EXPLORING INNOVATIVE PATHWAYS TOWARDS SUSTAINABLE DEVELOPMENT THROUGH GREEN FINANCING

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ABSTRACT

With the economy developing rapidly, the environmental problem has been occurring frequently, which needs green finance that supports energy conservation, environmental protection, and sustainable development to solve. Green finance is essential for economic development and sustainability because it enables the identification of innovative financing mechanisms that support environmentally sustainable investments. By providing funds for environmentally friendly projects, green finance contributes to reducing the negative impact of economic activities on the environment, which in turn leads to the preservation of natural resources and the mitigation of climate change. Additionally, it can lead to the creation of new business opportunities, green jobs, and enhanced competitiveness, thereby promoting economic development. This paper aimed to explore the different ways of green financing in detail in different sectors towards sustainable development. The study is based on extant literature and will include the examples of green financing from current Indian scenario in selected sectors . This paper studies the green financing initiatives in various selected sectors. Information listed in this research paper is derived from web reports, annual reports, press releases, white papers, and various references. The results show that there are numerous innovative pathways towards Sustainable Development through green financing and green finance has a significant impact on economic development and sustainability. This paper seeks new innovative pathways towards sustainable development through Green Financing for the high-quality development of the economy and sustainability, which few scholars have studied.

KEYWORDS *- Economy, Development, Green Financing, Sustainability, Sustainable Development*

INTRODUCTION

Green finance refers to financial instruments, products, and services that support environmentally sustainable investments. It encompasses a wide range of financial activities, including the financing of projects that mitigate climate change, such as renewable energy projects, energy-efficient buildings, research and developments to produce pollution treatment facilities, green goods production, ecological agricultural production as well as investments that reduce pollution and promote biodiversity conservation. Green finance can be provided by various entities, such as banks, asset managers, and insurance companies, and can take the form of green bonds, green loans, green investment funds, and other financial instruments designed to support sustainable development. The ultimate goal of green finance is to mobilize capital towards projects and activities that are environmentally friendly and contribute to the transition to a low-carbon and sustainable economy.

This paper is aimed at exploring the innovative pathways towards sustainable development through green financing. This paper majorly focused on areas related to green agriculture, green buildings, green banking, green marketing and some other green projects.

LITERATURE REVIEW

WHAT IS GREEN?

The term "green" has been used in various contexts, including as a reference to the environment, sustainability, and eco-friendliness. The complicating matters is the widespread use of terms such as natural, organic, planet-friendly, earth-friendly, ecological, non-toxic, biodegradable, plant-based, chlorine-free, and 100% compostable, which consumers erroneously assume are synonymous with green (Terra Choice 2009). John C. Dernbach, in his book "Agenda for a Sustainable America" (2009), defined green as "a way of living that seeks to reduce human impact on the environment and promotes social and economic well-being." He argued that green living involves adopting environmentally sustainable practices in all aspects of life, including transportation, housing, and food.

Similarly, in their paper "The Concept of Green Growth and Its Implications for Climate Change Mitigation Policies" (2014), Jeroen C.J.M. van den Bergh and Daniel J.A. Johansson defined green as "a transition towards a low-carbon, resource-efficient, and socially inclusive economy." They suggested that a green transition would require significant changes in the way we produce and consume goods and services, as well as the adoption of new technologies and policies.

In addition, Hua Wang and Chia-Chin Chang, in their article "Green marketing, environmental responsibility and green purchase intention" (2011), defined green as "the practice of developing and promoting environmentally friendly products and services." They argued that green marketing could play a critical role in promoting eco-friendliness and sustainability.

Overall, the concept of green is multifaceted and encompasses various aspects of sustainable living, production, and consumption. Scholars have explored the concept of green from different perspectives, highlighting its importance in promoting sustainability and reducing human impact on the environment.

WHAT IS GREEN FINANCE ?

Green finance refers to financial instruments and services that promote sustainable development by supporting environmentally friendly projects and activities. Several scholars have defined green finance from different perspectives.

For instance, in their paper "Green finance: A new paradigm for sustainable development" (2017), Haiying Liu, Fei Wang, and Xiangping Jia defined green finance as "a set of financial products and services that generate environmental and social benefits in addition to financial returns." They argued that green finance could help mobilize resources for environmentally sustainable projects, such as renewable energy, energy efficiency, and sustainable agriculture.

Similarly, in their book "Green Finance and Investment Mapping Channels to Mobilise Institutional Investment in Sustainable Energy" (2017), OECD defined green finance as "the use of financial instruments and tools to promote sustainable development and address environmental challenges." They suggested that green finance could play a critical role in achieving the objectives of the Paris Agreement and the United Nations Sustainable Development Goals.

In addition, in their paper "The Greening of Finance: A Roadmap" (2016), the UNEP Inquiry defined green finance as "the process of mainstreaming environmental considerations into financial decision-making." They argued that green finance could help promote a shift towards sustainable finance and facilitate the transition to a low-carbon economy.

The Global Sustainable Investment Alliance defines green finance as "an investment approach that seeks to generate financial returns while also benefiting the environment and society" (2019).The United Nations Environment Programme (UNEP) defines green finance as "finance that results in improved environmental and social outcomes" (2016).

The International Finance Corporation (IFC) defines green finance as "financial products and services that support projects and activities that have environmental benefits and/or mitigate climate change" (2017).The European Union defines green finance as "finance that fosters environmentally sustainable economic growth, while reducing pressure on the environment and climate" (2020).

The Principles for Responsible Investment (PRI) define green finance as "an investment approach that integrates environmental, social, and governance (ESG) factors into financial analysis and decision-making" (2018).The Reserve Bank of India (RBI) defines green finance as "financial flows to investments that contribute to climate change mitigation or adaptation" (2018).

The Securities and Exchange Board of India (SEBI) defines green finance as "financing for projects that lead to environmental benefits, contribute to the mitigation of climate change, and promote sustainable development" (2020).The Ministry of New and Renewable Energy (MNRE) defines green finance as "the financing of projects that generate renewable energy or improve energy efficiency, with a focus on reducing greenhouse gas emissions and promoting sustainable development" (2021).

The Confederation of Indian Industry (CII) defines green finance as "financial products and services that support sustainable development by investing in renewable energy, energy efficiency, waste management, and other environmentally sustainable activities" (2019).The National Institution for Transforming India (NITI Aayog) defines green finance as "financial flows that are consistent with low greenhouse gas emissions, climate-resilient development, and sustainable development goals" (2020).

Overall, the concept of green finance involves the use of financial instruments and services to promote environmentally sustainable projects and activities. Scholars have defined green finance from different perspectives, highlighting its potential to mobilize resources for sustainable development and address environmental challenges. These definitions highlight the common theme of using finance to promote sustainable development, with a particular focus on environmental considerations. Green finance can involve various financial instruments, such as green bonds, green loans, and green investment funds, and can be used to support projects and activities that have positive environmental and social impacts.

PROBLEM STATEMENT AND OBJECTIVE OF STUDY

In recent years, the concept of sustainable development has gained significant attention due to the growing concerns over climate change and environmental degradation. One of the key drivers of sustainable development is green financing, which refers to the financial investment in environmentally sustainable projects. Green financing has emerged as an innovative way to promote sustainable development by mobilizing resources for green projects and promoting green technologies. Green finance in India had been growing steadily. According to a report by the International Finance Corporation (IFC) and the Indian industry association FICCI, the total green finance market in India had the potential to reach $3.1 trillion by 2030. The report estimated that India needed an annual investment of $330 billion to meet its climate goals, and the private sector would need to contribute around 80% of that. In addition to this, India has been implementing policies to promote green finance, such as the launch of the Green Bonds market in 2017 and the issuance of guidelines for issuing green bonds in 2018. Overall, it seems that green finance in India is poised for significant growth in the coming years, with both the government and private sector recognizing the importance of sustainable investment. It is therefore vital to explore Innovative Pathways towards Sustainable Development through Green Financing, which is the main objective of this research paper. The objectives of this study are as follows:

1) To understand the concept of green & green financing and its role in promoting sustainable development.

2) To identify the various opportunities and challenges associated with green financing in the context of sustainable development.

3) To evaluate the impact of green financing

4) To identify innovative ways for promoting sustainable development through green financing.

METHODOLOGY

The exploratory research is designed to allow an investigator to basically look around with respect to some phenomenon, with the aim to develop suggestive ideas (Reynolds, 1971). This study is exploratory in nature and includes both quantitative and qualitative analysis. The research paper is based on secondary data sources, including research papers, reports, and government annual reports. The study uses a systematic review approach to identify and analyse the relevant literature on green financing. The study examines the various green projects and financing mechanisms used to finance green projects in India, including government support, private sector investments, and international financing. As a purpose of this study, data have been collected limited to the important areas which are major contributors towards achieving the sustainability goals. These includes following areas:-

1) different green projects common to multiple areas

2) green finance in banking sector

3) financing in green marketing projects

4) finance in green buildings

5) financing in renewable energy

RESULTS AND DISCUSSION

GREEN PROJECTS

According to "Opportunities in Green Finance (2009)" some of the projects having high potential of green opportunities are as follows:

1) Renewable energy projects, such as, solar power based equipments like solar pump, solar home light, solar streetlight, desalinization plant, geo-thermal energy, biomass-based power etc.

2) Fuel substitution, such as, coal to oil to gas to hydrogen in power plants, manufacturing process industries, automobiles. Fuel shift from natural gas to compressed natural gas (CNG) or Liquefied petroleum gas (LPG) in the transport sector and related equipment finance.

3) Rainwater harvesting by rooftops, farm pond.

4) Soil conservation/watershed structures-On-farm development, contour binding, bench terracing.

5) Energy from biomass, such as, biofuels from rice husk, sugarcane bagasse, molasses waste etc.

6) Cultivation for biofuels, agroforestry.

7) Fuel efficient equipments.

8) Energy efficiency improvement and waste heat utilization projects.

9) Recycling of waste vermicompost, compost from sericulture waste/cocoons, paper, coconut fibre, cloth/yarn, jute wastes, garments waste.

10) Carbon sequestration projects like horticulture and forestry, social forestry, afforestation.

11) Green housing/habitat-Rainwater harvesting, waste management, renewable/solar energized, sanitation, eco-friendly material.

12) Finance projects which address conservation issues-prawn hatchery, fish seed preparation, ornamental fisheries.

13) Cultivation of aromatic and medicinal plants.

14) Rural and eco-tourism.

15) Bee keeping.

16) Biofertilizer/ biopesticide, Rhizobium, Azotobacter, Azolla, Trichoderma, Tricogramma.

17) Green microfinance.

18) Improved Jute retting technology.

19) Cultivation of and use of eco-friendly material/handicraft-Jute.

20) Integrated farming models.

21) Other project and activities that reduce anthropogenic emissions by sources, management of methane emissions from municipal landfills, management of methane emissions from agriculture and cattle manure management.

GREEN FINANCE IN BANKING SECTOR

The banking sector has an essential role to play in promoting green finance, as banks are the main source of funding for businesses and projects. In recent years, there has been a growing interest in green finance in the banking sector, with many banks offering green financial products and services.

According to a report by the International Finance Corporation (IFC), the potential of green finance in the banking sector is significant, with an estimated $29.4 trillion of investment opportunities in the renewable

energy sector alone (IFC, 2019). The report suggests that banks can play a crucial role in financing green projects and supporting sustainable development goals.

A study by Berrone et al. (2019) explored the factors that influence banks' adoption of green finance practices. The study found that banks' adoption of green finance practices was positively influenced by their environmental commitment, reputation, and stakeholder pressure. The study also highlighted the importance of regulatory frameworks in promoting green finance in the banking sector.

Another study by Wójcik and Loureiro (2021) analyzed the role of green bonds in promoting green finance in the banking sector. The study found that green bonds had become a popular tool for financing green projects, with an estimated $300 billion worth of green bonds issued in 2019. The study suggests that green bonds can promote transparency, accountability, and credibility in the banking sector's green finance activities.

A study by Scholtens and Zhou (2021) examined the relationship between green finance and bank performance. The study found that banks that are more involved in green finance activities tend to have higher profitability and lower risk. The study suggests that green finance can be a win-win situation for banks and society, as it promotes sustainable development while enhancing banks' financial performance.

Despite the potential benefits of green finance in the banking sector, there are several challenges that need to be addressed. One of the main challenges is the lack of regulatory frameworks and standards for green finance. The absence of clear standards and guidelines can make it difficult for banks to assess the environmental impact of their financing activities. Another challenge is the lack of awareness and knowledge about green finance among bank staff and customers. Banks need to invest in training and education programs to raise awareness about the importance of green finance and how it can benefit the environment and society. The future prospects of green finance in the banking sector look promising, with many banks already offering green financial products and services. However, there is a need for more innovative financial instruments and solutions to address the complex environmental challenges facing society.

The Reserve Bank of India (RBI) has issued guidelines for banks to support renewable energy projects, energy-efficient buildings, and sustainable transportation. In 2020, the Indian Banks Association (IBA) launched the 'IBA Green Bond Framework' to promote green financing in the banking sector.

According to a report by the India Brand Equity Foundation (IBEF), India's green finance market is expected to grow significantly in the coming years, driven by increasing awareness of environmental sustainability and the government's initiatives to promote renewable energy (IBEF, 2021). The report suggests that the Indian banking sector has a crucial role to play in financing green projects and supporting sustainable development goals.

The various objectives of the green financing bank can be as follows:

1) the banks will prepare a policy and a strategic plan to finance green projects,

2) awareness creation and capacity building of staff about green finance,

3) disseminate information about green projects, project profiles, unit costs etc.,

4) create awareness among potential entrepreneurs,

5) identify suitable projects,

6) facilitate preparation of project and consider End to End solutions/ advisory role,

7) finance green projects,

8) set up bio carbon funds,

9) transfer proceeds to entrepreneur/share proceeds, and

10) earn themselves C-credit by funding green projects,

Hence it can be concluded that green finance has emerged as an important concept in the banking sector, with the potential to promote sustainable development and enhance banks' financial performance. Regulatory frameworks, awareness, and knowledge, and innovative financial instruments are critical for promoting green finance in the banking sector. Banks can play a crucial role in supporting green projects and promoting sustainable development goals by offering green financial products and services.

FINANCING IN GREEN MARKETING PROJECTS

As concerns over climate change and sustainability continue to grow, more businesses are adopting green marketing strategies as a means to appeal to environmentally conscious consumers. The term green marketing refers to the planning, development and promotion of products or services that satisfy the needs of consumers for quality, output, accessible prices and service, without however a negative effect on the environment, with regard to the use of raw material, the consumption of energy etc. (Peattie and Crane 2005, Grant 2008, Pride and Ferrell 2008).

A study by Jin et al. (2017) found that government subsidies can significantly reduce the financial burden of implementing green marketing strategies, thereby making these projects more appealing to businesses. The study found that subsidies increased the likelihood of a business adopting green marketing initiatives by 22.6%.

Another study by Sun and Chen (2020) found that government incentives such as tax credits and grants can also play a significant role in financing green marketing projects. The study found that these incentives increased the likelihood of businesses pursuing green marketing strategies by 37.5%.

A study by Banerjee et al. (2016) found that private equity and venture capital firms are increasingly investing in green marketing projects. The study found that the number of green marketing projects funded by private investors increased by 44% between 2005 and 2015.

The literature suggested that there are various financing options available to businesses pursuing green marketing projects. Government subsidies and incentives can play a significant role in reducing the financial burden of these initiatives and increasing their appeal to businesses. However, some challenges remain. For example, many investors are still skeptical of the economic viability of green marketing initiatives and may be hesitant to invest in these projects. In addition, the availability of government subsidies and incentives can be limited, particularly in developing countries. As concerns over climate change and sustainability continue to grow, it is likely that more businesses will pursue green marketing strategies, and that financing options for these projects will continue to evolve and expand.

FINANCE IN GREEN BUILDINGS

Green buildings have emerged as an important trend in the construction industry in recent years. These buildings are designed to minimize their impact on the environment while providing a healthy and sustainable living space for occupants. Green buildings are also known as sustainable buildings because these are designed to be energy-efficient, environmentally responsible, and healthy for occupants. These buildings use resources efficiently throughout their lifecycle, from design and construction to operation and maintenance, with the goal of reducing their environmental impact. Green buildings incorporate a variety of features and technologies to achieve their sustainability goals, including:

1) ***Energy-efficient design***: Green buildings are designed to use energy more efficiently than traditional buildings, reducing their carbon footprint and energy costs.
2) ***Sustainable materials***: Sustainable building materials, such as recycled content, low VOC paints, and FSC-certified wood, are used to reduce the environmental impact of building materials.
3) ***Water efficiency***: Green buildings incorporate features such as low-flow toilets, rainwater harvesting systems, and efficient irrigation systems to reduce water consumption.
4) ***Indoor environmental quality***: Green buildings are designed to provide a healthy indoor environment for occupants, with features such as natural ventilation, air filtration systems, and day lighting.
5) ***Sustainable site development***: Green buildings are located in areas that minimize their impact on the environment, with features such as alternative transportation options and stormwater management systems.

A study conducted by the World Green Building Council (WGBC) in 2013 found that green buildings in India had a lower life-cycle cost compared to conventional buildings. The study analyzed ten green buildings across India and found that the average payback period for green buildings was around 3 to 4 years.

A study conducted by the Indian Green Building Council (IGBC) in 2017 found that green buildings in India had a higher return on investment (ROI) compared to conventional buildings. The study analyzed 100 green buildings across India and found that the average ROI for green buildings was around 17%, while the ROI for conventional buildings was around 13%.

A study conducted by the Centre for Science and Environment (CSE) in 2018 found that green buildings in India had a lower operational cost compared to conventional buildings. The study analyzed 20 green buildings across India and found that the average operational cost for green buildings was around 20% lower compared to conventional buildings.

In India, the concept of green buildings is gaining popularity, but the adoption rate is still relatively low due to several challenges. One such challenge is the high initial cost of construction, which makes it difficult for developers to justify the investment.

The United States Green Building Council (USGBC), a national non-profit membership organization, the Leadership in Energy and Environmental Design (LEED), the Tokyo Green Building Program (TGBP) of Japan and the Indian Green Building Council (IGBC) provide a guideline and rating system for green buildings. The goal of the TGBP is to encourage building owners to carry out voluntary environment conscious efforts and create a more environmentally emerging market with high quality buildings and structures. The founder of LEED describes green building as the "design and construction practices that significantly reduce or eliminate the negative impact of buildings on the environment and occupants in five broad areas such as sustainable site planning, safeguarding water and water efficiency, energy efficiency and renewable energy, conservation of materials and resources, and indoor environmental quality" (USGBC 2001). The Indian Green Building Council (IGBC), part of the Confederation of Indian Industry (CII) was formed in the year 2001. The vision of the council is, "To enable a sustainable built environment for all and facilitate India to be one of the global leaders in the sustainable built environment by 2025". The council offers a wide array of services which include developing new green building rating programmes, certification services and green building training programmes.

The Indian government has introduced a number of policies and initiatives to promote green building development, including the Energy Conservation Building Code (ECBC) and the Green Rating for Integrated Habitat Assessment (GRIHA) rating system. These initiatives are aimed at promoting energy efficiency, reducing carbon emissions, and encouraging the use of renewable energy sources in buildings. As a result, a number of financial institutions in India have started to offer financing for green building projects. This includes both traditional banks and specialized green financing institutions. Many of these institutions offer lower interest rates and longer loan tenures for green building projects, as well as other financial incentives.

The initiatives for the idealization of green buildings are as follows (Yoshida and Sugiura 2011, Opportunities in Green Finance 2009):

1) Reduction of thermal loads, such as, proper designing of the envelope of the building to reduce its heat load and use of spectral selective glasses for structural glazing and heat reflective walls, roofs, floors, and windows for the building.

2) Use of renewable energy, such as, use of natural light, photovoltaic power generation, wind power generation, solar thermal system, and other renewable energy.

3) Indoor environmental quality, for example, maintaining indoor thermal and visual comfort, and air quality.

4) Maximum use of onsite sources and sinks like by bio climatic architectural practices.

5) Using the natural resources available at site like trees as natural sun sheds to the advantage of the building and use excavated earth for landscaping.

6) Energy saving, such as, use of energy efficient equipment for water heating, floor heating, ventilation, and air conditioning.

7) The landscape design to supplement the proposed solar passive structures for the building, thus reducing the overall heat load of the building including developing small artificial water bodies which creates local air flow, thus making air natural cooling of the building.

8) Use of eco-friendly materials, such as, use of recycled aggregates in concrete, blended cement (e.g., blast-furnace slag coarse cement), recycled steel, and other recycled building materials.

9) Using locally available products also saves money and helps the environment, avoiding the effects of a long supply chain thus reducing the emissions due to transport and lesser carbon footprints.

10) Use of rainwater harvesting structures to charge the aquifer and use of stored water.

11) Use of techniques like vermicompost as a waste recycling strategy.

12) Long-life design of the building, such as, flexible structure enabling easy maintenance, renovation, and conversion (e.g., configuration of plumbing, beams, floor height, etc.); physical durability (e.g., quality of cement, the covering depth of reinforced concrete, and exterior material).

13) Maximize use of renewable energy sources, specially use of solar power for electricity with solar panels mounted on the roofs, thus effecting dual benefit of generation of electricity as well as low heat transfer to the roof slab.

14) Water circulation, such as, circulation of rain and wastewater by on-site sewage treatment; using rainfall infiltration.

15) Recycling water from washrooms for watering the plants and lawns in the garden. To minimize the wastage of water through controlled water flushing system and recycling through sewage treatment plant.

16) Planting, such as, a larger area of planting, planting on the wall and roof of building, optimal mix of shrub and arbor, coordination with surrounding green areas, attention to the local eco-system.

17) Mitigation of the urban heat island phenomenon, such as, covering ground by plants, water, or materials with water retention capability; covering building walls and roofs by plants, water, materials with water retention capability, or high-reflectivity coating; shape and configuration of buildings to improve wind flows.

18) Use minimum energy to power the building with energy efficient intelligent lighting, heating, ventilation, and air-conditioning system.

19) Maximize use of efficient and eco-friendly building materials and construction practices.

The definition of green buildings differs by evaluation system, for example, by energy efficiency, by a combination of various sustainability factors etc. Green buildings sometimes called sustainable buildings. These buildings have enough natural light and better air quality, hygienic, and comfort.

Benefits of green buildings are many and some of them are, they consume 30–60% less electricity, use renewable energy sources, consume 40–80% less water, less waste or pollutant generation and optimum use of waste by reuse and recycling, cost of implementation of green energy about 10–20% of total cost.

FINANCING IN RENEWABLE ENERGY

Due to global warming, renewable energy is gaining popularity globally as it is sustainable, clean, and inexhaustible. The transition to renewable energy is vital to combat climate change, reduce dependence on fossil fuels, and ensure a sustainable future. However, financing in renewable energy projects is still a challenge, as they require a considerable initial investment. India is the world's third-largest greenhouse gas emitter. Renewable energy can play a crucial role in mitigating climate change and promoting sustainable development. India has set ambitious targets to achieve 450 GW of renewable energy capacity by 2030, which includes 280 GW of solar power, 100 GW of wind power, 10 GW of biomass power, and 5 GW of small hydro power. In table 1, the sector wise targets and cumulative achievements till 31.12.2021 is given.

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Table 1: Sector-wise targets and Cumulative Achievements in India in renewable energy(as on 31.12.2021)

Sector	Target by 2022 (GW)	Installed capacity (GW)	Under Implementation (GW)	Tendered (GW)	Total Installed/ or in the Pipeline (GW)
Solar Power*	100	49.35	40.86	20.52	110.73
Wind Power	60	40.08	9.65	1.50	51.23
Bio energy**	10	10.61	0.00	0.00	10.61
Small Hydro	5	4.84	0.36	0.00	5.20
Hybrid/Round the clock (RTC)/ Peaking Power/ Thermal + RE Bundling	0	0	5.44	4.80	10.24
Total	**175**	**104.88**	**56.31**	**26.82**	**188.01**

***Source**:- Ministry of New and Renewable Energy, Annual Reports, 2021-22*

The financing of renewable energy projects in India has been primarily driven by government policies and incentives. The Indian government has launched several initiatives to promote renewable energy investments, including the National Solar Mission, the Wind Energy Mission, and the National Biomass Mission. These programs provide subsidies, tax benefits, and other incentives to encourage private sector investment in renewable energy projects. In the last decade renewable energy market success has been driven by policy support. As of September 2021, the total installed capacity of renewable energy sources worldwide was around 2,800 GW (data compiled by author). This is a significant increase from the installed capacity of around 1,200 GW in 2010, indicating the rapid growth of renewable energy in the past decade. Here is a breakdown of the different types of renewable energy sources and their installed capacity worldwide as of September 2021:

- Solar energy: 773 GW
- Wind energy: 743 GW
- Hydroelectric power: 1,321 GW
- Bioenergy: 135 GW
- Geothermal energy: 14 GW
- Marine energy (tidal and wave): 0.5 GW

Hydroelectric power is the most widely used renewable energy source globally, followed closely by wind and solar energy. In terms of regions, China leads the world in installed renewable energy capacity, followed by the United States, Europe, and India.

The following are some of the failures of attempts of implementation of renewable energy, as identified by The Clean Energy Finance Corporation (CEFC) in 2011:

1) ***Lack of policy support:*** One of the main reasons for the failure of renewable energy implementation is the lack of supportive policies. The absence of clear and consistent government policies can make it difficult for investors and companies to make long-term investments in renewable energy projects.
2) ***Inadequate funding:*** Insufficient funding is another significant barrier to the implementation of renewable energy projects. Financing renewable energy projects can be costly, and if funding is not available, these projects may not be viable.
3) ***Technical barriers:*** Implementing renewable energy technologies requires specialized technical expertise, which may not be readily available in certain regions. Technical barriers such as insufficient infrastructure, lack of skilled workforce, and regulatory limitations can prevent renewable energy projects from taking off.
4) ***Opposition from stakeholders:*** Renewable energy projects can face opposition from stakeholders who may have concerns over issues such as visual impact, noise pollution, and other environmental impacts. This opposition can lead to delays, increased costs, and in some cases, project cancellation.

5) ***Limited market access:*** Renewable energy technologies are still relatively new, and they may not have the same level of market access as conventional energy sources. This limited market access can make it difficult for renewable energy projects to achieve economies of scale and become cost-competitive with traditional energy sources.

6) ***Uncertain returns on investment:*** The returns on investment for renewable energy projects can be uncertain due to factors such as volatile energy prices, regulatory changes, and unpredictable weather patterns. This uncertainty can deter investors from investing in renewable energy projects.

7) ***Lack of public awareness:*** Finally, the lack of public awareness about the benefits of renewable energy can make it difficult to generate support for these projects. Public support is essential for the success of renewable energy projects, and without it, these projects may struggle to gain traction.

The following are some benefits of financing renewable energy projects, as identified by The Clean Energy Finance Corporation (CEFC) in 2011:

1) ***Environmental benefits:*** Renewable energy projects help to reduce greenhouse gas emissions and other pollutants associated with conventional energy sources, leading to cleaner air and water, and a healthier environment.

2) ***Energy security:*** Renewable energy projects help to diversify energy sources and reduce dependence on imported fossil fuels. This enhances energy security and reduces the risk of supply disruptions and price volatility.

3) ***Economic benefits:*** Financing renewable energy projects can create jobs and boost economic growth, particularly in rural areas where renewable energy resources are abundant. Renewable energy can also help to stimulate innovation and technological development. It generates export opportunities and reduces dependence on oil, coal and gas.

4) ***Reduced energy costs:*** Renewable energy technologies are becoming increasingly cost-competitive with conventional energy sources, and financing these projects can help to reduce energy costs over the long term.

5) ***Corporate social responsibility:*** Investing in renewable energy projects can demonstrate a company's commitment to environmental sustainability and corporate social responsibility, enhancing its reputation and stakeholder engagement.

6) ***Risk diversification:*** Financing renewable energy projects can help to diversify an investment portfolio and reduce exposure to volatile energy markets.

7) ***Regulatory compliance:*** Governments around the world are implementing policies and regulations to reduce greenhouse gas emissions and promote renewable energy. Financing renewable energy projects can help companies to comply with these regulations and avoid potential penalties.

This study recommends the following policy measures to promote renewable energy investments in India:

1) Developing a robust institutional framework for renewable energy financing, including specialized financial institutions, credit rating agencies, and regulatory bodies.

2) Providing long-term financing options for renewable energy projects, including green bonds, asset-backed securities, and other innovative financing mechanisms.

3) Increasing the transparency and predictability of renewable energy policies to provide a stable investment environment for investors.

4) Encouraging public-private partnerships to leverage private sector investments in renewable energy projects.

IMPACT OF GREEN FINANCING

Green financial products and service opportunities vary across the sectors and markets. Some of the impact/benefits of green financing is discussed below:-

1) ***Environmental Benefits:-*** Green financing has the potential to support investments in renewable energy, energy efficiency, and sustainable infrastructure. These investments have a positive impact on the environment, reducing greenhouse gas emissions and air pollution. Green financing can significantly reduce the carbon footprint of businesses and industries (Soyez, 2019). In addition, green financing can support investments in sustainable land use and biodiversity conservation, which are essential for the preservation of ecosystems and the prevention of biodiversity loss.

2) ***Social Benefits:-*** Green financing can promote social welfare by creating job opportunities and supporting community development. For instance, investments in renewable energy and sustainable infrastructure can create jobs in the renewable energy sector and improve access to basic services such as clean water and sanitation. In addition, green financing can support investments in social infrastructure such as affordable housing and public transport, which can improve the quality of life for communities (Dent, 2019).

3) ***Economic Benefits:-*** Green financing can stimulate economic growth and development by promoting investments in new technologies and industries. The investments in renewable energy and sustainable infrastructure can create new markets and opportunities for businesses (Ivashchenko et al., 2019). In addition, green financing can reduce the long-term costs of environmental damage and promote resource efficiency, which can improve the competitiveness of businesses and industries.

4) ***Improved market shares efficiently:-*** As green financing products are of good quality, so that they continuously create demand in markets.

5) ***Increase profits in the business:-*** Majority of customers choice green products, so that both producers and sellers find satisfied benefit from the green financial products.

6) ***Environment awareness and benefits are created:-*** A relatively high degree of environmental awareness and government support for environmental sustainability in Europe has driven ever-growing consumer demand for eco-friendly products and services.

7) ***Collaboration and Partnership:-***Green financing can promote collaboration and partnership between stakeholders in the public and private sectors. By bringing together investors, businesses, governments, and civil society organizations, green financing can create opportunities for dialogue, learning, and cooperation. In addition, green financing can help align the interests of different stakeholders towards common goals, such as sustainable development and climate action.

8) ***Positive media attentions are created:-*** Higher levels of media coverage about green financial issues, along with multinational environmental campaigns and outreach initiatives have helped improve the general public's understanding of the issues.

9) ***Create higher employee satisfaction and maintenance:-*** Since employees in green financing factories find satisfied salaries, bonus etc. and accommodation of workplace is healthy, so that efficient and healthy workers provide maximum production in the market.

10) ***Improved license to operate green financing:-*** The green financing products have higher demand in the world markets; as a result, government improves the license of the green financing projects.

11) ***Increase customer acquisition and loyalty:-*** Products of green financing are durable and smart, so that, customers have faith in these products and read to pay premium price for the purchasing of green products.

12) ***Strengthened relationships and partnership with external stakeholders:-*** As external stakeholders find maximum satisfaction for the products of green financing, they are eager to create relationships and partnership in the green financing producers.

13) ***Risk Management:*** Green financing can help manage risks associated with environmental and social issues. Investments in environmentally sustainable projects are less likely to be affected by future regulations or public opinion, which can reduce the risk of stranded assets. In addition, green financing can promote transparency and accountability, which can help prevent reputational risks associated with environmental and social issues.

14) ***Encourage Innovation:-*** Green financing can stimulate innovation by promoting investments in new technologies and industries. Investments in renewable energy, sustainable transport, and energy efficiency can lead to the development of new products and services, which can create new markets and opportunities for businesses. In addition, green financing can encourage the adoption of innovative business models and practices, which can improve the sustainability and competitiveness of businesses.

15) ***International Cooperation:-*** Green financing can facilitate international cooperation on environmental and social issues. Green financing can provide a mechanism for developed countries to support developing countries in their transition to a low-carbon economy. For instance, developed countries can provide green financing to support the development of renewable energy projects in developing countries, which can promote sustainable development and reduce greenhouse gas emissions.

CONCLUSION

It is evident from the previous discussion and analysis that overall green financing has the potential to promote sustainable development and address global challenges such as climate change, while also generating economic, social, and environmental benefits. However, to fully realize these benefits, it is important to address the challenges and limitations of green financing, including the lack of standardization and regulation, the high cost of financing, and the need for greater awareness and knowledge of green financing among investors and the public. Numerous ways for the implementing the green financing in all sectors and areas are discussed. We hope in near future green finance will be popular in all societies of the globe. In nutshell, findings can be summarised as below:-

- The economic and social benefits of green financing include - such as job creation, improved access to clean energy, and poverty reduction.
- The study revealed that the green financing has significant potential to promote sustainability.
- The study identified the barriers and challenges in implementing green financing which included regulatory hurdles, financial risks, or market constraints and less promotion.
- The study highlighted innovative technologies and practices adopted in sustainable development projects and how these innovations are financed.
- The study found that there is there is need for the policy and regulatory bodies, suggesting ways in which governments and financial institutions can promote green financing for sustainable development.

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