ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 10, Issue, 05, pp.69671-69674, May, 2018

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

ELECTRICITY GENERATION FROM RENEWABLE ENERGY IN BANGLADESH REVISITED

***Shafiqul Alam**

International Climate Protection Fellow at Ecologic Institute, Berlin, Germany, Under the Fellowship of Alexander von Humboldt Foundation, Germany

ARTICLE INFO

Article History:
Received 22nd February, 2018
Received in revised form
24h May, 2018
Accepted 25th May, 2018
Published online 30th May, 2018

Key words:
Electricity generation,
Renewable Energy,
Feed-in-tariff, Net metering,
Bangladesh.

Glossary of Abbreviations:

FIT: Feed-in-Tariff
IDCOL: Infrastructure Development Finance Company Limited
PO: Partner Organization
RE: Renewable Energy
SE: Sustainable Energy
SHS: Solar Home System
SREDA: Sustainable and Renewable Energy Development Authority

****Corresponding author***

ABSTRACT

Since the commissioning of last unit of hydroelectric power plant of aggregate capacity of 230 MW in 1988, installed capacity of renewable energy based electricity in Bangladesh has only been increased by 276 MW, mostly from off-grid solar home systems. The formulation of renewable energy policy and establishment of Nodal Agency to administer the sector have, in fact, not been able to bring any revolution in the sector even during the time of falling price of renewable energy in the world. This paper provides a review on the status quo of renewable energy based electricity generation in Bangladesh. It has looked into the reasons within the existing policy frameworks and concludes that necessary incentive is missing to provide price signal to drive investment in the sector. By examining policy instruments of different countries, the paper recommends that policy push through Feed-in-Tariff for large scale grid connected projects and in the form of net metering for solar roof-top projects would help address the challenges of the sector. While existing refinancing scheme, which is a common scheme for different products, can only motivate investors of very small scale renewable energy projects, a dedicated funding scheme with attractive interest rate shall be designed for large scale projects.

Citation: Shafiqul Alam, 2018. "Electricity generation from renewable energy in Bangladesh revisited", *International Journal of Current Research*, 10, (05), 69671-69674.

INTRODUCTION

The global energy transformation is nicely poised with increasing share of renewable energy (RE) and increased competitiveness of electricity from RE. In recent years, cost of RE has fallen considerably, paving the way for inclusion of more RE in the grid that has normally been dominated by fossil fuels. While technological innovation has played an important role in energy transition and cost reduction of RE, the global energy transformation has been driven by strong policy push. To this end, governments of different countries have had influence in creating enabling environment. Like global shift, Bangladesh also needs to increase share of RE in its electricity generation to accommodate part of the increased demand for electricity attributed to the sustained economic growth of the country, which is hovering around 7% (World Bank, 2018).

Moreover, increased demand for electricity has forced the government to rely on imported liquid fuels based electricity (Mujeri, Chowdhury and Shahana, 2014). As still a significant percent of population doesn't have access to electricity, overall challenges in the electricity sector are immense for Bangladesh but well chalked out plans for RE can help minimize some of the challenges, such as, reducing import. Bangladesh does have a RE policy in place and it is recognized that the country has potential for RE. Based on available evidences, this paper gauges and analyzes the status quo of RE in Bangladesh and building on experience of other countries, it recommends the possible policy instruments that can help expand RE technologies in electricity generation in Bangladesh.

Relevant policies, targets and supporting framework: In 2008, the RE policy of Bangladesh was developed with the major objectives of harnessing RE, stimulating private and

public investment in RE and scaling up contribution of RE to electricity generation. Along with these, targets were also fixed, i.e., generating altogether 5% and 10% electricity from RE sources by 2015 and 2020 respectively (Habib and Shah, 2016). The policy further stipulated the necessity of creating an enabling environment and providing legal support for encouraging RE in the country. The policy, further, laid the initial foundation for formation of a government authority to administer the RE sector through raising awareness, implementing demonstration projects, developing business cases, initiating related research, processing grid connected RE projects etc. (Power Division, 2008). Later on, in 2012, the Sustainable and Renewable Energy Development Authority (SREDA) was established to promote, facilitate and demonstrate sustainable energy (SE) that includes both RE and energy efficiency (Ministry of Power, Energy and Mineral Resources, 2018).

At present, functions of SREDA, as Nodal Agency, include, inter alia, piloting new technologies and taking initiatives for expansion, creating congenial environment for the investors, carrying out research and development on RE, developing capacity of relevant stakeholders and creating awareness for RE in the country (SREDA, 2018a). Meanwhile, to support RE policy of the government, the Central Bank of Bangladesh, i.e., Bangladesh Bank, introduced a green refinancing scheme of approximately US$25 million in 2009, focusing solar energy, biogas and waste treatment projects at the outset. The scope of the scheme has later been enhanced to 47 items. Highest lending rate of the loan for bank customers has been capped at 9% (UNEP, 2015). In addition, state owned financial institute, namely, Infrastructure Development Company Limited (IDCOL) has a strong RE portfolio. In fact, IDCOL has pioneered solar home system (SHS) in Bangladesh. Loan from IDCOL is being channeled to the small scale RE projects through partner organizations (PO), who are charged in between 6-9% per annum. However, as the POs charge a premium over their cost of borrowing, actual cost at the project level significantly increases. The grid connected RE projects are financed on commercial terms (IDCOL, 2018). Furthermore, being in line with RE policy, the government has set the goals of generating electricity amounting 2,000 MW and 2,896 MW from RE sources by 2020 and 2021 respectively. Solar mini grids, solar park, solar rooftop, waste to energy and some other initiatives have been undertaken to achieve the RE targets (SREDA, 2018b).

Present Status of renewable energy: Although earlier study identified a potential of over 50,000 MW electricity from only grid connected solar energy (Mondal and Denich, 2010), present contribution of all forms of RE sources to electricity generation shows a grim prospect. Even with formulation of a Nodal Agency to administer and promote RE in the country, electricity generation from RE is still far from being satisfactory. Almost after a decade of crafting the RE policy, no clean energy revolution has happened. As of now, RE sources have a contribution of meager 506.67 MW to the total national grid of installed capacity of 16,322.67 MW, including captive generation, representing only 3.10% share (SREDA, 2018c). Of the share of RE in electricity generation, 230 MW hydroelectric power plant, consisting of 5 units, was commissioned in phases and over the period from 1962 to 1988 (Global Energy Observatory, 2018). Therefore, RE sources have practically contributed to 276.66 MW as installed capacity since 1989. More than 270 MW of the total renewables is harnessed from solar energy consisting of 250 MW from off-grid (SREDA, 2018c), thanks to the success of SHS. While RE target of 2015 has not been met, in the prevailing situation, the government is unlikely to accomplish its 2020 or 2021 RE targets.

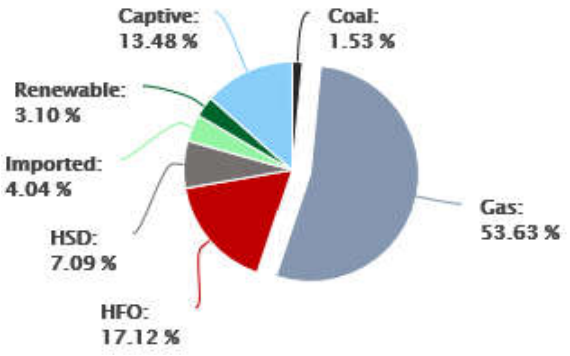

Figure. Energy mix in Electricity Generation (SREDA, 2018c)

Explaining the status quo: The present status of RE in Bangladesh is primarily due to high cost of RE technologies, information asymmetry, lack of capacity and weak regulatory incentives etc. (Amin, Islam, Kamal and Mithila, 2016). Other factors that affect the adoption of REs in general include, among others, unpriced externalities, economies of scale, low interest from policy makers etc. (Groba & Breitschopf, 2013). Although globally cost of renewable energies has been gradually decreasing over the years, it can't be said so for Bangladesh. Given that Bangladesh has only implemented just over 200 MW of RE, mostly off-grid solar, in almost three decades, we are at the very bottom of the learning curve and with lagging research activities, it is not surprising that cost of RE is very high and information asymmetry is prevalent. While technological advancement is important, factors like access to low-cost finance, a conducive policy environment and good auction design have played major roles in falling price of RE (IRENA, 2017). However, Bangladesh doesn't have any instrument other than the Central Bank's refinancing scheme to incentivize uptake of RE technologies. The refinancing scheme can only attract very small scale projects, for example, Pico Grid with capacity of less than 3 KW, as defined by SREDA based on capacity of different Grids, but can't motivate the investors to embark, for instance, on large scale RE project. The lending terms of IDCOL doesn't also provide necessary impetus to the grid connected RE. Additionally, no policy instrument has been designed to price fossil fuels that reflects true social costs, addressing externalities. The establishment of SREDA shows positive intention of the government whereas the heavy reliance on imported oil based power plants along with plans to generate significant amount of electricity from coal in the new power systems master plan (Power Division, 2016) suggests that the RE sector has not received policy boost that it deserves. Amid low interest from policy perspective, the RE policy has not been updated during a decade. Moreover, one of the tasks of SREDA was to create enabling environment for RE projects but the purpose is yet to be served.

Need for policy instruments: In our regional context, India has set an enormous target of harnessing 175 GW electricity from RE technologies by 2022. Out of 175 GW, 140 GW is anticipated from solar energy of which 40 GW is planned through grid connected solar rooftops. To attract investment on

solar rooftop, India has different solar policies, such as, net metering (producer exports to grid after fulfilling his demand), gross metering (producer exports full electricity to the grid), accelerated depreciation (early recovery of investment) etc. Preferential tariffs are offered for both net metering and gross metering based of generation capacity (Goel, 2016). On the other hand, countries in Europe, for instance, Estonia, Denmark, Germany, Greece, France, Netherlands, Portugal, Slovenia etc. have largely been using Feed-in-tariff (FIT) as policy instrument for RE. Others have preferred green certificates, investment incentive, energy tax exemption etc. It has been observed that FIT systems can be implemented within short time and with little additional cost (Haas, et al., 2011). It is claimed that, FIT instruments have played significant role in boosting RE in Europe (Zhang, Gerven, Baeyens and Degrève, 2014). Furthermore, FIT policy in Portugal positively affected the country in terms of reducing externalities and creating financial and social benefits (Behrens, Rodrigues, Brás and Silva, 2016). Empirical evidence from China suggests that, policies, such as, FIT and carbon price, can internalize positive effect, i.e., learning by doing, and negative effect, i.e., externalities, and have important effect in diffusion of RE technologies (Liu & Wei, 2016).

As far as the situation of Bangladesh is concerned, the government's role would be to give the price signal to the private sector to result in subsequent investment in the sector. It is, particularly, necessary as the private sector typically relies on the profit. Suitable policy instruments, such as, FIT, can give such signal to the market. In view of these, the government of Bangladesh needs to choose among the available alternatives, i.e., FIT, net metering, gross metering, low cost finance or other benefits. The primary objective of the instrument is to provide the necessary incentives to remove the initial challenges, develop capacity through learning-by-doing and bring down the cost of RE technologies. As the government's plan for electricity generation from RE includes mainly solar and wind resources whereas solar energy provision has both rooftop and large scale plants, single instrument might not be suitable for Bangladesh. For rooftop solar, it would be more rational to use net metering with the offer of preferential tariff taking into account of own consumption of the supplier to the grid. However, for bigger scale grid connected solar and wind, FIT at preferential tariff could be the choice. In so doing, the government needs to craft a new policy to replace age-old RE policy. In addition, if the government is to expand RE capacity from 506 MW to around 3,000, a dedicated refinancing scheme for RE with increased funding base shall be developed and segregated from existing refinancing scheme for 47 products. More importantly, the cost of refinancing scheme shall be reviewed to make it reasonably attractive for a sector of such importance. With the accomplishment of objective of cost reduction and capacity development, the incentive might be reduced over time. Having said that, drafting the relevant Regulation for policy instrument (s) with preferential tariff and the approval process would be subject to consultation with external stakeholders and validation within relevant ministries of the government. It would, therefore, take time to have the policy in place. In such case, Bangladesh might not be able to meet 2021 target of installing 2,896 MW RE systems. Yet, Bangladesh would be benefited from mid to long term even if the policy instrument is ready within next 2-3 years. Unless the country explores its RE resources, the energy insecurity of the country would continue to grow in the future. And the question is can Bangladesh continue to rely on imported fuel based electricity system?

Further area of research: In light of prevailing conditions of RE sector, future areas of research could be designing FIT and net metering schemes for Bangladesh with preferential tariff and how these instruments could be effectively implemented by SREDA considering its institutional capacity and experience of last several years. Other research could be on optimal pricing of fossil fuels in Bangladesh context taking into account of externalities.

Conclusion

Contrary to the simplistic believe that, the RE target fixed by policy along with refinancing scheme of the Central Bank would automatically spur investment in the sector has been a misjudgment. From present status of RE, it is fair to say that, the contribution of RE to total installed capacity of electricity in Bangladesh has been quite negligible apart from success in off-grid SHS. Notably, SREDA, as a Nodal Agency, has not been able to play its role that could have transformed the sector. Available evidences suggest, unless we do anything alternative, we won't be able to harness sizeable amount of electricity from RE. In that event, the energy insecurity of the country would only increase. Hence, appropriate policy instruments, such as FIT and net metering, shall be devised and the existing refinancing facility shall be tailored to the need of the RE sector. This policy push would help drive down the upfront cost of RE and provide the scope of learning-by-doing in local context.

REFERENCES

Amin, S. B., Islam, S., Kamal, T. and Mithila, N. 2016. Prospects and Constraints of Renewable Energy Sector in Bangladesh: An Analytical Exercise. *World Journal of Social Sciences*, 6: 1-12.

Behrens, P., Rodrigues, J., Brás, T. and Silva, C. 2016. Environmental, economic, and social impacts of feed-in tariffs: A Portuguese perspective 2000–2010. *Applied Energy*, 173: 309-319. doi: https://doi.org/10.1016/j.apenergy.2016.04.044

Global Energy Observatory. 201). Retrieved May 22, 2018, from http://globalenergyobservatory.org/geoid/40450

Goel, M. (2016). Solar rooftop in India: Policies, challenges and outlook. *Green Energy & Enviornment*, 129-137.

Groba, F. and Breitschopf, B. 2013. Impact of renewable energy policy and use on innovation - a literature review. Berlin: DIW.

Haas, R., Panzer, C., Resch, G., Ragwitz, M., Reece, G. and Held, A. 2011. A historical review of promotion strategies for electricity from renewable energy sources in EU countries. *Renewable and Sustainable Energy Reviews*, 1003-1034. https://doi.org/10.1016/j.rser.2010.11.015

Habib, S. M. and Shah, P. 2016. Development of renewable energy financing in Bangladesh in response to the central bank's policy initiatives. Proceedings of the 2nd International Conference on Energy Production and Management.

IDCOL. 2018. Retrieved May 12, 2018, from http://idcol.org/home/r_lending_terms

IRENA. 2017. Renewable Power Generation Costs in 2017.

JICA. 2016. Survey on Power System Master Plan.

Liu, Y. and Wei, T. 2016. Market and Non-market Policies for Renewable Energy Diffusion: A Unifying Framework and Empirical Evidence from China's Wind Power Sector. *The Energy Journal*, 37. doi:http://dx.doi.org/10.5547/01956574.37.SI1.lyan

Ministry of Power, Energy and Mineral Resources. 2018. Retrieved May 22, 2018, from https://mpemr.gov.bd/power/details/26

Mondal, M.A. and Denich, M. 2010. Assessment of renewable energy resources potential for electricity generation in Bangladesh. *Renewable and Sustainable Energy Reviews*, 14(8). doi:https://doi.org/10.1016/j.rser.2010.05.006

Mujeri, M. K., Chowdhury, T. and Shahana, S. 2014. Energy Sector in Bangladesh: An agenda for reforms. Geneva: International Institute for Sustainable Development.

Power Division. 2008. Renewable Energy Policy of Bangladesh. Dhaka: Ministry of Power, Energy and Mineral Resources, Government of the People's Republic of Bangladesh.

SREDA. 2018a. Retrieved May 21, 2018, from http://www.sreda.gov.bd/index.php/site/page/ea5e-cdac-19fd-2767-44be-4791-34ff-4c3d-4039-0194

SREDA. 2018b. Retrieved May 22, 2018, from http://www.sreda.gov.bd/index.php/site/page/7b9b-49f7-69fb-40fd-45a3-9e6c-b391-7ba5-31f9-13ee

SREDA. 2018c. Retrieved May 22, 2018, from http://www.sreda.gov.bd.

UNEP. 2015. Designing a Sustainable Financial System in Bangladesh: Summary Briefing.

World Bank. 2018. Retrieved May 12, 2018, from https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=BD

Zhang, H. L., Gerven, T., Baeyen, J. and Degrève, J. 2014. Photovoltaics: Reviewing the European Feed-in-Tariffs and Changing PV Efficiencies and Costs. *The Scientific World Journal*.

****