

Exploring College Students' Perceptions of Solar Energy & Solar Products in The City of Sri Ganganagar

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Abstract

Human race have led to series of innovations since we all evolved from apes. All these innovations have led to an excessive use of non renewable sources such as fossil fuels to such an extent that they are about to face extinction.

Reducing the co2 emission is now the heart of all energy related policies framed across the world. In India, MNRE ie Ministry of new & renewable energy is the nodal ministry of the government of India which handles all matters related to renewable energy.

Power generation from renewable sources has been at an accelerated rate since last few years. It is also believed that individuals and societies perceptions, prejudices act as an influential force affecting the consumption of energy.

This research paper entails the perception, willingness to buy behaviour of the "Zoomers": a section which has gained immense following and exposure due to presence of social platforms. Researcher believes that if the government is able to harness this section most effectively & efficiently, they will be able to achieve the targets agreed upon in Paris.

Keywords: Renewable Energy, solar misconceptions, climatic awareness, environmental sciences, climatic changes, solar energy, Solar products, green electricity.

INTRODUCTION

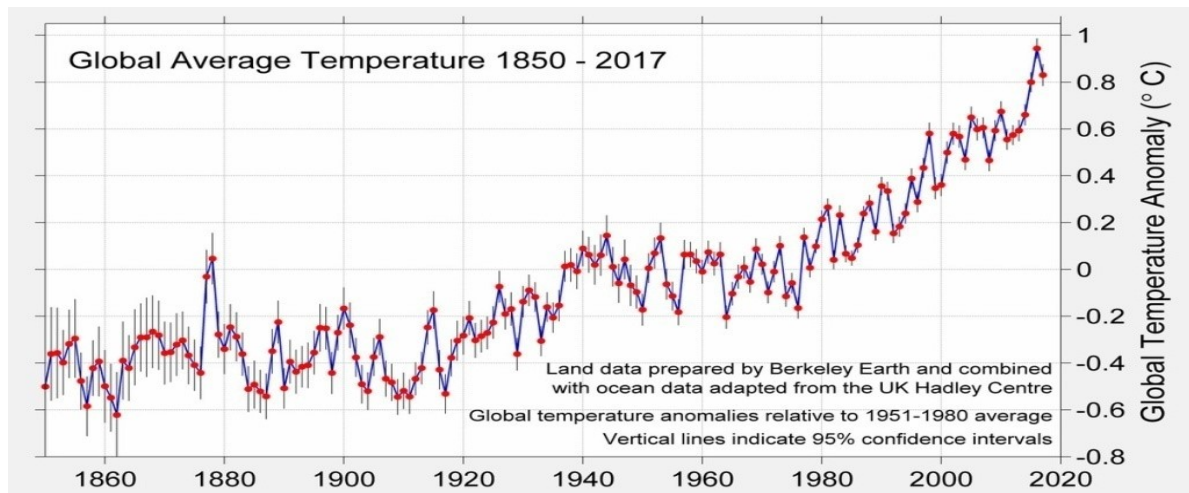
Sources of energy have been the most important decisive factor in shaping up the future of any nation. This role even firmed up since 1760's since the inception of Industrial revolution in great Britain. The role of hydrocarbons, natural gas was redefined followed by coal to be consumed maximum for energy generation. As per the media reports, the condition in almost each and every state regarding the coal storage are very alarming. Majority of the storages is on the verge of finishing. Reasons behind this surfaced shortage can be accounted to excessive rainfall, rise in international prices, COVID, reduced production, increased freight rates etc.

Coal is used immensely due to its excellent efficiency but the combustion releases hydrogen, sulphur, carbon dioxide which acts as an insulator to trap the heat in our atmosphere. If we can say, many ailments can be acclaimed due to these releases such

as leaching, volatization, oxidation, bone dystrophy, kidney malfunctions etc. Since last few decades the exploitation of our planet has increased at an tremendous rate. The mother earth has too started reciprocating in the form of earthquakes or droughts at one place to tsunamis or cyclones at other.

(Source: Why this climate change data is on flip-flops, leggings, and cars-"Warming stripes" keep showing up on clothes and crafts)

Its said that the students form the pillars of every nation. Researches from time to time have performed researches on them to see how they construct the sense of any complex concepts? Undoubtedly, their present decisions will frame the shape of the future generations to come. Hence it becomes very crucial to bring up topics such as global warming, pollution, sources of energy for the analytical awareness rather than making it a mere debate topic for the class. Students can become the drivers of the change we seek tomorrow.



LITERATURE REVIEW

The term “Perception” is a noun which has many subtle meanings to it. On one hand Wikipedia (2008) defines perception as understanding of information through our senses whereas the Collins Essential English Dictionary announces it to be an insight or an intuition.

It is an uniquely personalized experience. One can draw only those inferences what is known to the self. But sometimes, we might misunderstand or mislabel someone or something at any point of time. The best ways to handle this disconnect or the misalignment is through intensive information.

This research paper talks about the various factors that help in formation of a perception of the zoomers towards constructive use of solar products at their homes. Bradford T. [1] discusses the economical transformation of the global energy sector, enhancing the reasons behind the global shift towards renewable energy.

With the help of exploratory factor analysis, it was found that the purchase intentions of consumers towards solar products are shaped up by many factors. The intense study of these factors such as social influence, price value, performance efficiency, self efficacy, hedonic motivation etc may be helpful to the policy makers, retailers etc.[2]. If we compare the willingness versus technological advancements for saving natural resources and reducing GHG emissions, it is observed that public willingness for adoption plays a crucial role. [3]. The public acceptance studies across the world amongst wither small samples [3,4] or across relatively large samples [5] followed by studies across developing or developed nations such as Australia[3], Finland [6] or Japan [7] by different researchers showed one common result that the rate of acceptance is directly dependent on people’s perception at large. Payback period is usually longer in case of solar. A study conducted by Alnaser [8] to estimate the amount of

electricity generated from a residential PV panel in a house met around 12% of the total house’s demand. In a post assessment study, it was actually found out that the electricity generated in a building using a smart solar PV system was 26%- 37% less than what was estimated. In many countries such as Bangladesh [9] the rural electrification through solar home systems has gained tremendous popularity even for remote areas where the conventional electricity could not be distributed due to lack of infrastructure.

In marketing, positioning have always played a crucial role. On reading various research papers on positioning of solar products in the market, it was observed that many researchers believed that there is a strong link between market-oriented culture and organizational performance. The market demand consists of more than one factor such as extent of competition in the market, economic conditions of the inhabitants, political influences, market developmental stage, legal issues, economic feasibility etc. and not just the customer [10].

Past studies focusing on college students showed that students were more likely to have a superficial knowledge about the concepts like renewable energy, solar energy etc. it has been noticed that students sometimes referred sun as a mere source of thermal energy with no specific differentiation between the terms such as UV rays, sun rays, heat rays etc [11]. But recent studies on the same topic reveal a tremendous change in the student’s perception and attitude towards renewable sources of energy. The solar product market in India is stipulated to grow at a cumulative aggregate growth rate of 11 % which will make it possible for the nation to surpass the set target by 2024 [13] . The government’s financial supportive initiatives have welcomed the installations of grid connection with warm arms. The highly fragmented global solar energy market seem to observe the same trends due

to the presence of the cost effective cadmium telluride and silicon cells being the components of third generation solar panels[14].

Health [15] argued that the decisions related to any product or brand does not always take place rationally rather the brand decisions mostly are induced intuitively. “The theory of Low involvement process of advertising” supports that through the repeated processing of elements or any message even at low attention levels may lead to gradual establishment of meaningful associations. If we implement this theory in the research, it can be inferred that regular exposure of information related to solar energy can have a meaningful impact on long term memory of zoomers too.

Overall the challenges associated with the abstract comprehension of the term ‘energy’ always exist. Same findings came across through the tenth annual national report card of NEETF in 2015 when the National Environmental Education and Training Foundation conducted a study on energy knowledge, attitude & behaviour of adults in US through a telephonic interview of 1503 adults over the age group of 18 years [16]. Surprisingly, only 12% of the total respondents were able to pass the quiz. The report suggested that energy conservation needs more awareness amongst the youngsters and henceforth should be an integral part of their academia. Researches show that incorporation of the topic in academia as well as special energy courses at university levels have enhanced the student’s awareness level by 80% thereby increasing the potential customer base.[12]. The awareness level amongst students has enhanced their willingness to purchase solar energy system at their homes (87%).

Aim of the study:

The main aim of this research paper was to explore the understanding of college students of Sriganganagar city towards the alternative energy sources with special reference to solar energy & solar products. The choice of taking college students as the unit of analysis sprung from the desire to understand how the modern zoomers take their decisions. Three main questions surfaced the research throughout.

- 1) To what extent is our audience updated about the cause or the aftermaths of the climatic changes surrounding us?

- 2) Do our zoomers understand the science behind working of solar products?
- 3) Are they seriously aware about their roles and responsibilities in shaping up the future of the upcoming generations by coping up with the global phenomenon?

METHODOLOGY

A sample of 100 college students from medical, commerce and arts sections were chosen randomly from four renowned colleges of the city. The sample size can be classified as 47% boys and 53% girls. The exploratory research took place in the form of survey where in the research project was explained to the students in the language they were most comfortable with. If required, assistance too will be given while getting the questionnaire filled. Closed ended as well as open ended questions were used to fetch qualitative as well as quantitative data eventually leading to a greater validity and better understanding of findings.

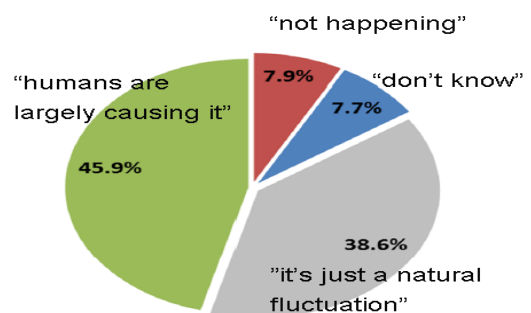
DATA ANALYSIS

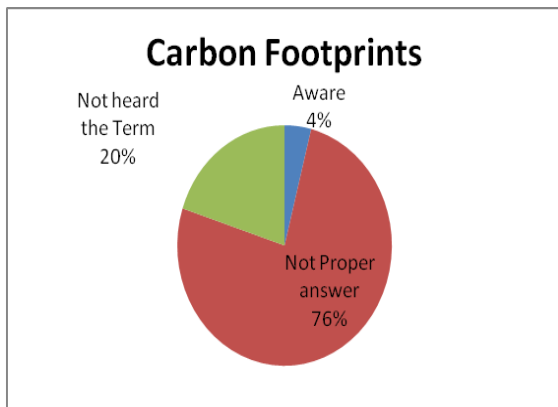
Frequency analysis was used to check the distribution of variables. Non parametric analysis method, spearman’s rank correlation coefficient, chi square analysis were used to analyse the findings.

FINDING OF THE STUDY

The questionnaire started with all the demographic details of the students including the educational qualification of the parents. The first question asked the respondents that are they aware about the climatic changes taking place in the environment. As an astonishing result, maximum students referred only rise in temperature, pollution as the major problems that they see. When asked that are they aware about the concept of the global warming, approximately students said that they have heard the term, know the details, no idea. The results are shown in the pie chart.

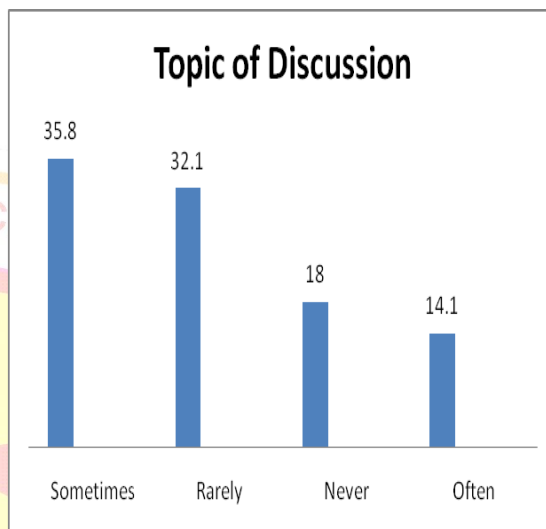
What best describes your thoughts about climate change?



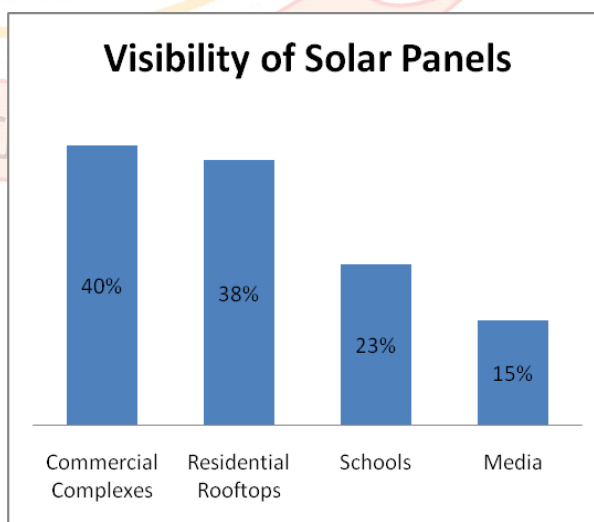
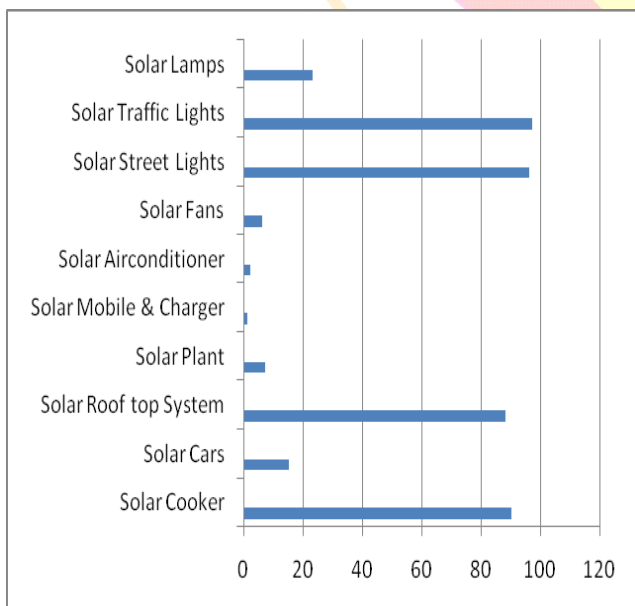


When respondents were asked that whether and how often they talk about the global warming concepts with their family, friends and relatives, 14.1% respondents said that they often talk about the global warming in reference to the rise in temperature in today's time. Approximately, 18% of the respondents said never. They are the most important potential audiences that have to be targeted through some special educational programs. The threatening fact is that being students, actively in touch of teachers, co students and books, if they feel disconnected to this topic, then how are the mindsets of the those adults who are not aware of the conceptual knowledge even.

of products. Solar cookers have been seen by few of the students especially science background in the science lab. Few students said that they have seen these solar cookers during the science projects competition and many have credited YouTube as their source of information.



When questions related to visibility and familiarity with solar panels was asked, approximately 94% out of 100 indicated that they have seen the solar panels and are familiar with the inherent concepts. The visibility was painted to be maximum for commercial complexes (40%), on rooftops (38%), in their schools (23%) and in the media (15%). Question regarding the working mechanism of solar panels posed a challenge to approximately 45%

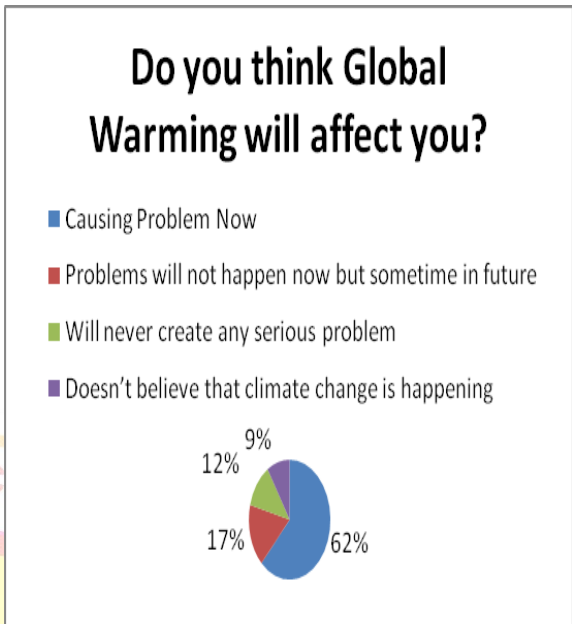


In another question, students were asked to identify the Solar products that they have heard/ seen in any manner. Related to the solar products, students have seen a very limited type

students where in they provided a very generalized aspect. Very small portion of the respondents (23%) accurately described

mechanism. There were a very small number of respondents which could be marked as confused content. Most of the other responses suggested inaccurate justification of the process whereas some students nearly 24% of the students seemed to be totally unaware about the basic concepts.

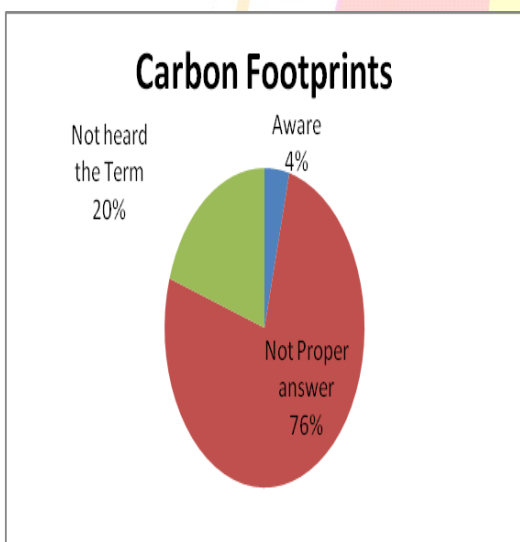
The next question targeted about the perceptions of the respondents that whether the global warming is going to create any problems or will affect them in any cost? Approximately 17% of the students were aware about the ill effects that would be faced by them. Some who were aware about the direct impacts, said yes whereas who lacked clarity in the theoretical concepts said kind of. Yet there were some portion of the students who believed that nature will maintain itself and thus did not believe in climatic changes.



Suggestions:

The most probable solution that can help overcome this willingness perception gap is creation of polity-academia corridor which entails combined efforts of both government as well as academics.

- The government and manufacturers should carry out more of demonstrations, exhibitions at various colleges or areas to target the desired audiences. These exhibitions can act as a two way interactive platform to understand functioning and operations of solar energy products.
- The solar product manufacturers should imbibe innovative technology to bring down the production cost so as to make



he next questionnaire discussed about whether the students are aware of the concept of carbon footprints. In answer to this, about 76% of the respondents did not give any proper answer to the concept of carbon footprints. The students said that this topic is not a part of their curriculum and hence the subject clarity is lacking. Near about 4% of the students who were regular library users have come across this term and were able to give a satisfactory answer. 20 % of the students have not even heard this term.

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Figure 2.1 SAVE Model

Instead of PRODUCT	Focus on SOLUTION Define offerings by the needs they meet, not by their features, functions, or technological superiority.
Instead of PLACE	Focus on ACCESS Develop an integrated cross-channel presence that considers customers' entire purchase journey instead of emphasizing individual purchase locations and channels.
Instead of PRICE	Focus on VALUE Articulate the benefits relative to price, rather than stressing how price relates to production costs, profit margins, or competitors' prices.
Instead of PROMOTION	Focus on EDUCATION Provide information relevant to customers' specific needs at each point in the purchase cycle, rather than relying on advertising, PR, and personal selling that covers the entire marketing communication spectrum.

it affordable for the masses.

- Ettenson contributed by revolutionizing the SAVE model of marketing to retool the 4Ps of marketing mix. The use of SAVE model can initiate the awareness and the ultimate consumption of the solar products amongst the public. The government can use this model to re-strategize the marketing mix so that awareness can be increased.
- The SAVE models first strategy would be to discuss about the SOLUTIONS provided by the solar panels and solar products instead of being pushy about the solar sales. The marketers and the government should lay stress on the strengths and the opportunities related to the solar systems at homes, commercial buildings etc. Influencing the families and creating awareness about the climatic changes and its most possible hazardous mal-effects can be effectively supported through these means.
- The second element of the SAVE model talks about ACCESS that is making the Solar system reachable to the masses. This can be done by establishing counseling centers, toll free help lines so that anyone can gather detailed information about the same. Moreover, seminars, workshops in the schools, colleges and other educational institutions should be conducted by the Government or by the private firms so that segment marketing can take place.
- The long term benefit of the solar systems and the use of solar products in day to day life should be highlighted in the eyes of the students by focusing on the VALUE instead of mere price. This can increase the number of the potential buyers of the same technology. The cost-benefit analysis would help the students to understand the long term value of the solar technology.

Conclusion:

Although the contradictions as well as comprehensions in case of college students go hand in hand, the survey revealed that most of

the respondents understood the solar products but had some misconceptions about the working mechanism.. Lack of proper knowledge can be compensated with proper marketing campaigns so that the confusions can be removed.

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