

Investigating the Constraints to the Adoption and Use of Solar Water Heaters in Hisar



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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. Demand for energy has grown manifold in all sectors of Indian economy and it is expected to increase considerably in the coming years, as a result of increasing population and economic growth in the country. Demand for primary energy resources i.e. coal, oil and natural gas, has grown at the rate of six percent between 1981 and 2001 (Energy Planning Commission, 2009). At present we depended the non-renewable source of energy. Heating water dominates the energy needs of households sector. For households in developing nations, heating water is often the most energy intensive process, and therefore the most expensive and time-intensive. The word itself- solar, describes that we are dealing with some renewable energy source for a hot water systems. The present study was conducted in hisar district, Haryana to identify the constraints in installation and use of solar water heaters. In this paper the main focus is on problems faced by the families during installation and using SWH majority of the families (92%) did not face any problem during installation of solar water heater while few families (8%) did face the problem, while using the SWHs Four-fifth of the families did not face any problem while 20 percent families faced the problems. Among those facing the problems, 14 percent reported breakage of pipe followed by improper storage of water, cracking of PVC plate and problem with the meter.

Keywords: SWH, Installation, Problems.

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. Demand for energy has grown manifold in all sectors of Indian economy and it is expected to increase considerably in the coming years, as a result of increasing population and economic growth in the country. India is the fourth largest energy consumer in the world. Demand for primary energy resources i.e. coal, oil and natural gas, has grown at the rate of six percent between 1981 and 2001 (Energy Planning Commission, 2009). At present we depended the non-renewable source of energy.

Heating water dominates the energy needs of households sector. For households in developing nations, heating water is often the most energy intensive process, and therefore the most expensive and time-intensive. Some households rely on biomass to heat water. In many countries demand for fuel wood is one of the principle contributors to deforestation. Other rely on electricity and LPG to heat their water. These fuel options are unsustainable as they are costly to household and contribute to buildup of greenhouse gases in the atmosphere. The hot water requirements are primarily met presently by combustion of fossil fuels like coal, fuel oil, LPG and electricity.

Because of insufficient fuel supply, the country suffers from a severe shortage of electricity generation. In order to reduce supply risk from energy sources with high price volatility such as oil, electricity and LPG, the government is encouraging more generation from renewable energy sources, such as hydropower and solar. Solar energy used for water heating is one of the potential solutions to this problem. Solar energy is clean and renewable. It doesn't emit carbon dioxide during operation. Solar energy is environment friendly as it has zero emissions while generating electricity or heat.

Policy Development Committee Solar (PDC Solar, 2008) reported that a solar geyser, for a normal household, repays itself within three to four years after purchase, depending on the location of the household and the hot water consumption by the family. It was further stated that under normal conditions, a solar geyser does not have any maintenance requirements and therefore no maintenance cost. The useful life of a solar geyser is expected to be between 15 and 25 years. Mahote (2009) found that the solar water heaters were found to have many technical problems which have lead to breakage of many of the heaters. Maintenance was found to be very poor.

MNRE (2010) reported that using high quality low-iron glass, it was possible to increase the solar energy gain by 2–6 percent. The primary barriers included lack of public awareness of the benefits of SWHs, lack of properly trained engineering and installation technicians, and the need for more research and development of improved designs of SWHs. Solar supply is greatest in summer, when there is no demand for heating, and lowest in winter, when the demand is highest. Praveena and Kumaresh (2011) found that the users of SWH, about 6.67 percent of the respondents were having the problem of leakage of water followed by the glass breakage (5.00%) while non-user respondents were facing the problem in EWH as safety problem (11.67%) followed by not cost effective (8.32%) and time consuming (3.33%).

Soni (2016) found that Solar Water Heater has been one of the most popular solar installations across the country. Solar water heater is considered as the widely accepted and proven green energy devises widely used by households. SWHs of 100-300 litres capacity are suited for domestic application. A 100 litres capacity SWH can replace an electric geyser for residential use and saves 1500 units of electricity annually. A SWH of 100 liters capacity can prevent emission of 1.5 tons of carbon dioxide per year. With having average life span of 15-20 years.

Aim of the Study

The aim/purpose of this study was to know about the problems faced by the families during installation and using SWH.

Methodology

Locale of Study

The study was conducted in urban area of Hisar city of Haryana state which was selected purposively as the researcher is well acquainted with the area.

Sampling Procedure

A sample of 50 respondents were selected users of solar water heaters.

Tools for Data Collection

Data were collected personally by the researcher using questionnaire method in order to assess the energy use pattern for hot water requirement.

Analyses of Data

Data was coded and tabulated to draw meaning inferences.

Results

Results shows that a vast majority of the families (92%) did not face any problem during installation of solar water heater while few families (8%) did face the problem. Six percent of the families were facing the problem in water tank followed by the improper storage of water and defective product (2 percent each). Six percent families filed complaints for redressal to the installer followed by the agencies (2%). Eight percent of the families got positive reaction and were satisfied with the redressal. Six percent of the families got partial redressal followed by the full redressal of SWH (2%).

Fig:1 Problems faced during installation of SWH

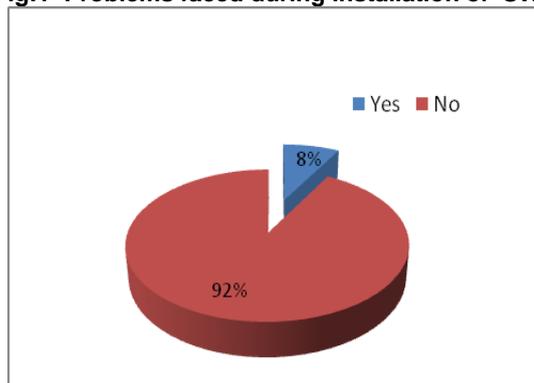


Table 1: Problems faced by families during installation of SWH

(n=50)

Attributes	f (%)
Problems faced*	
Defective product	1 (2.00)
Improper storage of water	1 (2.00)
Problem in water tank	3 (6.00)
Redressal sources for filing complaints	
To the manufacturer	-
To the installer	3 (6.00)
To the agency	1 (2.00)
Satisfied with redressal	
Yes	4 (8.00)
No	-
If yes	
Fully	1 (2.00)
Partially	3 (6.00)

Figures in parenthesis indicate percentage

***Multiple responses**

Reveal the problems faced by the families while using the SWHs and its solution. Four-fifth of the families did not face any problem while 20 percent families faced the problems. Among those facing the problems, 14 percent reported breakage of pipe followed by improper storage of water, cracking of PVC plate and problem with the meter. Out of these, 16 percent families resolved the problem by getting it got repaired only 4 percent got it replaced. Sixteen percent families had filed complaints to the company followed by to the plumber (4%). A less number of families got the problems solved free of cost while 6 percent families spent Rs 400-600 and Rs 200-400 (6%, each). Ten percent of families could get the problem resolved on the same day followed by upto 3 months (8%) and upto 6 months or above (2%). A

vast majority of the SWHs (92%) were not under the guarantee or warranty period as these were out of guarantee or warranty period

Fig 2: Problems faced while using SWH

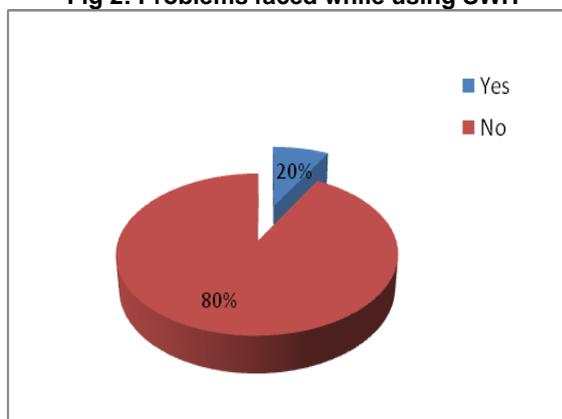


Table 2: Problems faced by families while using the SWHs and solution

(n=50)

Attributes	f (%)
Type of problems	
Improper storage of water	1 (2.00)
Breakage of pipes	7 (14.00)
Problem with meter	1 (2.00)
Cracking of PVC plate	1 (2.00)
Source of problem solution	
Company	8 (16.00)
Plumber	2 (4.00)
Way of resolving problem	
Repair	8 (16.00)
Replacement	2 (4.00)
Money spent to resolve the problem (Rs)	
200-400	3 (6.00)
400-600	3 (6.00)
Free of cost	4 (8.00)
Time taken to resolve the problem	
Same day	5 (10.00)
Upto 3 months	4 (8.00)
Upto 6 months or more	1 (2.00)
Guarantee and warranty period	
Yes	4 (8.00)
No	46 (92.00)

Figures in parenthesis indicate percentage

Conclusion

This research study has conducted an investigation into the barriers faced by solar water heating in hisar. These major problem in water tank, improper storage of water, defective product, breakage of pipe, cracking of PVC plate and problem with the meter. Due to lack of properly trained engineers and installation technicians, there is need for more research and development of improved design of SWH.

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