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IDENTIFYING DEMOGRAPHIC DETERMINANTS WHICH MIGHT LEAD TO THE PURCHASE OF RENEWABLE ENERGY PRODUCTS: A STUDY BASED ON SIKKIM AND DARJEELING

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Abstract
In the past decades a large number of studies have explored the technical aspects of products related to renewable energy pan India. However, few studies based on marketing concepts have been carried out for the afore mentioned products. Thereby, creating a vacuum between product(renewable energy) awareness and product acceptance among its potential users. This research paper have been carried out in Sikkim and Darjeeling which is situated at North Eastern part of India, where negligible studies based on marketing of products related to renewable energy(domestic products) are conducted. The focus of this paper is on demographic factors, such as, marital status, number of children, number of family members, age of respondents, profession of respondents, educational level of respondents and income level of respondents. Besides demographic determinants the authors have also attempted to study the association of respondents present residence and the area of locality(rural, semi-urban and urban) and its influence in their purchase decision. Demographic factors have been coupled with four factors to achieve a deeper understanding of reasons for the purchase of renewable energy products. Result suggests that there are significant association between certain demographic determinants with purchase intention of respondents from Sikkim and Darjeeling.

Keywords: renewable energy, demographic factors, awareness, Government, purchase.

1. Introduction

Renewable energy has time and again gained its importance as one of the safest energy. The urgency to adopt technology related to renewable energy has spiked within the decades amongst manufacturers and Government throughout the globe. Establishing renewable energy parks have been one of the tactics for encouraging the usage and promotion of clean energy worldwide. Renewable energy have also been playing a significant role in agricultural sector though the extensive adoption of such products are still in its nascent stage. Sikkim is second smallest[i] State and Darjeeling is a town and a municipality of West Bengal[ii], both fall under North East Region of India. Geographical and climatic condition of Sikkim and Darjeeling is a challenge for the survival of renewable energy products. Awareness comes from information and the pattern of disseminating information plays a vital role in adoption of such products among the people residing in this areas. Reasoning ability and need to adopt such products must arise within the communities and educating them is a Hercules task yet not impossible.

The Sikkim Renewable Energy Development Agency (SREDA) was constituted by the State Government in 1999[iii]. This autonomous agency was mandated with the charge of promoting and popularizing renewable energy, and to also act as the State Nodal Agency for all renewable energy programmes and projects in the State. West Bengal Renewable Energy Development Agency[iv], formed in the year 1993, has a mandate to promote Renewable Energy Technologies and create an environment conducive to their commercialization through innovative projects. The Agency, popularly known as WBREDA, has its corporate office at Kolkata, India. The West Bengal Renewable Energy Development Agency (WBREDA) is the State Nodal Agency for implementation of Non – Conventional Energy Programmes in the State of West Bengal. SREDA and WBREDA have been consistent in providing renewable energy benefits to the nook and corner of the state. Darjeeling (which lies towards North Bengal) and Sikkim have erratic weather conditions and it falls toward the Himalayan states, inspite of its topographical hurdles and poor road infrastructure due to rain and landslide SREDA and WBREDA have tirelessly been promoting renewable energy technologies.

2. Methodology

Data for analysis were collected using structured questionnaire(secondary data) where respondents had to choose from continuous scale starting from 0 till 10, this continuous scale was further divided into ratio scales whose range was 0-3=low,4-7=medium and 8-10 is high. If the response was towards 0 then respondents intention was not to buy the products and if response is towards 10 than respondents are willing to buy the product. 600 questionnaires were collected over the span of approximately 6 months. For segregating the data, Microsoft excel sheet was used and for analysis SPSS software version 20 was used. The variables are on ratio scale so t-test will be appropriate. Solar water heater, biomass stove, solar street lamp and wind water pump was considered during the study.

Note: Significance value of 0.000 has been taken as 0 value.
If significance value is above 0.05, the null hypothesis is accepted or else it stands rejected.

2.1 Reliability Test

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.697	.610	4

We can see that Cronbach's alpha is 0.697, which indicates a high level of internal consistency.

2.2 Null Hypotheses

Ho_1: There is no significant relation of marital status with purchase of RE products.
Ho_2: There is no significant relation between number of children and purchase of RE products.
Ho_3: There is no significant relation between family size and purchase of RE products.
Ho_4: There is no significant relation between respondents present residence and purchase of RE products.
Ho_5: There is no significant relation between area of residence and purchase of RE products.
Ho_6: There is no significant relation between age and purchase of RE products.
Ho_7: There is no significant relation between profession and purchase of RE products.
Ho_8: There is no significant relation between educational level and purchase of RE products.
Ho_9: There is no significant relation between income level and purchase of RE products.

2.3 Results and Analysis

Ho_1: There is no significant relation of marital status with purchase of RE products. Unmarried N=263.Married N=337						
FACTORS		**Mean**	**F**	**Sig.**	**hypothesis**	**interpretation**
Buy if Government subsidy is available	Unmarried	5.84	3.08	0.080	accept null hypothesis	There are no significant factors leading to the purchase of the product.
	Married	6.21				
Buy if Government directly promotes it	Unmarried	5.43	17.76	0	reject null hypothesis	There are significant factors leading to the purchase of the product.
	Married	6.37				
Buy if I am sure about its benefits	Unmarried	6.38	1.57	0.210	accept null hypothesis	There are no significant factors leading to the purchase of the product.
	Married	6.64				
Buy if it provides local employment	Unmarried	1.40	12.82	0	reject null hypothesis	There are significant factors leading to the purchase of the product.
	Married	1.55				

Table 1

Observation 1	For factor 'buy if Government subsidy is available' mean values are 5.84 and 6.21, we accept the null hypothesis and infer that there are no significant relation of marital status with purchase of the product as significant value is 0.080 which is above the tabulated value 0.05.
Observation 2	For factor 'buy if Government directly promotes it' mean values are 5.43 and 6.37, we reject the null hypothesis and infer that there are significant relation of marital status with purchase of the product as significant value is 0 which is below the tabulated value 0.05.
Observation 3	For factor 'buy if I am sure about its benefits' mean values are 6.38 and 6.64, we accept the null hypothesis and infer that there are no significant relation of marital status with purchase of the product as significant value is 0.210 which is above the tabulated value 0.05.
Observation 4	For factor 'buy if it provides local employment' mean values are 1.40 and 1.55, we reject the null hypothesis and infer that there are significant relation of marital status with purchase of the product as significant value is 0 which is above the tabulated value 0.05.

Discussion based on Table 1

Result inferred from observation 1 of table 1 states that irrespective of respondents marital status there is no motivation for them to purchase the product even if Government provides subsidy. This result is due to the lack of knowledge among the people as it was observed during data collection and lack of consistent initiatives from the concerned department to spread awareness among them. Majority of the respondents (84%) disagree with the statement that Government should not finance renewable energy, but rather that the pace of investment of Government in renewable energy is relatively too slow (Yusuf Opeyemi Akinwale,2014) [v]. Most of the respondents depended on facilities provided by the State Government and were not self motivated to buy renewable energy products. Government subsidies and renewable energy certificate (REC) along with strict policies are highly required for promoting renewable source based generations. Investment based Renewable energy generations can be encouraged in Tamilnadu as it has witnessed more potential industries and people(J. Jeslin Drusila Nesamalar et al.2017)[vi]. Similarly, if REC is provided to industries manufacturing RE products specially meant for Northeast States based on its geographic, climatic and topographical compatibility and if subsidies are also made easily accessible than the adoption of RE can accelerate in Sikkim and Darjeeling. Though RE manufacturing firms are not currently established either in Sikkim nor in Darjeeling, Governments' role in promoting the said product is always welcomed with an open arms. Research and development labs can be set up by Government in order to test the new technologies as well as invent efficient panels and so on(J. Jeslin Drusila Nesamalar et al.2017).Referring to the findings from observation 3 of table 1, respondents' irrespective of their marital status would not buy renewable energy products even if they are sure about its benefits. This negative attitude of respondents related to the product is due to lack of awareness regarding its benefits. Though solar water heaters are available from Government agencies,they prefer electric geysers and some other sources to get hot water, as they are not aware of the technology. This can be overcome by good marketing strategies and public campaigns so as to address customers concerns and also to increase its sales which adds to its profits (Ashwin J.Baliga,2015)[vii] The life-cycle stage of any technologies is important while considering the creation and expansion of renewable and its association with income and employment. Each life cycle stage has its own impact on economic development and employment(study based in Scotland)(Ronald William McQuaid 2016) [viii]As stated in literature regarding product life cycle, author correctly states that each life cycle of any product will create income and employment. In relation to this, referring to the result from observation 4 of table 1 we find that irrespective of respondents marital status they would purchase renewable energy products if it leads to local employment. Hence, proper identifying of that stage of product in product life cycle of renewable energy initiates appropriate strategies to be framed in creating study courses for students or trainees which will directly influence employment and will definitely add to the rise in the demand of the said products in Sikkim and Darjeeling.

Ho_2: There is no significant relation between number of children and purchase of RE products.						
Children. None N=299,Below 2 children N=104,Above 2 children N=197						
FACTORS		**Mean**	**F**	**Sig.**	**hypothesis**	**interpretation**
Buy if Government subsidy is available	None	5.83	4.13	0.016	reject null hypothesis	There are significant factors leading to the purchase of the product.
	Below 2	6.67				
	Above 2	6.06				
Buy if Government directly promotes it	None	5.50	8.40	0	reject null hypothesis	There are significant factors leading to the purchase of the product.
	Below 2	6.10				
	Above 2	6.41				
Buy if I am sure about its benefits	None	6.34	3.58	0.029	reject null hypothesis	There are significant factors leading to the purchase of the product
	Below 2	7.11				
	Above 2	6.50				
Buy if it provides local employment	None	1.44	10.32	0	reject null hypothesis	There are significant factors leading to the purchase of the product.
	Below 2	1.37				
	Above 2	1.61				

Table 2

Observation 1	For factor 'buy if Government subsidy is available' mean values are 5.83 and 6.67 and 6.06, we reject the null hypothesis and infer that there are significant relation between number of children with purchase of the product as significant value is 0.016 which is below the tabulated value 0.05.
Observation 2	For factor 'buy if Government directly promotes it' mean values are 5.50 and 6.40 and 6.41, we reject the null hypothesis and infer that there are significant relation between number of children with purchase of the product as significant value is 0 which is below the tabulated value 0.05.
Observation 3	For factor 'buy if I am sure about its benefits' mean values are 6.34 and 7.11 and 6.50, we reject the null hypothesis and infer that there are significant relation between number of children with purchase of the product as significant value is 0.029 which is below the tabulated value 0.05.
Observation 4	For factor 'buy if it provides local employment' mean values are 1.44 and 1.37 and 1.61, we reject the null hypothesis and infer that there are significant relation between number of children with purchase of the product as significant value is 0 which is below the tabulated value 0.05.

Discussion based on Table 2

50% of the developers of renewable energy suggest that the Government should engage in promotion of the green building concept among the general public(study based on Bhopal)(Dr.Priya Grover, 2015).[ix] Similarly, respondents irrespective of number of children they have, they are ready to buy renewable energy product if Government subsidy is available.As stated in the previous results active participation of State Government is crucial in wide adoption of the said products. Till date, concept of green building has not yet found its niche in Sikkim nor in Darjeeling. However, energy parks are established in various places at Sikkim, such as, tourist spots and State Government buildings[iii]. Due to location constrains and lack of adequate infrastructure, people of Sikkim and Darjeeling have less opportunities as compared to other people living in cosmopolitan cities. This is one of the main reason for them being fully dependent on facilities provided by State Government whom they have elected with lot of hope, faith and belief that they will provide 'vikash'(development) in their village or locality. Hence, manufacturers may in collaboration with State Government promote the said products with win-win situation. Based on result, respondents were open to the idea of adopting technologies which they are not sure of and have little/no knowledge about just for the sake of their children. This result assumes that parents are willing to adopt the products if its various benefits are known. Hence, parents may be recognized as a new target customer while promoting the said products. Organizations will have to focus on its target group who may be the adopters or non-adopters of their innovation. This can be conquered by good marketing strategies and public campaigns (Ashwin J.Baliga,2015)These respondents are far sighted where they are assuming that their children might have greater job prospects in future. Hence, an extensive skill development programmes may be started to develop required skills in this sector and contribute in undisrupted adoption of such technologies/products in future. Hands-on trained person will end up being an asset for the company and also community who adopts renewable energy products. Hence, Government of Sikkim and Darjeeling and its concerned department may adopt certain programmes like the Scottish Government, has created specific programmes like The Energy Skills Challenge Fund and the Low Carbon Skills Fund (Scottish Government, 2012; Skills Development Scotland, 2014) which have been set up to lend a hand in training new or transitional workers to join the energy industry workforce. (study based on Scotland)(Ronald William McQuaid,2016)

H_{o_3}: There is no significant relation between family size and purchase of RE products.

Below 4 members N=176, between 4-6 members N=349, above 6 members N=75

FACTORS		Mean	F	Sig.	hypothesis	interpretation
Buy if Government subsidy is available	Below 4 members	5.27	7.28	0.001	reject null hypothesis	There are significant factors leading to the purchase of the product.
	Between 4-6 members	5.75				
	Above 6 members	5.92				
Buy if Government directly promotes it	Below 4 members	5.58	7.28	0.001	reject null hypothesis	There are significant factors leading to the purchase of the product
	Between 4-6 members	5.62				
	Above 6 members	5.91				
Buy if I am sure about its benefits	Below 4 members	5.80	1.93	0.146	accept null hypothesis	There are no significant factors leading to the purchase of the product.
	Between 4-6 members	5.47				
	Above 6 members	5.15				
Buy if it provides local employment	Below 4 members	1.44	1.27	0.281	accept null hypothesis	There are no significant factors leading to the purchase of the product.
	Between 4-6 members	1.50				
	Above 6 members	1.53				

Table 3

Observation 1	For factor 'buy if Government subsidy is available' mean values for are 6.27 and 5.75 and 6.92, we reject the null hypothesis and infer that there are significant relation between family size and purchase of the product as significant value is 0.001 which is below the tabulated value 0.05.
Observation 2	For factor 'buy if Government directly promotes it' mean values are 6.58 and 5.62 and 6.04, we reject the null hypothesis and infer that there are significant relation between family size and purchase of the product as significant value is 0.001 which is below the tabulated value 0.05.
Observation 3	For factor 'buy if I am sure about its benefits' mean values are 6.80 and 6.47 and 6.15, we accept the null hypothesis and infer that there are no significant relation between family size and purchase of the product as significant value is 0.146 which is above the tabulated value 0.05.
Observation 4	For factor 'buy if it provides local employment' mean values are 1.44 and 1.50 and 1.53, we accept the null hypothesis and infer that there are no significant relation between family size and purchase of the product as significant value is 0.281 which is above the tabulated value 0.05.

Discussion based on Table 3

The Government of Madhya Pradesh in collaboration with EPCO, BDA and BMC is at present working on the progress of a Clean Development Management (CDM) Agency in Bhopal, which will attend to the issues associated with sustainable development and will assist the growth of green homes in the city(study based on Bhopal)(Dr. Priya Grover, 2015).Such agencies can actively participate in providing subsidy and promoting renewable energy products at every corner of the concerned State. The result from observation 1 of table 3 too shows that respondents of varied family size have significant association with their purchase decision if Government subsidy is available. Family size is one of the factor which should not be overlooked by manufacturers and marketeers of RE products. We have to understand that family size is one dimension which is neglected by promoters and manufacturers. Technology or in other words 'products' of renewable energy must be reengineered in a user friendly manner where maintenance is less and payback period is below the standard of 5 years for domestic use. This may take time but it must be initiated by encouraging establishment of research and development centre or department in Sikkim and Darjeeling. Result from observation 3 of table 3 shows that there is no significant relation in respondents size of their family to purchase of renewable energy products even if they are aware of its benefits. This inference may be due to the lack of knowledge related to various benefits associated with it. One of such benefit is employment which society as a whole will acquire. Hence, highlighting on employment benefits might lead to adoption of renewable energy products along with sustainable development of the entire society. “Green” jobs in the renewable energy sector are expected to grow extensively in future, based upon unrelenting Governmental policies and support mainly to reduce carbon use (Ronald William McQuaid,2016).The findings from observation 4 of table 3 is something which needs to be pondered upon and discussed extensively by concerned authorities, which states that respondents irrespective of their family size would not buy renewable energy products even if it provides local employment. Study based on availability of skilled workers in this sector from Sikkim and Darjeeling is yet to be explored hence commenting on this subject would not be authentic. However, based on the observation and other associated results from this research we may assume that lack of after sales services and non accessibility of renewable energy products(domestic) in the market highlights lack of expertise in this area. As stated in the literature, this sector has noteworthy skills gaps, principally in construction, technical, and engineering categories. The skills shortage (not being able to hire suitably skilled workers) and skills gap (their existing workforces not having adequate skills)were clearly evident and supported the argument that skills remain a major issue for “Green” industries (study is based on Scotland) (Ronald William McQuaid,2016). Hence, creating a reliable job and providing required training in this sector where educated, potential and unemployed educated youth gets to explore their ideas and technical skills, might lead to purchase of the said products in future in Sikkim and Darjeeling.

Ho: There is no significant relation between respondents present residence and purchase of RE products. Darjeeling N=288, Sikkim N=312						
FACTORS		**Mean**	**F**	**Sig.**	**hypothesis**	**interpretation**
Buy if Government subsidy is available	Darjeeling Sikkim	6.17 5.94	1.12	0.290	accept null hypothesis	There are no significant factors leading to the purchase of the product
Buy if Government directly promotes it	Darjeeling Sikkim	6.10 5.82	1.60	0.206	accept null hypothesis	There are no significant factors leading to the purchase of the product.
Buy if I am sure about its benefits	Darjeeling Sikkim	6.65 6.42	1.23	0.267	accept null hypothesis	There are no significant factors leading to the purchase of the product.
Buy if it provides local employment	Darjeeling Sikkim	1.54 1.43	7.18	0.008	reject null hypothesis	There are significant factors leading to the purchase of the product.

Table 4

Observation 1	For factor ' buy if Government subsidy is available' mean values are 6.17 and 5.94, we accept the null hypothesis and infer that there are no significant relation between respondents present residence and purchase of the product as significant value is 0.290 which is above the tabulated value 0.05.
Observation 2	For factor 'buy if Government directly promotes it' mean values are 6.10 and 5.82, we accept the null hypothesis and infer that there are no significant relation between respondents present residence and purchase of the product as significant value is 0.206 which is above the tabulated value 0.05.
Observation 3	For factor 'buy if I am sure about its benefits' mean values are 6.65 and 6.42, we accept the null hypothesis and infer that there are no significant relation between respondents present residence and purchase of the product as significant value is 0.267 which is above the tabulated value 0.05.
Observation 4	For factor 'buy if it provides local employment' mean values are 1.54 and 1.43, we reject the null hypothesis and infer that there are significant relation between respondents present residence and purchase of the product as significant value is 0.008 which is below the tabulated value 0.05.

Discussion based on Table 4

Irrespective of Government providing subsidy for the said products there is no association with the respondents wish to buy renewable energy products. We may assume that respondents are not aware or have less knowledge regarding subsidies provided, hence, spreading awareness might escalate the adoption of siad products in future. Awareness related to where such products are sold in subsidized rate must be the highlight. It was felt that 45% of the public viewed financial incentive as fairly vital for the setting up of renewable energy at home and growth of the business in the area.(V. P. Khambalkar,2010)[x]. Result of observation 2 of table 4 shows that even if Government directly promotes the product residents of Sikkim and Darjeeling might not buy the products. At present concerned agencies are not extensively involved in promoting renewable energy products due to various constrains, such constrains needs to be identified and tackled with a feasible strategies. Hence, the said products have failed to win the trust of the people. Therefore, inferring that an active role and feasible policies favouring communities by the concerned Government must be applied at a war foot in order to push renewable energy products. Since awareness is less or minimal hence adoption of such products are viewed with suspicion. Even if some of the respondents are aware of the product and its benefit but are unable to maintain the product due to lack of technical after sales support. The objective to meet electricity demand of village can be achieved by making appropriate use of resources like biomass and solar. The two major problem of managing the residue left after harvesting and inconvenient electricity supply of villages could be well overcome by utilizing the existing resource of village and making itself sustainable in its energy requirements(Rahul Mishra,2013)[xi]. Segregating harvest residues is the first step towards breaking the flow of appropriate usage of such residues. Which may be done for future research. Respondents (Sikkim and Darjeeling) are willing to buy renewable energy products if it provides employment. Millions of useful jobs will be created in the process of development of the infrastructure required for the new industries resulting from massive solar projects. Publicizing job creation, in addition to environmental and energy access reimbursement, will strengthen the economic case for clean energy policies and build public support for these initiatives(Moumita Sadhu. Et.al 2015)[xii]

Ho: There is no significant relation between area of residence and purchase of RE products						
Rural N–175, Suburban N–238, Urban N–187						
FACTORS		**Mean**	**F**	**Sig.**	**hypothesis**	**interpretation**
Buy if Government subsidy is available	Rural	6.23	3.40	0.034	reject null hypothesis	There are significant factors leading to the purchase of the product.
	Sub-urban	6.24				
	Urban	5.64				
Buy if Government directly promotes it	Rural	6.35	3.27	0.039	reject null hypothesis	There are significant factors leading to the purchase of the product
	Sub-urban	5.94				
	Urban	5.61				
Buy if I am sure about its benefits	Rural	6.59	4.43	0.012	reject null hypothesis	There are significant factors leading to the purchase of the product.
	Sub-urban	6.18				
	Urban	6.90				
Buy if it provides local employment	Rural	1.59	8.29	0	reject null hypothesis	There are significant factors leading to the purchase of the product.
	Sub-urban	1.39				
	Urban	1.50				

Table 5

Observation 1	For factor ' buy if Government subsidy is available' mean values are 6.23 and 6.24, 5.64, we reject the null hypothesis and infer that there are significant relation between area of residence and purchase of the product as significant value is 0.034 which is below the tabulated value 0.05.
Observation 2	For factor 'buy if Government directly promotes it' mean values are 6.35 and 5.94, 5.61, we reject the null hypothesis and infer that there are significant relation between area of residence and purchase of the product as significant value is 0.039 which is below the tabulated value 0.05.
Observation 3	For factor 'buy if I am sure about its benefits' mean values are 6.59 and 6.18, 6.90, we reject the null hypothesis and infer that there are significant relation between area of residence and purchase of the product as significant value is 0.012 which is below the tabulated value 0.05.
Observation 4	For factor 'buy if it provides local employment' mean values are 1.59 and 1.39, 1.50, we reject the null hypothesis and infer that there are significant relation between area of residence and purchase of the product as significant value is 0 which is below the tabulated value 0.05.

Discussion based on Table 5

The result based on our research from observation 1 of table 5 shows that residence location of respondents affects their decision to buy renewable energy products. Such as respondents staying in rural and semi-urban area will require more subsidised products. Hence, region wise promotional strategy is to be adopted by the concerned authorities by breaking them into phases. If subsidies or attractive incentives are provided to developers and manufacturers of renewable energy products, than the price may also be in favour of common people. Not only will it attract users from rural areas but will also attract users from urban areas.Therefore, fulfilling the objective of users, developers and Government may be successfully achieved. As stated in the previous mentioned discussions, people living in rural, semi-urban and urban areas have faith and trust in initiative undertaken by the concerned Government. Similar result can be observed under observation2 of table 5 where respondents irrespective of which area they live have significant relation with purchase of renewable energy products. Setting up of research and development labs related to renewable energy products (J. Jeslin Drusila Nesamalar et al.(2017) will make people curios and this curiosity must be encourage by letting them see how it is produced and its associated benefits. Addition to it renewable energy certificate (REC) and strict policies are highly required for promoting renewable source based generations. (J. Jeslin Drusila Nesamalar et al.(2017) When people believe that using a particular product gives them benefits they are certain to purchase it. Solar water heater saves cost, is environmental friendly and reliable when compared to others. BNF(benefits) thus results in CSN(customer satisfaction).CSN were found to be statistically significant and has a positive influence on BLY(brand loyalty)(Ashwin J.Baliga 2015).Associations where local community women or residents are involved, the success stories are more. If such steps are taken by all the States in India then the problem of energy security would be controlled to large extent and will lead to increase in employment. The SEWA(*Self Employed Women's Association*) Savera programme has built competence of women workers to market, sell, and provide technical services to the end-user. SEWA Sathis are assigned a cluster of villages, around their place of occupation, to link women

workers to the programme. Once a women worker buys the product, the SEWA Sathi is responsible for collecting their repayment amount. For both the tasks, SEWA Sathis are provided incentives. (Ruchi Sankrit 2015).[xiii] Engaging local women will also fulfil the idea of women empowerment and will result in gaining trust of potential users of the community.

Ho_6: There is no significant relation between age and purchase of RE products.						
15yrs-25yrs N=173, between 25yrs-35yrs N =198, between 36yrs-45yrs N=103, between 46yrs-55yrs N=72, above 56yrs N=54						
FACTORS		**Mean**	**F**	**Sig.**	**hypothesis**	**interpretation**
Buy if Government subsidy is available	15- 25	6.03	2.10	0.079	accept null hypothesis	There are no significant factors leading to the purchase of the product.
	26 35	5.71				
	36 45	6.26				
	46-55	6.68				
	Above 56	6.09				
Buy if Government directly promotes it	15- 25	5.81	2.93	0.020	reject null hypothesis	There are significant factors leading to the purchase of the product
	26-35	5.60				
	36-45	6.25				
	46-55	6.78				
	Above 56	6.07				
Buy if I am sure about its benefits	15- 25	6.09	5.36	0	reject null hypothesis	There are significant factors leading to the purchase of the product.
	26-35	6.91				
	36-45	6.73				
	46-55	6.97				
	Above 56	5.54				
Buy if it provides local employment	15- 25	1.45	4.71	0.001	reject null hypothesis	There are significant factors leading to the purchase of the product.
	26-35	1.44				
	36-45	1.48				
	46-55	1.49				
	Above 56	1.76				

Table 6

Observation 1	For factor ' buy if Government subsidy is available' mean values are 6.03, 5.71, 6.26, 6.68 and 6.09. We accept the null hypothesis and infer that there are no significant relation between age and purchase of the product as significant value is 0.079 which is above the tabulated value 0.05.
Observation 2	For factor 'buy if Government directly promotes it' mean values are 5.81, 5.60, 6.25, 6.78 and 6.07. We reject the null hypothesis and infer that there are significant relation between age and purchase of the product as significant value is 0.020 which is below the tabulated value 0.05.
Observation 3	For factor 'buy if I am sure about its benefits' mean values are 6.09, 6.91, 6.73, 6.97 and 5.54. We reject the null hypothesis and infer that there are significant relation between age and purchase of the product as significant value is 0 which is below the tabulated value 0.05.
Observation 4	For factor 'buy if it provides local employment' mean values are 1.45, 1.44, 1.48, 1.49 and 1.76. We reject the null hypothesis and infer that there are significant relation between age and purchase of the product as significant value is 0.001 which is above the tabulated value 0.05.

Discussion based on Table 6

Referring to the result from observation 1 of table 6 shows that age of respondents do not have association with them purchasing the products. Hence, if Government has sustainable promotion strategies for spreading awareness and providing incentives for family who adopts renewable energy products, it will lead to positive response from potential users. The Government of Madhya Pradesh is on the verge of kick starting promotion of sustainable development and green building technology in order to generate awareness in the general public(study based on Bhopal)(Dr. Priya Grover, 2015)[ix]. Another tactics is to divide the community based on different age and conduct awareness programmes accordingly, which at present in not initiated in Sikkim neither in Darjeeling. It is due to this reason that result under different age factor shows contradictory result. Such as, respondents between 15-25 years can be given awareness related to solar lamps as they will be working independently or will be studying. Similarly, 26-35 years and above of respondents may be enlightened about biomass stove and solar water heater as this is the b age when people get married and start their own family. The emphasis on personal benefits from green consumption in the form of recurring saving in energy expenses, despite initial high investment

should be capitalized.(Aindrila Biswas 2016)[xv]. One of the marketing strategies where Panchayat or Municipal head must themselves use any one of the renewable energy product and become an opinion leader in their community. It will feed in their status symbol and rest of the people too will start adopting if proper guidance related to price, maintenance and availability is provided.We may assume that large scale production of renewable energy will lead to its adoption based on Central Government policies which will have direct impact on the rise of employment opportunities to the educated unemployed youths and also open up areas for extensive research in both engineering and management. It was estimated that roughly six jobs in the supply chain (part of the multiplier effects) were linked to each job in the development category, so there was potential for substantial employment growth (study based on Scotland)(Ronald William McQuaid,2016)[viii]. Employment will lead to increase in purchasing power of people which will have positive impact in the overall economy of the country. Hence, younger generation of Sikkim and Darjeeling will get job opportunity will as have positive impact in their mind and overall well being of community.

Ho: 'There is no significant relation between profession and purchase of RE products
Business N=100,Professional N=15, Employed N=250, Retired N=41,Others N=194

FACTORS		Mean	F	Sig.	hypothesis	interpretation
Buy if Government subsidy is available	Business	6.57	4.00	0.003	reject null hypothesis	There are significant factors leading to the purchase of the product
	Professional	3.93				
	Employed	5.93				
	Retired	5.71				
	Others	6.17				
Buy if Government directly promotes it	Business	6.30	0.80	0.525	accept null hypothesis	There are no significant factors leading to the purchase of the product.
	Professional	6.27				
	Employed	5.77				
	Retired	5.80				
	Others	6.03				
Buy if I am sure about its benefits	Business	6.69	0.57	0.688	accept null hypothesis	There are no significant factors leading to the purchase of the product.
	Professional	6.87				
	Employed	6.58				
	Retired	6.10				
	Others	6.43				
Buy if it provides local employment	Business	1.52	6.12	0	reject null hypothesis	There are significant factors leading to the purchase of the product
	Professional	1.67				
	Employed	1.37				
	Retired	1.61				
	Others	1.57				

Table 7

Observation 1	For factor ' buy if Government subsidy is available' mean values are 6.57, 3.93, 5.93, 5.71 and 6.17. We reject the null hypothesis and infer that there are significant relation between profession and purchase of the product as significant value is 0.003 which is below the tabulated value 0.05.
Observation 2	For factor 'buy if Government directly promotes it' mean values are 6.30, 6.27, 5.77, 5.80 and 6.03. We accept the null hypothesis and infer that there are no significant relation between profession and purchase of the product as significant value is 0.525 which is above the tabulated value 0.05.
Observation 3	For factor 'buy if I am sure about its benefits' mean values are 6.69,6.87, 6.58, 6.10 and 6.43. We accept the null hypothesis and infer that there are no significant relation between profession and purchase of the product as significant value is 0.688 which is above the tabulated value 0.05.
Observation 4	For factor 'buy if it provides local employment' mean values are 1.52, 1.67, 1.37, 1.61 and 1.57. We reject the null hypothesis and infer that there are significant relation between profession and purchase of the product as significant value is 0 which is below the tabulated value 0.05.

Discussion based on Table 7

Irrespective of profession of respondents their purchase decision is influenced if Government subsidy is provided. Hence, making our previous discussion and result more strong related to respondents faith and trust in Government.The larger proportion of the respondents (82%) also believed that every citizen in the country has a role to play in supporting the Government to solve electricity crisis in the country and average of 88% of the respondents agreed to adopt renewable energy technologies (RETs) if Government carry people along from the inception of such technologies.(Nigeria)(Yusuf Opeyemi Akinwale et.al,2014)[v].Government have to seek the support of the citizens since inception if they want everyone to adopt renewable energy products. Creating a sense of belongingness among citizens will create a sense of responsibility and accountability where they might atleast take an initiative by purchasing and using renewable energy products**.** One interviewee said: "Energy policy is subordinate to EU's environmental policy. Energy investments should be non-risky

investments, and energy production should be reliable, efficient, competitive and environmentally friendly."(Matti Lehtovaara et al,2013)[xiv]

Prolific community ownership has been occurring in Germany. Unions played a strong role in framing solar energy manufacturing ''as a way to promote local growth and local jobs,'' and ''most solar panels are owned by residences, with more than 90 percent of panels operated by homeowners, cooperatives, and communities, not big energy companies or utilities.'' (B.K. Sovacool 2012)[xv] Creating prolific community ownership may be experimented among residents of Sikkim and Darjeeling irrespective of their profession**.**

Ho_8 There is no significant relation between educational level and purchase of RE products						
School Level N−164, Graduate N− 181, Post Graduate N− 125, Others N− 130						
FACTORS		**Mean**	**F**	**Sig.**	**hypothesis**	**interpretation**
Buy if Government subsidy is available	School level	6.51	3.81	0.010	reject null hypothesis	There are significant factors leading to the purchase of the product
	Graduate	6.03				
	Postgraduate	6.06				
	Others	5.48				
Buy if Government directly promotes it	School level	6.27	3.72	0.011	reject null hypothesis	There are significant factors leading to the purchase of the product.
	Graduate	5.74				
	Postgraduate	5.42				
	Others	6.38				
Buy if I am sure about its benefits	School level	6.39	0.56	0.642	accept null hypothesis	There are no significant factors leading to the purchase of the product.
	Graduate	6.45				
	Postgraduate	6.76				
	Others	6.56				
Buy if it provides local employment	School level	1.45	5.32	0.001	reject null hypothesis	There are significant factors leading to the purchase of the product.
	Graduate	1.52				
	Postgraduate	1.37				
	Others	1.60				

Table 8

Observation 1	For factor ' buy if Government subsidy is available' mean values are 6.51, 6.03, 6.06 and 5.48. We reject the null hypothesis and infer that there are significant relation between educational level and purchase of the product as significant value is 0.010 which is below the tabulated value 0.05.
Observation 2	For factor 'buy if Government directly promotes it' mean values are 6.27, 5.74, 5.42 and 6.38. We reject the null hypothesis and infer that there are significant relation between educational level and purchase of the product as significant value is 0.011 which is below the tabulated value 0.05.
Observation 3	For factor 'buy if I am sure about its benefits' mean values are 6.39, 6.46, 6.76 and 6.56. We accept the null hypothesis and infer that there are no significant relation between educational level and purchase of the product as significant value is 0.642 which is above the tabulated value 0.05.
Observation 4	For factor 'buy if it provides local employment' mean values are 1.45, 1.52, 1.37 and 1.60. We reject the null hypothesis and infer that there are significant relation between educational level and purchase of the product as significant value is 0.001 which is below the tabulated value 0.05.

Discussion based on Table 8

Different awareness tools can be adopted depending on the place and average education level of public. The promotion strategy should cover all the aspects of green building construction and development so that the customers are fully aware and the developers cannot take illegal advantage of the customers(study based on Bhopal)(Dr. Priya Grover, 2015)[ix].Respondents have very high trust towards Governments policies and programmes. Direct involvement of the Government in promoting renewable energy products can convert potential customers into present consumers of renewable energy products. Readiness to pay the green price premium can be fostered through improved environmental awareness programs. Environmental education campaigns closely linked with daily life, having a more participatory approach can help

in the promotion of environmental knowledge, strengthening the perceptual factor(Aindrila Biswas,2016)[xvi]. It might be wise to comment that though in recent school and college curriculum renewable energy concepts have been introduced but the need to buy has not been inculcated. It provides us with the option to not only make them aware of such products but also encourage them to buy the same. One specialist evaluated that the entire global energy ecosystem is in a radical transition phase: "We live in an era of the biggest energy revolution and transition ever witnessed. Centralised utility-based energy systems are being replaced by decentralised energy systems."(Matti Lehtovaara et al,2013).Similarly, respondents whose education level ranges from school level to post graduate degree have significant relation with employment and purchasing renewable energy products (referring to observation 4 table 8). Thereby parallel creation of jobs with people adopting and using the said products. The role of employers in the industry is vital in growing the investment in skills and career development for workers, especially young workers, for instance through good quality apprenticeships, or women and/or groups such as the unskilled (see e.g.:European Foundation for the Improvement of Living and Working Conditions, 2011;Johnson et al., 2009)(study conducted in Scotland)(Ronald William McQuaid,2016)[viii]

Ho_9: There is no significant relation between income level and purchase of RE products.						
Below Rs. 25,000 N=433, Rs. 25,001-Rs.50,000 N=125,Rs.50,001-Rs.75,000 N=32, Rs.75,001 above N=10						
FACTORS		**Mean**	**F**	**Sig.**	**hypothesis**	**interpretation**
Buy if Government subsidy is available	BELOW Rs.25,000	5.90	2.11	0.098	accept null hypothesis	There are no significant factors leading to the purchase of the product.
	Rs.25,001-Rs.50,000	6.41				
	Rs.50,001-Rs.75,000	6.75				
	Rs.75,001-ABOVE	5.70				
Buy if Government directly promotes it	BELOW Rs.25,000	6.09	3.02	0.029	reject null hypothesis	There are significant factors leading to the purchase of the product.
	Rs.25,001-Rs.50,000	5.91				
	Rs.50,001-Rs.75,000	4.78				
	Rs.75,001-ABOVE	4.70				
Buy if I am sure about its benefits	BELOW Rs.25,000	6.59	2.79	0.040	reject null hypothesis	There are significant factors leading to the purchase of the product.
	Rs.25,001-Rs.50,000	6.66				
	Rs.50,001-Rs.75,000	5.41				
	Rs.75,001-ABOVE	5.60				
Buy if it provides local employment	BELOW Rs.25,000	1.48	0.70	0.555	accept	There are no significant factors leading to the purchase of the product.
	Rs.25,001-Rs.50,000	1.51				
	Rs.50,001-Rs.75,000	1.53				
	Rs.75,001-ABOVE	1.30				

Table 9

Observation 1	For factor ' buy if Government subsidy is available' mean values are 5.90, 6.41, 6.75 and 5.70. We accept the null hypothesis and infer that there are no significant relation between income level and purchase of the product as significant value is 0.098 which is above the tabulated value 0.05.
Observation 2	For factor 'buy if Government directly promotes it' mean values of respondents are 6.09, 5.91, 4.78 and 4.70. We reject the null hypothesis and infer that there are significant relation between income level and purchase of the product as significant value is 0.029 which is below the tabulated value 0.05.
Observation 3	For factor 'buy if I am sure about its benefits' mean values are 6.59, 6.66, 5.41 and 5.60. We reject the null hypothesis and infer that there are significant relation between income level and purchase of the product as significant value is 0.040 which is below the tabulated value 0.05.
Observation 4	For factor 'buy if it provides local employment' mean values are 1.48, 1.51, 1.53 and 1.30. We accept the null hypothesis and infer that there are no significant relation between income level and purchase of the product as significant value is 0.555 which is above the tabulated value 0.05.

Discussion based on Table 9

The result is surprisingly adverse to our assumption that people will buy products if subsidy is available. This may be due to lack of awareness and lack of willingness to pay for such products as they are comfortable using conventional products. Hence, more success stories based on this product adoption must be highlighted in order to generate demand from different

income level of people. Extensive involvement of public sector is solicited . The Government will play a very important role in promoting green energy and developing the concept to practical solutions in the near future. More specifically, the study results indicate that Finnish people do expect more from the public sector about renewable energy production (Md.Munjur E. Moula et.al,2013)[xvii] Government have to keep up with the expectations of the people and work towards providing them the best of renewable energy products, which will benefit all the stakeholders.Hence, the said product is viable for all strata of public once they are aware of its long time benefit and knowledge of operating it. Renewable energy product line must be designed and priced in a strategic manner where people from all strata of society will be able to use it. If the product is meant for rural area than the price must be affordable and so on for other emerging markets.A career includes the person's long-term occupation undertaken together with opportunities for progress, so it includes sustainability in terms of long-lasting employment and opportunities for progress in the occupation. This approach to length of time employed and progression is consistent with other views of sustainable employment, such as that of the UK National Audit Office (2007, p.7), who suggest that "having "sustainable" employment means that an individual remains in work, either in one job or by moving to other jobs; but sustainable employment also means work that provides opportunities to advance and earn more" (p.7).(Ronald William McQuaid,2016).[viii]Referring to the result from observation 4 of table 9, we find that respondents who are already earning may not purchase the product even if it helps in generating local employment. This leads us to the literature review which talks about career advancement. If such employment retention strategies are adopted by the firm than respondents might be interested in purchasing the said product, though further research in this matter needs to be taken up.

3. Conclusion

Renewable energy has today become a need of an hour. Changing life style of every individual leads to change in their attitude towards environment and standard of living. If this change of attitude in inclined towards better future for all than it is undeniably a good change but if the change is self centred and disastrous for future citizen then it requires to be tamed and bring them in the right path. The research conducted in Sikkim and Darjeeling was challenging and informative.Though there are no drastic difference in their mannerism towards renewable energy but there were few observations which cannot be ignored. During data collection few finding were observed, awareness related to solar water heater, solar lamps, awareness related to availability of the products, dependability on Government and attitude towards buying those products.

The following results are also to be noted:

1. Respondents showed their willingness to purchase renewable energy products provided Government directly promotes it and if it provides local employment.
2. Respondents irrespective of number of children they have had significant relation with purchase decision with all four factors.
3. Respondents were reluctant to buy renewable energy products even if they were aware of its benefits. It may be because those benefits are vague or they do not see personal benefit. Success stories, such as, reduced electricity bill, increase in tourist influx due to energy parks and so on must be more in order to make potential users accept and adopt the products.
4. Respondents both from Sikkim and Darjeeling have significant relation between purchase decision and all four factors.

Lastly, irrespective of where the data was collected this research have attempted to identify demographical determinants which might trigger purchasing decision towards renewable energy products. During literature review, points such as, policies, subsidy for manufacturers and public, technology, after sales, long payback period, less knowledge regarding the products were common across referred literature review.

4. Limitations

Respondents were not open to discuss reasons for not buying renewable energy as it is not even an option for them when it comes to buying due to the fact that it not available in market. Hence, our question were close ended and options provided were well known to them. Secondly, respondents were kind enough to give only about 5 to 10 minutes of their time due to their daily chores.

5. Suggestions Based on Findings of Research

- Organizing awareness program and various training provided at village level is not the only solution and is not sufficient as Panchayat or Village Head must follow up and see whether those products are used diligently or not. If not in use than they must submit a report to the concerned department so that the concerned department frames solutions to overcome the loopholes.
- To encourage domestic households to adopt renewable energy products, the installation of such products must be made compulsory in coming years and attractive incentive schemes which are presently executed must be prolonged for a few more years.

- Manufacturers have to focus on reengineering the design of such products for easy usage and installations with minimal maintenance cost. Where, various service centres must be operational with adequate spare parts for after sales services.
- Extensive training if required must be encouraged at large scale.
- Similarly, courses related to engineering and management of renewable energy products for domestic usage can be conducted on a regular intervals throughout the year.
- Advertisement highlighting benefits of using such products can be implemented on a large scale, benefits may be highlighted on the basis of individual and community as a whole.
- Attractive intensive schemes for manufacturers, suppliers and consumers might escalate the awareness, acceptance and adoption of such products, such as, tax holiday for manufacturers of renewable energy products.

It is an undeniable fact that Renewable energy is one of the rational solution for substituting depleting fossil fuels. There are ample scope for research specially in marketing aspects for future studies and research.

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