost is more than average value as maximum actual demand is quite lesser than 85% of contract demand.

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Rajkot

Atmiya University Rajkot

B) % of Annual power met by RE resources:

Table 2: Annual power met by RE resources

Source of renewable energy	Solar roof top generation (kWh)	Grid electricity consumption (kWh)	Total electricity consumption (kWh)	% of renewable energy
Solar Rooftop	2,95,899	9,37,880	12,33,779	**23.98**

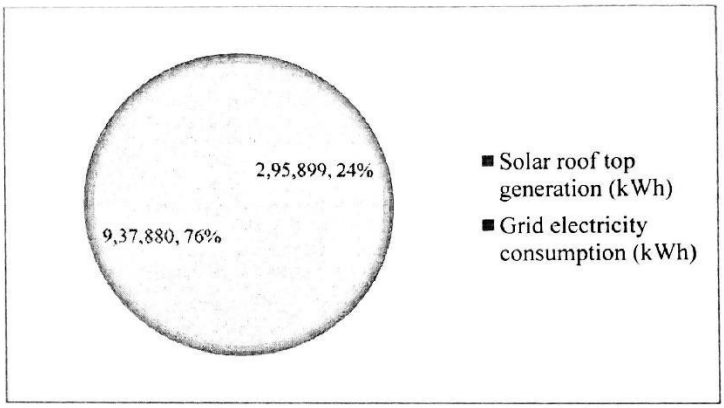

Fig. 1: % of Annual power met by RE resources

C) Green energy application per year and CO_2 Emission reduction

Table 3: CO_2 Emission reduction

Total annual energy requirement (kWh)	12,33,779
Total application of the green energy (kWh)	2,95,899
Estimated CO_2 green house gas emission reduction per year (Ton)	208.017

Registrar
Atmiya University
Rajkot

Atmiya University Rajkot

D) Solar PV Power generation and cost saving

Table 4: Solar PV generation and associated cost saving

Sr. No.	Billing Month	RE generation (kWh)	Effective unit electricity cost (INR)	Cost saving (INR)
1	Apr-20	38,737	7.25	2,80,843
2	May-20	29,866	9.23	2,75,663
3	Jun-20	22,195	8.54	1,89,545
4	Jul-20	21,712	8.55	1,85,638
5	Aug-20	14,434	8.9	1,28,463
6	Sep-20	22,112	9.08	2,00,777
7	Oct-20	25,762	9.41	2,42,420
8	Nov-20	22,129	9.38	2,07,570
9	Dec-20	22,270	10.3	2,29,381
10	Jan-21	24,591	10.23	2,51,566
11	Feb-21	23,961	9.68	2,31,942
12	Mar-21	28,130	8.87	2,49,513
Total for Year 2020-21		**2,95,899**		**26,73,322**

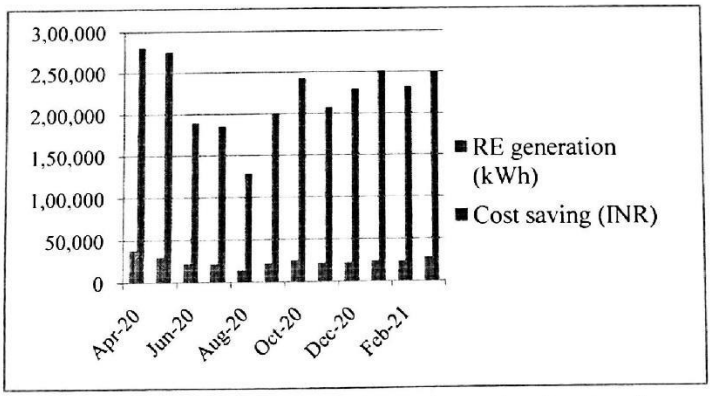

Fig. 2: Solar PV Power generation and associated cost saving

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Atmiya University Rajkot

5. Steps taken for Energy Conservation

Energy efficiency and conservation plays a pivotal role in addressing environmental and economic challenges, making it a critical component of sustainable development efforts worldwide. Atmiya University has grabbed the opportunity for energy saving using following methodologies and contributing to reduce carbon footprints.

a. Rooftop system: 450 kW of solar PV rooftop system is installed. Total 2,95,899 units of electricity have been generated by it in A.Y. 2020-21. Due to this RE generation, carbon footprint of institute has been reduced by 2.08.017 kg.
b. LED light: Much of the lighting requirement is met through LED lights. LED lights are much Energy efficient than fluorescent lights.
c. Natural ventilation: Good ventilation is observed in the institute.
d. Average power factor of 0.9965 is maintained, which is appreciable.

6. Recommendations for Improving Energy Efficiency and Energy Conservation

a. Comfortable air conditioned temperature is 24°C.
By setting the thermostat at comfort temperature, 24% saving on Electricity consumption is possible.

b. Major proportion of fans are of conventional type (50 W).
Approx. power consumption per year for a conventional fan is 50*8*300 = 120 kWh.
Running Cost per year per fan is INR 5.05*120 = INR 606
If BLDC fans of 28 W are installed,
Running cost per year per fan is 28*8*300 = INR67.2*5.05 = INR 339
Cost saving of Electricity per fan = 606-339 = INR 267
Cost of installation BLDC fan = INR 3300
Capital cost recovery time = 3300/267 = 12 year
Hence, in case of need of replacement of fans, conventional fans must be replaced by BLDC fans only.

c. Time independent works like all water tank filling must be encouraged during time interval of 10 pm to 6 am. This will fetch night usage concession and electricity units consumed in this interval will be charged at lower electricity rates.

d. Also, time independent activities must avoid during peak time intervals 7am to 11am and 6pm to 10pm. The power usage in these intervals will be

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Atmiya University Rajkot

charged at bit higher than normal electricity charges.

e. Power saving boards must be displayed at multiple locations.

f. Energy conservation awareness programs may be conducted in the campus for creating better usage of Electricity.

Prepared By:

05.05.21

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Rajkot

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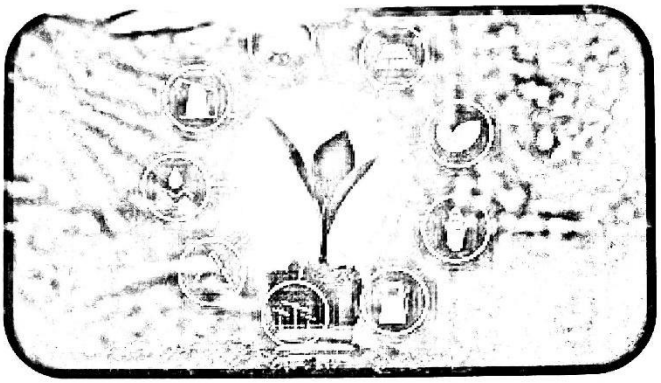
1.3 ENERGY AUDIT REPORT-2021-22

ENERGY AUDIT REPORT



Atmiya University
Yogidham Gurukul, Kalawad Road,
Rajkot – 360005

Date: 14/04/2022

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Atmiya University Rajkot

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1	April-21	1,14,825	9,64,621	8.40
2	May-21	78,650	7,08,672	9.01
3	June-21	1,06,660	9,10,956	8.54
4	July-21	1,13,580	9,57,315	8.43
5	Aug-21	1,29,005	10,84,237	8.40
6	Sept-21	1,30,520	10,96,358	8.40
7	Oct-21	1,67,772	13,74,455	8.19
8	Nov-21	87,747	7,22,637	8.24
9	Dec-21	84,474	7,67,538	9.09
10	Jan-22	71,669	6,28,400	8.77
11	Feb-22	53,074	5,15,213	9.71
12	March-22	79,497	7,42,835	9.34

Effective Average cost of energy is Rs. 8.71 per unit. In the month of May, December 21 and January, February, March 22, unit energy cost is more than average value as maximum actual demand is quite lesser than 85% of contract demand.

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Atmiya University
Rajkot

Atmiya University Rajkot

B) % of Annual power met by RE resources:

Table 2: Annual power met by RE resources

Source of renewable energy	Solar roof top generation (kWh)	Grid electricity consumption (kWh)	Total electricity consumption (kWh)	% of renewable energy
Solar Rooftop	3,57,884	12,17,473	15,75,357	**22.71**

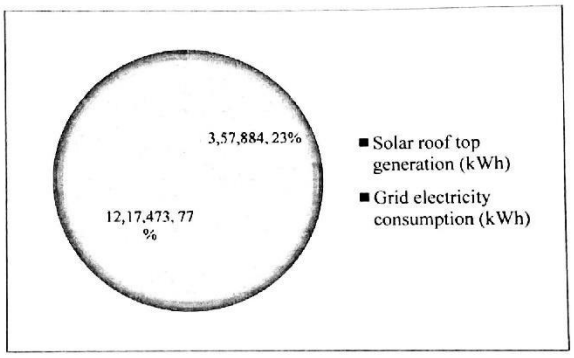

Fig. 1: % of Annual power met by RE resources

C) Green energy application per year and CO_2 Emission reduction

Table 3: CO_2 Emission reduction

Total annual energy requirement (kWh)	15,75,357
Total application of the green energy (kWh)	3,57,884
Estimated CO_2 green house gas emission reduction per year (Ton)	255.8871

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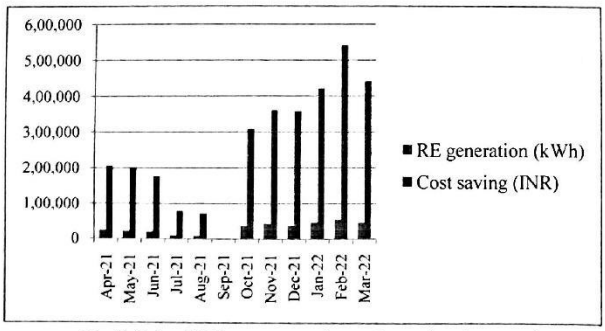
Atmiya University
Rajkot

Atmiya University Rajkot

D) Solar PV Power generation and cost saving

Table 4: Solar PV generation and associated cost saving

Sr. No.	Billing Month	RE generation (kWh)	Total Electricity Consumption (kWh)	Effective unit electricity cost (INR)	Cost saving (INR)
1	Apr-21	24,533	1,14,825	8.4	2,06,077
2	May-21	22,452	78,650	9.01	2,02,293
3	Jun-21	20,781	1,06,660	8.54	1,77,470
4	Jul-21	9,458	1,13,580	8.43	79,731
5	Aug-21	8,619	1,29,005	8.4	72,400
6	Sep-21	0	1,30,520	8.4	0
7	Oct-21	37,696	1,67,772	8.19	3,08,730
8	Nov-21	43,792	87,747	8.24	3,60,846
9	Dec-21	39,408	84,474	9.09	3,58,219
10	Jan-22	48,137	71,669	8.77	4,22,161
11	Feb-22	55,776	53,074	9.71	5,41,585
12	Mar-22	47,232	79,497	9.34	4,41,147
Total for Year 2021-22		**3,57,884**	**12,17,473**		**31,70,658**



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a. Rooftop system: 450 kW of solar PV rooftop system is installed. Total 357884 units of electricity have been generated by it in A.Y. 2021-22. Due to this RE generation, carbon footprint of institute has been reduced by 2,55,887 kg.
b. LED light: Majority of lighting is through LED lights. LED lights are much Energy efficient than fluorescent lights.
c. Natural ventilation: Good ventilation is observed in the institute.
d. BLDC fan: It consumes almost 50% less energy than the conventional fan. The institute has installed it at some locations.
e. Average power factor of 0.983 is maintained, which is appreciable.

6. Recommendations for Improving Energy Efficiency and Energy Conservation in the Organization

a. Much of the working area of the institute is air conditioned. As per recommendations for building space cooling through recommended optimum temperature setting by BEE, by increasing the AC temperature by 1°C, we can save about 6% of Electricity. Typically, room temperature is set between 20-21°C whereas comfort temperature is 24-25°C. By setting the thermostat at comfort temperature, 24% saving on Electricity consumption is possible. Also, it is always better to run AC at 26+ degrees and put the fan on at slow speed, from energy conservation aspect.
b. Also, time independent activities must avoid during peak time intervals 7 am to 11 am and 6 pm to 10 pm. The power usage in these intervals will be charged at Rs. 5.05 per unit.
c. Energy conservation awareness programs may be conducted in the campus for creating better usage of Electricity.

Prepared By:

14.04.22

Seema Vachhani
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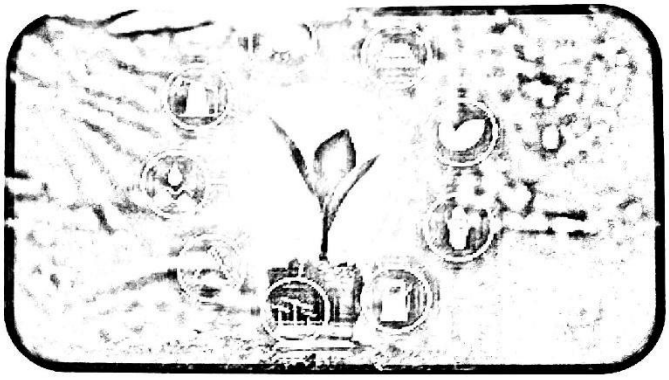
1.4 ENERGY AUDIT REPORT-2022-23

ENERGY AUDIT REPORT



Atmiya University
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Date: 14/04/2023

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Acknowledgement

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We are thankful to Hon. P P Shri Tyagvallabh Swamiji for giving opportunities to conduct Energy audit of various facilitates at Atmiya university campus.

This report is made with sincere efforts and gives details of relevant data collected during energy audit study, observation, analysis and recommendations made pertaining to different facilities in campus.

Several energy conservation measures have been identified and proposed in course of study and these options when implemented are expected to bring in lasting benefits in term of energy saving as well as cost saving to the management.

Research, Innovation and Translation cell is willing to support the management technically toward implementation of energy saving measures for deriving energy conservation and cost effective benefits.

Mrs. S. V. Vachhani
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1. About the Organization

Sarvoday Kelavani Samaj is a non government, non-profit organization, established in 1963 that works primarily in the domain of Education. It is spread in 23 acre land, situated at Rajkot city, Gujarat, India. The aim of Sarvoday Kelavani Samaj is to cultivate a new generation that is capable of creating a difference for the better future. Sarvoday Kelavani Samaj managed an autonomous Atmiya group of institutions. Later, Sarvoday Kelavani Samaj established Atmiya University in 2018 under Gujarat Private Universities Act, 2018.

2. Introduction

Energy audit is a comprehensive assessment which an in-depth analysis of energy consumption patterns, identifies potential areas for improvement and offers recommendations to enhance energy efficiency, reduce cost and minimize environmental impact.Prime objective of energy audit is to reduce the amount of energy used in the organization without compromising theoutput. The audit includes suggestions on alternative means and methods for achieving energy savings to a greater extend. In general, energy auditing and management ofenergy consumption is to offer goods or services at the lowest possible cost and with the least amount of environmental effects.

3. Need for an Energy Audit

The need for energy auditarises from the importance of energy efficiency and sustainability in today's world. Energy audit serves several purposes and provides numerous benefits, including:

a. Identifying energy conservation opportunities by analyzing energy use and identifying areas where energy is being wasted or inefficiently used.
b. Cost reduction: Energy cost represents a significant part of total cost for any organization. An energy audit helps to identify energy-saving measures that can lead to cost reductions by reducing energy waste, optimizing equipment performance, and improving operational efficiency.
c. Environmental Sustainability: Energy consumption is closely linked to environmental impact, particularly in terms of greenhouse gas emissions and climate change. By conducting an energy audit, organizations can identify ways to reduce their carbon footprint and contribute to environmental sustainability goals.
d. Compliance with Regulations and Standards: By proactively addressing compliance issues, organizations can avoid penalties and maintain a positive reputation.
e. Energy Management and Planning: An energy audit provides valuable data and insights that enable organizations to develop comprehensive energy management plans.

4. Aims and objective of energy audit

The aim of an energy audit is to identify the energy efficiency, conservation and

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savings opportunities at the premises of the audit sites in as systematic manner. The audit process is carried out with the following objectives.

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d. Providing technical information on how to build an energy balance as well as guidance to be sought for particular applications.
e. Detailed analysis on the calculation of energy consumption, analysis of latest electricity bill of the campus, understanding the tariff plan provided by state electricity board.

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The audit involves visiting physical position of load and carry out inventory of load. Due measurement of electrical load of equipment and circuit is carried out. Energy bill received from PGVCL is audited and studied for kWh requirement and how efficiently energy is used. Various positions are interacted, familiarized with energy audit and involved for successful and result oriented energy audit. Energy conservation and saving opportunities are identified for implementation.

6. Systems studied during Energy Audit

a. Lighting fixtures have been physically in various campuses verified and recorded.
b. Reviewed implemented non-conventional energy installation and applications in university for use.
c. Electricity bills served by PGVCL are verified and worked out for cost of power.
d. It is reviewed about Awareness program if any for optimum use of electricity and water as well as its saving undertaken at the university level. There is tremendous scope to create awareness among user about efficient andoptimum use of energy and water to save. Instruction cum Request Sign board shall be displayed near eachswitch-board and toilet block to influence andto guide user to arrest misuse and wastage of power and water.

7. Statistical Data& Observations

Atmiya Campus is educational organization and it uses majorly electricity as input energy source for application of various university activities. The electricity is procured from PGVCL by HT connection of 900 kVA. PGVCL serves monthly electricity bill for payment & on receipt of monthly electricity bill it is paid. Standby power source DG set of (625+320) kVA is available to use during power failure from PGVCL.

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A) Average Cost of Power

Monthly electricity bill is served by PGVCL against electricity used & is paid by university. A cost of power is worked out from total kWh used & their amount.

Table 1: Average cost of power

Sr. No.	Month of billing	Grid electricity consumed (kWh)	Grid electricity cost(INR)	Effective Unit energy cost (INR).
1	April-22	1,31,681	11,35,373	8.62
2	May-22	1,38,424	12,01,141	8.68
3	June-22	1,39,783	12,49,675	8.94
4	July-22	1,54,323	13,68,851	8.87
5	Aug-22	1,46,969	13,30,354	9.05
6	Sept-22	1,46,065	13,25,749	9.08
7	Oct-22	1,55,375	13,77,529	8.87
8	Nov-22	91,664	8,92,473	9.74
9	Dec-22	95,057	9,20,935	9.69
10	Jan-23	76,331	7,83,885	10.27
11	Feb-23	71,931	7,54,715	10.49
12	March-23	99,575	9,81,430	9.86

Effective Average cost of energy is Rs. 9.35per unit. In the month of November, December 22 and January, February, March23, unit energy cost is more than average value as maximum actual demand is quite lesser than 85% of contract demand.

B) Total % of LED Lighting Load in Total Lighting Load:

Table 2: % of LED lighting

Particulars	Total lighting requirement	Lighting requirement met by LED lights	Lighting through other type of lamp
Load (kW)	37.087	35.487	1.6
Annual Consumption (kWh)	66,756.6	63,876	2,880

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C) % of Annual power met by RE resources:

Table 3: Annual power met by RE resources

Source of renewable energy	Solar roof top generation (kWh)	Grid electricity consumption (kWh)	Total electricity consumption (kWh)	% of renewable energy
Solar Rooftop	3,72,250	14,47,178	18,19,428	20.46%

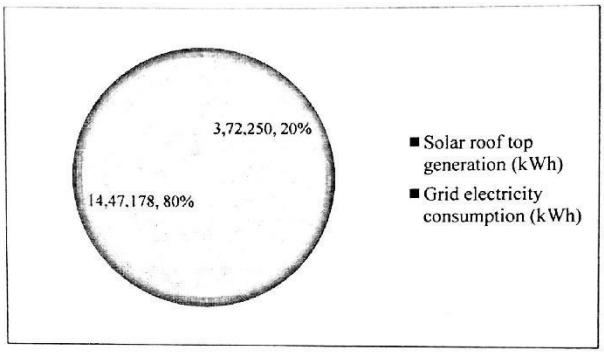

Fig. 1: % of Annual power met by RE resources

D) Green energy application per year and CO_2 Emission reduction

Table 4: CO_2 Emission reduction

Total annual energy requirement (kWh)	18,19,428
Total application of the green energy(kWh)	3,72,250
% on total requirement	20.46%
Estimated CO_2green house gas emission reduction per year (Ton)	266.531

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E) Solar PV Power generation and cost saving

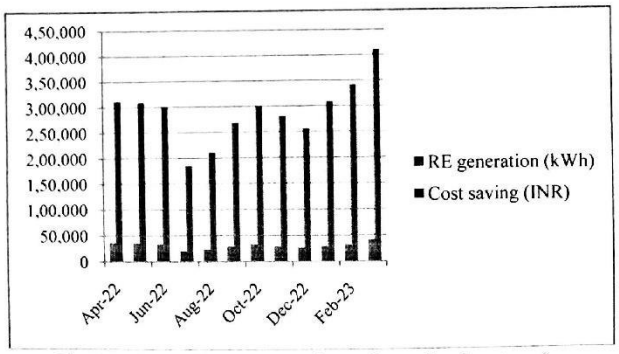

Fig. 2: Solar PV Power generation and associated cost saving

Table 5: Solar PV generation and associated cost saving

Sr. No.	Billing Month	RE generation (kWh)	Total Electricity Consumption (kWh)	Effective unit electricity cost (INR)	Cost saving (INR)
1	Apr-22	36,176	1,31,681	8.62	3,11,837
2	May-22	35,568	1,38,424	8.68	3,08,730
3	Jun-22	33,642	1,39,783	8.94	3,00,759
4	Jul-22	20,784	1,54,323	8.87	1,84,354
5	Aug-22	23,264	1,46,969	9.05	2,10,539
6	Sep-22	29,568	1,46,065	9.08	2,68,477
7	Oct-22	33,664	1,55,375	8.87	2,98,600
8	Nov-22	28,864	91,664	9.74	2,81,135
9	Dec-22	26,432	95,057	9.69	2,56,126
10	Jan-23	30,064	76,331	10.27	3,08,757
11	Feb-23	32,576	71,931	10.49	3,41,722
12	Mar-23	41,648	99,575	9.86	4,10,649
Total for Year 2022-23		**3,72,250**	**14,47,178**		**34,81,687**

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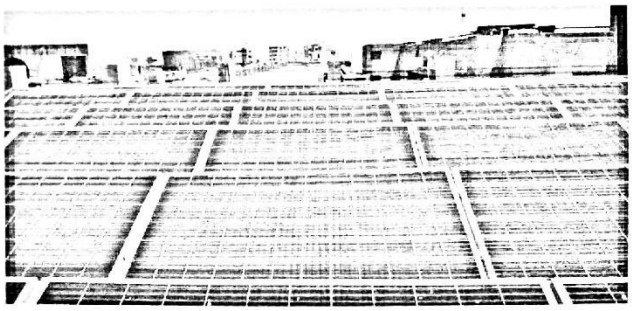
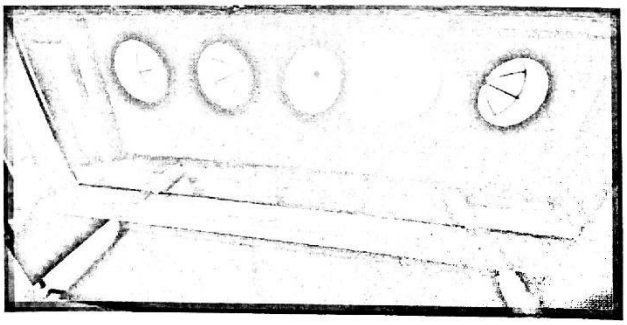
8. Steps taken for Energy Conservation

A) Solar PV Power Generation



B) Lighting through LED lights

C) Use of Natural Lights through Sun Roofs



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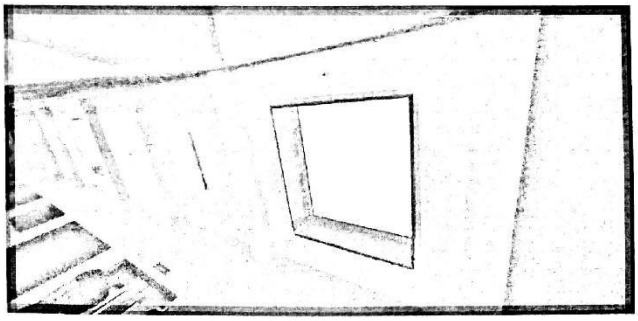
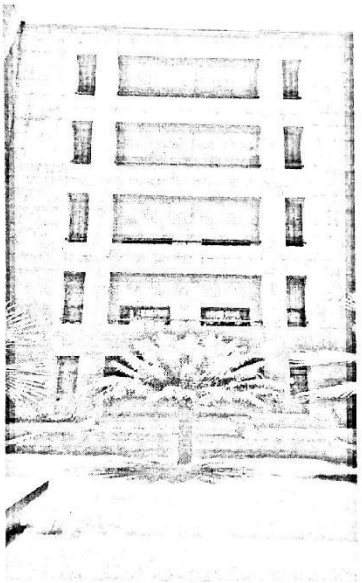


D) Use of Natural Ventilation



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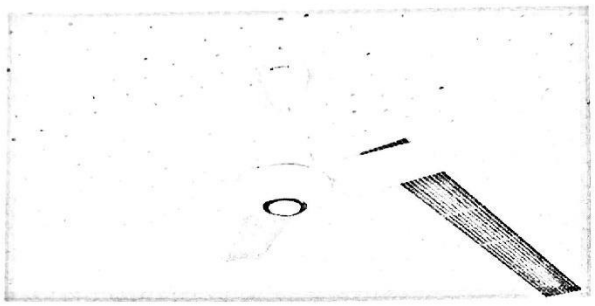
E) Installation of BLDC fans in new building



F) Power factor is maintained nearly at 0.999, which is quite appreciable.

9. Recommendations for Improving Energy Efficiency and Energy Conservation in the Organization

A) There is great power saving opportunities by using automation tools.

- ✓ In toilets, motion sensors can be used to switch on the lights when occupancy is there and to switch off the lights when occupancy is not there. This can reduce toilet Electrical load by much extent.
- ✓ Considering 120 toilet blocks with 2 no. of 22 Watt tube lights,
- ✓ Approx. power consumption per year is 106*120 = 12,720kWh.
- ✓ Considering unit charges in peak hours INR 5.05,
- ✓ Running Cost per year is INR 535*120 = INR 64,200
- ✓ If motion sensor is installed, Running cost per year is INR 66*120 = INR7,920
- ✓ Cost saving on Electricity charges = 64,200-7,920 = INR 56,280
- ✓ Cost of installation of motion sensor is INR 700*120 = INR 84000
- ✓ **Capital cost recovery time = 84,000/56,280 = 1.49 year**

B) All the corridors of the building are highly illuminated during all working hours INR As an automation tool, dimmable lights with sensors may be used for energy conservation.

Considering 11 LEDs of 12 Watt working 10 hours in a day, for each corridor illumination

- ✓ Approx. power consumption per year for a corridor is 12*11*10*300 = 396kWh.
- ✓ Running Cost per year is INR 5.05*396 = INR 2,000
- ✓ If dimmable lights are installed,
  Running cost per year is (12*11*2*300) + (3*11*8*300) = INR158.4*5.05 = INR 800

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- ✓ Cost saving of Electricity = 2.000-800 = INR 1,200
- ✓ Cost of installation of dimmable lights is INR 715*11 = INR 7,865
- ✓ **Capital cost recovery time = 7,865/1,200= 6.5 year**

C) Time independent works like all water tank filling must be encouraged during time interval of 10 pm to 6 am. This will fetch night usage concession and Electricity units consumed in this interval will be charged at **INR 3.77 per unit**.

D) Also, time independent activities must avoid during peak time intervals 7am to 11am and 6pm to 10pm. The power usage in these intervals will be charged at **INR 5.05 per unit**.

E) Power saving boards must be displayed at multiple locations.

F) Energy conservation awareness programs may be conducted in the campus for creating better usage of Electricity.

G) Currently, few Fluorescent lights are in use in the campus. These lights must be replaced by LED lights earliest.

H) Major proportion of fans are of conventional type (50 W).
Approx. power consumption per year for a conventional fan is 50*8*300 = 120 kWh.
Running Cost per year per fan is INR 5.05*120 = INR 606
If BLDC fans of 28 W are installed,
Running cost per year per fan is 28*8*300 = INR67.2*5.05 = INR 339
Cost saving of Electricity per fan = 606-339 = INR 267
Cost of installation BLDC fan = INR 3300
Capital cost recovery time = 3300/267 = 12 year
Hence, in case of need of replacement of fans, conventional fans must be replaced by BLDC fans only.

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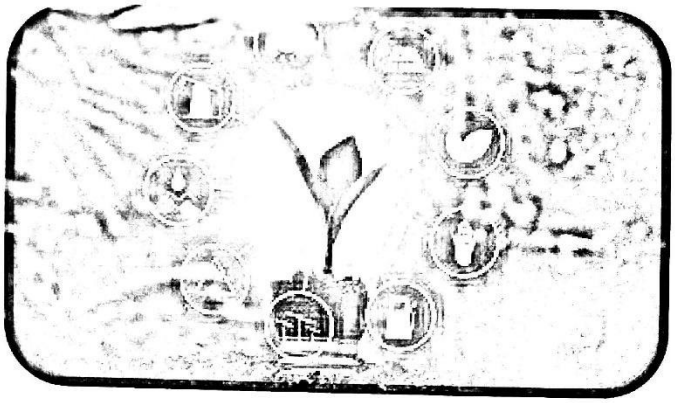
1.5 ENERGY AUDIT REPORT-2023-24

ENERGY AUDIT REPORT



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Dr. A. M. Kothari
Director – Research, Innovation & Translation
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A) Average Cost of Power

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Table 1: Average cost of power

Sr. No.	Month of billing	Grid electricity consumed (kWh)	Grid electricity cost (INR)	Effective Unit energy cost (INR)
1	Apr-23	1,13,646	10,95,096	9.64
2	May-23	1,21,355	11,82,304	9.74
3	Jun-23	1,38,105	13,24,044	9.59
4	Jul-23	1,50,730	14,50,845	9.63
5	Aug-23	1,69,125	16,57,664	9.80
6	Sep-23	1,43,030	14,09,279	9.85
7	Oct-23	1,56,480	15,48,450	9.90
8	Nov-23	1,29,110	12,91,410	10.00
9	Dec-23	87,850	9,09,604	10.35
10	Jan-24	89,135	9,35,318	10.49
11	Feb-24	96,240	9,95,139	10.34
12	Mar-24	1,06,830	10,37,012	9.71

Effective Average cost of energy is INR 9.92 per unit. In the month of November, December 23 and January, February 23, unit energy cost is more than average value as maximum actual demand is quite lesser than 85% of contract demand.

B) Total % of LED Lighting Load in Total Lighting Load:

Table 2: % of LED lighting

Particulars	Total lighting requirement	Lighting requirement met by LED lights	Lighting through other type of lamp
Load (kW)	41.034	39.54	1.49
Annual Consumption (kWh)	73,861.2	71,172	2,682

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C) % of Annual power met by RE resources:

Table 3: Annual power met by RE resources

Source of renewable energy	Solar roof top generation (kWh)	Grid electricity consumption (kWh)	Total electricity consumption (kWh)	% of renewable energy
Solar Rooftop	5,37,472	15,01,636	20,39,108	**26.35**

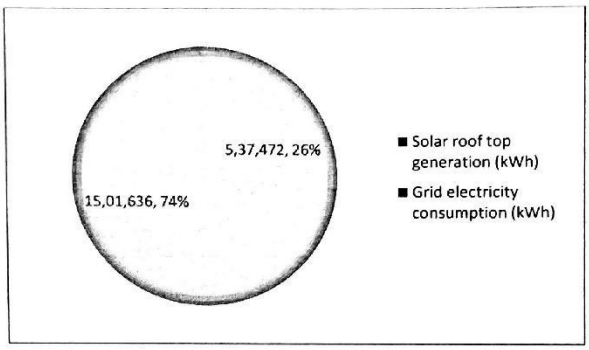

Fig. 1: % of Annual power met by RE resources

D) Green energy application per year and CO_2 Emission reduction

Table 4: CO_2 Emission reduction

Total annual energy requirement (kWh)	20,39,108
Total application of the green energy(kWh)	5,37,472
Estimated CO_2green house gas emission reduction per year (Ton)	**180.719**

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E) Solar PV Power generation and cost saving

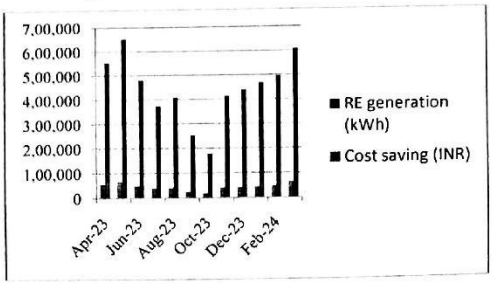

Fig. 2: Solar PV Power generation and associated cost saving

Table 5: Solar PV generation and associated cost saving

Sr. No.	Billing Month	RE generation (kWh)	Total Electricity Consumption (kWh)	Effective unit electricity cost (INR)	Cost saving (INR)
1	Apr-23	57,504	1,13,646	9.64	5,54,339
2	May-23	66,992	1,21,355	9.74	6,52,502
3	Jun-23	50,144	1,38,105	9.59	4,80,881
4	Jul-23	38,736	1,50,730	9.63	3,73,028
5	Aug-23	41,520	1,69,125	9.8	4,06,896
6	Sep-23	25,616	1,43,030	9.85	2,52,318
7	Oct-23	18,080	1,56,480	9.9	1,78,992
8	Nov-23	41,280	1,29,110	10	4,12,800
9	Dec-23	42,400	87,850	10.35	4,38,840
10	Jan-24	44,640	89,135	10.49	4,68,274
11	Feb-24	47,840	96,240	10.34	4,94,666
12	Mar-24	62,720	1,06,830	9.71	6,09,011
Total for Year 2023-24		**5,37,472**	**15,01,636**		**53,22,545**

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8. Recommendations for Improving Energy Efficiency and Energy Conservation in the Organization

A) Major proportion of fans are of conventional type (50 W).
Approx. power consumption per year for a conventional fan is 50*8*300 = 120 kWh.
Running Cost per year per fan is INR 5.05*120 = INR 606
If BLDC fans of 28 W are installed,
Running cost per year per fan is 28*8*300 = INR67.2*5.05 = INR 339
Cost saving of Electricity per fan = 606-339 = INR 267
Cost of installation BLDC fan = INR 3300
Capital cost recovery time = 3300/267 = 12 year
Hence, in case of need of replacement of fans, conventional fans must be replaced by BLDC fans only.

B) Time independent works like all water tank filling must be encouraged during time interval of 10 pm to 6 am. This will fetch night usage concession and Electricity units consumed in this interval will be charged at **INR 3.77 per unit**.

C) Also, time independent activities must avoid during peak time intervals 7am to 11am and 6pm to 10pm. The power usage in these intervals will be charged at **INR 5.05 per unit**.

D) Currently, few Fluorescent lights are in use in the campus. These lights must be replaced by LED lights earliest.

Prepared By:

24.05.24

Seema Vachhani
Certified Energy Auditor
Reg. No. : EA-25555
Bureau of Energy Efficiency, India
Atmiya University

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Registrar
Atmiya University
Rajkot

Atmiya University Rajkot

Policy document on environment and energy usage

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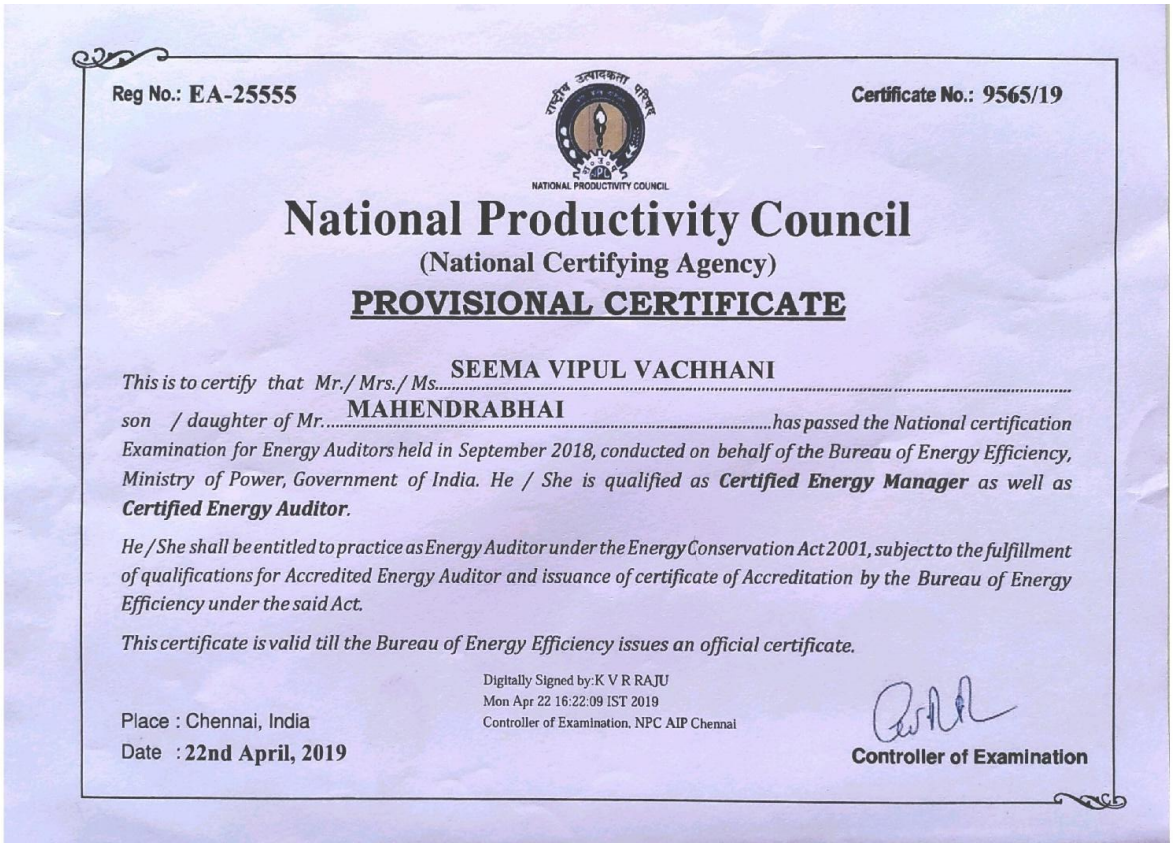
Atmiya University Rajkot

1.6 CERTIFICATES OF THE AWARDS RECEIVED FROM RECOGNIZED AGENCY



Reg No.: EA-25555 Certificate No.: 9565/19

NATIONAL PRODUCTIVITY COUNCIL

National Productivity Council

(National Certifying Agency)

PROVISIONAL CERTIFICATE

This is to certify that Mr./ Mrs./ Ms. **SEEMA VIPUL VACHHANI**

son / daughter of Mr. **MAHENDRABHAI** *has passed the National certification Examination for Energy Auditors held in September 2018, conducted on behalf of the Bureau of Energy Efficiency, Ministry of Power, Government of India. He / She is qualified as* ***Certified Energy Manager*** *as well as* ***Certified Energy Auditor****.*

He / She shall be entitled to practice as Energy Auditor under the Energy Conservation Act 2001, subject to the fulfillment of qualifications for Accredited Energy Auditor and issuance of certificate of Accreditation by the Bureau of Energy Efficiency under the said Act.

This certificate is valid till the Bureau of Energy Efficiency issues an official certificate.

Digitally Signed by:K V R RAJU
Mon Apr 22 16:22:09 IST 2019
Controller of Examination, NPC AIP Chennai

Place : Chennai, India
Date : **22nd April, 2019**

Controller of Examination

Registrar
Atmiya University
Rajkot

Atmiya University Rajkot

Energy Conservation Club of the University

URJA Energy Conservation Club

Activity Report-1

ATMIYA UNIVERSITY

Established under the Gujarat Private Universities Act No. 32 of 2016

Yogidham Gurukul, Kalawad Road, Rajkot - 360020, Gujarat (INDIA)

Energy Conservation Club

Consumer to Contributor

Date : 31.01.2024

CIRCULAR

All the students are hereby informed that the club is going to display making of fan and tube light installation layout for laboratories and class rooms, using Lucid chart software, as a pilot project from energy conservation aspect. Layout for other laboratories and classrooms will be done as club activity by students. Interested students may take the opportunity at room No. 50, B wing, Main Building at 11 O'clock onwards on 02.02.24.

Seema V. Vachhani
Coordinator

Registrar
Atmiya University
Rajkot

Atmiya University Rajkot

ATMIYA UNIVERSITY
Established under the Gujarat Private University Act 11, 2016
Yogidham Gurukul, Kalavad Road, Rajkot - 360005, Gujarat (INDIA)

Report

Students' Clubs

Name of the Club: Energy Conservation Club

Date: 02/02/2024

Main Coordinator: Mrs. Seema V. Vachhani

Co –Coordinators: 1. Mr. Dhaval Y.Raval

2. Ms. Devangi Paneri

Time: 11:50 am to 1:40 pm

Venue: Room No. 50

No. of Faculty Coordinators present: 5

No. of Students present: 7

Description of the Club Activity carried out:

The club is going to display fan and tube light installation layout for some laboratories and class rooms, as pilot project from energy conservation aspect. Sample of this layout is made using Lucid chart software. Other layout will be done as club activity. So, today students were made aware regarding software and how to use it in easier way. Mr. Dhaval Raval explained the software to students in detail. Students had shown much interest for this activity.

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ATMIYA UNIVERSITY
Established under the Gujarat Private University Act 11, 2015
Yogidham Gurukul, Kalavad Road, Rajkot - 360005, Gujarat (INDIA)

Visual Glimpses of the Event:

Registrar
Atmiya University
Rajkot

Atmiya University Rajkot

ATMIYA UNIVERSITY
(Established under the Gujarat Private University Act 11, 2016)
Yogidham Gurukul, Kalawad Road, Rajkot - 360005, Gujarat (INDIA)

ATMIYA UNIVERSITY
(Established under the Gujarat Private University Act 11, 2016)
Yogidham Gurukul, Kalawad Road, Rajkot - 360005, Gujarat (INDIA)

Energy Conservation Club
"Journey from Consumer to Contributor"

Club Activity

Date: 02.02.23 **Time:** 11:50 AM **Venue:** Room No. 50

Sr.	Name	Mobile No.	Course & Semester	Sign
1	ZALA Rutupalsinh	9510235230	B.Tech mech 4th	
2	bhatt Harshdeep	6351441 5181	"	
3	Kishan Amethiya	93285 93892	"	
4	Ambavadara vijay	7227961950	"	
5	Pankhiya Hemil N.	9925325643	Diploma com Mech Engg.	
6	Dhruvrajsinh Rathod	7878392991	DCE	
7	JANVEGR RAJYAGURU	9106310088	B tech Electrical Engg	

Seema V. Vachhani
Coordinator

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Atmiya University
Rajkot

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Activity-2: Energy Conservation Awareness


ATMIYA UNIVERSITY

Yogidham Gurukul, Kalawad Road, Rajkot - 360020, Gujarat (INDIA)

Energy Conservation Club

Consumer to Contributor

Date : 27.12.2023

CIRCULAR

All the students are hereby informed that the club is organizing a discussion on topic "Energy Conservation" as energy conservation is today's ever rising demand. Interested students may take the opportunity at room No. 50, B wing, Main Building at 11 O'clock onwards on 30.12.23.

Seema V. Vachhani
Coordinator

Registrar
Atmiya University
Rajkot

Atmiya University Rajkot

ATMIYA UNIVERSITY

Yogidham Gurukul, Kalawad Road, Rajkot - 360020, Gujarat (INDIA)

Report

Students' Clubs

Name of the Club: Energy Conservation Club

Date: 30/12/2023

Main Coordinator: Mrs. Seema V. Vachhani

Co –Coordinators: 1. Mr. Dhaval Raval

2. Ms. Devangi Paneri

Time: 11:50 am to 1:40 pm

Venue: Room No. 50

No. of Faculty Coordinators present: 3

No. of Students present: 3

Description of the Club Activity carried out:

The club today took the activity of Energy Conservation Awareness among the students. We use the energy in different forms for our day to day life, like thermal energy, electricity, water etc. Mrs. Seema Vachhani explained how different forms of energy can be saved by making minor changes in our habits. Also, it is explained in detail that how these energy conservation practices will be yielding benefits in terms of cost saving, sustainability. In addition to that, how energy conservation practices will lead to reduction in environmental impact of using energy discussed in detail.

Registrar
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Rajkot

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ATMIYA UNIVERSITY

Visual Glimpses of the event:

Registrar
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ATMIYA UNIVERSITY

Established under the Gujarat Private University Act 11, 2018

Yogidham Gurukul, Kalawad Road, Rajkot - 360005, Gujarat (INDIA)

Student Attendance:

ATMIYA UNIVERSITY

Energy Conservation Club

"Journey from Consumer to Contributor"

Club Activity

Date: 30-12-23 **Time:** 11:50 AM **Venue:** Room No. 50

Sr.	Name	Mobile No.	Course & Semester	Sign
1	Rangani Neel	992377551	B.Tech. Electrical 4th Sem	
2.	Ravani Harshit	9016057957	B.Tech. Electrical 4th sem	
3	Pariktiya Hemil N.	9925325645	Diploma computer	

Seema V. Vachhani

Coordinator

Registrar

Atmiya University

Rajkot

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Atmiya University
Rajkot

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Club activity on Energy Conservation for IT & Computer Sector

ATMIYA UNIVERSITY

Established under the Gujarat Private University Act 11, 2018

Yogidham Gurukul, Kalawad Road, Rajkot - 360020, Gujarat (INDIA)

Energy Conservation Club

Consumer to Contributor

Date: 10.01.2024

CIRCULUR

All the students are hereby informed that the club is organizing a discussion on topic "Energy Conservation in IT & Computer sector" as energy conservation be today's ever rising demand. Interested students may take the opportunity at room No. 50, B wing, Main Building at 11 O'clock onwards on 13.01.2024.

Seema V. Vachhani
Co-ordinator

Registrar
Atmiya University
Rajkot

Atmiya University Rajkot

ATMIYA UNIVERSITY

Report

Students' Clubs

Name of the Club: Energy Conservation Club

Date: 13/01/2024

Main Coordinator: Mrs. Seema V. Vachhani

Co –Coordinators: 1. Mr. Dhaval Y. Raval

2. Ms. Devangi Paneri

Time: 11:50 am to 1:40 pm

Venue: Room No. 50

No. of Faculty Coordinators present: 3

No. of Students present: 6

Description of the Club Activity carried out:

The club today took the activity of Energy Conservation practices in IT and Computer engineering field. Students were explained with energy consumption details of PC in on mode, standby mode and sleep mode. Also, students were urged to keep PC in sleep mode as it saves energy by much extent. Student were explained how software running in background keeps on consuming energy and how it affects the performance of the system.

Registrar
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ATMIYA UNIVERSITY

Visual Glimpse of the Event:

Registrar
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Atmiya University Rajkot

ATMIYA UNIVERSITY

ATMIYA UNIVERSITY

Energy Conservation Club

"Journey from Consumer to Contributor"

Club Activity

Date: 13.01.24 Time: 11:50 to 01:40PM Venue: Room No. 50

Sr.	Name	Mobile No.	Course & Semester	Sign
1	Pandya Nisarg	8926309089	5	
2	Ramani ~~Ateer~~ Harsh	7041257959	5	
3	Rangani Veer	9925225551	5	
4	Sheth Bhumik P.	9737573472	5	
5	Hardik Solanki	6352007990	5	
6	Dobariya Sahil	9265076175	5	

Seema V. Vachhani
Coordinator

Registrar
Atmiya University
Rajkot

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