'Green Investing' as an Approach to Make 'Green Bangladesh': the Role of Stock Exchanges

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ABSTRACT

Manufacturing various products and delivering numerous services have its respective impacts on the environment. Today, a range of eco-friendly economic instruments available worldwide, such as the eco-investment, green stocks, green investment, green banking, green bonds, green savings accounts, green mutual funds, green money market accounts and green certificates of deposit that have gained the positive reputation among many investors in the stock markets. Green investments are directed by corporations that invest in businesses committed to the environment. Some of these businesses either implement entire energy practices or good waste management systems. In the past, very few companies could have been called eco-friendly, along with several nations ensuring their support for the environment and creating environment-friendly policies, several companies have come forth with a clear objective of being responsive to the environment and lessen emissions. Bangladeshi mutual funds have not really presented much achievement in the green fund arena through the global counterparts is working in this sector. In this context, this paper intends to attract the attention of corporations towards green investments, which are effective for safe-environment and protection to earth. This paper focuses on various green investments and green investing companies in Bangladesh, and the primary focuses are: (1) to acquaint with nature of the companies involved in green funds and green investing, (2) to make an overview of different global green investing arrangements, (3) to suggest Bangladeshi companies to come forward in green investing to make Bangladesh green and pollution-free.

Keywords: Business Ethics, Green funds, green investments, green portfolio and social responsibility

INTRODUCTION

Manufacturing various products and offering numerous services, investments, laws, and strategies have its respective impacts on the environment. It is indeed, good news that there is a range of eco-friendly economic instruments available worldwide, such as the eco-investment, green stocks, green investment, green banking, green bonds, green savings accounts, green mutual funds, green money market accounts and green certificates of deposit (Peattie & Charter, 2003). These investments have gained in positive reputation among many investors in the stock markets, for the past few years. Green investments are directed by corporations that invest in businesses committed to the environment. Some of these businesses either implement entire energy practices or good waste management systems. Then there are some corporations involved in manufacturing recycled products or promoting renewable energy. In addition, some of them set aside means to clean the environment (Peattie, 2001). These are corporations who execute their duties to the environment while enhancing their bottom line and earning a profit as well. Apart from the 'feel good factor' about supporting to keep the world clean and being a socially responsible citizen, someone can also accomplish financially by investing in these funds. In the past, very few companies could have been called eco-friendly, along with several nations ensuring their support for the environment and creating environment-friendly policies, several companies have come forth with a clear objective of being responsive to the environment and lessen emissions. Bangladeshi mutual funds have not really presented much achievement in the green fund area through their global counterparts is working in this sector (Cronin, Smith, Gleim, Ramirez, & Martinez, 2011). It is not surprising that there is a growing concern about the role of society and environment in decisions of investment (Masoom &

Zaman, 2017; Nodee & Masoom, 2016). In this context, this paper intends to attract the attention of corporations towards green investments, which are effective for safe-environment and protection to earth. This paper focuses on various green investments and green investing companies in Bangladesh. Here, green Bangladesh refers to pollution free Bangladesh (Rahman, Barua, Hoque, & Zahir, 2017). In recent years we have seen that the technological development in the country caused e-waste (Masoom & Toufique, 2016). In addition, an enormous usage of plastic bottle in Dhaka city, where there was no Container-deposit legislation (CDL) enacted, threatens the ecological balance (Toufique & Masoom, 2015). Like all other megacities, the materialistic values are on the rise in this city dwellers (Masoom & Moniruzzaman Sarker, 2017), hence, how to make the country green, has become a pivotal issue. The primary objectives of the paper are (1) To acquaint with nature of the companies involved in green funds and green investing, (2) To make an overview of different global green investing arrangements, (3) to suggest Bangladeshi companies to come forward in green investing to make Bangladesh green and pollution-free.

Review of Literature

Matthew Haigh and James Hazelton have come up with a study on the market share of Socially Responsible Investing (SRI) funds in the most developed regions i.e. Europe, United States of America and Australia, to show that the claim of SRI funds is unlikely to lead to any outcome (Haigh & Hazelton, 2004). SRI funds also comprehensively claim that they will outperform the traditional active mutual funds. This paper makes a breakthrough in the SRI literature by adopting an accredited framework to explain the constant presence of SRI funds. SRI funds are encouraged to invest in companies that have issues at a more systemic level. A recommended mechanism is the joint persuasion by corporations and more specifically governments.

Katherina Glac stated that "the phenomenon of socially responsible investing has become more common over the past two decades" (Glac, 2009). Nevertheless, it is noteworthy that knowledge and ability of a distinct socially responsible investor are heavily constrained to the eloquent and comparative aspects. The import question of "why do some investors practice socially responsible investing and others don't?" therefore remains unanswered'. To resolve this constraint in this literature, this paper develops the model of the decision for investment in a socially responsible way that is based on the cognition works. The hypotheses suggested in the model have been verified with an experimental survey. The results indicate that the how investment scenarios are presented i.e. framing of the scenario influences the probability of involvement in publicly responsible investing and how much return the persons are prepared to sacrifice when selecting socially responsible over conventional investment alternatives. The study does not find the support in favor of an association between expectations about corporate social responsibility and the probability of engagement in socially responsible investing.

Céline Louche looked into the matter of investor's standpoint of the arena of corporate social responsibility and more precisely on the practice of Responsible Investment (RI) (Louche, 2010). The aim of the paper was threefold: first of all providing a general context on Responsible Investment – definition, history, influential factors, and inclinations; secondly, to give a broad idea of the current performs of responsible investment and its key features and finally to discuss some vital issues that may change the course of the future of RI. RI is still a progressive and underdevelopment activities expected to keep up its growth in near future. Responsible investors can play a pivotal role in transmuting the concept of investing by combining social and environmental aspects while concurrently bringing up the issue in a corporation's CSR agenda.

Greig A. Mill's research empirically tests the monetary performance of a UK unit trust that was at first "conventional" but later carried out socially responsible investment (SRI) values such as the ethical investment principles (Mill, 2006). A comparative analysis is conducted with three comparable conventional funds whose investment objectives continued as before. Analysis techniques applied in previous studies came up with similar results: average risk-adjusted return i.e. performance is unaffected by moving to SRI, with no indication of over-or under-performance relative to the suitable benchmark market index by any of the four tested funds. More intriguing was the fact that changes in standard deviation i.e. variability of returns over time which is a measure of risk are also modeled using generalized autoregressive conditional *heteroscedasticity* (GARCH) models, that has not been previously applied to SRI funds that are known so far. Results illustrate a transitory increase in variability of returns, followed by a return to going back to previous levels after around four years. Evidence shows the augmented variability to be tagged with the implementation of SRI rather than with a change in fund's management. Possible explanations for the later reduction in variability include the wider outreach of corporate social responsibility activities by firms and steeper learning curve by fund managers. In addition to indicating on a formerly overlooked phenomenon, this paper raises demands for supplementary research.

Discussions

The companies in contemporary years emphasized not only on profit maximization but also socially accountable approach where businesses are not answerable to stockholders and stakeholders. Among the stakeholders, the environmental concerns are emphasized on investment pattern of a company. It is the responsibility of firms to use

its resources to benefit the society. A method that underwrites to sustainable development by environmental reimbursements for the stakeholders is the central activity of socially responsive businesses as well as for the trade communities. It is now undoubtedly recognized that businesses and corporate houses are now not confined to the strict consideration of profit maximization, they are also working for a better cause which is called Corporate Social Responsibility (CSR) (Akter, 2012; Rahman et al., 2017). One of the salient features of CSR is that it is not a lawful binding; rather it is more of deliberate social and environmental footsteps for socially-responsive businesses. Appropriate uses of jargon refer to CSR reporting including such terms as 'socially responsible accounting', 'corporate social disclosures', 'sustainable reporting', 'social accounting', and 'social and ethical accounting' (Nodee & Masoom, 2016). It merely refers to the external interpretation of social, ethical and environmental features of business organizations. It is also considered to be an amalgamation of activities intended to promote sustainable development in social, environmental and economic aspects. Bangladesh is one of the most environmentally challenged countries, where severe air, water, and noise pollutions are threatening human health, ecosystems and economic growth of Bangladesh (Akter, 2012). Air pollution is one of the consequences of population explosion, excessive burning of fossil fuels, industrialization and associated motorization. The water pollution is triggered due to industrialization. The underground water of Bangladesh has been contaminated due to arsenic poisoning. The dwellers of major cities of the country are also divulged to a high level of sound pollution. The overall degradation of the environment is also affected due to poverty, over-population, and lack of awareness regarding the subject. It is facilitated by deforestation, soil erosion, destruction of wetlands, and natural calamities. What is alarming is that, no single company offers green stocks in Bangladesh's stock market. Nonetheless, several listed companies in the Dhaka Stock Exchange (DSE) and the Chittagong Stock Exchange (CSE) are giving emphasis on social and environmental issues which are also part of the stakeholders of the companies (Rahman et al., 2017). Green investments fall under the category of socially responsible investing (SRI) or Impact Investing. The companies that invest in green funds usually try their best to make sure that their daily operations do not hamper environment much and have an as little negative effect on the environment as possible and emit as little pollution as possible. Many of these companies also cater to products and services that are made with a view to making the planet a cleaner, greener and better place to live in (Peattie, 2001). If we are looking for areas to invest our money while still maintaining a positive environmental outlook, we should undeniably go for investing in green investing more specifically green mutual funds and alternative energy mutual funds. Green investments are a great way of earning money while keeping the earth green. In today's world, the market plays a pivotal role in almost every decision that the people make in their lives (Masoom, 2015). Anyways, keeping our focus on Green investing, these are funds that invest in companies whose activities, projects and investments are beneficial or at least supportive for the environment, instead of destroying it or resulting into problems like the variety of pollutions. Examples for these kind of green companies can be those that are involved directly in helping the environment–like effective waste management, innovative recycling, or asbestos removal companies, or that have clean, sustainable, "Green" business models– meaning that their processes are not environmentally harmful and cruelty-free.

We have listed few companies that are believed to be worth investing in the lines of Green Investments and hopefully, in this present market turmoil, if we decide to invest for the long term we might get a cheap bargain. We have witnessed that institutional investors play a crucial role in the Dhaka Stock Exchange (Alam & Masoom, 2016). The following are examples relating to green funds and green investing companies.

1. Calvert Global Alternative Energy Fund (CGAEX): This invests only in alternative-energy companies. This fund was launched in 2007 and is managed by Jens Peers, the head of eco-investing for KBC Asset Management. Peers are based in Ireland and have a firm awareness of the political and legislative landscape in both the U.S. and Europe. This is exceptionally important in alternative energy since government opinion about which types of alternative energy to subsidize can have a prominent impact on the companies. Current holdings include Gamesa (GCTAF) and Vestas (VWSYF), the two biggest wind turbine manufacturers.

2. Canadian Solar Technology: Canadian Solar, which is incorporated in Canada but carries out all manufacturing in China, makes solar cells that convert sunlight into electricity. They struck a deal in July 2008 with Conergy to provide modules for photovoltaic systems.

3. Chesapeake Energy: Chesapeake Energy is the cleanest burning hydrocarbon on the planet and it's a producer of natural gas. In North America, there are already enough known natural gas deposits to power the U.S. for at least the next 120 years.

4. DWS Climate Change's: At year-end, its top holdings included Technologies (UTX Quote), General Electric (GE Quote), and Siemens (SI Quote). All three are active in the space, but their substitute energy divisions are too small to move the needle for any of them.

5. FPL Group Utilities: Based out of Florida, FPL Group is the parent of Florida Power and Light, a utility that produces most of its electricity from clean and renewable fuels. It's counted among the leaders in wind power generation with 55 wind farms in 16 states.

6. Hexcel Technology: Hexcel manufactures carbon fibers and other composites used in the making of wind turbines. To meet China's growing demand for wind power, the company is scheduled to open a new plant in Tianjin, in October 2008.

7. Intel Corp: Intel, the company that's best known as the maker of Pentium Processors is also heavily involved in the solar trade. In fact, Intel's solar business is doing so well that they announced plans to spin it off into a separate company called SpectraWatt in June of 2008.

8. EnerSys: EnerSys is a producer of lithium-ion rechargeable batteries, the type of battery used to power hybrid electric cars. Furthermore, the company won a contract to provide batteries for submarines.

9. Apogee Enterprises Services: Apogee Enterprises creates energy efficient glass called CrystalGray, this special glass can reduce utility bills up to 30 percent.

10. Interface Inc.: Interface is the world's largest seller of recycled carpet. The Founder and Chairman Ray Anderson was the keynote speaker at GreenWorld, a trade conference on sustainable design. He and the company are committed to producing new materials by recycling old carpets.

11. New Alternatives Fund (NALFX): Since 1982, this fund also benefits from deep manager experience, with the father-son team of David and Maurice Schoenwald at the helm. New Alternatives for the past five years has returned an average of about 20 percent per year, outperforming the benchmark S&P 500's 10 percent a year. The fund's holdings count alternative-energy companies like solar cell manufacturer Q-Cells (QCLSF), also non-energy companies like Owens Corning (OC: 26.49, +0.96, +3.76 percent) and Whole Foods Market (WFMI: 27.76, +0.02, +0.07 percent). The expense ratio is one of the lowest for a green fund and it's at 0.94 percent, but there's also a maximum upfront sales charge of 4.75 percent. Morningstar's Herbst's only hesitation is that the managers do all the research and stock selection themselves. They do not have any group of analysts who are working for them, neither anyone else is involved in the fund's regular decisions, which is a risk should anything happen to the managers.

12. Portfolio 21 (PORTX): PORTX is a fund which invests in companies all around the world of all size that are incorporating sustainability into everyday business practices. Although, over the period of time they may have changed their investment strategy, but based on the information that is available from various source like internet, the estimate parameters for investment in the Green mutual fund call PORTX or Portfolio 21 are: Companies are evaluated on a wide range of factors: their investments, products and services, leadership on environmental sustainability, facility-level improvements, liabilities and environmental management processes. A company need not to be something outstanding in every area to ensure the fund, rather it must have strengths in several areas.

13. Winslow Green Growth: After PORTX, there is another hugely popular Green Mutual Fund called Winslow Green Growth Fund. This fund primarily invests in the U.S in small-cap growth companies. However, they have a strict specification for investment – They invest entirely in firms whose impact is either beneficial or benign to the environment. The first shortlist the so-called GREEN companies and within them, they look growth opportunities. Since there exists a large number of small companies, the segment of small-cap stocks give them a big and wide base of companies for investing. They also do an environmental review to make sure their invested companies are off the track and started causing environmental degradation. One of the very well-known Green mutual fund for investment with depth of options for investments.

14. PowerShares Wilder Hill Clean Energy Portfolio: PowerShares WilderHill Clean Energy Portfolio follows the WilderHill Clean Energy Index (ECO), which is a basket of selected 36 clean energy stocks that specify the U.S. clean energy sector. The term clean energy is used to define the industries that stand to provide value substantially from a social transition by use of cleaner energy and conservation. This fund is primarily an Exchange traded fund or ETF, which can be called as Green ETF or a clean energy ETF, which tries to reproduce the WilderHill Clean Energy Index (ECO). A very well-known fund among the investors, giving them the Green Mutual Fund concepts is yet to become available for real-time trading as like the one available in the form of ETF.

15. Sierra Club Funds: Although no real "Green Companies" in the large-cap fragment, nevertheless this Sierra Club fund invests in large-cap companies which are thoughtfully screened to avoid industries the Sierra Club think environmentally harmful. Therefore, this particular fund may not set off for companies that are in the solar energy business, except they are open to the companies that care for the environment and reduce their ecological footprint that's good for the environment and can have an outspread effect. Since they are large companies, they have the money and influence to make a footprint if they take any green initiative.

16. Sasol: Sasol specializes in coal-gasification, a process that makes coal a cleaner fuel to burn. The company is working in collaboration with China's Shenhua Group to produce motor fuel from coal by 2016. So with the fuel price showing a lot of volatility, the environmentalist taking a cover and raising their voices against Global Warming, concerns being raised about the use of Fossil Fuels, it is time for all the investors to think and work in the Green Investments sectors or spend in Green Companies.

17. Wal-Mart Services: Wal-Mart might seem like an unusual green trade, considering it's the nation's biggest user of electricity. However, Wal-Mart is testing diesel blends in its fleet of trucks, it's designed new milk jugs that are more suitable for the environment and it bundles used plastic wrap and sells it for recycling.

18. Winslow Green Growth Fund (WGGFX): This is launched in 2001, has been a strong performer, with a five-year average annual return of about 25 percent. That's significantly more than the benchmark Russell 2000 Growth index, which saw a five-year annualized return of 16 percent. Current holdings include Green Mountain Coffee Roasters (GMCR: 66.29, +0.36, +0.54 percent), Chipotle Mexican Grill (CMG: 88.86, - 1.01, -1.12 percent) and First Solar (FSLR: 136.74, -2.25, -1.61 percent). The major selling point of this no-load fund is its managers, Jack Robinson and Matthew Patsky. Both have been involved in "green" investing for years, and have a depth of experience that's unusual for environmentally focused funds. Although the expense ratio of 1.45 percent may seem high, it's on the low end for an actively managed alternative-energy fund. The fund invests primarily in small-cap stocks. If that feels too risky, there's another option. In late 2007, Robinson and Patsky launched the Winslow Green Solutions Fund (WGSLX) with essentially the same strategy, except that it targets larger, more established companies like BorgWarner (BWA: 32.67, +0.49, +1.52 percent), Veolia Environment (VE: 32.71, -0.05, -0.15 percent), a French utility, and Ingersoll-Rand (IR: 36.27, -0.15, -0.41 percent).

Green financing can play a pivotal role in implementing the broader arena of sustainable economic development. Lack of access to finance in Bangladesh is characterized by to a larger extent real market risk as macro economy of Bangladesh is undergoing several developments (Ko, Hwang, & Kim, 2013). The perception of higher risk relates to increased discount rate i.e. higher interest rate, loans with short-term tenure, and incremental equity requirements in this country. We need to resolve these financing barriers in order to promote green financing ensuring our long-term economic growth. Among many developing countries, Bangladesh has its own success stories, mostly through Solar Home System (SHS), positively impacting the life of millions of off-grid people living at the bottom of the pyramid. Other developing countries have enhanced their Renewable Energy (RE) investments in a steeply upward trajectory since 2004 specifically making it double in last four years. In the year 2014, financing for RE globally in the developing countries region were almost equal with that of developed ones, with the first group attracting $131.3 billion and the second group $138.9 billion (Rahman et al., 2017). To achieve high economic growth as laid out in the five year plan, the government of Bangladesh has prioritized power sector development in a more proactive manner. Side by side with establishing conventional power plants, the government has set ambitious renewable energy goal of generating 500 MW power by 2016 and solar power to contribute about 10 percent of total generation by 2021. So far the plan has worked very well for the country, where total installed capacity of RE is 167 MW and many mega projects are in the pipeline to follow expected to come in light in coming years.

In spite of this encouraging picture, the sector is yet to reach its fullest potential. There are multiple factors responsible for impeding the faster growth of RE sector, within which finance has to play the most prominent role. RE finance in Bangladesh faces a pool of barriers, resulting in lagging behind from the anticipated schedule of implementation. In order to bring this gap closer, the mobilization of private investment and finance is highly essential. This approach is relatively new since previously the bulk investments in infrastructure have been done through Government. These days, private institutions are becoming more and more active in a variety of roles across the energy sector in different areas of the country. In Bangladesh, There are a lot of companies working with environmental agendas, a snapshot of which is given below:

Aftab Automobile Limited (DSE: AFTABAUTO) presented HINO automobiles that are extensively operated on every route of the country. The enterprise has also familiarized environmental friendly (CNG-driven) *AK1JMKA* model HINO automobiles for the first time in the nation. To offer the uppermost luxury on roads, Aftab Automobiles Limited has of late introduced 'HINO *RM2KSKA*' model- the most exclusive transport in the country. On the other hand, Berger Paints Bangladesh Limited (DSE: BERGERPBL) offers an environment-friendly series of '*BreatheEasy*'- the first-ever odor-free and eco-friendly paint in the country. In 2012 two more products were launched - *'BreatheEasy Wall Putty'* and *'BreatheEasy Water Sealer'*. The *BreatheEasy* chains are environment-friendly as these have low volatile organic compound (VOC). Its 'anti-bacterial' and 'stain-free' features shield the fence from stains and fungi.

Eastern Housing Limited (DSE: EHL): In the amenities and real estate sector, EHL states the operation is to shape and develop environment-friendly apartments, commercial buildings and land projects by means of the highest standards of security, architecture, green technology, and manufacturing. Manzurul Islam, the Chairman of the Eastern Housing Limited said that "In order to ensure environment-friendly sustainable real estate, we have emphasized on the usage of environment-friendly building materials, effective wastage management, and efficient energy systems." For the distinguished shareholders, the firm focuses on the environment-friendly maintainable real estate by usage of environment-friendly building resources, operational wastage management, and efficient energy schemes.

Dhaka Electric Supply Company Ltd. (DSE: DESCO) stimulated the use of renewable energy and confirmed installation of the eco-friendly solar panel with a volume of around 2.7 MW for 2,491 numbers of clients at their sites up to June 30, 2012, in line with the administration policy. DESCO installed a solar panel with a volume of 17.04 kW at its own 48 installations up to June 30, 2012.

IDLC Finance Limited (DSE: IDLC): As a non-banking financial institution, IDLC is more concerned about the environment. Selim R. F. Hussain, CEO & Managing Director told the stakeholders that IDLC's external environmental efforts mainly revolved around continuing tree plantation initiative, which was begun a few years ago, and the launching of an environmental awareness campaign in different schools. This initiative was aimed at educating children on matters such as mitigation and environmental pollution, adoption of the 3R principle of Reduce, responsible consumption of natural resources, Reuse and Recycle to minimize wastage etc. IDLC covered 11 schools and is receiving very positive feedback from these schools.

Monno Ceramic Industries Limited (DSE: MONNOCERA): In the ceramics sector, It is a robust supporter of the environment, spending, for example, simply natural non-toxic materials in its porcelain, and merely recycled pulp in its packaging dumping of waste factory products in accordance with the European standards. Monno does not employ children or distinguish between genders and has an equivalent opportunity policy. It also cautions for the community, providing welfare, basic education, vocational training and for those less well-off, together with a home for the underprivileged children. That advance from these programmes is facilitated to find jobs according to their distinct abilities. Monno's own social environmental and ethical policy is of its customers and has satisfied the necessities of all factory and ethical audits autonomously carried out on their behalf.

Trust Bank has in full swing its green journey after partaking green banking, development considering the environment, preserving environment and biodiversity and environmental risk management strategies.

The Bangladesh Bank issued guidelines for green banking and environmental risk management in 2011. In August 2009 the central bank launched the BDT 2 bn. green banking refinances scheme to set up biogas plants, solar panel, and industrial ETP (effluent treatment plant) under the scheme – to help reduce industrial pollution and at the same time increase supply of power. The introduced fund has been given the name of "solar energy, biogas and effluent treatment plant sector refinance scheme". More new sectors other than solar have been brought under the green banking refinance scheme to establish an environment-friendly economy," Under the refinancing scheme project, Bangladesh Bank is giving out loans to commercial banks at interest rates from 5 percent to 12 percent for direct refinancing and credit wholesale to the entrepreneurs. Entrepreneurs will then have access to commercial bank loans in those sectors at a maximum interest rate of a further 5 percent. According to the fund's conditions, overall interest rates will not exceed 12 percent.

Banks will be given a maximum of 100 percent refinancing facilities against their finance in setting up those plants in rural and urban areas and sewage treatment plants for polluting industries. Consequently, the banks can sanction up to BDT 40 mn loans for setting up effluent treatment plants, under the newly revised scheme. Previously, the limit was BDT 10m. The banks will be allowed to lend out in rural areas up to BDT 175,000 to install solar panels in their home and BDT 150,000 for setting up solar mini-grids.

For biogas power plants, loans amount varies from BDT 50,000 up to BDT 2.5m which can be allocated for coordinated cattle farming under the refinancing scheme. For PET bottle reprocessing plants, LED bulb manufacturing plants and environment-friendly brick kilns, banks have the ability to provide credit up to BDT 50mn.

The scheme was initiated to stay in line with the government's focus to meet 5 percent of the entire demand for electricity from green energy by 2015 and 10 percent by 2020. Thus far Bangladesh Bank has managed to include new 40 environment oriented products under its revolving finance program for solar power, biogas, and effluent treatment plants by giving loans at an affordable interest. The banks and FIs have already managed to disburse BDT 826 bn as green financing during the period of January 2012 to June 2014. The BB has brought 47 green products under its refinance scheme where 23 are green energy products. BB also has set an annual target for banks and financial institutions for direct financing which had been made mandatory from January 2015. Here has a quick review of the refinancing process and on other related issues:

a) Solar Energy

Under this scheme, one will get re-finance if he/she generates electricity by setting up a solar panel in their apartments, business organization, cooperative society or for other family reasons with the help of banks or other financial institution that provide finance for such purposes.

This scheme also includes the following sub-sectors:

- Solar Home System
- Solar Irrigation Pumping System
- Solar Mini Grid
- Solar Photovoltaic Assembly Plant

The Capacity of Solar System ranges from 10Wp to 50KWp. The amount of loan ranges from BDT 10,000 to BDT 60,000,000.

Entities that are eligible:

- Single/Joint Family
- Cooperative Societies
- Business Enterprise

The rate of Interest for Loan Holder:

• If banks or any financial institutions provide a loan to the consumers directly, the rate of interest ranges from 8 percent to 9 percent.

• If banks or other financial institutions provide Micro Finance Institutions (MFI linkage), the rate of interest ranges from 11 percent to 12 percent.

Loan Payment Period and Interest Calculation:

Loan repayment period ranges from 4 years to maximum 10 years. Interest calculation shall be done using reducing balance method.

Period of Re-financial Loan Payment:

Re-financial loan repayment time ranges from minimum 6 months to maximum 10 years.

Debt-Equity Ratio:

This ratio will be based on the mode of banker-consumer relationship.

b) Bio-Gas

Under this scheme, one will get re-finance if he/she takes a loan from banks or other institution for the purpose of producing and using bio-gas in both urban and rural areas.

This scheme also includes the following sub-sectors:

- Setup of Bio-gas Plant in Existing Cattle/Poultry Firm
- Production of Organic Fertilizer from Slurry
- Combined Cattle Rearing and setup of Bio-gas Plant
- Setup of Medium Bio-gas Plant

Loan Amount:

The amount of loan ranges from BDT 25,000 to BDT 2,500,000.

Entities who are eligible:

Single or Joint Family or Enterprise has the eligibility to avail the loan.

Debt-Equity Ratio:

This ratio will be based on the mode of banker-consumer relationship.

The rate of Interest for Loan Holder:

- If banks or any financial institutions provide a loan to the consumers directly, the rate of interest will be 9 percent.
- If banks or other financial institutions provide Micro Finance Institutions (MFI linkage), the rate of interest will be 11 percent.

Loan Payment Period & Interest Calculation:

Loan payment period ranges from minimum 3 months to maximum 5 years. Interest shall be calculated using reducing balance method.

Re-financial Loan Payment Period:

Re-financial loan payment time ranges from minimum 6 months to maximum 5 years.

(c) Potential financial mechanisms for Renewable Energy (RE)

In Bangladesh, the following schemes can be of use in order to promote renewable energy financing:

Green bonds: These are bonds backed by assets and facilitate re-financing of renewable energy projects that ultimately result in liquidity. It is also known as climate bonds. These are considered to be very popular in many developed markets, especially in United States of America, Europe, and China. So it can be introduced in a developing market like Bangladesh as well.

Debt funds: It is designed to deal with bank debt instruments of infrastructure projects with setting up a low cost, long-term debt from pension funds and insurance with a view to re-financing the project. In 2011, Debt Fund was initiated in India in order to promote RE finance. So it is quite possible to bring in such type of funds in Bangladesh.

Off-grid fund: Off-grid funds backed by CSR and individual sources of high-net-worth can be of great use in supporting the development of rural and commercial off-grid projects, with a view to focusing on financial return and social impact simultaneously.

Risk Insurance Instruments: Insurance instruments provide protection against various uncertainty and risks involved in RE project i.e. resources, off-taker, technology, power purchase agreement, project development risks etc. These types of instruments can draw the attention of a large number of risk-averse lenders and investors to the sector.

Above mentioned mechanisms are successfully executed in many countries and it can really make a breakthrough in Renewable Energy investment by assembling various new mode of financing i.e. sovereign wealth funds, pension funds, CSR Funds etc. It can also promote refinancing of debt with the combination of lower-cost funds and longer tenure along with providing a wider approach to tax benefits and up surging the interface of investors. So we can initiate these types of new and emerging financing window in order to facilitate RE financing on a broader scale.

To Promote Green RE finance

To mobilize finance for renewable energy, a holistic approach is a must, keeping in mind that each renewable energy market has some unique features and complex systems that need to be addressed. Financing structure must be tailored to the context of the locale where the funds will be disbursed, coupled with a supportive and transparent regulatory policy and its enforcement with government interventions where needed. The following measures can be taken to boost the scope of RE under BB's current green re-financing scheme:

At present, the status of disbursement of funds in RE project has not reached up to a satisfactory level, where

simplification of loan disbursement due diligence and management of collateral can change things dramatically.

RE financing packages that are well tailored can reduce the variance for RE project due to diligence procedure and can effectively address issues like credit linkage, different risk exposures and uncertainty regarding repayment.

RE financing should not be restricted or linked to single borrower exposure limit which already in practice for conventional lending in power projects.

BB can increase the frequency of disbursement within the re-financing program for Private Financial Institutions such as banks and NBFIs and align the whole procedure with RE project/program need.

BB has the legal authority to shape the behavior of the banks and NBFIs and hence it will have to motivate all the commercial banks to properly implement green banking policy to curb its own environmental pollution, lending out to environmentally friendly projects and lessening investment in environmentally detrimental projects. Commercial banks should be encouraged to provide financial support to the newly come up off-grid projects.

Conclusion

Environment-friendly production process includes waste-control, eco-efficiency, noise, spills, visual state including efforts to identify, improve, handle, prevent carbon confiscation, contamination and emissions, climate change, product improvement, including goods that help to preserve the environment, water discharge information, air emission data, investigation on new methods of manufacturing to lessen environmental pollution, pollution prevention technologies, pollution control of manufacturing process, pollution reductions in the control of business operations, solid waste disposal information, conservation of natural resources, recycling plant of waste products, establishment of effluent processing plant, land restoration and forestation programmes, raw material maintenance, designing facilities suitable with the environment, offering wildlife conservation and noise. This is also pertinent to energy saving and preservation, development and exploration of first-hand sources, proficiency, insulation, deployment of waste substances for energy conservation, investigation of the company's efforts to the reduction energy consumption, articulation of the company's concern about energy shortage, direct energy use, indirect energy use, revealing energy savings resulting from product recycling, disclosing amplified energy efficiency of products and receiving an reward for an energy conservation programme. The environmental monetarist emphasis on areas with financial consequence, examination of environmental-economic interaction, contingency provisions, environmentally-related loans, grants, costs of procurement and installing environment-friendly machines and equipment, maintenance and consultancy costs, past and contemporary spending for pollution control, projected estimates of expenditures for pollution control equipment and facilities and a report of allocation of distinct fund. The Green Mutual Investing has been gaining fame recently as more and more investors are starting to worry and act in the favour of the environment. More and more oil consumption, consequences of global warming, increasing rates of natural disasters, and similar other factors are now driving many investors to believe that if we don't begin taking care of the environment instantly, the world might not be a better place in near future.

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