



A STUDY ON CUSTOMER AWARENESS AND ATTITUDE TOWARDS SOLAR WATER HEATER IN HOUSEHOLDS, COIMBATORE

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ABSTRACT

Humanity faces an exclusive and extensive challenge in energy/heat. It has played a pioneering role, but there is a narrowing gap between demand and supply of energy. At present we depended the non-renewable source of energy. These are all having the so many carbon by-products and pollute the environment. So the man has evolving to find out the alternatives source of clean energy. In such way one of the alternative renewable energy is solar energy. The study is descriptive in nature both primary and secondary data to be considered for this analysis. 100 samples are randomly selected in the area of north zone of Coimbatore and analysed for the study. Three objectives are framed and required tools to be applied for this study. Through this study customers awareness and attitude towards solar water heater have been analysed and provide the suitable suggestions to improve the solar energy utilization in households.

KEYWORDS

Alternative source, Non-renewable, Solar energy, Utilisation.

I. INTRODUCTION

Energy consumption can never be disregarded in day to day lifecycle. Our energy needs are rising as a result of continued population increases, economic growth, and individual fuel/energy consumption. At some point, the population of the planet will use up all the coal and oil that lay under the surface of the earth. More significantly, using the coal and oil and the by-products of those natural materials creates by-products that pollute our environment. We have abundantly blessed with solar energy. This energy contains of radiant light and heat energy from the sun. Out of all energy released by sun only a small fraction of energy is absorbed by the earth. Just this tiny portion of the sun's energy that hits the earth is enough to meet all our power needs. There are several ways to hitch the sunlight. The use of solar panels or photovoltaic cell is the most communal way to obtain the much needed solar energy. They are very efficient in producing a clean and renewable source of electricity. Although solar energy is widely known but it is not widely used today, solar energy has a great prospective to be used in future. So this conception required more research then only we can educate the people to use the solar energy in their day to day lifespan.

II. REVIEW OF THE LITERATURE

Dr. Hemantkumar P. Bulsara (2011), conducted a study entitled, "Factors considered while selecting Water Heaters as perceived by Builders in South Gujarat – India". This paper provides the study of importance of the factors considered while selecting water heaters as perceived by the Builders in the South Gujarat region of India and concluded that the Solar water heater market may also growth due to energy conservation reason but due to climatic condition in the South Gujarat region where Monsoon normally stays for 4-5 months, effectiveness of Solar water heaters could be examined.

S.Praveena and K.Kumaresh (2011) have made a study on "A Study on Usage And Consumer Satisfaction Towards Solar Water Heaters in Coimbatore District of Tamilnadu, this study is used to analyze the usage and customer satisfaction towards solar water heaters in Coimbatore. From this study, majority respondents of the users and non-users have positive attitude towards solar water heaters (SWH) and they felt that awareness about SWH was less. The finding reveals that the customers are satisfied with the performance of solar water heaters and non-users were willing to purchase SWH in future.

P.Pradeepa and Dr. Sathyamoorthy (2013) made a study on "A Study on Consumer Awareness towards Solar Heater System with Special Reference to Mettupalayam Town". This study found that Solar Domestic hot water technology has been around for more than of century, addressing residential markets that were always trevally small with equipment and design technique that can only be considered as almost because of natural gas and petroleum depletion (2-4) a huge market is about to open up for cost effective residential solar domestic hot water equipment with reliable backup provision should be provided and for the evaluate the future market can compare two distributor.

Dr. P. Thilagavathi, C.Mownica, (2014), have made a study on "Customer Satisfaction towards Solar Water Heater with Reference to Erode City". This study designed to know the factor influence the customer to the purchase of SWH, level of satisfaction, Problem faced by the customer. The analysis and the findings of the study reveals that the maximum of the respondents are influenced by the factor of no electricity charge to purchase the solar water heater and face the problem of high price for the solar water heater, and majority of respondents are satisfied about the solar water heater.

III. STATEMENT OF THE PROBLEM

Energy utilization cannot be forgetting in our life. But there is always gap between demand and supply. Due to the increasing energy demand and less availability of energy sources, society needs to find out the alternate source of energy, which should be clean and green, in this way we have abundantly consecrated with solar energy. Solar is the only source can satisfy energy need of the nation. Solar energy can be used for several applications such as lighting, heating and cooling etc., Hence the study creates awareness to use the solar energy in day to day life.

IV. OBJECTIVES OF THE STUDY

- To study the socio-economic characteristics of solar water heater customers in Coimbatore.
- To study the awareness and attitude among the selected sample with use of SWH systems in households.
- To find out the opinion towards solar water heaters in households.

V. HYPOTHESES OF THE STUDY

H0: There is no significant difference between the age group and customers' opinion towards SWH systems

H1: There is a significant difference between the age group and customers' opinion towards SWH systems

H0: There is no significant difference between gender group and customers' opinion towards SWH systems

H1: There is a significant difference between gender group and customers' opinion towards SWH systems

VI. SCOPE OF THE STUDY

The study is conducted to find out the awareness and attitude of the domestic solar water heater customers in North zone of Coimbatore. Coimbatore is the second largest district in the state of Tamil Nadu and it is becoming the solar cell city. To attempt the specified objectives, 100 respondents were selected from the population in the North zones of Coimbatore and analysed for the study.

VII. RESEARCH METHODOLOGY

In view of deciding objectives of the study, the researcher senses that descriptive analysis is most appropriate to analyse the awareness and attitude of the customer. Descriptive analysis is concerned with describing the characteristics of a particular individual or a group. The researcher found that there are 330 customers are using solar water heater in selected areas of Coimbatore north zone. For this study purpose 100 (30%) samples are selected from the study population by using (Lottery method) Multi-stage random sampling method. The study depends on both primary and secondary data. The primary data was collected through the questionnaires administered to different types of selected sample respondents from the North zone of the Coimbatore. The secondary information were collected from different sources like newspapers, magazines, journals, books, company agents, offices, pamphlets and websites.

Statistical Tools

- 1. Simple percentage analysis
- 2. Pearson's Correlation Coefficient
- 3. One-Way ANOVA

VIII. LIMITATIONS OF THE STUDY

- It is a micro level study and consequently the findings of the study are relevant only to the market segments keeping the characteristics of Coimbatore.
- Only the SWH users were taken for the study and non-users not considered.
- Due to the time constriction the sample size were limited to 100 respondents only.

IX. DATA ANALYSIS AND INTERPRETATION

1. SIMPLE PERCENTAGE ANALYSIS

Percentage refers to a special kind of ratio. By using the algebraic notation as follows; $P = (Fi/N) \times 100\%$

Where 'Fi' is the number of respondents and 'N' is the total number of sample

Table- 1.1
Personal profile of the Respondents

Personal Profile	Category	Frequencies	Personal Profile	Category	Frequencies
Gender	Male	43	Age	Below 21	3
	Female	57		21 – 40 years	62
	Total	100		41 – 60 years	30
Marital status	Married	84	Family members	Above 60	5
	Unmarried	26		Total	100
	Total	100		Below 3 members	14
Education	No formal education	19	3-4 members	42	
	School Level	48	5-6 members	26	
	Graduate level	21	Above 6 members	18	

	Other professional course	12		Total	100
	Total	100	Nature of family	Nuclear	64
Occupation	Business	14		Joint	36
	Professional	9		Total	100
	Private employee	19	Monthly Income	Below Rs. 15 001	17
	Government employee	21		Rs. 15,001 to Rs. 30,000	35
	Agriculture	30		Rs. 30,001 to Rs.45,000	30
	Others	7		Above Rs.45,000	18
	Total	100	Total	100	

Source: Primary Data

INFERENCE

From table 1.1, it is observed that, out of 100 Respondents, 57 percent of the respondents are female group and most of 62 percent of the respondents' are belongs to the age group of 21-40 years. Most of (48%) the respondents are having school level education and 30 percent were occupied in agriculture group. Most of (35%) the respondents were belonging to the income group of Rs. 15,001 to Rs. 30,000. Majority 84 % of the respondents are married. Most of (64%) the respondents' belongs to the nuclear family and 42 percent of the respondents' are having 3-4 members in their family.

2. PEARSON'S CORRELATION COEFFICIENT

In this study researcher has used the Pearson correlation analysis for analysing awareness and attitude.

Table -2.1
Relationship between Personal factor and study factor

S.No.	Variables	Age group (X)	Awareness (Y)	Calculated r value	Relationship
1	Age & Source of awareness	3	56	0.19	Weak positive correlation
		62	30		
		30	12		
		5	2		
2	Education & awareness	Education (X)	Awareness (Y)	0.85	Strong positive correlation
		19	56		
		48	30		
		21	12		
3	Income & awareness	Income (X)	Awareness (Y)	0.71	Strong positive correlation
		18	56		
		36	30		
		34	12		
4	Family members & SWH Capacity	Family members (X)	SWH capacity (Y)	0.79	Strong positive correlation
		14	39		
		42	40		
		26	15		
5	Family members & Used hours	Family members (X)	Used hours (Y)	0.84	Strong positive correlation
		14	35		
		42	45		
		26	12		
6	Income & capacity of SWH	Monthly Income (X)	SWH capacity (Y)	0.93	Very Strong positive correlation
		117	75		
		136	34		
		96	175		
		59	81		

Source: Primary Data

INFERENCE

It is clear from the table 2.1 shows that there is weak positive correlation between the age and awareness source of the respondents. Which states that the personal factor (Age) may not influences the study factor (source of awareness). Hence it is concluded that the increase in age group may not eventually increase the source of awareness and vice versa.

The table shows further, there is strong positive correlation between the education and awareness source, Income and awareness, family members and SWH capacity, family members and SWH used hours of the respondents. Which states that the personal factor may influences the study factor. Hence it is concluded that the increase in independent variable like age, income, family members may eventually increase the dependent variable like awareness source, SWH capacity, used hours and vice versa.

The table also inferred that there is a very strong positive correlation between Income and capacity of SWH, Which states that the Monthly income may highly, influences the study factor. Hence it is concluded that the increase of income may increase the capacity of SWH and vice versa.

3. ANALYSIS OF VARIANCE

In this study ANOVA has been used to study the Respondents opinion towards solar water heater with the following personal profile like Age group and Gender.

3.1 ONE-WAY ANOVA BETWEEN AGE GROUP AND RESPONDENTS OPINION TOWARDS SWH

Null Hypothesis (H₀): There is no significant difference between Age and Respondents opinion towards SWH.

Table-3.1.1

One-Way ANOVA between Age and Respondents Opinion towards SWH

Aspects		Sum of Squares	Df	Mean Square	F-value	P-value
Fulfil needs/expectation	Between Groups	2.343	3	.781	.526	.665
	Within Groups	142.567	96	1.485		
	Total	144.910	99			
Reduce EB bill	Between Groups	3.380	3	1.127	.664	.576
	Within Groups	162.860	96	1.696		
	Total	166.240	99			
Reduces pollution	Between Groups	2.406	3	.802	.501	.682
	Within Groups	153.634	96	1.600		
	Total	156.040	99			
improves lifestyle	Between Groups	7.271	3	2.424	2.116	.103
	Within Groups	109.969	96	1.146		
	Total	117.240	99			
Intention to use other solar products	Between Groups	4.347	3	1.449	.921	.434
	Within Groups	151.043	96	1.573		
	Total	155.390	99			

Source: Primary Data

INFERENCE

It is clear from the table -3.1.1 indicate that the customers' opinion towards various aspects of SWH. The table shows that the p-value is greater than 0.05. So the null hypothesis is accepted at 5% level of significant. Hence it is concluded that there is no significant difference between the age group and the customers' opinion towards SWH.

It is inferred that the various age group of the respondents having the same opinion on various aspects of SWH like Full fill the needs/expectation, reduce EB Bill, Reduces pollution, Lifestyle

improvements and intention to use other solar products.

3.2 ONE-WAY ANOVA BETWEEN GENDER AND RESPONDENTS OPINION TOWARDS SWH

Null Hypothesis (H₀): There is no significant difference between Gender and Respondents opinion towards SWH.

Table-3.2.1

One-Way ANOVA between Gender and Respondents Opinion towards SWH

Aspects		Sum of Squares	Df	Mean Square	F-value	P-value
Fulfil needs/expectation	Between Groups	.751	1	.751	.510	.477
	Within Groups	144.159	98	1.471		
	Total	144.910	99			
Reduce EB bill	Between Groups	.696	1	.696	1.010	.317
	Within Groups	67.494	98	.689		
	Total	68.190	99			
Reduces pollution	Between Groups	.000	1	.000	.000	.997
	Within Groups	156.040	98	1.592		
	Total	156.040	99			
improves lifestyle	Between Groups	2.103	1	2.103	1.790	.184
	Within Groups	115.137	98	1.175		
	Total	117.240	99			
Intention to use other solar products	Between Groups	.056	1	.056	.035	.851
	Within Groups	155.334	98	1.585		
	Total	155.390	99			

Source: Primary Data

INFERENCE

It is clear from the table -3.2.1 indicate that the customers' opinion towards various aspects of SWH. The table shows that the p-value is greater than 0.05. So the null hypothesis is accepted at 5% level of significant. Hence it is concluded that there is no significant difference between the Gender group and the customers' opinion towards SWH.

It is inferred that the Gender group of the respondents having the same opinion on various aspects of SWH like Full fill the needs/expectation, Reduce EB Bill, Reduces pollution, Lifestyle improvements and intention to use other solar products.

X. FINDINGS

SIMPLE PERCENTAGE ANALYSIS

The study reveals the following findings.

- Most of the respondents (57%) are Female.
- Majority of the respondents (62%) are belonging to the age group between 21-40 years.
- Most of the respondents (48%) are having the school level education.
- 30% of the respondents are belonging to the agriculture group.
- 35% of the respondents are belonging to the monthly income group between Rs.15,001 to Rs.30,000.
- Majority of the respondents (84%) are married.
- Majority of the respondents (64%) are belonging to nuclear family group.
- Most of the respondents (42%) are belonging to 3 – 4 members in their family.

PEARSON'S CORRELATION COEFFICIENT

- There is weak positive correlation between the age and awareness source of the respondents. Which states that the personal factor (Age) may not influences the study factor (source of awareness). Hence it is concluded that the increase in age group may not eventually increase the source of awareness and vice versa.

- There is strong positive correlation between the education and awareness source, Income and awareness, family members and SWH capacity, family members and SWH used hours of the respondents. Which states that the personal factor may influences the study factor. Hence it is concluded that the increase in independent variable like age, income, family members may eventually increase the dependent variable like awareness source, SWH capacity, used hours and vice versa.
- There is a very strong positive correlation between Income and capacity of SWH, Which states that the personal factor may highly, influences the study factor. Hence it is concluded that the increase of income may increase the capacity of SWH and vice versa.

ONE-WAY ANOVA

- There is no significant difference between the age group and the customers' opinion towards SWH. Hence the two group mean values are same. It is inferred that the various age group of the respondents having the same opinion on various aspects of SWH like Full fill the needs/expectation, Reduce EB Bill, Reduces pollution, Lifestyle improvements and intention to use other solar products.
- There is no significant difference between the Gender group and the customers' opinion towards SWH. Hence the two group mean values are same. It is inferred that the Gender group having the same opinion on various aspects of SWH like Full fill the needs/expectation, Reduce EB Bill, Reduces pollution, Environment/social benefit, Lifestyle improvements and intention to use other solar products.

XI. SUGGESTIONS

- Most of the customers are feels that the awareness of the Solar water heater and it social/ economical benefit are less. So SWH vendors and Government should take the necessary action to make the customer awareness on solar energy and it's important through the advertisement and strict rules.
- Most of the customers have an opinion that the solar water heaters fulfill the needs and generate the savings; hence they may have the intension use other solar product also. It is the responsible to make the facilitation to avail the other solar product like solar fan, light, inverter, etc., It will be increase the sales and utilization among the customer.
- SWH vendors should improve their service in all aspects such as after sale service, avail the govt. subsidy, immediate service on leakage, marketing survey about the satisfaction and problems, etc.,

XII. CONCLUSION

"The customer is always precise" is a prominent business slogan. The fundamental fact behind this statement understands that, customers are the life blood for any business. Keeping this in mind, this study has been piloted at Coimbatore city to identify the customers' awareness and attitude towards solar water heater. The findings of the study describe that the customers have less aware about the energy source demand and solar energy important. It is suggested that the SWH vendor should take some necessary action to improve the sources of awareness through advertisement and new policies. This study shows that respondents having the positive attitude towards. Hence SWH vendors may provide other solar products (Light, fan, and inverter). To improve the utilization of solar energy government should make very strict rules and give subsidy to install the solar energy systems in their homes for domestic purpose.

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