

# Awareness Level on Energy Management among Rural Households

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## ABSTRACT

People's lives revolve around energy, which has significant socioeconomic implications. The promotion of energy-saving and efficiency measures in the transportation and residential sectors has a significant impact on residents' daily routines. Delivering energy efficiency to customers is difficult for utilities, state energy offices, and other program implementers because rural communities have different energy needs. The present study aimed at awareness level on energy management practices among the rural households in Erode District. Questionnaire method was used to collect primary data from the rural households. 100 rural households were chosen from Erode District as a sample of the study. Convenience sampling method was used in the study. Rural areas often have different infrastructure, energy use, and fuel mix than their metropolitan counterparts. Stakeholders in rural energy efficiency, such as agricultural clients, rural-based organizations, and smaller utilities, may also stand out. Being a very practical energy source, electrical energy is now widely used in everyday life. Given that each individual consumer obtains electrical energy from the power system via the distribution system. A distribution system's proper design becomes crucial for maintaining the consistency and dependability of the energy supply. Transmission and distribution networks give communities in both urban and rural areas a vital lifeline and unmistakable socioeconomic advantages.

**Keywords:** Energy, Household, Rural areas, Transmission, Consistency.

## I. INTRODUCTION

Energy management refers to the use of technology in planning, executing, and controlling energy production and consumption in order to maximize energy efficiency. In addition to providing rural residents with a vital material foundation for survival, rural energy is also a crucial component of the contemporary energy

system. It includes all aspects of the rural area's energy supply and consumption, including resource utilization and production. It encompasses a wide range of topics related to rural residents' lives and industrial and agricultural production. Access to and use of energy in rural areas is a major problem globally, particularly for developing nations. The main goals of energy management are to prevent climate change, save money, conserve resources, and make sure that everyone has easy access to the energy spectrum. The demand for dependable electricity is rising worldwide, which is putting more pressure on the power sector to create cleaner, more effective solutions. One of the biggest challenges today is how to produce, process, distribute, and use energy while guaranteeing that everyone has access to affordable and clean energy in a world where energy availability is limited, and climate change is a pressing issue. The global trends of population growth, rapid urbanization, industrialization of emerging economies, resource constraints, technological advancements, energy consumption levels, power generation capacities, environmental challenges, and resource shortages are all directly affecting the energy sector, which is undergoing transformation. Due to the introduction of smart metering technology, India's power sector is keeping up with the digital transformation of industries in this day and age. Unquestionably, the switch to smart metering is a crucial step toward effective and customer-focused energy management. Smart meters are vital nodes in the energy network that can send precise data, including energy consumption, power supply status, and tamper alerts, straight to utilities when they have the necessary infrastructure in place. Owing to deficiencies in digital literacy and restricted knowledge of smart meter applications, numerous customers exclusively depend on SMS notifications, which do not offer a breakdown of bills. Many users might therefore prefer to keep getting paper bills. Furthermore, a lot of customers

might not know how to use or even know about smart meter mobile apps. Furthermore, customers, particularly in rural areas, might find it challenging to pay the bills after switching to smart meters because of concerns about being disconnected if they forget to recharge, problems with cash flow, and obstacles to digital payments. By creating policies that are friendly to consumers and interacting with them, the shift to smart metering should involve consumers as crucial allies.

### Need for the study

India is the fourth-largest energy consumer in the world. Although the country's energy needs are still growing, national energy poverty may be sustained by energy shortages and inadequate infrastructure. The proactive, methodical monitoring, regulation, and optimization of an organization's energy use with the goal of reducing costs is known as energy management. Energy management involves small steps like switching to energy-saving lightbulbs and keeping an eye on monthly energy bills. Planning for energy has grown in importance as modern society has developed. Through the declaration of energy independence for consumers and beneficial support for the global climate, integrated energy planning and management unify, mobilize, and ensure the efficient use of renewable energy that makes an efficient energy system and truly sustainable energy. India uses non-renewable energy sources to meet 65% of its electricity needs; hydropower provides 19% of the electricity, renewables account for 12%, and nuclear power provides 2%. In order to meet the nation's rapidly expanding electricity needs, demand is far outpacing supply. Lack of electricity has caused many businesses to lose money, reduced productivity as a result of having to shut down for a few days each month or scale back production, and increased operating costs as a result of some businesses having to pay for backup power sources. Growing demand is one aspect of the issue, but inadequate infrastructure also plays a role in the electricity shortages that have hampered India's industrial sector's recovery and hampered the country's overall economic growth.

### Problem of the Study

For millions of rural Indian households, the lack of access to safe and clean energy sources like solar or grid electricity continues to be a major issue. For cooking, lighting, appliance operation, and other necessities, more than 240 million people rely on conventional, inefficient biomass fuels. For rural energy consumers, this complicated reality is

currently poorly understood. Many people now have greater access due to the introduction of safer and greener energy options in recent years, as well as suitable financial assistance in some places. However, a large number of households have not completely switched to these safer and cleaner options, but rather have kept using a variety of sources. In addition to having detrimental consequences on the environment and human health, the absence of sufficient energy services in rural developing nations has social ramifications. The nearly total reliance of rural populations in the majority of these regions on traditional fuels combined with antiquated technologies that have poor energy efficiency and harmful emissions exacerbates many of these issues. Technological advancements as well as alternative approaches for providing sufficient, reasonably priced solutions for rural energy issues. A considerable amount of progress and achievement has also been made in the field of renewable energy due to the implementation of numerous policies, fiscal measures, and programs. But due to lack of awareness, still the rural household are struggling in energy management. Major disparities in access to energy are a major issue in India, and they affect the entire subcontinent. In India, 77 million households still light with kerosene, per a census. In rural India, where up to 44% of households lack access to electricity, the issue is even more severe. India has launched a number of projects and programs to combat energy poverty, but local implementation has been weak and there have been logistical issues. Addressing the problem in rural villages is particularly expensive and challenging due to geographical obstacles and access problems. India is dealing with a shortage of supply and a rising demand. Along with the country's rapidly expanding population and needs, significant infrastructure and efficiency reforms will also be required. The potential for improvement of energy efficiency of processes and equipment through awareness creation is enormous.

### Objective of the study

To know the awareness level on energy management among rural households in Erode District.

## II. MATERIALS AND METHODS

Vaidya et al. (2008) examined the current state of affairs and the effects that household energy use has on the environment in Nepal's urban environment. The report offers a number of suggestions for cooperative environmental laws and sustainable energy use. Based on information

from a questionnaire survey, the study assessed the degree of sustainable energy consumption and looked at the volume and makeup of household energy use in urban areas. The results show that LPG is the main cooking fuel and electricity is the main source of lighting. The results also showed that only a small portion of the Kathmandu Valley's population practices energy conservation and is aware of environmental issues like climate change. Both income levels and population density have a positive impact on the total amount of energy consumed in urban areas. After statistically analyzing the relationship between lifestyle factors and energy consumption, Sanquist et al. (2012) came to the conclusion that lifestyle factors explain 40% of the variation in energy consumption. The perception of energy consumption is known as energy awareness. Although consumers must reduce their energy use, many lack the necessary knowledge to do so. Conversely, people are more driven to adopt energy-saving practices when they are more reasonable. Arinaitwe et al. (2023) investigated the relationship between energy management and top management commitment in small and medium manufacturing firms in a developing country perspective. To conduct this study, 66 manufacturing companies in Kampala, Uganda, were examined. The study found that

senior management commitment affects energy management. All three of its dimensions such as top management beliefs, top management support, and top management participation are positively and significantly predicting energy management in manufacturing firms. The primary data used in this study was gathered from a sample of one hundred rural households in Erode District. Erode District was chosen as the study's geographic location solely on the basis of convenience sampling. Information from the sample respondents was gathered using the questionnaire method. To conduct the analysis, multiple regression analysis was used.

### III. RESULTS AND DISCUSSIONS

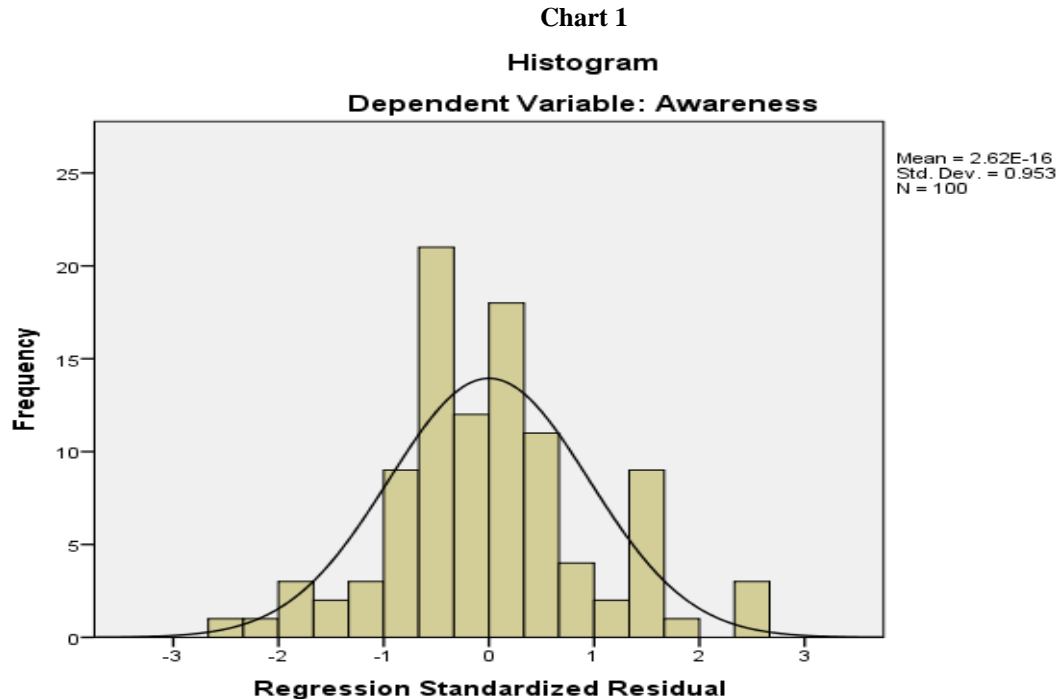
A statistical method for examining the relationship between one dependent variable and multiple independent variables is called multiple regression. Using known values for the independent variables to forecast the value of the single dependent variable is the goal of multiple regression analysis. The relationship between independent variables and the awareness of rural households towards energy management was studied and the result is given below.

**Table 1**  
**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.674 <sup>a</sup>	.454	.400	6.664

The multiple linear regression co-efficient is found to be statistically fit as  $R^2$  is 0.454 for awareness towards energy management of rural households. It shows that the independent variables contribute about 45.4 percent of the variation in the awareness towards energy management of rural

households and this is statistically significant at 1 percent level. It is found from the analysis that educational status and occupation are having significant association with the awareness towards energy management of rural households at 1 and 5% level.



The following table shows the multiple regression analyses which show the relationship between independent variables and the awareness towards energy management of rural households.

**Table 2**  
**Multiple Regression Analysis**

Variables	Unstandardized Coefficients		t	Sig.
	B	Std. Error		
(Constant)	22.070	5.026	4.391	.000
Age	-.045	.795	-.057	.955
Gender	-.150	.923	-.163	.871
Marital status	-.485	1.139	-.425	.672
Income level	.317	1.057	.300	.765
Educational status	8.195	1.617	5.069	.000*
Family type	.072	.761	.095	.925
Occupation	-1.453	.617	-2.355	.021**
Family size	.482	.623	.774	.441
Consuming level of energy	.059	.605	.098	.922

- Significant at 1% level; \*\* - Significant at 5% level.

It is revealed that variables such as income level, educational status, family type, occupation, family size and consuming level of energy are positively associated with the awareness towards energy management of rural households.

The velocity of increasing the level of awareness towards energy management of rural

households shows better results such as income level with 0.317 units change, with 8.195 units change in educational status, with 0.072 units change in family type, with 1.482 units change in family size, and with 0.059 units change in consuming level of energy.

In Anova table, the variables whose F Value is 8.331 and the associated probability for F test is less than or equal to 0.05. Hence the F value

is significant at 1% level and the study is perfectly fit to know the relationship between the selected variables.

**Table 3**

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3329.211	9	369.912	8.331	.000 <sup>b</sup>
	Residual	3996.229	90	44.403		
	Total	7325.440	99			

a. Dependent Variable: Awareness

Therefore, it is revealed from the study that the independent variables such as educational status and occupation are having significant association with the awareness towards energy management of rural households at 1 and 5% level. At the same time, the variables such as income level, educational status, family type, occupation, family size and consuming level of energy are positively associated with the awareness towards energy management of rural households.

#### IV. RECOMMENDATIONS AND CONCLUSION

In order to increase customer satisfaction, electricity service providers must take a customer-first strategy. In order to achieve this, electricity service providers must raise the caliber and dependability of their supply. Villages may see an increase in demand for electricity if a steady supply is available and new, profitable uses are made possible. In order to encourage demand, policies should encourage the use of medium- to high-power appliances in rural areas.

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