6.5.2	***Institution has adopted the following for Quality assurance:*** ***1. Academic and Administrative Audit (AAA) and follow up action taken*** ***2.Conferences, Seminars, Workshops on quality conducted*** ***3. Collaborative quality initiatives with other institution(s)*** ***4.Orientation programme on quality issues for teachers and students*** ***5. Participation in NIRF and other recognized ranking like Shanghai Ranking, QS Ranking Times Ranking etc*** ***6.Any other quality audit recognized by state, national or international agencies***

6. Any other quality audit recognized by state, national or international agencies

Energy Audit Report

Year – 2020-21

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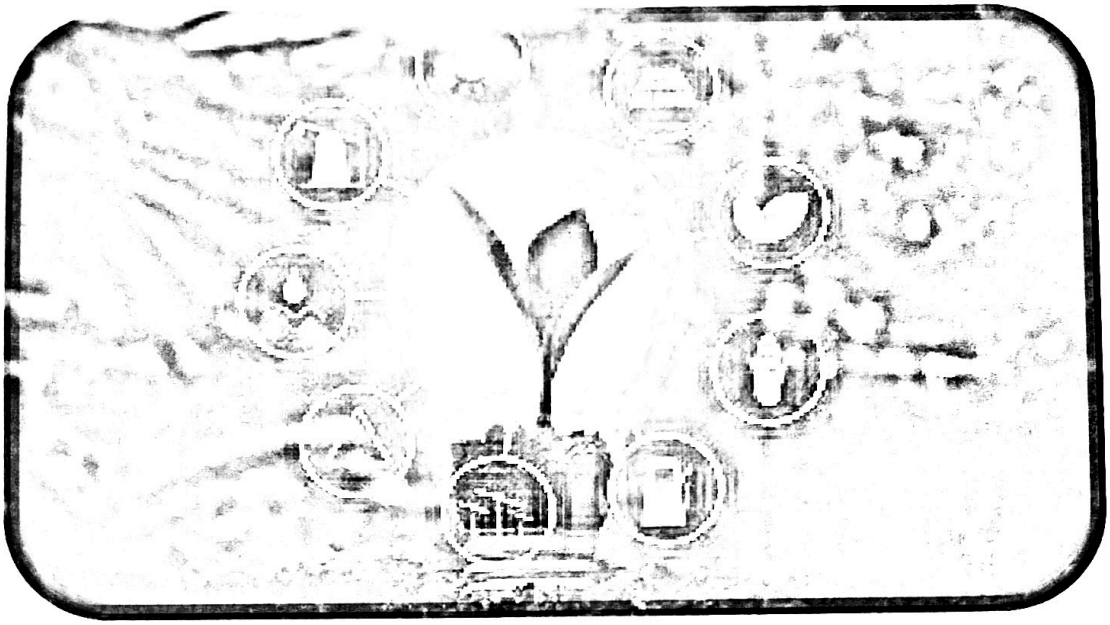
ENERGY AUDIT REPORT



Atmiya University

Yogidham Gurukul, Kalawad Road,
Rajkot – 360005

Date: 05/05/2021

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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-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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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**

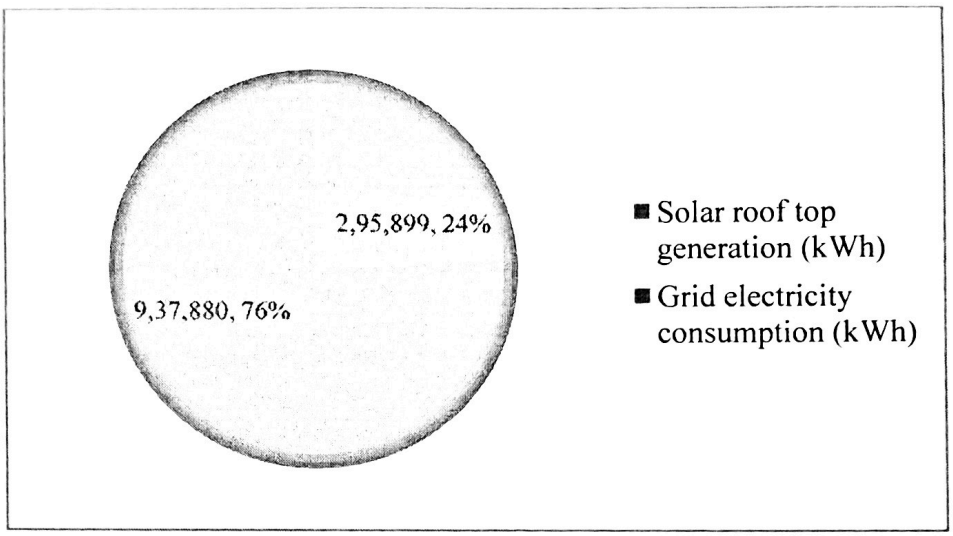

Fig. 1: % of Annual power met by RE resources

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

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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-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**

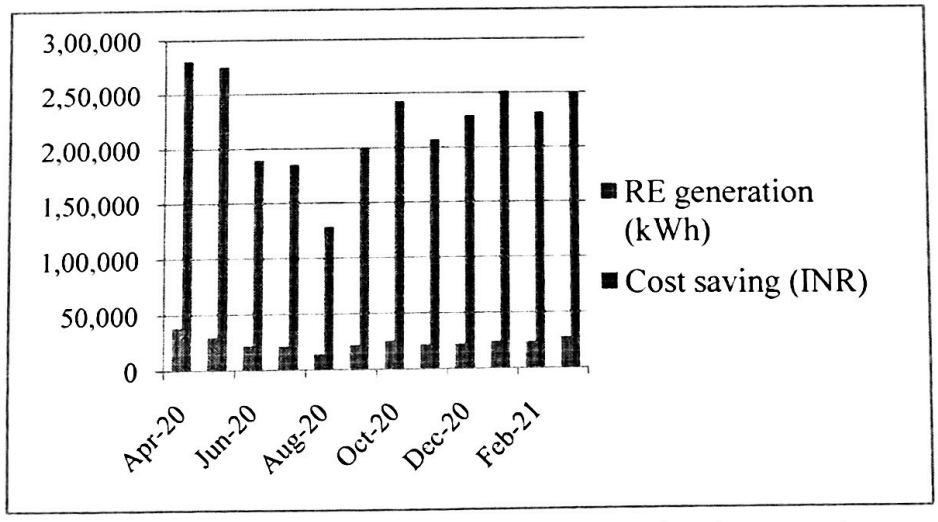

Fig. 2: Solar PV Power generation and associated cost saving

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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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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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