

Impact of Government Policies on Green Finance Flow to Private Renewable Energy Companies in India

Saundarya Singh¹, Dr Mohammad Junaid Alam²

¹Research Scholar Department of Economics (SSBS) Sharda University, Greater Noida, India

²Research Supervisor Department of Economics (SSBS) Sharda University, Greater Noida, India

Abstract

The shift to renewable energy in India needs significant amounts of finance, especially for private renewable energy firms that contribute largely towards increasing the capacities of solar, wind, hydro and other forms of renewable energy sources. These policies have the ability to impact the flow of finances by making investments less risky, more viable and encouraging the creation of institutional financing mechanisms, among others. This paper analyses the effects of policies on the flow of green finances to private renewable energy firms in India. The policies being analysed include Jawaharlal Nehru National Solar Mission, viability gap funding, institutional finance through renewable-energy financing organizations, renewable purchase obligations, green bond issuance, blended finance and climate finance instruments, among others. Some of the challenges facing the flow of green finances to renewable energy firms include high capital cost, minimal involvement of financial institutions, non-compliance with renewable purchase obligations, underdeveloped debt markets and relatively low foreign investment. This paper uses a qualitative approach to analyze the connection between policies and flow of finances to renewable energy firms based on secondary data from government policies, institutional reports and other related studies.

Keywords: Green Finance, Renewable Energy, Government Policies, Private Investment, Solar Energy, Green Bonds, Climate Finance, India

INTRODUCTION

The energy sector of India is witnessing a major paradigm shift influenced by the needs of economic development and energy requirements along with environmental concerns. The traditional energy resources, especially fossil fuels, have been the choice of India for meeting its developmental demands in terms of industrialisation, urbanisation, and increased household demand. However, the issues related to green house gases emission, pollution and the issue of energy security have added value to the role of renewable energy in the planning process of the nation. India has set ambitious targets in relation to renewable and non-fossil energy, and hence there is a greater need for financial investment in solar, wind, hydro and other renewable energy sources. The attainment of these goals not only demands public finance but also active participation of private sector players.

Green finance has become an increasingly significant tool for channelling financial resources into environmentally and climate-friendly actions. In the renewable energy industry, green finance can be of different types, which include, but are not limited to, banking finance, institutional finance, equity finance, green bonds, blended finance and other innovative types of financing. The access and cost of such financing largely depend on the regulatory environment in which the renewable energy enterprises are operating. Policies of governments can lower investment risks through subsidies, incentives, guarantees, viability gap financing and other clear market needs. They can also stimulate

demand for the renewable electricity generation and create institutional arrangements to ensure financing of projects. According to the original research, government intervention is one of the key factors in terms of shaping the flows of finance toward private renewable energy enterprises.

This is especially relevant due to the fact that the scope of the needed investments surpasses the budget capabilities of the government bodies involved. Private companies dealing with renewable energy are involved in the process of developing projects, building infrastructure, deploying technologies and generating electricity, which enables them to contribute to the expansion of renewable energy capacity. However, there are certain aspects of renewable energy projects which may affect the willingness of commercial banks and other sources of financing to invest their money into such projects, including high costs of projects at the stage of development, lengthy process of developing the projects, regulatory uncertainties and risks associated with electricity markets and infrastructure. The author of the source paper highlights high initial investments, limited involvement of some banks, lower levels of foreign investment and inefficiencies of regulation as important factors that hinder financing.

Some government policies have been helpful in facilitating the development of the investment environment for renewable energy in India. First, the introduction of the Jawaharlal Nehru National Solar Mission in 2010 was one such example where the government took an active initiative towards promoting renewable energy by developing solar power through capacity building and cost reduction. Another set of mechanisms, such as viability gap funding and the involvement of renewable energy institutions has helped in making projects financially viable. At the same time, the development of green bonds as well as other sources of financing has helped to open up avenues for investment in environmentally sound projects. The literature review of the source paper shows that the use of these mechanisms can help reduce risk and make renewable energy investments more attractive.

In view of this backdrop, the current research paper looks into the effect of government policies on the flow of green finance in favour of private sector renewable energy companies in India. The present study highlights the interaction between policy measures and financial environment conducive to the involvement of the private sector in renewable energy production. Specific emphasis has been placed on policy coherence, institutional backing, financial instruments, regulatory compliance and novel forms of climate finance. In this regard, finance will not be considered in isolation from the wider context of government regulations and renewable energy production. The aim of the current research is to examine how the existing policies help in making investments and where the major gaps are that can be bridged through institutional approaches.

LITERATURE REVIEW

Green finance has grown significantly with the increase in environmental sustainability considerations in financing decisions. According to the available literature, green finance is linked to the provision of resources through financing activities that offer environmental benefits like generation of renewable energy, energy efficiency, and climate infrastructure. Within the Indian setting, renewable energy is among the key sectors in which green finance can be used due to the increasing need for clean energy in India and its energy transition goals. According to the source paper, green finance goes beyond individual financings in environmentally friendly ventures, since the financial sector,

regulation, and institutions affect how the finances flow towards such projects. Thus, environmental goals and financial mechanisms have started receiving attention in the literature.

An extensive portion of the literature has dealt with the importance of renewable energy technologies in terms of their impact on India's evolving energy mix. The technologies of solar power, wind power and hydro-power have been seen to be significant sources of development through renewable energy, with solar energy being of particular importance due to technical progress, reduced cost, and availability of resources. From the reviewed literature, it can be understood that renewable energy capacities have been growing at a considerable rate and that the involvement of private companies has been instrumental in the process. But this growth in capacities has also generated the necessity for large investments. Thus, government intervention becomes important because the government can affect cost, risk, and expected profit from investments. Various policy instruments such as subsidies, taxation-related instruments, viability gap fund, and production-linked interventions have been considered for the purpose.

One more significant theme covered in the literature is the structure of finance available for renewable-energy initiatives. Traditional bank financing is one of the sources of funding, while development-finance institutions, private equity, venture capital, and debt financing are other ways of acquiring funding. Green bonds have become an increasingly popular tool since they allow linking the investors interested in environmentally oriented projects with the projects demanding considerable capital. As the source paper points out, India has developed its own green bond development, whereas lack of liquidity in the green bond market is still one of the challenges. Literature on the issue of adaptation finance suggests that there may be difficulties related to private financing where financial results cannot be easily quantified. Thus, it is obvious that the use of green financing tools depends not only on the existence of environmental goals but also on the creation of appropriate financial tools, revenue models, etc.

Comparative literature offers further insights regarding the role of design and implementation of institutions. Lessons learned from other countries like China and Germany point to the importance of institutions such as mandatory disclosures and specific green finance institutions that help foster investments that promote environmental sustainability. While regulations and financial institutions in India have dealt with green finance concerns over time, there may still be a delay and unevenness in implementation across various areas. Hence, comparative literature reveals a separation between policymaking and successful policy implementation. A government may set up goals, financing methods or renewable energy mandates, but the actual impact will depend on enforcement and institutional coordination along with the conditions prevailing in the market. Based on the literature examined, the following institutional concerns related to renewable energy financing in India are highlighted.

In summary, the existing body of literature suggests that there are a number of ways through which government policies can affect private renewable energy investments. Government policies could lower financial risks, increase the feasibility of projects, generate demand, and facilitate the involvement of financial institutions. Nonetheless, the body of literature also suggests that even the provision of government policies is not enough to guarantee proper green finance flows. The presence of high capital costs, uncertainties regarding timelines of projects, few financial tools, poor implementation,

and underdeveloped financial marketplaces would continue to inhibit private investments. It is against this backdrop that newer strategies like sovereign green bonds, blended finance, dedicated green banks, crowdfunding and climate finance taxonomies have gained prominence in the recent past as potential means of improving financing conditions.

RESEARCH OBJECTIVES

Firstly, it is important to investigate the effects of government policy on the direction of green finance into private firms in India developing renewable energy sources. It is expected that the study will provide insights into the manner in which major policy initiatives and institutions impact the attractiveness of renewable energy projects in terms of finance. Special focus will be placed on such measures as policies related to the development of solar energy, viability gap funding, institutional finance and renewable energy obligation. The goal here is to reveal the channels of influence of governmental interventions on investment decisions and availability of capital. In contrast to conventional thinking about government policy in terms of subsidies, the focus of the study will lie in the broader context in which policy-making processes create an attractive environment for investors to develop projects and obtain financing from banks.

The second aim is to assess the main financial, regulatory, and institutional constraints facing private investments in renewable energies. Renewable-energy ventures are characterized by a high upfront cost requirement, long payback times, and uncertainties concerning the market and regulatory environment. In this case, the study aims at assessing some of the determinants that might impact the level of willingness of financiers and banks to offer funds to private firms investing in renewables. Special attention is given to the involvement of banks in renewable energies financing, foreign investments, renewable energy purchase requirements, debt market development, and regulation enforcement. The aim here is not just to identify the different barriers but rather how these constraints are interlinked with each other. Through analyzing these barriers together, it will be possible to explain why the existing policies are not enough to ensure adequate financing of renewables.

The third objective of the study is to explore new financing models and come up with policy-based measures that can help facilitate the development of green finance models in favour of private renewable energy enterprises. For instance, the study will consider innovative financing tools like sovereign green bonds, blended financing models, green banks, climate financing and crowdfunding. Other issues of importance to be covered include the need for better implementation of regulations, efficient risk sharing and financial market development. Therefore, the objective of the study is to seek ways through which new financing models can be combined with the current government efforts and not replace them.

METHODOLOGY

The analysis involves using a qualitative and descriptive approach in order to analyze the link between government policies and the inflow of green finance into the private renewable energy firms operating in India. No primary data collection techniques have been used, since there are plenty of information that can be gathered from the information contained in the government policies, institutional reports, previous studies and other related literature. This method is ideal for policy-oriented research, where regulation, financing and institutional aspects constitute the main focus of the research.

The methodology adopted in this research paper will reflect the approach that has been employed in the original paper, where the policy interventions have been linked to the financing process.

Secondary data provides the basic foundation for this research. Secondary policy data consists of any data related to the Jawaharlal Nehru National Solar Mission, renewable energy finance organisations, renewable purchase obligations, green finance tools and climate finance innovations. Data on institutions and sectors help in understanding the capacity for renewable energy, investment trends and financing challenges. The original article uses information related to the positioning of India regarding its solar and wind power capacity, financing needs of renewable projects, involvement of public sector banks and foreign investments. The research does not make use of any new survey data or quantitative figures but relies upon the synthesis of existing information to highlight patterns.

The analytical framework focuses on organizing the information collected along four major axes – policy support for renewables, availability of green finance, challenges faced by private investment and possible solutions for financing. First, the analysis takes into account the policy instruments meant to facilitate the development of renewable energy and their connection with private financing. Next, it analyses various obstacles like initial high costs, lack of involvement of the financial sector, regulatory risks, and poor enforcement. Finally, it looks at new mechanisms which could help reduce risks and increase funding sources. The previous methodology was built on a similar premise of synthesizing barriers and possible solutions, including consistency of policies, risk sharing and new financing techniques.

Data Analysis and Interpretation

Based on the analysis of the secondary information provided in the paper, it becomes clear that government policy plays an important role in affecting the stream of green finance that flows into the private renewable energy sector of India. It becomes apparent that certain policy efforts create the conditions conducive to renewable energy investments by means of creating targets, financing options, and institutional and regulatory measures. Of special importance is the Jawaharlal Nehru National Solar Mission, initiated in 2010, as it has laid down a solid policy framework for fostering the development of solar power, bringing down its cost and making it possible to undertake largescale projects. Viability gap funding and the institutional efforts of renewable energy financing agencies may also prove to be ways of making projects more attractive for private investors. Thus, the growth of renewable energy capacity cannot be regarded as an independent process in terms of government involvement. Nevertheless, it becomes clear that certain financing barriers still persist in spite of policy support.

According to the sector-wise evaluation of the data collected, it seems evident that the solar energy has been receiving especially much attention to investors and policy-makers. In particular, it is estimated that solar energy has been attracting about 35% of the investment incentives while hydro and wind energy comes second. This can be explained by the fast development of solar technology, falling costs, as well as the presence of policy measures aimed at solar projects. As far as the literature analyzed within the paper is concerned, it becomes clear that the capacity of renewable energy has already been above 170 GW by 2022, even though it was below the overall goal of 500 GW of the non-fossil

capacity set for the whole country. The role of the private sector in this process has been significant indeed. This means that if the policy incentives are used together with technological development and institutional support, the private investment can be stimulated. Nonetheless, it turns out that the increase in one renewable energy area does not help to solve the problem of financing in the entire sector of renewable energy.

Financial sector involvement constitutes another critical aspect for consideration. According to the paper, the various sources of finance for renewable energy projects include commercial banks, development finance institutions, venture capital, private equity and green bonds. However, the information provided seems to indicate a lot of reluctance on the part of the financial institutions, considering that renewable energy projects normally entail high initial cost and a period of non-return. In fact, it emerges from the study that only a few public sector banks financed renewable energy projects, and there was little foreign investment. This, therefore, shows that the availability of renewable energy projects does not automatically mean that enough financial resources will be mobilised. Investors and lenders assess the risk involved in the project, regulatory environment, repayment periods and other factors in making a decision to provide funds. It is clear, therefore, that government policies affect not just the availability of financial resources, but also the risks involved in renewable energy projects.

Finally, it is important to discuss the aspect of regulation implementation and alternative sources of financing. Renewable Purchase Obligation is aimed at generating demand for renewable energy, however, there are some challenges associated with its implementation. Poor implementation of this tool may lower certainty for the private companies working in the field of renewable energy since it is essential to have a stable demand for projects that require large amounts of investment. Moreover, the lack of developed debt markets and diversification of financial products is also considered to be one of the barriers preventing large investments. On the other hand, sovereign green bonds, blended finance, green banks, crowdfunding and climate-finance taxonomies may serve as sources of additional financing. It appears that the issue in India is not only about the lack of financing but also about proper financial tools which are needed to attract capital to renewable energy projects.

FINDINGS AND DISCUSSION

The first key finding of the study is the role of policy on the part of the government in facilitating private-sector engagement in the renewable energy industry in India. The policy framework has enabled the creation of mechanisms which have made renewable energy projects attractive to the private firms by making them visible and viable. The introduction of the Jawaharlal Nehru National Solar Mission stands out as one such mechanism which has played an important role in facilitating the growth of the sector because it brought clear objectives regarding the growth of solar energy to the fore. Viability-gap funding and institutional mechanisms are two other factors identified by the study as making the projects more attractive. Both these interventions are vital since renewable energy projects usually require a large amount of capital expenditure up front while revenues begin to flow after some time. It is possible for the policy mechanisms to affect the relationship between the two in order to lower certain kinds of risks or enhance project viability.

Secondly, the persistent problem facing private renewable energy firms in terms of finance is considered. Despite the ever-growing significance of renewable energy technologies, the

features of renewable energy projects can be problematic for traditional lending institutions. In particular, the paper draws attention to the comparatively high initial cost of investing in renewable projects compared with conventional coal-based projects. Long payback periods are also emphasized as one of the factors of importance to financial institutions. In addition, it is stated that the number of publicly owned banks funding renewable energy projects was quite limited and foreign investment was still low. This shows that there should be financing solutions which would take into account the specifics of risks and time associated with renewables. Traditional approaches in lending may sometimes lack flexibility when it comes to projects characterized by lengthy development times and unpredictable cash flow. Hence, it can be concluded that there is a need to increase both renewable energy capacity and appropriate financial instruments simultaneously. Otherwise, policies will be unable to reach their maximum efficiency.

The third insight addresses the role of regulatory enforcement in assessing the effectiveness of renewable energy policies. The purpose of Renewable Purchase Obligations is to compel electricity distribution utilities and other obliged parties to purchase renewable energy in order to create a certain market for renewable energy producers. The research highlights a lack of enforcement as one of the problems. If the regulations are not enforced properly, the renewable energy firms would not know how their product will be demanded in the future and would make the decision about their investments or financing of their projects accordingly. Therefore, the analysis shows that policy development and policy implementation are two different stages and should be evaluated independently. It means that even if the policy is well-defined in terms of its goals, the results might be poor in case of low-quality monitoring and enforcement of such policies.

The fourth finding relates to the possibility of utilising innovative finance mechanisms to overcome current investment constraints. The research highlights such mechanisms as sovereign green bonds, blended finance, green banks and crowdfunding as those mechanisms which can diversify the sources of funds for renewable-energy ventures. The latter becomes especially important, as the mechanism may utilise public and private funding, thus sharing risks among participants of the chosen project. Green banks will be able to offer specific financing for environmental projects, while green bonds will allow institutions to identify the appropriate green projects. Taxonomy for climate finance could also provide criteria for defining environmentally sustainable activities. It may be concluded from the analysis that these mechanisms are supposed to serve as a supplement to other means of policy implementation. The success of their functioning would depend on transparent rules, reliable assessment of projects, regulation and proper information for investors. It follows from the above that further development of green finance in India requires policy tools in addition to innovation in financing mechanisms.

CONCLUSION

The study finds that government policies are one of the factors that contribute to green-finance flows in the private renewable-energy firms in India. Government intervention has led to the creation of an environment in which renewable energy investments can grow due to targets, incentives, institutions, and financing. The experience with solar energy shows that such policy considerations as the Jawaharlal Nehru National Solar Mission and others have been of vital importance. As a result, private firms become

important players in the growth of renewable energy capacity. Nevertheless, at the same time, the study finds that government policy alone cannot address all the problems associated with financing. Green-finance availability depends on such variables as cost and risk, regulatory clarity, the development of financial markets, and willingness to invest on the part of banks and other financial firms. Therefore, the general message of this research is that the policy of renewable energy should combine energy policy and financial policy.

The research also reveals that financing constraints are still one of the major problems in India's transition to renewable energy sources. As a rule, renewable energy projects need considerable upfront costs and can be associated with fairly long investment periods, which makes them rather difficult to finance using traditional sources. Lack of involvement from certain financial institutions and a small contribution of foreign capital in financing, as revealed by the research show that the current financing framework is not compatible with the necessary investment volumes yet. Thus, the creation of special financing tools becomes especially relevant in such a case. For instance, green bonds, blended finance and other instruments could help increase financing options and diversify risks among different parties. But, in order to do this successfully, it is essential to have reliable institutions and standards in place. Hence, future financing of renewable energy sources in India should pay attention not only to volume but also to structure of capital.

Another key lesson from the research is that policy implementation is as crucial as the policy process itself. There have been several initiatives in India aimed at facilitating renewable energy development, but their efficiency largely depends on implementation mechanisms being consistent, effective and coordinated. In particular, the research highlights problems associated with Renewable Purchase Obligation and development of renewable energy markets. In case when the regulatory requirements are not enforced consistently, private companies can become uncertain about the potential for sales and revenues. Thus, implementation mechanisms should be improved in order to provide investors with increased certainty. It means that the success of policy initiatives should be evaluated not only by the implementation of new programs but also by their ability to create stable environment for companies working in the sector of renewable energy.

Another finding of the study is that innovation in green-finance methods could become a more significant tool to deal with the financing problem. Examples of different instruments used for mobilizing funds and allocating project risks include sovereign green bonds, blended finance, green banks and crowdfunding. A climate finance taxonomy will help enhance transparency through providing better classification and definition of green activities in various industries. Such innovations might help investors and financiers find eligible projects and assess their environmental benefits. However, innovative financing methods cannot replace fundamental tools such as viable projects, clear regulations and strong institutions. The role of those methods will be larger in a stable policy environment. Therefore, the framework of green finance in India must include both traditional government involvement and innovations in the sphere of financing renewable energy projects.

In summary, the study reveals that there is a need for an integrated and coordinated strategy of renewable energy investments in India, which should involve various governmental institutions, private companies, banks, investors and financial institutions. Policies from the government can define the direction and the incentives for the

transition, whereas the involvement of the private sector can be helpful in providing capital, technology and project development skills. When it comes to financial institutions, they may facilitate long-term investments in case the risks and returns are evident enough, while new financial instruments can help diversify the scope of financing options. Hence, the study highlights the need to enforce renewable energy obligations, extend the scope of viability gap and blended finance arrangements, develop debt markets further, mobilize investments and establish green finance classifications. In other words, such steps may help to create the link between the goals in terms of renewable energy and the funding needed to reach them.

REFERENCES

1. Asian Development Bank. (2022). *Asian Development Outlook 2022: Mobilising Taxes for Development*. Asian Development Bank, Manila.
2. Bergek, A., Jacobsson, S., & Sandén, B. A. (2013). "Legitimacy and the Governance of Solar Energy Innovation in Emerging Markets." *Energy Policy*, 56, 1–12.
3. Central Electricity Authority. (2022). *National Electricity Plan: Volume I – Generation*. Government of India, New Delhi.
4. Climate Policy Initiative. (2022). *Landscape of Green Finance in India: India's Green Investment Flows in FY 2021/22*. Climate Policy Initiative, New Delhi.
5. Climate Policy Initiative. (2022). *Global Landscape of Climate Finance 2021*. Climate Policy Initiative.
6. Government of India. (2015). *India's Intended Nationally Determined Contribution: Working Towards Climate Justice*. Government of India, New Delhi.
7. Government of India. (2021). *India's Updated Nationally Determined Contribution under the Paris Agreement*. Government of India, New Delhi.
8. Government of India. (2022). *India's Long-Term Low-Carbon Development Strategy*. Government of India, New Delhi.
9. Government of India, Ministry of Finance. (2021). *Union Budget 2021–22*. Government of India, New Delhi.
10. Government of India, Ministry of Finance. (2022). *Union Budget 2022–23*. Government of India, New Delhi.
11. Government of India, Ministry of New and Renewable Energy. (2018). *Annual Report 2017–18*. Government of India, New Delhi.
12. Government of India, Ministry of New and Renewable Energy. (2019). *Annual Report 2018–19*. Government of India, New Delhi.
13. Government of India, Ministry of New and Renewable Energy. (2020). *Annual Report 2019–20*. Government of India, New Delhi.
14. Government of India, Ministry of New and Renewable Energy. (2021). *Annual Report 2020–21*. Government of India, New Delhi.
15. Government of India, Ministry of New and Renewable Energy. (2022). *Annual Report 2021–22*. Government of India, New Delhi.
16. International Energy Agency. (2021). *India Energy Outlook 2021*. International Energy Agency, Paris.
17. International Energy Agency. (2021). *World Energy Outlook 2021*. International Energy Agency, Paris.
18. International Energy Agency. (2022). *World Energy Outlook 2022*. International Energy Agency, Paris.

19. International Finance Corporation. (2022). *Climate Investment Opportunities in Emerging Markets: India*. International Finance Corporation, Washington, DC.
20. International Renewable Energy Agency. (2019). *Renewable Energy Market Analysis: The GCC Region*. IRENA, Abu Dhabi.
21. International Renewable Energy Agency. (2020). *Renewable Power Generation Costs in 2020*. IRENA, Abu Dhabi.
22. International Renewable Energy Agency. (2021). *World Energy Transitions Outlook: 1.5°C Pathway*. IRENA, Abu Dhabi.
23. International Renewable Energy Agency. (2022). *World Energy Transitions Outlook 2022: 1.5°C Pathway*. IRENA, Abu Dhabi.
24. Ministry of Finance, Government of India. (2022). *Draft Framework of India's Climate Finance Taxonomy*. Department of Economic Affairs, New Delhi.
25. Organisation for Economic Co-operation and Development. (2022). *Clean Energy Finance and Investment Roadmap of India: Opportunities to Unlock Finance and Scale Up Capital*. OECD Publishing, Paris.
26. Reserve Bank of India. (2021). *Annual Report 2020–21*. Reserve Bank of India, Mumbai.
27. Reserve Bank of India. (2021). *Report on Trend and Progress of Banking in India 2020–21*. Reserve Bank of India, Mumbai.
28. Reserve Bank of India. (2022). *Annual Report 2021–22*. Reserve Bank of India, Mumbai.
29. Reserve Bank of India. (2022). *Report on Trend and Progress of Banking in India 2021–22*. Reserve Bank of India, Mumbai.
30. Sarangi, G. K. K. (2018). *Green Energy Finance in India: Challenges and Opportunities*. Asian Development Bank Institute, Tokyo.
31. Securities and Exchange Board of India. (2021). *Business Responsibility and Sustainability Reporting by Listed Entities*. Securities and Exchange Board of India, Mumbai.
32. Securities and Exchange Board of India. (2022). *Annual Report 2021–22*. Securities and Exchange Board of India, Mumbai.
33. United Nations. (2015). *Transforming Our World: The 2030 Agenda for Sustainable Development*. United Nations, New York.
34. United Nations Environment Programme. (2021). *Adaptation Gap Report 2021: The Gathering Storm*. United Nations Environment Programme, Nairobi.
35. World Bank. (2021). *State and Trends of Carbon Pricing 2021*. World Bank, Washington, DC.