Journal of Cleaner Production 151 (2017) 393–405

Contents lists available at ScienceDirect

Journal of Cleaner Production

journal homepage: www.elsevier.com/locate/jclepro

Factors influencing buying behaviour of green energy consumer

Deepak Sangroya [a, *], Jogendra Kumar Nayak [b]

[a] SCMHRD, Symbiosis International University, Pune, India
[b] Indian Institute of Technology, Roorkee, India

ARTICLE INFO

Article history:
Received 12 June 2016
Received in revised form
9 February 2017
Accepted 2 March 2017
Available online 21 March 2017

Keywords:
Consumer behaviour
Green energy
Post purchase evaluation

ABSTRACT

Green energy has gained significant research attention across the globe due to its ability to reduce environmental damage. However, for complete acceptance of green energy, only government regulations are not enough; the willingness to use green energy and contribute to the wellbeing of the environment should spring from within consumers. Such willingness may be developed by enhancing consumers' perceived value of green energy. However, in order to do so, it is necessary to assess existing levels of consumers' perceived value towards green energy. The present study develops a multidimensional green perceived value scale to measure existing levels of consumers' perceived value. The scale considers green perceived value as a multidimensional second order construct comprising functional value, social value, conditional value and emotional value dimensions. Such an attempt has not been made before which highlights the originality value of the present study. The scale can be used to assess consumers' perception towards green energy. Such information would help in formulating strategies that encourage consumers to voluntarily adopt green energy. The study also reveals that it is not only the financial aspects that lead consumers to decide on adoption of green energy; consumers are also driven by emotional and social considerations. Thus, policy makers could formulate pro-green energy programmes and mass messages that appeal to consumers' sense of responsibility to voluntarily adopt green energy without having to rely on financial incentives. Researchers could examine the considered dimensions of the scale further with respect to other constructs related to consumer behaviour.

1. Introduction

Over the last two decades, climate change has emerged as a major concern for academics, practitioners and governments due to the threat it poses to existence (Shove et al., 2015). Researchers around the world have, in no uncertain terms, stated that countries must reduce the emission of greenhouse gases or suffer potentially catastrophic effects from climate change (Chandel et al., 2016; Kondoh, 2009; Sarzynski et al., 2012). Since combustion of fossil fuels for energy generation is the prime source of greenhouse emissions, many scholars assert that a shift towards green energy is imperative to achieving environmental goals (Sarzynski et al., 2012).

Zarnikau (2003) has defined green energy as "electricity generated using renewable energy sources, and including technologies such as photovoltaic solar panels, biomass projects, geothermal projects and wind farms" (p.1661). The usage of green energy sources for electricity generation involves zero greenhouse gas emission, thereby offering a lasting solution to climate change (Kostakis and Sardianou, 2012). Hence, green energy has attracted significant research attention around the globe. According to Herbes and Ramme (2014), renewable sources of energy may be utilized to successfully fight global warming. Governments around the world also have shifted focus towards generating electricity from renewable sources of energy (Shrimali and Kniefel, 2011). In several countries, incentive programs such as feed-in-tariffs, captive generation, and favoured access to grids for renewable energy producers have been initiated to encourage private investment. In fact, the Dutch government liberalized the green electricity market and offered relatively generous fiscal incentives to stimulate demand for green energy in the residential customer segment also.

The Government of India has also, along similar lines, launched various incentives schemes such as generation based incentives, accelerated depreciation benefit, renewable energy certificates and captive generation to encourage establishment of renewable

* Corresponding author.
E-mail addresses: sangroyadeepak@gmail.com (D. Sangroya), joginder.nayak@gmail.com (J.K. Nayak).

http://dx.doi.org/10.1016/j.jclepro.2017.03.010
0959-6526/

energy generating facilities (Shrimali et al., 2013). Further, following the examples of countries of North America, Europe and the Asia Pacific region, The Government of India decided to liberalise the Indian electricity market (Schmid, 2012). This is evident from the Indian Electricity Act 2003, which lays down a liberalized procedure for setting up electricity generation plants. The Act allows private corporations, persons or cooperative societies to own or operate electricity generation plants. Legislations have also been formed to facilitate investment in residential-scale electricity generation systems (solar photovoltaic systems or thermal for example) as utilities agreed to purchase if any excess energy is generated. In many Indian cities (Mumbai, Ahmedabad, Surat, New Delhi, Bangalore, etc.) today, due to liberalisation of the electricity market, consumers can choose from which provider to purchase electricity while considering whether the power has been generated from renewable sources.

While government regulations do play a major role in promoting and encouraging adoption of green energy, only legislations may not be enough to bring about the desired change; consumer involvement and willingness are essential to successful adoption of green energy. As an example, German policy makers discovered that even after almost ten years of promoting renewable energies through legislative means (EEG), no considerable integration of renewables into the market occurred (Herbes and Ramme, 2014). USA and UK may be quoted as other examples: The Cape Wind project in Massachusetts, USA was delayed for many years due to organized resistance against the proposal. A study on applications of onshore wind farms in the UK, found that two out of three applications were rejected over an 18 month period in 2006–2007 (Thøgersen and Noblet, 2012). Thus, wind energy generators called for action "to win over a 'not in my back yard' element campaigning against new projects" (Thøgersen and Noblet, 2012). This shows how important social acceptance was for the future expansion of green energy (Upham et al., 2015).

On the basis of the discussion above, it can be said that it is the combination of energy policies of governments and environmental concerns of users that contributes towards the development of a green power market. According to Hartmann and Apaolaza-Ibáñez (2012), "Green energy's future success depends on effective branding and marketing communication strategies designed to enhance consumers' benefit perception" (p.1254). In other words, the extent to which green energy would be accepted or adopted by consumers would depend on the value the consumers perceive would accompany it (Wüstenhagen et al., 2007). Consumer value has been acknowledged as an important driver of consumers' product evaluations and future purchase decisions (Barlow and Maul, 2000; Gale, 1994). Recently, energy researchers in social sciences highlighted the need to understand how consumers made decisions about energy when those decisions necessitated trade-offs between various benefits and costs (Yang et al., 2015).

Perceived customer value is considered a decisive factor for determining product or service attractiveness (Lindgreen et al., 2012). In environmental and green marketing literature, Chen and Chang (2012) introduced the unidimensional green perceived value (GPV) construct and defined it as "a consumer's overall appraisal of the net benefit of a product or service between what is received and what is given based on the consumer's environmental desires, sustainable expectations, and green needs" (p. 505). However, this definition does not consider the complex nature of perceived value (Sweeney and Soutar, 2001; Holbrook, 2006). In fact, no previous study systematically developed an analytical model for determining the multidimensional nature of the perceived customer value construct pertaining to green energy. The present paper considers GPV as a multidimensional second order formative construct made up of functional value, conditional value, emotional value and social value. This assertion has been made on the basis of the study carried out by (Hartmann and Apaolaza-Ibáñez, 2012; Masini and Menichetti, 2012) which stated that a green energy consumer considers various types of benefits (utilitarian, psychological and social) from the use of green energy. Also, situational factors influencing green energy use may either advance or hinder green energy usage (Tanner and Sybille, 2003). Milne and Boardman (2000) categorised these factors into group (e.g., social norms), internal (e.g., personal attitudes) and external (e.g., situational) dimensions. It is clear that a construct (here, green perceived value) that influences a customer on several levels cannot be considered unidimensional.

It has been mentioned above that combining energy policies of governments and environmental concerns of users would be more effective in developing a market for green energy. Incentivising purchase of green energy might be a short term strategy, but cannot be considered a long term and lasting solution (Herbes and Ramme, 2014). For lasting change (to make green energy business sustainable), the willingness to accept, purchase and use green energy must come from within consumers (Hartmann and Apaolaza-Ibáñez, 2012). To achieve this, their perception of value towards green energy must be enhanced (Kaenzig and Wüstenhagen, 2008). However, formulating marketing/awareness programmes directed at enhancing green perceived consumer value towards green energy would require measuring existing levels of consumers' green perceived value. With the help of a tool that measures such perceived value, policy makers could identify the elements that appeal to consumers the most and influence their decisions with respect to purchase of green energy. Such identification would help in formulating effective policies and marketing programmes that address consumers in a way that they feel motivated to use green energy and like contributing to the environment and society through green energy usage. This way, their concern for the environment can be translated into voluntary action (green purchase behaviour). Authors such as (Lindgreen et al., 2012; Sánchez-Fernández and Iniesta-Bonillo, 2007) have also suggested that customer perception of value in any given context should be measured through a scale specifically designed to guage such perceived value in that context. The current study proposes a multidimensional GPV scale to assess green perceived value of consumer specifically in context of green energy.

In this study, GPV is proposed as a multidimensional second order formative construct with four first order dimensions: social value, functional value, emotional value and conditional value. Primary data were collected through a nationwide survey and were statistically analysed with the help of exploratory factor analysis (EFA) and confirmatory factor analysis (CFA).

2. Understanding GPV and associated value dimensions (functional, conditional social and emotional)

Extant literature recognizes perceived value as the "foundation of all effective marketing activity" (Holbrook, 2006, p. 715) and a key determining factor of consumer buying behaviour (Sweeney and Soutar, 2001). Consumer perceived value is a subjective construct as it depends on the various contexts that determine the distinctive properties of different products (Sanchez et al., 2006). Several dimensions of perceived value have been recognised by researchers (Lindgreen et al., 2012) in context of both consumer and industrial markets. Appendix A lists some of the dimensions that have been associated with perceived value by previous studies and shows perceived value in terms of the following functional aspects: utilitarian (Babin et al., 1994); price and quality (Sweeney and Soutar, 2001); functional value (Sanchez et al., 2006); utilitarian–quality and price (Tsai, 2005; Walsh et al., 2014). Perceived