



A STUDY ON ENERGY SAVING ASPECTS OF SOLAR PANELS

Ms. Vandhana Hegde

N, PG Research Scholar, Department of Home Science – Interior Design & Decor, Sri Kanyaka Parameswari Arts and Science College, No:1, Audiappa Naicken Street, Broadway, Chennai-600001

Ms. Kavitha. P. S*

M.Sc., M.Phil, Assistant Professor, Department of Home Science – Interior Design & Decor, Sri Kanyaka Parameswari Arts and Science College, No:1, Audiappa Naicken Street, Broadway, Chennai-600001 *Corresponding Author

ABSTRACT

Energy is available in different forms. It is available as renewable and non renewable sources. Renewable resources are naturally replenished over a period of time such as solar energy, geothermal energy, tidal energy and wind energy. Among these renewable sources, Sun is said to be the source of all forms of energy. According to Lijingcheng (2010) Solar energy is most commonly collected by using solar cells. Of course solar energy can be put to use to heat or light up a room by simply having well placed windows and skylights. To use solar energy to power electrical appliances solar cells and panels are used. A solar panel is a device that collects and converts solar energy into electricity or heat. Solar panels were in use over one hundred years ago for water heating in homes. The purpose of the study is to find out the energy saving aspects of solar panels such as factors considered in selection of solar panels and electricity charges before and after installing solar panels among the residents of Chennai. Hence the present study focuses on the energy saving aspects of solar panels. The results showed that there is significant difference among the electricity bills before and after installing solar panels.

KEYWORDS : Solar Panels, Solar energy, Energy saving aspects.

INTRODUCTION

Energy is very critical to all development aimed at human welfare covering household, agriculture, transport and industrial sectors. Energy is a key input in economic growth there is a close link between the availability of energy and the future growth of nation. The energy from the sun is in the form of radiations, which is called as the solar energy (Chauhan, 2006). With rapid rise in energy prices, concern over pollution, depletion of resources and environment degradation the awareness for limited resources around the world has increased dramatically. Governments with vision have come to realise that generation of electrical power through non-renewable sources of energy is not enough. The power of the future must be environmentally friendly as well (Suhas P Sukhatme, 1996). The current statistics based on solar energy is scaling up rapidly, with capacity more than trebling over the past four years. The solar power generation in the year 2016 is rapidly increasing with 29.6% increase. It is about to contribute more than 20% of the growth of global power in 2016 (Indian statistical analysis.com).

Researches like Dipankar Deb, 2017 have said that solar energy is available in abundance and can be easily extracted using solar cells along with regular maintenance of solar panels. In today's context the need for energy is increasing day by day, as the fossil fuels are depleting, we are in a condition of using renewable energy resource in various forms. Though there is an awareness of using solar energy, the aspects which is been considered for solar panels is not yet known to the general public.

Researchers have done lot of study on the solar power aspects like the energy saving aspects, solar devices and other concepts. The energy saving aspects of these solar panel systems are not done in detail. Hence, the need has risen to study the energy saving aspects of solar panels system among the residents.

REVIEW OF LITERATURE

Energy is a crucial input in the process of economic, social and industrial development. Energy can neither be created, nor be destroyed. It only changes from one form to another (Chauhan, 2006). The energy received on earth from sun is termed as "solar energy" and it reaches in form of radiation. The biggest advantage of solar energy is that it does not bring about any pollution (Nangia, 2002). Humans have used the solar energy directly for the purpose of drying, lighting, cooking food as well as to power the agriculture

that supplies us with food. In recent centuries usage of renewable energy has paved way to create solar panels which conserves energy. The great future of solar energy is that the fact it is likely to continue to exist so far into future that we can think of it as being unending (Goyal, 2009).

According to Naunihal Singh, (2008) the care and maintenance of solar panels are as stated, Solar panels don't require extensive care, proper maintenance and occasional cleaning which help to extend their lifespan and efficiency. Solar panels have no moving parts so the main area of maintenance is to keep them clean. It is recommended to check the panels; especially during peak dry periods when dust builds up may be higher. Dirty panels cannot absorb the energy as efficiently and will have a much reduced performance level. The main sources of dirt are bird droppings and dust which can be easily removed using either a dry cloth or detergent and warm water.

METHODOLOGY

The study on energy saving aspects of solar panels is been discussed below:

Objectives of the study:

- To find out the selection factors of using solar panel system among residents.
- To identify the electricity charges before installation and after installation of solar panels.

Operational definition

Solar energy: The direct energy received on earth from sun is termed as "solar energy" and it reaches in form of radiation. The biggest advantage of solar energy is that it does not bring about any pollution (Koteswara Rao, 2006).

Research design: Research design is the determination and statement of the general research approach or strategy adopted for the particular project. It is a heart of planning the design with adheres to the research an objective, ensuring the client needs (Kothari, 2005). An Expost facto research design, cross sectional in nature was used with demographic variables such as ownership, working status, income, age, and type of house as independent variable and the energy saving aspects of solar panels as dependent variable.

Sampling design:

A random sampling technique, in which each member of the population has an equal chance of being selected as subject was used for this study. A total of 100 samples in which residents of Chennai residing in own house and rented house were selected for the study.

Tools used for the study:

The main tool used for collecting data was questionnaire. The questionnaire is one where list of questions are properly selected and arranged pertaining to the investigation (Gupta, 1993). The demographic profile of selected respondents, electricity bill before and after installation of solar panels and factors considered in selection of solar panels were collected and comprised.

Conduct of survey:

A pilot study was conducted to identify the typographical errors and to validate the questionnaire. The main study was done to collect the data's pertaining to questionnaire tool and was analysed statistically.

RESULTS AND DISCUSSION

Demographic profile of selected respondents

Demographic profile of the selected subjects reveals the personal data of selected subjects such as Income, Age, Working status, Occupation, Ownership which was analysed and presented in table 1.

Age:

Table 1 reveals higher percentage of selected residential where from the age group of 40-50 years (50%) followed by 30-40 years (26%) and the rest of them where below 30 years (20%) and above 50 years (4%).

Income:

It is observed that in general 50% of the selected subjects earning were above Rs.30,000-50,000 and 36% of the respondents income was above Rs.50,000 and the rest 14% income was below Rs.30,000.

Work Status:

It is observed that in general 76% of the selected subjects residing in residence were working and the rest 24% were non-working groups.

Type of house

From the table 82% the respondents were residing in own house and remaining 18% of them were in rental house.

Occupation:

Majority of 36% of the selected respondents in residents were doing business. Nearly 32% of the residents were employed, 20% were homemakers and rest of them 12% were professionals

Table-1: Demographic profile of selected respondents (In per cent)

Demographic Profile		N=100	PERCENT (%)
Age	Below 30	20	20
	30-40years	26	26
	40-50years	50	50
	Above50	4	4
Income	Below 30,000	14	14
	30,000-50,000	50	50
	Above 50,000	36	36
Work status	Working	76	76
	Non-working	24	24
Types of house	Own	82	82
	Rental	18	18
Occupation	Employed	32	32
	Business	36	36
	Professional	12	12
	Homemaker	20	20

Ns- Not significant *-significant at 5 per cent level **- significant at 1 per cent level

Electricity bill charges before and after using solar panels

From the table 3 it is clear that the electricity charges before and after installing solar panels proved that there is significant difference among the selected respondents. It is also evident from the table that the significant difference is at 1% level (10.725**). The ultimate solution for energy crises will be through the discovery of methods of harnessing the non-conventional such as solar energy sources; the extraction of non-conventional energy will not only help in meeting energy demands, but also help in their developments (Vandana.S,2002).

Table 3: T-Test depicting electricity bill charges before and after installation of solar panels

Bill charges	Mean	N	STD DEVIATION	STD ERROR	T
Before installation	1.86	100	0.808	0.114	10.725**
After installation	2.80	100	0.833	0.118	

CONCLUSION:

Hence it can be concluded that the solar panels are the best way for clean energy source and it has lot of energy saving aspects like it is being used for domestic purposes, even for small and all heavy appliances it is applicable. It also ensures saving money, energy and electricity bills and it has been a form of trend setting factor. There is a constant supply for domestic purpose and it also reduces the impact on thermal energy. Hence it can be said that these solar panels paves way for green energy and sustainable energy form in upcoming years of development.

REFERENCES

- Li jingcheng(2010) Application of solar energy, Saimaa University of Applied Sciences,Lappeenranta
- H.P.Garg (2000), "Solar energy and applications", TataMC Graw-hill Publishing Company, New Delhi, Pg.123-130
- Koteswara Rao (2006), "Energy resources", BS Publications, Hyderabad, Pg.86
- Nangia (2002), "Sustainable development", Macmillan India ltd, Kolkata, Pg.56.
- Naunihal Singh (2008), "Energy crisis", Author press, New Delhi, Pg.30-40.
- Sushas.S.Sukhatme (1996) "Solar energy, principles of thermal collection, TataMC Graw-hill Publishing Company, New Delhi, Pg.37.
- Sushas.S.Sukhatme (1996), "Solar energy", TataMC Graw-hill Publishing Company, New Delhi, Pg.240
- Vandana (2002), "Alternative energy", APH Publishing Cooperation, New Delhi, Pg.73-79