

Solar Energy Survey-An Analysis

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Abstract

The solar energy in India can complement the existing energy resources to a certain extent as they form one of the best energy resources. There are numerous applications of solar panels such as, urban planning and architecture, agriculture and horticulture, transport and reconnaissance, water treatment, heating, cooling and ventilation, cooking, photovoltaic and fuel production [1]. Hence an analysis has been made in this paper to read the mindset of people who have employed the solar panels at their households and work arena, and to project the relationship between their likeliness towards this renewable energy and other factors of general attention. Further, extending this survey to the entire nation would be a milestone in the performance analysis of the state of solar energy in India, since the country is in a bare necessity to go in for alternative renewable energy resources.

Keywords: Bio-Waste Integration, Power Generating Sources, Renewable Energy, State of Charge

1. Introduction

The solar power is an amazing energy source with which the input energy is driven out of the heat energy from the sun other than combustion, higher mechanized process.

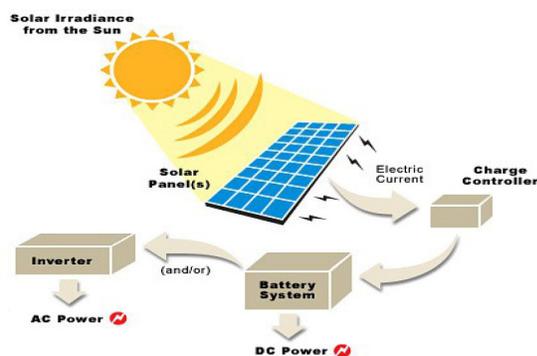


Figure 1. Basic Working Model of Solar Power.

Source: <http://www.alternative-energy-news.info/technology/solar-power/> [2]

The solar panel receives the solar radiation from the sun and develops potential difference upon the silicon cells. This potential drives the electrons in the form of electric current, which is then directed to the charge controller. Depending upon the requirement, a single battery or a series of batteries are coupled to the charge controller. The DC power is then converted to AC power by employing an Inverter. This entire setup is connected to the household items [3].

2. Statement of the Problem

Solar power has become the vital power source that substitutes other sources of power and provides an eco-friendly energy solution. Hence, it is essential to read the mindset of people who utilize solar power in their daily chores to know the impact created by solar energy.

3. Objectives of the Study

- To focus on the mindset of people who have opted for solar power as a renewable energy usage.
- To determine the relationship between the people's likeliness towards this renewable solar energy and other factors of general attention.

4. Methodology

The period of study was six months based on the primary data collected through a structured questionnaire. Convenient sampling method was adopted to choose 100 respondents. However the sample client search was made through a random selection among the Taluks in Coimbatore.

5. Tools of Analysis

Data analysis has been made by employing the following statistical tools:

- Percentage analysis [4] gives a broad outlook about the stability, viability and effectiveness yielded by solar energy among the users.
- ANOVA is an organization of additive data decomposition, and its sums of squares indicate the variance of each component of the decomposition [5]. Hence applied to project the relationship between the likeliness of the users of solar energy and other factors of general attention.

5.1 Percentage Analysis

The percentage analysis helps to determine the impact created by solar panels and allied products on the mindset of people who have opted for this renewable energy resource, considering all the Physical Parameters [6] listed below:

- A→Likeness
- B→Requirement fulfillment
- C→Affordability
- D→Optimum power generation
- E→Monitoring
- F→Power Distortion
- G→Space occupied
- H→Sustained ambience
- I→Non-Circulating
- J→Durable and Reliable components

- K→Installing new plants
- L→Pleasing appearance
- M→Other power resources
- N→Satisfiable solar grants
- O→Integrating solar and wind
- P→Additional quality policies
- Q→Recent failures in system
- R→High initial installation cost
- S→To meet energy demands
- T→Monitor SOC
- U→Shifts in power point
- V→Bio-waste integration
- W→Replacement of glass plates
- X→Solar power will dominate
- Y→Solar power utilization

As per the parameters indicated in Table 1, 89 percent of the sample groups have positive opinion towards solar cell, whereas there is less compromise on affordability and power generation. Frequent monitoring of the system is also felt mandatory.

Among the indicated parameters in Table 2, 67 percent of the group have voted positive towards power distortion and there is a slight compromise in ambience and space occupied. There is positive response for the durability and reliability aspect

The opinion of the clients towards installation of new solar plants turned positive at a higher note as shown in Table 3, compared to pleasing appearance and other power

Table 1. Percentage Analysis(A to E)

S.NO	OPINION	PARAMETERS (Value in %)				
		A	B	C	D	E
1.	YES	89	34	48	47	69
2.	NO	11	66	52	53	31

Table 2. Percentage Analysis(F to J)

S.NO	OPINION	PARAMETERS (Value in %)				
		F	G	H	I	J
1.	YES	67	42	48	53	69
2.	NO	33	58	52	47	31

Table 3. Percentage Analysis(K to O)

S.NO	OPINION	PARAMETERS (Value in %)				
		K	L	M	N	O
1.	YES	81	54	56	41	66
2.	NO	19	46	44	59	34

resources. The sample group also showed their likeliness towards the concept of integrating solar power and energy from wind.

The percentage analysis in Table 4 shows that people are in dire need for additional quality policies and however there is a slight compromise for recent failures in the system and in meeting energy demands. There is frequent monitoring of State of charge (SOC) and depth of discharge among the solar cells. But then a sea change is observed in the respondents' opinion towards incurring higher installation costs because they feel it costly compared to other energy resources.

From Table 5, it can be inferred that there is no phenomenal change in the parameters listed above such as, shifting of power point in power point tracking, Bio-Waste integration and replacement of glass plates. There is less chance for solar power utilization and its dominance to change in the upcoming years

Table 4. Percentage Analysis(P to T)

S.NO	OPINION	PARAMETERS (Value in %)				
		P	Q	R	S	T
1.	YES	72	50	70	55	58
2.	NO	28	50	30	45	42

Table 5. Percentage Analysis(U to Y)

S.NO	OPINION	PARAMETERS (Value in %)				
		U	V	W	X	Y
1.	YES	54	58	43	56	51
2.	NO	46	42	57	44	49

Table 6. Love Solar Panels and Other Solar Products
*Opinion towards Space Occupied Cross tabulation

		Opinion towards Space Occupied		Total
		1	2	
		Love Solar Panels and Other	1	
Solar Products	2	5	6	11
Total		42	58	100

Table 6.1 ANOVA: Opinion towards Space Occupied (degree of freedom taken at 1%)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.015	1	.015	.059	.808
Within Groups	24.345	98	.248		
Total	24.360	99			

5.2 Analysis of Variance

5.2.1 Hypotheses

- There is no significant difference between respondents' love of Solar panels and Solar related products, and that of Space occupied by the Solar products, Reliability of the power electronic devices, Interest to install new Solar plants, Move to other power generating sources, Solar grants from the Government, Think solar power would dominate all the existing power resources.
- There is no significant difference between solar generated power fulfilling the power requirement of the respondents and their Interest to install new solar products.

5.2.2 Love Solar Panels and Solar Related Products (Q1) Vs Space Occupied (Q7)

Null Hypothesis (H_0): There is no significant difference between love solar panels and solar related products and space occupied by the solar products.

It is found from Table 6.1 that the null hypothesis is accepted and there is no significant difference between love solar panels and solar related products and space occupied by the solar products.

5.2.3 Love Solar Panels and Solar Related Products (Q1) Vs Reliability of the Power Electronic Devices (Q10)

Null Hypothesis (H_0): There is no significant difference between love solar panels & solar related products and Reliability of the Power Electronic Devices.

It is found from Table -7.1 that the null hypothesis is accepted and there is no significant difference between love solar panels and solar related products and Reliability of the Power Electronic Devices.

5.2.4 Love Solar Panels and Solar Related Products (Q1) Vs Interest to Install New Solar Plants (Q11)

Null Hypothesis (H_0): There is no significant difference between love solar panels & solar related products and Interest to install new solar plants.

It can be inferred from Table 8.1 that the null hypothesis is accepted and there is no significant difference between

love solar panels and solar related products and Interest to install new solar plants.

5.2.5 Love Solar Panels and Solar Related Products (Q1) Vs Move to Other Power Generating Sources (Q13)

Null Hypothesis (H_0): There is no significant difference between love solar panels & solar related products and Move to other Power Generating Sources.

It is found from the anova analysis that the null hypothesis is accepted and there is no significant difference between love solar panels and solar related products and Move to other Power Generating Sources.

Table 7. Love Solar Panels and Other Solar Products
* Reliability of the Power Electronic Devices Cross tabulation

		Reliability of the Power Electronic Devices		Total
		1	2	
Love Solar Panels and	1	63	26	89
Other Solar Products	2	6	5	11
Total		69	31	100

Table 7.1 ANOVA: Reliability of the Power Electronic Devices (degree of freedom taken at 1%)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.258	1	.258	1.198	.276
Within Groups	21.132	98	.216		
Total	21.390	99			

Table 8. Love Solar Panels and Other Solar Products
* Interest to installing new solar products Cross tabulation

		Interest to installing new solar products		Total
		1	2	
Love Solar Panels and	1	74	15	89
Other Solar Products	2	7	4	11
Total		81	19	100

Table 8.1 ANOVA: Interest to install new solar products (degree of freedom taken at 1%)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.373	1	.373	2.432	.122
Within Groups	15.017	98	.153		
Total	15.390	99			

5.2.6 Love Solar Panels and Solar Related Products (Q1) Vs Solar grants from the Government (Q14)

Null Hypothesis (H_0): There is no significant difference between love solar panels & solar related products and Solar grants from the Government.

The anova analysis for Table 10.1 shows that the null hypothesis is accepted and there is no significant difference between love solar panels and solar related products and Solar grants from the Government.

5.2.7 Love Solar Panels and Solar Related Products (Q1) Vs Think Solar Power Would Dominate All the Existing Power Resources (Q24)

Null Hypothesis (H_0): There is no significant difference between love solar panels & solar related products and

Think solar power would dominate all the existing power resources.

It is clear from the Table 11.1 that the null hypothesis is accepted and there is no significant difference between love solar panels and solar related products and Think solar power would dominate all the existing power resources.

5.2.8 Generated Power Fulfill the Power Requirement (Q2) Vs Interest to Installing New Solar Products (Q11)

Null Hypothesis (H_0): There is no significant difference between Generated Power fulfill the power requirement and Interest to installing new solar products.

It is found from the anova analysis that the null hypothesis is accepted and there is no significant difference between Generated power fulfill the power requirement and Interest to install new solar products.

Table 9. Love Solar Panels and Other Solar Products * Move other power generating sources Crosstabulation

		Move other power generating sources		Total
		1	2	
Love Solar Panels and	1	50	39	89
Other Solar Products	2	6	5	11
Total		56	44	100

Table 9.1 ANOVA: Move to other power generating sources (degree of freedom taken at 1%)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.003	1	.003	.010	.919
Within Groups	24.637	98	.251		
Total	24.640	99			

Table 10. Love Solar Panels and Other Solar Products * Solar grants from the Government Cross tabulation

		Solar grants from the Government		Total
		1	2	
Love Solar Panels and	1	35	54	89
Other Solar Products	2	6	5	11
Total		41	59	100

Table 10.1 ANOVA: Solar grants from the Government (degree of freedom taken at 1%)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.227	1	.227	.927	.338
Within Groups	23.963	98	.245		
Total	24.190	99			

Table 11. Love Solar Panels and Other Solar Products * Think solar power would dominate all the existing power resources Cross tabulation

		Think solar power would dominate all the existing power resources		Total
		1	2	
Love Solar Panels and	1	51	38	89
Other Solar Products	2	5	6	11
Total		56	44	100

Table 11.1 ANOVA: Think solar power would dominate all the existing power resources (degree of freedom taken at 1%)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.137	1	.137	.550	.460
Within Groups	24.503	98	.250		
Total	24.640	99			

Table 12. Generated Power fulfill the power Requirement * Interest to installing new solar products Cross tabulation

		Interest to installing new solar products		Total
		1	2	
Generated Power fulfill	1	26	8	34
the power Requirement	2	55	11	66
Total		81	19	100

Table 12.1 ANOVA: Interest to install new solar products (degree of freedom taken at 1%)

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.106	1	.106	.678	.412
Within Groups	15.284	98	.156		
Total	15.390	99			

6. Findings

There is no significant difference between respondents' love of solar panels and solar related products and that of

- Space occupied by the solar products.
- Reliability of the Power Electronic Devices.
- Interest to install new solar plants.
- Move towards other Power Generating Sources.
- Solar grants from the Government.
- Solar power would dominate all the existing power resources.

There is no significant difference between Generated Power from the solar panel and the power requirement and Interest to installing new solar products.

7. Conclusion

This opinion survey helps in reading the mindset of people towards solar power and also determines the resolution for solar products. Extending this survey to the entire nation would be a milestone in the performance analysis of the state of solar energy in India. This kind of oriented questionnaires to the people can easily figure out the state

of renewable energy, and a strong prediction of future energy usage and its demand.

8. References

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