

Probable Difficulties Confronted By Customers: With Reference To Renewable Energy

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ABSTRACT

Products of renewable energy have witnessed changes in its design along with its adoption strategies over the past decades. But the fact related to its slow adoption still remains in India, especially towards North Eastern part of India. Slow adoption of renewable energy may be due to various perceived problems, which may or may not be the actual problems encountered by people. This study is with regards to prospective difficulties faced by respondents from Sikkim and Darjeeling while choosing products of renewable energy, they are, Solar Water Heater, Solar Street Lamps and Biomass Stoves. The study has correlated demographical factors with the difficulties that people may be facing. Five more factors are added in the discussion for providing more in-depth reasons leading to problems of accepting renewable energy. Recommendations for the same is also provided for each factor.

Keywords renewable energy, demographic factors, problems faced, Sikkim, Darjeeling.

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Introduction

Sikkim lies in Northeast India and Darjeeling lies in north Bengal, however shares similar weather seasons with reference with winter, spring, summer and autumn season¹. Business related to renewable energy or green energy have to study changing consumer behaviour in the market. Cited by Shafaat & Sultan (2012) that Joel Makower felt that challenges faced by green marketer are lack of standards and common consensus among the public, about what actually constitutes “green”. There are numerous issues and challenges faced by prospective customers and also varies from region to region. SREDA (Sikkim Renewable Energy Development Agency) and WBREDA (West Bengal Renewable Energy Development Agency) are Nodal agencies engaged in providing off grid energy to the residents of Sikkim and Darjeeling respectively. They provide products of renewable

energy to beneficiaries on regular basis on subsidized rates.

These agencies are the only source from where people can avail products of renewable energy in Sikkim and Darjeeling. Hence, people have very little knowledge regarding renewable energy. This research is based on solar water heater, biomass stove and solar street lamps. Probable difficulties that customers may encounter are discussed by correlating it with five factors, which is mentioned under materials and methods. This research paper also makes an attempt to recommend measures in order to overcome the difficulties in acceptance of renewable energy.

1. MATERIALS AND METHODS

1.1 Objective: The objective of this research is to determine the marketability of products of renewable energy by identifying possible

difficulties experienced by potential customers. This study includes demographical segmentation considering age factor, occupation, marital status, education and place of residence. These were correlated with five factors, namely,

- I. The purchased product might not satisfactorily perform.
- II. Price of the product is not within my budget.
- III. Renewable energy has less product varieties.
- IV. Products are not easily available in the market.
- V. There is low subsidiary for these products.

Which are indicated in all the tables provided under.

Reliability analysis was conducted for the above five factors using SPSS, Cronbach Alpha. The closer is the value of alpha towards 1.00, greater is the internal consistency of the items assessed. Here, Cronbach alpha is 0.819 which is closer to 1.00, hence, the factors taken are reliable.

Reliability Statistics	
Cronbach's Alpha	N of Items
.819	5

1.2 Literature review

The theory of planned behaviour had found that consumers past experience plays an important role in determining their present behaviour (Han, 2011). Also stated by (Dark, 2014) that adoption and diffusion of technology explains how, why and at what time a technology spreads in any society. Thus, society's culture must be taken into consideration, may be through change agents who might bring innovation in their society along with gatekeepers and opinion leaders. (Bhatia and Jain, 2013) stated that around 75 % of consumers showed willingness to purchase green products if it is available in the product category which are often purchased. In other words, green products must be readily available for their consumption like other conventional products. Another study conducted by (Husted, 2014) found that environmental attitudes of consumers in Mexico influenced their

willingness to pay a premium price for an environmentally-certified products. Thereby, stating that price may not be a common hindrance for the acceptance of the same. (González, 2015) suggested that marketing managers and policymakers might consider a blend of customers ecological behaviors along with demographic and attitudinal variables, such as, perceived consumer effectiveness, environmental and social values, instead of focusing in general the high or low adoption levels of pro-environmental behaviors. Consumers highlight on loss averse, (Frederiks, 2015) meaning, they weigh loss more heavily than gains, specially when faced with making decision. People tend to perceive losing as something greater than gaining something different. Reliability as suggested by (Kulkarni, 2015) is an important factor influencing respondent's decision to shift to alternative energy supply. Respondents were more likely to pay access amount for an energy supply with this feature.

1.3 Research Gap:

Research related to the proposed topic in Sikkim and Darjeeling regarding products of renewable energy are very few or nil. Most of the studies are focused on technical aspects of the various products under renewable energy, which is infact required and necessary but marketability of the same should not be overlooked or neglected. More studies related to marketing of the domestic products of renewable energy must be encouraged in Sikkim and Darjeeling. Hence, the need of an hour was realized which motivated this research.

2.4 Techniques used: Data were collected using structured questionnaire where respondents had to select options provided in continuous scale starting from 0 to 10. The response towards 0 indicated negative purchase decision and response towards 10 indicated positive purchase decision. 600 questionnaires were collected over the span of approximately 6 months. For data segregation, Microsoft excel sheet was used and for analysis SPSS software version 20 was used. Solar water heater, biomass stove and solar street lamp was considered during the study.

3. RESULTS

3.1 Null Hypotheses

The following literature highlighted have enabled researcher to frame the hypotheses for this study in order to justify the selected hypotheses. (Rex & Baumann, 2007) stated that female, young people and people with high education and income were found to be engage in green consumer behaviour. As inferred by (Dark, 2014) that adoption and diffusion of technology resides within a society's culture where an individual learns norms and values. Research conducted by (Chairy, 2012) on under graduate students found that those scoring high on spirituality had stronger intention to purchase green product. (LaMarche *et.al*, 2012) stated that users thought Home Energy Displays are too expensive, thereby showing significant gap between peoples' willingness to pay and the actual basic cost of the products. (S.Choi and A.Ng, 2011) inferred that price have strong impact on evaluation and purchase intention when economic sustainability is low. Thus, the hypotheses were

generated to find whether the result contradicts or is similar with residents of Sikkim and Darjeeling.

H0₁: There are no significant problems faced by customers across the marital status.

H0₂: There are no significant problems faced by customers across the place of residence.

H0₃: There are no significant problems faced by customers across the age group.

H0₄: There are no significant problems faced by customers across the occupation.

H0₅: There are no significant problems faced by customers across educational level.

Five factors mentioned above are incorporated in the discussion part of hypothesis.

3.2 Analysis

H0₁: There are no significant problems faced by customers across the marital status.

Table 1: Relationship between various product factors and marital status of the respondent.

Unmarried =263, Married=337					
	Factors	Mean	F	Sig.	Null hypothesis
I	Unmarried	4.82	2.11	0.147	accept
	Married	5.10			
II	Unmarried	4.75	1.39	0.239	accept
	Married	4.96			
III	Unmarried	4.91	32.57	0	reject
	Married	6.02			
IV	Unmarried	5.13	8.68	0.003	reject
	Married	5.75			
V	Unmarried	4.93	2.60	0.108	accept
	Married	5.24			

Note: Significance value of 0.000 has been taken as 0 value.

If significance value is above 0.05, null hypothesis is accepted or else it stands rejected.

Discussion

Factor I of table 1 shows that respondents regardless of their marital status do not have significant problem associated with the factor 'purchased product might not satisfactorily perform'. This may be due to the fact that they are

not using the product in a conventional way but are using on occasional basis. (Priya Grover, 2015) stated that Government of Madhya Pradesh engages in training programs for developers and engineers on the technicalities associated with green building construction. Thereby transferring the knowledge to consumers. Hence, marital status might not be the factor leading to the purchase of renewable energy. Performance of the product is not a factor considered under marital status.

Factor II of table 1 shows that irrespective of respondents' marital status, they do not have significant problem under the factor '*price may not be within their budget*'. (Surendra *et al.*,2011) stated that major Renewable Energy Technologies are unaffordable to people staying in rural areas even under government subsidy. It is considered a major barrier for establishing such technologies in rural areas and urban areas due to different income levels. Hence, pricing needs to be customized according to the stratum of society during product penetration phase. Respondents might not even consider purchasing renewable energy as it may be too expensive for them. Another possible reason may be that married respondents and unmarried respondents may have different needs which they consider more important than purchasing any products related to renewable energy.

Less product variety of renewable energy is a significant problem faced by respondents regardless of their marital status, based on result from Factor III of table 1. According to (Aslani, 2014) academic programmes such as RE (Renewable Energy) business management or MBA programmes in energy/RE may help students in understanding purchase behaviour of people. Similarly, if such courses, are introduced in Sikkim and Darjeeling than engineering students might be encouraged to design new products of renewable energy as their major project, which may later turn into a feasible product. This program might be unique where future engineers and future business managers will be studying together to develop and introduce cleaner energy for the entire community and nation.

(Sovacool,2012) mentioned that Danish wind projects has been promoting communal and individual ownership. As the *products are not easily available in the market* at Sikkim & Darjeeling, India too can adopt community and individual ownership as followed by the Danish Government. Referring to Factor IV of table 1, respondents do not have easy access to products of renewable energy and hence they are unable to adopt it. Providing community and individual ownership might enhance the acceptance and adoption of products of renewable energy in Sikkim and Darjeeling.

(Vikas *et.al*, 2013) mentioned that Government might provide budgetary support or incentives to increase the usage of Renewable Energy by, for instant, use of solar energy in schools, malls and hospitals. Result from Factor V of table 1 shows that respondents irrespective of their marital status do not have *problem related to low subsidiary of these products*. Similar facilities are frequently provided by Government of Sikkim and in Darjeeling as well and it might be due to this reason that low subsidiary is not seen as a problem as solar lanterns were provided for free or on subsidized rates. However, the domestic market is still very young and many households do not have products related to renewable energy, which creates a market for manufacturers to introduce their products.

H0₂: There are no significant problems faced by customers across the place of residence.

Table 2: Relationship between various product factors and the place of residence.

Darjeeling=288, Sikkim=312					
	Factors	Mean	F	Sig.	Null hypothesis
I	Darjeeling	5.42	20.19	0	reject
	Sikkim	4.57			
II	Darjeeling	5.13	8.03	0.005	reject
	Sikkim	4.63			
III	Darjeeling	5.81	7.52	0.006	reject
	Sikkim	5.27			
IV	Darjeeling	5.94	17.73	0	reject

	Sikkim	5.06			
V	Darjeeling	5.63	28.83	0	reject
	Sikkim	4.63			

Discussion

(Akella *et al.*,2009) mentioned that local mini grid power can be fed into existing local grid under Clean Development Mechanism plants. One of the problem identified by respondents is *product functionality*, as shown in *Factor I of table 2*. If mini local grid is established in Sikkim and Darjeeling as stated in literature where its energy may be combined with existing local grid, then people might enjoy its benefits. Therefore, the problem of *product functionality* may be addressed to an extent.

Respondents face problem related to *price not being within their budget* to buy products of renewable energy as found in the result from *Factor II of table 2*. Efforts made by the concerned authorities to make these products feasible and affordable may take time to be practically realized by public but it may be attainable in future days to come. According to (Mishra and Singh, 2013) renewable energy sources proved to be more reliable and environmentally friendly in remote or off grid areas inspite of having huge capital and installation cost. Thus, price is one of the factors which may create barrier in product adoption, which needs to be addressed by policy makers in connection with Village Head, Panchayat and Mayor of that city. Keeping in mind the per capita income of their area and framing attractive incentives and pricing policy.

Less variety of product seems to be another significant problem faced by respondents from Sikkim and Darjeeling according to the result from *Factor III of table 2*. According to (Nicole and Joshua, 2013) education related to renewable energy must be to increase the general education level of adult residents. Secondly, focus on educating people from renewable energy sector through webinars and virtual classes. If such educative measures as mentioned are undertaken

by concerned authorities in Sikkim and Darjeeling in various skill development programs and innovative fairs which gives a platform for budding engineers and entrepreneurs to showcased their designs related to products of renewable energy.

As opined by (Surendra *et al.*,2011) that financial institutions are not motivated to invest in Renewable Energy Technologies because of the immature business models, market insecurity and implementation and usage risks. Same scenario is confronted in Sikkim and Darjeeling, whatsoever products are available in many households are the result of Government initiatives. But the maintenance and after sales service of the product is almost nil, leading to products obsolescence. This de-motivates both potential customers and manufacturers from taking a foot forward towards investing in products of renewable energy. Therefore, the result from *Factor IV of table 2* shows significant relation of *problem related to product availability*. If the problem of product variety is addressed than may be to an extent the lack of product availability may be controlled. It might take hundreds of trial and error but is attainable.

As stated by (Salkin, 2012) that State and Local level have authorized Property Assessed Clean Energy (PACE) financing, which permits property owners to borrow money from local Government for installation of renewable energy systems. The costs are then paid through assessments attached to their property tax bills. PACE financing was attractive as it offers long-term, fixed-rate financing and loans are transferable with the property. If such support is provided to the public of Sikkim and Darjeeling than it might act as stimulus for public to purchase it. As researcher found significant *problem related to low subsidy* by customers from *Factor V of table 2*.

H0₃: There are no significant problems faced by customers across the age group.

Table 3: Relationship between various product factors with age group.

15yr- 25yr=173, b/w 26yr-35yr=198, b/w 36yr-45yr=103, between 46yr-55yr=72, above 56yr=54					
Factors		Mean	F	Sig.	Null hypothesis
I	15yr- 25yr	5.27	3.13	0.014	reject
	26yr-35yr	4.72			
	36yr-45yr	5.30			
	46yr-55yr	4.36			
	Above 56yr	5.19			
II	15yr- 25yr	4.58	4.49	0.001	reject
	26yr-35yr	5.04			
	36yr-45yr	5.50			
	46yr-55yr	4.36			
	Above 56yr	4.65			
III	15yr- 25yr	5.17	2.58	0.037	reject
	26yr-35yr	5.56			
	36yr-45yr	6.13			
	46yr-55yr	5.42			
	Above 56yr	5.59			
IV	15yr- 25yr	5.11	2.88	0.022	reject
	26yr-35yr	5.80			
	36yr-45yr	5.81			
	46yr-55yr	4.94			
	Above 56yr	5.57			
V	15yr- 25yr	5.12	0.90	0.462	accept
	26yr-35yr	5.24			
	36yr-45yr	5.21			
	46yr-55yr	4.69			
	Above 56yr	4.89			

Discussion

(M.Donald, 2011) mentioned that educational opportunities provided by the National Renewable Energy Laboratory (NREL) had beneficial effect in developing confidence of Native American Tribes towards renewable energy developments. If such educational programmes related to technical aspects of the products (renewable energy) are provided to local people (of Sikkim and Darjeeling) than the problem mentioned in research about the performance of the product might be tackled to some extent, as they might have gained knowledge about maintenance knowhow through such programmes. Researcher found the *performance of the product* as one of the significant problems faced by respondents from *Factor I of table 3*. Thereby, providing technical

education to people concerned might be encouraged even in Sikkim and Darjeeling.

Results from *Factor II of table 3* shows that there is a relation between consumers purchase decision with *price of the product not being within their budget*, from respondents belonging to different age level. (Edwards *et al.*, 2004) stated about “carbon finance” where distributor or enterprise provides credit to buyers for greenhouse gas reductions from improved cookstoves from developing countries. Hence, concept of carbon finance may be encouraged as it engulfs consumer, distributor and enterprise as price is considered as one of the reasons for non-acceptance of products of renewable energy by public.

Less product variety of renewable energy is found to be one of the significant problems faced by respondents, regardless of their age level, based on the result from *Factor III of table 3*. Respondents aged between 36-45 years feel that renewable energy have less product variety as they have high mean value as compared to other age groups. (Sterzinger.G, 2007) stated that critical role for government is to mobilize Universities and energy developers for developing renewable energy technologies. Hence, when introducing various product designs of renewable energy, age group between 35-45 years must be targeted since they might be attracted with new designs. (Ohlan, 2016) mentioned that expanding renewable energy would contribute in reducing dependency on foreign energy sources, vulnerability to volatile international oil and natural gas prices, and consequences of carbon emissions. *Lack of easy availability* of products of renewable energy in Sikkim and Darjeeling seems to be a problem respondent are facing regardless of their age level based on the finding from *Factor IV of table 3*.

H04: There are no significant problems faced by customers across the occupation.

Products that respondents have, such as, solar water heater and solar lamp were provided under Government schemes which hardly worked for few years. People who knew about the schemes of subsidized rate took advantage and bought the said products. If policies are amended and is made more favourable for people who wants to purchase renewable energy than the advantage stated in literature may be experienced.

Respondents aged between 26-35 years have high mean score stating that there is no significant problem faced by them when it comes to low subsidy of renewable energy. In other words, *low subsidy* for products of renewable energy is not a problem faced by respondents, as shown in *Factor V of table 3*. (Sterzinger G.,2007) stated that risk-sharing in the form of government grants and loan guarantees, as developed by the U.S. Government are critical to commercialization. Thus, schemes where risks are shared by Government might be an effective strategy for adoption of renewable energy.

Table 4: Relationship between various product factors with the occupation.

Business=100, Professional=15, Employed=250, Retired=41, Others=194					
Factors		Mean	F	Sig.	Null hypothesis
I	Business	5.25	2.21	0.067	accept
	Professional	5.20			
	Salaried	4.65			
	Retired	4.93			
	Others	5.24			
II	Business	5.64	5.49	0	reject
	Professional	4.87			
	Salaried	4.70			
	Retired	3.98			
	Others	4.87			
III	Business	6.08	1.95	0.101	accept
	Professional	5.80			
	Salaried	5.39			
	Retired	5.80			
	Others	5.35			
IV	Business	5.80	0.87	0.481	accept
	Professional	6.13			
	Salaried	5.32			
	Retired	5.51			

	Others	5.47			
V	Business	6.12	8.03	0	reject
	Professional	5.20			
	Salaried	4.74			
	Retired	4.27			
	Others	5.22			

Discussion:

(Kumar & Raju, 2013) stated that risk of consumer negative purchase response tends to decrease depending on quantity and relevance of information passed through the selected communication messages. But the result from *Factor I of table 4*, shows that *performance of purchased product is not a significant problem* faced by respondents regardless of their profession. This result may be due to lack of awareness regarding operation and maintenance of products of renewable energy. Secondly, they might have predetermined mindset that the product might not work properly hence it does not motivate them to buy the product even if its performance is satisfactory. Selecting appropriate communication message may have the potential to convert attract new users as stated by (Kumar & Raju, 2013).

Referring to the result from *Factor II of table 4* shows that respondents across various designations have significant problem related to the *pricing of the products* of renewable energy. They might not be aware of subsidies provided for the said products. (Surendra *et al.*, 2011) opined that increased participation of private sector in renewable energy development, dissemination and promoting competition might enhance its accessibility to consumers, thereby reducing the cost and improving service quality. Encouraging more private players means more products with attractive pricing schemes thus the problem faced by respondents might decrease.

Less product variety of renewable energy is not a significant problem faced by respondents based on their profession, from *Factor III of table 4*. New policies should support innovation in component manufacturing as suggested by (Sterzinger G.,

2007). Less product variety cannot be ignored by manufacturers nor policy makers. But researcher assumes that while promoting products of renewable energy, profession as a factor may be overlooked as it might not be an effective segmentation of product market.

Engaging community members in energy issues is a must, according to (Nicole and Joshua, 2013) Involvement of community as one of the strategy may be adopted in Sikkim and Darjeeling for the people to start taking ownership for such project, which may set an example for younger generations to take lead after wards. If energy is generated in the community itself than it might be convenient for people to avail its facilities. However, result from *Factor IV of table 4* shows that *product unavailability* is not a problem for respondents regardless of their profession. This may be due to the fact that these products of renewable energy are not a priority product.

There is unequal access to energy services in rural populations versus urban populations, (Barnes *et.al*, 2005). Finding *low subsidy* for products of renewable energy is found to be a problem faced by customers of Sikkim and Darjeeling, based on result from *Factor V of table 4*. This discrimination of energy services related to solar lantern are minimal in Sikkim as Government and SREDA have together implemented distribution of solar lanterns in every district. Which however, was not observed in Darjeeling, as none of the respondents contacted by researcher had solar lanterns. But solar water heater has not entered rural section of Sikkim in a wide scale as compared to solar lanterns. This discrimination or rather lack of awareness have led to present energy scenario, which needs to be altered on a war foot by the concerned Government and Nodal agencies.

H0₅: There are no significant problems faced by customers across educational level.

Table 5: Relationship between various product factors with education level.

School Level=164, graduate= 181, Postgraduate= 125, Others = 130					
Factors		Mean	F	Sig.	Null hypothesis
I	School level	5.29	6.79	0	reject
	Graduation	5.25			
	Postgraduate	4.18			
	Others	4.97			
II	School level	5.51	11.11	0	reject
	Graduation	4.26			
	Postgraduate	4.65			
	Others	5.12			
III	School level	5.91	4.69	0.003	reject
	Graduation	5.34			
	Postgraduate	4.98			
	Others	5.85			
IV	School level	6.20	13.85	0	reject
	Graduation	5.33			
	Postgraduate	4.37			
	Others	5.85			
	Total	5.48			
V	School level	5.73	6.98	0	reject
	Graduation	4.93			
	Postgraduate	4.54			
	Others	5.11			

Discussion:

Study conducted by (McDonald, 2013) found that respondents exposed to unsuccessful projects of mechanical failures due to extreme and unpredictable weather conditions questioned the potential of renewable energy projects in future. Similar problem related to *functionality of products* was found by researcher regardless of respondents' education level from *Factor I of table 5*. Thereby, making product functionality as one of the components which might attract potential users. Thus, renewable energy manufacturers need to test solar and wind products in harsh weather condition before making a final decision to launch it in the market.

Price may not be within my budget is a problem which respondents are currently facing based on result from *Factor II of table 5*. (Faiers and Neame, 2006) found that the 'early adopters' from householders who had adopted solar panels through Northamptonshire Solar plan scheme had

a 'payback' issue. Price and payback period of products of renewable energy are two aspects of finance which needs to be debated and worked on by policy makers and producers and engineers manufacturing these products. If these two factors are amended in favour of both producers and customers then demand and adoption of it might fall in its appropriate place.

Result from *Factor III of table 5* shows that *less product variety* is one of the significant problems faced by respondents when it comes to products of renewable energy. Consumers showed willingness to buy green products only if it is available in often purchased product category as stated by (Bhatia and Jain, 2013). Variety in the products of renewable energy may be possible in coming years due to advanced technology as this problem may be identified as one of the areas where manufacturers must invest more resources in research and development in order to meet this need.

According to (Kulkarni & Anil, 2015) low population density in rural areas makes electricity companies non-feasible to operate, therefore products of renewable energy is the answer to it. Researcher found that respondents face significant problem of *non-availability* of renewable energy product in the market irrespective of respondents' education level from *Factor IV of table 5*. Which makes researcher believe that if products are available when people actually want to buy it then adoption problem might be consistently solved.

Researcher found that *low subsidy* for products of renewable energy is one of the significant problems faced by customers of Sikkim and Darjeeling regardless of their educational qualification, based on the result from *Factor V of table 5*. Whatever percentage of subsidies are provided by SREDA and WBREDA, people are compelled to take it as it is comparatively cheaper. (Kulkarni & Anil, 2015) stated that the institutional framework, load forecasting, operation and maintenance and many other aspects must be tailored for serving rural electrification.



Figure 1: Demand for renewable energy in Sikkim and Darjeeling

From fig.1 it may be referred that respondents are not willing to purchase renewable energy due to reasons discussed in this paper and may have other possible reasons which needs further intensive study.

4. CONCLUSIONS

This research has tried to correlate and identify problems encountered by respondents across various demographic factors. *Product might not work properly* was a problem faced by respondents residing at Sikkim and Darjeeling, by respondents of different age group and by respondents having different educational level. *Price of the product is not within the budget* was identified by respondents from Sikkim and Darjeeling, by

respondents from different age groups, by respondents from varying occupation and education. *Less products variety* as a problem was encountered by respondents irrespective of the marital status, respondents residing at Sikkim and Darjeeling, from different age group and education. *Non-availability of the product* was identified by respondents irrespective of their marital status, respondent from Sikkim and Darjeeling, respondents from different age group and different educational level. And finally, *low subsidiary of the product* is identified as a problem by respondents from different educational level, by different occupations and by people living in Sikkim and Darjeeling. These finding may not be

absolute as the result may vary year after year. However, these finding may enable manufacturers and policy makers in redesigning the product and promoters may frame attractive strategies for wide adoption of the products of renewable energy. There is a lot of scope for future study in this topic, which needs to be explored further.

REFERENCES

1. https://www.darjeeling-tourism.com/darj_000125.htm
2. www.sreda.gov.in/
3. <http://www.wbreda.org/>
4. Adam Faiers, Charles Neame(2006), Consumer attitudes towards domestic solar power systems, *Energy Policy*, Volume 34, Issue 14, September 2006, Pages 1797-1806.
5. A.K. Akella et al. (2009), Social, economical and environmental impacts of renewable energy systems, *Renewable Energy* 34 (2009) 390–396
6. Alireza Aslani (2014), Private sector investment in renewable energy utilisation: strategic analysis of stakeholder perspectives in developing countries, *International Journal of Sustainable Energy*, 33:1, 112-124, DOI: 10.1080/14786451.2012.751916
7. Barnes, D., Krutilla, K., Hyde, W. (2005), *The Urban Household Energy Transition*, Resources for the Future Press, Washington, DC.
8. Bhatia M and Jain A(2013), Green Marketing: A Study of Consumer Perception and Preferences in India, *Electronic Green Journal*, 1(36), ISSN1076-7975, Publication Date 2013-01-01, *Electronic Green Journal* (<https://escholarship.org/uc/item/5mc39217>)
9. B.K. Sovacool, P. Lakshmi Ratan (2012), Conceptualizing the acceptance of wind and solar electricity, *Renewable and Sustainable Energy Reviews* 16 (2012) 5268–5279
10. Chairy (2012), Spirituality, Self Transcendence, and Green Purchase Intention in College Students, *Procedia - Social and Behavioral Sciences* 57 (2012) 243 – 246, www.sciencedirect.com
11. Clary.M. Donald (2011), Commercial-Scale Renewable Energy Projects on Tribal Lands, *Natural Resources & Environment*, Vol. 25, No. 4, Renewable Energy (Spring 2011), pp. 19-23, Published by: American Bar Association. Stable URL: <http://www.jstor.org/stable/23054847>.
12. Dr. Priya Grover (2015), Analysing Market Feasibility of Residential Green Buildings in Tier-II Cities in India, *IOSR Journal of Business and Management (IOSR-JBM)* e-ISSN: 2278-487X, p-ISSN: 2319-7668. Volume 17, Issue 3.Ver. I (Mar. 2015), PP 62-69
13. Edwards, R.D., Smith, K.R., Zhang, J., May. (2004). Implications of changes in household stoves and fuel use in China. *Energy Policy* 32 (3), 395–411.
14. E.R. Frederiks et al.(2015), Household energy use: Applying behavioural economics to understand consumer decision-making and behaviour, *Renewable and Sustainable Energy Reviews* 41(2015)1385–1394
15. E. Rex, H. Baumann (2007), Beyond ecolabels: what green marketing can learn from conventional marketing, *Journal of Cleaner Production* 15 (2007) 567-576
16. González, E. M., Felix, R., Carrete, L., Centeno, E., & Castaño, R. (2015). Green shades: a segmentation approach based on ecological consumer behavior in an emerging economy. *Journal of Marketing Theory and Practice*, 23(3), 287-302.
17. Han, H., Hsu, L. T. J, Lee, J. S. & Sheu, C. (2011), “Are lodging customers ready to go green? An examination of attitudes, demographics, and eco-friendly intentions”, *International Journal of Hospitality Management*, 30, pp. 345–355.
18. Husted, B. W., Russo, M. V., Meza, C. E. B., & Tilleman, S. G. (2014). An exploratory study of environmental attitudes and the

- willingness to pay for environmental certification in Mexico. *Journal of Business Research*, 67(5), 891-899.
19. J. LaMarche, K. Cheney, C. Akers, K. Roth, and O. Sachs (2012), Home Energy Displays: Consumer Adoption and Response, Fraunhofer Center for Sustainable Energy Systems. Prepared for: The National Renewable Energy Laboratory On behalf of the U.S. Department of Energy's Building America Program Office of Energy Efficiency and Renewable Energy 15013 Denver West Parkway Golden, CO 80401 NREL Contract No. DE-AC36-08GO28308
 20. K.C. Surendra et al. (2011), Current status of renewable energy in Nepal: Opportunities and challenges, *Renewable and Sustainable Energy Reviews* 15 (2011) 4107–4117
 21. Khare Vikas et.al (2013), Status of solar wind renewable energy in India, *Renewable and Sustainable Energy Reviews* 27 (2013) 1–10, Contents lists available at SciVerse ScienceDirect.
 22. Kumar, P., Raju, K. V. (2013), The Role of Advertising in Consumer Decision Making. *Journal of Business and Management*, Vol. 14, No. 4, pp. 37-45.
 23. McDonald C. Nicole and Pearce M. Joshua (2013), Community Voice: Perspectives on Renewable Energy in Nunavut, Arctic, Vol. 66, No. 1 (March 2013), pp. 94-104, Published by: Arctic Institute of North America. Stable URL: <http://www.jstor.org/stable/23594610>
 24. Melissa Dark, Jenny Daugherty, Peter Campbell, and William Grimson (2014), Taking Emerging Renewable Technologies to Market ,chapter 8, Book Title: Understanding the Global Energy Crisis, Book Editor(s): EUGENE D. COYLE, RICHARD A. SIMMONS, Published by: Purdue University Press. (2014), Stable URL: <http://www.jstor.org/stable/j.ctt6wq56p.13>
 25. Patricia Salkin (2012) The Key to Unlocking the Power of Small Scale Renewable Energy: Local land Use Regulation, *Journal of Land Use & Environmental Law*, Vol. 27, No. 2 (Spring 2012), pp. 339-367, Florida State University College of Law.
 26. Rahul Mishra & Shakti Singh (2013), Sustainable Energy Plan for a Village in Punjab for Self-Energy Generation, *International Journal of Renewable Energy Research*, Vol.3, No. 3
 27. R. Ohlan (2016) Renewable and non-renewable energy consumption and economic growth in India, *Energy Sources, Part B: Economics, Planning, and Policy*, 11:11, 1050-1054
 28. Sanjeev H. Kulkarni & T.R. Anil (2015), Status of Rural Electrification in India, Energy Scenario and People's Perception of Renewable Energy Technologies, *Strategic Planning for Energy and the Environment*, 35:1, 41-72, DOI: 10.1080/10485236.2015.11439123
 29. S.Choi and A.Ng (2011), Environmental and Economic Dimensions of Sustainability and Price Effects on Consumer , *Journal of Business Ethics*, Vol. 104, No. 2 (December 2011), pp. 269-282, Published by: Springer, Stable URL: <http://www.jstor.org/stable/41476085>
 30. Shafaat, A.; Sultan, A. (2012). Green Marketing. *Excel International Journal of Multidisciplinary Management Studies*. Vol. 2, No. 5.
 31. Sterzinger G (2007), The Economic Promise of Renewable Energy, *New Labor Forum* 16(3-4): 81-91, Vol. 16, No. 3/4 (Fall, 2007), Published by: Sage Publications, Inc. Stable URL: <http://www.jstor.org/stable/40342716>, Accessed: 06-09-2017 06:35 UTC