Vol 3 Issue 4 May 2013

Impact Factor : 0.2105

ISSN No : 2230-7850

Monthly Multidisciplinary Research Journal

Indian Streams Research Journal

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RNI MAHMUL/2011/38595 **ISSN No.2230-7850**

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Indian Streams Research Journal
Volume 3, Issue. 4, May. 2013
ISSN:-2230-7850
Available online at www.isrj.net

ORIGINAL ARTICLE

"THE STUDY OF CONSUMER AWARENESS OF USE OF SOLAR ENERGY SYSTEMS WITH REFERENCE TO WESTERN MAHARASHTRA"

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Abstract:

Energy security has an important bearing on achieving national economic development goals and improving the quality of life of the people. An energy crisis is any great bottleneck (or price rise) in the supply of energy resources to an economy. The increasing prices for petroleum products, projection that petroleum resources would be exhausted in a relatively short period of time and the use of fossil fuel resources for political purposes will adversely affecting worldwide economic and social development. In addition, global warming caused largely by green house gas emission from fossil fuel generating systems is also a major concern. These problems can be overcome by alternative sources that are renewable, cheap, easily available, and sustainable. And the solar energy is best promising source. But unfortunately this source of energy has been get neglected. People are using solar energy systems in industries as well as for household purposes but its use is negligible .Most of the people are not aware of use of solar energy systems. In this study researcher has aimed to find out the consumer aware of Solar energy, solar energy systems and its use

KEYWORDS:

Solar energy, solar energy systems, energy crisis, fossil fuel, consumer awareness

INTRODUCTION

Energy security has an important bearing on achieving national economic development goals and improving the quality of life of the people. The level of per capita energy consumption has for long been considered as one of the key indicator of economic growth. The Indian state of Maharashtra is at a crossroads. Its people endure frequent electricity blackouts due to a booming energy demand that far outpaces energy production.. Today there is enough water for agriculture but the farmers cannot pump the water due to intermittent power supply; the agricultural output of the State is being affected .We get energy mainly out of fossil fuels (non renewable sources) like coal, petroleum, oil and natural gas. But as non renewable sources are limited in nature and use of some of these sources are harmful to environment and earth. In other words all non-renewable resources are uniformly exhausting in near future. The problems posed by electric energy generation from fossil sources include high costs due to large demand and limited resources, pollution and CO2 production. These problems can be overcome by alternative sources that are renewable, cheap, easily available, and sustainable. And the solar energy is best promising source.

In the Vedas Surya Dev is referred to as the god of light who is responsible for all life on earth. The Sun is the richest source of electromagnetic energy (mostly in the form of heat and light) in the solar system. . It is fact that after our stores of oil and coal are exhausted the human race can receive unlimited power from the rays of the sun. Solar energy offers a clean, climate-friendly, very abundant and inexhaustible energy resource to mankind, relatively well-spread over the globe. Its availability is greater in warm and sunny countries like India including Maharashtra. In Maharashtra it is available everywhere and almost

Title : "THE STUDY OF CONSUMER AWARENESS OF USE OF SOLAR ENERGY SYSTEMS WITH REFERENCE TO WESTERN MAHARASHTRA" Source:Indian Streams Research Journal [2230-7850] ANITA KHATKE yr:2013 vol:3 iss:4

every day of the year. The energy from the sun could play a key role in de-carbonizing the global economy alongside improvements in energy efficiency and imposing costs on greenhouse gas emitters. The strength of solar is the incredible variety and flexibility of applications, from small scale to big scale. Solar technologies or systems can help ensure greater energy security and sustainability. It can also provide significant contribution to raise the living standards in developing economies it lends itself to a range of solutions, from a few watts as in a solar lantern or solar home lighting system to a few kilowatts as in a rooftop solar power system to mega-watt-scale grid-connected solar power plants. A whole new solar power ecosystem is generating new jobs and entrepreneurship. In spite of several benefits, the use of solar energy is very less. It is observed that the problem pertaining to consumption of solar energy systems is mainly revolving around of 3Ns and they are non-awareness, non-availability and non-adaptability. Government and marketers, manufactures of solar energy systems has to adopt the favorable marketing strategies to overcome these 3 Ns.

SOLAR ENERGY

Sun worship by ancient civilisations is evidence of the recognition of the sun's central importance in sustaining life. Sun is worshipped as "surya" in India from ancient times. According to the Indian mythology, surya was responsible for health and life, a reflection of what was perhaps the scientific belief of the time. Surya is one of the principal Vedic deities.solar energy - energy derived from the sun's radiation .the sun gives us 1000 times more power than we need. if we can use 5% of this energy, it will be 50 times what the world will require. [03] Solar energy, radiant light and heat from the sun, has been harnessed by humans since ancient times using a range of ever-evolving technologies

SOLAR ENERGY SYSTEMS –

These are the device which collect and concentrates and converts solar energy is to useful heat energy and electric energy which are useful to humankind some examples solar energy systems- solar panels, solar home lightings, solar water pump, solar invertors, solar air conditioner, solar water heater, solar cooler, solar lanterns, solar generator, solar cooker, solar street lights, solar battery charger, solar television, solar fridge, solar dryer, solar led lights.

Dr. Manmohan Singh, (2010) India's current prime minister said while releasing the national action plan on climate change, rightly said

"In this (India's) strategy, the sun occupies centre stage, as it should being literally the original source of energy. We will pool all our scientific, technical, and managerial talents, with financial resources, to develop solar energy as a source of abundant energy to power our economy and to transform the lives of our people. Our success in this endeavor will change the face of India."

STATEMENT OF THE PROBLEM

Whole India as well as Maharashtra is facing problem of energy crises. There is huge gap between demand and supply. Whole Maharashtra is facing problem of energy deficits. due to this industries, commercials & also household getting badly affected. Urban area is facing problem of load shading. in rural areas 12-14 hours, load shading of power supply is there. Thus, the agriculture progress and farmers get badly affected .energy is blood flowing through economy. the energy we use generates electricity from natural of resources like water, oil , wood , coal , gas etc. but all these resources are limited, one day many of this will come to an end. India is importing large amount of fossil fuels. The burning of fossil fuels creates pollution results into global warming. To overcome this situation we have to accept new options i.e. use of solar energy. Solar energy is free of cost & available everywhere & unlimited never-ending courses. Using solar energy we can solve many problems such as electrically shortage, which affected the economy, pollution .over use of natural resources environment natural resources.

But unfortunately the most of the people are not aware of the use and importance of solar energy systems. Very few people are using solar energy products. People are aware of only few solar energy systems while there are various systems available. This research mainly focuses on consumer awareness of use solar energy system.

OBJECTIVES

The board objectives of this study is to study the consumer awareness of use of solar energy systems western Maharashtra .however, the specific objectives of the study are as under.

1.To study the consumer awareness of use of solar energy systems in two cities of western Maharashtra i.e. Pune and Solapur
2.To study the consumer awareness about solar energy systems (products) in households and professionals of two cities of western Maharashtra
3.To find out the usage level of various solar systems
4.To give suggestions to increase create consumer awareness and to overcomes the barriers of use of solar energy system.

SIGNIFICANCE OF STUDY

1This study will give us the picture of consumer awareness of use of solar energy systems in households and professional i.e. how many people's on professionals using the solar systems.
2It also gives an idea about, if peoples are using the solar energy systems, which systems they are using and at what extend.
3This study and suggestions is beneficial to society, economy, saving nature and ultimately saving earth. e.g. by using solar energy systems, the rural areas can overcome through the problems of load shading etc

SCOPE

The scope of the study is restricted to the two cities of western Maharashtra i.e. Pune and Solapur. It covers districts places i.e. Pune and Solapur cities. This study will focus on households as well as professionals. Also study is limited to survey of households and professionals (business) only.

LIMITATIONS

The present study is limited to two cities of western Maharashtra only. This study doesn't cover use of other renewable energies. It covers only the consumer awareness of solar energy systems. It focuses only on households.

HYPOTHESIS

. "Consumer awareness about the use of solar energy systems is negligible in respondents from Pune and Solapur"

RESEARCH DESIGN AND METHODOLOGY

The research purpose and research questions of this thesis indicate that this study is more descriptive and little bit exploratory. And also our interest is to describe the area of research and later we would begin to explain analyze the collected data in order to find out and analyze awareness level about the use of solar energy products by households and professionals. Therefore descriptive and analytical statistic research is suitable for this study.

The procedure used the survey methods to answer the research questions and analyze awareness level about the use of solar energy products by our research purpose and research question reveal that this study is mainly descriptive. it is because the data has been collected through questionnaires and conducted to find out and analyze awareness level about the use of solar energy products by households and professionals. .in this study, the questionnaires survey was used to obtain information about consumer awareness about the use of solar energy products among households in western Maharashtra

DATA COLLECTION METHODS

Primary data

For this study, the primary data is collected by, interviewees of concern persons; discussion with concern authorities, questionnaire is prepared and gets filled from selected samples a questionnaire was used as the main form of data collection in this research. The questionnaire was distributed to the household energy consumers form Pune and Solapur cities.

Secondary data

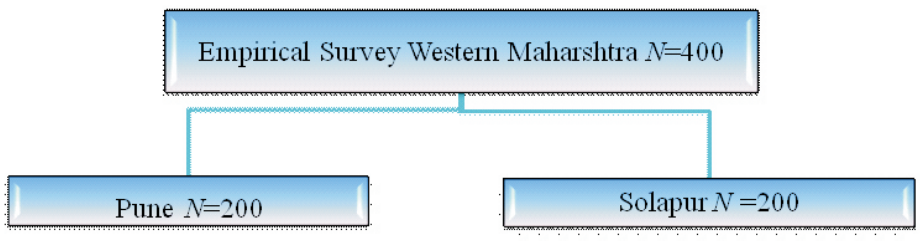
For this study the researcher gathered the secondary data from sources such as books, journal, brochures, internet, articles, and external data also can be collected such as from any related information from internet, textbooks, journals, magazines, articles, and etc

Sampling frame

For the present study, data were collected from a two cities from western Maharashtra i.e. Pune and Solapur. Pune city is considered to be semi metro city as well as urban area. Solapur city is still considered to be semi urban area.

Sampling technique and sample size

Stratified random sampling method is used to collect the data. Total samples were 400. The 200 samples were from each city. The figure represents the sample plan (for respondents)



HYPOTHESIS TESTING

H1. "Consumer awareness about the use of solar energy systems is negligible in respondents from Pune and Solapur"

To harness solar energy there are various solar energy systems are available. These are also called as solar products. Some of systems are solar home lights, solar water pump, solar inverters, solar air-conditioner, solar water heater, solar cooler, solar lanterns, solar generators, solar cooker, solar street light, solar battery charger.etc. These solar systems can solve our major energy problems and can make the world energy sustain. These solve systems are eco friendly, pollution free. But still energy customers are not much aware about these systems.

Researcher wanted to explore the awareness of the respondents from 400 households from Pune and Solapur cities as samples from western Maharashtra about the several of the solar energy systems and also to fine out users of solar energy systems. .

Researcher has taken the response from the respondents related to their awareness about the 11 solar energy systems or products. The questions was asked giving four options i.e. Aware, not aware, using and seen the systems. Researcher has taken the total of the responses given by the respondents.

Household - 400 respondents

Table no.1 awareness about solar energy systems/products

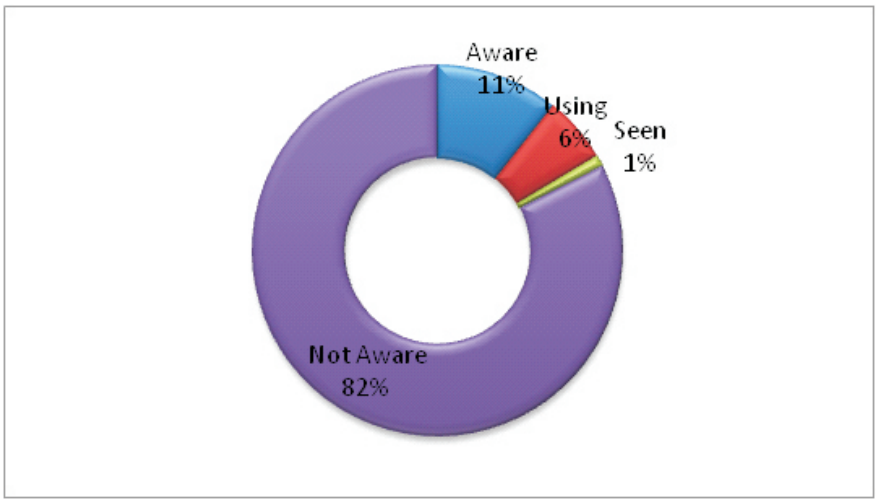
item	cities	aware %	using %	seen %	not aware %	total %
solar home lights	Pune	8.5	10	3.5	78	100
	Solapur	14	3.5	0	82.5	100
solar water pump	Pune	9	1	0	90	100
	Solapur	9	3.5	0.5	87	100
solar inverters	Pune	3.5	0	0	96.5	100
	Solapur	3.5	0.5	0	96	100
solar air-conditioner	Pune	1.5	0	0	98.5	100
	Solapur	2.5	1	0	96.5	100
solar water heater	Pune	15	26	10.5	48.5	100
	Solapur	26	18.5	4	51.5	100
solar cooler	Pune	2	1	0	97	100
	Solapur	9.5	0	0	90.5	100
solar lanterns	Pune	6	5	1.5	87.5	100
	Solapur	28	11	1.5	59.5	100
solar generators	Pune	1	0.5	0	98.5	100
	Solapur	12	1.5	0	86.5	100
solar cooker	Pune	16	3	0	81	100
	Solapur	33.5	13.5	0	53	100
solar street light	Pune	3.5	7	0	89.5	100
	Solapur	11.5	9	0	79.5	100
solar battery charger	Pune	9.5	4	1	85.5	100
	Solapur	11.5	6	0	82.5	100

Researcher has calculated average of responses of all 11 solar energy systems .it can be represented as follows.

Table no.2 total average awareness about solar energy systems/products

Item	Aware %	Using %	Seen %	Not aware %	Total %
Households	10.745	5.7	1.02	82.55	100

Graph .no 1 Total awareness about solar energy systems/products



The above table and graph clearly shows that the average awareness about solar energy systems is only 11 % (considering values of aware and using).Only 5.7 % respondents are using solar energy systems. 1.02 % respondents have seen the solar energy systems. 82.55% are not aware of various solar energy systems/products.

So it is proved from above table that from out of 400 respondents only 11 % respondents are aware of solar energy systems, it is negligible percentage. The results clearly prove that awareness level about the solar energy systems is negligible in professionals.. Researcher can conclude that the hypothesis, "consumer awareness about the use of solar energy systems is negligible in respondents from Pune and Solapur" is accepted.

It is also seen that respondents are aware about only few solar energy systems. Among all solar energy systems awareness about solar water heater is good. Little Awareness about solar cooker, solar home lights and water pumps is observed. But awareness about other products like solar inverters, solar air-conditioner, and solar cooler, solar generators Solar street light Solar battery charger is negligible. While these other systems are also extremely useful

SUGGESTIONS AND RECOMMENDATION

Considering the findings the researcher is suggesting effective marketing strategies to promote and create the awareness about solar energy systems and its effective use. The following are the marketing strategies

Application of marketing strategies - 4 P's of marketing for marketing of solar energy Systems

Objective	Marketing Strategy
Product Mix	Using innovative technology and cheap raw material to reduce production price Increasing efficiency of solar panels Reducing size of solar panels and multi designs of solar panels Assurance of good after sales and maintenance services Manufacturing Solar panels which can also used as decorative item for roof
Price Mix	Reducing price of solar products to more extend, By mass production, using cheap easily available raw material and new technology Providing financial solutions for purchase of solar products Government has to provide income tax benefits on purchasing of solar system like insurance policies and infrastructure bonds to individual solar customer
Place Mix	Making available in each electronic shop, in malls as consumer electronics, also making easy availability in rural market Government has to increase no. of Akshay Urja shops in cities as well as each talukas places. Urja shops should be in each corner of the city.
Promotion Mix	Promotion mix is most important mix overall. Heavy promotion by government as well as by manufacturer and marketers of solar energy systems. Government has to promote solar energy by appointing **Brand ambassador**, very famous, well known personality like Mr. Amitabh Bachhan, Amir Khan, Anna Hazare, Kajol etc. Government should launch advertising campaign like polio dose and digital set top box, which is already running in Medias. NGO and social group help can be taken for promotion of solar products. Detailed informative chapters should be including in school syllabus.

CONCLUSION

Despite immense potential, the market for solar gadgets isn't very sunny in India. Lack of awareness and perceived high cost of these products pose hurdles in the way of their acceptance Awareness about solar products in India can be attributed to factors like lack of marketing initiatives, less visibility, and high cost of products. These factors are also blocking their wide acceptance .While the future for solar technologies looks bright, solar programs must learn to tell solar energy's 'value' story. Creating messages that connect to consumers on a financial or value level are the keys to increasing solar installations. Doing so will mean stronger state economies, more jobs, a cleaner environment and another step toward energy independence.

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