Running Head: Renewable Energy Marketing

RENEWABLE ENERGY MARKETING: CASE ANALYSES OF STRATEGIES OF SELECTED ORGANIZATIONS IN BANGLADESH AND THE UNITED STATES: CHALLENGES AND OPPORTUNITIES

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Abstract

This study explores and analyzes marketing strategies of renewable energy by selected companies in Bangladesh and the United States. The study identified, compared and contrasted different marketing strategies by the participating companies. The study was also taken to a normative level where the author recommended improvements to renewable energy marketing. Company officials representing six different companies – three from Bangladesh and three from the United States – were interviewed for the study. The author assigned pseudonyms for the companies and did not reveal the identity of the interviewees in order to protect confidential proprietary information provided by the companies. While there are differences found in marketing strategies of the companies from the two very different countries, there are also commonalities, especially when the companies are serving similar target groups. High initial costs and lack of awareness of renewables are the two major challenges identified in the study. All the participating companies reaffirmed that better education and better government incentives on renewables along with appropriate marketing strategies by the companies can take renewable energy a long way. Renewable energy technology could be a vital force in alleviating the ongoing global energy crisis.

Background

Renewable energy comes from natural resources such as sunlight, wind, rain, tides and geothermal heat. Unlike fossil fuels, the major sources of conventional energy, these resources are constantly replenished and will never run out. Renewable energy could be derived directly from the sun (such as thermal, photochemical and photoelectric), indirectly from the sun (such as wind, hydropower and photosynthetic energy stored in biomass), or from other natural movements and mechanisms of the environment (such as geothermal and tidal energy) (Definition of Renewable Energy, n.d.). About 1.5 billion people in the world do not have access to electricity and a surprising number of 3 billion people still use traditional biomass for cooking (Aron, Kaiser, Liautaud & Nowlan, 2009). This lack of basic necessities, such as clean and reliable energy for cooking, provides an opportunity for producers of renewable energy. In countries like Bangladesh, where most people live outside the electricity grid area, an alternative source of power or renewable energy would fill the void (Siddiqui & Newman, 2000).

In developing countries, renewable energy is quicker, more feasible and demand-driven when compared to extending the infrastructure need by expanding the grid. Developing countries provide potential major markets for renewable energy producers. Except for a few rare cases where renewable energy is fed into the power grid – a common mechanism in developed countries – the accessibility of renewable energy in developing countries comes through stand-alone systems such as small solar photovoltaic (PV) systems, mini hydro systems and biogas systems for individual households and communities that are outside the grid area (Aron et al., 2009). These modular systems are capable of meeting a wide range of demands, from the modest, basic needs of a low-

income rural family to a more energy-consuming household or commercial user (Aron et al., 2009).

Climate change and other environmental concerns also have brought the issue of renewable energy to the forefront (Farhar & Houston, 1996). In the developed world, the concern is mostly about the non-emitting and more environmentally friendly alternatives to fossil fuel-based power. Renewable energy, on the other hand, could be the solution in the face of severe energy crisis in many developing countries, especially the rural parts, though the environmental concerns are very real in developing countries too (Renewable Energy: Potential and benefits, 2007). According to a Pew Research poll ("Declining public support…," 2008), 82% of Americans favor increased funding for alternative energy. A subsequent Pew survey ("Obama's ratings little affected….," 2010) revealed people's positive attitudes toward renewable energy and energy efficiency and preferences for the renewables have been found to be consistent with people's increasing environmental concerns. The survey indicates that 81% of respondents agree that there needs to be stricter laws and regulations for environmental protection. Effective marketing is the key to popularizing renewable energy technology globally ("Obama's ratings little affected….," 2010).

While the general scope for marketing renewable energy is present for both developed and developing countries, there are obvious challenges in both cases. Consumers in developed countries are not bound to choosing renewable energy options because in most cases they are already connected to the conventional grid. Therefore, the constraints of pricing (renewable energy is usually more expensive), accessibility, customer knowledge, policies and regulations play an important role in their case – they

are more concerned about “green energy” (Press & Arnould, 2009). Green energy is the term used for energy sources that are known to be non-polluting and environmentally friendly. On the other hand, the ability to pay among most customers in developing countries is limited, while the initial cost of the stand-alone systems that they need is high (Aron, Kayser, Liautaud & Nowlan, 2009). Thus, the constraints for consumers in developed and developing countries are different. Nevertheless, the willingness to pay for renewables in both developed as well as developing countries has to be created through appropriate marketing strategies that include effective communication. Consumers’ limited ability to pay in developing countries needs to be addressed through marketing strategies as well.

The rationale for this study emerged from an observation of the contrasts in the renewable energy marketing process between a developing and a developed country that are best exemplified by two countries: Bangladesh and the United States. The U.S., one of the richest countries in the world, has an excellent grid power supply system accessible and affordable to almost all its citizens. Nevertheless, a large portion of the consumers would like to have “green” electricity and are even ready to pay a premium for that. On the other hand, Bangladesh, a developing country, has severe power shortages and a very limited grid supply even by the standard of other developing countries in the region. To most rural Bangladeshis, renewable energy is the only option available for electrification. Therefore, Bangladesh and the United States have been selected for this study so as to better approach the constraints of marketing renewables from two different perspectives. At the same time, it should be mentioned that while the contrasts are very clear, the market interactions in renewable energy between Bangladesh and the United States are

strikingly significant and businesses on both sides can benefit from the study. Another reason the author chose the two countries is because he is a native of Bangladesh and conversant with the sociopolitical, and economic systems. He is also a resident of the United States where he obtained his higher education.

Purpose and Potential Benefits of the Study

Experts agree that access to energy, especially in developing countries, would lead to improved quality of life and by extension increased commercial activity and an overall economic benefit to society ("Renewable energy: Potential and benefits," 2007). Thus, it can be surmised that greater energy access would benefit Bangladesh economically. The purpose of this study is to explore and analyze marketing strategies of renewable energy by selected companies in Bangladesh and the United States. The main focus of the analysis would be to identify, compare and contrast issues like the chosen marketing practices of the organizations, types of media used for advertising the products, major challenges and opportunities in marketing to different market segments, successes and failures of the various initiatives taken and the overall prospects of renewable energy.

The research would also recommend improvements to renewable energy marketing, how people can be better served by the companies' marketing initiatives, how energy issues can be addressed and how problems can be solved efficiently and effectively. The study could benefit not only renewable energy marketers, but also society, because the world needs to invest in renewable energy in order to combat climate change and promote sustainable development (Fischer & Newell, 2004). The outcome of this study could help improve people's access to renewable energy, which in turn may result in economic benefits of people and society as a whole. Government incentives in the forms

of various subsidies would be the keys to popularizing renewable energy and making it affordable (Fischer & Newell, 2004).

The findings of the study may suggest further options in advertising and marketing renewable energy products. Various public relations practices identified in the study would also help marketers generate effective pre-market conditionings. The participating U.S. companies would be able to give insights into Bangladeshi businesses and vice versa. Such ideas coming from different perspectives would provide the marketers of both countries with more strategies to effectively market renewable energy technology. Thus, the adoption of some of the recommendations of the research may have some influence on the entire renewable sector. In general, a large section (residential, government and/or commercial entities) of society in the United States as well as in Bangladesh, are potential customers of renewable energy. These people will directly benefit from renewable energy technology in various ways if they can be better motivated and guided to adopt the technology.

Literature Review

Renewable Energy: The U.S. Perspective

Farhar and Houston (1996) analyzed results from various national surveys conducted in the United States in the 1990s, which indicated that approximately 40% to 70% of respondents would pay a premium for environmental protection or for renewable energy. The green pricing programs that the utilities offered was an important step in this regard. These programs allowed interested consumers to have a portion of all their overall energy supply provided from renewable energy sources (Ottman, 1997). A study by Marcus, Helmich, Schilberg, Naigian and Ruszovan (1995) found that although the

Willingness to Pay (WTP) for renewables had been expressed, fewer than 10% would actually pay the increased monthly cost, at least initially.

Faber et al. (2001) found that as in the United States, generating electricity from Renewable Energy Sources (RES) has also been a high priority of the European Commission. An increasingly popular mechanism in this regard is green electricity pricing, which allows companies and utilities to offer electricity from RES at special tariffs. Companies offer products with an enhanced price to cover the increased generation cost. Faber et al. (2001) also found that bot h the regulatory and the voluntary government strategies for popularizing electricity generation from renewables are mostly price-driven in the forms of rebates, tax incentives, feed-in tariffs, rate-based incentives, shareholder programs, contribution programs and green tariffs. Environmental pricing in the form of carbon emission taxes or removal of fossil and nuclear generation subsidies is another way – mostly an indirect one – through which RES is also being promoted (Faber et al., 2001).

Renewable energy programs and prospects

As of 2009, the global solar electricity market was more than $10 billion per year and the industry is growing at more than 30% per annum (U.S. Department of Energy, 2005). Low-cost, base-loadable and fossil-based electricity has been viewed as a cost competitor for electrical power generation for some time now (Lewis, 2007). But to provide a truly widespread primary energy source, solar energy must be captured, stored and utilized in a cost-effective manner for the consumers. Even a solar system with a 70% efficiency rate would not provide the needed technology if it were expensive and if there were no cost-effective mechanisms to store and disseminate energy upon demand

(Hoffert et al., 2002). Therefore, a competitive and successful solar-based energy system will not only require cost reduction in the existing photovoltaic manufacturing methods but will also require considerable research and development to be able to capture and produce energy in a convenient and a scalably manufacturable form (Lewis, 2007).

For decades, the federal government has supported research and development (R&D) of renewable energy technology in the United States (Kladiva, 1999). The fiscal year 2010 budget request included critical investments in a number of important energy efficiency and renewable energy programs ("Obama's ratings little affected….," 2010). The budget for such programs was an increase of $140 million (compared to the Fiscal Year 2009 Omnibus enacted levels) to $2.32 billion – an 85% increase compared to the previous administration's last budget for energy efficiency and renewable energy ("Obama's ratings little affected….," 2010).

Many U.S. states are launching different programs to improve their energy efficiency and to promote alternative energy sources – a step toward energy independence while combating the issues related to climate change (Goldstein, 2007). Thirty states plus the District of Columbia have established Renewable Portfolio Standards (RPS), which are state programs that require retailers of electric generators to obtain a certain percentage of power from renewable energy sources annually (Chin & Weihe, 2010). Such RPS programs, mostly administered by state public utility commissions, generally require one to five percent of power to come from renewables in the first year of implementation and more in subsequent years (Chin & Weihe, 2010). According to analysts at the National Renewable Energy Laboratory in Golden, Colorado, and Lawrence Berkley National Laboratory in Berkley, California, motivating energy

consumers to use solar, wind, hydropower or other “green power energy,” more states would need to become competitive power markets and green pricing programs need to be expanded (“Consumer choice…,” 2002).

Voluntary, utility-based green pricing programs have grown significantly in the United States in the last five years, from 1.8 billion kWh in sales in 2004 to more than 4.8 billion kWh in 2008 (Friedman & Miller, 2009). The growth rates for program sales, however, indicated a yearly decline for the first time in several years. The growth of residential participation in green pricing utility programs in regulated states particularly slowed in 2008 (Bird, Kreycil & Friendman, 2009). Some programs, such as the Sunshine Energy program in Florida and one proposed by Southern Indiana Gas & Electric Company did not quite work as intended and were subsequently discontinued (Friedman & Miller, 2009). Lack of communication with the consumers as well as ineffective marketing initiatives were two drawbacks with those companies (Friedman & Miller, 2009).

Developing effective marketing models for renewable energy could be the key to popularizing renewables among consumers. Marketing expenditures should satisfy goals and utility and public values, such as public awareness and the value of customer education (Wreden, 2005). Nevertheless, the voluntary market for renewable energy in the United States has been significant (Bird, Kreycik & Friedman, 2008). Voluntary market demand for renewables slightly exceeded compliance market demand for new renewables from 2004 to 2008 (Bird, Kreycik & Friedman, 2009). State Renewable Portfolio Standards (RPS) policies collectively called for utilities to procure about 23 billion kWh of new renewable energy generation in 2008. The awareness raised through

program marketing also led to the growing popularity of green pricing in the United States (Friedman & Miller, 2009). Nevertheless, there are concerns among consumers regarding marketing and overall performance of green pricing programs. The major concerns include assertions that: (1) green pricing programs spend too much on marketing, (2) marketing expenditures serve private, not public interests, (3) green pricing programs do not result in new renewable energy development, and (4) public disclosure is poor and programs are not transparent enough (Friedman & Miller, 2009).

Photovoltaics

The photovoltaic industry in the United States today is growing at a rapid rate. The industry would grow even faster if costs could be reduced for both final products and capital investments (Kurtz, 2008). Concentrated photovoltaics (CPV) introduced a complementary approach that uses concentrating optics to focus light onto small cells. There was a little commercial interest in CPV about a decade ago when the total size of the industry was one-tenth of what it is today (Kurtz, 2008). Also, the champion concentrator cell was only 30% efficient as compared with 40% today (Kurtz, 2008). In the last 10 years, as the solar industry has mushroomed, cumulative investment in CPV has grown to about $1 billion (Bosi & Pelosi, 2007).

Cost analyses of some photovoltaic companies suggest that using high-efficiency concentrator cells can reduce the costs for solar electricity (Luque, Sala & Luque-Heredia, 2006). CPV companies are exploring different approaches of applications. The companies are assessing which designs will give the best performance, lowest cost and longest reliability to the consumers (Kurtz, 2008). After satisfactory demonstrations of stress tests, testing cycles and other technical aspects, some companies have planned for

high-volume manufacturing from the start, which would be the key toward cost reduction (Kurtz, 2008). One disadvantage the CPV companies face is the energy rating – an important phenomenon for power purchase agreements and utility applications. The methods used for predicting energy production for solar plate systems are well-documented, but because of lack of enough data on CPV technology, investors do not have the same level of confidence in similar predictions for CPV systems (Kurtz, 2008). Nevertheless, the companies continue to work on developing efficient and cost-effective CPV systems and cell efficiencies are expected to continue to increase toward 45%-50% (King et al., 2007). Emcore, a photovoltaic research and development company, claims an efficiency rate of 39%. National Renewable Energy Laboratory (NREL) also described its new, inverted structure at 38.9% efficiency (Geisz et al., 2007).

Opportunities with wind energy

Another source of renewable energy, wind power represents the fastest growing renewable energy source. In 2008 alone, there was a 29% growth in onshore wind power – leading to 120,798 megawatt (MW) of installed capacity worldwide (Dvorak, Archer & Jacobson, 2009). Offshore wind power grew even at a faster rate of 32% in 2008 with 1471 MW installed in the seas of Europe. Still, that represented only 1.2% of the installed total worldwide (Global Wind Energy Council, 2009). Even though offshore wind turbines are subject to several additional constraints, such as offshore weather, wave conditions and the high costs of mounting the turbine to the sea floor and undersea electrical transmission cable per unit distance, they still have some distinct advantages over their onshore counterparts (Dvorak, Archer & Jacobson, 2009). For instance:

1. Offshore turbines can be installed closer to coastal urban load centers where most electrical energy demand exists.
2. Such installations will be closer to load centers.
3. Offshore winds are faster and more consistent at lower vertical heights.
4. Offshore turbines and components are not limited by the roadway shipping constraints that onshore wind turbines confront (Dvorak, Archer & Jacobson, 2009).

A detailed cost-benefit analysis also suggests that offshore turbines installations are more advantageous than onshore ones (Snyder & Kaiser, 2009). Although many offshore wind energy projects have been proposed in the United States, particularly off the East coast, no offshore turbines had actually been installed as of 2009 (Dvorak, Archer & Jacobson, 2009). An overall California resource assessment in this regard indicates that significant resource potential exists off the coast of California in mostly deep waters (Musial & Butterfield, 2004). Another global study of offshore surface wind power distributions by Liu, Tang and Xie (2008) pointed out high average wind speeds on the leeward side of Cape Mendocino, California, in the deep water areas, an important resource for renewable energy.

Bangladesh Perspective

The consequences of not having access to energy in any country are severe – education, health, daily living and the overall well-being of people are seriously affected. Half of the world's population, if not more, lives on less than $2 per day (Collier & Dollar, 2001). According to the United Nations Development Program's data on energy access, approximately 79% of the people in the developing world have no access to

electricity (Legros et al., 2009). The total number of people without electricity is estimated at about 1.5 billion, or a quarter of the world's population, mostly concentrated in sub-Saharan Africa and southern Asia (Legros et al., 2009). While communication technology has shown the potential to improve life and livelihood even in the poorest Bangladeshi villages, lack of electricity continues to be a barrier. A study by Siddiqui and Newman (2000) indicates that apart from fueling the basic household necessities, electricity would enable many rural industries to develop beyond subsistence. Healthcare can be greatly improved. For instance, a simple refrigerator in the household or in a community health center would enable the adequate storage of vaccines and antibiotics. The study also indicates that because of the absence of grid electricity and lack of conventional energy sources in most parts of rural Bangladesh, renewable energy is not only an environmentally benign option, but also it is also the only option. Bangladesh has a suitable environment for solar PV, and in some localities, wind energy. Also, there are opportunities in biogas (mostly from animal manure), and mini hydro opportunities in the hilly regions, as well as some tidal power in the delta islands in the south (Renewable Energy Policy of Bangladesh, 2008).

Challenges and opportunities

There is no national coordinating agency for the renewable energy sector in Bangladesh (Islam & Islam, 2005). In 1998, the Bangladeshi government lifted import duty and value-added tax from solar photovoltaic and wind turbines. Islam and Islam (2005) found that although solar PV programs of different government bodies are subsidized, the available resources are scarce. The World Bank funded a market survey that found that there is an existing market size of 0.5 million households for Solar Home

Systems (SHS) on a fee-for-service scheme in the off-grid regions of Bangladesh (World Bank, 1998). Another World Bank survey (2000) found that private diesel generator set operators in most of the off-grid rural markets are also interested in marketing SHS in the surrounding areas if favorable financing arrangements are available. Several organizations are implementing various awareness building programs on renewable energy technology in Bangladesh. There has been publicity through electronic media, such as short films and television advertisements, as well as print media, such as brochures, folders, newsletters and trade guides on renewable energy technology. Organizations also develop advertising campaigns and mobile exhibitions in rural and remote areas using mobile exhibition vans (Islam & Islam, 2005).

In a third-world country setting such as Bangladesh, energy industries could be one of the vital ingredients to fight poverty and for socio-economic development (Renewable Energy Policy of Bangladesh, 2008). To bring the entire country onto the grid by the year 2020, the government of Bangladesh issued its Vision and Policy Statement in 2000 (Renewable Energy Policy of Bangladesh, 2008). This policy goes along with Article 16 of the Constitution of the People's Republic of Bangladesh, which emphasizes the removal of the disparity in the standards of living between the urban and rural areas through rural electrification and development (Renewable Energy Policy of Bangladesh, 2008). The commercial dimension of renewable energy is still developing in Bangladesh, so particular policy development by the government in the renewable sector of energy is very important (Renewable Energy Policy of Bangladesh, 2008). Investment costs of renewable energy are generally higher compared to fossil fuel alternatives. This option, however, becomes economically viable when externalities such as environmental costs,

health hazards and lower operating costs are taken into account (Renewable Energy Policy of Bangladesh, 2008). Bangladesh is currently utilizing solar and wind energy, biomass, biogas and hydro energy as renewable energy sources.

It is quite challenging to establish new development projects and to continue existing ones because of the high population of Bangladesh. Nevertheless, implementation of renewable energy technology, especially in the rural parts of the country, will solve many problems. In a country of 162 million people, only about 30% have access to electricity ("Renewable Energy Lights Up the Countryside," 2009). At the pace which the Rural Electrification Board is advancing by connecting about 400,000 households each year, it will take about 35 years to achieve the government's goal of providing electricity to the entire population of the country ("Renewable Energy Lights Up the Countryside," 2009?). Bangladesh is a delta with more than 400 rivers crisscrossing through the country. Therefore, extending the grid system would be complicated and prohibitively expensive ("Renewable Energy Lights Up the Countryside," 2009). Approximately 70% of the total commercial energy of Bangladesh is provided by natural gas, and the remainder is provided by oil, hydropower and coal. The present proven reserve of gas is projected to be exhausted by 2030 (Sharif, 2009). Load shedding (cutting off the electric supply on certain lines when demand becomes greater than the supply) as a result of the shortage of electricity supply is another major problem in the entire country. Load shedding has been projected to be about 1750 MW by 2014. In addition to that, the scarcity of gas supply in the near future can make it more than 3000 MW (Sharif, 2009). In the face of all these difficulties, the best thing about

solar is that solar energy can be generated in all parts of the country, even in the remotest region of the rural areas (Sharif, 2009).

Opportunities with biogas

Biogas, a form of biofuel consisting of methane and carbon dioxide, is a type of renewable energy that results from biomass. It may include crop residues, sewage and manure. Biogas is not usually associated with the release of environmentally damaging pollutants. Biogas has an enormous potential to be utilized as renewable energy source in Bangladesh. There are about three million potential households in the country that raise cattle and poultry. There is a possibility to generate 800 MW of electricity using these resources. About eight to nine million metric tons of rice husk produced annually in Bangladesh can generate as much as about 400 megawatts of electricity from biomass (Sharif, 2009). The National Domestic Biogas and Manure Program in Bangladesh has reached an impressive milestone in implementing biogas plants throughout the country. Since its initiation in 2006, the program has provided 12,000 households with biogas plants, benefitting more than 70,000 people (Marree & Sud, 2010). Apart from biogas' roles in reducing indoor air pollution, shortening cooking time and producing organic fertilizers, biogas plants also have created considerable employment opportunities in the country (Marree & Sud, 2010). Wind energy, on the other hand, has not been explored in Bangladesh. No comprehensive wind mapping has been conducted to measure its potential as a renewable energy source. Each wind turbine has been projected to produce about one megawatt of electricity and it has been assumed to be a potential resource mostly in the coastal areas and offshore islands (Sharif, 2009).

Marketing and promoting renewable energy

The per capita energy consumption in Bangladesh – a 77 kg oil equivalent (kgoe) is very small compared to the world average of about 1,272 kgoe (Asian Development Bank, 2000). Therefore, rapid implementation of solar home systems in Bangladesh is imperative. A study by Khan (2006) shows that the utilization of renewable energy could be linked to reducing poverty, achieving primary education, promoting gender empowerment and achieving environmental sustainability. Another study by Islam (2005) found, by analyzing the 2004 and 2006 National Energy Policies, that the importance of renewable energy sources had not been duly recognized in government policy. The study also suggested incorporating renewable energy development programs into the framework of national energy policy, rather than employing some isolated efforts which may not provide satisfactory outcomes in the long run. Hiranvarondon, Hill and O'Keefe (1999) suggested an implementation strategy to successfully disseminate the renewable energy technology. They emphasized easing government barriers to market expansion by removing excessive duties and taxes and by removing subsidies on products that compete with solar systems. The study also found that national governments, donor agencies, educational and research institutions and private sectors could be key players in the promotion and dissemination of solar systems in developing countries.

Cabraal, Cosgrove and Schaeffer (2000), who conducted extensive studies in Indonesia, Sri Lanka, the Philippines and the Dominican Republic, found that successful solar PV market development in the rural areas requires removal of financial and institutional barriers. They proposed the establishment of a responsive and a sustainable infrastructure with the guarantee of quality products and services. The study also found

that the initial high costs of the stand-alone solar system have been found to be a problem in all those countries. Nieuwenhout et al. (2000) studied the use of solar energy in developing countries. They concluded that there is no single best organizational model to promote the development of solar home systems. Successful dissemination, according to their findings, depends on the different institutional, legal, socioeconomic and cultural conditions in different countries. Factors such as suitable financing schemes to address the problem of high initial cost, adequate supplies, proper maintenance and viable choices of configurations to suit the consumers' needs and affordability, are essential for successful promotion of solar PV-based rural electrification (Ahammed & Taufiq, 2008).

A case study by Ahammed and Taufiq (2008) found that a successful implementation of solar systems in rural areas, especially where the grid electricity is unavailable, can contribute to development in areas such as rural electrification, water pumping and treatment system, health care, communication, agriculture, transportation, security system, income generation and more. The study identified other advantages of solar systems as: (1) the consumer is the owner of the power generating system, (2) there are no fuel cost and no billing charges, (3) solar PV systems are durable and environmentally friendly and can be implemented in any part of the country.

It is true that non-conventional energy like renewable energy such as solar, biogas or biomass form is still a novelty in Bangladesh and its share in the overall energy sector is still insignificant (Ibrahim, Shykhulazzaman & Kamruzzaman, 2009). But there is no doubt about the tremendous potential of renewable energy and its demand in the country. The enthusiasm for solar energy is also enormous in the rural areas. But the high initial price is something beyond the affordability of many households in rural areas. Ibrahim,

Shykhulazzaman & Kamruzzaman (2009) indicated in their study that this high initial cost of the systems is one of the major barriers to the expansion and commercialization of solar home systems in Bangladesh.

Research Questions

The purpose of this study is to analyze the marketing strategies of selected companies involved in renewable energy business in Bangladesh and the United States, and to identify the challenges and opportunities associated with the marketing of renewable energy sources. The study attempts to address the following questions:

RQ #1: What are the basic marketing packages used to reach the target market?

RQ #2: What media are used in advertising the products to different audiences/market segments?

RQ #3: What are the major challenges and successes in marketing products to different audiences/market segments?

RQ #4: What are the opportunities for renewable energy use?

Method

A total of six renewable energy companies took part in this study: three from the Bangladesh and three from the United States. Companies A, B, and C are the ones from Bangladesh, and Companies D, E, and F are from the United States. All six selected companies are the major providers and/or facilitators of renewable energy technologies in their respective countries. These selected companies have all or some of the following features: the leading renewable energy manufacturers, distributors, integrators, financiers, system developers and specialization in design and installation of equipment in their

regions of operations. The renewable energy companies were chosen based on one or more of the following criteria:

- Whether or not it was a leading company in the renewable energy industry
- Whether or not the company operated nationwide or within a smaller geographic region
- Suggestions from people involved in the area of renewable energy
- A thorough online research of the companies
- Author's own prior awareness of some existing companies

Once the companies were chosen, executives were recruited for interviews. The executives were recruited for interviews based on:

- Their roles in the companies. Preference was given to the marketing executives or executives who were involved in the company's marketing processes.
- Their experience with the company – the longer the better.
- The availability of the participants.

One representative executive from each company was interviewed for the study. Participation was completely voluntary and the participants were informed that they could withdraw at any time before and during the interviews without any penalty. There was no incentive for the participants. The interview questions along with an informed consent form were sent to the participants via e-mail. The participants were asked to sign the information consent form as an acknowledgement of the study they were participating in before responding to the interview questions. The participants e-mailed back their responses and the consent forms with their signatures on the forms (one consent form came in the regular mail) to the author. The author also requested the

participants to permit a follow-up on themes or clarify any answers, if needed, during the data analysis process.

RQ #1: What are the basic marketing packages used to reach the target market?

To address this question, participants were asked about their company's predominant marketing packages/bundles of renewable energy technology and the reasons behind selecting such packages, target markets and strategies to motivate the consumers to choose renewable energy options. The interview questions also addressed their financial schemes for making the products affordable.

The information on different packages provides insights about the different modules available in the market by different companies at different prices. For example, a specific package from one of the renewable energy companies in Bangladesh consists of a solar module, an industrial battery, a charge controller, a lamp, a switch, a switch board and the installation service. This information would help the marketers to ascertain what packages would be cost-effective in resolving their customers' energy issues.

RQ #2: What media are used in advertising the products to different audiences/market segments?

The participants were interviewed on what media they used for different segments of the market (e.g. residential vs. commercial vs. public/government in the United States, and rural vs. urban in Bangladesh) and the reasons behind choosing such media outlets. The participants were asked about the effectiveness of their media use as well as what other forms of media they utilized.

Understanding the media use of comparable companies and their effectiveness enables marketers to devise strategies to reach the target group efficiently and effectively. It is presumed that any company would most likely have to use some form of media to reach its target market. Therefore, this information is vital in evaluating the promotional strategies and coming up with best practices for marketers.

RQ #3: What are the major challenges and successes in marketing products to different audiences/market segments?

To explore the challenges and successes in marketing renewable energy products, the interview questions to respondents addressed the challenges they faced and successes they had in marketing products to residential, government and commercial customers.

The responses to this research question are vital for evaluating the effectiveness of the business strategies, marketing packages and promotional initiatives by the companies. This evaluation of challenges and successes could lead to strategies that would bring in better results for the marketers.

RQ #4: What are the opportunities for renewable energy use?

To address this question, participants were asked about their target markets as well as the different segments of a market for renewables. They were asked about the current predominant uses of their renewable energy products by the target groups and what improvements could be done in promoting the products. The participants were also asked how appropriate the current marketing packages are and the scopes for improvements. Finally, they were asked to comment on the future they see for the business.

This overarching question was to find out the respondents' perceptions on the overall prospects of renewable energy. The analysis of the current modules of the participating companies, their marketing strategies and the improvements recommended by the marketers would create a best-practice framework for the future.

The responses to the interview questions provided enough information on the existing marketing practices of the selected companies, their successes and challenges. At first, the interviews were reviewed and analyzed individually. Each response was analyzed to find out insights that it may have to answer the overarching research questions of the study. The answers were sorted by key themes and by relevant information within themes. New themes and facets within themes were added as important data/information come up from the interviews. The data were qualitatively analyzed to identify, compare and contrast issues such as the chosen marketing practices of the companies, types of media used for advertising the products and major challenges and opportunities in marketing to different market segments. The successes and failures of the various initiatives taken and the overall prospects of renewable energy were evaluated. Rather than a narrative presentation of the data from interviews, the outcomes were taken to a normative level – in essence, a prescription or recommendation of improvements to renewable energy marketing, how people can be better served by the companies' marketing and public relations initiatives and how energy issues can be addressed and resolved more successfully.

Profile of participating companies

Each company shared its proprietary information with the author for the purpose of this study. Thus, the author came to an agreement with the company representatives

that the company names and those of the respondents would not be identified. This was clearly written on the consent form that each respondent had to sign before participating in the study. The author then assigned pseudonyms to the companies.

Bangladeshi Companies

Company A is one of the major nongovernmental organizations and one of the leading solar energy systems integrators in Bangladesh. The organization's aim is to bring the message and actions of science and technology nearer to the life-activities of the common people of Bangladesh. The company specializes in distribution and installation of Solar Home Systems in rural Bangladesh.

Company B, located in Bangladesh, is one of the largest and fastest growing rural-based renewable energy companies in the world. The company specializes in a unique approach of blending market and social forces together to bring the world's most up-to-date technology to the rural people of Bangladesh. The company has developed market-based programs with social objectives for popularizing renewable energy technologies to millions of people in Bangladesh.

Company C is a non-bank financial institution that plays a major role in bridging the financing gap for developing medium and large-scale infrastructure and renewable energy projects in Bangladesh. For implementing renewable energy technology in Bangladesh, the company works in collaboration with its Participating Organizations (POs). Company C also oversees the activities of the POs that it finances. The company is the current market leader in private sector energy infrastructure financing in Bangladesh.

United States Companies

Company D is the leading full service renewable energy systems integrator, project developer and solar contractor in the Rocky Mountain region of the United States. The company delivers award-winning solar solutions to its consumers. The company's mission is to provide both urban and rural communities with a sustainable, independent, clean energy future. With years of experience in the renewable energy sector, Company D, throughout the West, has been serving its customers with cost-effective solar energy solutions.

Company E is a renewable energy company that specializes in agricultural, residential and commercial wind and solar energy systems. The company provides its customers, throughout the West Coast of the United States, with full-service renewable energy systems integration from concept design through construction coordination. Company E also is a supplier and facilitator for installations for a number of manufacturers of alternative energy products in the West Coast.

Texas-based **Company F** is one of the leading solar integrators in the United States. The company specializes in design, sales and installation of solar systems for its different customer bases. Since its establishment more than a decade ago, the company has been providing an alternative and sustainable power source along with the highest quality of service and products throughout the country.

Results

Company A

SWOT Analysis

- **Strengths:**

- Implemented microcredit system that made Solar Home System (SHS) affordable.
- Trained local young people to assemble accessories, install systems and provide services.
- Effective person-to-person contact with the potential customers.
- Popularized solar PV, and demystified the belief that it is beyond the capacity of rural Bangladeshi people.

- **Weaknesses:**
  - Operates only in rural non-grid areas where customers have limited affordability.
  - Reaches only a small segment of rural society so far.
  - Scale of operation is small.
  - Depends on other companies for supplies, and therefore, sometimes faces uncertainties.
- **Opportunities:**
  - Currently targets lower-income customers using low-power-consuming LED lights and higher income groups by offering diverse applications such as solar pumping. Technological advancements are favorable in this regard.
  - Aspiration for basic needs for electricity is increasing, and that is the main focus of the company.
  - Acute power crisis and frequent power cuts are creating more demands for solar PV even in grid areas.

- Government policy is favorable for making solar PV more popular.

- **Threats:**
  - Grid electricity is highly subsidized and local politicians are always promising their constituents that very soon the grid will reach their village.
  - Regular recovery of installment payment sometimes becomes uncertain.

Marketing packages used to reach the target market

Predominant marketing packages. The goal of Company A from Bangladesh in the renewable energy sector is to facilitate rural electrification through Solar Home Systems (SHS). Since the limited affordability of rural families is a major concern in Bangladesh, the company concentrates on small SHS for basic household needs. A typical solar system package consists of a solar panel of 50 Watt peak (Wp), a battery of 80 Ah (ampere-hour), a charge controller, four seven-watt fluorescent tube lights, and a mobile phone charger. In addition, a 14-inch black-and-white television is sometimes included in the package. However, for this, the consumers would need to economize on the light. The package with the 50 Wp system is by far the most popular one among consumers. The system usually provides 3-4 hours of lighting and about one hour of television viewing. Most of the consumers pay for the system in installments over 2-3 years. The company follows microcredit schemes in this regard where the consumers pay about one-fourth of the price up front and then pay the rest in monthly installments with a small service charge. Within the guarantee period, the company also provides the basic repair and maintenance services free of cost.

The affordability for the consumers is a major reason why they select such packages offered by Company A. Most of the consumers in the rural areas can barely afford the packages that satisfy basic needs. Company A is also serving those who can afford more as well as those who can afford less. For the former, an 85 p watt system is capable of providing better and longer hours of lighting. For the latter, a 40 p watt system can provide basic lighting for much shorter period of time. The company is currently in the process of reaching out to the rural poor with the affordable 10 p watt system with Light Emitting Diodes (LED) lights. The company intends to design packages that can be afforded by all households in villages in Bangladesh.

Target market. Company A has been in the solar business for five years. At the beginning, only the most affluent in the village could afford solar systems, and thus, the company targeted only that small segment of rural society. The market, at the beginning, included rich farmers and families where at least a member has a job or business in villages or in cities, as well as families with members working abroad who send regular remittances.

Over the years, this target group expanded as the purchasing power of the villagers increased. In the meantime, the cost of the systems went down to some extent. With the introduction of smaller systems using LED lights, the company now targets the affluent segments of society, who include modest to small share-croppers and businessmen. The company's next goal is to make the prices so low that the installment amount does not much exceed the cost of kerosene – the popular alternative fuel for lighting usually used in hurricane lamps in village households.

Strategies to make renewable energy more popular and affordable.

The microcredit system of Company A made the SHS more affordable. Also the following company initiatives reduced the prices:

- The company trains local young people from disadvantaged families to assemble some of the electronics in the system. That way, the company saves money and does not have to import systems.
- The company also develops its own technicians for installation and maintenance.
- The company receives a small subsidy per system from the World Environmental Fund. This subsidy allows consumers to pay less.

Different forms of media used in advertising products to different market segments. Company A has not so far marketed to the urban population of Bangladesh – almost all of who have access to grid electricity. However, the company is considering the urban market as a lucrative one since periods of load shedding is increasing due to the low availability of electricity compared to the demand. Urban customers are now looking for solar photovoltaics to charge their emergency batteries for the load shedding periods. Company A mostly depends on person-to-person contacts (word of mouth) for communicating with its potential customers. The company sets up local centers from which workers would visit the village households and motivate villagers to use solar PV. It also puts banners in places of congregation such as village bazaars to inform potential customers about its products. Demonstration meetings also are very effective in showing the neighborhood people the applications of solar PV, especially demonstrating the positive experiences of current users. The company also distributes flyers and posters among the villagers.

Company A is constrained to these limited methods of advertising for several reasons. First, the company has limited human resources for implementing an effective advertising campaign. Television ads will not be very effective, as most of the people of the target market live in the non-grid areas. Newspaper ads would not be favorable either, as literacy and newspaper readerships are low among this target group. As television viewership increases, the company is considering creating television commercial for its rural audience. The high costs of TV commercials can be made more affordable if several players marketing SHS to the same rural target group do it jointly. As the Company A representative said, “In fact the question now is to popularize solar power by convincing the potential customers that it is a worthwhile investment taking a long-term view. Once the demand is enhanced and enough demand-driven dynamics are established, the competing companies can emphasize their own specialties.”

Major challenges and successes in marketing the products to the different audiences/market segments. Challenges that Company A faces in marketing its products to the rural population (Company A has not expanded its operation to the urban population yet) include the following:

- Most of the potential customers have limited income; therefore, it is often difficult for them to invest in such a high cost facility.
- Although most of the rural people are not connected to grid electricity, the grid is never too far from the villages, as most of the nearby towns and business centers have already been connected to the grid. According to the Company A representative, grid electricity is highly subsidized and local politicians are always promising that grid extension will soon cover the new areas. People,

therefore, are always hoping to be connected to the grid, which usually does not come true.

- Rural people also get discouraged when they compare grid electricity to solar PV in terms of expense as well as longevity and intensity of power. Most can barely afford the basic small systems with which nothing more than basic needs are satisfied. Also the solar systems are subject to vagaries of weather.
- The microcredit system lengthens the recovery time of the system price to 2-3 years. The regular recovery sometimes becomes uncertain. The default of installments payments is also not uncommon, and it makes an already expensive recovery system even more expensive. Nevertheless, the more discipline in the installment process has been established and default rates are going down as a result.
- Most of the parts of the systems including the solar panel need to be imported. Sometimes the supplies are not adequate compared to the demand, which varies from month to month. Global price for solar equipments also vary. The unfavorable exchange rates against the local currency are also a reason for high price of the systems.
- As the customers get the solar systems at the threshold of their affordability, a price increase will be critical.

Successes:

- When Company A started to provide SHS along with some other companies at a commercial level, it was unthinkable in the country. As the Company A representative aptly put it:

> There were hardly any possibilities of economic availability of SHS by private persons. Solar PV was regarded as a very expensive option that needs highly trained and qualified specialized engineers. We soon blew these myths and have been in business profitably.

- The company is successful in gradually convincing the target groups about the importance and advantage of solar PV. The potential consumers respond well in general.
- The company installs, on an average, 150 new systems every month in different target areas of the country.
- The word-of-mouth dissemination of information on SHS and the demonstrated effects of the systems already installed have been a reasonably successful marketing approach. There are, however, opportunities for improvement and new strategies considering the changing market situations.

Opportunities for renewable energy use. So far, Company A sells its products almost exclusively to rural Bangladesh. Rural people, therefore, are 100% of the users. The solar home system (SHS) is used as the only source of electricity in the households. Because of its limited size and capacity, the one Company A is mostly marketing currently is used for basic needs of lighting. There are also some systems available with which customers can use their television and can charge their cell phones. People in rare cases are buying SHS for shops and work places too. The company's promotional efforts of door-to-door marketing of its products have been successful at the field level. There has also been a nationwide promotional effort by other companies for SHS in recent times. The Bangladesh government is also putting more emphasis on solar PV in its energy policy.

According to the Company A representative, “The government policy is also reflected in the public statements by politicians and bureaucrats at various levels which also serve in disseminating SHS and other means of solar PV.” Many government institutions are now using solar panels, and these now have more visibility to the general public.

While Company A believes its current marketing packages are appropriate, as the packages have been designed to meet the actual demands of the target groups, the company also acknowledges some scope of improvements too. As the company representative says, “To avoid the non-payment of the installments, we could include a pre-paid device which will allow the use of SHS power only after payment, preferably through mobile phone transfer or buying activation cards. Simple user-friendly technologies are being developed for this.” The company is also working on a plan to offer smaller, lower-power packages for the lowest-income people with simple user-friendly packages that would last a long time without much maintenance and replacement requirements. LED lights and efficient and rechargeable lithium ion batteries could make it a feasible option within the affordability of this particular target group.

Company B

SWOT Analysis

- **Strengths:**
    - The company has been successful in gaining trust and confidence of rural people.
    - The company has achieved the economy of scale, currently reaching 0.55 million clients with over 21,000 systems installed per month.

- Effectively decentralized its activities and transfer technology to the rural area.
- Empowered local youth and women.

- **Weaknesses:**
  - High costs and limited consumer financing are creating marketing obstacles.
- **Opportunities:**
  - Effective motivational programs in the community have started to produce dividends.
  - Introduction of big solar systems at government offices and private enterprises have opened new opportunities in urban areas.
  - Plans to set up its own PV panel and battery manufacturing companies that might lower the costs.
- **Threats:**
  - Lack of policy supports where these are needed, such as Tax and VAT exemptions and facilities to sell solar PV electricity to the grid.

Marketing packages used to reach the target market

Predominant marketing packages. Company B offers different packages to both rural and urban markets of Bangladesh. The packages offered are depicted in the company's marketing document (see Figure 1).

SL. No.	System in Watt	Load	Package Included	Package Price (BDT) (Only for out of Grid Electricity*)
1	130Wp	11 Nos. 7 Watt Lamp & 17"-20" B/W TV point	1 No. 130 Wp Solar Module, 2 No. 100 Ah Industrial Battery (Tabular Plate), 1No. 15Amps Charge Controller, 1 No. Structure, 11No.s 6 Watt Lamp, Switch, Switch Board, Installation & Other Accessories	65,400
2	120Wp	10 Nos. 7 Watt Lamp & 17"-20" B/W TV point	1 No. 120 Wp Solar Module, 2 No. 100 Ah Industrial Battery (Tabular Plate), 1No. 15Amps Charge Controller, 1 No. Structure, 10No.s 6 Watt Lamp, Switch, Switch Board, Installation &Other Accessories	62,900
3	85Wp	8 Nos. 7 Watt Lamp & 17" B/W TV point	1 No. 85 Wp Solar Module, 1 No. 130 Ah Industrial Battery (Tabular Plate), 1No. 10 Amps Charge Controller, 1 No. Structure, 7 Nos 6 Watt Lamp, Switch, Switch Board, Installation &Other Accessories	40,800
4	80Wp	7 Nos. 7 Watt Lamp & 17" B/W TV point	1 No. 80 Wp Solar Module, 1 No. 100 Ah Industrial Battery (Tabular Plate), 1No. 10 Amps Charge Controller, 1 No. Structure, 7 Nos 7 Watt Lamp, Switch, Switch Board, Installation &Other Accessories	38,400
5	75Wp	6 Nos. 7 Watt Lamp & 17" B/W TV point	1 No. 75 Wp Solar Module, 1 No. 100 Ah Industrial Battery (Tabular Plate), 1No. 10 Amps Charge Controller, 1 No. Structure, 7 Nos 6 Watt Lamp, Switch, Switch Board, Installation &Other Accessories	36,900
6	65Wp	5 Nos. 7 Watt Lamp & 1 No. 17" B/W TV point	1 No. 65 Wp Solar Module, 1 No. 100 Ah Industrial Battery (Tabular Plate), 1No. 5 or 10 Amps Charge Controller, 1 No. Structure, 6 Nos 6 Watt Lamp, Switch, Switch Board, Installation & Other Accessories	32,800
7	60Wp	5 Nos. 7 Watt Lamp & 1 No. 17" B/W TV point	1 No. 60 Wp Solar Module, 1 No. 80 Ah Industrial Battery (Tabular Plate), 1No. 5 or 10 Amps Charge Controller, 1 No. Structure, 5 Nos. 7 Watt Lamp, Switch, Switch Board, Installation & Other Accessories	31,300
8	50Wp	4 Nos. 7 Watt Lamp & 1 No. 17" B/W TV	1 No. 50 Wp Solar Module, 1 No. 80 Ah Industrial Battery (Tabular Plate), 1No. 5 or 10 Amps Charge Controller, 1 No. Structure, 4 Nos 6 Watt Lamp, Switch, Switch Board, Installation & Other Accessories	26,800
		point		
9	40Wp	3 Nos. 7 Watt Lamp & 1 No. 14" B/W TV point	1 No. 40 Wp Solar Module, 1 No. 55 Ah Industrial Battery (Tabular Plate), 1No. 5 or 10 Amps Charge Controller, 1 No. Structure, 3 Nos 6 Watt Lamp, Switch, Switch Board, Installation & Other Accessories	21,400
10	20Wp/21wp	2 nos. 5 Watt CFL Lamp or 1 No. 3 watt CFL Lamp along with 1 Tube Light Set	1 No. 20 Wp Solar Module, 1 No. 23 Ah Industrial Battery (Tabular Plate), 1No. 1 Charge Controller, 1 No. Structure, 1 Nos 7 Watt CFL & 3 LED Lamp, Switch, Switch Board, Installation & Other Accessories	11,700
11	10Wp	1 no. 5 Watt CFL Lamp & 2/3 Nos. LED Lamp (18,24,36)	1 No. 10 Wp Solar Module, 1 No. 18 Ah Industrial Battery (Tabular Plate), 1No. 1 Charge Controller, 1 No. Structure, 1 Nos 5 Watt CFL & 2 no LED Lamp, Switch, Switch Board, Installation & Other Accessories	8,800

Mode of Repayment	Down Payment	Installment	Service Charge (Flat Rate)
Option-1	25%	24 months	6%
Option-2	15%	36 months	8%
Option-3	100% Cash payment with 4% discount.		

Package for Urban Population

SL. No.	Load	Package Included (100% cash Payment)	Using Time per day	Package Price (BDT)
1	2 Nos. CFL Lamp-20 watt & 2 Nos. 56" Ceiling Fan	2 Nos. 75 Wp Solar Module, 2 Nos. 60 Ah Industrial Battery, 1No. 15Amps Charge Controller, 1 No. 400 watt Inverter, 1 No. Structure & Other Accessories	4 hours	75,000
2	3 Nos. CFL Lamp-20 watt & 3 Nos. 56" Ceiling Fan	4 Nos. 50 Wp Solar Module, 2 Nos. 100 Ah Industrial Battery, 1No. 20 Amps Charge Controller, 1 No. 600 watt Inverter, 1 No. Structure, &Other Accessories	4 hours	1,05,000

SL. No.	Load	Package Included (100% cash Payment)	Using Time per day	Package Price (BDT)
3	4 Nos. CFL Lamp-20 watt & 4 Nos. 56" Ceiling Fan	2 Nos. 130 Wp Solar Module, 2 Nos. 130 Ah Industrial Battery, 1No. 25 Amps Charge Controller, 1 No. 800 watt Inverter, 1 No. Structure & Other Accessories	4 hours	1,39,000
4	5 Nos. CFL Lamp-20 watt & 5 Nos. 56" Ceiling Fan	4 Nos. 85 Wp Solar Module, 4 Nos. 85 Ah Industrial Battery, 1No. 30 Amps Charge Controller, 1 No. 1000 watt Inverter, 1 No. Structure & Other Accessories	4 hours	1,69,000
5	2 Nos. CFL Lamp-20 watt, 2 Nos. 56" Ceiling Fan & 1 No. 21" Color TV point	4 Nos. 50 Wp Solar Module, 2 Nos. 100 Ah Industrial Battery, 1No. 15 Amps Charge Controller, 1 No. 600 watt Inverter, 1 No. Structure & Other Accessories	4 hours	1,11,000
6	3 Nos. CFL Lamp-20 watt, 3 Nos. 56" Ceiling Fan & 1 No. 21" Color TV point	4 Nos. 65 Wp Solar Module, 2 Nos. 130 Ah Industrial Battery, 1 No. 20 Amps Charge Controller, 600 watt Inverter, 1 No. Structure & Other Accessories	4 hours	1,33,000
7	4 Nos. CFL Lamp-20 watt, 4 Nos. 56" Ceiling Fan & 1 No. 21" Color TV point	4 Nos. 85 Wp Solar Module, 4 Nos. 80 Ah Industrial Battery, 1No. 25 Amps Charge Controller, 1 No. 1000 watt Inverter, 1 No. Structure & Other Accessories	4 hours	1,64,000
8	5 Nos. CFL Lamp-20 watt, 5 Nos. 56" Ceiling Fan & 1 No. 21" Color TV point	8 Nos. 50 Wp Solar Module, 4 Nos. 100 Ah Industrial Battery , 1No. 30 Amps Charge Controller, 1 No. 1000 watt Inverter, 1 No. Structure & Other Accessories	4 hours	1,99,000
9	2 Nos. CFL Lamp-20 watt, 2 Nos. 56" Ceiling Fan & 1 No. Computer	4 Nos. 65 Wp Solar Module, 2 Nos. 130 Ah Industrial Battery , 1No. 15 Amps Charge Controller, 1000 watt Inverter, 1 No. Structure & Other Accessories	4 hours	1,37,000
10	2 Nos. CFL Lamp-20 watt, 2 Nos. 56" Ceiling Fan, 1 No. 21" Color TV point & 1 No. Computer	4 Nos. 85 Wp Solar Module, 3 Nos. 80 Ah Industrial Battery, 1No. 15 Amps Charge Controller, 1000 watt Inverter, 1 No. Structure & Other Accessories	4 hours	1,66,000

Figure 1. *Various SHS packages information for rural and urban markets*

Source: Data provided by Company B

The company developed these customized packages in response to the special energy needs of the rural people to assist them in income generation and minimize their reliance on subsidies. The goal is to empower the rural people to solve their own problems and to reduce dependency on others. The company's models are intended to bring technology to the people by coupling innovative financing with technology transfer through effective community involvement. The rural people have realized the tremendous potential of solar – they now can have better and brighter lights, watch television and increase their business activities, while incurring the same cost as kerosene.

Target market. Company B offers the system to all groups of rural community. The SHS is available for rural community in 11 customized packages with three different payment schemes. The company designs its packages keeping in mind the needs as well as affordability of the consumers.

Strategies to make renewable energy more popular and affordable. The key elements of the sustainable strategies of Company B:

- Creating innovative financing schemes based on installments that make the technology more affordable, compared to traditional energy alternatives with the objective of creating ownership.
- Creating awareness for renewables through motivational programs and social activities at the community level. Company B, for example, organizes special programs for school children to increase awareness of renewable energy technology.
- Gaining the trust and confidence of the rural people. This is achieved by focusing on consumer needs and providing quality services including consumer-friendly product design, installation, training the clients on proper use of the technology, free monthly after-sales support and strict quality control. Company B also offers a consumer-friendly approach of a buy-back system that allows consumers to return the solar systems at depreciated prices if their area is connected to the grid.
- Training and employing young people at the community level. The company uses its resources to decentralize its activities and transfer the technology to the rural areas and build rapport with the rural people. It also links the technology to income-generating activities. For example, Company B encourages community-based manufacturing by purchasing and assembling accessories locally.
- Empowering women as the main actors and entrepreneurs of change. The company has already established 46 technology centers and trained over 1,500

women who are working independently as renewable energy technicians and entrepreneurs.

Different forms of media used in advertising products to different market segments. Company B distributes leaflets and newsletters to reach out to the urban market. In addition, it participates in seminars, symposiums and fairs to promote its products. Also, the company believes its web site is a great resource for potential urban customers. The company also schedules meetings with potential customers for more elaborate explanations of the products. The company follows a different approach to market to the rural population. Door-to-door consultation, posters, leaflets, electronic and print media are used to reach out to the rural market. Advertisement flashes through local cable TV networks are commonly used. In addition, the company conducts fairs and display SHS in schools, colleges, and other village-based institutions. The media used by the company effectively disseminate the information about renewables among people, create awareness and motivate them to purchase and use SHS. The company utilizes its community contacts in order to make its media use more effective.

Major challenges and successes in marketing the products to the different audiences/market segments. Challenges that Company B faces in marketing its products to the urban population:

- Need to establish a regulatory body.
- Lack of direct investment.
- Lack of after-sales service.
- Lack of policy for selling electricity from renewable energy to national grid.

- Need to create financial institutions for funding renewable energy technologies sector.
- Tax and VAT exemptions.
- Lack of research and development initiatives.
- Solar panels are not produced locally.

The company faces a different set of challenges when marketing to the rural population. These are:

- High costs.
- Very limited consumer financing.
- Very limited investments in this sector due to perceived risks and uncertainty.
- Knowledge and awareness gap.
- Lack of after-sales service.
- Lack of funds.
- Availability of panels and accessories.
- Lack of trained manpower.

Successes:

- The introduction of big solar photovoltaic systems/solar panels at government offices and private restaurants are one of its successes in urban areas.
- In rural areas, Company B reached economies of scale and break-even much before the expected time period.
- Currently, the total number of clients is more than a half- million with over 21,000 systems installed per month.

- Increased sales decreased overhead costs, which ultimately provided rural people with further credit options. Local production of solar accessories further reduced cost.
- According to the company representative, Company B takes pride in its efficient workforce. The company has about 8,500 staff members, most of whom are engineers working in 1,000 rural offices spread all over Bangladesh.
- The company's operation has created employment opportunities locally.
- The micro-utility models allow more than one person to share a single SHS. As a result, users could save on expenditures and maximize benefits.
- Village women are an integral part of the company's workforce in rural Bangladesh. The company may be seen as playing an important role in the empowerment of women.

Opportunities for renewable energy use. Among users of Company B's products, 99.5% are rural users, whereas urban users constitute only 0.5%. The current predominant uses of Company B's SHS are lighting, charging cell phones, powering radios and television. The current marketing packages of Company B help to increase the rural customer base by reaching remote areas, which gives the users the essence of ownership. However, the company believes there are opportunities for improvement. Rather than importing products, the company could cut costs by setting up its own PV and battery manufacturing company, setting up companies for manufacturing SHS accessories such as CFL, LED, lamp, charge controllers, mobile charger, cable and DC-DC converter, as well as setting up companies for DC appliances. Company B also

believes new strategies by new investors and companies associated with renewable energy mix would accelerate the development.

Company C

SWOT Analysis

- **Strengths:**
    - Supplement government's vision of electrifying Bangladesh by the year 2020.
    - Support from international organizations, whose grants and soft loans the company is channeling toward its Partner Organizations (POs).
    - Collaborative effort has been the company's greatest strength. It does so by harnessing the strength of each participating organization, utilizing the global experience of the international partner organizations and providing a leading service in the implementation of solar PV in the country through dissemination and quality control.
- **Weaknesses:**
    - Has to depend on the partner organizations' efficiency to keep up the success rate. The factors affecting POs also affect Company C.
- **Opportunities:**
    - There is an opportunity for the company to establish 1-2 MW solar panel assembling plant in Bangladesh which may reduce cost of panels and provide people with other opportunities.

- While it is not cost-effective for individual companies to run expensive advertising campaigns, Company C can effectively do this on behalf of its partner organizations.

- **Threats:**
  - Reduction in grants and soft loans from the international organizations is a possible threat.

Marketing packages used to reach the target market

Predominant marketing packages. Company C's mission is to fulfill basic electricity requirements in the rural parts of Bangladesh not covered by the grid system. Hence, the company is supplementing the government's vision of electrifying Bangladesh by 2020. Company C, with the support from various international organizations, is channeling both grant and soft loans to SHS installed in rural areas under its solar program. The program is being implemented through its Partner Organizations (PO), that also work on solar energy projects. After recruiting the POs through the PO Selection Committee, Company C provides grants and soft loans to the POs, sets technical specifications for solar equipment through the Technical Standards Committee, develops publicity materials, provides staff and customer training and monitors POs' performances. The interest rate of loans that Company C gives away to the POs is 6-8% and loan tenure is 6-10 years. Company C usually does not require any collateral or security for the loan. The households are required to pay minimum 10% of the system cost as down payment. The POs then enter into a leasing agreement and install the system. A typical SHS system includes a PV module, battery, charge controller, solar lamp and switch.

Company C provides two types of grants to participating organizations: (1) grant-A or capital buy-down grants to lower the costs of SHS and (2) grant-B or institutional development grants to build up institutional capacity. If the POs extend loans or micro-credits to households, the organizations will refinance 80% of the loans from Company C as long as the refinancing amount does not exceed $285. The remaining 20% of PO loans to households will be the POs' investment in each SHS. The POs may sell different SHS with different capacities from 10 Wp to 130 Wp or with other capacities, as approved by the Technical Standards Committee.

The target for installation of SHS since 2010 is shown in the table below:

Year	Up to 2009 (Actual)	Projection		
		2010	2011	2012
Installation		204,000	240,000	118,448
Installation (cumulative)	437,552	641,552	881,552	1,000,000
Equivalent MW (cumulative)	24	35	49	55

Table 1. *SHS installation targets since 2010*

Source: Data provided by Company C

Target market. Company C works in collaboration with partner organizations like the companies that are in the solar energy business and NGOs. The solar energy projects of Company C are collaborative efforts where strengths of each participating institution have been harnessed to the fullest extent. The international partner organizations have been contributing to the successful implementation of solar energy in Bangladesh through their global experience, company C through discharging social responsibility of the government and the POs through their access to the grass roots. The partner organizations are selected by an independent committee. The committee selects the POs based on short listing and field visit reports of Company C.

Strategies to make renewable energy more popular and affordable. The two types of grants – the capital buy-down grant to lower the costs of SHS and the institutional development grant to build up institutional capacity – are the steps Company C takes to ensure the SHS is more cost-effective for the POs and end users. Company C achieved its first target of installing 50,000 SHS in August 2005, three years ahead of the projected completion period and $2 million below the projected cost. According to the data provided by Company C, a total of 454,170 SHS have been installed throughout Bangladesh as of January 2010. This is a tremendous achievement by a company that is dedicated to popularizing and implementing alternative energy. Except for the PV module, components such as battery, charge controller, solar lamp and switch are produced locally. One of the local battery suppliers has doubled its capacity to meet the demand of the project. Along with reducing the costs for Company C, POs as well as consumers, local manufacturers of solar equipments are also creating job opportunities for people. To further reduce the cost of PV modules and to provide people with other opportunities, Company C is trying to establish a 1-2 MW solar panel assembly plant in Bangladesh.

Apart from giving away grants and loans, Company C, through its Technical Standards Committee, also ensures that the technical standards of the systems is financed. The company's Operational Committee looks after the operational aspects of the solar program, which include issues like installation of SHS, implementation status of the decisions taken and collection efficiency. Also, two types of audits conducted by an independent organization and company C's extensive training programs (including

consumer training on fixing minor problems without waiting for the technician) ensure proper implementation of solar energy technology in rural Bangladesh.

Different forms of media used in advertising products to different market segments. Company C develops and distributes publicity materials to raise awareness and popularize solar technology in different parts of Bangladesh. Among the publicity materials the company uses are posters, leaflets, T-shirts and billboards. Company C is working on providing more of the promotional materials to the POs for wider publicity of SHS. The company also advertised SHS on radio and television. Distribution of publicity materials by Company C, along with the advertising campaigns by partner organizations, play an important role in disseminating information on SHS in rural Bangladesh.

Major challenges and successes in marketing the products to the different audiences/market segments. Challenges that Company C faces:

- SHS is still quite new to people. Creating awareness is a big challenge.
- Promoting the systems as well as educating consumers.
- Natural disasters affect the company's monthly collection efficiency. As a result of Cyclone Aila, which had a devastating effect on the coastal region of the country, the government asked the POs to stop collection of the installments there. Collection efficiencies of the POs working on that region thus declined significantly.

Successes:

- There was no organized effort in the renewable energy industry when Company C started its program. The company's solar energy program provided a huge impetus to the implementation of SHS in Bangladesh.

- The company provides consumer training on SHS.
- According to Company C, the company's solar programs have brought in positive changes in the economy. For example, working hours have increased for small businessmen, weavers, tailors, hairdressers and handicraft makers. Students also benefit through extended hours of studies at night.
- Access to television and radio programs enable people to keep informed of news around the world.
- The company's projects provide people with a sense of security. People feel more secure at night after the installation of SHS.
- More job opportunities for skilled and unskilled labor have been created as a result of the company's solar programs. Local youths who have good ideas in the area are being hired by the unit offices. Partner organizations are also hiring engineers to manage the technical aspects of SHS.

Opportunities for renewable energy use. Company C's solar energy programs, on the other hand, are implemented exclusively through the partner organizations. Therefore, 100% of the company's efforts are materialized by the partner organizations like solar energy companies and NGOs. Company C oversees the business through its Technical Standard Committee, Operations Committee and Audit Department.

Company D

SWOT Analysis

- **Strengths:**
  - Company has a niche market and specializes in the most profitable project type.

- Has reputation as a socially responsible "green" company.
- The company has been successful in empowering individuals, businesses and communities toward energy independence, sustainable future and clean energy economy.

- **Weaknesses:**
  - The company faces challenges from its commercial/government/institutional market's low priority, lack of budget and general resistance toward renewables.
- **Opportunities:**
  - The company's emphasis on bigger systems yields better profitability.
  - Better opportunities for commercial, government and institutional customers in terms of tax credits and Renewable Energy Credits (REC) purchases.
- **Threats:**
  - People's preconceived notions about what the technology can and cannot do, as well as what the financial payback may or may not be.
  - Solar rebates may diminish as it did in the past years.

Marketing packages used to reach the target market

Predominant marketing packages. Company D of the United States specializes in ground and roof-top solar PV installations. The package includes 20-kilowatt power generating systems and energy monitoring and demand control systems. In this highly competitive solar market, the company focuses on (1) finding a niche market and specializing in one project type and (2) lowering cost of sales and operations. It is

cheaper for Company D to install one 20 kW commercial system than four 5 kW residential systems.

Target market. Company D targets commercial, government and institutional consumers. The company focuses on bigger systems, as it is easier to make profit on bigger systems. According to a Company D marketing representative, "With larger systems we can install one 100 kW project and only have to coordinate with one entity than work with 20 homeowners and their personalities." In addition, the economics such as tax credits and Renewable Energy Credits (REC) purchases for for-profit entities are much better for commercial, government and institutional customers than for homeowners and small non-profits.

Strategies to make renewable energy more popular and affordable. Renewable energy companies have federal and local incentives to help offset the initial high cost of installations. As electric rates go up, customers' savings increase from their solar systems. There are also some federal tax incentives that are beneficial for customers. Additionally, the company promotes itself as a socially responsible "green" company. For property owners, Company D suggests that in addition to the 20 years on incoming REC payments, they can also charge their tenants for green power. Having a solar array could also attract and help retain tenants.

Different forms of media used in advertising products to different market segments. Company D mostly uses its Web site (SEO), cold-calling campaigns, referral business and being on contractor lists/request for proposals. The web site brings the company to the attention of prospective customers who are actively seeking solar PV. The company makes its web site resourceful to potential consumers with downloadable

information and educational videos that use cookies to track activity by individual users. The company has a team of three in-house sales cold callers who compile lists of commercial properties and their owners throughout the target markets and call them and provide them with information on solar systems. The company believes the channels it is using to reach out to the target market are quite effective. Some of the alternative approaches would not serve its purposes. According to the company representative, "We've found that print advertising is expensive and hard to track. Phone books are outdated. Events are overcrowded with competitors and produce diluted results at best." On the other hand, the in-house cold callers have proven to be more effective than outsourcing a calling service.

Major challenges and successes in marketing the products to the different audiences/market segments. Company D, in its commercial/government/institutional market, faces some challenges such as:

- Prospects are too busy.
- Limited or no budget.
- Information gap or misinformation.

Preconceived notions about what technology can and cannot do as well as what the financial payback may or may not be are some challenges faced by the company.

Successes:

- Company D has been successful with its direct outbound campaigns.
- The company, for almost three decades now, has worked on empowering individuals, businesses and communities in an effort to achieve energy independence, sustainable future and clean energy economy.

Opportunities for renewable energy use. Among clients of Company D, corporate users constitute 70% and government users constitute the other 30%. The company serves more than 500 clients. Saving money and reducing clients' environmental footprint are the two major focuses of the company. The range of the company's projects encompasses state, county and city government centers, schools, colleges and universities, large companies and small business, churches and synagogues, nature preserves and national parks.

Company E

SWOT Analysis

- **Strengths:**
  - Offers its customers the most efficient panels available in the market.
  - The company has created a unique niche for its products and services consisting of farmers, ranchers and wineries.
- **Weaknesses:**
  - Had to shift business toward wind energy as the cost of solar is five times higher than wind. But putting some 60-foot tower is not "neighbor friendly" in cases of residential customers either.
- **Opportunities:**
  - State incentives on wind energy.
  - As electric rates grow up, wind power becomes a very efficient way to pump water and save considerably on utility cost.
  - It is simpler and cheaper to advertise in agricultural publications and to participate in agricultural shows and events.

- **Threats:**
  - The state incentives may diminish.

Marketing packages used to reach the target market

Predominant marketing packages. Company E of the United States sells a variety of solar panels from different vendors and represents 9-10 windmill distributors. The company offers its customers the most efficient panels available on the market to maximize energy potential. The company's current main focus, however, is on windmills since the cost of solar is five times higher than wind. It offers varieties of windmills for different needs. State incentive on wind energy is another reason for the company's new focus. The company has created a unique niche for its products and services.

Target market. Company E's major target market consists of farmers, ranchers and wineries – a unique niche for its products. One major expense of farming is water. As electric rates grow up, wind power becomes a very efficient way to pump water and save considerably on utility costs.

*S**trategies to make renewable energy more popular and affordable.*** Company E takes initiatives to educate its audience on how the federal and state subsidies work on their renewable energy systems. For example, the company would show clients how they can get a $95,000 windmill for under $16,000 with the state rebate program. Additionally, the federal government gives an Investment Tax Credit – a cash grant, which amounts to 30% of the total projected cost. Combining these two incentives, the cost goes down to a very affordable $16,000. Company E's major strategy in making renewables more affordable is to make people aware of the rebates. The company does this through education by presenting at farm bureau meetings. Another strategy is to list a 5- to 10-

year history of area utility costs. The utility costs usually increase yearly. Informing people of the projected rate increases by the utility companies in the next six months or a year works as a motivator for consumers to consider the renewable energy options.

Major challenges and successes in marketing the products to the different audiences/market segments. Challenges that Company E faces:

- The biggest challenge for the company in selling and installing solar projects, especially with the residential customers, is the initial cost and the large outlay of funds. It is difficult for customers to come up with tens of thousands of dollars. According to the Company E representative, "Even with a very efficient marketing campaign, trying to convince folks that it will be 10-12 years before their system pays off and that it STILL is a sound financial decision – can be a tough sell."
- The assumption was, as the solar rebates diminish as it did in the past years, the cost of panels would go down as well. The fact is that the cost of panels has only gone down a bit, but not to the level that makes it easily affordable for many.
- High cost was a major reason why Company E made the transition to wind energy.
- Putting up a 60 feet tower is not "neighbor friendly" in cases with residential customers.
- A major challenge for the company in promoting wind energy is to educate and get the word out to people.

Successes:

- Financially, the wind systems look quite lucrative for the wind companies as well as consumers. As the company representative points out: "In 2005, an $84,000

wind system (before rebates), cost $58,000 (after rebates). In 2010, a $95,000 wind system costs $16,000."

- Speaking to groups, attending shows and fairs and conducting large-scale mailing via e-mail – all brought considerable success in the marketing process to different target groups.

Opportunities for renewable energy use. Company E has a different consumer base which includes farmers and ranchers. They constitute 90% of the company's total users. Government users that would include school projects constitute 5%, and corporate or big industrial sites constitute the remaining 5% of the users. Previously, when rebates were larger for solar, the majority of the customers were homeowners who used to put solar panels on their roofs or install "ground mounts" if space permitted. The company then moved largely into wind technology, and the majority of the company's clients today are agriculture-based (ranches, farms and vineyards).

Company E, which is currently presenting to Farm Bureau meetings and attending trade shows as part of its advertising of wind energy, believes it should spend advertising dollars in a wider range of agricultural publications throughout the state. There are scopes of improvement in successfully reaching the target market. Mass e-mail marketing and a service called "Constant Connect," which has worked well with other industry products, could be the two avenues the company would like to try out in the future. Improvements can also be made by spending more dollars to buy targeted ads in major publications that are popular among the company's niche market. The company management believes that such plans as regularly scheduled and consistent television and radio ads, sponsorship of a major agricultural event, connecting schools and other educational institutions to

renewable energy (installing a small-scale windmill at a rural school, for instance, and putting a monitoring system), and offering a “raffle” for a “free” windmill would help them to be more successful in reaching the target audience.

Company F

SWOT Analysis

- **Strengths:**
  - The different packages are identified and developed through research. Packages are then bid individually, based on their various characteristics.
  - Flexibility in choosing the target market. For example, prior to 2009, the residential customers were the focus; now, the company is targeting general contractors and government facility managers. But still Company F has a mixed target group.
- **Weaknesses:**
  - The decision makers in various target groups are quite different. The company needs different types of information and approaches to convince decision makers of different groups.
- **Opportunities:**
  - Educating people on various aspects of solar PV has proven to be a useful tool. The company has been successful in educating commercial and government customers on grant opportunities and facilitating their involvements by writing grants.

- **Threats:**
  - The commercial customers expect a payback within a period of about two years, which is unreasonable.

Marketing packages used to reach the target market

Predominant marketing packages. Company F sells energy by watt at the cost of $4.50 per kilowatt. Packages are bid individually, based on different prices and variations on mounting, size and specific components. The pricing is industry standard for integrators in the United States. The different products and packages are identified and developed through research. Relationships develop and prosper when credit terms are favorable.

Target market. Prior to 2009, residential customers were the target market for Company F. At present, the company is mainly targeting general contractors and government facility managers.

Strategies to make renewable energy more popular and affordable. In order to motivate customers to choose renewable energy options, Company F focuses on financial opportunities such as grants, rebates and tax savings for initial purchase. The company's strategies emphasize money "earned" after paycheck of system cost.

Different forms of media used in advertising products to different market segments. Company F does not use any TV/radio spots for advertising its products. The company takes part in trade shows and events. The company also e-mails newsletters to prospective audiences. Company F sponsors appropriate events as part of advertising its products to its target market. The company uses the same advertising outlets to reach out to its customers – residential, general contractors and government facility managers.

Major challenges and successes in marketing the products to the different audiences/market segments. Challenges that Company F faces:

- The major challenge the company faces in marketing products to commercial customers is that the expected payback period is about two years, which seems unreasonable to the company.
- Effective education is a challenging task. Company F looks at educating people as an important tool in marketing its products, especially the residential customers. According to the company representative, “Most need tutorials on solar basics and terms before we can discuss options. People come from different backgrounds with different levels of knowledge and interest.” Therefore, it is crucial for the companies to provide different customers with the different information they need.
- Identifying and connecting with decision makers is a challenging task in marketing to government customers.

Successes:

- Exhibiting the company’s products at trade shows that are specially designed for government customers was effective.
- Since Company F is not GSA certified yet, most of its government projects fall under a general contractor. Therefore, the company makes focused efforts, which has been effective to reach out to general contractors.
- The company’s efforts in reaching out to residential customers by sponsoring neighborhood parties where it provides food and drink and presents slideshows have been a success.

- As part of its neighborhood focus, the company also offers special “kit” pricing with the same modules, racking, inverters, and monitoring system. The company also participates in home tours. Example includes the green home/cook house/AIA.
- The company was successful in its communication process with commercial and government customers. The company also was successful in educating commercial and government customers about grant opportunities and facilitating their involvement by writing grants.

Opportunities for renewable energy use. Among the customers of Company F, 20% are individual or residential users and 15% are corporate users. Government users constitute the largest portion of 65% of the total users. The company uses a third-party financial analysis provider to help the clients make educated financial and technical decisions about solar installation. Although payback is directly related to the customer’s system size and configuration, most of the company’s grid-tie systems with a rebate will break even after 4-9 years depending on usage and peak power consumption. Non-rebate systems, on the other hand, can take anywhere from 9-16 years.

Future of renewable energy

Millions of people in Bangladesh, especially in the rural parts, live outside the grid areas, and thus do not get any electricity. The prospect of the grid reaching them in the near future is slim. As the Company A representative said, “The process of grid expansion is a slow, difficult and expensive process, which has been virtually at a standstill for a long time. In fact, the generation of electricity falls far short of the demand even for the places which are already grid-connected.” According to the Company A

representative, SHS will be the only feasible means of electrification of rural homes. The increasing aspiration for a better quality of life with the availability of electricity, as well as with the increasing purchasing power of many rural families, opens up the market for SHS.

Company A's management envisions a great prospect for solar electricity in the urban grid-connected areas too. Solar energy can work as a supplementary power source for the long hours of load-shedding. The company's management also believes that the urban market for SHS in Bangladesh will be quite significant in near future. There is also a good possibility of expanding the business beyond the available packages and needs served. According to the Company A representative:

> Solar PV systems can be packaged as a more formidable power supply for richer people in urban and rural areas. While the present SHS are almost all DC (Direct Current) systems operated at a low voltage of 12-volt DC, one needs an AC (Alternating Current) system operated at 220 volt AC to run various other appliances such as refrigerators, conventional fans, motors etc. Therefore, AC Solar PV systems may also be marketed in future. Though much more expensive, this will increase the acceptability of solar PV among the more affluent people.

One of the future applications of solar PV in Bangladesh would be in the field of solar pumping. Agriculture accounts for about 23% of GDP in Bangladesh. Another 33% of GDP is contributed by the rural non-farm economy, which is also largely linked to agriculture ("World Bank supports…," 2008). Agriculture in the dry season heavily depends on irrigation either from ground water or surface water sources. Electricity is the most convenient power source for operating irrigation pumps; however, people away

from the grid would prefer solar PV-powered pumps instead of diesel-powered ones that are currently being used. The elimination of batteries from the pumps will be a big simplification and a major cost-saving measure in the solar PV-operated systems. It is expected that the next big change in the marketing of solar PV in Bangladesh will come in the shape of solar irrigation pumps. As the Company A representative says, "Both from the point of view of general electricity usages and solar pumping, the solar power business in Bangladesh is bound to increase many fold in the future."

The Company B management also sees a bright future for this business in Bangladesh. The government has also been taking initiatives to be able to accomplish the demand for electricity in both urban and rural areas. More renewable energy companies in the market would ultimately lower the prices of solar equipments. Solar energy can go a long way in Bangladesh. According to the Company B official, "We can dream of Bangladesh – a country which has risen to the challenges of global warming and transformed itself into a modern country where renewable energy technology is the everyday norm." Making renewable energy technology readily available at an affordable price can bring a true "Green Revolution" to the rural people. The Company B management does not think that it is too farfetched to dream:

> When we started promoting SHS to the rural people, most people though it was a utopian dream. It was an unachievable target. There were many challenges…Now after 15 years, we have a thriving Solar Home System sector with growing demand and increasing efficiency at lesser costs.

According to the data provided, a total of 732,907 SHS have been installed as of December 2010 under Company C's solar energy program. Company C's original

target was to finance one million installations by 2012. At the current installation rate, it is expected that the target will be achieved by August 2011. Company C, therefore, has recently revised its target, which is to finance 2.5 million installations of SHS by 2014. The 28 partner organizations have installed a total of 801,357 SHS throughout Bangladesh as of January 2011. These statistics provided by Company C are indicative of a great future of renewable energy in Bangladesh. Company C's collaborative approach with the other companies in promoting renewables in the country will resolve the country's energy crisis to a great extent in near future.

Company D management believes the market potential for solar is huge. Other than policy and market barriers in the United States, there are actually very few bottlenecks to slow it down. As the company representative says, "As the U.S. uses 25% of the world's primary energy, we need to find a way to get that energy without fueling contentious international relations, relying on other countries, or polluting our environment." Renewable energy industry fuses technology with manpower and creates job opportunities. Company D management believes, it is not too far away from happening when solar will become a standard energy source in the United States at the same cost or even cheaper than fossil fuels. According to the Company D representative, "Renewables will continue to get cheaper and eventually lose subsidies; fossil fuel energy will get more expensive as it gets harder to extract and carbon is taxed." But making renewable energy the major source of energy would not be an easy task, as the Company D representative says, "The road to get there will be very bumpy and possibly ugly with stop and go incentive programs and policy wars as conventional energy is pushed out."

Company E's management believes much of the future of renewable energy in the United States would depend on the continuation of rebates. The rebates must be big enough to make renewable energy affordable for people. Advancement in technology is vital as well – for example, thin style flexible solar panels and other improvements that are under way would make renewables more efficient. Political atmosphere is another area to watch. According to the Company E representative, "While one would like to think that everybody supports 'green' technology, some politicians still love the oil companies and are not supportive of renewable energy as others." The same individual believes there are huge potentials for renewables throughout the world. The younger generation has a task to spread the news of this tremendous potential of renewable energy around the world. Like the other companies, Company F also foresees a great future of renewable energy technology around the world. It believes the cost will continue to come down, and the need for renewables will continue to rise. With an improved and more efficient battery technology, solar energy will be more effective in meeting the baseline needs. More people will be attempting to adopt an off-grid life-style.

Table 2: *Major findings of the study at a glance*

	Company A	**Company B**	**Company C**	**Company D**	**Company E**	**Company F**
Products/ Packages	Intends to design packages affordable for all	Customized packages in response to energy needs	Channels grants and loans to participating organizations	Specializes in ground and roof-top solar PV	Varieties of windmills for different needs	Packages identified and developed through research
Target market	Families in villages, especially parents who make purchasing decisions	All groups of rural community	Solar energy companies and NGOs working on renewable energy projects	Commercial, government and institutional consumers	Farmers, ranchers and wineries	Residential, government consumers and general contractors
Strategies for affordable renewable energy	Microcredit system	Innovative financial schemes based on installments	Grants and loans	Federal and state incentives	Educates consumers on how federal and state subsidies work	Focuses on financial opportunities such as grants, rebates and tax savings
Media used	Person-to-person contacts, demonstration meetings	Leaflets, newsletters, participation in seminars, fairs and symposiums	Posters, leaflets, T-shirts and billboards	Web site, cold-calling and referral	Web site, agricultural publications and special events	Trade shows and events
Major challenge	Limited affordability of products by customers	High costs	Lack of awareness on renewables	Limited budget and information gap	High cost of initial installation	Lack of education on SHS and long payback periods
Major success	Successful in convincing target groups about importance of solar PV	Employment opportunities and empowerment of women	Company efforts brought positive changes to economy	Empowered business, individuals and communities	Great success in communicating with potential customers	Successfully used different media for different audiences
Positioning	User-friendly and	Innovative financial	Loans to partner	Socially responsible	Quality windmill at	Customer need is the

	affordable packages that would last long without much maintenance	schemes to make the technology affordable with the objective of creating ownership	organizations without collaterals or securities	"green" company	the cheapest possible price	number one priority. Products are developed through research
Opportunity	Using technology to serve the lowest income consumers	"Green Revolution" for rural consumers	2.5 million installations of SHS by 2014	Solar energy will become a standard energy source in the U.S.	Much of the future would depend on continuation of federal and state incentives	Cost will continue to come down and need for renewables will continue to rise

Discussion

This study has explored marketing strategies of renewable energy by selected companies in Bangladesh and the United States. The main focus of the study is to identify, compare and contrast issues like the chosen marketing practices of the organizations, types of media used for advertising the products, major challenges and opportunities in marketing to different market segments, success and failure of the various initiatives taken, and the overall prospects of renewable energy. Finally, the goal is to take the findings to a normative level -- recommending improvements on how renewable energy marketing can better serve both the companies and consumers. The study was designed to answer four overarching questions: (1) What are the basic marketing packages used to reach the target market, (2) What forms of media are used in advertising the products to different market segments, (3) What are the major challenges and successes in marketing products, and finally, and (4) What are the prospects/opportunities for renewable energy use?

Comparing and contrasting the marketing practices

All three participating companies from Bangladesh have a similar goal of facilitating rural electrification through Solar Home Systems (SHS) in the country. Considering the very limited purchasing power of the rural market, which is essentially the major market in Bangladesh, making SHS affordable is the main challenge for the companies. All the company representatives expressed excitement for how meaningful the changes in people's lives were as a result of installing SHS in their homes. Three to four hours of continuous lighting and about an hour of television viewing were very exciting for the people. The common system for the consumers to pay for the SHS is in installments over a period of 2-3 years' time. One of the participating companies gives loans to its Participating Organizations (POs) without any collateral or security deposits to implement renewable energy programs in Bangladesh. This unique offer could strongly encourage the companies to implement new programs. The cost-effectiveness of the POs as well as the end users is a big concern for the company when designing the grant systems. With a variety of incentives mostly offered by the government, this is one way of paying for renewables in the United States too.

In Bangladesh, the demographics of rural people are quite varied, consisting of groups with a very limited ability to pay, more affluent farmers, and families with members working in bigger cities or even abroad. The companies, therefore, are planning on introducing systems that could be affordable to the poorest of the poor. The companies are working on cost-cutting and various subsidies. The Bangladeshi companies are taking steps like training local young people from disadvantaged families, producing accessories and installing the systems at home rather than importing them to save costs. The

companies also receive subsidies from international organizations such as World Environmental Fund. A more effective government subsidy system, like that in the United States, would be beneficial for Bangladesh as well. One of the participating company's goals to make SHS affordable for all is to be able to set a price that the installment amount does not much exceed the cost of kerosene. Linking technology to income-generating activities and empowering people also play a crucial role in making SHS more desirable and affordable for more people.

Different products and markets

While SHS is the predominant solar system used in rural Bangladesh, because of the differences in the socio-economic structures, demand and purpose of renewables, renewable energy packages are different in the United States. As one can imagine, the popular packages are much stronger in terms of power generation and bundled with energy monitoring and demand control systems in the highly competitive solar market in the United States. Finding a niche market is the key in renewable energy business in the United States. But mostly because of the competitiveness of the market and considering consumers' willingness to pay, cost saving and making the renewables affordable is also a concern for the U.S. companies.

There is a strong contrast in target markets of the companies of the two countries too. While the companies in Bangladesh mostly target residential customers, the U.S. companies have a commercial, government and institutional target base along with the residential counterpart. Government incentives such as tax credits and renewable energy credits are much better for commercial, government and institutional customers in the United States. Both the federal and the state governments in the United States provide

consumers with a variety of incentives, whereas Bangladeshi consumers need more such incentives from the government for using renewables.

Demographics are quite different in the two countries too. In Bangladesh, the target market consists mostly of the rural population, while the demographics in the United States range from rural (farmers and ranchers) to urban (government and institutions). As electricity rates are going up in the United States, consumers could use renewable energy for cost-saving purposes. Being socially responsible and "green" is another major reason for shifting into renewables in the United States. Cost is the most important challenge and concern in both countries. One of the participating U.S. companies shifted its business to wind energy from solar because it receives more lucrative state incentives for wind.

The marketing approaches of companies in both countries appear similar when the target markets and the demographics were similar. When a participating U.S. company targeted farmers, ranchers and wineries, its strategic decisions such as product design, pricing, promotion and distribution process were similar to those of the Bangladeshi companies trying to reach out to the rural market. The Bangladeshi companies put a great emphasis on gaining trust and confidence of the rural consumers through listening and serving their needs. Companies work very closely with the customers. A tremendous achievement in implementing renewables in Bangladesh is empowering women by making them independent and entrepreneurs of change. Thousands of women today are working independently as renewable energy technicians and entrepreneurs in the technology centers in the villages. Although the rural market is the major market for renewable energy companies in Bangladesh, participating companies believe the urban

market can be a great one too, especially because of the increasing periods of load-shedding due to the low availability of electricity compared to the demand.

Advertising strategies

The study found some common means of advertising SHS by the Bangladeshi companies, such as person-to-person interaction and dissemination of information through word of mouth, demonstration meetings in the local centers, door-to-door consultations, banners, flyers and posters, seminars, symposiums, participation in village fairs, displaying SHS in schools, colleges and other institutions. The companies do not think extensive TV or radio ads would be as effective as the ones mentioned above, because of the limited TV viewership and limited number of radio listeners. These ads are costly too. Print ads in newspapers or magazines would not work either, as illiteracy is a major problem in rural Bangladesh. The companies focus on providing their consumers with important information on renewables and building awareness. Thus, many initiatives are taken to be able to interact at the community level through meetings, seminars and village fairs.

The advertising tools are different in the United States. The company web sites are great resources for prospective consumers. According to the participating U.S. companies, radio and television spots and print ads are not cost-effective. Rather, companies are more interested in participating and sponsoring special events, trade shows, e-mailing newsletters and cold-calling. One of the participating companies that has a rural customer-base takes part in agriculture shows and sponsors events – a very similar approach taken by the Bangladeshi companies.

Challenges and successes

The biggest challenge all the participating Bangladeshi companies face is limited income/limited ability to pay for a high-cost facility. Some hope for their locality to be connected with the national grid, which is probably not going to happen in the near future. The expense, longevity and intensity of power comparisons between grid and solar electricity tend to discourage some people from adapting renewable energy options. The successful recoveries of microcredits are also quite challenging, as the regular recovery sometimes become long and uncertain. Most of the SHS components are not locally produced, which makes it difficult for the companies to keep cost at an affordable range. That means limited profitability is a common scenario with the companies. As consumers often get SHS at the threshold of their affordability, a price increase will be critical. Bangladesh has a very limited number of financial institutions that fund the renewable energy sector. Also, more tax exemptions would popularize renewables in Bangladesh. Since the idea of solar technology is still new to many of people in rural areas, successful promotion of renewables as well as awareness building is a big challenge for the companies.

The U.S. companies, on the other hand, face different challenges from residential, commercial, government and institutional market segments. Successfully identifying and connecting with the decision makers is a challenging task in marketing to government consumers. The long payback period by commercial consumers, on the other hand, is sometimes problematic too. Like the Bangladeshi companies, high initial cost and the large outlay of funds are the major challenges in effectively reaching residential consumers. Lack of knowledge and education among residential consumers, for example,

is a problem. According to one of the participating companies, preconceived notions play a big role in decision making.

There is a tremendous demand for renewables in Bangladesh. The participating companies contributed to electrifying thousands of households in the country. Increased sales in turn decreased overhead costs that ultimately provided people with credit options. Local production of solar accessories also reduced cost. The Bangladeshi companies' offices throughout the country also created considerable employment opportunities for local people, especially women. The empowerment of women is very important in a developing country like Bangladesh. Successful implementation of solar energy technology also contributed to the reduction in harmful carbon emissions every year, which is a major environmental concern not only in Bangladesh but throughout the world.

The U.S. companies are taking various initiatives for educating and building awareness among people. Businesses and communities are being empowered in this regard for energy independence, sustainable future and clean energy economy. The companies are using a variety of communication channels to effectively disseminate information on the products, services, grant opportunities, as well as federal and state incentives such as tax cuts and rebates. All the participating companies emphasized the importance of educating people from different backgrounds on renewables.

All the participating companies envisioned a great future for renewable energy. Solar could become a standard energy source in the United States in the near future and could be available at a cheaper price than fossil fuels. Bangladeshi companies also expect to provide people with solar systems at a price similar to that of kerosene, so that the systems are affordable to anyone. With emerging technology, it will be possible to reduce

cost and offer renewables at affordable prices to consumers anywhere in the world. In developing countries like Bangladesh, there is a great prospect for renewable energy in the urban grid connected areas as well. Renewable energy in this regard would be a supplementary power source for the long hours of load-shedding.

Recommendations

Though the results of this study materialized through the responses from companies in two very different countries, surprisingly one sees many commonalities. The following are some recommendations applicable to both developed and developing countries, based on the results of this study.

Concerning products offered and targets addressed

- In order to effectively serve various segments of potential customers, companies have to develop appropriate product packages. The consumers may be residential ones from rural or urban areas, or they may be commercial, government or institutional customers. The products have to be appropriate to the consumers and must meet their specific needs, be it the poorest villagers in Bangladesh needing only basic lighting, or a big commercial concern in the United States requiring a strong electrical power generation for running a complex business. Appropriate new and emerging technologies may be adopted for this – very low-power-consuming LED lights in the former case, for example.
- It is often useful for a company to concentrate on a niche market; for example, agricultural customers, in the United States, are mostly served by wind generators, whereas solar PV water pumping would be beneficial for small

farmers in Bangladesh. A company, for example, may find it more profitable to focus on a bigger (100 kw) system for an institution rather than 20 homeowners (5 kw each). Each company should try to find and focus on a niche. By so doing, it provides optimum service to consumers.

- To cope with the high initial cost of the product package, companies should try to take advantage of clean energy subsidies such as rebates and tax benefits. whenever these are available.
- Companies should proactively pursue cost-minimization efforts in the products offered and the marketing system adopted. This can be achieved by introducing programs for low-cost production of batteries, accessories and solar panels to substitute for costly imports.

Reaching out to the potential customers

- Companies may find it more cost-effective to try to target potential consumers through direct contact, rather than through mainstream mass media (TV, newspaper or Internet advertisement). Thus, farmers' meetings or agricultural shows may be useful venues for promotions of a company focusing on the agricultural market. A raffle or an offer of a free system to selected individuals in a trade show may be effective as well. The same can be done in a village bazaar or a fair in a country like Bangladesh. For solar home systems, house-to-house contact is an appropriate choice in rural Bangladesh, while a neighborhood party with free food, drinks, slide shows and demonstrations would be appropriate both in the United States and Bangladesh. Of course

appropriate materials such as brochures, posters, flyers, banners and a well-designed Web site would be helpful.

- More expensive promotional efforts may be taken up by the groups or trade associations of the companies. The promotional efforts will be aimed at popularizing renewable energy for economic benefits and better lives for people. These can come in the form of TV/radio advertisements and organizing big trade fairs among others.
- Convincing potential consumers should be the main task. Advantages of renewable energy systems should be painstakingly explained. Grants, rebates, and available tax cuts should also be explained. One should emphasize the fact that a seemingly long payback period should not deter the consumers, as the package would still be useful for many more years afterward. The prospect of increased rates for conventional utilities in the future because of carbon tax is also important to mention. In the case of developing countries like Bangladesh, things such as the prolonged and frequent power cuts in the grid should not be overlooked.
- The importance of green energy should be highlighted to customers. The feeling of environment-friendliness is something the consumers will cherish.
- As technologies involved with renewables are sometimes new to people, awareness sessions should take place in schools, other relevant institutions, board meetings and even family get-togethers.

Expansion of the market

- Incentives given to customers in form of grants, rebates and tax exemptions will be critical in the expansion of the market. Therefore, there should be a concerted effort to lobby the government and relevant authorities through various environmental and specialist bodies, to maintain and increase the incentives.
- Companies should follow closely the aspirations and needs of potential consumers and their love for green energy. In case of poverty-stricken rural people of the developing countries, the companies should focus on improvement of purchasing power and desire for a better quality of life. These would allow the companies to consider expanding the markets to new segments.
- A variety of marketing modes should be considered for different segments. For example, in the case of the rural poor in developing countries, sharing of a system by several households (micro-utility), microcredit and pre-paid systems for buying power for a limited time may be adopted. For both developed and developing countries, possibilities such as standalone systems, local grids, and feeding electricity into the main grid could be considered.
- Companies should explore the possibilities of expanding into new areas of application of renewable energy. Some potential issues in Bangladesh, such as solar PV pumping for irrigation and alternative emergency power source during frequent power cuts in grid areas, have hardly been touched.

- Companies should try to reach the consumers whose income will be enhanced by the use of the renewable energy. It is particularly critical in case of rural low-income families in developing countries where a member can barely afford the systems on offer. A positive correlation between longer hours of business and income generation will immediately make the system attractive to them, especially where a microcredit facility is available.

Serving the customers

- Trust is vital for the companies providing renewable energy. The consumers should feel comfortable and risk-free in this less well-known technology. Personal contacts, consumer training, after-sale services, buy-back programs in case of any problems, are just some tactics that help build trust.
- In cases of marketing to small households in rural and remote areas, particularly in developing countries, the marketing objectives should emphasize that the purpose is not just profit, but also service to the community. Companies can create social business, which is a relatively new concept, in this regard. In social business, there is no loss and no dividend for the investor. The investor will only get the invested money back. The profit will stay with the company (Social Business, n.d.). Social entrepreneurship and corporate social responsibilities should also be integral parts of renewable energy businesses to serve the society. Aftermarket services such as repairs, maintenance and replacements should be easily available locally through direct personal contact.
- Involvement of the community will help in serving the customers. In case of rural use in developing countries, renewable energy marketing should be

accompanied with the training of local disadvantaged young people who can work as technicians for installation, repair and other servicing of the system. The empowerment of women should be an important goal in such trainings.

- For the sake of trust and confidence of the consumers, there should be appropriate agencies for quality regulation and standardization of renewable energy systems in countries where these are not present. Companies should cooperate in identifying or building up such entities.

Addressing the energy issues

- Companies should work in concert with others toward making renewable energy a significant and increasing part of the total energy mix of the country. In developing countries, this should play an important part in the rural electrification, giving more disadvantaged people access to electricity.
- Green energy for all should be a goal taken up by the companies along with other bodies working for it. Policy support and removal of barriers in marketing renewable energy should be proactively pursued. This is vital in both developed and developing countries.
- Adequate policy support and research funds have to be generated for the advancement of technology, which will make renewable energy sources more efficient and less expensive. For example, high-efficiency, thin-film, flexible solar panels should be available soon in the market at affordable prices. Companies should help create a favorable environment for this through advocacy and through making good use of the research.

- There is a huge potential for renewable energy throughout the world. This is especially true for the majority of people in developing countries who live in the off-grid areas. Companies in developed as well as developing countries should have plans to expand their businesses to serve this market.

Limitations and suggestions for future study

This study analyzed the marketing strategies of only three companies from Bangladesh and three from the United States. The involvement of more companies would enrich a study and would help the reader to get a better picture of the overall marketing strategies of the companies in the industry. This study predominantly portrayed solar energy market situations in the two countries. Future studies can address different forms of renewable energy in different regions. Future studies can address specific marketing elements and thoroughly analyze them, unlike the multiple elements presented in one study like this one. For example, a quantitative and qualitative study can be designed to analyze the product/packaging strategies of different companies. The involvement of more companies representing different geographic locations with more in-depth interviews of the company representatives would produce a more enriched study.

Additionally, because this is a comparative qualitative study, the methodology allowed the researcher to get information, but did not allow for consistent information from participants. A combination of qualitative and quantitative approaches might generate consistent results. Therefore, this study can provide important elements to researchers interested in further exploring this topic.

Conclusion

The study reaffirms the confidence of all the companies on the bright future of renewable energy business. A vast portion of the market remains untapped, and there are tremendous opportunities for rapid growth. But the incentives being offered by governments and international agencies should remain in place, unless these can be replaced by a reduction in cost. Technology development and wider applications could reduce the cost in future, which would make renewables more attractive and affordable to the customers. Companies have to carefully choose their products and appropriate niches and market segments, and adopt necessary strategies to get to where the companies want to go. The companies' pre-market conditioning efforts in this regard include educating people on renewable energy and empowering people toward energy independence and sustainable development. Effective communication and utilizing proper advertising platforms are keys to promote renewable energy among people. All the participating companies attest to the fact that direct contact with potential customers is still the best and most cost-effective method of reaching them. If companies, government and foreign agencies take proper initiatives to popularize renewables and make the systems affordable, renewable energy in near future could be able to alleviate the ongoing global energy crisis.

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