Solar's Future in Rural India and Green Marketing

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Abstract: Despite the Government of India's efforts to electrify rural India, 13% of the Indian population remains without an adequate supply of electricity. Even if the houses are connected to the conventional grid, there is an inconsistent supply of electricity. To solve this issue, electrification of such remote villages has been accomplished through the installation of solar photovoltaic (PV) home lighting systems. The system's functionality is determined by the intensity of sunlight, which varies with the seasons. During the winter and summer seasons, the system operates for 4 to 5 hours on average, while during the rainy season, the system operates for 2 to 3 hours on average. While solar home systems hold great promise for improving India's access to electricity as these products are a quick, low-cost, and efficient way to provide basic lighting to underprivileged households. The objective is to change consumer attitudes through increased awareness of green issues. It was found that 59% of the population were found unaware of the benefits of green energy. Hence, green marketing is a phenomenon that has gained prominence in the market to become an important concept in India; the strategy to promote long-term sustainable development. The concept, necessity, and significance of green marketing have been emphasized in this paper to expand the reach of solar as a renewable source of energy.

Key Words: —*Alternative sources of energy, Solar Products, Green Marketing, Sustainability, Rural electrification, Renewable products.*

I. INTRODUCTION

The goal of this study is to assess market development using a green marketing strategy to increase renewable energy usage. Given the limitations of present alternatives, proponents suggest recruiting private actors to help speed the market for solar products, while admitting the significant challenges of reaching remote, underprivileged sections of Sub-Urban India.

This method tries to address the drawbacks of donor-driven and fee-for service models in terms of preserving gain s after projects have been completed.

This study report will also focus on answering the following questions:

a) If the research was successful in building demand for a long-term market?

And

b) Did the user recognize the benefits?

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This research also looks at how to alter the original designs to address supply-side constraints, with a particular focus on the function of facilitators. According to the findings, some gaps in the rural solar market will need to be remedied before the sector can become truly self-sustaining.

Firms can use the provided green marketing tactics to achieve the goal of expanding solar reach for rural electrification**.**

II. LITERATURE REVIEW

The author in this study talks about finding the impact of solar energy in rural development. The Ministry of New and Renewable Energy (MNRE) had implemented the 'Remote Village Electrification Programme' (RVEP) in all states to electrify remote villages through the installation of solar home lighting systems. As a result, the use of kerosene decreased in rural areas. After the installation of solar lighting, approximately 69 percent reported a significant improvement in their children's education and 78 percent reported an improvement in their standard of living. The number of income-generating activities also had a significant increase. The village's crime rate also decreased because of solar streetlights. (*Tarujyoti Buragohain, 2016*).

This study was done by a survey conducted by the Royal Institution of Chartered Surveyors (RICS). Here, 59 percent of rural people were unaware of solar products, and only 13

percent of those owned solar products. This low product share was due to poor distribution and market communication. Though, it was found that the solar-powered products had a large market in rural areas, where they had the potential to easily replace expensive diesel and kerosene. Aside from irrigation, solar energy could also be used to power villages. *(Neeta Sharma and Rachana Rai, 2014).*

This research was done to study the solar energy opportunities and challenges in India under the concept of "Green Marketing". Green marketing refers to a holistic marketing strategy in which the production, marketing the consumption, and disposal of products and services are done in a less harmful way to the environment, with increasing awareness about the consequences of global warming, non-biodegradable wastes, the adverse effect of contaminants, and so on. The study mentioned that both marketers and consumers are becoming more aware of the need to transition to green products and services. While the transition to "green" may appear to be costly in the short term, it will undoubtedly prove to be indispensable and cost-effective in the long run. (*J.Priyadharshini and M.Selladurai, 2016)* This study was conducted to understand and educate the customer by making sure about the customer awareness and the issues the solar product was addressing. Educating target customers about the benefits of utilizing a clean renewable energy substitute that is environmentally friendly is important for everyone. It also conveyed the message of being authentic and transparent with everything done in green marketing campaign. The benefits should be delivered, and whatever done as environmentally friendly should be consistent. Also, to appease the buyer trust must be built by convincing them that the product will perform as expected. As for the pricing strategy, the marketer must make sure that their customers can afford the product and believe it's worth it. (*Prof. Jaya Tiwari 2012).*

This study was conducted to investigate awareness, perception, and motivation to adopt Solar products by variables like Willingness to pay (WTP) under Sustainable Development goals. The selection criteria to choose poor energy efficient states like Bihar, UP and Jharkhand were low electrification rate (<50%), dependency on kerosene for lighting purpose and energy deprivation to be less than 50%. These villages faced frequent power outages, unreliable electric supply, unannounced load shedding and voltage fluctuations. The findings suggested that rural India was keen on adapting clean energy substitutes with higher level of awareness. As per the finding 66 % rural population accepted solar lamps as a better substitute over kerosene lamps while 68% were willing to pay price of Rs.600 for it. The WTP depended on income level slightly moderated by awareness and education. The main barriers were Information barrier, initial cost of installation and income level which affected the solar demand. The rural market in both electrified and non-electrified villages could be targeted for low-cost sustainable solar products. Most of the awareness was created by word of mouth rather than other mediums like radio, newspaper etc. *(Rohit Sharma and Deepak Chaudhary, 2021)*

This study talks about the Solar Project that started with an investment of USD5000, in Unnao districts of Uttar Pradesh with a purpose of providing solar products to the 'Electricity' underserved population. Soon after the project started, the results returned positive outcomes in a short time span of 6 months- this was a result of the excellent marketing, business partnerships, quality of product and continuous evaluation. The research paper also talks about the major challenge they faced to sell their products to the poor community because of their limited access to finance and how they win at this with help of their rural bank partnerships. The primary research was done with partnership homely survey firms to market their product with live demonstrations. The surveys were majorly focused on the parameters that included the number of participants, household electricity situation, presence of village heads, questions that concerned villagers, number of villagers who signed up and follow up to earn after sale trust and documenting the demonstrations with no missing data. There were 37 marketing campaigns conducted in between February and June to aware people about the product and brand, free maintenance, and warranty periods. The results from the survey provided better approach of selling the product in which the company could answer the buyer's questions more efficiently. (*Johannes Urpelainen and Semee Yoon, 2016).*

This study was done to evaluate the impacts, successes and of failures of rural village electrification through solar power in Chhattisgarh. It studied the technical and maintenance factors set by Indian rural electrification policy by analyzing electricity output from micro-grids. The Solar home systems (SHS) had a positive impact on women and children. Women average cooking time increased by 36 minutes later, a sign of higher flexibility while children's study time increased by average 41 minutes. The use of kerosene also decreased by41%. However, it was found that CFLs were frequently being replaced with incandescent lights. The CFLs provided to the operators were not in adequate quantity along with a month's delay. The customers had to pay INR 120 for them,

which was a lot more than incandescent bulbs. Also, bulbs were easily available in local shops. Moreover, SHS employ specifically adapted lights, this primarily pertains to micro-grids which has no alternative in local marketplaces. Thus, micro-grids may not be the best technological and organizational answer for large villages which needed competent maintenance people. They are more expensive than SHSs, hence larger villages have received less capacity per family than smaller villages. *(M. Millinger, T. Mårlind, E.O. Ahlgren, 2012).*

III. Objectives

The main goal of the proposed study is to change consumer attitudes through increased awareness of "Green Issues" to use clean renewable energy like Solar Power systems. The awareness for renewable sources is suggested to both consumers and marketers using green marketing strategies. The paper examines the opportunities and challenges a firm, or a government faces during the expansion to increase the reach of Solar Power as a renewable source of energy in rural India. This alternative is required to compensate for the frequent power outages faced by the country.

IV. Research Methodology

The secondary research is exploratory in nature; it focuses on Literature reviews, News Papers, Journals, websites, and other reliable sources.

4.1 Background

The lag in grid growth both off grid and on- grid solar panels is due to less demand growth. However, the environmental consequences of petroleum-based energy, health concerns associated with reliance on kerosene for lighting, and the growing demand for charging mobile phones are all reasons to look for ways to make renewable energy accessible to India's rural population. Better lighting and electricity may also assist rural education and income- generating opportunities, as well as make information more accessible via television, radio, and mobile phones. In the light of experience with various models, strategies for promoting solar energy in rural regions have emerged.

4.2 An Alternative approach of expanding the Solar Products

Martinot et al. (2002) point to a shift in renewable energy promotion in the early 21st century from project-oriented, supply- and donor-driven to market assessment with a user emphasis, viable business and capital models, and risk and cost sharing to establish sustainable markets. Nygaard (2009) presents five variations of three major strategies to promote solar household systems in developing countries (SHS).

- A donor's highly subsidized donation.
- Fee-for-service, in which national governments award contracts that could result in regional monopolies (concession model) or reduced competition (dealer or leasing model).
- Market sales, in which private providers sell directly to the end user (credit model), possibly with or without subsidies and/or other sources of funding (cash sales model).

Only a few countries, such as India and Kenya, have built a large enough market to force prices down to the point where commercial sales can take over on a long-term basis. "Unrestricted generosity undermines the markets," according to some researchers.

The fee-for-service industry faces several challenges, one of which is generating income. There must be significant competition, price reduction, and scalability for a market to emerge. Suppliers may just depart when their contracts expire, as was the case in. Zimbabwe is an African country. (Mulugetta et al., 2000, cited in Nyaagard, 2009). The World Bank's Sustainable Solar Market Package approach used a hybrid strategy in which public institutions such as health care facilities, schools, and other public photovoltaic (PV) installation sites in rural areas were put up for a public competitive bid. Following that, the successful bidder was given the contract to provide these public installations, as well as a bonus for increasing the market for private PV sales in the individual municipalities. An independent model of this model was assessed in other places, Lighting for academics and other entertainments was largely seen as a benefit by relatively wealthy clients in particular rural areas, who were paying more for kerosene, candles, and batteries than they had previously spent.

4.3 Market Conditions for developing Solar in Rural Areas

Finding the right supplier: The plan should strive to raise demand to a 'critical mass,' which will attract enough providers to cut costs and provide superior product services.

Finance: While projects may include credit schemes (often with subsidies to reduce interest costs and stimulate

purchases) through existing financial institutions, obtaining long-term financing for low-income clients, particularly in rural areas, is typically problematic. Even when microcredit is available, the smaller amounts are limited, and group emphasis of microfinance make it unsuitable for SHS borrowing.

Subsidies: Subsidies are widely believed to be necessary to level the playing field between solar PV and the grid, as well as other sources with heavily subsidized capital costs. Different models use subsidies in different ways, but they all face the same issues when it comes to eliminating market inefficiencies and preserving demand and supply when subsidies are eliminated.

Maintenance and Quality: While there is no guarantee that technicians will stay on after projects are completed or that customers will be able to afford the costs of repairs and replacements, it is critical to train professionals and promote the construction of maintenance infrastructure in specific areas. Palit and Sarangi found it to be "one of the most significant conditions for the limited success of many projects" in South Asia, as well as a source of consumer dissatisfaction due to delayed maintenance by providers.

The Approach to market the solar product that could help the rural area.

The potential for making modern energy available at an affordable price has increased significantly in the last decade, thanks to cost-cutting supply innovations like light-emitting diodes (LEDs), advances in synergistic technologies that streamline cost recovery (pay-as-you-go technologies), and growing investment in new business models for producing and marketing affordable solar products (2010). This entails making more affordable, dependable, and high-quality lighting products and services available to consumers, as well as encouraging private sector suppliers to profitably manufacture, market, and distribute lower-cost products, such as strengthening ties between a larger solar energy industry and local service providers.

By lowering current technological, financial, policy information, and institutional hurdles, attention must also be made to financing and other market conditions for the scale-up of contemporary lighting goods. Governments, private agencies, and non-governmental organizations (NGOs) must also be engaged to help and promote the penetration of contemporary lighting services for the country's underprivileged population.

However, over the last decade, solar products have served a significant number of rural households in terms of availability, accessibility, and information, and this, too, only through "a stream of plan and contract- based sales for health, education, telecommunications, and similar sectors. Direct consumer sales were restricted to high-end items for relatively affluent families and enterprises. The few firms that marketed solar equipment (often as a sideline, not as a major company) did not have much presence in rural areas and capacity to service them by their own.

In such case, the company must generate the demand of more capable, portable solar lamps which provides more reliability in terms of product as well as service. "**Supplying**" **t**he PVs which could serve a greater purpose for any household needs timely repair and services which is learnt by the local service provider. Strengthening the technical capabilities of the product- which had been discovered by the many manufacturers should be put in use and the same product should be delivered to the rural population with partnerships with NGOs, local government agencies, local banks in the area etc. This would not only help any company to successfully make its reach to the most rural areas of a state, but a better product would also help them to grow with a "*word of mouth*" marketing strategy. Also, additional providers would be attracted to serve the targeted rural regions if the open market strategy was combined with subsidies and facilitation to assist generate demand. The impacts of increased competition and volume may result in lower pricing for solar lanterns and WP systems than the average cost.

Companies dealing in solar would also benefit if they provide "Good Quality Assurance" to their customers by providing a longer warranty period for major components and a subsidy for battery replacement when needed, as the rural supply infrastructure currently lacks outlets and servicing. The amount of time it took for repairs to be performed was the top complaint of customers. Given the difficulties of durability, breakdowns, and the lack of quick availability of replacement parts, increasing the number of electrical stores that sell parts and specialists who can perform simple repairs on solar goods in remote locations is critical, as is verifying equipment quality and satisfactory installation through field inspections of each installed system by qualified engineers.

Arranging the **finance** for solar enterprises, particularly to extend their importation of equipment to match the projected expansion of demand under the project, making financing available to customers for the high upfront expenses through a line of credit and incentives to Rural and Community Banks etc. This would help the manufacturers in two ways:

- The tie-ups with banks would build an unconscious trust in the buyer's mind about the product.
- The manufacturer would easily recover the amount from the buyer and would not take many efforts for recovery of money.

Facilitate: Market research; employing and financing the salaries of Solar Project Officers to facilitate contracts between potential buyers and equipment suppliers. Although word-of-mouth can help improve solar perceptions among non-clients and project beneficiaries, advertising campaigns are required to keep demand growing in the absence of subsidies. Assuring that local technician will be able to assist. Many initiatives have helped to create the framework for the solar marketplace to continue to expand in previously unserved areas. Solar benefits have improved in terms of knowledge, demand, and willingness to pay, and have been shown to be substantially stronger than projected.

4.4 Green Marketing

The American Marketing Association organizes green marketing, also known as ecological marketing (AMA). The term "green marketing" first appeared in the early 1990s.

According to Peattie (2001), there are three stages in the evolution of green marketing. During the first phase, which was dubbed "Ecological" green marketing, all marketing activities were concerned with assisting in the provision of solutions to environmental problems.

The second phase was "Environmental" green marketing, with the emphasis shifting to clean technology, which included designing and developing innovative products to address pollution and waste issues.

The third stage of green marketing was "Sustainable." Focuses on developing high- quality products that meet the needs of consumers by emphasizing quality, performance, pricing, and convenience in an environmentally friendly manner.

4.5 What exactly are Green Products?

Products that are grown in a self-contained environment. Recyclable, reusable, and biodegradable products are preferred. These goods are made with all-natural components. Recycled materials and non-toxic chemicals are used in these products. The product's contents fall into the category of approved chemicals. Products that are environmentally friendly and do not harm or pollute the environment. Animal-free products are those that are not subjected to animal testing. Reusable, refillable containers, and other products with environmentally friendly packaging. Solar Products fall into this category.

4.6 Why Firms Should Use Green Marketing?

4.6.1 Opportunity

In India, approximately 25% of consumers prefer environmentally friendly products, presenting an opportunity for green marketers to reach a sizable segment of the population.

4.6.2 Social responsibilities

Many businesses have begun to recognize the significance of acting in an environmentally responsible manner. They are committed to achieving both environmental and financial objectives while adhering to the principle of Extended Producer Responsibility (EPR).

4.6.3 Cost-cutting

The hazardous waste reduction could result in significant cost savings. Many businesses can form a symbiotic relationship in which one company's waste is used by another as a low-cost raw material.

4.7. Influence of the government

The government enacts numerous regulations to safeguard consumers and society. Furthermore, the Indian government has enacted legislation to limit the manufacturing of damaging commodities and by-products. Bans on plastic bags, smoking in public places, and other similar measures restrict industrial output and consumer consumption of hazardous items, particularly those that are harmful to the environment.

4.8. Competition's Pressure

Businesses' drive to keep their competitive edge has also been a major driving element behind environmental marketing. When companies see competitors touting their environmental policies, they often try to copy them. Competitive pressure has forced an entire business to evolve, and as a result, in some circumstances, to lessen its adverse environmental behavior.

4.9. Green Marketing Guidelines

- Understand your customer.
- Educating your clients.
- Creating a welcoming environment allows you to be genuine and transparent.
- Assure the buyer with high-quality products.
- Proper pricing, which is both affordable and

premium.

V. CONCLUSION

The world is gradually transitioning towards sustainable clean energy which have less detrimental effects on the environment due to awareness about the implications of global warming, pollutants etc. Solar energy, which is renewable, has long been regarded as the best option for alleviating energy-related concerns in countries such as India.

Rural India's understanding of green energy, which have the potential to eliminate inadequate electrification, has risen because of green marketing tactics as found through research. The primary reason for not converting to alternative fuels has been found to be unawareness and an effective green marketing could eliminate this.

It is recommended to both marketers and consumers to target the market by promoting cost-effective long-term benefits of using the cleaner energies. The government's program of rural electrification has successfully increased awareness for the same.

Although, the consequences of these initiative through direct subsidies for capital expenses and supplier capacity- building may be phased out after early market stimulation, continuous support for access to financing — for both the supply and demand sides — and local facilitators may be required to keep the market growing.

It is also critical to ensure the local availability of spare parts and experienced personnel to repair the equipment for rural solar purchasers to continue to reap the advantages. It's critical to have a plan in place for progressively phasing off subsidies and incentives, keeping only those that are required to keep the green rural market growing in India.

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