



## Research Article

# REASONS AND FACTORS FOR PURCHASE OF SOLAR WATER HEATER

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**Abstract:** The present study "Reasons and Factors for Purchase of Solar Water Heaters" was taken up to understand the reasons and factors considered by consumer while purchasing a solar water heater. Ex-post facto research design was adopted to conduct the study. A total of hundred households (east zone-20, west zone-20, central zone-20, north zone-20 and south zone-20) were selected in Hyderabad city. An interview schedule was used for data collection. Saving more money on conventional fuels (power/gas) (1<sup>st</sup> rank), hot water availability throughout the day (2<sup>nd</sup> rank) and reducing the difficulty to carry hot water bucket from kitchen to bathroom (3<sup>rd</sup> rank) were considered as reasons for purchasing solar water heater.

**Keywords:** Solar Energy, Solar Water Heater

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## Introduction

Solar energy is used in our daily life either directly or indirectly to produce heat or light. Production of light and electric current from the sun's rays uses 'photovoltaic technology', which involves direct conversion of sunlight into electricity. The thermal form of solar energy is used for cooking, water heating or purification, drying and fruit ripening, lighting, distillation or producing steam for power generation [1]. Many households could reduce their fuel costs by eliminating or reducing the need for wood, gas or electricity to heat water. Carbon emissions can be reduced by substituting conventional energy with non-conventional energy source like solar energy. According to a lifecycle analysis conducted in Australia, domestic solar water heating systems can produce net greenhouse gas savings in 2.5-5 years. There were also health benefits associated with solar hot water due to lessened exposure to toxins and pollutants released from burning fuels. By enabling access to hot water, households could improve their health and hygiene [2].

## Methodology

An ex-post facto research design was adopted to elicit data for the present study as the scientist does not have control over independent variables like age, education, economic status etc. of the respondents who have adopted solar water heaters. Hyderabad city was purposively selected for the study as the investigator was familiar with the local language, which would help to build quick rapport and also to enable in depth study combined with personal observation. Total five zones i.e. East, West, North, South and Central in Hyderabad were purposively selected for the study. Users of solar water heater were purposively chosen as they could only express their reasons and factors for purchase of solar water heaters (SWH). The list of SWH users in Hyderabad city was collected through NEDCAP (New & Renewable Energy Development Corporation for Andhra Pradesh). Interview schedule come Likert scale was adopted for data collection. Interview schedule is a data collection technique in which the interviewer physically meets the interviewee and asks the questions related to the research

topic. Structured interview schedule was used for data collection. Statements were framed in English but respondents were questioned in both English and vernacular language to elicit correct information. The data was collected regarding profile and house related information of the respondents, general and cost related information about SWH, reasons and factors for purchase of SWH. Collected data was analysed by using frequencies, percentages and ranking for the present study.

## Results and Discussions

### Reasons for purchase of SWH

Statements pertaining to the reasons for purchasing solar water heater were framed mainly to understand why the user had purchased solar water heater. The reasons stated were spending more money on conventional fuels (power/gas), consuming lot of time in heating water on stove, difficult to carry hot water bucket from kitchen to bathroom, danger involved in using electrical geysers by children, chances of an electric shock with geysers, increasing power charges and hot water availability throughout the day. [Table-1] refers to the reasons for purchase of SWH. Respondents were asked to report on a 5-point continuum scale i.e. strongly agree (5), agree (4), undecided (3), disagree (2) and strongly disagree (1). Each point on the scale carried a score. These score values were not printed on the instrument but are shown here just to indicate the scoring pattern. Each statement was scored by 100 respondents on a 5-point scale. The maximum score earned on that statement was 100X5=500 i.e. strongly agree and minimum score earned on each statement was 1X100=100 i.e. strongly disagree. Hence, the score for each statement would fall between 100 and 500. Mean score was calculated for each statement by dividing the total score obtained with total number of samples. Ranking was given to each statement based on the total score of that statement. The total score was calculated on each statement separately by multiplying the score with the number of responses on all 5 categories and added up. Later ranking was supported by calculating Z score percentage based on the mean and standard deviation of each statement.

Table-1 Distribution of respondents according to the reasons for purchase of SWH (N=100)

Reasons	5(SA)	4(A)	3(N)	2(D)	1(SD)	Total Score	Mean	S.D	Z Score %
Saving more money on conventional fuels(power/gas)	73	19	3	3	2	458	4.58	0.84	82.57
Reduces lot of time in heating water on stove	43	43	9	2	3	420	4.20	0.90	79.53
Reducing the difficulty to carry hot water bucket from kitchen to bathroom	49	41	5	4	1	433	4.33	0.74	81.52
No supervision is required when children had to use SWH	29	46	20	5	0	399	3.99	0.82	78.59
Less chances of an electric shock with Geysers	28	63	5	3	1	414	4.14	0.71	80.44
Avoiding fluctuations in voltage supply/irregular power supply	38	52	8	1	1	425	4.25	0.72	81.12
No need to remember to switch on/off SWH	39	51	8	1	1	425	4.25	0.72	81.12
Decreasing power charges	31	59	7	2	1	417	4.17	0.71	80.64
Hot water availability throughout the day	57	33	7	1	2	442	4.42	0.82	81.59

Table-2 Distribution of respondents according to the factors considered while purchasing a SWH

Factors	5(SA)	4(A)	3(N)	2(D)	1(SD)	Total Score	Mean	S.D	Z Score %
Environmentally friendly	16	22	24	23	5	291	2.91	1.14	67.09
Cost effectiveness	39	34	13	14	0	398	3.98	1.03	76.95
Safe to use	37	29	27	3	4	392	3.92	1.04	76.42
Government subsidy	30	30	30	7	3	377	3.77	1.04	75.25
Loan availability	32	29	30	5	4	380	3.80	1.01	75.72
Less maintenance than electric water heater	22	38	29	10	1	370	3.70	0.95	75.41
Good appearance	21	49	15	10	5	371	3.71	1.05	74.69
Reduction in electricity bill	28	52	18	2	0	406	4.06	1.13	76.80
Hot water availability throughout the day	53	37	9	1	0	442	4.42	0.69	82.44
Low cost	12	14	42	28	4	302	3.02	1.02	69.14
Space saving	10	29	31	25	5	314	3.14	1.06	69.84
Type of house	35	37	20	5	3	396	3.96	1.00	77.03

Thus, as per Z score, nearly 83 percent stated that saving more money on conventional fuels (power/gas) reason was ranked as high for purchase of SWH by the respondents' answer. The next important reasons for purchasing SWH were hot water availability throughout the day (2<sup>nd</sup> rank), reducing the difficulty to carry hot water bucket from kitchen to bathroom (3<sup>rd</sup> rank). The least important reason for purchasing SWH were that more supervision not required when children use it and avoiding the chance of electric shock.

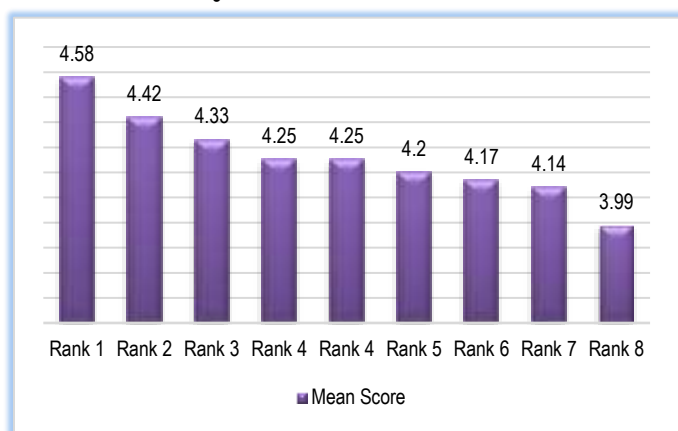


Fig-1 Distribution of respondents according to the reasons for purchase of SWH by mean score

The results based on mean score revealed that the most important reason that was considered purchasing a SWH was saving more money on conventional fuels (power/gas) of mean score 4.58 and S.D 0.84 with Z-score 82.57%, hot water availability throughout the day of mean score 4.42 and S.D 0.82 with Z-score 81.59%, reducing the difficulty to carry hot water bucket from kitchen to bathroom of mean score 4.33 and S.D 0.74 with Z-score 81.25%. The least reason that was considered purchasing SWH was that more supervision was not required when children use it and avoiding the chance of electric shock of mean score 3.99 and S.D 0.82 with Z-score 78.59%. The S.D on each statement shows that responses were not polarized. Findings were supported by another study saying that majority of the respondents ranked high about saving money as the main reason for purchase of SWH followed by safe to people, environment friendly, less maintenance cost and more warranty period of the product [1].

**Factors considered while purchasing a SWH**

Factors that have contributed to buy SWH were questioned. The factors are environmentally friendly, cost effectiveness, safe to use, government subsidy, loan availability, less maintenance than electric water heater, good appearance, reduction in electricity bill, hot water availability throughout the day, low cost, space saving and type of house.

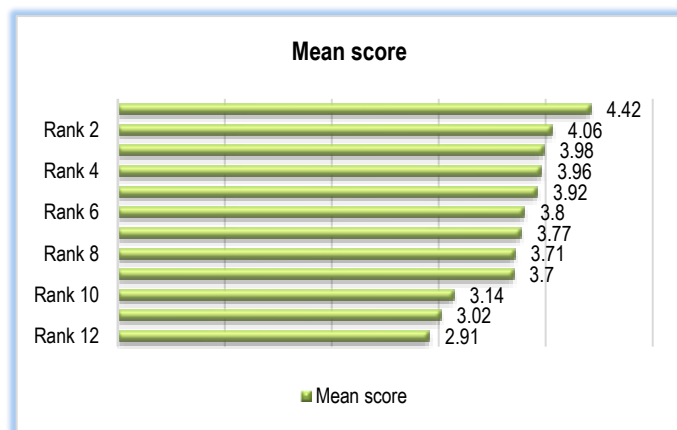


Fig-2 Distribution of respondents according to the factors considered while purchasing a SWH by mean score

Based on mean score also the most important factor that was considered while purchasing SWH was hot water availability throughout the day of mean score 4.42 and S.D 0.69 with Z-score 82.44%, reduction in electricity bill of mean score 4.06 and S.D 1.13 with Z-score 76.80% and cost effectiveness of mean score 3.98 and S.D 1.03 with Z-score 76.95%. The least factor that was considered while purchasing SWH was environmentally friendly of mean score 2.91 and S.D 1.14 with Z-score 67.09%. Similar study found that in the case of Surat, safety has been considered as the most important factor for selecting the water heater. After sales service and technology have been considered at 2<sup>nd</sup> and 3<sup>rd</sup> spot respectively. Exterior styling was given least importance by the builders [3].

**Conclusion**

Solar water heater being a renewable energy technology can save fuel bill as expressed by majority of the respondents. Hot water availability throughout the day was the major reason quoted as the motivating factor in purchasing the solar water heater.

**Application of research:** The study that more motivation from the government side in terms of providing subsidy, giving awareness are essential to be adopted on a larger scale and save on electricity consumption.

**Research Category:** Renewable energy

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**Study area / Sample Collection:** Total five zones *i.e.* East, West, North, South and Central in Hyderabad were selected for the study

**Ethical approval:** This article does not contain any studies with human participants or animals performed by any of the authors.  
Ethical Committee Approval Number: Nil

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