Strategies to Promote Solar Power Energy: A Review of Literature

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Abstract **-** *Solar Energy is a clean renewable resource with zero emission. With the recent development taken place globally, solar energy has the potentiality of expanding into large scale operations and fulfils the industrial and domestic use. The cost of establishing large scale solar plants is not cheap for developing countries. However these plants can function and maintain at low operation cost. Germany, Sweden and many emerging economies like China have paid their attention on solar energy generation based on two major concerns. First one is the sustainable growth and the second one is energy security. Especially in developing countries, the usage of solar energy has a low growth due to the lack of commercial competitiveness. In other words, consumers are not well aware of the benefits of solar power energy. Social, behavioural and attitude issues exist and that create a barrier in promoting them. Mostly there is a financial barrier when it considers in promoting to rural areas. However there is a need of promoting commercial competitiveness and creating awareness on solar power energy. It is also required to change the human habits and attitude to promote a market transformation. On the other hand these changes are difficult to practice when there are market forces influenced by existing fossil fuel users and manufacturers. Hence, the objective of this review is to study the consumer awareness of solar energy to achieve sustainable growth as identified by Literature. For over past two decades, large number of studies has been documented in relation to renewable energy development. Solar power is one of major attraction in academic research. In this study, a substantial amount of published articles were referred in order to grab the real gravity of the solar power markets and consumer awareness as a desk research. The objective heading the analysis of literature is to understand the consumer awareness of solar energy. The literature suggests that there are effective strategies which will able to create consumer awareness in solar power energy in developing countries.*

Keywords: *Solar power, Marketing, Strategies, Promotions, Awareness, Economic Competitiveness*

I.MARKETING STRATEGY IN CREATING CONSUMER AWARENESS

The marketing strategy is the way in which the marketing function organises its activities to achieve a profitable growth in sales at a marketing mix level and "a marketing strategy may be defined as a plan to achieve the organisation's by specifying what resources should be allocated to marketing or by specifying how these resources should be used to take advantage of opportunities which are expected to arise in the future. Marketing strategy would consist of identifying markets and customers' needs in those markets, planning products which will satisfy the needs of these markets and organising marketing resources (Kotler 2003). Therefore the ultimate aim of marketing is to make customer aware and influencing repeat purchases.

A. Green Marketing

When marketing enters to protect the environment and sustainability, it appears as green marketing. Hence the solar power industry positioned as a renewable energy, green marketing is applicable to it. According to the American Marketing Association, green marketing is the marketing of products that are presumed to be environmentally safe. Thus green marketing incorporates a broad range of activities to produce, promote, package and reclaim products in a manner that is sensitive or responsive to ecological concerns (American Marketing Association, 2010). In the parlance of marketing, electricity suppliers will have to move from a product or sales philosophy to a marketing, or customer-oriented, one. Some firms may go a step further, and incorporate an eco-marketing, or enviropreneurial, strategy (Menon and Menon, 1997).

Polonsky and Mintu-Wimsatt (1995) define green marketing broadly as, "the application of marketing 3 concepts and tools to facilitate exchanges that satisfy organizational and individual goals in such a way that they preserve, protect, and conserve the physical environment."

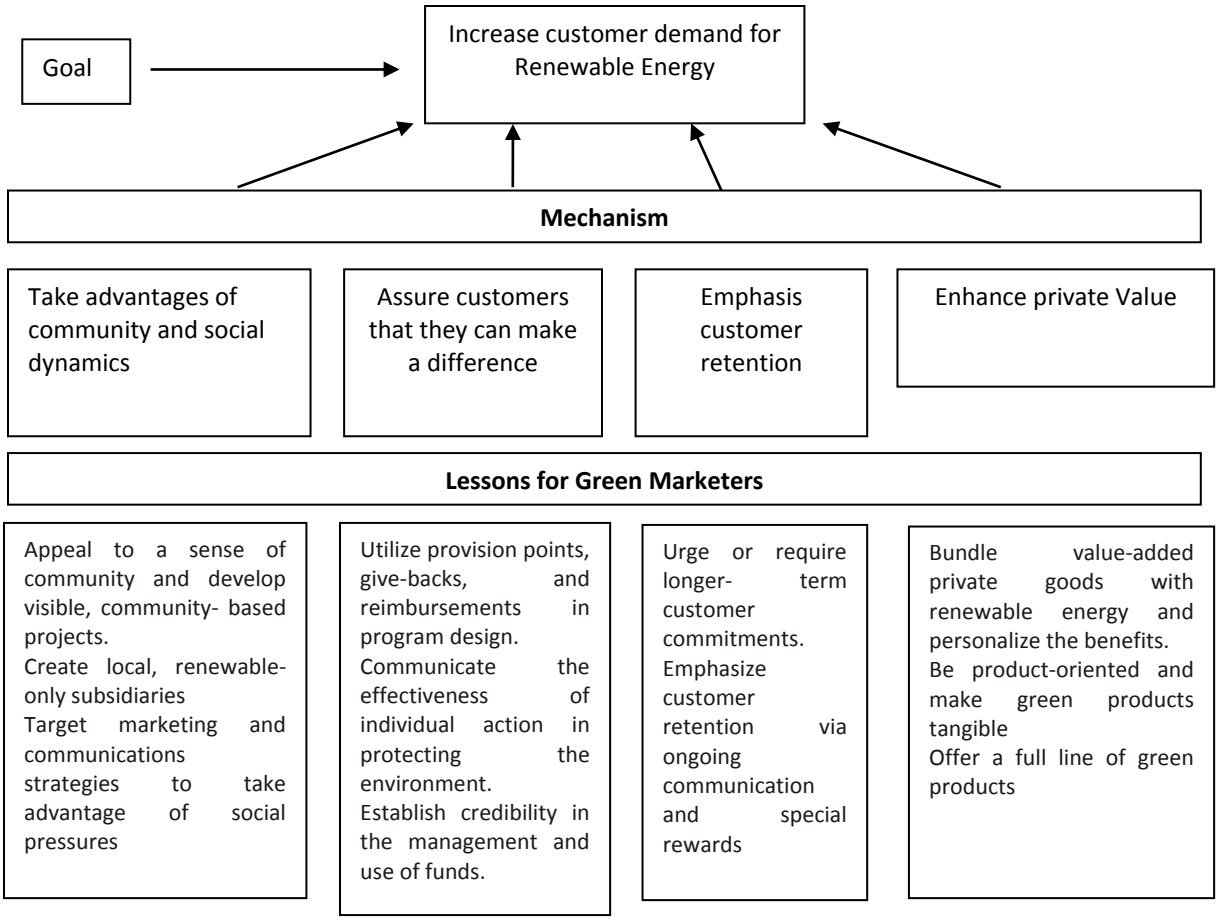

Figure 1: Lessons for Green Marketers
Source: Green Marketing, Renewables, and Free Riders: Increasing Customer Demand for a Public Good, 1997

As shown in the figure 01, green marketers can look at four different areas as implementing community based work related with renewable subsidiaries by attracting the public on rising issues and developing marketing strategies according to them is one way. The green markets can use the same strategies to influence customers on sustainability and benefits of buying green product in order to make a difference. Making the communication more strong with customer will enable marketers to develop long tern relationships with customers. Finally marketer can convey the personal value that a customer will receive by consuming a green product. By adding all of them together in a marketing strategy, the green marketer can create the awareness among customers on renewable energy.

B Green Power Marketing

Green energy marketing is one of new concerns in renewable energy industries in the developed countries. Many authors are keen in discussing it as the application of marketing into green power industry. Customer motivations to conserve resources for the future and promote technical innovation may also be 4 important in "green" power purchases. These benefits of renewables should convey to public. Similar as discussed earlier the figure 02 explains what mechanisms can be implemented in order to create the renewable energy demand. Marketing techniques that green markets use at this point are given as a clear picture.

II. CONVENTIONAL ENERGY

The conventional sources of energy are generally non-renewable sources of energy, which are being used since a long time. These sources of energy are being used extensively in such a way that their known reserves have been depleted to a great extent. At the same time it is becoming increasingly difficult to discover and exploit

their new deposits. It is envisaged at known deposits of petroleum in our country will get exhausted by the few decades and coal reserves are expected to last for another hundred years. The coal, petroleum, natural gas and electricity are conventional sources of energy (Singh, 2012). Therefore solar energy is one source of non-conventional renewable energy which comes from resources which are naturally replenished on a human timescale as sunlight, wind, rain, tides, waves, and geothermal heat.

III. RENEWABLE ENERGY

A natural resource is considered an energy resource, if it can be converted to a usable form of energy. There are numerous forms of energy sources in the world and different countries use different resources, primarily selected on economic principles. However, environmental and political reasons also influence the selection of a country's energy portfolio (Sustainable Energy Authority. 2013).

An energy resource is known as an 'indigenous energy resource' when it originates within the country. It is known as non-indigenous if it originates outside the country. Renewable Energy is a form of energy resource that is replaced by a natural process at a rate that is equal to or faster than the rate at which that resource is being consumed (Sustainable Energy Authority, 2010). Attributed to geo-climatic settings, Sri Lanka is blessed with several types of renewable energy resources. Some of them are widely used and developed to supply the energy requirements of the country. Others have the potential for development when the technologies become mature and economically feasible for use. Main renewable resources available in Sri Lanka are Biomass, Hydro Power, Solar and Wind (Sustainable Energy Authority, 2013).

Solar energy is the mother of all form of energy. Energy derived direct from the sun radiation is solar energy. The primary source of food energy for all multicellular organisms is biomass. Wind which is essentially air in motion, carries with it kinetic energy. The amount of energy contained in the wind at any given instant is proportional to the wind speed at that instant. The temperature of the wind also influences the energy content of the wind but it is not important in the context of wind-based production system (Abbasi and Abbasi, 2010).

A. Solar System:

Past research shows that domestic solar systems are well-suited to an urban environment, are a proven and effective technology, and offer the opportunity for individuals to make a statement about their environmental beliefs (BRECSU 2001). Solar systems can raise a householder's awareness of energy consumption by means of a monitoring facility provided with the installation. This enhanced awareness of energy use could encourage further energy efficiency. Truffer et al (2001) define this type of efficiency as using 'negawatts'; units of energy never used, perhaps due to intervention by an energy efficient product or more efficient behaviour arising from changing attitudes towards energy use. This type of behavioural change is advantageous to the adoption of solar as it increases the compatibility of the systems with current energy consumption trends. An example can be seen in hot water consumption trends in Denmark, where the average daily hot water demand has dropped from 250 litres per day to 100 litres per day, which matches the daily hot water production of a ST system (Knudsen, 2002).

IV. GLOBAL ENERGY SUPPLY AND DEMAND

World electricity generating capacity is likely to increase by more than 70% by 2030 due to the transformation of conventional energy to non-conventional energy, and this offers an opportunity to develop renewable energy technologies up to a stage where they are fully competitive with conventional technologies. Most of the increase in demand is expected to take place in developing countries (EIA, 2006). Therefore the expectation is more towards to create the awareness among customers who live in developing countries and effortlessly can convert them as solar energy users.

A. Financing and capacity building

Renewables face several barriers today, delaying in their deployment on a commercial scale. Cost competitiveness combined with risk perceptions related to new technologies has resulted in a lack of availability of finance to renewables, particularly in developing countries. Financing problems thus represent one of the most important barriers in expanding renewables' usage. Several national as well as international agencies have tried to address this barrier through a variety of measures in both developed as well as developing countries. Capacity Building and awareness raising: Capacity building of financial institutions ,investors and other stakeholders depending on their familiarity with the RE technology, awareness raising of stakeholders, including customers of the technology, are other areas of importance, which traditionally have been a part of the strategy in most RE projects (Painuly and Wohlgemuth. 2006).

Incentive-based renewable energy programs are in operation in several developing countries. The World Bank's renewable energy programs in Indonesia (solar home system project), Sri Lanka, and Laos etc. are incentive-based programs (Longa.W and Hernandezb. J.A. 2012).

In even most remote areas, renewable energy is increasing access to basic energy services – including lighting and communications, cooking, heating and cooling, and water pumping – and generating economic growth. PV household systems, wind turbines, micro hydro powered or hybrid mini-grids, biomass-based systems or solar pumps, and other renewable technologies are being employed in homes, schools, hospitals, agriculture, and small industry in rural and off-grid areas of the developing world. Off-grid renewable solutions are increasingly acknowledged to be the cheapest and most sustainable options for rural areas in much of the developing world. This will have an impact on market development in the long term, especially if the barriers to accessing information and financing products are addressed (Longa and Hernandezb. 2012).

The barriers to the adoption of domestic solar systems lie primarily with the financial aspects of the systems. Therefore capacity building and creating awareness will be two strategies to raise funds for renewable energy projects. Especially solar grid connected systems are highly expensive in the initial stage. But the operating cost is less. Hence the long term benefits are higher in the level when it compares to conventional energy sources. The investors are also required to aware on the solar energy generation as a profitable business. Therefore the marketing strategies must target not only public but also investors to who are capable of growing this sustainable industry.

V. RENEWABLE TECHNOLOGY

Although many renewable energy technologies will be imported, for a relatively simple technology such as the solar thermal system, local fabrication can prove to be a cheaper option. In that case, quality labeling and certification will be very important in order to prevent for poor and inconsistent quality products that can hamper demand and risks spoiling future market development (Ölz. And Beerepoot. 2010)

1) Solar Technology

In particular, one of the reasons why governments subsidize the installation of solar panels is to promote the development of the solar technology so that it will become cost competitive with traditional sources of generation, therefore economically self-sustainable. The point where electricity generated from a solar installation reaches the electricity grid price is usually called grid-parity, either at the wholesale market price or at the higher end-consumer retail price (Lobel & Perakis, 2011).

VI. CONSUMER DEMAND

Additionally, consumer awareness about the technology will improve with the number of installed systems, which creates a second positive feedback in the adoption process. In other words, the cost improvements and the information spread through the consumer market will reinforce the demand process over time (Lobel & Perakis, 2011).

A. Market barriers

A variety of market-related issues impede the robust development of solar electricity, such as: consumer awareness and education; government, legislative, and regulatory roadblocks; and financing. Consumers must become better educated about using solar energy — not just for hot water and space heating, but for their electricity needs. They do not need to worry about understanding the underlying physics of solar-electric generation; but they will want to be firmly convinced of the practicality and performance of PV systems over time. Consumer awareness of and familiarity with solar technologies should start at an early age in educational institutions and should continue into the marketplace (US Photovoltaic Industry Road Map, 2003). Suggested strategies to overcome the identified market barriers are given in the table 01.

B. Characteristics of the consumer

The nature of the green consumer must be understood to be able to introduce valuable incentives to increase consumer uptake. Knowledge of the consumer should be the focal point of all marketing action (Bell & Emory, 1971). Individuals who believe that they can effectively counter-act environmental devastation through pro-environmental choices will seek tangible benefits linked to their actions (Straughan & Roberts, 1999).

Studies have been conducted which address the characteristics of green consumers. Some of identified qualities of people who are likely to exhibit Ecologically Concerned Consumer Behaviour (ECCB). Therefore it is important to a green marketer to identify green consumers who have the characteristics of ECCB. Therefore sufficient marketing research is one key to identify the consumer who needs to be aware of the solar power market.

Table 01 – Suggested Specific Strategies That Industry Must Pursue to Overcome Market Barriers

• Increase value proposition to customers
• Develop alliances with other groups
• Develop a common message
• Form an industry coalition to strategize
• Strengthen the industry's trade association
• Lower product price
• Improve the distribution infrastructure
• Consider developing alliances with energy service companies
• Target end-user groups with appropriate messages
• Reduce all market barriers with a plug-and-play application
• Reduce technical jargon in advertising
• Develop a killer application

Source: US Photovoltaic Industry Road Map, 2003

C. Customer awareness and attitudes

Attitudes toward various characteristics of solar power systems are isolated to determine which characteristics are preventing the pragmatic early majority from adopting solar power. Therefore some of identified barriers in the UK context are poor aesthetics, high cost, insufficient government grants for solar power purchase, too much maintenance required, does not add value to property, difficult installation (Faiers & Neame, 2006).

Understanding consumers' attitudes towards an innovative product provides two key benefits. First, strengths and weaknesses in the innovation attributes can be identified and managed effectively (Hsu et al. 2000). Second, more control can be imposed on the marketing strategy in order that the innovation is made attractive to the most receptive audience (Auty and Elliott 1998). The marketing strategy can then take into account the step- wise process that individuals take when deciding whether or not to adopt an innovation. However, product manufacturers and marketers must overcome the challenge that consumers' stated behaviour does not always manifest itself in actual consumption behaviour.

However, with product development, the economic, operational and aesthetic aspects could be improved and by utilising sensible marketing strategies that spread awareness of the innovation and improve its observability, the potential for solar power is greatly enhanced. Some of the recommendations are suppliers and manufacturers should work closely with the 'early adopters' to develop the operational, economic and aesthetic aspects of the products; suppliers should seek to achieve greater understanding of what customers' perceptions actually are, in order for them to develop products that meet their needs and financial assessments of solar power products should be undertaken, as well as determination of the optimal level at which domestic solar products become attractive to current householders (Faiers & Neame, 2006) .

Knowledge of a green product/service's contribution to the health of the environment and to the individual has been positively related to a higher customer willingness to pay (WTP) (Roper, 1990; Straughan & Roberts, 1999; Roberts, 1996). Similarly, consumer perceptions of the effectiveness and greenness of a renewable electricity source will determine the premium that a green consumer is willing to pay (Rowlands & Parker, 2002).

VII. SUMMARY

Green marketer should develop marketing strategies to attract green consumers who show the Ecologically Concerned Consumer Behavior. Innovations in the product must be delivered in the selected marketing strategy. Consumers prefer to learn about products through marketing activities. Therefore personal value that a consumer receives from purchasing solar power should be communicated.

The relationship between the marketing objective and the consumers characteristics are presented in the figure 02. The green power marketing strategy should aim to deliver a green message with the information of price, innovation, technology, aesthetic benefit of the product as well as personal benefits of the product. The effective communication channel must be established to deliver this message. Thus this message should talk to the exact consumers which the solar power industry wants to talk.

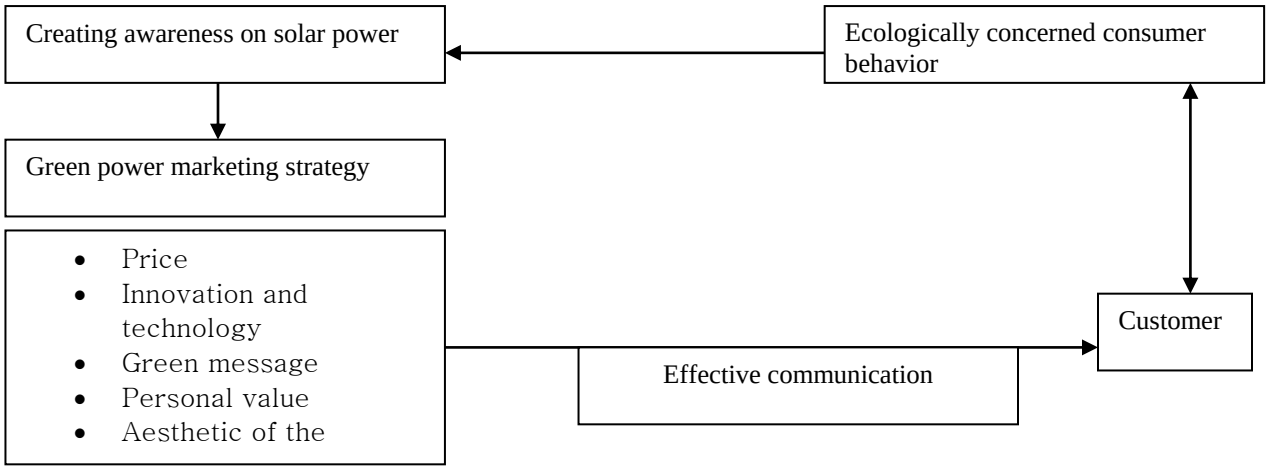

Figure 2 – Suggested model to create in solar power market consumer awareness
Source; created by the author

Therefore a communication plays a major role in this. The Ecologically Concerned Consumer is the target market of the solar power industry. When consumers are ecologically concerned through the marketing strategy they are aware of the solar power market and products. Then the long term consumer-manufacturer relationship starts.

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