



# CONSUMER PERCEPTION AND ACCEPTANCE OF SOLAR RENEWABLE ENERGY AS ALTERNATE SOURCES OF POWER IN NAGPUR.

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**Abstract:** This paper discusses the significance of green energy as well as the rising cost of thermal energy. People are looking for alternative energy sources as the electricity consumption ratio rises on a daily basis. Several electric devices are increasing in every home, corporate sector, and business in response to need and fashion. As a result of its impact on rising electricity costs, the government also pushes government schemes and programs to raise public awareness about green energy. Green energy is also being considered by consumers in order to keep electricity costs low. While purchasing solar green energy equipment, the consumer has several misconceptions about the equipment. This study employs the theory of consumption values to identify the variables influencing consumers' decisions about green energy.. This study is based on how Nagpur City consumers view the value of green energy.

**Keywords:** Green energy, consumer buying behavior, government schemes, consumer perception.

## 1.1 Introduction:

There are numerous environmental consequences to both rising demand and increased reliance on fossil fuels to meet that demand. Non-renewable resource reserves, such as coal, gas, oil, and uranium, are depleting on a daily basis. Since these non-renewable assets are so widely used, electricity production is under pressure to transition away from carbon-emitting processes and to solar, nuclear, and other sustainable alternatives. Solar energy is the most declared and dependable future renewable energy resource. Natural assets such as coal, biomass, and fossil fuels are depleting, while energy and electricity consumption are increasing. Energy resource for the future. As we all know, natural resources such as coal, biomass, and fossil fuels are depleting while consumption of energy and electricity is increasing. Solar is one of the most effective renewable energy resources with long-term consistency as well as efficiency. Almost every country considers green energy and conducts long-term research to develop the solar market. India is the world's fourth-largest consumer of energy. The government encourages people to conduct business or production by supporting entrepreneurship development programs (Make in India). The energy consumption ratio and existing energy production remain unchanged. Solar is an alternative option for maintaining sustainable production conditions, as well as a better and more secure future option.

## 1.2 Consumer Buying Behavior:

Consumer Buying Behavior encompasses the decisions that customers make prior to buying an item or aid (both online and offline). This might entail using Google or other search engines, reacting to social media posts, or engaging in an array of other activities. Understanding this process benefits companies as it lets them more effectively tailor their marketing initiatives to previous marketing efforts that effectively influenced consumers to buy. The choice, buying, and usage of items and offerings by consumers to satisfy their desires is referred to as buyer's behavior Several processes contribute to consumer behavior. Many factors, particulars, and characteristics impact both the customer and the consumer in their decision-making process, their spending habits, the brands they buy, and the retailers they stop by. (Madhavan, n.d.)

Shopping habits are now influenced by the social groups to which every person is related. As a result, buyers buy products to form and maintain connections with others. (Kesari et al., 2021) The subject of consumer behavior is vast. Many buyers are not aware of the factors that impact their choices about a specific product, service, or brand.

The factors which impact consumers' purchasing decisions are referred to as consumer behavior. Personal, psychological, social, or economic characteristics distinguish these factors. (Qazzafi, 2020) Purchases made for personal, family organization, or group use are referred to as buyer behavior. Consumer behavior can be defined as the sum of the consumer's efforts and outcomes related to the need to solve problems. The identification of a gap in supply motivates consumers to solve problems..(Madhavan, n.d.) Long-term interruptions in power can be avoided, and renewable energy sources and technologies can offer a range of ways to the issues facing emerging economies like India. Solar power can solve environmental problems, increase the availability of energy, and open up an important market for clean energy in India in besides supplying new energy sources.(Verma, 2021). Potential consumers might be concerned that implementing a micro-generation technology such as solar energy systems will require them to change how they live because heating and electricity generation are distinct from people's routines..(Quraishi & Ahmed, 2019) the following diagram shows the conceptual display what parameter enforces on consumer buying behavior.

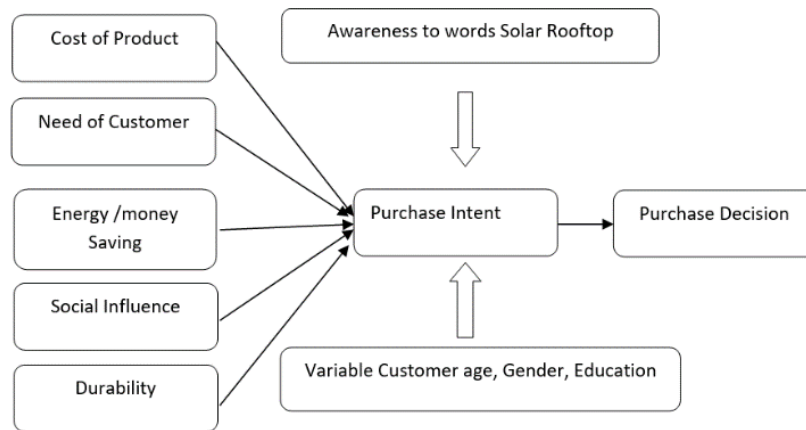


Figure 1 Diagram represents the external factor forces on buying behavior decision

### 1.3 Review of literature:

The total amount of rooftops that, based on factors like size, direction, shading, and location, might be suitable for solar power is referred to as the nation's solar rooftop potential. Rooftop potential does not take availability or cost into account, nor does it equate to the financial or commercial potential for rooftop solar. Rather, it represents the maximum quantity of solar energy that can be installed on American rooftops. The total amount of solar that could be installed on an individual rooftop depends on its size, construction, tilt, shading, and location. This is referred to as the rooftop potential for solar. Installers offer bids to customers to assist them in understanding the potential expenses and benefits of setting up solar panels on their rooftops using data gathered from satellites maps, irradiance data, (2021)

- 1) (Kumar et al., 2020) Discuss how sustainable technology uses scientific or technical expertise to create environmentally friendly products and services. The environmental disorder is a global issue that can be resolved holistically, with the consumer at the center. The devastating effects of ecological imbalance seen in recent decades have prompted each link in the supply chain to reconsider how to consume energy, particularly power. The study is based on Indian consumers' acceptance of green and clean power generation technology such as solar energy.
- 2) (Boztepe, 2013) discuss The needs of people have changed due to industrial development, growth, and advancements in technology. Resource devastation and pollution have been witnessed by our planet as the requirements of the world have become more diverse. Human life is adversely affected by environmental damage and pollution brought on by the use of resources from the earth. People have been searching for means of securing the future they want and residing in suitable environments. Instead of being oblivious to environmental problems like contamination and global warming, consumers are starting to take sustainability into account when making purchases, along with the product's features and cost. Concerns regarding pollution and sustainability are growing among the public.
- 3) (Kapoor et al., 2014) Describe it, Every procedure and action is now focused on making the surroundings greener in light of climate change and environmental preservation. One such program that motivates

individuals all over the globe to adopt environmentally friendly technologies within their homes is household solar equipment. Recently, there has been a focus on using solar energy for cooking, heating, and lighting at home. Understanding the actions of multiple variables that could affect customer satisfaction and good intentions toward such innovations is crucial to increasing the usage of those green innovations.

- 4) (Kapoor et al., 2014) Long-term power outages can be avoided, and sources of clean energy and innovations can offer a number of answers to issues facing emerging economies like India. Solar power can solve environmental problems, increase the availability of energy, and open up a sizable market over clean energy in India in addition to supplying fresh sources of energy.

### 1.3 Research methodology:

The study "Consumer Perception and Acceptance of Solar Renewable Energy as Alternate Power Sources in Nagpur" is an empirical research study that seeks to understand consumer perception and acceptance of solar products in Nagpur. To collect and analyse data, the study will employ a combination of quantitative and qualitative research methods. The study's research design will be descriptive in nature, as it seeks to describe and analyse consumers' eco-conscious preference, perception, and behavior toward Solar rooftop products. A survey questionnaire will be used to collect data from a sample of consumers in Nagpur city for the study. Which will be arbitrary and judgmental. In addition to the research, the study will conduct in-depth interviews with 200 survey respondents to gain a better understanding of their thinking, attitude, and behavior toward solar rooftops. The interviews will be semi-structured, with open-ended questions that allow respondents to share their experiences and perspectives on the subject. In addition, to provide a theoretical framework for the research findings, the study will review relevant literature on Solar rooftop consumer behavior and sustainability. The findings of the research will be presented in a comprehensive report that includes data analysis, findings, and recommendations.

### 1.4) Research Question:

- 1) What is the level of perception and acceptance of consumers in Nagpur city towards solar rooftop product?
- 2) What are behavior of consumers in Nagpur city towards solar rooftop product?, and what attitudes influence their purchasing behavior

### 1.5) Objective if the study:

- 1) To analyse the perception of consumers towards Solar rooftop services in Nagpur city.
- 2) To identify the consumer buying Behavior to-words about Solar rooftop services in Nagpur city.
- 3) To find the level of acceptance ratio of solar product an in the Nagpur city market.

### 1.6) Hypothesis:

**H<sub>1</sub>**. There is a relationship between Green energy generation and consumers saving money.

**H<sub>11</sub>**. There is no relationship between Green energy generation and consumers saving money

**H<sub>2</sub>**. A good quality picture of solar rooftop services do not motivate the purchase decision of a potential consumer.

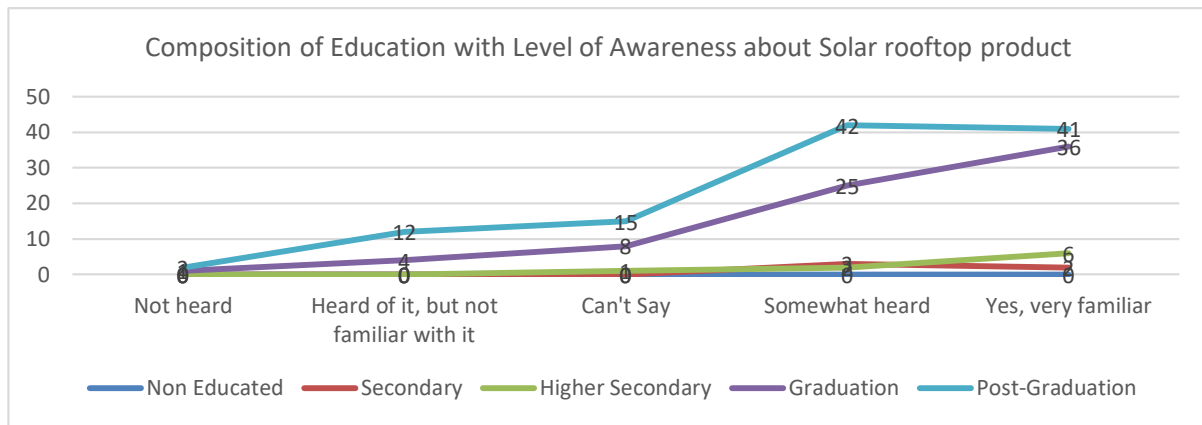
**H<sub>12</sub>**. A good quality picture of solar rooftop services motivates the purchase decision of a potential consumer.

### 1.7) Analysis and Interpretation:

#### 1.7.1 Analysis 1: Education of Respondents \* Have you heard about "Solar Rooftop product" before?

Education of Respondents * Have you heard about "Solar Rooftop product" before?							
Count							
		Have you heard about "Solar Rooftop product" before?					Total
		Not heard	Heard of it, but not familiar with it	Can't Say	Somewhat heard	Yes, very familiar	
Education of Respondents	Non Educated	0	0	0	0	0	0
	Secondary	0	0	0	3	2	5
	Higher Secondary	0	0	1	2	6	9
	Graduation	1	4	8	25	36	74
	Post-Graduation	2	12	15	42	41	112
Total		3	16	21	78	85	200

**Table 1: composition of Education with Level of Awareness about Solar rooftop product**



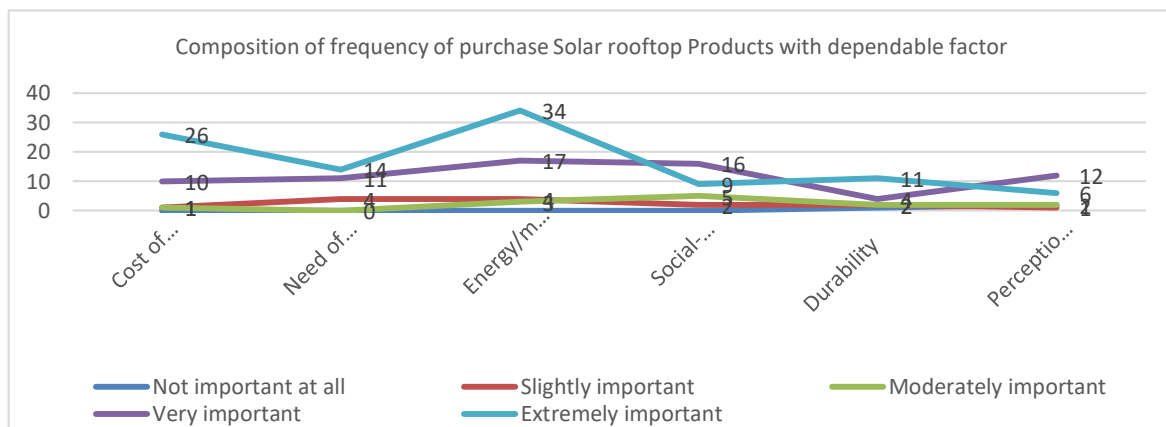
**Graph-1: Composition of Education with Level of Awareness about Solar rooftop product**

The study's research will show the level of education of Nagpur city consumers regarding solar rooftop products, as well as their awareness of energy consumption costs. It can also highlight the sources of information that consumers rely on when making solar rooftop purchase decisions, thereby achieving the goal of determining the level of awareness and knowledge of consumers in Nagpur city regarding Solar rooftop products.

**Analysis 2: factor affecting while purchasing Solar rooftop ?**

factor affecting while purchasing Solar rooftop ?							
		Count					
		How important is it for you to use solar rooftop products?					
		Not important at all	Slightly important	Moderately important	Very important	Extremely important	Total
Does the factor depend on purchasing Solar rooftop product ?	Cost of product	0	1	1	10	26	38
	Need of consumer	0	4	0	11	14	29
	Energy/money Saving	0	4	3	17	34	58
	Social-Influences	0	2	5	16	9	32
	Durability	1	2	2	4	11	20
	Perception of consumers(s)(doubt about product)	2	1	2	12	6	23
Total		3	14	13	70	100	200

**Table 2- Composition of frequency of purchase Solar rooftop Products with dependable factor**



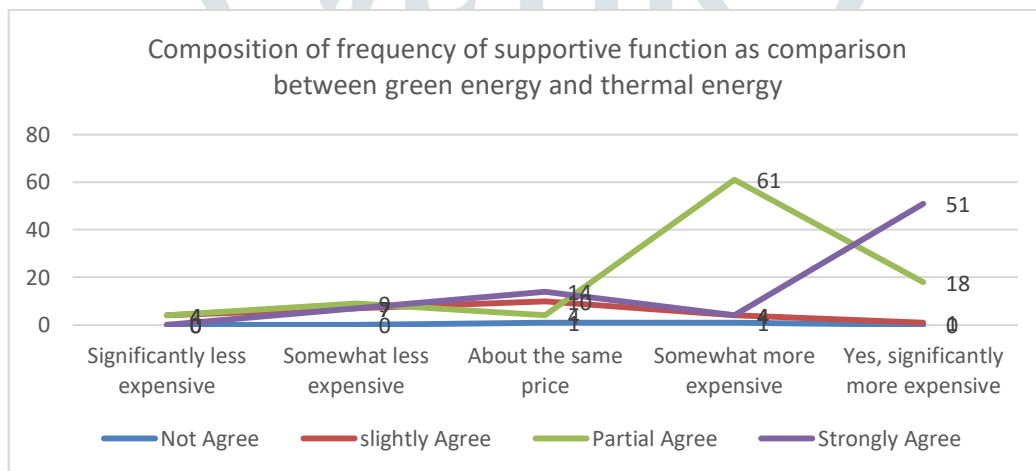
**Graph 2: Composition of frequency of purchase Solar rooftop Products with dependable factor**

The findings can provide useful insights into the types of information that customers are familiar with, as well as customer education about solar rooftop products. It is an efficient method of learning about the consumer's preferences. This graph depicts the influence of a factor on a consumer's decision to purchase a solar product.

**Analysis 3: Do you think solar product are more expensive than regular than use of thermal energy consumption?**

Do you think solar product are more expensive than regular than use of thermal energy consumption?						
Count						
		How much are you willing to pay cost				Total
		Not Agree	slightly Agree	Partial Agree	Strongly Agree	
Do you think solar product are more expensive than non-eco-friendly products?	Significantly less expensive	0	4	4	0	8
	Somewhat less expensive	0	7	9	7	23
	About the same price	1	10	4	14	29
	Somewhat more expensive	1	4	61	4	70
	Yes, significantly more expensive	0	1	18	51	70
Total		25	44	113	68	200

**Table 3: Composition of frequency of supportive function as comparison between green energy and thermal energy**

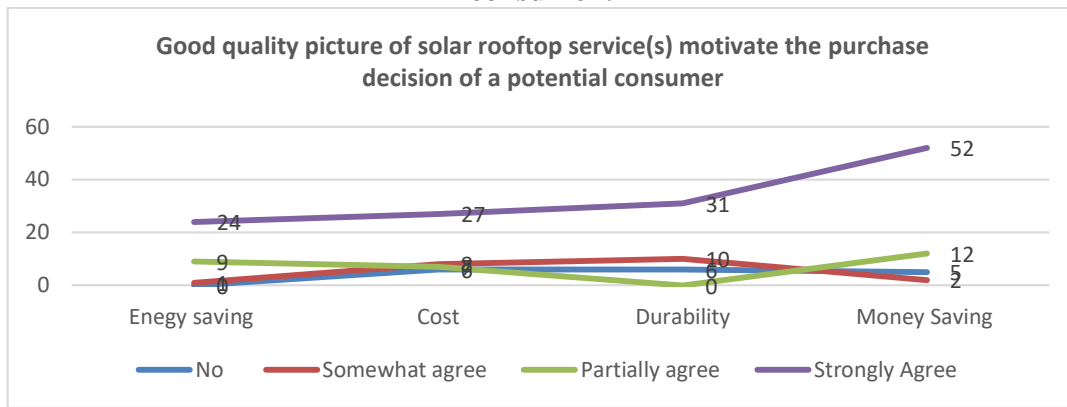


**Graph 3: Composition of frequency of supportive function as comparison between green energy and thermal energy**

The study can show how consumers perceive and compare thermal energy and solar energy. Many factors influence the decision to purchase solar rooftop products.

**Analysis 4: Is good quality picture of solar rooftop service(s) motivate the purchase decision of a potential consumer?**

Is good quality picture of solar rooftop service(s) motivate the purchase decision of a potential consumer						
Count						
		Factor				Total
		Energy saving	Cost	Durability	Money Saving	
Option	No	0	6	6	5	17
	Somewhat agree	1	8	10	2	21
	Partially agree	9	7	0	12	28
	Strongly Agree	24	27	31	52	134
Total		34	48	47	71	200

**Table 4: Is good quality picture of solar rooftop service(s) motivate the purchase decision of a potential consumer?****Graph 4: : composition of factor who is motivated the purchase decision of potential consumer**

A high-quality image of products and services is an important function that helps to entice customers to make future purchases. It also has a significant impact on potential customers in changing their negative decision to a positive decision about purchasing solar rooftop products. The graph above depicts the related factors that clear the scenario about solar rooftop products.

### 1.9 Results and Discussion:

According to the findings of the Consumer perception and acceptance of solar renewable energy as alternate sources of power in Nagpur are becoming more conscious of energy costs and attracted to the solar rooftop, which provides dramatic changes to the scenario to change the definition of electricity. According to the study findings, consumers in Nagpur are well aware of solar rooftops and are concerned about environmental changes. Nowadays, thermal electricity unit costs are rising by the day, so middle-class and upper-middle-class families with a high consumption ratio should consider changing their energy scenario. According to the findings, age, education, gender, and money all have an impact on consumer consciousness. According to the research, solar rooftop roof-top solar power has a big influence on what people buy. Exposure to green marketing increases consumers' propensity to buy environmentally friendly products and their readiness to shell out more for them (government support). Many government agencies attempt to push solar products into the local market in order for them to spread among consumers. According to the survey, educated and semi-educated consumers were more aware of the solar rooftop product. Social influences and advertisements about solar products and their benefits leave a lasting impression on consumers' minds, and this factor contributes to a positive decision to purchase a solar rooftop. The research findings also show that solar products and a clear picture motivate consumers to purchase solar rooftop products because they are aware of the rising cost of thermal electricity and want to meet a sustainable need. Overall, consumer perception and acceptance of solar renewable energy as an alternate source of indicate and focus the Conscious consumers in Nagpur city towards Solar rooftop product.

### Conclusion:

This paper has successfully identified factors that influence a consumer's decision to purchase a solar roof top based on their perceived need(s). This factor has a significant influence on consumer decisions, where gender, income, and, most importantly, education of the consumer are all significant factors in changing consumer behavior. According to the research, consumers in Nagpur are becoming more aware of and concerned about how the products they use affect the environment, which influences their purchasing decisions Solar power has the potential to be one of the most effective and efficient renewable energy sources. Green technology has the capacity to create a sustainable future and alter the world.(Kumar et al., 2020) According to the findings, customer perception, perceived control over behavior, and power concern are the factors that most influence purchase intention.(Fathima M.S et al., 2023). Finally, it is discovered that consumers' adoption of solar lighting solutions is primarily driven by sustainability issues, with societal factors, environmental knowledge, as well as environmental attitude all playing a part.(Kesari et al., 2021).

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